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AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

Nombre: MAYOR , CRISTINA
Referencia: RYC2020-030061-I
Área Temática: **Biomedicina**
Correo Electrónico: cristina.mayor-ruiz@irbbarcelona.org

Título:

Targeted protein degradation: a novel paradigm in drug development

Resumen de la Memoria:

I am a young, passionate scientist with the declared goal of promoting drug innovation in Spain while training the next generation of chemical biologists. Overall, I aim to innovate (pharmacologic) strategies to probe, understand and eventually target disease--relevant proteins.
During my PhD with Óscar Fernández--Capetillo (CNIO, Madrid) I described novel mechanisms of resistance to anticancer therapies. Aiming to intervene in a more direct manner in cancer treatment, I decided to do a postdoc in chemical biology with Georg Winter (CeMM, Vienna), where I became proficient at research in the emerging field of targeted protein degradation (TPD).
TPD represents a transformative paradigm in drug development based on the pharmacological reprogramming of ubiquitin E3 ligases. This strategy is based on the use of synthetic drugs called degrades that induce proximity between an E3 and a target protein of interest, inducing its proteasomal degradation.
Among other advantages over traditional pharmacology (i.e. inhibitors), TPD has allowed the elimination of otherwise undruggable targets. In the Winter lab, I (i) mapped the genetic determinants of TPD, (ii) innovated the first rational strategy to discover monovalent degraders, and (iii) focused on the chemical probing of oncogene effectors.

Only 2 years after starting my postdoc, I accepted a Junior Group Leader position at IRB Barcelona through a competitive international call. From January 2021 onwards, I will push the limits of TPD to better understand and ultimately control protein activity in cancer. Capitalizing on my expertise in the field, my research at IRB Barcelona will focus on (1) developing screening strategies to identify monovalent degraders and other proximity--inducing drugs with therapeutic interest, and on (2) tackling exciting biological questions that, either benefit from the high kinetic resolution provided by TPD, or that involve E3 (dys)regulation dynamics.
I am convinced that the background acquired over those years has built an ideal foundation to reach my professional goals as an independent group leader.
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Resumen del Currículum Vitae:

After completing my B.S. of Biotechnology with first class honors in 2012, I obtained a la Caixa fellowship to do my M.S. and start my PhD with Óscar Fernández-Capetillo (CNIO, Madrid). My PhD focused on the study of resistance mechanisms to anticancer therapies:

- We revealed that CDC25A loss promotes resistance to ATR inhibitors (Mol Cell, 2016 and J Mol Biol, 2017).
- I also investigated mechanisms of resistance to RAS-related therapies. In collaboration with M. Barbacid, we discovered that deletion of the repressor ERF is able to rescue RAS deficiency (Genes & Dev, 2018). We showed the first example of a tumor that grew despite lacking all RAS genes.
- In parallel, I contributed to the identification of a novel drug transporter by the Superti-Furga lab and to the discovery of a p53-dependent haploidy checkpoint (Nat Chem Biol, 2014; PNAS, 2017).

I defended my PhD thesis in Sept 2017 (Cum laude and Extraordinary Doctorate award).

With the same genuine enthusiasm but aiming to intervene in a more direct manner in cancer treatment, I decided to do a postdoc in chemical biology. Fascinated by the potential of targeted protein degradation (TPD), and with a strong interest in intersecting chemical biology with post-genomic technologies, I decided to join the group of Georg Winter at CeMM (Vienna). TPD represents a transformative paradigm in drug development based on inducing proximity to E3 ubiquitin ligases. After securing two competitive postdoc fellowships (EMBO and Marie Curie score 99.6/100), I started my postdoc in Jan 2018, focusing my research on:

- Global genetic determinants of TPD. It led to my first publication as a postdoc within the 1st year. We informed on regulation of E3s amenable for TPD and outlined biomarkers for upcoming clinical investigation (Mol Cell, 2019). It led to a patent application and, given my foundational role, I am co-corresponding author.
- Discovery of molecular glue (MG) drugs. We described the first rational and scalable drug screening strategy to find MGs (Nat Chem Biol, 2020). Out of this work, five patents were filed and a biotech startup funded (Proxygen).
- Chemical probing of oncogene effectors. I developed TPD chemogenetic approaches to identify and disrupt transcriptional effectors of oncogenic programs.

Only 2 years after starting my postdoc, I was offered a Junior Group Leader position at IRB Barcelona, through a competitive international

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

call. From Jan 2021 onwards, I will study the multifaceted subtleties of TPD to ultimately control protein activity in cancer. Capitalizing on my expertise in TPD, I will pursue these lines of research:

1. Drug discovery
   1.1 Expanding the toolbox for TPD.
   1.2 Beyond the current applications of inducing protein proximity to E3 ubiquitin ligases.
2. Molecular biology
   2.1 Dysregulation of E3 ubiquitin ligase plasticity in disease.
   2.2 Oncoprotein degradation and interplay with the immune system.
   2.3 Overcoming TDP resistance mechanisms.

Since 2012, I have been awarded 14 scientific prizes/fellowships. Besides, I regularly act as a reviewer (journals and grants) and participate in outreach activities. My CV indicates that I have successfully planned and executed cutting-edge science in a highly collaborative manner, while securing the most competitive funding in every step of my career.

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Turno de acceso general

Nombre: DEL PINO PARIENTE, ISABEL
Referencia: RYC2020-029275-I
Área Temática: **Biomedicina**
Correo Electrónico: i.delpino.pariente@gmail.com

Título:

Neural plasticity mechanisms of cognitive decline

Resumen de la Memoria:

My research is focused on neural circuit function in the central nervous system (CNS). Following my bachelor¿s degree in Biology (University of Valencia), I did my PhD in Neurochemistry at the Max-Planck-Institute for Brain Research (Germany) (3 publications, 2 as first author) investigating the molecular determinants of synapse organization. In particular, my work contributed to unveil new protein machineries controlling inhibitory synaptic function (Del Pino I et al., J. Biol Chem 2014 and Del Pino I et al., Biochem Biophys Res Commun 2011). Then, I joined the laboratories of Dr. Beatriz Rico and Dr. Oscar Marin at the Instituto de neurociencias CSIC-UMH (Spain) later at King s College London (UK), to address the molecular mechanisms regulating the development of inhibitory circuit organization and its implications for adult brain function (7 publications, 3 as first author). My contribution to the field of GABAergic interneuron development demonstrate how genetic predisposition to neurodevelopmental disorders influence the early integration of different types of GABAergic neurons in the cerebral cortex, hippocampal function and cognitive performance (Del Pino I et al., Neuron 2013 and Del Pino I et al., Nat Neurosci 2017). Moreover, this very successful training resulted in additional reviews (Del Pino I et al., CONB 2018), previews (Del Pino I and Marin O, Dev Cell 2014) and original papers in high impact journals i.e. Science, Development and eLIFE. After my postdoc, I was awarded an Initiative d¿Excellence (IdEx) award fellowship in 2015 from the University of Bordeaux to join the Neurocentre Magendie (France) (Del Pino I et al., Cerebral Cortex 2020). Finally, through a JIN-Retos en investigación 2019, a Young IBRO Regions Connecting Award 2019 and a CIDEGENT-distinguished researcher 2020 grant I established my lab focusing on neural plasticity mechanisms of brain development and cognitive decline (Dehorter and Del Pino, Front Cell Neurosci 2020).
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Resumen del Currículum Vitae:

Neuroscientist with a PhD in biochemistry and >10 years of scientific career in the field of
developmental and cognitive neuroscience. Awarded with IBRO prices to young group leaders, research grants for international postdoctoral researchers in France (Initiative d'Excellence/ IdEx-Fellowship from l'Université de Bordeaux) and with several international travel grants.
Author of 13 publications, three of them very high impact factor: Neuron, Science and Nature Neuroscience. First author of seven original publications and reviews: two of them in high impact journals: Neuron and Nature Neuroscience.
CIDEGENT Distinguised Researcher and Principal Investigator of the Neural Plasticity Group at the Centro de Investigación Príncipe Felipe in Valencia with a career in prestigious research institutes across 4 different countries: Max-Planck-Institute for Brain Research (Frankfurt am Main, Germany), Instituto de Neurociencias (Alicante, Spain), King's College London (London United Kingdom) and Neurocentre François Magendie INSERM U1215 (Bordeaux, France).
Technical expertise spanning from molecular and cellular physiology to in vitro
electrophysiology and rodent behaviour. Expert in neural circuits underlying mental disorders and animal models of neurodevelopmental and neurodegenerative disorders.
Mentoring and supervision of trainees (4), master (6), PhD-students (3) and postdocs (1) since
2013.
Ad hoc reviewer for Brain structure and Function.
Invited speaker in national and international conferences and research centers in Spain (5), France (3), USA (1) and Australia (1).
Young IBRO Regions Connecting Award.
Initiative d'excellence award for international postdoctoral researchers by the University of
Bordeaux.
IBRO-PERC FENS Travel Grant and SRUK/CERU Travel Grant.
Total publications: 13
h-index = 8 by Google scholar
i10 index = 8 by Google scholar
Articles in journals of the first quartile: 12
Articles with citation data: 11
Sum of the times cites: 536

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CONVOCATORIA 2020

Turno de acceso general

Nombre: CASANOVA ACEBES, MARIA
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Área Temática: **Biomedicina**
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Título:

Immune surveillance in cancer initiation and progression

Resumen de la Memoria:

Myeloid cells, which constitute the first barrier of the innate immune system upon an insult, are equipped to provide sensing, recognition, pro-inflammatory and resolving functions. The diversity of effector capabilities of the innate system has been well established for monocytes and macrophages (Macs) in steady-state; however, only recently others and we have suggested that neutrophils support tissue homeostasis within healthy and sub-clinical scenarios (Casanova-Acebes Cell 2013; JEM 2018). Resident Macs colonize developing tissues during embryogenesis and are maintained through local proliferation. Their functions in tissues are dictated by the environmental cues in which they reside (Casanova-Acebes Nat. Comm. 2020). Resident Macs act as tissue remodelers during development, repair and in pre-malignant disease. In contrast, monocytes and neutrophils arise once definitive bone marrow (BM) hematopoiesis is established, and are recruited to tissues by daily infiltration. Both BM and embryonic-derived myeloid cells maintain tissue homeostasis in check, by inherent cell plasticity at the molecular and epigenetic levels, which have been the focus of my research over my PhD and postdoctoral studies.

1. Myeloid cells in homeostasis: During my PhD studies, I demonstrated an unexpected function of neutrophils for the control of hematopoietic niches in the BM. Through a combination of multiple techniques (including intravital microscopy, mouse surgery, cell biology and flow cytometry) I discovered a population of aged neutrophils in the blood, which fluctuate in circulation (i.e. their levels change regularly following day/night cycles). In a follow-up study on the biology of neutrophils, I showed that neutrophils infiltrate the vast majority of tissues in mice following strict circadian patterns in the absence of preexisting inflammation. I found that a constant influx of neutrophils in the intestinal mucosa, support distant BM hematopoiesis by regulating mesenchymal niches in the bone marrow.

2. Myeloid cells in cancer: Macs are one of the most abundant immune cell components of tumor lesions. Through their ability to promote tissue remodeling, cell clearance, antigen processing and presentation, and production of immunomodulatory cytokines, Macs play key roles in shaping the tumor microenvironment (TME). Because of their critical roles, Macs are an important target for cancer treatment, potentially through their ability to modulate tumor innate and adaptive immunity, and the response to cancer immunotherapy. An unanswered question raised from macrophage studies in mice, is whether the origin of macrophages in different tumors impacts tumor cell dissemination and drug response. By using lineage-tracing murine models of fate-mapped adult-Macs and single cell RNAsequencing, I discovered that in non-small cell lung cancer (NSCLC) discrete Macs populations differ in origin, and have a distinct temporal and spatial distribution in the tumor microenvironment, both in mice and human. I found that tissue-resident Macs are the first cells to interact with tumor cells to promote tumor invasiveness and early regulatory T cells (Tregs) in the lung. Ablation of embryonic Macs significantly reversed Treg/Teff ratios and reduced tumor growth, highlighting the specialized function of ontogenically distinct Macs (Casanova-Acebes under consideration Nature).

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Resumen del Currículum Vitae:

I currently am a Junior Group Leader at CNIO leading the Cancer Immunity Group. I received my PhD in Cellular Biology and Genetics under the supervision of Dr. Andrés Hidalgo at the Universidad Autónoma de Madrid (Spain) in 2015. My PhD studies were focused on understanding the mechanisms of neutrophil aging and how the natural clearance of aged neutrophils triggers the homeostatic release of hematopoietic progenitors from bone marrow into the blood. For my postdoctoral studies I joined Dr.Merad laboratory in April 2015, after being awarded a long-term postdoctoral fellowship from the Human Frontiers Science Program (HFSP). During my postdoctoral research I explored the role of macrophage ontogeny in the context of lung adenocarcinoma and ovarian cancer. In the first of my studies, I discovered that embryonic and adult macrophages have a distinct temporal and spatial distribution in the tumor microenvironment. I found that embryonic macrophages are the first cells that interact with tumor cells to promote tumor invasiveness and early regulatory T cell induction. I found that ablating embryonic macrophages, while sparing adult ones, significantly reversed the Treg/Teff ratio and reduced tumor growth, highlighting the specialized function of ontogenically different macrophages. My work emphasizes the key contribution of embryonic macrophages to tumor outcome and uncovers novel macrophage determinants of tumor immunity. This work is currently under a second round of revision in Nature. Also during my postdoc, I uncovered that nuclear receptors RXRs play a role in the maintenance of macrophage identity in serous cavities through regulating chromatin activity and transcriptional regulation, in a manner that is partially dependent on retinoic acid signalling. In this study, I also described that loss of RXRa in macrophages impairs ovarian cancer progression in a murine model of high-grade serous ovarian carcinoma (Casanova-Acebes et al.,2019 Nat.Comm).Over my scientific career, I have successfully obtained continued funding during my PhD in Spain as well as during my postdoctoral training from national (FPI, Plan Nacional) and international sources (HFSP and AACR). I have managed and used this financial support to expand my training and to produce knowledge reflected in multiple peer-reviewed publications. While I am now based in Madrid, I keep strong ties with Europe

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

(Germany and France) and several collaborations across USA (Mount Sinai & Regeneron). For my career as an independent researcher, I aim to expand the role of myeloid cells in metastasis initiation and progression in human and murine models. My past and present work shows that targeting myeloid cells at early phases dampens tumor progression and metastasis development, and suggest that early myeloid-targeted intervention could block cancer cell expansion. I have a long-standing interest in the origin and function of myeloid cells in steady-state and disease, particularly cancer and inflammation. While my Ph.D. thesis focused on the mechanisms that regulate the bone marrow hematopoietic cell niche by neutrophil clearance, during my postdoc I applied my previous expertise to ask whether macrophage heterogeneity in tumors impacts cancer progression. As an independent researcher, my goal is to develop novel strategies that target innate cells to promote anti-tumor immunity.

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Turno de acceso general

Nombre: ROVIRA ALGANS, XAVIER
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Área Temática: **Biomedicina**
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Título:

Photopharmacological approaches for the study of signalling mechanims and the development of innovative drugs

Resumen de la Memoria:

As researcher, I have a strong commitment to science and I am profoundly convinced to pursue a career as group leader in the academy. Since the beginning, I demonstrated a high degree of independence. Currently, thanks to a grant from the Spanish Ministry of Economy, Industry and Competitiveness, I have been able to start my own research line, which is devoted to innovation of pharmacology with the aim to solve unmet needs where classical approaches are limited.

After my MSc in Bioinformatics and Computational Biology by the Universidad Complutense of Madrid, I gained a solid experience working for the industry with Lead Molecular Design Inc, where I collaborated in the research of important national and international pharmaceutical companies. Later, I did my PhD at the Institute of Neurosciences of the Universitat Autonoma de Barcelona focused on mathematical and molecular modelling of cell receptors. In 2011, I did a postdoctoral stay of more than 4 years in the team lead by Dr Jean-Philippe Pin at the Institut de génomique fonctionnelle (Montpellier, France). My participation in the research of the team was an excellent opportunity to acquire new skills to study the function of membrane receptors by learning cutting edge experimental procedures in one of the leading research labs in the field. My main research interest has been the study of G protein-coupled receptors (GPCRs), which constitute the largest family of individual drug targets. In particular, I have developed multidisciplinary approaches to understand processes that affect GPCR function such as oligomerization and allosterism. I centred my attention on metabotropic glutamate receptors (mGlu), which are of great therapeutic interest and form physiologically relevant and obligatory homodimers, thus representing an ideal model to study GPCRs dimerization. Of note, during the last few years I have worked in the search for innovative ligands targeting GPCRs and, in particular, in new programs for the development of light-regulated ligands. Importantly, I have been able to establish a multidisciplinary international network of collaborators which is playing an essential role in the development of this emerging field named Photopharmacology. Indeed, under the framework of a collaborative work, we developed for the first time diffusible photoswitchable, very high affinity, allosteric modulators targeting GPCRs, which provided a proof of concept for the development of these type of molecules with therapeutic potential. Moreover, we validated their activity in primary cell cultures, brain slices and diverse animal models (zebrafish, tadpoles and mice), including preclinical models of chronic pain. I am convinced that such a unique combination of experts will be a key factor for the future development of the field which has a huge potential to solve unmet needs of the healthcare system.

Within my current research group at the Institute of Advanced Chemistry of Catalonia (IQAC, CID-CSIC), together with Dr. Amadeu Llebaria, we are currently managing projects that go from the design of new molecules to the study of physiological responses. We develop photopharmacological tools to precisely regulate in time and space essential proteins that enable the of control of their activity in a native environment. This research may help fighting a number of diseases with unmet needs.

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Resumen del Currículum Vitae:

From the beginning, I have been involved in highly multidisciplinary projects, which include a combination of biological, chemical and theoretical methods. My degree is in Biology and my MsC in Bioinformatics and computational biology. I did my PhD at the Universitat Autònoma de Barcelona (UAB) and performed two International predoctoral stays of 6 months each at Cornell University (New York) and at Université Paris Descartes (Paris). After my PhD, I was awarded two competitive fellowships (FEBS Longterm and Beatriu de Pinos) for a postdoctoral stay at the Institute of Functional Genomics in Montpellier (France). After this experience, I took a position at the Institute for Bioengineering of Catalonia in Barcelona and, then, I built my own team at the University of Vic, named Molecular Photopharmacology. Recently, I moved my laboratory to the group of Dr. Amadeu Llebaria at the Institute of Advanced Chemistry of Catalonia (IQAC, CID-CSIC) where we are co-leading photopharmacology projects including chemistry and biology.

