MINISTERIO
DE ECONOMÍA
Y COMPETITIVIDAD

SECRETARÍA DE ESTADO
DE INVESTIGACIÓN
DESARROLLO E INNOVACIÓN

SECRETARÍA GENERAL
DE CIENCIA, TECNOLOGÍA
E INNOVACIÓN

DIRECCIÓN GENERAL
DE INVESTIGACIÓN
CIENTÍFICA Y TÉCNICA

SUBDIRECCIÓN GENERAL
DE RECURSOS HUMANOS
PARA LA INVESTIGACIÓN

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2014

Turno de acceso general

Nombre: **ALEGRE CEBOLLADA, JORGE**
Referencia: RYC-2014-16604
Área Científica: Biología Fundamental y de Sistemas
Correo Electrónico: jalegre@cnic.es

Título:

Single-Molecule Mechanobiochemistry of the Myocardium

Resumen de la Memoria:

Experience:
In my laboratory, I capitalize on my double expertise in protein biochemistry (PhD student, Complutense University) and single-molecule force-clamp spectroscopy by Atomic Force Microscopy (Postdoc, Columbia University, New York) to bridge the gap between mechanics and biochemical regulation of sarcomeric proteins. I have a strong track record of publications as first and corresponding author (Cell, Nature Chemistry, JBC) and senior authorships (JBC). I have been awarded several fellowships and grants (NIH grant as PI, FP7 program) and invited to give oral presentations and to chair scientific sessions at international conferences and Research Institutes. I was awarded the Prize for Best Biophysicist under 33 years old by the Spanish Biophysical Society in 2014 (SBE). I often serve as a reviewer for international journals (JACS, PLOS) and funding agencies (ANEP). I have supervised 12 undergraduate students, PhD students and postdoctoral fellows. I have extensive international experience (stays, collaborations, funding).

Research Interests:
We generate new fundamental knowledge on the mechanical properties of the myocardium and its regulation, with the potential to uncover new targets to treat cardiac disease. Contractility of cardiac muscle depends on the concerted action of sarcomeric proteins with a mechanical function, such as actin, myosin, titin and several other associated proteins. Mutations in these proteins lead to different forms of life-threatening cardiomyopathies. However, the molecular mechanisms leading from genotype to pathogenic phenotype remain unknown. My group is currently testing the hypothesis that missense mutations in elastic sarcomeric proteins can induce mechanical phenotypes that result in the development of disease. We also want to understand how the elasticity of the myocardium is tuned by posttranslational modifications of sarcomeric proteins. The sort of mechanisms of cardiac regulation that we examine cannot be studied using classic biochemistry techniques alone, and have remained unexplored. By implementing advanced single-molecule manipulation techniques, we are contributing to establish Mechanobiochemistry as a new field of science.

Resumen del Currículum Vitae:

I obtained my PhD in Biochemistry from Complutense University (Madrid), under the supervision of Álvaro Martínez del Pozo and José G. Gavilanes. Funded by a FPU PhD Fellowship, I employed biochemical, spectroscopic and biophysical approaches to study how toxic pore-forming proteins interact with lipid membranes. During this period, I acquired extensive experience in protein biochemistry techniques.

In 2008, I joined the laboratory of Julio Fernández (Columbia University, New York), who pioneered single-molecule force-clamp spectroscopy by Atomic Force Microscopy (AFM). My postdoctoral training period was funded by 3 Postdoctoral Fellowships. Thanks to my background in protein biochemistry and the experience of the Fernández laboratory, I led several research projects in the interphase between physics, biology and chemistry. I described that intramolecular isopeptide bonds block mechanical unfolding of bacterial adhesins (JBC 285, 11235). I developed mechanical uncaging as a tool to study chemical reactions at the single-bond level. I applied this new technique to observe directly, for the first time, disulfide isomerization in a model protein (Nat Chem 3, 882) and, more recently, in Amyotrophic Lateral Sclerosis-linked Mutants of Superoxide Dismutase 1 (JBC, 289, 26722). I was invited to comment on milestone contributions describing mechanical protein unfolding mediated by the proteasome (Cell 145, 339). I participated in the development of HaloTag-based covalent tethering for single-molecule experiments (JACS 135, 12762). I contributed to implement novel force-clamp protocols to measure oxidative folding (Cell 151, 794). The most significant discovery of this period was the discovery of a novel mechanism of regulation that increases muscle elasticity through strain-dependent modification of cryptic cysteines in titin (Cell, 156, 1235, cover of the issue). My independent research program is based on the findings described in this paper. For instance, I have recently developed the techniques required to equip protein hydrogels with equivalent regulatory mechanisms. These novel biomaterials have potential applications in the field of tissue engineering (Macromol Mater Eng, in press).

The impact and reach of my research career is supported by several distinctions and honors. I have been awarded a CNIC-IIF-Marie Curie (International Incoming Fellowship for Young Group Leaders from the FP7 program) to establish my independent research program. I have published 31 articles (h-index: 13; 409 citations; 11 first author; 5 corresponding author; 2 senior author). I have given more than 15 oral presentations at national and international conferences, or seminars at Research Institutions. I have chaired 2 sessions at the BPS meeting. I have been awarded 5 pre- and postdoctoral fellowships. I was awarded the Prize for Best Biophysicist under 33 years old by the Spanish

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2014

Turno de acceso general

Biophysical Society. I have received 3 awards to my academic performance. I have been asked to act as reviewer for leading international journals and for the Spanish National Agency of Evaluation. I am a scientific adviser to the International Foundation for Science. I have positive evaluation from ANECA as ﷺContratado Doctorﷺ. I was awarded an NIH grant as a Principal Investigator. I have supervised 12 undergraduate students, PhD students and postdoctoral fellows.

MINISTERIO
DE ECONOMÍA
Y COMPETITIVIDAD

SECRETARÍA DE ESTADO
DE INVESTIGACIÓN
DESARROLLO E INNOVACIÓN

SECRETARÍA GENERAL
DE CIENCIA, TECNOLOGÍA
E INNOVACIÓN

DIRECCIÓN GENERAL
DE INVESTIGACIÓN
CIENTÍFICA Y TÉCNICA

SUBDIRECCIÓN GENERAL
DE RECURSOS HUMANOS
PARA LA INVESTIGACIÓN

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2014

Turno de acceso general

Nombre: **FRIGOLA MAS, JORDI**
Referencia: RYC-2014-15837
Área Científica: Biología Fundamental y de Sistemas
Correo Electrónico: jofrima@yahoo.com

Título:

From human epigenetics to yeast biochemistry.

Resumen de la Memoria:

The goal of my PhD was to find out epigenetic changes associated to colorectal tumorigenesis. The main DNA methylation changes associated to cancer are global hypomethylation and regional promoter hypermethylation. To evaluate their potential role in tumor progression, we developed a novel technique, called Amplification of InterMethylated Sites (AIMS). We found that global losses and local gains are independent processes and contribute in different ways to cancer progression. Specifically, global hypomethylation has a correlation with genomic instability, regardless of p53 status. Concerning the regional hypermethylation, previously was associated to local silencing of discrete genes. However, we showed that this loss of gene expression can occur through long range epigenetic silencing, with similar implications as loss of heterozygosity in cancer. My postdoc studies are on chromosome replication. In eukaryotes, DNA replication is a two-step mechanism. During G1 the replication origins are licensed and in S-phase replication starts. At the heart of this regulation lays the replicative helicase. During the first step, an inactive helicase is loaded onto origins and is not activated until S-phase. Using budding yeast, we showed that the recruitment of the helicase onto origins it depends on an essential C-terminal domain of Mcm3. Interestingly, this domain is conserved from yeast to humans, suggesting similar roles in higher eukaryotes. In addition, we found that ATP hydrolysis is not only critical for the helicase loading, it also plays an important role on releasing abortive reactions that could compromise the integrity of the origins. Furthermore, if the licensing components have been inactivated by Cyclin Dependent Kinase, the helicase is also released in ATP dependent manner. This result reveals a novel ATPase-dependent quality control of origin licensing contributing to precise once per cell cycle replication. More recently, we have unveiled an unexpected roles of ATP binding and hydrolysis by the different licensing factors. ATP binding and hydrolysis by the MCM replicative helicase is absolutely required for loading. Noteworthy, ATP hydrolysis by the loading factors ORC and Cdc6 is not involved. Instead, hydrolysis by Cdc6 is constrain to release of abortive reactions.This work alters our view of how ATP is used to license replication origins.

