annual report 2013

INSTITUTO
DE TECNOLOGIA
QUÍMICA E BIOLÓGICA
ANTÓNIO XAVIER /UNL

Knowledge Creation

2013 Snapshots

9377 Citations in 2013

450 Communications to International Conferences (approx.)

Articles in 2013 (peer-reviewed) 291

PhD holders 186

Ongoing, financed projects 109

PhD students 135

PhD theses awarded 38

Table of contents

What is ITQB

The *Instituto de Tecnologia Química e Biológica* (ITQB) is an academic research centre of the Universidade Nova de Lisboa. Its mission is to carry out scientific research and post-graduate teaching in Chemistry, Life Sciences, and associated technologies, while also serving the community and performing university extension activities for the promotion of science and technology.
With 53 independent teams in 2013, ITQB hosted over 400 researchers, including 135 PhD students, with different backgrounds and research interests. Researchers benefit from excellent research facilities, equipment, and scientific support services, some of which unique in the country.
ITQB further coordinates the largest *Laboratório Associado*, a status attributed by the Portuguese Government in recognition of scientific excellence, as determined by international evaluation panels. This consortium includes the *Instituto Gulbenkian de Ciência* (IGC), the *Instituto de Biologia Experimental e Tecnológica* (IBET), and the *Centro de Estudos de Doenças Crónicas* (CEDOC), and has competencies and expertise ranging from the molecule to clinical trials.

Research

ITQB Research Groups are organized into five Research Divisions - Chemistry, Biological Chemistry, Biology, Plant Sciences, and Technology. Collaboration between divisions is strongly encouraged. All scientific matters at ITQB are overseen by the Scientific Council, formed by elected PhD holders, and the Scientific Advisory Board.
Research at ITQB is mainly supported by contracted projects (competitively awarded) with national and international R&D funding agencies such as *Fundação para a Ciência e Tecnologia* and the European Commission (108 ongoing research projects in 2013). This year, ITQB researchers published 276 WoS papers and were cited 9377 times.
Opportunities for industrial applications sometimes arise from research developed at ITQB. Collaboration with industry, patent submissions or the creation of start-up companies are the paths to follow from lab to business. This competence is mainly carried out by ITQB´s association with IBET, the largest private, non-profit biotechnology research organization in Portugal.

Education

ITQB's highly multidisciplinary nature makes it a leading centre for the advanced training of researchers in Portugal. Education at ITQB is thus strongly embedded in its research activities.
The Pedagogical Council oversees the educational activities at ITQB. High academic standards are ensured by the Teaching Quality Committee.
In 2013, a new PhD Program (Molecular Biosciences) was approved by the national accreditation agency and was selected for funding by the FCT (eleven scholarships per year). The program was scheduled to start in January 2014. ITQB is involved in two additional FCT-funded PhD programs. A new Master Course in Biochemistry for Health in collaboration with FCT-UNL was also accredited in 2013.

ITQB PhD Program in Chemical and Biological Sciences and Engineering
This PhD course ran for the last time in 2013. Built to reflect the highly multidisciplinary nature of the institute, this program aimed to provide a broad perspective of Chemistry, Life Sciences and Bioengineering, and prepare students for their future careers. The strong component of research was complemented by seven curricular units to which students committed a tenth of their time.

Master Research Projects
ITQB welcomes master's students who wish to develop their research at the institute; students then defend their theses at their host universities.

Director
Cláudio M. Soares
Vice-director
M. Margarida Oliveira

Institute Council
Francisco Murteira Nabo (chair)
Júlio Pedrosa de Jesus
Peter Villax
Adriano O. Henriques
Carlos Crispim Romão
Dušica Radoš
Helena Santos
Inês Cardoso Pereira
Manuel Carrondo
Maria Arménia Carrondo
Raquel Sá-Leão

Management Council
Cláudio M. Soares (chair)
M. Margarida Oliveira
Teresa Venda
Fernando Jorge Tavares

Scientific Advisory Board
Peter J. Sadler (coordinator)
Charles L. Cooney
Staffan Normark
Joel L. Sussman
Paul Christou
Bonnie L. Bassler
Friedrich Götz

Scientific Council
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Chemistry Coordinator - Luís Paulo N. Rebelo
José M. S. S. Esperança (Isabel M. Marrucho)
Biological Chemistry Coordinator - Pedro Matias,
Ricardo Louro (Lígia Saraiva Teixeira)
Biology Coordinator - Adriano Henriques
Raquel Sá-Leão (Mariana Pinho)
Plant Sciences Coordinator - Nelson Saibo
Rita Abranches (Maria Carlota Vaz Patto)
Technology Coordinator - Paula Marques Alves
Abel Oliva (Ana Sofia Coroadinha)

Pedagogical Council
Cláudio M. Soares (chair)
Manuela Serra Marques Pereira
Adriano José Henriques
Hugo Soares (student)
Mafalda Rodrigues (student)

Teaching Quality Committee
Mário Nuno Berberan e Santos (chair)
M. Manuela Chaves
(+ pedagogical committee)

Teaching Quality Office
Júlia Costa

Coordinator of PhD Program
Inês A. Cardoso Pereira

PhD Program Scientific Committee
M. Margarida Oliveira
Adriano O. Henriques
Júlia Costa
Lígia Saraiva

Master Course in Medical Microbiology
This collaboration with the *Instituto de Higiene e Medicina Tropical*, the *Faculdade de Ciências Médicas*, and the *Faculdade de Ciências e Tecnologia*, aims to train specialists in microbiology skilled in the application of advanced laboratory techniques for diagnoses, for microbiological research, and for quality control and certification of microbiology laboratories.

Master Course in Biochemistry for Health
A collaborative Master with Faculdade de Ciências e Tecnologia and Faculdade de Ciências Médicas, which provides a critical and analytical perspective of Human Health from a Biochemical point of view.

Master Course in Science Communication
A collaborative course with the *Faculdade de Ciências Sociais e Humanas*, focused on the particularities of communicating science to different audiences, via media, via formal and informal education, or directly from research institutions.

Research Training
Training can take different formats, ranging from a small regular participation in the lab activities to a one- year research project.

Post-Graduation Courses
- Scientific Research Training A - 60 ECTS

University Extension Courses
- Scientific Research Training (Graduates / Masters) - 15 | 30 | 40 ECTS
- Research Integration (Undergraduates) - 16 ECTS

Coordination of MSc Medical Microbiology at ITQB
Hermínia de Lencastre (chair)
Adriano O. Henriques
Cecília Arraiano

Coordinator of MSc in Biochemistry for Health at ITQB
Pedro Matias

Coordination of MSc in Science Communication at ITQB
Ana M. Sanchez

Coordinators of Research Training Courses
Célia Miguel
Cláudio Gomes

Support Services

Researchers at ITQB are supported by technical and administrative staff in a number of areas (see organizational flowchart). These support services include:
Science Management collaborates with researchers in identifying potential funding sources and in the application process.
Projects Office supports researchers in applying for and managing projects.
Academics Office centralizes information regarding advanced education at ITQB.
Accounting and Treasury offers accounting support to all financed projects, manages all purchases and payroll processing, and is responsible for the inventory and property.
Lab Management coordinates the purchase and maintenance of scientific equipment for the institute and supervises common scientific equipment .
Washing Room conducts washing and sterilization of material and culture media.
Industry Liaison Office offers support in the management of intellectual property and technology transfer, and contracts with industry.
Information Technology (IT) Support offers computational support
Storages handles the purchase, storage, and supply of materials and reagents.
Maintenance support oversees the maintenance of the building and all infrastructures.
Communication office manages institutional and scientific communication.

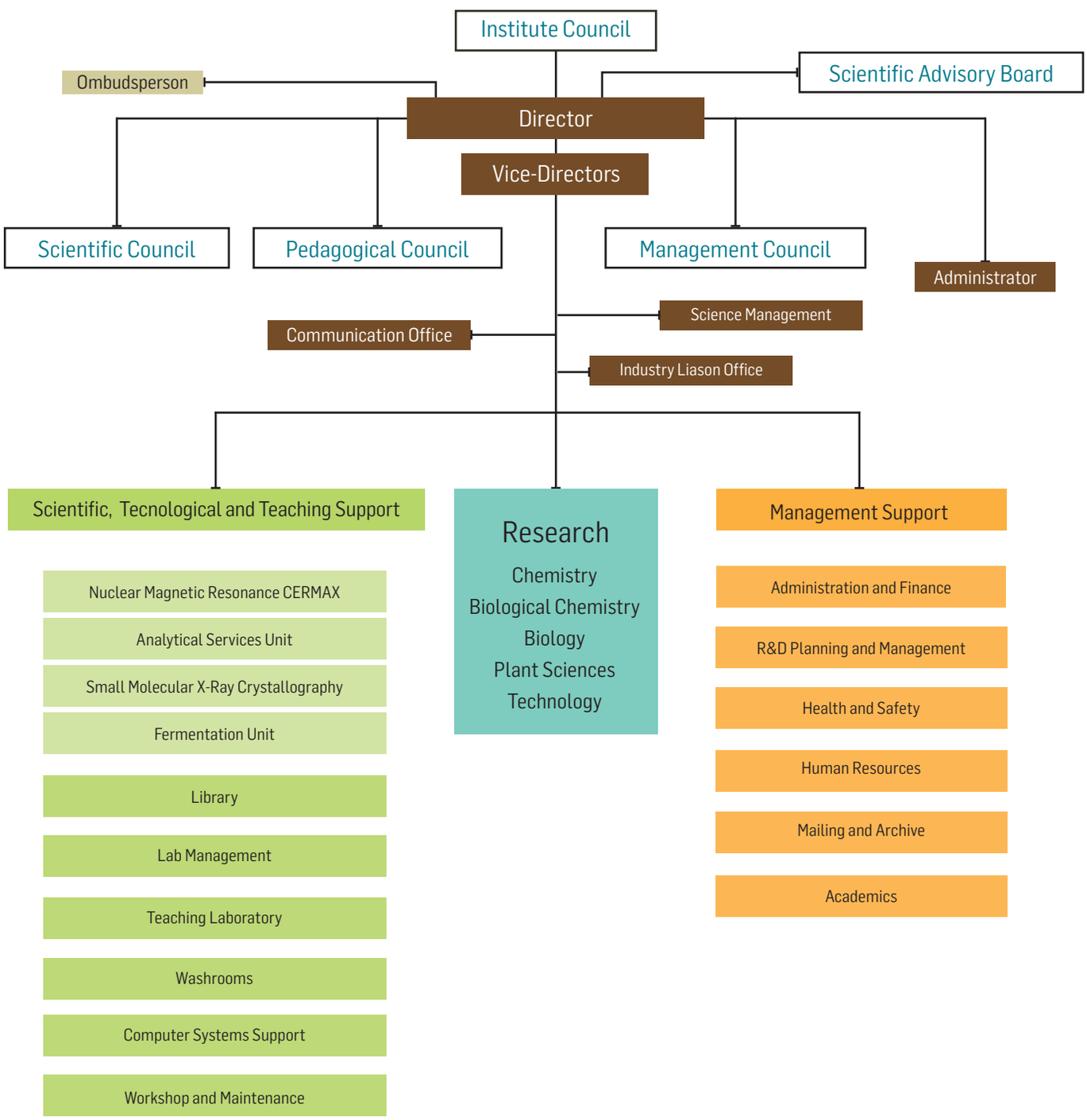
Additionally, some scientific support services are also available to outside researchers and companies.
Analytical Services Unit ITQB/IBET analytical development, validation and testing of chemicals and biologicals and studies on candidate pharmaceutical products according to OECD Good Laboratory Practices Principles.
Centro de Ressonância Magnética António Xavier **(CERMAX)** with several NMR spectrometers (300, 400, 500 and 800 MHz), including the highest field NMR spectrometer in Portugal. It is part of the National NMR Facility.
Library maintains ITQB publication records and manages bibliographic databases.
Teaching Laboratory designed and equipped to support the teaching activities in areas ranging from Biochemistry to Genetics.
Greenhouses manages the cultivation of plants for research purposes.

See full list of staff in the appendix (page 71)

Infrastructure and Support Committee
Cláudio M. Soares
Margarida Oliveira
Teresa Venda
Fernando Jorge Tavares
Maria Cristina Pinto
Maria de Lurdes Conceição
Ana M. Sanchez
João Rodrigues
Isabel Murta
Cláudia Almeida
Carlos Frazão, Daniel F. Branco e Carlos Cordeiro
Henrique Nunes e Nuno Monteiro
Pedro Domingos
Rita Ventura

Health and Safety Committee
Helena Matias (Coordinator)
Margarida Oliveira (Vice-Director)
Henrique Campas Nunes, (Alexandre Maia)
Fernando Jorge Tavares (Cristina Afonso)
Cláudio M. Gomes (Ricardo Louro)
Abel Oliva (Júlia Costa)
Mariana Pinho (Lígia Martins)
Cândido Pinto Ricardo (Nelson Saibo)
Rita Delgado (Margarida Archer)
Jaime Mota (Pedro Domingos)
António Cunha (João Clemente)
Christopher Maycock (Rita Ventura)
Beatriz Royo
Sérgio Filipe
Cecília M. Arraiano
Ricardo Coelho
Cláudia Almeida
Isabel Ribeiro (IBET)
Helena Santos, MD

Organization



Research Groups

Chemistry

Bioorganic Chemistry
Rita Ventura

Coordination and Supramolecular Chemistry
Rita Delgado

Homogeneous Catalysis
Beatriz Royo Cantabrana

Micro-Heterogeneous Systems
Eurico de Melo

Molecular Thermodynamics
Luís Paulo N. Rebelo

Organic Synthesis
Christopher Maycock

Organometallic Chemistry
Carlos C. Romão

Collaborators
James Yates - Single Molecule Processes

Biological Chemistry

Bacterial Energy Metabolism
Inês Cardoso Pereira

Metalloproteins and Bioenergetics Unit
Biological Energy Transduction
Manuela M. Pereira
Metalloenzymes and Molecular Bioenergetics
Miguel Teixeira

Biomolecular NMR
Manolis Matzapetakis

Genomics and Stress
Claudina Rodrigues-Pousada

Macromolecular Crystallography Unit
Structural Biology
Carlos Maria Franco Frazão
Industry and Medicine Applied Crystallography
Pedro Manuel Marques Matias
Membrane Protein Crystallography
Margarida Archer Frazão
Structural Genomics
Maria Arménia Carrondo

Inorganic Biochemistry and NMR
Ricardo Saraiva L. Oliveira Louro

Microbial & Enzyme Technology
Lígia O. Martins

Molecular Genetics of Microbial Resistance
Lígia M. Saraiva

Molecular Interactions and NMR
Patrick Groves

Molecular Simulation
António Baptista

Protein Biochemistry Folding & Stability
Cláudio M. Gomes

Protein Modelling
Cláudio M. Soares

Raman Spectroscopy
Smilja Todorovic

Collaborators
Filipe T. de Oliveira - Mössbauer Spectroscopy

Biology

Bacterial Cell Biology
Mariana G. Pinho

Bacterial Cell Surfaces and Pathogenesis
Sérgio R. Filipe

Bacterial Signaling
Karina B. Xavier

Cell Physiology and NMR
Helena Santos

Cell Signaling in *Drosophila*
Pedro Domingos

Control of Gene Expression
Cecília M. Arraiano

Glycobiology
Júlia Costa

Microbial Development
Adriano O. Henriques

Microbiology of Human Pathogens Unit
Molecular Genetics
Hermínia de Lencastre
Molecular Microbiology of Human Pathogens
Raquel Sá-Leão
Bacterial Evolution and Molecular Epidemology
Maria Miragaia

Plant Sciences

Disease and Stress Biology
Ricardo Boavida Ferreira

Forest Biotech
Célia Miguel

Genomics of Plant Stress
Margarida Oliveira

Plant Biochemistry
Cândido Pinto Ricardo

Plant Cell Biology
Rita Abranches

Plant Cell Biotechnology
Pedro Fevereiro

Plant Metabolomics
Carla António

Plant Molecular Ecophysiology
Manuela Chaves

Collaborators
Philip Jackson - Plant Cell Wall

Technology

Applied and Environmental Mycology
Cristina Silva Pereira

Biomolecular Diagnostic
Abel Oliva

Animal Cell Technology Unit
Cell Bioprocesses
Ana Sofia Coroadinha
Cell Line Development and Molecular Biotechnology
Paula M. Alves
Engineering Cellular Applications
Manuel J.T. Carrondo

Mass Spectrometry
Ana V. Coelho

Microbiology of Man-Made Environments
Teresa Crespo

Nutraceuticals and Delivery
Catarina Duarte

Pharmacokinetics and Biopharmaceutical Analysis
Ana L. Simplício

Systems Biodynamics
Andreas Bohn

Collaborators
Fátima Lopes - Antibiotic Stress and Virulence of Enterococci
Maria do Rosário Bronze - Analytical Chemistry
Cidália Peres - Food Microbial Technology

Invited and Visiting Professors

Alessandro Giuffrè | Fast Kinetics
Alexander A. Konstantinov | Bioenergetics
Alexander Tomasz | Microbiology
David L. Turner | Biology
Hansjörg Hauser | Eukaryotic Molecular Biology
John G. Aunins | Bioprocess Engineering
Jonas Almeida | Biomathematics
José Artur Martinho Simões | Chemistry
José Canongia Lopes | Molecular Simulation
Maria Teresa N. Duarte | Crystallography
Kenneth R. Seddon | Ionic Liquids
Otto-Wilhelm Merten | Bioengineering
Peter F. Lindley | Structural Biology
Peter G. Hildebrandt | Raman Spectroscopy
Robert Samson | Mycology
William Frank Martin | Molecular Evolution

Statistics 2013

53 Research Groups

417 Researchers

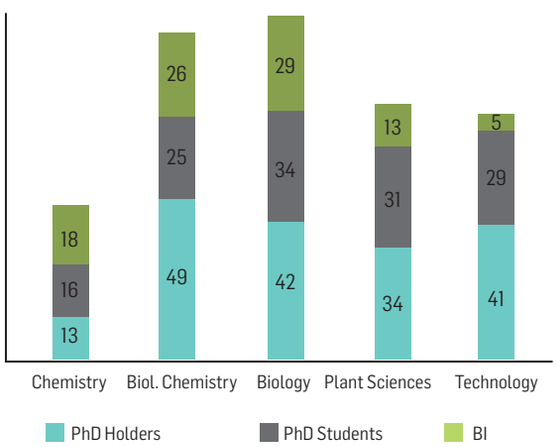
BI fellows 96

PhD students 135
integrated into research groups

PhD holders 186

Permanent staff	23
Laboratório Associado	16
Other institutions	13
iBET	12
Retired	3
Programa Ciência	7
FCT Investigator	5
Welcome/Marie Curie/EC	3
Others	3
Post Doctoral Fellows	101

Researchers by divison



Average group size	7.9 researchers
Group leaders by gender	30 female / 22 male
Group leaders by nationality	48 Portuguese / 4 other
International PhD Holders	32

EU countries: 18
Bulgaria (1), Germany (1), Greece (1), Irland (1), Poland (2), Servia (3), Spain (3), UK (6)

Rest of the world: 4
India (1), Norway (1), Russia (1), Tunisia (1)

38 PhD Theses

PhD Theses distribution

20	Biology
12	Biochemistry
2	Chemistry
4	Technological and Engineering Sciences

PhD Theses since 1995 **350**

Registered PhD students 225
including 90 PhD students from IGC (as of 31 December 2013)

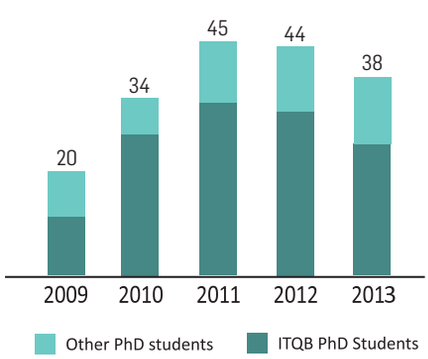
New PhD students in 2012 36

MolBios Individual Fellowships 11 (to start in 2014)

Master Theses in Science Communication 7

Post-graduations 8

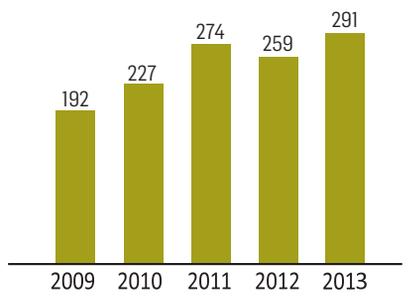
PhD theses in the last five years



291 Research Articles

ISI-WOS journals	**277**
Other peer-review articles	**14**
Book chapters	**13**
Edited Books	**2**
(see full list in the Research Output Section)	
Average number of papers per group	5.4
Citations (2013)	**9,377**
Total ITQB papers (1990-2013)	**3,166**
Total ITQB citations (1990-2013)	**70,584**

Publications in peer review journals in the last five years



Average citations per paper **29**
Considering a paper's maturation time of three years (includes all ITQB papers until 2008 and the corresponding total citations to date)

h-index **98**

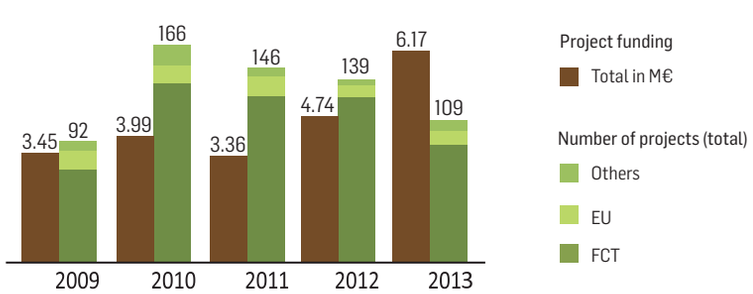
Communications **450**
in International Scientific Meetings

109 Research Projects

6,17 M€

89 *Fundação para a Ciência e a Tecnologia* | **7** European Commission | **3** European Commission (individual grants)
1 *Ministério da Defesa* | **4** Pfizer Contract | **1** Sudoe Interreg
1 European Research Council | **2** *Ciência Viva* | **1** Astellas Pharma Europe Limited

Projects in the last five years



Internationalization

Publications with international teams **115**

Countries with more than 20 papers: Usa, Spain, Germany, France

Between 10 and 20 papers: England, Netherlands

Between 3 and 9 papers: Switzerland, Denmark, Scotland, Italy, Brazil, Poland, Canada, Australia, Luxembourg, Ireland, Finland

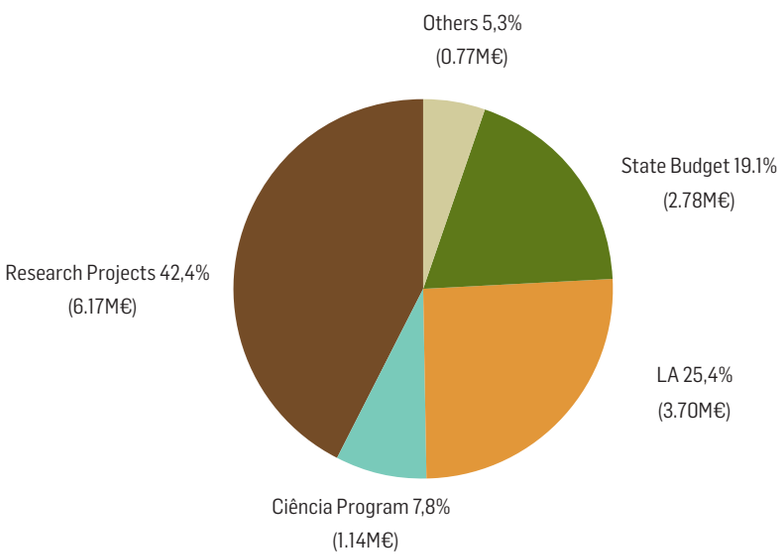
With two papers or less: South Africa, Russia, Romania, Japan, Czech Republic, Thailand, Sweden, South Korea, Singapore, Philippines, Norway, Kenya, Iran, India, Gambia, Egypt, Ecuador, Croacia, Cambodia, Bulgaria, Belgium, Austria, Argentina

International collaborations within projects **145**

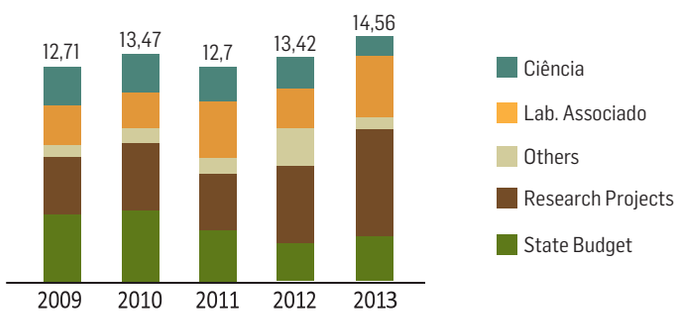
Through FCT projects: 25
Argentina (1), Brasil (1), France (4), Germany (6), Spain (5), The Netherlands (2), UK (3), USA (3)

Through EU projects: 120
Argentina (1), Austria (3), Belgium (2), Brazil (1), Bulgaria (3), China (2), Czech Republic (1), Denmark (3), Spain (18), Estonia (1), Ethiopia (1), Philippines (1), Finland (1), France (20), Germany (15), Hungary 84), India (1), Ireland (1), Israel (1), Italy (14), Mali (1), The Netherlands (1), Norway (1), United Kingdom (13), Switzerland (7), Sweden (1), Syria (1), Turkey (1)

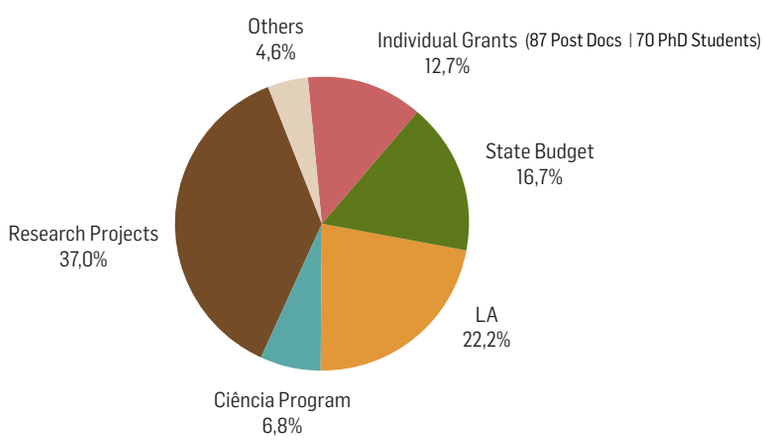
Overall budget 14.56 M€



Funding sources in the last five years (in M€)



Most ITQB PhD students and post-docs are financed directly through FCT fellowships.
The chart below depicts ITQB's budget including this figure (2,12 M€).



Total 16,68M€

Prizes and Awards

Individual distinctions

Cecília M. Arraiano
Elected chair of women in science working group of FEBS

Helena Santos
President of the International Society for Extremophiles (2012-2014)

Paula M. Alves
Nominated Vice- President of the European Society of Animal Cell Technology (ESACT)

Research distinctions

Catarina Duarte
1st Prize for Research Aveleda - White Wine & Health (Research Grant Aveleda - white wine and health)

Margarida Serra
ACTIP (Animal Cell Technology Industrial Platform) Award 2013-2014
Bioengineering approaches for up- and down-stream processing of human stem cells for clinical application.

