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AGENCIA ESTATAL DE INVESTIGACIÓN

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2017

Turno de acceso general

Nombre: GUARDADO CALVO, PABLO
Referencia: RYC-2017-22079
Área Científica: Biología Fundamental y de Sistemas
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Título:

STRUCTURAL VIROLOGY

Resumen de la Memoria:

My research career was being focused on understanding the molecular mechanisms of the viral life cycle. Particularly, I have focused on three important aspects of the virus-cell interactions: (1) The structural characterization of the proteins involved in viral attachment to cells, (2) the structural mechanism of viral assembly and, (3) the structural and molecular mechanisms of viral fusion. Related with viral fusion, I have studied the structural basis of the neutralization capability of some broadly neutralizing antibodies against enveloped viruses.
I started my research career at Universidad de Santiago de Compostela with a thesis entitled Crystallographic structures of proteins from animal viruses involved in the interaction virus-host under the supervision of Dr. Mark Johan van Raaij with an FPU Fellowship. During my Ph.D., I worked on several projects with viral proteins of the families Reoviridae and Adenoviridae. 1) I carried out studies of several proteins responsible of the attachment to the cellular receptor; I solved the structure of the fiber of the avian reovirus, the head domain of the long fiber of fowl adenovirus 1, and the head domain of the fiber of the porcine adenovirus 4 (NADC-1 strain). 2) I solved the structure of the tandem repeat galectin of the porcine adenovirus 4, identified specific ligands using a glycan microarray and solved the structures of the complexes, and 3) I worked in the structure of the dsRNA-binding protein sigmaA from the avian reovirus, and we proposed a dsRNA binding model that could explain its biological function.
After my Ph.D., I moved to the Institut Pasteur in Paris, where I spent 5 years as a postdoctoral fellow under the supervision of Dr. Felix Rey with an EMBO Fellowship and later with a Sidaction Postdoctoral Fellowship. During these years I was involved in many projects: 1) I carried out structural studies of capsid proteins of viruses of the family Retroviridae, solving the structure of the CACTD domain of the Feline Immunodeficiency Virus (FIV), the structures of several HIV-CACTD mutants, and the complexes of the different capsid domains with several nanobodies. 2) I did structural studies of several class II fusion glycoproteins of the family Bunyaviridae and 3) solved the structures of several broadly neutralizing antibodies in complex with the Dengue envelope glycoprotein. These structures led to the development of a new vaccine strategy, which was the object of a UK- based patent.
Afterwards, I have obtained a permanent position as a staff scientist in the Institut Pasteur, where I am leading a small team of 3 persons. I am expanding my postdoctoral research in Bunyavirus and in 2016 I have obtained a 3-years grant as PI to develop novel viral antigens of bunyaviral proteins inspired on complexes with human neutralizing antibodies.
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Resumen del Currículum Vitae:

Current Position

Staff scientist (grade CR1 in the French system). Institut Pasteur, France.

Previous positions and professional activity:

2015 - 2017: Staff scientist (grade CR2 in the French system). Institut Pasteur, France.
2010 - 2014: Postdoctoral Fellow. Institut Pasteur, France.
2005 - 2010: PhD student. University of Santiago de Compostela, Spain

Publications:
I have 18 publications in international journals such as Nature and Science. I have published 12 first-author papers: one in Science (IF 37.2 and co-corresponding author), one in Nature (IF 41.4), one in Nature communications (IF 12.1), one in Plos Pathogens (IF 7.7), two in Journal of Virology (IF 4.7), two in Journal of General Virology (IF in 2008 was 3.2, one of the papers was selected for the cover), one in Journal of Molecular Biology (IF in 2005 was 4.8), two in Act. Cryst. F (IF 0.7), and one in Advances in Virus Research (IF 4.2).

Patents:

2014: Dengue subunit vaccine and antibodies binding the virion dependent epitope of dengue virus (1413086.8)
2014: Anti-SAMHD1 monoclonal antibody:clone I19-18 (2014-62). Commercialized by EMD Millipore.

Conferences:
I have presented my work in several international meetings: 8 oral communications and 7 posters.

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R&D Projects:
I have participated in 7 national and international scientific projects. I am principal investigator of a grant from the French ANR-Labex.

Research in international centers:
I have worked almost eight years at the Institut Pasteur in Paris. I have made a three months stay in the Hellenic Institut Pasteur in Athens (Greece), a 2-months stay at ESRF in Grenoble (France), and a 1 month stay in the University of Creete (Greece).

Fellowships:
2005-2006: PhD Fellowship from Diputacion de La Coruña
2006-2010: FPU Fellowship from the Spanish Ministry of Education
2010-2012: EMBO Long Term Postdoctoral Fellowship from European Molecular Biology Organization (EMBO)
2013: ANRS postdoctoral Fellowship (Rejected in favour of Sidaction Fellowship)
2012-2014: Sidaction Fellowship from Fundation Sidaction.

Awards:
2006: Award for the best communication in the XVII Symposium of the GEC (Grupo especializado de cristalografia).

Teaching:
2008-2009: I have taught in the Department of Biochemistry and Molecular Biology in the University of Santiago de Compostela.

During my career I have assisted numerous graduate students and postdoctoral fellows. Actually, I am in charge of one PhD student and two postdoctoral fellow.

Other scientific activities:
I often review articles for the International Journal of Molecular Sciences.
Develop of Python modules for the analysis of proteins in Pymol. One of them has been cited 3 times.

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CONVOCATORIA 2017

Turno de acceso general

Nombre: COGLIATI , SARA
Referencia: RYC-2017-23013
Área Científica: Biología Fundamental y de Sistemas
Correo Electrónico: scogliati@cnic.es

Título:

Deciphering the role of respiratory chain supercomplexes: from structure to physiology.

Resumen de la Memoria:

In 2007, after my master degree, in the laboratory of Prof. Bonapace (IGBMC), I studied the role of the epigenetic regulator Np95 contributing significantly to two pubblications (Papait R. et al. 2008; Magnani E. et al. Submitted). In 2008, I joined the laboratory of Prof. Scorrano (Padova, Italy) for my PhD on the physiological impact of cristae morphology. Using genetic and apoptotic manipulations of cristae structure, I discovered that mitochondrial respiration and mitochondria-dependent cellular growth were affected. It called for a study of the effects on respiratory chain. To this aim, thanks to a Travelling Fellowship, I joined for a short stay the lab of Prof. Enriquez at the CNIC, in Madrid. There, I acquired a unique expertise in respiratory chain supercomplexes(SCs) organization that was fundamental for the discovery that cristae remodeling affected the assembly of SCs resulting in impaired mitochondrial respiratory function (Cogliati et al. 2013). Later, thanks to my expertise in the cristae morphology, I critically contributed to the characterization of a unified molecular model of cristae morphology control (Glytsou C. et al. 2016). Being really fascinated by the role SCs on metabolism, in 2013, I moved to the lab of Prof. Enriquez for my postdoc. Here, I discovered that the assembly of CIV into different SCs is determined by different tissue specific subunit isoforms and that SCAF1 is the only assembly factor able to bring CIV together with CIII. Moreover, I characterized the functional domains of SCAF1 and the molecular mechanism of III+IV assembly. This discovery was a very important step forward in the understanding SCs organization (Cogliati S. et al. 2016). Thanks to my expertise in the structure and function of SCs, I took part in a breakthrough work characterizing respiratory chain function and structure of conplastic mice (Latorre-Pellicer A. et al. 2016). I critically contributed to deciphering the complex IV dysfunction during aging in white adipose tissue (Soro-Arnaiz I. et al. 2016). Further, I contributed to the characterization of mitochondrial function and SCs structure in a model of pressure-overload induced cardiac hypertrophy and heart failure (Padrón-Barthe et al. 2018, in press). Recently, I collaborated with Prof. Puigserver laboratory at Harvard Medical School studying the molecular mechanisms that regulate SCs dynamics. My knowledge was crucial in deciphering the effect of different metabolic conditions on SCAF1 expression and SCs structure. Currently, I am studying how different SCs organizations impact on metabolism in response to high fat diet, exercise and aging in new mouse models. Moreover, I am collaborating with the group of Prof. Mercader (University of Bern, Switzerland) giving my critical contribution to explore the role of SCAF1 and SCs in zebrafish. In turn, this original study is improving my knowledge giving me new abilities in a completely different animal model. In conclusion, during my early scientific career, I have acquired a wide knowledge in mitochondrial function and respiratory chain organization that gives me the confidence to initiate an independent line of research to investigate deeply the role of mitochondria on metabolism especially focused on sex-bias function and development.
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Resumen del Currículum Vitae:

In 2007, I worked at the IGBMC in the laboratory of Prof. Bonapace. studying the role of the epigenetic regulator Np95 and my results significantly contributed to two publications (Papait R. et al. 2008; Magnani E. et al. Submitted). After, in 2008, I joined the laboratory of Prof. Scorrano (Padova, Italy) for my PhD studying the role of cristae morphology on supercomplexes(SCs) assembly. In order to gain knowledge in the field of SCs organization, I collaborated with Prof. Enriquez (CNIC,Madrid) thanks to a Journal of Cell Science Travelling Fellowship. It was fundamental to demonstrate that shape of biological membranes influences membrane protein complexes suggesting also a new molecular mechanism (Cogliati S. et al. 2013). This work was successfully published in a high impact factor journal. Later, I also critically contributed to the characterization of a unified molecular model of cristae morphology control (Glytsou C. et al. 2016). During my PhD, I took part in many scientific meetings presenting my data with posters. In 2008, I was selected for an oral presentation in the International Symposium on Mitochondrial physiology and pathology. In 2012, I was honored with a Keystone Symposia Conference Assistant fellowship and I edited the report of the conference Mitochondrial Dynamics and Function. In the same year, I was awarded with a FEBS/EMBO travelling fellowship to take part in the FEBS/EMBO Mitochondria in life, death and disease meeting. Moreover, I was invited to write with my supervisor one Research Highlights and one Preview. For my postdoc in 2013, I moved to the lab of Prof. Enriquez and I characterized the mechanism of III+IV SCs assembly deciphering the role of some tissue specific subunits of CIV and the assembly factor SCAF1. This work represents a very important step forward in the understanding of SCs organization and it was published in a very important journal (Cogliati S. et al. 2016). In the same year, thanks to my unique knowledge on SCs organization, I gave important contributions to other important studies many of them already published (Nature, Cell Reports). Recently, I collaborated with Prof. Puigserver laboratory at Harvard Medical School. This breakthrough study on the molecular mechanisms that regulate SCs dynamics is now under revision in a high impact factor journal (Balsa et al. under revision). During my postdoc, I had the great opportunity to participated in different international meetings presenting my data with posters. Moreover, I have been tutoring many students during their final-year projects. Due to my remarkable contribution in the field, I was invited to write a book chapter and a review (Cogliati S. et al. 2016) that is significantly considered among the scientific community (more than 40 citations so far). Currently, I am involved in a project studying the

physiological impact of different SCs organization in distinct animal models. To sum up my scientific production, I can underline that I produced 9 publications in the first quartile and all of them have been cited for a total of more than 370 citations resulting in a h-index of 6 (Web of Science).

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Turno de acceso general

Nombre: FERNANDEZ MARTINEZ, JAVIER
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Título:

Structure and Function of the Nuclear Pore Complex

Resumen de la Memoria:

I earned my degree in Biology and Biotechnology at the University of Alicante (Spain). After a period of training at the Department of Microbiology of the Universidad Miguel Hernandez, under the supervision of Prof. Francisco Rodriguez-Valera, where I worked in the characterization of marine microorganisms, I obtained a FPI Fellowship from the Spanish Ministry of Science and Technology and joined the Laboratory of Molecular Genetics at the Centro de Investigaciones Biologicas (CSIC) in Madrid. Under the supervision of Prof. Miguel Angel Penalva Soto and Dr. Eduardo Espeso, I carried out my graduate studies, earning the degree of Ph.D. in Science at the Universidad Complutense de Madrid. My doctoral thesis was focused on defining the determinants regulating the nuclear transport of the transcription factor PacC, the final effector of the filamentous fungus Aspergillus nidulans environmental pH signaling pathway. After my thesis, I spent a short transition period working at the Laboratory of Developmental Neurobiology at the Instituto de Neurociencias in Alicante (Spain), under the supervision of Professor Joan Galceran, where I gained valuable experience working with human cell lines and vertebrate signaling pathways, and managed to publish a first author paper in the Journal of Cell Science. For my postdoctoral training, I joined the Laboratory of Cellular and Structural Biology, at The Rockefeller University in New York (USA), under the supervision of Prof. Michael P. Rout. Shortly after joining Prof. Rout laboratory in 2007 I was awarded the Postdoctoral Fellowship of the Spanish Ministry of Education. Later I was promoted to Research Associate, my actual position, and now I am in the last stage of promotion to Research Assistant Professor at The Rockefeller University.

My work at The Rockefeller University has been dedicated to the structural and functional characterization of the nuclear pore complex (NPC) and its building modules. The NPC is a massive (~50 MDa) protein assembly, formed by multiple copies of 30 different proteins called nucleoporins or Nups. The NPC is the sole mediator of transport between the nucleus and the cytoplasm. I developed and used a combination of biochemical, proteomics, electron microscopy and genetic methods to obtain structural information about previously uncharacterized single Nups, NPC subcomplexes, and finally, the whole NPC. The structural data thus gathered was then used to calculate the structure of the assemblies by an integrative approach. This way, I was able to solve the structure of several single major Nups, two of the main NPC modules (the Nup84 complex and the cytoplasmic mRNA export platform, published as an Article in Cell (Fernandez-Martinez et al., 2016)) and the whole yeast NPC at sub-nanometer precision (recently accepted to be published as an Article in Nature). The NPC structure allows us to rationalize the architecture, transport mechanism, and evolutionary origins of the NPC, and constitutes an invaluable roadmap for future work in the nuclear transport field. For the future I plan to use the NPC as a model system to analyze interactions between molecular machines and how they are coordinated in space and time - within the different cellular compartments and during the cell lifetime.

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Resumen del Currículum Vitae:

My work has been focused on developing experimental methods and techniques to dissect the architectures of native macromolecular assemblies.

