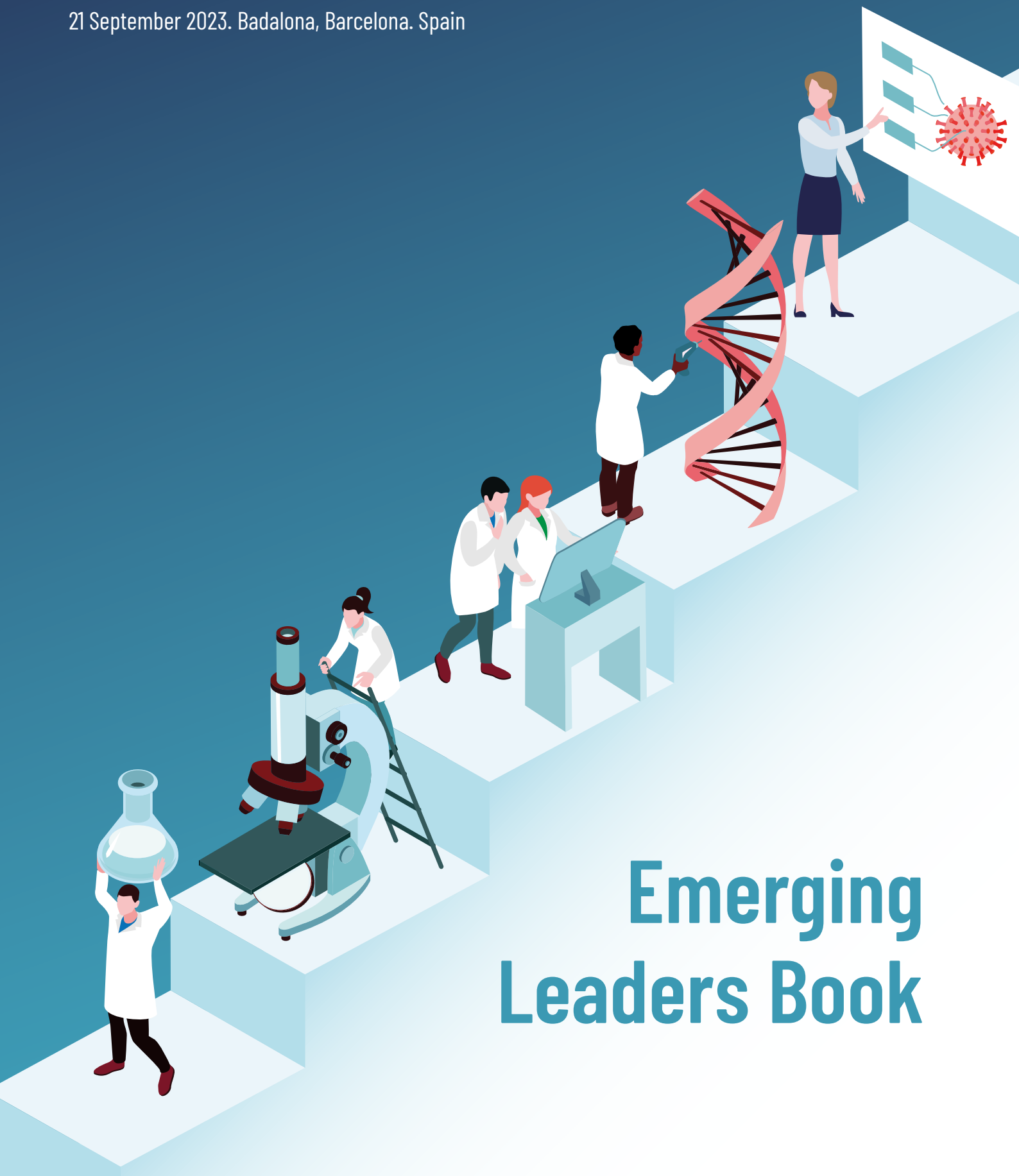
The Future Now:
Emerging Leaders in Biomedicine

Josep Carreras Leukaemia Research Institute (IJC) – Auditorium

21 September 2023. Badalona, Barcelona. Spain



Emerging Leaders Book

The symposium "The Future Now: Emerging Leaders in Biomedicine" (September 21, Josep Carreras Institute) was conceived with the aim of creating a local platform for networking, sharing cutting-edge research and fostering scientific collaborations between senior postdoctoral researchers and junior group leaders in Barcelona. This initiative is promoted by the Josep Carreras Leukaemia Research Institute (IJC-CERCA), the Vall d'Hebrón Institute of Oncology (VHIO-CERCA), the Institute for Bioengineering of Catalonia (IBEC-CERCA), the Institute of Molecular Biology of Barcelona (IBMB-CSIC), the Centre for Genomic Regulation (CRG-CERCA) and the University Pompeu Fabra, Department of Medicine and Life Science (MELIS).