Resumen del Currículum Vitae:

Bachelor degree in Biology, Universitat de Girona (1997), bachelor degree in Biochemistry, Universitat Autònoma de Barcelona (1999). PhD degree in genetics, Universitat de Barcelona (2005). Awarded with special doctorate (2006). Thesis title: Epigenetic alterations in colorectal cancer. Supervisor: Miguel Angel Peinado. From my thesis I published five different papers, all as a first author. Nucleic Acids Research (2002), Oncogene and Human Molecular Genetics (2005) and Cancer Research and Nature Genetics (2006). This last paper deserved news and views on the same journal and was recommended by Faculty 1000. During my PhD studies, I decided to visit professor Susan Clark (Sydney, Australia). I stayed for a year on her laboratory and it was the beginning of a long collaboration between her and Dr.Peinado. Furthermore, based on the published results (Nature Genetics, 2006), we submitted a US-based patent, which I am the first author. My postdoc studies are on chromosome replication in S. cerevisiae at the London Research Institute with Dr. John diffley. So far, my work has resulted in three published papers, one review in Current Opinion in Cell Biology (2012) and an article format paper in Nature (2013) and Mol Cell (2014). I am the first author on the first two papers and second author on the latest. The Nature article has been cited in Faculty 1000 and it was highlighted in Nature Review in Molecular Cell Biology and Molecular Cell. Both of my PhD and postdoc studies have been presented in several international meetings and they have been cited over 750 times. From my fourteen years of research experience, nine have been abroad (Sydney and London). During this time I have established successful collaborations with other scientists and I have gained experience with both, mammalian cells and yeast. My scientific background spans from epigenetics in humans to biochemistry in yeast, complementing my degrees in Biology and Biochemistry, respectively. Consequently, I feel highly qualified and confident to establish my own research group.

MINISTERIO
DE ECONOMÍA
Y COMPETITIVIDAD

SECRETARÍA DE ESTADO
DE INVESTIGACIÓN
DESARROLLO E INNOVACIÓN

SECRETARÍA GENERAL
DE CIENCIA, TECNOLOGÍA
E INNOVACIÓN

DIRECCIÓN GENERAL
DE INVESTIGACIÓN
CIENTÍFICA Y TÉCNICA

SUBDIRECCIÓN GENERAL
DE RECURSOS HUMANOS
PARA LA INVESTIGACIÓN

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2014

Turno de acceso general

Nombre: **SEKULIC , NIKOLINA**
Referencia: RYC-2014-16050
Área Científica: Biología Fundamental y de Sistemas
Correo Electrónico: nikolina.sekulic@gmail.com

Título:

BIOPHYSICAL CHARACTERIZATION OF NUCLEOSOMES

Resumen de la Memoria:

My research interests are focused on biophysical studies of nucleosomes - major building blocks of chromatin. The nucleosomes are protein-DNA complexes comprised of ~147 base pairs long DNA wrapped around heterooctameric histone core (H2A, H2B, H3, and H4). The organization of the chromatin is dynamic resulting in compaction and relaxation during every cycle of cell division. Also, cell differentiation, gene regulation and other key cellular processes are associated with changes in chromatin structure. Alteration of spacio-temporatal regulation of the chromatin changes in cell results in disease or death. Since chromatin is made of nucleosomes, majority of the changes in chromatin structure originate from modifications in the nucleosomes, most obvious being presence of different histone variants and posttranslational modifications. Our knowledge is very sparse of how are these changes affecting nuclesome structure. I am set to use diverse biophysical techniques to investigate the structure of nucleosome at the molecular level.

During my doctoral studies, I acquired lots of experience in protein expression, purification and X-ray crystallography. I have successfully applied this knowledge towards answering questions in chromatin biology during my postdoctoral studies. My crystal structure of subnucleosomal complex essential for formation of centromeres, was the first atomic-resolution structure of centromere specific histone variant (Nature, 2010). In my present and future research I am focusing of on the biophysical characterizations of nucleosomes and nucleosomes in complex with other nucleosome-binding proteins. To be better suited for complexity of these studies, I have expanded my X-ray crystallography background towards mastering in-solution X-ray and neutron-based techniques - SAXS and SANS. SANS experiments exploit contrast variation schemes to provide information on DNA and protein subunits independently which makes them very suitable for nucleosome studies. I have also gained experience in fluorescence-resonance energy transfer (FRET) and hydrogen/deuterium exchange coupled with mass spectrometry (HDX-MS) that are very useful in providing information on structural arrangements within complexes.

Resumen del Currículum Vitae:

During my doctoral studies I have worked on nucleotide kinases. These are small soluble enzymes that are adding phosphate or sulfate group to nucleotides. Among the products of these enzymes are building blocks for DNA and RNA, signalling molecules (cGMP), reserves of energy (ATP) or sulfate (adenosine phospho-sulfate: APS).

In particular, the major focus of my thesis was bi-functional enzyme PAPS-synthetase (PAPS: phospho-adenosine-phospho sulfate). This enzyme consists of two catalytic subunits on single polypeptide chain. One of them, ATP-sulfurylase, is responsible for assimilation of inorganic sulfate in form of the molecule of APS (adenosine phospho sulfate). The other one, APS-kinase, is catalyzing phosphorylation of this product to yield PAPS, the final form that serves as universal sulfate donor in reactions of sulfations. While working on this project I have solved the crystal structures of each of the subunits of the PAPS-synthetase with various combination of substrates, products and their mimics (total of 5 structures; PDB: 2OFX, 2OFW, 2PEZ, 2PEY, 2QJF). My work identified residues involved in product binding and catalysis and my careful structure-function analysis has revealed the origin of strong substrate inhibition observed by APS kinase. I was able to generate, through structure-led rational mutant design, enzyme that is totally devoid of the inhibition (Sekulic, JBC, 2007; Sekulic, JMB, 2007).

I have also worked on guanylate kinase, an enzyme that catalyzes phosphoryl transfer form ATP to GMP resulting in the formation of GDP and ADP. I purified, crystallized and solved the structure of this enzyme in complex with its substrate GMP and product ADP. Structural analysis revealed conformational changes that occur upon binding of nucleotides and the key residues involved in the phosphoryl transfer (Sekulic, JBC, 2002; PDB: 1LVG).

After productive PhD, I wanted to extend my expertise to protein-DNA interactions. I joined the lab of Prof. Ben Black at the University of Pennsylvania when his lab has just started revealing how specialized nucleosome at the centromere (location on the chromosome required for accurate chromosome segregation in mitosis), distinguishes itself from the rest of the chromatin. I have accepted the challenge to biophysically characterize centromeric nucleosome that contains specific histone H3 variant named CENP-A. During my first two years in the lab I was successful in solving the crystal structure of this histone variant in hetrotetrameric complex with its binding partner histone H4 (Sekulic, Nature, 2010; PDB: 3NQJ, 3NQU). My crystal structure was the first structure of CENP-A protein, since it was discovered 25 years earlier as the key protein in centromeres (Earnshaw, Chromosoma, 1985). This information, together with solution based small-angle

scattering and experiments verifying ~147bp DNA length and negative DNA super coiling was also the first to directly prove that in vitro assembled centromeric CENP-A containing nucleosoems have octameric histone core and wrap with the overall structure very much like canonical H3-containing nucleosomes (as opposed to various other models evoking different stoichiometry and/or DNA wrap and length, that existed in the field at the time - Black, Cell, 2011).

MINISTERIO
DE ECONOMÍA
Y COMPETITIVIDAD

SECRETARÍA DE ESTADO
DE INVESTIGACIÓN
DESARROLLO E INNOVACIÓN

SECRETARÍA GENERAL
DE CIENCIA, TECNOLOGÍA
E INNOVACIÓN

DIRECCIÓN GENERAL
DE INVESTIGACIÓN
CIENTÍFICA Y TÉCNICA

SUBDIRECCIÓN GENERAL
DE RECURSOS HUMANOS
PARA LA INVESTIGACIÓN

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2014

Turno de acceso general

Nombre: **DE LUCAS TORRES, MIGUEL ANDRES**
Referencia: RYC-2014-16278
Área Científica: Biología Fundamental y de Sistemas
Correo Electrónico: mdelucas@ucdavis.edu

Título:

Gene Expression Control During Plant Development

Resumen de la Memoria:

The main focus of my scientific career has been the analysis of the molecular mechanisms by which different signaling pathways are connected to regulate gene expression in plants. More specifically, I have addressed three biological questions of increasing complexity:

(1) How is environmental information integrated within the plant developmental programs? As a paradigm for molecular integration, we stated during my PhD Thesis that PIF transcription factors (TFs) act as central hubs for environmental signals: PIF expression is regulated by the circadian clock and temperature, PIF protein stability is largely modulated by light and by brassinosteroid-dependent phosphorylation, and the ability of PIF proteins to bind their target promoters is directly regulated by the gibberellin-dependent DELLA nuclear proteins and dimerization with brassinosteroid-dependent BES1/BZR1 TFs. This contribution was reflected in first-authored publications in Nature and Genes & Development.