To date, the results of my research have been the object of 36 publications, of which 30 are ranked by JCR (97% in Q1 and ~50% in top 10 (D1)). These include 7 contributions with an IF > 10, three as first author (Nat Commun, Nat Chem Biol and TIPS). Besides, I have 2 publications as corresponding author, of which one as last author in J Med Chem in 2020 (D1 by JCR). Two articles are currently in preparation, one as a corresponding author, and one patent registered. My publications have achieved in the last 5 years >680 citations for a total h-index of 18 (Scholar). I presented my research achievements in >20 conferences and have been invited as a speaker to national and international congresses. In addition, I have organized international symposiums, workshops, and congresses. I have supervised 3 PhD, 1 Master and several undergraduate students. I am currently directing two PhD thesis, and involved in several teaching and outreach activities. In 2020, I received a national prize (Premios Fotón) for a popular science article about Photopharmacology. I also serve as a reviewer for scientific journals, the national funding agency (AEI) and the European Research Council (ERC) as an expert evaluator.

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AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

I have been responsible of tasks in international projects and, importantly, I have been the recipient of a competitive national grant to start my own research group as an independent researcher (SAF2015-74132-JIN). I also collaborate with several companies for the development of biotechnological and pharmaceutical products. Of note, I contributed to the establishment of a collaboration with Lilly USA with the aim of bringing photopharmacology from bench to bedside in which I coordinate pharmacology tasks.

My primary research interest is the pharmacology of molecular receptors. I study their mechanisms of activation and search for ligands with innovative properties that can be used as research tools and therapeutic agents. I currently develop light-controlled drugs to precisely regulate in time and space receptors in their native environment. I believe that this research will be of prime importance to understand the spatiotemporal regulation of cell signalling events and may represent the future of innovative therapies.

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AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

Nombre: ORTIZ MUNOZ, GUADALUPE
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Área Temática: **Biomedicina**
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Título:

Atherosclerosis-associated Chronic inflammation and its Implications on the Progression and Response of Cancer to Immunotherapies

Resumen de la Memoria:

At Autonoma University of Madrid my PhD focused on the role of SOCS proteins in the modulation of inflammatory processes in atherosclerosis and diabetic nephropathy. I studied too, the contribution of FcgR during atherosclerosis. This work helped to the better understand immune mechanisms associated to atherosclerosis supporting the use of immunotherapies. I published a total of 14 articles including 2 first-authored articles (Ortiz-Muñoz, ATVB.2009; Ortiz-Muñoz, J Am Soc Nephrol.2010). My research was funded by national and international grants and scientific networks programs and predoctoral fellowships. I had the opportunity to co-supervise two master students.

In 2009, I graduated and obtained a postdoctoral fellowship from the Leducq Foundation, which allowed me to work on a collaborative project between Dr. Kane at UCSF and Dr. Meilhac at INSERM. I characterized HDL isolated from patients with coronary artery disease. Here I deepen my knowledge about lipoproteins to better understand the development atherothrombosis. My studies were reported in 3 publications 2 of which I first-authored (Ortiz-Muñoz, FASEB.2009; Ortiz-Muñoz, Aterosclerosis J.2016).

In 2011 I decided to apply the knowledge acquired in the modulation of inflammation and innate immune responses in lung disease by joining the laboratory of Dr.Looney at UCSF (USA). I studied the role of neutrophils and platelets interactions in acute lung injury to better understand this pathogenesis. I had exciting results using aspirin to decrease platelet activation and lung injury. This study was named plenary paper in Blood journal. Moreover, I identified a role of the cystic fibrosis ion channel (CFTR) in platelets correlated with the associated hyper-inflammatory state in patients. These results have been published recently (Ortiz-Munoz, J Clinical investigation. 2020.) Because of my interest in platelet biology I also studied the function of the pulmonary circulation in platelet biogenesis and the hematopoietic potential of the lung. I discovered that the lung circulation is an important player in the production of platelets and that the lung is a megakaryocyte niche. The study was published in the high-ranking journal Nature, I am first author. This work had a great impact, meriting comments and analyses in several scientific journals and world-wide lay media coverage.

In 2017 I was hired as Senior Scientific Researcher at Cancer immunology, Genentech. The mission of my research is to establish a deep understanding of immune cell function in inflammation and cancer, develop novel approaches to modulate the tumor microenvironment and validate the efficacy of myeloid compartment targeted therapies in augmenting protective immunity. For this purpose, I lead the development of STAMP, a new technique that combines real time in vivo imaging with next generation sequencing to analyze formation, evolution and features of individual tumors. I am responsible of STAMP bioimaging platform, I train, design and supervise users. Also, during the last 4 years I had the opportunity to co-supervise the work of two interns.

My ability to design/execute experiments permitted me to function independently. The interdisciplinary nature of my work gives me a unique perspective to collaborate effectively with scientists from different areas.

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Resumen del Currículum Vitae:

I started my scientific career in 2003. Since there I published a total of 22 articles of which 10 times, I have been first author (including here 3 methods papers). As per now my WOS profile shows a H index of 17 (19 on SCOPUS) with a total citation (no self-citations) of 1.121. Ortiz-Munoz et al. Blood . 2014. IF 15 has been named as Plenary paper. 2014 in blood journal and has attached an editorial commentary: The fat and the skinny on acute lung injury. James C. Zimring. Also my last publication Ortiz-Munoz et al. J C investigation.2020.IF 13 was the subject of an editorial commentary: Platelets: inflammatory effector cells in the conflagration of cystic fibrosis lung disease. Guy A. Zimmerman. My publication Ortiz-Munoz et al. Nature 2017 IP:46, was named at UCSF, the Most Popular Science Stories of 2017 and has had a great impact, meriting comments with an on line attention of 1613 of Altmetric score. Also, the article was the subject of institutional press release.

This research has been founded by more than 12 internationals and national grants (including CAM, MEC, LENA, RED CAM, RECABA , NHI and Cystic Fibrosis Foundation).

My results have been presented in a total of 13 international conferences in which 8 times I was the presenter author.

At Universidad Autónoma (Madrid) I graduated in Biology and I carried out my PhD supervised by Drs. Carmen Gomez-Guerrero and Jesus Egido. My research focused on the study of the immune and inflammatory mechanisms in atherosclerosis and diabetes. During this period, I did an internship at INSERM in France during more that 6 months.

Throughout my posdoc period I was awarded with the Leduc-Transatlantic fellowship that give me the opportunity to further study the

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

innate immunity and inflammation by investigating the interaction of dysfunctional HDL with the myeloid compartment in stroke. This collaborative work was accomplished at INSERM (France) and UCSF (USA).
Later, my interest for the search of new targets to modulate inflammation and innate immune responses in the cardiovascular system, drove me to joined Mark Looney s lab at UCSF (Pulmonary Department), where I applied the knowledge acquired to the lung biology.
In summary during my academic training I investigated in 4 research institution, 3 of them international research labs. (1) INSERM at Paris, France (2) Cardiovascular Research Institute (UCSF) and (3) Pulmonary Department (UCSF) in USA.
In 2017 I jointed Genentech at Cancer Immunology dept as immunologist to better understand immune cell function in inflammation and cancer, develop novel approaches to modulate the tumor microenvironment and validate the efficacy of myeloid compartment targeted therapies in augmenting protective immunity. As a result of my studies I recently submitted our findings to Nature journal Ortiz-Muñoz et al. Skin tumor arrays reveal local immune heterogeneity in response to cancer immunotherapy. Nature j. Submitted sept 2020.

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AYUDAS RAMÓN Y CAJAL
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Turno de acceso general

Nombre: ARRANZ MENDIGUREN, AMAIA
Referencia: RYC2020-029494-I
Área Temática: **Biomedicina**
Correo Electrónico: amaia.arranz@achucarro.org

Título:

Humanized models to study neurodegeneration and Alzheimers disease

Resumen de la Memoria:

Dr Arranz is a neuroscientist specialized in describing mechanisms involved in the pathogenesis of various CNS disorders. She graduated in Biology from the University of Basque Country (UPV-EHU, 2001) and performed her PhD in Neurosciences working in Carlos Matute's lab at the UPV-EHU (2002-2007) with a FPU fellowship. During her PhD she studied the role of glutamatergic and purinergic systems in physiological conditions and in neurodegeneration in rodent models of Stroke and Multiple Sclerosis and defended her thesis with European mention and Suma Cum Laude. Her postdoctoral training lasted over 10 years in prestigious research centers in US and Belgium. She first joined Yu Yamaguchi's lab at Sanford-Burnham Institute (2008-2012) with a postdoctoral fellowship (MEC-Fulbright). There, she focused on addressing the function of the major extracellular matrix component, hyaluronan (HA), in the CNS and provided the first evidence for a physiological role of HA maintaining proper neuronal activity and avoiding epileptogenesis through the regulation of the extracellular space volume. She then became interested in identifying basic mechanisms causing Alzheimer (AD) and Parkinson (PD) and joined Bart De Strooper s lab at the University of Lovaina & VIB Institute (KUL-VIB, 2012-2018) as senior postdoc and later as staff scientist. She was awarded her first grant as PI to analyze the role of genes mutated in PD, and revealed an essential role of LRRK2, one of these PD-associated genes, in synaptic vesicle endocytosis and neurotransmission. Afterwards, she focused on generating the first humanized chimeric model of AD using a combined approach that includes rodent models of AD and the pluripotent stem cell technology (hESC/iPSC). First chimeric model revealed a selective vulnerability of human neurons to the amyloid pathology and associated neuroinflammation not observed in mouse neurons, and settled the basis for follow-up projects. During her stay at KUL-VIB, she also collaborated in other projects studying AD and PD co-authoring studies published in top journals, and she got funding as PI/co-PI through national and international competitive calls. In 2019 she became Ikerbasque Research Fellow and leader of the Laboratory of Humanized Models of Disease at Achucarro Basque Center for Neuroscience. The major research goal in her lab is to understand the molecular and cellular mechanisms that underlie AD and other CNS diseases by using humanized models. To generate these models, human iPSCs are first differentiated into neurons and glial cells and then exposed to disease-related factors (i.e. amyloid-B, Tau, a-synuclein, etc) in in vitro models or in vivo in chimeric model mice. This technology allows studying the responses of human glia and neurons exposed to such toxic factors at morphological, molecular and functional levels and unraveling human-specific pathways and mechanisms involved in the pathogenesis of AD, PD and other CNS diseases. The lab is currently funded by the Ministry of Science and Innovation (RTI-2018), Ikerbasque (startup-2019) and the Basque Government (PIBA-2020). Dr Arranz has been invited speaker at prestigious institutions and conferences. She is grant reviewer for the Spanish National Agency and international organizations and journal reviewer of top scientific journals.
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Resumen del Currículum Vitae:

Dr Arranz graduated in Biology from the University of Basque Country (UPV-EHU, 2001). She obtained her PhD in Neurosciences with Summa Cum Laude working in Carlos Matute's lab at the UPV-EHU (2002-2007), where she participated in 3 research projects and published 4 papers on the role of glutamatergic and purinergic systems in Stroke and Multiple Sclerosis, 2 of them as first author (Glia 2008: Neurobiology of Disease 2010). Her postdoctoral training lasted 10.5 years in prestigious research centers in US and Belgium. She first joined Yu Yamaguchi's lab at Sanford-Burnham Institute (La Jolla, 2008-2012) where she focused on determining the role of extracellular matrix components in neuronal activity and epileptogenesis. She participated in 2 research projects and published 2 papers (J Neurosci 2014; Reviews Neurosci 2017). She then became interested in identifying basic mechanisms causing Alzheimer and Parkinson and joined Bart De Strooper s lab at the University of Lovaina & VIB Institute (KUL-VIB, 2012-2018) as senior postdoc and later staff scientist. There she used her experience on mouse modeling to start a new research line focused on the generation and characterization of human-mouse chimeric models of Alzheimer s disease (AD) which allowed the analyses of human neurons and microglia in vivo (Neuron 2017; Nat Neurosci 2019). She co-authored additional studies published in top journals (Nature, Lancet Neurology, PNAS, Molec Neurodegenerat, etc) and got funding as PI/co-PI through competitive calls from the Alzheimer s Association US, Alzheimer s Foundation Belgium and FWO Flanders Research Foundation. Since February 2019, she is Ikerbasque Fellow and the head of the Humanized Models of Disease Lab at the Achucarro Basque Center for Neuroscience. Her lab is currently composed by 2 PhD students (Maria Alfonso, Joan Cruz), 1 master student (Nuria Gabils) and 1 undergrad (Isabel Jimenez). She is also visiting professor at KUL-VIB, where she collaborates with De Strooper s lab and supervises a PhD student (Pranav Preman). The major research goal at her lab is to understand the molecular and cellular mechanisms that underlie AD and other CNS diseases by using humanized models of disease and the pluripotent stem cell (ESC/iPSC) technology. Human iPSCs are first differentiated into neurons and glial cells (astrocytes, oligodendrocytes or microglia), and then exposed to amyloid-B;, Tau and other disease-related factors, in in vitro models or in vivo in chimeric models of disease. This technology allows studying the

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

responses of human glia and neurons exposed to disease-associated factors at morphological, molecular and functional levels, and unraveling human-specific pathways and mechanisms involved in the pathogenesis of AD and other CNS diseases. The lab is currently funded by the Ministry of Science and Innovation (RTI-2018), Ikerbasque (startup-2019), and the Basque Government (PIBA-2020), and has 2 papers under revision at Mol. Degenerat and Cells. Dr Arranz has been invited speaker at prestigious institutions and international conferences and lecturer at the Master and official PhD program in Neurosciences of the UPV/EHU. She is grant reviewer for the Spanish National Agency and various international organizations, as well as journal reviewer of top scientific journals.

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AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

Nombre: ROS DOMINGUEZ, SUSANA
Referencia: RYC2020-029457-I
Área Temática: **Biomedicina**
Correo Electrónico: susana.ros@cruk.cam.ac.uk

Título:

Imaging Metabolic Heterogeneity in Cancer: Drug resistance and Metastasis

Resumen de la Memoria:

Changes in metabolism demand are among the earliest signs of the transformation process, since cancer cells increase the demand of nutrients for growth and division. It is not fully understood how metabolism changes as tumours progresses, to adapt to stresses like for example survival to therapy, dormancy or invasion to other organs. Tumor heterogeneity can, amongst other factors, provide with the metabolic plasticity to adapt to these stresses and accommodate to demands. Metabolic imaging allows real time analysis of changes in cancer metabolism. Quantification of these metabolic changes is a powerful approach that could facilitate new strategies to identify when cancer clones provide with the metabolic plasticity to survive, proliferate and invade new sites.

I have more than 10 years of research experience investigating the role of metabolism in disease. In Prof. Guinovart s lab (IRB-Barcelona Spain), where I carried out my PhD, I studied the role of glycogen storage in diabetes and obesity. I analysed the post-translational modifications of the liver glycogen synthase (Ros S, JBC 2009), and demonstrated that overexpression of the active form of the enzyme ameliorates glucose tolerance not only in healthy but also diabetic preclinical models, causing as well a reduction in food intake (Ros S, JBC 2010; Ros S, Diabetologia 2011). After my PhD, I started my line of investigation in cancer metabolism in the laboratory of Prof. Schulze (LRI London UK). Through an innovative siRNA screen I found that the glycolytic enzyme PFKFB4 is an essential factor for the survival of prostate cancer cells and a potential therapeutic target (Ros S, Cancer Disc. 2012). I also established that PFKFB4 is essential to support the anabolic metabolism of p53-deficient cancer cells (Ros S, Oncogene 2017). To broaden my technical expertise, I joined Prof. Brindle s lab (University of Cambridge UK) in 2014, where I apply real time metabolic analysis to cancer cells. My main lines of investigation are the characterization of metabolic signatures in patient-derived cancer models, and the discovery of metabolic biomarkers that allow early detection of cancer resistance to therapy. In my most recent first-author and co-corresponding paper (Ros S, Cancer Cell 2020), I applied MRI analysis of metabolic flux using hyperpolarized [1-13C] pyruvate to study the role of cell metabolism in drug resistance, and demonstrated that the transcriptional factor FOXM1, through modulation of target genes that control this flux, is a biomarker of resistance to drugs targeted to inhibit PIK3CA in ER+ breast cancer. In addition to these lines of investigation, I also lead a multidisciplinary project that develops chemical probes for early detection of p53 amyloid aggregates in cancer cells.

My future research plan will continue to address how metabolic heterogeneity within a tumour contributes to (1) metabolic adaptation for tumor recurrence after treatment; (2) how these adaptations could drive processes like metastasis and dormancy; (3) identify new metabolic vulnerabilities in subtypes of cancer with poor prognosis and no specific target therapy. The results of this investigation will provide new ways to diagnose and monitor cancer response, and they could also be the base of alternative therapies.

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Resumen del Currículum Vitae:

Education and current position: Cancer, metabolism and imaging expert. PhD under the supervision of Prof. Guinovart at IRB-Barcelona (Spain), funded with a FPU fellowship from MEC. My doctoral dissertation Metabolic impact of liver glycogen synthase activation in Diabetes and Obesity got the highest qualification (Sobresaliente cum laude). After my PhD, I pursued a postdoc in Cancer Metabolism at London Research Institute (UK) in the lab of Prof. Schulze (2010-2014), through an international postdoctoral program. In 2014 I moved to the University of Cambridge, where I currently hold a Research Associate position in Prof. Brindle lab, with a Maternity leave in 2018. My line of investigation uses real time imaging to the study the metabolism of cancer cells.

Research and leadership: 21 peer-reviewed articles (76% Q1). First-author of six with one co-corresponding author* (with IF > 20 Cancer Cell*; Cancer Discovery), three first-author reviews (IF > 20 Cancer Discovery; Cell Metabolism) and 12 Co-author (IF > 20 second author, Nature Biotech. and Nature Neur.). My work has been cited ~1600 times (h-index=16). I have secured extramural funding from a rich portfolio of funding agencies, including international bodies as well as industrial partners (~ 600K). I have secured funding for lab members since 2016, supervising a PhD student, a Postdoctoral fellow and a Research Assistant. I run three research lines: (1) identification of metabolic signatures in patient-derived models; (2) establishing metabolic biomarkers of resistance to targeted therapy; (3) investigating the role p53 amyloid aggregates in cancer. I have presented my research at >20 national and international conferences, I have been invited to give talks at several world-class institutes and I have been a reviewer in highly prestigious journals. My knowledge has earned me a very active role in the Biological Safety Committee of the University of Cambridge.

Teaching experience: Actively involved in teaching, training, and mentoring activities in Spain and the United Kingdom. I have given lectures in the University of Barcelona (Chemistry module- Biochemistry degree and Biology module- Chemistry degree 2004- 2009) and University of Cambridge (Biochemistry Part-II since 2016). I have participated in undergraduate student programmes to promote basic research (LRI and The University of Birmingham, 2011; Experimenting new biochemistry pathways course for secondary school students

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

University of Barcelona 2008; Introductory Biochemistry Course for secondary school students University of Barcelona 2004-2006). I have also promoted basic research in secondary school teachers (Advances in biochemistry and biotechnology course University of Barcelona 2007).

Goals: My aim is to establish a world-class laboratory in Spain which will focus on Cancer Metabolism and Imaging using my research and managerial experience and my network from academia and industry. The team will tackle important questions regarding tumour metabolic heterogeneity and influence on drug resistance and metastasis that will impact and leadership at international level, with high productivity and providing excellent training to future investigators. Given my high-quality publication record, grant awarding, independence, leadership and international mobility/network, I do believe I am a strong candidate of a RyC grant.