In scientific meetings

A. R. Oliveira, J. A. Thompson. K. B. Xavier
EMBO | FEBS course on 'Host-Microbes Interactions', Inter-species bacterial signaling and gut microbiota.
30 August - 7 September 2013, Spetses, Greece
Best Poster Award

D. Simão , C. Pinto, M Serra, A. Teixeira, G. Schiavo, E. J. Kremer, P. M. Alves e C. Brito
"Modeling human neuronal functionality in vitro: 3D culture for neural differentiation and maturation."
8th International Meeting of the SPCE-TC,
May 2013, Faro, Portugal,
Best Abstract Award

Helena I.M.Veiga, Mário R.C. Soromenho, José M. S. S. Esperança, José N. Canongia Lopes, Luis Paulo N. Rebelo
"Ionic liquids under tension"
COIL-5, Vilamoura, Portugal, 2013
Honourable Mention Poster Award

Nuno Faria
Portuguese Congress of Microbiology and Biotechnology (MicroBiotec'13)
6-8 December 2013, Aveiro, Portugal.
SPM'13 – Best oral presentation (ex aequo)

P. Gomes-Alves, R. Cunha, M. Serra, P. M. Alves
'Lover's Proteome',
EuPA OPEN PROTEOMICS 2, 14-20 October 2013, Saint-Malo, France
Third place in Proteomics Photo and Graphic Art Contest

Rute G. Matos
Budapest Biostruct Course on Basics in Protein Crystallization and Crystallography 2013
August 30 – September 3, 2013, Budapest, Hungary
Best oral presentation

Saúl Silva
10º Encontro Nacional de Quimica Orgânica
4-6 September 2013, Lisbon
Best Masters Thesis

V.J. Pereira, B.R. Oliveira, M.J. Benoliel, R.A. Samson, M.T. Barreto Crespo
"Fungiwatch: Benefits and Hurdles Associated with the Presence of Fungi in Water"
MicroBiotec'13, Aveiro, Portugal.
Best Poster in the area Environment

V.M. Gaspar, J.M. Marques, F. Sousa, R.O. Louro, J.A. Queiroz, I.J. Correia
"Characterization of Nanomedicines Uptake and Intracellular Trafficking in Cancer Cells"
VI Symposium on Technology and Health, Instituto Politécnico da Guarda (IPG), 3 May 2013, Guarda, Portugal
Prize for best oral presentation

Events

Main events at ITQB

Dia Aberto 2013: Ser Cientista
April 20

Biomush Project Meeting
April 12

6th CERMAX
practical course on basic NMR
workshop
June 24-27

January | April | May | June

ITQB PhD Program
Starting session
Jan 10

"A arte dos fungos filamentosos"
Exibition by Patrícia Noronha
25 May

"Planta do Futuro" | Outreach activities in *Oeiras Parque*
International Fascination Plants Day
May 18-26

Career Development Master Class
Germ Stories - Five Decades in Microbiology with Roberto Kolter (Harvard Medical School)
May 6-9

ITQB Day
Celebrating ITQB's integration in UNL
July 5

Best PhD Thesis Prize 2012
Thesis on biology
by Pedro Matos Pereira
July 5

Cleanward project meeting
July 04

Course Structure and Function of Membrane Proteins
Nov 5-8

Transbio Workshop | Metabolomics and Molecular Interactions for Biology and Health
Nov 13-15

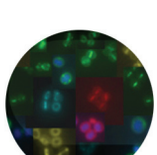
"Um cientista vem à escola"
Science & Tecnology Week 2013
Nov 18-22

July September October November

4th ITQB PhD Students Meeting
Oct 14-25

Awareness Session
Funding opportunities under HORIZON 2020
Excellence Science pillar: Marie Curie & ERC
Sep 13

European Researchers Night
Sep 27



Mini-Symposium
"Bacterial Cell Surfaces"
Sep 26

"Bacterial growth, antibiotic resistance and dormancy"
Sep 27

"Analysis of Staphylococcus epidermidis population structure by whole genome sequencing"
Sep 28

Seminars at ITQB

Frontier Leaders Seminars

Selective Oxidation with Non Heme Iron Complexes that Support High Oxidation States
Miquel Costas, University of Girona, Girona, Spain

Capnocytophaga canimorsus, cave canem!
Guy R. Cornelis University of Basel,Switzerland and University of Namur, Belgium

Integrated molecular circuits for stem cell activity in Arabidopsis roots
Ben Scheres , Wageningen University, Netherlands

Surprising new functions for peptidoglycan maturation enzymes in bacteria
Ivo Gomperts Boneca, INSERM, Institut Pasteur, France

Understanding and exploiting hydrogenases
Kylie A. Vincent, Inorganic Chemistry Lab., Univer. of Oxford, UK

European Research Council: Challenges and Opportunities Applying for funding within the European Research Council
Teresa Lago, Universidade do Porto, Portugal
Alexandra Veiga, ITQB-UNL, Portugal
Maria Arménia Carrondo, ITQB-UNL, Portugal

Relevance of Carbene Bonding Motifs in Enzyme Reactivity
Martin Albrecht, University College, Dublin, Ireland

Starting an electrical conversation between microorganisms and electrodes to achieve bioproduction
Korneel Rabaey, The University of Queensland, Australia

Using exoelectrogenic and electrotrophic microorganisms with different microbial electrochemical technologies for electricity and biofuels production
Bruce Logan, The Pennsylvania State University, USA

Of nature and nurture: connecting gene regulation, metabolism and disease
Matthias Hentze, Eur Molecular Biology Lab., Heidelberg, Germany

AVX Seminars

Computer-driven drug discovery: amyloidosis by transthyretin, a case study
Rui Brito, FCT, Universidade de Coimbra

Medicinal and aromatic plants as sources for bio-based products
Ana Cristina Figueiredo, Faculdade Ciências, Universidade de Lisboa

Advanced fluorescence and microscopy methodologies in membrane biophysics
Manuel Prieto, IST, Universidade de Lisboa

Generating and shaping novel action repertoires
Rui Costa, Fundação Champalimaud

Between commensalism and pathogenicity
Isabel Gordo, Instituto Gulbenkian de Ciência

SCAN

Immune evasion through modulation of Rab and Arf small GTPases expression
Duarte C. Barral, CEDOC

Driving force vs electrostatic interactions - Which plays the main role in collisional electron transfer?
Teresa Catarino, Cell Physiology and NMR

Glycoproteomics in health and disease
Júlia Costa, Head of Glycobiology Laboratory

The translational applications of an Evolutionary Cell Biology
José Pereira Leal, Computational Genomics Laboratory, IGC

Coagulase-negative staphylococci: a tool box for Staphylococcus aureus
Maria Miragaia PhD, Auxiliary Researcher

Tales from the crypt:recognition properties of polyamine cage compounds
Pedro Mateus, Coordination and Supramolecular Chemistry Laboratory

Abiotic stress seen from a plant's perspective
Margarida Oliveira, Genomics of Plant Stress Laboratory

"Magic mushrooms" The untapped potential of filamentous fungi
Cristina Silva Pereira, Applied and Environmental Mycology

When a gene is worth two: Alternative splicing of an Arabidopsis membrane transporter
Paula Duque, IGC

Impact of the irrigation regime applied to Aragonez (Syn. Tempranillo) grapevines on grape berry flavonoids and ABA biosynthesis and accumulation
Olfa Zarrouk Post-doctoral Fellow

Molecular details of electron transfer in fumarate reduction by flavocytochrome c3
Catarina Paquete, Inorganic Biochemistry and NMR

Prediabetes: what is known and what we would like to know
Maria Paula Macedo, CEDOC

PTMomics – a potpourri of experimental approaches
Ana Varela Coelho, Mass Spectrometry Laboratory

Portuguese public buses as major MRSA reservoirs: a worrisome finding!
Teresa Conceição, Molecular Genetics Lab Laboratory

Novel insights into embryogenesis and secondary growth in forest tree species
Célia Miguel, Forest Biotech Laboratory

Phylogenomics of symbiont-mediated protection to pathogens
Luis Teixeira, Host-microorganism interactions lab, IGC

Design and in vitro Evaluation of Potential CO-Releasing Molecules: a case study
Ana C. Coelho, Organometallic Chemistry Laboratory

Design and Synthesis of new probes for AI-2 quorum-sensing receptors studies
Sofia Miguel, Bioorganic Chemistry Laboratory

Dendritic cells: sugars in the spotlight
Paula Videira, CEDOC

ABCC proteins: molecular and biochemical aspects of their involvement in vacuolar anthocyanin transport
Rita Francisco, Plant Molecular Ecophysiology Lab

Small molecule activation mediated by organometallic complexes
Beatriz Royo, Homogeneous Catalysis Lab, ITQB

Malaria Liver stage infection: A struggle to die
Carlos Penha Gonçalves, IGC

Spore development and toxin production by the human intestinal pathogen Clostridium difficile
Adriano Henriques, Microbial Development Lab, ITQB

Sensing and processing the interspecies quorum sensing signal AI-2
Karina Xavier, Bacterial Signaling Lab, ITQB

UniMS: towards a new operations management for the Mass Spectrometry services
Margarida Oliveira e Paula Alves, ITQB

A Journey into the New RNA World
Cecília Arraiano, Control of Gene Expression Lab, ITQB

Directed evolution for tweaking with protein unfolding pathways
Vânia Brissos, Microbial & Enzyme Technology Lab, ITQB

Mind the gap: linking microbial bioenergetic metabolism to electricity production
Ricardo Louro, Inorganic Biochemistry and NMR Lab, ITQB

Other Seminars

News From Gold Catalysis and Palladium Bioorganometallic Chemistry
Stephen K. Hashmi, University of Heidelberg, Germany

Biophysical Methods in Drug Discovery: Combination is Key The Project Kinetics for Drug Discovery
Matthias Frech- Merck KGaA, Germany

Design of enzymes: integrating sequence analysis and molecular modelling
Juergen Pleiss University of Stuttgart, Germany

Pathway Engineering in Corynebacterium glutamicum for organic and amino acid production from starch
Bernhard Eikmanns, University of Ulm, Germany

Two Essential Processes in Chloroplast Biology: Protein Complex Assembly and Protein Splicing
David Stern, Boyce Thompson Inst. of Plant Research, Ithaca, New York, USA

LC-MS tools for environmental and food analysis
Teresa Galceran, University of Barcelona, Spain

Evolution and regulation of bacterial growth, morphology, and development
Yves V. Brun, Indiana University, USA

Discovering plant genomes
Michel Delseny- University of Perpignan, France

A molecular insight to the mitochondrial ADP/ATP carrier
Eva Pebay-Peyroula, Institut de Biologie Structurale, Grenoble

A study of Ionic Liquids in the pharmaceutical sector
Robin Rogers, University of Alabama, USA

Mitochondrial diseases – it's not about energy, after all
Nuno Raimundo - Universitatsmedizin Goettingen, Germany

Metagenomic exploration of Andean mountain microbiomes: who is there and why we care
Maria Mercedes Zambrano, Corpogen Research Center, Colombia

Early bioenergetic evolution
William F. Martin, University of Düsseldorf, Germany

Micro-evolution, transmission and clonal replacement in MRSA
Edward Feil University of Bath, UK

Persistence Pays Off: Understanding the Mechanisms of Antimicrobial Tolerance by Bacterial Pathogens
Gregory Phillips, Iowa State University, USA

Molecular Epidemiology of MRSA in Wisconsin
Sanjay Shukla- Marshfield Clinic Research Foundation,USA

Clostridium difficile ribotypes - interaction with hosts and environments
Maja Rupnik, University of Maribor, Faculty of Medicine, Maribor, Slovenia

The intracellular life of Salmonella
David W. Holden- Imperial College London

Proteoliposomes in nanobiotechnology approaches
Pietro Ciancaglini, Universidade de São Paulo, Brazil

Advances in somatic embryogenesis of tropical trees and study of plants transformed with P5CS gene
Marguerite Quoirin, Federal University of Parana, Curitiba, Brazil

Understanding quorum sensing and its impact in the clinic and the environment.
Miguel Cámara, Centre for Biomolecular Sciences, University of Nottingham, UK

Genomic characterization of Enterococcus faecium
Willem van Schaik, University Medical Center Utrecht, The Netherlands

Harnessing pluripotent stem cells for pharmacology
Marc Peschanski, I-STEM, INSERM, Evry, France

Understanding how short-chain lipids help doxorubicin cross membranes
Manuel Nuno Melo, Faculty of Mathematics and Natural Sciences, Groningen, Netherlands

Exploring the complexity of drought and dehydration tolerance in C4 grasses
Melvin J. Oliver, Plant Genetics Research Unit, University of Missouri, Columbia, USA

Trehalose, a sugar for all seasons
Matthew J. Paul, Plant Biology and Crop Science, Rothamsted Research, England

Functional characterization of genes related to abiotic stresses in rice
Márcia Pinheiro Margis, Núcleo de Genômica Funcional de Plantas, Brasil

How does the hydrogenase enzyme work?
Csaba Bagyinka, Institute of Biophysics, Biological Research Center, Szeged, Hungary

COHiTEC Program 2014
Presentation Roadshow

What can the sulfur isotope fractionation associated with dissimilatory sulfite reductase tell us about the redox evolution of Earth's atmosphere?
William D. Leavitt, Harvard University

Protein Interactions
António Pineda, Centro de Investigación Príncipe Felipe, Spain

Methylome reorganization during in vitro dedifferentiation and regeneration of Populus trichocarpa
Steve Strauss, College of Forestry, Oregon State University, USA

Modelling Lung Cancer Tumor Progression and Suppression
Emmy Verschuren, FIMM, Institute for Molecular Medicine, Helsinki, Finland

Characterization of oil biosynthetic genes in oilseeds and transient assays to access gene function
Felipe Maraschin, Universidade Federal Rio Grande do Sul, Porto Alegre, Brasil

Science and Society

ITQB Open Day (20 April)

1001 Visitors

Organizing committee

Ana Matias	José Andrade	Pedro Matias
Eurico Melo	Marta Alves	Rita Delgado,
Filipe Almeida	Mónica Martins	Tiago Martins
Irina Franco	Pedro Fevereiro	

International Fascination Plants Day (18 -28 May)

National Coordinators

Nelson Saibo, Ana Sanchez and Joana Lobo Antunes

Researchers in Oeiras Park

André Cordeiro	Margarida Rosa	Nelson Saibo
Andreia Rodrigues	Marta Alves	Pedro Barros
Carlota Vaz Pato	Natacha Vieira	Pinto Ricardo
Célia Miguel	Inês Chaves	Rita Abranches
Diana Branco	Manuela Veloso	Rita Santos
Diana Macedo	Margarida Oliveira	

"**A minha vida de Planta**" ("**My Life as a Plant**")
Children's book about Science (Translation from Alan Jones & Jane Ellis, University of North Carolina at Chapel Hill, EUA).
Ana Paula Santos & C. Pinto Ricardo

Open Labs (7, 14, 21, 28 March)

69 Visits / 28 students

Visited Labs

Microbial & Enzyme Technology
Protein Biochemistry Folding & Stability
Molecular Genetics
Bacterial Cell Surfaces and Pathogenesis
Cell Physiology and NMR
Molecular Microbiology of Human Pathogens
Protein Modeling
Plant Cell Biotechnology
Genomics of Plant Stress (GPlantS)
Industry and Medicine Applied Crystallography
Bacterial Cell Biology
Nutraceuticals and Delivery

School Visits

9 Visits / 169 students

Visiting Schools

Agrup. Escolas IBN Mucana
Escola Básica 2,3 com Ensino Secundário de Alvide (Agrupamento de Escolas de Alvide)
Escola Secundária de Camões
Escola Secundária S.João do Estoril
Núcleo de Estudantes de Bioquímica Universidade de Coimbra
Universidade Atlântica

Visited Labs

Bacterial Cell Surfaces and Pathogenesis
Bacterial Energy Metabolism
Cell Signaling in Drosophila
Control of Gene Expression
Coordination and Supramolecular Chemistry
Disease and Stress Biology
Forest Biotechnology
Genomics and Stress
GPlantS
Mass Spectrometry
Microbiology of Man-made Environments
Molecular Genetics
Molecular Genetics of Microbial Resistance
Plant Biochemistry
Plant Cell Biotechnology
Stress by Antibiotics and Virulence of Enterococci

Summer Training for High School Students (June - July)

Memórias de Stress nas plantas
Ana Paula Santos

Cool plants
J Miguel Costa

O que escondem os Epigenomas das plantas?
Ana Paula Santos

Técnicas Gerais em Microbiologia e Genética
Adriano Henriques

Espectrometria de massa, proteómica e afins
Ana V. Coelho

Science and Technology Week (18-22 Nov)

Visiting Researchers

Ana Oliveira	Joana Lobo Antunes	Nuno Faria
Catarina Milheiriço	José Brito	Patricia Noronha
Claudina R Pousada	Liliana Ferreira	Pedro Domingos
Filipe Baeta	Luis Gafeira	Pedro Fevereiro
Hugo Soares	Manuela Pereira	Pedro Matias
Inês Guinote	Maria R. Bronze	Raquel Sá-Leão
James Yates	Mónica Serrano	Vanessa Pereira

Visited Schools

"O Xururuca" em São João do Estoril
Agrupamento de Escolas de Carnaxide
Colégio Oriente (Parque das Nações)
EB1 Actor Vale 1º ano, turma A
EB1 Moinhos do Restelo
EB1 S. José - Agrup. de Escolas Baixa Chiado (Centro de Lisboa)
EB1/JI de Porto Salvo
EB1/JI. S.to António , do Agrupamento de Escolas Rainha D. Leonor, em Lisboa
Escola Básica Conde de Oeiras
Escola Cooperativa "A Torre"
Escola D. Carlos I em Sintra
Escola de Santo António, Parede
Escola Secundária do Forte da casa
Escola Secundária Dr. José Afonso no Seixal
Escola Secundária Fernando Lopes Graça - Parede - 8ºano turma B
Escola Secundária Quinta do Marquês- Oeiras
St. Julians School Carcavelos
The International Preparatory School (also known as IPS)

Research Highlights

C

Bioorganic Chemistry

Rita Ventura rventura@itqb.unl.pt

The vast majority of biologically active carbohydrates exist as oligo- and polysaccharides and glycoconjugates in which monosaccharide units are linked via glycosidic bonds. The glycosylation reaction is still a major challenge in carbohydrate synthesis, especially the synthesis of 1,2-cis glycosides, where there is not a general method for their efficient stereoselective preparation. Many factors influence the anomeric selectivity, such as the glycosidic donor (choice of protecting groups) and acceptor, the solvent, the anomeric leaving group, the promoter, temperature. Recently, we reported that NIS/TfOH mediated glycosylations of ethyl 6-O-acetyl-2,3,4-O-tribenzyl-1-D-thioglucoside with several acceptors, ranging from unhindered linear primary alcohols to other sugars, afforded higher alpha-anomeric selectivities when compared with other 6-O-protecting groups.1 The 6-O-acetyl group being electron withdrawing, reduced the reactivity at the anomeric position compared to the tetrabenzylated thioglycoside and favoured the formation of the alpha-glucosides (1,2-cis glucosylation). In the case of galactosides, higher alpha-selectivities were obtained in the glycosylation reactions with phenyl 2,3-O-dibenzyl-4,6-O-dichloroacetyl-1-D-thiogalactoside as the donor, showing that in this case, a stronger electron withdrawing 4-O-ester group had an influence in the anomeric selectivity favouring the formation of 1,2-cis galactosides.2
During this period the start-up ExtremoChem was created, it employs two post-doctoral researchers and is supported by venture capital.

Lourenço, E. C.; Ventura, M. R. Carbohydrate Research 2011, 346, 163.
Lourenço, E. C.; Ventura, M. R. Tetrahedron 2013, 69, 7090.

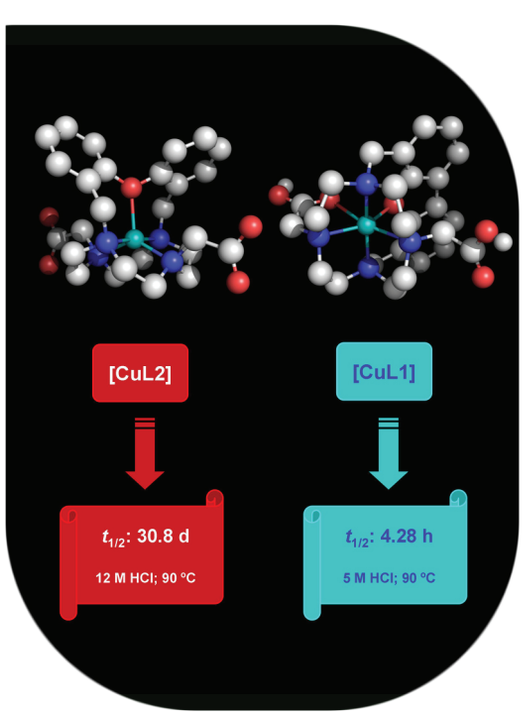
C

Coordination and Supramolecular Chemistry

Rita Delgado delgado@itqb.unl.pt

The search for compounds capable of forming chelates with high thermodynamic stability, fast complexation kinetics, and high inertness toward dissociation for safe use in medicinal applications continues to be a challenging research field. The chelates of some N-functionalized derivatives of cyclen (1,4,7,10-tetraazacyclododecane) are used in these applications.

Two cross-bridged cyclen-based macrocycles with two trans-N-acetic acid arms having a dibenzofuran (H_2L1) or a diphenyl ether bridge (H_2L2) were studied in our laboratory. Both compounds behave as “proton sponges”, and present high stability constants with Cu^{2+} and Ga^{3+} cations. They exhibit an excellent selectivity for Cu^{2+}, ensuring that metal ions largely present in the human body would not interfere. Both [CuL1] and [CuL2] chelates are extremely inert to demetallatation, especially [CuL2]. The acid-assisted dissociation of [CuL1] led to half-life time ($t_{1/2}$) of 4.28 h in 5 M HCl at 90 °C, while [CuL2] needed harsher acidic conditions of 12 M HCl at 90 °C with $t_{1/2}$ of 30.8 days. To the best of our knowledge [CuL2] exhibits the highest $t_{1/2}$ value for a complex of Cu^{2+} with a polyazamacrocycle derivative. These features place these copper(II) chelates as good candidates for radiopharmaceuticals using ^{67}Cu for therapeutic purposes or ^{64}Cu for positron emission tomography (PET).



Esteves, C. V. et al. (2013) Inorg. Chem., 52(9), 5138-5153.

C

Homogeneous Catalysis

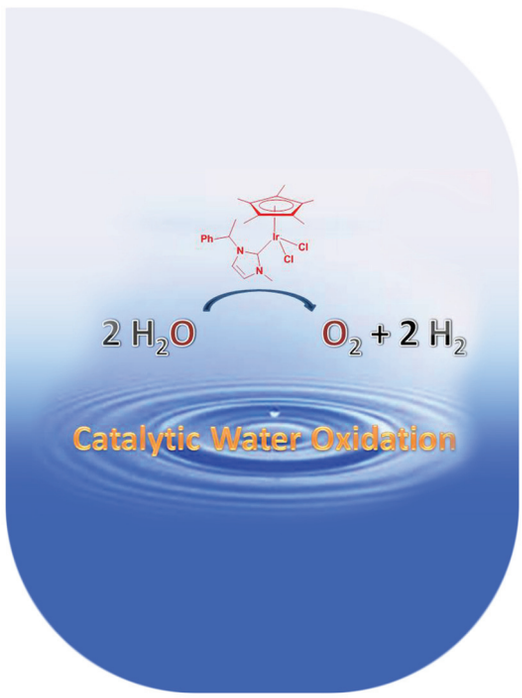
Beatriz Royo broyo@itqb.unl.pt

Splitting water to form oxygen and hydrogen by using organometallic catalysts

Nature utilizes solar energy to extract electrons and release protons from water, a process called photosynthetic water oxidation. Inspired by this natural process, chemists are intensely interested in using sunlight to split water and form O2 and H2. This process will allow to covert and store solar energy into chemical energy. The critical challenge to practical water splitting schemes is the development of water oxidation catalysts (WOCs).

We have developed an exceptional water oxidation (WO) catalyst, the organometallic iridium Cp*Ir(NHC)Cl2 complex, which displayed remarkable activity, 17.000 h-1 turnover frequencies (TOF) and turnover numbers (TONs) close to 400.0000, the largest ever reported for a metal catalyzed WO reaction, using NaIO4 as oxidant in water at 40 °C. High turnover numbers were attained by this catalyst system without noticeable degradation of the oxidation activity, even after storage of reaction solutions during several months. Therefore these systems must be susceptible to be incorporated into long-lasting electrochemical cells, operating at low overpotentials to overcome undesirable degradation of the activty in photoelectrocatalytic cells.

Codolà, Z. et al Chem. Eur. J. (2013) 19, 7203-7213

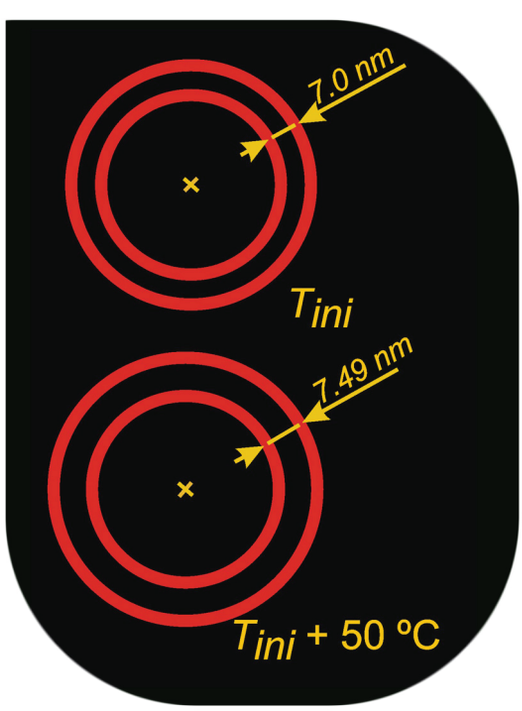


C

Micro-heterogeneous Systems

Eurico Melo eurico@itqb.unl.pt

Barriers isolating cells and cell organelles from each other and the whole body of living organisms from the external environment are molecular constructs whose key components are lipids. In most cases the lipids are organized in bilayer membranes that, besides the barrier function, also have an active role in metabolite trafficking and many other aspects of the biochemical activity of the cell. The physical and chemical properties of these membranes, in particular the primary parameters such as bilayer thickness and area per lipid molecule, are quite well known. However, the measurement of second-order thermodynamic properties such as the variation of the bilayer expansion with temperature was never addressed sufficiently. Along the last year we have developed a new method for the experimental determination of the thermal area expansion coefficient of bilayers, a property that has applications in the study of the interactions between lipid bilayers and proteins, peptides and other amphipathic molecules, and is an input in computer simulations. Based on the data obtained for bilayers with several lipid compositions we proposed a novel molecular mechanism for lipid bilayer thermal expansion.



C

Organic Synthesis

Chris Maycock maycock@itqb.unl.pt

The copper oxidation of some suitably substituted tertiary amines in the presence of air is catalytic and only 10% of the copper reagent is required. The mechanism of the reaction, that has been shown to be general for the formation of these Dihydro-1,3- oxazines, is interesting. In many cases the intramolecular cyclisation is stereoselective and while attempting to discover the source of this stereoselectivity we found that the intermediate iminium disocciated to form a pair of molecules that underwent a [4+2] cycloaddition to afford the observed products. This mechanism is unexpected and novel. The aerobic oxidation of the copper species is also of note.

Deb, M. L., et all (2013). Angewandte Chemie-International Edition, 52(37), 9791-9795

C

Molecular Thermodynamics

Luís Paulo N. Rebelo lrebelo@itqb.unl.pt

It's almost like magic. In their search for better and better solvents, researchers from the Molecular Thermodynamics Lab tested new types of ionic liquids to solve some of the oldest engineering problems in chemistry.

Fluorinated Ionic Liquids were developed and characterized, and the formation of three nanosegregated domains was demonstrated. Fluorinated Ionic Liquids can be used as “three in one” solvents, increasing the solubilisation power. Playing with the Van der Waals, coulombic and hydrogen bonding interactions and the size of the fluorous domain will allow the development of solvents designed for each specific application.

Unusual LCST-type behaviour - We show for the first time that one of the mechanisms that can lead to systems with LCST phenomena can also be incorporated in binary mixtures using functionalized ionic liquids and ethers. The most remarkable feature is that it is possible to rationalize in a quite straightforward way the diverse fluid phase behavior by simply taking into account the changes at a ionic or molecular level that cause small shifts in the balance between the three types of interaction.

Deep eutectic solvents - We were able to create a liquid mixture out of a specific solid salt by adding one of three natural organic acids that are also solids. All these materials are cheap, non-toxic, completely biodegradable, and biocompatible. The results are highly promising liquids, efficient and selective in separations, with the additional benefit of producing a liquid end product that can be recovered and reused.

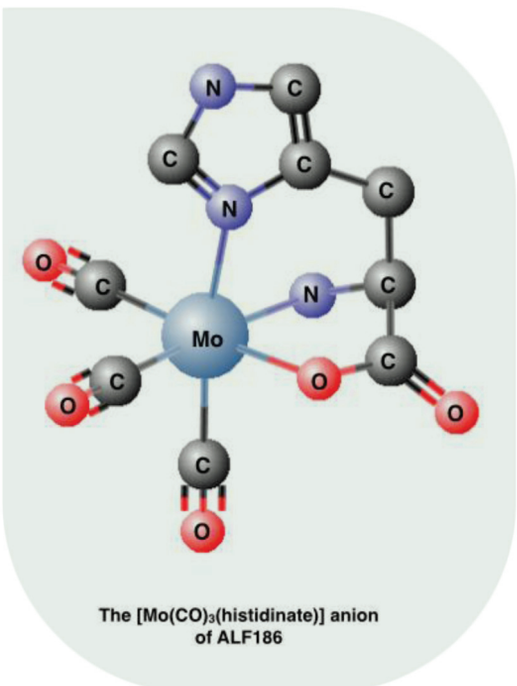
Pereiro, A. B. et al. (2013) J. Phys. Chem. B 117, 10826.
Costa, A. J. L. et al. (2013) RSC Adv. 3, 10262.
Oliveira, F. S. et al. (2013) Green Chem. 15, 1326.

C

Organometallic Chemistry

Carlos Romão ccr@itqb.unl.pt

In the late 1970's the pioneering work of Wolfgang Beck at the Maximillian University, Munich, Germany, started populating the chemical space with new entities emerging from two unrelated fields: Biochemistry and Organometallic Chemistry. In 1980, the 18th paper of the series "Metal-Complexes with Biologically Significant Ligands" described the salt [Mo(CO)3(his)]K isolated from the reaction of the natural aminoacid histidine with a reference organometallic species, Mo(CO)6. A typical finding of fundamental research, this compound looked like a mere curiosity because it was made long ahead of its time. When in 2000, carbon monoxide, CO, was recognized as a major cytoprotective, therapeutically useful active principle, such very water soluble, strongly air sensitive complex, non-toxic anion was immediately regarded as a useful prodrug for the controlled delivery of CO. In fact, this anion is one of the most useful experimental CO Releasing Molecules (CORM) known to date. Injected in vivo it behaves like a bolus of "solid CO" providing proof-of-concept for the curative use of CO in many experimental animal models of disease. After almost a decade of regular use of [Mo(CO)3(his)]Na, known as ALF186 at Alfama Inc, ITQB/IBET, its hitherto confidential pharmacological and biochemical properties were published in Dalton Transactions in 2013 thus contributing for the advancement of CO therapy and CORM design.



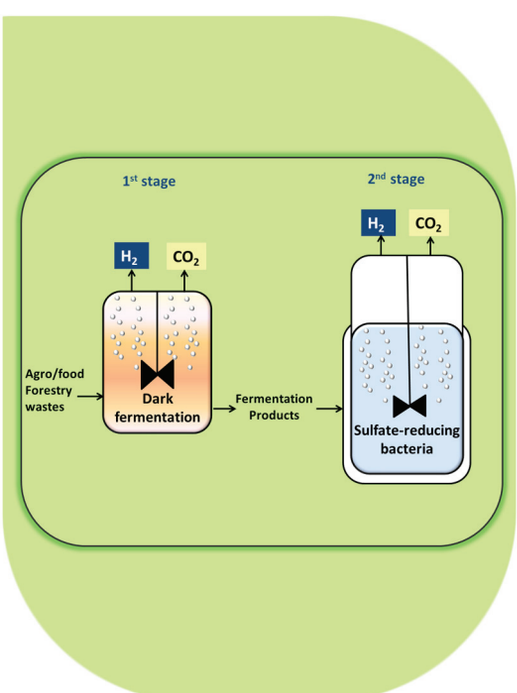
The $[Mo(CO)_3(histidinate)]$ anion of ALF186

BC

Bacterial Energy Metabolism

Inês A. Cardoso Pereira ipereira@itqb.unl.pt

The BEM lab is interested in studying Energy Metabolism in environmentally important bacteria to explore their biotechnological applications. We have focused in a widespread group of environmental organisms that respire sulfur compounds. These organisms play a key role in the biogeochemical cycles of sulfur and carbon in anaerobic habitats, and are important players in Environmental Biotechnology. In 2013 we made an important contribution to expanding the biotechnological application of these organisms by showing that they have a high activity in biological hydrogen production. Using a model organism whose hydrogen metabolism is quite well characterized, we demonstrated a high specific hydrogen production activity from formate, with 100% conversion. This study demonstrates that these organisms can be an attractive option to be used in second stage processes of hydrogen production, as they present higher activity levels than those found for the currently used photosynthetic organisms.