(2) How is a complex process coordinated at the transcriptional level? During my postdoctoral stay we have defined the topology of the gene regulatory network that ensures coordinated activation of multiple secondary cell-wall biosynthesis enzymes.
These findings have been described in a first-authored publication in Nature.

(3) How is gene expression coordinated across different cell types in a given organ? We have recently found that chromatin remodeling is tightly integrated with the activity of cell-type specific transcription factors to achieve correct gene expression. On one hand, we have defined the TF network that regulates the expression of different subunits of the PRC2 complex in different cell types. And on the other hand, we have defined the relevance of cell-type specific histone post-translational modifications catalyzed by PRC2 to establish the balance between cell differentiation and cell division.

My future research will focus in understanding how histone modifications are dynamically modulated by environmental signals and hormones during cell differentiation and development.

Resumen del Currículum Vitae:

- EDUCATION
2011 to present:HFSP & EMBO Postdoctoral Fellow. Plant Biology Department. University of California, Davis. USA. Adviser: Siobhan Brady
2004-2010: MS & PhD in Sciences - Molecular Biology, Autonomous University of Madrid. Madrid - SPAIN. Adviser: Salomé Prat.
1998-2003: B.A. Biological Sciences, Universidad de Oviedo. Asturias • SPAIN.

- AWARDS:
2011: HUMAN FRONTIERS SCIENCE PROGRAM postdoctoral fellowship LT000571/2011L
2010: EMBO LONG TERM FELLOWSHIP (LTF 1614-2010)
2009 Promega Biotech Iberica Award

- PUBLICATIONS

Taylor-Teeples M*, Lin L*, de Lucas M*, Turco G, Toal T, Gaudinier A, Young N, Trabucco G, Veling M, Lamothe R, Handakumbura P, Xiong G, Corwin J, Tsoukalas N, Pauly N, Kliebenstein D, Tagkopoulos I, Breton G, Pruneda-Paz J, Ahnert S, Kay SA, Hazen S, Wang C, Dehesh K, Zhang L, Ware D, Brady SM. (2015)
Environmental, Developmental and Genotype-Dependent Regulation of Xylem Cell Specification and Secondary Cell Wall Biosynthesis in Arabidopsis thaliana.
Nature. doi:10.1038/nature14099

Bernardo-García S*, de Lucas M*, Martínez C, Espinosa-Ruíz A, Davière JM, Prat S. (2014)
BR-Dependent Phosphorylation Modulates PIF4 Transcriptional Activity and Shapes Diurnal Hypocotyl Growth

Genes Dev 28 (15): 1681–94.

de Lucas M*, Prat S. (2014)
PIFs Get BRright: PHYTOCHROME INTERACTING FACTORs as Integrators of Light and Hormonal Signals
New Phytol 202 (4):1126–41. doi:10.1111/nph.12725.

de Lucas M, Provart NJ, and Brady SM. 2014.
Bioinformatic Tools in Arabidopsis Research.
Methods in Molecular Biology (Clifton, N.J.) 1062: 97–136. doi:10.1007/978-1-62703-580-4_5

Ron M, Dorrity M, de Lucas M, Toal T, Hernandez IR, Little SA, Maloof JN, Klibenstein DJ, and Brady SM.
Identification of Novel Loci Regulating Inter-Specific Variation in Root Morphology and Cellular Development in Tomato–
Plant Physiology, April. doi:10.1104/pp.113.217802.

de Lucas M, and Brady SM. 2013.
Gene Regulatory Networks in the Arabidopsis Root.
Current Opinion in Plant Biology 16 (1): 50–55. doi:10.1016/j.pbi.2012.10.007

Davierè JM, de Lucas M, and Prat S. 2008.
Transcriptional Factor Interaction: a Central Step in DELLA Function.
Current Opinion in Genetics & Development 18 (4): 295–303. doi:10.1016/j.gde.2008.05.004.

de Lucas M*, Davière JM*, Rodríguez-Falcón M*, Pontin M, Iglesias-Pedraz JM, Lorrain S, Fankhauser C, Blázquez MA, Titarenko E, Prat S. (2008)
A Molecular Framework for Light and Gibberellin Control of Cell Elongation
Nature 451 (7177): 480–84. doi:10.1038/nature06520

- CONGRESS AND COURSES:

EMBO Interdisciplinary Plant Development 2014
XXII Plant and Animal Genomics
III International Conference in Plant Vascular Biology
EMBO Laboratory Management Course for Postdocs
EMBO fellows meeting. Heidelberg
XXII HFSP Awardees Meeting
Congress of the Spanish Society of Biochemistry and Molecular Biology
Plant Modelling Summer School
IX Spanish Plant Molecular Biology Meeting
VIII Spanish Plant Molecular Biology Meeting

- INTERNSHIPS

2009:Salk Institute for Biological Studies, La Jolla, San Diego, California, USA. Adviser: Dr. Joanne Chory.
2007:Centre for Integrative Genomics (CIG), Laussane, Suiza. Adviser: Dr. Christian Fankhauser

- SOCIETY MEMBERSHIP

Spanish Society of Biochemistry and Molecular Biology (SEBBM)
Spanish Society of Plant Physiology (SEFV)

MINISTERIO
DE ECONOMÍA
Y COMPETITIVIDAD

SECRETARÍA DE ESTADO
DE INVESTIGACIÓN
DESARROLLO E INNOVACIÓN

SECRETARÍA GENERAL
DE CIENCIA, TECNOLOGÍA
E INNOVACIÓN

DIRECCIÓN GENERAL
DE INVESTIGACIÓN
CIENTÍFICA Y TÉCNICA

SUBDIRECCIÓN GENERAL
DE RECURSOS HUMANOS
PARA LA INVESTIGACIÓN

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2014

Turno de acceso general

Nombre: **BURGUILLOS GARCIA, MIGUEL ANGEL**
Referencia: RYC-2014-16442
Área Científica: Biología Fundamental y de Sistemas
Correo Electrónico: m.burguillos@qmul.ac.uk

Título:

Estudio de la microglia en diferente enfermedades neurodegenerativas. Papel immunomodulatorio de las caspasas 3/7/8 y galectin-3

Resumen de la Memoria:

My main interest during my research career is the role that microglia cells (the immune cells of the brain) play during disease in different neuroinflammatory disorders.
This interest started very early during my PhD studies in the University of Seville. During this period, 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. Importantly, we found evidence of caspase involvement in microglia activation in the ventral mesencephalon and frontal cortex from brains obtained from patients suffering Parkinson¿s disease and Alzheimer¿s disease, respectively. These findings received a scientific recognition with their publication as a full article in Nature (2011, 472(7343):319-324). After completing my PhD degree, I first moved to University of Lund from 10/2009 until 04/2011. At that time, I studied the role of microglial cells during Stroke/ischemia. In particular I studied the effect over the inflammatory response that a lectin termed galectin-3 has over microglial cells. Specifically the we studied its relationship with other proteins such as Toll like Receptor proteins (manuscript currently in revision in Cell Reports (CELL-REPORTS-D-14-01855, Burguillos et al., handling editor Sabbi Lall -slall@cell.com-), and the downstream mechanisms triggered by this protein. Also during that period I studied the effect that the microchannel acoustophoresis technique has over microglial survival and also the role of galectin-3 has over microglial activation induced by alpha-synuclein protein.
Subsequently I moved to Karolinska Institute in Stockholm from 05/2011 until 12/2013, where I studied the tumour supportive role of microglia during gliomas expansion. We found that microglial caspases also play a role in glioma expansion (manuscript currently in revision in Nature (NATURE-2014-05-05954A, Burguillos et al., handling editor Marie-Therese Heemels -T.Heemels@nature.com-).
Currently I am in the Centre for Neuroscience and Trauma in Queen Mary University of London where I am studying the mechanisms triggered in microglial cells upon head Trauma in in vivo models as well as in Trauma patients.