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AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

Nombre: OLIVER PEREZ, EDUARDO
Referencia: RYC2020-028884-I
Área Temática: **Biomedicina**
Correo Electrónico: eduolpe@gmail.com

Título:

New cardiovascular targets and innovative therapeutic strategies

Resumen de la Memoria:

I dedicated my research trajectory to better understand cardiovascular diseases with a clear objective: the finding of new targets and therapeutic strategies. During my PhD (2004-2010) in the University of Valencia (UV) as FPU fellow, I studied the role of adrenergic receptors (AR) and the GRKs that regulate its activity in the genesis and development of systemic hypertension. I found that an up-regulation of the alpha-adrenergic system and an attenuation of the beta-vasodilation where in the origin of the disease. These results highlighted the relevance of these receptors as therapeutic targets and as diagnostic tools in circulating cells. This experience allowed me to publish 13 research articles, most of them Q1 (5 of them as first author, 1 as corresponding), and 22 presentations in congresses (7 poster as main author and 1 oral communication). Also, I collaborated and learn from molecular biologist (IBV-CSIC) and cardiologist (H.U. La Fe & La Ribera), and stayed six months in the University of Glasgow. From 2011 to 2016 I was Postdoc at Imperial College London, enrolled in a project aiming to describe the genes responsible of hypoxia-induced pulmonary hypertension. Here, I described for the first time the zinc transporter ZIP12 as a main regulator of pulmonary vasoconstriction and vascular remodelling during pulmonary hypertension. The work was published in Nature (first author), and resulted in a patent and a master agreement with a pharma venture for the search of potential therapies. It is worth to highlight that I obtained my first grants as co-applicant from British Heart Foundation and from Imperial NHS trust. During this time, I contributed to relevant discoveries in the field, describing other new targets (RhoB, HDACs, IFNAR), and related drugs. I published 7 papers (Circulation, Circ Res, ATBV, Cardiovs Res). In September 2016, I was recruited by CNIC through a Marie Skłodowska-Curie-COFUND Research Fellow. Since this time, I raised my own funding, among others in 2018 with a senior Madrid Talent Attraction 5-years project to develop my own line. Herein, I further investigated initial scientific questions: 1) what is the role of beta1-AR on inflammatory cells during cardiovascular diseases?; 2) Is the beta3-AR a potential target for pulmonary hypertension?; 3) What is the impact of ZIP12 over-expression at cellular and molecular level?. Since 2018, I published 11 research articles in top-tier high impact journals (most of them as senior basic researcher of the group), 1 of them as co-corresponding author in the European Heart Journal (TOP1 journal), 1 book chapter and 4 reviews as corresponding author. Also, as part of Dr Borja Ibañez s group I have a critical role in several international projects (ERA-CVD and ERC Consolidator grants), and I actively participate in clinical trials. Up to date, I supervised 7 Master thesis and 2 on-going PhD thesis. On top of my research experience, I am external lecturer of the Master of Drug Research and Rational Use (UV), and I am committed with science and society being involved in science policy, science advice and science communication initiatives. All this work has been recognized with the European (2016) and Spanish (2017) Young Investigator awards in Pharmacology and the Arquimedes prize for tutors in Biology and Biomedicine (2017) among others.
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Resumen del Currículum Vitae:

I am a Pharmacist with a PhD in pharmacology from University of Valencia thanks to a FPU scholarship (2005-2009). My thesis focused on the role of adrenergic system in the development of cardiovascular diseases. During this time, I was trained in molecular biology at Instituto de Biomedicina de Valencia (CSIC) and University of Glasgow (UK), and in translational medicine at Hospital La Ribera and Hospital La Fe. In my first Postdoc at Imperial College London (2011-2016), I described in Nature (2015) the zinc transporter ZIP12 as a new potential drug target against pulmonary arterial hypertension (PAH), a devastating heart and lung disease triggered by chronic hypoxia. Within this period, I became expert on PAH, combining the use of classical genetics with functional genomics, using next generation technologies, and functional studies to find new therapeutic targets and strategies. In 2016, I joined CNIC awarded with a CNIC International Postdoctoral Fellow (COFUND-MSCA), and currently I hold a 'Talent Attraction program' Senior Research Fellow of Comunidad de Madrid. In CNIC, I develop my own research line on New cardiovascular targets and innovative therapeutic strategies focussing on protecting the vasculature from endothelial damage, inflammation and remodelling. For this purpose I received funding as PI of 3 grants (CAM) and CoPI of 1 (ISCIII-CIBERCV). Additionally, I am senior researcher coordinator of basic research in the lab projects aiming to assess new therapies in cardiovascular diseases from infarct to heart failure, led by Dr. Ibañez. Herein, I am also team member of 7 (ERC-CG, ERA-CVD, RETOS, FIS, BBVA, CAM-RENIM and SEC). Before: co-applicant of 4 research grants in the UK, and main applicant of 16 public and private grants for educational, science communication and outreach purposes, I am currently PhD co-supervisor of 2 in CNIC and External Lecturer of the Master in Drug Research and Rational Use at University of Valencia. I received the EPHAR Young Investigator Award (2016), the 32nd SEF Young Investigator Award (2016) and the 1st award in Biomedicine for tutors of the 16th Arquimedes contest (2017), among others. I have published more than 37 publications in top-tier journals such as Nature, Circulation, Circ Res, Brit J Pharmacol or JPET, to name a few, including original papers, reviews and book chapters, and 1 world-wide patent. I have been invited to present my work in more than 10 international conferences (among them a selected oral presentation at the ESC congress 2020), and in more than 40

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

abstracts in 30 national and international meetings. I am Associate Editor of the BMC Cardiovascular Disorders, ad-hoc reviewer of top-tier journals, Grant reviewer of ANEP, ACIE, Madri+d and PhD examiner of 7 thesis. Moreover, I am founding member of the Society of Spanish Researcher in the UK (SRUK/CERU; President 2015-16), member of SEBBM, member of Spanish Society of Pharmacology (Chair of the Young Pharmacologist committee 2010-2015), Member of the Zinc-UK network, and Fellow of the PVRI. Finally, I promote social, academic and science outreach events such as # CienciaenelParlamento (founding member and vice-president), and contribute to science communication and science policy.

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AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

Nombre: MONCUNILL PIÑAS, GEMMA
Referencia: RYC2020-029886-I
Área Temática: **Biomedicina**
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Título:

Understanding infection and vaccines immunity through systems immunology

Resumen de la Memoria:

I am an immunologist with over 10 years of experience in infectious diseases and vaccines, with a specific focus on HIV, malaria, and recently, COVID-19. My research aims to understand the mechanisms underlying immunity against complex infectious diseases, knowledge necessary to find new approaches to fight pathogens and advancing immunotherapies. I have described mechanisms of acquired immunity to malaria, vaccine-induced immunity and immune alterations due to HIV and malaria exposure. The past months I devoted part of my research to COVID-19, describing the seroprevalence in different cohorts and populations and assessing the magnitude, breadth and maintenance of the immune response.

My career started in 2004 at IrsiCaixa AIDS Research Institute, where I got a PhD degree in Immunology in 2009, working on new anti-HIV agents. Afterward, I moved to ISGlobal (Barcelona Institute for Global Health), where I did a postdoc on malaria immunology (2009-2013). Between 2009 and 2011, I traveled often to FM-CISM (Mozambique) where I set up and supervised the field component of my studies, acquiring wide experience in conducting studies in endemic areas and obtaining high-quality clinical data and biospecimens. During my postdoc, I obtained a Sara Borrell contract (Instituto de Salud Carlos III) that allowed me to perform a stay in Dr. McElrath lab at the Fred Hutchinson Cancer Research Center (USA, 2013-2014). There, I performed a malaria vaccine study and became proficient in cellular responses and flow cytometry. In 2015, I moved to the lab of Prof. Kollmann at the University of British Columbia (Canada). There I performed a study that aimed at identifying the factors affecting immune development and responses in infants, including HIV and malaria exposure in utero. In 2017, I returned as an Assistant Research Professor at ISGlobal, where I obtained a Health Research and Innovation Strategic Plan grant (Department of Health, Catalan Government).

My ultimate goal is to decipher the rules of immunity that determine infection and vaccine outcomes. Given the complexity and variability of the immune system and the effect of numerous environmental factors in shaping it, I have started applying unbiased systems immunology approaches to achieve my study aims. Such approaches include OMIC methods, in-depth immune profiling, and computational analyses. My current and future main research lines are:

1) Immune correlates and host determinants predicting infection and vaccine outcomes
2) Immune alterations driven by pathogen exposure and coinfections
3) Mechanisms of disease tolerance and biomarkers of pathology and severity

I have published 37 papers (17 as first, 8 as last and 17 as corresponding author) and two book chapters. I have also developed an extensive collaborative network with researchers in 20 countries (>200 coauthors). I have participated in several national, EU and NIH projects and international contracts, being a principal or key investigator, coordinating and leading multidisciplinary teams. I successfully co-directed a PhD and 10 MSc theses and I am currently co-directing the theses of 4 more PhD and 2 MSc students.

The Ramón y Cajal grant will allow me to continue establishing myself as an independent researcher and to keep developing cutting edge research in a multidisciplinary and translational environment.

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Resumen del Currículum Vitae:

I have more than 10 years of immunology in infectious diseases expertise, most of which have been dedicated to malaria, HIV and vaccinology. Currently, I am an Assistant Research Professor in the Malaria Immunology group at ISGlobal, where I work on mechanisms of susceptibility and immunity to malaria and other infectious diseases, including COVID-19.

In 2004, I graduated in Biology from the UB. In 2009, I obtained my PhD in Immunology (UAB). I carried out my PhD project at IrsiCaixa on new anti-HIV agents under the supervision of Dr. Esté, resulting in 6 manuscripts (1st author in 4). Next, I joined Dr. Dobaño s Malaria Immunology group at ISGlobal as a postdoctoral fellow. I traveled often to FM-CISM (Mozambique) to conduct and supervise field studies and train lab personnel. I developed and optimized multiparametric and multiplex techniques to measure cellular responses, which allowed me to identify biomarkers of disease immunity and severity, and correlates of vaccine-induced protection. These results are reported in more than 10 manuscripts in which I am 1st or last author.

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AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

From 2013 to 2017 (4 years), I made two stays abroad: at the Fred Hutchinson Cancer Research Center (FHCRC, Seattle, USA) and at the University of British Columbia (UBC, Vancouver, Canada). At the FHCRC, I joined Dr. McElrath s group (a reference lab for HIV vaccine studies), where I led a study on malaria vaccine immunology. There, I became an excellent expert in flow cytometry and I identified novel cellular responses to the RTS,S pediatric vaccine, which may predict its efficacy (5 papers, 2 under preparation). At UBC, I joined the group of Prof. Kollmann where I led a study on immune development in early life (3 manuscripts, 2 in preparation). Between both stays abroad, I enjoyed a maternity leave. By mid-2017 I rejoined ISGlobal as an Assistant Research Professor and in February 2018 I finished a 2nd maternity leave period. My latest manuscripts as senior author show the work I led on antibody signatures associated with malaria protection, identified by machine learning methods. Lately, I have started using OMIC techniques, and Systems Biology approaches to decode how the immune system works and it is modulated, with the final goal of improving and finding new approaches to fight infectious diseases, including COVID-19. In fact, I redirected part of my research to fight the pandemic, providing seroprevalence data and understanding of the SARS-CoV-2 immune response. As a result, I published 4 manuscripts, 2 more are submitted and 4 under preparation, and I obtained as PI a TRANSVAC grant and a UNITAID-DNDi funded contract to perform a multicentric study across 7 sites in Africa.

Previously, I had obtained 2 postdoctoral contracts (PERIS, Catalan government, and Sara Borrell, ISCIII) and a PhD fellowship (Catalan government). In addition, I have been one of the principal architects of all grants awarded to the Malaria Immunology group, including an NIH R01 and a EU FP7 grant. I have participated in more than 20 research projects, including international multicenter studies. I successfully coordinated and led some of these, through which I built a strong network and developed leadership, organizational and teamwork skills. My senior and correspondence authorships, and my strong record of mentorship and invited talks, support my leadership capacity.

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AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

Nombre: CARDOSO DELGADO, TERESA
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Área Temática: **Biomedicina**
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Título:

Dysfunctional Mitochondria Bioenergetic Fluxes in Chronic Liver Disease and related Comorbidities

Resumen de la Memoria:

I am a biochemist, a degree obtained at the University of Lisbon, Portugal. During my PhD from the University of Coimbra, Portugal, I gained expertise in fluxomics applied to the study of diabetes and hepatic insulin resistance (IR). Afterwards, I moved to the University of Pittsburgh, PA, USA, to study the metabolic changes associated with nutrient-mediated regulation of hepatic genes. We further aimed at understanding the relationship between macrophages and hepatocytes and its pertinence for the development of liver disease, in particular non-alcoholic fatty liver disease (NAFLD). In 2011, I moved back to Portugal to the New University of Lisbon, focusing on the role of anti-diabetic drugs in the regulation of liver lipid metabolic fluxes in response to insulin signaling. Since March 2013, I have been integrated at the at the CIC bioGUNE in Spain where I have been able to synergize my expertise on liver flux and mitochondria energetic metabolism with Dr. Martínez-Chantar laboratory extensive background in molecular mechanisms associated with liver disease. Herein, we have studied the impact of ubiquitin-like mediated post-translational modifications (PTMs) in liver disease. These PTMs are common mechanisms and a valuable approach taking into account the genetic and signaling heterogeneity associated with liver disease. Other project that I have been directly involved focus on the regulation of the glycine N-methyltransferase by the microRNA miR-873-5p and its role as an epigenetic regulator in early stages of liver fibrosis and cirrhosis. Since 2018, I have been implementing my independent research line. My core focus is the pivotal role for nitrogen-containing compounds metabolism, in particular ammonia and the amino acid glutamine, in NAFLD and associated mitochondria dysfunction as well as in related liver pathologies, namely Hepatocellular Carcinoma (HCC) and concomitant non-hepatic comorbidities, IR and diabetes. Regarding the impact of ammonia in NAFLD, our group and others have previously shown that hepatic ammonia accumulates in advanced NASH by mechanisms that are still under debate. One additional mechanism to this hepatic ammonia deregulation in NAFLD was brough-up by our research by showing that the high-activity glutaminase 1 (GLS1) isoform is overexpressed in the livers of non-alcoholic steatohepatitis (NASH) patients and mouse models of diet-induced NASH, a condition localized in the most harmful spectrum of NAFLD. More importantly, we have demonstrated that the therapeutic inhibition of glutaminase 1 can ameliorate NASH unraveling the underlying mechanisms. These results were obtained on the frame of a project which I led and sponsored by the RETOS 2018 call Pivotal role for the metabolism of the amino acid glutamine in Non-Alcoholic Fatty Liver Disease (NAFLD) treatment (GLS1@NAFLD) and a contract sponsored by the AECC Investigador 2018, and resulted in a high-impact publication where I am corresponding author (Cell Metabolism- IF=21.567). Based on this early evidence, future research objectives include: to address the mechanims underying GLS1 regulation in NAFLD; to evalute if hepatic ammonia and comcomitant GLS1 upregulation are drivers and atractive therapeutic approaches in NASH-driven HCC; and finally, to understand the mechanisms underlying the ammonia and GLS1 dependence of liver tumor cells.
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Resumen del Currículum Vitae:

Since 2004, I have been dedicated to the study of liver disease metabolism. As a young research student, at the CNC, Coimbra, Portugal, I developed novel methodologies by using Magnetic Resonance Spectroscopy and Imaging to assess hepatic metabolic flux derangements in hepatic Insulin Resistance and diabetes. As a post-doc, I moved to the University of Pittsburgh, PA, USA, where I focused on the study of metabolic changes associated with nutrient-mediated regulation of genes and on the role played by anti-diabetic drugs in the regulation of liver lipid metabolism fluxes in response to insulin signaling. In 2013, I was incorporated in the CIC bioGUNE, Spain, where I have been dedicated to the study of novel mechanisms involved in liver disease, such as ubiquitin-like proteins-mediated post-translational modifications and epigenetic modulators. More recently, I have been implementing my independent research line focused on the study of the rewiring of nitrogen metabolism, in particular the catabolism of the amino acid glutamine and ammonia production, in the pathogenesis, progression and therapy in chronic liver disease. During my research trajectory, I have been continuously supported by competitive calls both as a pre-doc and post-doctoral fellow (Portuguese Foundation for Science and Technology, European Association for the Study of Diabetes, Spanish Association against Cancer). I have accomplished 38 publications (6 original research publications as corresponding author, 10 as first author, and 6 Reviews), 1 book chapter (Fatty Liver Disease:a reality with many questions, EOLAS ediciones), held over 30 oral communications in International congresses (six of them by invitation, of special interest in the International Liver Congress-ILC), presented webinars (Nanostring Technologies) and PhD courses (UNL, Portugal) by invitation. I have established collaborations with national (CICbioGUNE, UPV/EHU, CIMA, CIMUS, BioDonostia, and others) and international researchers (University College of London/UK, University of Modena/Italy, University of Lisbon/Portugal, Cedars-Sinai/USA, among others) as well as with industry technology partners (Agios, Takeda, Silence, Mitotherapeutix, Tekniker, Histocell). I have directed 1 PhD thesis from the UPV/EHU, defended in 2017 (Lucía Barbier-Torres), and since 2015 I am a professor at the Master of Molecular Biology and Medicine from the

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CONVOCATORIA 2020

Turno de acceso general

UPV/EHU, Spain. In the last 5-years, about 88% of the total of my original research publications are within the 1st quartile, whereas ~56% are within the 1st decile of their respective JCR® category. Of highlight I am corresponding author of two high-impact publications in the field (Cell Metabolism and Hepatology). In total, I have participated in 4 national projects as collaborator and got awarded 3 grants as Principal Investigator. I participated actively in crowdfunding activities to support my research, such as the viral campaigns from the Spanish Association against Cancer: #intrefresacontraelcáncer and #bermeotunacontraelcáncer. Finally, as a result of my independent research line, I have accomplished a high publication in the field as corresponding author (Cell Metabolism 2020), a national highly competitive grant as PI (2018 RETOS), an AECC-sponsored contract (Investigador 2018) and finally a first-year PhD student, currently involved in this project, will defend her thesis in the upcoming years.