1- Kim S, Fernandez-Martinez J, Nudelman I, Shi Y, Zhang W et al., Nature, 2018, Integrative Structural and Functional Anatomy of a Nuclear Pore Complex. in press (co-first author): For the first time, we have determined a subnanometer precision integrative structure for the entire 552-protein yeast NPC and mapped its functional elements in unprecedented detail. This integrative structure allows us to rationalize the architecture, transport mechanism, and evolutionary origins of the NPC and constitutes a hallmark for future work on the nuclear transport field.

2- Fernandez-Martinez et al., Cell, 2017, Structure and Function of the Nuclear Pore Complex Cytoplasmic mRNA Export Platform. PMID 27839866 (co-first author): For decades, the cytoplasmic mRNA export platform in the NPC was depicted (even in textbooks) as a filamentous structure projecting towards the cytoplasm. My work revealed that this view is not accurate, and that the platform is rather compact and projects towards the NPC central channel. This central positioning of the mRNA export platform reveals that the mRNA export and remodeling processes are fully integrated in the NPC central channel, and are not two disconnected molecular mechanisms, as suggested by previous models.

3- Upla et al., Structure, 2017, Molecular Architecture of the Major Membrane Ring Component of the Nuclear Pore Complex. PMID 28162953 (co-corresponding author): We used a combination of negative-stain electron microscopy, nuclear magnetic resonance, and small-angle X-ray scattering methods to determine an integrative structure of the 120 kDa luminal domain of Pom152. Our structural analysis revealed that the luminal domain is formed by a flexible string-of-pearls arrangement of nine repetitive cadherin-like Ig-like domains, that resemble the organization seen in type I cadherins. Together with other molecular similarities, this strongly indicates an unexpected evolutionary connection between NPCs and the cell adhesion machinery.

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4- Hayama R, Rout MP, Fernandez-Martinez J., Current Opinion in Cell Biology, 2017, The nuclear pore complex core scaffold and permeability barrier: variations of a common theme. PMID 28624666 (corresponding author): We propose a novel, groundbreaking model for the evolutionary origin of the most mysterious part of the NPC: the permeability barrier. This barrier is formed by intrinsically disordered proteins that, we suggest, arose from the simple expansion and modification of pre-existing disordered linkers.

5- Fernandez-Martinez et al., Journal of Cell Biology, 2012, Structure-function mapping of a heptameric module in the nuclear pore complex. PMID 22331846 (co-first author): using an integrative approach, I was able to solve, for the first time, the structure of the whole, native seven-component Y-shape Nup84 complex. The structure revealed which regions of the complex are involved in key interactions with the rest of the NPC and which domains perform key roles in stabilizing the membrane curvature of the nuclear envelope at the NPC.

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Turno de acceso general

Nombre: MELE MESSEGUER, MARTA
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Título:

genomica funcional

Resumen de la Memoria:

My research stands at the interface of population genetics and functional genomics. During my career, I have had a multidisciplinary training that ranges from developing computational methods to setting up novel high-throughput experimental techniques.

The focus of my PhD thesis was to understand what migratory routes humans took when they left Africa 50,000 years ago to give rise to the population diversity we observe today. To address this, I developed a novel computational method to analyze present-day human sequences using recombination as a genetic marker. I then applied this method to hundreds of samples from the Old World and I showed that humans left Africa following a different route than the one previously assumed. As a postdoctoral researcher, I became interested in how the phenotypic and genotypic diversity we observe in humans today (the focus of my PhD), could be explained by differences in gene regulation. Thus, I decided to use my background in population genetics to move in the field of functional genomics and address both how genetic variation impacts gene regulation and how the human transcriptome is regulated in the context of health and disease. This research can be summarized in three main lines:

1. Transcriptional regulation across tissues and individuals. I performed a large-scale study of how variation in gene expression and splicing across tissues and individuals explains human phenotypic variation and is ultimately linked to disease. We found that genes exhibiting high interindividual expression variation included disease candidates associated with sex, ethnicity, and age. My work also highlighted that variation across individuals was larger for splicing than for expression. This suggests that splicing plays a crucial role in defining individual variation (Melé et al. Science 2015).
2. Transcriptional changes during acute infection across tissues. I extended the previous biological framework by studying how both protein coding genes and a novel gene class named long non-coding RNAs (lncRNAs) changed in response to acute viral infections. I have analyzed more than 100 transcriptomic samples from non-human primates infected with Ebola virus and studied the host response to such deadly infection. This study will be the largest viral-host transcriptome study carried out to date, and it will provide a detailed map of how Ebola viruses interact with the host pathways and functions.
3. Pre- and post- transcriptional regulation of lncRNAs. To expand on the study of lncRNAs and how genetic variation impacts gene regulation, I performed a large-scale analysis of all aspects of lncRNA regulation (Melé et al. Gen Res 2017). Then, I set up an innovative high-throughput approach to functionally characterize the impact of genetic variation in lncRNA promoters and enhancers. My work showed that lncRNA regulation is different from that of protein coding genes, but the impact of genetic variation is similar between the two.

My goal is to set up an innovative research program that combines population genetics and functional genomics to study the impact of genetic variation in gene regulation and what are the implications for disease susceptibility. Specifically, I plan on applying the cutting-edge techniques acquired during my postdoc to focus on understanding how genetic variation affects both DNA and RNA regulatory elements.
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Resumen del Currículum Vitae:

My research stands at the interface of population genetics and functional genomics. During my career, I have participated in projects that study the mechanisms implied in generating current genetic diversity in populations (from my PhD at Pompeu Fabra University), how this genetic diversity relates to transcriptomics (during my first post-doc at the CRG), and how genetic variation affects gene expression (the focus of my current research at Harvard University). I have studied how the human transcriptome is differentially regulated either across tissues and individuals, between gene classes (such as lncRNAs and mRNAs) or during infection with specific pathogens, including Ebolavirus.

My scientific career has allowed me to develop myself as a highly successful independent scientist:

1) I have successfully produced scientific publications in top tier journals in every step of my career. I am an author of eighteen peer-reviewed publications, including seven as first author. I have been involved in over thirty other publications as a member of the GTEx Consortium, the Great Ape Genome Consortium, and the Genographic Consortium. In the last two years I have published first-author papers in highly prestigious journals such as Science and Genome Research that were picked up by the Spanish media, as well as a perspective paper in Molecular Cell. According to Google Scholar I have more than 2,300 citations and h-index of 14.

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2) I have presented my research in eleven International conferences, four as speaker. In addition, I have been invited to give talks at several institutions including Oxford University (Oxford, UK; 2013 and 2018), EBI-EMBL (Cambridge, UK; 2017), CRCT (Toulouse, France; 2017), CRG (Barcelona, Spain; 2017) and MRC London (London, UK; 2018).

3) I have been the official supervisor of two master thesis and currently one PhD thesis at Harvard University and have been member of one thesis committee. I am part of the Harvard mentoring program for Women in Science since 2016, and I have mentored four female Harvard grad students to promote their career development.

4) I have teaching experience both in Master classes (Biomedical Research Master; UPF) and as invited lecturer in Biology BSc. degree (UPF). To promote dissemination of my work, I have published outreach articles in two journals for the general public for which I was awarded a Scientific communication prize.