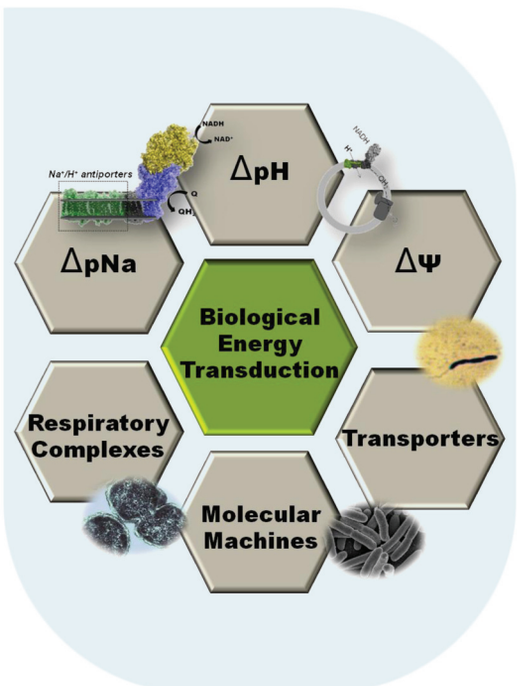
BC

Metalloproteins and Bioenergetics Unit

Biological Energy Transduction

Manuela M. Pereira mpereira@itqb.unl.pt

Respiratory complex I is an energy transducing molecular machine. It converts the redox energy from NADH:Quinone oxidoreduction to membrane potential energy. This potential energy is vital for synthesis of ATP, exchange of solutes/nutrients across the membrane and motility. Most mitochondrial diseases (including neurodegenerative ones such as Parkinson and dystonia disorders), apoptosis (and its resistance in cancer cells) and ageing are associated with the functioning of respiratory complexes, including complex I. We have contributed to the understanding of the structural/functional mechanism of complex I by investigating its constituents and related complexes. We aimed at identify a common denominator, i.e. the conserved structural elements based not the rationale that conservation reflects functional relevance. The identification of such denominator allowed us to put forward an original perspective on the evolution, function and mechanism of respiratory complex I. The coupling mechanism should be based on long range conformational changes, and not on possible conformational changes at the catalytic sites close to the membrane surface.



BC

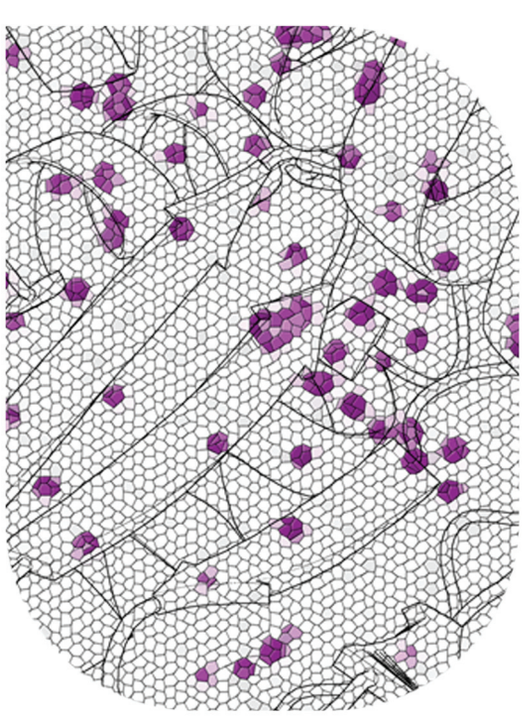
Biomolecular NMR Laboratory

Manolis Matzapetakis matzman@itqb.unl.pt

Inside living organisms myriads of molecules of different sizes and functions act in parallel in an intricately orchestrated symphony that despite the systems complexity, result in a perfectly tuned system. Key to this function are various levels of control that are regulated by interactions between the various components. The specificity of these interactions is crucial for the function of the whole. Most of the modern pharmaceuticals are designed to specifically target such interactions so as to either activate beneficial pathways or to suppress detrimental ones. For the designed pharmaceuticals to only target the desired elements it is important to have both the correct chemical composition but also to be able to mimic the desired target in solution.

In an effort to find ways to design molecules that adopt a desired conformation in solution that would enhance their activity, we used Nuclear Magnetic Resonance spectroscopy to study the structure of a proposed peptide vaccine for treatment of Alzheimer's disease. The peptide combined a known antigen with elements of the protein that cause Alzheimer's, linked by a small sequence designed to orient these two elements in solution. We found that while a small population of the molecule did indeed adapt the desired conformation, the majority did not . This observation may help increase the activity of such molecules in later generations of the vaccine.

Ramírez-Gualito et al. (2013) Molecules,18 5 p. 4929-41

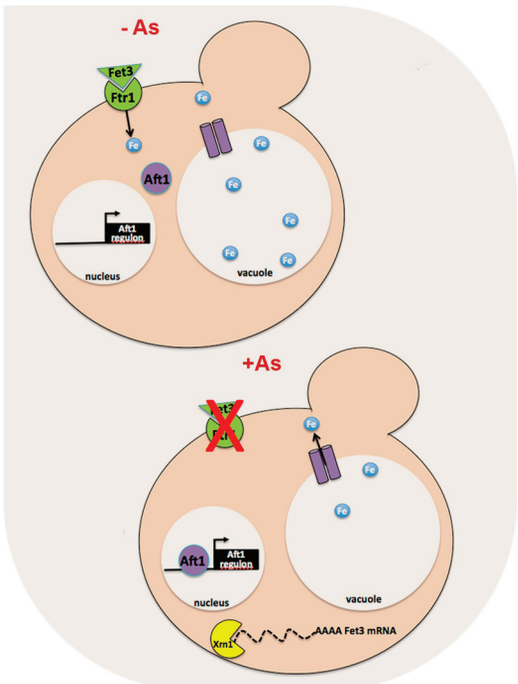


BC

Genomics and Stress Laboratory

Claudina R. Pousada claudina@itqb.unl.pt

We seek to decipher how organisms confronted with several environmental cues are able to regulate their gene expression in order to maintain proper homeostatic control. In our research we use the budding yeast Saccharomyces cerevisiae and one of the focuses of our research is to uncover the mechanisms that allow yeast cells to survive under arsenic contaminated environments.
Arsenic is a double-edge sword. On the one hand it is powerful carcinogen and on the other it is used therapeutically to treat acute promyelocytic leukemia. We have reported that arsenic activates the iron responsive transcription factor, Aft1, as a consequence of a defective high-affinity iron uptake mediated by Fet3 and Ftr1, whose mRNAs are drastically decreased upon arsenic exposure by Xrn1(see Fig). Moreover, arsenic causes the internalization and degradation of Fet3. Most importantly, fet3ftr1 mutant exhibits increased arsenic resistance, decreasing arsenic accumulation which suggests that Fet3 plays a role in arsenic toxicity. Our studies also revealed that arsenic disrupts iron uptake in mammals, which can be relevant to clinical applications.



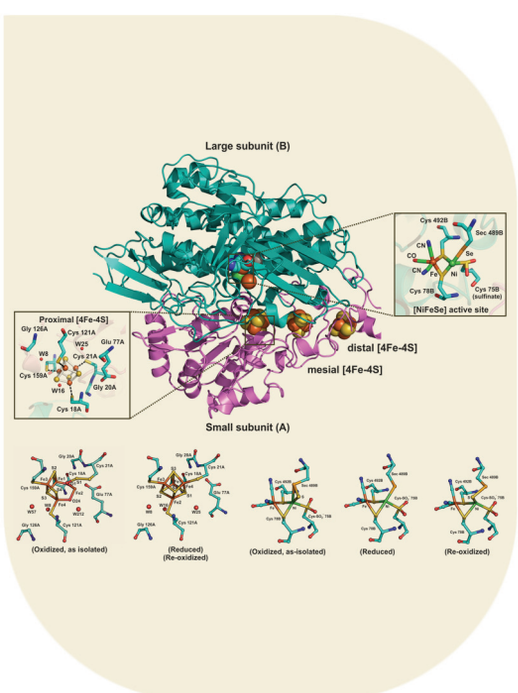
BC

Macromolecular Crystallography Unit

Industry and Medicine Applied Crystallography

Pedro Matias matias@itqb.unl.pt

Hydrogenases are enzymes that can potentially be used in bioelectrical devices or for biological hydrogen production, the most studied of which are the [NiFe] type. Most [NiFe] hydrogenases are inactivated by oxygen and the few known O_2-tolerant enzymes are hydrogen-uptake enzymes, unsuitable for hydrogen production, due to strong product inhibition. In contrast, the [NiFeSe] hydrogenases, where a selenocysteine is bound to the nickel, are very attractive alternatives because of their high hydrogen production activity and fast reactivation after O_2 exposure. In 2013 we reported five high-resolution crystallographic 3D structures of the soluble form of the [NiFeSe] hydrogenase from *D. vulgaris* Hildenborough in three different redox states (oxidized as-isolated, reduced with H2 and re-oxidized in air), which revealed the structural changes that take place at the active site during enzyme reduction and re-oxidation. We observed the oxidation to sulfinate of the terminal Cys residue bound to the Ni atom in the active site to be irreversible. However, the highly oxidized form of the proximal iron-sulfur cluster found in the oxidized as-isolated structures is fully reversible upon reduction. These results provided new insights into the pathways of O_2 inactivation in [NiFe], and in particular, [NiFeSe] hydrogenases. In addition, they suggest that different enzymes may display different oxidized states upon exposure to O_2, which are probably determined by the protein structure.

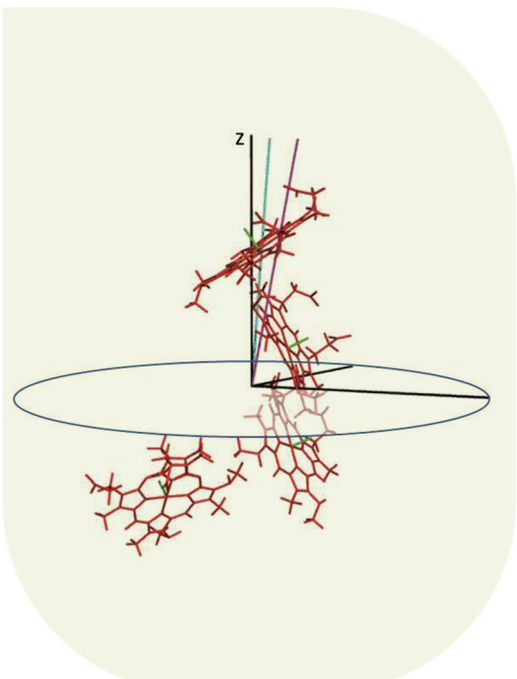


BC

Inorganic Biochemistry and NMR

Ricardo O. Louro louro@itqb.unl.pt

Multiheme cytochromes c are ubiquitous proteins in prokaryotes. They play key roles in the bioenergetic metabolism of sediments and soil organisms that are of great interest for biotechnological processes of low environmental footprint, collectively known as bioelectrochemical technologies. These include bioremediation of metal contaminated soils, energy generation from wastewater in microbial fuel cells and the bioelectrosynthesis of fine chemicals. The structures of many of these proteins are organized as domains linked by peptide segments that can have varying levels of flexibility. This flexibility can be essential for their biological activity. NMR spectroscopy is uniquely capable of probing this flexibility in conditions mimicking the physiological context. One of the most powerful NMR probes of molecular flexibility is the phenomenon of Residual Dipolar Couplings. In a collaborative work with the organic synthesis laboratory we measured for the first time the spontaneous RDCs of a multicentre paramagnetic protein. This protein was the small tetraheme cytochrome from Shewanella oneidensis MR-1, a model organism for the study of bioelectrochemical technologies. We showed that the spontaneous RDCs are correlated with the orientation of the ligands coordinating the iron in the hemes. This opens the tantalizing perspective of using known structures of multiheme cytochromes involved in extracellular electron transfer to probe their orientation and dynamcs.



BC

Macromolecular Crystallography Unit

Membrane Protein Crystallography

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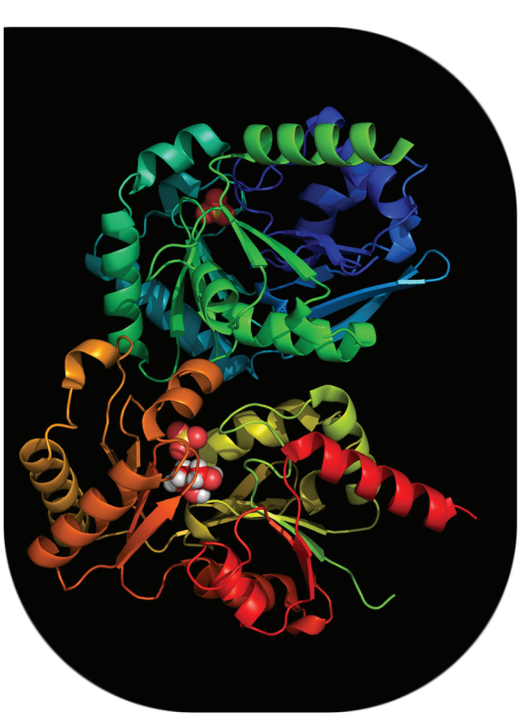
Our group is interested in the three-dimensional structure determination of proteins by X-ray Crystallography, which will provide insights into their biological function. In the case of enzymes, elucidating their structures allows the visualization at atomic level of the protein global fold and architecture of the active site. If the substrate is bound to the protein, it enables a detailed characterization of the substrate interactions with the protein. This data contributes to a better understanding of the protein function and sheds light into their reaction mechanism.

We have solved the crystal structure of a bacterial α-phosphoglucomutase that has an overall fold similar to eukaryotic phosphomannomutases. It catalyzes the reversible conversion of α-glucose 1-phosphate to glucose 6-phosphate. The crystal structure of α-PGM from *Lactococcus lactis* (APGM) was determined at 1.5 Å resolution and contains a sulfate and a glycerol bound at the enzyme active site that partially mimics the substrate. The substrate specificity and catalytic mechanism of APGM are discussed based on its structure.



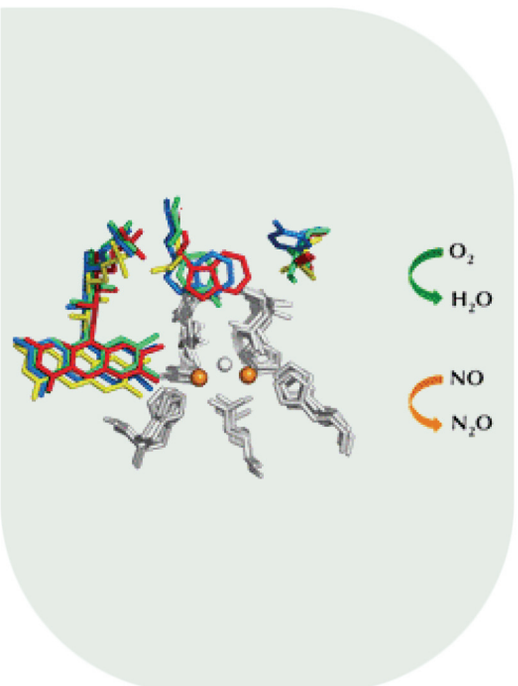
BC

Metalloproteins and Bioenergetics Unit

Metalloenzymes and Molecular Bioenergetics

Miguel Teixeira miguel@itqb.unl.pt

Flavo-diiron Proteins (FDPs) are a widespread family of enzymes, present in the three life domains, that reduce directly oxygen to water and/or nitric oxide to nitrous oxide, therefore eliminating the sources of Reactive oxygen or nitrogen species. The molecular determinants for the selectivity of these enzymes towards each of those two putative substrates has been investigated by a thorough comparison of the structures of these enzymes, which led to the construction of single and double site directed mutants of residues close to the active diiron site, using as a model the oxygen-reducing FDP from the anaerobic protozoan *Entamoeba histolytica*. Investigation of the reactivity towards oxygen and nitric oxide, by amperometric and fast kinetics approaches showed that a tyrosine close to the catalytic site plays a determinant role in the enzyme´s reactivity: its substitution by a serine led to enzymes with enhance NO reductase activity and to a substantial decrease of the kinetic stability of the enzyme under multiple turnover conditions towards oxygen.

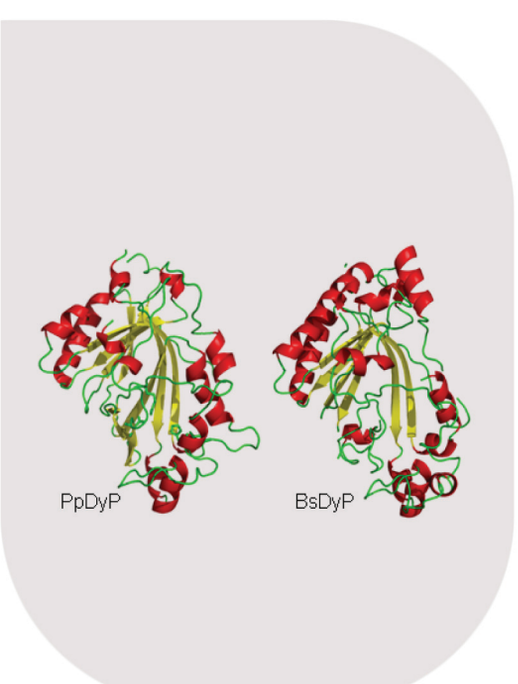


BC

Microbial & Enzyme Technology

Ligia O. Martins lmartins@itqb.unl.pt

We have established catalytic and spectroscopic fingerprints of two recombinant DyP-type peroxidases (DyPs) from the soil bacteria *Bacillus subtilis* and *Pseudomonas putida* MET 94. DyPs constitute a novel family of heme containing peroxidases that successfully degrade a wide range of substrates, from high redox potential synthetic dyes, iron and manganese ions, aromatic sulphiles to phenolic or nonphenolic lignin compound units and even lignin, using hydrogen peroxide as electron acceptor. DyPs show primary sequence, structural and apparently mechanistic features unrelated to “classical” peroxidases. In particular the H2O2 binding site (i.e. the acid-base catalyst) of DyPs is aspartate, whereas the binding sites in classic peroxidases are found at histidine. They show two domains showing a typical ferrodoxin-like fold distinct from other heme peroxidases that are primarily α-helical proteins. DyPs have been classified into four subfamilies, A-C constituted by bacterial enzymes and class D containing predominantly fungal enzymes. Emerging evidence reveals that DyPs from different subfamilies possibly have different physiological roles and that to a certain extent these enzymes represent the bacterial equivalent of fungal ligninolytic peroxidases. In addition, due to their origin they can be produced in higher yields and genetically engineered for improved performance and therefore they have an utmost importance and potential for White Biotechnology applications.



BC

Molecular Genetics of Microbial Resistance

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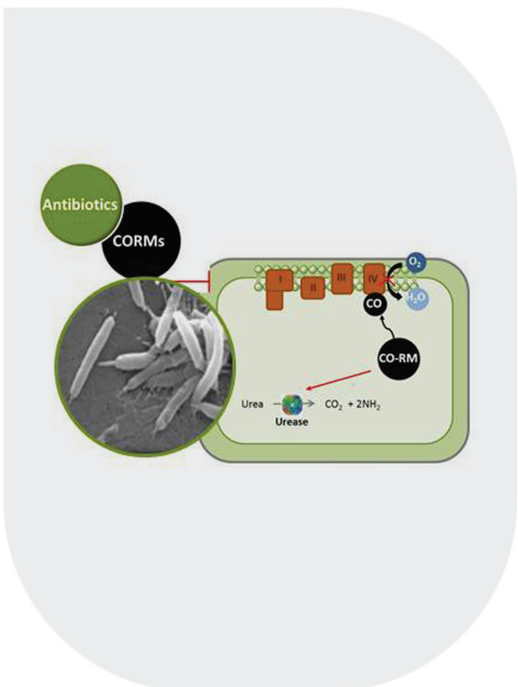
Helicobacter pylori infects over half of the world population causing gastric and duodenal ulcers and ultimately malignant gastric cancer. However, the increasing occurrence of antibiotic-resistant H. pylori strains makes treatments more difficult. In Tavares AF, et al. (2013) PLoS One. 8(12):e83157, we showed that CORMs are able to kill different strains of Helicobacter pylori, including antibiotic resistant strains, and found two CORMs able to inhibit the growth of the bacteria both in vitro and during infection of mammalian cells in culture. The mode of action seems to involve the release of the carbon monoxide, which in turn interferes with the bacteria respiration and with the activity of an enzyme essential for pathogenesis. This bactericidal effect was stronger when CORMs were used in combination with traditional antibiotics.

Antibiotic resistance is less likely to be developed when using multiple bactericidal agents that affect different pathways. So, the ability of CORMs to kill *Helicobacter pylori* makes them good candidates for fighting antibiotic resistant strains. The benefit of using CORMs might even be double: known for their anti-inflammatory effect, these molecules should help redu cing the gastric mucosal inflammation, which is the main cause for the development of malignant lesions.

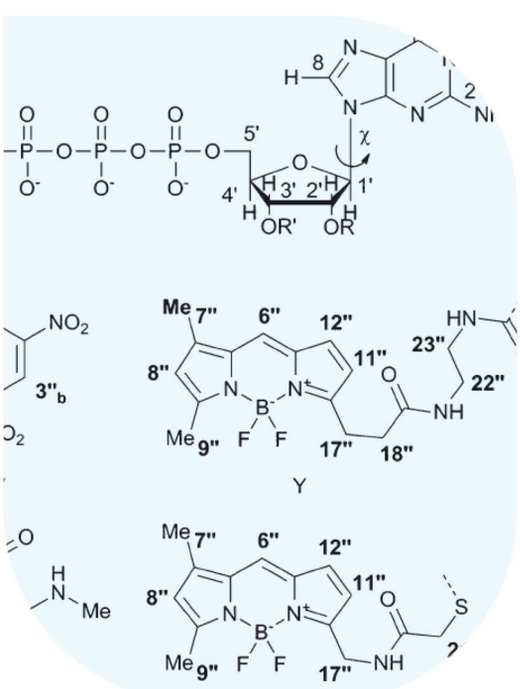


BC

Molecular Interactions and NMR

Patrick Groves pgroves@itqb.unl.pt

Nucleotides are the building blocks of DNA and our genetic code. They are also important molecules in signaling pathways where changes in their concentrations or binding properties can result in disease or protection from disease. Fluorescent-labeled nucleotides have been developed as very sensitive tools to visualize the location and activity of nucleotides. This is partly because nucleotides have weak properties to be seen by other tools that scientists have in their labs. Unfortunately, the addition of fluorescent groups to the nucleotide can lead to different binding properties compared to the unmodified nucleotide. We showed that NMR spectroscopy can be used to check different fluorescent nucleotide analogs in order to select the most suitable one for a particular study. NMR spectroscopy can also collect information on the unmodified nucleotide for reference.



BC

Molecular Simulation

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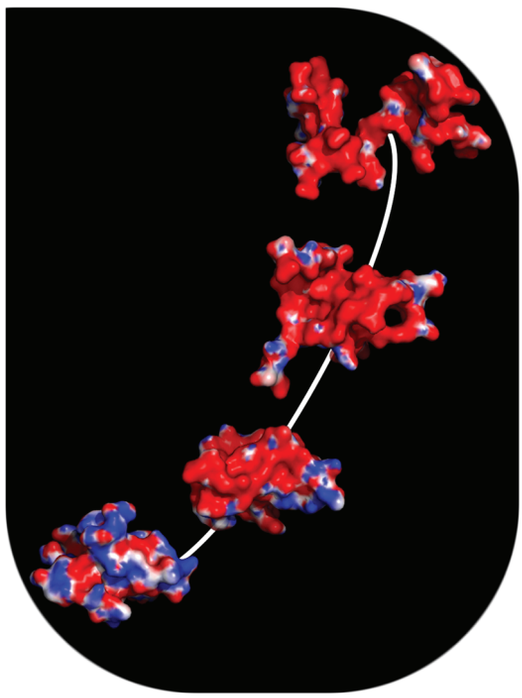
Peptide dendrimers are synthetic tree-like molecules composed of amino acids, often used as agents for catalysis, binding and drug delivery. Their bio-compatibility and proteolytic resistance makes them promising biomedical agents, but their structural determinants have thus far remained elusive, precluding a truly rational molecular design. Although we previously showed the existence of two distinct levels of compactness, the underlying reasons for such features remained unclear.

We have now conducted a comprehensive study using computational simulations, in order to identify the major structural determinants of dendrimer compactness. Our results clearly show that a trade-off between electrostatic effects and hydrogen bond formation controls structure acquisition in these systems. Moreover, by selectively changing the dendrimers charge we are able to manipulate the exhibited compactness. In contrast, the length of branching residues does not seem to be a major structural determinant.

Our results are in accordance with the most recent experimental evidence and shed some light on the key molecular-level interactions controlling structure acquisition in these systems. Thus, our study provides valuable insights that can contribute to the development of truly tailor-made dendritic systems.



Filipe et al. (2013) Macromolecules, 46: 9427-9436.

BC

Protein Biochemistry Folding & Stability

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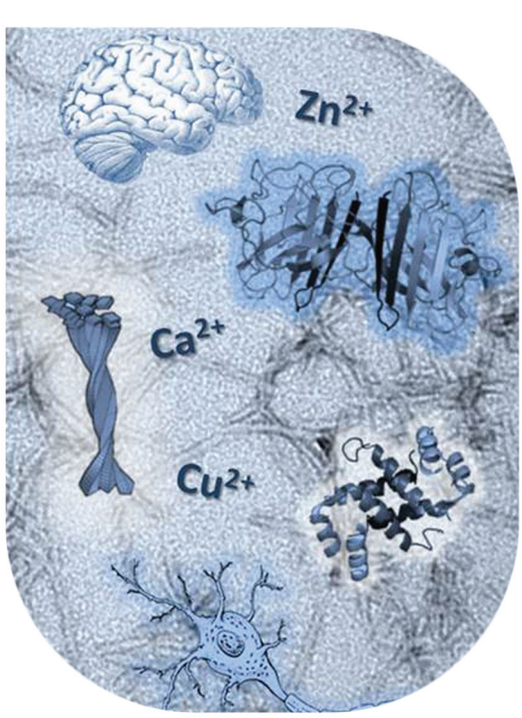
Protein misfolding and aggregation is a hallmark in several human diseases. In recent years we investigated these processes in models of metabolic disease and neurodegeneration, as well as the pharmacological rescue of misfolded proteins by small molecules. Since amyloid neurodegenerative diseases are mostly sporadic we are now interested in establishing how chemical and biological factors in the cell environment influence aggregation in neurodegenerative diseases such as Amyotrophic Lateral Sclerosis (ALS) and Alzheimer's disease (AD). This year we highlight two major contributions from our lab towards the goal of understanding how metal ions and interactions between amyloidogenic proteins contribute to disease. In a paper published in the Journal of Biological Chemistry we showed that Ca promotes aggregation of SOD1, which is involved in ALS, into soluble amyloid oligomers rather than into inert fibrils, suggesting a link to toxic effects of the Ca overload observed in patients. We have also uncovered in a PLOS ONE paper the molecular basis of amyloid formation by the calcium-binding S100 glial cytokines, which are highly elevated in AD and ALS, and induce the aggregation of other proteins, namely SOD1. Hopefully this research on disease pathomechanisms will open new avenues towards effective therapies for neurodegeneration.



Leal et al J. Biol. Chem. (2013) 288(35):25219-28.
Carvalho et al PLoS ONE (2013) 8(10):e76629.

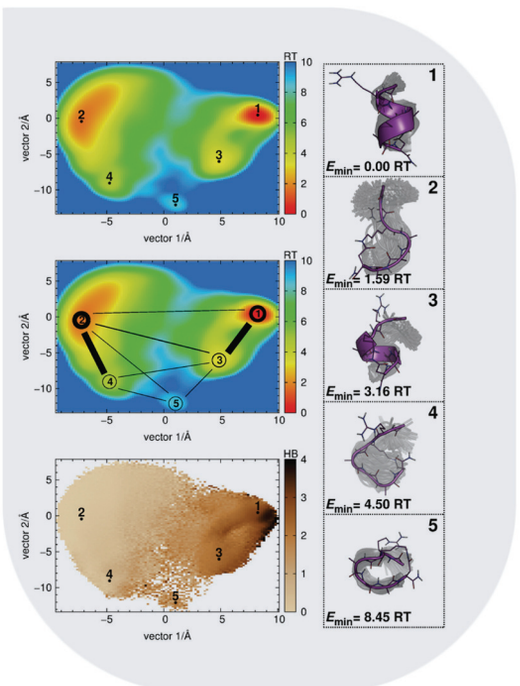
BC

Protein Modeling

Cláudio M. Soares claudio@itqb.unl.pt

cyc-RKAAAD is a short cyclic peptide known to adopt a remarkably stable single turn α-helix in water. We extensively sample the conformational space of cyc-RKAAAD using μs-long MD simulations. We characterize the peptide conformational preferences in terms of secondary structure propensities and, using Cartesian-coordinate principal component analysis (cPCA), construct its free energy landscape, thus obtaining a detailed weighted discrimination between the helical and non-helical subensembles. The cPCA state discrimination, together with a Markov model built from it, allowed us to estimate the free energy of unfolding (–0.57 kJ/mol) and the relaxation time (~0.435 μs) at 298.15 K, which are in excellent agreement with the experimentally reported values (–0.22 kJ/mol and 0.42 μs1). The results obtained attest the suitability of modern simulations methods to explore the conformational behavior of peptide systems with a high level of realism.

Damas, J. M., et al (2013). Journal of Chemical Theory and Computation, 9(11), 5148-5157.