Resumen del Currículum Vitae:

POSITIONS:
-01/2014- Present: Senior Research Fellow, Centre Neuroscience and Trauma. Blizard Institute. Queen Mary University of London. 4 Newark Street, London (UK) E1 2AT.
-05/2011 - 12/2013: Post doc in Department of Department of Oncology-Pathology, Cancer Centrum Karolinska (CCK), R8:03, Karolinska Institute, (Mentor: Associate Professor: Bertrand Joseph).
-10/2009 - 04/2011: Post doc in Experimental Neuroinflammation Laboratory, Department of Experimental Medical Science, Wallenberg Neuroscience Center. BMC B11 (Mentor: Associate Professor Tomas Deierborg).
EDUCATION:
- (1997/2003) Licentiate in Biology. Faculty of Biology. University of Seville.
- Graduated student in the Department of Cell Biology. Faculty of Biology. University of Seville (2001-2004). During these three years I have worked in the field of p53 and cancer in vitro. (Supervisors Joaquin Piñero and Trinidad Ortiz).
- PhD. student in the Department of Biochemistry and Molecular Biology. Faculty of Pharmacy. University of Sevilla. (2004- 28 September 2009 with the highest mention (Matricula de Honor, cum laude). Title of the thesis: Biochemical and Molecular Basis of the cell death in the neuroinflammatory model of Parkinson's disease induced by LPS. (Supervisor Jose L. Venero Recio).

AWARDS/PRIZES:
- First prize Universidad de Sevilla -ENDESA. (2011)
- Post doc award - Barncancerfonden (2011)- Declined
- Post doc award - Vetenskapsrådet -VR- (2011)- Accepted.
- Scientific Prize of the Department of Oncology-Pathology, Cancer Centre Karolinska, Karolinska Institute. (2012)

SUPERVISION:
MSc Students:
- Supervisor of Ashray Jayaram Shetty. Msc student in the Department Neuroscience and Trauma, Blizard Institute. Queen Mary University of London. Date of Registration: (2014-04/2014-07). Title of the project: Differential Toll like receptor (TLR)-4 response in

microglial cells stimulated with Galectin-3 as compared with HMGB1 or LPS.

PhD students:

- Co-supervisor of Xianli Shen. PhD student in the Department of Oncology-Pathology, Cancer Centrum Karolinska, Karolinska Institutet. Date of Registration: 2012-01-27. Title of the thesis: Caspase signalling controls microglia activation and glioma invasion. Main Supervisor: Associate Professor Bertrand Joseph.
- Co-supervisor of Maria Jose Oliva Martin. PhD student in the Department of Biochemistry and Molecular Biology. Faculty of Pharmacy. University of Sevilla, Sevilla, Spain. Title of the thesis: Papel de la Caspasa-8 en el Proceso de Inflamación Cerebral y Periferico. Date of Registration: 2011-12-01. Main Supervisor: Professor Jose Luis Venero Recio.
- Co-supervisor of Antonio Jesus Boza Serrano. PhD student in Experimental Neuroinflammation Laboratory, Department of Experimental Medical Science, Wallenberg Neuroscience Center. Lund, Sweden. Title of the thesis: Modulation of microglial response in neurodegenerative diseases -The effect of galectin-3 in neuroinflammation. Date of Registration: 2013-08-01. Main supervisor: Assistant Professor Tomas Deierborg.

REFEREE FOR:

For journals:

- BMC Neuroscience (06/2010).
- Journal of Neurochemistry (09/2011).
- Molecular Therapy (10/ 2012).
- NeuroMolecular Medicine (07/2014).

For Grant applications foundations:

- Biotechnology and Biological Sciences Research Council.BBSRC (July 2014).

MINISTERIO
DE ECONOMÍA
Y COMPETITIVIDAD

SECRETARÍA DE ESTADO
DE INVESTIGACIÓN
DESARROLLO E INNOVACIÓN

SECRETARÍA GENERAL
DE CIENCIA, TECNOLOGÍA
E INNOVACIÓN

DIRECCIÓN GENERAL
DE INVESTIGACIÓN
CIENTÍFICA Y TÉCNICA

SUBDIRECCIÓN GENERAL
DE RECURSOS HUMANOS
PARA LA INVESTIGACIÓN

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2014

Turno de acceso general

Nombre: **SHNYROVA ZHADAN, ANNA**
Referencia: RYC-2014-16697
Área Científica: Biología Fundamental y de Sistemas
Correo Electrónico: anna.shnyrova@ehu.es

Título:

Molecular mechanisms of morphogenesis of cellular membranes at nanoscales

Resumen de la Memoria:

El principal objetivo de mi investigación es comprender los mecanismos moleculares fundamentales subyacentes a la morfogénesis de las membranas celulares. Las células controlan la forma y la topología de sus sistemas de membrana utilizando complejos de proteínas especializadas. Estas proteínas funcionan generalmente en un entorno molecular muy concurrido, además de que las deformaciones de la membrana producidos por estos complejos proteicos se localizan en áreas de membrana extremadamente pequeñas. En general se cree que estos procesos tan extremadamente complejos y confinados en el espacio sólo puede entenderse a través de la reconstitución y del análisis mecanístico de la actividad de las proteínas individuales a nanoescala. Este paradigma define mis principales líneas de investigación. Por un lado, he desarrollado nuevos enfoques experimentales para la reconstitución y la cuantificación de deformaciones de membrana por parte de las proteínas. Como estudiante predoctoral, elaboré un método de reconstitución in vitro del proceso de formación y gemación de una partícula similar a virus, es decir, de una vesícula de membrana conteniendo proteínas virales (Shnyrova et al., JCB 2007). Últimamente, he conseguido aumentar la resolución espacial de mis medidas y resolver la actividad de un complejo de proteína individual encargado de la fisión de membrana (Shnyrova et al., Science 2013). También he aprendido a aplicar métodos nanotecnológicos de vanguardia a procesos de membrana (Geng et al., Nature 2014). Quiero desarrollar diferentes nanoplantillas de membrana para poder reconstruir el proceso de deformaciones de membrana a nivel molecular. Por otro lado, me he centrado en los dominios que se forman a nanoescala durante los procesos de fusión y fisión de la membrana. Creo que el estudio de las deformaciones extremas de membrana que ocurren de forma rápida en este tipo de dominios puede proporcionar ideas mecanicistas inestimables sobre la mecánica molecular general de la remodelación de membranas celulares. Tengo la intención de continuar con mis proyectos de investigación centrados en la superfamilia de las dinaminas. Las proteínas de esta familia han estado implicadas tanto en la fusión como en la fisión de membranas. Tengo la intención de aplicar mis nuevos conocimientos nanotecnológicos para resolver y comparar la secuencia de las deformaciones de la membrana en el curso de ambas reacciones. Mi plan es adentrarme más en el análisis de las características moleculares claves que distinguen las proteínas de fusión y fisión y comprender los efectos de las mutaciones de proteínas relacionadas con las patologías humanas. Este enfoque ya nos ha permitido relacionar la dinámica del cambio conformacional de la dynamina 1 con las deformaciones de membrana que culminan en su hemifission, estando el manuscrito correspondiente bajo revisión en la revista Nature. Para comparar la fisión de membrana inducida por diferentes clases de proteínas, he empezado a estudiar la fisión de membrana producida por la proteína M2 del virus de la influenza. Por último, sigo estudiando la auto-organización de la membrana a nanoescala como la principal fuerza impulsora detrás de la formación de los dominios proteo-lipídicos, tales como los complejos transitorios de la dinamina, especializados en la fusión y fisión de la membrana (Shnyrova et al., Curr Biol 2009).

Resumen del Currículum Vitae:

Licenciada en Ciencias Químicas por la Universidad de Salamanca, la candidata obtiene el grado de Salamanca en 2005. Ese mismo año se matricula en el programa de doctorado del Departamento de Bioquímica y Biología Molecular de la misma universidad y obtiene una beca del programa de colaboración predoctoral (GPP) de los Institutos Nacionales de Salud (NIH), Bethesda, EEUU. Dicho programa otorga becas a estudiantes de doctorado para que realicen su investigación en el NIH. Debido a que el NIH no es una institución académica, sino de investigación, uno de los requisitos del programa GPP es defender la tesis en la universidad de origen. Por ello, tras tres años de estancia ininterrumpida en los EEUU y la publicación de un artículo de investigación en la revista J Cell Biol, la candidata vuelve a Salamanca para defender su tesis con Sobresaliente Cum Laude en 2008. Tras la defensa de la tesis, la candidata obtiene una beca postdoctoral para continuar con su investigación en el NIH. A finales de 2009, la candidata vuelve finalmente a España para incorporarse como becaria postdoctoral al recién formado grupo de investigación del Dr. Frolov en la Unidad de Biofísica de la Universidad del País Vasco. En la actualidad, la candidata ocupa el puesto de Investigadora contratada Doctora en la Unidad de Biofísica.
En su etapa postdoctoral, la candidata realiza varias estancias en EEUU, destacando la beca de viaje que le ha sido recientemente otorgada por Universidad del País Vasco para visitar el grupo del Dr. Noy en la Molecular Foundry en el Lawrence Berkley National Laboratory, Berkley, EEUU.

