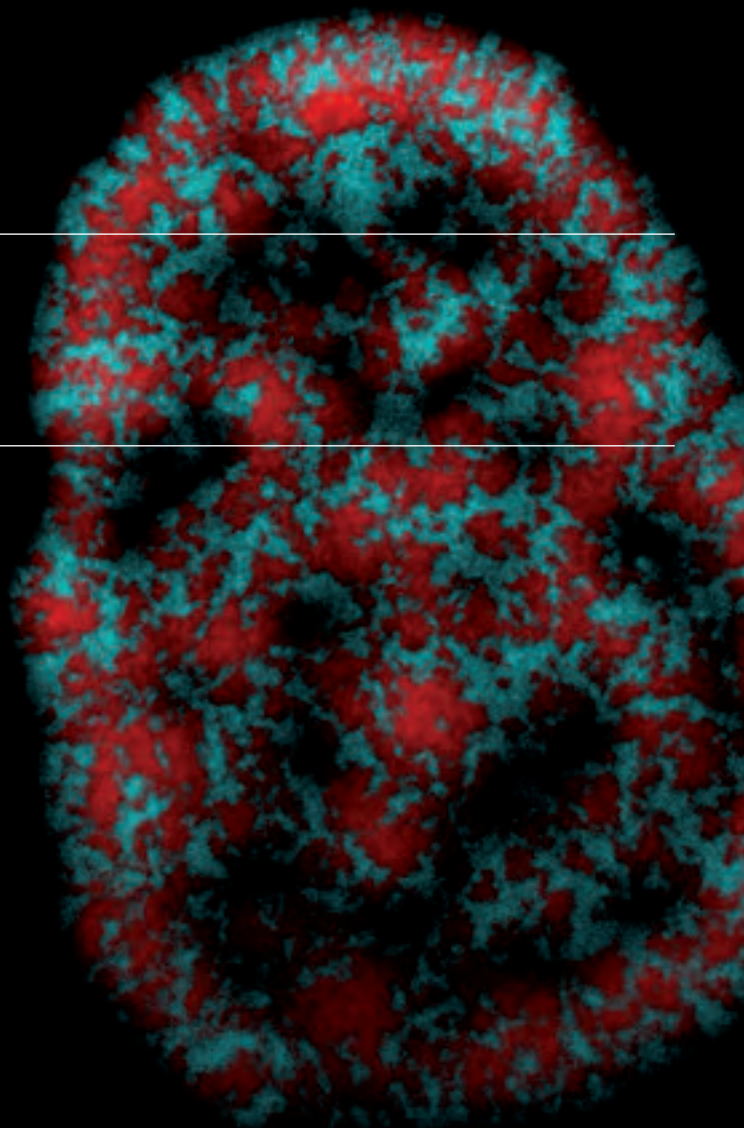


ANNUAL REPORT 2016



INSTITUTO
GULBENKIAN
DE CIÊNCIA



COVER IMAGE

Fluorescence stereoscope image of a colony of two identical strains (blue and red) of the fission yeast *Schizosaccharomyces pombe*, mixed in equal proportions, seeded on an agar plate and grown for 24 hours at 32°C. The two strains form micro-colonies that touch each other but do not overlap. © Lília Perfeito, IGC.

ANNUAL REPORT 2016



INSTITUTO
GULBENKIAN
DE CIÊNCIA

This Annual Report covers the Instituto Gulbenkian de Ciência's financial year, from 1st January to 31st December 2016.

CONTENTS

06 The Director's Introduction

11 Organisation

12 The IGC at a Glance

17 Budget Overview

18 A walk through 2016

1 RESEARCH

24	<i>Adrain, Colin</i> / Membrane Traffic
26	<i>Alves, Filipa</i> / Biophysics and Genetics of Morphogenesis
28	<i>Amorim, Maria João</i> / Cell Biology of Viral Infection
30	<i>Athanasiadis, Alekos</i> / Protein-Nucleic Acids Interactions
32	<i>Baena González, Elena</i> / Plant Stress Signalling
34	<i>Bank, Claudia</i> / Evolutionary Dynamics
36	<i>Becker, Jörg</i> / Plant Genomics
38	<i>Beldade, Patrícia</i> / Variation: Development and Selection
40	<i>Bettencourt Dias, Mónica</i> / Cell Cycle Regulation
42	<i>Carneiro, Jorge</i> / Quantitative Organism Biology
44	<i>Castro, Diogo S.</i> / Molecular Neurobiology
46	<i>Chaouiya, Claudine</i> / Network Modelling
48	<i>Chelo, Ivo M.</i> / Eco-evolutionary Genetics
50	<i>Chikhi, Lounès</i> / Population and Conservation Genetics
52	<i>Demengeot, Jocelyne</i> / Lymphocyte Physiology
54	<i>Domingos, Ana I.</i> / Obesity
56	<i>Duque, Paula</i> / Plant Molecular Biology
58	<i>Ferreira, Miguel Godinho</i> / Telomeres and Genome Stability
60	<i>Fesel, Constantin</i> / Lupus and Autoreactive Immune Repertoires
62	<i>Fonseca, Rosalina</i> / Cellular and Systems Neurobiology
64	<i>Gjini, Erida</i> / Mathematical Modelling of Biological Processes
66	<i>Gonçalves-Sá, Joana</i> / Science and Policy
68	<i>Gordo, Isabel</i> / Evolutionary Biology
70	<i>Howard, Jonathan C.</i> / Host-Pathogen Co-Evolution
72	<i>Janody, Florence</i> / Actin Dynamics
74	<i>Jansen, Lars E.</i> / Epigenetic Mechanisms
76	<i>Mallo, Moisés</i> / Patterning and Morphogenesis
78	<i>Martins, Vera</i> / Lymphocyte Development and Leukemogenesis
80	<i>Mirth, Christen</i> / Development, Evolution and the Environment
82	<i>Moita, Luís Ferreira</i> / Innate Immunity and Inflammation
84	<i>Oliveira, Raquel A.</i> / Chromosome Dynamics
86	<i>Oliveira, Rui F.</i> / Integrative Behavioural Biology
88	<i>Parkhouse, Michael</i> / Infection and Immunity
90	<i>Penha Gonçalves, Carlos</i> / Disease Genetics
92	<i>Pereira Leal, José</i> / Computational Genomics
94	<i>Perfeito, Lília</i> / Evolution and Genome Structure
96	<i>Rocha, Luís M.</i> / Complex Adaptive Systems and Computational Biology
98	<i>Soares, Miguel P.</i> / <i>Inflammation</i>
100	<i>Sucena, Élio</i> / <i>Evolution and Development</i>
102	<i>Teixeira, Luís</i> / <i>Host-Microorganism Interactions</i>
104	<i>Telley, Ivo A.</i> / <i>Physical Principles of Nuclear Division</i>
106	<i>Xavier, Karina B.</i> / <i>Bacterial Signalling</i>
108	In-house Collaborations 2016
110	External Collaborations 2016
112	External Associated Groups 2016

2 SUPPORT TO RESEARCH

CORE FACILITIES

116	Animal House Facility
117	Transgenics Unit
118	Plant Facility
119	Bioinformatics and Computational Biology Unit
120	Gene Expression Unit
121	Genomics Unit
122	Histopathology Unit
123	Advanced Imaging Unit
124	Electron Microscopy Facility
125	Flow Cytometry Facility
126	Antibody Service

SERVICES

127	Technico-Scientific Support
127	Biosafety
128	Administrative Unit
128	Accounting and Internal Audit
129	Informatics Unit
129	Library
130	General Maintenance
130	Research Funding Affairs
131	Science Communication and Outreach

132 RESEARCH STRUCTURES & NETWORKS

3 PUBLICATIONS

PEER-REVIEWED PUBLICATIONS

136	In-house publications
142	Epub ahead of print
143	IGC current address
143	Associated groups

OTHER PUBLICATIONS

144	Proceedings
144	Book chapters

4 PRIZES & HONOURS

148 Prizes & Honours

5 GRADUATE EDUCATION & TRAINING

152	PhD programme in Integrative Biology and Biomedicine IBB
156	Graduate Programme Science for Development PGCD
160	Gulbenkian Training Programme in Bioinformatics GTPB
162	Postdoctoral Training
163	Summer Internship Programme
164	Theses
166	Teaching at other PhD programmes

6 SEMINARS & MEETINGS

170	Seminars at the IGC
180	Meetings, Conferences & Workshops
184	Presentations by IGC researchers
184	- at international meetings and seminars
191	- at national meetings and seminars

7 PUBLIC ENGAGEMENT IN SCIENCE

198	Institutional communication
199	Science education projects
200	Public events
202	Art and science projects
203	Fundraising

205 ACKNOWLEDGEMENTS

The DIRECTOR'S INTRODUCTION

JONATHAN HOWARD

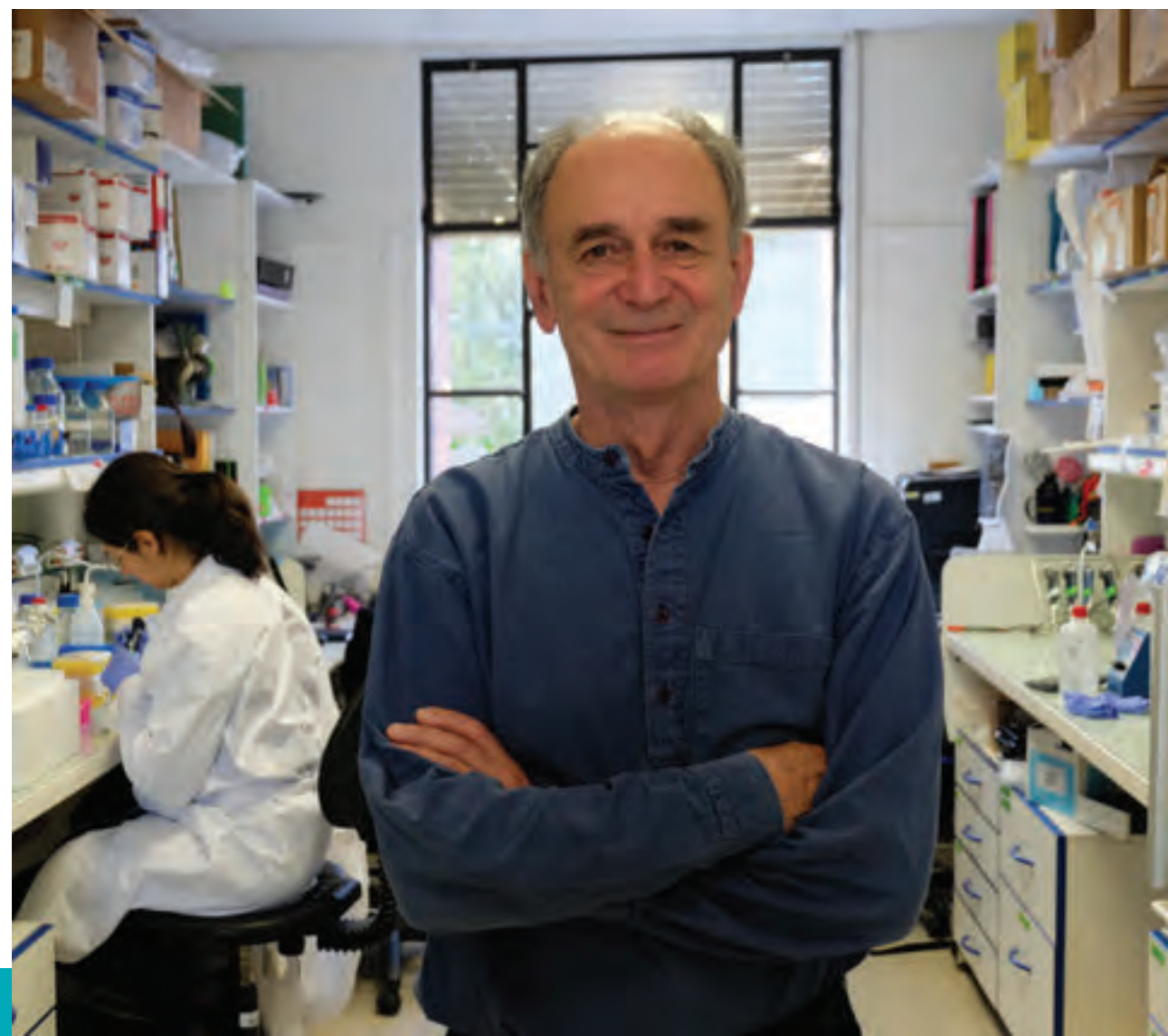
It is remarkable how often the IGC has been evaluated in the four years since I became Director. Every year, now four times, the 9 eminent members of our Scientific Advisory Board (SAB) have come to look over the entire institute for reassurance that our overall standards are being maintained, to confirm new Group Leader appointments, to examine in detail the performance of cohorts of Group Leaders who have been working for a number of years at the IGC, and to speak freely about our successes and failures to the Management Committee and Board of Administration of our headquarters and principal financial support, the Calouste Gulbenkian Foundation (FCG). The diligence of the SAB in returning every year with their sharp critical judgement, their loyalty to the overarching idea and philosophy of the IGC, the subtlety and insight of their mediation and representation between the IGC and the Foundation, are all beyond praise. These yearly doses of criticism and advice at the highest level are the best guarantee that the IGC will continue to foster its strengths and recognise its weaknesses. The SAB also provides an essential link between the scientists of the IGC and the non-scientists of the Foundation. The Foundation undoubtedly shares our aspirations in a general sense, our striving for scientific excellence, for first-rate publications, for generous funding from competitive sources, and perhaps above all for an international reputation. Nevertheless the only way the Foundation can find out how well we are achieving these goals is by asking other people. The essential virtue of the SAB is that it provides the Foundation with an unvarnished, objective evaluation of our work, untainted by local rivalries or prejudices. All being well, this should give the Foundation the confidence it needs to justify its continued support for the IGC project. The advice and criticism that the SAB provides for the IGC serve us and the Foundation well. It is, however, a privileged communication that has no more than an indirect role to play in influ-

encing the flow of competitive funds from our national research support body, the Fundação para a Ciência e a Tecnologia (FCT). To provide ongoing infrastructural support, the FCT embarked in 2013 on its own intensive evaluation of nationally-funded research institutes in all fields, including the IGC. In previous years, autonomous research institutes had been bundled together for FCT funding purposes into larger structures, the Laboratórios Associados (LA), an exercise in top-down planning for coordinated translational programmes, but not well-suited to the kind of investigator-initiated research practised by the IGC. The "Units of Research and Development" (UID) planned for the 2013/2014 evaluation were defined differently, with the qualities of transparency and internal coherence being favoured that were not apparent in the LA structures. In this spirit, the Laboratório Associado de Oeiras that included not only the IGC, but our respected neighbour institutes the ITQB, IBET and CEDOC, broke apart to form a constellation of new, smaller and more targeted UID structures. The IGC maintained its unity, with the exception of our plant scientists who joined a new UID devoted to plant research while keeping their own research laboratories at the IGC. Sensitive to the risk that embedded prejudices and rivalries on the Portuguese research landscape could tarnish the evaluation of the new UIDs, the FCT prudently invited the European Science Foundation to undertake the review. The ESF is an established European organisation formerly prominent in the sponsorship of scientific conferences and small meetings, more recently converted into a Europe-wide agency for research evaluation with a large index of qualified non-Portuguese academic reviewers at its disposal. Despite a ferocious and deeply damaging political controversy in Portugal over the broader intentions of the FCT, the objectivity and competence of the ESF review were widely (if not universally) appreciated. The IGC was proud to emerge from the ESF review with the rare designation of "exceptional" and

a generous infrastructure grant for 3 years from 2015, with a further review at 3 years. Grounds indeed for celebration, but as it turned out not for resting on our laurels.

My appointment as Director of the IGC in 2012 was integrated into a new 5-year plan of support by the Calouste Gulbenkian Foundation, the "New Scientific Project". This, among other prescriptions, included a review of the Institute's work and achievements, to be conducted in 2016 by an International Review Committee, a group of academic referees of the highest distinction entirely outside the sphere of influence of the SAB. This group of 8 scientists, assembled and headed by Prof. Herbert Jaeckle, from the Max Planck Institute of Biophysical Chemistry in Göttingen and until recently Vice-President for the Biological and Medical Sciences section of the Max-Planck Society, visited the IGC in June of 2016. Measured and critical,

"The (Gulbenkian) Foundation undoubtedly shares our aspirations in a general sense, our striving for scientific excellence, for first-rate publications, for generous funding from competitive sources, and perhaps above all for an international reputation."



their report also placed the IGC high on an international scale of excellence, both in research achievements and in graduate education. It is difficult to overstate the importance of this review for the relationship between the Gulbenkian Foundation and the IGC. "Only the best" was Calouste Gulbenkian's motto for his acquisitions, and that was the lens through which the Foundation inspected the IGC. What the SAB, the UID review and now finally the International Review Committee were all saying was, yes, the IGC really is excellent. The best? I think we would all hesitate to claim the superlative, not only because it is not something that is easy to be sure about, but also because of its invidious implications for the many other excellent research institutions in Portugal.

"There is another aspect to all these reviews that should give us pleasure and encouragement, and that is the repeated endorsement of the IGC style of science, the diversity, the small groups, the level of interaction, collaboration and internal criticism, the insistence on creativity and excellence, the maturity of our PhD students."

There is another aspect to all these reviews that should give us pleasure and encouragement, and that is the repeated endorsement of the IGC style of science, the diversity, the small groups, the level of interaction, collaboration and internal criticism, the insistence on creativity and excellence, the maturity of our PhD students. Our reviewers have offered much advice and criticism, but none has suggested that we abandon this way of scientific life in favour of a departmental structure or large structured groups or more product-oriented, translational habit, or that our scientists should fuse their aspirations into larger consortial frameworks.

At the end of 2016 the IGC has every reason to feel vindicated in its science as in its philosophy, yet all is

not fixed yet. Our new government has reminded us that the fellowship mode of employment, in Portuguese "Bolsas", is rapidly falling out of use in Europe. In many European countries now even the PhD students have taxable salaried work contracts providing for the full range of social security benefits; at the IGC at the end of 2016 we have about 350 employees of whom fewer than 100 have security of employment through a work contract. A new law passed in August imposes strict limitations on the employment of post-doctoral scientists on fellowships, whether as Group Leaders, "postdocs", technicians, lab managers, or facility managers. I do not believe a single person at the IGC thinks that this is a bad thing. Frankly speaking, it comes as a relief to many, considering that the IGC's extensive use of fellowships has been a convenience for its cheapness, simplicity and flexibility but has also been effectively an exploitation of the charms of the IGC as a place to work and recently of the dire economic state of the Portuguese nation.

"Perhaps the fellowship system fitted better to the IGC when it was young and growing, but now as a mature institution it is past time to celebrate the loyalty and expertise of its many outstanding members by the provision of proper work contracts."

Perhaps the fellowship system fitted better to the IGC when it was young and growing, but now as a mature institution it is past time to celebrate the loyalty and expertise of its many outstanding members by the provision of proper work contracts. Certain it is, however, that the enforced replacement of fellowships with work contracts comes at a time when the government has no resources to pay for it. At the end of 2016 a team of professionals from Deloitte helped us to understand the complexities of the IGC employment situation. Mastering the full cost implications of their report, and reconciling the new labour legislation with the necessity for flexibility and turnover are the challenges for 2017. We are now facing in 2017 the prospect of our next eval-

uation, the three-year interim review of the UID that provides critical public financial support for our infrastructure. Much has changed in the Portuguese political landscape since 2014 when the UID was first evaluated, and it is clear that the evaluation will be significantly influenced by these changes. We know that the success with which an institution responds to the new law on fellowships will be a specific evaluative criterion that was absent in 2014. We can also guess that the furore surrounding the previous UID evaluation, albeit focused more on the priorities of the FCT than on the integrity of the process itself, will influence the conduct of the evaluation, but in ways that are hard to predict. That the ESF will play no part in the new evaluation seems all but certain, but who or what will replace their role, and how and by whom they will be selected, is still unknown.

"Science itself is changing, but the value of the individual creative mind working in an open, supportive and honest environment will not be replaced."

These are exciting times for the IGC. Thanks above all to the International Review Committee report I believe the Foundation was reinforced in its appreciation of the unique value of the IGC. The Foundation will now be looking forward to the identification of a new IGC Director to exploit new opportunities and new priorities. Science itself is changing, but the value of the individual creative mind working in an open, supportive and honest environment will not be replaced.



ORGANISATION

The Instituto Gulbenkian de Ciência (IGC) was founded by the Calouste Gulbenkian Foundation (FCG) in 1961. The direct governance of the Institute is made through the Director, a Deputy Director with primary responsibility for financial administration, and a Deputy Director for Science. The Director is in turn answerable to a Management Committee, appointed by the FCG Board of Trustees, which acts on behalf of the Board and reports directly to them. An eminent external Scientific Advisory Board oversees the scientific activity of the IGC, whereas the Ethics Committee assures the ethical conduct of the scientific related to vertebrate animals or human beings.

CALOUSTE GULBENKIAN FOUNDATION

BOARD OF TRUSTEES

Artur Santos Silva | **Chairman**

Isabel Mota

Teresa Gouveia

Martin Essayan

José Neves Adelino

Guilherme d'Oliveira Martins

Emílio Rui Vilar *

Joaquim Gomes Canotilho *

António Guterres *

* *Non-executive Trustees*

INSTITUTO GULBENKIAN DE CIÊNCIA

Jonathan Howard | **Director**

José Mário Leite | **Deputy Director**

Jorge Carneiro | **Deputy Director for Science**

MANAGEMENT COMMITTEE

José Neves Adelino (FCG) | **Chairman**

António Coutinho (IGC and Champalimaud Foundation)

Eduardo Marçal Grilo (FCG)

Diogo de Lucena (Universidade Nova de Lisboa)

Guilherme d'Oliveira Martins (FCG)

Jonathan Howard (IGC)

SCIENTIFIC ADVISORY BOARD

Kai Simons (Max Planck Institute, Dresden, Germany) | **Chairman**

Martin Raff (University College London, UK)

Ginés Morata (Universidad Autónoma de Madrid, Spain)

David Sabatini (New York University, USA)

Terrence Sejnowsky (The Salk Institute, USA)

Tony Hyman (Max Planck Institute, Dresden, Germany)

Linda Partridge (Max Planck Institute, Cologne, Germany)

Ruslan Medzhitov (Yale University, USA)

Paul Schmid-Hempel (ETH Zurich, Switzerland)

ETHICS COMMITTEE

Tânia Carvalho (PhD, DVM, Instituto de Medicina Molecular) | **Chairperson**

Carlos Penha-Gonçalves (PhD, DVM, IGC)

Manuel Rebelo (PhD, IGC)

Miguel Fontes (MD, External member)

Isabel Garcia (Civil servant, External member)

Vera Martins (PhD, IGC)

Maria de Athayde Tavares (Lawyer, External member)

Vasco Trigo (Journalist, External member)

Ana Cristina Borges (PhD, IGC)

The IGC AT A GLANCE

The Instituto Gulbenkian de Ciência (IGC) is a private institute devoted to basic biological and biomedical research, and to graduate training. The IGC is free from hierarchical structure, with small independent research groups working in an environment designed to foster interaction and cooperation. The scientific programme of the IGC is multidisciplinary, including Cell and Developmental Biology, Evolutionary Biology, Inflammation, Immunology, Host-Pathogen Interactions, Disease Genetics, Plant Biology, Neurosciences, Theoretical and Computational Biology.

THE IGC MISSIONS ARE THUS:

1. To promote multidisciplinary science of excellence in basic biological and biomedical research;
2. To identify, educate and incubate new research leaders, providing state-of-the-art facilities and full financial and intellectual autonomy to pursue research projects;
3. To promote the reciprocal exchange of knowledge between the laboratory bench, clinical medicine and industry with a view to enhancing the value of fundamental research to society;
4. To provide international graduate teaching and structured training programmes that respond to present-day imperatives;
5. To promote the values of science in society, scientific literacy, and the active participation of citizens in scientific research, through engagement with different communities and stakeholders.

The institute is part of the Oeiras Campus, home to several other basic and applied research centres in biology, biotechnology and chemistry.

Since 1998

the IGC has hosted 88 research groups; 44 of these have moved on to other research institutes, 28 to research centres in Portugal.

29 research groups

in Portugal are IGC-associated groups, with access to IGC facilities and services

The IGC pioneered

graduate training in Portugal. Since 1993, 10 PhD Programmes have been set up, with approximately 80 speakers/year/programme.

By December 2016

over 550 PhD students had started their science education at the IGC in programmes and research groups.

FACTS & FIGURES in 2016*



392

PEOPLE WORK AT THE IGC
including 20 Visitors
163 males
229 females



298

RESEARCHERS
of which 142 are
PhD holders



42

GROUP LEADERS
24 Portuguese
18 Rest of the World
20 Female
22 Male



11

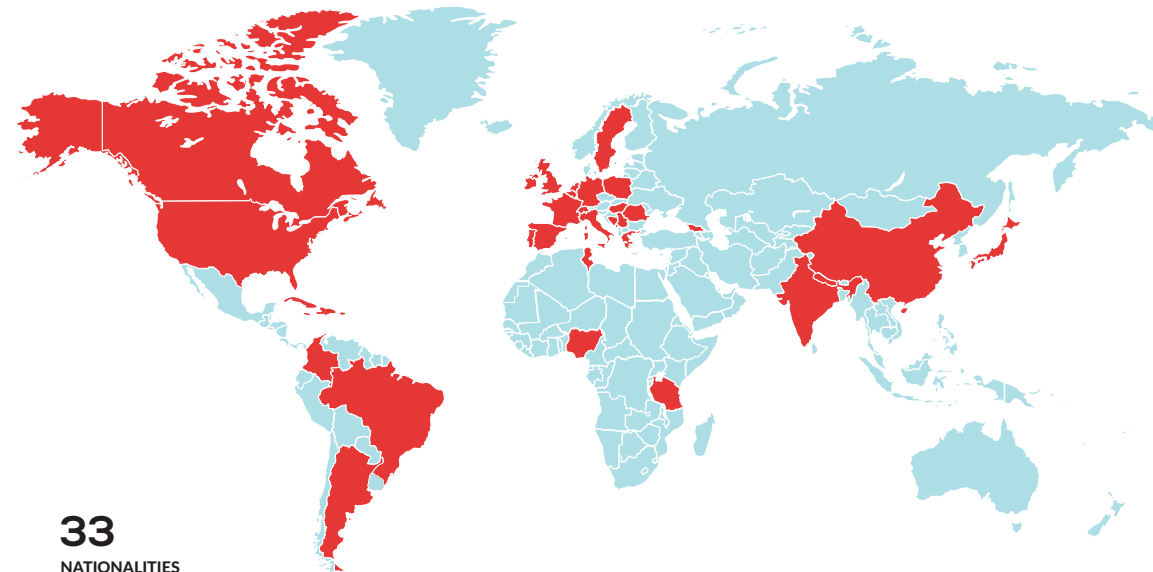
CORE FACILITIES
46 Core Facility Staff, of
which 15 are PhD holders
(includes 5 heads that are
also Group Leaders)



9

SERVICE UNITS
35 Service Units staff, of
which 8 are PhD holders

79	Postdocs
82	PhD students
42	Research groups' technicians
22	Masters students
11	Trainees
20	Visitors
2	PhD Programmes
1	New Research Group



33

NATIONALITIES
278 Portuguese
114 Rest of the World

SCIENTIFIC COMMUNICATION

Albania	1
Argentina	1
Armenia	1
Belgium	1
Brazil	6
Canada	2
Cabo Verde	9
Colombia	2
Cyba	1
France	14
Germany	10
Greece	3
Hungary	1
India	6
Ireland	2
Italy	6
Japan	3
Montenegro	1
Nepal	1
Netherlands	4
Nigeria	2
Poland	5
Portugal	278
Romania	1
Serbia	3
Spain	13
Sweden	1
Switzerland	1
Tanzania	1
Tunisia	1
Turkey	1
United Kingdom (UK)	7
United States (USA)	3

In 2016

2

BOOK CHAPTERS

13

**PEER-REVIEWED PUBLICATIONS
FROM ASSOCIATED GROUPS**

140

**PEER-REVIEWED PUBLICATIONS
FROM IN HOUSE GROUPS**



In the last 5 years

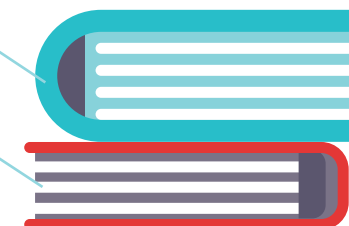
768

**PEER-REVIEWED PUBLICATIONS
FROM IN HOUSE GROUPS**

149

**PEER-REVIEWED PUBLICATIONS
FROM ASSOCIATED GROUPS**

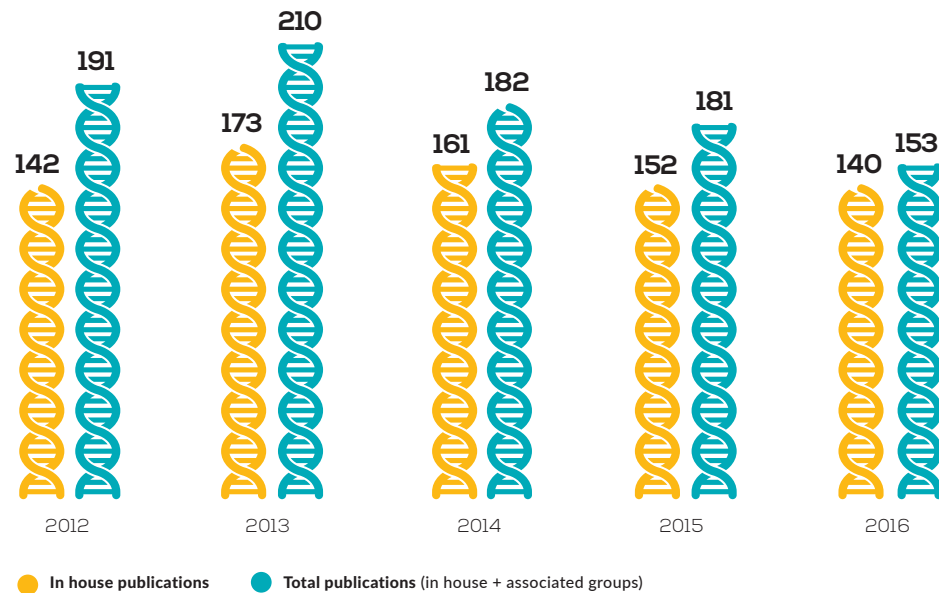
917 TOTAL



* As of December 31st, 2016

PUBLISHED ITEMS WITH IGC ADDRESS IN EACH YEAR

Source: Web of Science, January 2017



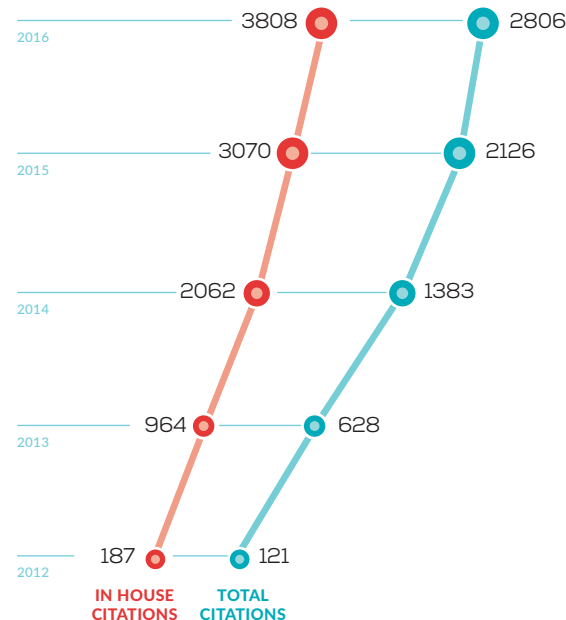
15
PhD THESES
17
MSc THESES

182
INTERNATIONAL
PRESENTATIONS
BY IGC RESEARCHERS
92
NATIONAL PRESENTATIONS
BY IGC RESEARCHERS

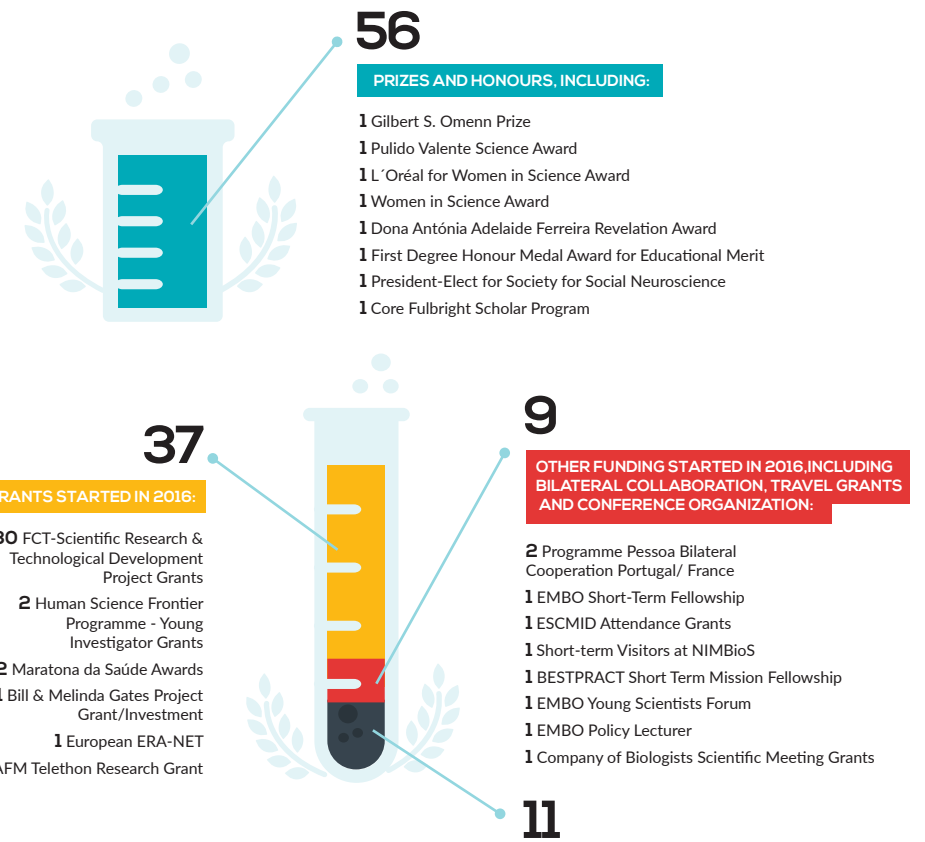
183
SEMINARS AT IGC
106 External speakers
29
CONFERENCES, MEETINGS,
WORKSHOPS ORGANISED BY
IGC RESEARCHERS

CITATIONS TO IGC PAPERS IN EACH YEAR

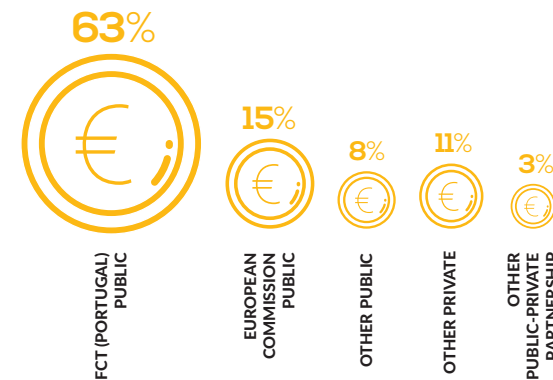
Source: Web of Science, January 2017



COMPETITIVE AWARDS SECURED BY IGC RESEARCHERS



RESEARCH GRANTS BREAKDOWN BY FUNDING SOURCE 2012-2016

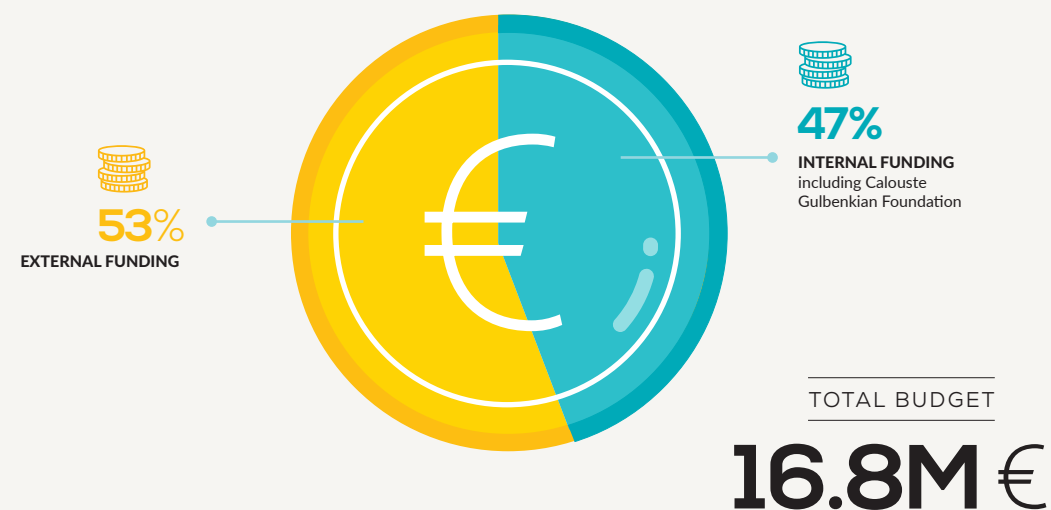


IN THE LAST 5 YEARS

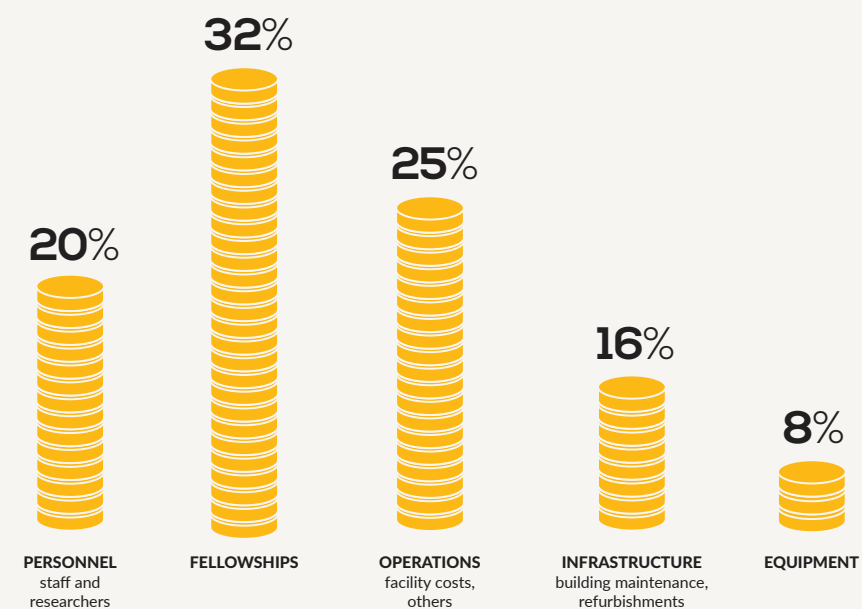
127
GRANTS

Source: IGC Research Funding Affairs

BUDGET OVERVIEW 2016



BREAKDOWN OF IGC EXPENDITURE



A WALK THROUGH 2016

"Aqui há Ciência!" reunion at the IGC

Kindergarten and primary school teachers that participated in the "Aqui há Ciência" project gathered at the IGC for a special event.



JANUARY

FEBRUARY



Call for the 2017 PhD Programme IBB

Applications for the IGC PhD Programme in Integrative Biology and Biomedicine (IBB) were opened.



Ceremony of the Pulido Valente Science Award 2015

Bahtiyar Yilmaz, former PhD student in Miguel Soares' laboratory, won the Pulido Valente Science Award 2015 for the discovery of a natural defence mechanism against malaria transmission triggered by resident bacteria in the gut.



IGC researchers honoured by Ciência Viva

Raquel Oliveira, Mónica Bettencourt Dias, Ana Domingos and Karina Xavier, group leaders at the IGC, were honoured in the exhibition and book "Mulheres na Ciência" (in English, "Women in Science").

MARCH

IGC at Futurália

Under the motto "Is doing research your scene?", the IGC participated in Futurália, the largest education, training and employability Fair in Portugal.



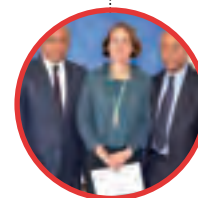
Two IGC scientists awarded with HSFP Young Investigator grants

Ana Domingos and Ivo Telley, both group leaders at the IGC, received a Young Investigator grant from the Human Frontier Science Program (HFSP) worth over 1 million USD.



"Ciência em Três" a new platform with educational resources for teachers

"Ciência em Três" (in English, "Science in Three"), a new platform with educational resources for teachers and educators developed by the IGC, was launched.



Director of the PhD Programme PGCD honoured by the Cabo Verde Government

Joana Gonçalves Sá, Director of the Graduate Programme Science for Development (PGCD) and group leader at IGC, received the First Degree Medal Award for Educational Merit by the Prime Minister of Cabo Verde.

APRIL



"Hands on Immunology" - IGC opened its doors for Immunology Day

The IGC joined the Portuguese Society of Immunology (SPI) to celebrate the International Immunology Day and prepared a full programme of activities for high school students.



Two IGC researchers awarded with "Maratona da Saúde" grants

Two projects of Íris Caramalho and Ana Domingos won the Maratona da Saúde Awards dedicated to Diabetes.



IGC at Belém Art Fest

For the second consecutive year, the IGC participated in Belém Art Fest with an art & science installation.



AMeeGuS - IGC PhD students retreat

The 10th Annual Meeting of Gulbenkian Students (AMeeGuS) joined PhD students from IGC and CRG (Centre for Genomic Regulation).

MAY



EMBO Workshop on Neural Control of Metabolism and Eating Behaviour

International scientists attended this EMBO workshop in Cascais, organised by Ana Domingos.



XLII Annual SPI meeting

Over 150 scientists gathered at the IGC for the XLII Annual Portuguese Society of Immunology (SPI) meeting.



IGC at Maker Faire Lisbon

The IGC participated at the Maker Faire Lisbon with an art&science installation.



Omenn Prize awarded to IGC PhD Student

João Barroso Batista, PhD student of the Evolutionary Biology group at the IGC, was the 2015 recipient of the Gilbert S. Omenn Prize.



IGC Scientist received Dona Antónia 2015 Award

Raquel Oliveira, group leader at the IGC, was honoured with the Revelation Award Dona Antónia Adelaide Ferreira, awarded by Sogrape Vinhos.



IGC at NOS Alive

Science and music came together for the 9th year running at the NOS Alive'16 music festival.



First Scientific Meeting of PGCD

PhD students of the three editions of the Graduate Programme Science for Development (PGCD) gathered at the IGC for the first time.

JULY



The Bill & Melinda Gates Foundation funded IGC scientists

The research group led by Miguel Soares at IGC was specifically selected by The Bill and Melinda Gates Foundation to help finding a vaccine against malaria.



EMBO course on "3D Developmental Imaging"

The 5th edition of this EMBO workshop, organised by Gabriel Martins, head of the Advanced Imaging Unit at IGC, focused on one of the main challenges of development biology: visualising *in vivo* embryos.



IGC at "Ao Leme com a Ciência Viva" Festival

IGC participated at the Science Festival "Ao Leme com a Ciência Viva", an event organised by Ciência Viva to celebrate its 20th anniversary.

AUGUST



IGC researcher elected President of the Society for Social Neuroscience

Rui Oliveira, group leader at IGC, was elected President of the Society for Social Neuroscience, a scientific international society with headquarters in the USA.



EMBO Young Scientists' Forum 2016

The EMBO Young Scientists' Forum 2016, organised by 5 IGC scientists, was held at the Calouste Gulbenkian Foundation.



IGC researcher awarded with NARSAD Young Investigator Grant

Rosalina Fonseca, group leader at IGC, was awarded with a NARSAD Young Investigator Grant from the Brain & Behavior Research Foundation.

SEPTEMBER



Call for the 2017 PGCD

Applications to the 2017 edition of the Graduate Programme Science for Development (PGCD) were opened.



"Lab in a Box" – bringing science to students in Africa

The project "Lab in a Box", developed by IGC researchers and science communicators, kicked off in Cabo Verde.



IGC Open Day

Under the motto "Science in Zoom", the 8th edition of the IGC Open Day brought 1800 visitors to the IGC.

OCTOBER



3rd Cross-Institutional Meeting of Young Researchers

This meeting brought together more than 100 postdocs from the IGC, ITQB-NOVA, IMM and Champalimaud Research for 3 days of intense scientific activity.



World premiere of "Quatuor pour l'aurore des temps"

Gulbenkian Orchestra soloists played the "Quatuor pour l'Aurore des Temps" from Camille van Lunen, artist in residence at the IGC, in a world premiere at the Calouste Gulbenkian Foundation.



New Artist in Residence

Simon Bill, a British painter and novelist, is the new Artist in Residence for a period of 6 months.

NOVEMBER



IGC at the Science and Technology Week

IGC joined the National Week of Science and Technology 2016 with an online platform of biology-related puzzles and an art & science installation at the Electricity Museum in Lisbon.



Gulbenkian Training Programme in Bioinformatics reaches 5000 students

Celebrating its 17th year anniversary, the Gulbenkian Training Programme in Bioinformatics (GTPB) hosted the number 5000 student during the course IB16S-Introductory Bioinformatics.

DECEMBER



1

RESEARCH



42

GROUPS



298

RESEARCHERS



37

NEW PROJECTS



140

PUBLICATIONS

MEMBRANE TRAFFIC

GROUP LEADER
ADRAIN, COLIN



RESEARCH INTERESTS

- Regulation of signalling by metalloproteases;
- Role of the ER quality control machinery, *in vivo*.



MAIN ACHIEVEMENTS

Control of metalloprotease “shedding”: Our work focuses on understanding “shedding”: the stimulated release of signalling molecules from the cell surface by metalloproteases. Diverse cues stimulate the metalloprotease TACE—the enzyme that cleaves TNF, and the activating ligands of the EGFR. We previously identified proteins called iRhoms to be essential for TACE trafficking to the Golgi apparatus, where it undergoes an essential activation step. We now identify a novel role for iRhom2: shedding stimuli trigger phosphorylation of iRhom2. iRhom2 phosphorylation is required for substrate shedding, without affecting TACE trafficking (iRhom2’s established role). We propose a new function for iRhom2 as a transducer of shedding sig-

nals through iRhom2, via an ‘inside out’ mechanism. **A novel iRhom cofactor:** We identified a cytoplasmic protein that binds specifically to both mammalian iRhom paralogues. Our data suggest that this new protein, iTAP (iRhom tail-associated protein) is a novel component of the iRhom/TACE pathway, essential to facilitate the ER exit of iRhom/TACE. **Role of UBXD8 in lipid homeostasis:** We aim to understand, at an organismal level, the contribution made by the ER protein quality control machinery. We have generated mice mutant in the ER/lipid droplet-localised protein, UBXD8. Our preliminary data imply a role for UBXD8 in the control of adipose tissue homeostasis.

LAB MEMBERS IN 2016

Marina Badenes, Postdoc
Miguel Cavadas, Postdoc
Abdulbasit Amin, PhD student, 2016 IBB
Catarina Gaspar, External PhD student
Ioanna Oikonomidi, PhD student, 2014 IBB
Joana Perdigão, Masters student
Emma Burbridge, Lab manager
Inês Félix, Technician

FUNDING

- European Commission
- Fundação para a Ciência e a Tecnologia
- Worldwide Cancer Research

PUBLICATIONS

Lemberg, M.K., Adrain, C. (2016) *Inactive rhomboid proteins: new mechanisms with implications in health and disease.* *Semin Cell Dev Biol.* 60: 29-37.

Wunderle, L., Knopf, J.D., Kühnle, N., Morlé, A., Hehn, B., Adrain, C., Strisovsky, K., Freeman, M., Lemberg, M.K. (2016) *Rhomboid intramembrane protease Rhbdl4 triggers ER-export and non-canonical secretion of membrane-anchored Tgfa.* *Sci Rep-Uk.* 6: 27342.

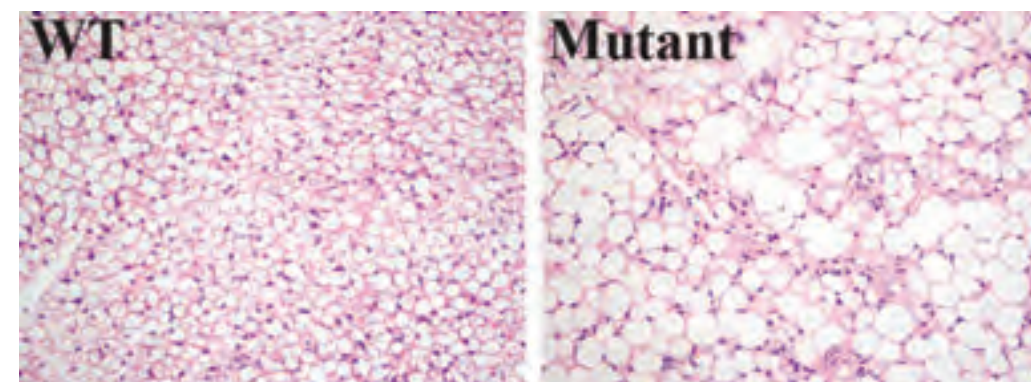


Figure: 200x images of hematoxylin and eosin-stained tissue sections from brown adipose tissue (BAT) isolated from wild type (WT) versus *Ubxd8* mutant mice. Whereas the WT BAT contains adipocytes with a normal characteristic multilocular appearance, the *Ubxd8* mutant BAT contains smaller numbers of mostly large unilocular adipocytes (i.e., containing a single large lipid droplet). The interstitium of UBXD8 mutant BAT also contains substantially more infiltrating immune cells.

E-MAIL: cadrain@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/cadrain>

BIOPHYSICS AND GENETICS OF MORPHOGENESIS

GROUP LEADER
ALVES, FILIPA



RESEARCH INTERESTS

Throughout development and growth, gene expression and cell metabolism are regulated both in space and in time, leading to complex patterns of cell differentiation from seemingly simpler initial conditions. We use math-

ematical modelling to study how the dynamic behaviour of key regulatory networks can generate well-defined sharp state transitions in the cells, triggered by critical changes in their biophysical parameters.



MAIN ACHIEVEMENTS

We are investigating two distinct, yet related, mechanisms:

- 1) Cells express different genes depending on their spatial location. We are analysing the pigmentation patterning in butterfly wings to investigate how local gene regulation and tissue architecture act together to define organised patterns of cell differentiation and how this interplay both generates and constrains the phenotypic variation observed within and between species.
- 2) Cells express different genes at different points in time. We are studying the developmental switch of ova-

ry maturation in *Drosophila* as a model system for how the patterning of individual organs is coordinated in time as whole body development and growth progress and how the regulatory mechanisms involved ensure robustness against environmental and physiological perturbations.

To quantitatively compare modelling and experimental results, we are developing tailored quantitative image analysis methods, acquisition systems and databases, focusing on disentangling different quantitative traits from complex patterning phenotypes.

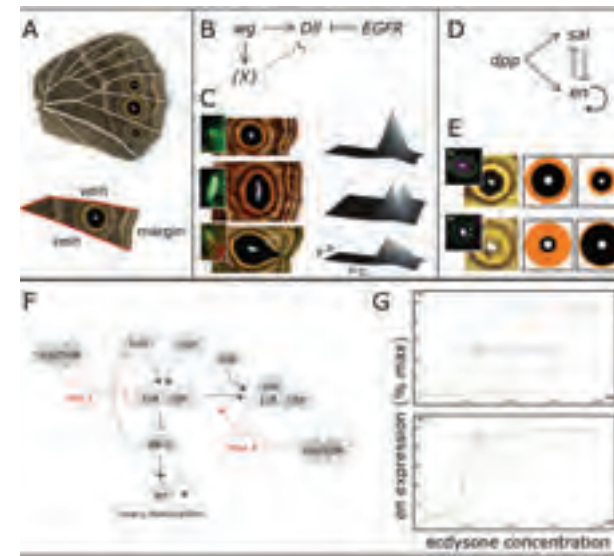


Figure: Patterned cell fate determination in butterfly wings. A) *Bicyclus anynana* adult hindwing (ventral side), highlighting vein outlines (upper panel). The bottom panel shows a wing modular spatial unit defined by adjacent veins and wing margin. B) Candidate regulatory network for wing margin and vein signalling during focal determination (details in the main text). C) Left: Adult wing eyespots, with insets showing the corresponding Dll expression patterns in the larval wing disc; Right: Model results corresponding to changes in different parameter values. The plots show the relative level of Dll expression along the wing proximal-distal (P-D) and posterior-anterior (P-A) axes. The wild type pattern is shown in the first plot. If the space between two consecutive veins is wider than normal, the resulting Dll expression pattern and the corresponding adult eyespot become rod-shaped (second plot). If Dll repression close to the wing margin (by the unidentified gene X) becomes weaker, the resulting eyespot is elongated along the wing proximal-distal axis (third plot). D) Candidate regulatory network underlying eyespot patterning. E) Adult wing eyespots (left), with insets showing the corresponding sal (magenta) and en (green) expression patterns in the pupal wing. Increasing or decreasing the level of Dpp production (or the number of focal cells) results in bigger or smaller eyespots (first row plots). If the strength of the inhibitory effect of engrailed is increased, the black ring is almost completely replaced by gold-coloured scales, and the reverse happens if the inhibitory action of spalt becomes stronger (second row plots).

The developmental switch of ovary maturation in *Drosophila*. F) Network considered in the model, including two alternative hypotheses for the regulatory interaction between the insulin and the ecdysone signalling pathways. G) Model results for the relative level of engrailed expression as a function of ecdysone concentration, considering three different initial levels or ISS/TOR signalling (arrow direction indicates stronger signalling). Upper panel: Expected dynamics in the case the ISS/TOR signalling is acting on engrailed expression by regulating the availability of EcR/USP in the ovary (Hypothesis 1 in the network diagram). Bottom panel: Expected dynamics in the case the ISS/TOR signalling was acting on engrailed expression by regulating the binding probability of 20E to the EcR/USP complex (Hypothesis 2).

SOFTWARE DEVELOPMENT IN 2016

MathColor/FijiColor

These packages comprise a growing set of interactive applications implementing novel methods for the quantitative analysis of colour patterns in natural colour images and gene expression patterns in fluorescence labelled images.

WingPatterns

This knowledge base combines in the same platform the experimental image collections (with the respective associated metadata) and the quantitative analysis results of the gene expression patterns in larvae and pupae, adult pigmentation, vein patterning and wing shape, among other morphometric traits. Associated with the database, we are developing automated image analysis algorithms and data-mining techniques.

Public website: <http://wingpatterns.igc.gulbenkian.pt>

E-MAIL: filipaalves@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/falves>

CELL BIOLOGY OF VIRAL INFECTION

GROUP LEADER
AMORIM, MARIA JOÃO



RESEARCH INTERESTS

Influenza A virus (IAV) is a major human pathogen. We focus on how IAV modulates host membrane trafficking,

altering cellular architecture and host immunity to assist viral infection.



MAIN ACHIEVEMENTS

We made considerable progress in understanding:

Viral assembly: IAV genome contains 8 distinct RNA segments (vRNPs), packaged in a budding virion, but the location of complex formation remains unclear. Recent reports propose that genome assembly and vRNP transport outward recycling vesicles are connected events. Our 2016 manuscript suggests an alternative model, whereby binding of vRNPs to vesicles outcompetes that of its host cognate partners, impairing flow and resulting in vesicular clustering. Such impairment creates vRNP hotspots and facilitates complex formation downstream. An additional manuscript shows that among the cognate partners, the motor KIF13A, is still

able to bind recycling vesicles and propel movement. Hence, the step hindered in recycling flow occurs *a posteriori*.

Modulation of host innate immunity: In specific cells, the recycling endosome is involved in cytokine secretion; MHC-I presentation and phagocytosis. Hence, the IAV induced impairment may modulate host immunity, a hypothesis we are investigating. In addition, other membrane trafficking alterations occur upon infection. Using the mouse model, we identified the host GPI-anchored protein DAF as a factor modulated by infection, that leads to more severe outcomes and we are currently dissecting the underlying mechanism.

LAB MEMBERS IN 2016

Marta Alenquer, Postdoc

Sílvia Costa, Postdoc

Nuno Santos, PhD student, 2016 PGCD | Started in October

Zoé Vaz Da Silva, PhD student, 2013 PIBS

Filipe Ferreira, Lab manager | Started in March

Ana Nascimento, Masters student | Left in August

Joana Perdigão, Masters student | Started in August

Maria Veríssimo, Masters student | Left in August

PUBLICATIONS

Vale-Costa, S., Alenquer, M., Sousa, A.L., Kellen, B., Ramalho, J., Tranfield, E.M., Amorim, M.J. (2016) Influenza A virus ribonucleoproteins modulate host recycling by competing with Rab11 effectors. *J Cell Sci.* 129: 1697-1710.

Vale-Costa, S., Amorim, M.J. (2016) Clustering of Rab11 vesicles in Influenza A virus infected cells creates hotspots containing the eight viral ribonucleoproteins. *Small GTPases.* 23: 0-7.

Vale-Costa, S., Amorim, M.J. (2016) Recycling endosomes and viral infection. *Viruses.* 8: 64-92.

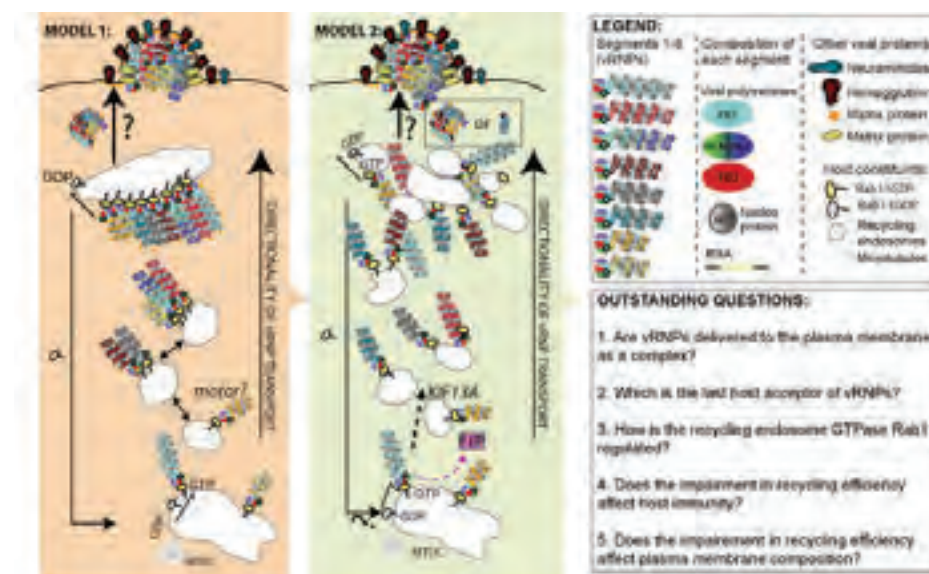


Figure: Models proposed for assembly of IAV segmented genome – **Model 1** suggests that collision of recycling endosome vesicles carrying vRNPs, on route to the budzone, promotes RNA-RNA interactions and sequentially leads to IAV genome assembly. This model is supported by super-resolution based approaches assessing co-localisation among distinct segments. **Model 2** originates from our work and proposes that vRNP binding to recycling vesicles hinders their flow, leading to vesicular clustering. Clustering creates hotspots of all vRNPs that become in close proximity, which might facilitate assembly downstream. Correlative light and electron microscopy based approaches support model 2. Note that we found no evidence of assembled genomes zones of vesicular clustering.

E-MAIL: mjamorim@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/mjamorim>

EXTERNAL WEBSITE: <http://sites.igc.gulbenkian.pt/cbv/>

PROTEIN NUCLEIC ACIDS INTERACTIONS

GROUP LEADER
ATHANASIADIS, ALEKOS



RESEARCH INTERESTS

For the vertebrate innate immune system nucleic acids represent a major Pathogen Associated Molecular Pattern (PAMP) capable of triggering interferon responses and apoptotic/necroptotic cell death. We are interested in understanding how cells distinguish self-nucleic acids

from foreign and the molecular mechanisms involved in maintaining homeostatic balance. We are studying the dsRNA pathway and the role of A to I RNA editing to render cellular transcripts non recognisable by the innate immune sensors.



MAIN ACHIEVEMENTS

We developed tools to study the localisation and interaction partners of a domain family uniquely found in proteins involved in the recognition of nucleic acids in the cytoplasm. We demonstrated the association of such domains with Stress Granules (SGs) involved in storage of stalled ribosomes and their associated

mRNAs and identified relevant interaction partner proteins. Together with our previous work with viral inhibitors of the cellular sensors showing a similar localisation our results point to SGs as a centre for the innate immune sensing pathway.