5) I have obtained funding to carry out my research both at the PhD level and at the postdoctoral level including PhD fellowships (from Spanish Ministry and from the Catalan government), funding to perform stays abroad, and a postdoctoral fellowship to fund my salary and part of my research at Harvard University (LSRF; 180,000 US $). Finally, I led the preparation of a major grant application (U19-NIH) awarded to fund one of my postdoctoral projects (400,000 US$).

I believe that my career trajectory, mentoring experience and capacity to fund my research have equipped me well to be a successful independent researcher. My goal is to set up an innovative research program to expand our knowledge on how the human transcriptome is regulated in the context of health and disease using cutting-edge computational and experimental tools.

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CONVOCATORIA 2017

Turno de acceso general

Nombre: LOPEZ SAGASETA, JACINTO
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Área Científica: Biología Fundamental y de Sistemas
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Título:

STRUCTURAL AND BIOPHYSICAL STUDIES ON ANTIGEN RECOGNITION AND VACCINE DEVELOPMENT

Resumen de la Memoria:

My scientific career began with my doctoral studies in 2002 at the University of Navarra. I worked on the biochemical characterization of an endothelial receptor (EPCR) and two factors of the coagulation system, protein C and factor VII. I developed skills in molecular cloning, recombinant protein expression, purification, site-directed mutagenesis, biophysical characterization of binding kinetics via surface plasmon resonance (SPR) and protein crystallography. I defended my PhD in 2007 and graduated with Sobresaliente cum laude. Subsequently, I initiated novel studies to demonstrate how EPCR, which is an MHC class I-like protein that hosts a lipid in a hydrophobic groove, can be down-regulated by the binding of different phospholipids, which could ultimately have an impact in the development of thrombosis. I combined biophysical characterization via SPR and fluorescence spectroscopy and mass spectrometry techniques to demonstrate that EPCR can bind phospholipids of different nature and alter its anticoagulant and anti-apoptotic properties. This research period translated into twelve research articles, three as lead author. I coauthored nine additional papers as a result of successful collaborations. Two of my first author papers merited Comment Articles on the pioneering nature of these studies by their respective journals: BLOOD (2012) and THE JOURNAL OF THROMBOSIS AND HAEMOSTASIS (2007).
In 2009, I moved to USA and joined the Department of Biochemistry & Molecular Biology of The University of Chicago as a postdoctoral researcher to lead structural and biophysical studies on antigen recognition by Natural Killer T cells. In 2010, I was awarded a Postdoctoral Fellowship by the Spanish Ministry of Education. I produced four strong publications as first author: JOURNAL OF IMMUNOLOGY (2013), PNAS (2013), EMBO JOURNAL (2012), PLOS BIOLOGY (2012) and co-authored a fifth publication in IMMUNITY (2011). I solved the first crystal structure of a MAIT Cell Receptor bound to MR1 (López-Sagaseta et al; PNAS, 2013). This ternary complex was pursued for a long time and this structure became a reference in the biology of antigen presentation by MHC class I-like molecules.
In 2015, I was awarded a Marie Skłodowska-Curie IF grant. As Principal Investigator, I conducted structural studies for new generation vaccines in the industrial sector at GlaxoSmithKline Vaccines, Siena, Italy. I determined the crystal structure of a vaccine-elicited human antibody bound to a meningoccocal antigen. To the best of my knowledge, the first report of a vaccine-elicited human antibody Fab bound to a bacterial antigen. I published two articles, both as first and corresponding author, which illustrates my role as Principal Investigator (NATURE COMMUNICATIONS, 2018; CSBJ, 2015).
Combined with my previous scientific background in academia, the dual nature of my scientific career favours a unique and strong position to lead pioneering research lines. I set out to explore how scenarios such as tumor growth and infectious diseases can alter the lipid cargo of MHC molecules, and become a target for T cell receptors and antibodies. In addition, I aim at extending my recent work on structural vaccinology and protein-based nanoparticles for the development of innovative vaccine candidates against drug-resistant and currently untreatable infectious diseases.

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Resumen del Currículum Vitae:

BS CHEMISTRY, 2002, UNIVERSITY OF NAVARRA
PHD, 2007, UNIVERSITY OF NAVARRA
PUBLICATIONS:
20 articles:
- 2 as corresponding author:
NATURE COMMUNICATIONS (2018) AND COMPUTATIONAL AND STRUCTURAL BIOTECHNOLOGY JOURNAL (2015)
- 9 as first author:
NATURE COMMUNICATIONS (2018), COMPUTATIONAL AND STRUCTURAL BIOTECHNOLOGY JOURNAL* (2015), BLOOD** (2012), JOURNAL OF IMMUNOLOGY (2013), PNAS (2013), EMBO JOURNAL (2012), PLOS BIOLOGY (2012), PROTEIN EXPRESSION AND PURIFICATION (2009), JOURNAL OF THROMBOSIS AND HAEMOSTASIS** (2007). *Features within most downloaded and cited articles of the journal. ** Articles with journal Comment Article.
- 10 without the participation of my PhD advisor
- 16 belonging to the first quartile of the Science Journal Ranking.
- I was awarded the Prize for the Best Article in Thrombosis and Haemostasis at the XXIV National Congress of the Spanish Society of Thrombosis and Haemostasis. Murcia (Spain). October 2008. J Thromb Haemost, 2007.
- I was a selected applicant in for the course "APS Data collection workshop and CCP4 school: From data collection to structure refinement and beyond", 2001, Argonne National Laboratory, U.S.A.

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CITATION METRICS: H-index: 14; Total citations: 559; Average citations per item: 28.0.
INTERNATIONAL MOBILITY EXPERIENCE: Italy, Principal Investigator, Glaxosmithkline Vaccines (June 2015 – June 2017); Research professional, The University of Chicago (May 2014 - April 2015); Postdoctoral researcher, The University of Chicago (July 2009 - April 2014).
AWARDS FROM COMPETITIVE NATIONAL AND INTERNATIONAL CALLS:
Marie Skłodowska-Curie IF Grant. 2015; Peer-reviewed process: "The applicant has an excellent track record and evidence of independent thinking and leadership potential"; Postdoctoral Fellowship, Spanish Ministry of Education. 2010; Travel Grant for New Technologies Incorporation; Spanish Foundation of Haematology and Haemotherapy. 2009; Program for the Improvement of the Research Capacity. Government of Navarra. Postdoctoral Fellowship. 2008; Predoctoral fellowship. Foundation for Applied Medical Research, University of Navarra. 2005; Predoctoral fellowship. FIS, Spanish Ministry of Health, Grant PI021040. 2002.
PARTICIPATION IN NATIONAL AND INTERNATIONAL CONFERENCES AND SEMINARS:
- 4 oral presentations as invited speaker
- Co-author in 5 additional oral presentations
- 5 poster presentations
- Session Chair at PhD Workshop, GSK Vaccines, 2016.
TEACHING EXPERIENCE:
I have supervised 1 Postdoctoral and 4 pre-doctoral researchers; Three became co-authors in publications of peer-reviewed journals as a result of their participation in the research carried out in the laboratory under my supervision.
I have provided teaching support at "Metodología y Experimentación Bioquímica", Degree in Biochemistry, University of Navarra, 2003-2004.
PARTICIPATION IN SCIENTIFIC COMMITTEES:
Member of PhD thesis defense committee. The University of Navarra, 2016;
INVITATIONS FOR MANUSCRIPT REVIEW:
Scientific Reports, Experimental and Molecular Pathology Journal, Applied Biochemistry and Biotechnology Journal.