La candidata es primera autora en 6 artículos. Posee artículos en prestigiosas revistas científicas como Nature, Science, J Cell Biol y Curr Biol, entre otros. Ha presentado su trabajo en numerosos congresos de ámbito nacional e internacional, siendo ponente invitada en dos de ellos. La candidata también ha impartido charlas invitadas en los Institutos Nacionales de la Salud, EEUU y en la Universidad del País Vasco, España. En 2013 la candidata recibió el premio de la Sociedad de Biofísica de España otorgado a investigadores en biofísica menores de 33 años.

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2014

Turno de acceso general

La candidata ha sido uno de los miembros clave de equipos de investigación de proyectos financiados por fondos nacionales e internacionales.

Durante su estancia postdoctoral en el NIH, la candidata ha dirigido proyectos de investigación de estudiantes universitarios. En la actualidad es co-directora de dos estudiantes de doctorado, teniendo una de ellas la fecha de defensa de tesis prevista para el 27 de febrero de 2014. Además, la candidata ha impartido clases para estudiantes del Máster en Biología Molecular y Celular de Membranas de la Universidad del País Vasco.

Otros méritos curriculares de la candidata a destacar son la obtención de becas de viaje para asistir a congresos internacionales y la pertenencia a la Sociedad Biofísica de EEUU, Sociedad Biofísica de España y Sociedad Española de Bioquímica y Bilogía Molecular.

MINISTERIO
DE ECONOMÍA
Y COMPETITIVIDAD

SECRETARÍA DE ESTADO
DE INVESTIGACIÓN
DESARROLLO E INNOVACIÓN

SECRETARÍA GENERAL
DE CIENCIA, TECNOLOGÍA
E INNOVACIÓN

DIRECCIÓN GENERAL
DE INVESTIGACIÓN
CIENTÍFICA Y TÉCNICA

SUBDIRECCIÓN GENERAL
DE RECURSOS HUMANOS
PARA LA INVESTIGACIÓN

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2014

Turno de acceso general

Nombre: **GOMEZ HERREROS, FERNANDO**
Referencia: RYC-2014-16665
Área Científica: Biología Fundamental y de Sistemas
Correo Electrónico: F.Gomez-Herreros@sussex.ac.uk

Título:

DNA damage and transcription. Implications in cancer and neurodegeneration

Resumen de la Memoria:

I obtained my PhD in the University of Seville (Spain) under the supervision of Professor Sebastián Chávez. During my PhD I did focus on RNA polymerase II transcription elongation process using S.cerevisiae as a model organism. Through genetic screenings we were able to establish interaction networks between well-known elongation factors and others that had not been related to transcription until then. I did performed genetic screenings using mutants of the chromatin remodeler Spt6 and the cleavage-inducing factor TFIIS. Found interactions led us to one of the bottlenecks of cell viability during transcriptional stress in eukaryotic cells. Moreover we established how cells respond to this kind of stress both at gene expression level and cell cycle regulation. These studies have broad implications that range from the establishment of the molecular bases of transcription regulation in eukaryotes to the understanding of cellular processes triggered by NTP-depleting drugs, commonly used as immunosuppressants.

For my Postdoctoral I moved to Professor Keith Caldecott's laboratory in the Genome Damage and Stability Centre in Sussex (United Kingdom), a renowned research group in DNA repair. I focused in the study of Tdp2, a 5'-tyrosyl DNA phosphodiesterase required for the repair of DNA topoisomerase 2-induced double strand breaks. In collaboration with Dr. Cortés-Ledesma¿s laboratory (Spain) we addressed two main questions. First, we defined the role of Tdp2 in Non Homologous End Joining, one of the two major pathways of double strand break repair in eukaryotes. Secondly, using mouse models, we demonstrated the major importance of Tdp2 as an etiological factor in the response to treatments with DNA topoisomerase II inhibitors and poisons, very commonly used in chemotherapeutical cocktails against a variety of cancer types, therefore demonstrating its gross relevance in clinic.

In 2014 I got my biggest achievement in Professor Caldecott¿s laboratory so far. I described the consequences of the abortive cycle of DNA topoisomerases type II in mammals. This discovery implies a landmark in the field, as the endogenous source of this kind of DNA damage was completely unknown. Moreover, this spontaneous DNA damage, when not properly repaired, results in a human syndrome characterised by intellectual disability, epilepsy and progressive ataxia. We described for the first time patients affected by this hereditary disease.

In the present I coordinate my studies on Tdp2 with the co-supervision of a PhD student and a postdoctoral fellow whose projects are related to the molecular bases of the interplay between the single strand beak repair machinery and RNA polymerase II transcription.

Resumen del Currículum Vitae:

Fernando Gómez Herreros
Born in Sevilla (Spain), April the 28th 1980.
-Academic Formation
Bachelor of Science in Biology, University of Sevilla (1998-2003).
PhD in Biology, University of Sevilla (September 2010).
-Research Experience
February 2003 - August 2003
Associated student at the Department of Genetics, Faculty of Biology, University of Sevilla (Spain).
September 2003- October 2010
Research fellow at the Department of Genetics, Faculty of Biology, University of Sevilla (Spain).
From November 2010
Post-doctoral fellow at the Genome Damage and Stability Centre, University of Sussex (UK)
-Participation in international R&D&I projects funded in competitive calls by public or private bodies
Name of the project: Chromosomal Single-Strand Break Repair: Mechanisms and Degenerative Disease
Project type: Research and development, including transfer
Project area: National (United Kingdom)
Role: Researcher

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2014

Turno de acceso general

Institution where project took place: University of Sussex
City: Brighton, United Kingdom
Head(s) researcher(s): Keith W Caldecott
Number of researchers: 5
Type of participation: Collaborator
Code acc. to the funding institution: MR/J006750/1
Start-End date: 01/05/2012 - 30/04/2017 Duration of the project: 5 years
Total amount (Great Britain Pounds): 2088530
Dedication: Full time
-Publications
1: Gómez-Herreros et al., TDP2 protects transcription from abortive topoisomerase activity and is required for normal neural function. Nat Genet. 2014 May;46(5):516-21.
2: Rulten SL, Rotheray A, Green RL, Grundy GJ, Moore DA, Gómez-Herreros F, et al. PARP-1 dependent recruitment of the amyotrophic lateral sclerosis-associated protein FUS/TLS to sites of oxidative DNA damage. Nucleic Acids Res. 2014 Jan;42(1):307-14.
3: Miguel A, Montón F, Li T, Gómez-Herreros F, et al. Biochim Biophys Acta. 2013 Nov;1829(11):1248-55.
4: Gómez-Herreros F et al., Balanced production of ribosome components is required for proper G1/S transition in Saccharomyces cerevisiae. J Biol Chem. 2013 Nov 1;288(44):31689-700.
5: Gómez-Herreros F, et al. TDP2-dependent non-homologous end-joining protects against topoisomerase II-induced DNA breaks and genome instability in cells and in vivo. PLoS Genet. 2013;9(3):e1003226.
6: Gómez-Herreros F, et al. One step back before moving forward: regulation of transcription elongation by arrest and backtracking. FEBS Lett. 2012 Aug 31;586(18):2820-5.
7: Gómez-Herreros F, et al. TFIIS is required for the balanced expression of the genes encoding ribosomal components under transcriptional stress. Nucleic Acids Res. 2012 Aug;40(14):6508-19.
8: Vanti M, Gallastegui E, Respaldiza I, Rodríguez-Gil A, Gómez-Herreros F, et al. Yeast genetic analysis reveals the involvement of chromatin reassembly factors in repressing HIV-1 basal transcription. PLoS Genet. 2009 Jan;5(1):e1000339.
9: Jimeno-González S, Gómez-Herreros F, et al. A gene-specific requirement for FACT during transcription is related to the chromatin organization of the transcribed region. Mol Cell Biol. 2006 Dec;26(23):8710-21.
10: Gómez-Herreros F, et al. Transcription elongation tuning of genes encoding ribosome assembly factors is essential for cell homeostasis and is controlled by Spt6. submitted to PLoS Genet
-Other scientific activity:
Poster and selected talks in several international conferences