LAB MEMBERS IN 2016

Luisa Gabriel, Postdoc | Left in July
Gabrielle Kosoy, Technician | Started in September

FUNDING

- Fundação para a Ciência e a Tecnologia

PUBLICATIONS

Passagem-Santos, D., Bonnet, M., Sobral, D., Trancoso, I., Silva, J.G., Barreto, V.M., Athanasiadis, A., Demengeot, J., Pereira-Leal, J.B. (2016) Rag recombinase as a selective pressure for genome evolution. *Genome Biol Evol.* 8: 3364-3376.

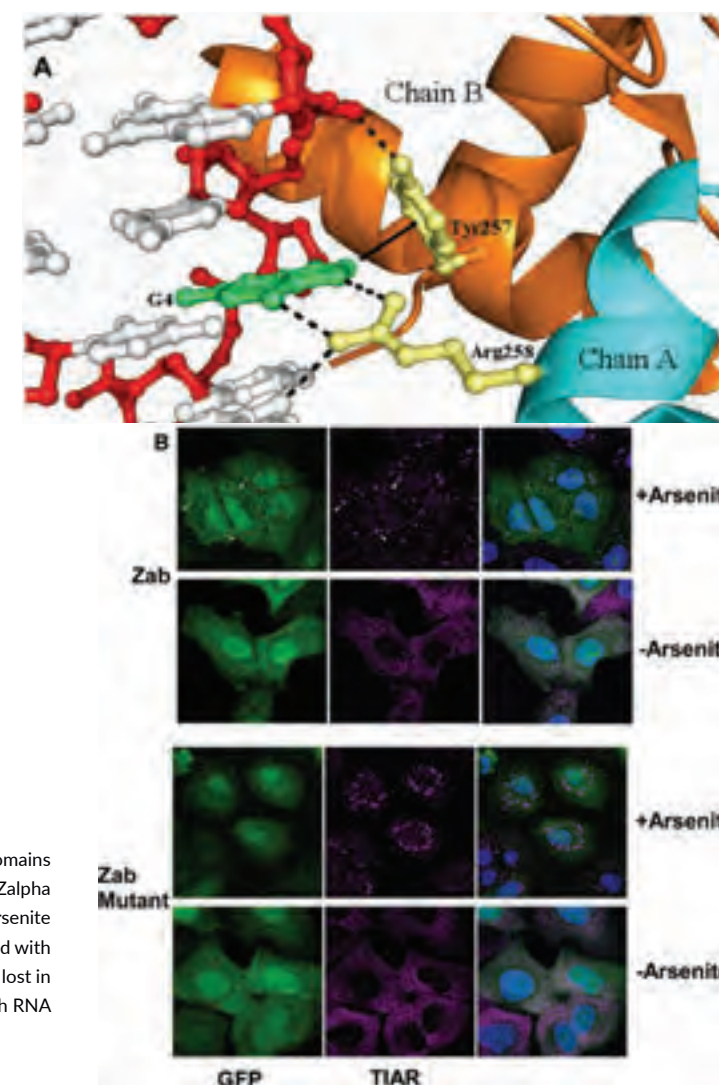


Figure: A) Interaction of Zalpha domains with dsRNA and dsDNA. B) Zalpha domains (green) localise in arsenite induced Stress Granules as indicated with anti-TIAR (pink). This localisation is lost in mutant Zalpha domains that abolish RNA binding.

E-MAIL: alekos@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/aathanasiadis>

PLANT STRESS SIGNALLING

GROUP LEADER
BAENA GONZÁLEZ, ELENA



RESEARCH INTERESTS

Mounting evidence suggests that in plants environmental information is partly conveyed through sugar signals. One central component of the signalling network that monitors the plant sugar status is the SNF1-related Protein Kinase1 (SnRK1). SnRK1 regulates energy homeostasis and in doing so, it promotes

tolerance to stress and influences numerous growth and developmental processes. We seek to understand how this key pathway is regulated and how it operates as a first step to understand how sugar signals influence stress tolerance and shape plant development.



MAIN ACHIEVEMENTS

Our work has uncovered several mechanisms by which SnRK1 is regulated:

- SnRK1 activity results in the SUMOylation-dependent ubiquitination of several subunits of the complex and their subsequent degradation through the proteasome. This is important for resetting SnRK1 signalling and preventing detrimental pathway overactivation.
- In collaboration with Paula Duque (IGC) we have found that the SR45 splicing factor negatively regulates SnRK1 stability and are currently investigating

the underlying mechanisms.

- Using a luciferase-based mutant screen we have identified two factors that impinge on SnRK1 activity. Current efforts aim at unravelling the mechanistic basis for this.

In collaboration with Wolfram Weckwerth (Vienna) we have performed high throughput phosphoproteomics analysis that have uncovered numerous potential SnRK1 targets, implicated e.g. in translation control or photosynthesis.

LAB MEMBERS IN 2016

Ana Confraria, Postdoc
 Leonor Margalha, Postdoc
 Concetta Valerio, Postdoc
 Mattia Adamo, External PhD student
 Carlos Elias, PhD student, 2013 PIBS
 Bruno Peixoto, External PhD student | Started in July
 João Jacinto, Trainee | Left in May
 Lidia Jesus, Trainee | Started in July; left in August
 Américo Rodrigues, Visitor
 Andrea Barghetti, Visitor | Started in February; left in March
 Ksenija Slavic, Visitor | Started in January

FUNDING

- Fundação para a Ciência e a Tecnologia

SELECTED PUBLICATIONS*

Carvalho, R.F., Szakonyi, D., Simpson, C.G., Barbosa, I.C.R., Brown, J.W.S., **Baena-González, E.**, Duque, P. (2016) *The Arabidopsis Sr45 splicing factor, a negative regulator of sugar signaling, modulates Snf1-related protein kinase 1 (Snrk1) stability.* **Plant Cell.** 28(8): 1910-1925.

Crozet, P., Margalha, L., Butow, R., Fernandes, N., Elias, A., Orosa, B., Tomanov, K., Teige, M., Bachmair, A., Sadanandom, A., **Baena-González, E.** (2016) *SUMOylation represses SnRK1 signaling in Arabidopsis.* **Plant J.** 85: 120-133.

Nukarinen, E., Nägele, T., Pedrotti, L., Wurzinger, B., Mair, A., Landgraf, R., Börnke, F., Hanson, J., Teige, M., **Baena-González, E.**, Dröge-Laser, W., Weckwerth, W. (2016) *Quantitative phosphoproteomics reveals the role of the AMPK plant ortholog Snrk1 as a metabolic master regulator under energy deprivation.* **Sci Rep-Uk.** 6: 31697.

*The complete list of publications is available on section 3. Publications.

Control conditions (Light) Energy stress (extended night)

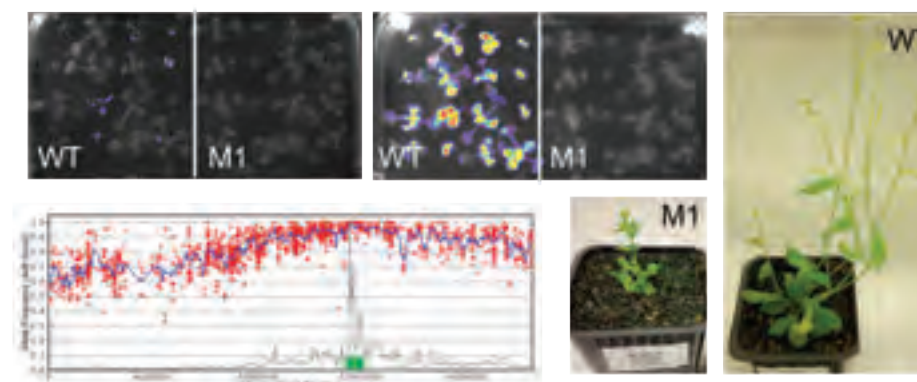


Figure: Identification of mutants with altered SnRK1/energy signalling. The *DIN6::LUC* reporter is strongly induced in the original reporter line ("WT") under extended night conditions, but this induction is lost in mutant M1. NGS-based mapping of M1 identifies a gene in chromosome 4 that is likely responsible for the phenotype. M1 plants display a reduced growth phenotype which is similar to that reported for plants with transient systemic SnRK1 silencing.

E-MAIL: ebaena@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/ebaena>

EVOLUTIONARY DYNAMICS

GROUP LEADER
BANK, CLAUDIA



RESEARCH INTERESTS

Work in the *Evolutionary Dynamics* group is focused on the study of evolution, and in particular on the population genetics of adaptation and speciation. Questions at the interface between theoretical and empirical biology

are approached through theoretical modelling, computational methods, and statistical data analysis, and via targeted collaborations with wet-lab researchers.



MAIN ACHIEVEMENTS

Can we predict fitness landscapes?

Using the concept of fitness landscapes, we aim at understanding the relative roles of stochastic and deterministic processes in adaptive evolution. We analysed a large multi-allelic intragenic fitness landscape of 640 engineered mutations in yeast Hsp90. Using a combination of existing and novel theoretical approaches, we studied the accessibility of the global fitness peak and the potential for predictability of the fitness landscape topography. We found local ruggedness of the landscape and the existence of epistatic hotspot mutations,

which together make predictability inherently difficult if mutation-specific information is not considered.

Can we kill a virus by increasing its mutation rate?

We studied the evolutionary dynamics of influenza A virus under different concentrations of *Favipiravir*, which is a drug that leads to an increase in mutation rate across the genome. By tracking down real-time evolution of several populations we were able to evaluate the extinction dynamics and the potential adaptive response of the virus to different drug treatments.

LAB MEMBERS IN 2016

Alexandre Blanckaert, Postdoc | Started in October

Inês Fragata, Postdoc

Ana Hermina Ghenu, Technician | Started in March

Telmo Cunha, Trainee | Started in June; left in August

Andreia Teixeira, Trainee | Started in April

Mariana Vidal, Trainee | Started in July; left in September

Mark Schmitz, Visitor | Started in September

FUNDING

- Fundação para a Ciência e a Tecnologia

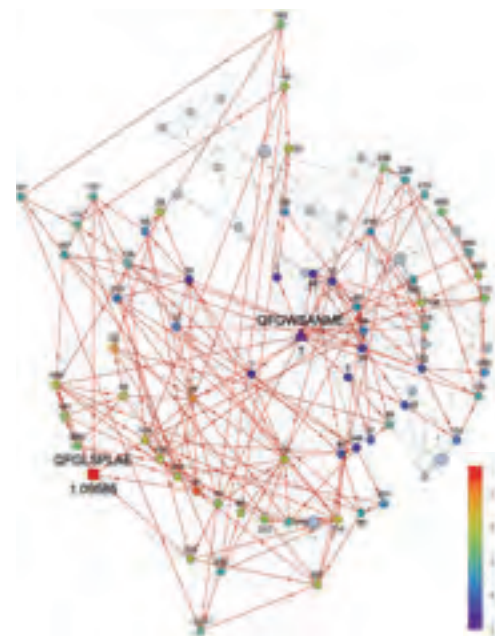


Figure: Network of beneficial mutations in a large intragenic fitness landscape. Vertices represent genotypes colored by their fitness, and arrows represent single mutational steps, with the direction of the arrow indicating increasing fitness. Red arrows indicate all possible paths that lead from the parental genotype (in the centre) to the global optimum (red square). In the studied landscape, almost 80% of vertices are included in an adaptive walk (i.e. a monotonically fitness-increasing) to the global optimum, indicating that the global optimum is accessible from large parts of the landscape. Figure adapted from Bank, Matuszewski, et al. (2016) PNAS.

SELECTED PUBLICATIONS*

Bank, C., Matuszewski, S., Hietpas, R.T., Jensen, J.D. (2016) On the (un)predictability of a large intragenic fitness landscape. *Proc Natl Acad Sci USA*. 113(49): 14085-14090.

Bank, C., Renzette, N., Liu, P., Matuszewski, S., Shim, H., Foll, M., Bolon, D.N.A., Zeldovich, K.B., Kowalik, T.F., Finberg, R.W., Wang, J.P., Jensen, J.D. (2016) An experimental evaluation of drug-induced mutational meltdown as an antiviral treatment strategy. *Evolution*. 70(11): 2470-2484.

Matuszewski, S., Hildebrandt, M.E., Ghenu, A., Jensen, J.D., Bank, C. (2016) A statistical guide to the design of deep mutational scanning experiments. *Genetics*. 204(1): 77-87.

*The complete list of publications is available on section 3. Publications.

SOFTWARE DEVELOPMENT IN 2016

Interactive online tool for experimental design of high-throughput bulk competitions

This software helps experimentalists optimise the cost vs. error of deep mutational scanning experiments. The tool visualises key results from Matuszewski et al., *Genetics*, 2016 for values relevant to proposed experiments. Public website: evoldynamics.org/tools

E-MAIL: claudiab@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/cbank>

EXTERNAL WEBSITE: <https://evoldynamics.org/>

PLANT GENOMICS

GROUP LEADER
BECKER, JÖRG



RESEARCH INTERESTS

We are studying sexual reproduction and early embryogenesis, with a particular focus on (epi)genetic mechanisms acting during male gametogenesis. Male gametes in the plant and animal kingdom carry complex sets of RNA molecules, including not only mRNAs but also small RNAs. We have shown that in the angiosperm *Arabidopsis thaliana* epigenetic reprogramming during male gametogenesis seems to be partially responsible for these distinct transcriptomes. In addition, the CCR4-NOT complex seems to play a role through its regulation of mRNA decay rates. The extant bryophyte *Physcomitrella patens* serves as our EVO-DEVO model. We have created a comprehensive transcriptome atlas as a start-

ing point to analyse how genetic and epigenetic regulation during male gametogenesis evolved in land plants. Intercellular communication between male and female gametes (recognition and fusion) are additional questions we are addressing. Our analysis of *Arabidopsis* tetraspanins has led to the identification of two functionally redundant sperm cell expressed tetraspanin-binding partners. A double mutant results in severe fertility defects associated with predominant single fertilisation events, supporting our hypothesis that tetraspanins and their associated binding partners can form signalling complexes with essential functions in gamete recognition and fusion.



MAIN ACHIEVEMENTS

- Further insights into the functional role of tetraspanin-binding partners during double fertilisation.
- A new project in *Physcomitrella* on the origins of plant centrioles has started.
- Establishment of protocols to allow single cell analyses of *Arabidopsis* sperm cells.

LAB MEMBERS IN 2016

Leonor Boavida, Postdoc | Left in December
Ann-Cathrin Lindner, Postdoc
Paulo Navarro Costa, Postdoc
Patrícia Pereira, External PhD student
Sónia Pereira, PhD student, 2016 IBB | Started in September
Chandra Misra, External PhD student | Started in May
Mário Santos, Lab manager
Josimar Cruz, Trainee | Started in April; left in July

FUNDING

- Fundação para a Ciência e a Tecnologia

SELECTED PUBLICATIONS*

Boavida, L.C., Becker, J.D. (2016) *Plant evolution: what does it take to be an egg?*. *Curr Biol.* 26: R527-530.

Navarro-Costa, P., McCarthy, A., Prudêncio, P., Greer, C., Guilgur, L.G., Becker, J.D., Secombe, J., Rangan, P., Martinho, R.G. (2016) *Early programming of the oocyte epigenome temporally controls late prophase I transcription and chromatin remodelling.* *Nat Commun.* 7: 12331.

Wibowo, A., Becker, C., Marconi, G., Price, J., Hagmann, J., Papareddy, R., Kageyama, J., Becker, J.D., Weigel, D., Gutierrez-Marcos, J. (2016) *Hyperosmotic stress memory in Arabidopsis is mediated by distinct epigenetically labile sites in the genome and is restricted in the male germline by DNA glycosylase activity.* *eLife* 5: e13546.

*The complete list of publications is available on section 3. Publications.

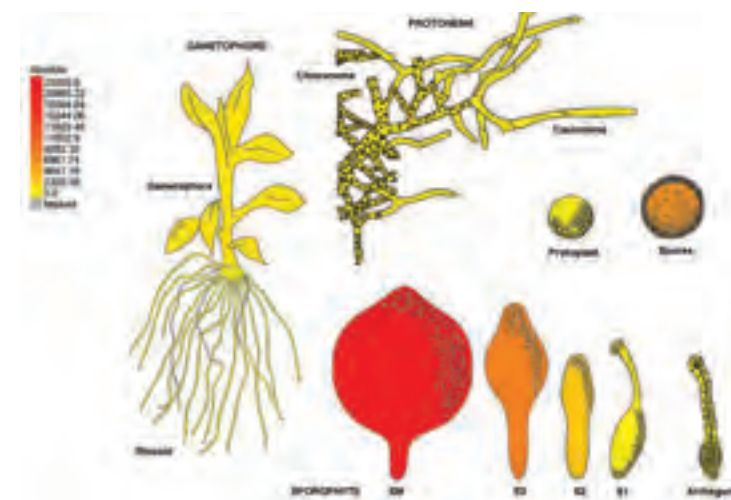


Figure: Screen shot (modified) of the *Physcomitrella* electronic Fluorescent Pictograph (eFP) browser (bar.utoronto.ca/efp_physcomitrella). The graphical representation shows the expression level of the transcription factor TCP5 during the *Physcomitrella* life cycle.

E-MAIL: jbecker@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/jbecker>

VARIATION: DEVELOPMENT AND SELECTION

GROUP LEADER
BELDADE, PATRÍCIA



RESEARCH INTERESTS

Our Eco-Evo-Devo research combines concepts and approaches from various disciplines to characterise genetic and environmental factors that account for intra-specific variation, the raw material for natural selection and a universal property of biological systems. Understanding the mechanisms that generate this variation is a key challenge. What are the genetic changes that contrib-

ute to evolutionarily relevant variation? How do they interact with environmental factors to regulate developmental trajectories and outcomes? For the dissection of variation in complex, diversified and ecologically-relevant phenotypes, the lab uses two complementary models: *Bicyclus anynana* butterflies and *Drosophila melanogaster* flies.



MAIN ACHIEVEMENTS

In 2016, the lab focused mostly on the role of the external environment on the generation of novel genetic variants (through the mobilisation of transposable elements, TEs; Marta Marialva's PhD thesis defended in Nov) and of novel phenotypic variants (through developmental plasticity). Main findings were: 1) the effect of environmental perturbation on TE mobilisation during oogenesis depends on

genotype and TE identity, 2) identification of loci contributing to inter-genotype differences in levels of TE activity and developmental plasticity, 3) unravelling non-additive environment by environment effects on the development of plastic traits, and 4) successful establishment of genome editing to study gene function in wing pattern development in *B. anynana*.

LAB MEMBERS IN 2016

Erik Bergen, Postdoc | Started in September
Elvira Lafuente, PhD student, 2013 PIBS
Marta Marialva, PhD student, 2011 PIBS | Left in October
Yara Rodrigues, PhD student, 2015 PGCD
Nuno Soares, PhD student, 2013 PIBS
Pedro Castanheira, Technician | Left in December
Ana Eugénio, Technician | Left in October
Carolina Silva, Technician

PUBLICATIONS

Beldade, P., Peralta, C.M. (2016) *Developmental and evolutionary mechanisms shaping butterfly eyespots*. *Curr Opin Insect Sci*. [Epub ahead of print].

FUNDING

• Fundação para a Ciência e a Tecnologia

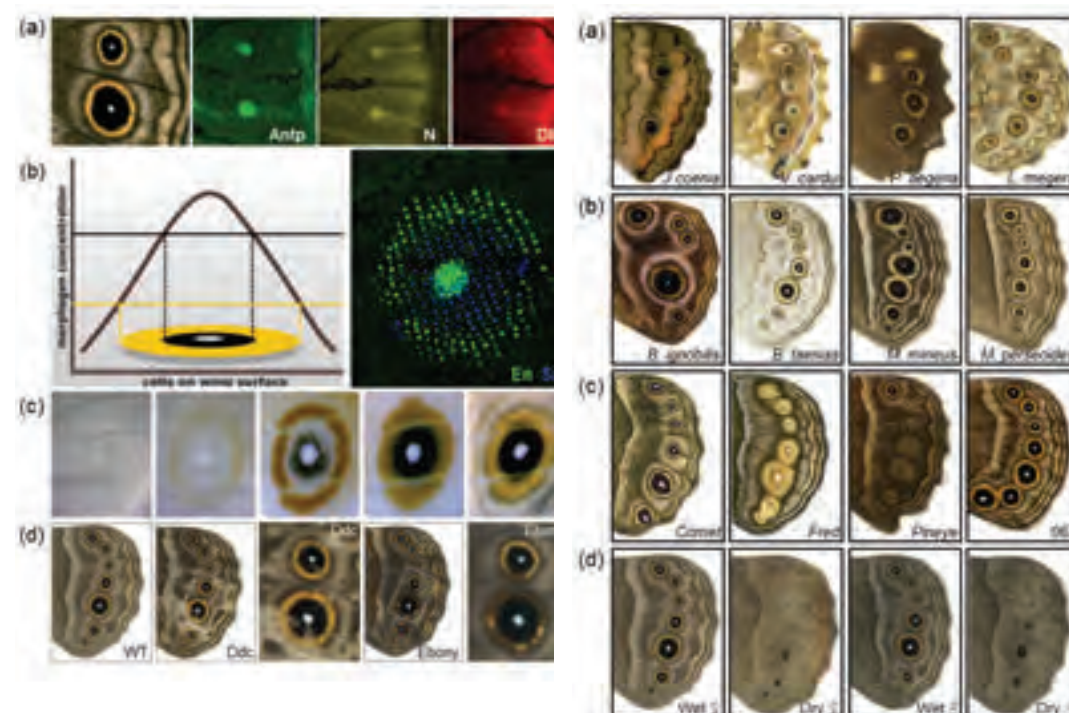


Figure 1 (Left): Diversity in butterfly eyespot patterns, including distantly related species (a), closely related species (b), and *Bicyclus anynana* genetic (c) and environmentally-induced variants (d). From Peralta and Beldade COIS.

Figure 2 (Right): Eyespot development, including: establishment of organizer in larval wings involving genes *Antennapedia*, *Notch*, and *Distal-less* (a), establishment of colour rings in early pupal wings involving signalling from organizer and expression of colour ring-defining genes *Engrailed* and *Spalt* (b), and color production in late pupal wings (c). CRISPR-mediated knockout of pigment synthesis genes *Ddc* and *Ebony* in early embryos leads to mosaic adults with pigmentation deficiencies. From Peralta and Beldade, COIS.

E-MAIL: pbeldade@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/pbeldade>

CELL CYCLE REGULATION

GROUP LEADER
BETTENCOURT DIAS, MÓNICA



RESEARCH INTERESTS

Our laboratory is interested in general principles in biology regarding the counting and assembling of complex subcellular structures, and their variations observed during development, in disease and evolution. We use

complex cytoskeletal assemblies, such as centrioles and cilia, as study subjects. We follow three complementary research lines in their output: mechanisms of biogenesis & function, disease (cancer) and evolution.



MAIN ACHIEVEMENTS

Our group identified mechanisms in *Xenopus* extracts and human cycling cells by which centrosomes form always at the same time during the cell cycle, through regulation of CDK1/CyclinB (Zituni *et al.*, Curr Biol., 2016). CDK1/CyclinB prevents the direct interaction of two critical regulators of centriole biogenesis.

We have discovered that centrioles are not intrinsically stable but need to be stabilised by their matrix. In

doing so, we have discovered a mechanism by which centrosomes are inactivated and eliminated in oogenesis. During oogenesis, the centriole associated matrix (PCM) is lost, leading to centriole loss. Centrioles are then contributed paternally by the sperm, for embryo development. We were able to prevent centrosome loss in the egg, which led to problems in embryo development (Marques *et al.*, Science, 2016).

LAB MEMBERS IN 2016

Maria Francia, Postdoc | Left in February
Susana Gouveia, Postdoc | Left in August
Daisuke Ito, Postdoc
Swadhin Jana, Postdoc
Carla Lopes, Postdoc
Ana Rita Marques, Postdoc
Gaelle Marteil, Postdoc
Zitouni Sihem, Postdoc
Irina Fonseca, PhD student, 2016 PGCD | Started in October
Sónia Pereira, PhD student, 2016 IBB
Catarina Nabais, PhD student, 2014 IBB
Sascha Werner, PhD student, 2013 PIBS
Marco Louro, Masters student
Patrícia Rodrigues, Masters student | Started in July
Mariana Faria, Lab manager
Paulo Duarte, Technician
Susana Mendonça, Technician
Mafalda Duque, Trainee | Started in July; left in October
Marina Arbi, Visitor | Started in October; left in December
Pedro Prudêncio, Visitor | Started in January; left in August

SELECTED PUBLICATIONS*

Borrego-Pinto, J., Somogyi, K., Karreman, M.A., König, J., Müller-Reichert, T., Bettencourt-Dias, M., Gönczy, P., Schwab, Y., Lénárt, P. (2016) *Distinct mechanisms eliminate mother and daughter centrioles in meiosis of starfish oocytes*. J Cell Biol. 212(7): 815-827.

Pimenta-Marques, A., Bento, I., Lopes, C.A.M., Duarte, P., Jana, S.C., Bettencourt-Dias, M. (2016) *A mechanism for the elimination of the female gamete centrosome in Drosophila melanogaster*. Science. 353(6294): aaf4866.

Zitouni, S., Francia, M.E., Leal, F., Montenegro, G.S., Nabais, C., Duarte, P., Gilberto, S., Brito, D., Moyer, T., Kandels-Lewis, S., Ohta, M., Kitagawa, D., Holland, A.J., Karsenti, E., Lorca, T., Lince-Faria, M., Bettencourt-Dias, M. (2016) *Cdk1 prevents unscheduled Plk4-stil complex assembly in centriole biogenesis*. Curr Biol. 26(9): 1127-1137.

*The complete list of publications is available on section 3. Publications.

FUNDING

- European Research Council
- Fundação para a Ciência e a Tecnologia

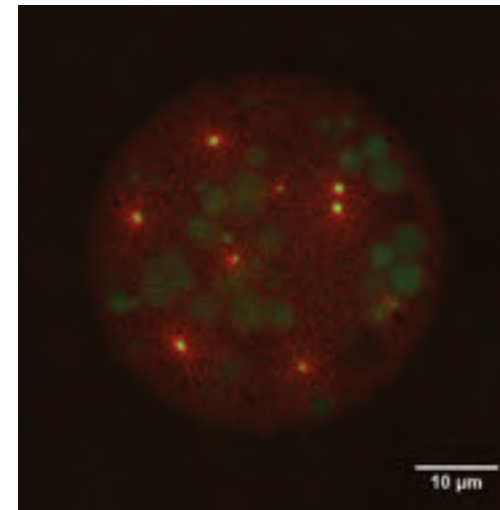


Figure: Centrioles (in green) nucleate microtubules (in red) in a droplet of cytosol extracted from a fly egg. From Catarina Nabais (PhD student in collaboration with Ivo Telley, IGC).

E-MAIL: mdias@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/mdias>

EXTERNAL WEBSITE: <http://sites.igc.gulbenkian.pt/ccr/>

QUANTITATIVE ORGANISM BIOLOGY

GROUP LEADER
CARNEIRO, JORGE



RESEARCH INTERESTS

The *Quantitative Organism Biology* group studies the multilevel mechanisms that give rise to properties of the whole organism, in search for general principles of biological organisation and, eventually, the design of artificial systems. Our approach is two fold: on the one

hand, we create mathematical models of specific exemplary systems aiming to uncover basic principles, and on the other hand, we develop the quantitative methods required to assess the properties and predictions of these models.



MAIN ACHIEVEMENTS

We have a long-standing interest in understanding cellular form and motility through the development of quantitative frameworks that describe the morphodynamics of individual cells. The calibration and estimation of the parameters of such morphodynamical models is a major challenge as it involves rigorous quantitative comparison of the model predictions with live-imaging data. We have recently made a breakthrough by fitting a complex model of a swimming spermatozoon to raw imaging data by maximising the cross-correlation be-

tween experimental microscopy images and synthetic image generated with the model. We demonstrated that mechanistic information contained in the model is able to uncover missing information in the imaging data, identifying patterns that escape or are hidden from the human eye. An extreme example of this approach is the successful prediction of the flagellum conformation and position in space based only on the dynamics of optical density of the sperm heads alone.

LAB MEMBERS IN 2016

Delphine Pessoa, PhD student, 2014 IBB
Pedro Silva, External PhD student
Eleonora Tulumello, PhD student, 2015 IBB
Marco Louro, Masters student
Luis Ponce, Visitor

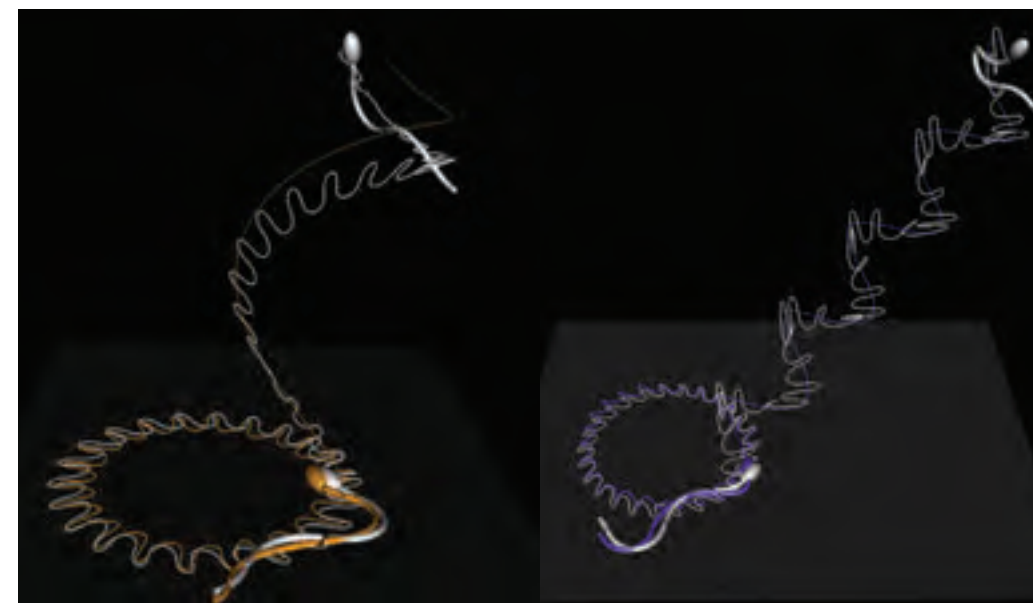


Figure: Reconstituted conformation and swimming trajectories of spermatozoa of the *L. pictus* (brown, left) and *S. purpuratus* (purple, right) imaged when confined to the water-solid interface plane and when swimming freely in 3 dimensions and the corresponding solutions of a morphodynamical model based on resistive-force theory (white).

E-MAIL: jcarneir@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/jcarneiro>

EXTERNAL WEBSITE: <http://qobweb.igc.gulbenkian.pt/>

MOLECULAR NEUROBIOLOGY

GROUP LEADER
CASTRO, DIOGO S.



RESEARCH INTERESTS

Our research is focused on the gene regulatory networks that operate in the developing vertebrate nervous system, to control the generation of neurons from multipotent neural stem cells. To address the regulatory logic of neurogenesis, we study the activity of proneural transcription factors such as *Ascl1*. These function as master regulators being both required and sufficient to induce a full programme of neuronal differentiation. We aim to understand how *Ascl1* coordinates neuro-

genesis by investigating: i) its mutual interactions with the chromatin landscape, and ii) how it interacts with other transcriptional networks, in particular the Notch signalling pathway. We also investigate how key transcriptional networks that underlie neural stem cell function are used in a malignant context. We develop these studies in cancer stem cell models of Glioblastoma, the most common and deadly of brain tumours.



MAIN ACHIEVEMENTS

We have shown the zinc-finger factor MyT1 is directly activated by *Ascl1*, and promotes neurogenesis by counteracting Notch signalling at multiple levels. It targets both pathway components and downstream targets, including known regulators of the neural stem cell programme.

In collaboration with David J. Solecki, we studied the function of the zinc-finger transcription factor *Zeb1* in neurogenesis in the mouse cerebellum. We found that *Zeb1* controls neuron differentiation and germinal zone exit in this brain region, by regulating a mesenchymal-epithelial-like transition programme.

LAB MEMBERS IN 2016

Alexandre Raposo, Postdoc

Francisca Vasconcelos, Postdoc | Left in November

Pedro Rosmaninho, PhD student

Mário Soares, PhD student, 2015 IBB

Vera Teixeira, Lab manager

Javier Cores, Trainee | Started in July; left in August

Alexandra Vargas, Visitor | Started in April; left in July

FUNDING

• European Commission

PUBLICATIONS

Castro, D.S. (2016) *One more factor joins the plot: Pbx1 regulates differentiation and survival of midbrain dopaminergic neurons.* **EMBO J.** 35(18): 1957-1959.

Singh, S., Howell, D., Trivedi, N., Kessler, K., Ong, T., Rosmaninho, P., Raposo, A.A., Robinson, G., Roussel, M.F., Castro, D.S., Solecki, D.J. (2016) *Zeb1 controls neuron differentiation and germinal zone exit by a mesenchymal-epithelial-like transition.* **Elife.** 14: 5e12717.

Vasconcelos, F.F., Sessa, A., Laranjeira, C., Alexandre, A.S.F., Teixeira, V., Hagey, D.W., Tomaz, D.M., Muhr, J., Broccoli, V., Castro, D.S. (2016) *Myt1 counteracts the neural progenitor program to promote vertebrate neurogenesis.* **Cell Rep.** 17: 469-483.



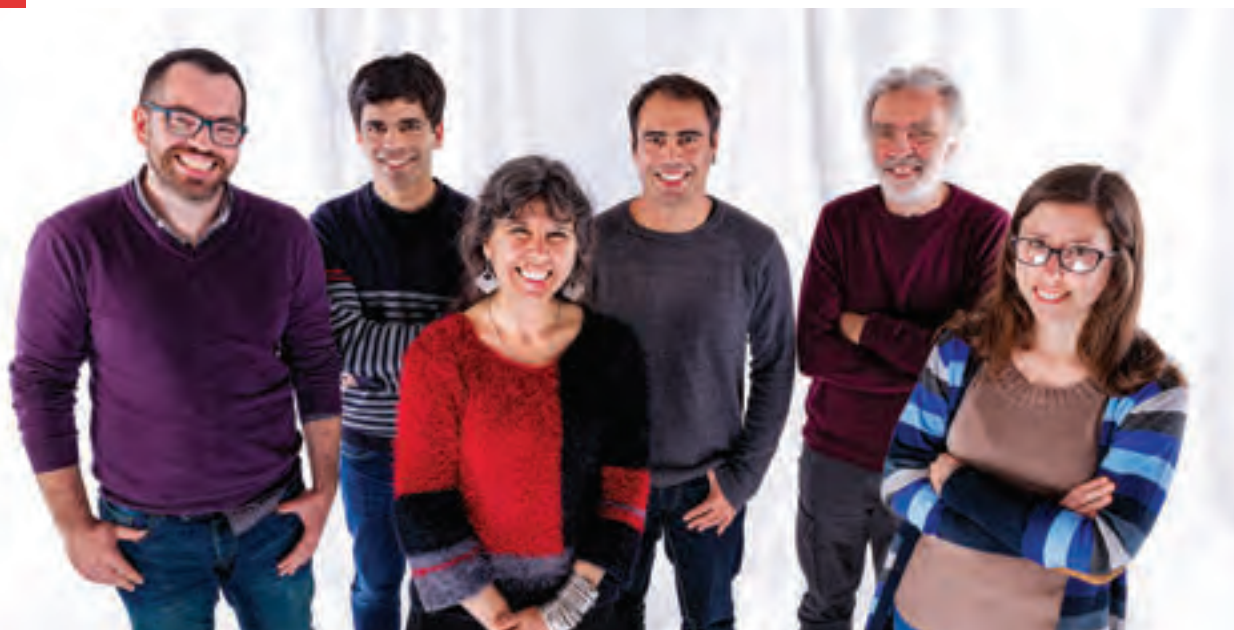
Figure: Mouse embryo. Image from Francisca Vasconcelos.

E-MAIL: dscastro@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/dcastro>

NETWORK MODELLING

GROUP LEADER
CHAQUIYA, CLAUDINE



RESEARCH INTERESTS

Complementary to experimental approaches, mathematical models allow to get further insights into the functioning of complex regulatory networks and to formulate hypotheses, e.g. identify proper strategies to enforce or prevent certain behaviours. We mainly rely on a discrete, logical framework, which can uncover key char-

acteristics of the dynamics of such networks. Our activity is organised along three lines: 1) Theoretical work with the definition of efficient methods to analyse large models; 2) Computational work with the development of software tools; 3) Modelling work with the study of specific networks, in collaboration with experimentalists.



MAIN ACHIEVEMENTS

A modelling study of primary sex determination in placental mammals has been published (Sánchez & Chaouiya, 2016). Moreover, we have contributed to the analysis of an extended model of T cell differentiation, characterising T cell plasticity (Abou-Jaoudé *et al.*, Front Genet., 2016).

Concerning methodological achievements, a SAT (Boolean SATisfiability testing) has been used to study the numbers of stable patterns of Boolean models com-

posed over hexagonal grids*. Furthermore, we have formally defined an efficient procedure to explore the basins of attraction of logical models by using their reverse dynamics (publication in preparation).

*Varela, P.L., Lynce, I., Manquinho, V., Chaouiya, C., Monteiro, P.T. (2016) *Stable states of Boolean regulatory networks composed over hexagonal grids*. SASB'16 Proceeding, ENTCS (Electronic Notes in Theoretical Computer Science). *In press*.

LAB MEMBERS IN 2016

Ana Morais, PhD student, 2016 IBB

Ricardo Pais, PhD student, 2013 PIBS

Pedro Varela, External PhD student

Tiago Pedreira, Technician | Started in September

Camila Ramos, Technician | Left in December

Jose Cury, Visitor | Left in May

Pedro Monteiro, Visitor

FUNDING

- Fundação para a Ciência e a Tecnologia



Figure: We implement our methodological developments in software tools and rely on these tools for our modelling work: GINsim allows to define and analyse logical models of intra- cellular networks, and EpiLog allows to define and analyse logical models over hexagonal grids.

PUBLICATIONS

Abou-Jaoudé, W., Traynard, P., Monteiro, P.T., Saez-Rodriguez, J., Helikar, T., Thieffry, D., **Chaouiya, C.** (2016) *Logical modeling and dynamical analysis of cellular networks*. *Front Genet.* 7: 94.

Sánchez, L., **Chaouiya, C.** (2016) *Primary sex determination of placental mammals: a modelling study uncovers dynamical developmental constraints in the formation of sertoli and granulosa cells*. *BMC Syst Biol.* 10: 37.

SOFTWARE DEVELOPMENT IN 2016

GINsim

Supports the definition and analysis of logical models of regulatory/signalling networks. This tool is in constant development, implementing most of our methodological advances.

Public website: <http://ginsim.org>

EpiLog

Supports the extension of the logical modelling approach to multi-cellular systems represented as hexagonal grids of communicating cells. We have recently implemented stochastic updating modes to overcome the inherent synchrony of cellular automata.

Public website: <http://epilog-tool.org/>

E-MAIL: chaouiya@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/cchaouiya>

EXTERNAL WEBSITE: <http://compbio.igc.gulbenkian.pt/nmd/>

ECO-EVOLUTIONARY GENETICS

GROUP LEADER
CHELO, IVO M.



RESEARCH INTERESTS

We are interested in how adaptation to stressful environments is affected by interactions between organisms. For this purpose we use a multilevel approach that ranges from genes to ecosystems in the context of experimental evolution with *Caenorhabditis elegans* and different bacteria. The focus is on intra-population mechanisms, by which negative feedbacks can lead to the maintenance of genetic variability, or on interactions between species, where strong selective pressures occur between

predators and prey, or host and parasites.

In this context we want to broadly know:

1. If adaptation to a new environment is affected primarily by the type (host/parasite, host/commensal, predator/prey, etc.) or by the strength of interactions;
2. If the strength and type of interactions between organisms can change due to co-evolution during adaptation.



MAIN ACHIEVEMENTS

- Performed experimental adaptation of *Escherichia coli* populations to standard *C. elegans* growth medium under normal and high salt concentrations.
- Showed that competition between *Serratia marcescens* mutants results in higher virulence towards *C.*

elegans.

- Demonstrated that fission yeast (*Schizosaccharomyces pombe*) cells that reach *C. elegans* gut intact maintain viability.

LAB MEMBERS IN 2016

Ana Paula Marques, Postdoc

Mariana Delgadinho, Masters student | Started in September

Ana Laranjeira, Masters student | Left in September

Thiago Guzella, Visitor

FUNDING

- Fundação para a Ciência e a Tecnologia

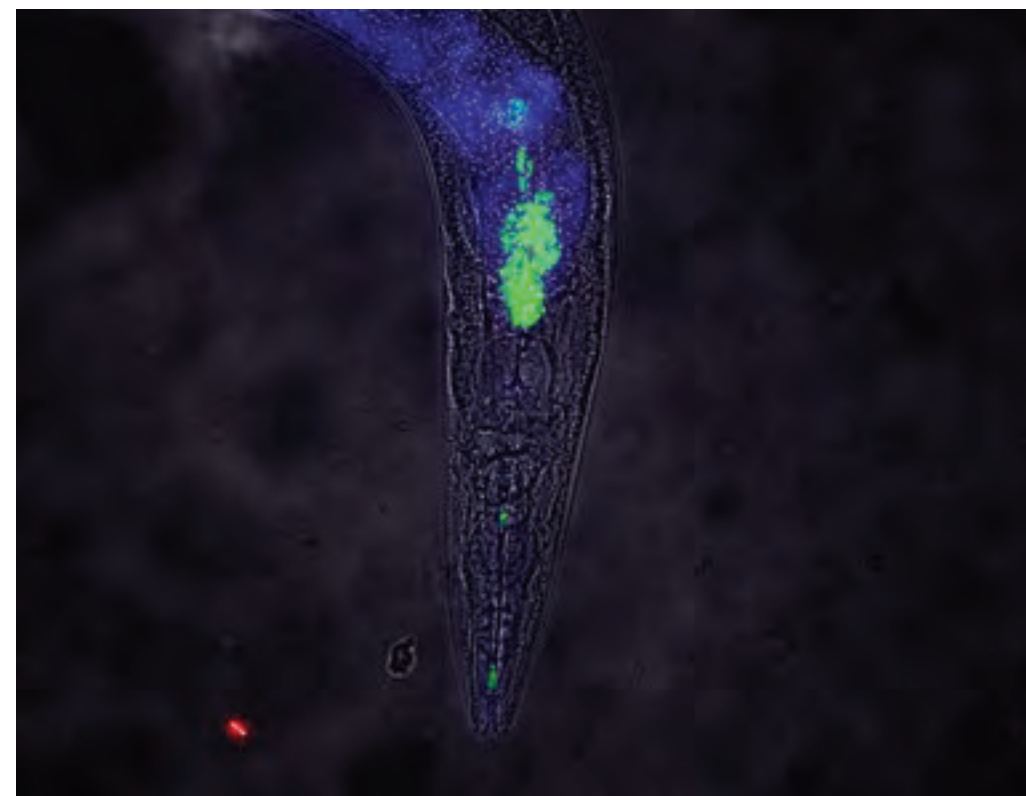


Figure: *C. elegans* feeding on *S. pombe*. Fission yeast (*S. pombe*) fluorescent cells (green) maintain physical integrity despite mechanical challenges such as those imposed by the nematode's (*C. elegans*) grinder, and reach the worm's intestine intact. *C. elegans* intestinal cells fluoresce in blue upon excitation (DAPI). Picture obtained at 30x magnification and pixel size of 0.41 μm . Image from Ivo Chelo and Lília Perfeito.

E-MAIL: imchelo@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/ichelo>

POPULATION AND CONSERVATION GENETICS

GROUP LEADER
CHIKHI, LOUNÈS



RESEARCH INTERESTS

The *Population and Conservation Genetics* group is interested in understanding the properties of genetic data in populations as a consequence of the demographic history of species. This evolutionary history can be seen as a series of major events such as population collapses, expansions, and admixture processes when populations separated for some time are reconnected as a consequence of natural or anthropogenic events. We develop new and use/test existing methods to improve our un-

derstanding of the recent evolutionary history of species. We also, and crucially, want to understand the limits of genetic or genomic data as inferential tools. Applications go from human evolution to conservation genetics of wild (lemurs, baboons, dolphins) and domesticated species. The group is increasingly interested in the way population and social structure influence patterns of genomic diversity.



MAIN ACHIEVEMENTS

We developed the notion of IICR (Inverse Instantaneous Coalescence Rate) formalised by O. Mazet from the Institut de Mathématiques de Toulouse. This parameter provides a new framework to interpret genetic data from structured populations. It can be used to re-interpret the history of humans, not as a history of popula-

tion size changes but rather as a history of changes in connectivity. We have shown that elephants from Borneo, and Colobus monkeys from Guinea, are influenced by human-dominated habitats and that existing populations may suffer from inbreeding if nothing is done to reconnect them in the future.

LAB MEMBERS IN 2016

Inês Carvalho, Postdoc
Bárbara Parreira, Postdoc
Tânia Rodrigues, Postdoc
Jordi Salmons, Postdoc | Left in June
Jade Bruxaux, External PhD student | Started in October; left in December
Gabriele Sgarlata, PhD student, 2016 IBB | Started in July
Barbara Le Pors, Technician
Isa Pais, Technician
Tiago Maié, Trainee
Patrícia Santos, Trainee | Left in December
Tiago Zoeten, Trainee | Started in October

FUNDING

- Fundação para a Ciência e a Tecnologia

SELECTED PUBLICATIONS*

Goossens, B., Sharma, R., Othman, N., Kun-Rodrigues, C., Sakong, R., Ancrenaz, M., Ambu, L. N., Jue, N. K., O'Neill, R. J., Bruford, M. W., Chikhi, L. (2016) *Habitat fragmentation and genetic diversity in natural populations of the Bornean elephant: Implications for conservation*. *Biol Conserv.* 196: 80-92.

Mazet, O., Rodríguez, W., Grusea, S., Boitard, S., Chikhi, L. (2016) *On the importance of being structured: instantaneous coalescence rates and human evolution-lessons for ancestral population size inference?*. *Heredity*. 116: 362-371.

Otoni, C., Rasteiro, R., Willet, R., Claeys, J., Talloen, P., Van de Vijver, K., Chikhi, L., Poblome, J., Decorte, R. (2016) *Comparing maternal genetic variation across two millennia reveals the demographic history of an ancient human population in southwest Turkey*. *R Soc Open Sci.* 3: 150250.

*The complete list of publications is available on section 3. Publications.



Figure: *Propithecus coquereli* (Coquerel's sifaka) is one of the more than 100 species of lemurs currently recognised. Lemurs are only found in Madagascar. *P. coquereli* lives in the north west from Madagascar, and is one of the nine recognised species of the genus *Propithecus*.

E-MAIL: chikhi@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/lchikhi>

EXTERNAL WEBSITE: http://compbio.igc.gulbenkian.pt/pcg/pcg_home.html

LYMPHOCYTE PHYSIOLOGY

GROUP LEADER
DEMENGEOOT, JOCELYNE



RESEARCH INTERESTS

We are concerned with those properties of the immune system that guarantee tissue integrity as well as immune tolerance to foetuses, commensals and food antigens, while maintaining the ability to mount efficient responses to infectious agents and some tumours. When these properties fail, as in central immune-regulation disorders, we question the mechanisms defining which organ is targeted. Symmetrically, in aggregated autoim-

mune diseases we ask which central immune-regulation process is affected. We also maintained a line of research assessing the consequences of the RAG activity, a recombinase responsible for the diversification of immune cells, on genomes integrity. Our interests led us to lead, or get involved, in various collaborative works, including with clinicians.



MAIN ACHIEVEMENTS

We demonstrated that mouse strain specific resistance to induced autoimmune prostatitis is dependent on regulatory T cells activity that dampens a potential for tissue infiltration and associated destruction.

We confirmed an evolutionary constrain imposed by the co-optation of the RAGs, and evidenced adaptation in vertebrates through the purging of RSS at

domains of open chromatin exposed to RAG activity.

We followed for one year a cohort of patients treated with anti-TNF biologicals, and evidenced that regular immunogenicity monitoring provides clinicians with pertinent information for educated therapeutic choices.

LAB MEMBERS IN 2016

Iris Caramalho, Postdoc
Rômulo Areal, PhD student, 2011 PIBS
Vital Domingues, PhD student, 2015 IBB
José Santos, PhD student, 2014 IBB
Vânia Silva, PhD student, 2013 PIBS
Eleonora Tulumello, PhD student, 2015 IBB
Marie Louise Bergman, Lab manager
Inês Cabral, Technician
Vasco Correia, Technician
Cristiana Banila, Trainee | Started in June; left in August
Francisca Fontes, Visitor
Sandra Gama, Visitor
Paula Matoso, Visitor | Started in February
Afonso Mota, Visitor | Started in August; left in December

FUNDING

- Association Française pour les Myopathies
- Fundação para a Ciência e a Tecnologia
- Maratona da Saúde

PUBLICATIONS

Passagem-Santos, D., Bonnet, M., Sobral, D., Trancoso, I., Silva, J.G., Barreto, V.M., Athanasiadis, A., Demengeot, J., Pereira-Leal, J.B. (2016) *Rag recombinase as a selective pressure for genome evolution. Genome Biol Evol.* 8: 3364-3376.

Breser, M.L., Lino, A.C., Motrich, R.D., Godoy, G.J., Demengeot, J., Rivero, V.E. (2016) *Regulatory T cells control strain specific resistance to experimental autoimmune prostatitis. Sci Rep-Uk.* 6: 33097.

Oruc, Z., Oblet, C., Boumediene, A., Druille, A., Pascal, V., Le, R.E., Cuivillier, A., El, H.C., Lecardeur, S., Leanderson, T., Morelle, W., Demengeot, J., Aldigier, J., Cogné, M. (2016) *IgA structure variations associate with immune stimulations and IgA mesangial deposition. J Am Soc Nephrol.* 27:2748.

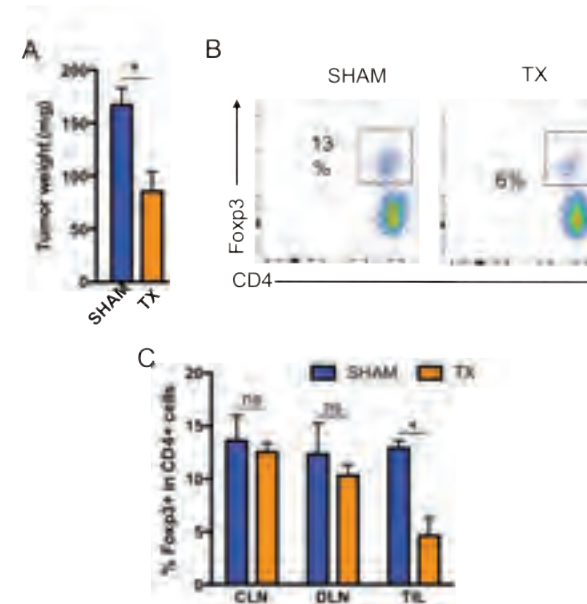


Figure: Removal of the thymus, a procedure common in children undergoing major cardiac surgery, is here revealed to potentiate tumour immunotherapy. Mice submitted to surgery without (SHAM) or with (TX) removal of the thymus were treated with a model checkpoint inhibitor 7 days after the injection of a melanoma. Analysis 21 days later showed decreased tumour weight (A), and decreased regulatory T cells in tumour infiltrates (TIL) in TX animals when compared to SHAM controls (B, C), but not in control lymph nodes (cLN) and tumour draining lymph nodes (dLN).

E-MAIL: jocelyne@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/jdemengeot>

OBESITY

GROUP LEADER
DOMINGOS, ANA I.



RESEARCH INTERESTS

Our laboratory is interested in the function of the nervous system in weight control, aiming at identifying neurons that play a fundamental role in eating behaviour and metabolism. We rely on newly developed targeted mouse strains that enable the application of state-of-the-art neuro-genetic techniques: we use optogenetics to establish the role of molecularly identified populations of

neurons, and translational ribosome affinity purification – TRAP – to identify molecular targets with neuromodulatory activity enriched in those key neurons. We believe that our experimental approach will pave the way for the identification of novel molecular targets with potential in the treatment of obesity.



MAIN ACHIEVEMENTS

- Roksana Pirzgalska was awarded the 2016 Vasco Pulido Valente Award.
- Paper accepted in *Nature Communications*: Pereira, M.M.A., Mahú, I., Seixas, E., Martínéz-Sánchez,

N., Kubasova, N., Pirzgalska, R.M., Cohen, P., López, M., Bernardes, G.J.L., Domingos, A.I. A brain-sparing diphtheria toxin for chemical genetic ablation of peripheral cell lineages. *Nat Commun. In press.*

LAB MEMBERS IN 2016

Elsa Seixas, Postdoc

Inês Mahú, PhD student, 2014 IBB

Roksana Pirzgalska, External PhD student

Nadya Kubasova, Technician | Left in January

Imogen Morris, Technician

Mariana Costa, Trainee | Started in July; left in August

Madalena Grilo, Trainee | Started in June; left in September

Beatriz Silveira, Trainee | Started in July; left in August

Andreia Barateiro, Visitor

Ana Campos, Visitor | Started in May; left in July

Aparajita Lahree, Visitor | Started in August; left in November

Miguel Vasques, Visitor | Started in September

FUNDING

- EMBO
- Fundação para a Ciência e a Tecnologia
- Human Frontiers Science Program
- Maratona da Saúde

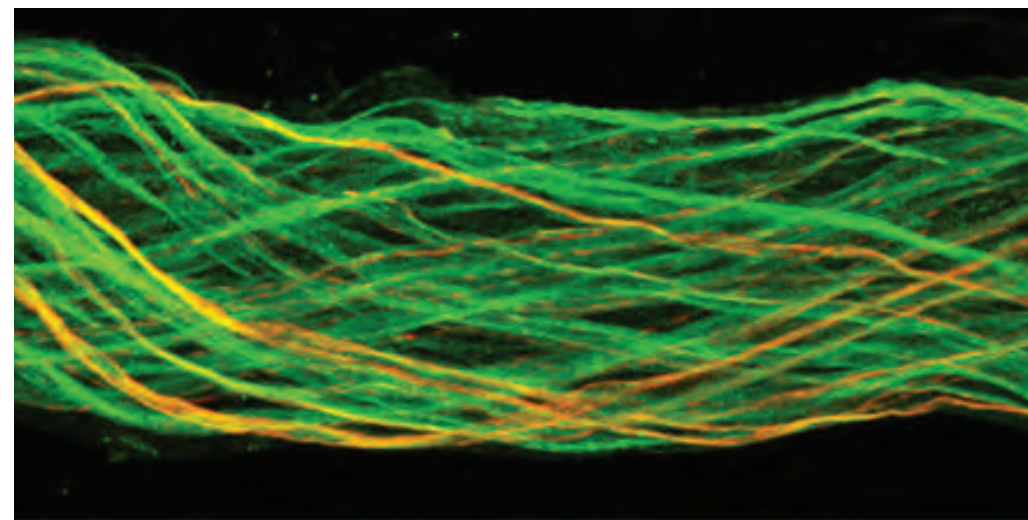


Figure: Nerve bundles dissected from inguinal fat pad contain sympathetic neurons (TH⁺, orange).

E-MAIL: dominan@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/adomingos>

EXTERNAL WEBSITE: <http://domingoslabobesity.weebly.com/>

PLANT MOLECULAR BIOLOGY

GROUP LEADER
DUQUE, PAULA



RESEARCH INTERESTS

Our group uses *Arabidopsis thaliana* as a model system to investigate how plants sense and respond to environmental stress at the molecular level. We are focusing on the role of alternative splicing, which is likely to contribute chiefly to the stress tolerance essential for plant survival. Another major ongoing project in the lab is un-

covering a role for transporters of the Major Facilitator Superfamily (MFS) in plant abiotic stress responses. Interestingly, the functional analysis of these membrane proteins has been revealing striking examples of the biological impact of alternative splicing in plants.



MAIN ACHIEVEMENTS

In support of our hypothesis that alternative splicing plays a key role in plant stress tolerance, we have shown that two *Arabidopsis* proteins, belonging to the highly conserved SR family of alternative splicing modulators, control the response to distinct environmental signals via regulation of the abscisic acid (ABA) stress signalling pathway. The identification of the physiological transcripts targeted by these SR splicing factors to achieve plant stress tolerance is un-

der way.

In 2016, we reported that the *Arabidopsis* SR-like protein SR45 regulates sugar signalling during early seedling development via modulation of the levels of the energy-sensing SNRK1 protein kinase and broadly controls alternative splicing *in vivo* including that of the SR45 gene itself. We have also established a protocol to monitor and quantify root responses to stress imposed by various heavy metals.

LAB MEMBERS IN 2016

Tom Laloum, Postdoc | Started in March
Guiomar Martin, Postdoc | Started in November
Esther Novo-Uzal, Postdoc | Started in June
Dale Richardson, Postdoc
Dora Szakonyi, Postdoc
María Niño-González, PhD student
Filipa Lopes, Masters student | Left in October
Vera Nunes, Technician
Marius Brechtenkamp, Trainee | Left in March
Inês Travanca, Trainee | Started in January; left in February
Aya Yokota, Trainee | Started in January; left in June
Catarina Gouveia, Visitor | Started in July; left in September

FUNDING

- Fundação para a Ciência e a Tecnologia

PUBLICATIONS

Carvalho, R.F., Szakonyi, D., Simpson, C.G., Barbosa, I.C.R., Brown, J.W.S., Baena-González, E., Duque, P. (2016) The *Arabidopsis* SR45 splicing factor, a negative regulator of sugar signaling, modulates Snrk1-related protein kinase 1 (Snrk1) stability. *Plant Cell*. 28(8): 1910-1925.

Ling, Y., Alshareef, S., Butt, H., Lozano-Juste, J., Li, L., Galal, A.A., Moustafa, A., Momin, A.A., Tashkandi, M., Richardson, D.N., Fujii, H., Arold, S., Rodriguez, P.L., Duque, P., Mahfouz, M.M. (2016) Pre-mRNA splicing repression triggers abiotic stress signaling in plants. *Plant J.* [Epub ahead of print].

Remy, E., Duque, P. (2016) Assessing tolerance to heavy-metal stress in *Arabidopsis thaliana* seedlings. *Methods Mol Biol.* 1398: 197-208.

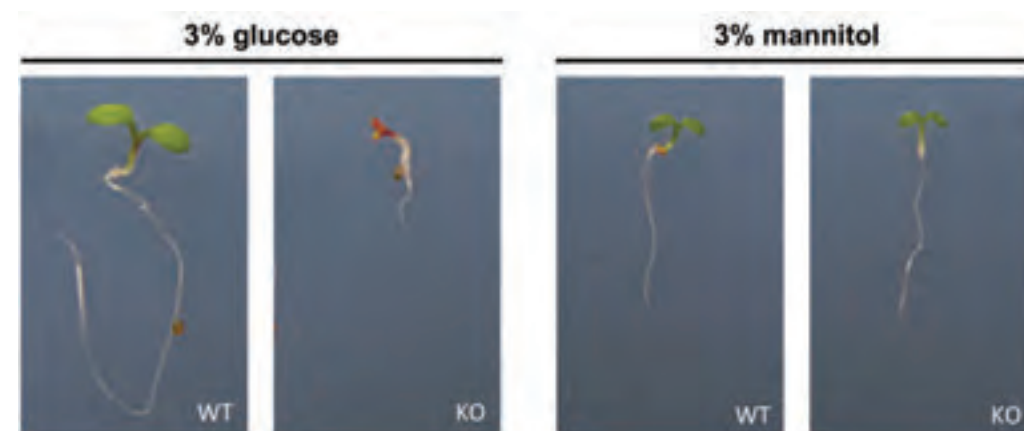


Figure: A knockout mutant for the *Arabidopsis* SR45 splicing factor displays a sugar-specific growth arrest during early seedling development.

E-MAIL: duquep@igc.gulbenkian.pt
IGC WEBPAGE: <http://www.igc.gulbenkian.pt/pduque>

TELOMERES AND GENOME STABILITY

GROUP LEADER
FERREIRA, MIGUEL GODINHO



RESEARCH INTERESTS

It is estimated that one in three people will be diagnosed with cancer during their lifetime (source: CancerStats, CRUK). The strongest risk factor for cancer is age, with 75% of cases diagnosed in people aged 60 and over. Our goal is to investigate the mechanisms underlying chromosome-end protection and the outcomes of its failure,

not only at the cellular level but also at the organism level. Our work will allow the discovery of key regulators guarding cells from genomic instability. Ultimately, we aim at preventing the incidence of age-associated cancer, by identifying and manipulating the agents responsible for its increase.



MAIN ACHIEVEMENTS

We finished our comparative study of telomere dynamics, DNA Damage Response (DDR), and aging-related dysfunction and disease in different tissues, in wild type (from 3 to 42 months) and telomerase mutant zebrafish (Carneiro *et al.*, 2016). Briefly, in naturally aged organisms, shortening of telomeres in specific tissues coincides with rise of DNA damage, decline in cell proliferation and age-specific organ decline. For example, critically short telomeres accumulate in the gut

and muscle, leading to tissue damage that culminates in local disruption of organ homeostasis. Additionally, critically short telomeres are recognised as threatening DNA breaks and accumulate DNA damage (Telomere Induced Foci, TIF), further contributing to tissue decline. Our findings strongly support that telomere shortening acts as a major contributor to the increase in DNA damage, tissue dysfunction and disease observed in aging.