By coming together, we can shape the future of biomedicine, establish enduring connections, and contribute to the advancement of science in our local community and beyond.

This Emerging Leaders Book gathers short presentations on the research carried out by some of the participants, with the aim of giving them visibility and fostering scientific collaborations.

Abante, Jordi

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Genomics, Machine learning, Statistics and Probability

In 2014 I received my BS in Industrial Engineering (power electronics and signals) from the Universitat Politècnica de Catalunya in Barcelona. After graduating, I went on to obtain an MS from the Electrical & Computer Engineering department at Texas A&M University. There, I joined the Center for Bioinformatics and Genomic Systems Engineering, where I was involved in several computational genomics research projects (Datta lab). In 2015, I was awarded the "la Caixa" fellowship to pursue research in computational genomics during my Ph.D. as a member of the Goutsias lab, developing computational methods to study epigenetic signatures in close collaboration with the Feinberg lab of the Johns Hopkins University School of Medicine. In addition to my research and Ph.D. coursework, I earned an MS focused on statistical learning from the Applied Mathematics & Statistics department at Johns Hopkins University in 2018. After successfully defending my dissertation entitled "Statistical Signal Processing Methods for Epigenetic Landscape Analysis" in May 2021, I joined the Biomedical Data Science Department at Stanford University (Salzman & Ioannidis lab) as a Postdoctoral Research Fellow being awarded the the Stanford Center for Computational, Evolutionary and Human Genomics postdoctoral fellowship. In January 2023, I became a Postdoctoral Researcher in the Departments of Biomedical Sciences (Canals lab) and Mathematics and Computer Science at Universitat de Barcelona (Radeva lab) where I develop methods for multimodal single-cell data to study brain development and developmental alterations in Huntington's disease. Currently, my main research interest lies at the intersection of statistics, machine learning and genomics.

Angulo-Urarte, Ana

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PIK3CA mutations, Clonal dynamics, Congenital rare disorders

My research aim is to contribute to the development of a comprehensive understanding of when (timing), where (cell linage), who (variant) and how (triggered mechanism) PIK3CA activating mutations contribute to the onset and progression of PIK3CA-related diseases with a special interest in PIK3CA-related congenital overgrowth disorders (PROS).

Currently, I am funded by the Marie Skłodowska-Curie Individual Fellowship at the Josep Carreras Institute (IJC, Barcelona). I have a strong background in vascular biology and PI3K signaling and I am highly experienced with cutting-edge microscopy methods and with genetically modified mouse models of high complexity.

In 2011, I was awarded with a fellowship from "la Caixa" Foundation to do a MSc in Biomedical Research in Barcelona. Then I obtained my PhD from the University of Barcelona while studying the function of PI3Kalpha in vascular morphogenesis. During my PhD, I also visited the laboratory of the Prof. Markus Affolter and Dr. Heinz Georg Belting with an EMBO Short-Term Fellowship to complement my research using transgenic zebrafish embryos that allow in vivo dynamic imaging of vessel formation. During my postdoctoral work at the Amsterdam Medical Center I studied how force-dependent membrane deformation at cell-cell junctions contribute to the coordinated physiological process of sprouting angiogenesis. In 2020, I started as senior postdoc in the group of Dr. Mariona Graupera to lead my independent research line in PIK3CA-related congenital disorders expanding the scope beyond PIK3CA-related vascular malformations to explore other understudied niches. In 2021, I got my own Marie Skłodowska-Curie Individual Fellowship and founding from the CLOVES patient's foundation to follow my independent line of research.