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Turno de acceso general

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Título:

RNA-BASED REGULATION OF GENE EXPRESSION AND ANTIVIRAL RESISTANCE IN PLANTS

Resumen de la Memoria:

My research has focused on the study of different areas of RNA biology in plants and viruses: from the basic understanding on how RNAs regulate gene expression and control or induce diseases to a more applied and biotechnological research aiming to engineer artificial RNAs for the efficient and selective control of plant gene expression or to repress pathogenic RNAs and generate disease resistance.
During my PhD at IBMCP (Valencia, Spain), I developed several RNA-based tools to engineer resistance in plants against viroids, small non-coding RNAs that induce disease in several plant species. These tools included the synthesis of i) double-stranded RNAs specifically complementary to viroid RNAs, and ii) a new generation of trans-acting hammerhead ribozymes with tertiary stabilizing motifs highly active against viroid RNAs at the low magnesium concentrations present in plant cells. In my first postdoctoral position at CNB (Madrid, Spain), I became interested in understanding how RNA viruses induce infections in susceptible hosts, and identified several viral pathogenicity determinants in different Potyviridae proteins. In my second postdoctoral position, first at OSU (Corvallis, USA) and second at DDPSC (St Louis, USA), I investigated how plant small RNAs (sRNAs) function through their interaction with ARGONAUTE (AGO) proteins. Specifically, I studied how target RNAs cleaved by AGO/sRNA complexes are routed into post-transcriptional gene silencing amplification pathways, and how AGOs regulate endogenous processes and function in antiviral defense. I also developed a platform including new molecular and bioinformatics tools for the simple, rapid and cost-effective design and generation of artificial sRNA constructs for highly specific and effective gene silencing in plants.
Since my reintegration at the IBMCP, I have focused my research in further understanding how AGO complexes function in posttranscriptional gene regulation and antiviral defense in plants. Specifically, my current and future research seeks to apply genome-wide approaches for the identification of the whole spectrum of target RNAs and proteins interactors of plant AGOs during development and stress conditions, as well as to further develop artificial sRNA-based strategies for the fine-tune regulation of gene expression and enhanced antiviral defense in plants.

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Resumen del Currículum Vitae:

In 2001, I graduated as Agricultural Engineer (major in Biotechnology) from the Universidad Politécnica de Valencia. I was awarded with a Formación de Profesorado Universitario, FPU predoctoral fellowship from the Spanish Government to work at the Instituto de Biología Molecular y Celular de Plantas (IBMCP, Valencia, Spain) for developing RNA-based tools to engineer resistance in plants against viroids. In 2008, I defended my PhD with honours, and initiated a first postdoctoral stage at the Centro Nacional de Biotecnología (Madrid, Spain) to identify viral pathogenicity determinants in Potyviridae proteins. In 2009, I was awarded with a postdoctoral fellowship from the Spanish Government to investigate how plant small RNAs (sRNAs) function through their interaction with ARGONAUTE (AGO) proteins, first at Oregon State University (Corvallis, USA), and next at the Donald Danforth Plant Science Center (Saint Louis, USA). In 2015, I was awarded with a Marie S. Curie Individual Fellowship for my reintegration at the IBMCP as principal investigator of my own project aiming to develop new antiviral tools for enhanced crop protection. In 2015, I was also awarded with a Proyecto I+D+I para jóvenes investigadores grant which I had to decline due to incompatibility with the Marie S. Curie grant. I develop my research at the IBMCP with a postdoctoral contract from CSIC. My goal I to understand how AGO complexes function in posttranscriptional gene regulation and antiviral defense.
I have published 24 articles listed in Web of Science (WOS). Several of these articles have been published in internationally renowned journals such as Nature Communications, Nature Plants, Nature Structural & Molecular Biology, Current Opinion in Plant Biology, Plant Cell or Nucleic Acids Research. 19 of these articles are in the first quartile (Q1), and 15 in the first decile (D1) impact factor-based categories. 19 are research articles (I am first author in 11, last author in 1 and corresponding author in 4), 4 are review articles (I am first and corresponding author in 1) and 1 is a commentary article (I am single author). My publications have been cited 705 times according to WOS, with a mean of 109.6 citations per year during the last 5 years. My H index is 14. I have also published 3 articles in non-WOS journals: 1 research article (I am last and corresponding author) and 2 commentary articles (I am first and corresponding author in 1, and single author in the other). I have also published 9 book chapters (I am first author in 2, and single author in 3) and edited 1 book.
I am co-inventor of a US patent and have participated in 19 research projects (1 as principal investigator), reviewed 3 different European grant proposals as H2020 Expert, contributed 44 communications to meetings (15 as speaker), named member of the review editorial board of 3 journals, reviewed articles for 16 different journals, tutored 5 undergraduate students and 3 Master students, participated in the committees of 3 PhD and 5 Master theses, and coordinated 1 scientific meeting. Other merits include teaching activities in 2 different Master programs, the participation in 20 courses of specialization, the obtention of official advanced degrees in English and French and of the Profesor Ayudante Doctor accreditation, and the engagement in various face-to-face or online outreach activities.

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AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2017

Turno de acceso general

Nombre: IRANZO SANZ, JAIME
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Área Científica: Biología Fundamental y de Sistemas
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Título:

Modelización de sistemas evolutivos

Resumen de la Memoria:

For the last 9 years, I have been doing research on the interface of Biology and Physics. My goal is understanding the major evolutionary and ecological processes that occur in microbial populations from a systems perspective, combining empirical data with tools from statistical mechanics, game theory, and network science. For my doctoral research, I joined a diverse group of biologists, geologists, physicists, and engineers working together at the Center for Astrobiology in Madrid to investigate the origin and evolution of life. With my advisor, Dr. Susanna Manrubia, I modeled the evolutionary responses of viral and microbial populations to opposing selective pressures and applied our results to the design of novel antiviral therapies. I also formulated mathematical models to explore the conditions that lead to the evolution of multipartite viruses (viruses with segmented genomes that are packaged in separate capsids), whose origins remain an open question that has recently spawned renewed interest among plant virologists. Collaborating with experimentalists to guide my research and validate the theoretical work allowed me to obtain results that would not have been possible using only experimental or modeling approaches.

I have further pursued transdisciplinary research goals as a postdoctoral fellow in Dr. Eugene Koonin's group at the National Center for Biotechnology Information in Bethesda, USA. During the past 4 years, I have acquired skills in bioinformatics and computational biology that have enabled me to study fundamental aspects of microbial evolution. The ubiquity of altruistic behavior in unicellular organisms, the inevitable rise and persistence of parasites in evolution, the network of gene sharing in the virosphere, and the processes that shape microbial genomes have been central topics of my recent research. Overall, my doctoral and postdoctoral work has resulted in 16 articles as first author, including publications in top journals such as PNAS and Nature Communications, as well as co-authorships in Nature Reviews Microbiology and Trends in Microbiology.