LAB MEMBERS IN 2016

Ana Almeida, Postdoc | Started in July; left in August
Inês Castro, Postdoc | Left in September
Mounir El Mai, Postdoc | Started in January
Jose Planells, Postdoc
Akila Sridhar, Postdoc
Edison Carvalho, PhD student, 2014 PGCD
Kirsten Lex, PhD student, 2013 PIBS
Pamela Borges, PhD student, 2015 PGCD
Joana Nabais, External PhD student | Left in May
Gianluca Selvaggio, External PhD student | Left in May
Tânia Ferreira, Lab manager
Asya Martirosyan, Technician | Started in September
Sónia Rosa, Wing technician
Phillip Aguiar, Trainee | Left in May
Ana Figueira, Trainee

FUNDING

- European Commission
- Fundação para a Ciência e a Tecnologia
- Howard Hughes Medical Institute

PUBLICATIONS

Carneiro, M.C., de Castro, I.P., Ferreira, M.G. (2016) *Telomeres in aging and disease: lessons from zebrafish*. *Dis Model Mech*. 9: 737-748.

Carneiro, M.C., Henriques, C.M., Nabais, J., Ferreira, T., Carvalho, T., Ferreira, M.G. (2016) *Short telomeres in key tissues initiate local and systemic aging in zebrafish*. *PLoS Genet*. 12: e1005798.

Vinagre, J., Nabais, J., Pinheiro, J., Batista, R., Oliveira, R.C., Gonçalves, A.P., Pestana, A., Reis, M., Mesquita, B., Pinto, V., Lyra, J., Cipriano, M.A., Ferreira, M.G., Lopes, J.M., Sobrinho-Simões, M., Soares, P. (2016) *Tert promoter mutations in pancreatic endocrine tumours are rare and mainly found in tumours from patients with hereditary syndromes*. *Sci Rep-Uk*. 6: 29714.

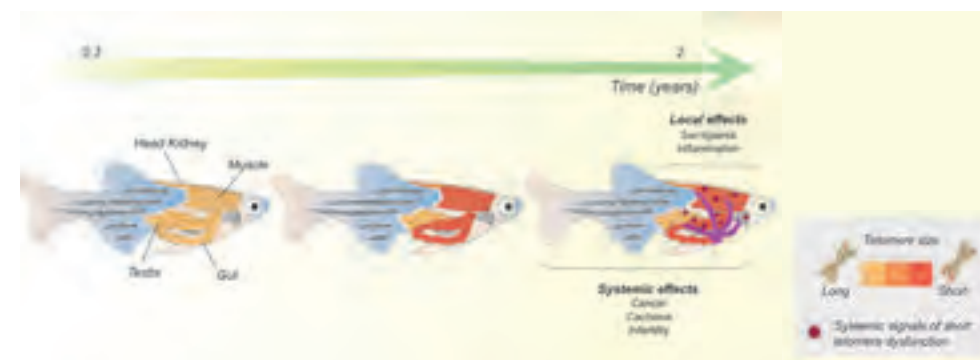


Figure: Telomeres shorten at different rates, anticipating local and systemic dysfunction in zebrafish aging. Telomeres shorten naturally over time in specific zebrafish organs, such as gut and muscle (but not testis), regardless of differences in proliferation rates. This shortening, together with the accumulation of local telomere damage, precludes the onset of tissue dysfunction events in aging, including intestinal inflammation and sarcopenia (Carneiro *et al.*, 2016). Critically short telomeres in the gut and muscle may be sufficient to disrupt homeostasis in other tissues where telomeres do not erode, by generating systemic signals of dysfunction that create a "disease-permissive" environment.

E-MAIL: mgferreira@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/mferreira>

EXTERNAL WEBSITE: <http://sites.igc.gulbenkian.pt/telomere/tgs/Welcome.html>

LUPUS & AUTOREACTIVE IMMUNE REPERTOIRES

GROUP LEADER
FESEL, CONSTANTIN



RESEARCH INTERESTS

Systemic Lupus Erythematosus (SLE) is a human autoimmune disorder where altered physiologies and self-reactive repertoires of both B- and T-cells are intimately connected. Autoreactive IgG antibodies are the diagnostic hallmark of SLE and diversify over long time periods

before disease becomes manifest, however, this depends also on innate-immune and other nonspecific factors. Our approach is to model the ways in which genetic factors, molecular mechanisms and immune repertoires are interconnected in SLE pathogenesis.



MAIN ACHIEVEMENTS

In SLE patients, FOXP3⁺ T-regulatory cells (Tregs) are functionally deficient, associated to their reduced surface expression of the high-affinity IL-2 receptor CD25. Evaluating our previous FCT-funded project, we are now about to publish the first part of its results, showing that SLE patients and their unaffected first-degree relatives both shared reduced CD25 on early Tregs, while only Tregs of manifest SLE patients showed a specific and drastic reduction or absence of the otherwise strong CD25 upregulation upon Treg activation. Also studying separate longitudinal sample collections

from 33 SLE patients, we have found that disease activity-associated Treg measures were not time-invariant but rather reflected the degree of frequency fluctuation over time, and that time courses of the individual patients were compatible with periodic oscillations. Based on this, we are currently following the hypothesis that the IL-2 dependent T-cell regulation defect in SLE essentially consists in a dynamic instability of Treg homeostasis. We found corroborating evidence for this in cytokine profiles, gene expression and a dynamic differential equation-based model.

LAB MEMBERS IN 2016

Nuno Costa, External PhD student

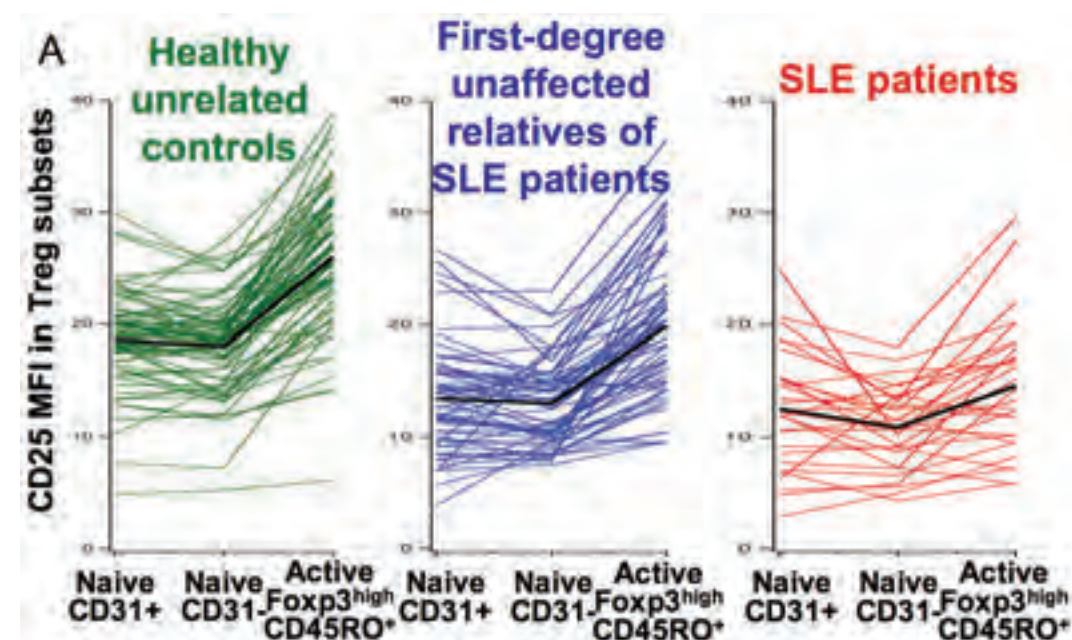


Figure: Surface CD25 in FOXP3⁺ Treg subsets in SLE patients, unaffected first-degree relatives and unrelated healthy controls. Each line represents an individual; lines are drawn from early to late Treg subsets.

E-MAIL: cfesel@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/cfesel>

CELLULAR & SYSTEMS NEUROBIOLOGY

GROUP LEADER
FONSECA, ROSALINA



RESEARCH INTERESTS

In the last decade, memory maintenance has evolved as a highly dynamic process. The synaptic-tagging and capture model (STC), now extended from synaptic to system level including to humans, provides a conceptual basis for how short-term memory can be consolidated

to long-term memory within a specific time frame. The experimental demonstration of STC has revealed that associative forms of synaptic plasticity can occur within large time-windows, relying on the sharing of a common pool of plasticity-related proteins.



MAIN ACHIEVEMENTS

Synaptic cooperation and competition are two synaptic integration mechanisms that allow events, separated in time by several minutes, to be associated as long-term memories. To address the significance of the rules observed at the cellular level to memory maintenance, we used a system very well known from the anatomically and behaviourally point of view and were able to show that the thalamic and cortical synapses projecting to pyramidal neurons of the lateral amygdala al-

so engage in synaptic cooperation. We also found that the endocannabinoid signalling plays a crucial role in determining the temporal window for synaptic cooperation. Interestingly, cortical and thalamic synapses also engage in synaptic competition and their temporal dynamics is different. Also, the endocannabinoid receptor, CB1R is involved in this asymmetric synaptic competition. We are currently addressing whether these rules are relevant for discriminative fear learning.

LAB MEMBERS IN 2016

Ana Drumond, Masters student
Natália Madeira, Trainee
João Vian, Visitor

FUNDING

- BIAL Foundation
- Brain and Behavioral Foundation
- Fundação para a Ciência e a Tecnologia

PUBLICATIONS

Drumond, A., Madeira, N., Fonseca, R. (2016) Endocannabinoid signaling and memory dynamics: a synaptic perspective. *Neurobiol Learn Mem.* [Epub ahead of print].

Fonseca, R. (2016) The aging memory: modulating epigenetic modifications to improve cognitive function. *Neurobiol Learn Mem.* 133: 182-184.

Szabó, E.C., Manguinhas, R., Fonseca, R. (2016) The interplay between neuronal activity and actin dynamics mimic the setting of an ltd synaptic tag. *Sci Rep-Uk.* 6: 33685.

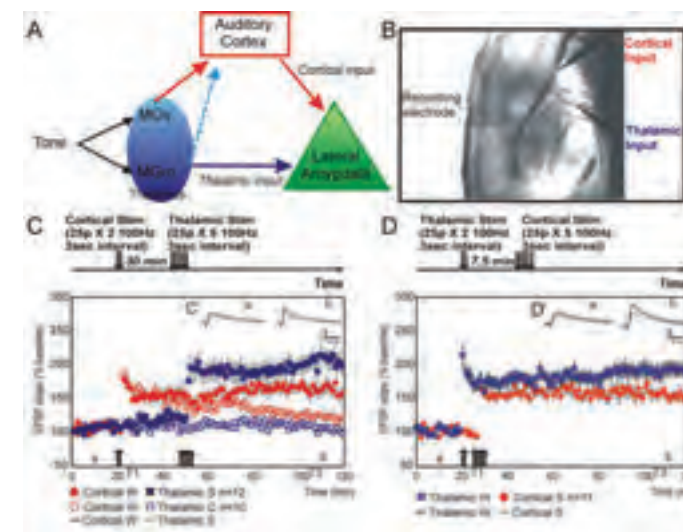


Figure: A) Graphic representation of the connections to the lateral nucleus (LA) of the amygdala. The thalamic nuclei MGv and MGm receive information from the tone and project strongly to the auditory cortex and to the LA respectively. The MGm nuclei also project weakly to the auditory cortex contributing to an indirect connection to the LA nuclei. B) Image from a coronal brain slice showing the LA and the positioning of both stimulating electrodes and the recording electrode. C) A transient LTP induced by weak stimulating the cortical input (open red symbols) is converted into a long-lasting LTP (solid red symbols) by subsequent strong stimulation of the thalamic pathway (solid blue symbols). This thalamic-to-cortical cooperation operates within a long time scale (30 min) and is dependent on protein synthesis (data not shown). D) Similarly, transient LTP induced by weak thalamic stimulation (light blue symbols) is converted into L-LTP by subsequent strong stimulation of the cortical input (red symbols). However, cortical-to-thalamic cooperation only occurs within a shorter time scale (7.5 min).

See <https://www.youtube.com/watch?v=ExiDGpOApSQ&t=2s> for description of this work.

E-MAIL: rfonseca@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/rfonseca>

MATHEMATICAL MODELLING OF BIOLOGICAL PROCESSES

GROUP LEADER
GJINI, ERIDA



RESEARCH INTERESTS

We develop mathematical and computational frameworks to understand population dynamics, interactions, and intervention effects in microbial ecosystems. Our models are data-driven, integrated with sophisticated parameter estimation procedures. With the models, we aim to extract processes from patterns that are observed at different biological, temporal and spatial scales, and

test competing mechanistic hypotheses about the data. Our research spans a wide range of systems, including *Streptococcus pneumoniae* bacteria, African trypanosomes and antigenic variation, antimicrobial resistance dynamics and evolution, infection control and host immunity processes.



MAIN ACHIEVEMENTS

- 2 new papers departing from previous research and with new collaborators.
- Established 2 important collaborations in the USA at University of Tennessee and University of Michigan.
- First research grant in collaboration with University of Michigan – awarded by FLAD-NSF.
- 3 invited talks in Portuguese institutions.
- 3 other papers completed and in review by the end of 2016.
- Media attention on the PLOS Comp. Biology paper (Portuguese national newspaper, RTP TV channel, and Antena 1 radio programme).

LAB MEMBERS IN 2016

Joana Teixeira, Masters student | Started in September
Maria Gaivão, Technician | Started in May; left in July
Maria Pereira, Trainee | Started in January; left in March
Patrícia Brito, Visitor | Started in July

SOFTWARE DEVELOPMENT IN 2016

R-package SiMRiv

(In collaboration with Lorenzo Quaglietta and Miguel Porto)

Individual-based, spatially-explicit simulation and analysis of multi-state movements in river networks and heterogeneous landscapes. Provides functions to generate and analyse individual-based spatially-explicit simulations of multi-state movements in heterogeneous landscapes, based on "resistance" rasters.

Public website: <https://cran.r-project.org/web/packages/SiMRiv/index.html>

SELECTED PUBLICATIONS*

Gjini, E., Brito, P.H. (2016) Integrating antimicrobial therapy with host immunity to fight drug-resistant infections: classical vs. adaptive treatment. *PLoS Comput Biol.* 12: e1004857.

Gjini E., Madec, S. (2016). A slow-fast dynamic decomposition links neutral and non-neutral coexistence in interacting multi-strain pathogens. *Theor Ecol.* 1-13.

Gjini, E., Valente, C., Sá-Leão, R., Gomes, M.G.M. (2016) How direct competition shapes coexistence and vaccine effects in multi-strain pathogen systems. *J Theor Biol.* 388: 50-60.

*The complete list of publications is available on section 3. Publications.

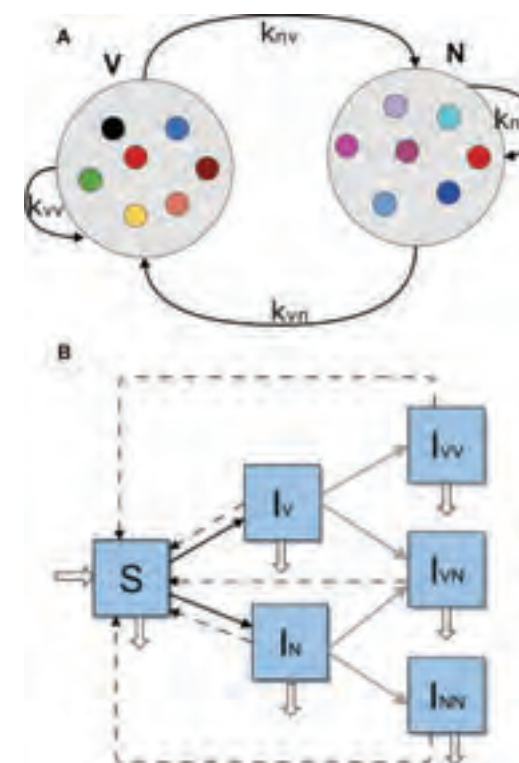


Figure: Model diagram for co-colonisation dynamics in a multi-strain system. A) Pathogen subtypes are grouped in two sets, V and N, characterised by within-group and between-group interaction. B) Susceptible-Infected-Susceptible model structure with single and dual colonization. The black arrows refer to acquisition of a first clone. The grey arrows refer to altered acquisition of a secondary clone in an already colonised host, where clone interactions can range from competition to cooperation. The dashed arrows depict colonization clearance. The white arrows reflect host demographic processes: birth and death. This model is studied in the *Theor Ecol* paper (2016), where a slow-fast dynamics approach interpolates between a neutral and non-neutral model for multi-strain coexistence, and quantifies the asymmetries that are important for the maintenance and stabilisation of diversity.

E-MAIL: egjini@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/egjini>

EXTERNAL WEBSITE: <https://biomathematica.wordpress.com/>

SCIENCE & POLICY

GROUP LEADER
GONÇALVES SÁ, JOANA



RESEARCH INTERESTS

Individual decisions can have a large impact on society as a whole. This is obvious for political decisions, but still true for daily decisions made by common citizens. Individuals decide how to vote, whether or not to stay at home when they feel sick, to drive or to take the bus. In isolation, these individual decisions have a negligible social outcome, but collectively they determine the results of an election and the start of an epidemic. We

are interested in understanding these decision-making events, particularly the behaviours that affect health and disease, expecting that this deeper knowledge will lead to better public decisions. We use a systems-level and big data approach to study complex problems at the interface between Biology, Computation, Social Sciences and Mathematics.



MAIN ACHIEVEMENTS

- Developed a computational system to identify the onset of flu in 8 countries. It was tested in real-time by Portuguese health authorities, during the 2015/16 flu season. This work was accepted for publication.
- Co-organised the “Citizen Forum”: a panel of citizens, randomly sampled to mirror society’s diversity. The first deliberative session will take place in the first week of 2017.
- The PI coordinated “Lab in a Box”, a scientific kit aimed to bring science to the classroom. Approximately 70 protocols (in Life, Environmental and Physical Sciences) were developed and tested by a large team of volunteers. As a pilot, 50 kits with materials were sent to Cabo Verde and teachers were trained to use it. This project is supported by UNESCO, among others.

LAB MEMBERS IN 2016

Frederico Francisco, Postdoc | Started in March
Miguel Won, Postdoc
Caetano Mendes, PhD student, 2013 PIBS
Manuel Pita, Postdoc and Visitor
Paulo Almeida, Technician | Started in January
Inês Maciel, Administrative Personnel
Carla Semedo, Administrative Personnel

PUBLICATIONS

Muller, N., Piel, M., Calvez, V., Voituriez, R., Gonçalves-Sá, J., Guo, C-L, Jiang, X., Murray, A., Meunier, N. (2016). A predictive model for yeast cell polarization in pheromone gradients. *PLoS Comput Biol.* 12(4): e1004795.

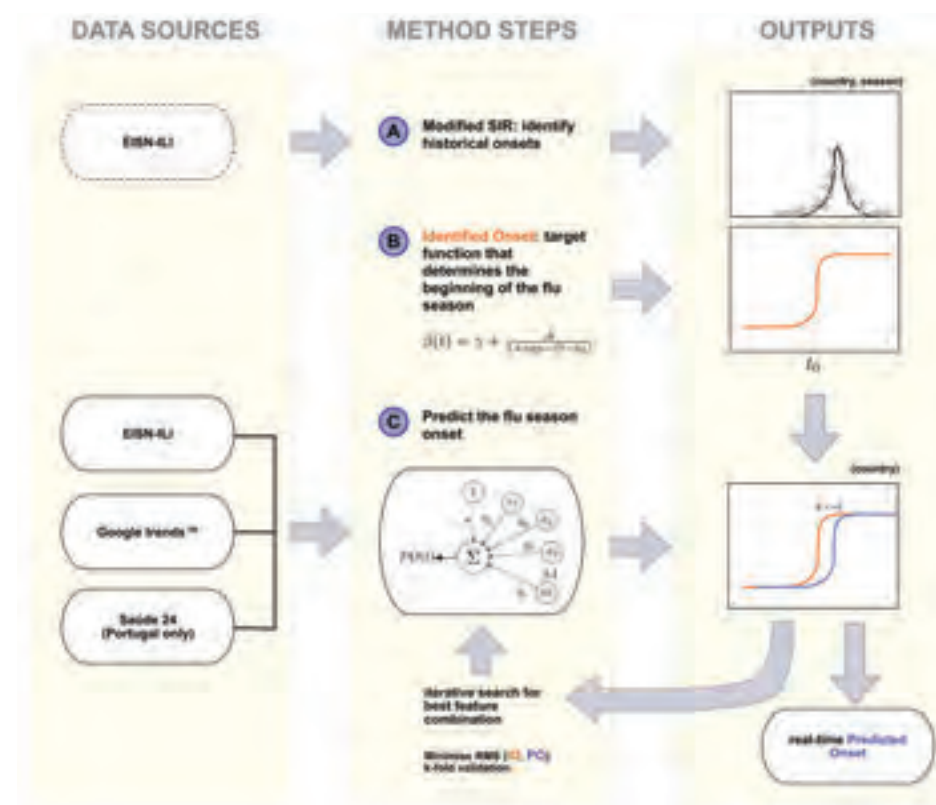


Figure: 3-step flow diagram. Data Sources and diagrammed method. Left column (labelled Data Sources) shows the different data used at the different stages; the middle column (labelled Methods Steps) shows the different methods and approaches developed; the column on the right (labelled Outputs) shows the fits and curves used for comparison. Alternative Influenza Like Illness (ILI)-related data sources (bottom left column) were used as input to create a Prediction Onset (PO) function (blue line, bottom right column). The PO is chosen in an iterative process, in real-time, as the one that minimises the difference to the Identified Onset (orange line). The IO is the “gold-standard”, created from traditional data.

E-MAIL: mjsa@igc.gulbenkian.pt
IGC WEBPAGE: <http://www.igc.gulbenkian.pt/mjsa>

EVOLUTIONARY BIOLOGY

GROUP LEADER
GORDO, ISABEL



RESEARCH INTERESTS

The area of our research interests is Evolutionary Biology, with a great focus on microbial evolution. We combine both theoretical and empirical methods aiming at a better understanding of the major forces that shape variation in microbial populations. Present and future projects of the lab include:

- Study the process of adaptation in the context of ecosystems using *Escherichia coli* as a model organism.
- Test theoretical models of adaptive evolution against

genotypic and phenotypic data obtained in experimentally adapted bacterial populations.

- Determine the level of epistatic interactions on fitness between mutations that confer resistance to commonly used antibiotics.
- Study the evolution of mutation rates and determine the factors that influence polymorphism for mutation rates in bacterial populations.



MAIN ACHIEVEMENTS

In the context of antibiotic resistance, we have shown that environmental variation may greatly affect the fitness effects of multiple resistance in bacteria. In particular we show that double resistance to two commonly used antibiotics can (unfortunately) increase bacteria survival in environments typical of infection. In the context of health and the microbiota, we have

shown that a regime of strong mutation-strong selection is characteristic of the evolutionary process experienced by a typical bacteria, thus suggesting that, unlike what is currently assumed, the time scale of ecological and evolutionary change in the microbiota may be similar.

LAB MEMBERS IN 2016

Roberto Balbotin, Postdoc

Paulo Durão, Postdoc

Nelson Frazão, Postdoc

Ricardo Ramiro, Postdoc

Ana Margarida Sousa, Postdoc | Left in November

Jorge Sousa, Postdoc | Left in August

João Batista, External PhD student | Left in December

Luís Cardoso, PhD student, 2015 IBB

Daniela Güleresi, Lab manager

Hugo Barreto, Trainee

Ana Henriques, Trainee | Started in July; left in September

Cátia Pereira, Trainee | Started in July; left in October

André Rocha, Visitor

FUNDING

- Deutsche Forschungsgemeinschaft

SELECTED PUBLICATIONS*

Durão, P., Güleresi, D., Proença, J., **Gordo, I.** (2016) Enhanced survival of rifampicin and streptomycin double resistant *E. coli* inside macrophages. *Antimicrob Agents Ch.* 60(7): 4324-4332.

Lourenço, M., Ramiro, R.S., Güleresi, D., Barroso-Batista, J., Xavier, K.B., **Gordo, I.**, Sousa, A. (2016) A mutational hotspot and strong selection contribute to the order of mutations selected for during *Escherichia coli* adaptation to the gut. *PLoS Genet.* 12: e1006420.

Ramiro, R.S., Costa, H., **Gordo, I.** (2016) Macrophage adaptation leads to parallel evolution of genetically diverse *Escherichia coli* small-colony variants with increased fitness in vivo and antibiotic collateral sensitivity. *Evol Appl.* 9: 994-1004.

*The complete list of publications is available on section 3. Publications.

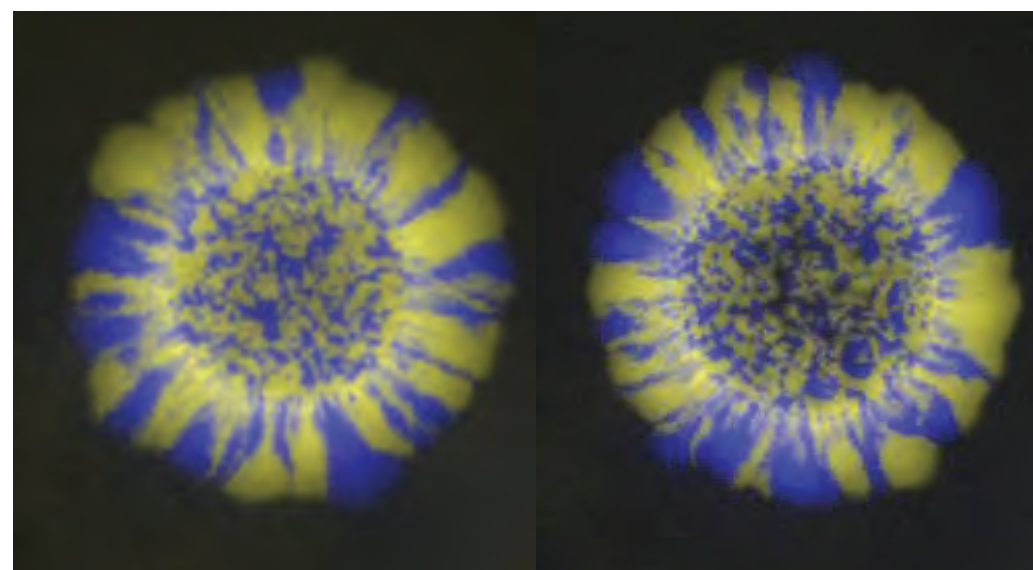


Figure: Rifampicin mutant (CFP) competing against the wildtype (YFP) on solid medium (left). Two differentially labelled wildtypes competing against each other on solid medium (right). Images from Paulo Durão and Cátia Pereira.

E-MAIL: igordo@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/igordo>

EXTERNAL WEBSITE: <http://eao.igc.gulbenkian.pt/EVB/index.html>

HOST-PATHOGEN CO-EVOLUTION

GROUP LEADER
HOWARD, JONATHAN C.



RESEARCH INTERESTS

We use the protozoan parasite *Toxoplasma gondii* and a natural host, the house mouse, to understand the interplay between mechanisms of virulence on the part of the parasite, and mechanisms of resistance on the part

of the host. These opposing processes usually achieve the desired balance of pathogen transmission and host survival.



MAIN ACHIEVEMENTS

To understand the adaptive significance of hyper-virulent *Toxoplasma* strains.

LAB MEMBERS IN 2016

Joana Loureiro, Postdoc
Catalina Alvarez, PhD student, 2015 IBB
Ana Rodrigues, PhD student, 2015 PGCD
Cláudia Campos, Lab manager
Julia Saggau, Trainee
Helen Springer-Frauenhoff, Visitor

SELECTED PUBLICATIONS*

Hermanns, T., Muller, U.B., Konen-Waisman, S., Howard, J.C., Steinfeldt, T. (2016). The *Toxoplasma gondii* *rho*try protein ROP18 is an *Irga6*-specific kinase and regulated by the dense granule protein GRA7. *Cell Microbiol.* 18(2): 244-259.

Maric-Biresev, J., Hunn, J.P., Krut, O., Helms, J.B., Martens, S., Howard, J.C. (2016) Loss of the interferon- γ -inducible regulatory immunity-related GTPase (*Irg*), *Irgm1*, causes activation of effector IRG proteins on lysosomes, damaging lysosomal function and predicting the dramatic susceptibility of *Irgm1*-deficient mice to infection. *BMC Biol.* 14: 33.

Müller, U.B., Howard, J.C. (2016) The impact of *Toxoplasma gondii* on the mammalian genome. *Curr Opin Neurobiol.* 32: 19-25.

*The complete list of publications is available on section 3. Publications.

FUNDING

- European Commission

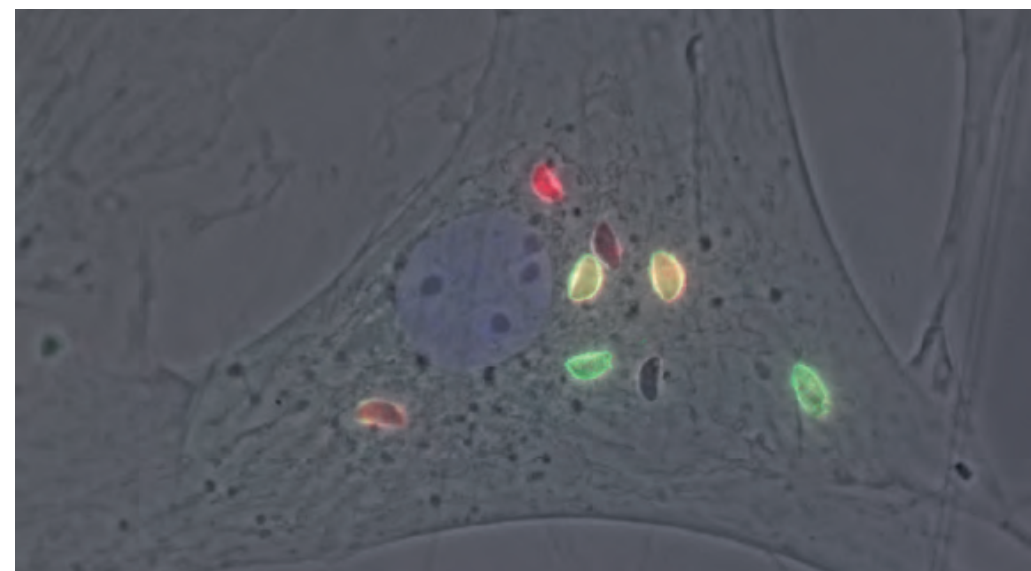


Figure: IFN gamma-induced murine fibroblast (6hrs) at 7 hours post-*Toxoplasma gondii* infection. The intracellular *Toxoplasma* Gra7 (red), *Irgb6* (green) and cell nucleus (blue) are marked.

E-MAIL: jhoward@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/jhoward>

ACTIN DYNAMICS

GROUP LEADER
JANODY, FLORENCE



RESEARCH INTERESTS

The actin cytoskeleton being the engine of cellular migration, much attention has been focused on identifying actin regulators involved in the dissemination of malignant tumour cells away from the primary tumour. However, actin dynamics is also involved in a multitude of other cellular functions that are all affected during epithelial cell carcinogenesis, including cell polarity, shape and stiffness, trafficking, signalling and cytokinesis. Thus, actin dysregulation is probably a central contrib-

utor to all stages in the evolution of epithelial cancers. Using *Drosophila melanogaster*, inducible human cell lines that recapitulate the multistep development of cancer, tumour samples and computational modelling, we aim to understand how cancer pathways hijack the actin cytoskeleton to control key cellular functions involved in the development of pre-malignant and malignant features.



MAIN ACHIEVEMENTS

We have shown that prior to cells acquiring malignant features, they undergo a transient stress-fibre-dependent stiffening state leading to cell proliferation and the progression towards a fully transformed state (Tavares *et al.*, resubmitted; collaboration J. Paredes; J. Pereira Leal and J. Guck). We have demonstrated that the nu-

clear protein related to the Sno/Ski family of co-repressors Dachshund potentiates Hedgehog signalling to ensure the proper timing of *Drosophila* eye differentiation and the accuracy of cell cycle control (Bras-Pereira *et al.*, 2016; collaboration F. Casares).

LAB MEMBERS IN 2016

Catarina Brás-Pereira, Postdoc | Left in August

Praachi Jain, PhD student, 2014 IBB

Sandra Tavares, PhD student, 2012 PIBS

Clara Barreto, Masters student

Filipe Viegas, Masters student | Left in October

Margarida Araújo, Trainee | Left in December

PUBLICATIONS

Brás-Pereira, C., Potier, D., Jacobs, J., Aerts, S., Casares, F., Janody, F. (2016) *Dachshund potentiates hedgehog signaling during Drosophila retinogenesis*. *PLoS Genet.* 12: e1006204.

FUNDING

- Fundação para a Ciência e a Tecnologia
- Associação Laço

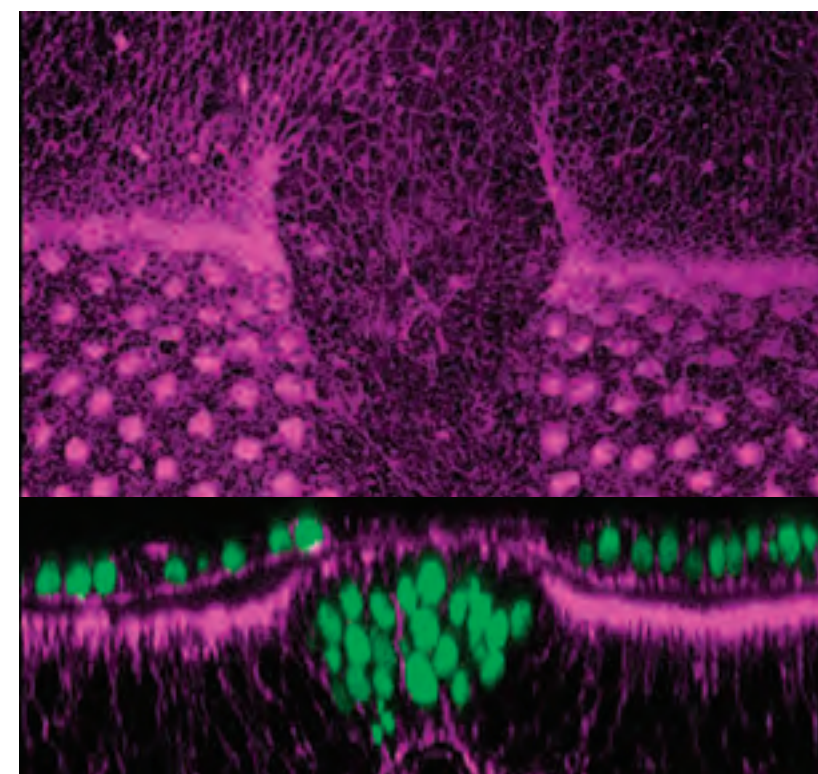


Figure: Loss of *dachshund* function in cells with impaired Decapentaplegic signalling abrogates *Drosophila* retinal development. (*dac*, *smo* double-mutant clones marked positively with GFP (green), stained with phalloidin (purple) to outline the cell shape. (Upper image) Standard confocal image (mutant cells are not labelled). (Bottom image) Cross-section through the eye disc epithelium along the morphogenetic furrow.

E-MAIL: fjanody@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/fjanody>

EPIGENETIC MECHANISMS

GROUP LEADER
JANSEN, LARS E.



RESEARCH INTERESTS

The genome is propagated through cell division by duplication of a full set of chromosomes followed by the faithful separation of each chromosome copy into two new daughter cells during mitosis. In addition, so-called “epigenetic” chromosome structures that maintain functional chromosomes and that “memorize” the transcriptional state of a cell lineage are also maintained through

mitotic and sometimes even meiotic divisions.

Although the mechanism of duplication and mitotic transmission of DNA sequences has been worked out decades ago, how the more fluid epigenetic information of gene activities and chromosome structure is maintained in time is not understood. We are interested in resolving this.



MAIN ACHIEVEMENTS

In 2016, we completed a major research line in our lab that focused on how epigenetically-controlled centromeric chromatin is replicated along the cell cycle. This work, driven by Ana Stankovic, a PhD student, has revealed how major cell cycle kinases link the process of centromeric chromatin assembly to cell cycle progression. This work has been accepted for publication in

Molecular Cell. In addition, we have developed a novel tool to determine histone dynamics and inheritance, genome-wide. This has led to the direct demonstration that histone turnover changes during mouse differentiation and defined new putative enhancer regions that may be involved in control of gene expression in mouse ES cells. This work was published this year in *eLife*.

LAB MEMBERS IN 2016

Inês Milagre, Postdoc | Started in September

Sreyoshi Mitra, Postdoc

Marina Pineda, Postdoc

Wojciech Siwek, Postdoc

Dragan Stajic, PhD student, 2013 PIBS

Ana Stankovic, PhD student, 2011 PIBS

Rúben Abreu, Masters student | Left in February

Sebastiaan Van Den Berg, Masters student | Started in January; left in December

João Mata, Technician

Samuel East, Trainee | Started in August; left in October

FUNDING

- European Research Council

PUBLICATIONS

Deaton, A.M., Gómez-Rodríguez, M., Mieczkowski, J., Tolstorukov, M.Y., Kundu, S., Sadreyev, R.I., Jansen, L.E.T., Kingston, R.E. (2016) *Enhancer regions show high histone H3.3 turnover that changes during differentiation*. *Elife*. 5: e15316.

Stankovic, A., Guo, L.Y., Mata, J.F., Bodor, D.L., Cao, X., Bailey, A.O., Shabanowitz, J., Hunt, D.F., Garcia, B.A., Black, B.E., Jansen, L.E.T. (2016) *A dual inhibitory mechanism sufficient to maintain cell-cycle-restricted CENP-A assembly*. *Mol Cell*. [Epub ahead of print].

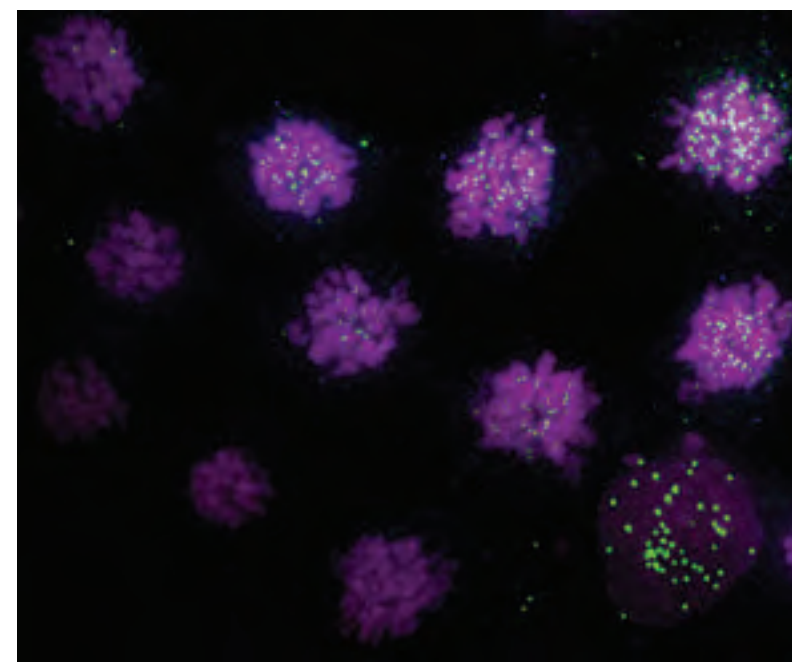


Figure: Human cancer cells are arrested in mitosis. Chromosomes are condensed and arranged for separation into daughter cells that will inherit both genetic and epigenetic information. Centromeres that are responsible for chromosome segregation are marked in green.

E-MAIL: ljansen@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/ljansen>

EXTERNAL WEBSITE: <http://sites.igc.gulbenkian.pt/epilab/>

PATTERNING AND MORPHOGENESIS

GROUP LEADER
MALLO, MOISÉS



RESEARCH INTERESTS

The ultimate goal of our research group is to understand the molecular mechanisms translating patterning information into morphogenetic processes during vertebrate embryonic development. One of the main current focuses of our laboratory aims at determining what regulates the function of the axial progenitors that make the different body elements and the role they play in the

evolution of the vertebrate body plan. Most of our work uses the mouse as the model system by means of *in vivo* functional analyses complemented with *in vitro* differentiation systems involving stem and progenitor cells. We have recently incorporated other model systems to address Evo-Devo questions derived from our research.



MAIN ACHIEVEMENTS

We have shown that the balance between Oct4 and Gdf11 signalling activities is a key regulator of the trunk length diversity among vertebrates. This conclusion was built on experiments in mice modulating the activity of these factors using loss and gain of function approaches. We also showed that the extremely long trunks of snakes resulted from persistent Oct4 activity, derived from their acquisition of a different set of

Oct4 regulatory elements.

We have shown that the Snail gene is responsible for the epithelial to mesenchymal transition that relocates the axial progenitors from the epiblast into the tail bud during the trunk to tail transition.

Using a genetic trick, we isolated pure populations of axial progenitors and identified their molecular fingerprint using an RNA-seq approach.

LAB MEMBERS IN 2016

Ana Rita Aires, Postdoc

Ana Casaca, Postdoc

Luísa Machado, Postdoc

Irma Varela Lasheras, PhD student, 2011 PIBS

André Dias, Masters student

André Mesquita, Masters student | Started in September

Ana Nóvoa, Technician

FUNDING

- Fundação para a Ciência e a Tecnologia
- Santa Casa da Misericórdia de Lisboa

SELECTED PUBLICATIONS*

Aires, R., Jurberg, A.D., Leal, F., Nóvoa, A., Cohn, M.J., Mallo, M. (2016) Oct4 is a key regulator of vertebrate trunk length diversity. *Dev Cell*. 38: 262-274.

Casaca, A., Nóvoa, A., Mallo, M. (2016) Hoxb6 can interfere with somitogenesis in the posterior embryo through a mechanism independent of its rib-promoting activity. *Development*. 143: 437-448.

Guerreiro, I., Gitto, S., Novoa, A., Codourey, J., Nguyen, H.T.H., Gonzalez, F., Milinkovitch, M.C., Mallo, M., Duboule, D. (2016) Reorganisation of hoxd regulatory landscapes during the evolution of a snake-like body plan. *Elife*. 5: e16087.

*The complete list of publications is available on section 3. Publications.

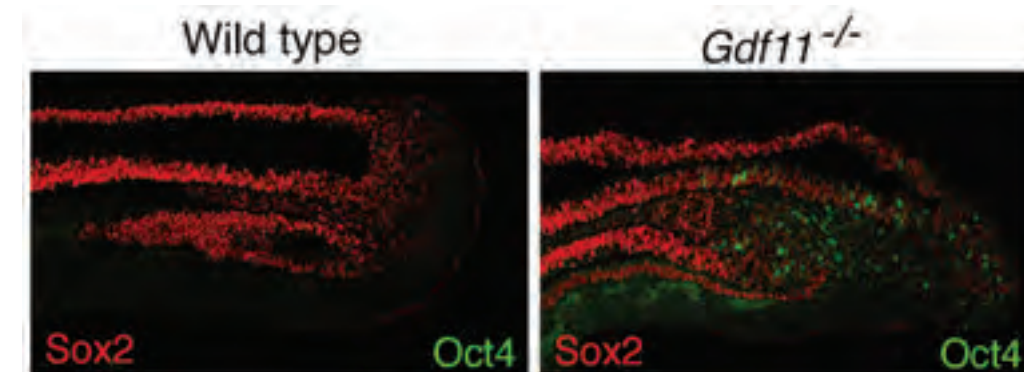


Figure: Oct4 is active in the progenitor compartment of Gdf11^{-/-} embryos. Immunofluorescence analysis of Oct4 (green) on sagittal sections of tails from wild type and Gdf11 mutant embryos at E10.5. It shows presence of Oct4 in the mutants but not in the wild type embryos. Sox2 was also analysed (red) to show the position of the neural tube (upper tube) and the endoderm (lower tube).

E-MAIL: mallo@igc.gulbenkian.pt
IGC WEBPAGE: <http://www.igc.gulbenkian.pt/mmallo>

LYMPHOCYTE DEVELOPMENT & LEUKEMOGENESIS

GROUP LEADER
MARTINS, VERA



RESEARCH INTERESTS

Research in the lab focuses on the development of T lymphocytes and on the processes that lead to leukaemia from precursors of T lymphocytes. We use mouse models that enable us to assess small cell populations in the thymus (where T lymphocytes develop) and learn how

they interact with each other. One of our major goals is to learn about the genes that regulate these interactions and whether they are involved in the early steps of leukemogenesis.



MAIN ACHIEVEMENTS

I established the independent research group I came to start in September 2015. We now manage one of the largest mouse colonies at IGC, which we greatly owe to the outstanding support of the Animal Facility team. With the support of the Transgenics Unit and the substantial contribution of Moisés Mallo, we established one novel mouse mutant line, and have two others in the pipeline (the three very demanding from the tech-

nical point of view). The conditions for Flow cytometry analysis have greatly improved and we can now perform analysis using complex multicolor panels on a daily basis. A postdoc and a PhD student joined the team, which means we are progressing in the 3 fronts of the research programme I proposed when joined the IGC.

LAB MEMBERS IN 2016

Luna Ballesteros, Postdoc | Started in April

Rafael Paiva, PhD student, 2016 IBB | Started in July

Carolina Alves, Lab manager

Joana Silva, Technician

Rita Simões, Trainee | Left in June

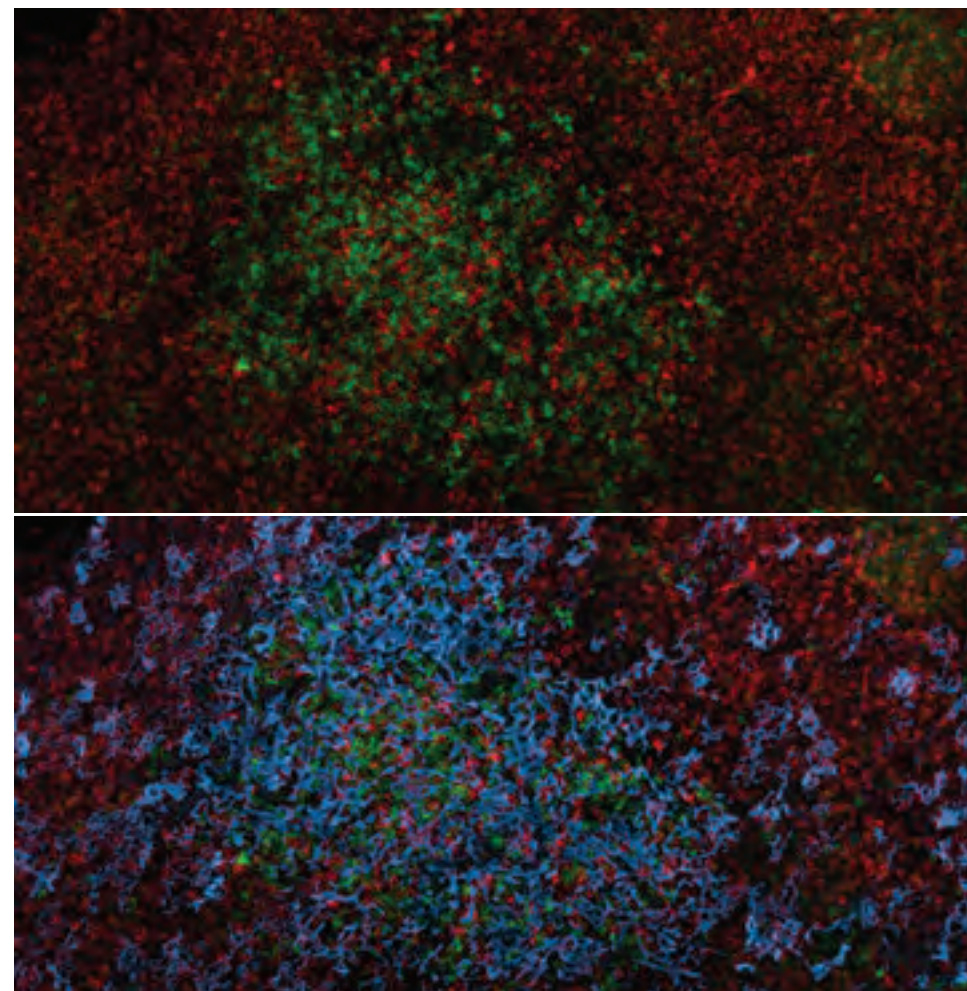


Figure: (Upper image) Section of a wild type thymus graft deprived of progenitor import and stained for the T lymphocyte markers CD4 (green) and CD8 (red). (Bottom image) The same section was also stained for cytokeratin 5 (cyan), which identifies medullary epithelial cells and enables the visualisation of medullary areas in this thymus graft.

E-MAIL: vmartins@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/vmartins>

DEVELOPMENT, EVOLUTION & THE ENVIRONMENT

GROUP LEADER
MIRTH, CHRISTEN



RESEARCH INTERESTS

Changes in the environment profoundly shape developmental and behavioural responses in all organisms, a process known as phenotypic plasticity. In my laboratory, we seek to understand how environmental cues influence development and behaviour and how these interactions evolve to generate species-specific phenotypes. We approach this problem at multiple biological

levels with the goal of understanding: 1) the mechanisms that allow the environment to modify the synthesis of hormones necessary for development; 2) how organs interpret hormonal cues to coordinate their development with that of the whole body, and; 3) how the choices animals make while foraging impact their development and life history.



MAIN ACHIEVEMENTS

In 2016, my lab continued to contribute to our understanding of how nutrition regulates organ and body growth. Our studies in the ovary demonstrate that the steroid hormone ecdysone switches the relative roles of the signalling pathways that regulate growth and patterning in this organ (Mendes & Mirth, 2016). This highlights a mechanism that alters organ sensitivity

to environmental conditions, a hallmark of plasticity. In addition, we identified two peptide hormones that relay the larval nutritional status to the rest of the body to regulate growth and developmental timing (Koyama *et al.*, 2016). The findings from these studies have broadened our perspective of how environmental conditions like nutrition alter development.

LAB MEMBERS IN 2016

Takashi Koyama, Postdoc

Nuno Soares, PhD student, 2013 PIBS

Pedro Antunes, Masters student | Started in June

FUNDING

- Fundação para a Ciência e a Tecnologia

PUBLICATIONS

Koyama, T., Mirth, C.K. (2016) Growth-blocking peptides as nutrition-sensitive signals for insulin secretion and body size regulation. *PLoS Biol.* 14: e1002392.

Mendes, C.C., Mirth, C.K. (2016) Stage-specific plasticity in ovary size is regulated by insulin/insulin-like growth factor and ecdysone signaling in *Drosophila*. *Genetics*. 202(2): 703-19.

Mirth, C.K., Anthony, F.W., Shingleton, A.W. (2016) Allometry and size control: what can studies of body size regulation teach us about the evolution of morphological scaling relationships?. *Curr Opin Insect Sci.* 13: 93-98.



Figure: *gbp1, gbp2 ex67* mutant adult is smaller than heterozygous adult. One-day-old female adults of mutant (right) and heterozygote (left) animals. Scale bars are 1 mm.

E-MAIL: christen@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/cmirth>

EXTERNAL WEBSITE: <http://themirthlab.org/>

INNATE IMMUNITY AND INFLAMMATION

GROUP LEADER
MOITA, LUÍS FERREIRA



RESEARCH INTERESTS

Severe sepsis remains a poorly understood systemic inflammatory condition with high mortality rates and limited therapeutic options outside of infection control and organ support measures. Based on our recent discovery in mice showing that anthracycline drugs prevent organ failure without affecting the bacterial burden in a model of severe sepsis, we propose that strategies aimed at target organ protection have extraordinary potential for the treatment of sepsis and possibly for other inflam-

mation-driven conditions. However, the mechanisms of organ protection and disease tolerance are either unknown or poorly characterised. The central goal of this research programme is to identify and characterise novel cytoprotective mechanisms, with a focus on DNA damage response dependent protection activated by anthracyclines as a window into stress-induced genetic programmes leading to tissue protection.



MAIN ACHIEVEMENTS

1 - Proposed the addition of a novel component to the current conceptual framework for the initiation of innate immune responses based on the surveillance of

homeostasis perturbations.

2 - European patent on the use of anthracyclines to treat sepsis awarded to our laboratory.

LAB MEMBERS IN 2016

Ana Costa, Postdoc
Rita Ferreira, Postdoc
Catarina Moita, Postdoc
Philipp Seidel, Postdoc | Started in May
Henrique Colaço, PhD student, 2015 IBB
Isa Santos, External PhD student
Tiago Velho, External PhD student
André Barros, Technician | Started in September
Dora Pedroso, Technician | Started in February
Sarah Macris, Trainee | Started in May; left in June
Kirandeep Saini, Trainee | Started in July; left in September
Susana Moreira, Visitor

SELECTED PUBLICATIONS*

Colaço, H.G., Moita, L.F. (2016) Initiation of innate immune responses by surveillance of homeostasis perturbations. *FEBS J.* 283(13): 2448–2457.

Neves-Costa, A., Moita, L.F. (2016) Modulation of inflammation and disease tolerance by DNA damage response pathways. *FEBS J.* 284(5): 680–698.

Velho, T.R., Santos, I., Póvoa, P., Moita, L.F. (2016) Sepsis: the need for tolerance not complacency. *Swiss Med Wkly.* 146: w14276.

*The complete list of publications is available on section 3. Publications.

FUNDING

- European Research Council
- Fundação para a Ciência e a Tecnologia

PATENTS IN 2016

- Anthracycline for using in the treatment of sepsis, 12780554.7, 15.12.2016, Luis Ferreira Moita

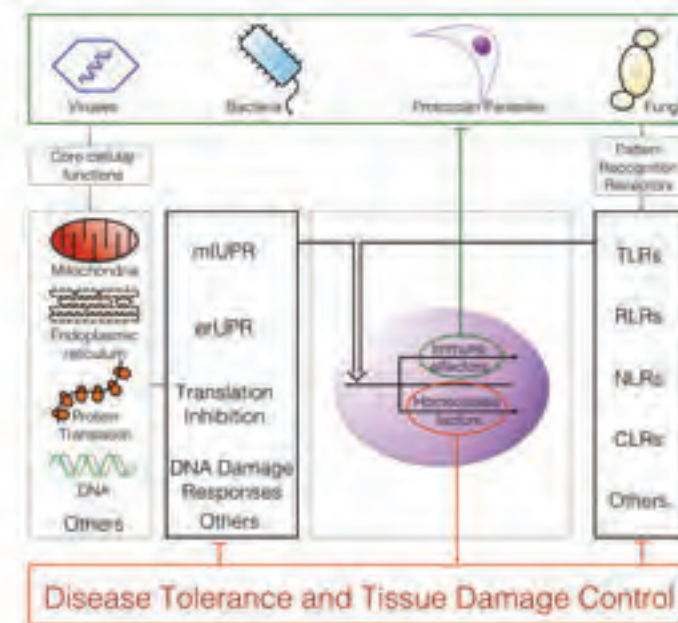


Figure: Initiation of innate immune responses by surveillance of homeostasis perturbations.

E-MAIL: lmoita@igc.gulbenkian.pt
IGC WEBPAGE: <http://www.igc.gulbenkian.pt/lmoita>

CHROMOSOME DYNAMICS

GROUP LEADER
OLIVEIRA, RAQUEL A.



RESEARCH INTERESTS

The *Chromosome Dynamics* Lab studies how chromosome architecture contributes to faithful genome segregation. Genome stability relies on the fact that at each round of cell division, the genetic information is properly segregated into the two daughter cells. Proper completion of this process, in turn, depends on major changes in chromosome organisation including cohesion between the two sister chromatids and condensation of the long

DNA fibers. We aim to dissect how mitotic chromosomes are assembled and how their physical properties contribute to faithful cell division. By studying the contribution of chromosome structure in the mechanics of nuclear division we aim to identify novel routes to aneuploidy that underlie several human conditions, including developmental diseases, cancer and infertility.



MAIN ACHIEVEMENTS

To study mitotic chromosome organisation, we adopted a “reverse and acute approach” to reveal the requirements for key proteins in the maintenance of chromosome structure, with unprecedented temporal resolution. We have shown that topoisomerase II inhibition results in rapid chromosome decondensation while, unexpectedly, condensin I inactivation

leads to over-condensation of chromosome arms. This over-condensation results from the re-intertwining of previously separated sister chromatids. These results highlight that maintenance of chromosome architecture throughout metaphase is a far more dynamic process than previously anticipated. (Piskadlo *et al.*, in preparation).

LAB MEMBERS IN 2016

Sara Carvalho, Postdoc | Started in January
Leonardo Guilgur, Postdoc
Mihailo Mirkovic, PhD student, 2014 IBB
Ewa Piskadlo, PhD student, 2013 PIBS
Cíntia Ramos, PhD student, 2014 PGCD
Alexandra Tavares, Lab manager
Catarina Freire, Trainee | Started in July; left in September
Tiago Santos, Trainee | Started in July; left in September

PUBLICATIONS

Piskadlo, E., Oliveira, R.A. (2016) *Novel insights into mitotic chromosome condensation*. **F1000research**. 5: 1807.

FUNDING

- EMBO
- European Commission
- European Research Council
- Fundação para a Ciência e a Tecnologia

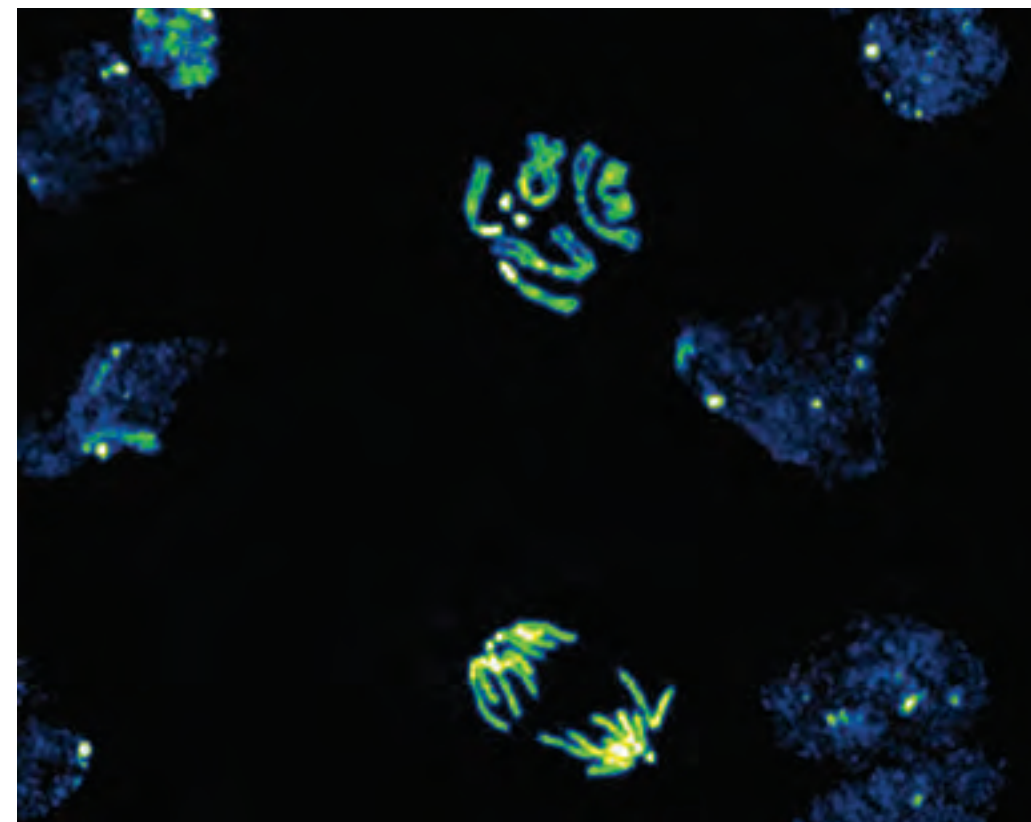


Figure: Cell divisions in *Drosophila* larval brain. Image from Alexandra Tavares.

E-MAIL: rcoliveira@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/rcoliveira>

EXTERNAL WEBSITE: <http://sites.igc.gulbenkian.pt/chr/>

INTEGRATIVE BEHAVIOURAL BIOLOGY

GROUP LEADER
OLIVEIRA, RUI F.



RESEARCH INTERESTS

Our main research interest is the integrative study of social behaviour, which combines the study of proximate causes (gene modules, hormones, neural circuits, cognitive processes) and ultimate effects (evolutionary consequences). In particular, we aim to understand how brain and behaviour can be shaped by social environment, and how the cognitive, neural and genetic mechanisms underlying plasticity in the expression of social behaviour

have evolved. For this purpose we use zebrafish and other selected fish species as study models. Current research questions centre on four topics: 1) evolution of social cognition and of its neuromolecular mechanisms; 2) genomic and epigenomic mechanisms of social plasticity; 3) neuroendocrinology of social interactions and of social plasticity; 4) fish cognition and welfare.