MINISTERIO
DE ECONOMÍA
Y COMPETITIVIDAD

SECRETARÍA DE ESTADO
DE INVESTIGACIÓN
DESARROLLO E INNOVACIÓN

SECRETARÍA GENERAL
DE CIENCIA, TECNOLOGÍA
E INNOVACIÓN

DIRECCIÓN GENERAL
DE INVESTIGACIÓN
CIENTÍFICA Y TÉCNICA

SUBDIRECCIÓN GENERAL
DE RECURSOS HUMANOS
PARA LA INVESTIGACIÓN

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2014

Turno de acceso general

Nombre: **MARTIN CASTRO, FRANCISCO ANTONIO**
Referencia: RYC-2014-14961
Área Científica: Biología Fundamental y de Sistemas
Correo Electrónico: famartin@cajal.csic.es

Título:

Neuroendocrine regulation of animal behavior and disease

Resumen de la Memoria:

I started my PhD in Dr. Morata's lab at the CBMSO studying the regulation of the organ size using Drosophila wing imaginal disc as a model. In my thesis (2005) I focused on the growth control of wing disc by the Dpp/brk pathway, showing that Dpp regulates wing size in a quantitative manner through brk. Besides, I contributed to the first description of undead cells and collaborated with Dr Macias (UNC, Argentina) to describe the role of apoptosis and PVR signaling pathway in Drosophila genitalia. I continued working in the CBMSO as a post-doc (2005-2008) starting a new research line in which I demonstrated 'in vivo' the existence of an intrinsic size control checkpoint and that the unit of size is the compartment. I also addressed whether cell competition, a mechanism that kills unfitted cells within a tissue, was part of such intrinsic checkpoint, to conclude that it is not. The contribution of each initial cell to the compartment size is exclusively determined by its division rate within the framework of a size control mechanism that stops growth once the compartment has reached final size. In parallel, with the support of Dr Morata, I led a team to study the role of posterior Dpp in wing development, following up an observation I made during my PhD. We demonstrated that posterior Dpp is necessary and sufficient to determine the pattern of the wing proximal region. Beyond this, I continued my work on undead cells, and also collaborated with Dr Milan (IRB, Barcelona) to elucidate the role of Wingless and Notch in proliferation. Given my interest in cell competition, I joined as a senior post-doc (2008-2010) to an ERC project at Dr Moreno's group (CNIO), studying the cell competition process in the compartment border. We also discovered the "flower code", a mechanism of cell-to-cell communication during cell competition. From 2011 to 2014, I have been associated to Dr. Leopold¿s team (iBV, Nice, France) as a researcher in a new ERC project. Within this project, I developed a novel and exciting line of research about hormonal regulation of behavior. In collaboration with Dr. O'Connor`s team (USA) we found an unexpected role for secreted PTTH in sensitizing two light-sensing systems to maintain light avoidance during larval stages. PTTH concomitantly promotes the end of larval stages and the search for a dark site to initiate metamorphosis, controlling when and where to pupariate. In summary, we described the unexpected role of a single hormone that is able to coordinate growth and behavior to optimize conditions for adult development. In addition, I have also conducted a screen specifically on PTTH expressing neurons to find genes that regulate developmental timing and growth. My h-index is 9 (483 citations), I have published 10 research articles in prestigious journals (Science, Dev Cell, PNAS, Development, etc), 2 invited reviews, and 3 of my publications have been highlighted in F1000 and commented. I have mentored PhD students, my work has been presented at international meetings and prestigious research institutions and I maintain fruitful national/international collaborations. My current interest combines neurobiology, physiology and behavioral approaches to understand the neuroendocrine control of animal behavior in response to environmental and internal cues and its links with several diseases using Drosophila as a model system.

Resumen del Currículum Vitae:

Education
- 2005. PhD in Sciences (Molecular Biology) Cum Laude. UAM, Madrid. Supervisor: Prof. G. Morata
- 1999. BSc in Biology (Biochemistry and Molecular Biology), UAM, Madrid.

Research experience
- 2015-present. Visiting researcher. Instituto Cajal. Madrid, Spain.
- 2011-2014. Senior postdoctoral researcher. Institute de Biologie Valrose (iBV), Nice, France.
- 2008-2010. Senior postdoctoral researcher. CNIO, Madrid, Spain.
- 2005-2008. Postdoctoral researcher. CBMSO, Madrid, Spain
- 1999-2005. PhD student. CBMSO, Madrid, Spain.

Fellowships
- 2004. Predoctoral CSIC fellowship
- 2000. Predoctoral Comunidad Autónoma de Madrid FPI Fellowship.
- 1999. Initial Research UAM Fellowship

Participation in national/international projects

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2014

Turno de acceso general

- The Genetics and Physiology of Growth and Size Determination. 2011-2015. Head researcher: Pierre Leopold. Funding body: European Research Council
- Genetic and genomic study of cell competition in Drosophila. 2009-201. Head researcher: Eduardo Moreno. Funding body: European Research Council.
- Participation in 6 national research projects, including one Consolider-Ingenio project and one Programa de Actividades de I+D entre Grupos de Investigación en Biociencias from CAM project.

Peer-reviewed Publications (H-index: 9. Number of citations: 483)
- Yamanaka N*, Romero NM*, Martin FA*, Rewitz Kf, Sun M, O'Connor M, Leopold P (2013). Science 341, 1113-1116 (*co-first author). Ranked in F1000. Comment in Science Signaling (2013) and JGP (2013). Q1.
- Rhiner C, López-Gay JM, Soldini D, Casas-Tinto S, Martín FA, Lombardía L, Moreno E (2010). Dev Cell 15, 985-98. Ranked in F1000. Comment in Dev Cell (2010) and Nat Rev Gen (2010). Q1.
- Foronda D, Pérez-Garijo A, Martin FA* (2009). Mech. of Dev 126, 99-106 (*corresponding autor).
- Martín FA*, Herrera SC*, Morata G (2009). Development 136, 3747-56 (*co-first author). Comment in Nat Rev Gen (2009). Q1.
- Martín FA, Peréz-Garijo A, Morata G (2009). Int. J. Dev. Biol. 53,1341-7 (review).
- Herranz H, Perez L, Martin FA, Milán, M (2008). Embo J 27, 1633-1645. Q1.
- Morata G, Martín FA (2007). Dev. Cell 13, 1-2 (preview). Q1.
- Martín FA, Morata G (2006). Development 133: 4421-4426.
- Pérez-Garijo A, Martín FA, Struhl GS, Morata G (2005). PNAS 102 (49): 17664-69. Q1.
- Macías A, Romero NM, Martín F, Suárez L, Rosa AL, Morata, G (2004). Int. J. Dev. Biol.48: 1087-1094.
- Pérez-Garijo A, Martín FA, Morata, G (2004). Development 131: 5591-5598. Ranked in F1000. Comment in Science Signaling (2004) and Nat Rev Mol Cell Biol (2013). Q1.
- Martín FA, Pérez-Garijo A, Moreno E, Morata, G. (2004). Development 131: 4921-4930. Q1.

13 participations in National and International Scientific Meetings
Invited speaker at prestigious Research Institutes
SEBD postdoctoral award (X meeting of the Spanish Society of Developmental Biology, 2014)
4 collaborations with national/international groups that ended up in a publication
Reviewer of international peer-reviewed journals
Member of 4 Thesis Committees
Mentoring of 2 graduate students
Participation in the blog de divulgacion cientifica Bio (Ciencia+Tecnologia)

MINISTERIO
DE ECONOMÍA
Y COMPETITIVIDAD

SECRETARÍA DE ESTADO
DE INVESTIGACIÓN
DESARROLLO E INNOVACIÓN

SECRETARÍA GENERAL
DE CIENCIA, TECNOLOGÍA
E INNOVACIÓN

DIRECCIÓN GENERAL
DE INVESTIGACIÓN
CIENTÍFICA Y TÉCNICA

SUBDIRECCIÓN GENERAL
DE RECURSOS HUMANOS
PARA LA INVESTIGACIÓN

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2014

Turno de acceso general

Nombre: **CONTE , VITO**
Referencia: RYC-2014-15559
Área Científica: Biología Fundamental y de Sistemas
Correo Electrónico: vtconte@gmail.com

Título:

Integrating in vitro and in silico techniques to quantify epithelial tissue dynamics

Resumen de la Memoria:

I set my past research line on developing and integrating in vivo, in vitro and in silico experimental techniques to quantify epithelial tissue dynamics. Cell and tissue dynamics is central to a vast number of significant biomechanical processes in developmental and cellular biology like morphogenesis, cancer metastasis and tissue repair. In all such processes cells and tissues migrate, grow and reshape to a diverse degree of complexity in order to serve a specific function. Biomechanical epithelial function requires force generation and stress transmission to create, sustain and coordinate motion at the cellular and tissue level. To that end, I focused my research career on understanding cells and tissues in biomechanical terms. This understanding provides opportunity for the integration of in vitro and in vivo microscopy techniques with computational engineering methods and in silico physical modelling. The hybrid cross-disciplinary approaches I developed allowed me to quantify determinants and predictors of tissue dynamics during morphogenesis, tissue invasion and repair. Specifically, I researched biomechanical determinants of epithelial motion by developing computational engineering tools for experimental techniques known as Cell Stress Microscopy, Traction Force Microscopy and Video Force Microscopy. I combined all such techniques with in silico physical modelling to also decipher biomechanical predictors of tissue dynamics. Results are published in high-ranking international journals of the likes of Nature Cell Biology, Nature Physics and PNAS.