Throughout my doctoral and postdoctoral training, I have learned that the same evolutionary and adaptive mechanisms that generate functional patterns in biological systems may explain the emergence of complex hierarchical structures in ecological, technological, and even social systems. Furthermore, the relative contribution of "non-canonical" evolutionary mechanisms, such as horizontal gene transfer and parasite-host coevolution, may underlie the fundamental differences among evolving systems. In the coming years, I wish to keep exploring such mechanisms from an integrative perspective, focusing on the computational analysis and mathematical modeling of microbial genomes and microbiomes, and leveraging the expanding datasets of environmental metagenomics to develop quantitative modeling approaches. At the same time, I expect to combine methods from physics, ecology and evolutionary biology to study the interactions among microbes, viruses and hosts.
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Resumen del Currículum Vitae:

EDUCATION
2014-present: Postdoctoral Fellow, National Center for Biotechnology Information, National Institutes of Health, USA.
2013: PhD in Mathematical Engineering, Carlos III University of Madrid, Spain.
2012: BSc in Physics, National Distance Education University (UNED), Spain.
2011: MSc in Mathematical Engineering, Carlos III University of Madrid, Spain.
2007: BSc in Biochemistry, University of Navarra, Spain.
2007: BSc in Biology, University of Navarra, Spain. Third National BSc Prize, Extraordinary BSc Award of the Universidad de Navarra.

RESEARCH EXPERIENCE
2014-present: Postdoctoral fellow with Eugene Koonin, PhD, Senior Investigator at the National Center for Biotechnolgy Information, National Institutes of Health (Bethesda, USA). Research focus: Modeling prokaryotic and viral evolution.
2009-2013: Doctoral trainee and research assistant with Susanna Manrubia, PhD, Senior Investigator at the Astrobiology Center, CSIC-INTA. Research focus: Evolutionary dynamics of heterogeneous, fast evolving populations.
2008: 3-month research internship with Luis Mario Floría, PhD, Professor of the Department of Condensed Matter Physics, University of Zaragoza. Research focus: Evolutionary games in complex networks.
2008: 3-month research internship with Ricard Solé, PhD, ICREA Research Professor at the Universitat Pompeu Fabra and head of the Complex Systems Lab at the Barcelona Biomedical Research Park. Research focus: Modeling protocell division.
2008: 2-month research internship with Pablo Villoslada, MD/PhD, head of the Neuroimmunology Lab at the Center for Applied Medical

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Research of the University of Navarra. Research focus: Origin of autoimmunity and immune response against tumors.
2007: 4-month research internship with Susanna Manrubia, PhD, Senior Investigator at the Astrobiology Center, CSIC-INTA. Research focus: Lethal defection in RNA viruses.
2004-2007: Undergradute research assistant with Pablo Villoslada, MD/PhD, head of the Neuroimmunology Lab at the Center for Applied Medical Research of the University of Navarra. Research focus: Study of the interferon signalling network in T-lymphocytes and its relation with multiple sclerosis.

PUBLICATIONS
First author: 16 articles (2 PNAS, 1 Nature Communications).
Total: 22 articles (1 Nature Review Microbiology, 1 Trends in Microbiology, 3 PNAS).
H-index: 12, number of citations: 445 (based on Google scholar).

SCHOLARSHIPS, GRANTS AND AWARDS
2014-2017: Intramural Research Training Award Fellowship. National Institutes of Health, USA.
2009-2013: Research Assistant Grant of the Comunidad de Madrid.
2008: Third National BSc Prize in Biology (2006-07). Spanish Ministry of Education.
2008: Special Prize in Physics, in the "VII Certamen Universitario Arquímedes". Spanish Ministry of Science and Innovation.
2008: Collaboration Fellowship of the University de Zaragoza, Oct-Dec 2008. Institute for Biocomputation and Physics of Complex Systems, University of Zaragoza.
2007: Research Introduction Fellowship, Sept-Dec 2007: Astrobiology Center (CSIC-INTA).
2007: Extraordinary BSc Award in Biology, University of Navarra 2007.
2006-2007: Collaboration Fellowship for undergraduate students: Department of Physics and Applied Mathematics of the University of Navarra and Spanish Ministry of Science.

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AGENCIA ESTATAL DE INVESTIGACIÓN

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2017

Turno de acceso general

Nombre: MARTINO , FABRIZIO
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Área Científica: Biología Fundamental y de Sistemas
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Título:

Chromatin structure and function

Resumen de la Memoria:

Chromatin regulates every aspect of DNA metabolism from DNA replication and transcription to DNA damage response and repair. All these activities are mediated by multi-subunit protein complexes that recognise and modify chromatin. I have always been interested in how these multi-subunit protein complexes function at the molecular level.
During my PhD I reconstituted yeast heterochromatin in vitro and dissected it biochemically. The system I reconstituted allowed me to answer questions that were open since many years and that could not have been answered in vivo. The results I obtained were published in four articles and the system I set up have been used by other members of the lab and contributed to the publications of several articles.
During my PhD I accumulated a solid background in the preparation and isolation of multi-subunit protein and protein-chromatin complexes. I decided to apply this knowledge and experience to structural biology. I decided to solve the high-resolution X-ray structure of a protein bound to the nucleosome core particle. When I started my post-doc no structure of a protein bound to the nucleosome was published event though hundreds of chromatin remodelers were described. Moreover, the complex I was trying to isolate and crystallise was very large for X-ray crystallography. The project I was starting was therefore very challenging, but biologically very interesting. My structure was the fourth structure of a protein bound to nucleosome published at that time. Even nowadays only very few high-resolution structures of chromatin containing complexes have been published. My work was published on a Nature Structural and Molecular Biology article where I am the last and solo-corresponding author and the first author of this article is the student I supervised during her thesis. Because of my pioneering work in the field I have been invited as speaker at the prestigious Boeringer foundation conference on chromatin.
Because of the difficulty of solving the structure of chromatin-containing complexes by X-ray crystallography and because of a technological revolution in the cryo-EM field, I decided to learn cryo-EM. I started my training at the LMB and then I wanted to be more independent and moved to the lab of Oscar Llorca in Madrid. While I was looking for grants to fund my own projects I joined one of Oscar's projects. I solved the first high-resolution structure of the group. The structure I solved describes the unexpected function of a new domain of a central component of Pontin and Reptin containing complexes. This work is now under the second round of revision for Nature Communication. While I was working on this project I obtained a ?Projecto para Jovenes Investigadores?. The project I proposed aims at understanding how proteins involved in the DNA damage response function at the molecular level.
Recently, I developed a project that puts together structural biology, biophysics and synthetic biology. This project aims at studying the molecular properties of biological machineries in vivo, in their native environment while they expert their function. This project is now funded by a Human Frontier Science Program Grant.
Obtaining a RyC would allow me to continue my research on chromatin and too continue applying for grants and develop new ideas.
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Resumen del Currículum Vitae:

International mobility is a strong asset of my scientific career. I studied and worked in four European Countries and five different institutes. I obtained my bachelor and master degree in Italy, my PhD in Switzerland and had my postdoctoral training in the UK and in Spain.
At each stage of my career I learned new techniques, developed new methods and tools and financed my research with international grants.
In Switzerland I joined the laboratory of Susan Gasser where I set-up an in vitro biochemical system to complement and expand the work of the group. I was the only biochemist of the group. To learn how to produce, isolate and characterise multi-subunit protein complexes I attended several EMBO courses. To further improve my knowledge and skills in the preparation and isolation of multi-subunit protein complexes, I obtained a EMBO-short term fellowship to visit the LMB, one of the world leading institutions in structural biology. During my PhD I published four articles on high-impact journals such as Molecular Cell and The EMBO journal.
During my PhD I became an independent biochemist and I felt that Structural Biology was the natural development of my career. I therefore decided to join the LMB in Cambridge, UK. During my post-doc I solved the X-ray structure of the BAH domain of Sir3 bound to the nucleosome core particle at atomic resolution. This project was very challenging because of the complexity of the system that I reconstituted and crystallised and it was very pioneering because at the time when I started the project there were no examples of structures of protein complexes bound to the nucleosome solved by X-ray. I therefore had to develop methods and protocols de novo. My structure has been the fourth structure of a protein-nucleosome complex published and my work has been published on an article in Nature Structural and Molecular Biology where I am the last and solo-corresponding author. During my postdoctoral training I supervised a PhD student who is also the first author of this article. I funded my post-doc entirely with external grants such as the Swiss National Fund Fellowship, the EMBO Long Term Fellowship and the Marie Curie intra-European fellowship. Because of my work I have been invited to

give an oral contribution to the 106th Boehringer Ingelheim International Titisee Conference.
Toward the end of my postdoc at the LMB, I started my training in cryo-EM. I later joined the group of Oscar Llorca at the CIB in Madrid where I solved the first high-resolution structure of the Llorca's group. This work is now under revision for Nature Communication. I am first author of this article. While I was in Oscar's group I contributed in setting up the cryo-EM part of the EM facility at the CIB and I helped Oscar, who was scientific director of the facility, to update and improve the facility. Together with Oscar I wrote a book chapter on Transmission Cryo-electron Microscopy in Drug Discovery. I am last and corresponding author of this publication.
I recently obtained a Proyecto para Jovenes Investigadores to study the structural details of how proteins recognise and modify chromatin. I recently designed a project that is at the frontiers of structural biology, cell biology and synthetic biology. This project has been recently awarded a Human Frontier Science Program grant.

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AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2017

Turno de acceso general

Nombre: BURGUILLOS GARCIA, MIGUEL ANGEL
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Área Científica: Biología Fundamental y de Sistemas
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Título:

Study of the different mechanisms that regulate microglia activation in different neurodegenerative diseases

Resumen de la Memoria:

The main theme of my research career is the role that microglia cells (the immune cells of the brain) play during disease in different neuroinflammatory disorders. Throughout my career, I have studied mechanisms regulating microglia activation in various diseases.
Very early during my Ph.D. studies at the University of Seville we uncovered a completely novel and unexpected role for caspase-8 and its downstream substrates caspase-3/7 in the control of microglia activation and associated neurotoxicity to neuronal cells. These findings received a scientific recognition with their publication as a full article in Nature (PMID: 21389984).
After completing my Ph.D. degree, I first moved to University of Lund (Sweden) from 10/2009 until 04/2011 where I investigated the role that a lectin termed galectin-3 has over microglial cells during Stroke/ischemia. Furthermore, I studied the effect that the microchannel acoustophoresis technique has over microglial survival. These results were published in several journals (PMIDs: 25387690, 23724038, 26158634) including the journal Cell Reports where I appear as the first and corresponding author (PMID: 25753426).

Subsequently, I moved to Karolinska Institute in Stockholm (Sweden) from 05/2011 until 12/2013, where I studied the tumor supportive role of microglia during gliomas expansion. We found that microglial caspases also play a role in glioma expansion. The results we published them in Nature Immunology (PMID: 27618552) where I am sharing the first authorship.

Subsequently, from 01/2014 until 08/2016, I moved to the Centre for Neuroscience and Trauma at Queen Mary University of London (UK) where I focused on two different projects. In the first project, we studied the role of galectin-3 upon head trauma in vivo and found that inhibition of this protein decreased the neuroinflammatory response and conferred neuroprotection upon head injury. We published the results of this project in Scientific Reports (PMID: 28128358) where I appear as the last and corresponding author. In the second project, I focused on the epigenetic mechanism regulating microglia activation upon TLR stimulation, the results of which are presently under revision in the journal Cell Reports where I appear as the last and corresponding author.

Currently, (09/2016-now) I am based in the Department of Clinical Neurosciences at the University of Cambridge (UK) where I am studying different mechanisms regulating microglial phagocytic response in Alzheimer s disease. In particular, I am studying the role of two proteins (PLCg2 and ABI3) in microglia activation during Alzheimer¿s disease progression.

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Resumen del Currículum Vitae:

My main achievements in my CV are described here:

1st achievement: We uncovered a completely new role of killing caspases (caspases 8 and 3/7) in the control of microglia activation and associated neurotoxicity. This study was published as a full article in Nature. This mechanism is based on the orderly activation of microglial caspases 8 and 3/7 that promotes NF-kB translocation into the nucleus via PKCdelta-IKKbeta. We observed that killing caspase activation is tightly controlled and is independent of cell death (PMID: 21389984). Importantly, we found evidence of activation of caspases 8 and 3 in reactive microglia in the ventral mesencephalon and frontal cortex of brains from patients suffering Parkinson¿s disease and Alzheimer¿s disease respectively. The interest of the article is supported by comments in Nature Reviews Neuroscience, Nature Reviews Immunology, Science Signaling y SciBX, article of the week in PD online research), Revista de la Sociedad Española de Bioquímica y Biología Molecular (a fondo).

2nd achievement: We have established that microglial caspases play an important role in the expansion of Glioma cells into other areas of the brain. In particular, we observed that inhibition of basal caspase-3 activity in microglia cells promoted the polarization of these cells into a tumor supporting phenotype. The results were published in Nature Immunology where I am sharing first authorship (Shen X and Burguillos MA* Nature Immunology 2016) (PMID: 27618552).

3d achievement: We described how galectin-3 was capable to mediate the early inflammatory response upon head trauma in vivo. We demonstrate that the usage of either galectin-3 knockout mice or the injection of a neutralizing antibody against galectin-3 decreased the inflammatory response and inferred neuroprotection after head injury. The results were published in the journal Scientific Reports where I

appear as a last and corresponding author (Yip PK, et al., Scientific Reports 2017)(PMID: 28128358).

4th achievement: We have increased the knowledge of the lectin galectin-3 in the neuroinflammatory field, specifically in microglial cells. Although this protein is known to be induced after injury (especially during ischemic processes) not much has been described in the mechanisms where this protein is involved. We have described the mechanisms triggered by galectin-3 after binding to a member of the Toll-like receptor family and its effect both in vitro (in cell lines and primary microglial cell cultures), in vivo (in a murine model of focal ischemia) and observed this phenomena in patients that suffered from Stroke/Ischemia (Burguillos et al., 2015 Cell Reports)(PMID: 25753426).

5th achievement: We described the cell death pathway that dopaminergic neurons follow in a neuroinflammatory model of Parkinson's disease (PD) induced by intranigral injection. The dopaminergic neurons die in a caspase-independent pathway induced by the release of the apoptosis-inducing factor (AIF). The usage of PARP1 or calpains inhibitors prevent the death of dopaminergic neurons in our animal model of PD and in our co-culture set-up with dopaminergic and microglial cells, the knockdown of AIF but not caspase 3 in DA neurons prevent the cell death induced by the inflammatory response induced by LPS treatment (Burguillos et al., 2011)(PMID:20850531.)