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AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

Nombre: SCODELLER , PABLO
Referencia: RYC2020-028754-I
Área Temática: **Biomedicina**
Correo Electrónico: pablo.david.scodeller@ut.ee

Título:

Peptide-guided Theranostics (PGT)

Resumen de la Memoria:

The ability to target specific cellular, extracellular and vascular compartments of a disease determine the success in delivering a pharmacological or diagnostic agent, by concentrating it in the site of interest and reducing the risks associated with off-target accumulation.
The vasculature, extracellular matrix (ECM) in breached tissue and circulating cells of diseases can be sensitively probed using in vivo phage display (IVPD). In IVPD, a peptide library expressed on bacteria-replicating virus (bacteriophage, or simply phage) is injected into live mice bearing the injury or the disease. The phage which express the binding peptide will remain bound to the diseased tissue after perfusing; the binding phage are then recovered, amplified ex vivo and used for subsequent in vivo selection rounds. The sequence of the binding peptide (encoded in the capsid protein) is determined by sequencing the DNA of the rescued phage. The methodology was pioneered by Erkki Ruoslahti in 1996, with whom I performed a 2-year postdoc in 2013-2015. Using this technique, I have co-identified a peptide that targets early Alzheimer s disease (AD) and glioblastoma (Nat. Comm. 2017), another peptide that targets brain injuries (Nat. Comm. 2016), and identified a third peptide that targets pro-tumoral macrophages (Sci. Rep. 2017). The research of the Peptide-guided theranostics lab (PGT) will expand on the theranostic applications and discoveries spawned by my previous findings and will also use IVPD to find novel disease targets and applications, also through collaborations with other Spanish and international labs. The identified peptides will be subjected to chemical modifications to enhance their properties (affinity, stability, oral activity). The scope of the PGT lab will place emphasis on solid cancers and neurological disorders and will deal with the following topics/research lines:

1) Tumor-associated macrophages (TAMs). The effect of depleting and/or reprogramming specific subpopulations of TAMs, on tumor progression, metastasis, and resistance to chemo and immunotherapies, in metastatic mouse models of breast cancer, melanoma, gastric cancer, and in glioblastoma models. Lymph node macrophages as biomarkers of early relapse and metastasis, to be detected using live imaging with peptide-targeted probes.

2) Alzheimer s disease (AD). Early detection, using live imaging, by targeting vascular markers of early AD (e.g. CTGF, Mann & Scodeller Nat. Comm. 2017) with targeting peptides modified with PET-active moieties or near infrared dyes.

3) Glioblastoma. Systemic delivery anti-tumor immunity-activating cytokines (e.g. IL-2) fused to novel glioblastoma ECM-targeting peptides.

4) Central nervous system (CNS) injuries. Systemic delivery of therapeutic agents (e.g. siRNA, Chondroitinase) conjugated or fused to novel CNS injury-targeting peptides (e.g. Mann & Scodeller Nat. Comm 2016).

I have a translational vision of my research, reflected on my 4 patents as co-inventor, all stemming from targeting peptides identified using in vivo phage display. This translational aspect may result in short term benefits to the Spanish economy and healthcare system. I expect to generate many new patentable and marketable targeting peptides and theranostic derivatives thereof, by doing new in vivo phage display screens in the PGT lab.

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Resumen del Currículum Vitae:

After obtaining a degree in biomedical engineering, I did a PhD in chemistry, studying electrochemistry and colloidal chemistry. I worked on nano-structured amperometric and photonic electrodes based on redox enzymes. I published, among others, two JACS papers as a first author. During my first postdoc, in material science, I designed a nano-formulation of an enzyme (Hyaluronidase) that is used in cancer therapy and published a Nanoscale paper on its efficacy for treating melanoma, as first and sole corresponding author.
In 2013 I performed a 2-year postdoc in the laboratory of world-renowned cancer biologist Erkki Ruoslahti (at SBPMDI institute, San Diego, USA, NCI-designated cancer center). Ruoslahti is known for identifying fibronectin, the tumor-homing sequence RGD, the first integrin, and he has made seminal contributions to the field of tumor microenvironment. During this postdoc I worked on cancer and neuroinflammation and chemo-adjuvants for intraperitoneal chemotherapy. I used in vivo phage display to identify new targeting ligands and biomarkers of brain diseases and published two Nature Communications papers as co-first author, a Journal of Controlled Release paper as a second author and was co-inventor in 3 patents.

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INVESTIGACIÓN

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

In 2015 I moved to Estonia, to do a postdoc in the lab of Dr. Tambet Teesalu, known in the cancer field for discovering tumor-penetrating peptides. In the 3 years as a postdoc in his lab at the University of Tartu (UT), I worked mainly on tumor-associated macrophages, I identified and published a peptide that targets drugs and imaging agents to pro-tumoral macrophages and published a paper in Scientific Reports (61 citations) as first and co-corresponding author and was co-inventor in a patent describing the peptide and its uses.
In 2015-16 I obtained a permanent researcher position from the Argentine Council for Scientific Research (CONICET, Argentina) and a research grant as principal investigator from the Argentine ministry of science (MINCYT) but I rejected both due to the poor funding situation of Argentine science. In 2017 I obtained a 4-year early career grant of 334K from the Estonian Research Council (ETAG) and in 2018 was promoted to faculty in the UT. In 2020 I obtained a 24K proof of concept grant from UT to develop orally-active protumoral macrophage-targeted therapies.
My capacity to lead a research group is partially reflected on my 2 recent publications as an independent researcher, carried out by my PhD student and collaborators, in the Institute of Biomedicine and Translational Medicine at the UT, where I hold a faculty position since 2018. My capacity to generate funding as an independent researcher is reflected on the 3 research grants obtained as principal investigator, one of which is a 334K grant. I have published impactful publications as first or co-first author in all the labs I worked in and have generally differentiated my own research line from that of the host lab. I have been the main supervisor of one successful master s thesis, am currently the main supervisor of a PhD thesis and have funded and supervised visiting postdoctoral students. I have a translational vision of my research, reflected on my 4 patents as co-inventor and a spin-off program in progress of which I am the principal investigator, all stemming from targeting peptides identified using In Vivo Phage Display.

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AYUDAS RAMÓN Y CAJAL
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Turno de acceso general

Nombre: PUIGHERMANAL PUIGVERT, EMMA
Referencia: RYC2020-029596-I
Área Temática: **Biomedicina**
Correo Electrónico: emma.puighermanal@gmail.com

Título:

Dissecting the cellular and molecular mechanisms of the effects of cannabinoids in the brain

Resumen de la Memoria:

I performed my PhD in 3 years in the Neuropharmacology Lab (2008-2011, UPF-Barcelona) under the co-supervision of Prof. Maldonado and Prof. Ozaita. My thesis project was focused on the study of the molecular mechanisms triggered by cannabis exposure and their relation with some mouse behaviors. The results gave rise to 8 publications (4 as first-author, including a Nature Neuroscience), 1 patent, and 6 awards, including the Best Thesis in Biomedicine Award . I also had the opportunity to build leadership qualities by mentoring 1 technician and 10 undergraduate/master students, and to collaborate with the industry sector testing new compounds in preclinical studies.

In 2012, I joined the Valjent Lab (CNRS-INSERM-UM) in Montpellier (France) as a postdoctoral fellow, where I studied the cell type-specific signal transduction induced by drugs of abuse such as psychostimulants or cannabinoids and under pathological conditions (e.g. Fragile X syndrome, Rett syndrome). Notably, I was awarded with the EMBO Long-Term fellowship, Marie Sklodowska-Curie fellowship, and the NARSAD Grant (Brain & Behavior Research Foundation, USA), all of which allowed me to financially support myself and lead my own lines of research. I was also awarded with the Stanford Visiting Scholar Grant to perform a 3 month-internship at Ding Lab (Stanford University, USA). The multidisciplinary approaches employed during my postdoc provided me with extensive training in molecular biology, pharmacology, histology, and animal behavior, as well as in state-of-the-art techniques, such as the RiboTag approach, iDISCO, DREADDs, and optogenetics. The results I generated gave rise to 15 publications (7 as first-author including a Nature Communications, 4 as last author, 6 as corresponding author), 3 prizes, and numerous poster presentation/talks in national/international conferences. I also had the opportunity to widen my leadership qualities by mentoring 1 technician, 1 master student, 1 undergraduate student and co-supervising 3 PhD students.

In 2018 I got the Beatriu de Pinós fellowship to return to Spain and joined the Quintana Lab (Autonomous University of Barcelona) for a 2nd postdoc until the present. In this lab, I applied my expertise in cannabinoid pharmacology and brain physiology to study the effects of cannabinoids as potential treatments for mitochondrial diseases, a group of very severe neuromuscular diseases for which no treatments have been approved yet. The results gathered among these 2 years are very promising and allowed us to file an international patent (#WO2020152336) and receive 1 prize and 3 grants.

Overall, I have published 23 articles, some of them in high impact journals such as Nature Neuroscience, Nature Communications, Nature Metabolism, Journal of Clinical Investigation and Journal of Neuroscience (+1 manuscript in revision and 3 in preparation). I have also gathered 2 patents, 10 prizes, 15 oral communications, 44 poster presentations, competitive fellowships/grants, leadership qualities, and broad experience in scientific dissemination. My career plan is to devote myself to academic research in the field of Neurobiology, become an associate professor and lead my own research lab.

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Resumen del Currículum Vitae:

Current position:
Postdoctoral fellow at Mitochondrial Neuropathology Lab (UAB, Barcelona)

Previous positions:
Visiting scholar (2017): Department of Neurosurgery - Stanford University (USA)
Postdoctoral researcher (2012-2017): INSERM-CNRS (France)

Publications: 23 (11 first-author, 4 last-author, 6 corresponding author)

Patents: 2

Conference participations: 15 talks + 44 poster presentations

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AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

Prizes and awards: 10

Main fellowships and grants:
-SMART Money Grant (European Development Regional Fund, 2020)
-Beatriu de Pinós fellowship (co-founded between the European Union and the Government of Catalonia, 2018-2020)
-Stanford Visiting Junior Scholar fellowship (France-Stanford Center for Interdisciplinary Studies, 2017)
-NARSAD Young Investigator Grant (Brain & Behavior Research Foundation, USA, 2015-2017)
-Marie Curie Intra-European fellowship (European Commission, 2014-2016)
-EMBO Long-Term fellowship (2012-2014)
-Formación del Profesorado Universitario (FPU) doctoral fellowship (2009-2011)
-Fondo de Investigación en Salud (FIS) doctoral fellowship (Instituto de Salud Carlos III, 2008)

Mentoring activities: Co-supervision of 3 PhD students, 14 undergraduate/master students and 2 technicians

International conference organization:
Title: Mechanisms underlying memory storage and pathological learning
Date/venue: 19/05/2015 Montpellier (France)

Ad hoc reviewer:
European Neuropsychopharmacology, British Journal of Pharmacology, FEBS Letters, Molecular and Cellular Neuroscience, Bio-Protocol.

Member of thesis defense committees:
1) Neurobiological links between depression and drug dependence by Irene Gracia (Pompeu Fabra University, Spain, 2016)
2) Dual role of mTOR in Huntington s disease: contribution to striatal neuronal survival and dysfunction by Jordi Creus (University of Barcelona, Spain, 2018) (Substitute panel member)

Teaching activities and scientific dissemination:
-Lectures in the master of Neuroscience (Pompeu Fabra University-Barcelona University, Spain, 2018-2020)
-Outreach activity at Ravenswood Middle School (Palo Alto, California, USA, 2019)
-Scientific dissemination in Fira de Recerca CosmoCaixa. (Spain, 2019)
-Lectures in Animal Behavior for the French Accreditation of animal experimentation (Montpellier, France, 2016-2017)
-Scientific dissemination during Brain Awareness Week (2010, 2014)
-Lectures in Biology (Lycée Français de Barcelone. Spain, 2010, 2011)
-Participation in several interviews in 7 Spanish TV channels, in national and international radio programs, and in Spanish newspapers regarding the effects of cannabis (2009-2011)
-Lectures to 3rd-year undergraduate students (Biology Degree. Pompeu Fabra University. Spain, 2008-2010)

Experience in the industry sector:
Collaboration with Minoryx Therapeutics testing new compounds in preclinical studies (2019-2020)
Professional service to Esteve Pharmaceutical Company testing new compounds in preclinical studies (2008)

Aqu Associate Professor Accreditation from the Generalitat de Catalunya

Interests: Understanding the brain circuits, neuronal types and molecular mechanisms that are key upon pharmacological manipulations in both physiological and pathological conditions.

Goals: Get a tenure position in a Research Center/University, have my own lab and secure funding international and national funding.

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AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

Nombre: ESPINET HERNANDEZ, ELISA
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Área Temática: **Biomedicina**
Correo Electrónico: elisa.espinet@gmail.com

Título:

Understanding the tumor as a whole: Interplay tumor-microenvironment and importance of patient heterogeneity

Resumen de la Memoria:

It was very early in my career that I become fascinated by the concept of the tumor-stroma interactions. My PhD work, initially aimed to study the role of TGF-b in colorectal cancer (CRC) tumor epithelial cells, totally shifted towards the study of the contribution of fibroblasts to the initiation of CRC metastasis after some unexpected findings. During my PhD I had the opportunity to closely work with clinicians and pathologist and to use human data and material to generate and study hypothesis. I totally felt in love with this type of approach that has marked my investigation and research lines since then. As a postdoctoral researcher I embarked myself on an ambitious project aiming to characterize the different cells present in human pancreatic ductal adenocarcinoma (PDAC), one of the deadliest types of human cancer. PDAC is the solid tumor with highest stromal content (up to 90% of the tumor mass), what makes it very interesting to study of the interactions between tumor and stromal cells. Current therapy options remain mainly palliative what calls for a better understanding of the disease in order to find better treatment options. During my postdoc I needed to expand the experience acquired in my PhD with CRC samples to establish new protocols to work with human PDAC which is technically a very difficult tumor to work with. These techniques are now routinely used in my postdoctoral laboratory and have been also successfully used in collaboration with other groups to work with other tissues. Additionally, I broaden my knowledge to learn and apply stat-of-the-art low-input sequencing technologies (DNA-methylation and RNA-sequencing). Starting from observations done in patients, I combine fundamental as well as complementary in vitro (primary human cells) and in vivo (Patient Derived Xenografts PDXs and immunocompetent mice) approaches to validate observations and generate new hypothesis. The ultimate goal of my research is to find better personalized therapies for pancreatic cancer patients. My line of research (present and future) focuses on the understanding of the heterogeneity of the tumor epithelial cells of different patients and how this heterogeneity defines the complex molecular interactions with the tumor microenvironment to finally affect the evolution of the disease. Only if we understand the tumor as a whole we will be able to tackle this deadly disease.
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Resumen del Currículum Vitae:

My career has been a consistently upward trajectory towards independence. Both as a PhD student and as a Postdoctoral researcher my work has focused on topics that were not the primary expertise of the laboratory. This has represented a big challenge but also a great fulfillment when seeing the achievements accomplished. My PhD student time taught me the importance of thinking out of the box, and engaged me in the excitement of working with human data and samples to better understand cancer disease. I needed to establish resources and experimental models in a journey to explore a new topic in the laboratory. The freedom given by my PhD supervisors was instrumental for my development as an independent researcher. Later, as a senior postdoctoral researcher working in a big laboratory, I have completely led my work. I conceived and designed of my own projects and those of my master students. I obtained funding to cover most of my research. I established national (German) and international collaborations (US, Canada, Belgium) to pursue the development of my projects and I have dealt with the publishing process (rebuttal and communication with the editor) of the most highly demanding journals. With my acquired experience at different levels and an exciting research plan idea, I feel totally thrilled about my next steps as independent investigator.

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AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

Nombre: ZAFRA MARTIN, MªPAZ
Referencia: RYC2020-028855-I
Área Temática: **Biomedicina**
Correo Electrónico: mpzaframartin@gmail.com

Título:

Impact of distinct KRAS mutations in cancer

Resumen de la Memoria:

My main scientific interest is to understand the mechanisms behind tumor initiation and progression, to find genetic underpins that could guide treatment options. I started my research path in the immunology area in Jose M Rojo group at Centre of Biological Research (CIB)-Margarita Salas. During that period of time, I was immersed in the study of downstream signaling mechanisms exerted by the inducible T-cell costimulator (ICOS) to drive T cell activation (Acosta-Zafra et al, Cell Mol Life Science, 2011). Understanding ICOS effector signaling is crucial to define adaptive immune responses and, as a matter of fact, agonist and antagonists are currently being tested as immunotherapy candidates to treat cancer patients. Then, I carried my PhD at Victoria del Pozo lab (IIS-Fundación Jiménez Díaz), where I continued working in an immunology related project. I investigated the effect of SOCS3, a suppressor of cytokine signaling that negatively regulates this cascade, in a model of chronic asthma. Those years supposed my first encountered with animal models, and I instantly became fascinated about their potential uses. I developed a successful strategy to intranasally deliver a small-interfering RNA (siRNA) to target SOCS3, resulting in the asthmatic phenotype inhibition (Zafra et al, PLoS One, 2014). Moved by the impressive therapy results, I further characterized SOCS3 function in eosinophils purified from asthmatic patients (Zafra et al, International Journal of Molecular Science, 2015) and explored its effect in other T-helper type-2 immune pathologies where eosinophils are a disease hallmark (Zafra et al, Journal of Gastroenterology, 2013). After defending my PhD, I decided to continue my scientific career in investigating a lethal disease as cancer. Therefore, I did a short postdoctoral training with Luisa M Botella (CIB-Margarita Salas) in which we systematically measured endoglin and other endothelial markers in biopsies from colorectal cancer (CRC) patients (Nogués et al, World Journal Surg Oncology, 2020), to explore its potential as biomarkers in CRC diagnosis and prognosis. Next, I decided to join Lukas Dow lab (Weill Cornell Medicine). Focusing in the KRAS oncogene, I reengineered the well-known KrasLSL-G12D allele to better reflect the mutational landscape observed in the clinic. I chose three KRAS mutations that are third most common (after KRASG12D and KRASG12V) in pancreatic (KRASG12R), lung (KRASG12C) and colon cancer (KRASG13D). They all drove different phenotype during pancreatic cancer tumor initiation and showed differential sensitivity to targeted-therapies (Zafra et al, Cancer Discovery, 2020), confirming the importance of precisely recapitulate the genetic landscape of human cancers to define unique phenotypes. Motivated by the development in 2016 of base editor enzymes, we improved the efficiency of these editors in mice and organoids (Zafra-Schatoff et al, Nature Biotechnology, 2018). The optimized editors opened the possibility to model cancer associated mutations in an efficient and precise manner. These two studies, together with my strong background in immunology, position me to continue my research by, in one hand, exploiting the unique features of the KrasLSL-mutant models and in the other, keep building genetically defined preclinical cancer models with the goal to fight cancer.
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Resumen del Currículum Vitae:

My scientific career is supported by a high publication record in important scientific journals (25 in total, 8 as first author, 1 as co-corresponding author), and grants/awards that funded my research. Before finishing my biochemistry degree, I had the opportunity to join Jose Maria Rojo laboratory as a research assistant (2008-2009, Centro de Investigaciones Biológicas (CIB)) where I published my first-author paper working in the T cell costimulatory molecule ICOS. In 2010, after being awarded with a Conchita Rábago predoctoral fellowship, I started at Victoria del Pozo s group (IIS-Fundacion Jiménez Diaz) to pursue a PhD. Very early during my training, I begun to grow interest in using mouse models to test therapies. One of my achievements during my doctoral training was the successful intranasal delivery of siRNAs to knockdown SOCS3 in an asthma mouse model. During my PhD I published 11 peer-reviewed articles, 3 of them as first author. After defending my thesis (Best Thesis Award from IIS-Fundación Jiménez Díaz), I did a short postdoctoral training at Luisa Botella (2014-2015, CIB), where I first worked in the cancer field and rewired my interest to continue my scientific career in trying to dissect out the mechanisms underlying tumorigenesis by using genetically defined preclinical cancer models. In 2015, I joined Lukas Dow lab (Weill Cornell Medicine) as a postdoctoral trainee and enroll in the prestigious Mouse Development, Stem Cells & Cancer Course at Cold Spring Harbor Laboratory (2016) to learn how to engineer stem cells to develop genetic complex mouse models. At Dow lab, I focused on two parallel projects aimed at defining how specific cancer-associated genetic changes impact disease and/or response to therapy. The first project was a technical challenge to significantly improve the ease and practicality of engineering single base alterations in the mammalian genome. Through both DNA and protein engineering efforts, I generated a series of powerful CRISPR-based tools, including new and effective base editors. The first fruit of this work was published 2 years ago in Nature Biotechnology (Zafra-Schatoff et al, 2018) and led to a patent. I was really honored to be invited to present this work at genome engineering conferences both in the US and UK. My second project tried to understand why specific cancer types show specific types of oncogenic mutations in KRAS. In 2017 I was granted with a Molecular and Translational Oncology Research Training Grant to pursue this project. I used my optimized CRISPR tools to engineer a series

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

of new Cre-conditional Kras mutant mouse strains. Each mutation has shown a different impact on tumor initiation in the pancreas and colon (Zafra et al, Cancer Discovery, 2020, co-corresponding author). This is a fundamentally important discovery in cancer biology and opens up a huge range of questions in multiple cancer types that can now be addressed with these models. The strains are now deposit at The Jackson Laboratory (KrasLSL-G12C; KrasLSL-G12R, KrasLSL- G13D), and multiple pharmaceutical companies have shown interest to test their drugs in these models. I have experience in mentoring 1 summer student and 5 PhD candidates at Weill Cornell Medicine and allergology residents at IIS-Fundación Jiménez Díaz. I am reviewer for Npj Precision Oncology.