BC

Raman Spectroscopy of Metalloproteins

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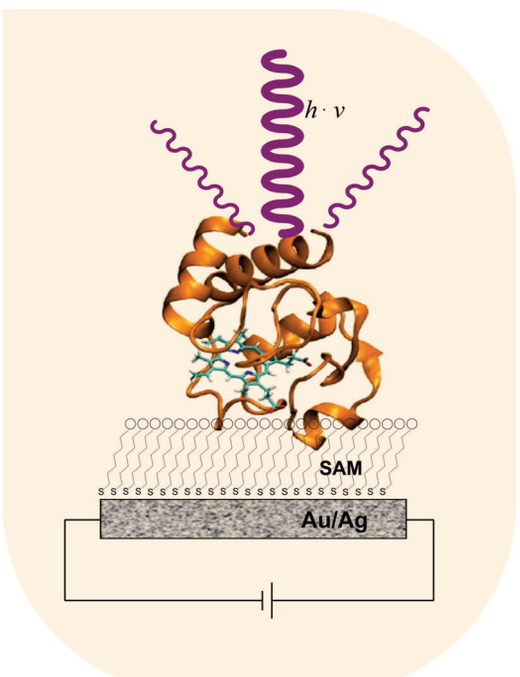
In the past period we have focused on several metalloenzymes (e.g. cd1 nitrite reductase, DyP peroxidase) and on novel biocompatible electrode materials (SAM modified nanostructured gold/silver and functionalized transparent conducting oxides) which together can provide promising new platforms for bioelectrocatalysis. We have developed a powerful toolbox of analytical approaches, based on confocal surface enhanced (resonance) Raman spectroscopy and spectroelectrochemistry, which allowed us to characterize both, the electrode material and the immobilized enzyme, simultaneously and evaluate the potential of the studied enzymes for biotechnological applications. In addition, we have provided spectroscopic insights into molecular details of active sites of DyPs from two different subfamilies. A comparative study employing resonance Raman (RR) and surface enhanced RR spectroscopies allowed us to correlate the heme coordination patterns of these enzymes in solution, crystal, and immobilized states and understand the parameters that control the spin state distribution and activity in these enzymes. Taken together, the obtained results helped us define structural and mechanistic features of the immobilized DyPs under working conditions of the future bioelectronic construct s that can operate as biosensors or biocatalysts.



BC

Macromolecular Crystallography Unit
Structural Biology

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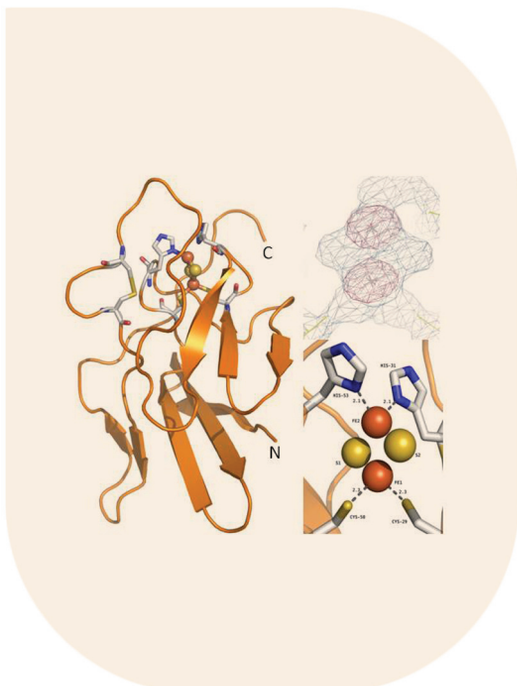
In order to perform the overwhelming variety of chemical reactions that support life, nature devised ways of tuning the intrinsic physical-chemical properties of the available elements by associating them in specific functional arrangements. Instances of such associations are iron sulfur (FeS) proteins that contain clusters of iron and sulfur atoms. These clusters structures range from 2Fe-2S diamonds, intermediate 3Fe-4S butterfly-shaped clusters, to 4Fe-4S cluster cubes. FeS proteins appear in diverse biological systems and their FeS centers assume specific reduction potentials, suitable for particular biochemical functions where electrons flow is required. Rieske proteins form a particular class among FeS proteins, where the diamond shaped 2Fe-2S cluster is coordinated by two cysteines and two histidines. These proteins are ubiquitous and may be part of membrane bound complexes, e.g. electron transport systems of the *bc* complex of respiratory chains, or of the *b6f* photosynthetic complex. The thermoacidophilic archaeon Acidianus ambivalens contains a Rieske ferredoxin, which has an hitherto unknown additional region of 40–44 residues at the C-terminus with a Cx3C motif that introduces a novel disulfide bond within the Rieske fold. The structural study of this new Rieske protein, RFd2, will help in the understanding on how reduction potentials are modulated for specific functions, a fundamental problem in biological chemistry.



BC

Macromolecular Crystallography Unit
Structural Genomics

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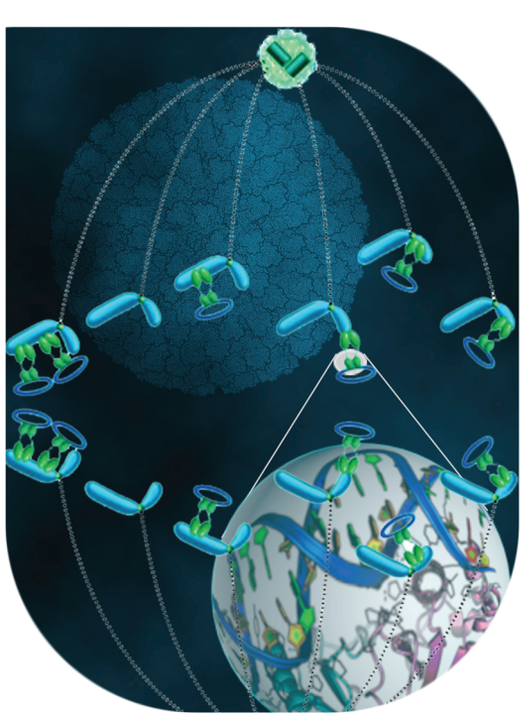
Herpesviruses establish life-long latent infections. During latency, gammaherpesviruses, such as Kaposi's sarcoma-associated herpesvirus (KSHV), persist as multicopy, circularized genomes in the cell nucleus and express a small subset of viral genes. KSHV latency-associated nuclear antigen (LANA) is the predominant gene expressed during latent infection. C-terminal LANA binds KSHV terminal repeat (TR) DNA to mediate DNA replication. TR DNA binding also allows tethering of the viral genome to mitotic chromosomes to mediate DNA segregation to daughter nuclei.

We have identified regions on LANA that are critical for herpesvirus to lie dormant within our bodies, literally tying the virus to our chromosomes. The work funded by the Harvard Medical School-Portugal Program was published in PLoS Pathogens in 2013.

By solving the X-ray structure we discovered two functional faces of LANA, “one face binding the viral DNA and the other face linking to the host chromosome”. Studying a human virus is often difficult because of their inability to infect other animals in the same way. With no good animal models it is very hard to test new assumptions on the disease. But for the Kaposi's sarcoma-associated herpesvirus, we have a mouse virus that acts much in the same way. In this work, it was possible to manipulate mouse LANA and see how virus latency was affected: mutations that prevented DNA binding lead to the loss of virus latency.



B

Bacterial Cell Biology

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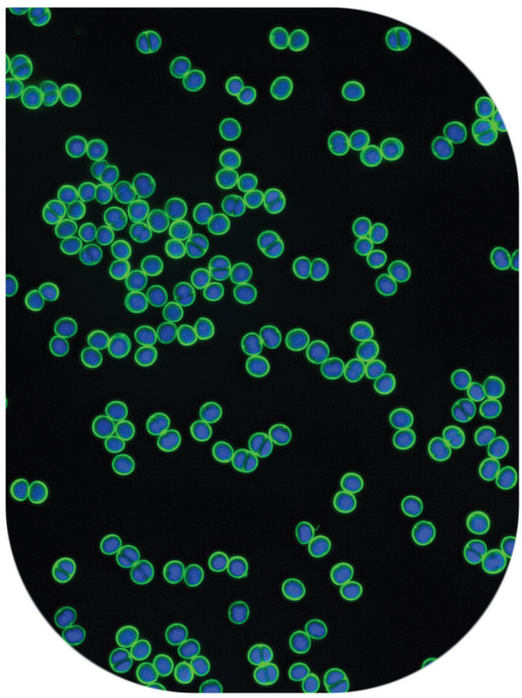
Staphylococcos aureus is an extremely versatile pathogen capable of causing from minor infections to life threatening ones, such as bacteremia or endocarditis, with high morbidity and mortality rates. Currently it causes more deaths than AIDS and tuberculosis combined in the USA. Besides its virulence, *S. aureus* is well known due to its increasing resistance to antibiotics. Methicillin Resistant *S. aureus* (MRSA) strains are among the most important causes of antibiotic-resistant hospital infections worldwide and have emerged also in the community. An alternative to current antibiotic therapies is the use of two agents that act synergistically to kill bacteria. In the context of various collaborations, we have been involved in elucidating the mechanisms of action of new compounds that resensitize MRSA to beta-lactams. Two examples are murgocil, a staphylococcal-specific inhibitor of the peptidoglycan synthesis enzyme MurG and ticlopidine, an antiplatelet drug which was found to inhibit TarO, the protein that catalyses the first step of wall teichoic acids synthesis. Surprisingly, MRSA lacking teichoic acids become susceptible to beta-lactams, most likely due to disruption of the normal functioning of the penicillin binding proteins (PBPs), enzymes involved in the last stages of peptidoglycan synthesis.



B

Bacterial Cell Surfaces and Pathogenesis

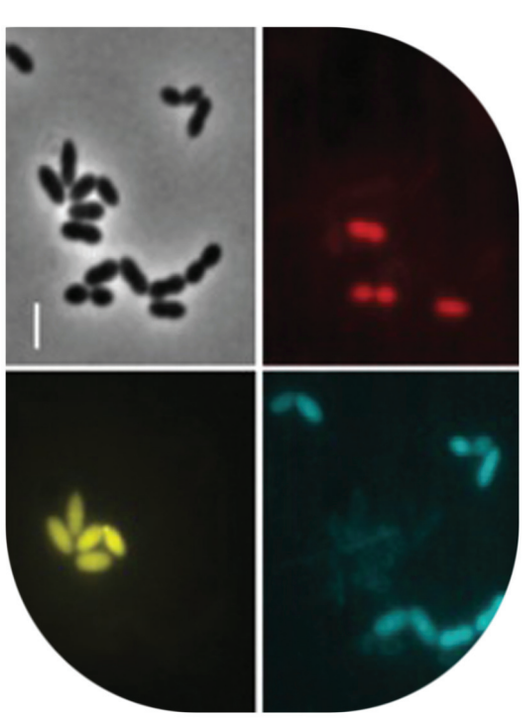
Sérgio R. Filipe sfilipe@itqb.unl.pt

Streptococcus pneumoniae are Gram-positive bacteria often associated with a variety of infections that can range in severity from otitis media to pneumonia or meningitis. We have been interested in the determination of the subcellular localization of enzymes used by this bacterial pathogen to propagate and evade the host immune system.

We have recently showed that fluorescent derivatives of key enzymes responsible for the synthesis of capsule, a major virulence factor in *S. pneumoniae*, localize at the division septum of bacteria at a specific time of their cell cycle, to ensure the full encapsulation of bacteria and probably efficient evasion of bacteria from the host immune system.

However, we were constrained by the lack of tools that permit efficient protein expression or co-localization of more than two different proteins inside the same *S. pneumoniae* bacteria cell. Therefore we constructed a set of plasmids that allows efficient expression of fluorescent derivatives of pneumococcal proteins. This was achieved by the introduction of a 10 amino acid tag, named i-tag, at the N-terminal end of the fluorescent proteins, which results in an improved translation efficiency and allowed the determination of the subcellular localization of various proteins in pneumococcal bacteria.

The availability of the new plasmids described in this work should greatly facilitate studies of protein localization in *S. pneumoniae* and probably in other Gram-positive bacteria.

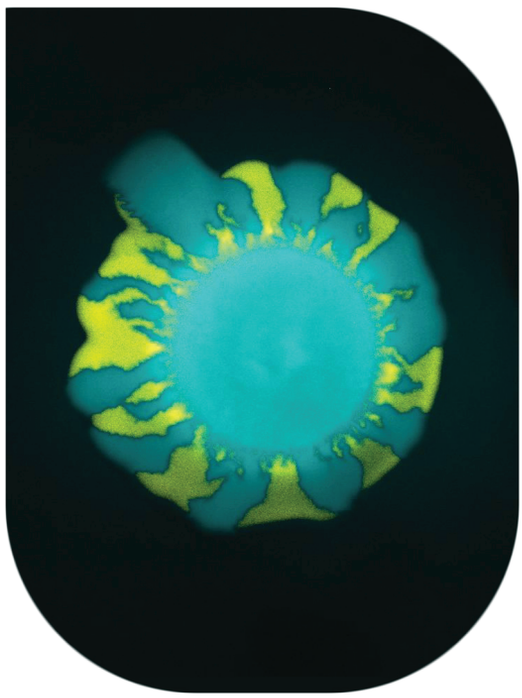


B

Bacterial Signaling

Karina Xavier karina@itqb.unl.pt

Commensal bacteria play important roles in mammalian nutrition/digestion, tissue maturation, development of the immune system and protection against infections and inflammations. One of the well-studied beneficial properties of gut microbiota is colonization resistance to pathogens. Perturbations in the microbiota composition lead to loss of this protection barrier. Upon disruption of gut homeostasis as a consequence of prolong antibiotic treatments the gut environment changes and different bacteria gain competitive advantage. Enterobacteria, usually at very low frequency in the gut, are among the bacteria which increase in frequency after such treatments and are associated with conditions of low colonization resistance to pathogens. We are using the antibiotic streptomycin to disrupt colonization resistance in the mouse gut, and study the molecular mechanisms that enable expansion of Escherichia coli to the gut. In collaboration with the group of Isabel Gordo and Jocelyne Demengeot at IGC we want identify the processes which give competitive advantage to E. coli in the gut. We setup an experimental system where we simply let E. coli evolve in the mouse gut, its natural environment, and then identify the beneficial mutations in its genome. With this method we have already identify the processes which are important for the first steps of E. coli adaptation to the antibiotic-treated mouse gut, next we want to determine how the host immune system and direct microbe-microbe interactions influence this process.



B

Cell Physiology and NMR

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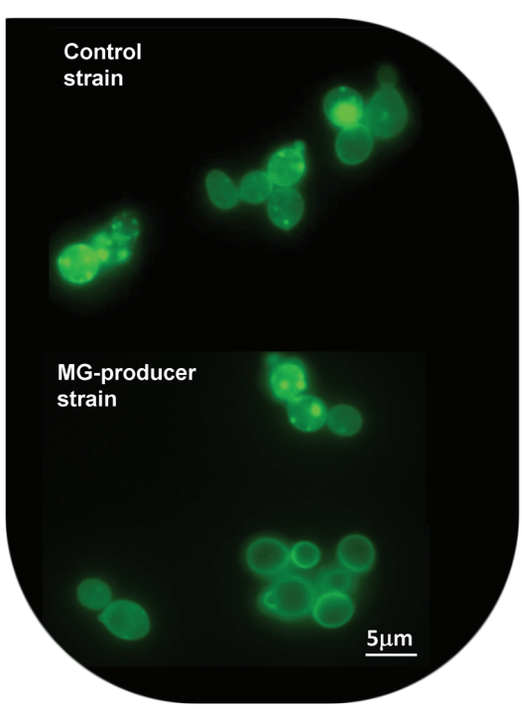
A solute from (hyper)thermophiles inhibits aggregation of α-synuclein in a model of Parkinson's disease

Some marine microorganisms thrive at temperatures near 100ºC. **They synthesize unique solutes presumably used for** protection against heat damage, making them interesting sources of protein stabilizers. While many tests have been performed in vitro, it was important to examine the protecting properties of these compounds in the **overcrowded cytoplasm of living cells**. We looked into the effect of **mannosylglycerate** in a **yeast model of Parkinson´s disease** and found that it reduces the formation of α **synuclein** (α-Syn) **inclusions**, a typical marker of Parkinson's disease.
S. cerevisiae cells, expressing α-Syn tagged with a fluorescent protein, were engineered to synthesize mannosylglycerate. Fluorescence microscopy was used to assess the number of cells with fluorescent foci. There was a 3-fold decrease in α-Syn inclusions and this reduction was accompanied by attenuation of the α-Syn-induced cytotoxicity. It is proven that mannosylglycerate acts as a chemical **chaperone** and the stabilization mechanism involves direct **solute/protein interactions**. This is the first demonstration that this ionic solute, closely associated with stress adaptation in hyper/thermophiles, acts as a potent chemical chaperone in vivo, preventing protein **misfolding/aggregation**. The usefulness of these findings to the development of new drugs against protein-misfolding disorders will be assessed.



B

Cell Signaling in Drosophila

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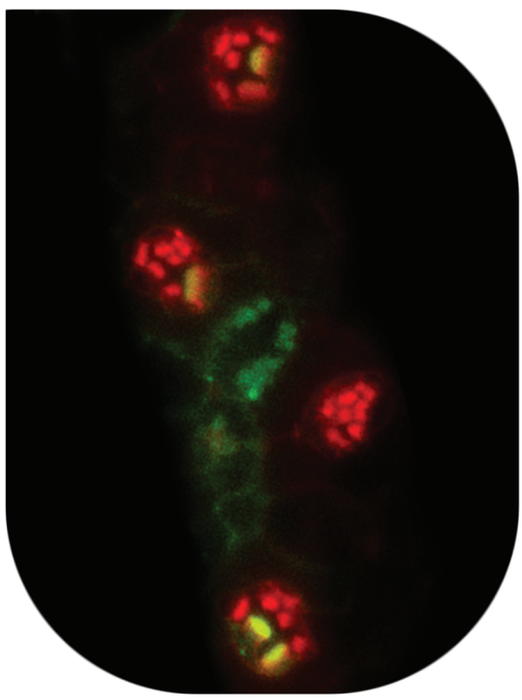
The highlight of this last year in our laboratory was the publication of our Coelho et al Cell Reports article. In this work, we show that Ire1 (Inositol requiring enzyme 1) is required for photoreceptor differentiation and rhabdomere morphogenesis in Drosophila. The role of Ire1 in this paradigm occurs by a mechanism that is independent of the most well know mediator of Ire1 signaling, the transcription factor Xbp1. Instead, Ire1 directly degrades several mRNAs, including the one coding for Fatty acid transport protein (Fatp). In Ire1 mutant photoreceptors, the disregulation of Fatp levels causes an increase of phosphatidic acids leading to severe defects in the formation of the rhabdomere, the light sensing organelle of the photoreceptors.

Coelho, D. S., et al. (2013) Cell Reports, 5(3), 791-801.



B

Control of Gene Expression

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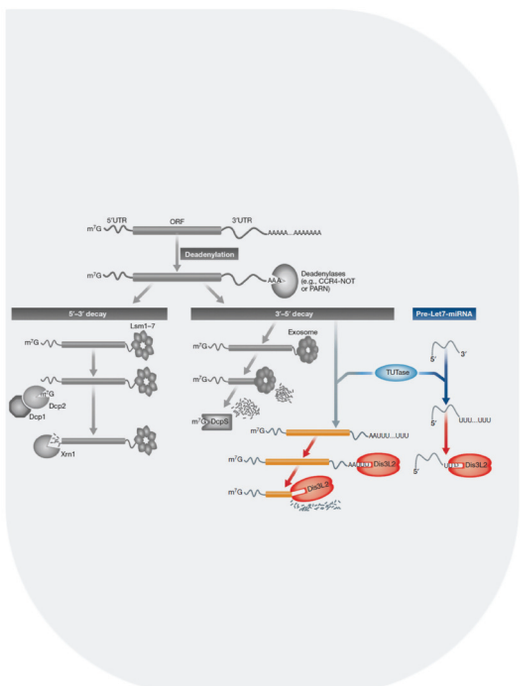
The difference was in the tail: A DIStinctively novel exoribonuclease that really likes U

Cells control the expression of their genes at different levels. One strategy is to degrade the molecules that serve as intermediates between the information contained in DNA and the acting proteins, the messenger RNAs. The whole RNA degradation process is highly regulated: mRNA molecules are marked for destruction and ribonucleases (RNases) chop the mRNAs in pieces.

Our lab (Control of Gene Expression Lab) together with collaborators from the IGC Telomere and Genome Stability Lab have identified a new RNA degrading enzyme in fission yeast that constitutes a major player in the 3'-5' exonucleolytic decay of transcripts. The enzyme has the unprecedented property of preferring RNA molecules with a tail of Us instead of the typical tail of As of messenger RNAs. We have shown that this enzyme represents an alternative pathway of eukaryotic RNA decay that is challenging the models already established.

Subsequent report (in Nature) identified the tumor suppressor micro RNA (miRNA) let-7 as a physiologic substrate of Dis3L2 demonstrating the enzyme association with cancer and stem cell maturation. Moreover, the known association of Dis3L2 gene mutation with Perlman's syndrome (fetal overgrowth disease) and predisposition to Wilms' tumors confirms the importance of this protein in maintaining normal cell metabolism and development.

Malecki, M. et al. (2013) EMBO Journal 32(13): 1842-1854.



B

Glycobiology

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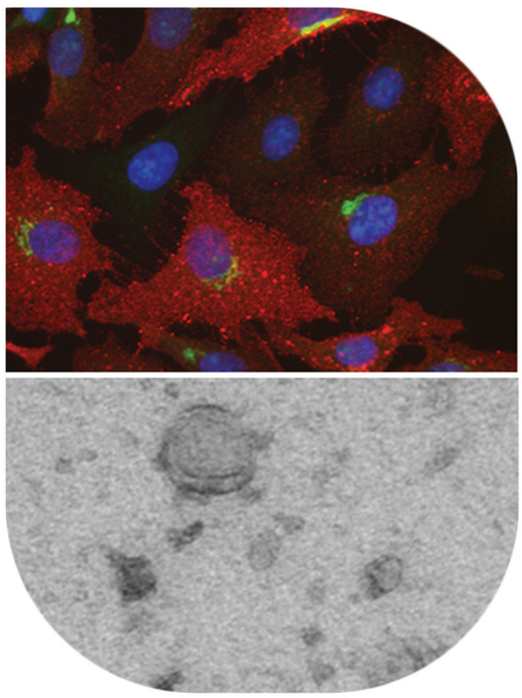
Glycosylation is a common post-translational modification of proteins in eukaryotic cells. In tumor cells alterations in cell surface glycosylation take place and glycans are useful biomarkers in different types of cancer.
Exosomes are vehicles of cellular proteins to the outside of the cell. These membrane vesicles are secreted by various cell types, including tumor cells and neurons, and have been associated with the transmission of pathogenicity among cells. Since exosomes are found in biological fluids, such as blood, cerebrospinal fluid, or urine, they are potential diagnostic targets for cancer and other diseases. Exosomes have a unique protein, lipid and glycan composition.
We have studied protein glycosylation of exosomes from ovarian carcinoma SKOV3 cells using glycomics techniques (lectin blotting, NP-HPLC and mass spectrometry). The sialoglycoprotein galectin-3-binding protein was identified as an abundant marker of exosomes. Furthermore, exosomes contained specific glycan signatures that consisted predominantly of complex glycans, and high mannose glycans were also detected. Finally, bisecting N-acetylglucosamine containing glycans were also found.
The results open novel perspectives to explore the potential roles of glycoproteins and N-glycans in exosome biology and as markers for ovarian cancer.



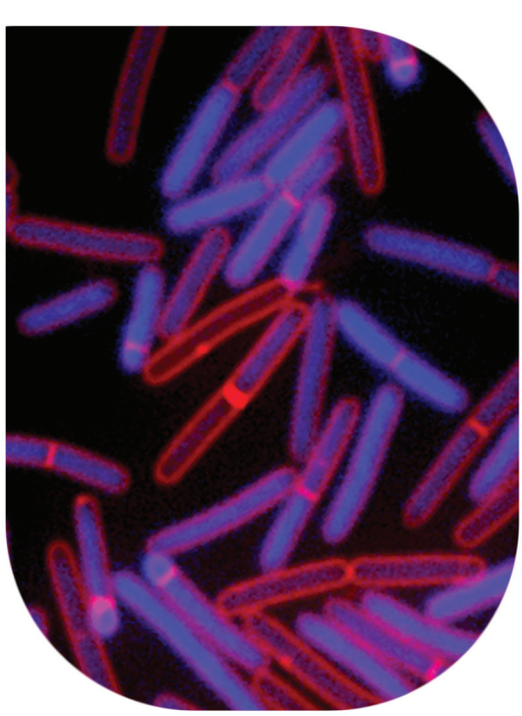
Escrevente et al. (2013) PLOS One. 8(10): e78631.

B

Microbial Development

Adriano O. Henriques aoh@itqb.unl.pt

Clostridium difficile is a strict anaerobic, spore forming bacterium. It is presently the most common cause of hospital-acquired infections associated with antibiotic therapy. The organism relies on the ability to form oxygen-resistant spores to spread and infect new hosts. Despite the importance of spores for the infectious cycle, a detailed characterization of spore differentiation has been lacking. Using a combination of genome-wide approaches with studies of gene expression at the single cell and population levels, researchers at the Microbial Development Laboratory in collaboration with colleagues from the Institut Pasteur in Paris, have published a detailed analysis of the morphological changes that take place during spore differentiation in this organism, in relation to the changes in gene expression during the process. The two articles show that sporulation, a developmental process that emerged some 2.5 billion years ago, is largely conserved in C. *difficile*, but less tightly controlled that in the more recent, aerobic model organism *Bacillus subtilis*. The authors speculate that this feature may be related to the pathogenic nature of C. *difficile*. The two studies further establish a platform for inspecting the function of key sporulation genes, many of which are specific to C. difficile and related to host colonization and transmission. Thus, studies of sporulation by C. *diffilce* will result in novel strategies for diagnostic and therapy.



Pereira F., at al. PLoS Genet. 2013. 9(10): e1003782.
Saujet L., et al. PLoS Genet. 2013. 9(10): e1003756

B

Microbiology of Human Pathogens Unit
Molecular Genetics

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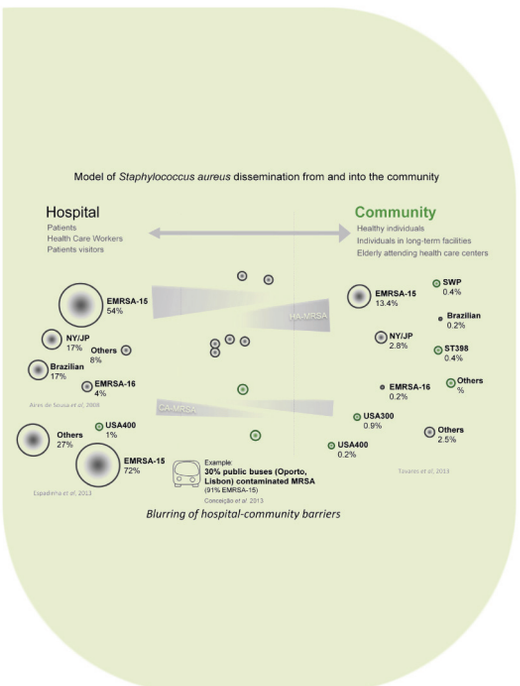
Methicillin-resistant Staphylococcus aureus (CA-MRSA) causing infections in healthy persons in the community have increased worldwide and are a major public health concern. CA-MRSA are different from MRSA found in hospitals, having a higher pathogenic potential and distinct clonal types.
Portugal is the European country with the highest MRSA prevalence in hospitals (50%), but the frequency of MRSA in the community in our country was unknown.
To understand the extent of dissemination of CA-MRSA in Portugal we collected MRSA isolates at entrance of 16 hospitals distributed over the country and characterized them using state-of-the-art molecular typing techniques. Surprisingly, we found an extremely high frequency of MRSA in the community, reaching 21%, which is one of the highest described in Europe. However, only a small proportion belonged to typical CA-MRSA epidemic clones; the great majority of the isolates (89%), belonged to epidemic clones highly related to those found in hospitals in Portugal. Our results suggest that the high MRSA frequencies in the community in Portugal result mainly from a spill-over from the hospital.
The high prevalence of MRSA in the community in Portugal is worrisome and should be seen as a warning to the public health providers. Unless strict infection control measures are adopted in the hospital, MRSA will continue to spread from the hospital into the community what will result in an epidemic that will be extremely difficult to control.



Tavares A., et al. (2013) Eur J Clin Microbiol Infect Dis. 32(10):1269-83.

B

Microbiology of Human Pathogens Unit
Molecular Microbiology of Human Pathogens

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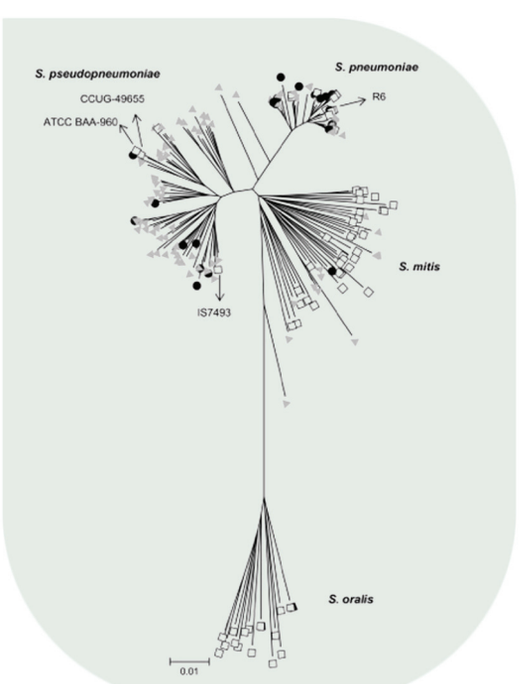
Streptococcus pneumoniae (pneumococcus) is an important human pathogen worldwide responsible for systemic diseases such as meningitis, pneumonia, and bacteraemia. It is also frequently carried asymptomatically in the upper respiratory tract. A correct identification of this pathogen is, in most cases, straightforward using methodologies that have been established for several years. However, some pneumococci display atypical properties that hinder their identification. These atypical isolates are most often associated to colonization and non-invasive disease and thus tend to be regarded as less pathogenic. We have analyzed a large collection of invasive and non-invasive disease isolates presumptively identified as atypical pneumococci. This collection was obtained over several years in Spain. We combined the usual phenotypic assays with several DNA-based methodologies. We have found that only one fourth of the isolates were indeed atypical pneumococci. Almost half were S. pseudopneumoniae, a closely-related species described for the first time a decade ago, and the remaining belonged to other streptococcal species. With this study we have shown that: (i) the so-called atypical pneumococci are often misidentified; (ii) S. pseudopneumoniae and non-capsulated pneumococci may cause severe invasive disease.