Link to video presentation

Barniol-Xicota, Marta

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Chemical Biology, Enzymes, Biological Membranes

In our lab we are interested on dissecting the roles of relevant enzymes with the ultimate goal to explore their potential in therapeutics. We investigate the role of lipid metabolism in breast cancer progression and malignancy by studying metabolic enzymes and lipid protein interactions to explore novel therapeutic modalities. In parallel, we develop synergistic chemical biology methods and chemistry-based technologies, including: lipid nanodiscs, chemical phage display, chemical probes and inhibitors. For this we use an interdisciplinary approach that blends synthetic and medicinal chemistry, molecular biology, peptide chemistry, proteomics and cell biology.

Batalha, Iris

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Nanomedicine, Drug Delivery, Infectious Diseases

Iris L. Batalha is currently a Junior Leader Research Fellow at the Institute for Bioengineering of Catalonia (IBEC) in Barcelona, a Panel Tutor in Nanotherapeutics at the University of Cambridge Institute of Continuing Education, a freelance Senior Innovation Consultant at Inspiralia (Spain and USA), a Co-founder, Director and Editor-in-Chief of the non-profit organisation Women Ahead of Their Time (WATT), and a Research Associate at Peterhouse College. From 2017 to 2020, she was a joint Research Associate at the Department of Engineering Nanoscience Centre and Department of Medicine Molecular Immunity Unit, University of Cambridge. From 2014 to 2017, she worked at the Department of Chemical Engineering and Biotechnology, University of Cambridge, and the biopharmaceutical company MedImmune/Astrazeneca, followed by a brief experience as a healthcare/pharmaceutical consultant. Her research interests and expertise lie in medical and pharmaceutical research and development, particularly in the fields of nanobiotechnology, bio-inspired materials, downstream processing, formulation and drug delivery.

Bayona-Feliu, Aleix

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Genome instability, Cancer, Epigenetics

My research interest is to understand the contribution of epigentics to prevent genome instability, a hallmark of cancer cells. During my scientific career, I have investigated the role of linker histone H1 on the maintenance of genome integrity (Bayona-Feliu et al. Nat Communications 2017; Bayona-Feliu et al. Bioch. et Biophys. Acta – Gene Reg. Mech. 2016), the contribution of histone acetylation, DDX39B/UAP56 DNA:RNA helicase and TDP-43 RNA binding protein to R-loop homeostasis and R-loop-dependent DNA damage (Salas-Armenteros et al. EMBO J. 2017; Perez-Calero et al Genes&Dev 2020; Giannini, M. and Bayona-Feliu, A. et al 2020 PloS Genetics) and, most importantly, deciphered a master contribution of the SWI/SNF complex, which is among the most frequently altered factors in cancer, to genome stability (Bayona-Feliu et al Nature Genetics 2021). This discovery was highly present in the media due to its high therapeutic potential (Bayona-Feliu et al. Mol&Cell Oncology 2021). Indeed, chromatin is emerging as a key player preventing R-loop-dependent DNA damage and genome instability (Bayona-Feliu et al Biochem Soc Trans 2021). Two additional studies are also pending publication, a genome-wide approach deciphering the epigenetic factors that help mediate at transcription-replication conflicts and cancer mutagenesis associated to these sites, and a second one resulting from an external collaboration in which I unveiled a major relevance of homologous recombination mutational signatures to centrosomal component CEP170 deficiencies in cancer (Rodríguez-Real, G. et al. 2023, accepted, EMBO Reports). Currently, I am performing large-scale combinatorial CRISPR/Cas-based screenings in chronic myeloid leukemia (CML), lung adenocarcinoma and ovarian carcinoma cell lines to decipher unknown genetic interactions with high therapeutic potential that could be further explored in the clinic. At this stage of my scientific career, I am integrating all my previous knowledge in the fields of epigenetics and genome instability, and applying them to the field of cancer biomedicine to help develop new therapies to treat human malignancies.

Bernatowicz, Kinga

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Imaging, Cancer, Biostatistics

I hold a PhD in Physics from the Swiss Eidgenössische Technische Hochschule (ETH) Zurich and possess extensive experience as a medical physicist at Saint Luc Hospital in Brussels. During my early academic career, I employed computational simulations and computer vision techniques for experimental predictions and decision-making in the development of innovative particle therapy treatments and imaging methods. These advancements enabled the treatment of tumors affected by respiratory motion and daily anatomical changes, highlighting my expertise in medical imaging, oncology, and data science.