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AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

Nombre: GARCIA MARQUES, JORGE
Referencia: RYC2020-029831-I
Área Temática: **Biomedicina**
Correo Electrónico: jors198@gmail.com

Título:

Neural cell lineages and cell therapy

Resumen de la Memoria:

I have always been fascinated by the brain and how so much complexity emerges from a single cell. This fascination led me to study how cell lineage determines cell diversity in the nervous system. I devoted my postdoc to generate tools that could answer these questions. Ready to explore the full potential of these tools, my mid-term goal is applying this technology to generate cell types on-demand. This work could help treating human pathologies in which these cell types are lost.

In 2005, I joined Lopez-Mascaraque s lab as a research assistant (2005) to work in the role of astroglia in a model of neuronal migration in mice. I visited Prof. Greer s lab at the Yale University (2007) to analyze the gene expression of different populations of astrocytes, which resulted in my first publication (Garcia-Marques et al., Glia, 2010). We described how various astrocyte populations established migratory boundaries via their different ability to promote neuronal migration. We hypothesized that the ultimate reason for these differences was the existence of progenitor subtypes, each producing astrocytes with a differential ability to support neuronal migration. However, astrocyte lineages were poorly described, mostly due to the lack of molecular tools for lineage tracing. This was a determinant step in my career, and I assimilated how important technological advances are to solve long-standing problems in biology.

In 2009, I visited Prof. Ivan Rodriguez¿s lab at the Geneva University. This visit provided me with the expertise on molecular biology that I needed to develop Star Track, the first tool I generated to study cell lineages (Garcia-Marques et al., Cereb Cortex, 2013). Star Track transformed the research in the lab and yielded numerous publications and collaborations. Interestingly, we found some astrocyte clones exhibited a proliferative response to brain injury, while others remained unaffected. After finalizing my PhD, I joined Tzumin Lee s lab at Janelia Research Campus. At that time, I wanted to work in a different and simpler model where I could better understand how cell specification occurs. This lab is a benchmark in Drosophila neuronal lineages, and Janelia was a really exciting institution with a scientific vision well-aligned with my own convictions. This period yielded my best two works thus far. The first describes the design and optimization of CaSSA, a new tool to gain access to specific cell types (Garcia-Marques et al., Neuron, 2019). The second work describes CLADES, a novel strategy to trace and manipulate cell lineages (Garcia-Marques et al., Nat Neurosci, 2020, co-corresponding author). Also, I acquired skills on how to be a good group leader, collaborate with different teams or communicate my science. Although I could not secure my own funding due to Janelia¿s regulations, I attended several workshops on grant writing that proved really helpful. After finishing my postdoc, I was awarded a Marie Curie Fellowship to work at the CNB-CSIC. Under the supervision of Dr. Marta Nieto, I am currently working in the application of CaSSA and CLADES to manipulate neural progenitors in the cerebral cortex in mice. I am planning on using part of these results as preliminary data to apply for European funding, with the aim of establishing my own lab and become an independent researcher.

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Resumen del Currículum Vitae:

CURRENT POSITION
Marie Curie Fellow CNB-CSIC

PREVIOUS POSITIONS
2016-2020 Research Scientist- Janelia Research Campus HHMI
2014-2016 Postdoctoral associate - Janelia Research Campus HHMI
2012-2014 Postdoctoral associate Instituto Cajal CSIC
2007-2012 PhD candidate Instituto Cajal CSIC

EDUCATION
PhD in Neuroscience, Universidad Autonoma de Madrid
BS in Physics (1st year), Universidad Nacional de Educación a Distancia
BS in Biology, Universidad Complutense de Madrid

PUBLICATIONS

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

14 publications in international journals, 7 of them as first-author, 2 of them as co-corresponding author: 1 Nature Neuroscience (1st and co-corresponding author, IF 20.07), 1 Neuron (1st author, IF 14.31), 1 Progress in Neurobiology (1st and co-corresponding author, IF 9.37), 2 Cerebral Cortex (1st author, IF 8.3), 1 Journal of Neuroscience (1st author, IF 6.34), 2 Glia (1st author, IF 6.2), 1 PLoS ONE (co-first author, IF 3.53), 1 Nucleic Acids Research (IF 11.5), 1 Elife (IF 7.55), 1 Scientific Reports (IF 4.3), 1 Open Biology (IF 3.89), 1 Frontiers in Neuroscience (IF 3.57). Publications highlighted in Nature Neuroscience (1), Neuron (1), F1000 (1) and Prelights (2).

PATENTS
First co-inventor in Methods and compositions for genetically manipulating genes and cells . PCT/US2018/042731.

RESEARCH IN INTERNATIONAL CENTERS
2014-2020 Janelia Research Campus, HHMI
2010 (1 month) Université de Genève
2007 (4 months) School of Medicine, Yale University

FELLOWSHIPS
2008-2012 Marie Curie, European Commision
2008-2012 JAE predoctoral, CSIC
2007-2008 I3P program, CSIC

TEACHING
I have mentored 1 BSc student, 3 PhD students and 1 postdoctoral fellow, and obtained the Certificate on Pedagogical Aptitude (250 hours) .

AWARDS
Best Talk Award, 14th Christmas Meeting Instituto de Neurociencias de Alicante UMH-CSIC
Travel Award for the Hindsight-2020 Meeting Paul G. Allen Frontiers Group.
Travel Award for the Society for Neuroscience Meeting Society for Neuroscience
Travel Award for the 3rd Neurotrain Event FENS

OUTREACH
I have participated in 5 outreach activities: Janelia s RESET program (2018), Brain Awareness Week (2010), Semana de la Ciencia y la Tecnología en el CSIC (2009), VI and VII Feria Madrid por la Ciencia.

ORGANIZATION OF INTERNATIONAL MEETINGS

- High-Throughput Dense Reconstruction of Cell Lineages conference. Organized by Tzumin Lee, Connie Cepko, Isabel Espinosa Medina and Jorge García Marqués. Janelia Research Campus, Ashburn VA, USA. April 2019

OTHER ACTIVITIES
Invited reviewer for the journal Science and Elife.
Participation as Advisor for the Wiley editorial group.
Member of the PhD thesis committee of Irene Rubio-Ferrera (UAM, 2019).
Co-founder of the Con/Ciencia association for Neuroscience outreach. (2012).

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AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

Nombre: PACHEU GRAU, DAVID
Referencia: RYC2020-029544-I
Área Temática: **Biomedicina**
Correo Electrónico: DPACHEU@unizar.es

Título:

Mitochondrial diseases: From Genetic factors to tissue-specificity

Resumen de la Memoria:

As an undergraduate student I made an internship (funded by the Ministry of Education) in the group of Biogenesis and Mitochondrial Pathology lead by Prof. Julio Montoya, where I was introduced to mitochondrial pathology and the potential effects of population variation on the mitochondrial DNA. After my graduation in 2007, I joined the group to start my PhD. I investigated the effect of mitochondrial genetic background on antibiotic therapy. This study evolved into complementary research lines: Epidemiological studies in patients with phenotypes related to antibiotic treatment, like neurosensorial hearing loss and Menieres disease were performed to identify new/described pathological mutations in the mt-rRNAs. Interestingly, one of these pathological mutations (m.1555A>G) was found to be fixed in orang-utans as the wild-type allele. Our research showed that the mutation, combined with an antibiotic which in humans is associated with mitochondrial deafness, showed a dramatic impairment of their OXPHOS system. Therefore, the human pathologic mutation was probably fixed in the mitochondrial genome due to the absence of aminoglycosides in the orangutan environment.

These results raised the idea that other ancient and conserved mitochondrial genetic variants in the mt-rRNAs (like those variants which define mitochondrial haplogroups) might as well have an effect on antibiotic therapy. In order to test this hypothesis I generated cybrids, containing different genetic variants of the mt-rRNAs and I treated them with different ribosome-targeting antibiotics. Using this approach, I was able to show that cybrids containing the highly frequent m.3010A allele exhibit a decreased mitochondrial function when treated with the antibiotic linezolid. These results suggested that mitochondrial antibiograms should be implemented for at least the most frequent mitochondrial ribosomal RNA polymorphisms and combinations of polymorphisms and the most frequently used ribosomal antibiotics.

After my graduation, I moved to the UMG (Göttingen, Germany), where I joined the laboratory of Prof.Rehling as a postdoctoral fellow. My goal there was to gain insights into the molecular mechanisms that regulate translation and the biogenesis of respiratory chain complexes inside human mitochondria. I participated in several projects which identified new assembly intermediates of Complex IV (MITRAC) and characterized the function of COA6 as a thiol reductase involved in COX2 maturation and its relation with hypertrophic cardiomyopathy.

In a complementary project, trying to understand how the import of precursor proteins into mitochondria may be related to pathology, we were able to identify the first mutation in the TIM22 pore-forming subunit of the carrier translocase affecting the biogenesis of inner mitochondrial membrane proteins critical for metabolite exchange.

Finally, and in order to develop new strategies to better understand defects on mitochondrial translation within the context of the cell, we established a method to monitor mt-translation using click-chemistry and fluorescent microscopy allowing us to monitor mitochondrial translation in different cell types, disease models or subcellular compartments.

The combination of all knowledge and technology adquired will allow me to understand the pathophysiology and tissue specificity of mitochondrial diseases.

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Resumen del Currículum Vitae:

I performed my biochemistry studies at the University of Zaragoza. As undergraduate student I made an internship (funded by the Ministry of Education) in the group of Biogenesis and Mitochondrial Pathology and then I joined it to start my PhD. I was granted first a fellowship from the CIBERER and then one from the Government of Aragon. I obtained my PhD in March 2012 (Sobresaliente Cum Laude) and I was awarded with an extraordinary PhD prize. I moved to the University Medical Centre of Göttingen (Germany), where I joined the laboratory of Prof.Rehling as a postdoc. In 2013 I was granted an Alexander von Humboldt fellowship for postdoctoral researchers, together with funding to cover my research expenses (Research cost grant for Humboldt fellows). From 10-2015 to 09-2020 I continued developing my own research ideas in Prof. Rehling¿s group as a Postodc/Project leader. Next, I moved back to the University of Zaragoza as Assistant Professor (Profesor Ayudante Doctor). I have been actively teaching in Undergraduate, Master and PhD courses. I have published 30 scientific articles (2 still accepted/In press) (10 as first author, 1 as last author, 6 as second author, 2 as corresponding author, 14 published in first decile journals, 9 of them in first quartile ones (for new papers considered last published JCR stats), including top journals like Cell, Cell Metabolism, EMBO, EMBO reports, Current Biology. I am co-author of 2 book chapters. I have presented 29 contributions in 14 international and 9 national conferences and I have been invited to present my results in National and International Conferences/Symposia as well as Scientific Seminars. I have been awarded with 1 research scholarship, 3 research fellowships, and 4 research awards. I have participated in 15 national and EU competitive projects, 2 of them supporting my own independent research line (Research Costs Grant for Humboldt fellows, 19200 Euro, Retos de la Sociedad (JIN), 169400 Euro). I have reviewed scientific papers for more than 10 journals, performed project evaluation duties for the Royal National Institute for Deaf People (RNID, UK), I was invited as member of a PhD thesis

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

committee in the University of Zaragoza, and I organized the second Y-DZHK Göttingen Retreat (German Center of Cardiovascular Research). I have supervised students from the prestigious Molecular Biology Master/PhD program (Georg-August University of Göttingen/Max Planck International research school) and the Molecular Medicine Master Program (University Medical Center Göttingen), since May 2018 I supervised a PhD student (co-supervised with Peter Rehling).

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CONVOCATORIA 2020

Turno de acceso general

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Título:

Caracterización ómica para predecir el riesgo enfermedades y sentar las bases para medicina de precisión

Resumen de la Memoria:

My research revolves around the genetics of complex disease in humans. I analyse multi-omic profiles from patients to improve our understanding of the genetic architecture of complex traits. The long-term goal of this research is to use these findings as the foundation for precision medicine, namely using -omics profiles to personalize health treatment.

My PhD (2007-2012) focused on clarifying the aspects that determine the replicability of genetic studies across human populations. I determined that risk alleles present in most population cause the bulk of genetic effects for disease (Marigorta et al., PLoS Gen 2013). This has implications for the transferability of estimators of risk across humans (further developed in Marigorta et al., Trends in Gen 2018).

During my postdoc in the US (2013-2018) I led multiple analyses using transcriptomic profiles, leading to gene signatures useful for patient stratification in several inflammatory conditions (Kugathasan et al., The Lancet 2017, Venkateswaran* Marigorta* et al., CMGH 2018, Hyams et al., The Lancet 2019). I also specialized in devising innovative approaches for genetic risk assessment, including the transcriptional risk score methodology that overperforms DNA-based predictions (Marigorta et al., Nat Gen 2017, Mo et al., Gen Med 2018). I also carried out pioneering works on the role of interactions between genes and lifestyle factors in the rising prevalence of modern disease (Marigorta and Gibson, Front in Gen 2014, Nagpal et al., Genes 2018).

Starting early 2019, I am the leader of the Integrative Genomics lab at the CIC bioGUNE. We tackle important aspects of disease biology through integration of statistical genetics with multiomic profiling of patients. Funded from several public and private sources, we are a five-person team with two postdocs and two PhD students who work on improving the power of predictors of genetic risk, discovering signatures to predict drug response in Crohn¿s disease, and disentangling the cell nature of inflammatory and metabolic diseases.
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Resumen del Currículum Vitae:

Since 2019, I am the PI of the Integrative Genomics lab at the CIC bioGUNE. Our research focuses in devising methods for assessing genetic risk, which we try to gear towards translational impacts in the clinic. We perform computational analyses of multi-omic profiles obtained from patient cohorts, leveraging our multidisciplinary background in disease genomics, including statistical genomics, genetic epidemiology, and evolutionary and quantitative genetics.

In 2012, I obtained my PhD under the supervision of Prof. Arcadi Navarro at the UPF in Barcelona. During this period, I received a good command of epidemiology and statistical genetics, as well as developing a taste for analysing the emerging trends in medical genomics.

After moving to Atlanta in 2013 for a postdoc at the lab of Greg Gibson (Georgia Institute of Technology), I performed seminal work using transcriptome profiling to track clinical status, making conceptual and analytical contributions to both basic and translational research. I led the RNA-Seq analyses of the Lancet paper by the RISK consortium in 2017, uncovering a gene signature that leads to a risk stratification model with outstanding negative predictive value. On the other hand, the first authorship in the Nature Genetics in 2017 is the highlight of my career with a novel approach to interpret GWAS. I devised the transcriptional risk scores , a risk assessment tool based on gene expression that is far more predictive of Crohn s status than DNA-based scores. Showing how to provide a path for translational purposes, we also identified two classes of pathogenic and protective genes, a finding that has important implications for the understanding of the mechanism by which genetic risk variants exert the effects on disease risk (a hot-topic in current human complex trait genetics). In the last stage of my postdoc I worked in validating this approach for other diseases and applying my expertise in transcriptomic profiling for the PROTECT study, leading to a flurry of recent publications.

The rationale of my career has been to devise innovative approaches for genetic risk assessment, which will be the foundation of precision medicine. A particularly noteworthy aspect of my trajectory is the ability to identify emerging trends in the field, and tackling them through innovative and unexpected angles. Of note, this inventive characteristic has been crucial to develop a diverse scientific portfolio. Rather than being someone who only carries out methodological elements and routine analyses in large consortia, I have played an important role in the intellectual maturation of most of my papers as collaborator. I am increasingly recognized as an expert in genomics for precision medicine, as testified by the invitation to serve in the precision medicine-working group of the European Crohn¿s and Colitis Organization.

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AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

After 5.5 years of international experience in the US, in 2018 I gained the La Caixa Foundation Incoming Junior Leader grant to set up my own lab. My expertise as the foundation for the lab, we aim to bridge theoretical insights and the practices that are routine in the clinic, especially in inflammatory disease. As of Jan 2021 we are a five-person group that includes two postdocs and two PhD students who have secured their own funding, plus a third one who will join in the fall through an FPI.

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CONVOCATORIA 2020

Turno de acceso general

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Título:

Vascular damage as driver of senescence and fibrosis

Resumen de la Memoria:

In my research, I am trying understand the connection between aging and chronic fibrotic disorders. Fibrotic disorders, such as chronic kidney disease, cardiac fibrosis or pulmonary fibrosis are estimated to account for 30% or the death cases in the western world. The incidence of chronic fibrotic diseases increase exponentially with age. However, it remains unclear how aging promotes fibrosis.
My central hypothesis is that the primary organ that drives aging associated pathologies, is our circulatory system. With age, and particularly with unhealthy life-style, we damage our circulatory system promoting microvascular injuries, small bleedings in our body. My findings suggest that where our vessels become damaged, nearby red blood cells tend to encounter friction leading to their hemolysis or to their escape from the circulatory system causing micro-hemorrhages. Hemolytic and hemorrhagic red blood cells (RBC) release iron and heme into their surrounding, driving thereby inflammation and a form of cellular damage, called senescence. Under normal circumstances the damaged tissue would be replaced for healthy tissue in a process of repair and regeneration. However, in aged individuals, due to their accumulated defects in their circulatory system, the microbleedings keep on re-occuring, driving thereby the cyclic repetition of the above sequence, and eventually to the build up of fibrotic scar tissue.