Rolo, D., et al. (2013) Plos One, 8(2), 9.

P

Disease and Stress Biology

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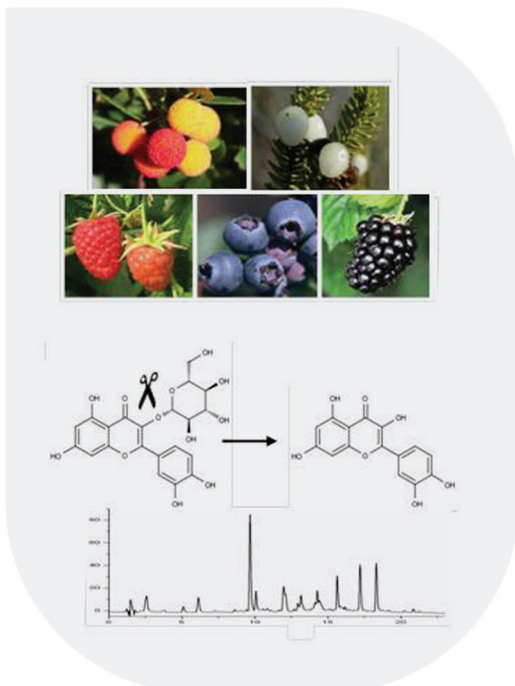
Berry fruits are a good source of phenolic compounds and, thus, potentially beneficial to human health.
Polyphenol intake from fresh fruit, and the relative contribution from berries, in the Portuguese population, was assessed by a semi quantitative food frequency questionnaire (1). Berries accounted for 9% of total fresh fruit intake, from which 80% were due to strawberries. Total polyphenol intake from fresh fruits was 783.9 mg ± 31.7 mg of Gallic Acid Equivalents (GAE) per day, from which 14% were from berries. Within berries, strawberries accounted for 11% of total polyphenol intake, with the other consumed berries accounting for 3% of the total polyphenol intake per day. This reflects low consumption of berries in the Portuguese population, the main reasons being low market availability and high prices.
Due to the importance of berries to polyphenol intake, selected varieties of commercial blueberries, raspberries, and blackberries and two wild berries, Portuguese crowberry and strawberry tree fruit, were characterized. Individual phenolic content was determined by liquid chromatography–diode array detection and mass spectrometry (HPLC-DAD-MS) after hydrolysis by a novel combination of the fungal glycosidases, hesperidinase and cellulase (2). This method was able to disclose new sources of dietary phenolic compounds, and highlighted the usefulness of Portuguese crowberry and strawberry tree fruit as a source of polyphenols.



Pinto P., et al. (2013) Int J Food Sci Nutr 64, (8), 1022-9.
Pimpao R., et al. (2013) J Agric Food Chem 61, (17), 4053-62.

P

Forest Biotech

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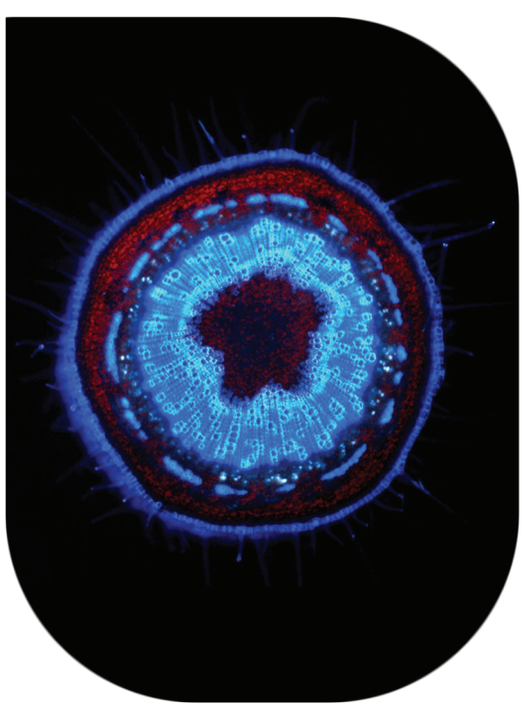
Wood is the result of a differentiation process that ends with the programmed death of specific plant cells - the xylem cells. The correct timing for this cell death is controlled by the molecule thermospermine. We have unveiled how the levels of thermospermine are controlled in wood cells of poplar, the plant model for trees.
We tried to assess the effect of increasing thermospermine levels in poplar (by overexpressing the thermospermine synthase gene) and found that this was surprisingly not possible in the xylem. This evidence suggested the existence of a mechanism specific to these tissues to maintain thermospermine homeostasis.
By characterizing the crosstalk between thermospermine and the endogenous hormone auxin, the presence of a negative feedback loop mechanism was established whereby auxin positively influences thermospermine function in delaying death of the wood cells while thermospermine negatively affects endogenous auxin content in order to re-establish the equilibrium in thermospermine levels. This safeguard mechanism ensures the fundamental role of thermospermine during wood formation.
It is proposed that thermospermine is a xylem specific polyamine and should be considered as a novel plant growth regulator essential to ensure proper wood development. These findings are of great interest to the forest tree breeding and biotechnology community as the control of xylem cell death process during wood formation affects tree wood properties and biomass production.



P

Genomics of Plant Stress (GPlantS)

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In recent years, researchers have realized the importance of other regulatory mechanisms besides transcriptional control, such as the ubiquitin/26S proteasome system (UPS), in the modulation of abiotic stress responses. In the UPS, ubiquitin is covalently bound to target proteins as an ubiquitin chain (polyubiquitination) and often prompts the ubiquitinated target protein for degradation through the 26S proteasome machinery. In this system, the E3-ubiquitin ligases play a crucial role since these proteins confer specificity to target proteins to be ubiquitinated. In our work, we have identified in rice a REALLY INTERESTING NEW GENE (RING) E3-ubiquitin ligase which was named OsHOS1. We have also found that this E3-ubiquitin ligase can target for degradation a master transcription factor in the cold stress response, OsICE1, thus influencing the plant response to cold. We used a RNA interference (RNAi) strategy to down-regulate the expression of OsHOS1 and observed an accumulation of OsICE1 protein in the transgenic rice plants. This accumulation of OsICE1 influenced the expression of one of its downstream genes, OsDREB1A, leading to an up-regulation as compared to WT rice plants in response to cold. However, physiological analysis did not reveal an increased tolerance to cold stress in the transgenic plants. These observations suggest that OsHOS1 may have other targets that can influence the rice plants responses to abiotic stress.

P

Plant Biochemistry

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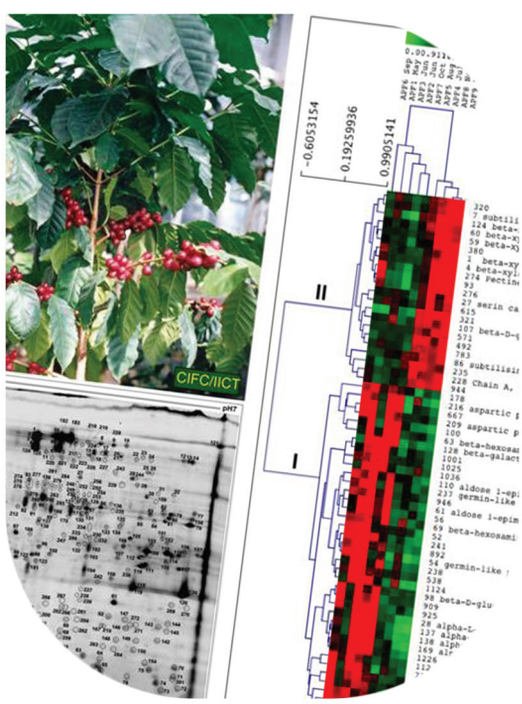
Coffee is an important commercial product mostly obtained from *Coffea arabica*. This species is greatly affected by coffee-leaf-rust (CLR), a fungus that causes a major disease and enormous economic loss. "Centro de Investigação das Ferrugens do Cafeeiro" (CIFC/IICT) has developed expertise in the genetics of coffee resistance to CLR. We have been collaborating with CIFC in studying proteomics of the coffee/CLR interactions, directing attention to the plant extracellular space (or apoplast), which plays a crucial role in initiating and coordinating many defense responses to biotic and abiotic stresses. Coffee is grown in CIFC under greenhouse conditions making it possible to follow the effect of the changing temperature along the year on the patterns of the apoplastic proteins. This information is relevant for the understanding of coffee ecology and, also, for the study of the coffee/CLR interactions. Principal component analysis of the apoplastic protein samples, collected from May to December, revealed the existence of two groups of sampling dates mainly discriminated by the thermal amplitude: higher (group I) and lower (group II). Different proteins are associated with the two groups, indicating that apoplast structural modifications occurred in response to temperature. Our work highlights the dynamics of the apoplast secretome, which acts as the first line of defense against adverse factors.

Guerra-Guimarães, L. et al. (2014) Journal of Proteomics, 104: 128-139.



Plant Cell Biology

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Over the past two decades, plant-based platforms have emerged as valuable systems for the low-cost production of recombinant proteins and as an alternative to established systems such as bacteria or mammalian cell cultures. Our laboratory has been working on the establishment of the legume plant *Medicago truncatula* as a platform for the cost-effective production of recombinant proteins. We work mainly with suspension cell cultures, which offer many advantages, such a controlled environment and the ability to comply with Good Manufacturing Practices. Recently, we showed the successful production of two human proteins, Erythropoietin and Prostaglandin D Synthase. These results strengthen the potential of the *Medicago truncatula* expression platform that we had previously established in our work on feed additives, and pave the way for the synthesis of glycoproteins at a much lower production cost

Plant Cell Biotechnology

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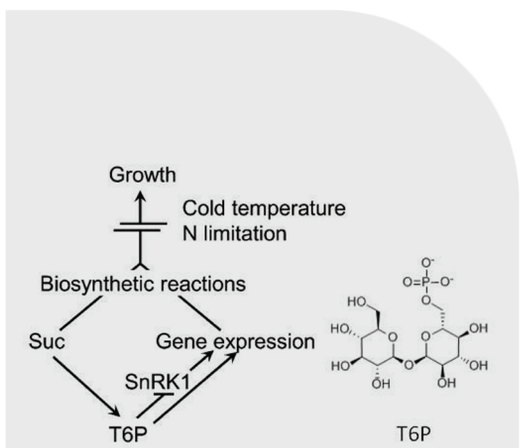
We show that restriction of plant growth by low temperature or low nitrogen leads to large increases in trehalose-6-phosphate (T6P). While the regulation of the plant sucrose non-fermenting 1 AMP-activated serine/threonine-protein related kinase (SnRK1) in response to endogenous Sucrose levels likely involves factors in addition to T6P, in vitro catalytic data, and now in vivo gene expression data in a physiological context, support the view that T6P regulation of SnRK1 provides an explanation for the control of growth in response to plant tissue sucrose availability providing other factors are not limiting. Evidence presented suggests the mechanism operates above a level of sucrose of 3 µmol g-1 plant fresh weight (FW) and 0.3 to 0.5 nmol T6P g-1 FW likely to indicate a sucrose starvation threshold. This starvation threshold (3–5 µM T6P) is close to the Ki of the T6P/SnRK1 complex. Increases in sucrose above this level through sucrose feeding or through treatments that induce sink-limited growth resulted in a proportionate increase both in T6P content and changes in expression of SnRK1 marker genes. SnRK1 is likely inhibited in vivo by up to 80% or more by T6P under the physiological conditions caused by low temperature. The T6P/SnRK1 signaling pathway is necessary for the acceleration of growth following relief from sink-limited conditions, such as low temperature.



Model for the role of T6P in priming plant growth

P

Plant Molecular Ecophysiology

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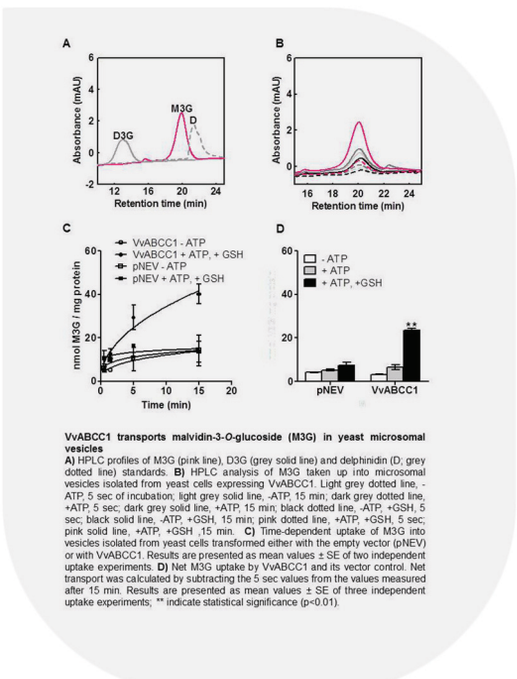
Anthocyanins represent the largest class of flavonoids and constitute one of the most important families of secondary metabolites. They have been shown to be synthesized as protective compounds in response to abiotic stresses, such as UV, cold and drought, but also to attract pollinators. Anthocyanins are synthesized in the cytosol and accumulate in the vacuoles, mostly of the epidermal tissues of fruits, leaves, and flowers. In red grape berries (*Vitis vinifera*) the accumulation of anthocyanins in the exocarp is one of several events that characterize the onset of fruit ripening. Due to the fact that the vacuolar sequestration of anthocyanins has only been partially characterized, we focused our study on elucidating the role ABC-type transporters on such process. We present biochemical evidence that an ABC protein, ABCC1, localizes to the tonoplast and is involved in the transport of glucosylated anthocyanidins. ABCC1 is expressed in the exocarp throughout berry development and ripening, with a significant increase at véraison (i.e., the onset of ripening). Transport experiments using microsomes isolated from ABCC1-expressing yeast cells showed that ABCC1 transports malvidin 3-O-glucoside. The transport strictly depends on the presence of GSH, which is co-transported with the anthocyanins and is sensitive to inhibitors of ABC proteins. By exposing anthocyanin-producing grapevine root cultures to buthionine sulphoximine, which reduced GSH levels, a decrease in anthocyanin concentration is observed. In conclusion, we provide evidence that ABCC1 acts as an anthocyanin transporter that depends on GSH without the formation of an anthocyanin-GSH conjugate.



VvABCC1 transports malvidin-3-*O*-glucoside (M3G) in yeast microsomal vesicles
A) HPLC profiles of M3G (pink line), D3G (grey solid line) and delphinidin (D; grey dotted line) standards. **B)** HPLC analysis of M3G taken up into microsomal vesicles isolated from yeast cells expressing VvABCC1. Light grey dotted line, -ATP, 5 sec of incubation; light grey solid line, -ATP, 15 min; dark grey dotted line, +ATP, 5 sec; dark grey solid line, +ATP, 15 min; black dotted line, -ATP, +GSH, 5 sec; black solid line, -ATP, +GSH, 15 min; pink dotted line, +ATP, +GSH, 5 sec; pink solid line, +ATP, +GSH ,15 min. **C)** Time-dependent uptake of M3G into vesicles isolated from yeast cells transformed either with the empty vector (pNEV) or with VvABCC1. Results are presented as mean values ± SE of two independent uptake experiments. **D)** Net M3G uptake by VvABCC1 and its vector control. Net transport was calculated by subtracting the 5 sec values from the values measured after 15 min. Results are presented as mean values ± SE of three independent uptake experiments; ** indicate statistical significance ($p<0.01$).

Francisco et al (2013) Plant Cell, 25(5), 1840-1854.

T

Applied and Environmental Mycology

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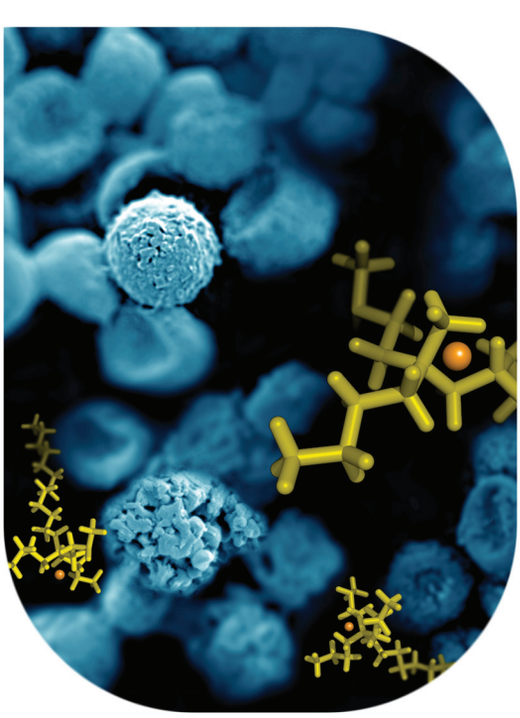
Sphingolipids act as structural components of membranes and lipoproteins, and mediate cell-signalling in most eukaryotes. Each of these molecules carry a sphingoid base backbone, but their combinatorial biosynthesis leads to numerous subspecies which vary in their lipid backbones and complex headgroups. Our knowledge on the functional roles of sphingolipids in filamentous fungi is limited when compared to mammals and plants. Through combining gene/protein expression with organic/analytical chemistry, we elucidated how the chemical structure of ionic liquids (i.e. molten salts) affects the toxic response of filamentous fungi. At sub-inhibitory concentrations, ionic liquids alter the fungal metabolic footprint, activate the biosynthesis of osmolytes and uncommon secondary metabolites and increase the expression of genes coding in multidrug transporters, secondary metabolism and cell wall repair, inspiring their use in fungal biology [1,3]. Some ionic liquids activate an uncharacterised alternative pathway of cell wall integrity in *Aspergillus nidulans* [4], while altering sphingolipid biosynthesis. We are now filling knowledge gaps in this signalling cascade in *A. nidulans*.



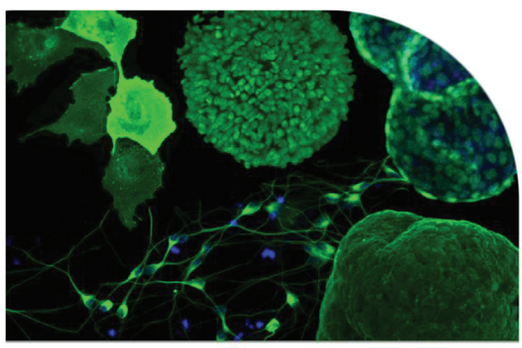
Petkovic, et al. Green Chem. (2009) 11:889–894.
Martins et. al J Proteomics (2013) 94: 262-278.
Hartmann et al. New J Chem (2012) 36: 56-63.
Hartmann and Silva Pereira. New J Chem (2013) 37:1569-1577.

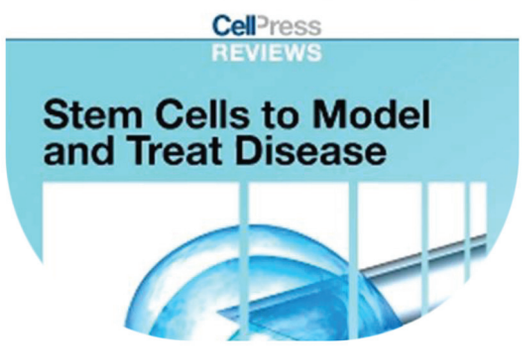
T Animal Cell Technology Unit

Paula M. Alves marques@itqb.unl.pt | Manuel J. T. Carrondo mjtc@itqb.unl.pt | Ana S. Coroadinha avalente@itqb.unl.pt

Reasearch highlight I

Human pluripotent stem cells (hPSCs), with their ability for extensive proliferation and multi-lineage differentiation, can serve as a renewable source of cellular material in regenerative medicine, in vitro toxicology and disease modeling applications. A pre-requisite for the transition of hPSCs or their progeny to these fields is the establishment of efficient cell culture protocols for large-scale expansion, differentiation, purification, storage and distribution. The major challenges in producing hPSC-derivatives are the scaling up of reproducible pure cell populations of undifferentiated cells without compromising their self-renewal ability and differentiation potential and the directed differentiation to specific cell types with improved differentiation efficiency, high purity and functionality.





The recently published review from the Animal Cell Technology Unit (Serra et al. 2012), has been selected and included in the most recent book from Cell Press Reviews: Stem Cells to Model and Treat Disease. In this chapter, we describe how hPSCs (constitute an extremely attractive tool for cell therapy and disease modeling and the latest advances in hPSCs process engineering, underlining why this is one of the main focusing areas of our research group. This book also includes a chapter by Shinya Yamanaka, recipient of the 2012 Nobel Prize for Physiology or Medicine for his work on the reprogramming of mature cells to pluripotency.

Serra M. et al. (2012) Trends in Biotechnology, 30(6):350-9

T Animal Cell Technology Unit

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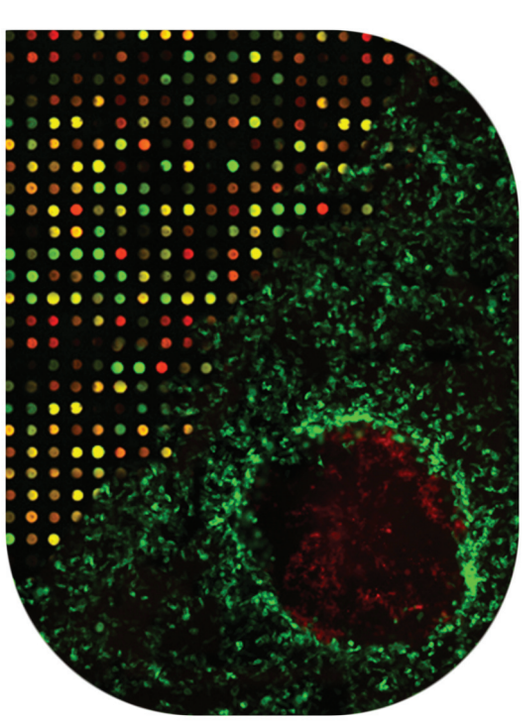
Reasearch highlight II

One of the interests of the research group is to further understand the virus host cell interaction. We have been using functional genomics to study the physiological changes imposed in the production of simple and complex retrovirus. This knowledge is being applied by means of reverse metabolic engineering in human cell lines producing retroviral and lentiviral gene therapy vectors. To this end, we have been focusing in: i) understanding the metabolic constraints associated to virus replication, ii) identifying gene targets for manipulation, iii) implementing novel analytical tools to support gene manipulation and clone screening to iv) genetically engineering the phenotype of producer cells towards increased titers, enhanced cell robustness and improved quality of the viral gene therapy bioproduct.



In Rodrigues et al. (2013) functional genomics tools, including microarray transcriptome analysis, metabolite profiling, lipidomics, RNA interference and genetic engineering, were used and inter-crossed for knowledge generation and cell manipulation. Eight metabolic pathways were identified as impacting virus production and within those several gene targets for further study. Through cell engineering titer improvements up to 32-fold were obtained. Additionally to higher productivities, relevant phenotypes – such as reduced toxic by-product secretion, serum independence and increased apoptosis resistance – are being studied.

Rodrigues, A.F. et. al., 2013, Metab. Eng. Nov; 20: 131-145

T

Biomolecular Diagnostics

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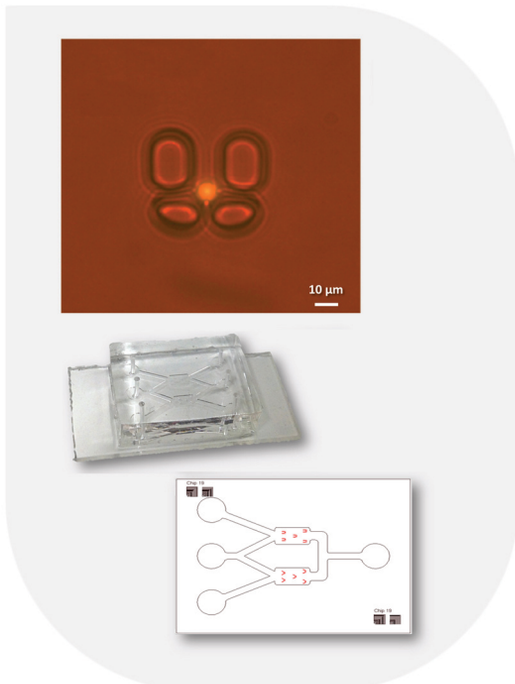
The development of microfabricated structures in polymeric supports allows the miniaturization of channels and reservoirs arrangements in micrometer scale, suitable for biological studies of cells. We have been working in the development of microfluidic channels layouts in polydimethylsiloxane (PDMS) blocks for use in cell handling and characterization, namely by the design and construction of an hybrid chip with electrodes and fiber optic next to the flowing channel, which allows an optical and impedimetric interrogation of the passing through cells (e.g. ovine erythrocytes) . In a further step we have developed (in collaboration with the CENIMAT/UNL) sealed PDMS structures on glass, that can be used for trapping individual cells in small structures, towards single cell analysis. The different shape and size chips are mounted on top of a inverted microscope and manipulated by pressure, allowing the entrapment of small cells (erythrocytes) or larger cells (Medicago spp in vitro cultured cells) that will be studied in real time assays by challenging with different biomolecules (e.g. antibodies, receptors, ssDNA) conjugated with quantum dots.Image



T

Mass Spectrometry

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Omics profiling in echinoderms tissue and organ regeneration

The molecular pathways that trigger and are responsible for the amazing intrinsic regenerative ability that leads to a functional re-growth of echinoderms body-parts are still unknown. In order to approach this subject, several proteomic strategies were used to evaluate the impact of wound healing and tissue re-growth on starfish radial nerve cords, coelomocytes and coelomic fluid upon arm tip amputation. Additionally, a preliminary metabolomic study has been conduct on this fluid, also at different regeneration stages. Our results show that several functional classes of proteins known to be involved in regeneration events in other model organisms, such as chordates, were identified for the first time in echinoderm nervous system regeneration events and interestingly, some were found to be regulated at the post-translational level through proteolytic, phosphorylation or glycosylation pathways. Also, several proteins with no previous association with regeneration events were identified and are considered as interesting molecules for future studies. At the metabolome level, asterosaponins, bioactive secondary metabolites with known immunological, physiological and pharmacological activities, seem to be also promising actors in regeneration.
Performance of future studies urge to clarify the importance of the detected molecular profile changes on regeneration and to depict the associated molecular and cellular mechanisms.

T

Microbiology of Man-made Environments

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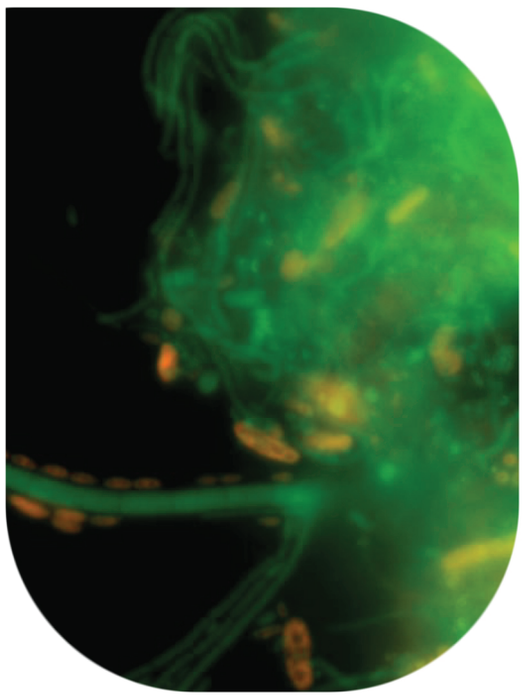
Description of Patulibacter medicamentivorans sp. nov.
A Gram-positive, aerobic, non-motile, catalase positive, oxidase negative, non-motile, non-sporulating rods (0.3-0.4x1.0-1.1 µm) with ibuprofen degrading capacity, designated I11T, was isolated from activated sludge from a wastewater treatment plant. Optimum temperature and pH for growth are 32 °C and 6-7.5, respectively. Growth is not observed in media containing more than 1.5 % (w/v) NaCl. The major respiratory quinone was identified, as well the predominant fatty acid and polar lipid, the cell wall contained *meso*-diaminopimelic acid as the diagnostic diamino acid and the G+C content of the genomic DNA was 74.1 mol%. On the basis of 16S rRNA gene sequence analysis, the closest phylogenetic neighbours of strain I11T were *Patulibacter ginsengiterrae, Patulibacter minatonensis*, and *Patulibacter americanus.* The phenotypic characterisation support the inclusion of strain I11T within the genus *Patulibacter*. However, distinctive features and the 16S rRNA gene sequence analysis suggested the proposal of a new species. Therefore, the name *Patulibacter medicamentivorans* (me.di.ca.men.ti.vo'rans N.L. n. *medicamentus* pharmaceutical drug; L. part. adj. *vorans devouring*; N.L. adj. *medicamentivorans* eater of pharmaceutical drug) was proposed, and the type strain is I11T



T

Nutraceuticals and Delivery

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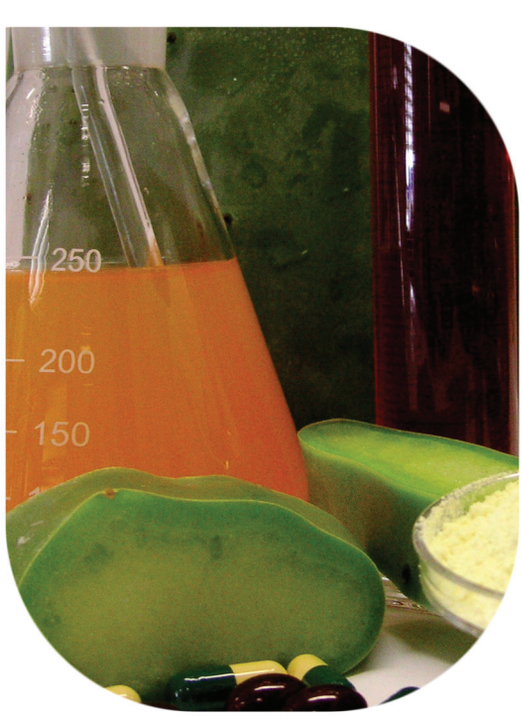
The project BioNIO "Bioactive Natural Ingredients from Opuntia spp.. Valorisation of plants from Alentejo" (2010-2013), has contributed to expand scientific knowledge and technological solutions pivotal for the development of functional products from *Opuntia* species. Extracts were obtained with high-yield, using biocompatible procedures; positive bioactivities with relevance for the nutraceuticals, nutricosmetics and cosmeceuticals industries were identified and correlated with metabolites; and conditions to deliver products/formulations with high bioavailability and stability were found. As an example, *Opuntia ficus-indica* and *Opuntia robusta* residues from fruit juice production were explored as potential sources of natural chemotherapeutic ingredients towards colon cancer. Hydroalcoholic extraction and adsorption separation processes were used to produce a natural extract that efficiently inhibited cancer cell growth, evaluated in human colon carcinoma HT29 cell line, inducing cell cycle arrest in different checkpoints—G1, G2/M and S. The phytochemical constituents presented in the samples, namely betacyanins, flavonoids (isorhamnetin derivatives) and phenolic acids (ferulic acid) were identified as the main responsible compounds for the cell cycle arrest. Moreover, the extracts that presented the lowest effective dose values in terms of polyphenols showed to increase intracellular ROS accumulation in HT29 cells, suggesting that cancer cell death may be induced by the pro-oxidant effect of these compounds.