MAIN ACHIEVEMENTS

During 2016, the Oliveira lab particularly focused on the study of the role of oxytocin in social cognition in zebrafish, using relevant transgenic and mutant lines. Three main studies found: (1) developmental effects of oxytocin on zebrafish sociality in adulthood; (2) genotype-environment interaction in the effect of the oxytocin receptor gene on different aspects of zebrafish

social behaviour, namely social attraction, social memory and shoaling behaviour; and (3) effects of oxytocin in animacy (i.e. biological motion) detection. During this year the Oliveira lab started a new FCT grant, published 5 papers in peer-reviewed journals, and 2 PhD theses were completed.

LAB MEMBERS IN 2016

Felipe Espigares, Postdoc | Started in March
Ana Nunes, Postdoc
Gonalo Oliveira, Postdoc | Started in January; left in August
Magda Teles, Postdoc
Ibukun Akinrinade, PhD student, 2015 IBB
Sara Cardoso, External PhD student
Ana Faustino, External PhD student | Left in May
Ana Sofia F lix, External PhD student
Cl udia Gonalves, PhD student, 2016 PGCD | Started in November
J lia Pinho, External PhD student
Leonor Carreira, Masters student
Diogo Ribeiro, Masters student | Left in December
Daniela Santos, Masters student | Started in September
Raquel Martins, Technician | Left in August
Nasser Karmali, Trainee | Started in November
Diana Abad, Visitor | Started in June; left in September

FUNDING

- BIAL
- Funda o para a Ci ncia e a Tecnologia

SELECTED PUBLICATIONS*

Oliveira, R.F., Sim es, J.M., Teles, M.C., Oliveira, C.R., Becker, J.D., Lopes, J.S. (2016) Assessment of fight outcome is needed to activate socially driven transcriptional changes in the zebrafish brain. *Proc Natl Acad Sci USA*. 113: E654-661.

Teles, M.C., Gozdowska, M., Kalamarz-Kubiak, H., Kulczykowska, E., Oliveira, R.F. (2016) Agonistic interactions elicit rapid changes in brain nonapeptide levels in zebrafish. *Horm Behav*. 84: 57-63.

Teles, M.C., Cardoso, S.D., Oliveira, R.F. (2016) Social plasticity relies on different neuroplasticity mechanisms across the brain social decision-making network in zebrafish. *Front Behav Neurosci*. 10: 16.

*The complete list of publications is available on section 3. Publications.

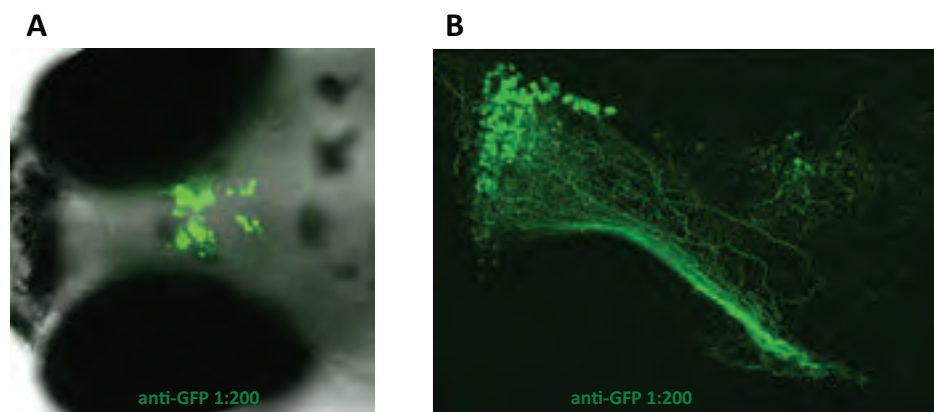


Figure: Visualisation of the oxytocinergic (OXT) neurons involved in zebrafish social behaviour: (A) 6 days post-fertilisation larvae whole-mount brain of an OXT-GFP transgenic fish (amplification = 40x); (B) adult brain sagittal section of an OXT-GFP transgenic fish (amplification = 10x).

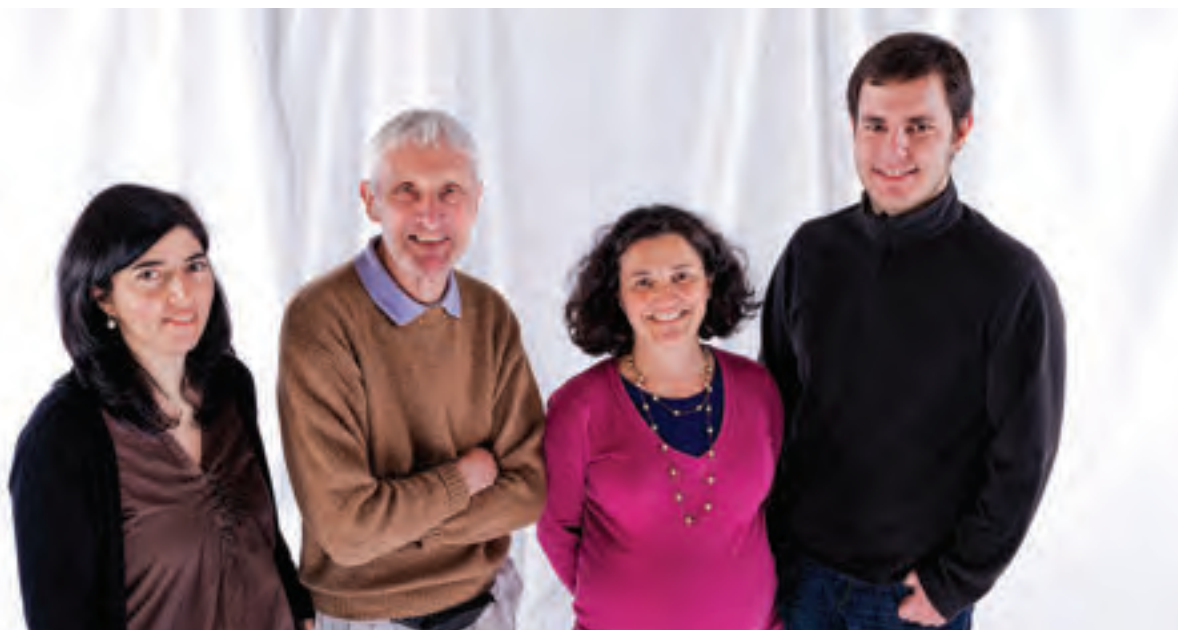
E-MAIL: roliveira@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/roliveira>

EXTERNAL WEBSITE: <https://oliveiralab.org/>

INFECTION & IMMUNITY

GROUP LEADER
PARKHOUSE, MICHAEL



RESEARCH INTERESTS

- Pathogen modulation of host cell biology and innate immunity
- Control of neurocysticercosis



MAIN ACHIEVEMENTS

- The African Swine Fever virus encoded non-essential, non-homologous, gene I329L inhibits Toll-like receptor activation through two mechanisms.
- The non-homologous HCMV gene UL76 induces cell cycle arrest via its conserved N-terminal domain and induces expression of IL-8 via its variable C-terminal domain.
- Development of a lateral flow assay for the rapid detection of extraparenchymal neurocysticercosis.

LAB MEMBERS IN 2016

Sílvia Correia, Postdoc

Rute Nascimento, Postdoc

Júlio Henriques, Masters student | Started in September

Pedro Moura, Technician | Started in February; left in August

Diogo Tomaz, Technician | Started in September

Catarina Azevedo, Trainee | Started in December

Ana Catarina Oliveira, Trainee | Started in May

FUNDING

- Fundação para a Ciência e a Tecnologia

SELECTED PUBLICATIONS

Carpio, A., Fleury, A., Parkhouse, R.M.E. (2016) Elimination of *Taenia solium* transmission in Peru. *New Engl J Med.* 375: 1196-1197.

Carpio, A., Romo, M.L., Parkhouse, R.M.E., Short, B., Dua, T. (2016) Parasitic diseases of the central nervous system: lessons for clinicians and policy makers. *Expert Rev Neurother.* 16(4): 401-414.

Fleury A, Sastre P, Sciutto E, Correia S, Monedero A, Toledo A, Hernandez M, Harrison LJ, Parkhouse R.M.E. (2016) A lateral flow assay (LFA) for the rapid detection of extraparenchymal neurocysticercosis using cerebrospinal fluid. *Exp Parasitol.* 171: 67-70.

*The complete list of publications is available on section 3. Publications.

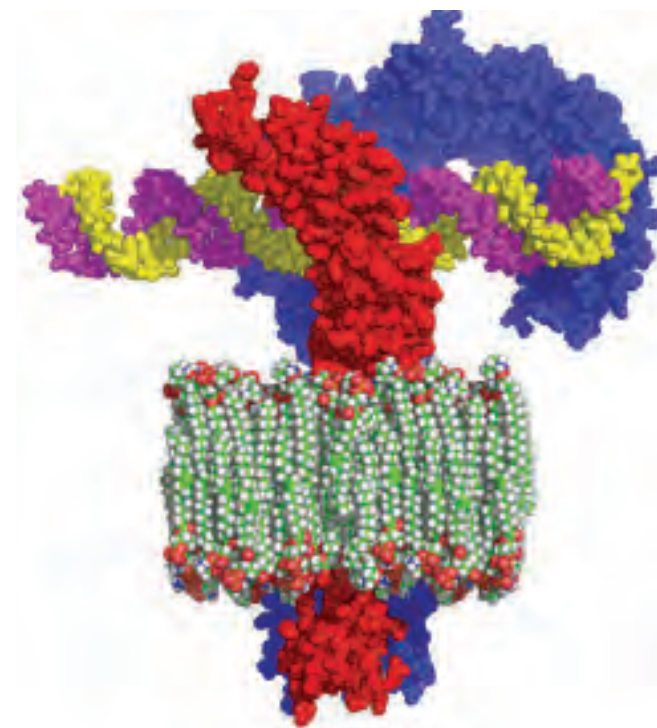


Figure: Sphere model of a putative I329L-TLR3 heterodimer.

E-MAIL: parkhous@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/mparkhouse>

DISEASE GENETICS

GROUP LEADER
PENHA GONÇALVES, CARLOS



RESEARCH INTERESTS

Our research in genetics of inflammatory responses to malaria infection drove us to ask how infection/inflammation impacts on cellular metabolism and organ physiology.

Main lines of research are focused on:

a) How placental inflammation caused by malaria leads

to placental dysfunction;

b) The role of brain microvessel endothelial cells in the inflammatory response that leads to the development of cerebral malaria;

c) The inflammatory responses in the liver during acute and chronic insults.



MAIN ACHIEVEMENTS

- Identifying vasoactivator pathways activated in trophoblasts upon exposure to erythrocytes infected with the malaria parasite.
- Finding that mouse brain endothelial cells produce interferon upon exposure to erythrocyte derived microvesicles.
- Finding that CD26 plays a role in activated Kupffer cells in the context of fatty liver disease induced by western diets in mouse models.
- Describing phenotype shifts in macrophage populations during liver fibrosis and fibrosis regression in a mouse model of chronic liver injury.

LAB MEMBERS IN 2016

Luciana de Moraes, Postdoc

Teresa Pais, Postdoc

Inês Coelho, PhD student, 2015 IBB

Yash Pandya, PhD student, 2015 IBB

André Barateiro, Masters student | Left in September

Nádia Duarte, Lab manager

Sónia Cunha, Technician

Fátima Martins, Visitor | Started in October

Rita Patarrão, Visitor

FUNDING

- European Commission
- March of Dimes Foundation

PUBLICATIONS

de Moraes, L.V., Dechavanne, S., Sousa, P.M., Barateiro, A., Cunha, S.F., Nunes-Silva, S., Lima, F.A., Murillo, O., Marinho, C.R.F., Gangnard, S., Srivastava, A., Braks, J.A., Janse, C.J., Gamain, B., Franke-Fayard, B., **Penha-Gonçalves, C.** (2016) *Murine model for pre-clinical studies on var2csa-mediated pathology associated to malaria in pregnancy.* *Infect Immun.* 84(6): 1761-1774.

Ferjani, Z., Bouzid, D., Fourati, H., Fakhfakh, R., Kammoun, T., Hachicha, M., **Penha-Gonçalves, C.**, Masmoudi, H. (2016) *CREM variant Rs17583959 conferred susceptibility to T1d risk in the Tunisian families.* *Immunol Lett.* [Epub ahead of print].

Martins, M., Boavida, J.M., Raposo, J.F., Froes, F., Nunes, B., Ribeiro, R.T., Macedo, M.P., **Penha-Gonçalves, C.** (2016) *Diabetes hinders community-acquired pneumonia outcomes in hospitalized patients.* *BMJ Open Diabetes Res Care.* 4: e000181.

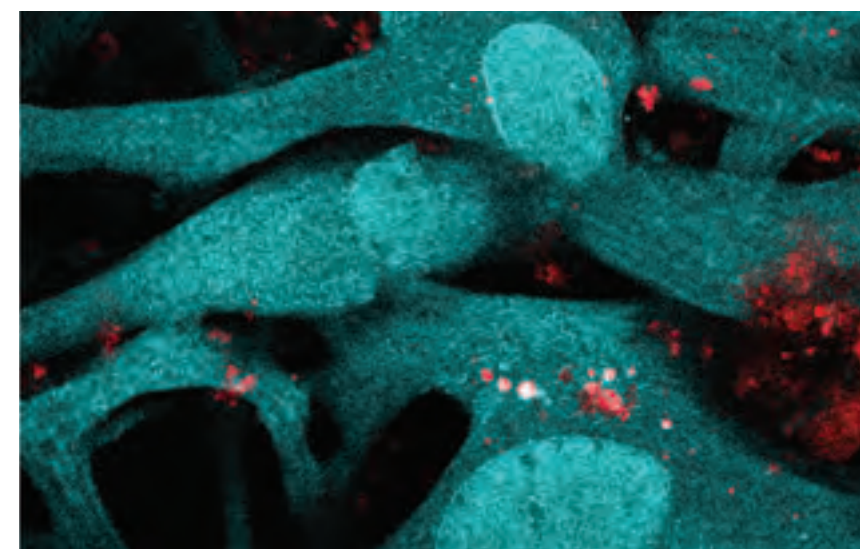


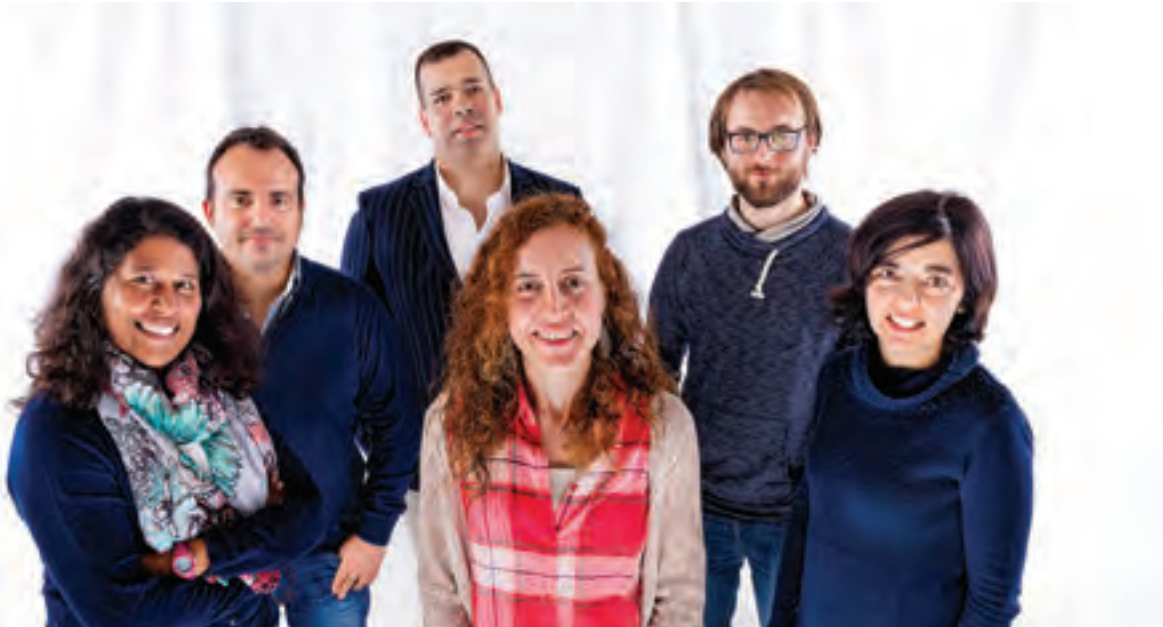
Figure: Primary mouse brain endothelial cells from B6.Cyan mice (cyan). Microvesicles isolated from serum of mice with cerebral malaria labelled with PKH62 (red).

E-MAIL: cpenha@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/cgoncalves>

COMPUTATIONAL GENOMICS

GROUP LEADER
PEREIRA LEAL, JOSÉ



RESEARCH INTERESTS

We are interested in the evolutionary mechanisms underlying the origins and evolution of cellular life and the complex structures within the cell, and in the medical applications of evolutionary genomics.

Our specific domains of application revolve around the endomembrane system, microtubule organising centres and systems where cells live inside other cells (endosymbiosis, endoparasitism, endosporeulation).



MAIN ACHIEVEMENTS

We have improved the Rabifier pipeline and turned it into an open source project, available for community development, under the title Rabifeir 2.0. We used this bioinformatics pipeline to discover that there are Rab-like sequences in Archaea, and that these miss specific structural features that allow us to propose an order of events in the emergence of the complex Rab prenylation cycles that are characteristic of Eukaryotes. We have performed additional work to understand the impact of tree reconciliation in the inference of selection, a problem that is particularly relevant for the inference

of selection in the Rab family of GTPases that we are performing. We have invested in genomic characterisations of aquatic environments and became involved in metagenomics approaches – in the context of these analyses which so far have been focused on phytoplankton, we identified a series of novel species and even managed to reconstruct full genomes from full environmental metagenomics sequencing from African samples. We are currently collaborating in the characterisation of deep-sea waters and sediments.

LAB MEMBERS IN 2016

Ricardo Leite, Postdoc

Paula Silva, Postdoc

Jaroslav Surkont, Postdoc

Joana Vaz, Postdoc | Left in June

Ana Paula Aguiar, PhD student, 2014 PGCD

Marc Gouw, Visitor

SOFTWARE DEVELOPMENT IN 2016

Rabifeir 2.0

We implemented an improved sequence annotation pipeline for identification and classification of Rab GTPases with significant improvements in performance. It is freely available for use in a web portal as well as in an open source code repository. Public website: <http://www.rabdb.org/>

FUNDING

- Fundação para a Ciência e a Tecnologia

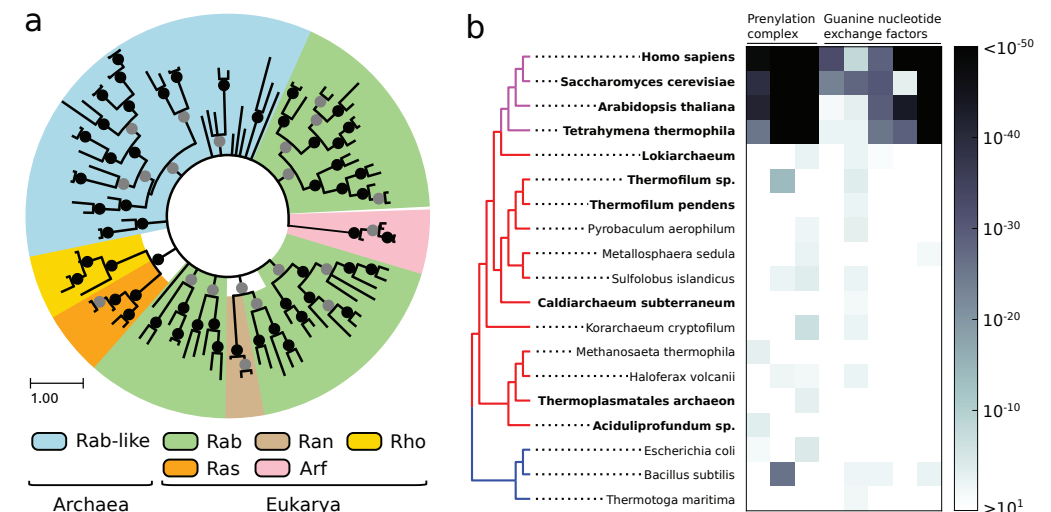
SELECTED PUBLICATIONS*

Cardoso, J., Mesquita, M., Dias, P.A., Bettencourt Dias, M., Chaves, P., **Pereira-Leal, J.B.** (2016) *Cyr61 and Taz upregulation and focal epithelial to mesenchymal transition may be early predictors of Barrett's esophagus malignant progression.* **PLoS ONE.** 11: e0161967.

Diekmann, Y., **Pereira-Leal, J.B.** (2016) *Gene tree affects inference of sites under selection by the branch-site test of positive selection.* **Evol Bioinform Online.** 11(Suppl 2): 11-7.

Passagem-Santos, D., Bonnet, M., Sobral, D., Trancoso, I., Silva, J.G., Barreto, V.M., Athanasiadis, A., Demengeot, J., **Pereira-Leal, J.B.** (2016) *RAG recombinase as a selective pressure for genome evolution.* **Genome Biol Evol.** 8: 3364-3376.

*The complete list of publications is available on section 3. Publications.



E-MAIL: jleal@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/jleal>

EXTERNAL WEBSITE: <http://www.evocell.org/cgl/>

EVOLUTION AND GENOME STRUCTURE

GROUP LEADER
PERFEITO, LÍLIA



RESEARCH INTERESTS

Can we predict evolution? This is one of the most fundamental questions in biology today. If we can predict evolution, we can control it. Doing so will change the way we understand biology, the way we use living organisms in biotechnology, the way we treat disease and the way we see ourselves.

The *Evolution and Genome Structure* research group aims to create a predictive framework of evolutionary biology by addressing how variations in genetic background in general, and chromosome structure in particular affect the evolutionary path of populations.



MAIN ACHIEVEMENTS

We continued our work on the evolvability of different genomic backgrounds while we also developed the framework that will allow us to analyse and interpret the data. Specifically, we showed that any mutation that increases the growth rate of populations is inherently epistatic, i.e., its evolutionary outcome depends on the genetic background where it appears. On the experimental side, we have measured the adaptation rate of 17 different yeast genotypes. As previously

observed, their rate of accumulation of mutations is highly dependent on initial fitness. In collaboration with the group of *Eco-Evolutionary Genetics*, we are developing a bacteria-nematode system to study the evolution of a nematocidal protein. This project has implications to our fundamental understanding of how toxins evolve. Importantly, it is a proof-of-principle that experimental evolution can be used to improve molecules of economic and medical importance.

LAB MEMBERS IN 2016

Diogo Santos, PhD student, 2014 IBB
Mariana Delgadinho, Masters student
Simone Delgado, Technician

FUNDING

- Fundação para a Ciência e a Tecnologia

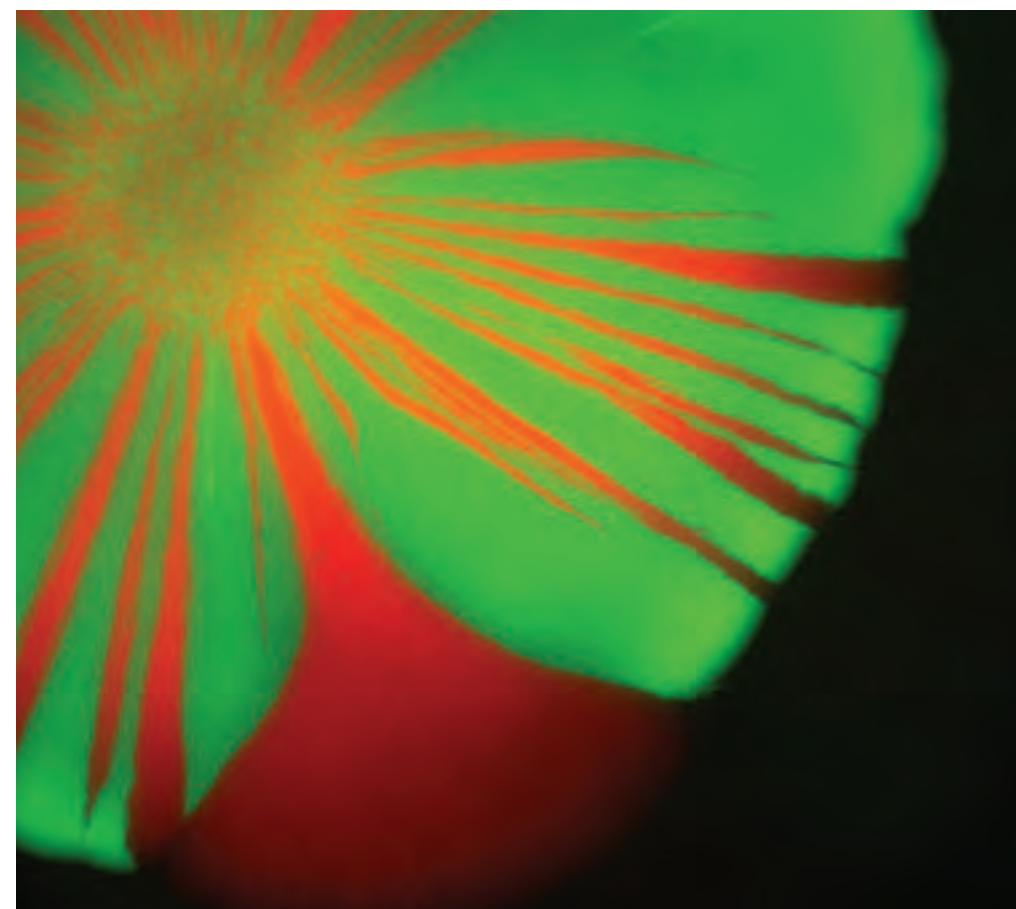


Figure: Example of a beneficial mutation (large red area) increasing in frequency during the growth of a fission yeast colony.

E-MAIL: lperfeito@igc.gulbenkian.pt
IGC WEBPAGE: <http://www.igc.gulbenkian.pt/lperfeito>

COMPLEX ADAPTIVE SYSTEMS & COMPUTATIONAL BIOLOGY

GROUP LEADER
ROCHA, LUÍS M.



RESEARCH INTERESTS

We are interested in the informational properties of natural and artificial systems, which enable them to adapt and evolve. This means both understanding how information is fundamental for controlling the behaviour and evolutionary capabilities of complex systems, as well as abstracting principles from natural systems to produce adaptive information technology. This theoretical and applied research agenda is organised in three main threads: Complex Networks & Systems, Computation-

al & Systems Biology, and Computational Intelligence. Projects in the group range from Biomedical Literature and Social Media Mining to understanding redundancy, robustness, modularity and control in Complex Networks, Collective Intelligence on the Web and in Social Systems, and Agent-based models of Evolutionary Systems such as RNA Editing and Artificial Immune Systems. We are also committed to interdisciplinary research, teaching and graduate training.



MAIN ACHIEVEMENTS

PI became a Fullbright Scholar. In terms of research outputs, we are particularly happy with the Scientific Reports paper with PhD student Alexander Gates. This paper was very well received by the community and we have received many invitations to speak about this work. We are also very happy of the paper on Drug

Interaction discovery from Instagram with PhD student Rion Correia. This paper was considered to be one of the top 30 papers in Translational Bioinformatics in 2016 and has similarly resulted in several invitations to speak about the work.

LAB MEMBERS IN 2016

Rion Correia, External PhD student
Nathan Ratkiewicz, External PhD student

SOFTWARE DEVELOPMENT IN 2016

Instagram Drug Explorer

Public website: <http://www.informatics.indiana.edu/rocha/publications/IDE/index.php>

FUNDING

- Fulbright Commission
- Luso-American for Development Foundation

SELECTED PUBLICATIONS*

Correia, R.B., Li, L., **Rocha, L.M.** (2016). *Monitoring potential drug interactions and reactions via network analysis of Instagram user timeliness*. **Pac Symp Biocomp.** 21: 492-503.

Gates, A.J., Rocha, L.M. (2016) Control of complex networks requires both structure and dynamics. **Sci Rep-Uk**. 6: 24456.

*The complete list of publications is available on section 3. Publications.



Figure: Example of results obtained through Instagram drug explorer.

E-MAIL: rocha@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/lrocha>

EXTERNAL WEBSITE: <http://www.informatics.indiana.edu/rocha/>

INFLAMMATION

GROUP LEADER
SOARES, MIGUEL P.



RESEARCH INTERESTS

- To understand the biology of inflammation and immunity as it pertains to the maintenance of homeostasis.
- To identify and develop therapeutic strategies with impact in human diseases associated with major morbidity and/or mortality.



MAIN ACHIEVEMENTS

- Bauer, A., et al., (2016) Identification of Cyclins A1, E1 and Vimentin as downstream targets of heme oxygenase-1 in vascular endothelial growth factor-mediated angiogenesis. *Sci Rep.* 6: 29417.
- Mitterstiller, A., et al., (2016) Heme Oxygenase 1 controls early innate immune response of macrophages to *Salmonella typhimurium* infection. *Cell Microbiol.* 18(10): 1374–1389.
- Soares, M.P., Bozza, M.T. (2016) Red alert: Labile heme is an alarmin. *Curr Opin Immunol.* 38: 94-100.
- Soares, M.P., Hamza, I. (2016) Macrophages and iron metabolism. *Immunity.* 44: 492-504.
- Soares, M.P., Yilmaz, B. (2016) Microbiota control of malaria transmission. *Trends Parasitol.* 32 (2) 120-130.
- Vale, P.F., et al., (2016) Beyond killing: can we find new ways to manage infection?. *Evol Med Public Health.* 1: 148-157.

LAB MEMBERS IN 2016

Patricia Amador, Postdoc
 Laura Barrio, Postdoc | Left in August
 Birte Blankenhaus, Postdoc
 Faouzi Braza, Postdoc
 Ana Rita Carlos, Postdoc
 Susana Ramos, Postdoc
 Vital Domingues, PhD student, IBB 2015
 Ana Ribeiro, PhD student, PIBS 2011
 Sumnima Singh, PhD student, PIBS 2013
 Pedro Ventura, Masters student
 Sofia Rebelo, Lab manager
 Silvia Cardoso, Technician
 Maria Moita, Research assistant | Left in November
 Patrycja Michalska, Visitor | Left in April

SELECTED PUBLICATIONS*

Soares, M.P., Bozza, M.T. (2016) Red alert: Labile heme is an alarmin. *Curr Opin Immunol.* 38: 94-100.

Soares, M.P., Hamza, I. (2016) Macrophages and iron metabolism. *Immunity.* 44: 492-504.

Soares, M.P., Yilmaz, B. (2016) Microbiota control of malaria transmission. *Trends Parasitol.* 32 (2) 120-130.

*The complete list of publications is available on section 3. Publications.

FUNDING

- Bill & Melinda Gates Foundation
- European Research Council
- Fundação para a Ciência e a Tecnologia

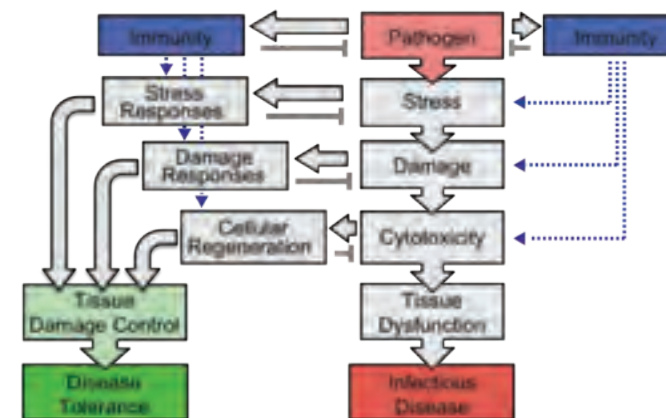


Figure: Tissue damage control and disease tolerance. Tissue damage control mechanisms involve a number of stress and damage responses that act in a concerted manner to protect parenchyma cells and tissues from virulence factors emanating from pathogens and from immune-driven resistance mechanisms leading to immunopathology. Tissue damage control mechanisms rely, initially, on stress responses that rewire metabolic pathways, preserving the functional outputs of parenchyma cells. If stress persists over time, damage to intracellular metabolites, macromolecules and cellular organelles develops, which is countered by damage responses. If this second layer of tissue damage control fails to preserve the functional outputs of parenchyma cells, the default response becomes programmed cell death. This eventually leads to tissue dysfunction and damage. When this occurs, the last layer of tissue damage control is cellular regeneration and tissue repair. These layers of tissue damage control confer host protection against infection irrespectively of pathogens, establishing disease tolerance to infection.

E-MAIL: mpsoares@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/msoares>

EVOLUTION AND DEVELOPMENT

GROUP LEADER
SUCENA, ÉLIO



RESEARCH INTERESTS

The *Evolution and Development* lab explores the interplay between evolutionary and developmental biology. Studying this interface provides insight into the mechanisms at either level as well as those operating across levels that ultimately shape variation and diversity around us. We approach this concept experimentally

through both experimental evolution and the comparative method. Using *Drosophila melanogaster* as a reference model and other insect species, we study a) immune cell function diversity and haematopoiesis and, b) the evolution of the immune response.



MAIN ACHIEVEMENTS

Following our previous work showing the larval sessile clusters to be true haematopoietic tissues, we have demonstrated that in the haematopoietic primary organ, the lymph gland, similar mechanisms operate. The generality of the Notch-dependent transdifferentiation of plasmotocytes into crystal cells calls for a reanalysis of the established binary cell fate decision model. This finding in *Drosophila* is of potential relevance to the understanding of terminal differentiation

of vertebrate haematopoietic lineage cells, known to be highly context-dependent and plastic. We have performed a NGS characterisation of populations adapted to bacterial infections between 2010 and 2014. We validated functionally genes that underlie the adaptive process and extended our mechanistic analysis of the evolved populations to uncover immune, physiological and behavioural processes behind these adaptations.

LAB MEMBERS IN 2016

Kohtaro Tanaka, Postdoc
Vitor Faria, External PhD student
Ana Morais, PhD student, 2016 IBB
Catarina Nunes, PhD student, 2016 IBB
Joana Carvalho, Masters student
Nuno Martins, Masters student
Ana Eugénio, Technician | Started in November
Luis Gonzalez, Technician | Left in May
Julien Marcetteau, Technician | Left in September
Tânia Paulo, Technician
Marília Santos, Technician
Ana Afonso, Trainee | Started in March; left in June
André Alves, Trainee | Started in March; left in May
Andreia Oliveira, Trainee | Started in March; left in May

PUBLICATIONS

Faria, V.G., Martins, N.E., Magalhães, S., Paulo, T.F., Nolte, V., Schlötterer, C., **Sucena, É.**, Teixeira, L. (2016) *Drosophila* adaptation to viral infection through defensive symbiont evolution. **PLoS Genet.** 12: e1006297.

Faria, V.G., Paulo, T.F., **Sucena, É.** (2016) Testing cannibalism as a mechanism for horizontal transmission of Wolbachia in *Drosophila*. **Symbiosis.** 68(1-3): 79-85.

Magalhães, S., **Sucena, É.** (2016) Genetics of host-parasite interactions: towards a comprehensive dissection of *Drosophila* resistance to viral infection. **Mol Ecol.** 25: 4981-4983.

FUNDING

• Fundação para a Ciência e a Tecnologia

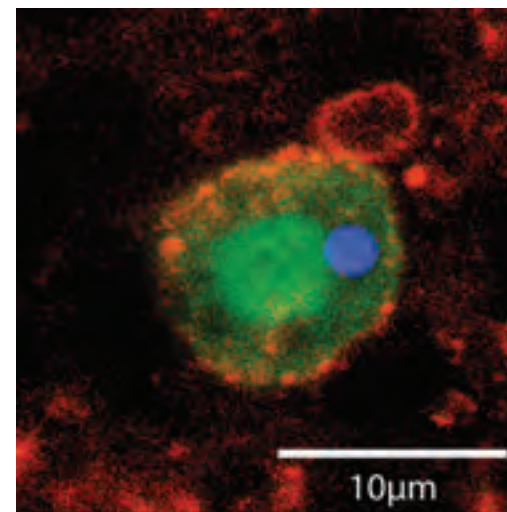


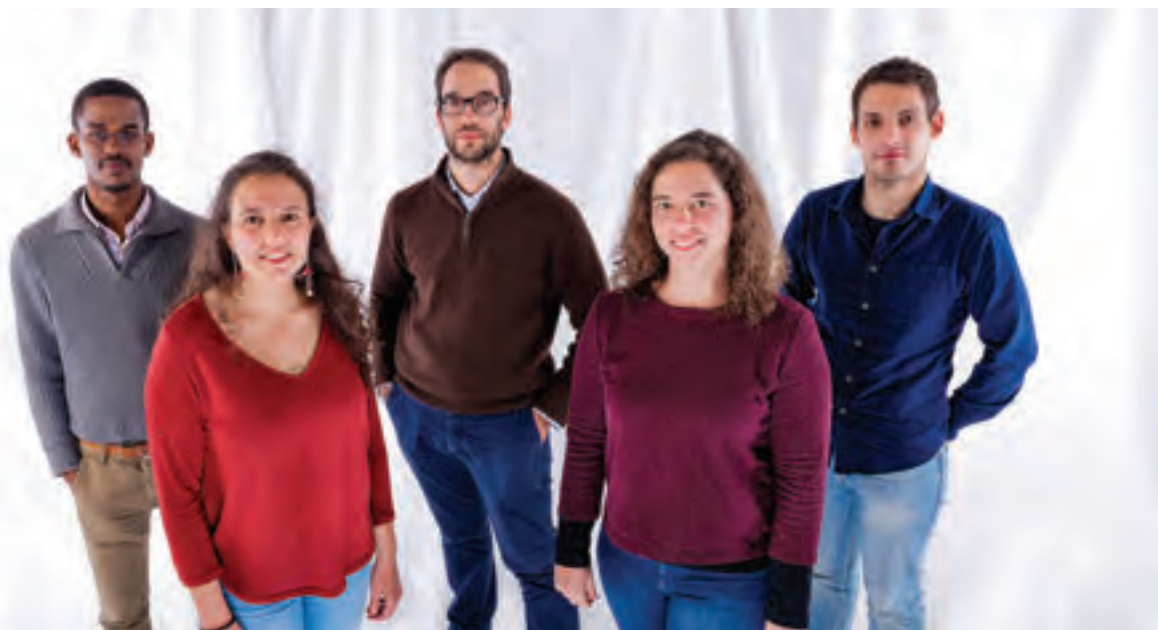
Figure: Detection of fluorescent beads (blue) inside double positive cells for P1 antibody in red (plasmotocyte) and Bc-GFP in green (crystal cell), confirms that active phagocytes can engage into a transdifferentiation process towards a crystal cell fate.

E-MAIL: esucena@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/esucena>

HOST-MICROORGANISM INTERACTIONS

GROUP LEADER
TEIXEIRA, LUÍS



RESEARCH INTERESTS

Multicellular organisms and microorganisms are continuously interacting. Many of these interactions are mutually beneficial. However, multicellular organisms have to actively thwart invasion by opportunistic or overtly pathogenic microbes.

We are interested in how hosts interact with microorganisms at the functional and evolutionary levels. Our group approaches this subject from the classical pathogen versus host immunity perspective and also by analysing the interaction of the host with commensals and

mutualists. We address this general problem studying *Drosophila melanogaster* interaction with viruses, intracellular bacteria (*Wolbachia*), and gut microbiota, with an emphasis on symbiotic associations. We are studying them with the perception that a particular microorganism is not solely interacting with the host but also with all its other symbionts. A reductionist approach to these complex relationships is possible in *Drosophila* because of its powerful genetics and relatively simple symbiotic community.



MAIN ACHIEVEMENTS

We showed that adaptation to viral infection in *D. melanogaster* is also mediated by strong selection at the level of the *Wolbachia* population (Faria *et al.*, 2016). This demonstrates that host interaction with patho-

gens shapes the genetic diversity of its symbionts and that these contribute to host adaptation to pathogens. This work was a collaboration with the groups of É. Sucena, S. Magalhães, and C. Schlötterer.

LAB MEMBERS IN 2016

Catarina Carmo, Postdoc

Nelson Martins, Postdoc

Elves Duarte, PhD student, 2014 PGCD

Gonçalo Matos, PhD student, 2016 IBB | Started in July

Inês Pais, PhD student, 2011 PIBS

Marta Silva, Masters student | Started in September

Rita Valente, Lab manager

Miguel Landum, Technician

Gustavo Eduardo, Technician | Started in July

Maria da Graça, Trainee | Started in March; left in July

Thomas Graham, Trainee | Started in October

Anastasiya Kryzhanska, Trainee | Started in July; left in September

João Lampreia, Trainee | Started in January; left in February

Shushan Toneyan, Trainee | Started in July; left in September

PUBLICATIONS

Faria, V.G., Martins, N.E., Magalhães, S., Paulo, T.F., Nolte, V., Schlötterer, C., Sucena, É., **Teixeira, L.** (2016) *Drosophila* adaptation to viral infection through defensive symbiont evolution. **PLoS Genet.** 12: e1006297.

Srinivasan, N., Gordon, O., Ahrens, S., Franz, A., Deddouche, S., Chakravarty, P., Phillips, D., Yunus, A.A., Rosen, M.K., Valente, R.S., **Teixeira, L.**, Thompson, B., Dionne, M.S., Wood, W., Sousa, C.R. (2016) Actin is an evolutionarily-conserved damage-associated molecular pattern that signals tissue injury in *Drosophila melanogaster*. **eLife.** 5: e19662.

FUNDING

• Fundação para a Ciência e a Tecnologia

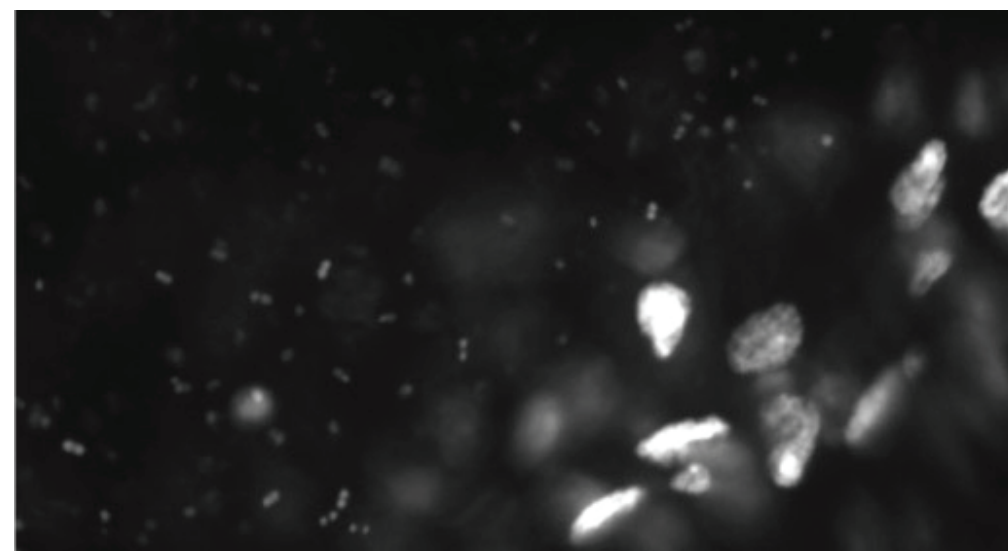


Figure: Gut bacteria of *Drosophila melanogaster*. DNA stained with SytoxGreen. Large patches are nuclei of *Drosophila* gut cells, small dots are bacteria.

E-MAIL: lteixeira@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/lteixeira>

PHYSICAL PRINCIPLES OF NUCLEAR DIVISION

GROUP LEADER
TELLEY, IVO A.



RESEARCH INTERESTS

We are a multidisciplinary team interested in the physical aspects of intracellular organisation. As a model system, we study the earliest stage of *Drosophila* development, from the mature egg to fertilisation to pre-blastoderm cleavages. We focus on pronuclear fusion in the

fertilised egg and how the syncytial embryo defines the inter-nuclear distance between rapid mitotic divisions. We use reconstitution approaches in egg explants combined with time-lapse light microscopy and image processing while taking advantage of *Drosophila* genetics.



MAIN ACHIEVEMENTS

This year, we made significant progress in deciphering the mechanism of nuclear positioning by studying mutants that decouple chromatin from centrosomal duplication. In these mutants, the cytoskeletal organisation is preserved – in the absence of nuclei – and a regular network emerges with unit lengths matching the inter-nuclear distance in wild type embryos. We have identified a microtubule-based protein module that is involved in defining the unit length of separation. We

developed an extract approach to study young fertilised eggs and visualise pronuclei and sperm in time-lapse and high-resolution, something that has not been possible to date. With this approach, we study how *Wolbachia* infection in *Drosophila* affects the last stages of fertilisation. We started our efforts in reconstituting egg polarity in explants. Finally, we concluded a collaborative analysis of the mechanics of actin-myosin ring constriction during cytokinesis.

LAB MEMBERS IN 2016

Raquel Barros, Postdoc | Left in April

Jorge Carvalho, Postdoc

Amid Massouh, Postdoc | Started in December

Ojas Deshpande, PhD student, 2013 PIBS

Catarina Nabais, PhD student, 2014 IBB

Pedro Sampaio, External PhD student | Started in January

Gustavo Eduardo, Technician | Started in June

Raquel Lares, Technician | Left in December

Júlia Nunes, Technician | Left in December

PUBLICATIONS

Silva A.M., Osório D.S., Pereira A.J., Maiato H., Pinto I.M., Rubinstein B., Gassmann R., Telley I.A., Carvalho A.X. (2016) Robust gap repair in the contractile ring ensures timely completion of cytokinesis. *J Cell Biol.* 215(6): 789-799.

FUNDING

- European Commission
- Fundação para a Ciência e a Tecnologia
- Human Frontiers Science Program

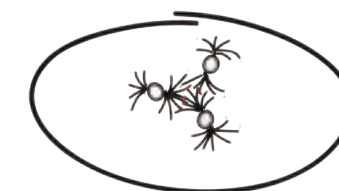
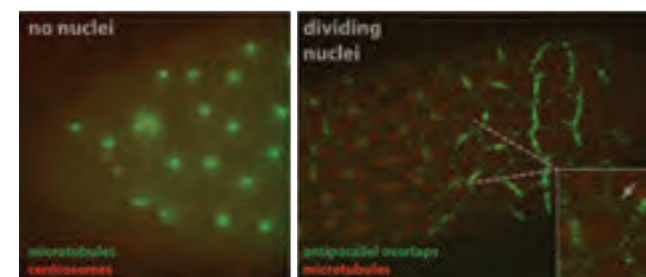
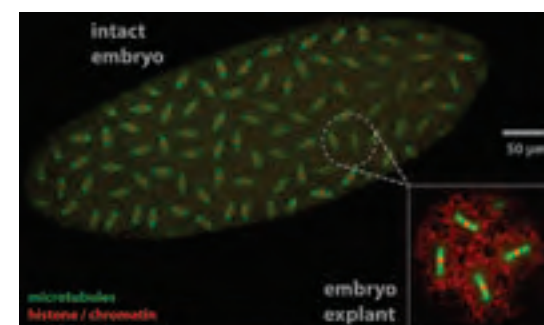


Figure: This scheme illustrates the regular arrangement of nuclei and synchronous assembly of mitotic spindles in the syncytial embryo of *Drosophila melanogaster* (top panel). Because there are no membranes between individual nuclei and spindles, it is not clear how the embryo is keeping a regular arrangement without collisions. We study the mechanism of nuclear positioning by reducing embryo volume and generating embryo explants that reconstitute nuclear divisions (top, inset). Knowing that microtubule asters nucleated from centrosomes play a crucial role in nuclear separation, we study mutants that form asters and that arrange these structures in a similar regularity in the absence of nuclei (bottom left). Microtubules from neighbouring asters physically interact, form antiparallel overlaps and recruit cross-linking proteins (bottom middle), leading to mechanical bridges between nuclei or spindles which help maintaining their distance and prevent collision (bottom right). A regular arrangement of nuclei at that stage is a prerequisite for subsequent developmental stages.

E-MAIL: itelley@igc.gulbenkian.pt
IGC WEBPAGE: <http://www.igc.gulbenkian.pt/itelley>

BACTERIAL SIGNALLING

GROUP LEADER
XAVIER, KARINA B.



RESEARCH INTERESTS

Bacteria coordinate group behaviours through production, release, and detection of small chemical signals, autoinducers, via a cell-cell signalling process called quorum sensing. Many of these behaviours are important in the regulation of virulence and many other functions involved in bacteria-host interactions. The

bacteria-host interactions controlled by quorum sensing can be hostile or beneficial for the host. We are interested in understanding how bacterial signalling shapes the multi-species bacterial communities that can be found in animals and plants and how these communities affect host physiology.



MAIN ACHIEVEMENTS

Bacterial communities cooperate through the production of various public goods in order to cope with multiple constraints encountered in the environment. These cooperative behaviours are under the threat of being exploited by non-producing cheaters: individuals that benefit from cooperative actions but don't contribute to the production of the public goods. In the presence of cooperators, cheaters can increase in frequency and cause cessation of cooperation, thus inducing collapse

of the entire population. We have studied emergence of social cheaters in populations of *Pseudomonas aeruginosa*, the major pathogen isolated from lungs of cystic fibrosis patients. Our results show that we can induce or prevent population collapse simply by manipulating carbon or iron availability. These findings can be used to improve therapeutic approaches for clearance of *Pseudomonas* infections.

LAB MEMBERS IN 2016

Vitor Cabral, Postdoc | Started in May
Jessica Thompson, Postdoc
Ana Rita Oliveira, PhD student, 2015 IBB
Ozhan Ozkaya, PhD student, 2011 PIBS
Inês Torcato, External PhD student
Filipe Vieira, External PhD student
Miguel Pedro, Masters student
Joana Amaro, Lab manager
André Carvalho, Technician
Joana Dias, Technician | Left in April
Catarina Pinto, Technician | Started in March

FUNDING

- European Commission
- Fundação para a Ciência e a Tecnologia
- Howard Hughes Medical Institute

PUBLICATIONS

Lourenço, M., Ramiro, R.S., Güleresi, D., Barroso-Batista, J., **Xavier, K.B.**, Gordo, I., Sousa, A. (2016) A mutational hotspot and strong selection contribute to the order of mutations selected for during *Escherichia coli* adaptation to the gut. *PLoS Genet.* 12: e1006420.

Thompson, J.A., Oliveira, R.A., **Xavier, K.B.** (2016) Chemical conversations in the gut microbiota. *Gut Microbes.* 7:163-70.

Valente, R.S., **Xavier, K.B.** (2016) The Trk potassium transporter is required for rsmb-mediated activation of virulence in the phytopathogen *Pectobacterium wasabiae*. *J Bacteriol.* 198: 248-255.

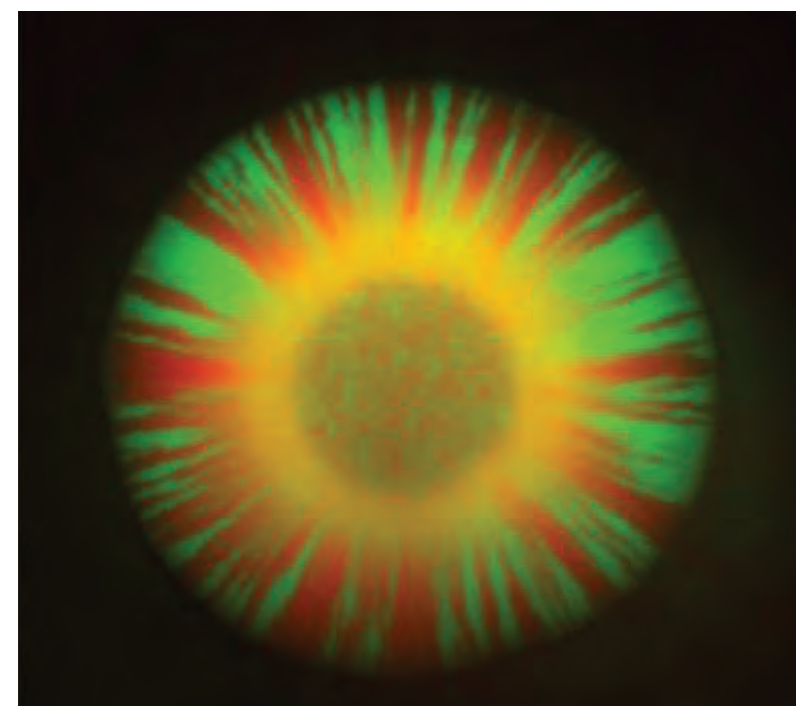


Figure: Colonies of *Pseudomonas aeruginosa*. WT and mutant bacteria are labeled with fluorescent markers (GFP and dsRed) to study competition among WT and mutants for the production of public goods.

E-MAIL: kxavier@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/kxavier>

EXTERNAL WEBSITE: <https://www.facebook.com/bacterialsignalling/>

IN-HOUSE COLLABORATIONS 2016



CELL AND DEVELOPMENTAL BIOLOGY

Adrain, Colin • Membrane Traffic • MBT
 Bettencourt Dias, Mónica • Cell Cycle Regulation • CCR
 Castro, Diogo • Molecular Neurobiology • MNB
 Ferreira, Miguel Godinho • Telomeres and Genome Stability • TEL
 Janody, Florence • Actin Dynamics • ADY
 Jansen, Lars • Epigenetic Mechanisms • EPM
 Mallo, Moisés • Patterning and Morphogenesis • PTM
 Oliveira, Raquel • Chromosome Dynamics • CHR
 Telley, Ivo • Physical Principles of Nuclear Division • PND

QUANTITATIVE AND COMPUTATIONAL BIOLOGY

Alves, Filipa • Biophysics and Genetics of Morphogenesis • BGM
 Carneiro, Jorge • Quantitative Organism Biology • QOB
 Chaouiya, Claudine • Network Modelling • NMD
 Gjini, Erida • Mathematical Modelling of Biological Processes • MMB
 Gonçalves Sá, Joana • Science and Policy • SCP
 Pereira Leal, José • Computational Genomics • CGN
 Rocha, Luís • Complex Adaptive Systems and Computational Biology • CSB

PLANT BIOLOGY

Baena, Elena • Plant Stress Signaling • PSS
 Becker, Jörg • Plant Genomics • PLG
 Duque, Paula • Plant Molecular Biology • PMB

IMMUNOBIOLOGY

Amorim, Maria João • Cell Biology of Viral Infection • CBV
 Athanasiadis, Alekos • Protein - Nucleic Acids Interactions • PNA
 Demengeot, Jocelyne • Lymphocyte Physiology • LYP
 Fesel, Constantin • Lupus and Autoreactive Immune Repertoires • LAI
 Howard, Jonathan • Host-Pathogen Co-Evolution • HPE
 Martins, Vera • Lymphocyte Development and Leukemogenesis • LDL
 Moita, Luís Ferreira • Innate Immunity and Inflammation • IIM
 Parkhouse, Michael • Infections & Immunity • IIM
 Penha Gonçalves, Carlos • Disease Genetics • DGT
 Soares, Miguel • Inflammation • INF
 Teixeira, Luís • Host-Microorganism Interactions • HMI

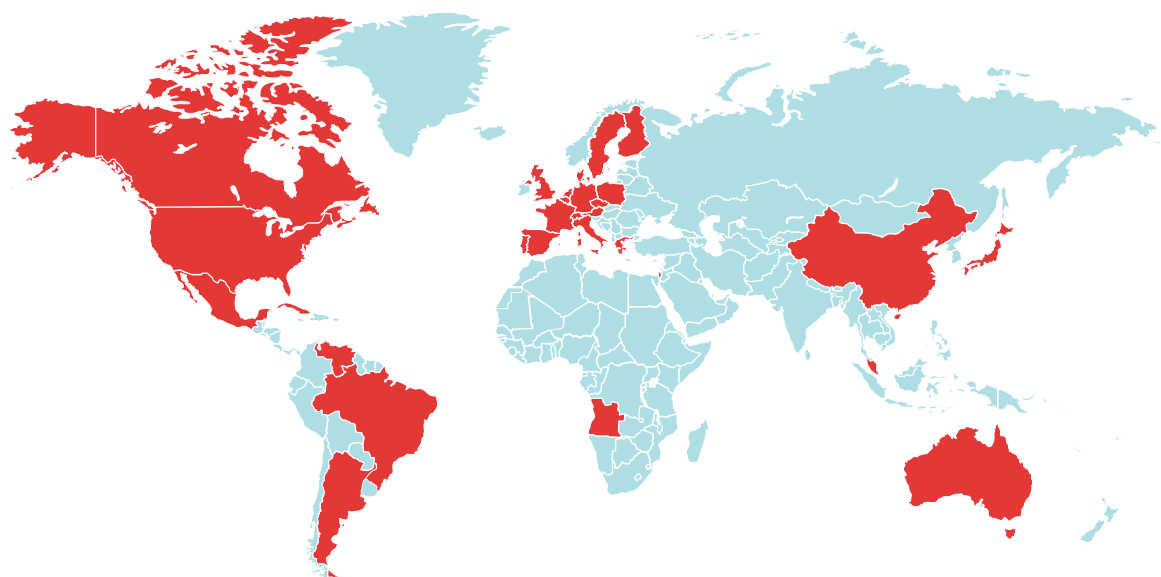
EVOLUTIONARY BIOLOGY

Bank, Claudia • Evolutionary Dynamics • EVD
 Beldade, Patrícia • Variation: Development and Selection • VDS
 Chelo, Ivo • Eco-Evolutionary Genetics • EEG
 Chikhi, Lounès • Population and Conservation Genetics • PCG
 Gordo, Isabel • Evolutionary Biology • EVB
 Mirth, Christen • Development, Evolution and the Environment • DEE
 Perfeito, Lília • Evolution and Genome Structure • EGS
 Sucena, Élio • Evolution and Development • EVO
 Xavier, Karina • Bacterial Signalling • BAS

NEUROBIOLOGY

Domingos, Ana • Obesity • OBS
 Fonseca, Rosalina • Cellular and Systems Neurobiology • CSN
 Oliveira, Rui • Integrative Behavioural Biology • IBH

EXTERNAL COLLABORATIONS 2016



In 2016, the IGC researchers collaborated with researchers from the following external institutions:

EUROPE

Aarhus University, Denmark
Barts Cancer Institute, UK
Bristol University, UK
CEDOC, Portugal
Center for Sepsis Control and Care, Germany
Centre de Physique Theorique, Campus de Luminy, France
Centro de Investigaciones Biológicas, Spain
Centro Nacional de Biotecnología, Spain
Champalimaud Research, Portugal
CRG-Barcelona, Spain
Ecole Normale Supérieure, France
EMBL, Germany
EMBL-Grenoble, France
EPFL, Lausanne
Faculdade de Ciências da Universidade de Lisboa, Portugal
Faculdade de Medicina da Universidade do Porto, Portugal
Fleming Institute, Greece
Ghislain Schyns, DSM Nutritional Products Ltd., Switzerland
Gregor Mendel Institute, Austria

Hospital Curry Cabral, Portugal
Hospital Dona Estefânia, Portugal
Hospital Garcia Orta, Portugal
Hospital Santa Maria, Portugal
Hospital Santo Antonio, Portugal
I3S, Portugal
ICBAS/Universidade do Porto, Portugal
Imperial College London, UK
INEM-Hospital Necker, France
Institut Curie, France
Institut de Mathématiques de Luminy, France
Institute de Biologie de l'École Normale Supérieure, France
Institute for Biological Imaging of Helmholtz Zentrum, Germany
Institute of Environmental Sciences, Krakow, Poland
Institute of Organic Chemistry & Biochemistry, Czech Republic
Institut National de Recherche Agronomie, France
Instituto de Biología Molecular y Celular de Plantas, Spain
Instituto de Ciências Sociais, Portugal
Instituto de Medicina Molecular, Portugal
Instituto de Tecnologia Química e Biológica, Portugal
Instituto Politécnico Leiria, Portugal
Instituto Português de Oncologia, Portugal
Instituto Português do Mar e da Atmosfera, Portugal
Instituto Superior Técnico, Portugal

Institut Pasteur de Lille, France
IPATMUP, Porto
ISCTE-Universidade de Lisboa, Portugal
ISI Foundation, Italy
IST Austria, Austria
Jacques Monod, Paris
Johan Wolfgang Goethe University, Germany
Karolinska Institute, Sweden
Leiden University Medical Center, The Netherlands
LMCB - MRC Laboratory for Molecular Cell Biology, UK
London School of Hygiene and Tropical Medicine, UK
Max F. Perutz Laboratories, Austria
Medical University of Innsbruck, Austria
Ministério da Educação e da Ciência, Portugal
MPI for Molecular Plant Physiology, Germany
Pirbright Institute, UK
Sainsbury Laboratories of Cambridge University, UK
San Raffaele Scientific Institute, Italy
School of Life Sciences, UK
Swiss Institute of Bioinformatics, Switzerland
Technical University of Munich, Germany
Technische Universität, Germany
The Francis Crick Institute, UK
Centre for Experimental & Clinical Infection Research, Germany
Umeå University, Sweden
Universidad de Santiago de Compostela, Spain
Universidad de Valencia, Spain
Universidade do Algarve, Portugal
Universidade Nova de Lisboa, Portugal
Universidad Pablo de Olavide, Spain
Université de Bordeaux, France
Université de Tours, France
Université Paul Sabatier, France
Université Toulouse, France
University of Bielefeld, Germany
University of Cambridge, UK
University of Cologne, Germany
University of Copenhagen, Denmark
University of Dundee, UK
University of Durham, UK
University of Edinburgh, UK
University of Geneva, Switzerland
University of Glasgow, UK
University of Hanover, Germany
University of Helsinki, Finland
University of Leicester, UK
University of Liège, Belgium
University of Limoges, France
University of Manchester, UK
University of Montpellier, France
University of Oxford, UK
University of Sheffield, UK
University of Sussex, UK

University of Vienna, Austria
Vetmeduni Vienna, Austria
ZMBH, Heidelberg, Germany

AMERICA

Arizona State University, USA
Carleton University, Canada
Duke University School of Medicine, USA
Eli Lilly, USA
Harvard University, USA
Indiana University, USA
Instituto de Inmunología Molecular, Cuba
Janelia Research Campus - HHMI, USA
John Hopkins, USA
Lake Forest College, USA
NIH, USA
NYU, USA
School of Medicine, UCSD, USA
Sloan Kettering Institute, USA
St. Jude Children's Research Hospital, USA
State University of São Paulo, Brazil
Swarthmore College, USA
The Rockefeller University, USA
UNAM, Mexico
Universidad de Carabobo, Venezuela
Universidade de São Paulo, Brazil
Universidade Federal de Pernambuco, Brazil
Universidade Federal de Rio Janeiro, Brazil
University of Cordoba, Argentina
University of Delaware, USA
University of Florida, USA
University of Houston, USA
University of Maryland, USA
University of Massachusetts Medical School, USA
University of Nebraska, USA
University of Ottawa, Canada
University of Pennsylvania, USA
University of Tennessee, USA
Virginia Tech, USA

ASIA

Haifa University, Israel
MBI Singapore, Singapore
National Institute of Genetics, Japan
University of Macau
University of Singapore, Singapore
Weizmann Institute, Israel
Yamaguchi University, Japan

AUSTRALIA

Monash University, Australia
University of Queensland, Australia

AFRICA

Faculdade de Medicina de Benguela, Angola

EXTERNAL ASSOCIATED GROUPS 2016

The following researchers develop their research at external associated institutes and research centres, and still maintain strong scientific collaborations with IGC groups, and access to IGC facilities.