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AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2017

Turno de acceso general

Nombre: OLMOS BUCHELT, YOLANDA
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Área Científica: Biología Fundamental y de Sistemas
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Título:

New roles of ESCRT-III proteins in nuclear envelope reformation during mitotic exit

Resumen de la Memoria:

Throughout my scientific career, I have gained a solid expertise in molecular and cell biology and have worked on several lines in this field, with extensive training in biochemistry, live-cell imaging and microscopy techniques.

My PhD studies at Centro Nacional de Investigaciones Cardiovasculares focused on investigating how the cellular response to oxidative stress is regulated at a transcriptional level, in order to prevent ROS accumulation and cell damage. My work was instrumental in characterizing a novel transcriptional complex formed by PGC1α, FoXO3a and SIRT1 that regulates the expression of a set of major antioxidant genes in endothelial cells. The identification of key components of this regulatory pathway in the vascular endothelium is essential to potentially identify new targets for pharmacological intervention in cardiovascular and metabolic-related diseases. In this period, I contributed to 6 original research manuscripts, 2 of them as a first author, and 1 review article.

During a short postdoctoral stay at Imperial College London, I used the knowledge on SIRT proteins acquired during my PhD to elucidate new roles of this family in the development of chemotherapeutic drug resistance in breast cancer. In this period, I widened my knowledge on cancer biology and, as a first postdoctoral experience, learnt to develop an independent line of research. Within a year I contributed to two research manuscripts, one of them as joint first-author, and a review.

I continued my postdoctoral studies at King□s College London, where I moved to a different and exciting research field that tries to understand how cells remodel its organelles to allow cell division to occur. My work at KCL has been focused in investigating how the nuclear envelope (NE) is remodeled during cell division and has importantly contributed to characterize a new role of ESCRT-III proteins in the regeneration of a sealed NE during mitotic exit. These studies led to two first-authored manuscripts in Nature (2015) and Current Biology (2016) and were a breakthrough in the fields of ESCRT and mitotic biology, providing key insights on how the NE seals to reestablish proper separation of the genome from the cytoplasm after mitosis. They were well received by the scientific community and commented in both Nature and Science. My current work focuses in deciphering how the ESCRT machinery is recruited and assembled at sites of annular fusion to perform its essential role in NE sealing after mitosis.

My career in different fields and research institutions both in Spain and the UK has allowed me to do high-quality research in different environments, publishing in some of the top scientific journals. I have regularly presented my work at international conferences, built productive scientific collaborations and have been involved in teaching activities and training of students in the lab. I have also been able to obtain research funding and throughout my postdoc, acquired the capability to establish and develop independent lines of research.

A prestigious Ramon y Cajal fellowship constitutes an excellent opportunity that would allow me to reintegrate into the Spanish research system and apply the expertise I acquired internationally during the past years.

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Resumen del Currículum Vitae:

I am a scientist with more than 10 years experience in molecular and cell biology research. After graduating in Biology at Universidad Complutense de Madrid (Spain), I joined Dr Maria Monsalve□s group at Centro Nacional de Investigaciones Cardiovasculares (Spain) to course my PhD studies. My work focused on investigating the transcriptional regulatory pathways that control the oxidative stress protection system in the vascular endothelium. It led to 2 first-author publications in J Biol Chem (2009) and Antioxid Redox Signal (2013), a review, and 4 other papers derived from my collaboration with members from my own group and others. I presented my PhD work in both national and international conferences, including 4 oral communications, and in 2007 was awarded with the Young Investigator Award from the Society for Free Radical Research Europe.

After obtaining my PhD in 2010, I joined Professor Eric Lam□s team at Imperial College London (UK) to explore new roles of FOXO/SIRT factors in chemotherapeutic drug resistance in cancer. This was a short but productive first postdoctoral experience where I generated a joint first-author manuscript in Carcinogenesis (2013), contributed to another manuscript in the lab and wrote a review article.

My postdoctoral studies continued at King□s College London (UK) where I joined Dr Jeremy Carlton□s lab. My research here has been

focused on characterizing a new role of ESCRT-III proteins in the regeneration of a sealed nuclear envelope during mitotic exit, providing key insights on how a proper separation of the genome from the cytoplasm is achieved after mitosis. My work led to 2 first-authored manuscripts in Nature (2015) and Curr Biol (2016) and I also contributed to a review article. In 2016, the Cancer Studies Division at KCL awarded me with the Post-doctoral Best Paper Prize. I have also presented my post-doctoral work in both national and international meetings, including 3 oral communications.

Throughout my career, I have mentored and trained younger scientists, including research technicians, PhD students and several MSc/BSc students and obtained funding to support my research through the KCL's Gender Ambition Scheme. As additional indicators of my visibility in the field, my work has been acknowledged with awards and invitations to present at conferences and research institutes. Overall, at this stage of my career my publication record includes 14 papers (620 citations, h-index=11), including the high-ranked journal Nature.

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AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2017

Turno de acceso general

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Título:

Biophysical and Molecular Basis of Organelle Morphology and Dynamics

Resumen de la Memoria:

During my career, I have gained multidisciplinary expertise in theoretical biophysics, molecular cell biology and biochemistry, and advanced microscopy tools. This has allowed me to quantitatively tackle different fundamental problems in cell biology, such as the mechanisms of membrane curvature generation and organelle homeostasis. During my PhD in theoretical biophysics (University of Barcelona and Tel Aviv University), I developed different theoretical and computational methods to study membrane dynamics and morphology. During my postdoc at Vivek Malhotra's Lab (CRG, Barcelona) I mastered a broad variety of biochemistry and molecular cell biology tools, with which I discovered novel ways of how lipids and proteins cooperate to functionally organize the Golgi membranes. Currently, I am a research fellow under the umbrella of the Single Molecule Biophotonics group at ICFO (Castelldefels, Barcelona), leading an independent research line focused on biophysical and molecular basis of organelle morphology and dynamics using molecular & cell biology tools combined with super-resolution nanoscopy. I am convinced that a multidisciplinary approach that combines these revolutionary tools will provide many of the breakthroughs in cell biology of the 21st century, which will, in the long run, transfer to the society by increasing our know-how of the mechanisms of human health and disease.
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Resumen del Currículum Vitae:

During my career, I have published 20 papers in high profile journals, including contribution as first and/or corresponding author in eLife, J. Cell Biol., EMBO J., Phys. Rev. Lett., Biophys. J., Annu. Rev. Biochem., etc., achieving over 1000 citations for an h-index of 14 (Google Scholar). I have presented my research in more than 20 international conferences and given invited talks at many congresses and renewed research institutes. I have been actively involved in international projects and have secured independent research funding. I have been awarded a Marie Curie PhD fellowship, a Juan de la Cierva postdoctoral fellowship. As an independent researcher at ICFO, I obtained funding through a CELLEX-Severo Ochoa program, as well as a Jóvenes Investigadores grant and a BIST Ignite research grant. I have been involved in several teaching and outreach activities and student supervision. I serve as a reviewer for journals (Cell, eLife, J. Cell Biol., Phys. Rev. Lett.) and have been member of different PhD thesis committees in both Physics and Biology.