Serra, A.T. et al. (2013) Food Research International 54, 892-901

T

Pharmacokinetics and Biopharmaceutical Analysis

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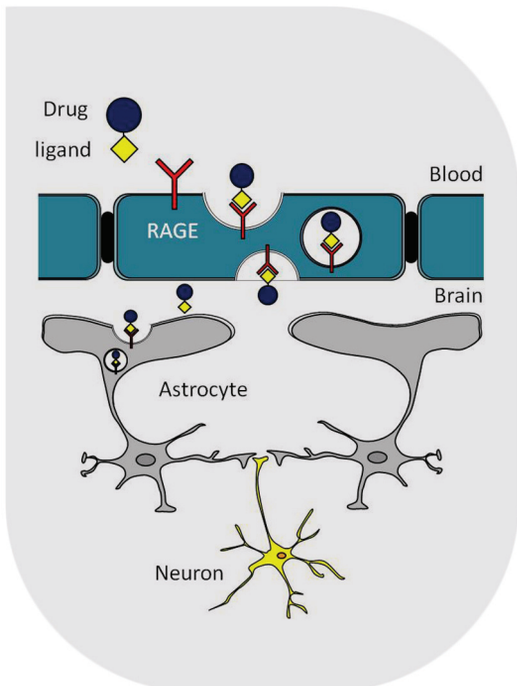
The development of drugs for neurological and oncological brain diseases is strongly limited by difficulties in brain delivery through the Blood Brain Barrier (BBB).
The Receptor for Advanced Glycan End-products (RAGE) is overexpressed in biological membranes in diseases such as Alzheimer's and diabetes, making it a perfect target for transcytosis of drugs in these illnesses.

In our laboratory, we addressed the question of brain permeation of strongly hydrophilic disease modifying peptidomimetic drugs for Alzheimer's disease, through a strategy based on RAGE receptor mediated transcytosis [1]. The strategy involves the covalent linkage of a small RAGE ligand based on abeta peptide, to the therapeutic agent, a β-Secretase 1 inhibitor. The compound was confirmed to permeate the BBB while maintaining the ability to inhibit of β-Secretase 1 selectively in relation to of β-Secretase 2.

Vila Real H, Simplício AL et. al., Prov. patent applic. ner 20141000033073 (Portugal). BBB permeable peptidomimetic Beta-secretase 1 inhibitor for the treatment of Alzheimer's disease



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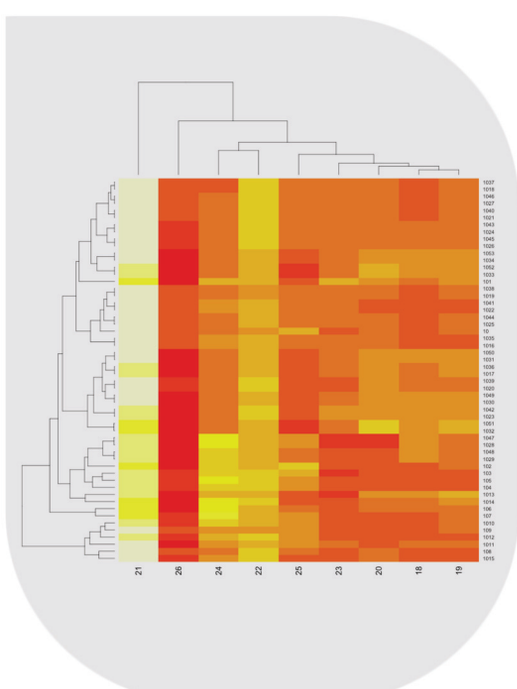
Systems Biodynamics

Andreas Bohn abohn@itqb.unl.pt

The core mission of the Systems Biodynamics (SBD) Group is the creation of systems-level knowledge in environmental life sciences and biotechnology through application of computational and mathematical tools for the simulation of dynamical processes, and for data management and analysis.
In 2013 we provided support in the fields of biostatistics and bioinformatics to various experimental groups at ITQB, IBET, IICT and the Alentejo Biotechnology Center (CEBAL) in Beja. Following a former project on the CorkOak bioinformatics platform CorkOakDB, a focus has been established on analyzing plant gene transcripts in different stages of development and in response to different stress conditions.
For this purpose, bioinformatics workflows - so called pipelines - were deployed in order to detect characteristic patterns in plant gene expression revealing the molecular keys to the response to stresses such as drought, heat or high salinity. Each pipeline was tailor-made for the corresponding project, but as common elements comprised a stage of data management and preprocessing, sequence alignment to already known genomes, and the statistical analysis of the resulting patterns of sequence abundances. These quantitative tools provide the fundament for the thorough biological interpretation of the experiments, leading to new knowledge to be published in the near future.



Memberships in national and international committees

ITQB Researchers as members of meeting organizing committees

COST Action CM1205 CARISMA
February, Lisbon, Portugal
Beatriz Royo, Member of the Management Committee

COIL 5 - 5th Congress on Ionic Liquids
April 21-25, Vilamoura, Portugal, 2013
Luís Paulo N. Rebelo (chair), José N. Canongia Lopes (co-chair), José M. S. S. Esperança, Isabel M. Marrucho, Cristina Silva Pereira
Executive Committee

IMIL3 - 3rd Iberian Meeting on Ionic Liquids
held as a pre-symposium of COIL-5
Vilamoura, Portugal, 2013
José M. S. S. Esperança, Isabel M. Marrucho (chairs)

Young Scientist Forum
July 6, St. Petersburg, Russia
Claudina Rodrigues-Pousada, Organizer

9th European Biophysics Congress, EBSA 2013
July 13-17, Lisbon, Portugal
Manuela M. Pereira, co-chair
Carlos Frazão, Cláudio M. Soares, Ligia O. Martins, Members of the Organizing Committee

13th *Congresso Luso-Espanhol de Fisiologia Vegetal*
July 23-27, Lisbon, Portugal
Margarida M. Oliveira, Nelson Saibo and Miguel Costa , Members of the Organizing Committee

3to4 Summer School on Bioinformatics
Nebion workshop in the frame of the 3to4 project
August 27-30, Zurich, Switzerland
Carla Pinheiro Member of the Organizing Committee

COST summer school chemistry of metals in biological systems
September 7-14, Louvain la Neuve, Belgium
Ricardo Louro, Member of the Organizing Committee

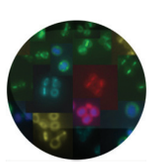
Transbio Emergence Forum
September 25-27, Montpelier, France
Ricardo Louro, Member of the Organizing Committee

Concessus/Licor Workshop
practical course/meeting
Miguel Costa, Member of the Organizing Committee

COST Action BM1005 European Network on Gasotransmitters 3rd Workshop
October 24-25, Lisbon, Portugal
Carlos Romão, Member of Organizing Committee

II Colóquio Nacional de Sementes e Viveiros
November 8 , APH, Coimbra, Portugal
Miguel Costa, Member of the Organizing Committee

Mini-Symposium
September 26-28, ITQB, Oeiras, Portugal
"Bacterial Cell Surfaces"
M. Gomes de Pinho, A. O. Henriques, co-organizers
"Bacterial growth, antibiotic resistance and dormancy"
Mariana G. Pinho, Adriano O. Henriques, co-organizers
"Analysis of Staphylococcus epidermidis population structure by whole genome sequencing"
Maria Miragaia and Herminia de Lencastre, co-organizers



Course Structure and Function of Membrane Proteins
November 5-8, ITQB, Oeiras, Portugal
Margarida Archer, Carlos Cordeiro , José A. Brito and Ricardo Gomes

Transbio Workshop | Metabolomics and Molecular Interactions for Biology and Health
November 13-15, ITQB, Oeiras, Portugal
Pedro Lamosa, Ricardo Louro, Ana Coelho, Isabel Bento e Margarida Nunes

ITQB Researchers as members of scientific committees

Meeting Scientific Committees

Catarina Duarte
FOOD I&DT - Alimentaria & Horexpo Lisboa 2013, Abril, Lisboa
Member of Scientific Commitee

Claudina R. Pousada
38th FEBS Congress, St. Petersburg , Russia Federation
Member of the Scientific Committee

Carlota Vaz Patto
First Legume Society Conference. Novi Sad, Serbia, 9-11th May 2013.

Helena Santos
MicroBiotec'13 - Portuguese Congress in Microbiology and Biotechnology, Aveiro, Portugal. December 6 - 8, 2013.
Member of the Scientific Committee.

Herminia de Lencastre
23th European Congress on Clinical Microbiology and Infectious Disease (ECCMID), Berlin, Germany April 27 - 30, 2013, "Streptococcus pneumoniae: evolution, host immunity, prevention and treatment"|Chair Oral Session "Is pneumococcal vaccine shifting the serotype distribution?"
Chair Symposium

EuroPneumo 2013- XI European Meeting on the Molecular Biology of the Pneumococcus, Madrid, Spain. May 28 - 31, 2013.
Member of the Scientific Committee.

MicroBiotec'13 - Portuguese Congress in Microbiology and Biotechnology, Aveiro, Portugal. December 6 - 8, 2013.
Member of the Scientific Committee.

Isabel Bento
BioStruct-X 2nd Annual Meeting, 5 – 6 September 2013, Hamburg, Germany

Luis Paulo N. Rebelo
COIL 5 - 5th Congress on Ionic Liquids
Member of the Scientific Committee

Manuela Chaves
INTERDROUGHT IV, September 2013, Brisbane, Australia.
Member of the Scientific Committee

Manuela Pereira
9th European Biophysics Congress, EBSA2013, Lisbon, Portugal,
Member of the Scientific Committee
VIII IberoAmerican Congress of Biophysics, Valparaiso, Chile,
Member of the Scientific Committee

Manuel J. T. Carrondo
Scale-Up and Manufacturing of Cell-Based Therapies I, January 2013, San Diego, California, USA.
Member of the Scientific Committee

Margarida Oliveira
13th Congresso Luso – Espanhol de Fisiologia Vegetal, Lisboa, July 23-27.
Member of the Scientific Committee

8th International Symposium on In Vitro Culture and Horticultural Breeding, Coimbra, June 2-7.
Member of the Scientific Committee

Maria Arménia Carrondo
SAC ESRF, May 30-31, 2013, Grenoble, France.
Member of the Science Advisory Committee

SAC ESRF, November 7-8, 2013, Grenoble, France.
Member of the Science Advisory Committee

INSTRUCT Biennial Structural Biology Meeting, 22-24 May 2013, EMBL-Heidelberg, German.
Member of the Executive Committee

Nelson Saibo
13th Congresso Luso – Espanhol de Fisiologia Vegetal, Lisboa, July 23-2.
Member of the Scientific Committee

Paula M. Alves
Scale-Up and Manufacturing of Cell-Based Therapies I, January 2013, San Diego, California, USA.
Member of the Scientific Committee

European Society of Animal Cell Technology, June 2013, Lille, France.
Member of the Scientific Committee

Other scientific committees

Ana Matias
COST Action TD1203, Food Waste Valorisation for Sustainable Chemicals, Materials and Fuels (EUBis)
Portuguese member of the Managing Committee

Ana V. Coelho
Mass Spectrometry Imaging: New Tools for Healthcare Research, Cost Action BM1104.
Member of the Management Committee (since 2011)

António M. Baptista
COST Action CM1102, "Multivalent Glycosystems for Nanoscience - MultiGlycoNano"
Portuguese member of the Managing Committee

Cecilia M. Arraiano
President, Portuguese Society of Genetics

Cláudio M. Soares
Member of the Council of the International Union for Pure and Applied Biophysics (IUPAB)

Cristina Silva Pereira
COST Action CM1206
Member of the Management Committee

Inês Cardoso Pereira
Portuguese Centre for Integrated Structural Biology (PCISBIO), an Affiliate Centre of Instruct, the European integrated infrastructure for Structural Biology.
Member of the Scientific committee

Manuela Pereira
Chair of the Portuguese Biophysical Society

Margarida Oliveira
Chair of the Portuguese Society of Plant Physiology

Raquel Sá-Leão
ESGEM (ESCMID Study Group on Epidemiological Markers) for 2011-2013 from the European Society of Clinical Microbiology and Infectious Diseases, Elected member of the Executive Committee

Ricardo Louro
COST action CM 1003 Biological oxidation reduction reactions
Member of the Management Committee

Rita Abranches
COST Action FA0804 (2008-2013) "Molecular farming: plants as a production platform for high value proteins".
National delegate and Management Committee Member

Rita Ventura
COST Action CM0905 (2010-2014) Organocatalyis (ORCA),
Member of the Management Committee

Memberships of editorial boards

Acta Crystallographica Section F
Margarida Archer, Member of Review Editorial Panel

Asymmetric Catalysis
Rita Ventura, Member of the Editorial Advisory Board

Bioinorganic Chemistry and Applications
Cláudio Gomes, Member of Editorial Board

BioMed Research International
(old Journal of Biomedicine and Biotechnology)
Cláudio M. Soares, Associate Editor

Biophysical Reviews
Cláudio M. Soares, Member of Editorial Board

Biotechnology and Bioengineering
Manuel J.T. Carrondo, Member of Editorial Board

Biotechnology Letters
Manuel J.T. Carrondo, Member of Editorial Board

BMC Biotechnology
Paula M. Alves, Member of Editorial Board

BMC Microbiology
Inês Cardoso Pereira, Associate Editor

Boletim de Biotecnologia
Sociedade Portuguesa de Biotecnologia (SPBT)
Ligia O. Martins, Member of Editorial Board

ChemistryOpen
Pedro Matias, Member of Editorial Advisory Board

Current Gene Therapy
Manuel J.T. Carrondo, Member of Editorial Board

Current Topics in Medicinal Chemistry
Cláudio Gomes, Member of Editorial Board

Dataset Papers in Biology - Biochemistry section
Cláudio Gomes, Member of Editorial Board

Extremophiles Journal
Helena Santos, Guest Editor

FEMS Microbiology Letters
Ligia M. Saraiva, Member of Editorial Board

Frontiers in Inorganic Chemistry
Beatriz Royo, Member of Editorial Board

Frontiers in Lipidology
Cláudio Gomes, Member of Editorial Board

Frontiers in Microbiology
Inês Cardoso Pereira, Associate Editor

Functional Plant Biology, Australia
Manuela Chaves, Associate Editor (since 2008)

International Journal of Molecular Sciences
Luis Paulo N. Rebelo, Editorial Advisor (since 2006)

Journal of Berry Research
Ricardo Boavida Ferreira, Member of Editorial Board

Journal of Biological Inorganic Chemistry
Maria Arménia Carrondo, Member of Editorial Board
Inês Cardoso Pereira, Member of Editorial Board

Journal of Biophysics
Cláudio M. Soares, Associate Editor

Journal of Biotechnology
Paula M. Alves, Member of Editorial Board
Manuel J.T. Carrondo, Associate Editor

Journal of Chemistry
Beatriz Royo, Member of Editorial Board

Journal of Crystallography
Pedro Matias, Member of Editorial Board

Journal of Experimental Botany
Manuela Chaves, Board of Reviewers Member (since 1998)

Journal of Inorganic Chemistry
Beatriz Royo, Member of Editorial Board

Journal of Integrated-OIMICS
C. Pinto Ricardo, Associated Editor
Carla Pinheiro, Associated Editor

Magazine da Sociedade Portuguesa de Microbiologia
Raquel Sá-Leão; Member of the Editorial Board

Microbial Cell
Claudina R. Pousada, Editorial Advisor

Microbial Drug Resistance and European Journal of Clinical Microbiology & Infectious Diseases
Herminia de Lencastre, Member of Editorial Board

Microbiologia
journal of the Portuguese Society of Microbiology
Sérgio Filipe Member of Editorial Board

MicrobiologyOpen
Ligia M. Saraiva, Member of the Editorial Board

PeerJ journal
Maria Miragaia, Member of Editorial Board
Manuela Chaves, Member of Editorial Board (since 2012)

Plant Cell Tissue and Organ Culture
Journal of Plant Biotechnology", Springer Associate
Margarida Oliveira, editor

PLoS ONE
Cláudio Gomes, Member of Editorial Board
Herminia de Lencastre, Member of Editorial Board
Cláudio M. Soares, Member of Editorial Board
Inês Cardoso Pereira, Member of Editorial Board
Ligia O. Martins, Member of Editorial Board
Ligia M. Saraiva, Member of Editorial Board

Scientific Reports
Cláudio Gomes, Member of Editorial Board
Cláudio M. Soares, Member of Editorial Board

Oxidative Medicine and Cellular Longevity
Special issue "Neurodegeneration, Neurogenesis, and Oxidative Stress"
Cláudio Gomes, Guest Editor

The Open Micology Journal
Claudina R. Pousada, Member of Editorial Board

The Scientific World Journal
Ana Sofia Coroadinha, Member of Editorial Board – Biotechnology Panel

Tree Physiology Journal
Célia Miguel Member of the Editorial Review Board

WIREs RNA Journal (Wiley Interdisciplinary Reviews)
Cecilia Arraiano, Member of Editorial Board

Yeast Journal
Claudina R. Pousada, Member of Editorial Board

Research Output

Project Coordination, Publications (WoS) and PhD Theses by Group

please refer to full list of publications (p. 55), full list of PhD Theses (p. 68), and projects (p. 49) / (projects submitted via IBET - p. 53)

Chemistry

Bioorganic Chemistry
Head: Rita Ventura
Project Refs: 25; 96
Publication Refs: 127; 135; 161
PhD Theses Refs: 36

Coordination and Supramolecular Chemistry
Head: Rita Delgado
Project Refs: 85
Publication Refs: 75; 76; 96; 97; 147; 213

Homogeneous Catalysis
Head: Beatriz Royo
Project Refs: 17; 70
Publication Refs: 47; 134; 275
Book Chapter 9

Microheterogeneous Systems
Head: Eurico Melo
Project Refs: 37

Molecular Thermodynamics
Head: Luís Paulo N. Rebelo
Project Refs: 7; 29; 45; 54; 57; 58; 79; 87; 93
Publication Refs: 11; 15; 16; 53; 57; 88; 89; 92; 109; 121; 131; 144; 145; 156; 157; 159; 160; 169; 170; 174; 178; 181; 182; 183; 207; 208; 233; 234; 245; 246; 247; 248; 249; 258; 259; 260; 261
PhD Theses Refs: 6; 34; 37

Organic Synthesis
Head: Christopher Maycock
Publication Refs: 22; 58; 70; 127; 161; 222

Organometallic Chemistry
Head: Carlos C. Romão
Project Refs: 60
Publication Refs: 106; 228; 229
Book Chapter 8

Collaborators

James Yates
Publication Refs: 34; 35

Others

Olga Iranzo
Project Refs: 16; 84; 94
Publication Refs: 93; 96; 97

António Lopes
Publication Refs: 9

Yann Astier
Project Refs: 107
Publication Refs: 38

Mª José Calhorda
Publication Refs: 133

Biological Chemistry

Bacterial Energy Metabolism
Head: Inês A. Cardoso Pereira
Project Refs: 71
Publication Refs: 61; 111; 114; 115; 142; 146; 155; 240; 267; 273; other articles 7
PhD Theses Refs: 5

Biological Energy Transduction
Metalloproteins and Bioenergetics Unit
Head: Manuela M. Pereira
Project Refs: 11; 55; 81
Publication Refs: 25; 143; 203

Biomolecular NMR Laboratory
Head: Manolis Matzapetakis
Project Refs: 59
Publication Refs: 13; 163; 199; 244

Genomics and Stress
Head: Claudina R. Pousada
Publication Refs: 13; 26; 28; 103; 155; 204; 264
PhD Theses Refs: 5

Industry and Medicine Applied Crystallography
Macromolecular Crystallography Unit
Head: Pedro Matias
Project Refs: 72; (25; 26; 27)
Publication Refs: 142; 164; 215

Inorganic Biochemistry and NMR
Head: Ricardo O. Louro
Project Refs: 12; 46; 48
Publication Refs: 23; 94; 105; other articles 10;
Book edited 2; Book Chapters 5; 6
PhD Theses Refs: 2

Membrane Protein Crystallography
Macromolecular Crystallography Unit
Head: Margarida Archer
Project Refs: 53
Publication Refs: 138; 234
PhD Theses Refs: 11

Metalloenzymes and Molecular Bioenergetics
Metalloproteins and Bioenergetics Unit
Head: Miguel Teixeira
Project Refs: 11; 32; 33; 36
Publication Refs: 241; 242; 243
PhD Theses Refs: 7; 9

Microbial and Enzyme Technology
Head: Ligia O. Martins
Publication Refs: 108; 128; 232; 239

Molecular Genetics of Microbial Resistance
Head: Lígia M. Saraiva

Project Refs: 13; 73
Publication Refs: 90; 162; 251; 267
PhD Theses Refs: 1; 7

Molecular Interactions and NMR
Head: Patrick Groves
Project Refs: 28; 44
Publication Refs: 112
Book Chapter: 7

Molecular Simulation
Head: António M. Baptista
Project Refs: 78
Publication Refs: 39; 62; 91; 137
PhD Theses Refs: 4

Protein Biochemistry Folding and Stability
Head: Cláudio M. Gomes
Project Refs: 50; 51; 65
Publication Refs: 42; 56; 80; 107; 129; other articles 11
Book Chapter 1
PhD Theses Refs: 12

Protein Modelling Laboratory
Head: Cláudio M. Soares
Project Refs: 23; 26
Publication Refs: 62; 94; 115; 137; 274
PhD Theses Refs: 4

Raman spectroscopy of Metalloproteins
Head: Smilja Todorovic
Publication Refs: 169; 232

Structural Biology
Macromolecular Crystallography Unit
Head: Carlos Frazão
Project Refs: 34
Publication Refs: 19; 20

Structural Genomics
Macromolecular Crystallography Unit
Head: Maria Arménia Carrondo
Project Refs: 4; 10; 22; 36; 39
Publication Refs: 36; 51; 67; 70; 108; other articles 8
PhD Theses Refs: 3

Collaborators
Filipe Tiago de Oliveira
Project Refs: 14

Biology

Bacterial Cell Biology
Head: Mariana G. Pinho
Project Refs: 8; 68
Publication Refs: 52; 77; 87; 141; 175; 187; 212; other articles 9
PhD Theses Refs: 28

Bacterial Cell Surfaces and Pathogenesis
Head: Sérgio R. Filipe
Project Refs: 20; 21; 89; 100
Publication Refs: 119; 257

Bacterial Signalling
Head: Karina Xavier
Publication Refs: 31; 176

Cell Physiology & NMR
Head: Helena Santos
Project Refs: 27; 69; 77; 83; 98
Publication Refs: 40; 46; 59; 60; 63; 75; 76; 78; 95; 97; 104; 127; 161; 164; 194; 195; 221; 262
Book Chapter 4
PhD Theses Refs: 10; 36

Cell Signaling in Drosophila
Head: Pedro Domingos
Project Refs: 9; 75
Publication Refs: 49

Control of Gene Expression Laboratory
Head: Cecília M. Arraiano
Project Refs: 3; 40; 90; (17)
Publication Refs: 13; 14; 18; 20; 21; 27; 66; 71; 117; 124; 140; 205; 206; 216; 236; 271
PhD Theses Refs: 14

Glycobiology
Head: Júlia Costa
Project Refs: 42
Publication Refs: 73
Book Chapter: 3

Microbial Development
Head: Adriano O. Henriques
Project Refs: 102
Publication Refs: 1; 122; 177; 227; other articles 12
PhD Theses Refs: 17; 24; 27

Molecular Genetics
Microbiology of Human Pathogens Unit
Head: Hermínia de Lencastre
Project Refs: 47; 63; 88
Publication Refs: 10; 24; 45; 50; 74; 79; 101; 120; 125; 214; 250; 263; 277; other articles 4; 5

Molecular Microbiology of Human Pathogens
Microbiology of Human Pathogens Unit
Head: Raquel Sa-Leão
Project Refs: 103; 104; 105; 106
Publication Refs: 10; 81; 101; 184; 192; 214; 217; 226; 263; 269

Others
Ana Rute Neves
Project Refs: 24
Publication Refs: 43; 44; 110; 268

Jaime Mota
Project Refs: 41; 43; 86
Publication Refs: 172

Plant Sciences

Disease and Stress Biology
Head: Ricardo Ferreira
Project Refs: 18; (4; 5)
Publication Refs: 29; 32; 185; 186; 223; 252; 253; 254; other articles 3; 6

Forest Biotechnology
Head: Célia Miguel
Project Refs: (3, 18, 19)
Publication Refs: 68; 69; 152; 153; other articles 3
PhD Theses Refs: 13

Genomics of Plant Stress Lab (GPlantS Lab)
Head: Margarida Oliveira
Project Refs: 19; 52; 74; 97; (6)
Publication Refs: 3; 136; 151; 158; 191; 225; 231; other articles 1; 11

Plant Biochemistry
Head: Cândido Pinto Ricardo
Project Refs: 30; 91
Publication Refs: 186

Plant Cell Biology
Head: Rita Abranches
Project Refs: 38; 66; 83

Plant Cell Biotechnology
Head: Pedro Fevereiro
Project Refs: 1; 31; 61; 92; (16, 22)
Publication Refs: 12, 17; 33; 85; 86; 100; 130; 132; 165; 166; 173; 222; 276; other articles 13
Book chapter: 2; 13

Plant Molecular Ecophysiology Laboratory (LEM)
Head: Manuela Chaves
Project Refs: 5; 6; 15
Publication Refs: 54; 64; 65, 99; 190; 204; 225; 237

Collaborators
Jorge Almeida
Publication Refs: 197

Technology

Applied and Environmental Mycology
Head: Cristina Silva Pereira
Project Refs: 56; (20)
Publication Refs: 41; 88; 89; 102; 118; 145; 149; 272
PhD Theses Refs: 6; 8; 34; 37

Animal Cell Technology Unit
Head: Paula M. Alves
(Cell Bioprocesses + Cell Line Development and Molecular Biotechnology + Engineering Cellular Applications)
Project Refs: (8; 9; 10; 11; 12; 13; 21; 22; 28; 30; 31; 32; 33; 34; 35; 36; 37; 38)
Publication Refs: 37; 48; 82; 83; 84; 95; 126; 210; 252; 270; other articles 2; 14
Book chapters 10; 11; 12

Biomolecular diagnostic
Head: Abel Gonzalez Oliva
Project Refs: 76; 95; (2)
Publication Refs: 116; 222
PhD Theses Refs: 33

Mass Spectrometry
Head: Ana V. Coelho
Project Refs: 25; 62; 67; 80; 99; 101
Publication Refs: 33; 49; 100; 150; 171; 198; 224; other articles 13;
Book Chapters: 4; Book edited: 1

Microbiology of Man-made Environments
Head: Teresa Crespo
Project Refs: (1, 15)
Publication Refs: 4; 6; 7; 8; 168; 179; 180; 218; 2189; 220; 266
PhD Theses Refs: 16; 35; 38

Nutraceuticals and Delivery
Head: Catarina Duarte
Project Refs: (7, 23, 24)
Publication Refs: 72; 98; 113; 154; 181; 211; 230; 265; 266

Pharmacokinetics and Biopharmaceutical Analysis
Head: Ana Luísa Simplício
Project Refs: (14)
Publication Refs: 5; 98; 126; book chapter 11

Systems Biodynamics
Head: Andreas Bohn
Project Refs: 64

Collaborators
Maria de Fatima Silva Lopes
Publication Refs: 2; 30; 148; 200; 201; 256
PhD Theses Refs: 30
Maria Rosário Bronze - Analytical Chemistry
Publication Refs: 193; 209

Others
Cidalia Peres
Project Refs: (5)
Publication Refs: 196

Jonas Almeida
Publication Refs: 167

Francisco Malcata
Project Refs: 49
Publication Refs: 139; 189; 202; 238; 255

Running Projects 2013 as of December 2013

Projects coordinated by ITQB Researchers/ Projects where ITQB Researchers participate