BELO, JOSÉ ANTÓNIO

CEDOC – Chronic Diseases Research Center, Faculdade de Ciências Médicas, Universidade Nova de Lisboa, Portugal

CAREY, MEGAN

Champalimaud Research, Portugal

COSTA, RUI M.

Champalimaud Research, Portugal

DÍAS, SÉRGIO

Instituto de Medicina Molecular, Portugal

DIONÍSIO, FRANCISCO

Faculdade de Ciências da Universidade de Lisboa, Portugal

DUARTE, ANTÓNIO

Faculdade de Medicina Veterinária, Universidade Técnica de Lisboa, Portugal

FARO, JOSÉ

Universidad de Vigo, Spain

FERNANDES, LISETTE

Biosystems and Integrative Sciences Institute (BioISI), Portugal

GRAÇA, LUÍS

Instituto de Medicina Molecular, Portugal

HENRIQUE, DOMINGOS

Instituto de Medicina Molecular, Portugal

ISRAELY, INBAL

Champalimaud Research, Portugal

JACINTO, ANTÓNIO

CEDOC – Chronic Diseases Research Center, Faculdade de Ciências Médicas, Universidade Nova de Lisboa, Portugal

LIMA, SUSANA

Champalimaud Research, Portugal

MAINEN, ZACHARY

Champalimaud Research, Portugal

MARTINHO, RUI

Centre for Biomedical Research, Universidade do Algarve, Portugal

MOITA, MARTA

Champalimaud Research, Portugal

MOTA, MARIA

Instituto de Medicina Molecular, Portugal

MOTA VIEIRA, LUÍSA

Divino Espírito Santo Hospital, Universidade dos Açores, Azores, Portugal

OLIVEIRA, SOFIA

Instituto de Medicina Molecular, Portugal

ORGER, MICHAEL

Champalimaud Research, Portugal

PATON, JOSEPH

Champalimaud Research, Portugal

RIBEIRO, CARLOS

Champalimaud Research, Portugal

SAÚDE, LEONOR

Instituto de Medicina Molecular, Portugal

SILVA SANTOS, BRUNO

Instituto de Medicina Molecular, Portugal

SIMAS, JOÃO PEDRO

Instituto de Medicina Molecular, Portugal

SOARES, HELENA

Faculdade de Ciências da Universidade de Lisboa, Portugal

THORSTEINSDÓTTIR, SOLVEIG

Faculdade de Ciências da Universidade de Lisboa, Portugal

VASCONCELOS, MARIA LUÍSA

Champalimaud Research, Portugal

VICENTE, ASTRID

BioSystems & Integrative Sciences Institute (BioISI), Universidade de Lisboa, Portugal and Instituto Nacional de Saúde Dr. Ricardo Jorge, Lisbon, Portugal



2

SUPPORT TO
RESEARCH



11
CORE
FACILITIES



9
SERVICES



81
STAFF



38
PUBLICATIONS



38
EXTERNAL INSTITUTIONS
THAT USED THE CORE
FACILITIES

ANIMAL HOUSE FACILITY

HEAD
REBELO, MANUEL



DESCRIPTION OF FACILITY

The *Animal House Facility* (AHF) provides infrastructure and services for model organism-based research including Rodent, Aquatic (zebrafish and frog) and Fly Facilities. The AHF seeks to integrate management of the different animal facilities, namely by sharing technological development and good practices among different animal models. The AHF staff duties include husbandry procedures, general maintenance of facilities and equipment, advanced services such as Rederivation, Cryopreservation, Gnotobiology, production of germ-free animals, assistance to researchers, colony maintenance, import and export of animals, organisation of Laboratory Animal Science (LAS) Courses, and support on legal issues. The organisation of the AHF team promotes a culture of shared values and principles that contributes to a close relation with the researchers.

NEWS IN 2016

The AHF participated in the two most prestigious International LAS Meetings (FELASA and AALAS) with a total of 4 oral communications and 3 poster presentations.

A research paper about pioneering work on zebrafish health control, fully developed at the Zebrafish Facility of the IGC, was published by the AHF Team.

H2020-INFRADEV-2016-2017 funded: this 3-year project will allow the AHF to continue progressing towards the development of a state-of-the-art Service on Germ-Free and Gnotobiology research, to benefit the rapidly developing field of microbiome research worldwide.

E-MAIL: mrebelo@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/facilities/animals>

EXTERNAL WEBSITE: <http://facilities.igc.gulbenkian.pt/vivaria.php>

PUBLICATIONS

Borges, A.C., Pereira, N., Franco, M., Vale, L., Pereira, M., Cunha, M.V., Amaro, A., Albuquerque, T., **Rebelo, M.** (2016) *Implementation of a zebrafish health program in a research facility: a 4-year retrospective study. Zebrafish.* 13(S1): S-115-S-126.

Jesus del Hierro, M., Fernandez, J., Castrillo, M., Martin-Dorado, I., Montoliu, L., Hagn, M., Mammano, F., Herault, Y., Brown, S., Ulfhaake, B., **Demengeot, J.**, Parkinson, H., Ramirez-Solis, R., Kollias, G., Sedlacek, R., Soininen, R., Ruelicke, T., Jonkers, J., Iraqi, F., De Angelis, M.H. (2016) *EMMA: The European Mouse Mutant Archive. Transgenic Res.* 25: 228-228.

STAFF IN 2016

Ana Cristina Borges, Manager Aquatic Facility
Joana Bom, Manager Germ-Free/Gnotobiology Facility
Liliana Vieira, Manager Fly Facility
Sandra Crisóstomo, Technician
Maysa Franco, Technician
Ana Sofia Leocádio, Technician
Carina Monteiro, Technician
Marília Pereira, Technician
Pedro Pinto, Technician
Ana Ribeiro, Technician
Liliana Vale, Technician
Adérito Vieira, Technician
João Lopes, Caretaker
Betting on Future

NEW EQUIPMENT IN 2016

Rodent Facility: Bedding disposal station, funded by IGC

TRANSGENICS UNIT

HEAD
MALLO, MOISÉS



DESCRIPTION OF FACILITY

The *Transgenics Unit* generates genetically modified mouse and *Drosophila melanogaster* strains for research groups at the IGC. Our work with mice includes: 1) Production of transgenic mice by pronuclear DNA injection using both conventional expression constructs and BACs; 2) Introduction of targeted modifications into endogenous genomic loci both following embryonic stem cell-mediated approaches and with the CRISPR/Cas9 technology. Our work with *Drosophila* includes: 1) A microinjection service to generate transgenic or mutant flies, via p-element, ΦC31 or CRISPR/Cas9 methods; 2) Microinjection for purposes other than the production of transgenic flies (e.g. *Wolbachia* transfer).

NEWS IN 2016

During 2016 we increased the production of mice with targeted genomic modifications with CRISPR/Cas9. Using this technique we produced 12 different lines containing inactivated genes, knock-ins (introducing tags or cre recombinase) and point mutations. We also developed projects to increase the efficiency of CRISPR/Cas9-mediated gene targeting by homologous recombination, combining addition of Rad51 and the use of single stranded DNA replacement templates. In addition, we kept our regular production of transgenic mouse lines and embryos using both regular DNA constructs and BACs. The *Drosophila* Transgenesis service started in March 2016. Since then, we generated 57 stable germline transgenic lines and 8 CRISPR lines, with a global success rate of 98%. Notably, we were able to successfully insert a 42kb fosmid.

PUBLICATIONS

Aires, R., Jurberg, A.D., Leal, F., Nóvoa, A., Cohn, M.J., **Mallo, M.** (2016) *Oct4 is a key regulator of vertebrate trunk length diversity. Dev Cell.* 38: 262-274.

Casaca, A., Nóvoa, A., **Mallo, M.** (2016) *Hoxb6 can interfere with somitogenesis in the posterior embryo through a mechanism independent of its rib-promoting activity. Development.* 143: 437-448.

Guerreiro, I., Gitto, S., Novoa, A., Codourey, J., Nguyen, H.T.H., Gonzalez, F., Milinkovitch, M.C., **Mallo, M.**, Duboule, D. (2016) *Reorganisation of hoxd regulatory landscapes during the evolution of a snake-like body plan. Elife.* 5:e16087.

STAFF IN 2016

Ana Nóvoa, Microinjection Technician in mice
Diogo Manoel, Staff Scientist transgenesis in fly | Started in March

E-MAIL: mallo@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/facilities/transgenics>

EXTERNAL WEBSITE: <http://facilities.igc.gulbenkian.pt/transgenics.php>

PLANT FACILITY



DESCRIPTION OF FACILITY

The *Plant Facility* at the IGC ensures the growth and maintenance of *Arabidopsis thaliana* and *Physcomitrella patens* plants, the model organisms used by the plant research groups hosted by the Institute. The facility consists of three custom-made fully controlled growth chambers with short-day and long-day light settings, as well as a walk-in plant growth room and five small reach-in chambers that allow the performance of cell-based assays and more precise phenotypical analyses. Three research groups (*Plant Molecular Biology*, *Plant Stress Signalling* and *Plant Genomics*) make use of the facility.

STAFF IN 2016

Vera Nunes, Technician



E-MAIL: vnunes@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/facilities/plants>

EXTERNAL WEBSITE: <http://facilities.igc.gulbenkian.pt/vivaria-plant-facility.php>

BIOINFORMATICS & COMPUTATIONAL BIOLOGY UNIT

HEAD
SOBRAL, DANIEL



DESCRIPTION OF FACILITY

The *Bioinformatics Unit* (UBI) provides consulting services in bioinformatics and computational biology during initial stages of study design and grant proposals. We also provide a broad range of support for ongoing studies requiring external expertise in bioinformatics, including: training and consulting on the use of bioinformatic tools; development of databases and data warehousing solutions; development of bioinformatics pipelines for genomic analysis; next generation sequencing (NGS) data analysis.

NEWS IN 2016

The UBI has provided more than 500 hours of direct support to IGC research groups, and 20 hours to external users. We have continued our collaboration with the *Gene Expression* and *Genomics* facilities and are implementing technologies for MinION long read sequencing. Also, we are optimising pipelines for 16S metagenomic analysis. We continued to provide an internal Galaxy web-service enabling IGC users easy access to bioinformatics tools. We started collaborating with Champalimaud to enable Galaxy service provision in the national cloud for scientific computation (INCD). At a broader level, we have continued our efforts to build a national bioinformatics infrastructure, through the ELIXIR consortium. We strengthened our links to the GTPB programme and have also given lectures in courses at the master and PhD level, particularly teaching introductory NGS data analysis.

E-MAIL: dsobral@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/facilities/bioinformatics>

EXTERNAL WEBSITE: <http://facilities.igc.gulbenkian.pt/bioinformatics.php>

PUBLICATIONS

Vasconcelos, F.F., Sessa, A., Laranjeira, C., Alexandre, A.S.F., Teixeira, V., Hagey, D.W., Tomaz, D.M., Muhr, J., Broccoli, V., Castro, D.S. (2016) *Myt1 counteracts the neural progenitor program to promote vertebrate neurogenesis*. *Cell Rep.* 17: 469-483.

Zerbino, D.R., Johnson, N., Juetteman, T., Sheppard, D., Wilder, S.P., Lavidas, I., Nuhn, M., Perry, E., Raffailac-Desfosses, Q., Sobral, D., Keefe, D., Gräf, S., Ahmed, I., Kinsella, R., Pritchard, B., Brent, S., Amode, R., Parker, A., Trevanion, S., Birney, E., Dunham, I., Flicek, P. (2016) *Ensembl regulation resources*. *Database-Oxford*. 2016: bav119.

STAFF IN 2016

Isabel Marques, Senior bioinformatics specialist | Left in May

Daniel Faria, Postdoc

Tiago Macedo, Systems administrator

João Costa, Technician

Mauro Truglio, Technician | Started in August

Samuel Viana, Masters student | Left in June

GENE EXPRESSION UNIT

GROUP LEADER
BECKER, JÖRG



DESCRIPTION OF FACILITY

The *Gene Expression Unit* provides expert services using NGS and Microarray Technologies.

NGS services are provided with the unit's Illumina MiSeq sequencer. They range from *de novo* and re-sequencing of small to mid-sized genomes, over amplicon sequencing (e.g. 16S metagenomics) to custom applications (e.g. RAD-Seq).

DNA microarray services focus on gene expression profiling, and range from experimental design over complete sample processing to expert advice on data analysis. The unit is an *Affymetrix Core Lab* with reference status for GeneChip technology in Portugal since 2002. RNA and DNA quality is assessed using a Bioanalyzer.

To date, the unit has contributed to more than 200 projects, resulting in 90 publications with more than 2500 citations (<http://www.researcherid.com/rid/B-9404-2012>).

NEWS IN 2016

In 2016, the unit has produced 256 Gigabases of sequencing data with its MiSeq. These derived from 365 samples of re-sequencing, 895 samples of 16S metagenomics, and 5 samples processed for custom experiments. In addition, we have run 24 microarrays and analysed 1349 RNA/DNA samples on our Bioanalyzer.

Our existing protocols have been optimised, resulting in significant cost reductions, and we have implemented a new protocol for RNA-Seq library prep (Smart-Seq2).

E-MAIL: jbecker@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/facilities/genexpression>

EXTERNAL WEBSITE: <http://facilities.igc.gulbenkian.pt/geneexpression.php>

SELECTED PUBLICATIONS*

Barbosa, R., et al., (2016) *Evidence of natural hybridization in Brazilian wild lineages of Saccharomyces cerevisiae*. **Genome Biol Evol.** 8: 317–329.

Godoy-Vitorino, F., et al., (2016) *The microbiome of a striped dolphin (Stenella coeruleoalba) stranded in Portugal*. **Res Microbiol.** [Epub ahead of print]

Gonçalves, M., et al., (2016) *Distinct domestication trajectories in top-fermenting beer yeasts and wine yeasts*. **Curr Biol.** 26: 2750–2761.

Muñoz-Ruiz, M., et al., (2016) *TCR signal strength controls thymic differentiation of discrete proinflammatory $\gamma\delta$ T cell subsets*. **Nat Immunol.** 17: 721–727.

Silva, I.N., et al., (2016) *Long-term evolution of Burkholderia multivorans during a chronic cystic fibrosis infection reveals shifting forces of selection*. **mSystems.** 1: e00029–16.

Sousa I., et al., (2016) *Multicentric genome-wide association study for primary spontaneous pneumothorax*. **PLoS ONE.** 11: e0156103.

*The complete list of publications is available on section 3. Publications

STAFF IN 2016

Sara Ramos, Technician | Started in March
João Sobral, Technician

GENOMICS UNIT

HEAD
PENHA GONÇALVES, CARLOS



DESCRIPTION OF FACILITY

The *Genomics Unit* provides expertise and technological support for research at the genome scale and is composed by Genotyping and Sequencing Services.

The Genotyping Service offers the AgenaBio iPLEX technology, allowing rapid SNP genotyping assays with up to forty SNPs assayed simultaneously. The facility collaborates with investigators on: SNP choice and SNP Assay Design, AgenaBio Procedure and Data Management for Genetic Studies, providing access to the BC/GENE interface software. Genotyping Service also offers a backcrossing service for users of genetically modified mice and mouse breeders.

The Sequencing Service offers DNA sequencing and fragment analysis using multicapillary with automatic sequencer ABI 3130XL. SNP genotyping and gene expression are also available with QS7 (ABI) and CFX384 (BioRad) Real-Time PCR systems.

NEWS IN 2016

The *Genomics Unit* started to introduce the long read DNA sequencing technologies using the MinION system.

To increase the flexibility of SNP genotyping system, the Unit installed a new geometry of chips that allows to run 24 samples at the same time.

PUBLICATIONS

Goossens, B., Sharma, R., Othman, N., Kun-Rodrigues, C., Sakong, R., Ancrenaz, M., Ambu, L.N., Jue, N.K., O'Neill, R.J., Bruford, M.W., Chikhi, L. (2016) *Habitat fragmentation and genetic diversity in natural populations of the Bornean elephant: Implications for conservation*. **Biol Conserv.** 196: 80-92.

STAFF IN 2016

Isabel Marques, Senior lab manager | Left in May
João Costa, Genotyping service
Susana Ladeiro, Sequencing

NEW EQUIPMENT IN 2016

MinION – Oxford Nanopore Sequencing system, funded by IGC



E-MAIL: cpenha@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/facilities/genomics>

EXTERNAL WEBSITE: <http://facilities.igc.gulbenkian.pt/genomics.php>

HISTOPATHOLOGY UNIT

HEAD
SOARES, MIGUEL P.



DESCRIPTION OF FACILITY

The *Histopathology Unit* (HU) aims to provide high quality preparations for the microscopic study of both normal and pathological cells and tissues.

As histopathology is a valuable instrument in scientific research, our technicians guide the users in their work and train them to use some of the equipment, when necessary. Furthermore, the provision of guidance in the interpretation of pathology samples and planning of projects involving histological analyses are central tenets of our unit.

Contrary to common perception, the process of histological diagnosis starts at examination of the gross specimen, whether human or animal, organism & organ, and then proceeds to histological analysis. The latter is not a “re-sult” but an interpretation, subject to multiple potential confounding factors and judgment. Thus, there are both technical and interpretational skills that are required.

The Unit provides these services for all internal groups, associate laboratories and has also established cooperation protocols with other academic institutions.

Last but not least, the health monitoring of the institute’s animal models, namely zebrafish, is also a main task undertaken by our unit.

STAFF IN 2016

Pedro Faisca, Veterinary Pathologist
Joana Rodrigues, Technician
Marta Pinto, Technician

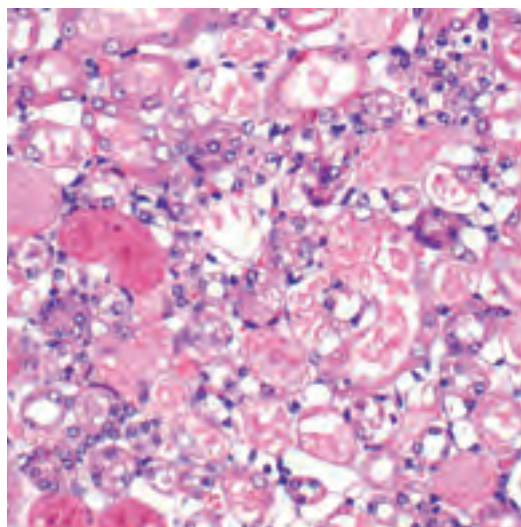


Figure: Murine model of glycerol induced acute renal failure HE 200x.

E-MAIL: mpsoares@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/facilities/histopathology>

EXTERNAL WEBSITE: <http://facilities.igc.gulbenkian.pt/histopathology.php>

ADVANCED IMAGING UNIT

HEAD
MARTINS, GABRIEL G.



DESCRIPTION OF FACILITY

The *Advanced Imaging Unit* provides access and support to high-end light microscopy imaging to the whole IGC community. The unit currently stands as an international reference, with cutting-edge techniques ranging from super-resolution, high-end widefield and confocal systems (high-throughput/screening capabilities), multiphoton, light-sheet microscopy, optical tomography and bioluminescence/fluorescence animal imaging. Some of these techniques are unique in Portugal and were developed in-house. The unit is also responsible for general maintenance of optical instruments, including satellite microscopes throughout the IGC. Users are trained in dedicated sessions and internal workshops. The unit also organises advanced workshops on light microscopy techniques, equipment setup, experimental design and image processing and analysis.

NEWS IN 2016

- Gabriel G. Martins appointed as WG2 leader of the NEUBIAS COST action;
- Installation of the new spinning disk confocal;
- Installation of double-sided illumination in Open-Spin light-sheet microscope;
- Organisation of the EMBO practical course on 3D Developmental Imaging;
- Participation in the 1st NEUBIAS Training School;
- Co-organisation of the Spanish-Portuguese Meeting for Advanced Optical Microscopy;
- Members of the unit contributed directly to 7 publications.

E-MAIL: gaby@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/facilities/uic/imaging>

EXTERNAL WEBSITE: <http://facilities.igc.gulbenkian.pt/microscopy.php>

SELECTED PUBLICATIONS*

Estrada, M.F., Rebelo, S.P., Davies, E.J., Pinto, M.T., **Pereira, H.**, Santo, V.E., Smalley, M.J., Barry, S.T., Gualda, E.J., Alves, P.M., Anderson, E., Brito, C. (2016) *Modelling the tumour microenvironment in long-term microencapsulated 3D co-cultures recapitulates phenotypic features of disease progression*. **Biomaterials**. 78: 50-61.

Felix, P.M., Gonçalves, A., Vicente, J.R., Fonseca, P.J., Amorim, M.C.P., Costa, J.L., **Martins, G.G.** (2016) *Optical micro-tomography “OpenT” allows the study of large toadfish Halobatrachus didactylus embryos and larvae*. **Mech Develop**. 140: 19-24.

Silva, J.G., **Martins, N.P.**, Henriques, R., Soares, H. (2016) *HIV-1 Nef impairs the formation of calcium membrane territories controlling the signaling nanoarchitecture at the immunological synapse*. **J Immunol**. 197: 4042-4052.

***The complete list of publications is available on section 3. Publications**

STAFF IN 2016

Ânia Gonçalves, Technician | Left in February
João Lagarto, Technician | Left in March
Hugo Pereira, Technician
Nuno Pimpão Martins, Technician

NEW EQUIPMENT IN 2016

Leica Spinning Disk confocal microscope of the *Chromosome Dynamics* group, funded by the European Research Council

ELECTRON MICROSCOPY FACILITY

HEAD
TRANFIELD, ERIN



DESCRIPTION OF FACILITY

At the *Electron Microscopy Facility* at the IGC we believe that electron microscopy is a powerful tool that can be used to address research questions in the life sciences. With this in mind we aim to:

- Provide centralised, high quality electron microscopy infrastructure to support scientific investigation.
- Offer electron microscopy services, mentorship and skill training.
- Collaborate with researchers within our institute, our country and the scientific community to foster knowledge of technical developments in electron microscopy.

NEWS IN 2016

2016 was an exciting year in the *Electron Microscopy Facility*. In January and February the facility was closed for an extensive renovation to make room for a new 120kV Transmission Electron Microscope. In March the Facility re-opened and in April and May the new Transmission Electron Microscope was installed. This microscope not only doubles the number of available microscopes, it also enhances our technical capabilities for cryo-electron microscopy and correlative light and electron microscopy.

NEW EQUIPMENT IN 2016

FEI Tecnai G2 Spirit BioTWIN Transmission Electron Microscope, funded by Fundação para a Ciência e a Tecnologia

E-MAIL: etranfield@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/facilities/uic/emf>

EXTERNAL WEBSITE: <http://facilities.igc.gulbenkian.pt/electronmicroscopy.php>

PUBLICATIONS

Vale-Costa, S., Alenquer, M., Sousa, A.L., Kellen, B., Ramalho, J., **Tranfield, E.M.**, Amorim, M.J. (2016) Influenza A virus ribonucleoproteins modulate host recycling by competing with Rab11 effectors. *J Cell Sci.* 129: 1697-1710.

STAFF IN 2016

Sara Bonucci Costa, Technician

Ana Catarina Correia, Technician | Left in July

Ana Laura Sousa, Technician

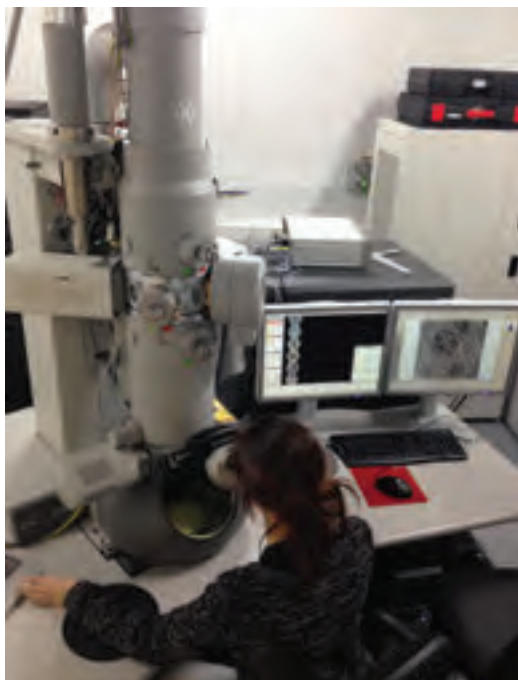


Figure: Ana Laura Sousa from the IGC EM Facility using the newly installed Tecnai G2 Spirit BioTWIN TEM.

FLOW CYTOMETRY FACILITY

HEAD (S)
GARDNER, RUI / MONTEIRO, MARTA



DESCRIPTION OF FACILITY

The *Flow Cytometry Facility* offers high quality flow cytometry technology services and expertise, providing the necessary support to the researchers at IGC, as well as to outside groups or companies. Currently, our facility stands as a national and international reference for flow cytometry and high-throughput cell sorting. The platform is equipped with two multicolour high-speed cell sorters, four analysers and a multiplex analyte reader. Experienced laboratory staff operates cell sorters, while researchers operate analysers. All users receive training in the systems they use, and the facility personnel are available to be consulted to advise on experimental design and data analysis. The need of new flow instruments and techniques to support the demands of research projects at IGC drives a continuous development of the facility, which closely follows the advances in the flow cytometry field, seeks and develops innovative projects, and implements strategies to improve the quality of the provided services.

NEWS IN 2016

In November 2016, Marta Monteiro has been hired to be the head of the facility, and Mariana Fernandes joined the service as a technician. In the first semester of 2016 a new 4-laser BD LSR Fortessa™ X-20 analyser enabling the detection of up to 16 parameters simultaneously was acquired for the unit. The facility is one of the founders of the Flx-Flow – a Portuguese network for Flow Cytometry born in 2016, which aims to bring together flow core facilities in the Lisbon area and enable the access of scientists to cutting edge applications.

E-MAIL: mmonteiro@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/facilities/uic/cytometry>

EXTERNAL WEBSITE: <http://facilities.igc.gulbenkian.pt/flowcytometry.php>

SELECTED PUBLICATIONS*

Barsky, L.W., Black, M., Cochran, M., Daniel, B.J., Davies, D., DeLay, M., **Gardner, R.**, Gregory, M., Kunkel, D., Lannigan, J., Marvin, J., Salomon, R., Torres, C., Walker, R. (2016) *International society for advancement of cytometry (ISAC) flow cytometry shared resource laboratory (SRL) best practices.* *Cytometry A.* 89(111): 1017-1030.

Carqueijeiro, I.T., Guimarães, A.L., Bettencourt, S., Martínez-Cortés, T., Guedes, J., Gardner, R., Lopes, T., Andrade, C., **Bispo, C.**, Martins, N.P., Andrade, P., Valente, P., Valente, I.M., Rodrigues, J.A., Duarte, P., Sottomayor, M. (2016) *Isolation of cells specialized in anticancer alkaloid metabolism by fluorescence activated cell sorting.* *Plant Physiol.* 171(4): 2371-2378.

***The complete list of publications is available on section 3. Publications**

STAFF IN 2016

Rui Gardner, Head | Left in May

Marta Monteiro, Head | Started in November

Cláudia Andrade, Technician | Left in March

Cláudia Bispo, Technician | Left in December

Mariana Fernandes, Technician | Started in October

Andreia Ribeiro, Technician | Started in May; left in September

NEW EQUIPMENT IN 2016

BD LSR Fortessa™ X20 (leasing), funded by Fundação para a Ciência e a Tecnologia

ANTIBODY SERVICE

HEAD
DEMENGOT, JOCELYNE



DESCRIPTION OF FACILITY

The *Antibody Service* provides a centralised resource for the production, purification and labelling of monoclonal antibodies. It also maintains a collection of hybridomas as well as purified and coupled antibodies for IGC investigators.

The *Antibody Service* offers the following procedures:

1. Quality Control of hybridomas:
 - Thawing, expanding, freezing;
 - Mycoplasma testing and cleaning;
 - Quantification of Ig production by ELISA;
2. Small to medium scale Ig production from QC hybridomas *in vitro* (10 to 100mg):
 - Optimization of production by sub-cloning;
 - Adaptation to serum free or IgG depleted media;
 - Purification by Protein A/G chromatography and protein quantification;
 - QC by protein gel electrophoresis.
3. Conjugation of monoclonal antibodies and other proteins to small molecules for FACS, western or immunohistology and high definition microscopy.

STAFF IN 2016

Ana Regalado, Technician

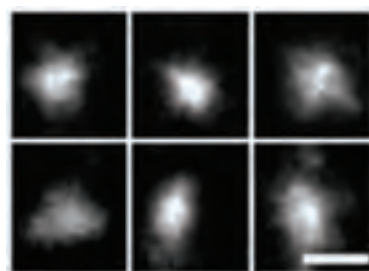


Figure 1: Super resolution using dSTORM of the distribution of CENP-A in a centromere using primary antibody direct labelling with Alexa Fluor® 647. Scale bar 200nm.

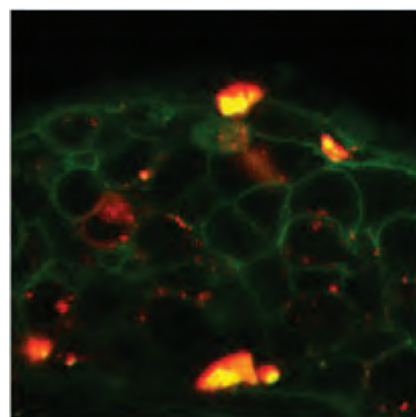


Figure 2: Cetuximab antibody labelled with FITC (green) binds to colorectal cancer cells (red-Dil).

NEWS IN 2016

This year the *Antibody Service* supported 12 laboratories and 1 facility at IGC. It also assisted 3 laboratories outside IGC. We produced a total of 250 mg of purified Ab, and labelled 30 different Ab or proteins. We initiated a novel collection of tools for protein purification and analysis, namely, anti-tags antibodies.

E-MAIL: jocelyne@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/facilities/antibody>

EXTERNAL WEBSITE: <http://facilities.igc.gulbenkian.pt/antibodies.php>

TECHNICO-SCIENTIFIC SUPPORT

HEAD
MORENO, NUNO



DESCRIPTION OF SERVICE

Our service supports facilities on a technical and management level, namely: homogenise the way internal accounting is made, develop tools to facilitate the communication to users and reporting, implementation of IOT (Internet Of Things) on the institute with over 200 sensors and actuators, running a seminar series dedicated to techniques and applications, development of apparatus to minimize HR burdening, 3D printing of custom devices for scientists.

E-MAIL: moreno@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/facilities/tss>

STAFF IN 2016

Ana Homem, Technician

Tiago Vale, Technician

NEWS IN 2016

Implementation of LxMart: a network in the Lisbon area for sharing best practices in science management with a strong focus on scientific facilities, software tools for management and post-awarding finances.

BIOSAFETY

HEAD
CARNEIRO, TIAGO



DESCRIPTION OF SERVICE

The IGC recognises the importance of ensuring the health and safety of all personal within its Campus. Hence, the biosafety unit aims to ensure that all reasonably practicable efforts are made to safeguard the institute's workers, visitors and contractors and also promote the security of the environment surrounding the IGC campus. In order to achieve these goals, the biosafety unit is committed to make available the adequate resources to support all relevant statutes, regulations and codes of practice and will take the appropriate steps to ensure:

- 1) A suitable and sufficient assessment of the risks to Health and Safety for all tasks performed by this organisation.
- 2) Information, instructions and the necessary training of all workers concerning health and safety.
- 3) The minimization of risks for health and safety in re-

lation to the use, handling, storage and transportation of chemical and biological substances used in the institute.

4) That all equipment handled at the institute is safe and without risks to health.

5) Maintenance of a safe workplace, safe means of access to it and safe egress from it.

NEWS IN 2016

In 2016, following changes in the legal regulations, the IGC obtained authorisation to:

- Work and manipulate genetically modified microorganisms and organisms, level 1 and 2.
- Manage radiation waste storage and disposal.

E-MAIL: tcarneir@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/facilities/biosafety>

ADMINISTRATIVE UNIT

HEAD
MARTINS, GRETA

DESCRIPTION OF SERVICE

The *Admin Unit* is responsible for: a) Post-award management of scientific projects; b) Administrative assistance to the IGC Directors and researchers; c) Assistance to new incoming researchers to the IGC; d) Logistics for seminar and other visitors; e) Meetings organisation; f) Processing of fellowships; g) Accounting processes in SAP. We collaborate with the accounting and purchasing sectors.

STAFF IN 2016

Liliana Rodrigues, Secretary to the Director
Olena Shydenko, Secretary to the Deputy Directors
Pedro Alves, Meetings organisation
Anna Maria Fejfer, Meetings organisation
Rita Gusmão, Admin project manager
Tatiana Rocha, Admin project manager
André Sousa, Admin project manager
Ana Santos, General secretary | Left in February
Jorge Costa, Chauffeur (Collaborator)

E-MAIL: gmartins@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/facilities/adminunit>

ACCOUNTING AND INTERNAL AUDIT

HEAD
LEITE, JOSÉ MÁRIO

DESCRIPTION OF SERVICE

This service provides support in all administrative and accounting matters, including ordering and stores, financial and fiscal support. The accounts office provides support in preparing financial reports of research projects, and in general accounting and management of projects. The accounting and financial reporting of research projects is executed by an external society: PWC. The Procurement is executed by an external society: FlyBridge. The internal auditing is executed by an external society: Deloitte.

E-MAIL: jleite@igc.gulbenkian.pt



NEWS IN 2016

The unit was re-designed towards specialisation with deeper focus on three specific areas of administrative support – senior management issues, project management and meetings organisation. The team was reduced by 2 members – support to purchasing was removed from admin unit responsibilities and an FCG member of the unit left for early retirement.

In 2016, the admin unit provided logistics and admin support for approximately:

- 11 national and international meetings;
- 36 seminar and/or other scientific visitors to the IGC;
- 6 new incoming researchers, including visas and social security;

The team also managed around 118 external scientific projects, prepared 18 financial reports and processed 350 fellowships.



STAFF IN 2016

Fátima Mateus, Accounts officer
Vítor Santos, Accounts and information officer
Joana Gusmão, Accounts officer
Bruno Pinto, Accounts officer
Abílio Simões, Stores manager
Ana Sofia Oliveira, Team responsible PwC
Tânia Lobão, Accounts officer PwC
António Bretanha, Procurement FlyBridge
Filipe Silva, Auditor Deloitte

INFORMATICS UNIT

HEAD
SOUSA, JOÃO

DESCRIPTION OF SERVICE

The IGC informatics (ITI) manages most of the ICT needs of the IGC including the development and maintenance of the IT and communications infrastructure, the direct support to IGC users (helpdesk), training and consulting as a service, development and maintenance of the scientific computation farm, and application development. These services are multi-layered and can be engaged fully or partially as needed. Most of the IGC infrastructure relies on the use of Open Source technologies and the competence of our dedicated staff to maintain a competitive level of service. Notable exceptions are the dedicated administrative applications that also rely on commercial

E-MAIL: jsousa@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/facilities/informatics>



STAFF IN 2016

João Garcia, Systems analyst
Mário Neto, Systems administrator
Fernando Azevedo, Technician
Manuel Carvalho, Technician
Ana Maya, Technician (relocated to FCG headquarters)

LIBRARY

HEAD
SOUSA, JOÃO

DESCRIPTION OF SERVICE

The IGC Library is an open access, specialised library in biomedicine. Its bibliographic collection covers Biology, Biochemistry, Genetics, Pharmacology, Microbiology, Physiology, Immunology, Virology, Cell Biology, Neuroscience and Developmental Biology. The library is intended for researchers, faculty and visiting scientists, students and staff of the IGC, but is also opened to external users, either from the national scientific community or from higher education institutions. It aims to provide access to useful, diversified and up to date information, to improve services provided, to acquire, register, maintain and distribute scientific information of interest to or



produced by researchers and students who work at the IGC.

The IGC library has a collection of printed journals in the field of health sciences, which spans almost 30 years. Currently it subscribes approximately 336 international scientific journals in electronic version.

STAFF IN 2016

Jorge Carneiro, Scientific coordinator
Pedro Homem, Library officer

E-MAIL: jsousa@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/facilities/library>

GENERAL MAINTENANCE

HEAD
LEITE, JOSÉ MÁRIO

DESCRIPTION OF SERVICE

This service provides support in all general maintenance (excluding scientific equipment and units), electricity, AVAC, buildings, gardening, cleaning and gives support to other activities that need it, such as garbage – general and biohazard – reconstruction and adaptation, etc.

E-MAIL: jleite@igc.gulbenkian.pt

RESEARCH FUNDING AFFAIRS

HEAD
VIDAL, SHEILA

DESCRIPTION OF SERVICE

The RFA Unit is responsible for the implementation of a pre-award grant administration service. Its main goal is to increase the IGC's capacity to attract competitive research funds launched by national, international, public and private grant programmes. This service reports directly to the Director, understands the different grant policies & requirements and works in collaboration with researchers, the Admin Unit, the Director and Deputy Directors. Services offered include: identification & dissemination of funding opportunities tailored to the needs of the institute; support to the development & submission of grant proposals and; post-award negotiation of grant agreements. The unit also organises and lectures several grant application training sessions and workshops for researchers at all career stages. Finally, this unit also monitors the impact of the services offered through the quantification of several criteria.

STAFF IN 2016

Teresa Costa, Pre-award grant manager

E-MAIL: svidal@igc.gulbenkian.pt
IGC WEBPAGE: <http://www.igc.gulbenkian.pt/facilities/rfaunit>



STAFF IN 2016

Filipa Pardelha, Technician
Pedro Alves, Technician
João Madureira, Technician
TDGI
Cofeley



NEWS IN 2016

During 2016, this service supported researchers in attracting several external competitive research funds. IGC researchers secured a total of 37 new external competitive research grants (31 FCT including 1 ERA-NET InfectERA; 2 HFSP Young Investigator Grants; 1 Bill Gates Project Grant/Investment; 1 AFM Telethon Research Grant; 2 Prémios Maratona da Saúde – Diabetes), 10 fellowships/contracts (4 FCT Postdoctoral Fellowships; 1 EMBO Long-Term Fellowship; 3 Marie Curie Individual Fellowships; 1 Liga Portuguesa Contra o Cancro-Pfizer PhD Fellowship; 1 Fulbright Core Scholar sabbatical); 8 prizes as well as 11 other type of funds, in a total amount of about 5,9 million €.

In addition, 2 IGC members were selected to participate in European COST Actions, 2 as Management Committee National Delegates for Portugal nominated by FCT and 1 also as a Working Group Member.

SCIENCE COMMUNICATION

HEAD
MENA, ANA

DESCRIPTION OF SERVICE

The IGC runs a dedicated science communication and outreach programme, which actively engages IGC researchers, staff and PhD students in a dialogue with the society. We aim at promoting the values of science, namely critical thinking, honesty and ethics, and openness to share and discuss new knowledge, encouraging public engagement in science. We also aim to raise the profile of the IGC and its research both nationally and internationally. Our programme involves a broad range of audiences: the media, students, teachers, general public, artists and policy makers.

STAFF IN 2016

Vanessa Borges, Public engagement officer
Inês Domingues, Communications officer
Catarina Júlio, Science education officer



NEWS IN 2016

Institutional communication: IGC scientific achievements were disseminated to the general public via traditional and social media. A new series of videos “PhD in a minute” was created.

Science Education: the IGC hosted visits from high-school and primary-school students, provided material for scientific activities, supported a scientific project and helped in the organization of a Science Café.

Public Events: the IGC participated in: a) Futurália, the largest education fair in Portugal; b) 2 music festivals, the Belém Art Fest and the NOS Alive festival; c) the Maker Faire; d) “Ao leme com a Ciência Viva” science festival; e) the Sci & Tech week; and organised the 8th edition of its Open Day.

Art & Science: the interactive installation Musical Morphogenesis was publicly presented in 5 different venues.

The complete list of activities can be found in the *Public Engagement* section of this report.

E-MAIL: anamena@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/outreach>



RESEARCH STRUCTURES & NETWORKS

RESEARCH STRUCTURES

UNIDADE DE INVESTIGAÇÃO – IGC

The Instituto Gulbenkian de Ciência (IGC) is an independent 'Research Unit' (Unidade de Investigação) rated as "Exceptional" under the international evaluation of Portuguese scientific research and technological development promoted by Fundação para a Ciência e a Tecnologia (FCT), in 2015. The scientific programme of the IGC Research Unit is dedicated to complex fundamental problems that fall largely into four research domains, namely quantitative biology, evolutionary biology, cell and developmental biology, and immunobiology. Modelling, quantitative biology and evolution are the conceptual substrate of the IGC, and influence thinking at the IGC in many ways. The Research Unit Team consists of 12 Research groups, each a cluster of 3 (or more) autonomous labs with sizes ranging from 3 to 15 lab members.

NATIONAL ROADMAP OF RESEARCH INFRASTRUCTURES OF STRATEGIC RELEVANCE

In 2013, FCT opened a call for research infrastructures to be included in the National Roadmap of Research Infrastructures of Strategic Relevance. This call aimed at assessing the existing research infrastructures, identifying national priority areas and introducing Portugal into the group of European countries who have produced their own national roadmaps in alignment with the European Strategic Forum on Research Infrastructures (ESFRI). In total, 40 infrastructures in all scientific domains were integrated in the Portuguese Roadmap, of which 23 are aligned with ESFRI. Four research structures of the IGC were selected to be included in the National Roadmap of Research Infrastructures:

- BioData.pt: Portuguese Biological Data Network (coordinated by José Pereira-Leal, IGC)
- PPBI: Portuguese Platform of BioImaging (coordinated by Paula Sampaio, Instituto de Biologia Molecular e Celular)

- GenomePT: National Facility for Genome Sequencing and Analysis (coordinated by Manuel Santos, University of Aveiro)

- CONGENTO: Consortium of Genetically Tractable Organisms (coordinated by Rui Costa, Champalimaud Foundation).

THE EUROPEAN MOUSE MUTANT ARCHIVE (EMMA) Head of the Portuguese node: Jocelyne Demengeot

The laboratory mouse is the most important mammalian model for studying genetic and multi-factorial diseases in Man. The European Mouse Mutant Archive (EMMA) is a not-for-profit repository for the collection, archiving (via cryopreservation) and distribution of relevant mutant strains that are essential for biomedical research.

EMMA draws on the expertise of 16 leading research institutes across Europe, including the IGC, in Portugal. The IGC offers the crucial Germ-Free Service that generates, breeds and houses mice that are free of all microorganisms. These germ-free animals are crucial in studies aimed at understanding the effects of microorganisms on a host, or dissecting the molecular mechanisms underlying the function of the immune system.

The germ-free facility of the IGC has generated more than 20 different strains of germ-free mice, requested by researchers from Portugal, Germany, USA, France and the UK. The facility has the capacity to temporarily host scientists wishing to carry out their own research with the mice at the IGC itself.

EMMA is part of the Infrafrontier Project, that links two complementary infrastructure networks with the aim of establishing a sustainable research infrastructure for systematic phenotyping, archiving and distribution of mouse models. IGC is one of the Infrafrontier partners, together with research facilities, government departments and funding agencies from 13 European countries, Canada and Israel.

NETWORKS

EU-LIFE

EU-LIFE is an alliance that gathers thirteen renowned European research centres in life sciences: CRG-Centre for Genomic Regulation, (Barcelona, Spain); VIB (Flanders, Belgium); Institut Curie (Paris, France); MDC-Max Delbrück Center for Molecular Medicine, (Berlin, Germany); Instituto Gulbenkian de Ciência (Oeiras, Portugal); CeMM-Research Center for Molecular Medicine of the Austrian Academy of Sciences (Vienna, Austria); IEO-European Institute of Oncology, (Milan, Italy); CEITEC-Central European Institute of Technology (Brno, Czech Republic); Netherlands Cancer Institute – Antoni van Leeuwenhoek (Amsterdam, Netherlands); FIMM-Institute for Molecular Medicine Finland (Helsinki, Finland); BRIC-Biotech Research and Innovation Centre (Copenhagen, Denmark); Babraham Institute (Cambridge, UK); FMI- Friedrich Miescher Institute for Biomedical Research (Basel, Switzerland).

Partners in EU-LIFE operate with similar principles of excellence, external review, integrity and independence, competitiveness, internationality, and social responsibility. EU-LIFE partners believe that they can join forces to better address complex questions in research, training and research management, thereby contributing to pushing European science forward. Specific working groups join efforts, share best practice, brainstorm, and design common activities in areas of common interest such as technology transfer, international collaboration, translational research, science communication, competitive funding strategies, recruitment and training.

EU-LIFE has been established as a voice for research institutes in European policy, currently participating in the two stakeholders' platforms that advise regularly Commissioner Moedas and European Commission's DG RTD - the Open Science Policy Platform and the European Research Area Stakeholders' platform.

ELIXIR

ELIXIR brings together life science resources from across Europe. These resources include databases, software tools, training materials, cloud storage and supercomputers. The goal of ELIXIR is to coordinate these resources so that they form a single infrastructure that makes it easier for scientists to find and share data, exchange expertise, and agree on best practices.

Together with INESC-ID, ITQB and iBET, IGC is in the consortium that started ELIXIR Portugal and contributes actively to its Platforms. Moreover, IGC is a

contractor in the H2020 EXCELERATE Project, that aims at accelerating the deployment of ELIXIR infrastructural services.

EMBnet - THE EUROPEAN MOLECULAR BIOLOGY NETWORK

Instituto Gulbenkian de Ciência node manager: Pedro L. Fernandes

The European Molecular Biology Network (EMBnet) is a network of academic partners that provide connections between communities of users and providers of bioinformatics resources. It has spearheaded a series of relevant initiatives to support the development of interconnected community resources.

The IGC is an institutional member of EMBnet since 1992.

GOBLET

Instituto Gulbenkian de Ciência representative: Pedro L. Fernandes

GOBLET, the Global Organisation for Bioinformatics Learning, Education and Training, is a focused group that dedicates systematic efforts to develop and enhance Bioinformatics Training and Education methods, sharing best practice in teaching and learning methods and supporting bioinformatics trainers and teachers worldwide.

The IGC is a member of GOBLET.

NEUBIAS

Instituto Gulbenkian de Ciência representative: Gabriel G. Martins (WG2 leader)

NEUBIAS is a new Network of European BioImage Analysts to advance life science imaging, aiming to maximize impact of imaging technology in Life-Sciences, and boost productivity of bioimaging-based research projects in Europe. NEUBIAS collaborates with EU imaging research infrastructures to set up best practice guidelines for image analysis. The Action is creating interactive databases for tools and workflows with annotated image sample datasets, to help matching practical needs in biological problems with software solutions, and to benchmark these tools. NEUBIAS developed a novel training programme with three levels of courses, open textbooks and offers travel grants in a Short-Term-Scientific-Missions programme to foster collaborations, technology access and knowledge transfer for scientists and specialists.

HGF Secreted by Activated Kupfer Cells Induces Apoptosis of Plasmodium-Infected Hepatocytes

Joana Roda, Carlos Rodriguez-Ibanez and Carlos Prieto-Garcia

3

PUBLICATIONS

On the (un)predictability of a large intragenic fitness landscape

Claudia Bangs, Sebastian Matuszewski, Wayne T. Strogatz, and Jeffrey G. Thompson

The study of fitness landscapes, which aims at mapping genotypes to fitness, is receiving ever-increasing attention. Novel experimental approaches combined with next-generation sequencing (NGS) methods enable accurate and extensive studies of the fitness effects of mutations, allowing us to test theoretical predictions and improve our understanding of the shape of the true underlying fitness landscape and its implications for the predictability and repeatability of evolution. Here, we present a uniquely large multiallelic fitness landscape comprising 640 engineered mutations that represent all possible combinations of 13 amino acid-changing mutations at 4 sites in the coat-shell protein Hsp18.1 in *Saccharomyces cerevisiae* under selected stability. Despite a pronounced fitness peak in reached via four previously neglected mutations, finding traditional and nontraditional recently proposed theoretical approaches, we generally feature of that global fitness landscape, using subsets of the data, reveals that nonredundant, targeted a smaller part of the is sufficient to reach the local maximum and non-redundant. This suggests that the fitness landscape is not necessarily smooth.

140

PEER REVIEWED
IN-HOUSE PUBLICATIONS

2

BOOK CHAPTERS

5

PROCEEDINGS

13

PEER REVIEWED
PUBLICATIONS FROM
ASSOCIATED GROUPS

PEER-REVIEWED PUBLICATIONS 2016

IN-HOUSE PUBLICATIONS

1. Abou-Jaoudé, W., Traynard, P., Monteiro, P.T., Saez-Rodriguez, J., Helikar, T., Thieffry, D., Chaouiya, C. (2016) *Logical modeling and dynamical analysis of cellular networks*. **Front Genet.** 7: 94.
2. Aires, R., Jurberg, A.D., Leal, F., Nóvoa, A., Cohn, M.J., Mallo, M. (2016) *Oct4 is a key regulator of vertebrate trunk length diversity*. **Dev Cell.** 38: 262-274.
3. Alves, P.C., Hartmann, D.O., Núñez, O., Martins, I., Gomes, T.L., Garcia, H., Galceran, M.T., Hampson, R., Becker, J.D., Silva, P.C. (2016) *Transcriptomic and metabolomic profiling of ionic liquid stimuli unveils enhanced secondary metabolism in Aspergillus nidulans*. **BMC Genomics.** 17: 284.
4. Azevedo, M., Sousa, A., Moura de Sousa, J., Thompson, J.A., Proença, J.T., Gordo, I. (2016) *Trade-offs of Escherichia coli adaptation to an intracellular lifestyle in macrophages*. **PLoS ONE.** 11: e0146123.
5. Baena-González, E., Hanson, J. (2016) *Shaping plant development through the Snrk1-tor metabolic regulators*. **Curr Opin Plant Biol.** 35: 152-157.
6. Bank, C., Matuszewski, S., Hietpas, R.T., Jensen, J.D. (2016) *On the (un)predictability of a large intragenic fitness landscape*. **Proc Natl Acad Sci USA.** 113(49): 14085-14090.
7. Bank, C., Renzette, N., Liu, P., Matuszewski, S., Shim, H., Foll, M., Bolon, D.N.A., Zeldovich, K.B., Kowalik, T.F., Finberg, R.W., Wang, J.P., Jensen, J.D. (2016) *An experimental evaluation of drug-induced mutational meltdown as an antiviral treatment strategy*. **Evolution.** 70(11): 2470-2484.
8. Barsky, L.W., Black, M., Cochran, M., Daniel, B.J., Davies, D., DeLay, M., Gardner, R., Gregory, M., Kunkel, D., Lannigan, J., Marvin, J., Salomon, R., Torres, C., Walker, R. (2016) *International society for advancement of cytometry (ISAC) flow cytometry shared*

resource laboratory (SRL) best practices. **Cytometry A.** 89(111): 1017-1030.

9. Bauer, A., Mylroie, H., Thornton, C.C., Calay, D., Birdsey, G.M., Kiprianos, A.P., Wilson, G.K., Soares, M.P., Yin, X., Mayr, M., Randi, A.M., Mason, J.C. (2016) *Identification of Cyclins A1, E1 and Vimentin as downstream targets of Heme Oxygenase-1 in Vascular Endothelial Growth Factor-mediated angiogenesis*. **Sci Rep-Uk.** 6: 29417.
10. Boavida, L.C., Becker, J.D. (2016) *Plant evolution: what does it take to be an egg?*. **Curr Biol.** 26: R527-530.
11. Borges, A.C., Pereira, N., Franco, M., Vale, L., Pereira, M., Cunha, M.V., Amaro, A., Albuquerque, T., Rebelo, M. (2016) *Implementation of a zebrafish health program in a research facility: a 4-year retrospective study*. **Zebrafish.** 13(S1): S-115-S-126.
12. Borrego-Pinto, J., Somogyi, K., Karreman, M.A., König, J., Müller-Reichert, T., Bettencourt-Dias, M., Gönczy, P., Schwab, Y., Lénárt, P. (2016) *Distinct mechanisms eliminate mother and daughter centrioles in meiosis of starfish oocytes*. **J Cell Biol.** 212(7): 815-827.
13. Brás-Pereira, C., Potier, D., Jacobs, J., Aerts, S., Casares, F., Janody, F. (2016) *Dachshund potentiates hedgehog signaling during Drosophila retinogenesis*. **PLoS Genet.** 12: e1006204.
14. Breser, M.L., Lino, A.C., Motrich, R.D., Godoy, G.J., Demengeot, J., Rivero, V.E. (2016) *Regulatory T cells control strain specific resistance to experimental autoimmune prostatitis*. **Sci Rep-Uk.** 6: 33097.
15. Cardoso, J., Mesquita, M., Dias, P.A., Bettencourt-Dias, M., Chaves, P., Pereira-Leal, J.B. (2016) *Cyr61 and Taz upregulation and focal epithelial to mesenchymal transition may be early predictors of Barrett's esophagus malignant progression*. **PLoS ONE.** 11: e0161967.

sion. **PLoS ONE.** 11: e0161967.

16. Carneiro, M.C., de Castro, I.P., Ferreira, M.G. (2016) *Telomeres in aging and disease: lessons from zebrafish*. **Dis Model Mech.** 9: 737-748.
17. Carneiro, M.C., Henriques, C.M., Nabais, J., Ferreira, T., Carvalho, T., Ferreira, M.G. (2016) *Short telomeres in key tissues initiate local and systemic aging in zebrafish*. **PLoS Genet.** 12: e1005798.
18. Carpio, A., Fleury, A., Parkhouse, R.M.E. (2016) *Elimination of Taenia solium transmission in Peru*. **New Engl J Med.** 375: 1196-1197.
19. Carpio, A., Romo, M.L., Parkhouse, R.M.E., Short, B., Dua, T. (2016) *Parasitic diseases of the central nervous system: lessons for clinicians and policy makers*. **Expert Rev Neurother.** 16(4): 401-414.
20. Carqueijeiro, I.T., Guimarães, A.L., Bettencourt, S., Martínez-Cortés, T., Guedes, J., Gardner, R., Lopes, T., Andrade, C., Bispo, C., Martins, N.P., Andrade, P., Valentão, P., Valente, I.M., Rodrigues, J.A., Duarte, P., Sottomayor, M. (2016) *Isolation of cells specialized in anticancer alkaloid metabolism by fluorescence activated cell sorting*. **Plant Physiol.** 171(4): 2371-2378.
21. Carvalho, R.F., Szakonyi, D., Simpson, C.G., Barbosa, I.C.R., Brown, J.W.S., Baena-González, E., Duque, P. (2016) *The Arabidopsis Sr45 splicing factor, a negative regulator of sugar signaling, modulates Snf1-related protein kinase 1 (Snrk1) stability*. **Plant Cell.** 28(8): 1910-1925.
22. Casaca, A., Nóvoa, A., Mallo, M. (2016) *Hoxb6 can interfere with somitogenesis in the posterior embryo through a mechanism independent of its rib-promoting activity*. **Development.** 143: 437-448.
23. Castro, D.S. (2016) *One more factor joins the plot: Pbx1 regulates differentiation and survival of midbrain dopaminergic neurons*. **EMBO J.** 35(18): 1957-1959.
24. Colaço, H.G., Moita, L.F. (2016) *Initiation of innate immune responses by surveillance of homeostasis perturbations*. **FEBS J.** 283(13): 2448-2457.
25. Confraria, A., Baena-González, E. (2016) *Using Arabidopsis protoplasts to study cellular responses to environmental stress*. **Methods Mol Biol.** 1398: 247-269.
26. Crozet, P., Margalha, L., Butowt, R., Fernandes, N., Elias, C.A., Orosa, B., Tomanov, K., Teige, M., Bachmair, A., Sadanandom, A., Baena-González, E. (2016) *SUMOylation represses SnRK1 signaling in Arabidop-*

sis. **Plant J.** 85(1):120-33.

27. Deaton, A.M., Gómez-Rodríguez, M., Mieczkowski, J., Tolstorukov, M.Y., Kundu, S., Sadreyev, R.I., Jansen, L.E.T., Kingston, R.E. (2016) *Enhancer regions show high histone H3.3 turnover that changes during differentiation*. **Elife.** 5: e15316.
28. de Moraes, L.V., Dechavanne, S., Sousa, P.M., Barateiro, A., Cunha, S.F., Nunes-Silva, S., Lima, F.A., Murillo, O., Marinho, C.R.F., Gangnard, S., Srivastava, A., Braks, J.A., Janse, C.J., Gamain, B., Franke-Fayard, B., Penha-Gonçalves, C. (2016) *Murine model for pre-clinical studies on Var2csa-mediated pathology associated to malaria in pregnancy*. **Infect Immun.** 84(6): 1761-1774.
29. Diekmann, Y., Pereira-Leal, J.B. (2016) *Gene tree affects inference of sites under selection by the branch-site test of positive selection*. **Evol Bioinform Online.** 11(Suppl 2): 11-7.
30. Durão, P., Güleresi, D., Proença, J., Gordo, I. (2016) *Enhanced survival of rifampicin and streptomycin double resistant E. coli inside macrophages*. **Antimicrob Agents Chemother.** 60(7): 4324-4332.
31. Estrada, M.F., Rebelo, S.P., Davies, E.J., Pinto, M.T., Pereira, H., Santo, V.E., Smalley, M.J., Barry, S.T., Gualda, E.J., Alves, P.M., Anderson, E., Brito, C. (2016) *Modelling the tumour microenvironment in long-term microencapsulated 3D co-cultures recapitulates phenotypic features of disease progression*. **Biomaterials.** 78: 50-61.
32. Faria, V.G., Martins, N.E., Magalhães, S., Paulo, T.F., Nolte, V., Schlötterer, C., Sucena, É., Teixeira, L. (2016) *Drosophila adaptation to viral infection through defensive symbiont evolution*. **PLoS Genet.** 12: e1006297.
33. Faria, V.G., Paulo, T.F., Sucena, E. (2016) *Testing cannibalism as a mechanism for horizontal transmission of Wolbachia in Drosophila*. **Symbiosis.** 68(1-3): 79-85.
34. Felix, P.M., Gonçalves, A., Vicente, J.R., Fonseca, P.J., Amorim, M.C.P., Costa, J.L., Martins, G.G. (2016) *Optical micro-tomography "OpenT" allows the study of large toadfish Halobatrachus didactylus embryos and larvae*. **Mech Develop.** 140: 19-24.
35. Fleury, A., Sastre, P., Sciotto, E., Correia, S., Monedero, A., Toledo, A., Hernandez, M., Harrison, L.J.S., Parkhouse, R.M.E. (2016) *A lateral flow assay (LFA) for the rapid detection of extraparenchymal neu-*

rocyticercosis using cerebrospinal fluid. **Exp Parasitol.** 171: 67-70.