Since joining the Vall d'Hebron Institute of Oncology in Barcelona as a postdoctoral researcher in November 2019, my research focus has centered on the investigation of tumor heterogeneity using quantitative medical imaging. In recognition of my contributions, I was honored with a Beatriu de Pinós Fellowship in 2020, which is co-funded by the EU Horizon 2020 program and the Generalitat de Catalunya. This prestigious award supports my efforts to integrate imaging and multi-omics data into predictive models for cancer immunotherapy.

I am deeply passionate about exploring the most cutting-edge computational solutions and their potential applications in addressing complex biomedical challenges.

Boloix Amenós, Ariadna

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Imaging, Cancer, Biostatistics

I am a postdoctoral researcher with a strong academic background in Pharmacy, having graduated from the University of Barcelona. Following my undergraduate studies, I pursued a master's degree in Biomedicine. In 2015, I embarked on a collaborative and enriching journey for my PhD, working jointly with the Childhood Cancer and Blood Disorders group at VHIR and the Nanomol group at ICMAB-CSIC. My doctoral research was centered on the development of non-liposomal lipid nanocarriers for RNA delivery. In 2019, I successfully defended my thesis and made the decision to continue my research journey, dedicated to advancing the evaluation of treatment efficacy from in vitro to in vivo models, particularly in the context of pediatric solid tumors at VHIR. My primary scientific passion revolves around advancing the field of RNA-based therapies for the treatment of pediatric solid tumors. Specifically, I specialize in the development and practical implementation of lipidic nanoparticles conjugated with microRNAs, with a focus on applications in treating neuroblastoma and other disorders that can benefit from RNA-based interventions. Notably, the results of my research have been patented under WO2020229469 and part of them were published in the scientific journal Small (Boloix A et al., 2022). My work has garnered significant attention from both national and international research groups, leading to valuable collaborations aimed at pushing the boundaries of this field. Furthermore, I am actively engaged in entrepreneurship and innovation programs, dedicated to elevating the technological readiness (TRL) of microRNA-based nanomedicine, paving the way for future clinical applications.

Brillet, Francois

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Skin microbiome

I am researcher in skin (micro)biology, I have experience managing academic-industrial collaborations and proven expertise in designing and executing research programs for the development of skin care actives (live commensal skin probiotics). I started as industrial PhD and pursued my career by initiating a joint-lab between L'Oreal, Nanyang Technological University and National University of Singapore at SCELSE, Singapore. After, I moved back to Europe and worked at the start-up Sbiomedic - recently acquired by Beiersdorf AG. I had the opportunity there to co-develop research lines with the Translational Synthetic Biology Laboratory, Department of Experimental and Health Sciences, Pompeu Fabra University. This productive collaboration lead to the successful acquisition of the start-up, scientific papers and patents. I have currently joined their lab as principal investigator for Sbiomedic/Beiersdorf and as visiting postdoctoral researcher at UPF to continue working closely with the scientists in Barcelona.

Castillo, Sandra

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Vascular biology, Rare diseases, Tumor angiogenesis

I obtained my Biology degree at the Universidad de Navarra followed by a PhD. in cancer genetics from Universitat de Barcelona where I identified new oncogenes in cancer development at the laboratory of Dr. Montse Sanchez-Cespedes at the CNIO (Madrid) and IDIBELL (Barcelona). In 2012 I joined the laboratory of Prof. Bart Vanhaesebroeck in London (UCL Cancer Institute) to study oncogenic PI3K signalling in cancer and rare syndromes. There, I discovered new genetic events in congenital vascular disorders and provided preclinical models and proof of concept for repurposing of oncology drugs for the treatment of these rare diseases. Back in Barcelona, in 2017 I joined the laboratory of Dr. Mariona Graupera (IDIBELL) with a Marie Curie Fellowship. Now, I am a 'la Caixa' Junior Leader Fellow in the Graupera lab at the Josep Carreras Leukemia Institute (IJC, Barcelona). I am developing research lines aimed at the genetic deciphering and molecular understanding of rare genetic syndromes caused by dysfunctional vasculature; including vascular malformations and tumours, and complex syndromes. Also, I am interested in the endothelial-intrinsic genetic and molecular traits of tumour vasculature and its impact on cancer progression. Our work is highly translational and I closely collaborate with clinicians managing these patients. This allow me to better understand these pathologies and have access to patients' samples for my studies. Upon this knowledge, we develop new preclinical mouse models to further study the biology of the disorders and test new therapies.