My future lab will focus on understanding the role of vascular injuries in regeneration and in aberrant repair giving rise to fibrotic and inflammatory diseases.

AIM 1.) Vascular injury in tissue repair and regeneration

I found that bleeding through iron deposition is a damage signal that is sufficient to evoke inflammation and immune recruitment. My data shows that iron directly activates the senescence program through the INK4a/ARF locus and this is essential for immune cells to home to the site of the vascular injury. Recent reports indicated a role for senescent cells in promoting plasticity in neighboring cells.
My central hypothesis is that vascular injuries through iron evoke a cytokine milieu with the possible involvement of senescent cells and immune cells and this is essential for somatic cells in the tissue to acquire plasticity and to thereby promote regeneration.
My lab will use models of lacerating skin wounds, and chemically induced Colitis models. Both models come with excessive bleeding and healing is complex. We will ask specific questions on the role of iron, senescent cells and immune cells in tissue regeneration after injury. All models are established and preparatory work with the involvement of clinical collaborators in ongoing.

AIM 2.) Vascular injury as a driver of aging associated inflammatory and fibrotic diseases.

I found that vascular injuries through iron are potent drivers of inflammation, senescence and associated fibrotic disorders. The senescence program is a detector of iron deposition, and in the absence of this program, immune cells are not recruited, leading to impaired iron clearance that consequentially promotes bacterial infection. I hypothesize that vascular damage is the driver of several inflammatory and fibrotic diseases. My lab ask fundamental questions about the involvement vascular damage, iron deposition and clearance chronic inflammatory diseases, focusing on inflammatory bowel disease.

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Resumen del Currículum Vitae:

As for my scientific career. As a predoctoral student I was trained in the fundamental principles of immunology and Ca2+ signaling. In my doctoral thesis, I described how Ca2+ signaling controls the actin cytoskeleton of B lymphocytes. I published my work in two first author papers (Maus et al., 2009 and 2013). My interest in the role of ion biology and immunology remained throughout my career.
I joined the laboratory of Stefan Feske at the New York University as a postdoctoral fellow. In a seminal paper from 2006, Professor Feske and his colleagues reported on their discovery of the store-operated Ca2+ entry (SOCE) pathway. I joined the Feske lab to explore the role of this novel pathway in health and disease.
I started my work by studying patients loss-of-function mutation in the genes mediating SOCE, who not well understood reasons presented with severe combined immunodeficiency (Maus et al., PNAS, 2015). I made the discovery that SOCE has a fundamental role in regulating cellular metabolism (Maus et al., Cell Metabolism, 2017), and that impaired T cell metabolism explains immunodeficiency in SOCE deficient patients (Vaeth and Maus et al., Immunity, 2017). In parallel, I discovered that the fundamental role of SOCE is not restricted to normal T

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

lymphocytes, but also important in leukemic T cells (Saint-Fleur and Maus et al., Cell Reports, 2017).
In 2017, I joined the lab of Manuel Serrano with aim to test for some of my hypothesis on the role of iron biology in aging and senescence. A screening approach and theoretical considerations led me to hypothesize that iron escaping from red blood cells (RBC) might be the physiologic driver of senescence and associated diseases. Investigating fibrotic tissues, I found that iron accumulation is a hallmark of fibroses, and I identified hemolysis as a source of the iron deposition. I found that hemolytic iron is sufficient to drive inflammation, senescence and fibrosis. I established a new mouse strain in which endothelial cells can be ablated, to demonstrate for the role of vascular injury in aging and senescence. Finally, I discovered that the senescence program is the first responder to vascular damage and iron. In a separate project, I discovered that an ROS-dependent breakdown of Fe/S cluster enzyme function establishes the cellular phenotype of senescence. Two manuscript on my work are under submission. My findings provide a novel framework for studying several chronic inflammatory diseases with direct translational relevance.

I am the first author of several high impact papers (Immunity, Cell Metabolism, PNAS, Cell Reports). I am in the process of publishing two first and corresponding papers in very high ranking journals. My work won various prestigious grants (Alex s Lemonade Stand Foundation for fighting Childhood Cancer, $100.000; Marie Skłodowska-Curie Actions Reintegration, 158.121; Spanish Ministry of Economy, RETOS Colaboración 2019, 1.271.625). I am adviser to the Biotech industry and founder of a company.

I believe that with my versatile training, with my international experience, my network of collaborators, my entrepreneurial spirit and experience, and with my new groundbreaking research, I am uniquely ready to start my own lab and make it succeed.

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AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

Nombre: TIAN , TIAN
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Área Temática: **Biomedicina**
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Título:

Targeting chromatin-associated proteins in cancers

Resumen de la Memoria:

As a physician-scientist trained in China, France, and Spain, my primary research interest is investigating how transcription factors (TFs) and chromatin-related factors interpret the genome to enable unique transcriptional programs during cellular differentiation and oncogenesis. After medical training in China and France, I performed my Ph.D. research work in the laboratory of Dr. Martine Duterque in the Centre National de la Recherche Scientifique (CNRS UMR8161, Lille France). During this period, I began to be interested in the functions of transcription factors in cancer. My Ph.D. work demonstrated that transcription factor ERG, aberrantly expressed in more than 50% of prostate cancer samples, contributes to prostate cancer progression (Tian et al. Oncogene 2013), and its aberrant expression is specifically associated with bone metastasis (Tian and Delliaux et al. Cancer Letters 2018).

In fall 2013, I moved to the Center for Genomic Regulation (CRG) as a postdoctoral fellow. In the laboratory of Pr. Thomas Graf, I was interested in another layer of transcription regulation: how transcription factors interact with chromatin-associated proteins to regulate gene expression. I focused on studying the role of chromatin-associated proteins in transcription factor-induced cell fate change systems. Using state-of-the-art techniques (Tian et al. JoVE 2020, co-corresponding author), we have shown that chromatin-associated protein Whsc1 links pluripotency exits and mesendoderm differentiation independent of its classical methyltransferase activity. Also, this study provided important evidence for intimate connections between regulatory networks that define pluripotent cells and differentiated cells (Tian et al. Nature Cell Biology 2019, co-corresponding author). Moreover, in an ultrafast and efficient lymphocyte B to iPSC reprogramming system, we found that transcription factor C/ebpa, Klf4, and Tfcp2l1 can interact with chromatin-associated Tet2 enzyme and recruit it to the chromatin, resulting in enhancer demethylation and activation (Sardina et al. Cell Stem Cell 2018, Tian et al. Methods Mol. Biol. 2021 in press).

In April 2019, I joined the Vall d Hebron Institute of Oncology (VHIO). As a Research Associate in the laboratory of Dr. Sandra Peiró, my current research interest is to study the functions and the therapeutic potential of chromatin-associated proteins in cancers. My ongoing work is supported by the Plan Estatal-tipo JIN and AECC Investigador Fellowship .

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Resumen del Currículum Vitae:

1. International mobility: I have received medical and scientific training in China, France, and Spain.
2. Scientific contribution: I have published 12 peer-reviewed research articles, including 5 articles as the first author (e.g. Nature Cell Biology, JoVE, Cancer Letters, Oncogene, etc), 2 as the co-corresponding author (Nature Cell Biology and JoVE), 7 as co-authors (e.g. Nature Genetics, Cell Stem Cell X2, Oncogene, etc.).
3. Grants: I have received 3 competitive grants as principal investigator (e.g. Plan Estatal I+D+i), travel grants from ISSCR, competitive fellowships (e.g. AECC investigador, Juan de la Cierva). In addition, I have actively participated in highly competitive national and international research projects, including Plan Estatal, ERC-Synergy and FP7-Health, and contracts from pharmaceutical companies for preclinical studies.
4. Teaching and mentoring: I have long-term teaching experience for medical students and Master students. I have been an instructor for courses organized by the Center for Genomic Regulation. Moreover, I have supervised the work of 1 Master student and 4 Ph.D. students and was invited as a committee member for two Ph.D. thesis defenses.
5. Scientific activities: I have been selected as a speaker in international scientific meetings, including Cold Spring Harbor Stem Cell meeting (USA) and Keystone Symposium Chromatin and Epigenetics (Canada). I have been invited to review articles for multiple scientific journals (e.g. Nature Communications, British Journal of Cancer, Scientific Reports, etc). I am also an active member of AACR and ASEICA.
6. Scientific collaborations: I was able to establish and manage national and international collaborations. Several results have been published in high-profile journals. Currently, I have an extensive collaboration network including clinicians and basic science researchers for different aspects of my projects.

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CONVOCATORIA 2020

Turno de acceso general

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Título:

Signalling pathways that determine responses to PI3K and MAPK inhibitors in glioblastoma

Resumen de la Memoria:

During my PhD in the laboratory of Prof. Jose Maria Medina and Prof. Arantxa Tabernero at the Institute for Neuroscience of Castilla y Leon, my research contributed to better understand the impaired synaptic plasticity of Down syndrome. We demonstrated that oleic acid acts as a neurotrophic factor, promoting neuronal differentiation and increasing the levels of choline acetyltransferase (ChAT) but, remarkably, this fatty acid failed to reproduce the same effects in trisomic cells. My results showed that the kinase DYRK1A is involved in cellular plasticity and its overexpression is responsible for central nervous system disturbance in Down syndrome.

For my postdoc, I decided to carry on with my interest in cell signalling using mass spectrometry-based phosphoproteomic studies in the laboratory of Prof. Pedro R. Cutillas at the Barts Cancer Institute in London. Here we have developed a chemical phosphoproteomics approach to systematically identify markers of kinase network circuitry in different cancer cell models. By comparing the selectivity profiles of a set of kinase inhibitors with their effects on cellular phosphoproteomes we identified more than 6,000 kinase-phosphosite relationships and more than 1,500 kinase-kinase relationships. My results displayed differences in network topologies after using these markers of network circuitry across tumours and I discovered uncharacterized connections in these cancer networks. With my project, we have improved the methodology used to reconstruct global kinase signalling networks from phosphoproteomics data applied in cancer cells. Moreover, I participated in the development of an approach that systematically predicts with reasonable low error the efficacy of drugs in reducing the proliferation of cancer cells.

Nowadays, I am focused on a project using different FLT3 inhibitors to derive signalling pathways that determine responses of acute myeloid leukaemia (AML) cells. In addition, I am collaborating with two research groups and I am also involved in additional projects carried out in my laboratory. I plan to start my own research line focus on the study of signalling pathways that determine responses to PI3K and MAPK inhibitors in glioblastoma. In fact, during my postdoc, I have identified a biomarker that predicts how different AML cell lines respond to these combined treatments.

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Resumen del Currículum Vitae:

I graduated in Pharmacy and then in Biotechnology at the University of Salamanca (Spain) in 2007 and 2009, respectively. I continued with my postgraduate studies: two years-Master courses in Surgery, Dissertation and finally I obtained the Advance Studies Certificate (DEA) in the department of Surgery, Faculty of Medicine at University of Salamanca (Spain) that let me to initiate my scientific career. In 2010, I joined the Neurochemistry group led by Prof. Arantxa Tabernero and Prof. Jose Maria Medina, located in the Institute for Neuroscience of Castilla y Leon (INCYL) as part of the University of Salamanca (Spain), to perform a PhD funded by The Ramon Areces Foundation. I finished my PhD in Neuroscience in 2014, with summa cum laude distinction and with an important scientific productivity: two first-author research articles, in Experimental Neurology and Molecular Neurobiology (both are 1st quartile in JCR) and a review article as a co-author in Journal of Neurology & Neuromedicine. I also presented my results at nine national and international congress; I was awarded with an oral talk as invited speaker in the XXXIV Congress of the Spanish Society of Biochemistry and Molecular Biology (SEBBM) Congress in 2011. Moreover, I obtained the Postgraduate Certificate in Academic Practice, which is a teaching and training program for lecturers, in the Faculty of Education at University of Salamanca (Spain). In addition, I participated as a member of the committee board in the Institute for Neuroscience of Castilla y Leon (INCYL) during 2012 and 2013.

In 2015, I moved to London where I got a contract from the Biotechnology and Biological Sciences Research Council (BBSRC) to work in Prof. Pedro R. Cutillas laboratory as a Postdoctoral Researcher, located in Barts Cancer Institute as part of the Barts and The London School of Medicine and Dentistry at Queen Mary University of London. During this time, I have published two first-author research articles in Nature Biotechnology and Nature Communications, one second-author research article in Cell and one second-author review article in Proteomics. I have also established collaborations with other groups, which ended up in two publications in Cell Systems and Biochemical Journal. I also presented six communications in national and international congress, two of them as an invited speaker at the British Society of Proteome Research (BSPR) meeting and the 16th Human Proteome Organization World (HUPO) congress, in 2019 and 2017, respectively. Throughout these years I have also supervised 4 research projects carried out by 1 visitor professor assistant, 2 visitor PhD students and 1 undergraduate student. I have been the viva examiner for 3 PhD students. More achievements to highlight during my

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

postdoc are the participation in a patent development, a teaching experience in problem-based learning (PBLs) for MBBS at the School of Medicine and Dentistry (Queen Mary University of London) and the attendance of a course in leadership organized by the Research Development Department.

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Turno de acceso general

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Título:

Emergence and Evolution of Bacterial Pathogens

Resumen de la Memoria:

My lab investigates the emergence and evolution of bacterial pathogens. Our goal is to elucidate the strategies that they utilize for colonization and transmission from its environmental reservoirs to the human host. Furthermore, we are interested in the connection that ecosystem perturbations (e.g. climate change) have in their virulence and transmission potential. My research program lies at the interface between ecology and pathogenesis and focuses on several pathogenic members of the Vibrionaceae, a family of ubiquitous aquatic bacteria. Our investigations have an emphasis on the intestinal pathogen Vibrio cholerae, which represents a paradigm of pandemic disease agents, and Vibrio vulnificus, a poorly understood emergent zoonotic pathogen source of a fulminant septicemia. Having studied many aspects of Vibrio pathogenesis, virulence regulation, and evolution for the last 16 years, I have acquired a wide-ranging background in the numerous topics that are critical for the success of my transdisciplinary research program. Furthermore, I have developed a holistic research approach that encompasses a mix of molecular biology, genomics, phylogenetics, bacterial pathogenesis, and ecology. Overall, by understanding pathogen emergence and evolution, we will ultimately gain the knowledge that will allow us to effectively forecast the traits of emergent virulent strains, predict the sources of outbreaks, and to design and produce reliable therapeutics against bacterial threats.
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Resumen del Currículum Vitae:

Contributions to Science:

1. Discovery of Virulence Adaptive Polymorphisms in pathogenic bacteria. When I began my studies on pathogen evolution, the underlying properties that needed to be present in a bacterial population for a human pathogen to emerge had been marginally investigated. Using a mix of bioinformatics, population genomics and molecular biology, we discovered the existence of variants of core genes in the genomes of pandemic V. cholerae and V. vulnificus that confer adaptations to virulence and enhance the potential of a given strain to give rise to pandemic disease; what we termed Virulence Adaptive Polymorphisms (VAPs). We determined that VAPs must be present in the genomic background of a bacterium before it can emerge as a successful pandemic clone. These findings revealed a novel layer in pathogen evolution and can be naturally implemented to the study of other pathogens. Our findings may lead to forecasting the factors that play a role in the emergence of a pathogen and identify the environmental drivers that foster their distribution and spread.

2. Host colonization dynamics of pathogenic Vibrios. At several stages of my scientific career I have made contributions to the understanding of host-microbe interactions and colonization of the Vibrionaceae. I discovered that genes involved in the catabolism of sialic acid are confined to pathogenic and commensal bacterial species and are required for successful host colonization in pathogenic Vibrios. Furthermore, we have made advances towards understanding the unique host colonization patterns among pathogenic clades of V. cholerae and V. vulnificus and recently proposed comprehensive models for host colonization of these pathogens, which make numerous predictions that are currently being tested in my laboratory.

3. Proteolysis of virulence regulator ToxR leads to persister cell formation. Numerous bacterial pathogens form persister cells under adverse conditions such as antibiotic exposure or nutrient limitation. V. cholerae is commonly found in this state in its environmental reservoirs between epidemics. I made some seminal findings on the molecular mechanisms and genetics that play a role in the regulation of persister cell formation in bacteria using V. cholerae as a model system. I found that proteolysis of the canonical virulence regulator ToxR mediates entry into a persister state linking virulence termination and V. cholerae transmission. These breakthroughs have broad ramifications particularly in two major aspects a) termination of virulence, as triggering proteolysis of ToxR terminates the virulence cascade, and b) the molecular mechanisms that regulate persister cell formation and V. cholerae transmission. Both aspects are currently being investigated in my lab as potential drug targets for prophylactic or therapeutic purposes.

4. Transfer and evolution of Pathogenicity Islands in bacteria. A crucial aspect in the emergence of numerous pathogenic bacteria is the acquisition of gene clusters termed pathogenicity islands. I studied the conditions that triggered the transfer of Vibrio Pathogenicity Island-2 in V. cholerae and the evolutionary history of pathogenicity islands among virulent bacteria. These findings shed light in the evolutionary origins of bacterial pathogens and provided tools to study and prevent the dissemination of these virulence traits.

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AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

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Título:

Differential roles of estrogens in obesity-driven breast cancer

Resumen de la Memoria:

Manuel Picón Ruiz started his research career studying a Master degree in Regenerative Biomedicine, and obtained his Ph.D. in Biomedicine in 2012 at the University of Granada, Spain. His predoctoral studies focused mainly in the isolation, in vitro expansion and characterization of stem cells from normal and tumor tissues. During his predoctoral stage, Manuel performed two international research stays (University of Bath, UK; and University of Miami, USA) and published 2 research articles related to the isolation of human adult stem/progenitor cells from abdominal fat tissue for endothelial and cardiac regeneration.

In 2013, Dr. Picón started his postdoctoral trainee at University of Miami, USA. During his postdoctoral studies, Dr. Picón focused his research career in: the study of cancer stem cells (CSC) in different solid tumors, particularly thus from the breast; the interactions between adipose tissue:breast cancer cells; and finally specializing in the study of the role of estrogens and obesity in inflammation and ER+ breast cancer as Assistant Scientist and Principal Investigator. Among the important contributions of Dr. Picón to these fields of knowledge, with a total of 11 articles published during this stage of his career, it is worth highlighting the development of a new methodology for CSC isolation and culture; the discovery of the molecular mechanism involved in adipose tissue driving breast tumor progression; or the publication of a review article in the field of obesity and breast cancer classified as "Continuing Medical Education" and "Continuing Nursing Education" by the American Cancer Society.

In September 2019, Dr. Picón returned to the University of Granada as Marie Curie fellow. He is actually pioneer in studying the role of estrone in obesity-mediated inflammation and ER+ breast cancer. Until date he has published as co-corresponding: a research article in the prestigious journal Cell Metabolism, describing for the first time that estrone and estradiol have different roles on NF-κB regulation and ER+ breast cancer progression; and a methods article for obtaining different adipose cell populations from breast adipose tissue for co-culture purposes.