36. Fonseca, R. (2016) *The aging memory: modulating epigenetic modifications to improve cognitive function.* **Neurobiol Learn Mem.** 133: 182-184.

37. Fransén-Pettersson, N., Duarte, N., Nilsson, J., Lundholm, M., Mayans, S., Larefalk, Å., Hannibal, T.D., Hansen, L., Schmidt-Christensen, A., Ivars, F., Cardell, S., Palmqvist, R., Rozell, B., Holmberg, D. (2016) *A new mouse model that spontaneously develops chronic liver inflammation and fibrosis.* **PLoS ONE.** 11: e0159850.

38. Gates, A.J., Rocha, L.M. (2016) *Control of complex networks requires both structure and dynamics.* **Sci Rep-Uk.** 6: 24456.

39. Gjini, E., Brito, P.H. (2016) *Integrating antimicrobial therapy with host immunity to fight drug-resistant infections: classical vs. adaptive treatment.* **PLoS Comput Biol.** 12: e1004857.

40. Gjini, E., Gomes, M.G.M. (2016) *Expanding vaccine efficacy estimation with dynamic models fitted to cross-sectional prevalence data post-licensure.* **Epidemics-Neth.** 14: 71-82.

41. Gjini, E., Valente, C., Sá-Leão, R., Gomes, M.G.M. (2016) *How direct competition shapes coexistence and vaccine effects in multi-strain pathogen systems.* **J Theor Biol.** 388: 50-60.

42. Gonçalves, S.A., Macedo, D., Raquel, H., Simões, P.D., Giorgini, F., Ramalho, J.S., Barral, D.C., Moita, L.F., Outeiro, T.F. (2016) *shRNA-based screen identifies endocytic recycling pathway components that act as genetic modifiers of alpha-synuclein aggregation, secretion and toxicity.* **PLoS Genet.** 12: e1005995.

43. Goossens, B., Sharma, R., Othman, N., Kun-Rodrigues, C., Sakong, R., Ancrenaz, M., Ambu, L.N., Jue, N.K., O'Neill, R.J., Bruford, M.W., Chikhi, L. (2016) *Habitat fragmentation and genetic diversity in natural populations of the Bornean elephant: Implications for conservation.* **Biol Conserv.** 196: 80-92.

44. Guerreiro, I., Gitto, S., Novoa, A., Codourey, J., Nguyen, H.T.H., Gonzalez, F., Milinkovitch, M.C., Mallo, M., Duboule, D. (2016) *Reorganisation of Hoxd regulatory landscapes during the evolution of a snake-like body plan.* **Elife.** 5: e16087.

45. Harrieff, M.J., Karamooz, E., Burr, A., Grant, W.F., Canfield, E.T., Sorensen, M.L., Moita, L.F., Lewinsohn,

D.M. (2016) *Endosomal MR1 trafficking plays a key role in presentation of Mycobacterium tuberculosis ligands to mait cells.* **PLoS Pathog.** 12: e1005524.

46. Jana, S.C., Bettencourt-Dias, M., Durand, B., Megraw, T.L. (2016) *Drosophila melanogaster as a model for basal body research.* **Cilia.** 5: 22.

47. Jana, S.C., Mendonça, S., Werner, S., Bettencourt-Dias, M. (2016) *Methods to study centrosomes and cilia in Drosophila.* **Methods Mol Biol.** 1454: 215-236.

48. Klionsky, D.J., ... Moita, L.F., ... et al., (2016) *Guidelines for the use and interpretation of assays for monitoring autophagy (3rd edition).* **Autophagy.** 12: 1-222.

49. Koyama, T., Mirth, C.K. (2016) *Growth-blocking peptides as nutrition-sensitive signals for insulin secretion and body size regulation.* **PLoS Biol.** 14: e1002392.

50. Lebesgue, N., da Costa, G., Ribeiro, R.M., Ribeiro-Silva, C., Martins, G.G., Matranga, V., Scholten, A., Cordeiro, C., Heck, A.J.R., Santos, R. (2016) *Deciphering the molecular mechanisms underlying sea urchin reversible adhesion: a quantitative proteomics approach.* **J Proteomics.** 138: 61-71.

51. Lebesgue, N., da Costa, G., Ribeiro, R.M., Ribeiro-Silva, C., Martins, G.G., Matranga, V., Scholten, A., Cordeiro, C., Heck, A.J.R., Santos, R. (2016) *Proteomic dataset of the sea urchin paracentrotus lividus adhesive organs and secreted adhesive.* **Data Brief.** 7: 1497-1505.

52. Lemberg, M.K., Adrain, C. (2016) *Inactive rhomboid proteins: new mechanisms with implications in health and disease.* **Semin Cell Dev Biol.** 60: 29-37.

53. Lopes, S.S., Distel, M., Linker, C., Fior, R., Monteiro, R., Bianco, I.H., Portugues, R., Strähle, U., Saúde, L. (2016) *Report of the 4th European Zebrafish Principal Investigator Meeting.* **Zebrafish.** 13(6): 590-595.

54. Lourenço, M., Ramiro, R.S., Güleresi, D., Barroso-Batista, J., Xavier, K.B., Gordo, I., Sousa, A. (2016) *A mutational hotspot and strong selection contribute to the order of mutations selected for during Escherichia coli adaptation to the gut.* **PLoS Genet.** 12: e1006420.

55. Magalhaes, A.C., Ferreira, A.R., Gomes, S., Vieira, M., Gouveia, A., Valenca, I., Islinger, M., Nascimento, R., Schrader, M., Kagan, J.C., Ribeiro, D. (2016) *Peroxisomes are platforms for cytomegalovirus' evasion from*

the cellular immune response. **Sci Rep-Uk.** 6: 26028.

56. Magalhães, S., Sucena, É. (2016) *Genetics of host-parasite interactions: towards a comprehensive dissection of Drosophila resistance to viral infection.* **Mol Ecol.** 25: 4981-4983.

57. Malaspinas, A., Westaway, M.C., Muller, C., Sousa, V.C., Lao, O., Alves, I., Bergström, A., Athanasiadis, G., Cheng, J.Y., Crawford, J.E., Heupink, T.H., Macholdt, E., Peischl, S., Rasmussen, S., Schiffls, S., Subramanian, S., Wright, J.L., Albrechtsen, A., Barbieri, C., Dupanloup, I., Eriksson, A., Margaryan, A., Moltke, I., Pugach, I., Korneliussen, T.S., Levkivskyi, I.P., Moreno-Mayar, J.V., Ni, S., Racimo, F., Sikora, M., Xue, Y., Aghakhanian, F.A., Brucato, N., Brunak, S., Campos, P.F., Clark, W., Ellingvåg, S., Fourmile, G., Gerbault, P., Injie, D., Koki, G., Leavesley, M., Logan, B., Lynch, A., Matisoo-Smith, E.A., McAllister, P.J., Mentzer, A.J., Metspalu, M., Migliano, A.B., Murgha, L., Phipps, M.E., Pomat, W., Reynolds, D., Ricaut, F., Siba, P., Thomas, M.G., Wales, T., Wall, C.M., Oppenheimer, S.J., Tyler-Smith, C., Durbin, R., Dortch, J., Manica, A., Schierup, M.H., Foley, R.A., Lahr, M.M., Bownern, C., Wall, J.D., Mailund, T., Stoneking, M., Nielsen, R., Sandhu, M.S., Excoffier, I., Lambert, D.M., Willerslev, E. (2016) *A genomic history of aboriginal Australia.* **Nature.** 538: 207-214.

58. Mallo, M. (2016) *Revisiting the involvement of signaling gradients in somitogenesis.* **FEBS J.** 283: 1430-1437.

59. Margalha, L., Valerio, C., Baena-González, E. (2016) *Plant Snrk1 kinases: structure, regulation, and function.* **EXS.** 107: 403-438.

60. Margarida, C.M., Peça, I.N., Raposo, C.D., Petrova, K.T., Teresa, B.M., Gardner, R., Bicho, A. (2016) *Doxorubicin-loaded galactose-conjugated Poly(D,L-Lactide-Co-Glycolide) nanoparticles as hepatocyte-targeting drug carrier.* **J Microencapsul.** : 1-11.

61. Maric-Biresev, J., Hunn, J.P., Krut, O., Helms, J.B., Martens, S., Howard, J.C. (2016) *Loss of the Interferon-γ-inducible regulatory immunity-related GTPase (Irg), Irgm1, causes activation of effector Irg proteins on lysosomes, damaging lysosomal function and predicting the dramatic susceptibility of Irgm1-deficient mice to infection.* **BMC Biol.** 14: 33.

62. Martins, M., Boavida, J.M., Raposo, J.F., Froes, F., Nunes, B., Ribeiro, R.T., Macedo, M.P., Penha-Gonçalves, C. (2016) *Diabetes hinders community-acquired pneumonia outcomes in hospitalized*

patients. **BMC Open Diabetes Res Care.** 4: e000181.

63. Matuszewski, S., Hildebrandt, M.E., Ghenu, A., Jensen, J.D., Bank, C. (2016) *A statistical guide to the design of deep mutational scanning experiments.* **Genetics.** 204(1): 77-87.

64. Mazet, O., Rodríguez, W., Grusea, S., Boitard, S., Chikhi, L. (2016) *On the importance of being structured: instantaneous coalescence rates and human evolution-lessons for ancestral population size inference?* **Heredity.** 116: 362-371.

65. Mendes, C.C., Mirth, C.K. (2016) *Stage-specific plasticity in ovary size is regulated by insulin/insulin-like growth factor and ecdysone signaling in Drosophila.* **Genetics.** 202(2): 703-19.

66. Minhos, T., Chikhi, L., Sousa, C., Vicente, L.M., da Silva, M.F., Heller, R., Casanova, C., Bruford, M.W. (2016) *Genetic consequences of human forest exploitation in two colobus monkeys in Guinea Bissau.* **Biol Conserv.** 194: 194-208.

67. Mirth, C.K., Anthony, F.W., Shingleton, A.W. (2016) *Allometry and size control: what can studies of body size regulation teach us about the evolution of morphological scaling relationships?* **Curr Opin Insect Sci.** 13: 93-98.

68. Mitterstiller, A., Haschka, D., Dichtl, S., Nairz, M., Demetz, E., Talasz, H., Soares, M.P., Einwallner, E., Esterbauer, H., Fang, F.C., Geley, S., Weiss, G. (2016) *Heme Oxygenase 1 controls early innate immune response of macrophages to Salmonella typhimurium infection.* **Cell Microbiol.** 18(10): 1374-1389.

69. Moura de Sousa, J.A., Alpedrinha, J., Campos, P.R.A., Gordo, I. (2016) *Competition and fixation of cohorts of adaptive mutations under fisher geometrical model.* **Peerj.** 4: e2256.

70. Müller, U.B., Howard, J.C. (2016) *The impact of Toxoplasma gondii on the mammalian genome.* **Curr Opin Neurobiol.** 32: 19-25.

71. Muller, N., Piel, M., Calvez, V., Voituriez, R., Gonçalves-Sá, J., Guo, C-L, Jiang, X., Murray, A., Meunier, N. (2016). *A predictive model for yeast cell polarization in pheromone gradients.* **PLoS Comput Biol.** 12(4): e1004795.

72. Navarro-Costa, P., McCarthy, A., Prudêncio, P., Greer, C., Guilgur, L.G., Becker, J.D., Secombe, J., Rangan, P., Martinho, R.G. (2016) *Early programming of the oocyte epigenome temporally controls late prophase*

I transcription and chromatin remodelling. Nat Commun. 7: 12331.

73. Neves-Costa, A., Moita, L.F. (2016) *Modulation of inflammation and disease tolerance by DNA damage response pathways. FEBS J.* 284(5): 680–698.

74. Nukarinen, E., Nägele, T., Pedrotti, L., Wurzinger, B., Mair, A., Landgraf, R., Börnke, F., Hanson, J., Teige, M., Baena-Gonzalez, E., Dröge-Laser, W., Weckwerth, W. (2016) *Quantitative phosphoproteomics reveals the role of the AMPK plant ortholog Snrk1 as a metabolic master regulator under energy deprivation. Sci Rep-Uk.* 6: 31697.

75. Oliveira, R.F., Simões, J.M., Teles, M.C., Oliveira, C.R., Becker, J.D., Lopes, J.S. (2016) *Assessment of fight outcome is needed to activate socially driven transcriptional changes in the zebrafish brain. Proc Natl Acad Sci USA.* 113(5): E654–E661.

76. Oruc, Z., Oblet, C., Boumediene, A., Druilhe, A., Pascal, V., Le, R.E., Cuvillier, A., El, H.C., Lecardeur, S., Leanderson, T., Morelle, W., Demengeot, J., Aldigier, J., Cogné, M. (2016) *IgA structure variations associate with immune stimulations and IgA mesangial deposition. J Am Soc Nephrol.* 27(9): 2748–2761.

77. Ottoni, C., Rasteiro, R., Willet, R., Claeys, J., Talloen, P., Van de Vijver, K., Chikhi, L., Poblome, J., Decorte, R. (2016) *Comparing maternal genetic variation across two millennia reveals the demographic history of an ancient human population in southwest turkey. R Soc Open Sci.* 3: 150250.

78. Parente, M.R., Monteiro, J.T., Martins, G.G., Saraiya, L.M. (2016) *Helicobacter pullorum induces in murine macrophages nitric oxide release that promotes phagocytosis and killing. Microbiology.* 162: 503–512.

79. Passagem-Santos, D., Bonnet, M., Sobral, D., Trancoso, I., Silva, J.G., Barreto, V.M., Athanasiadis, A., Demengeot, J., Pereira-Leal, J.B. (2016) *Rag recombinase as a selective pressure for genome evolution. Genome Biol Evol.* 8: 3364–3376.

80. Pimenta-Marques, A., Bento, I., Lopes, C.A.M., Duarte, P., Jana, S.C., Bettencourt-Dias, M. (2016) *A mechanism for the elimination of the female gamete centrosome in Drosophila melanogaster. Science.* 353(6294): aaf4866.

81. Piskadlo, E., Oliveira, R.A. (2016) *Novel insights into mitotic chromosome condensation. F1000research.* 5: 1807.

82. Rai, A., Pinto, S., Velho, T.R., Ferreira, A.F., Moita, C., Trivedi, U., Evangelista, M., Comune, M., Rumbaugh, K.P., Simões, P.N., Moita, L.F., Ferreira, L. (2016) *One-step synthesis of high-density peptide-conjugated gold nanoparticles with antimicrobial efficacy in a systemic infection model. Biomaterials.* 85: 99–110.

83. Ramiro, R.S., Costa, H., Gordo, I. (2016) *Macrophage adaptation leads to parallel evolution of genetically diverse Escherichia coli small-colony variants with increased fitness in vivo and antibiotic collateral sensitivity. Evol Appl.* 9: 994–1004.

84. Remy, E., Duque, P. (2016) *Assessing tolerance to heavy-metal stress in Arabidopsis thaliana seedlings. Methods Mol Biol.* 1398: 197–208.

85. Rocheta, M., Coito, J.L., Ramos, M.J.N., Carvalho, L., Becker, J.D., Carbonell-Bejerano, P., Amâncio, S. (2016) *Transcriptomic comparison between two Vitis vinifera l. varieties (Trincadeira and Touriga nacional) in abiotic stress conditions. BMC Plant Biol.* 16: 224.

86. Roulis, M., Bongers, G., Armaka, M., Salviano, T., He, Z., Singh, A., Seidler, U., Becker, C., Demengeot, J., Furtado, G.C., Lira, S.A., Kollias, G. (2016) *Host and microbiota interactions are critical for development of murine Crohn's-like ileitis. Mucosal Immunol.* 9: 787–797.

87. Sánchez, L., Chaouiya, C. (2016) *Primary sex determination of placental mammals: a modelling study uncovers dynamical developmental constraints in the formation of sertoli and granulosa cells. BMC Syst Biol.* 10: 37.

88. Schulte, K., Pawlowski, N., Faelber, K., Fröhlich, C., Howard, J., Daumke, O. (2016) *The immunity-related GTPase Irga6 dimerizes in a parallel head-to-head fashion. BMC Biol.* 14: 14.

89. Sgarlata, G. M., Salmona, J., Razanaparany, T. P., Rabarivola, C. J., Jan, F., Rasolondraibe, E., Andriaholinirina, N. V., Lafosse, S., Chikhi, L., Manni, F., Bayart, F. (2016) *Mitochondrial genetic diversity in the crowned sifaka (Propithecus coronatus) in a fragmented landscape. Primate Conserv.* 30: 39–57.

90. Silva, J.G., Martins, N.P., Henriques, R., Soares, H. (2016) *HIV-1 Nef impairs the formation of calcium membrane territories controlling the signaling nano-architecture at the immunological synapse. J Immunol.* 197: 4042–4052.

91. Singh, S., Howell, D., Trivedi, N., Kessler, K.,

Ong, T., Rosmaninho, P., Raposo, A.A., Robinson, G., Roussel, M.F., Castro, D.S., Szeleki, D.J. (2016) *Zeb1 controls neuron differentiation and germinal zone exit by a mesenchymal-epithelial-like transition. Elife.* 5: e12717.

92. Soares, M.P., Bozza, M.T. (2016) *Red alert: labile heme is an alarmin. Curr Opin Immunol.* 38: 94–100.

93. Soares, M.P., Hamza, I. (2016) *Macrophages and iron metabolism. Immunity.* 44: 492–504.

94. Srinivasan, N., Gordon, O., Ahrens, S., Franz, A., Deddouche, S., Chakravarty, P., Phillips, D., Yunus, A.A., Rosen, M.K., Valente, R.S., Teixeira, L., Thompson, B., Dionne, M.S., Wood, W., Reis, E.S.C. (2016) *Actin is an evolutionarily-conserved damage-associated molecular pattern that signals tissue injury in Drosophila melanogaster. Elife.* 5: e19662.

95. Surkont, J., Pereira-Leal, J.B. (2016) *Are there Rab GTPases in Archaea? Mol Biol Evol.* 33(7): 1833–1842.

96. Szabó, E.C., Manguinhas, R., Fonseca, R. (2016) *The interplay between neuronal activity and actin dynamics mimic the setting of an LTD synaptic tag. Sci Rep-Uk.* 6: 33685.

97. Szakonyi, D. (2016) *Leafdata: a literature-curated database for Arabidopsis leaf development. Plant Methods.* 12: 15.

98. Teles, M.C., Cardoso, S.D., Oliveira, R.F. (2016) *Social plasticity relies on different neuroplasticity mechanisms across the brain social decision-making network in zebrafish. Front Behav Neurosci.* 10: 16.

99. Teles, M.C., Gozdowska, M., Kalamarz-Kubiak, H., Kulczykowska, E., Oliveira, R.F. (2016) *Agonistic interactions elicit rapid changes in brain nonapeptide levels in zebrafish. Horm Behav.* 84: 57–63.

100. Teles, M.C., Oliveira, R.F. (2016) *Androgen response to social competition in a shoaling fish. Horm Behav.* 78: 8–12.

101. Teles, M.C., Oliveira, R.F. (2016) *Quantifying aggressive behavior in zebrafish. Methods Mol Biol.* 1451: 293–305.

102. Thompson, J.A., Oliveira, R.A., Xavier, K.B. (2016) *Chemical conversations in the gut microbiota. Gut Microbes.* 7(2): 163–170.

103. Vale, P.F., McNally, L., Doeschl-Wilson, A., King, K.C., Popat, R., Domingo-Sananes, M.R., Allen, J.E., Soares, M.P., Kümmerli, R. (2016) *Beyond killing:*

can we find new ways to manage infection?. Evol Med Public Health. 2016(1): 148–157.

104. Vale-Costa, S., Alenquer, M., Sousa, A.L., Kellen, B., Ramalho, J., Tranfield, E.M., Amorim, M.J. (2016) *Influenza A virus ribonucleoproteins modulate host recycling by competing with Rab11 effectors. J Cell Sci.* 129: 1697–1710.

105. Vale-Costa, S., Amorim, M.J. (2016) *Clustering of Rab11 vesicles in influenza A virus infected cells creates hotspots containing the eight viral ribonucleoproteins. Small GTPases.* 23:1–7.

106. Vale-Costa, S., Amorim, M.J. (2016) *Recycling endosomes and viral infection. Viruses.* 8(3): 64.

107. Valente, R.S., Xavier, K.B. (2016) *The Trk potassium transporter is required for RsmB-mediated activation of virulence in the phytopathogen Pectobacterium wasabiae. J Bacteriol.* 198: 248–255.

108. Vasconcelos, F.F., Sessa, A., Laranjeira, C., Alexandre, A.S.F., Teixeira, V., Hagey, D.W., Tomaz, D.M., Muhr, J., Broccoli, V., Castro, D.S. (2016) *Myt1 counteracts the neural progenitor program to promote vertebrate neurogenesis. Cell Rep.* 17: 469–483.

109. Velho, T.R., Santos, I., Póvoa, P., Moita, L.F. (2016) *Sepsis: the need for tolerance not complacency. Swiss Med Wkly.* 146: w14276.

110. Vieira, A.M., Feijó, J.A. (2016) *Hydrogel control of water uptake by pectins during in vitro pollen hydration of Eucalyptus globulus. Am J Bot.* 103(3): 437–451.

111. Vilas-Boas, F., Bagulho, A., Tenente, R., Teixeira, V.H., Martins, G.G., da Costa, G., Jerónimo, A., Cordeiro, C., Machuqueiro, M., Real, C. (2016) *Hydrogen peroxide regulates cell adhesion through the redox sensor RPSA. Free Radical Bio Med.* 90: 145–157.

112. Vinagre, J., Nabais, J., Pinheiro, J., Batista, R., Oliveira, R.C., Gonçalves, A.P., Pestana, A., Reis, M., Mesquita, B., Pinto, V., Lyra, J., Cipriano, M.A., Ferreira, M.G., Lopes, J.M., Sobrinho-Simões, M., Soares, P. (2016) *Tert promoter mutations in pancreatic endocrine tumours are rare and mainly found in tumours from patients with hereditary syndromes. Sci Rep-Uk.* 6: 29714.

113. Wibowo, A., Becker, C., Marconi, G., Durr, J., Price, J., Hagmann, J., Papareddy, R., Putra, H., Kagayama, J., Becker, J., Weigel, D., Gutierrez-Marcos, J. (2016) *Hyperosmotic stress memory in Arabidopsis is mediated by distinct epigenetically labile sites in the*

genome and is restricted in the male germline by DNA glycosylase activity. **Elife**. 5:e13546.

114. Wunderle, L., Knopf, J.D., Kühnle, N., Morlé, A., Hehn, B., Adrain, C., Strisovsky, K., Freeman, M., Lemberg, M.K. (2016) *Rhomboid intramembrane protease Rhbdl4 triggers ER-export and non-canonical secretion of membrane-anchored Tgfa*. **Sci Rep-Uk**. 6: 27342.

115. Zerbino, D.R., Johnson, N., Juettelman, T., Sheppard, D., Wilder, S.P., Lavidas, I., Nuhn, M., Perry, E., Raffailac-Desfosses, Q., Sobral, D., Keefe, D., Gräf, S., Ahmed, I., Kinsella, R., Pritchard, B., Brent, S., Amode, R., Parker, A., Trevanion, S., Birney, E., Dunham, I., Flicek, P. (2016) *Ensembl regulation resources*. **Data-base-Oxford**. 2016: bav119.

116. Zitouni, S., Francia, M.E., Leal, F., Montenegro, G.S., Nabais, C., Duarte, P., Gilberto, S., Brito, D., Moyer, T., Kandels-Lewis, S., Ohta, M., Kitagawa, D., Holland, A.J., Karsenti, E., Lorca, T., Lince-Faria, M., Bettencourt-Dias, M. (2016) *Cdk1 prevents unscheduled Plk4-StiI complex assembly in centriole biogenesis*. **Curr Biol**. 26(9): 1127-1137.

EPUB AHEAD OF PRINT

117. Beldade, P., Peralta, C.M. (2016) *Developmental and evolutionary mechanisms shaping butterfly eyespots*. **Curr Opin Insect Sci**. [Epub ahead of print].

118. Drumond, A., Madeira, N., Fonseca, R. (2016) *Endocannabinoid signalling and memory dynamics: a synaptic perspective*. **Neurobiol Learn Mem**. [Epub ahead of print].

119. Ferjani, Z., Bouzid, D., Fourati, H., Fakhfakh, R., Kammoun, T., Hachicha, M., Penha-Gonçalves, C., Masmoudi, H. (2016) *CREM variant Rs17583959 conferred susceptibility to T1d risk in the tunisian families*. **Immunol Lett**. [Epub ahead of print].

120. Gomes, M.G.M., Gjini, E., Lopes, J.S., Souto-Maior, C., Rebelo, C. (2016) *A theoretical framework to identify invariant thresholds in infectious disease epidemiology*. **J Theor Biol**. [Epub ahead of print].

121. Irwin, K.K., Laurent, S., Matuszewski, S., Vuilleumier, S., Ormond, L., Shim, H., Bank, C., Jensen, J.D. (2016) *On the importance of skewed offspring distributions and background selection in virus population genetics*. **Heredity**. [Epub ahead of print].

122. Kershaw, F., Carvalho, I., Loo, J., Pomilla, C.,

Best, P.B., Findlay, K.P., Cerchio, S., Collins, T., Engel, M.H., Minton, G., Ersts, P., Barendse, J., Kotze, P.G.H., Razafindrakoto, Y., Ngouessono, S., Mejer, M., Thornton, M., Rosenbaum, H.C. (2016) *Multiple processes drive genetic structure of humpback whale (Megaptera novaeangliae) populations across spatial scales*. **Mol Ecol**. [Epub ahead of print].

123. Lee, H.W., Khan, S.Q., Khaliqdina, S., Altintas, M.M., Grahammer, F., Zhao, J.L., Koh, K., Tardi, N.J., Faridi, M.H., Geraghty, T., Cimbalk, D.J., Susztak, K., Moita, L.F., Baltimore, D., Tharaux, P., Huber, T.B., Kretzler, M., Bitzer, M., Reiser, J., Gupta, V. (2016) *Absence of mir-146a in podocytes increases risk of diabetic glomerulopathy via upregulation of Erbb4 and Notch-1*. **J Biol Chem**. [Epub ahead of print].

124. Ling, Y., Alshareef, S., Butt, H., Lozano-Juste, J., Li, L., Galal, A.A., Moustafa, A., Momin, A.A., Tashkandi, M., Richardson, D.N., Fujii, H., Arold, S., Rodriguez, P.L., Duque, P., Mahfouz, M.M. (2016) *Pre-mRNA splicing repression triggers abiotic stress signaling in plants*. **Plant J**. [Epub ahead of print].

125. Michard, E., Simon, A.A., Tavares, B., Wudick, M.M., Feijo, J.A. (2016) *Signaling with ions: the key-stone for apical cell growth and morphogenesis in pollen tubes*. **Plant Physiol**. [Epub ahead of print].

126. Moraes-Fontes, M.F., Berntsson, S.G. (2016) *Comment on: PML in patients with systemic lupus erythematosus: a systematic literature review*. **Lupus**. [Epub ahead of print].

127. Silva, A.M., Osório, D.S., Pereira, A.J., Maiato, H., Pinto, I.M., Rubinstein, B., Gassmann, R., Telley, I.A., Carvalho, A.X. (2016) *Robust gap repair in the contractile ring ensures timely completion of cytokinesis*. **J Cell Biol**. [Epub ahead of print].

128. Soares, M.P., Yilmaz, B. (2016) *Microbiota control of malaria transmission*. **Trends Parasitol**. [Epub ahead of print].

129. Stankovic, A., Guo, L.Y., Mata, J.F., Bodor, D.L., Cao, X., Bailey, A.O., Shabanowitz, J., Hunt, D.F., Garcia, B.A., Black, B.E., Jansen, L.E.T. (2016) *A dual inhibitory mechanism sufficient to maintain cell-cycle-restricted CENP-A assembly*. **Mol Cell**. [Epub ahead of print].

130. Surkont, J., Diekmann, Y., Pereira-Leal, J.B. (2016) *Rabifit2: An improved bioinformatic classifier of Rab GTPases*. **Bioinformatics**. [Epub ahead of print].

131. Ubelmann, F., Burrinha, T., Salavessa, L., Gomes, R., Ferreira, C., Moreno, N., Guimas, A.C. (2016) *Bin1 and CD2AP polarise the endocytic generation of beta-amyloid*. **EMBO Rep**. [Epub ahead of print].

IGC CURRENT ADDRESS

132. Balbontin, R., Villagra, N., de la, G.M.P., Mora, G., Figueroa-Bossi, N., Bossi, L. (2016) *Expression of iron, the salmochelin siderophore receptor, requires mRNA activation by Ryhb small RNA homologues*. **Mol Microbiol**. 100: 139-155.

133. Braza, F., Brouard, S., Chadban, S., Goldstein, D.R. (2016) *Role of TLRs and damp in allograft inflammation and transplant outcomes*. **Nat Rev Neurol**. [Epub ahead of print].

134. Cavadas, M.A.S., Mesnieres, M., Crifo, B., Manresa, M.C., Selfridge, A.C., Keogh, C.E., Fabian, Z., Scholz, C.C., Nolan, K.A., Rocha, L.M.A., Tambuwala, M.M., Brown, S., Wdowicz, A., Corbett, D., Murphy, K.J., Godson, C., Cummins, E.P., Taylor, C.T., Cheong, A. (2016) *Rest is a hypoxia-responsive transcriptional repressor*. **Sci Rep-Uk**. 6: 31355.

135. Guadalupe, C.M., Pereira, M., Silva, Z., Iria, I., Coutinho, C., Lopes, A., Sá-Correia, I., Videira, P.A. (2016) *Using dendritic cells to evaluate how Burkholderia cenocepacia clonal isolates from a chronically infected cystic fibrosis patient subvert immune functions*. **Med Microbiol Immun**. [Epub ahead of print].

136. Guerreiro, P.S., Coelho, J.E., Sousa-Lima, I., Macedo, P., Lopes, L.V., Outeiro, T.F., Pais, T.F. (2016) *Mutant a53t α -synuclein improves rotarod performance before motor deficits and affects metabolic pathways*. **Neuromol Med**. [Epub ahead of print].

137. Lopes, F., Barbosa, M., Ameer, A., Soares, G., de Sá, J., Dias, A.I., Oliveira, G., Cabral, P., Temudo, T., Calado, E., Cruz, I.F., Vieira, J.P., Oliveira, R., Esteves, S., Sauer, S., Jonasson, I., Syvänen, A., Gyllenstein, U., Pinto, D., Maciel, P. (2016) *Identification of novel genetic causes of Rett syndrome-like phenotypes*. **J Med Genet**. [Epub ahead of print].

138. Mangerich, A., Debiak, M., Birtel, M., Ponath, V., Balszuweit, F., Lex, K., Martello, R., Burckhardt-Boer, W., Strobel, R., Siegert, M., Thiermann, H., Steinritz, D., Schmidt, A., Buerkle, A. (2016) *Sulfur and nitrogen mustards induce characteristic poly(adp-ribosylation) responses in hacat keratinocytes with distinctive cellu-*

lar consequences. **Toxicol Lett**. 244: 56-71.

139. Martins, T., Valentim, A.M., Pereira, N., Antunes, L.M. (2016) *Anaesthesia and analgesia in laboratory adult zebrafish: a question of refinement*. **Lab Anim-Uk**. 50: 476-488.

140. Proenca, J.T., Nelson, D., Nicoll, M.P., Connor, V., Efstathiou, S. (2016) *Analyses of Herpes simplex virus type 1 latency and reactivation at the single cell level using fluorescent reporter mice*. **J Gen Virol**. 97(3): 767-77.

ASSOCIATED GROUPS

1. Abrantes, P., Rosa, A., Francisco, V., Sousa, I., Xavier, J.M., Oliveira, S.A. (2016) *Mitochondrial genome association study with peripheral arterial disease and venous thromboembolism*. **Atherosclerosis**. 252: 97-105.

2. Barros-Martins, J., Schmolka, N., Fontinha, D., Pires de Miranda, M., Simas, J.P., Brok, I., Ferreira, C., Veldhoen, M., Silva-Santos, B., Serre, K. (2016) *Effector $\Gamma\delta$ T cell differentiation relies on master but not auxiliary Th cell transcription factors*. **J Immunol**. [Epub ahead of print].

3. Cabral, R., Pires, R., Anjos, R., Branco, C.C., Maciel, P., Mota-Vieira, L. (2016) *Genealogical and molecular analysis of a family-based cohort of congenital heart disease patients from the São Miguel island (Azores, Portugal)*. **Ann Hum Biol**. 43: 547-553.

4. Conceição, I.C., Rama, M.M., Oliveira, B., Café, C., Almeida, J., Mougá, S., Duque, F., Oliveira, G., Vicente, A.M. (2016) *Definition of a putative pathological region in Park2 associated with autism spectrum disorder through insilico analysis of its functional structure*. **Psychiat Genet**. [Epub ahead of print].

5. Gonçalves, A.B., Thorsteinsdóttir, S., Deries, M. (2016) *Rapid and simple method for in vivo ex utero development of mouse embryo explants*. **Differentiation**. 91(4-5): 57-67.

6. Gonçalves, A.C., Alves, R., Baldeiras, I., Cortesão, E., Carda, J.P., Branco, C.C., Oliveiros, B., Loureiro, L., Pereira, A., Nascimento, C.J.M., Sarmiento-Ribeiro, A.B., Mota-Vieira, L. (2016) *Genetic variants involved in oxidative stress, base excision repair, DNA methylation, and folate metabolism pathways influence myeloid neoplasias susceptibility and prognosis*. **Mol Carcinogen**. [Epub ahead of print].

7. Malik, R. Abrantes, P. *et al.* (2016) *Low-frequency and common genetic variation in ischemic stroke the metastroke collaboration*. **Neurology**. 86(13): 1217-1226.

8. Malik, R., Traylor, M., Pulit, S.L., Bevan, S., Hopewell, J.C., Holliday, E.G., Zhao, W., Abrantes, P., Amouyel, P., Attia, J.R., Battey, T.W.K., Berger, K., Boncoraglio, G.B., Chauhan, G., Cheng, Y., Chen, W., Clarke, R., Cotlarciuc, I., Debette, S., Falcone, G.J., Ferro, J.M., Gamble, D.M., Ilina, A., Kittner, S.J., Kourkoulis, C.E., Lemmens, R., Levi, C.R., Lichtner, P., Lindgren, A., Liu, J., Meschia, J.F., Mitchell, B.D., Oliveira, S.A., Pera, J., Reiner, A.P., Rothwell, P.M., Sharma, P., Slowik, A., Sudlow, C.L.M., Tatlisumak, T., Thijs, V., Vicente, A.M., Woo, D., Seshadri, S., Saleheen, D., Rosand, J., Markus, H.S., Worrall, B.B., Dichgans, M. (2016) *Low-frequency and common genetic variation in ischemic stroke the metastroke collaboration*. **Neurology**. 86: 1217-1226.

9. Murta, D., Batista, M., Silva, E., Trindade, A., Henrique, D., Duarte, A., Lopes-da-Costa, L. (2016) *Notch signaling in the epididymal epithelium regulates sperm motility and is transferred at a distance within epididymosomes*. **Andrology**. 4(2): 314–327.

10. Rathore, O.S., Faustino, A., Prudêncio, P., Van Damme, P., Cox, C.J., Martinho, R.G. (2016) *Absence of N-terminal acetyltransferase diversification during evolution of eukaryotic organisms*. **Sci Rep-Uk**. 6: 21304.

11. Rosa, A., Abrantes, P., Sousa, I., Francisco, V., Santos, P., Francisco, D., Xavier, J.M., Oliveira, S.A. (2016) *Ulcerative colitis is under dual (mitochondrial and nuclear) genetic control*. **Inflamm Bowel Dis**. 22(4): 774–781.

12. Sousa, I., Abrantes, P., Francisco, V., Teixeira, G., Monteiro, M., Neves, J., Norte, A., Robalo, C.C., Moura, E.S.J., Reis, E., Santos, P., Oliveira, M., Sousa, S., Fradinho, M., Malheiro, F., Negrão, L., Feijó, S., Oliveira, S.A. (2016) *Multicentric genome-wide association study for primary spontaneous pneumothorax*. **PLoS ONE**. 11: e0156103.

13. Thieleke-Matos, C., Lopes da Silva, M., Cabrita-Santos, L., Portal, M.D., Rodrigues, I.P., Zuzarte-Luis, V., Ramalho, J.S., Futter, C.E., Mota, M.M., Barral, D.C., Seabra, M.C. (2016) *Host cell autophagy contributes to Plasmodium liver development*. **Cell Microbiol**. 18: 437-450.

PROCEEDINGS

1. Correia, R.B., Li, L., Rocha, L.M. (2016). *Monitoring potential drug interactions and reactions via network analysis of Instagram user timelines*. **Pac Symp Bio-comp**. 21: 492-503.

2. Jesus del Hierro, M., Fernandez, J., Castrillo, M., Martin-Dorado, I., Montoliu, L., Hagn, M., Mammano, F., Herault, Y., Brown, S., Ulfhaake, B., Demengeot, J., Parkinson, H., Ramirez-Solis, R., Kollias, G., Sedlacek, R., Soininen, R., Ruelicke, T., Jonkers, J., Iraqi, F., De Angelis, M.H. (2016) *EMMA: The European Mouse Mutant Archive*. **Transgenic Res**. 25: 228-228.

3. Rocha, L.M., Correia, R. (2016). *Legislative polarization and social activism: a data-driven analysis of political communication*. **Amsterdam: Proceedings of the Conference on Complex Systems (CCS 2016)**.

4. Rocha, L.M., Correia, R. (2016). *Public health monitoring of drug interactions, patient cohorts, and behavioral outcomes via network analysis of Instagram and Twitter user timelines*. **Proceedings of the 6th Translational Bioinformatics Conference (TCB 2016)**.

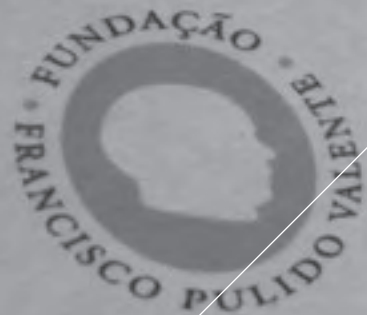
5. Rocha, L.M., Wood, I., Bollen, J. L., Sá, J. (2016). *Human sexual cycles are driven by culture and collective moods*. **Proceedings of the Conference on Complex Systems (CCS 2016)**.

BOOK CHAPTERS

1. Mallo, M. (2016). *The Axial Musculoskeletal System*. In “Kaufman’s Atlas of Mouse Development Supplement”. (R. Baldock, J. Bard, D.R. Davidson and G. Morriss-Kay Eds.). Academic Press. pp 165-175.

2. Rocha, L. M., Gates, A., Manicka, S. (2016). *The effective structure of complex networks drives dynamics, criticality and control*. In “Complex Networks 2016. Studies in Computational Intelligence”. Springer.





4

PRIZES &
HONOURS

PRÉMIO
PULIDO VALENTE
CIÊNCIA

NEUROCIÊNCIAS

FCT
Fundação para a Ciência e a Tecnologia

Atribuído a

Roksana Maria Pirzgalska

pelo trabalho intitulado

"Sympathetic Neuro-adipose Connections Mediate Leptin-Driven Lipolysis", da autoria de Mafalda M.A. Pereira, Nadiya Kubasova, Andreia Barateiro, Elsa Seixas, Gabriel G. Martins, Jeffrey M. Friedman, Ana I. Domingos, publicado na revista Cell 160 (1-9) 1-9, 24 September 2015.

O trabalho foi realizado no Centro de Investigação, Instituto Gulbenkian de Ciência.



11

PRIZES



45

HONOURS

PRIZES & HONOURS 2016

BARROSO BATISTA, JOÃO

Gilbert S. Omenn Prize, International Society for Evolution, Medicine, and Public Health

BETTENCOURT DIAS, MÓNICA

ERC Panel member - Starting Grants (LS1), European Research Council

BISPO, CLÁUDIA

Travel Award to CYTO 2016, International Society for Advancement of Cytometry (ISAC)

BRAZA, FAOUZI

Marie S. Curie Individual Fellowship, European Commission

CARAMALHO, ÍRIS

Postdoctoral fellowship, Fundação para a Ciência e a Tecnologia

CARVALHO, JOANA

Outstanding poster award, DrosTuga 2016

CHAOUIYA, CLAUDINE

Elected as an SBML Editor, Systems Biology Markup Language (SBML)

CONFRARIA, ANA

Postdoctoral fellowship, Fundação para a Ciência e a Tecnologia

COSTA, TERESA

BESTPRACT Short term mission fellowship, European BestPract Cost Action

DEMEANGEOT, JOCELYNE

ERC Panel member - Starting Grants, European Research Council

HHMI international reviewer, Howard Hughes Medical Institute

DUARTE, ELVES

Best PhD student oral communication award, DrosTuga 2016

DUQUE, PAULA

Member of Editorial Board, Scientific Reports

Member of Executive Board, International PhD Programme — Plants for Life

ESPIGARES PUERTO, FELIPE

Marie S. Curie Individual Fellowship, European Commission

FERREIRA, MIGUEL GODINHO

Member of the *Conselho Científico das Ciências da Vida e da Saúde*, Fundação para a Ciência e a Tecnologia

FRAGATA, INÊS

Godfrey-Hewitt Mobility Award, European Society for Evolutionary Biology

GJINI, ERIDA

ESCMID Attendance Grant for Short course, ESCMID

NIMBioS support for short-term visit, NIMBioS

Member of the organising committee, European Conference of Mathematical and Theoretical Biology 2018

GONÇALVES SÁ, JOANA

First Degree Honour Medal Award for Educational Merit, Government of Cabo Verde

LALOUM, TOM

Marie S. Curie Individual Fellowship, European Commission

LOUREIRO, JOANA

Marie S. Curie Individual Fellowship, European Commission

MALLO, MOISÉS

Editorial Board member, Developmental Dynamics

Editorial Board, ISRN Developmental Biology

Academic Editor, PLoS ONE

MARQUES, ANA RITA

L'Oréal Medal of Honour for Women in Science Award*, L'Oréal Portugal, UNESCO National Commission and Fundação para a Ciência e a Tecnologia

MARTINS, GABRIEL

Leader of the Training working group, NEUBIAS COST action network

Member of programme committee, SPAOM 2016 meeting

Member of Scientific Review panel, CORBEL

MENA, ANA

Chair of the Science Communication Working Group, EU-LIFE

MILAGRE, INÊS

Marie S. Curie Individual Fellowship, European Commission

MIRTH, CHRISTEN

Women in Science Award, School of Biological Sciences

NAVARRO-COSTA, PAULO

Postdoctoral award, Portuguese Society for Developmental Biology

NOVO-UZAL, ESTHER

Postdoctoral fellowship, Fundação para a Ciência e a Tecnologia

OLIVEIRA, RAQUEL

Prémio Dona Antónia Adelaide Ferreira ("Revelation Award"), Sigrapé Vinhos Lda.

OLIVEIRA, RITA

ASM Student/Postdoc Travel Grant, American Society for Microbiology

OLIVEIRA, RUI

President-Elect, Society for Social Neuroscience
Best Poster Award, 34th Annual Meeting of the Brazilian Ethnological Society

Member of the Biological Sciences Fellowships Evaluation Committee, Fundação para a Ciência e a Tecnologia

Member of the Biological Sciences Evaluation Committee for the Polonez Programme 2016, National Science Centre Poland

PIRZGALSKA, ROKSANA

Pulido Valente Science Award 2016*, Fundação Pulido Valente and Fundação para a

Ciência e a Tecnologia

EMBO Short-Term Fellowship, European Molecular Biology Organization

PISKADLO, EWA

Best Poster Award, EMBO Young Scientists Forum

ROCHA, LUÍS

Core Fulbright Scholar Programme, The J. William Fulbright Foreign Scholarship Board

Special Mention Award for Service to Community, The 5th International Workshop on Complex Networks and their Applications

SOARES, MIGUEL

Member of the Scientific Committee, "European Iron Club" Meeting

Scientific Advisor, EU-FP7 Consortium VISICORT

SOUTO MAIOR, CAETANO

Best Poster Award, 21st International Bioinformatics Workshop on Virus Evolution and Molecular Epidemiology

SRIDHAR, AKILA

EMBO Long-Term Fellowship, European Molecular Biology Organization

TEIXEIRA, LUÍS

FCT investigator, Fundação para a Ciência e a Tecnologia

THOMPSON, JESSICA

Postdoctoral fellowship, Fundação para a Ciência e a Tecnologia

VIDAL, SHEILA

Member of the EARMA Working Group on Cultures and Diversity in Research Management and Administration, European Association of Research Managers and Administrators

WERNER, SASCHA

Best Poster Award, EMBO Conference, Cilia 2016

XAVIER, KARINA

FCT investigator, Fundação para a Ciência e a Tecnologia

ERC Panel member – Consolidator Grants (LS6), European Research Council

**Awarded in 2016; publicly announced in 2017.*



5

GRADUATE EDUCATION
& TRAINING

2
PhD PROGRAMMES

1
ADVANCED TRAINING
PROGRAMME



82

PhD STUDENTS

167

STUDENTS ATTENDING
ADVANCED TRAINING

PhD PROGRAMME IN INTEGRATIVE BIOLOGY AND BIOMEDICINE | IBB

HEAD OF PROGRAMME
SUCENA, ÉLIO



DESCRIPTION OF THE PROGRAMME

The IGC PhD programme offers to a selected group of students the opportunity to learn biology from a combination of resident Institute researchers and invited faculty from many of the world's most prestigious scientific institutions. Students benefit from an intensive academic semester before choosing research groups to join, and writing their thesis projects. Candidates hail from all over the globe, and diverse academic backgrounds. The class of 2016 maintains its international collaboration with the University of Cologne, and the Max Planck Institute for Plant Breeding Research, as well as local partnerships with the Champalimaud Research (Champalimaud Foundation) and the Instituto de Tecnologia Química e Biológica (ITQB-UNL). Students also benefit from many educational courses and workshops throughout their PhD, including our popular bioinformatics

training programme, weekly seminars and an annual retreat. Graduate students drive social life at the Institute, organising cultural events year round.

The IBB programme is supported by the Fundação para Ciência e a Tecnologia and the Calouste Gulbenkian Foundation and its students are awarded their degrees from Universidade Nova de Lisboa.

SUPPORT STAFF

Manuela Cordeiro, Administrative assistant | Left in October

Paula Viana, Administrative assistant

E-MAIL: esucena@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/education/ibbprogramme>

STUDENTS ADMITTED IN 2016

NAME	NATIONALITY	FIRST DEGREE	INSTITUTION
Abdulbasit Amin	Nigeria	MSc (Physiology)	University of Ilorin, Nigeria
Alba Rodriguez	Spain	MSc (Biology)	Universidade da Coruña, Spain
Ana Morais	Portugal	MSc (Evolutionary and Developmental Biology)	Faculdade de Ciências da Universidade de Lisboa, Portugal
Catarina Nunes	Portugal	MSc (Evolutionary and Developmental Biology)	Faculdade de Ciências da Universidade de Lisboa, Portugal
Gabriele Sgarlata	Italy	MSc (Molecular Biology)	University of Padova, Italy
Gonçalo Matos	Portugal	MSc (Evolutionary and Developmental Biology)	Faculdade de Ciências da Universidade de Lisboa, Portugal
Rafael Paiva	Portugal	MSc (Biomedical Research)	Faculdade de Medicina da Universidade de Coimbra, Portugal
Sónia Pereira	Portugal	MSc (Biotechnology)	Instituto Superior Técnico, Universidade de Lisboa, Portugal

MODULES | COURSES RUN IN 2016

JANUARY 11-15

HISTORY OF BIOLOGICAL CONCEPTS

Organiser: Élio Sucena

Faculty: Michael Dietrich (Dartmouth College, New Hampshire, USA), Lars Jansen, Rui Oliveira (IGC, Portugal).

JANUARY 18-23

STATISTICS AND QUANTITATIVE BIOLOGY

Organisers: Jorge Carneiro and Claudine Chaouiya

Faculty: Nuno Sepúlveda (LSHTM, London, UK), Jorge Carneiro, Claudine Chaouiya (IGC, Portugal).

JANUARY 25-29

STRUCTURAL AND MOLECULAR BIOLOGY

Organisers: Alekos Athanasiadis and Lars Jansen
Faculty: Martin Jinek (University of Zurich, Switzerland), Reuben S. Harris (University of Minnesota, USA), Alekos Athanasiadis, Lars Jansen (IGC, Portugal).

FEBRUARY 01-05

BIOPHYSICS

Organisers: Filipa Alves and Ivo Telley

Faculty: Luis Melo (IST, Portugal), Susana Lopes (CEDOC, Portugal), Ricardo Louro, Manuela Pereira, Smilja Todorovic, Ivo Saraiva, James Yates (ITQB-UNL, Portugal), Cláudio Franco (IMM, Portugal), Gabriel Martins, Erin Tranfield, Filipa Alves, Ivo Telley (IGC, Portugal).

FEBRUARY 10-26

INSIDE THE CELL/CELL BIOLOGY

Organisers: Raquel Oliveira, Colin Adrain, Maria João Amorim, Mónica Dias and Florence Janody

Faculty: Pedro Carvalho (CRG-Barcelona, Spain), Clifford Brangwynne (University of Princeton, USA), Michael Way (Francis Crick Institute, UK), Markus Affolter (University of Basel, Switzerland), Arnaud Echard (Institut Pasteur, France), Henrique Girão (Universidade de Coimbra, Portugal), Taro Nakamura (Harvard University, USA), Reto Gassman (IBMC, Portugal), Marco Malumbres (CNIO, Spain), Edgar Gomes (IMM, Portugal), Duarte Barral (CEDOC, Portugal), Raquel Oliveira, Colin Adrain, Maria João Amorim, Mónica Dias and Florence Janody (IGC, Portugal).

MODULES | COURSES RUN IN 2016 (cont.)

FEBRUARY 29 - MARCH 04

DEVELOPMENTAL BIOLOGY

Organisers: Diogo Castro and Moisés Mallo

Faculty: Gonçalo Castelo-Branco (Karolinska Institute, Sweden), Laurent Nguyen (GIGA, Université de Liège, Belgium), Ram Reshef (University of Haifa, Israel), Fernando Roch (Université Paul Sabatier, France), Ana Tavares (CEDOC, Portugal), Rita Fior (Champalimaud Research, Portugal), Vera Martins, Diogo Castro and Moisés Mallo (IGC, Portugal).

MARCH 07-11

EVOLUTION

Organisers: Isabel Gordo and Lounès Chikhi

Faculty: Bret Payseur (University of Wisconsin, USA), Lounes Chikhi, Claudia Bank, Ivo Chelo, Isabel Gordo, Lilia Perfeito (IGC, Portugal).

MARCH 14-18

EVOLUTION, DEVELOPMENT AND ECOLOGY

Organisers: Patrícia Beldade and Ivo Chelo

Faculty: Christian Braendle (Université Nice Sophia, France), Johannes Jaeger (The KLI Institute, Austria), Manuel A. S. Santos (iBiMED, Portugal), Christen Mirth, Patrícia Beldade, Ivo Chelo, Takashi Koyama (IGC, Portugal).

MARCH 21-25

NEUROBIOLOGY

Organisers: Rui Oliveira and Ana Domingos

Faculty: Suzana Herculano Houzel (Universidade Federal Rio de Janeiro, Brazil), Tim Fawcett (University of Exeter, UK), Paul Cohen (Rockefeller University, USA), Ilona Grunwald Kadow (Max Plank Institute of Neurobiology, Germany), Michael Orger Joe Paton, Inbal Israely, Christian Machens, Carlos Ribeiro, Marta Moita, Susana Lima and Gonzalo de Polavieja (Champalimaud Research, Portugal).

MARCH 28 - APRIL 05

HOST-PATHOGEN INTERACTIONS/
IMMUNOBIOLOGY

Organisers: Luís Teixeira and Miguel Soares

Faculty: Peter Murray (St. Jude Children's Research Hospital, USA), Gabriel Nuñez (University of Michigan, USA), Paul Schulze-Lefert (Max Planck Institute for Plant Breeding Research, Germany), Alexander Chervonsky (University of Chicago, USA), Tatyana Golovkina (University of Chicago, USA), Vasco Barreto (CEDOC, Portugal), Bruno Silva Santos (IMM, Portugal), Vera Martins, Luis Moita,

Luís Teixeira, Miguel Soares, Jocelyne Demengeot, Jonathan Howard (IGC, Portugal).

APRIL 10-15

ECOLOGY

Organiser: Sara Magalhães (FCUL, Portugal)

Faculty: Paul Schmidt (University of Pennsylvania, USA), Marc-André Selosse (Musée National d'Histoire Naturelle, France), Ioannis Michalakis (IRD, France), Sara Magalhães (FCUL, Portugal).

APRIL 18-22

SYSTEMS BIOLOGY

Organiser: Claudine Chaouiya

Faculty: Nils Bluethgen (Charité Universitätsmedizin Berlin, Germany), Edda Schulz (Max Planck Institute for Molecular Genetics, Germany), Anais Baudot (Institut de Mathématiques de Marseille, France), Albert Goldbeter (Université Libre de Bruxelles, Belgium), Claudine Chaouiya, Erida Gjini (IGC, Portugal).

APRIL 25-29

PLANT BIOLOGY (Cologne, Germany)

Organiser: Isabell Witt (University of Cologne, Germany)

Faculty: Stanislav Kopriva, Ute Höcker, Maria Alnabi (University of Cologne, Germany), Andreas Weber, Urte Schluter, Vera Göhre, Heinrich-Heine (Universität Düsseldorf, Germany), Elena Baena-González, Jörg Becker, Paula Duque (IGC, Portugal).

MAY 02-06

FROM CELLS TO ORGANISMS

Organisers: Karina Xavier and Miguel Godinho Ferreira

Faculty: Marco Demaria (ERIBA, University Medical Center Groningen, The Netherlands), Adriano O. Henriques, Mónica Serrano (ITQB-UNL, Portugal), Sérgio Dias, Bruno Bernardes de Jesus (IMM, Portugal), Karina Xavier, Miguel Godinho Ferreira, Ozhan Ozkaya (IGC, Portugal).

MAY 09-13

HYPOTHESIS DRIVEN RESEARCH

Organisers: Jocelyne Demengeot and José Leal

Faculty: Jocelyne Demengeot, José Leal, António Coutinho (IGC, Portugal).



GRADUATE PROGRAMME SCIENCE FOR DEVELOPMENT | PGCD

HEAD OF PROGRAMME
JOANA GONÇALVES SÁ & PATRÍCIA BELDADE



DESCRIPTION OF THE PROGRAMME

The Graduate Programme Science for Development (PGCD) is an advanced training programme designed to prepare students from the various Portuguese Speaking African Countries (PALOP) to pursue research careers in Science and Technology, particularly in the Life Sciences.

It is currently being developed as a partnership between the IGC, the FCT and the MESCI of Cabo Verde, with three main goals:

- 1) To train the next generation of Portuguese-speaking African students, giving them the opportunity to learn advanced science;
- 2) To improve the quality of science education and scientific research in the PALOP;
- 3) To use science and technology as effective tools for development.

The programme offers basic training in the life sciences, particularly Plant Biology, Marine Biology and Tropical Diseases, consisting of one year of graduate courses, taking place in Praia, Cape Verde, followed by a 40 month research period leading to a PhD thesis, divided between the home countries and select institutes and universities abroad.

SUPPORT STAFF

Inês Maciel, Assistant
Carla Semedo, Assistant

E-MAIL: mjsa@igc.gulbenkian.pt; pbeldade@igc.gulbenkian.pt
IGC WEBPAGE: <http://www.igc.gulbenkian.pt/education/pgcd>
EXTERNAL WEBSITE: <http://pages.igc.gulbenkian.pt/pgcd/en>

STUDENTS ADMITTED IN 2016

NAME	NATIONALITY	FIRST DEGREE	INSTITUTION
Antonino Sambundo Kapitão	Angola	Medicine	Faculdade de Medicina de Benguela, Angola
Bernardete Leonardo Camilo	Mozambique	Oceanography	Universidade Eduardo Mondlane, Mozambique
Cláudia da Cruz Gonçalves	Cabo Verde	Psychology	Université de Moncton, Canada
Danilo da Silva Lopes	Cabo Verde	Biotechnology	Universidade Estadual de São Paulo, Brazil
Dizimalta dos Santos Miquitaio	Mozambique	Biology	Universidade Pedagógica, Mozambique
Hamilton Diniz Chiango	Mozambique	Forestry	Instituto Superior de Agronomia, Universidade de Lisboa, Portugal
Hélio Ribeiro Rocha	Cabo Verde	Public Health	Universidade Jean Piaget, Cabo Verde
Irina Suheila Fonseca	Cabo Verde	Cell & Molecular Biology	Universidade de Coimbra, Portugal
Joel Amaque Indi	Guinea- Bissau	Development & Environment	Universidade Federal do Ceará, Brazil
Nuno Pais dos Santos	Cabo Verde	Biotechnology	Faculdade de Ciências da Universidade de Lisboa, Portugal
Valdir Rocha Semedo	Cabo Verde	Biochemistry	Faculdade de Ciências da Universidade de Lisboa, Portugal
Valéria dos Santos Custódio	Cabo Verde	Biology	Universidade de Coimbra, Portugal

MODULES | COURSES RUN IN 2016

JANUARY 18-22

FROM DNA TO PROTEINS - HISTORY AND STATE OF THE ART

Organiser: Miguel Godinho Ferreira (IGC, Portugal)
Faculty: Lars Janssen (IGC, Portugal), Rui Martinho (Universidade do Algarve, Portugal).

JANUARY 25-29

MOLECULAR BIOLOGY AND TECHNIQUES

Organiser: Maria João Amorim (IGC, Portugal)
Faculty: Susana Gouveia (IGC, Portugal), Rita Teodoro (FCUL, Portugal).

FEBRUARY 01-05

THEORETICAL BIOLOGY AND EPIDEMIOLOGY

Organiser: Jorge Carneiro (IGC, Portugal)
Faculty: Nuno Sepúlveda (LSHTM, UK), Gabriela Gomes (LHSTM, UK).

FEBRUARY 08-12

EVOLUTION

Organisers: Filipa Vala (FCUL, Portugal), Tiago Paixão (IST, Austria)
Faculty: Rui Castaninha (IGC, Portugal), Sara Magalhães (FCUL, Portugal).

MODULES | COURSES RUN IN 2016 (cont.)

FEBRUARY 15-19

TRAFFICKING AND SIGNALLING

Organisers: Pedro Carvalho (CRG, Spain), Colin Adrain (IGC, Portugal)

Faculty: Cláudia Almeida (CEDOC, Portugal).

FEBRUARY 22-26

BIOINFORMATICS

Organiser: Nuno Morais (IMM, Portugal)

Faculty: Benilton Carvalho (UniCamp, Brazil), Inês Santiago (CRUK, UK).

FEBRUARY 29 - MARCH 04

CELL CYCLE

Organisers: Raquel Oliveira (IGC, Portugal)

Faculty: Florence Janody (IGC, Portugal), Susana Godinho (UCL, UK).

MARCH 07-11

DEVELOPMENT

Organisers: António Jacinto (CEDOC, Portugal), Leonor Saúde (IMM, Portugal)

Faculty: Rita Fior (IGC, Portugal), Sérgio Dias (FMUL, Portugal).

MARCH 14-18

BIODIVERSITY, GENOMICS AND CONSERVATION

Organiser: Nuno Ferrand (CIBIO, Portugal)

Faculty: Fernando Sequeira, Ricardo Lopes, Raquel Vasconcelos (CIBIO, Portugal), Inês Gameiro (UNL, Portugal).

MARCH 28 - APRIL 01

INTRODUCTION TO MARINE BIOLOGY

Organiser: Manuel Santos (ISPA, Portugal)

Faculty: Carlos Assis (FCUL, Portugal).

APRIL 04-08

MARINE ECOLOGY

Organiser: Miguel Barbosa (St. Andrews, UK)

Faculty: Roberta Bonaldo (Universidade de São Paulo, Brazil)

APRIL 11-15

MARINE POPULATION PHYLOGENIES, GENETICS AND GENOMICS

Organiser: Ricardo Beldade (CNRS, France)

Faculty: Rui Faria (Universidade do Porto, Portugal), Giacomo Bernardi (UCSC, USA)

APRIL 18-22

AQUACULTURE AND FISHERIES

Organiser: Jorge Gonçalves (Universidade do

Algarve, Portugal)

Faculty: Cláudia Aragão (Universidade do Algarve, Portugal).

APRIL 25-29

AQUATIC PLANTS AND ALGAE

Organisers: Ester Serrão (Universidade do Algarve, Portugal), Salomão Bandeira (UEM, Mozambique)

Faculty: Joel Creed (UERJ, Brazil), Peter Wirtz (Universidade da Madeira, Portugal), Joana Boavida (Universidade do Algarve, Portugal).

MAY 09-13

PLANT BIOLOGY AND BIOCHEMISTRY

Organiser: Paula Duque (IGC, Portugal)

Faculty: Jorge Marques da Silva (FCUL, Portugal), José Feijó (University of Maryland, USA), Alessandro Ramos (UENF, Brazil).