	Title	Project reference	Principal Investigator
	Projects funded by European Comission		
1	Strategies for organic and low-input integrated breeding and management (SOLIBAM)	FP7-KBBE-245058	Carlota Vaz Pato
2	Parliaments and Civil Society in Technology Assessment (PACITA)	SIS-CT-2011-266649	Mara Almeida
3	Standarization and orthogonsalization of teh gene expression flow for robust engineering of NTN (new-to-nature) biologival properties (ST-FLOW)	FP7-KBBE-289326	Cecília Arraiano
4	Transnational access and enhancement of integrated Biological Structure determination at synchrotron X-ray radiation facilities (BioStruct-X)	FP7-INFRAESTRUCTURES-283570	Mª Armenia Carrondo
5	3 to 4: Converting C3 to C4 ptotosynthesis for sustainable agriculture (3 to 4)	FP7-KBBE-289582	Manuela Chaves
6	Combining innovation in vineyard management and genetic diversity for a sustainable European viticulture (INNOVINE)	FP7-KBBE-311775	Manuela Chaves
7	Innovative ionic polymers frm natural sources for energy & environment (IONRUN)	PIRSES-GA-2012-318873	Isabel M. Marrucho
	Project funded by European Research Council (ERC)		
8	Finding new mechanisms for protein localization in Bacteria (ProteinLocalization)	ERC-2012-StG-20111109 - Grant Agreement 310987	Mariana Pinho
	Individual Fellowships funded by European Commission		
9	ER Stress and Photoreceptor Degeneration in Drosophila (DROSOERSTRESS)	PIRG03-GA-2008-230935	Pedro Domingos
10	The role of Base Excision Repair (BER) for extreme radiation and desiccation resistance of Deinococcus radiodurans (BERinDR).	PIEF-GA-2011-301202	Elin Moe
11	Ion Transport at atomic level (Itrans)	PCIG11-GA-2012-322346	Afonso Duarte
	Project funded by SUDOE INTERREG IV B Programme		
12	Biocluster Transnational de l'Espace Sud-Ouest Européen (TRANSBIO SUDOE)	SOE4/P1/F788	Ricardo Louro
	Projects funded by FCT		
13	Unraveling the mechanisms of nitrosative stress resistance of Helicobacter pylori: relevance for immune subversion and infectiousness	PTDC/SAU-MII/098086/2008	Marta Justino
14	Mössbauer spectroscopy and density functional theory studies of NO and O2 reductases	PTDC/BIA-PRO/101837/2008	Filipe Oliveira
15	Phenotypic plasticity of maritime pine to climate change	PTDC/AGR-CFL/099614/2008	Manuela Chaves
16	Engineered biomimetics for large-scale enrichment of phosphoproteins	PTDC/EBB-BIO/102163/2008	Olga Iranzo
17	Sustainable catalysis based on N-heterocyclic carbene metal complexes	PTDC/QUI-QUI/110349/2009	Beatriz Royo
18	Polyphenols as protective agents in cellular models of alpha-synucleinopaties, in particular Parkinson's diseases.	PTDC/BIA-BCM/111617/2009	Ricardo B. Ferreira
19	Effect of environmental stresses on rice epigenome.	PTDC/BIA-BCM/111645/2009	Ana Paula Santos
20	Small immunoactive peptidoglycan (siPGN) derivates to modulate an host inflammatory response.	PTDC/SAU-IMU/111806/2009	Sérgio Filipe
21	Synthesis of peptidoglycan in Streptococcus pneumoniae - where, when and why is it necessary to branch?	PTDC/BIA-MIC/111817/2009	Sérgio Filipe
22	GRIM-19, a novel protein involved in cell apoptosis: struture-function characterization.	PTDC/BIA-PRO/113064/2009	Isabel Bento

	Title	Project reference	Principal Investigator
23	Proton transfer and proton pumping in haem-copper oxidases. Methodological dvelopments and their application to unravel the molecular mechanism.	PTDC/QUI-BIQ/113446/2009	Cláudio Soares
24	PhytoLac- Engineered Lactococcus lactics for the optimizes production of nutraceutical plant-derived polyphenols	PTDC/EBB-EBI/113727/2009	Ana Rute Neves
25	Studies on the struture/activity relationship of AI-2, a bacterial signalling molecule for inter-species communication.	PTDC/QUI-BIQ/113880/2009	Rita Ventura
26	Membrane fusion mechanism of Influenza Hemagglutinin: a simulation and biophysical approach.	PTDC/QUI-BIQ/114774/2009	Cláudio Soares
27	Solution struture and mode of action of the dimeric bacteriocin Lcn972	PTDC/QUI-BIQ/114904/2009	David Turner
28	Identification of plants extracts with protective action against bacterial enterotoxins belonging to AB5 group: cholera toxin, heat labile toxin from Escherichia coli and Shiga toxin (dysentery).	PTDC/QUI-BIQ/115298/2009	Malgorzata Palczewsk
29	Playing with the ionic character of ionic liquids	PTDC/QUE-FTT/116015/2009	Luís Paulo N. Rebelo
30	Search for candidate protein biomarkers of Coffea arabica resistance to Hemileia vastatrix (leaf rust)	PTDC/AGR-GPL/109990/2009	Cândido Pinto Ricardo
31	Deciphering grain filling mechanisms in Phaseolus vulgaris L. under water deficit.	PTDC/AGR-GPL/110244/2009	Pedro Fevereiro
32	Detoxification of nitric ixide and/or oxygen in pathogenic (anaerobic) microbes: exploring the molecular determinants of substrate selectivity	PTDC/QUI-BIQ/111080/2009	Miguel Teixeira
33	Response to oxidative and nitrosative stress by Entamoeba histolytca: searching for new virlence factors.	PTDC/SAU-MIC/111447/2009	Miguel Teixeira
34	hCE- expression and characterization in in vitro and in silico models.	PTDC/EBB-BIO/111530/2009	Carlos Frazão
35	Hepatic toxicity in HIV-infected individuals exposed to nevirapine.	PTDC/SAU-TOX/111663/2009	Ana Coelho
36	Structural determinants of superoxide reduction- A detoxification system essential for life.	PTDC/BIA-PRO/111940/2009	Célia Romao
37	On characterization polarity within phospholipid/cholesterol lipid bilayers and its effects in membrane enzymology.	PTDC/QUI-BIQ/112943/2009	Eurico de Melo
38	The pathogen's perspective of molecular plant-microbe-interactions: genes expressed during the infection process of coffee leaf rust- Hemileia vastarix.	PTDC/AGR-GPL/114949/2009	Rita Abranches
39	Patogenia da protína LANA do herpesvírus do sarcoma de Kaposi	HMSP-ICP/0021/2010	Mª Armenia Carrondo
	Title	**Project reference**	**Principal Investigator**
40	Global analysis of antisense regulatory mechanisms in Staphylococcus aureus: ARMS	ERA-PTG/0002/2010	Susana Domingues
41	Characterisation of host cell pathways altered by effectors of Brucella, Chlamydia, and Coxiella: identification of novel therapeutic targets"	ERA-PT/0005/2010	Jaime Mota
42	Sampling and biomarker optimization and harmonization in ALS and other motor neuron diseases	JPND/0003/2011	Júlia Costa
43	Analysis of the molecular function of SteA, a Salmonella virulence protein	PTDC/BIA-MIC/116780/2010	Jaime Mota
44	The effect of divalent cations on G-Quadruplex formation and stability in genes related to neurodegenerative processes	PTDC/QUI-QUI/117105/2010	Patrick Groves
45	Ionic Liquids under tension	PTDC/QUI-QUI/117340/2010	José M.S.S. Esperança
46	Redox necklaces:functional characterization of a multidomain polyheme cytochrome	PTDC/QUI-BIQ/117440/2010	Catarina Paquete
47	Tracking the evolution of methicillin resistance in staphylococci:stages in the evolution of the mecA determinant and the SCCmec structure	PTDC/BIA-EVF/117507/2010	Maria Miragaia
48	Molecular mechanisms that orchestrate a two-electron reduction step coupled with protonation in redox enzymes that contain chains of single electron redox co-factors	PTDC/BIA-PRO/117523/2010	Catarina Paquete
49	NEW PROTECTION: NativE, Wild PRObiotic sTrain EffecCT In Olives in briNe	PTDC/AGR-ALI/117658/2010	Francisco Malcata

	Title	Project reference	Principal Investigator
50	Mechanisms of SOD1 toxic aggregation in neurodegenerative processes	PTDC/QUI-BIQ/117789/2010	Cláudio Gomes
51	Recovery of misfolded and aggregated proteins using biological nanoreactors and small molecules	PTDC/EBB-BIO/117793/2010	Cláudio Gomes
52	Na integrated approach to identify stress-realted regulatory genes in cork oak(SuberStress)	PTDC/AGR-GPL/118505/2010	Margarida Oliveira
53	Structural biology of Histidine Kinases: a new target for novel antibacterial drugs	PTDC/BIA-PRO/118535/2010	Margarida Archer
54	Development of New Oxygen Therapeutics using Fluorinated Ionic Liquids	PTDC/EQU-FTT/118800/2010	Ana B. Pereiro
55	A molecular insight into the respiratory alternative complex III	PTDC/BIA-PRO/120949/2010	Manuela Pereira
56	Creating value from bio-wastes:suberin extraction and biotransformation in biocompatibel ionic liquids aimig on novel biomaterials and compounds	PTDC/QUI-QUI/120982/2010	Cristina Silva Pereira
57	On the thermophysical characterization of new room temperature ionic liquids	PTDC/CTM-NAN/121274/2010	José M.S.S. Esperança
58	Ionic Liquids as Promoters of Aqueous Biphasic Systems: The Role of van der Waals and Coulomb Interactions	PTDC/QUI-QUI/121520/2010	Isabel M. Marrucho
59	Lactation and milk production in Goat (Capra hircus): identifying molecular markers underlying adaptation to seasonal weight loss	PTDC/CVT/116499/2010	Manolis Matzapetakis
60	Protein interaction with CO Releasing Molecules (CORM)	PTDC/QUI-BIQ/117799/2010	Carlos Romão
61	On characterization polarity within phospholipid/cholesterol lipid bilayers and its effects in membrane enzymology.	PTDC/AGR-PRO/118081/2010	Pedro Fevereiro
62	hCE- expression and characterization in in vitro and in silico models.	PTDC/QUI-QUI/118315/2010	Ana Coelho
63	Prevalence and characterization of *Staphylococcus aureus* in Portuguese-speaking African countries and in East Timor	PTDC/SAU-SAP/118813/2010	Hermínia Lencastre/T. Conceição
64	Soil function profiling during fungal bioremediation: integrated bio-geochemical and meta-proteomics assessment	PTDC/AAC-CLI/119100/2010	Andreas Bohn
65	Characterization of ER-quality control for the F508del-CFTR protein: potential therapeutic targets for cystic fibrosis	PTDC/SAU-GMG/122299/2010	Cláudio Gomes
66	Tailor-made expression hosts depleted in protease activity for recombinat protein production	ERA-IB/0001/2012	Rita Abranches
67	An Omics approcah for diagnosis tuberculose (Tbomics)	New-Indigo/0001/2012	Ana Coelho
68	The intriguing function of cytoskeleton-associated proteins in Gram-positive bacteria	ANR/BEX-BCM/0150/2012	Mariana Pinho
	Title	**Project reference**	**Principal Investigator**
69	NMR Net - National facility for nuclear magnetic resonance: from molecular structure and dynamics to protein function, cell physiology and metabolics	RECI/BBB-BQB/0230/2012	Pedro Lamosa
70	Well defined iron catalysts for challenging tasks	PTDC/QEQ-QIN/0565/2012	Beatriz Royo
71	Energy conservation by a novel NADH dehydrogenase family widespread in bacteria	PTDC/BBB-BQB/0684/2012	Inês Pereira
72	Structural Determinants of Oxygen Tolerance in a NiFeSe Hydrogenase	PTDC/BBB-BEP/0934/2012	Pedro Matias
73	Heme biosynthesis in Staphylococcus aureus:old bug new challenges	PTDC/BBB-BQB/0937/2012	Lígia Saraiva
74	Exploring rice biodiversity: a Genome-wide association (GWAS) study of salt-tolerance	EXPL/BIA-BIC/0947/2012	Sónia Negrão
75	Mechanisms of post transcriptional regulation of Xbp1: a potential modulator of the UPR and associated pathologies	PTDC/BEX-BCM/1217/2012	Fatima Cairrao
76	Development of microfluidic platform for single cell studies	PTDC/BBB-IMG/1225/2012	Abel Oliva
77	Reverting the carbon cycle: from C O to biodiesel	EXPL/BIA-MIC/1455/2012	Helena Santos
78	Increasing the realism of membrane modelling in constant-pH molecular dynamics methods: inclusion of electrochemical gradients and lipid titration	PTDC/QEQ-COM/1623/2012	António Baptista

	Title	Project reference	Principal Investigator
79	Green ionic liquids: new solutions for old engineering problems	PTDC/QEQ-FTT/1686/2012	Isabel M. Marrucho
80	Understanding echinoderms outstanding nervous system regeneration capabilities using a phospheproteomics approach	PTDC/MAR-BIO/2174/2012	Catarina Ferraz Franco
81	Disentangle the Functional and Structural Modularity of the Peripheral Arm from Respiratory Complexes I	PTDC/BBB-BQB/2294/2012	Manuela Pereira
82	Epigenetic modulation of transgene expression in plant cell cultures for the improved production of recombinant proteins	PTDC/BIA-PLA/2411/2012	Rita Abranches
83	Structural investigation of the anti-tuberculosis drug target phosphatidylinositol phosphate synthase (PIPS)	PTDC/BBB-BEP/2532/2012	David Turner
84	Development of multimodal imaging probes for intravascular molecular imaging of inflammation	PTCD/QEQ-MED/2656/2012	Olga Iranzo
85	Development of Dinuclear Cu(II) and Zn (II) complexes as potential inhibitors of oncogenic protein-protein interactions	PTDC/QEQ-SUP/2718/2012	Rita Delgado
86	Interaction between Legionella pneumophila and the host cell actin cytoskeleton	PTDC/BIA-MIC/2821/2012	Irina Franco
87	Ionic liquid-based systems for protein crystallization	PTDC/BBB-BEP/3058/2012	Magdalena Kowacz
88	Amidation of the peptidoglycan of Gram-positive bacteria: an unexplored potential target for antibiotics	PTDC/BIA-MIC/3195/2012	Hermínia Lencastre
89	Plant strategies for detection of the inflammatory bacterial peptidoglycan molecule	PTDC/BIA-PLA/3432/2012	Sérgio Filipe
90	Salmonella Persistence in eukaryotic cell: Examining the Role of RNases and Small Functional RNas	PTDC/BIA-MIC/4142/2012	Cecília Arraiano
91	A systems approach to understand salt stress tolerance in Casuarina glauca and its relationship with symbiotic nitrogen fixation.	PTDC/AGR-FOR/4218/2012	Ana Isabel Ribeiro
92	Exploiting Bean Genetis for food Quality and Atractiveness innovations	PTDC/AGR-TEC/3555/2012	Carlota Vaz Pato
93	Carbon Nanomaterials and Ionic Liquids: From fundamentals to sustainable technology applications.	FCT-ANR/CTM-NAN/0135/2012	Luís Paulo N. Rebelo
94	Molecular and Nano Tools for Cancer Theranostics	EXCL/QEQ-MED/0233/2012	Olga Iranzo
95	Optical fiber tweezers for single cell manipulation and analysis	EXPL/BBB-IMG/0500/2012	Abel Oliva
96	Biosynthesis of rare methylmannose polysaccharides in nontuberculous mycobacteria	PTDC/BIA-MIC/2779/2012	Rita Ventura
97	SUMOdulator - Researching SUMO modulation of plant abiotic stress responses	PTDC/BIA-PLA/3850/2012	Isabel Abreu
98	Cerebrospinal fluid metabolome: an instructive niche for CNS metastasis	PTDC/BIM-ONC/1242/2012	Luis Gafeira
99	Immunogenicity of vaccine candidate antigens from Staphylococcus pseudintermedius in Canis canis	PTDC/CVT-EPI/4345/2012	Ana Coelho
100	Rethinking Bacterial Cell Wall Synthesis: a combined synthetic and enzymatic approach	PTDC/QEQ-QOR/2132/2012	Sérgio Filipe
101	Driving Mitochondrial Effectors of Apoptosis Toward Neural Differentiation	PTDC/BIM-MED/0251/2012	Ana Coelho

Projects funded by Astellas Pharma Europe Limited

102	Sporulation And Fidaxomicin in-vivo conditions -develpment of an assay for direct spore quantification.	AS-25-RG-02	Adriano O. Henriques

Projects funded by PFIZER

103	Pneumo S-Influence of cigarette smoking in the dynamics of carriage of Steptococcus pneumoniae: a longitudinal study	WI183695	Raquel Sá-Leão

	Title	Project reference	Principal Investigator
104	PneumoY2: Evolution and adapatation of Streptococcus pneumoniae population in the era of expanded conjugates vaccines	WI182109	Raquel Sá-Leão
105	Pneumococcal colonization patterns in the elderly living urban and rural areas of Portugal	WS950381	Raquel Sá-Leão
106	Pneumococcal colonization patterns in young children living in urban and rural areas of Portugal	WS857151	Raquel Sá-Leão

Project funded by Ministry of Nactional Defence

107	Chemical and Biological Single Molecule Detection Roaming Robot (SENTINEL)		Yann Astier

Projects funded by Ciência Viva (outreach)

108	Da escola à Universidade	PEC245	Ana Sanchez
109	Hoje, um Cientista vem à nossa escola	PEC243	Ana Sanchez

Projects involving ITQB researchers where IBET is the host institution

(not accounted for in the statistics)

Projects funded by the European Comission

	Title	Project reference	Principal Investigator
1	Collab4Safety:Towards sustainable global food safety collaboration	311611	Teresa Crespo
2	PIROVAC: Improvement of current and development of new vaccines for theileriosis and babesios of small ruminants	FP7-KBBE-2009-3:	Abel Oliva
3	PROCOGEN - Promoting a functional and comparative understanding of the conifer genome - implementing applied aspects for more productive and adapted forest	FP7-KBBE-2011-289841	Célia Miguel
4	EUBerry: The sustainable improvement of European berry production, quality and nutritional value in a changing environment: Strawberries, Currants, Blackberries, Blueberries and Raspberries	FP7-KBBE-2010-4	Cláudia Santos
5	BACHBERRY: Bacterial hosts for production of bioactive phenolics from berry fruits	BACHBERRY	Cláudia Santos
6	3to4: Converting C3 to C4 photosynthesis for sustainable agriculture	FP7-KBBE-2011-5	Nelson Saibo
7	WINESENSE: Research on extration and formulation intensification processes for natural actives of wine	Winesense	Catarina Duarte
8	SADEL: Scaffolds for alternative delivery	HEALTH-F4-2011-278042	Manuel Carrondo
9	PREDECT -New models for preclinical evaluation of drug efficacy in common solid	115188	Catarina Brito
10	CARE-MI: Cardio repair european multidisciplinary initiative	HEALTH-2009-242038	Manuel Carrondo
11	ComplexINC - New Technologies and Production Tools for Complex Protein Biologics	HEALTH-F5-2012-279039	Paula Alves
12	BRAINVECTORS: From brain gene transfer towards gene therapy: pharmacological assessment of aav, cav-2 and lvv	286071	Manuel Carrondo
13	EDUFLUVAC: Combinatorial immunization strategy to educate the immune system towards cross recognition and coverage against antigenic drift in seasonal influenza virus exposure	EDUFLUVAC	Paula Alves

Projects funded by the FCT

14	hCE-2 - expressão e caracterização em modelos in vitro e in silico	PTDC/EBB-BIO/111530/2009	Ana Luisa Simplicio
15	Biotextile - biotecnologia de reactores descontínuos-sequenciais para o tratamento eficaz de águas residuais têxteis	PTDC/EBB-EBI/120624/2010	Gilda Carvalho

	Title	Project reference	Principal Investigator
16	A lactação e a lactopoiese em caprinos: identificação de marcadores moleculares à perda de peso sazonal	PTDC/CVT/116499/2010	André Almeida
17	Estudos bioquímicos e funcionais de exoribonucleases focando no seu determinante no controlo da expressão génica	PTDC/QUI-BIQ/111757/2009	Cecilia Arraiano
18	Genómica populacional e adaptativa da virulência na ferrugem alaranjada do cafeeiro (hemileia vastatrix)	PTDC/AGR-GPL/119943/2010	Célia Miguel
19	Tratamento de dados em larga escala em ambientes nuvem	EXCL/EEI-ESS/0257/2012	Célia Miguel
20	Perfil das funções do solo durante bioremediação fúngica: análise geoquímica e meta-proteómica integrada	PTDC/AAC-CLI/119100/2010	Cristina Silva Pereira
21	ER_TRANSPROT - Análise do proteoma de Ehrlichia ruminantium: uma análise complementar à transcriptómica para o estudo da patogenese e desenvolvimento de vacinas para a Cowdriose	PTDC/CVT/114118/2009	Isabel Eloi Marcelino
22	TREEFORJOULES - Melhoramento das propriedades da madeira de eucalipto e choupo para bioenergia	P-KBBE/AGR-GPL/0001/2010	Jorge Paiva
23	Desenvolvimento de novos sistemas para terapêutica de oxigénio: utilização de líquidos iónicos fluorados	PTDC/QUE-FTT/118800/2010	Ana Matias
24	NUTRABRASS - Nutracêuticos derivados de brassicacea: processamento a alta pressão de vegetais cruciferos para recuperação de ingredientes biologicamente activos com efeito na saúde	PTDC/AGR-TEC/3790/2012	Catarina Duarte
25	Determinantes estruturais da redução do superóxido - um sistema de destoxificação essencial à vida	PTDC/BIA-PRO/111940/2009	Tiago Bandeiras
26	Resposta de entamoeba histolyca aos stresses oxidativo e nitrosativo: em busca de novos factores de virulência	PTDC/SAU-MIC/111447/2009	Tiago Bandeiras
27	Estudos estruturais e funcionais da biogénese dos centriolos	PTDC/EBB-BEP/1724/2012	Tiago Bandeiras
28	Nova geração de células de empacotamento para a produção de biofármacos derivados de lentivirus	PTDC/EBB-EBI/118621/2010	Ana Sofia Coroadinha
29	Desenvolvimento de linhas celulares de mdck para crescimento em suspensão para a produção de bioprodutos virais: influenza e adenovirus	PTDC/EBB-BIO/118615/2010	Ana Sofia Coroadinha
30	Interacção entre adenovirus e células productoras: uma abordagem de biotecnologia de sistemas para melhorar a produção de vectores virais para entrega de genes	PTDC/EBB-BIO/119501/2010	Ana Teixeira
31	Aplicação de biotecnologia de sistemas na optimização da produção de biofármacos em culturas de células animais	PTDC/BBB-BSS/0518/2012	Ana Teixeira
32	Modelos de cultura 3d para redução da experimentação animal no desenvolvimento de fármacos: novas estratégias para estudos do metabolismo hepático de drogas e neurotoxicidade	PTDC/EBB-BIO/112786/2009	Catarina Brito
33	Desenvolvimento de modelos in vitro do sistema nervoso central para investigação pré-clínica: novas ferramentas para estudo de transferência de genes mediada por vectores virais	PTDC/EBB-BIO/119243/2010	Catarina Brito
34	Desenvolvimento de uma estratégia para purificar células estaminais	EXPL/BBB-EBI/1003/2012	Cristina P. Lisboa
35	Desenvolvimento e manipulação de células estaminais usando a tecnologia de transferência génica mediada por nanopartículas para aplicação clínica de células modificadas geneticamente	ENMED/0001/2010	Manuel Carrondo
36	Estratégias integradas para decifrar o receptoma de células estaminais cardíacas humanas e o seu papel no processo de regeneração cardíaca	PTDC/BBB-BIO/1414/2012	Patricia Alves
37	A arquitetura da vida: a estrutura quartenária de cápsulas virais por espectrometria de massa nativa	RECI/BBB-BEP/0104/2012	Patricia Alves
38	Integração de tecnologias de sirna e AAV no desenvolvimento de terapias dirigidas a cancro da mama basal: do desenvolvimento de vectores a avaliação anti-tumoral	PTDC/BBB-BIO/1240/2012	Paula Alves

Additionally, a number of projects with national and international companies involving ITQB researchers were established by IBET. These are not listed here.

Publications 2013

Articles indexed in Web of Science

1 Abecasis, A. B., Serrano, M., Alves, R., Quintais, L., Pereira-Leal, J. B., & Henriques, A. O. (2013). A Genomic Signature and the Identification of New Sporulation Genes. Journal of Bacteriology, 195(9), 2101-2115. doi:10.1128/jb.02110-12

2 Abrantes, M. C., Kok, J., & Lopes, M. D. (2013). EfaR Is a Major Regulator of Enterococcus faecalis Manganese Transporters and Influences Processes Involved in Host Colonization and Infection. Infection and Immunity, 81(3), 935-944. doi:10.1128/iai.06377-11

3 Abreu, I. A., Farinha, A. P., Negrao, S., Goncalves, N., Fonseca, C., Rodrigues, M., Baptista R, Saibo NJM, Oliveira, M. M. (2013). Coping with abiotic stress: Proteome changes for crop improvement. Journal of Proteomics, 93, 145-168. doi:10.1016/j.jprot.2013.07.014

4 Albuquerque, M. G. E., Carvalho, G., Kragelund, C., Silva, A. F., Crespo, M. T. B., Reis, M. A. M., & Nielsen, P. H. (2013). Link between microbial composition and carbon substrate-uptake preferences in a PHA-storing community. Isme Journal, 7(1), 1-12. doi:10.1038/ismej.2012.74

5 Almeida, A. P., Rodriguez-Rojo, S., Serra, A. T., Vila-Real, H., Simplicio, A. L., Delgadilho, I., da Costa, S.B., da Costa, L.B., Nogueira, I.D., Duarte, C. M. M. (2013). Microencapsulation of oregano essential oil in starch-based materials using supercritical fluid technology. Innovative Food Science & Emerging Technologies, 20, 140-145. doi:10.1016/j.ifset.2013.07.009

6 Almeida, B., Kjeldal, H., Lolas, I., Knudsen, A. D., Carvalho, G., Nielsen, K. L., Crespo, M.T.B., Stensballe, A., Nielsen, J. L. (2013). Quantitative proteomic analysis of ibuprofen-degrading Patulibacter sp strain I11. Biodegradation, 24(5), 615-630. doi:10.1007/s10532-012-9610-5

7 Almeida, B., Oehmen, A., Marques, R., Brito, D., Carvalho, G., & Crespo, M. T. B. (2013). Modelling the biodegradation of non-steroidal anti-inflammatory drugs (NSAIDs) by activated sludge and a pure culture. Bioresource Technology, 133, 31-37. doi:10.1016/j.biortech.2013.01.035

8 Almeida, B., Vaz-Moreira, K., Schumann, P., Nunes, O. C., Carvalho, G., & Crespo, M. T. B. (2013). Patulibacter medicamentivorans sp nov., isolated from activated sludge of a wastewater treatment plant. International Journal of Systematic and Evolutionary Microbiology, 63, 2588-2593. doi: 10.1099/ijs.0.047522-0

9 Almeida, J. E., Ferreira, P., Alves, P., Lopes, A., & Gil, M. H. (2013). Synthesis of a dextran based thermo-sensitive drug delivery system by gamma irradiation. International Journal of Biological Macromolecules, 61, 150-155. doi:10.1016/j.ijbiomac.2013.07.002

10 Almeida, S. T., de Lencastre, H., & Sa-Leao, R. (2013). Epidemiology and Population Structure of Serotypes 1, 5 and 7F Carried by Children in Portugal from 1996-2010 before Introduction of the 10-Valent and 13-Valent Pneumococcal Conjugate Vaccines. Plos One, 8(9). doi: 10.1371/journal.pone.0075442

11 Alves, F., Oliveira, F. S., Schroder, B., Matos, C., & Marrucho, I. M. (2013). Synthesis, characterization, and liposome partition of a novel tetracycline derivative using the ionic liquids framework. Journal of Pharmaceutical Sciences, 102(5), 1504-1512. doi:10.1002/jps.23487

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13 Amaral, C., Pimentel, C., Matos, R. G., Arraiano, C. M., Matzapetakis, M., & Rodrigues-Pousada, C. (2013). Two Residues in the Basic Region of the Yeast Transcription Factor Yap8 Are Crucial for Its DNA-Binding Specificity. Plos One, 8(12), 12. doi:10.1371/journal.pone.0083328

14 Andrade, J. M., Pobre, V., & Arraiano, C. M. (2013). Small RNA Modules Confer Different Stabilities and Interact Differently with Multiple Targets. Plos One, 8(1), 15. doi:10.1371/journal.pone.0052866

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16 Araujo, J. M. M., Pereiro, A. B., Lopes, J. N. C., Rebelo, L. P. N., & Marrucho, I. M. (2013). Hydrogen-Bonding and the Dissolution Mechanism of Uracil in an Acetate Ionic Liquid: New Insights from NMR Spectroscopy and Quantum Chemical Calculations. Journal of Physical Chemistry B, 117(15), 4109-4120. doi:10.1021/jp400749j

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19 Bandeiras, T. M., Freitas, M. C., Petrasch, D., Kletzin, A., & Frazao, C. (2013). SAD phasing towards structure determination of a thermostable Rieske ferredoxin with a novel stabilizing disulfide bridge. Acta Crystallographica Section F-Structural Biology and Crystallization Communications, 69, 555-558. doi:10.1107/s1744309113008385

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21 Barria, C., Malecki, M., & Arraiano, C. M. (2013). Bacterial adaptation to cold. Microbiology-Sgm, 159, 2437-2443. doi:10.1099/mic.0.052209-0

22 Barros, M. T., Dey, S. S., & Maycock, C. D. (2013). Metal-Free Synthesis of Secondary Arylamines: An Aliphatic-to-Aromatic Transformation. European Journal of Organic Chemistry(4), 742-747. doi: 10.1002/ejoc.201201263

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1 Coelho Av. and Franco C. (Eds.) (2013) Applications of Tandem Mass Spectrometry- its Principles and Applications. InTech. ISBN:978-953-51-0141-3

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Education Output

PhD Theses

Bioquímica

1 **Ana Filipa Nogueira Tavares**
"Novel insights into the action of antimicrobial agentes against human pathogens"
Supervisor: **Lígia Saraiva**

2 **Bruno Miguel Oliveira Maia da Fonseca**
"Mind the gap: characterization of periplasmic cytochromes from Shewanella oneidensis involved in extracellular electron transfer"
Supervisor: **Ricardo Louro**

3 **Catarina Isabel Simões Pires da Silva**
"Structure-function analysis of Multicopper oxidases"
Supervisor: **Isabel Maria Bento; Mª Arménia Carrondo**

4 **Diana Andreia Pereira Lousa**
"Molecular determinants of nonaqueous biocatalysis: A computational analysis"
Supervisor: **Cláudio Soares; António Baptista**

5 **Fábio de Oliveira Morais e Silva**
"Deciphering the genome of Desulfovibrio gigas: the role of the hydrogenases"
Supervisor: **Claudina Rodrigues-Pousada; Inês Cardoso Pereira**