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Resumen del Currículum Vitae:

Manuel Picón Ruiz conducted his PhD at the University of Granada (UGR) in Spain, successfully defending his thesis work in November 2012. After that, Dr. Picón moved to the Sylvester Comprehensive Cancer Center of the UM (USA), first as Postdoctoral Associate Researcher and then as Assistant Scientist. During his postdoctoral stage, Dr. Picón was awarded with a Susan G. Komen award in the role of Principal Investigator (PI), a grant intended to form outstanding postdoctoral researchers to become the next generation leaders in the field of breast cancer. In this sense, Dr. Picón participated in the publication of a Review article as first author in the top ranked journal in oncology (IF=244.585), which served as cover page and was classified as "Continuing Medical Education" and "Continuing Nursing Education" by the American Cancer Society. Furthermore, he co-directed a group of 15 researchers for the elaboration of a research article recently published in the prestigious journal Cell Metabolism. In addition, Dr. Picón contributed with his ideas in the submission of the prestigious RO1 proposal that was awarded with $1.5 million by the NIH. All this demonstrates the leadership capabilities of Dr. Picón and his potential to become a referent in the field of breast cancer research.

Until date, Dr. Picón has conducted his research career in a total of 5 international research centers from three different countries (Spain, UK and USA), has obtained 7 competitive fellowships and has participated in 12 national and international research projects (2 as PI). He has authored 15 papers in scientific journals, 12 of them included in first quartile journals; and 6 as first, last or corresponding author. He has an H-index of 11 and an i-10 index of 13, with a total of over 800 citations. Furthermore, has published 3 book chapters in prestigious publishers; has participated in a considerable number of congress/symposium with more than 30 communications and 3 first prizes; and has also participated in the development of an international patent. Furthermore, he has served as reviewer for five different Q1 journals.
Regarding to his teaching activity, Dr. Picón is accredited as Assistant Professor by the AGAE and ANECA. He has been novice professor in the degree of Medicine at the UGR; has participated in teaching undergraduate and PhD students at the UM, and as invited professor for Master and PhD programs at the UGR.

In September 2019, Dr. Picón moved back to the UGR as Marie Curie fellow. Actually, he is leading a research group within Dr. Marchal¿s lab, composed by two PhD students, several lab members and collaborators, such as: clinicians (Dr. Torné and Dr. Preda), bioinformaticians

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

(Dr. Hackenberg¿s group), gene editing¿ experts (Dr. Benabdellah¿s group) and experts in drug discovery (members of MEDINA¿s center). In addition, he acts as professor at the Department of Human Anatomy and Embryology,and is supervising several Master degree and PhD students. Regarding the last, he has successfully directed 4 Final Master Works at the UGR (one with Honors qualification). Moreover, he has co-authored 4 Anatomy Books for Medical Students, has been Master Thesis Committee Member for a total of 13 students and has also participated as Doctoral Committee Member in 1 Dissertation Committee. Actually, Dr. Picón is actively participating in grant submission (including those from the ERC) and seeking for a stable position at the UGR.

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CONVOCATORIA 2020

Turno de acceso general

Nombre: VILLACAMPA ALCUBIERRE, PILAR
Referencia: RYC2020-029929-I
Área Temática: **Biomedicina**
Correo Electrónico: villacampaalcubierrepilar@gmail.com

Título:

A MULTICELLULAR APPROACH FOR THE STUDY OF DIABETIC RETINOPATHY AND THE IDENTIFICATION OF THERAPEUTIC TARGETS

Resumen de la Memoria:

The study of retinal vasculature has been the main focus of my research for more than 10 years. Medical conditions associated with alterations and remodelling of retinal vasculature are a major cause for vision loss in patients, such as diabetic retinopathy. During my PhD, I used a transgenic model of diabetes-like retinopathy generated in Dr. Bosch s lab that expresses IGF-1 in the photoreceptors to study the contribution of neuronal and glial alterations in the development of diabetic retinopathy. Despite being normoglycaemic, this unique mouse model develops a progressive phenotype that faithfully resembles human diabetic retinopathy. I found that IGF-I overexpression induced retinal and oxidative stress, gliosis and microgliosis early before they have vascular alterations. Through a collaboration with Dr. Pedro de la Villa (Universidad de Alcalá, Spain), I analyzed the neurophysiological alterations of the TgIGF-I, which showed progressive impairment of electroretinographic amplitudes up to complete loss of response. I also worked in the development of new therapeutic approaches for proliferative retinopathy, based on the transfer of therapeutic genes to the retina using AAVs. We demonstrated the efficacy of AAV-mediated PEDF overexpression in counteracting proliferative retinopathy in the TgIGF-I model. Long-term expression of PEDF in the transgenic retinas was not only safe, but also capable of inhibit neovascularisation by normalising VEGF intraocular levels. The project that I developed as a Marie Curie Fellow in Prof James Bainbridge s group was focused on the study of the role of HIF factors in myeloid cells during ocular neovacularisation. Our results showed that HIF and VEGF from myeloid cells are not essential for ocular neovascularisation, as the myeloid-specific knock-out models for each of them didn t show any difference. Instead, I found that HIF stabilisation in those cells during OIR promotes healthy vascularisation by protecting glial cells. Since I started as JdC fellow in Dr Graupera's lab, I joined an ongoing project in the lab focused on the biology of pericytes in angiogenesis. By combining Ribotag technology and transcriptomic analysis I have identified specific signatures of pericytes in early and late stages of the physiological angiogenic process. Also, confirmed the contribution of PI3K signalling to this process of maturation of pericytes. All this knowledge has set the grounds for starting a parallel project studying the biology of pericytes during pathological angiogenesis and diabetic retinopathy; we are currently identifying changes in pericyte behaviour that may potentially be therapeutic targets for diabetic patients. During every step of my research career I have been progressively responsible of the development and management of the projects, as well as responsible of writing grants, research and review articles. I have improved my scientific communication skills and trained/mentored master and PhD students that joined the laboratory. I am currently an Associate Editor of the journal Bio-protocol. Thus, the development of my research career has allowed me to advance my understanding of ocular translational research, both theoretically and practically, and to improve the management, leadership and communicative skills that will allow me to establish myself as an independent researcher.
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Resumen del Currículum Vitae:

As a highly-motivated researcher, my expertise, after more than 10 years of training, is mainly focused on retinal vascular biology and the study and optimisation of new models of disease. I worked in Dr. Bosch s lab, at the Universitat Autonoma de Barcelona (Spain) for 8 years, including pre- and postdoctoral positions. This well-established group has been working for many years in the development of transgenic models for the study of the pathophysiology of Diabetes Mellitus and its complications. This allowed me to acquire essential skills in animal work, molecular biology, histology and microscopy and a wide expertise in diabetic retinopathy and gene therapy. In order to improve my skills at performing intraocular injections of gene therapy vectors I undertook a short stay at Prof. Robin Ali s lab, in the UCL Institute of Ophthalmology (UK) in 2008, which proved essential for the fast progression of research in the eye gene therapy project, leading to the publication of a manuscript in 2012 (Haurigot and Villacampa, shared first authorship, et al. 2012). In the same way, I established collaboration with Dr. Pedro de la Villa (Universidad de Alcala, Spain) to analyze the neurophysiological alterations of the IGFI mouse model of retinopathy, which also resulted in a publication (Villacampa et al. 2013). As a result of these publications, in 2013, I was awarded with the EU-funded Marie Curie IntraEuropean Fellowship, well-known for promoting high quality research and excellence of early career scientists, who are selected to work at Europe's most prestigious research centres. The development of this fellowship at UCL-Institute of Ophthalmology (London) offered me an excellent opportunity to complement my scientific expertise from a clinically-oriented point of view. In technical terms, I improved my knowledge in the myeloid cell field, familiarizing myself with the use of cellular markers and cytometric technologies. I also became familiar with the oxygen-induced retinopathy model, which I optimised in the lab. I expanded my theoretical and experimental expertise in ocular research techniques and in vascular cell biology. This project resulted in three publications (Liyanage, Fantin, Villacampa, shared first authorship, et al. ATVB 2016, Villacampa et al. PLoS One 2017, Villacampa, Liyanage, shared first authorship, et al. Angiogenesis 2019). Moreover, I was awarded with my first scientific project, in collaboration with my supervisor, Prof Bainbridge. Finally, in 2017, I was awarded with a Juan de la Cierva postdoctoral fellowship to join Dr Graupera's lab, which

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

has worked as a catalyst in my career. I have dedicated my research to understand the biology of pericytes during developmental and pathological angiogenesis. This project has allowed me to go in depth in the characterization of pericytes in different status of maturity. A manuscript based on these results has been recently published in the prestigious journal Circulation (IF: 23.6), with me as a first co-author. Moreover, I am second author of another outstanding work related with the role of endothelial cells in systemic metabolism, which is under revision in the very prestigious journal Nature. I think my expertise on vascular biology in this disease/development context gives me a unique profile for developing my independent research from a fresh, innovative perspective.

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AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

Nombre: LASSALE , CAMILLE
Referencia: RYC2020-029599-I
Área Temática: **Biomedicina**
Correo Electrónico: camille.lassale@gmail.com

Título:

Diet, physical activity, circadian rhythms and cardiometabolic diseases: an exposome approach

Resumen de la Memoria:

I have a life sciences engineering degree specialized in human nutrition (AgroParisTech, Paris, 2009). I started my scientific career with an internship at the CSIRO Human Nutrition in Adelaide, Australia (2008) where I conducted a validation study of a food frequency questionnaire. I complemented my degree with an MSc Public Health, (University Paris-Sud, 2010). I was awarded a competitive PhD fellowship from the Région Ile-de-France and joined Prof Serge Hercberg s Nutritional Epidemiology team (University Sorbonne Paris Nord). My PhD work included both methodological aspects of web-based nutritional data collection, and the study of aetiological associations between diet quality and metabolic health. I obtained my PhD in public health with distinction in November 2013.
During my first postdoctoral post at the School of Public Health, Imperial College London (2013-2016), I worked in the FP7 funded (8m) EPIC-CVD project, a consortium involving 10 countries coordinated by the University of Cambridge. I worked on CVD risk prediction including lifestyle and novel biomarkers, and on the myth of metabolically healthy obesity . I was invited for a 2-month research stay at the Julius Center, Utrecht, Netherlands to gain training in prediction modelling. I then joined University College London (2016-2018), focusing on determinants of ageing-related morbidities using the English Longitudinal Study of Ageing (PI: Michael Marmot, NIH funded 12m) and part of international consortia (InterConnect, LIFEPATH).
I obtained a competitive Beatriu de Pinos fellowship (92k) to join the Cardiovascular Risk and Nutrition group at the Hospital del Mar Research Institute (IMIM) with Dr Montse Fitó in January 2019. Using data from the PREDIMED, PREDIMED-Plus and REGICOR studies, my work focuses on novel cardiovascular biomarkers, in particular of HDL functionality, in relation to diet and physical activity. Moreover, I supervised 2 MSc projects on chrononutrition, studying the effect of breakfast skipping/calorie intake on cardiometabolic profile. I take part in projects on childhood obesity (PASOS study, STOP project). I also recently applied my epidemiological skills to address biological and social determinants of severity of COVID-19 using data from the UK Biobank.
I aim to develop a research line to uncover novel molecular pathways (epigenetics, metabolomics) underlying the link between lifestyle (eating and physical activity patterns), cardiovascular risk factors (obesity, diabetes, dyslipidemia, hypertension), and cardiometabolic disease. Using an exposome approach, I will investigate how molecular pathways can be influenced by diet and physical activity, and in particular timings and patterns of meals and physical activity. This has the potential to identify new therapeutic targets and enhance cardiovascular precision medicine by improving individual risk estimation.

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Resumen del Currículum Vitae:

I am an epidemiologist with primary research interest in uncovering dietary and physical activity predictors of cardiometabolic disorders and related novel biomarkers. I have also expertise in nutritional assessment tools, and worked on a wide range of age-related morbidities including sensory impairment, loss of function, psychosocial and socioeconomic inequalities, and more recently COVID-19.
General quality indicators of scientific production
Fellowships and grants
- Individual Fellowship Beatriu de Pinós (2019-2021) 92,000
- Individual PhD scholarship from the Région Ile-de-France (Paris area, 2010-2013) 90,000
- Collaborator in EPIC-CVD (FP7) 8m , ELSA (NIH National Institute on Aging and ESRC UK) over 12m , LIFEPATH (H2020) 6m : total >26 million
- Investigator on 3 projects Spanish Health Research Fund (2019-2021) 241,000
- Principal Investigator on 2 projects funded by French trusts (2011-2014) 47,000

Scientific production
- 60 articles: 16 as first author, 7 as last author, 18 as corresponding author. 25 articles in first decile (D1), 48 in first quartile (Q1), 10 articles with IF>10, 25 with IF>5. 3 systematic reviews
- H-index: 27, i-10 index 39, total number of citations >2500 (January 2021, Google Scholar)
- 1 book chapter
- 3 technical reports
- Supervision: 2 PhD theses, 12 MSc theses of international students
- >15 presentations at international conferences

Evidence of esteem

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AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

- Associate Editor of Nutrition Journal
- Invited peer reviewer for >20 international journals (BMJ, European Heart J, Circulation,)
- 9 invited talks
- 3 travel grants, 4 prizes for best abstract
- Committee member of postdoc associations at Imperial College and UCL (2014-2018)
- Media coverage of 2 research articles, interviews on international TV, radio, journals
- Teaching >300 hours at BSc, MSc and PhD level

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AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

Nombre: BELVER MIGUEL, LAURA
Referencia: RYC2020-029400-I
Área Temática: **Biomedicina**
Correo Electrónico: lbelver@carrerasresearch.org

Título:

Genetics and molecular mechanisms in hematologic malignancies

Resumen de la Memoria:

My research career spans over 15 years in which I have been trained in top-tier institutions in Spain and the USA.
I did my PhD with Dr. Almudena Ramiro at the Spanish National Cancer Center (CNIO). My thesis project studied the role of microRNAs in B-cell differentiation and demonstrated their strict requirement for preventing the development of B-cell-driven autoimmunity. This work culminated with the publication of a highly-cited article (Belver et al, Immunity 2010) that was awarded the Biogen-Idec Award for Young Scientist. Concurrently, the defense of my Doctoral Thesis received the Outstanding Doctoral Thesis Award from the Autonomous University of Madrid.
During my training with Dr. Ramiro, I also authored a review on microRNA control of lymphoid differentiation and function (Belver et al, Curr. Opin. Immunol., 2011), and contributed to additional projects on the regulation and function of AID, the enzyme responsible for the diversification of the antibodies and a major driver of B-cell oncogenic transformation (de Yébenes et al et al, J. Exp. Med, 2008; Pérez-Durán et al, J. Exp. Med, 2012; Delgado et al, PLoS Genet., 2020).
In 2012, I joined the laboratory of Dr. Adolfo Ferrando at Columbia University as a postdoctoral researcher. My work mainly focused on the study of the genetic and molecular basis of T-cell acute lymphoblastic leukemia (T-ALL). I first participated in the identification of N-Me, a T-cell-specific MYC enhancer that was the missing link to understand the NOTCH1-MYC regulatory circuit in T-ALL (Herranz et al, Nat. Med. 2014). Following this discovery, I performed an extensive molecular and functional characterization of N-Me. My results revealed that Gata3 pioneering activity at N-Me is essential for T-ALL initiation and maintenance, formally demonstrating for the first time that aberrant chromatin accessibility at oncogenic enhancers can act as a mechanism of leukemic transformation (Belver et al, Cancer Discov. 2019). The relevance of this work has been broadly recognized in international conferences with the Acute Leukemia Forum Young Investigator Award, the American Society of Hematology Abstract Achievement Award, and the European School of Haematology Early Career International Award.
During my postdoctoral training I also authored a review and book chapter on T-ALL genetics (Belver and Ferrando, Nat. Rev. Cancer, 2016; Gianni et al, Leukemia & Lymphoma, 2020) and made important contributions in other studies on acute lymphoblastic leukemia (Schnell et al, Blood, 2015; Herranz et al, Nat. Med., 2015; Oshima et al, Nat. Cancer, 2020), chronic lymphocytic leukemia (Puente et al, Nature, 2015; Fabbri et al, PNAS, 2017), and angioimmunoblastic T-cell lymphoma (Cortés et al, Cancer Cell, 2018).
Since August 2020, I lead the Leukemia and Immuno-Oncology group at the Josep Carreras Leukemia Research Institute. Our main interest is the study of the molecular mechanisms driving juvenile myelomonocytic leukemia (JMML) and the development of therapies for this disease. Using functional genetics techniques and experimental therapeutics approaches, we aim to identify novel enhancer-driven oncogenic mechanisms involved in the pathogenesis of JMML and design new antileukemic compounds for the treatment of this disease. To develop this research program, our group has been recently awarded a grant from the FERO foundation.
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Resumen del Currículum Vitae:

Personal information
Name: Laura Belver Miguel
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ORCID: 0000-0001-7493-7072
Address: Carretera de Can Ruti, Camí de les Escoles, s/n, 08916 - Badalona, Barcelona
Email: lbelver@carrerasresearch.org
Phone: 935572800 Ext. 4232

Current position
Principal investigator - Leukemia and Immuno-Oncology Group at the Josep Carreras Leukemia Research Institute

Previous appointments

2017	2020	Associated Research Scientist. Institute for Cancer Genetics. Columbia University (New York, USA)
2012	2017	Postdoctoral Researcher. Institute for Cancer Genetics. Columbia University (New York, USA)
2011	2012	Postdoctoral Researcher. Spanish National Center for Cardiovascular Research - CNIC (Madrid, Spain)
2006	2011	PhD Student. Spanish Nacional Cancer Center - CNIO (Madrid, Spain)

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

Education
PhD degree in Molecular Biology - Autonomous University of Madrid (2011)
BSc degree in Biochemistry - Autonomous University of Madrid (2011)
BSc degree in Biology - Autonomous University of Madrid (2006)

Publications
Peer-reviewed articles
1. Delgado et al. PLoS Genet. 2020; 16, e1008960. (Position: 10/12)
2. Oshima et al. Nat Cancer. 2020; 1, 1113-1127. (Position: 9/30)
3. Belver et al. Cancer Discov. 2019; 9, 1774-1791. (Position: 1/21)
4. Cortés et al. Cancer Cell. 2018; 33, 259-273. (Position: 8/14)
5. Fabbri et al. PNAS. 2017; 114, E2911-E2919. (Position: 5/13)
6. Puente et al. Nature. 2015; 526, 519-524. (Position: 13/57)
7. Herranz et al. Nat Med. 2015; 21, 1182-1189. (Position: 5/17)
8. Schnell et al. Blood. 2015; 125: 2806-2814. (Position: 4/8)
9. Herranz et al. Nat Med. 2014; 20: 1130-1137. (Position: 5/13)
10. Pérez-Durán et al. J Exp Med. 2012; 209: 1379-1389. (Position: 2/6)
11. Belver et al. Immunity. 2010; 33, 713-722. (Position: 1/3)
12. de Yébenes et al. J Exp Med. 2008; 205, 2199-2206. (Position: 2/8)

Reviews
1. Belver and Ferrando. Nat Rev Cancer. 2016; 16, 494-507. (Position: 1/2)
2. Belver et al. Curr Opin Immunol. 2011; 23, 368-373. (Position: 1/3)

Editorials
1. Belver and Ferrando. Cancer Discov. 2015; 5, 234-236. (Position: 1/2)

Book chapters
1. Gianni et al. Leukemia & Lymphoma. Cold Spring Harbor Laboratory Press. 2020. ISBN 978-1-621821-42-7. (Position: 2/3)

Research projects as Principal Investigator
Current support
FERO Award in Translational Oncology Research.
Molecular pathways and targeted therapies in JMML
Start date: 2021. Duration: 2 years. Total amount: 80,000 .
Past support
Lymphoma Research Foundation Postdoctoral Fellowship Grant
The role of NOTCH1 in Chronic Lymphocytic Leukemia
Start date: 2014. Duration: 2 years. Total amount: $100,000.