MAY 16-20

PLANT STRESS AND NUTRITION

Organiser: Elena Baena (IGC, Portugal)

Faculty: Alessandro Ramos (UENF, Brazil), Nelson Saibo (ITQB-UNL, Portugal).

MAY 23-27

BIOTECHNOLOGY TECHNIQUES

Organisers: Fátima Grossi de Sá (Universidade de Brasília, Brazil)

Faculty: Patrícia Pelegrini (Embrapa, Brazil).

MAY 30 - JUNE 03

TROPICAL AGRICULTURE

Organiser: Manuel Correia (ISA, Portugal)

Faculty: José Alexandre (Universidade de Évora, Portugal), Manuel Madeira, João Neves Martins (ISA, Portugal).

JUNE 06-10

IMMUNOLOGY

Organiser: Vasco Barreto (CEDOC, Portugal)

Faculty: Raffaella Gozzelino (CEDOC, Portugal), Afonso Almeida (IMM, Portugal), André Vale (IBCCF, Brazil).

JUNE 13-17

IMMUNITY OF HOST-PATHOGEN INTERACTIONS

Organiser: Helena Soares (CEDOC, Portugal)

Faculty: Raffaella Gozzelino (CEDOC, Portugal), Margarida Saraiva (IBMC, Portugal), Rogério Amino (Institut Pasteur, France).

JUNE 27 - JULY 1

TROPICAL MEDICINE AND CLINICAL MICROBIOLOGY

Organiser: Thomas Hanscheid (IMM, Portugal)

Faculty: Robert Badura, Carla Santos, Elisabete Martins (IMM, Portugal).

JULY 04-08

INTESTINAL INFECTIONS AND PARASITOLOGY

Organiser: José Gagliardi Leite (FioCruz, Brasil)

Faculty: Aldo Lima (UFC, Brazil).

JULY 11-15

VECTOR-BORNE DISEASES

Organisers: Maria Mota and Vanessa Zuzarte Luís (IMM, Portugal)

Faculty: Sílvia Boscardin (USP, Brazil).

JULY 18-22

PUBLIC HEALTH

Organiser: Inácio Mandomando (CISM, Mozambique)

Faculty: Lara Ferrero Gomez (UniCV, Cabo Verde), Amabélia Rodrigues (Bandim, Guinea-Bissau).

JULY 25-29

SCIENCE COMMUNICATION AND RESEARCH MANAGEMENT

Organiser: Sheila Vidal (IGC, Portugal)

Faculty: Ana Godinho (FCT, Portugal), Suely Costa (Falar Global, Portugal), Ana Mena, Teresa Costa (IGC, Portugal).



GULBENKIAN TRAINING PROGRAMME IN BIOINFORMATICS | GTPB

HEAD OF PROGRAMME
FERNANDES, PEDRO L.



DESCRIPTION OF THE PROGRAMME

The GTPB runs face-to-face Bioinformatics Training Courses regularly at the Instituto Gulbenkian de Ciência since 1999. Up to now, more than 5000 course participants have acquired practical skills that they can use with high degree of independence.

The Programme consists in a series of short, intensive hands-on courses delivered and fully documented in English. The design of the courses is based on sets of carefully chosen exercises, flanked by short lectures and participative interaction sessions. The training methodology is based on active learning principles. A set of courses addresses recognised needs in a stable manner, whereas new themes are introduced each year to allow for novel areas where Bioinformatics is making new impacts.

The courses are held in a fully equipped training room, enabling intensive interactions between instructors and participants.

In 2016, the GTPB has provided 13 training courses to a grand total of 167 participants from 19 nationalities. Of these, 113 participants were from Portuguese institutions, 60 from the IGC and 54 from foreign institutions.

E-MAIL: pfern@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/education/gtpb>

EXTERNAL WEBSITE: <http://gtpb.igc.gulbenkian.pt/bicourses>

MODULES | COURSES RUN IN 2016

Organiser: Pedro L. Fernandes

MARCH 28 - APRIL 1

NDARC16 - NGS DATA ANALYSIS, RNAseq, ChIPseq
Faculty: Mark Dunning (Cancer Research UK, University of Cambridge, UK), Tom Carroll (MRC Clinical Sciences Centre, UK), Nuno Barbosa-Morais (IMM, Portugal).

APRIL 11-15

PDA16 - PROTEOMICS DATA ANALYSIS

Faculty: Lennart Martens (Ghent University and VIB, Belgium), Harald Barsnes, Marc Vaudel (University of Bergen, Norway).

APRIL 18-22

IB16F - INTRODUCTORY BIOINFORMATICS: Our entry level course with a soft introduction to NGS data analysis

Faculty: David P. Judge (Freelancer Bioinformatics instructor), Pedro Fernandes, Daniel Sobral (IGC, Portugal).

MAY 9-13

ARANGS16 - AUTOMATED AND REPRODUCIBLE ANALYSIS OF NGS DATA

Faculty: Rutger Vos, Hannes Hettling (Naturalis, The Netherlands), Darin London (Duke University Medical Center, USA).

MAY 18-20

GTDA16 - GENOMIC AND TRANSCRIPTOMIC DATA ANALYSIS

Faculty: Francisco García and Alejandro Alemán (Centro de Investigación Príncipe Felipe, Spain).

JULY 11-15

BPBR16 - BIOINFORMATICS USING PYTHON FOR BIOMEDICAL RESEARCHERS

Faculty: Allegra Via (IBBE, CNR, Italy) and Vincenza Colonna (IGB, CNR, Italy).

SEPTEMBER 27-30

PM16 - PRECISION MEDICINE: NGS variant analysis and interpretation for translational research

Faculty: Fatima Al-Shahrour, Elena Piñeiro, Javier Perales (CNIO, Spain).

OCTOBER 10-14

3DAROC16 - 3C-BASED DATA ANALYSIS AND 3D RECONSTRUCTION OF CHROMATIN FOLDING

Faculty: Marc Marti-Renom, François Serra, Marco

di Stefano (Centro Nacional de Análisis Genómico and CRG-Barcelona, Spain).

OCTOBER 17-19

QPB16 - QUANTITATIVE PROTEOMICS USING BIOINFORMATICS

Faculty: Mikhail Savitski (EMBL, Germany), Roman Zubarev, Bo Zhang (Karolinska Institutet, Sweden).

NOVEMBER 02-04

AAIRRI16 - ANALYSIS OF ADAPTIVE IMMUNE RECEPTOR REPERTOIRES

Using high throughput sequencing data (NGS)

Faculty: Simon Frost (Cambridge University, UK).

NOVEMBER 07-11

AET16 - APPLIED EVOLUTIONARY THEORY

Faculty: Claudia Bank (IGC, Portugal), Rafael Guerrero (Indiana University, USA), Jan Engelstädter (University of Queensland, Australia).

NOVEMBER 14-18

IBSTATB16 - INTRODUCTORY BIostatISTICS FOR BIOLOGISTS

Faculty: Cristina Rocha and Fernanda Diamantino (FCUL, Portugal).

DECEMBER 12-16

IB16S - INTRODUCTORY BIOINFORMATICS: Our entry level course with a soft introduction to NGS data analysis

Faculty: David P. Judge (Freelancer Bioinformatics instructor), Pedro Fernandes and Daniel Sobral (IGC, Portugal).

POSTDOCTORAL TRAINING

SCIENTIFIC COORDINATOR
XAVIER, KARINA B.



DESCRIPTION OF THE PROGRAMME

The Postdoc Committee, a group of volunteer postdoctoral fellows, is responsible for organising activities to promote professional development of the postdoc community at the IGC.

In 2016, the Committee established a successful new format of the weekly seminar series ('20 minutes with...'), where IGC Postdocs and senior PhD students presented short talks. Scientific seminars by Daniel Van Damme (VIB, Belgium), Leonie Ringrose (Humboldt University, Germany), and Anna Akhmanova (Utrecht University, The Netherlands) were hosted. To find inspiration, three Career Path seminars by Maria Leptin (EMBO director), Peter Murray and Lucia Prieto Godino (TReND) were organised.

To improve professional skills, four workshops were

held: *Improving skills to better communicate with lay audiences* by the Science Communication Unit, *Advice and tips to improve your CV* by the RFA unit, *Surviving in Science* by Leonie Ringrose, and *Training on peer-reviewing*, supported by eLIFE. The Committee also co-organised the Annual Postdoc Retreat that brought together 116 researchers from IGC, iBET, ITQB, IMM, and CCU that participated on a three-day meeting focused on scientific interactions and career development. Portuguese and English language classes form part of the available training, coordinated by the committee. A document proposing future changes for continued professional development of IGC postdocs via a formal programme was drafted and submitted by the Postdoc Committee.

E-MAIL: postdoccommittee@igc.gulbenkian.pt

IGC WEBPAGE: <http://www.igc.gulbenkian.pt/education/pdtraining>

EXTERNAL WEBSITE: <https://www.facebook.com/igcpostdocs/>

SUMMER INTERNSHIP PROGRAMME

COORDINATOR
AMORIM, MARIA JOÃO

DESCRIPTION OF THE PROGRAMME

In 2014, the IGC and University of Oxford established a partnership aiming to bring young science undergraduates to the IGC for an 8-week lab experience under the Oxford University Internship Programme. This programme has since then expanded to accommodate several undergraduates studying at universities from the Lisbon area, including Instituto Superior Técnico, Universidade de Lisboa and Universidade Nova de Lisboa. In 2016, the IGC hosted 18 talented summer students that enjoyed the atmosphere of the IGC, experienced the life of a researcher and presented their work in a symposium for the IGC community.

Funding: University of Oxford and Calouste Gulbenkian Foundation

HOSTING GROUPS IN 2016

Chromosome Dynamics
Cell Cycle Regulation
Epigenetic Mechanisms
Evolutionary Dynamics
Evolutionary Biology
Network modeling
Cellular and Systems Neurobiology
Innate Immunity & Inflammation
Molecular Neurobiology
Host-Microorganism Interactions
Plant Stress Signalling
Quantitative Organism Biology
Lymphocyte Physiology



THESES 2016

BSc THESES

CRUZ, JOSIMAR

Generation of *Physcomitrella patens* mutants
Escola Superior de Tecnologia do Barreiro, Instituto
Politécnico de Setúbal, Portugal - December

MSc THESES

ABREU, RUBEN LOPES PEREIRA

Identification of inhibitory mechanisms preventing CENP-A assembly in S phase of the cell cycle
Universidade de Lisboa, Portugal - February

ALMEIDA, JOANA

Patogénese da doença do fígado gordo não-alcoólico em murganhos: O papel das células de kupffer
Universidade de Lisboa, Portugal - May

BARATEIRO, ANDRÉ

Impact of *Plasmodium* infection on the expression of bradykinin-receptor 2 on trophoblasts
Universidade de Lisboa, Portugal - November

CARVALHO, JOANA

A role for microRNAs in haematopoiesis and immunity of *Drosophila melanogaster*
Universidade de Lisboa, Portugal - October

DIAS, ANDRÉ

Retinoic acid: a key regulator of vertebrate embryonic development
Universidade de Lisboa, Portugal - January

LARANJEIRA, ANA

Can evolution of gut microbiota alter *C.elegans* longevity?
Universidade de Lisboa, Portugal - November

LINDEZA, ANA SOFIA

How does developmental plasticity differ between diverse types of nutrition regimes?
Universidade de Lisboa, Portugal - March

LOPES, FILIPA

Alternative splicing and SR proteins in ABA-mediated stress responses

ated stress responses

Universidade de Lisboa, Portugal - October

LOURO, MARCO

A stochastic model of centriole assembly
Universidade de Lisboa, Portugal - December

MARTINS, NUNO

How different host genotypes alter the virulence-transmission trade-off in a *Drosophila melanogaster* - *Pseudomonas entomophila* complex?
Universidade de Lisboa, Portugal - December

PEDRO, MIGUEL

Metabolic-derived functions during adaptation of *E. coli* to the mammalian gut
Universidade de Lisboa, Portugal - December

RAMOS, CAMILA V.

A discrete logical modelling framework to study tissue patterning and morphogenesis
Universidade de Lisboa, Portugal - July

RIBEIRO, DIOGO

Indirect genetic effects of oxytocin in the development of social behaviour in zebrafish
Universidade de Lisboa, Portugal - December

TOMAZ, DIOGO

Insight on the function of MyT1L in Ascl1 mediated neuronal reprogramming
Universidade de Lisboa, Portugal - January

VERISSIMO, MARIA INES

The role of ARL17 in influenza A virus infection
Universidade de Coimbra, Portugal - September

VIEGAS, FILIPE

Role of Tropomyosin 2 in cell proliferation and survival of *Drosophila melanogaster*
Universidade de Lisboa, Portugal - December

YOKOTA, AYA

Role of conserved RNA regulatory elements in posttranscriptional regulation by zinc
Université Pierre et Marie Curie, France - June

PhD THESES

AIRES, ANA RITA

Gdf11 signalling, Oct4 and the control of vertebrate trunk length
Universidade Nova de Lisboa, Portugal - July

ALMEIDA, ANA INÊS

An approach to molecular genetics of thyroid cancer: from novel mutations to a zebrafish model
Universidade do Porto, Portugal - February

AREAL, RÔMULO

Reciprocal interactions between *Helicobacter hepaticus* and the mouse immune system
Universidade Nova de Lisboa, Portugal - December

BARROSO-BATISTA, JOÃO

Adaptation of *Escherichia coli* to the mouse gut
Universidade Nova de Lisboa, Portugal - December

FARIA, VÍTOR GOUVEIA

Host-microbe interaction and evolution: infection, symbiosis, immunity and adaptation
Universidade Nova de Lisboa, Portugal - December

FAUSTINO, ANA

Social buffering of fear in zebrafish
Instituto Superior de Psicologia Aplicada, Portugal - May

KUS, KRZYSZTOF

At the crossroad between innate immunity and RNA editing: Structural and biochemical studies of the $Z\alpha$ domain family and the RNA editing enzyme ADAR1
Universidade Nova de Lisboa, Portugal - July

MARIALVA, MARTA

Effects of environmental and genetic factors on

transposable element activity

Universidade Nova de Lisboa, Portugal - November

MATEUS, ANA RITA

Temperature effects on genetic and physiological regulation of adaptive plasticity
University of Leiden, The Netherlands - July

PARREIRA, BÁRBARA

Patterns of genetic diversity in socially structured populations: an individual based approach
Universidade Nova de Lisboa, Portugal - April

RODRIGUEZ, WILLY

Estimation de l'histoire démographique des populations à partir de génomes entièrement séquencés
Université Paul Sabatier, France - June

ROSMANINHO, PEDRO

Gene regulation by the transcription factor ZEB1 in glioblastoma multiforme
Universidade Nova de Lisboa, Portugal - November

SOUSA, JORGE

The role of clonal interference across genetic backgrounds and environments
Universidade Nova de Lisboa, Portugal - May

SURKONT, JAROSLAW

Tracing protein evolutionary trajectory: Homology inference with specific molecular constraints
Universidade Nova de Lisboa, Portugal - June

TAVARES, SANDRA

The role of actin cytoskeleton downstream of the Src oncogene in the earlier events of breast tumour progression
Universidade Nova de Lisboa, Portugal - November



TEACHING AT OTHER PhD PROGRAMMES 2016

AMORIM, MARIA JOÃO

Myosin and actin steer plant cell division

ITQB MolBioS PhD Programme, Universidade Nova de Lisboa, Portugal - March

Viruses and the recycling endosome

7th Advanced Course in Cell Biology, Hong Kong University-Institute Pasteur, Hong Kong - March

Viruses and the recycling endosome

Faculdade de Medicina, Universidade de Coimbra, Portugal - November

BECKER, JÖRG

Microarrays as tools to decipher biological processes

ITQB MolBioS PhD Programme, Universidade Nova de Lisboa, Portugal - February

(Epi)genetic basis of sexual reproduction in land plants: A focus on the male gametes

ITQB Plants for Life PhD Programme, Universidade Nova de Lisboa, Portugal - April

Microarrays and deep sequencing as tools to decipher biological processes

BioFIG BioSYS PhD Programme, Faculdade de Ciências da Universidade de Lisboa, Portugal - June

BETTENCOURT DIAS, MÓNICA

IMM, Portugal - February

GABBA Graduate Program in Areas of Basic and Applied Biology, Universidade do Porto, Portugal - March

BISPO, CLÁUDIA

Flow Cytometry in plant sciences

ITQB Plants for Life PhD Programme, Universidade Nova de Lisboa, Portugal - April

BORGES, ANA CRISTINA

11th edition of the Laboratory Animal Science Course – Zebrafish module, Training in Biomedical Sciences and Other Areas, Universidade do Minho, Portugal - February

CASTRO, DIOGO

GABBA Graduate Program in Areas of Basic and Applied Biology, Universidade do Porto, Portugal - July

Brain Development Course, Karolinska Institute, Sweden - August

CHAQUIYA, CLAUDINE

Regulatory & signalling network modelling

ITQB MolBioS PhD Programme, Universidade Nova de Lisboa, Portugal - February

Logical modelling of multi-cellular systems

PSL-ITI PhD programme, Paris Sciences et Lettres University, France - November

Modelos Qualitativos de Redes Biológicas

Programa de Pós-Graduação em Engenharia de Automação e Sistemas, Universidade Federal de Santa Catarina, Brazil - November

DOMINGOS, ANA

NutriNeuro PhD Course on Neurobiology and Nutrition, Bordeaux University, France

DUQUE, PAULA

Alternative splicing controls translation efficiency of a membrane transporter to promote plant tolerance to zinc
BioFIG BioSYS PhD Programme, Faculdade de Ciências da Universidade de Lisboa, Portugal - January

Alternative splicing controls translational efficiency of a membrane transporter to promote plant tolerance to zinc
ITQB Plants for Life PhD Programme, Universidade Nova de Lisboa, Portugal - March

JANSEN, LARS

Principals of epigenetic inheritance

PhD course “Epigenetics from mechanisms to disease”, Universidade do Minho, Portugal - April

MALLO, MOISÉS

Development of the spinal cord

“Axonal regeneration” module, GABBA Graduate Program in Areas of Basic and Applied Biology, Universidade do Porto, Portugal - June

MARTINS, GABRIEL

Light microscopy

ITQB MolBioS PhD Programme, Universidade Nova de Lisboa, Portugal - January

Mesoscopic imaging

BioFIG BioSYS PhD Programme, Faculdade de Ciências da Universidade de Lisboa, Portugal - July

MIRTH, CHRISTEN

Oxford Brookes' Graduate Summer School in Eco Evo Devo

MOITA, LUÍS FERREIRA

Disease tolerance in immunity

ITQB MolBioS PhD Programme, Universidade Nova de Lisboa, Portugal - March

Disease tolerance in immunity

GABBA Graduate Program in Areas of Basic and Applied Biology, Universidade do Porto, Portugal - June

OLIVEIRA, RUI

Social cognition in zebrafish

Conférence Universitaire de Suisse Occidentale Inter-University Doctoral Programme in Ecology and Evolution Workshop “The role of sensory ecology and cognition in social decisions, Switzerland - July

REBELO, MANUEL

Animal house facilities and regulations for animal experimentation

PhD Programme in Health Sciences, Universidade de Coimbra, Portugal - October

ROCHA, LUÍS

I609- Complex Networks and Systems Advanced Seminar I, Indiana University, USA

SOARES, MIGUEL

Tissue Damage Control in Immune Mediated Inflammatory Diseases

BRIDGE GAPS – CROSS ROADS Joint Symposium of 4 PhD Programmes CCHD, IAI, ICA, MCCA/Medical, University of Vienna - February

Tissue damage control & disease susceptibility

GABBA Graduate Program in Areas of Basic and Applied Biology, Universidade do Porto, Portugal - June

Macrophage, iron metabolism & homeostasis

EFIS-EJI Ruggero Ceppellini Advanced School of Immunology - Metchnikoff's Legacy: Tissue Phagocytes and Functions - October

Tissue Damage Control & Disease Susceptibility

Advanced Immunology Course Institut Pasteur, France - December

SOBRAL, DANIEL

NGS Data Analysis

ITQB MolBioS PhD Programme, Universidade Nova de Lisboa, Portugal - February

Introduction to Bioinformatics

Workshop in Marine Genomics - September

TEIXEIRA, LUÍS

Symbiont modulation of host-pathogen interactions

ITQB MolBioS PhD Programme, Universidade Nova de Lisboa, Portugal

TRANFIELD, ERIN

Introduction to electron microscopy

ITQB MolBioS PhD Programme, Universidade Nova de Lisboa, Portugal - January

XAVIER, KARINA

Bacterial quorum sensing in the mammalian gut microbiota

BioFIG BioSYS PhD Programme, Faculdade de Ciências da Universidade de Lisboa, Portugal - January

Introduction to the concept of bacterial communities - quorum sensing and chemical communication in bacteria

ITQB MolBioS PhD Programme, Universidade Nova de Lisboa, Portugal - April

Bacterial communities inside our bodies

ITQB MolBioS PhD Programme, Universidade Nova de Lisboa, Portugal - April

6

SEMINARS &
MEETINGS

106
EXTERNAL
SPEAKERS

77
INTERNAL
SPEAKERS

PRESENTATIONS BY
IGC RESEARCHERS:

92
AT NATIONAL
MEETINGS

182
AT INTERNATIONAL
MEETINGS

29

MEETINGS
CONFERENCES
AND WORKSHOPS
ORGANISED BY IGC
RESEARCHERS

SEMINARS AT THE IGC 2016

JANUARY

Date 05.01
Title Chromosome architecture and the fidelity of mitosis during development
Speaker Raquel Oliveira
Affiliation IGC

Date 07.01
Title Unravelling hidden roles of microRNAs in bacterial pathogen host interaction
Speaker Ana Eulálio
Affiliation Institute for Molecular Infection Biology, University of Würzburg, Germany

Date 07.01
Title Epigenetic barriers in stem cell states during development and cancer
Speaker Alexandre Maia
Affiliation Icahn School of Medicine at Mount Sinai, USA

Date 08.01
Title Cell shape and morphogenesis: sub cellular and supracellular mechanisms
Speaker Maria Leptin
Affiliation EMBO, Heidelberg, Germany

Date 08.01
Title Career Paths in Science
Speaker Maria Leptin
Affiliation EMBO, Heidelberg, Germany

Date 12.01
Title The iron age of host microbe interactions
Speaker Miguel Soares
Affiliation IGC

Date 13.01
Title “What did you say?” - When we loose our senses
Speaker Sascha Werner
Affiliation IGC

Date 14.01
Title Changing peer review in life sciences research – eLife journal
Speaker Mark Patterson
Affiliation eLife, Cambridge, UK

Date 15.01
Title Johannes Holtfreter and the politics of gastrulation
Speaker Michael R. Dietrich
Affiliation Department of Biological Sciences, Dartmouth College, USA

Date 19.01
Title Central sensing of peripheral growth perturbations
Speaker Alisson Gontijo
Affiliation CEDOC, Portugal

Date 19.01
Title Cellular memory of transcription - initial observations

and future plans
Speaker Wojciech Siwek
Affiliation IGC

Date 20.01
Title Trypanosome parasites: a new life beyond the bloodstream
Speaker Luísa Figueiredo
Affiliation Instituto de Medicina Molecular, Portugal

Date 22.01
Title Getting in Shape: *in vivo* and *in silico* studies of tissue mechanics in growth control
Speaker Yanlan Mao
Affiliation MRC Laboratory for Molecular Cell Biology, University College London, UK

Date 26.01
Title Bridging theoretical and experimental evolution - predicting the future using models from the past?
Speaker Claudia Bank
Affiliation IGC

Date 27.01
Title Taking advantage of CRISPR technology to address centriole biogenesis questions in different organisms
Speaker Catarina Nabais/Maria Francia
Affiliation IGC

Date 29.01
Title Toward a molecular and clinical understanding of APOBEC mutagenesis in cancer
Speaker Reuben Harris
Affiliation Howard Hughes Medical Research Institute, University of Minnesota, USA

FEBRUARY

Date 02.02
Title IRG proteins in reproduction, haematopoiesis and immunity
Speaker Jonathan Howard
Affiliation IGC

Date 03.02
Title Sensing space and position: how can the syncytial nuclei do this?
Speaker Ojas Deshpande
Affiliation IGC

Date 05.02
Title Of blood flow patterns, endothelial cell polarization and vascular pattern formation
Speaker Claudio Franco
Affiliation Instituto de Medicina Molecular, Portugal

Date 09.02
Title A perspective on epigenetics from the two sides of the Danube river
Speaker Lars Jansen
Affiliation IGC

Date 10.02
Title Rottweiler in the kitchen – is allelic exclusion in antigen receptor genes an effect of avoiding RAG-mediated genome damage?
Speaker Delphine Pessoa
Affiliation IGC

Date 11.02
Title Plant mitochondrial genome maintenance and evolution: roles of the RECG1 DNA helicase in the surveillance of its recombination and segregation
Speaker José Gualberto
Affiliation Institut de Biologie Moléculaire des Plantes, Université de Strasbourg, France

Date 11.02
Title Harmonious management: creating high-performance teams
Speaker Roderick Shaw
Affiliation IGC

Date 12.02
Title Measuring the intracellular dew point: the physics and biology of membrane-less organelles
Speaker Clifford Brangwynne
Affiliation Department of Chemical & Biological Engineering, University of Princeton, USA

Date 15.02
Title New levels of complexity in ARP2/3 complex function
Speaker Michael Way
Affiliation The Francis Crick Institute, UK

Date 15.02
Title Germ cell development and early embryogenesis in the cricket *Gryllus bimaculatus*
Speaker Taro Nakamura
Affiliation Department of Organismic and Evolutionary Biology, Harvard University, USA

Date 16.02
Title The genetic basis of evolvability
Speaker Lilia Perfeito
Affiliation IGC

Date 17.02
Title Living in a shoal: the role of oxytocin-like in zebrafish sociality
Speaker Ana Rita Nunes
Affiliation IGC

Date 18.02
Title How dynein and its co-factors at the kinetochore ensure chromosome segregation fidelity
Speaker Reto Gassmann
Affiliation IBMC, Portugal

Date 19.02
Title Mitotic exit and mitotic cell death - molecular basis and therapeutic implications
Speaker Marcos Malumbres
Affiliation Cell Division and Cancer Group Spanish National Cancer Research Centre, CNIO, Spain

Date 23.02
Title Modelling autoimmune disease activity based on T-cell regulation dynamics
Speaker Constantin Fesl
Affiliation IGC

Date 24.02
Title Disease tolerance induced by “host stress master regulators”
Speaker Laura Barrio
Affiliation IGC

Date 25.02
Title Simon Bill’s Seminar
Speaker Simon Bill
Affiliation IGC

Date 26.02
Title Dynamic imaging in angiogenesis research: cell behavior in vascular remodelling
Speaker Markus Affolter
Affiliation Biozentrum, University of Basel, Switzerland

MARCH

Date 01.03
Title Signal integration in quorum sensing enables bacteria to respond to different ecological contexts
Speaker Karina Xavier
Affiliation IGC

Date 01.03
Title CNS development and epigenetics: on oligodendrocytes and multiple sclerosis
Speaker Gonçalo Castelo-Branco
Affiliation Karolinska Institute, Sweden

Date 02.03
Title Actin’ as a checkpoint?
Speaker Praachi Jain
Affiliation IGC

Date 03.03
Title Hox genes and the establishment of the kidney morphogenetic field: a new head on old shoulders
Speaker Ram Reshef
Affiliation Faculty of Natural Sciences, University of Haifa, Israel

Date 04.03
Title A dynamic unfolded protein response contributes to the control of cortical neurogenesis
Speaker Laurent Nguyen
Affiliation GIGA, Université de Liège, Belgium

Date 08.03
Title What is going on in the Network Modelling group? From theory to biological applications and... back!
Speaker Claudine Chaouiya
Affiliation IGC

Date 09.03
Title Crosstalk between ABA and Snrk1 mediated energy

signalling
Speaker Mattia Adamo
Affiliation IGC

Date 11.03
Title Genetics of rapid and extreme size evolution in island mice
Speaker Bret Payseur
Affiliation Laboratory of Genetics, University of Wisconsin, USA

Date 14.03
Title Intravital imaging of fungal-innate immune dynamics and dissemination *in vivo*
Speaker Robert Wheeler
Affiliation University of Maine, USA

Date 15.03
Title Found in translation: from genomics to novel gene functions
Speaker Andrea Pauli
Affiliation Research Institute of Molecular Pathology, Austria

Date 15.03
Title Tetraspanin-associated signalling complexes as mediators of gamete interactions in plant fertilization
Speaker Jörg Becker/ Leonor Boavida
Affiliation IGC

Date 15.03
Title Transcriptional integration of synaptic and neuroendocrine signalling in the zebrafish nervous system
Speaker Vincent Cunliffe
Affiliation Department of Biomedical Science, University of Sheffield, UK

Date 16.03
Title Imaging and modifying tumor-immune cell interactions in tumor rejection
Speaker Ana S. Almeida

Affiliation Cold Spring Harbor Laboratory, USA

Date 16.03
Title Plant experimental assay ontology
Speaker Inês Chaves
Affiliation Forest Biotech Lab, IBET/ITQB-UNL, Portugal

Date 16.03
Title Crosstalk between ABA and Snrk1 mediated energy signalling
Speaker Mattia Adamo
Affiliation IGC

Date 16.03
Title Controlled chaos: reigning in the TEV protease in order to study aneuploidy
Speaker Mihailo Mirkovic
Affiliation IGC

Date 18.03
Title Evolution of codon reassignment in yeast
Speaker Manuel A. S. Santos
Affiliation Department of Medical Sciences, iBiMED, Universidade de Aveiro, Portugal

Date 21.03
Title Linking genes, development and function of the zebrafish hypothalamus
Speaker Gil Levkowitz
Affiliation Weizmann Institute of Science, Israel

Date 23.03
Title Epithelial polarity and spindle orientation
Speaker Daniel Saint Johnston
Affiliation Gurdon Institute, Cambridge, UK

Date 23.03
Title Anticipating the future: evolutionary explanations for risk sensitivity, contrast effects and winner and loser

effects
Speaker Tim Fawcett
Affiliation University of Exeter, UK

Date 24.03
Title Does this look infected? Analyzing time course of viral load to assess impact of *Wolbachia* on dengue virus transmission
Speaker Caetano Mendes
Affiliation IGC

Date 24.03
Title Brain diversity in evolution: what changes, what doesn’t, and why does it matter?
Speaker Suzanaerculano-Houzel
Affiliation Federal University of Rio de Janeiro, Brazil

Date 24.03
Title Experimental population genomics in *Drosophila*
Speaker Christian Schlötterer
Affiliation Institut für Populationsgenetik Vetmeduni, Austria

Date 24.03
Title Between chemosensation and metabolism: how the nervous system integrates odors and tastes with internal state
Speaker Ilona Grunwald-Kadow
Affiliation Max Plank Institute for Neurobiology, Germany

Date 25.03
Title Transcriptional control of subcutaneous and visceral adipose tissue phenotype
Speaker Paul Cohen
Affiliation Rockefeller University, USA

Date 28.03
Title Making the invisible visible: structure and functions of the plant microbiota

Speaker Paul Schulze-Lefert
Affiliation Max Planck Institute for Plant Breeding Research, Germany

Date 29.03
Title Host immunity, pathogens and the microbiota at the intestinal barrier
Speaker Gabriel Nunez
Affiliation University of Michigan, USA

Date 29.03
Title Violation of Mendel’s first law: cell biological mechanisms of meiotic drive
Speaker Michael Lampson
Affiliation University of Pennsylvania, USA

Date 29.03
Title Career Path Seminar
Speaker Peter Murray
Affiliation St. Jude Children’s Research Hospital, USA

Date 30.03
Title Amino acid auxotrophy as a central immunoregulatory control point
Speaker Peter Murray
Affiliation St. Jude Children’s Research Hospital, USA

Date 30.03
Title Immune cells in the neuro-adipose connection
Speaker Roksana Pirzgalska
Affiliation IGC

APRIL

Date 01.04
Title Rab small GTPases into prokaryotes
Speaker José Pereira Leal
Affiliation IGC

Date 04.04
Title Microbiota and autoimmunity

Speaker Alexander Chervonsky
Affiliation University of Chicago, USA

Date 05.04
Title How cells count: control of centrosome number in homeostasis and disease
Speaker Mónica Bettencourt Dias
Affiliation IGC

Date 05.04
Title Identification of a novel retrovirus restriction factor
Speaker Tatyana V. Golovkina
Affiliation University of Chicago, USA

Date 12.04
Title Mechanisms of influenza A virus assembly
Speaker Maria João Amorim
Affiliation IGC

Date 13.04
Title Age as a carcinogen: is it all about telomere shortening?
Speaker Kirsten Lex
Affiliation IGC

Date 14.04
Title The strange lifestyle of multipartite viruses
Speaker Ioannis Michalakakis
Affiliation Institut de Recherche pour le Développement, France

Date 15.04
Title Rapid adaptation and eco-evolutionary dynamics over seasonal timescales
Speaker Paul Schmidt
Affiliation University of Pennsylvania, USA

Date 19.04
Title Network approaches for human diseases
Speaker Anaïs Baudot
Affiliation Marseille Institute of Mathematics, Aix-Marseille University, France

Date 20.04
Title How do zebrafish learn from others? - The social learning
Speaker Julia Pinho
Affiliation IGC

Date 21.04
Title The role of microRNAs in controlling gene expression variability
Speaker Nils Blüthgen
Affiliation Charite, Universitätsmedizin Berlin, Institut für Pathologie, Germany

Date 22.04
Title Disentangling the regulatory network governing X-chromosome inactivation
Speaker Edda Schulz
Affiliation Max Planck Institute for Molecular Genetics, Germany

Date 26.04
Title Behavioural differences underly frequency-dependent selection in *C. elegans*
Speaker Ivo Chelo
Affiliation IGC

Date 27.04
Title Orangutan development and the evolution of intelligence
Speaker Carel van Schaik
Affiliation Department of Anthropology, University of Zürich, Switzerland

Date 27.04
Title New insights into the origins of farming
Speaker Mark Thomas
Affiliation University College London, UK

Date 27.04
Title Making new enhancers for new genes (...or not): cis-regulatory evolution at a duplicated locus
Speaker Kohtaro Tanaka

Affiliation IGC

Date 29.04
Title Epigenetics meets mathematics: towards a quantitative understanding of polycomb/trithorax biology
Speaker Leonie Ringrose
Affiliation IRI for Life Sciences at the Humboldt University, Germany

MAY

Date 03.05
Title Innate immune responses to nucleic acids: the Zalpha domain family and its intriguing properties
Speaker Alekos Athanasiadis
Affiliation IGC

Date 04.05
Title Rampant reverse evolution of commensal bacteria colonizing the gut
Speaker Ana Margarida Sousa
Affiliation IGC

Date 06.05
Title Cellular senescence: when multitasking can be dangerous
Speaker Marco Demaria
Affiliation University Medical Center Groningen, The Netherlands

Date 10.05
Title Bringing mice and snakes together to shed light into the evolution of the vertebrate body plan
Speaker Moisés Mallo
Affiliation IGC

Date 10.05
Title Huntington's disease - pathogenic mechanisms and potential therapeutic targets
Speaker Flaviano Giorgini
Affiliation University of Leicester, UK

Date 11.05
Title The role of pH in sperm physiology
Speaker Alberto Darszon
Affiliation Instituto de Biotecnología, UNAM, Mexico

Date 13.05
Title Receptors for the export of bulky collagens and chylomicrons
Speaker Vivek Malhotra
Affiliation Centre for Genomic Regulation - Barcelona, Spain

Date 19.05
Title Career Path in Science
Speaker Lucia Prieto Godinho
Affiliation Center for Integrative Genomics at University of Lausanne, Switzerland

Date 20.05
Title The critical role of informatics in the fight against infectious diseases: EuPathDB and MaHPIC
Speaker Jessica Kissinger
Affiliation Institute of Bioinformatics, University of Georgia, USA

Date 24.05
Title Bacteria-host symbioses in *Drosophila melanogaster*
Speaker Luís Teixeira
Affiliation IGC

Date 25.05
Title Tracing endospore evolution: the conserved gene core and lineage specific novelties
Speaker Paula Ramos Silva
Affiliation IGC

Date 27.05
Title Motile cilia define left and right
Speaker Susana Lopes
Affiliation CEDOC, Portugal

Date 30.05
Title Modular transcriptional repertoire and microRNA target analyses characterize genomic dysregulation in the thymus of Down syndrome infants
Speaker Carlos Alberto Moreira-Filho
Affiliation Universidade de São Paulo, Brazil

Date 31.05
Title Disease Genetics
Speaker Carlos Penha Gonçalves
Affiliation IGC

Date 31.05
Title Roles of cytoskeleton in hippocampal synaptic plasticity
Speaker Yasunori Hayashi
Affiliation Riken, Brain Science Institute, Japan

JUNE

Date 01.06
Title Drug discovery opportunities for Portuguese academics
Speaker Tale Slidrecht
Affiliation European Lead Factory and Lygature, The Netherlands

Date 02.06
Title Genome editing in haploid human cells using CRISPR/CAS9
Speaker Daniel Lackner
Affiliation Horizon Discovery, Austria

Date 03.06
Title Rhomboids and the cell biology of intercellular signalling
Speaker Matthew Freeman
Affiliation Dunn School of Pathology, University of Oxford, UK

Date 03.06
Title Fundamental physical cellular constraints drive self-organization of tissues
Speaker Luis Maria Escudero
Affiliation Universidad de Sevilla, Spain

Date 07.06
Title Can (big) data help us make better-informed decisions?
Speaker Joana Gonçalves Sá
Affiliation IGC

Date 08.06
Title Membrane regulators of complement activation impact on influenza A virus infection (the many ways flu outsmarts the immune system)
Speaker Zoé Silva
Affiliation IGC

Date 15.06
Title “Should I stay or should I go?” Cyclic di-GMP signalling, motility and *Escherichia coli* gut colonisation
Speaker Jessica Thompson
Affiliation IGC

Date 16.06
Title Genetic ancestry and natural selection drive population differences in immune responses to pathogens in humans
Speaker Luis Barreiro
Affiliation University of Montreal, Canada

Date 17.06
Title The story of an intracellular pathogen that strives on reactive oxygen species
Speaker Marcelo Torres Bozza
Affiliation Universidade Federal do Rio de Janeiro, Brazil

Date 17.06
Title Regulation of tryptophan-kynurenine metabolism

by muscle PGC-1alpha impacts metabolism and psychiatric disease
Speaker Jorge Ruas
Affiliation Karolinska Institutet, Sweden

Date 20.06
Title The DNA damage response: chromatin and cancer
Speaker Kyle Miller
Affiliation Institute for Cellular and Molecular Biology, University of Texas at Austin, USA

Date 21.06
Title The effects of telomere shortening in tissue homeostasis
Speaker Miguel Godinho Ferreira
Affiliation IGC

Date 21.06
Title Epigenetic and transcriptomic characterization of neonatal T cells
Speaker Angélica Santana
Affiliation Universidad Autónoma del Estado de Morelos Cuernavaca, Mexico

Date 22.06
Title Double antibiotic resistance enhances survival in macrophages
Speaker Paulo Durão
Affiliation IGC

Date 24.06
Title Tales of the sensory immune system and the second brain
Speaker Henrique Veiga-Fernandes
Affiliation Instituto de Medicina Molecular, Portugal

Date 28.06
Title Mother to pup transmission favours mouse-*Helicobacter hepaticus* symbiosis
Speaker Jocelyne Demengeot
Affiliation IGC

Date 29.06
Title Control of early steps of the legume-rhizobia symbiosis by plant NF-Y transcription factors
Speaker Tom Laloum
Affiliation IGC

JULY

Date 01.07
Title The concept of tolerance in host-microbiota interactions
Speaker Janelle S. Ayres
Affiliation Salk Institute for Biological Studies, USA

Date 01.07
Title Regulation of microtubule organization and dynamics by minus-end binding proteins
Speaker Ana Akhmanova
Affiliation Utrecht University, The Netherlands

Date 05.07
Title Host- pathogen interaction and the control of infectious and non-infectious diseases
Speaker Michael Parkhouse
Affiliation IGC

Date 06.07
Title Tissue targeting in autoimmune disease: does the history of an organ has a word to say?
Speaker Vânia Silva
Affiliation IGC

Date 07.07
Title Canonical and non-canonical roles of telomerase modulate human stem cell self-renewal and differentiation
Speaker Luis Batista
Affiliation Washington University in St. Louis, USA

Date 11.07
Title Deciphering the role of glycosylation of ovarian cancer biomarker CA125
Speaker Lara Marcos da Silva
Affiliation IPATIMUP, Portugal

Date 12.07
Title Faraday and the Tree of Knowledge
Speaker Jorge Carneiro
Affiliation IGC

Date 13.07
Title Evolution of stem cell pluripotency regulation: RNA binding proteins and alternative splicing control in planarian stem cells
Speaker Jordi Solana
Affiliation Max-Delbrück Center for Molecular Medicine, Germany

Date 15.07
Title The TPLATE adaptor complex drives clathrin-mediated endocytosis in plants
Speaker Daniël Van Damme
Affiliation Department of Plant Systems Biology, VIB/UGhent, Belgium

Date 19.07
Title Understanding complex biological systems with mathematics: from cells to ecosystems
Speaker Erida Gjini
Affiliation IGC

Date 20.07
Title Public health monitoring and surveillance: from social media & electronic medical records
Speaker Rion Brattig Correia
Affiliation IGC

Date 22.07
Title The innate immune response as mediator of hematopoietic stem cell failure in a mouse mutant with defective

dna repair: unraveling the IFN-1 > BID > ROS connection in *mll5*-deficient mice
Speaker Hans Jörg Fehling
Affiliation Ulm University, Germany

Date 27.07
Title CSI: *Toxoplasma* - Determining cause of death during cell autonomous immunity to *Toxoplasma gondii*
Speaker Joana Loureiro
Affiliation IGC

Date 29.07
Title Exosomes: messengers of metastasis
Speaker Bruno Costa-Silva
Affiliation Champalimaud Foundation, Portugal

SEPTEMBER

Date 06.09
Title Why shuffle genes? The evolution of natural transformation and integrons in bacteria
Speaker Jan Engelstaedter
Affiliation University of Queensland, Australia

Date 09.09
Title Hypothalamus and thermogenesis: heating the bat, browning the wat
Speaker Miguel López
Affiliation CiMUS- Center for Research in Molecular Medicine and Chronic Diseases, Universidade de Santiago de Compostela, Spain

Date 13.09
Title How and why CMV, a DNA virus, behaves like an RNA virus
Speaker Timothy Kowalik
Affiliation University of Massachusetts Medical School, USA

Date 13.09
Title The effective structure of

complex networks drives dynamics, criticality and control
Speaker Luis Rocha
Affiliation IGC

Date 14.09
Title Dealing with the heat: some genotypes do better than others
Speaker Elvira LaFuente
Affiliation IGC

Date 16.09
Title Endosomal remodelling in dendritic cells stimulates antigen cross-presentation and CD8 T-cell responses
Speaker Marianne Boes
Affiliation UMC Utrecht, The Netherlands

Date 20.09
Title Multi-drug resistance evolution
Speaker Isabel Gordo
Affiliation IGC

Date 21.09
Title Unravelling the molecular mechanisms of a successful graft in grapevine
Speaker Maria Assunção
Affiliation ITQB-UNL, Portugal

Date 21.09
Title Starch metabolism – a regulatory role for Snrk1?
Speaker Bruno Peixoto
Affiliation IGC

Date 21.09
Title Surviving aneuploidy: Tolerate the unbalance
Speaker Leonardo Guilgur
Affiliation IGC

Date 23.09
Title The neurobiology of homeostasis
Speaker Zachary Knight
Affiliation University of California San Francisco, USA

Date 27.09
Title Trafficking, signalling and quality control
Speaker Colin Adrain
Affiliation IGC

Date 28.09
Title Halt... or not: how telomeres prevent checkpoint activation
Speaker Akila Sridhar
Affiliation IGC

Date 30.09
Title The locus of sexual selection
Speaker Judith Mank
Affiliation University College London, UK

OCTOBER

Date 04.10
Title Synaptic cooperation and competition in the amygdala: role in discriminative learning
Speaker Rosalina Fonseca
Affiliation IGC

Date 06.10
Title Ants as models for speciation
Speaker Jonna Kulmuni
Affiliation Department of Animal and Plant Sciences, University of Sheffield, UK

Date 06.10
Title Local adaptation and speciation in *Littorina*
Speaker Roger Butlin
Affiliation Department of Animal and Plant Sciences, University of Sheffield, UK

Date 06.10
Title Adaptation to temporally fluctuating environments by the evolution of maternal effects
Speaker Snighdadip Dey
Affiliation IBENS Institut de

Biologie de l'École Normale Supérieure, France

Date 06.10
Title Autocatalytic sets: the origin and organization of life
Speaker Wim Hordijk
Affiliation SmartAnalytiX.com, Lausanne, Switzerland

Date 07.10
Title Variants of histone H2A shape genome organisation and control transcription
Speaker Frederic Berger
Affiliation Gregor Mendel Institute of Molecular Plant Biology GmbH, Austria

Date 11.10
Title Early T lymphocyte development and leukemogenesis
Speaker Vera Martins
Affiliation IGC

Date 12.10
Title Animal research: Time to talk
Speaker Kirk Leech
Affiliation European Animal Research Association

Date 12.10
Title Sounds of silence: exploring the effect of synonymous mutations using fitness landscapes
Speaker Inês Fragata
Affiliation IGC

Date 14.10
Title Programming the Notch response
Speaker Sarah Bray
Affiliation Department of Physiology Development and Neuroscience, University of Cambridge, UK

Date 18.10
Title Social and affective neuroscience: lessons from fish
Speaker Rui Oliveira
Affiliation IGC

Date 21.10
Title The many activities of an old anti-cancer drug family: Anthracyclines
Speaker Jacques Neefjes
Affiliation Netherlands Cancer Institute, The Netherlands

Date 26.10
Title Decorating Darwin´s tree the role of epigenetic mechanisms in the adaptive evolution
Speaker Dragan Stajic
Affiliation IGC

Date 27.10
Title Father´s in utero and postweaning dietary folic acid intake affects the health and development of his offspring
Speaker Amanda MacFarlane
Affiliation Nutrition Research Division, Canada

Date 27.10
Title Tackling bacterial anti-microbial resistance – insights from experimental evolution
Speaker Alex Wong
Affiliation Department of Biology, Carleton University, Canada

Date 28.10
Title Chromatin replication and epigenome maintenance
Speaker Anja Groth
Affiliation Biotech Research and Innovation Centre, University of Copenhagen, Denmark

NOVEMBER

Date 02.11
Title Interrogating mechanisms of optic neuritis
Speaker Chelsea Larabee
Affiliation University of Oklahoma Health Sciences Center, USA

Date 02.11
Title Basics of plant sex - is there epigenetic reprogramming in basal land plants?

Speaker Ann-Cathrin Lindner
Affiliation IGC

Date 03.11
Title Insulin signalling and proteostasis are coordinated by the ubiquitin ligase chip to promote longevity
Speaker Thorsten Hoppe
Affiliation University of Cologne, Germany

Date 04.11
Title When genomes meet – RNA, epigenetics and phenotypes of hybrid plants
Speaker David Baulcombe
Affiliation Department of Plant Sciences, University of Cambridge, UK

Date 08.11
Title Actin dysregulation: a central contributor to all stages in the evolution of epithelial cancers
Speaker Florence Janody
Affiliation IGC

Date 09.11
Title The actin cytoskeleton in pre-malignant breast cancer expansion: when cells are overactin
Speaker Sandra Tavares
Affiliation IGC

Date 11.11
Title Sepsis and glucocorticoids, an impossible marriage?
Speaker Claude Libert
Affiliation VIB Inflammation Research Center UGent, Belgium

Date 15.11
Title Mechanisms of chromatin inheritance
Speaker Lars Jansen
Affiliation IGC

Date 16.11
Title Neocentromeres: from *de novo* formation to epigenetic

inactivation
Speaker Marina Murillo Pineda
Affiliation IGC

Date 17.11
Title Cell-free reconstitution of cytoskeletal form and function
Speaker Gijsje Koenderink
Affiliation FOM Institute AMOLF, The Netherlands

Date 18.11
Title Orchestrating aging across a troubled soma
Speaker Andrew Dillin
Affiliation Molecular and Cell Biology Department, UC Berkeley, USA

Date 18.11
Title Chromatin dynamics and epigenetic inheritance at the onset of life
Speaker Antoine Peters
Affiliation Friedrich Miescher Institute for Biomedical Research, University of Basel, Switzerland

Date 21.11
Title Programming and reprogramming brain tumour stem cells
Speaker Steve Pollard
Affiliation MRC Centre for Regenerative Medicine, UK

Date 22.11
Title Adaptive developmental plasticity: E*E and G*E effects
Speaker Patrícia Beldade
Affiliation IGC

Date 23.11
Title Becoming a male in the blenniid fish *Salaria pavo*: a neurogenomic perspective
Speaker Sara Cardoso
Affiliation IGC

Date 25.11
Title Endomembrane signalling in metabolism and inflammation

Speaker Romeo Ricci
Affiliation Institute of Genetics and Molecular and Cellular Biology, France

Date 29.11
Title How to distribute a dividing organelle in (large) space and (short) time
Speaker Ivo Telley
Affiliation IGC

Date 30.11
Title An evolutionary biology approach to human male fertility
Speaker Paulo Navarro Costa
Affiliation IGC

DECEMBER

Date 02.12
Title The pathophysiology of platelet-derived interleukin-1
Speaker Bernardo Franklin
Affiliation Institute of Innate Immunity, University of Bonn, Germany

Date 06.12
Title Gene regulation by the zinc-finger factor ZEB1 in development and disease
Speaker Diogo Castro
Affiliation IGC

Date 07.12
Title A role for energy signalling in plant shoot architecture
Speaker Ana Confraria
Affiliation IGC

Date 09.12
Title The revision of the genome by RNA editing; in sickness and in health
Speaker Robert Reenan
Affiliation Department of Molecular Biology, Cellular Biology and Biochemistry, Brown University, USA

Date 12.12
Title Bactereality
Speaker Wolfgang Ganter
Affiliation Visual artist working with bacteria on photographic film, Germany

Date 13.12
Title Based on a true story: genetic data and the histories of human populations
Speaker Lounès Chikhi
Affiliation IGC

Date 14.12
Title Ecology determines the mechanism of molecular evolution of a gut commensal lineage
Speaker Nelson Frazão
Affiliation IGC

Date 16.12
Title Maintaining tissue resident T cells at the epithelia
Speaker Marc Veldhoen
Affiliation Instituto de Medicina Molecular, Portugal

Date 21.12
Title Cell competition in T cell development
Speaker Luna Ballesteros Arias
Affiliation IGC

MEETINGS, CONFERENCES & WORKSHOPS 2016

FLOW CYTOMETRY: FUNDAMENTALS AND APPLICATIONS

JANUARY 18-22

The course covered the fundamentals of Flow Cytometry, focusing mostly on the main applications run at the IGC, and was directed to both experienced and inexperienced researchers. Topics included planning a flow experiment, cell dynamics (cell death, cell cycle, proliferation), multicolor flow, small particle analysis, high throughput flow, cell sorting, as well as data analysis and publishing.

Organisers: Flow Cytometry Unit

Sponsors: Enzifarma

IGC, Oeiras, Portugal

WORKSHOP: IMPROVING SKILLS TO BETTER COMMUNICATE WITH LAY AUDIENCES

MARCH 11 & 14

Included in the "Postdoctoral Workshop Series: Skills and tools to improve your career", this workshop aimed at providing some strategies and tips to help the postdoctoral community at the IGC to improve their communication skills when addressing to lay audiences, such as the general public, the media, or during a job interview. Twelve postdocs attended this workshop.

Organisers: Postdoctoral Committee & Science Communication Unit

IGC, Oeiras, Portugal

4TH EUROPEAN ZEBRAFISH PI MEETING

MARCH 15 - 19

Biannual meeting that gathered most European PIs using zebrafish as a model organism in experimental biology and biomedical research (ca. 150 attendees).

Organisers: Leonor Saúde (IMM), Susana Lopes and António Jacinto (CEDOC), Mike Orger (Champalimaud Research), Rui Oliveira (IGC)

Sponsors: FCT, Ciência Viva, Ocenário Lisboa, Tecniplast, Zeiss

Pavilhão do Conhecimento, Lisbon, Portugal

BEHAVIOURAL AND NEURAL GENOMICS OF SOCIALITY SYMPOSIUM AT THE INTERNATIONAL CONGRESS FOR NEUROETHOLOGY 2016

MARCH 30 - APRIL 3

Thematic symposia at a regular meeting of the International Neuroethology Society (ca. 500 attendees).

Organiser: Rui Oliveira

Montevideo, Uruguay

ROUND TABLE ON BIODIVERSITY AND SUSTAINABILITY

MARCH

Organiser: Joana Sá

Universidade de Cabo Verde

WORKSHOP: ADVICE AND TIPS TO IMPROVE YOUR CV

APRIL 8 & 22

Included in the "Postdoctoral Workshop Series: Skills and tools to improve your career", this workshop aimed at providing advices and tips in a practical setting to help young researchers to compose a more effective and tailored scientific CV. A scientific curriculum vitae is the most common communication tool used to self-marketing expertise when applying for academic/ research jobs, fellowships or grants. A total of 12 postdoctoral attended this workshop.

Organisers: Postdoctoral Committee & RFA Unit

IGC, Oeiras, Portugal

EMBO WORKSHOP ON NEURAL CONTROL OF METABOLISM AND EATING BEHAVIOUR

MAY 5-7

The main goal of this EMBO Workshop was to bring together expertise from these different disciplines to discuss recent developments and landmark discoveries.

Organiser: Ana Domingos

Sponsors: EMBO, IGC, IMP, Boehringer Ingelheim

Pestana Cidadela Cascais, Cascais

AMEEGUS - THE 10TH ANNUAL MEETING OF GULBENKIAN STUDENTS

MAY 15-19

To celebrate the 10th anniversary of the internal annual meeting of IGC PhD students, this year AMeeGuS was an international joint retreat with PhD students from the CRG (Barcelona, Spain). To inspire students as well as give them feedback, four keynote speakers and some scientists from the IGC were present at the retreat.

Organiser: PhD students IBB 2015

Sponsors: IGC, CRG, EMBO, eLife, Sarstedt, Tebu-bio, Izasa Scientific, Taper

Hotel do Sado, Setúbal

COMMUNICATION AMONG COMPLEX MICROBIAL POPULATIONS AND THEIR HOST

MAY 30-31

International Symposium at the College France opened to the public with more than 100 participants.

Organisers: Brett Finlay, Jean-Marc Ghigo, Philippe Sansonetti and Karina Xavier (IGC)

Paris, France

XLII ANNUAL MEETING OF THE PORTUGUESE SOCIETY OF IMMUNOLOGY

JUNE 1-3

The scientific programme reflected different aspects of immune cell activity. Creative and innovative foreigners were invited as well as new actors in the Portuguese Immunology community and clinicians to provide broad insights into the recent developments. In addition, younger immunologists were encouraged to present and discuss their latest results within allocated short talks and extensive poster sessions. The number of attendants reached 150.

Organisers: Iris Caramalho, Carlos Penha Gonçalves, Teresa Pais, Natacha Gonçalves (IMM) and Jocelyne Demengeot

Sponsors: Actimel, Celgene, Labclinics, Peprotech, Taper, Stemcell, Sarstedt, MACS miltenyi biotech, Tebu-bio, Enzifarma, Amgen, FCT, Roche Diagnósticos.

IGC, Oeiras, Portugal

WORKSHOP FOR CANDIDATES: HOW TO PREPARE AN APPLICATION TO THE 2016 MARIE S. CURIE INDIVIDUAL FELLOWSHIPS

JUNE 2

The aim of this informative session was to guide potential candidates through the general conditions and rules of this call. Special attention was given to the eligibility rules, typical activities expected to be developed during the postdoctoral training and the evaluation criteria. A total of 6 applicants attended this session.

Organiser: RFA Unit
IGC, Oeiras, Portugal

HOW TO APPLY TO THE 2016 FCT CALL FOR INDIVIDUAL FELLOWSHIPS

JUNE 17

This session aimed to inform and guide potential applicants on how to apply to the 2016 FCT Call for Doctoral and Postdoctoral fellowships. The session provides clarification of questions and helps to solve specific procedures, online-forms, rules and gives some tips and numbers to help potential candidates to be more successful. A total of 24 potential applicants attended this session.

Organiser: RFA Unit

IGC, Oeiras, Portugal

5TH EMBO COURSE ON "3D DEVELOPMENTAL IMAGING"

JULY 1-9

This EMBO Practical Course targeted researchers in developmental biology, interested in specific questions that require observation of cell movement and tissue morphogenesis, or understanding complex 3D spatial relationships between tissues. Multiphoton, SPIM/DSLM and OPT are a major feature of the course, as well as both open source and commercial solutions for equipment development and image analysis.

Organisers: Gabriel G. Martins, Nuno Moreno, José Feijó (University of Maryland) & Rob Bryson-Richardson (Monash University)

Sponsors: EMBO, Bitplane, Taper, Leica, MatTek, VWR, Zeiss, CellExplorer Labs, Izasa, LavisionBiotec, The Company of Biologists, EmouseAtlas, Thorlabs, PPBI, Alfacene, Thermofisher and IGC.

IGC, Oeiras, Portugal

INTERDISCIPLINARITY, NETWORKS, DATA AND COMPLEX SYSTEMS: PROMISE AND CHALLENGES

JULY 4-6

Satellite Workshop of the *Ciência 2016: Encontro com a Ciência e Tecnologia em Portugal*

Organiser: Luis M. Rocha

Sponsor: Fundação para a Ciência e Tecnologia

Lisbon, Portugal

LOGICAL MODELLING OF CELLULAR NETWORK

JULY 11-15

This mini-symposium at ECMTB 2016 (European Conference on Mathematical and Theoretical Biology) was organised in connection with the Consortium for Logical Modelling and Tools (CoLoMoTo, colomoto.org), which has been recently launched to promote the logical modelling framework and provide scientists with

dedicated standards and repositories, for models, simulations, and other methods.

Organiser: Claudine Chaouiya
Nottingham, UK

TELEOST FISH AS MODELS IN COMPARATIVE COGNITION SYMPOSIUM

JULY 12-15

Thematic symposia at the 8th European Conference of Behavioural Biology, a regular EU meeting with around 400 attendees.

Organisers: Theresa Burt de Perera (Univ. Oxford), Rui Oliveira (IGC)

University of Vienna, Austria

EMBO YOUNG SCIENTIST FORUM 2016

SEPTEMBER 1-2

The EMBO Young Scientists Forum (EYSF) is an annual EMBO initiative that aims to bring young European researchers together in an informal atmosphere in order to inspire students and postdocs to pursue a career in the life sciences.

Organisers: Raquel Oliveira, Mónica Bettencourt Dias, Lars Jansen, Ana Domingos and Elena Baena-González

Sponsors: EMBO, IGC, FCG, Tebu-bio

Fundação Calouste Gulbenkian, Lisbon, Portugal

DROSTUGA

SEPTEMBER 9-10

This meeting brought together 83 leading investigators and experts from Portugal and abroad, who use *Drosophila melanogaster* as a model system to decipher fundamental questions in biology. This meeting aimed at promoting dissemination of the latest research findings, communication between researchers in different fields and foster and strengthen networks.

Organisers: Florence Janody (IGC), Carla Lopes (i3S), Alisson M. Gontijo (CEDOC), Marta Moita (Champalimaud Research)

Sponsors: The Company of Biologists, Nzytech, LabOrders, DELTA, BestGene, STAB vida, Roche, The Developmental Studies Hybridoma Bank, the FEBS Journal, Instituto Politecnico de Tomar, Municipio de Tomar, Hotel dos Templários and Fundação Calouste Gulbenkian.

Hotel dos Templários, Tomar

AUSTRALIAN FLY MEETING

SEPTEMBER 15-17

Organisers: Mike Murray and Christen Mirth
Wharburton Victoria

JEDI MEETING

SEPTEMBER 18-21

This meeting brought together 20 young European Principal Investigators using *Drosophila melanogaster* as a model system.

Organiser: Raquel Oliveira

Visegrad, Hungary

IGC'S PRACTICAL COURSE ON ANIMAL HANDLING AND EXPERIMENTATION IN MICE AND ZEBRAFISH

SEPTEMBER 26-29

Under the scope of Laboratory Animal Science courses, this is the 20 hours practical module that allows IGC and external researchers to obtain a personal license to work with animals, issued by the *Direção Geral de Alimentação e Veterinária* (DGAV). The theoretical part of the course (20 hours) was done through an e-learning system, provided by the *Sociedade Portuguesa de Ciências de Animais de Laboratório* (SPCAL). The number of attendants was 29.

Organiser: Animal House Facility

Sponsors: IGC, Ultragene, Grupo Taper

IGC, Oeiras, Portugal

SPAOM: SPANISH-PORTUGUESE ADVANCED OPTICAL MICROSCOPY WORKSHOP

OCTOBER 5-7

SPAOM 2016 aimed at promoting the Spanish and Portuguese bioimaging scientific community and fostering communication between scientists and industry. The conference had an international scope: focused on the national Spanish and Portuguese microscopic panorama it also hosted invited talks by relevant European researchers and accepts contributions from abroad.