6 **Isabel Tavares Lima Martins**
"On the way towards the understanding of suberin degradation by Aspergillus nidulans
Supervisor: **Cristina Silva Pereira ; Luis Paulo N. Rebelo**

7 **Mafalda Cristina de Oliveira Figueiredo**
"*Desulfovibrio vulgaris* defenses against oxidative and nitrosative stresses"
Supervisor: **Lígia Saraiva; Miguel Teixeira**

8 **Mariana Boavida Lopes Carvalho**
"The biotransformation of pentachlorophenol by Mucor plumbeus: Mechanistic insights"
Supervisor: **Cristina S.Pereira/Andrew Hursthouse**

9 **Pedro Miguel Ferreira Assis de Sousa**
"Supercomplexes of Prokaryotic Aerobic Respiratory Chains – *Escherichia coli* and *Bacillus subtilis* supramolecular assemblies"
Supervisor: **Ana Margarida Melo; Miguel Teixeira**

10 **Pedro Oliveira Quintas**
"Electron Transfer and Ligand Binding Properties of Cytochromes"
Supervisor: **David L. Turner; Teresa M. Catarino**

11 **Przemyslaw Michal Nogly**
"Crystallographic studies on membrane and cytoplasmic enzymes: Bifunctional cytidylytransferase /CDP-alcohol phosphatidyltransferase and α-phosphoglucomutase"
Supervisor: **Margarida Archer**

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Supervisor: **Cláudio Gomes**

Biologia

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"Novel insights into plant vascular development: disclosing a mechanism to maintain thermospermine homeostasis in the xylem"
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Cláudia Lopes Pinheiro
Isaura Santos
Margarida M. Nunes
Luís Morgado

Management Support

Administration and Finance
Head: Fernando Jorge Tavares

Accounting
Ana Almada
Ana Cristina Afonso Silva
Mónica Adriano Vieira
Helena Cordeiro
Isabel Mestre
Nuno Lopes
Sónia Ermida

Treasury Section
Ana Freire
Anabela Bernardo Costa

Storages
Ana Isabel Santos
Bruno Gouveia
Carlos Martins
João Rodrigues
Ricardo Pinto

Human Resources
Head: Maria Cristina Pinto
Ana Luísa Cruz
Goretti Rocha
Maria Madalena Pereira

Mailing and Archives
Artur Freitas

R&D Planning and Management
Head: Maria de Lurdes Conceição
Cristina Amaral
Cristina Lopes
Cristina Oliveira
Isabel Murta

Legal Advisor
Anabela Simões

Academics
Ana Portocarrero
Fátima Madeira

Scientific, Technological and Teaching Support

Scientific Services

Nuclear Magnetic Resonance CERMAX
Coordinator: Helena Santos
Manager: Pedro Miguel Lamosa
Helena Pereira Matias
João Pires

Analytical Services Unit
Coordinator: Teresa Crespo
Vice-coordinator: Rosário Bronze
Quality Assurance : Ana Luísa Simplício
Quality Control: António Ferreira
Qualified Person: Eduardo Correia

Analytical Team
Sandra Silva
Cláudia Duarte
Cláudio Almeida
Paula Chicau
Ana Silva
Maria Conceição Almeida
Cristina Pereira
Paula Isabel Alves
Ana Fulgêncio
Susana Tenedório

Archive
Paula Neves
Isabel Ribeiro

UniMS
Joint commision
Margarida Oliveira
Paula Alves

Users direction
Ana Luísa Simplício
Isabel Abreu
Patrícia Alves
Susana Araújo

Technicians
Elisabete Pires
Conceição Almeida
Renata Soares
Catarina Correia

Small Molecule X-Ray Crystallography
Isabel Bento

Fermentation Unit
Coordinator: Miguel S. Teixeira
João Carita

Lab Manager
Cláudia Almeida

Teaching Laboratory
Coordinator: Adriano O. Henriques
Teresa Baptista da Silva

Library
Librarian: Isabel Murta
Susana Lopes (until May 2013)

Washrooms
Coordinator: Teresa B. da Silva
Ana Cristina Barreiros
Carmen Fernandes
Helena Vilaranda
Lúcia David
Maria Alice Ferreira
Maria Eugénia Santos
Pilar Campos
Sónia Serrano
Sónia Moita

Workshop and Maintenance
Head: Henrique Campas Nunes
Alexandre Maia
Aníbal Ribeiro
António Ramalho
Miguel Rodrigues
João Carlos Zanão Simões
José Luís Liberato
Luís Gonçalves
Nuno Soares
Nuno Monteiro
Tiago Escóbar

Computer Systems Support
Coordinator: Carlos Frazão
Executive coord.: Daniel F. Branco
Carlos Manuel Cordeiro
Hugo Gonçalo Cordeiro
Hugo Luiten
José Miguel Loureiro
Maria Manuel Rato

Research Divisions

Chemistry

Bioorganic Chemistry

Rita Ventura, Investigador Auxiliar

Ana Sofia Miguel	Post Doc
Eva Correia Lourenço	PhD Student
Osvaldo Ascenso	BI
Vanessa Miranda	BI
Lara Fidalgo	BSc Student
Gustavo Fonseca	Trainee
Jessica Pereira	Trainee
Marlinda Fernandes	Trainee

Coordination and Supramolecular Chemistry

Rita Delgado, Professor Associado com Agregação Jubilada IST

Luís M. P. Lima	Post Doc
Pedro Mateus	Post Doc
Catarina Alexandra Veríssimo Esteves	PhD Student
Lígia Mesquita	BI
Rui Fernandes	BI

Homogeneous Catalysis

Beatriz Royo Cantabrana, Investigador Auxiliar

Lorena Postigo Galindo	Post Doc
João M.S. Cardoso	PhD Student
Rita Isabel Lourenço da Silva Lopes	BI
Mara Pinto	BI
Ana Fernandes	BI
Rui Lopes	BI

Micro-Heterogeneous Systems

Eurico de Melo, Professor Auxiliar IST

Joana Rita Ripado Valério	BI

Organic Synthesis

Chris Maycok, Professor Associado FCUL

Mohit Lal Deb	Post Doc
Saul Silva	PhD Student
Paula Rodrigues	PhD Student

Molecular Thermodynamics

Luís Paulo N. Rebelo, Professor Catedrático

Isabel M. Marrucho	Investiga. Coordenador
José M. S. S. Esperança	Investi. Principal
Ana B. Pereiro	Post Doc
Helena I. M. Veiga	Post Doc
João M. M. Araújo	Post Doc
Magdalena Kowacz	Post Doc
Mara G. Freire	Post Doc
Mohammad Tariq	Post Doc
Patricia Reis	Post Doc
Marija Petkovic (cosup. Cristina S. Pereira)	Post Doc
Ana Lobo Ferreira	Post Doc
Anabela Costa	PhD Student
Diana Ruivo	PhD Student
Filipe Oliveira	PhD Student
Helga Garcia (cosup. Cristina Silva Pereira)	PhD Student
Isabel Martins (cosup. Cristina Silva Pereira)	PhD Student
Liliana Tomé	PhD Student
Mário Soromenho	PhD Student
Paulina Papis	PhD Student
Rui Ferreira (cosup. Cristina Silva Pereira)	PhD Student
Rita Leones	PhD Student
Sowmiah Subbiah	PhD Student
André Mão de Ferro	BI
Catarina Florindo	BI
David Patinha	BI
Susana Martinho	BI
Karen João	BI
Olga Cortes	BI
Fabiana Teixeira	BI
Filipa Cristina Alves	BI
Marita Cardoso	BI
Nicole Vieira	MSc Student
Pedro Bastos	MSc Student

Organometallic Chemistry

Carlos C. Romão, Professor Catedrático

Ana Catarina Martins Coelho	Post Doc
Hélia Jeremias	BI

Collaborators

James Yates, Single Molecule Process

Biological Chemistry

Bacterial Energy Metabolism

Inês Cardoso Pereira, Investigador Principal

Sofia Venceslau	Post Doc
Mónica Martins	Post Doc
Américo Duarte	Post Doc
Ana Raquel Ramos	PhD Student
Marta Marques (cosup. Pedro Matias)	PhD Student
André Santos	PhD Student
Fábio Silva (cosup. C. Rodrigues-Pousada)	PhD Student
Cláudia Mourato	PhD Student
Gonçalo Oliveira	Master Student
Sónia Zacarias (cosup. Pedro Matias)	BI
André Rocha	Trainee
Joana Silva Pinto	Trainee

Metalloproteins and Bioenergetics Unit

Biological Energy Transduction

Manuela M. Pereira, Investigador Auxiliar

Ana Patricia Refojo (cosup. Miguel Teixeira)	Post Doc
Ana Paula Batista (cosup. Miguel Teixeira)	Post Doc
Afonso M. Duarte	Post Doc
Bruno Marreiros	PhD Student
Filipa Sena	BI
Filipa Calisto	BI
Joana Sousa	BI
Paulo Castro	BI

Biomolecular NMR

Manolis Matzapetakis, Investigador Auxiliar

Ivo Saraiva	Post Doc
Meire Coelho de Almeida	PhD Student
Mariana Palma	PhD Student
Ana Catarina Silva Pereira	MSc Student

Genomics and Stress

Claudina Rodrigues-Pousada, Prof. Catedrático Convidado

Regina Andrade Menezes	Post Doc
Catarina Isabel Ribeiro Pimentel	Post Doc
Catarina Sá Almeida Amaral	Post Doc
Sofia Isabel Marques da Silva	Post Doc
Fábio de Oliveira	PhD Student*
Ana Rita Tomé Ferreira	PhD Student
Soraia Caetano	PhD Student
Cátia Inês Baptista Santos	BI
Mariana Oliveira	Trainee
Carolina Rodrigues	Trainee
Daniela Santos	Trainee

Macromolecular Crystallography Unit

Industry and Medicine Applied Crystallography

Pedro Manuel Marques Matias, Investigador Principal

Marta C. Marques (cosup. Inês C. Pereira)	PhD Student
Sara Teresa Silva	PhD Student
Sónia Zacarias (cosup. Inês C. Pereira)	BI

Inorganic Biochemistry and NMR

Ricardo Louro, Investigador Auxiliar

Catarina Morais Vaz Paquete	Post Doc
Bruno Miguel Oliveira Maia da Fonseca	PhD Student
Maria Alexandra Alves	PhD Student
Diego Hartman (shared Applied Env. Micology)	PhD Student
Nazua Lima Costa	PhD Student
Sónia Estevão Neto	BI
Mónica Alves	BI
Tiago Mestre	Trainee
Afonso Carrelo	Trainee
Isabel Pacheco (shared Bac. Energy Metabolism)	Technician

Macromolecular Crystallography Unit

Membrane Protein Crystallography

Margarida Archer Frazão, Investigador Auxiliar

Tânia Oliveira	Post Doc
Pik Yee Ma	Post Doc
José Brito	Post Doc
Przemyslaw Nogly	PhD Student
Ana Lúcia Rosário	PhD Student
Malgorzata Magoch	BI
Rute Teixeira	BI
Cecilia Pinto	BI
Filipa Varela	BI

Metalloproteins and Bioenergetics Unit

Metalloenzymes and Molecular Bioenergetics

Miguel Teixeira, Professor Catedrático

Vera Lúcia Gonçalves	Post Doc
Sandra Santos	PhD Student
Miguel Ribeiro	BI
Joana Carrilho	MSc Student

Microbial & Enzyme Technology

Lígia O. Martins, Professor Auxiliar Convidado

Vânia Sofia Brissos	Post Doc
Bruno Patrick Reynolds	Post Doc
Sónia Mendes	PhD Student
Diogo Tavares	MSc Student
Susana Proença	Trainee

Molecular Genetics of Microbial Resistance

Lígia M. Saraiva, Investigador Principal

Marta Justino	Post Doc
Susana Lobo	Post Doc
Lígia Nobre	Post Doc
Adelina Parente	PhD Student
Joana Baptista	PhD Student
Ana Filipa Tavares	PhD Student
Sara Sousa	BI
Inês Santos	MSc Student
Ana Antão	Trainee
Inês Ladeira	Trainee

Molecular Interactions and NMR

Patrick Groves, Investigador Auxiliar

Malgorzata Palczewska-Groves	Post Doc
Magdalena Komiazyk	BI

Molecular Simulation

António M. Baptista, Investigador Auxiliar

Dragana Popovic de Barros	Post Doc
Sara R. R. Campos	Post Doc
Pedro Magalhães	PhD Student
Luís C. S. Filipe	PhD Student
Catarina A.C. dos Santos	BI

Protein Biochemistry Folding & Stability

Cláudio M. Gomes, Investigador Auxiliar

Sónia Leal	Post Doc
Bárbara Henriques	Post Doc
Tânia Gomes Lucas	PhD Student
Joana Margarida Cristovão	BI
Sofia Baptista de Carvalho	BI
Ana M. Nunes	BI
Sara Francisco	BI

Protein Modelling

Cláudio M. Soares, Professor Associado

Bruno Lourenço da Silva Victor	Post Doc
Ana Sofia Fernandes de Oliveira	Post Doc
Diana Andreia Pereira Lousa	Post Doc
João Miguel Marques Martins Damas	PhD Student
Carla Baltazar	PhD Student
Davide Cruz	PhD Student
Jorge Miguel Antunes	PhD Student
Helia Jeremias	BI
Carlos Fernández Rodríguez	Eramus Student
Luis Demmelhuber	Eramus Student
Emanuel Lopes	Summer Student

Raman Spectroscopy

Smilja Todorovic, Investigador Auxiliar

Célia Silveira	Post Doc
Zélia Licínia Ferreira Gouveia	PhD Student
Daniela Presa	BI

Macromolecular Crystallography Unit

Structural Biology

Carlos Maria Franco Frazão, Investigador Principal

Patrícia Alexandra Teixeira Borges	PhD Student

Macromolecular Crystallography Unit

Structural Genomics

Maria Arménia Carrondo, Professor Catedrático

Isabel Bento	Investigador Auxiliar
Colin Edward McVey	Investigador Auxiliar
Célia Romão (colab. Miguel Teixeira)	Investigador Auxiliar
Elie Moe	Marie Curie Fellow
Rajesh Ponnusamy	Post Doc
Ana Maria Gonçalves	Post Doc
Alexandra Marques (colab. Isabel Abreu)	Post Doc
Ana Teresa da Silva Gonçalves	PhD Student
Bruno Correia	PhD Student
Patrícia Borges (colab. Carlos Frazão)	PhD Student
Cecilia Miranda (colab. Miguel Teixeira)	MSc Student
Daniela Moutinho	MSc Student
Pedro Castro	MSc Student
Sara Brandão	BI
Cristiana Sousa (colab. Tiago Bandeiras)	BI
Samarpita Lahiri (colab. Isabel Bento)	BI
Ricardo Coelho	Technician

Collaborators

Filipe Tiago de Oliveira, Mössbauer Spectroscopy

Biology

Bacterial Cell Biology

Mariana G. Pinho, Investigador Auxiliar

Patrícia Reed	Post Doc
Nathalie Reichman	Post Doc
Helena Maria Pinto Veiga	PhD Student
Pedro Matos Pereira	PhD Student
João Miguel Monteiro	PhD Student
Teresa Ferreira	PhD Student
Ana Raquel Ramos Pereira	PhD Student
Andreia Tavares	BI
Gabriela Henriques	Master Student
Pedro Escada Fernandes	Master Student

Bacterial Cell Surfaces and Pathogenesis

Sérgio R. Filipe, Investigador Auxiliar

Maria João Catalão	Post Doc
Mafalda Henriques	Post Doc
Filipa Vaz	PhD Student
Vânia Dias	MSc Student
Gonçalo Covas	BI
Ana Rita Narciso	BI
Joana Silva Figueiredo	BI
Sara Ramalhete	Trainee

Bacterial Signaling

Karina B. Xavier, Investigador Auxiliar

Jessica Thompson	Post Doc
Pol Nadal	Post Doc
Rita Valente	PhD Student
Ozhan Ozkaya	PhD Student
Ana Rita Oliveira	BI
Jorge André Pereira	Master Student
Filipe Vieira	Master Student

Cell Physiology and NMR

Helena Santos, Professor Catedrático

David Turner	Invited Professor
Teresa Catarino	Prof. Auxiliar FCT-UNL
Nuno Borges	Research Associate
Pedro Lamosa	Investigador Auxiliar
Luís Pedro Gafeira Gonçalves	Post Doc
Carla Jorge	Post Doc
Marta Rodrigues	Post Doc
Ana Lúcia Carvalho	Post Doc
Gonçalo Graça	Post Doc
Ana Esteves	PhD Student
Pedro Quintas	PhD Student
Dušica Radoš	PhD Student
Cristiana Faria	PhD Student
Joana Sousa	MSc Student
Andreia Filipa Cepeda	BI
Ana Isabel Mingote	BI
Inês Torcato	BI
Sara Rebelo	BI
Dário Neves	BI

Cell Signaling in *Drosophila*

Pedro Domingos, Investigador Auxiliar

Fátima Afonso Cairrão	Post Doc
Vanya Ivanova Rasheva	Post Doc
Dina Coelho	PhD Student
Gonçalo Poças	PhD Student
Nadine Simone Schweizer	PhD Student

Control of Gene Expression

Cecília M. Arraiano, Investigador Principal com Agregação

Lisete Galego	Assistant Researcher
Sandra Viegas	Post Doc
Susana Domingues	Post Doc
José Andrade	Post Doc
Ricardo Moreira	Post Doc
Michal Malecki	Post Doc
Rute Margarida Gonçalves Matos	Post Doc
Ana Filipa Reis	Post Doc
Inês Silva	Post Doc
Vânia Pobre	Post Doc
Ana Margarida Saramago	PhD Student
Andreia Aires	Technician
Cátia Bárria	BI
Teresa Pinto	BI
Ricardo Santos	MSc Student
Susana Barahona	MSc Student
Patrícia Apura	MSc Student

Glycobiology

Júlia Costa, Investigador Principal

Joana Batista	BI
Susana Jorge	BI

Plant Sciences

Microbial Development

Adriano O. Henriques, Professor Associado

Mónica Serrano	Post Doc
Catarina Fernandes	PhD Student
Patricia Amaral	PhD Student
Fátima Pereira	PhD Student
Wilson David Antunes	PhD Student
Filipa Nunes	PhD Student
Ana Paiva	BI
Rita Tomé	BI
Carolina Freitas	MSc Student

Microbiology of Human Pathogens Unit

Molecular Genetics

Hermínia de Lencastre, Professor Catedrático

Ana Madalena de Drummond Ludovice	Prof. Auxiliar FCT/UNL
Maria Miragaia	Investigador Auxiliar
Catarina Isabel Catarino Milheiriço	Post Doc
Nuno Alexandre Gomes Faria	Post Doc
Nelson Emanuel da Silva Frazão	Post Doc
Teresa Margarida Gomes da Conceição	Post Doc
Ons Bouchami	Post Doc
Ana Lopes Tavares	PhD Student
Teresa Carla de Almeida Figueiredo	PhD Student
Joana Rita Gonçalves Araújo Rolo	PhD Student
Inês Grilo	PhD Student
Diana Espadinha	PhD Student
Céline Catherine Coelho	BI
Isilda Gueifão	Lab Assistant
Manuela Nogueira	Administrative Assist.

Microbiology of Human Pathogens Unit

Molecular Microbiology of Human Pathogens

Raquel de Sá-Leão, Investigador Auxiliar

Ana Cristina Almeida Paulo	Post Doc
Alexandra Simões	Post Doc
Débora Tavares	PhD Student
Carina Valente	PhD Student
Ricardo Carvalho	MSc student
Sofia Félix	BI
Sónia Almeida	BI

Disease and Stress Biology

Ricardo Boavida Ferreira, Professor Catedrático ISA-UTL

Cláudia Nunes Santos	Senior Researcher
Paula Marinho Pinto	Invited Researcher
Lucélia Rodrigues Tavares	Post Doc
Regina Menezes	Post Doc
Rui Pimpão	PhD Student
Diana Macedo	PhD Student
Inês Figueira	PhD Student
Andreia Filipa Gomes	BI
Carolina Emanuel Jardim	BI
Inês Costa	MSc Student
Gonçalo Garcia	MSc Student
Vitor Gonçalves	MSc Student
Tânia Silva	BSc Student

Forest Biotech

Célia Miguel, Investigador Auxiliar

Sofia Leal	Investigator FCT
José de Vega-Bartol	Post Doc
Inês Chaves	Post Doc
Nuno Mendes	Post Doc
Andreia Miguel	PhD Student
Ana Milhinhos	PhD Student
Andreia Rodrigues	PhD Student
Andreia Matos	PhD Student
Ilanit Salmoski	BI
Inês Modesto	BI

Plant Biochemistry

Cândido Pinto Ricardo, Prof. Catedrático Jubilado ISA-UTL

Carla Maria Alexandre Pinheiro	Senior Researcher
José António Pires Passarinho	Investigador INIAV
Isa Catarina Monteiro Brás Ribeiro	PhD Student
Adelaide João Machado	BI

Plant Cell Biology

Rita Abranches, Investigador Auxiliar

Ana Sofia Pires	Post Doc
Ana Rita Basílio Santos	PhD Student
Ana Cláudia Nogueira	BI
Sara Ramalhete	Trainee

Plant Cell Biotechnology

Pedro Fevereiro, Professor Auxiliar FCUL com Agregação ITQB

Carlota Vaz Patto	Investigador Auxiliar
Jorge Paiva	Invited Researcher
André Almeida	Invited Researcher
Susana Araújo	Invited Researcher
Susana Neves	Invited Researcher
Ana Maria Ferreira	Post Doc
Jorge Cunha	Post Doc
Sofia Amaral Duque	Post Doc
Cátia Nunes	PhD Student
Diana Branco	PhD Student
Mara Alves	PhD Student
Matilde Cordeiro	PhD Student
Nuno Almeida	PhD Student
Pedro Mendes Moreira	PhD Student
Susana Leitão	PhD Student
Victor Carocha	PhD Student
Rita Severino	MSc Student
Priscila Pereira	MSc Student
Sara Costa	MSc Student
Letice Gonçalves	MSc Student
Ana Catarina Afonso	BI
Clara Graça	BI
José Salvado	BI
Maria Assunção	BI
Susana Pera	BI
Susana Leitão	BI
Diana Tomás	BI
Olivia Costa	BI
Marco Dinis	BI

Plant Molecular Ecophysiology

Manuela Chaves, Professor Catedrático Aposentado ISA-UTL

Alla Schvaleva	Post Doc
Olfa Zarrouk	Post Doc
Miguel Costa	Post Doc
Rita Francisco	Post Doc
Tânia Genebra	BI MSc
Maria Catarina Bicho	BI

Genomics of Plant Stress

Margarida Oliveira, Professor Associado com Agregação

Isabel Alexandra Aguiar de Abreu	Researcher IBET
Nelson José Madeira Saibo	Investigator FCT
Ana Paula Santos	Post Doc
Ana Paula Farinha	Post Doc
Sónia Negrão	Post Doc
Tiago Lourenço	Post Doc
Pedro Barros	Post Doc
Bruno Alexandre	Post Doc
Tânia Serra	Post Doc
Alexandra Marques	Post Doc
Inês Silva Pires	PhD Student
Cecilia Pina	PhD Student
Liliana Ferreira	PhD Student
André Cordeiro	PhD Student
Diego Almeida	PhD Student
Ana Ferro	PhD Student
Mafalda Rodrigues	PhD Student
Nuno Gonçalves	PhD Student
Helena Pires Sapeta	PhD Student
Margarida Rosa	PhD Student
Alicja Marta Góvska	PhD Student
Ana Rita Leal	BI MSc
Natacha Vieira	BI
Rita Borba	BI
Vanessa Azevedo	BI
Sofia Rodrigues	Technician
Graciela Castilhos	Visiting PhD Student
Fernanda Lazzarotto	Visiting PhD Student
João Victor Serqueira	Visiting Trainee

Collaborators

Phil Jackson, Plant Cell Wall

Technology

Applied and Environmental Mycology

Cristina Silva Pereira, Investigador Auxiliar

Tiago Lopes Martins	Post Doc
Marija Petkovic (cosup. Luís Paulo N. Rebelo)	Post Doc
Mariana Carvalho (cosup. Andrew Hursthouse)	PhD Student
Isabel Martins (cosup. Luís Paulo N . Rebelo)	PhD Student
Adélia Varela Castro	PhD Student
Helga Garcia (cosup. Luís Paulo N . Rebelo)	PhD Student
Rui Ferreira (cosup. Luís Paulo N . Rebelo)	PhD Student
Paula Cristina de Azevedo Alves	PhD Student
Diego de Oliveira Hartmann	PhD Student
Marina Guerreiro	BI
Celso Martins	BI
Dina Mestre	MSc Student

Biomolecular Diagnostic

Abel Oliva, Investigador Auxiliar

Carmo Barreto	Post Doc
Sara Horta Iracema Martinho	BI
Rita Morgado	BI

Animal Cell Technology Unit

Cell Bioprocesses

Paula M. Alves, Investigador Principal

Catarina Brito	Investigador Auxiliar
Margarida Serra	Investigador Auxiliar
Gonçalo Real	Investigador Auxiliar
Marco Patrone	Post Doc
Patricia Isabel Alves	Post Doc
Vitor Espirito Santo	Post Doc
Carina Silva	PhD Student
Sofia Almeida	PhD Student
Fabiana Fernandes (cosup. Ana Teixeira)	PhD Student
Francisca Monteiro	PhD Student
Paulo Fernandes (cosup. Ana S. Coroadinha)	PhD Student
Sofia Rebelo (cosup. Catarina Brito)	PhD Student
Daniel Simão (cosup. Catarina Brito)	PhD Student
Claúdia Correia (cosup. Margarida Serra)	PhD Student
Tiago Duarte (cosup. Ana Teixeira)	PhD Student
Barbara Cunha (cosup. Margarida Serra)	PhD Student
Mafalda Dias (cosup. Ana Teixeira)	PhD Student
Marcos Sousa	Senior Engineer Bioreaction
Marta Estrada	BI
Marta Silva	BI
Raquel Cunha	BI
Rita Costa	BI
Ana Terrasso	BI
Ana Pinto	BI
Nuno Espinha	BI
Carolina Pinto Ricardo	BI
Aniz Hamdis	BI
Susana Veloso (sup Catarina Brito)	MSc Student
Carina Vieira Brilha	Lab Manager

Animal Cell Technology Unit

Cell Line Development and Molecular Biology

Ana Sofia Coroadinha, Investigador Auxiliar

Rute Castro	Post Doc
Ana Filipa Rodrigues	PhD Student
Paulo Fernandes (cosup. Paula M. Alves)	PhD Student
Hélio Antunes Tomás	PhD Student
Hugo Soares	PhD Student
Miguel Ricardo Guerreiro	PhD Student
Tanja Laske	MSc Student
Ana Isabel Almeida	BI
Ana Sofia Oliveira	BI
Vanessa Bandeira	BI

Animal Cell Technology Unit

Engineering Cellular Applications

Manuel J. T. Carrondo, Professor Catedrático FCT-UNL

Ana Teixeira	Investigador Auxiliar
Cristina Peixoto	Head Downstream
Ana Barbas	Investigador Auxiliar
Gonçalo Real	Investigador Auxiliar
Nuno Carinhas (cosup. Ana Teixeira)	Post Doc
Ricardo Silva	Post Doc
Ricardo Perdigão	PhD Student
Piergiuseppe Nestola	PhD Student
João Vidigal (cosup. Ana Teixeira)	PhD Student
João Sá	BI
Duarte Martins	BI
Daniel Pais	BI
Ana Raposo	Lab Manager

Mass Spectrometry

Ana V. Coelho, Professor Auxiliar Convidado

Renata Soares	Investigador Auxiliar
Isabel Marcelino	Post Doc
Catarina de Matos Ferraz Franco	Post Doc
Natacha Couto	PhD Student
Ilídio Magalhães	MSc Student
Miguel Ventosa	BI
Rita Laires	BI
Pedro Alves	BI
Joana Martins	BI
André Guerra	Trainee
Filipa Lopes	Trainee
Bruno Pedras	Trainee
Ana Oliveira	Trainee
Conceição Almeida	Technician
Elisabete Andrade Alves Pires	Technician
S Mercúrio	Visiting PhD Student
A Moumenne	Visiting PhD Student
V Uliana	Visiting Trainee

Microbiology of Man-Made Environments

Teresa Crespo, Investigador Principal IBET

Vanessa Pereira	Post Doc
Gilda Sousa de Carvalho	Post Doc
Joana Lamego	Post Doc
Patrícia Rodrigues Noronha da Costa	Post Doc
Paula Isabel Loução Lopes Alves	Technician
Sandra Sanches	PhD Student
Ana Filipa Correia Silva	PhD Student
Catarina Correia	MSc Student
Anabela Vieira	BI
Ana Catarina Dourado	BI
Beatriz Oliveira	BI

Nutraceuticals and Delivery

Catarina Duarte, Investigador Auxiliar

Ana Matias	Post Doc
Ana Teresa Serra	Post Doc
Vanessa Gonçalves	PhD Student
Cátia Carmo	PhD Student
Sara Nunes	PhD Student
Mário Bordalo	MSc Student
Inês Silva	MSc Student

Pharmacokinetics and Biopharmaceutical Analysis

Ana L. Simplício, Investigador Auxiliar

Hélder João Vilareal	Post Doc
Hugo Serra	PhD Student
Catarina Correira	MSc Student
Helena Coelho	MSc Student
Márcia Alves	MSc Student
Rui Traquete	BI
Rita Silva	BI

Systems Biodynamics

Andreas Bohn, Investigador Auxiliar

Daniel Santa Cruz Damineli	PhD Student

Collaborators

Luis Filipe Vilas Boas, Analytical Chemistry
Maria Rosário Bronze, Analytical Chemistry
Maria de Fatima Silva Lopes, Food Microbial Technology

Research groups 53

Invited speakers 45

44 % articles with international teams

22 % Foreign PhD holders

6,2 M€ in Research Projects

2013 Curiosities

INSTITUTO
DE TECNOLOGIA
QUÍMICA E BIOLÓGICA
ANTÓNIO XAVIER /UNL

Knowledge Creation

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