I keenly wish to become a Ramon-y-Cajal fellow so that I can keep developing hybrid cross-disciplinary approaches that combine experimental techniques from the engineering, biology and physics. As a Ramon y Cajal fellow I shall endeavour to understand fundamental mechanical properties of living systems from an integrative point of view as a way to shed lights on significant biological processes that potentially impact the lives of everyone.

Resumen del Currículum Vitae:

I am a scientist in engineering and physics. I received my PhD in computational biomechanics from King's College London in 2009 under the supervision of Mark Miodownik. I currently am a Juan-de-la-Cierva fellow in the Laboratory of Integrative Cell and Tissue Dynamics led by Xavier Trepat at the Institute for Biomechanical Engineering of Catalonia (IBEC). My research collaboration network extends from Universtitat Politecnica de Catalunya in Barcelona (José Muñoz) to the Laboratory of Molecular Cell Biology at University College London in the United Kingdom (Buzz Baum) and the University of Waterloo in Canada (Wayne Brodland). My research has been published in high-ranking international journals of the likes of Nature Cell Biology, Nature Physics and PNAS, and it has also raised interests in the science news both nationally (Tendencia21, Sinc, EMO, LaGaceta) and internationally (PhysicsWorld, NatureAsia, ScienceDaily). My research has also granted me a €5000 short-term fellowship from the European Molecular Biology Organization (EMBO) as well as invitations to international conferences and research visits. Among these I would like to mention the research visits at the Institute for the Physics of Living Systems (IPLS) at the University College London and at the TEMASEK Lifesciences Laboratory led by Yusuke Toyama at the Mechanobiology Institute in Singapore, which was also followed by participation to the ICBME2013 conference. Also my ability to communicate science to all type of audiences has won me best presentation awards in science contests at the Thomas Young Centre (TYC) at Imperial College in London and at the Institute for Biomechanical Engineering in Barcelona. My professional profile shows that I am a junior Juan-de-la-Cierva scientist who could highly benefit of the Ramon-y-Cajal fellowship to become a more senior science investigator.

MINISTERIO
DE ECONOMÍA
Y COMPETITIVIDAD

SECRETARÍA DE ESTADO
DE INVESTIGACIÓN
DESARROLLO E INNOVACIÓN

SECRETARÍA GENERAL
DE CIENCIA, TECNOLOGÍA
E INNOVACIÓN

DIRECCIÓN GENERAL
DE INVESTIGACIÓN
CIENTÍFICA Y TÉCNICA

SUBDIRECCIÓN GENERAL
DE RECURSOS HUMANOS
PARA LA INVESTIGACIÓN

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2014

Turno de acceso general

Nombre: **PORLAN ALONSO, EVA**
Referencia: RYC-2014-15991
Área Científica: Biología Fundamental y de Sistemas
Correo Electrónico: emporlan@cnio.es

Título:

Intrinsic and extrinsic, niche-derived signals modulating quiescence, multipotency and long term neural stem cell maintenance.

Resumen de la Memoria:

My thesis work focused on the regulation of the cell cycle by nuclear receptors, and directly produced two publications (Oncogene, 2008; Oncogene, 2004). I trained in neuroscience at an internationally recognized research center (Neurons/Glia Interactions Laboratory INSERM U-495. Pitié-Salpêtriére. Hospital Paris, France), and I became interested on the signals that regulate the proliferation, self-renewal and maintenance of progenitor pools at the germinal niches in the adult brain, an interest that led me to Prof. Fariñas' laboratory. Funded by CIBERNED (2007-2013) at Dpt. of Cell Biology, U. de Valencia, I focused on the identification of intrinsic and extrinsic niche signals modulating adult neural stem cell quiescence vs. activation, with interest in cell cycle regulators and adhesion molecules. In this regard, we very recently identified the metalloproteinase MT5-MMP as a novel component of the niche, and found that together with its proteolytic substrate N-cadherin function as major regulators of neural stem cell quiescence in homeostasis and under regenerative conditions (Nature Cell Biology, 2014; comment in Nature Cell Biology News & Views). Also, my work contributed to the identification of the cell cycle inhibitor p21Cip1 as a major regulator of adult neural stemness and maintenance, regulating the transcription of the morphogen and glial inductor Bmp2 (Nature Neuroscience, 2013; comment in Science Signaling as the Editor's choice), and of the pluripotency factor Sox2 (Cell Stem Cell, 2013; recommended as being of special significance in its field from the F1000 Faculty). In collaboration with other members of Fariñas' lab, I also helped to demonstrate that kinase Dyrk1A is an asymmetrically segregating functional determinant for adult NSC self-renewal (Cell Stem Cell, 2010), and more recently, that neurotrophin-3 is a quiescence factor and supports long-term maintenance of neural stem cells (Neuron, 2014). Since July 2013, I am a scientist at the Cell Division and Cancer group, led by Dr. Malumbres, CNIO, Madrid, where I am focusing on the mechanisms of asymmetric cell division that underlie the maintenance of the stem and progenitor cell pools in the mammalian brain, using genetically engineered mouse models of mitotic regulators. So far I have contributed to the discovery that genetic ablation of E3-ubiquitin ligase APC/C-Cdh1 in the developing nervous system results in hypoplasic brain and hydrocephalus (Eguren et al., Nature Communications, 2013). In addition, I am characterizing neural stem-cell behavior in animal models of impaired asymmetric cell division, with high interest in the mechanisms underlying the genesis of neurodevelopmental disorders like primary microcephaly.

Resumen del Currículum Vitae:

Degree in Biological Sciences, with Masters in Biochemistry & Molecular Biology; 1994-1999; (UAM). PhD (Suma cum laude) in Biochemistry, Molecular Biology & Biomedicine, 01/12/2005, Dpt. de Bioquímica, (UAM) supervised by Dr. A Rodríguez-Peña and Dr. T Iglesias (IIB Alberto Sols CSIC-UAM). My thesis focused on the regulation of the cell cycle by nuclear receptors, and directly produced two publications, (Oncogene, 2008; Oncogene, 2004). I trained in neuroscience at an internationally recognized research center (Neurons/Glia Interactions Laboratory INSERM U-495. Pitié-Salpêtriére. Hospital Paris, France). Funded by CIBERNED (2007-2013) at Dpt. of Cell Biology, U. de Valencia, I focused on the identification of intrinsic and extrinsic niche signals modulating adult neural stem cell quiescence vs. activation, with interest in cell cycle regulators and adhesion molecules. This work led to the identification of the cell cycle inhibitor p21Cip1 as a major regulator of adult neural stemness and maintenance (Nature Neuroscience, 2013 -comment in Science Signaling as the Editor's choice- and Cell Stem Cell, 2013 -recommended by the F1000 Faculty-). Also, I contributed to the identification of the metalloproteinase MT5-MMP as a novel component of the niche, and as a major regulator of neural stem cell quiescence in homeostasis and under regenerative conditions (Nature Cell Biology, 2014; commented in Nature Cell Biology News & Views). I also helped to demonstrate that kinase Dyrk1A is an asymmetrically segregating functional determinant for adult NSC self-renewal. (Cell Stem Cell, 2010), and that neurotrophin-3 supports long-term maintenance of neural stem cells (Neuron, 2014). Since July 2013 I am a scientist at the Cell Division and Cancer group, led by Dr. Malumbres, CNIO, Madrid, where I am studying the mechanisms of asymmetric cell division underlying the maintenance of the neural stem and progenitor cell pools, using animal models of mitotic regulators, focusing on adult neural stem cell activation and maintenance and on neurodevelopmental disorders like primary microcephaly (Nature Communications, 2013). Globally, I have authored 8 original articles, being 1st author in 4 of them (impact factor: average, 15.823). Also, I am 1st author of one review article, one protocol article and co-author several manuscripts that are either under revision or in preparation. I have presented 11 poster communications at national and international scientific meetings, one awarded as Best Poster (Cambridge Neuroscience Stem Cells Meeting, 2011), have been invited to give 5 oral presentations in scientific meetings and in national and international research centers within their seminar cycles. I have participated in 11 national grants and in The MitoSys (systems biology of mitosis) project funded by the EU under FP7. I was faculty in 2 postgraduate courses (organised by IIBUAM-Oficina de Transferencia de Tecnología del CSIC-Comunidad de Madrid-Fondo Social Europeo) and I have supervised 2 Master Thesis with excellent marks in both