Honors and awards
ESH Early Career International Award (European School of Haematology, 2019)
Acute Leukemia Forum Young Investigator Award (Hemedicus, 2019)
ASH Abstract Achievement Award (American Society of Hematology, 2018)
LRF Postdoctoral Fellowship (Lymphoma Research Foundation, 2014 2016)
Biogen-Idec Award for Young Investigators (Biogen-Idec Foundation, 2012)
Outstanding Doctoral Thesis Award (Autonomous University of Madrid, 2011)

Oral presentations at international conferences
ESH 5th International Conference: New Concepts in Lymphoid Malignancies. Estoril, Portugal. 2019
Josep Carreras Institute Opening Symposium. Badalona, Barcelona, Spain. 2019
Acute Leukemia Forum. Newport Beach, California, USA. 2019
60th American Society of Hematology Annual Meeting. San Diego, California, USA.

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Turno de acceso general

Nombre: MASSANELLA LUNA, MARTA
Referencia: RYC2020-028934-I
Área Temática: **Biomedicina**
Correo Electrónico: mmassanella@irsicaixa.es

Título:

TRANSLATIONAL RESEARCH IN IMMUNOLOGY AND AGEING: Infectious diseases in the elderly population

Resumen de la Memoria:

After graduating in Biology (UPF, 2001-2006), I started my scientific career in the HIV field. I pursued a master degree in Biotechnology (UPF, 2006-2007), performing my master thesis at AIDS Research Institute-IrsiCaixa (Badalona, Spain). In 2007, I accepted to continue at IrsiCaixa as a PhD candidate. My thesis (Biomedicine, UPF, 2007-2012) focused on HIV immunopathogenesis, where I demonstrated that CD4 and CD8 T-cell activation are reflecting different pathogenic aspects in chronic HIV-treated subjects. In 2009, during my PhD training, I was awarded with the competitive pre-doctoral FI fellowship from AGAUR and the travel award fellowship from the same agency in 2011. During this period, I also pursued a HIV Master's Degree in Pathogenesis and Treatment of AIDS (UAB, 2011-2012).

In 2012, I started a post-doctoral training at the University of California San Diego (CFAR-UCSD, USA), where I was awarded with the distinguished Long-term post-doctoral fellowship from the EMBO and the Beatriu de Pinós (AGAUR, 2014-2016). My work focused on the characterization of the HIV reservoir, the mechanisms of HIV persistence and developing improved assays to quantify the size of the HIV reservoir. During this time, I was awarded with the developmental grant from the TMARC as principal investigator to investigate the effect of methamphetamine use on immunologic and virologic markers during suppressive ART. In 2015, I joined the immunopathology department from the Center of Research of CHUM (Canada, 2015-2019), as a postdoctoral fellow to continue my studies on HIV persistence and eradication. This same year, I was awarded with a research grant from amfAR to investigated the size and maintenance of the latent HIV reservoir in T cells. During my postdoctoral training, I had the opportunity to participate in international collaborative projects to evaluate how the timing of ART initiation impacts the size of the HIV reservoir in the adult and pediatric population.

My research career and especially my post-doctoral trainings allowed me to accumulate invaluable experience, to work as a part of team, but also to be a project leader and get new responsibilities in the international collaborations. I have clearly shown independent thinking, project management skills and leadership qualities all along my research career. All these essential skills allowed me to become an independent researcher, a role that I assumed in February 2020, when I returned to IrsiCaixa as a Principal Investigator. My primary research interest is to study ageing in the context of infectious diseases. First, I am investigating the accentuated immunoageing of individuals infected with HIV treated with antiretroviral therapy, and to evaluate how age impacts on HIV persistence. Also, I am studying the impact of imunosenescence and immunoageing in immune responses in elders against SARS-CoV-2 infection or vaccination. In addition to multiple presentations in national and international meetings, my scientific production includes 59 peer-reviewed articles (56 published in Q1 journals, 25 as first-author and 3 as corresponding-author, 1 manuscript currently under review (1 first and corresponding author), 5 additional articles currently in preparation, 6 review articles (4 as first author). With an h-index of 24, my research work has been cited over 2048 times to date.

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Resumen del Currículum Vitae:

I am a biologist (UPF, 2001-2006) with more than 13 years of academic research experience in the field of immunology and virology. I pursued two master s degree progams, on Biotechnology (UPF, 2006-2007) and HIV Master's Degree in Pathogenesis and Treatment of AIDS (UAB, 2011-2012). I defended my PhD in Biomedicine in 2012.

I have an exceptional productivity, ability to communicate in collaborative and multidisciplinary settings. Strong educational background in molecular biology, cellular biology, immunology and biostatistics. Involved in large observational studies, including cross-sectional and prospective studies, as well as interventional clinical trials. Author of numerous papers in reputable scientific journals. Multiple contributions in national and international research meetings.

General quality indicators (last update Jan 2021)
Number of articles in peer-reviewed journals: 59 (1 under review and 5 in preparation) and 6 review articles
Articles in Q1: 37 (84%)
Number of 1st author articles: 25 (23 in Q1)
Number of articles included within the first 3 authors: 37 (30 in Q1)
Number of corresponding author articles: 3 (+2 under review or in preparation)
Review papers:6
Total number of citations: 248 (last update January 18, 2021)
H-index: 24

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CONVOCATORIA 2020

Turno de acceso general

Participation in Competitive Research projects: 2 Project Principal Investigator, 15 as Co-investigator. I have also submitted 4 research grant applications (under revision).

Stays Abroad: As a Predoctoral student, 6 months at Center for AIDS Research- University of California San Diego. As a Post-doc, 3 years at Center for AIDS Research- University of California San Diego and 4.5 years at Center of Center of Research of CHUM (CR-CHUM, Montréal, Canada),

Communications in National and International Conferences: 5 oral communications and 21 poster presentations.

Trainees: two master students (2015-2019), a technician (2017-2019) and 4 summer undergraduate students (2015-2019).

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CONVOCATORIA 2020

Turno de acceso general

Nombre: SANCHEZ ALVAREZ, MIGUEL
Referencia: RYC2020-029690-I
Área Temática: **Biomedicina**
Correo Electrónico: msancheza@cnic.es

Título:

Cell organelles as signaling hubs in disease: novel roles in mechanoadaption and innate immunity

Resumen de la Memoria:

From the start of my research career, I have been fascinated by how cell dysfunction underpins human disease. My PhD research, carried out at Dr. Suñé s lab (CNB-CSIC, Madrid) in collaboration with Prof. García-Blanco (Duke University, USA), described novel mechanisms that couple and coordinate eukaryotic pre-mRNA transcription and splicing (Sánchez-Álvarez et al. Mol Cell Biol 2006; Sánchez-Álvarez et al. J Biol Chem 2010; Sánchez-Hernández et al. J Biol Chem 2012). I developed a keen interest on studying the coordination among different cellular functions and its impact on cell behavior, as these systems-level relationships are key to most relevant diseases. On early 2010, I joined Dr. Chris Bakal s Dynamical Cell Systems laboratory at the Institute of Cancer Research (London, UK). My aim was to investigate why essential stress signaling pathways (the Unfolded Protein Response, UPR) have such a significant impact on several complex pathologies, including different types of cancer, using omics technologies and systems biology. My research suggested novel genetic network models describing cell adaptation to oxidative stress (Arias, Sánchez-Álvarez et al. Mol Biosys 2012, co-first author), and explaining how cell growth and proliferation are necessarily coordinated with lipid metabolism to ensure organelle homeostasis (Sánchez-Álvarez et al. PLoS ONE 2014; Sánchez-Álvarez et al. Open Biol 2015, co-corresponding author). We also discovered that ER-mitochondria contacts integrate the shut-down dynamics of the UPR with growth signaling (Sánchez-Álvarez et al. Sci Rep 2017), and discovered new links between the regulation of ER architecture and the dynamics of the microtubule cytoskeleton (Sánchez-Álvarez et al; Sci Adv under review; bioRxiv DOI: 10.1101/2021.01.19.426991; co-corresponding author).
In late 2014, I joined professor del Pozo s lab at CNIC (Madrid, Spain) to explore the links between organelle homeostasis, cell adaptation to mechanical forces and disease. I contributed my experience in functional genomics and proteomics to gain insight into fibroblast mechanotransduction (Moreno et al. Cell Rep 2018), and to describe the cholesterol-binding protein CAV1 as an integral component of ER--mitochondria contact sites (Sala-Vila et al. Sci Rep 2016). We also discovered that CAV1-dependent organelle homeostasis determines the strength of angiogenic signaling by stromal cells, and tumor progression therein (Díez, Sánchez-Álvarez et al., under patent embargo). As independent researcher, I studied a novel role for lipid droplets (LDs) as hubs integrating innate immunity and metabolism (Bosch, Sánchez-Álvarez et al Science 2020, co-first author), and explore novel links between ECM secretion and immunity signaling (Sánchez-Álvarez et al in preparation).
My long-term aim is to better understand how the integration of different pathways by specific cell organelles regulates the interaction of the cell with its environment, and how these principles contribute to disease. Specifically, I aim to (1) study how lipid metabolism and the UPR feed from and into cell mechanoadaptation, and how these links contribute to tissue stiffening and its physiopathological effects; (2) explore the LD unannotated proteome for novel natural antimicrobial activities; and (3) characterize new emerging links between the cell secretion system and innate immunity.
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Resumen del Currículum Vitae:

I obtained my PhD degree in 2009 (Universidad Autónoma de Madrid; supervisor Carles Suñé, CNB-CSIC, Madrid, Spain) on the study of TCERG1, a novel regulator physically and functionally coupling the pre-mRNA transcription and splicing machineries, with the support of a FPU fellowship. We collaborated with Prof. Garcia-Blanco (Duke University Medical Center, USA), and I visited his laboratory for 3 months. I co-authored 3 original research articles (2 as first author, 1 third author (Mol Cell Biol 2006, J Biol Chem 2010&2012)); 2 invited review articles (Gene Res Int 2011; Gene 2012) and a patent application (P201131907).

I became fascinated by how the communication and coordination between different cell functions underlie emerging properties, which are essential to understand complex diseases. I decided to pursue postdoctoral training in systems biology to investigate how the UPR stress signaling network crosstalks with other cell functions. In early 2010, I joined the laboratory of Prof. Chris Bakal at the Institute of Cancer Research (London, UK) and developed research lines contributing novel understanding on (i) how growth signaling, cell cycle progression and lipid metabolism are tightly coordinated to ensure ER homeostasis and appropriate regulation; and (ii) how ER architecture is controlled. This research led to 5 publications (all of which I signed as first author, 3 as corresponding author (Mol Biosys 2012, PLoS ONE 2014, Open Biol 2015, Sci Rep 2017, Sci Adv under revision)); and was recognized by two awards in scientific meetings (ICR AC 2014; SRUK Symp 2014) and an invited News&Views comment (Nat Cell Bio 2018). I mentored 3 MSc students, and participated of the endorsing partnership the laboratory had with Perkin Elmer on HCS applications. I was appointed Honorary Visiting Scientist of the ICR (2014-2017).

I joined the laboratory of Prof. Miguel Ángel del Pozo (CNIC, Madrid) in late 2014, sponsored by a MSCA-COFUND fellowship, to explore the

AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2020

Turno de acceso general

links between organelle homeostasis, tumor biology and cell adaptation to mechanical forces. My research contributed to the further understanding of the mechanisms by which caveolin-1 (CAV1) regulates cell metabolism and organelle homeostasis, cell mechanoadaption and tumor progression. I co-authored 10 research and review articles (Cancer Met Rev 2020; Cell Rep 2018; Sci Rep 2018), and a patent application (19382456.2-1111 (European Patent Office)); and co-mentored 2 MSc students and 1 PhD candidate. Our research led to a Research Collaboration Agreement with the pharma company Dompé s.p.a.

I partnered as independent researcher with Prof. Albert Pol (IDIBAPS), on the characterization of lipid droplets as novel hubs integrating antimicrobial defense and metabolic rewiring; this collaboration led to a publication (Science, 2020) of which I am co-first author. I have served as Guest Editor (Oxid Med Cell Longev 2018-2020), as ad hoc reviewer to international funding bodies and journals (ANR, WHRI Academy; Curr Biol, J Cell Biol, RSC journals, PLoS, MDPI); and member of scientific committees (CNIC Cellomics WG, 2018-present).

As of January 1st 2021 I am a staff scientist at CNIC. The support from the RyC scheme will allow me to consolidate my research program, on how organelle homeostasis regulates the interaction of the cell with its environment and innate immunity.

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Título:

Understanding phenotypic variation in the mitochondrial genome in health and disease

Resumen de la Memoria:

My particular expertise is in mitochondria, the parts of the cell that generate energy from nutrients. My research aims to understand the role of the small, understudied, but critically important, circles of DNA in mitochondria (mtDNA) in metabolism and cell signaling. During my career, I have had a multidisciplinary training that runs from genetics (clinical and population) and bioenergetics to the application of multiomics approaches in cell biology and population cohorts. My research to date can be recapped in three main topics:
1. Phenotypical characterisation of mitochondrial population variants: Building the biggest (30 lines) collection of transmitochondrial cybrid cell lines in the world, representing 90% of the European mtDNA natural variation and characterization of the phenotypical effects driven by the mitochondrial population variants defining the haplogroups H, Uk and J (Gomez-Duran, HMG, D1, Pello, HMG, 2009,D1, Gomez-Duran, BBA,2012, Q1). Interaction of mtDNA variants with drugs (Gomez-Duran, DDT, 2011, D1; Pacheu-Grau, 2011, HMG, D1 FI:8,3).
2. mtDNA on gene expression. Description of interferon gamma mediated transcriptional mitochondrial retrograde response and innate immune function (Gomez-Duran*, 2017, JACI, D1, IF 12). Furthermore, I have described how TLR4 activation with LPS reversibly induces mitochondrial biogenesis, antioxidant defences and mitophagy to maintain cellular viability and respiration (Gomez-Duran*, 2018, FI 6.5, Q1).
3. Multi-omics approach to study mtDNA variants. I have recently been part of three of the biggest studies on mtDNA variants and metabolic regulation ever carried. Our recent data has shown that the mtDNA population variants induce different mito-nuclear responses involving key cellular pathways, such as mTORC1 and HIF1a (Gomez-Duran, submitted), alter blood cell counts and markers of renal function, such as aspartate transaminase and alanine transaminase (Yonova-Doing*, Calabrese*, Gomez-Duran, Accepted, Nature Genetics, 2020) and regulate the levels of key metabolites that modulates both mitochondrial and cytosolic proteins synthesis and proteostasis (EIF2A-ATF4) and modifies the disease risk of several common cardiovascular disorders (Gomez-Duran*, second round Nature Medicine).
Furthermore, using a similar multi-omic approach, we have recently evaluated the efficiency of bezafibrate in a Clinical Trial on MELAS patients and concluded that although there was a slight improvement in the mitochondrial function after the treatment, the worsening in the metabolomic signature, raises concerns about long-term sequelae (Gomez-Duran*, EMM, D1, IF: 10,293).
My late findings have provided a new mechanism linking mitochondrial phenotypic variation with common and rare diseases that does not directly involve oxidative phosphorylation but vital cell proteostatic pathways (i.e. mTORC1) through metabolic regulation, with impact at several levels. This data has generated many new questions. Therefore, my lab s overarching aim is to understand the role of mitochondrial phenotypic variation in metabolism and cell signaling in health and disease. Our long-term objective is to build and perform a full genotype-phenotype of the mitochondrial variability as well as to functionally characterize the genes and pathways in involved in these biological processes and find biomarkers
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Resumen del Currículum Vitae:

I am pharmacist specialized on mitochondrial functional genomics. I carried my PhD at the Mitochondrial Biogenesis and Pathology group in the Department of Biochemistry, Molecular and Cell Biology of the University of Zaragoza, led by Prof. Julio Montoya Villarroya, one of the Spanish pioneers in the field of OXPHOS studies and an authority on mitochondrial genetics under the supervision of Dr. Eduardo Ruiz-Pesini. Then, I stayed as a postdoc more than 7.7 years in Prof. Patrick Chinnery laboratory, a world authority in the study of mtDNA genetic variants and mitochondrial genomics, first at the University of Newcastle (UK) and then at Mitochondrial Biology Unit at the University of Cambridge. In February 2020, I returned to Spain as a Talento Fellow (Comunidad de Madrid) to start my own laboratory (MitoPhenomics).

My particular expertise is in mitochondria, the parts of the cell that generate energy from nutrients. My research aims to understand the role of the small, understudied, but critically important, circles of DNA in mitochondria (mtDNA) in metabolism and cell signaling in health and disease. During my career, I have had a multidisciplinary training that runs from genetics (clinical and population) and bioenergetics to the application of multiomics approaches in cell biology and population cohorts.

I have participated in 13 projects (4 as PI). I am currently leading a group of 2 people (soon 3) and I have been awarded with more than 450K euros since I established my independent group. I have published more than 34 papers, (D1: 15, Q1: 9, >Q1: 8) and 2 book chapters; 7

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CONVOCATORIA 2020

Turno de acceso general

1st author (4 D1, 2 Q1, 1 book chapter), 12 as 2nd author and 1 last author. My h-index is 17 (1143 citations). I have presented more than 60 contributions to international conferences (>50% as first author). I am currently an Associate Editor of 2 special issues on Mitochondrial Toxicity and another on Mitochondrial Dysfunction and Neurodegeneration. I have been reviewer of Blood, Stem Cells, Critical Care Medicine, Critical Care, Journal of Molecular Biology, Mitochondrion, Molecular Ecology and Evolution, Frontiers in Genetics, etc.

I am currently supervising 2 PhD students (1 at MRC-MBU (UK) and 1 at Mitophenomics lab as well as 1 TFM student. I have been member of examiner boards (see list), mentoring programs (U. of Cambridge) and I am now part of the ASEICA mentoring program as well as starting to establish a mentoring program at CIB-CSIC. I am also part of the teaching team of the MRes "Master in Molecular and Cellular Integrative Biology" imparted at the CIB-CSIC.

I have engaged into public dissemination and outreach activities at the MRC-MBU, including events such as the Science Week, 11F and others. I also I hold my own twitter @auroradevea with more than 1000 followers to disseminate mitochondrial research. Furthermore, I am committed with the equality of gender in science and research Thus, I have become a board member of the newly created Comisión Mujer y Ciencia from the CIB- CSIC and co-founded @mitowomen.