Cornes, Eric

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RNA biology, Gene regulation, C.elegans

I am fascinated by the regulatory potential of non-coding RNA molecules. First, as a PhD student at the Universitat Pompeu Fabra (Barcelona) and after, as a postdoc at the Institut Pasteur (Paris), I have taken advantage of the nematode C.elegans to study how these molecules contribute to animal development, stress adaptation and epigenetic inheritance. Interestingly, and independent on the mechanism studied, a remarkably recurrent observation from my PhD and Postdoc works is the tendency of non-coding RNAs and other regulatory factors to self-organize and locally concentrate at the subcellular scale, forming membrane-less organelles with emergent liquid-like properties, also known as biomolecular condensates. The formation of RNA condensates is arising as a widespread cellular phenomenon associated with a plethora of cellular functions and human diseases. However, the limited number of tools available to characterize and perturbate their composition and properties in a physiological context, limits our capacity to evaluate whether their formation is biologically relevant Now as an ATIP-Avenir Junior Group Leader at the CNRS/Inserm Unit ARNA (Nucleic Acids: Natural and Artificial Regulation) in Bordeaux (France), I will explore whether and how the formation of conserved biomolecular condensates in C. elegans contributes to the spatiotemporal regulation of gene expression programs during cell differentiation and generate models of human disease. I am looking forward to meet the community of young researchers in Barcelona to share scientific interests and personal experiences at this moment of our career.

Link to video presentation

Dalmasso, Giovanni

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Developmental Biology, Mathematical Modeling, Vascular Morphogenesis

I am Giovani Dalmasso, and my scientific journey has been a captivating exploration of both computation and experimentation within the realm of developmental biology. My academic foundation began with a robust background in Mathematics, nurturing my analytical skills and problem-solving acumen. It evolved during my transformative Ph.D. at the University of Heidelberg and the German Cancer Research Center (DKFZ), where I delved into computational models that illuminated complex biological dynamics. Today, I hold the position of MdM-CRM Senior Postdoctoral Fellow at the Centre de Recerca Matemàtica (CRM) in Bellaterra, Barcelona (Spain). Concurrently, I serve as a Visiting Postdoctoral Researcher at the European Molecular Biology Laboratory (EMBL) in Barcelona. These dynamic research environments empower me with advanced resources and foster collaborative work at the intersection of mathematical modelling and developmental biology. My scientific interests lie at the nexus of computation and biology, with a specific focus on unraveling the intricate processes governing three-dimensional tissue and organ development—a field with profound implications for regenerative medicine and tissue engineering. A central puzzle in my research is the formation of complex blood vessel networks during organogenesis, particularly as embryos surpass a size of approximately 2mm, necessitating an active vascular system for oxygen and nutrient distribution. In summary, my research journey encapsulates a blend of mathematics, computation, biology, and hands-on experimentation, all aimed at unraveling the intricate processes shaping 3D vasculature in developing organs, with a particular emphasis on the limb. My work not only advances our understanding of developmental biology but also holds promise for transformative applications in regenerative medicine and tissue engineering.

Davalos, Verónica

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Metastasis, Epigenetics, Cell plasticity

I'm devoted to leverage my knowledge and expertise in cancer epigenetics, tumor progression and metastasis to provide novel healthcare solutions for cancer treatment. After a Master degree (2003, Spanish National Cancer Research Center CNIO, Madrid-Spain) and a PhD in Biochemistry and Molecular Biology (2008, Vall d'Hebron Research Institute VHIR, Barcelona-Spain), I developed my scientific career at the Cancer Epigenetic Group headed by Dr. Manel Esteller, a well-recognized pioneer in the field, studying how epigenetic alterations contribute to the acquisition of hallmark tumor capabilities by regulating gene expression programs that promote tumorigenesis. In 2013, I joined to NYU Langone Medical Center (NY, USA) to study the crosstalk between melanocyte differentiation and melanoma metastasis in the framework of a Marie Curie International Outgoing Fellowship. Back to Spain in 2017 as Spanish Association against Cancer (AECC) Researcher at the Josep Carreras Leukaemia Research Institute (IJC, Barcelona-Spain), I worked on identifying epigenetic biomarkers to predict response to immunotherapy in cancer. Now, as Associate Research Scientist at IJC, I'm leading my own line of research in cancer of unknown primary (CUP), a heterogeneous group of metastatic tumors that lack an identifiable primary tumor. I'm interested on dissecting the cellular heterogeneity of CUPs by using cutting-edge technologies including single-cell DNA methylation and spatial transcriptomics. I'm also the Clinical Research Coordinator of The Cancer Genome Atlas project in CUPs (TCGA-CUPP), I've co-directed two PhD thesis (L.Piqué, 2019; L.Coll, 2021) and I've authored 45 publications, 91% in Q1 journals (Total impact factor 780; 3669 citations; h-index 27) https://orcid.org/0000-0003-4077-5137.