Organisers: Gabriel Martins and TSS Unit

Sponsors: Leica, Zeiss, Izasa, Olympus, Chroma, Cirklo, Agilent, Laser 2000, Innova, CSIC, IGC, IBMC

Bilbao, Spain

WORKSHOP: SOCIAL MEDIA TRAINING FOR SCIENCE COMMUNICATORS

OCTOBER 18 & 31; NOVEMBER 14

Under the scope of a EU-LIFE training series for professional science communicators, a remotely-delivered workshop was organised with the aim of providing training on Twitter, Facebook and LinkedIn for the communication officers of the EU-LIFE alliance. Lecturers from the University of the West of England (UWE) were invited to share their expertise in these social media channels. About 30 science communicators from the 13 EU-LIFE partner institutes participated in this workshop.

Organisers: Ana Mena, Inês Domingues (IGC), and Louisa Wood (Babraham Institute)

Sponsors: EU-LIFE

3RD CROSS-INSTITUTIONAL MEETING OF YOUNG RESEARCHERS

OCTOBER 19-21

The Third Joint Meeting of Young Researchers brought together postdoctoral fellows of four leading biosciences research institutes in Portugal: IGC, IMM, ITQB and Champalimaud Research. This initiative intended to go beyond fostering a common dialogue between these communities of young researchers, and established a starting point for strategic cooperation between these four hubs of scientific excellence. Additionally, the goal was also to draw attention to, and constructively discuss challenges and policy making that influence professional lives of postdoctoral fellows.

Organisers: IGC, Champalimaud Research, IMM and ITQB

Sponsors: eLife, Santa Cruz, Nzytech, Multicare, Fisher Scientific, Science Services, António M. S. Cruz, FEBS, Charles river, Let's Copy, Unicam, Atlantic Ferries, Tebu-bio.

Tróia, Portugal

1ST PORTUGUESE ELECTRON MICROSCOPY TECHNICAL MEETING

OCTOBER 28

This was the first of hopefully an annual Portuguese technical skill development meeting series with the goal of bringing together the Portuguese EM Community, helping experienced laboratories improve their skills, and developing laboratories expand their skills.

Organisers: EMF Unit, supported by IMM and IGC scientists

Sponsors: FEI and Agar Scientific

IGC, Oeiras, Portugal

ASYNCHRONOUS DYNAMICS OF LOGICAL MODELS: ASSESSING BIOLOGICALLY RELEVANT PROPERTIES

NOVEMBER 3-4

Organisers: Elisabeth Remy (Aix Marseille Université) and Claudine Chaouiya (IGC)

Sponsor: Institut de Mathématiques de Marseille
Marseille, France

EXPERIMENTAL EVOLUTION: THEORY AND CURRENT PRACTICES

NOVEMBER 7-11

International Graduate Programme in Life Sciences and the Interdisciplinary Master in Life Sciences

(IMaLis) at the Institute of Biology of the École Normale Supérieure (IBENS). The course introduced Master and PhD students in Evolutionary Biology to the experimental approaches employed to test evolutionary theory, bringing together world-renowned researchers to lecture on topics including the historical development of experimental evolution approaches, experimental design, the evolution of sexuality, origin of multicellularity and sociality, and the genetic basis of adaptation to changing environments. Lectures were complemented with computer tutorials on the analysis of experimental population genomics data.

Organiser: Ivo Chelo

Paris, France

DROSEU

NOVEMBER 14-15

Around 30 European population geneticists working in *Drosophila* came together to collect, sequence and analyse *Drosophila* populations across the whole continent.

Organiser: Élio Sucena

Sponsor: European Society for Evolutionary Biology

IGC, Oeiras, Portugal

PERSPECTIVES FOR RESEARCH MANAGERS IN PORTUGAL –

"DO DESAFIO À OPORTUNIDADE - PERSPETIVAS PARA OS GESTORES DE CIÊNCIA EM PORTUGAL"
NOVEMBER 28

The event aimed to bring together the stakeholders of the Portuguese research and innovation system to reflect on Science and Technology Management at national and international level. There was a focus on the skills and profiles of the science and technology managers, career paths, areas of action, and the added value of their action as an interface with the various stakeholders of the science and technology system. The programme included two round tables open to the public, followed by a third session dedicated to science and technology managers. A total of 330 participants attended this event.

Organisers: Sheila Vidal (IGC), Margarida Trindade (ITQB), João Cortez (i3S), Júlio Borlido Santos (i3S) and Filipa Borrego (freelance consultant)

Sponsor: Secretariado de Estado da Ciência, Tecnologia e Ensino Superior.

Teatro Thalia, Lisboa

PRESENTATIONS BY IGC RESEARCHERS 2016

AT INTERNATIONAL MEETINGS AND SEMINARS

ADRAIN, COLIN

Physiological and cellular roles of iRhoms in cytokine and growth factor signalling
COST Meeting BM1406, Ruđer Bošković Institute, Zagreb, Croatia - October

Control of ADAM metalloprotease signalling
Department of Cell Biology, University of Seville, Seville, Spain - December

ALVES, FILIPA

Dorsos are green, eyespots are blue, does natural selection shape you?
Biology'16: The Annual Swiss Conference on Ecology, Evolution, Systematics, Biogeography and Conservation, Lausanne, Switzerland - February

ATHANASIADIS, ALEKOS

Innate immune responses to nucleic acids: Zalpha domains and their intriguing properties
CECAD, University of Cologne, Cologne, Germany - December

BAENA-GONZÁLEZ, ELENA

SnRK1 signaling pathway – A link between environmental signals and plant growth
Universidad Politécnica de Madrid, Madrid, Spain - February

SnRK1 kinases: a link between metabolism, stress, and development
Sainsbury Laboratory Symposium “Induced Plant Development” EMBO meeting, Cambridge, UK - April

Regulation of the SnRK1 plant energy sensor
EMBO Young Investigators Science Forum 2016, Lisbon, Portugal - September

BANK, CLAUDIA

Epistasis and the predictability of evolution
University of Massachusetts Medical School, Massachusetts, USA - May

On the (un-)predictability of a large intragenic fitness landscape
Mathematical and Computational Evolutionary Biology, Montpellier, France - June

Fitness landscapes and the predictability of evolution
University of Edinburgh, Edinburgh, UK - July

On the (un-)predictability of a fitness landscape
The Ecology of Genome Evolution, Uppsala University, Uppsala, Sweden - September

Fitness landscapes and the predictability of evolution (and speciation?)
Swiss Federal Institute of Aquatic Science and Technology, Dübendorf, Switzerland - November

BARROSO-BATISTA, JOÃO

Adaptive immunity increases the pace and predictability of evolutionary change in commensal gut bacteria
EU-LIFE Scientific Workshop “Inflammation & Immunity in Health and Disease”, Vienna, Austria - May

BECKER, JÖRG

A transcriptome atlas of *Physcomitrella patens* provides insights into the evolution and development of land plants
Max Planck Institute for Plant Breeding Research, Cologne, Germany - April

Land plant evolution from the perspective of a tiny moss
Centre for Organismal Studies, University of Heidelberg, Heidelberg, Germany - April

A transcriptome atlas of *Physcomitrella patens* provides insights into the evolution and development of land plants
EMBO workshop: New model systems for early land plant evolution, Vienna, Austria - June

BELDADE, PATRÍCIA

Eco-evo-devo in *Bicyclus anynana* color patterns: novelty, plasticity, and immunity
Chubu University International Meeting on Integrative Approach to Understanding the Diversity of Butterfly Wing Patterns, Nagoya, Japan - August

Japan - August

BETTENCOURT DIAS, MÓNICA

Tsinghua University, Beijing, China - March

Biochemical Society Meeting on Cilia, Cytoskeleton and Cancer, Edinburgh, UK - April

Cilia Meeting @ Imagine Institute, Paris, France - June

12th International Congress of Cell Biology, Prague, Czech Republic - July

International Xenopus Meeting, Crete, Greece - August

EMBO Cell Fate and Nuclear Function, Killini, Greece - September

High-Throughput Microscopy for Systems Biology, EMBL, Germany - October

Cancer Models, Seville, Spain - December

BOM, JOANA

Implementation of a Gnoto/Axenic Facility: a case report from the Instituto Gulbenkian de Ciência
FELASA Congress, Brussels, Belgium - June

The IGC Gnoto/Axenic Facility: combined use of Isolators and IVC system for production, maintenance and experimentation with axenic animals
67th AALAS National Meeting, Charlotte/North Carolina, USA - November

BORGES, ANA CRISTINA

Zebrafish health programme: Implementation and results
FELASA Congress, Brussels, Belgium - June

CARNEIRO, JORGE

The Instituto Gulbenkian de Ciência
Campus Africa 2016, Universidad de la Laguna, Canarias, Spain - July

How to tame your transposon: Lessons from Rag-mediated

recombination of antigen receptor genes

Instituto de Biotecnologia, UNAM, Cuernavaca, Mexico - October

CARVALHAL, SARA

Characterisation of sister chromatid cohesion during cell division - a quantitative approach
Drosophila Genetics and Genomics Course, Wellcome Genome Campus, Cambridge, UK - July

CARVALHO, INÊS

A genetic perspective of one of the smallest conservation units of bottlenose dolphin in Europe – the Sado population (Portugal)
30th Annual Conference of the European Cetacean Society, Funchal, Portugal - March

Studying cetaceans in a small archipelago - Challenges and perspectives in the conservation of highly mobile top predators on São Tomé and Príncipe
II International Conference on Island Evolution, Ecology, and Conservation, Azores, Portugal - July

CASTRO, DIOGO

Transcriptional control of vertebrate neurogenesis by the proneural factor Ascl1
Department of Medical Biochemistry and Biophysics, Karolinska Institute, Stockholm, Sweden - August

Transcriptional control of vertebrate neurogenesis by the proneural factor Ascl1
GIGA-Neurosciences programme, Liege, Belgium - October

Gene regulation by the zinc-finger factor Zeb1 in Glioblastoma
Department of Medical Biochemistry and Biophysics, Karolinska Institute, Stockholm, Sweden - December

CHAOUIYA, CLAUDINE

Reversing Boolean gene regu-

latory networks

European Conference on Mathematical and Theoretical Biology 2016, Nottingham, UK - July

Reversing Boolean models

Workshop “Asynchronous dynamics of logical models: assessing biologically relevant properties” I2M, Marseille, France - November

When intricate regulatory networks defy intuition: computational models to decipher the control of cellular processes

Department of Microbiology, Immunology and Parasitology, Federal University of Santa Catarina, Florianópolis, Brazil - December

CHELO, IVO

Pervasive frequency-dependent selection in *Caenorhabditis elegans* competitions
Evolution meeting, Austin, USA - June

CHIKHI, LOUNÈS

On the importance of being structured: should we trust population size changes inferred from genomic data?
Universität Bern, Bern, Switzerland - January

On the importance of being structured: from habitat fragmentation in Madagascar to recent human evolution
TULIP International Conference, Université Paul Sabatier, Toulouse, France - April

Some questions we have on the importance of structured populations and demographic history
ConGenomics Meeting, CIBIO, Porto, Portugal - May

Effet de la structure spatiale et familiale de la population sur la taille efficace Ou plutôt Quelques conséquences de la structure des populations sur la notion de taille efficace
Séminaire Taille Efficace, INRA AgroParisTech, Paris, France - May

Entre science et story telling:

histoire des populations et données génétiques

Meeting “Représenter le vivant”, Université du Mirail, Toulouse, France - June

Based on a true story: genetic data and the histories of human populations

Human Evolution in Structured Populations Meeting, Oxford University, Oxford, UK - September

Based on a true story: genetic data and the histories of human populations

Dynamics of Human Peopling during the Pleistocene: Out of Africa, Université du Mirail, Toulouse, France - November

CORREIA, RION

Legislative polarization and social activism: a data-driven analysis of political communication

The Conference on Complex Systems, Amsterdam, The Netherlands - September

Public health monitoring of drug interactions, patient cohorts, and behavioural outcomes via network analysis of Instagram and Twitter user timelines

The Conference on Complex Systems, Amsterdam, The Netherlands - September

COSTA, TERESA

Presentation of the Instituto Gulbenkian de Ciência: facts & figures

BESTPRAC group short-term mission (STSM) to three universities in Flanders, UKRO, Brussels, Belgium - January

DOMINGOS, ANA

Keystone Symposia on New Therapeutics for Diabetes and Obesity, La Jolla, USA

Keystone Symposia on Obesity and Adipose Tissue Biology, Banff, Canada

Gordon Meeting, “Optogenetic

approaches to understanding neural circuits and behavior”, Newry, USA

International Conference of Endocrinology and Metabolism, Seoul, South Korea

University of Seoul School of Medicine, Seoul, South Korea

Diabetes Center of Asan Medical Center, University of Ulsan College of Medicine, Ulsan, South Korea

EMBO Workshop Neural Control of Metabolism and Eating Behaviour, Cascais, Portugal

EASO, Gothenburg, Sweden

IGBMC, Strasbourg, France

University of Bonn, Bonn, Germany

Babraham Institute, University of Cambridge, Cambridge, UK

Imperial College, London, UK

DOMINGUES, INÊS

Research institutions and social media: Channels for engaging the public and scientists

14th Public Communication of Science and Technology 2016, Istanbul, Turkey - April

DUQUE, PAULA

A plant-specific splicing regulator conferring tolerance to drought and salt stress during seed germination

Rothamsted Research, Harpenden, UK - March

An *Arabidopsis* RNA-binding protein regulating ABA-dependent stress responses during seed germination

University of Cologne, Cologne, Germany - April

The *Arabidopsis* SR protein SCL30a regulates drought and salt stress tolerance during seed germination

4th Post-EURASNET Meeting on RNA Alternative Splicing,

Poznan, Poland - September

Alternative splicing in plants: SR proteins and ABA-mediated stress responses

University of Nanjing, Nanjing, China - November

FERNANDES, PEDRO

Training Bioinformatics Instructors

ELIXIR Train-the-Trainer Workshop, EBI, Hinxton, UK - January

Vagrant

Bioinformatics Training using VM and Cloud Technologies, Espoo, Finland - May

Current needs in Europe for Bioinformatics Professionals

BITS/ELIXIR/GOBLET Train-the-Trainer Workshop, Salerno, Italy - June

E-infrastructures for the Bioinformatics Long Tail of Science

Digital Infrastructures for Research 2016, Krakow, Poland - September

FERREIRA, MIGUEL GODINHO

The role of telomeres in cancer and ageing

4th European Zebrafish Principal Investigator Meeting, Portugal - March

The role of telomeres in cancer and ageing

FLI Colloquium/ Beutenberg Campus Jena e.V., Germany - April

A role for telomere shortening in cancer and ageing in zebrafish

MSB talk/ITB, Germany - April

A role for telomere shortening in cancer and ageing in zebrafish

Telomeres, Telomerase and Disease, Brussels, Belgium - April

A role for telomere shortening in cancer and ageing in zebrafish

IRCAN, France - May

A role for telomere shortening in cancer and ageing in zebrafish

HHMI Meeting, USA - June

A role for telomere shortening in cancer and ageing in zebrafish

The FIRC Institute of Molecular Oncology Foundation, Italy - July

A role for telomere shortening in cancer and ageing in zebrafish

Telomere and Telomerase Meeting/CSH-Asia, China - September

A role for telomere shortening in cancer and ageing in zebrafish

CEA, France - October

A role for telomere shortening in cancer and ageing in zebrafish

Telomere Biology in health and Disease/French Society of Cancer, France - October

FESEL, CONSTANTIN

Features of SLE and their possible relation to infection and microbiota

SIGID steering committee meeting, Nîmes, France - May

FRAGATA, INÊS

Predictability of long-term, but not short-term, evolution in *Drosophila*

Mathematical and Computational Evolutionary Biology, France - June

GARDNER, RUI

Workshop: Systems for Simplifying Core Management

XXXI Congress of the International Society for Advancement of Cytometry 2016, Seattle, USA - June

FlowQC: pushing for a universal solution to monitor instrument performance

XXXI Congress of the International Society for Advancement of Cytometry 2016, Seattle, USA - June

GJINI, ERIDA

Understanding drug-immunity interplay during antibiotic treatment of infection

Workshop on Microbes and EcoSystems in Health, Liverpool School of Tropical Medicine, Liverpool, UK - April

Understanding host immunity in resistance management and rational design of antibiotic treatment

European Conference of Mathematical and Theoretical Biology 2016, Nottingham, UK - July

GONÇALVES SÁ, JOANA

Early detection of the flu season

Conference for Complex System, The Netherlands - October

Human sexual cycles are driven by culture and collective moods

Conference for Complex Systems Amsterdam, The Netherlands - October

Improving graduate education in Africa

EU-LIFE, The Netherlands - November

GORDO, ISABEL

Evolution of *E. coli* in the host environment

Evolutionary Systems Biology: From Model Organisms to Human Disease conference at the Wellcome Genome Campus, Cambridge, UK - March

Evolution of bacteria in the mammalian intestine

MESH: Workshop on Microbes and EcoSystems in Health, School of Tropical Medicine, UK - April

Rapid bacterial evolution within the mammalian gut

British Ecological Society Annual Meeting, Liverpool, UK - December

HORTA, CINTIA

Dissecting the post-mitotic roles of condensins

Drosophila Genetics and Genomics Course, Wellcome Genome

Campus, Cambridge, UK - July

HOWARD, JONATHAN

Exciting, effective and enigmatic – immunity-related GT-Pases in *Toxoplasma* infection
27th Annual Meeting of the German Society for Parasitology, Germany - March

Research, Development and Innovation

9th Annual Meeting of the Portuguese Association of Researchers and Students in the UK, Manchester, UK - June

Introduction

17th EMBL | EMBO Science and Society Conference EMBL, Heidelberg, Germany - November

JANODY, FLORENCE

Actin dysregulation: A central contributor to all stages in the evolution of epithelial cancers
Centre de Recherche en Cancérologie de Marseille, Marseille, France - September

JANSEN, LARS

TimeChIP identifies long-lived nucleosomes at active genes
Gordon Conference on Chromatin Structure & Function, Les Diablerets, Switzerland - May

Centromeric chromatin inheritance along the cell cycle
EMBO Workshop: Chromosome Segregation & aneuploidy Galway, Ireland June 2016

Histone variant inheritance and assembly at the centromere and beyond

Gordon Conference on Genomic Instability, Hong Kong, China - July

Chromatin-based epigenetic inheritance at the mammalian centromere

EMBO Young Scientist Forum, Lisbon, Portugal - September

MALLO, MOISÉS

A second life for Oct4 during embryonic development

Ulm's University Hospital, Ulm, Germany - November

MARTEIL, GAELE

12th International Congress of Cell Biology, Prague, Czech Republic - July

MARTINS, GABRIEL

Open source mesoscopic imaging and the frontier between bio & medical imaging
8th Workshop on Biomedical Engineering, Faculdade de Ciências da Universidade de Lisboa, Lisbon, Portugal - April

Multidimensional imaging in developmental biology
5th EMBO practical course on 3D Developmental Imaging, Oeiras, Portugal - July

OPENS_{pin} & OPenT mesoscopic imaging for cell & developmental biology
SPAOM2016, Bilbao, Spain - October

SPIM (Lightsheet microscopy) and OPT (Optical Projection Tomography) technical Workshop
SPAOM 2016, Bilbao, Spain - October

MARTINS, VERA

Cell competition and T cell development
International Symposium of Cell competition, Apoptosis and Cancer, Madrid, Spain - October

MENA, ANA

Morphogenesis of a project towards better science communication
14th Public Communication of Science and Technology 2016, Istanbul, Turkey - April

MIRTH, CHRISTEN

Society of Molecular Biology and Evolution, Gold Coast, Australia - July

Behavioural Neurogenetics of Drosophila Larvae, Ashburn, USA - October

Genetics of Adaptation Symposium, Bangalore, India - December

MOITA, LUÍS FERREIRA

The importance of being tolerant

Institute of Structural Biology, Helmholtz Zentrum München, Munich, Germany - July

The importance of being tolerant

Technical University of Munich, Munich, Germany - July

MONTEIRO, PEDRO

On the number and structure of Boolean functions compatible with a regulatory network topology
European Conference on Mathematical and Theoretical Biology 2016, Nottingham, UK - July

On the number and structure of Boolean functions compatible with a regulatory network topology
Workshop "Asynchronous dynamics of logical models: assessing biologically relevant properties", I2M, Marseille, France - November

NAVARRO-COSTA, PAULO

Early programming of the oocyte epigenome temporally controls late prophase I transcription and chromatin remodelling
EMBO Young Scientists Forum, Lisbon, Portugal - September

Using evolution to better understand human gametogenesis
Zentrum für Reproduktionsmedizin und Andrologie - Medizinische Fakultät, Münster, Germany - October

Early programming of the oocyte epigenome temporally controls late prophase I transcription and chromatin remodelling

Joint meeting of the Spanish and Portuguese Societies for Develop-

mental Biology - October

NUNES, ANA RITA

Unveiling the role of oxytocin-like peptides in the regulation of zebrafish social behaviour
Trento University, Trento, Italy - July

OLIVEIRA, RAQUEL

Chromosome dynamics during mitosis
EMBO YIP meeting, Heidelberg, Germany - May

Immediate and long-term consequences of premature loss of sister chromatid cohesion
Causes and consequences of aneuploidy, Les Treilles, France - June

Dissecting chromosome structure by acute protein inactivation
Chromosome Segregation and Aneuploidy - Chromo2016, Galway, Ireland - July

Chromosome dynamics during mitosis
EMBO Young Scientists Forum, Lisbon, Portugal - September

OLIVEIRA, RITA

Bacterial interspecies signalling in antibiotic-treated microbiota
6th ASM Conference on Beneficial Microbes, Seattle, USA - September

OLIVEIRA, RUI

Zebrafish as a model organism for the comparative study of social cognition and behaviour
4th European Zebrafish PI Meeting, Lisbon, Portugal - March

Communication networks in zebrafish: neuromolecular mechanisms and cognitive abilities for social communication
Symposium on "Behavioural and Neural Genomics of Sociality", International Congress for Neuroethology, Montevideo, Uruguay - April

Neuroendocrinology of social behaviour in zebrafish
Weizmann Conference on "Hormones: a Teeter-Totter of Sociality and Stress", Rohovot, Israel - July

Social zebrafish: an emerging model for the comparative study of social cognition
"Teleost fish as models in comparative cognition" Symposium at the 8th European Conference of Behavioural Biology, University of Vienna, Vienna, Austria - July

Neurogenomic mechanisms of social plasticity
Symposium on "The Causes and Consequences of Behavioural Plasticity", 16th Congress of the International Society for Behavioural Ecology, Exeter, UK - August

Social zebrafish
4th Conference Imaging Structure and Function of the Zebrafish Brain, Max Planck Institute for Neurobiology, Martinsried, Germany - December

PARKHOUSE, MICHAEL

Mecanismos de evasión por patógenos proveen una estrategia racional para controlar enfermedades infecciosas y no infecciosas
UNAM, Mexico - March

Diagnosis of viable Taenia metacestodes through detection of secreted HP10 antigen
CYSTINET Control of T. solium in endemic areas meeting, Paris, France - May

Inhibition of the interferon response by the African swine fever virus
3rd Annual GARA Scientific workshop, Ploufragan, France - September

PENHA-GONÇALVES, CARLOS
Foetal protection mechanisms in pregnancy-associated malaria
EU-LIFE/FAPESP meeting, São Paulo, Brazil - June

PEREIRA, HUGO

Openspin and OpenT mesoscopic imaging for cell & developmental biology
Bioimaging 2016 - Disease in Focus, i3S, Porto, Portugal - October

RAMOS, SUSANA

Kidney proximal tubular epithelial cells control disease tolerance to malaria by maintaining heme/iron homeostasis
9th International Conference on Heme Oxygenase, Prague, Czech Republic - September

ROCHA, LUÍS

Monitoring potential drug interactions and reactions via network analysis of Instagram user timeliness
Pacific Symposium on Biocomputing 2016, Hawaii, USA - January

Redundancy and control in complex networks
Workshop, Control and Observability of Network Dynamics, National Science Foundation, Mathematical Biosciences Institute, Columbus, USA - April

Redundancy and control in complex networks
2016 Summer Solstice: 8th International Conference on Discrete Models of Complex Systems, Universidade de Aveiro, Aveiro, Portugal - June

Modularity and the spread of perturbations in complex dynamical systems
Coarse-graining of Complex Systems, Satellite Workshop at The Conference on Complex Systems, Amsterdam, The Netherlands - September

Human sexual cycles are driven by culture and collective moods
The Conference on Complex Systems, Amsterdam, The Netherlands - September

The effective structure of complex networks drives dynamics, criticality and control
The Conference on Complex Sys-

tems, Amsterdam, The Netherlands - September 2016

Public health monitoring of drug interactions, patient cohorts, and behavioural outcomes via network analysis of Instagram and Twitter user timelines
The 6th Translational Bioinformatics Conference, Jeju Island, South Korea - October

The effective structure of complex networks drives dynamics, criticality and control
The 5th International Workshop on Complex Networks and their Applications, Milan, Italy - November

Social media mining for public health monitoring in precision medicine
ISI Foundation, Institute for Scientific Interchange, Turin, Italy - November

Structure and dynamics of complex systems: from social media mining to control of biochemical networks
Mathematics of Complex Systems: from precision medicine to smart cities, Coimbra, Portugal - December

SALMONA, JORDI

Comparative genomic diversity of two northern Madagascar lemur genera in a fragmented landscape
ConGenomics Meeting, CIBIO, Porto, Portugal - May

Comparative demographic history of two northern Madagascar lemur genera from site frequency spectrum
ConGenomics Meeting, CIBIO, Porto, Portugal - May

SOARES, MIGUEL

Tissue damage control at the "Iron Age" of host microbe interactions
Jagiellonian University, Kraków, Poland - February

Gut microbiota confers

immune protection against malaria transmission

27th Annual Meeting of the German Society for Parasitology, Göttingen, Germany - March

Disease tolerance as a defense strategy against infection

COST Action1307: Chemotherapy towards Diseases Caused by Endoparasites Meeting, Porto, Portugal - May

Disease tolerance as a defense strategy against infection

EU-LIFE Scientific Workshop 2016: Inflammation & Immunity in Health and Disease, Vienna, Austria - May

Targeting iron/heme in immune mediated inflammatory diseases

3rd Jena Symposium on Heme and Heme Degradation Products, Friedrich-Schiller-Universität Jena, Thuringia, Germany - May

Disease tolerance as a defense strategy against infection

Host-pathogen interactions: from bench to bedside/ARMINA, Nantes, France - June

The pathobiology of heme: tetrapyrroles and host microbe interactions

Gordon Research Conference on Chemistry and Biology of Tetrapyrroles, Salve Regina University, Newport, USA - July

A central stage for heme catabolism in disease tolerance to infection

9th International Conference on Heme Oxygenase, Prague, Czech Republic - September

Macrophage control of iron metabolism & homeostasis

Cell Symposium: 100 years of Phagocytes, Sicily, Italy - September

STANKOVIC, ANA

Cell cycle control mechanisms of mammalian centromere assembly

Gordon Conference on Structural

and Functional Dynamics of the Centromere in Mitosis and Meiosis, Mount Snow, USA - July

SUCENA, ÉLIO

Using evolution for the study of development and physiology

Vienna Graduate School of Population Genetics, Vienna, Austria - May

Using experimental evolution to learn about ultimate and proximate mechanisms of *Drosophila* immunity

Institute of Functional Genomics of Lyon, Lyon, France - June

Re-visiting crystal cell differentiation in the lymph gland

New Directions in *Drosophila* Blood Cell Biology, Woods Hole, USA - October

TAVARES, SANDRA

The actin cytoskeleton: A key mediator of pre-malignant breast cancer expansion

Mechanobiology - Mechanisms of force sensation and transduction that control cell behaviour in health and disease, Amsterdam, The Netherlands - March

TEIXEIRA, LUÍS

Natural host-microbe interactions in *Drosophila*: from defensive endosymbionts to gut microbiota

Griswold Annual Speaker at Department of Entomology, Cornell University, New York, USA - April

Toll and *Wolbachia*: two antiviral factors in *Drosophila*

MRC Centre for Virus Research, University of Glasgow, Glasgow, UK - May

Natural host-microbe interactions in *Drosophila*: from defensive endosymbionts to gut microbiota

Zoological Institute, University of Basel, Basel, Switzerland - June

Wolbachia genetic diversity

and antiviral protection in insects

FAPESP/EU-LIFE Symposium on Cancer Genomics, Inflammation & Immunity, São Paulo, Brazil - June

Toll and *Wolbachia*: two antiviral factors in *Drosophila*

Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, Minas Gerais, Brazil - June

TELLEY, IVO

Drosophila embryogenesis under a new light

IRI for Life Sciences–Humboldt University, Berlin, Germany - February

THOMPSON, JESSICA

Autoinducer-2 influences gut microbiota composition

1st Young Scientists Symposium in Mucosal Biology, University of Bern, Bern, Switzerland - June

TRANFIELD, ERIN

Three-dimensional imaging in electron microscopy

EMBO Practical Course on 3D Developmental Imaging, Oeiras, Portugal - July

Using correlative light and electron microscopy to understand influenza A viral assembly

ULTRAPATH XVIII, Annual Meeting of the International Society for Ultrastructural Pathology, Lisbon, Portugal - July

VARELA, PEDRO

SAT-based identification of stable states in composed Boolean regulatory networks

7th International Workshop on Static Analysis and Systems Biology, Edinburgh, UK - September

VASCONCELOS, FRANCISCA

MyT1 counteracts the neural progenitor program to promote vertebrate neurogenesis

Joint meeting of the Spanish and Portuguese Societies for Devel-

opmental Biology, Girona, Spain - October

VIDAL, SHEILA

Funding opportunities for European researchers

European COST Action BM1203 Working Groups meeting, Lisbon, Portugal - April

The challenging path towards widening participation

22nd Annual Conference EARMA 2016, Lulea, Sweden - June

EARMA addresses cultural and diversity issues: A new working group for EARMA

22nd Annual Conference EARMA 2016, Lulea, Sweden - June

XAVIER, KARINA

AI-2 and homeostasis of gut microbiota

International Symposium at the College France on “Communication among Complex Microbial Populations and Their Host”, Paris, France - May

Manipulation of the quorum sensing signal AI-2 affects the antibiotic-treated gut microbiota

Gordon Research Conference on Bacterial Cell Surfaces, Mount Snow, USA - June

Quorum sensing signal AI-2 affects the antibiotic-treated gut microbiota

Gordon Research Conference on Microbial Stress Response, Massachusetts, USA - July

AT NATIONAL MEETINGS AND SEMINARS

ADAMO, MATTIA

Interplay between energy and ABA signalling in plant growth and stress responses

ITQB-IGC Plant Interaction Meeting, Oeiras - March

Interplay between energy and ABA signalling in plant growth and stress responses

Green-IT Research Unit Annual Meeting, Oeiras - July

ADRAIN, COLIN

Trafficking control and signalling

Chronic Diseases Research Centre, Universidade Nova de Lisboa, Lisbon - July

AMORIM, MARIA JOÃO

Influenza A virus and the recycling endosome

Chronic Diseases Research Centre, Universidade Nova de Lisboa, Lisbon - April

BAENA-GONZÁLEZ, ELENA

SnRK1 signalling pathway – A link between environmental signals and plant growth

NEBFCUL's BioSAM – Biological Sciences Annual Meeting/FCUL, Lisbon - April

BANK, CLAUDIA

On the (un-)predictability of a large intragenic fitness landscape

NEBFCUL's BioSAM – Biological Sciences Annual Meeting/FCUL, Lisbon - April

BECKER, JÖRG

Land plant evolution from the perspective of a tiny moss

XL Jornadas Portuguesas de Genética, Coimbra - June

NGS services at IGC

3^a Reunião de Utilizadores de Plataformas NGS, INSA, Lisbon - November

BETTENCOURT DIAS, MÓNICA

Chronic Diseases Research Centre, Universidade Nova de Lisboa, Lisbon - April

Ciência 2016: Encontro com a Ciência e Tecnologia em Portugal, Lisbon - July

BISPO, CLÁUDIA

Flow Cytometry - fundamentals and applications

Universidade Lusófona de Humanidades e Tecnologias, Lisbon - April

Flow Cytometry

Faculdade de Ciências da Univer-

sidade de Lisboa, Lisbon - October

BLANCKAERT, ALEXANDRE

Local adaptation: a limit during early divergence?

XII Encontro Nacional de Biologia Evolutiva, Universidade de Aveiro, Aveiro - December

CARNEIRO, TIAGO

Workshop in “Biossegurança em experimentação animal”

INSA, Lisbon - September

CARVALHO, INÊS

A importância da genética na conservação da biodiversidade – o caso específico dos cetáceos

IV Jornadas da Investigação em Biologia, Faculdade de Ciências da Universidade de Lisboa, Lisboa - February

CAVADAS, MIGUEL

Beyond the ER: iRhom2-phosphorylation controls TACE activity at the cell surface

COST Proteostasis meeting, Universidade Nova de Lisboa, Lisbon - November

CHELO, IVO

Pervasive frequency-dependent selection in *Caenorhabditis elegans* competitions

XII Encontro Nacional de Biologia Evolutiva, Universidade de Aveiro, Aveiro - December

CHIKHI, LOUNÈS

On the importance of being structured: should we revisit the demographic history of species? (and how it could apply to humans) or Should we trust population size changes inferred from genomic data?

Portugaliae Genetica, Porto - February

On Madagascar, social groups and population structure

NEBFCUL's BioSAM – Biological Sciences Annual Meeting/FCUL, Lisbon - April

On the importance of being structured: from habitat frag-

mentation in Madagascar to recent human evolution
Instituto de Medicina Molecular, Lisbon - October

COELHO, INÊS
TREM-2 controla população reparadora de macrófagos na reversão da fibrose hepática
12º Congresso da Sociedade Portuguesa de Diabetologia - March

CONFRARIA, ANA
Interplay between microRNA and energy in *Arabidopsis*
Green-IT Research Unit Annual Meeting, Oeiras - July

COSTA, TERESA
Overview of the BESTPRAC group short-term mission (STSM)
“Finca-Pé” Meeting, Oeiras - March

DOMINGOS, ANA
Chronic Diseases Research Centre, Universidade Nova de Lisboa, Lisbon

Instituto de Medicina Molecular, Lisbon

DUARTE, ELVES
Molecular bases of *Wolbachia* - host interaction
DrosTuga 2016, Tomar

DUARTE, NÁDIA
CD26/DPP-4 determina perfil inflamatório das células de kupffer na patogénese de NAFLD
12º Congresso da Sociedade Portuguesa de Diabetologia - March

ELIAS, ALEXANDRE
Screening and characterization of *Arabidopsis* mutants with altered energy signalling
ITQB-IGC Plant Interaction Meeting, Oeiras - December

FERNANDES, PEDRO
Learning challenges in Bioinformatics
Bioinformatics Open Days, Universidade do Minho, Braga -

February

Bioinformatics meets Health Informatics
NOVAsaúde Workshop on Health Informatics, Reitoria da Universidade Nova de Lisboa, Lisbon - April

Flipped classroom
Jornada Pedagógica, Faculdade de Medicina da Universidade de Lisboa, Lisbon - November

FERREIRA, MIGUEL GODINHO
The role of telomeres in cancer and ageing
CNC.IBILI Seminars/Universidade de Coimbra, Coimbra - January

The role of telomeres in cancer and ageing
Escola Superior de Educação - April

A role for telomere shortening in cancer and ageing in zebrafish
Aging and Aging related diseases Workshop/CNC, Coimbra- October

The role of telomeres in cancer and ageing
XIX National Congress of Biochemistry/SPB2016 - December

FESEL, CONSTANTIN
Pathological autoimmunity: Tregs, lymphopenia and the example of SLE
Porto Autoimmune Meeting PAM, Universidade do Porto, Porto - October

GJINI, ERIDA
How classical and adaptive regimes interact with host immunity in antibiotic treatment of resistant infections
7th Workshop DSABNS 2016, Universidade de Évora - February

Using mathematics to understand infection dynamics and antibiotic treatment
Instituto de Medicina Molecular, Lisbon - November

Slow fast dynamics in inter-

acting multi-strain pathogens
Department of Mathematics, Universidade Nova de Lisboa, Lisbon - November

Mathematics and the battle against antibiotic resistance
CoLaB Workshop, Universidade de Coimbra, Coimbra - December

GONÇALVES SÁ, JOANA
Data mining for decision-making
Priberam Seminars, INESC-ID, Lisbon - April 2016

Science, literacy and inclusiveness
Centro de Formação de Escolas António Sérgio - April

Decision-making and sampling
Ciclo Ponto de Gravidade, Teatro Cão Solteiro - May

Data mining for decision-making
Department of Electronic Engineering, Instituto Superior Técnico, Lisbon - September

GORDO, ISABEL
***Escherichia coli* adaptation in the mammalian gut**
Portugaliae Genetica, Porto - March

Evolução de bactérias comensais no intestino
Illumina Users Group Meeting, INSA , Lisbon - November

Compensation of multiple antibiotic resistance
XII Encontro Nacional de Biologia Evolutiva, Universidade de Aveiro, Aveiro - December

Lessons from *Escherichia coli* about evolution in the mammalian gut
IMM Computational Biology and Bioinformatics Seminars, Lisbon - December

GHEU, ANA-HERMINA
How Finnish wood ants met halfway in sexual conflict
XII Encontro Nacional de Biologia Evolutiva, Universidade de Aveiro

Aveiro - December

HOWARD, JONATHAN
Exciting, effective and enigmatic – immunity-related GT-Pases in *Toxoplasma* infection
XLII Annual Meeting of the Portuguese Society of Immunology - June

JANODY, FLORENCE
The actin cytoskeleton: Friend and foe in cancer progression
Instituto de Patologia e Imunologia Molecular da Universidade do Porto, Porto - March

The actin cytoskeleton: Friend and foe in cancer progression
NEBFCUL's BioSAM – Biological Sciences Annual Meeting/FCUL, Lisbon - April

The actin cytoskeleton: Friend and foe in cancer progression
Instituto de Medicina Molecular, Lisbon - April

JANSEN, LARS
Chromatin-based epigenetic memory: the curious case of the centromere
Instituto de Medicina Molecular, Lisbon - October

LALOUM, TOM
Control of early steps of the *Medicago truncatula-Sinorhizobium meliloti* symbiosis by plant NF-Y transcription factors
IGC-ITQB Plant Interaction Meeting, Oeiras - June

LOPES, FILIPA
Alternative splicing and SR proteins in ABA-mediated stress responses
IGC-ITQB Plant Interaction Meeting, Oeiras - November

MALLO, MOISÉS
The control of body length in vertebrate embryos
NEBFCUL's BioSAM – Biological Sciences Annual Meeting/FCUL, Lisbon - April

Using the CRISPR/Cas9

system to modify the mouse genome
3rd Annual BiotchHealth Symposium, Universidade do Porto, Porto - June
MARTINS, GABRIEL
Mesoscopic imaging
8th Course on Optical Microscopy Imaging for Biosciences i3S, Porto - April

MARTINS, VERA
Leukemia and cell competition
XLII Annual Meeting of the Portuguese Society of Immunology, Oeiras - June

MENA, ANA
Comunicação de ciência para cientistas: dois cursos, duas abordagens
SciComPT2016, Lisbon - May

MOITA, LUÍS FERREIRA
The importance of being tolerant
Ciclo de conferências sobre doenças infecciosas, Hospital de Santa Maria, Lisbon - January

Targeting antigen crosspresentation for cancer immunotherapy
Fundação Champalimaud, Lisbon - March

The importance of being tolerant
AIMS meeting, Lisbon - March

iPROTECTION; ERCEA Information Session for Principle Investigators of ERC projects
Fundação Champalimaud, Lisbon - July

NIÑO-GONZÁLEZ, MARÍA
Analysis of *Arabidopsis* MFS membrane transporters unveils biological relevance of alternative splicing in plants
2nd General Green-IT meeting, ITQB, Oeiras - July

OLIVEIRA, RAQUEL
Chromosome architecture and the fidelity of mitosis during

development
Symposium David Drubin Visit, Lisbon - May

OLIVEIRA, RUI
Zebrafish as a model organism in social neuroscience
Lisbon Social Neuroscience Club, ISPA, Lisbon - April

O Cérebro Social: como a vida social influencia o cérebro e o comportamento
Culturgest, Ciclo de Conferências “Discursos do Cérebro”, Lisbon - September

Social and affective neuroscience: lessons from fish
Institute for Public Health, Universidade do Porto, Porto - November

PAIS, INÊS
***Drosophila melanogaster* has a stable, beneficial and host-specific gut microbiota**
DrosTuga, Tomar - September

PEIXOTO, BRUNO
Starch Metabolism – A regulatory role for SnRK1?
ITQB-IGC Plant Interaction Meeting, Oeiras - September

PENHA-GONÇALVES, CARLOS
Foetal factors in pathogenesis of malaria in pregnancy
NEBFCUL's BioSAM – Biological Sciences Annual Meeting/FCUL, Lisbon - April

PERFEITO, LÍLIA
Evolution and cancer
Faculdade de Ciências da Universidade de Lisboa, Lisbon - March

REBELO, MANUEL
VI Workshop “Biossegurança em experimentação animal”
Instituto Nacional de Saúde Doutor Ricardo Jorge, Lisbon - September

RICHARDSON, DALE
The plant-specific SR protein SCL30a confers ABA-depend-

ent salt and osmotic stress tolerance during seed germination in *Arabidopsis*

2nd General Green-IT meeting, ITQB, Oeiras - July

ROCHA, LUÍS

Social media mining for precision medicine

Clinical Seminar Series, Fundação Champalimaud, Lisbon - March

The challenge and promise of a two-dimensional science

Ciência 2016: Encontro com a Ciência e Tecnologia em Portugal, Lisbon - July

RODRIGUES, YARA

Integrating complex environmental information in developmental plasticity

XII Encontro Nacional de Biologia Evolutiva, Universidade de Aveiro, Aveiro - December

ROSMANINHO, PEDRO

Zeb1 potentiates gene transcription genome-wide in Glioblastoma Multiforme cancer stem cells via a novel LEF1/TCF dependent mechanism

Portuguese Society for Developmental Biology, Lisbon - April

SANTOS, DIOGO

The relativity of time in evolution

XII Encontro Nacional de Biologia Evolutiva, Universidade de Aveiro, Aveiro - December

SILVA, CAROLINA

Genetics of diversification: characterization of a hot-spot locus for pigmentation evolution

XII Encontro Nacional de Biologia Evolutiva, Universidade de Aveiro, Aveiro - December

SOARES, MIGUEL

Metabolic adaptation at the "iron age" of host microbe interactions

Chronic Diseases Research Center at Universidade Nova de Lisboa, Lisbon - February

Inflammation: a fine balance between immunity and disease

Faculdade de Medicina da Universidade de Lisboa, Lisbon - October

TAVARES, SANDRA

The actin cytoskeleton in pre-malignant breast cancer expansion: when cells are overactin

SPBD 10th Anniversary Symposium, Lisbon - September

TEIXEIRA, LUÍS

Natural host-microbe interactions in *Drosophila*: from defensive endosymbionts to gut microbiota

i3S/IBMC, Universidade do Porto, Porto, Portugal - January

Wolbachia and vector-borne diseases

Instituto de Higiene e Medicina Tropical, Lisbon - May

The bacterial endosymbiont *Wolbachia* protects against viruses

XLII Annual Meeting of the Portuguese Society for Immunology, Oeiras - June

VAZ DA SILVA, ZOÉ

Membrane regulators of complement activation impact in influenza A virus pathogenicity

XLII Annual Meeting of the Portuguese Society for Immunology, Oeiras - June

XAVIER, KARINA

A linguagem das bactérias que vivem no nosso corpo

XVII Jornadas de Biologia Aplicada, Universidade do Minho, Braga - February

The chemical language of the bacteria in our gut

VIII Jornadas de Genética e Biotecnologia, Universidade de Trás os Montes e Alto Douro, Vila Real - March



7

PUBLIC ENGAGEMENT
IN SCIENCE

>5500

VISITORS IN PUBLIC EVENTS

432

STUDENTS VISITED THE IGC

~207

RESEARCHERS & TECHNICIANS
ENGAGED IN OUTREACH
ACTIVITIES



5

NEW MULTIMEDIA
RESOURCES



1

INTERNATIONAL
EDUCATION
PROJECT



8

PARTICIPATIONS
IN PUBLIC EVENTS

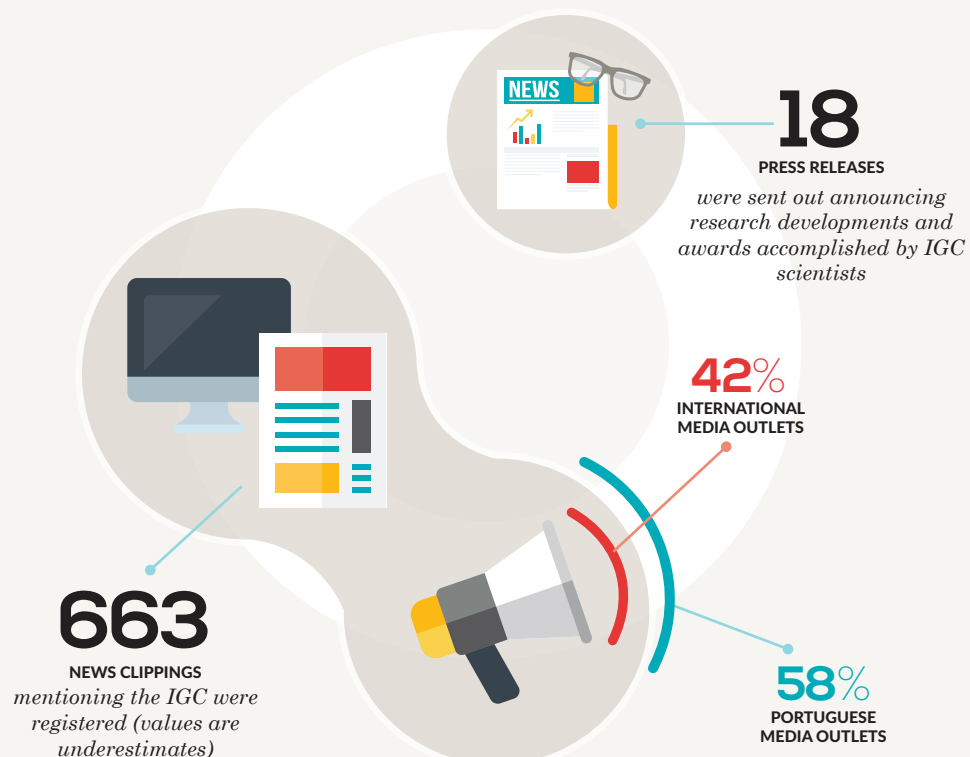


2

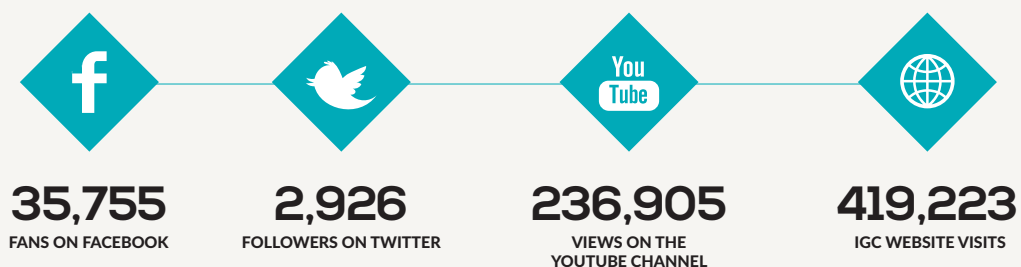
ARTISTS IN
RESIDENCE

PUBLIC ENGAGEMENT IN SCIENCE 2016

MEDIA OFFICE



NEW MEDIA



INSTITUTIONAL COMMUNICATION

PRODUCTION OF MULTIMEDIA RESOURCES

Four episodes of a new series of videos entitled “PhD in a minute” were produced in 2016, aiming at introducing the thesis work developed by IGC PhD candidates. A new video from the “IGC paper video” series - “Using statistics to prepare better experiments!” - was released, covering the scientific article published in *Genetics* by Claudia Bank’s laboratory.

SCIENCE EDUCATION PROJECTS

“LAB IN A BOX” – SCIENCE EXPERIMENTS FOR STUDENTS IN AFRICA

This new project is based on the concept of a mini-lab provided in a box, containing very simple and inexpensive materials that can support the development of experiments in Biology, Ecology, Geology, Chemistry and Physics. Established by the Graduate Programme Science for Development and by the Science Communication Unit, *Lab in a Box* aims at improving scientific literacy and stimulating experimental work as part of the science education curricula in African schools. In 2016, 34 IGC scientists and technicians volunteered to improve and further developed 43 experimental protocols in biology, ecology and chemistry; 500 boxes with reagents and material to run about those experiments were prepared and sent to every secondary school in Cabo Verde; and 24 Cabo-Verdean high-school teachers received specific training by IGC scientists and science communicators, in Praia, to implement these activities in the classroom. The Instituto Camões, the UNESCO National Commission, and the Ministry of Education of Cabo Verde support *Lab in a Box*.



Cabo-Verdean high-school teachers participating in a training session on “Lab in a Box” experiments.

SCHOOLS’ OUTREACH

In 2016, 188 students from 9 high schools (from Lisboa, Portimão, Silves, Coimbra, Almada, Sintra, Caparica and Oeiras) and 144 students from 4 universities (Universidade de Lisboa, Universidade Nova de Lisboa, Instituto Politécnico de Leiria and Instituto Superior Técnico) visited the IGC. One of our scientists was invited to participate in the “Encontro com o Cientista”, an initiative from “Escola Ciência Viva”, receiving a total of 49 students from 2 primary schools (in Lisbon). Two of our scientists went to 2 high schools to lecture on evolution (in Algés) and in science in general (in Barcelos), reaching 123 students. In total, we received 27 requests either to visit the IGC, also in specific events, or to provide material or assistance in the development of science projects.



High school students visiting a Facility in the IGC.

ONLINE EDUCATION RESOURCES

“Ciência em Três” - The IGC website for teachers

A new website was launched in the beginning of April to substitute the obsolete “Genes et al.” website. This website offers resources developed at the IGC for the teaching and learning of the life sciences. The resources available include experimental activities suitable for the classroom and divided by school years, videos illustrating biological processes and articles focusing areas of cutting-edge research. During 2016, the website received 14,031 total views corresponding to 4,075 users. A total of 555 downloads were done.



A new educational platform developed by the IGC was launched.

PUBLIC EVENTS

IGC AT FUTURÁLIA | 16-19 MARCH

Upon invitation by FCT, 4 IGC researchers participated in Futurália, the largest education, training and employability fair in Portugal. The researchers talked with high school students about their career path as scientists and informed students about the IGC PhD Programmes.



An IGC PhD candidate talks to high school students at Futurália.

INTERNATIONAL IMMUNOLOGY DAY | 29 APRIL

To celebrate the International Immunology Day, the IGC prepared a full programme of activities that aimed to guide the visitors in a great journey through the science behind immunology. A total of 51 students from 5 high schools (from Castelo Branco, Portalegre, Sintra, Cascais and Oeiras) attended lectures given by IGC scientists, learned concepts through laboratory activities and saw the daily life of researchers in guided tours to the laboratories. Six IGC research groups and one facility participated in this event.



High school students doing hands on activities at the IGC during the Immunology day.

IGC AT BELÉM ART FEST | 6-7 MAY

For the second consecutive year, the IGC was invited to participate in Belém Art Fest, a festival of Portuguese culture that takes place in Belém (Lisbon). 580 visitors talked to our scientists to unravel the complex world of the genetic networks and Plant Biology, and interacted with the science & art installation “Musical Morphogenesis”.



Visitors interacting with the installation “Musical Morphogenesis” at Belém Art Fest.

IGC AT MAKER FAIRE LISBON | 25-26 JUNE

The IGC participated at the Maker Faire Lisbon, an event with a “Do It Yourself” mindset that embraces all kinds of innovative science and engineering projects, with “Musical Morphogenesis”. About 700 visitors had the opportunity to interact and learn about this science & art installation.



Visitors learning the science behind “Musical Morphogenesis” at the Maker Faire Lisbon.

IGC AT NOS ALIVE 16 | 7-9 JULY

Science and music came together for the 9th year running at the NOS Alive’16 music festival. The main activities at the IGC corner were speed-dating, a photo exhibition of the NOS Alive fellows and four different science activities: a biodiversity quiz, a game testing the evolution of hosts and parasites, a fitness-land-

scape climbing board game and a game/quiz to explain malaria. This year, we also had a Plinko indicating which activity visitors should take and a “If you were a scientist what would you like to discover?” board, where visitors could write their ideas. Fifty IGC volunteers made these activities possible for about 1500 young people who visited the IGC corner.



IGC stand at the NOS Alive’16 Festival.

IGC AT “AO LEME COM A CIÊNCIA VIVA” FESTIVAL | 4 AUGUST

IGC was invited by the national agency Ciência Viva to participate at the Science Festival “Ao Leme com a Ciência Viva” in Belém (Lisbon), an event that had the participation of over 50 institutions. About 200 visitors engaged in two activities that were run by 7 IGC researchers: a biodiversity quiz and a hands-on activity where visitors could learn and experiment some of the steps involved in biodiversity research, from the field to the laboratory.



The Portuguese Minister for Science, Technology and Higher Education, and the President of Ciência Viva at the IGC stand at “Ao leme com a Ciência Viva” festival.

OPEN DAY – “SCIENCE IN ZOOM” | 1 OCTOBER

The 8th edition of the IGC Open Day brought 1800 visitors to the IGC. 170 IGC volunteers (including 29 non-Portuguese) participated in the event, showing the

science we do in many different activities: hands-on experiments, laboratory tours, talks with scientists, a Top Model room showing the model organisms used at the IGC, a fluorescent room with GFP-organisms, a science corner for kids and a group of sketchers to draw some of our science. This year we also had science & art projects, with the pre-premiere of “Quatuor pour l’aurore des temps”, a musical project of the artist in residence Camille van Lunen, in collaboration with in-house scientists, and played by a quartet of the Gulbenkian Music. Visitors also had the opportunity to interact with the installation “Musical Morphogenesis”.



A hands-on activity developed during the IGC Open Day.

IGC AT THE SCIENCE & TECHNOLOGY WEEK | 21-27 NOVEMBER

IGC participated in the Science & Technology Week 2016 with 2 different activities. “Musical Morphogenesis”, the science & art installation, was exhibited at the Electricity Museum in Belém (Lisbon) during the entire week. Around 750 visitors interacted with the installation. The IGC also created an online challenge: solving and deciphering 4 biology-related puzzles. The goal was to show some of the research developed at the IGC and test biology knowledge in a playful and fun way. 750 new sessions with 6.300 page visualisations, from 10 different countries were registered; 54 visitors managed to solve all puzzles.

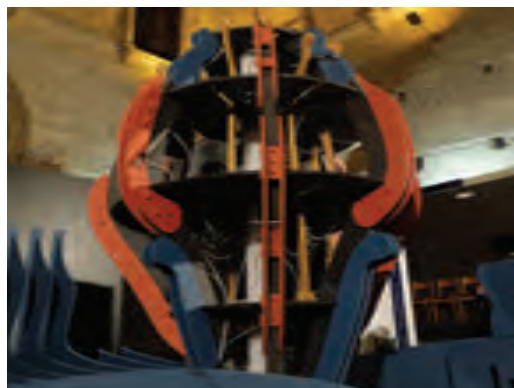


The IGC participated in the Science & Technology week with online biology-related puzzles, and a science & art installation.

ART & SCIENCE PROJECTS

'MUSICAL MORPHOGENESIS'

Musical Morphogenesis is an interactive installation that translates in sound, light and movement the development of a flower, unveiling the role of genetic networks during that process. This installation was developed by scientists, architects, engineers and a musician, in a collaborative project between the IGC, Gulbenkian Descobrir and Vitruvius-FabLab, ISCTE-IUL. During 2016 this installation was exhibited in 5 different venues (see public events for more information).



The science and art installation "Musical Morphogenesis".

ARTIST IN RESIDENCE: SIMON BILL

The British visual artist and novelist Simon Bill became the new artist in residence at the IGC in November 2016, and for a period of 6 months. During his residence, Simon will interact with the IGC community.



Simon Bill, artist in residence at IGC.

COMPOSER IN RESIDENCE: CAMILLE VAN LUNEN

From October 2015 to May 2016, the IGC hosted as Artist in Residence the French-Dutch composer and singer Camille van Lunen. During her residence, Camille promoted several musical activities with the IGC scientific community, and composed the piece "Quatuor por l'aurore des temps", based on biological themes. The pre-premiere of the piece occurred during the IGC Open Day, and its first public performance a month later, in November, in the Gulbenkian Foundation's main auditorium, played by 4 brilliant members of the Gulbenkian Orchestra.



Members of the Gulbenkian Orchestra with Camille van Lunen after the pre-premiere of "Quatuor por l'aurore des temps" at the IGC Open Day. From left to right: Jeremy Lake (violin), Esther Georgie (clarinet), Ana Manzanilla (violin), Camille van Lunen (composer), Michel Gal (piano).

OTHER PARTICIPATIONS

The IGC community collaborated in other projects promoted by different entities. These included a Science Café on "Genetic Improvement", organised by high school students from Escola Secundária da Cidadela (Cascais) and held at Café do Centro Cultural de Cascais, in May, with the goal of discussing potential benefits, negative impacts and bioethics concerns of genetic modification, with the broader community; and the Portuguese participation in London Design Biennale 2016, where the artist Marta de Menezes collaborated with IGC scientists to merge design and science, using bacteria and plants for data visualization (<http://www.londondesignbiennale.com/participants>).

FUNDRAISING 2016

DESCRIPTION

The IGC runs fundraising initiatives with private companies, charities and the general public to raise private funds for science. The IGC is under the *Scientific Sponsorship Law*. This law provides tax benefits for science-related donations by either individuals or companies.

MAJOR PROJECTS

NOS ALIVE – IGC RESEARCH FELLOWSHIPS

Established in 2007, the partnership between the Instituto Gulbenkian de Ciência (IGC) and *Everything is New*, promoter of the NOS Alive music festival, results in the IGC participation in this music festival and in two research fellowships per year that allow Portuguese young graduates to start their scientific careers. In 2016, Ana Eugénio and Tiago de Zoeten received a fellowship to develop one-year research projects at the Evolution and Development, and the Population and Conservation Genetics research groups, respectively. The practical works of these projects are to be carried out at the IGC, and in France and Madagascar. Since 2008, over 450 young graduates around the country have applied to these fellowships, and 14 received a fellowship. In 2016, 3 NOS Alive-IGC alumni were conducting a postdoc abroad, 6 were doing a PhD, and the other 3 were developing projects in different research groups.



Tiago de Zoeten and Ana Eugénio, the 2 NOS Alive-IGC young scientists of 2016.

COLEÇÃO CIÊNCIA – A PARTNERSHIP BETWEEN THE IGC AND VISTA ALEGRE

A collection of porcelain products, Coleção Ciência, results from a partnership between the IGC and *Vista Alegre*, a prestigious and market leader Portuguese porcelain manufacturer. In 2016, the porcelain Coleção Ciência was available at the IGC and at the Calouste Gulbenkian Foundation.



Mugs and coffee porcelain cups from the Coleção Ciência.

FUNDRAISING ACTIVITIES ORGANISED BY THE IGC PhD DELEGATES AND POSTDOCTORAL COMMITTEE

Several fundraising activities (beer hours, wine hours, thematic parties, etc.) were organised in 2016 to raise funds for the 10th PhD AMeeGuS meeting and for the postdoctoral retreat, via donations from attendees at the events, both from IGC staff and the general public.



Halloween party at IGC.



ACKNOWLEDGMENTS

We are grateful to everyone at the IGC - researchers, students and staff - who supplied information, text and images used in this report.

COORDINATOR

Ana Mena

EDITORS

Vanessa Borges

Inês Domingues

LAYOUT AND DESIGN

Formas do Possível . Creative Studio

PHOTOGRAPHY

Catarina Júlio

Sandra Ribeiro

The Instituto Gulbenkian de Ciência (IGC) Annual Report is also available for download from the IGC website at:

www.igc.gulbenkian.pt/annualreport

If you would like to receive a copy of this report, on a USB memory stick, please contact:

Science Communication and Outreach

Instituto Gulbenkian de Ciência

Tel: **+351 440 7959**

Fax: **+351 440 7970**

E-mail: info@igc.gulbenkian.pt

This is an open access publication, and with the exception of images and illustrations, the content may, unless otherwise stated, be reproduced free of charge in any format or medium, subject to the following conditions: content must not be used in a misleading context, the IGC must be credited as the original author and the title of the document specified in the attribution.

First published by the Instituto Gulbenkian de Ciência, 2017

© Copyright Fundação Calouste Gulbenkian 2017