cases, one of them being awarded with Honor Mention. Currently I am supervising 1 Master's Final Project and directing one doctoral thesis. I am an evaluator for ANEP (Agencia Nacional de Evaluación y Prospectiva) and for COST actions, an intergovernmental framework for European Cooperation in Science and Technology.

MINISTERIO
DE ECONOMÍA
Y COMPETITIVIDAD

SECRETARÍA DE ESTADO
DE INVESTIGACIÓN
DESARROLLO E INNOVACIÓN

SECRETARÍA GENERAL
DE CIENCIA, TECNOLOGÍA
E INNOVACIÓN

DIRECCIÓN GENERAL
DE INVESTIGACIÓN
CIENTÍFICA Y TÉCNICA

SUBDIRECCIÓN GENERAL
DE RECURSOS HUMANOS
PARA LA INVESTIGACIÓN

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2014

Turno de acceso general

Nombre: **MATIAS DA FONSECA, SANDRA CRISTINA**
Referencia: RYC-2014-16308
Área Científica: Biología Fundamental y de Sistemas
Correo Electrónico: fonseca.sandra@gmail.com

Título:

JA signaling components, perception mechanism and active hormone.

Resumen de la Memoria:

In 1999, I joined the Institute of Applied Science and Technology, Lisbon, to study chestnut ink disease by identifying changes on cell wall modifying enzymes involved in the defense responses to Phytophthora (patent, WO/2004/113546).
Between 2001 and 2005 I carried out my PhD at the Faculty of Sciences, University of Lisbon and as a visiting student at the Biological Research Center, Szeged, Hungary. My research was focused on pear fruit ripening and softening, the de/coupling of ethylene production from cell wall modification enzymes activity and its effect on normal fruit ripening. I also developed the first pear microarray. On trying to improve the quality of my research and applicability of my results, I established several collaborations with other groups as well as with producers. As a result, 4 original research papers (two as first author) and one international patent (WO/2004/113546) were published. I was also the person in charge of the sequencing service of the laboratory.
My growing interest in plant hormonal signaling, led me to join, in 2005, Roberto Solano's group as Post-doctoral researcher at the Centro Nacional de Biotecnologia (CNB-CSIC, Madrid). There I studied the jasmonate signaling pathway with outstanding results. In 2007 we published (co-first author) in NATURE the identification a new family of transcriptional repressors, the JAZ proteins and in 2009 we published in NATURE CHEMICAL BIOLOGY (first author) the identity of the bioactive jasmonate hormone, and of its long sought receptor. I also contributed to the demonstration that JAZ repressors are dimeric proteins (second author of Plant Journal, 2009). Because we resolved the core of JA signaling pathway and answered important questions, I also contributed as first and third author to two publications in Current Opinion in Plant Biology (2008, 2009). In this period we established important and fruitful interdisciplinary collaborations with groups in Sweden (Mats Hamberg&#65533;s at Karolinska Institut) and in Germany (Claus Wasternack&#65533;s).
Since 2010 my work was been dedicated to the search of new JAZ interactors and for this purpose I optimized a pull-down method (Methods in Molecular Biology, 2013). In addition, I participated in the characterization of MYC2-like bHLH transcription factors. In collaboration with Philiipe Reymond&#65533;s group (Lausanne, Switzerland) we demonstrated that MYC2,3,4 proteins regulate glucosinolate biosynthesis and therefore contribute to plant resistance against insects (Plant Cell, 2013). I also found that other MYC2-like genes, bHLH003, bHLH013 and bHLH017 are JAZ interactors that interestingly act as repressors of JA mediated responses. Therefore, we unraveled a new mechanism for fine-tuning JA responses trough competition of activator and repressor transcription factors for the same cis-regulatory sequences (Plos One 2014, first author).
Recently and based on my previous experience with jasmonate precursors, conjugates and mimetics, I contributed to a manuscript (Frontiers in Plant Science, 2014, first author) striking the importance of small molecules in hormone research.
On the constant search for new frontiers and exciting projects, I have developed strategies to address those I considered the &#65533;major gaps&#65533; on JA research. With this independent project I was awarded an EMBO Installation grant (2012) and an FCT investigator grant (2012)

Resumen del Currículum Vitae:

Sandra Fonseca graduated in Biology by the University of Lisbon, in 1999 (Final Mark 16/20) and obtained a PhD degree in Molecular Biology by the University of Lisbon in 2005 (Summa cum Laude).
In 1999, I started working as a researcher in chestnut ink disease at the Institute of Applied Science and Technology (ICAT), Lisbon, Portugal. This work resulted in one international patent (Serrazina, Fonseca et al., WO/2004/113546) explored by Castania Sociedade Agroflorestal company.
Between 2001 and 2005 I developed my PhD research at FCUL and as a visiting student at Biological Research Center, Szeged, Hungary. The topic of my research was pear fruit ripening and softening for which I developed a small cDNA array (the first one at that time). This work led to two papers as first author, Fonseca et al (2004) PLANT SCIENCE and Fonseca et al., (2005) JOURNAL OF EXPERIMENTAL BOTANY and to an international patent, Fonseca et al., WO/2002/016613.
My collaboration in projects related to salt stress tolerance of Populus euphratica, and on Humulus lupulus genetic improvement resulted in two publications as second author, Gu, Fonseca et al., (2004) TREE PHYSIOLOGY and Batista, Fonseca et al., (2008) PLANT CELL REPORTS. At that time I was responsible of the sequencing service and also had a major involvement in the creation of the microarray facilities at ICAT.
In 2005 I joined Roberto Solano's laboratory as a Post-doctoral researcher at the Centro Nacional de Biotecnologia (Madrid). I was dedicated to the study of the jasmonate signaling pathway with outstanding results. We found the long sought JAZ repressors, the JA receptor and the biologically active jasmonate molecule. As a result, nine publications, two of which of very high impact:

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2014

Turno de acceso general

Chini*, Fonseca* et al. (2007) NATURE (*shared first authorship);
Fonseca et al. (2009) NATURE CHEMICAL BIOLOGY;
Chico, Chini, Fonseca et al. (2008) CURRENT OPINION IN PLANT BIOLOGY;
Chini, Fonseca et al. (2009) PLANT JOURNAL;
Fonseca, et al. (2009) CURRENT OPINION IN PLANT BIOLOGY;
Schweizer, Fernández-Calvo, Zander, Diez-Diaz, Fonseca et al. (2013) PLANT CELL;
Fonseca and Solano (2013) METHODS IN MOLECULAR BIOLOGY;
Fonseca et al. (2014) PLOSONE;
Fonseca et al. (2014) FONTIERS IN PLANT SCIENCE.
Overall, in numbers, I have published 12 scientific papers (7 of which as first author and 4 as second author) a book chapter and two international patents. My publications (with an average impact factor of 9.1) were cited 1229 times by 910 documents according to WOS and are all journals in the Q1 of their areas. I took part in several national and international meetings where I had the opportunity to expose my work to a large audience (most of times as a speaker) and I've also participated in science divulgation events. I contributed to the integration and training of several students and act as a referee for Plant Physiology, PlosOne and Plant Cell Tissue and Organ Culture journals. My work has been supported by fellowships funded by the Portuguese Foundation for Science and Technology and a JAE-Doc contract from CSIC, obtained in competitive calls. Recognizing my independent thinking and promising independent researcher capacities, in 2012 I was awarded an EMBO Installation grant and a FCT Investigator contract. I was recognized with the NOVO prize (Science Category) for young highlighted personalities in Portugal.