Fernández-Duran, Irene

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Sirtuins, Senescence, PRRs

My research interest is focused on better understanding the innate immune mechanisms that control inflammation under stress. In particular, I am interested in studying the role of pattern recognition receptors in activating the inflammatory response in non-infectious contexts, such as ageing or cancer. I obtained my PhD in Molecular and Clinical Medicine at the Edinburgh Cancer Research Centre (CRUK / University of Edinburgh) studying the function of inflammatory caspases in oncogene-induced senescence under the supervision of Dr. Juan Carlos Acosta. Currently I am a postdoctoral researcher at the Chromatin Biology Lab, within the Josep Carreras Leukaemia Research Institute, and under the supervision of Dr. Alejandro Vaquero I am currently using unbiased quantitative proteomics to identify novel substrates of sirtuins, a conserved family of NAD+-dependent deacetylation enzymes. Here I am investigating the crosstalk between sirtuins and pattern recognition receptors and validating novel sirtuin enzymatic targets that control the interferon response.

Ferrer, Gerardo

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Leukemia, Immunology, Epigenetics

My undergraduate degree in biotechnology provided a broad understanding of how contemporary technology can be used to unravel biological conundrums, with a focus on human physiology. Then I pursuit a PhD with Prof. Monserrat and Dr. Moreno at the University of Barcelona focused on autoimmunity and cancer biology, specifically related to chronic lymphocytic leukemia (CLL). In 2013, I started as a postdoctoral researcher in training at The Feinstein Institute for Medical Research (USA), working with Prof. Chiorazzi, one of the world leaders on a CLL xenograft model using immune-deficient mice; to understand better the interaction of CLL cells with other cells of the microenvironment, especially T cells. In addition, I started a new area of investigation the ménage à trois between CLL cells, myeloid suppressor cells and T cells. On December 2019 I joined the Josep Carreras Leukaemia Research Institute to develop my line of research on immunology and epigenetics to better understand leukemogenesis, immune evasion and transformation.

Link to video presentation

Fraire, Juan

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Drug Delivery, Enzyme-powered Nanomotors, Vapor Nanobubbles

Juan Fraire received his PhD in Chemistry from the University of Cordoba (Argentina). After his PhD, Juan joined the Laboratory of General Biochemistry and Physical Pharmacy at Ghent University (Belgium) headed by Prof. Stefaan De Smedt and Prof. Kevin Braeckmans as postdoctoral researcher. During this period, his research was centered on the photoporation concept as an advanced drug delivery technique for nucleic acid therapeutics and cell transfections. He is a former Fulbright (Boston University) and FWO (Ghent University) fellow, and his early-career achievements have been recognized by the Ocean Optics Young Investigator Award and Sabato Institute Award. In 2021, Juan joined the Smart Nano-Bio-Devices group led by Prof. Samuel Sanchez at the Institute for Bioengineering of Catalonia - IBEC (Spain) as senior postdoctoral researcher, and in 2022 he became a Beatriu de Pinós - Marie-Curie COFUND fellow. Juan is currently Senior Researcher at IBEC, where he leads projects related to the design and evaluation of "Advanced Nanotechnological Tools for Drug Delivery" at the Smart Nano-Bio-Devices group. His research focuses on exploring the synergy between nanocarriers, advanced light-triggered effects, and cutting-edge enzymatic nanobots for biomedical purposes.

Gouveia, Leonor

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Endothelium, Patophysiology, Organotipicity

My career path started at Universidade de Lisboa (Portugal) where I did my BSc in Molecular Biology and Genetics. Building upon my BSc, I pursued a Master's degree in Medical Science in the field of Infection Biology at Uppsala University (Sweden). While infection biology was definitely an interesting field, I wanted to shift gears and did my PhD studies in the field of Developmental Genetics, also at Uppsala University. In 2018 I obtained my Doctorate degree after defending my thesis entitled: "The role of PDGF-A in lung development, injury and repair". Afterwards, I moved to Idibell (Spain) for my postdoc to work on the vasculature of adipose tissues and its contribution to the development of obesity and systemic metabolic disorders. Currently I am a postdoc at Josep Carreras Leukaemia Research Institute, in the group Endothelial Pathobiology and Microenvironment lead by Dr. Mariona Graupera. I am very interested in studying blood vessels, in particular endothelial cells. These cells are highly heterogeneous and show organ-specific molecular fingerprints that are important for maintaining organ function. As the discovery of this organotypicity is relatively recent, there are many underexplored functions of the endothelium both at homeostasis and in pathophysiological conditions. My goal is to use the power of scRNAseq, together with in vivo studies to uncover novel functions of the endothelium, currently in adipose tissues, but also in other tissues in the future.

Grussu, Francesco

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Diffusion MRI, Cancer, Computer simulations

I am a Biomedical engineer who works in Magnetic Resonance Imaging (MRI). I graduated at the University of Cagliari (BEng Biomedical engineering, 2009) and University of Genoa (MEng Bioengineering, 2012) and then obtained a PhD at University College London (UCL) (Magnetic Resonance Physics, 2016). I have worked as a post-doc at UCL from February 2016 to September 2020, where I was a member of the Queen Square Institute of Neurology and Centre for Medical Image Computing. I keep collaborating closely with UCL, of which I am a Honorary Senior Research Associate. I have been Trainee representative (2018-2020) of the White Matter Study Group of the International Society for Magnetic Resonance in Medicine (ISMRM), of which I am a member since 2013. Since October 2020 I am a post-doc at the Vall d'Hebron Institute of Oncology (Barcelona, Spain), where I work on quantitative MRI (qMRI) development for precision medicine in cancer. In 2021 I was awarded a post-doctoral Beatriu de Pinós Fellowship by the Generalitat de Catalunya to develop novel liver diffusion MRI methods in oncological applications. From 2022, I am a "la Caixa" Foundation Junior Leader Fellow. My project, entitled "New-generation oncological MRI (New-OncoMRI): development, validationand application", aims to boost the sensitivity and biological specificity of diffusion MRI in cancer using artificial intelligence and computer simulations informed by histology.

Javierre, Biola M

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3D genome organization, Epigenetics, Noncoding alterations, Normal & malignant hematopoiesis

Since I began my scientific career, I have been deeply interested in understanding how genetically complex diseases develop, in particular autoimmune diseases and blood cancers. Initially, during my PhD (CNIO, Madrid, Spain), I approached this from an epigenetic perspective (Genome Res, 2010 & Mol Cancer Res, 2011). Then, stimulated by the fact that most epigenetic, as well as genetic, alterations associated with these diseases affect non-coding regions, I joined Peter Fraser's group (Babraham Institute, Cambridge, UK) to understand the contribution of the non-coding genome to genetically complex diseases, based on the study of the spatial-temporal chromatin architecture (Cell, 2016; Nat Commun, 2021 & Nat Commun, 2023). In addition, I also studied in the role of genome architecture regulated by epigenetic machinery in cell differentiation and oncogenesis (Nat Genet, 2015). The Promoter Capture Hi-C (PCHi-C) method, and its low input version (liCHi-C), that I developed were fundamental to both projects (J Vis Exp, 2018 & J Vis Exp, 2023). After 2 maternity leaves, I lead a research line combining my expertise in cell differentiation, malignant transformation, epigenetics and genome architecture to better understand hematopoiesis (IJC, Barcelona, Spain; https://www.carrerasresearch.org; https://www.javierrelab.com), which is a key process that is closely associated with blood cancer (Trends Immunol, 2020; Front Immunol, 2020 & Nature Commun, 2023). My team (composed by 1 senior bioinformatician, 3 postdocs, 7 PhD students, 1 technician and 2 master students), combines state-of-the-art single-cell and bulk omics strategies, computational biology and mouse experimentation to provide novel insights into normal and malignant hematopoiesis.

Link to video presentation

Le Roux, Anabel-Lise

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Membrane mechanics, Mechanotransduction, Cell stretching

I graduated in biophysics before working 7 years in the biomedical industry. I decided to take the opportunity to redirect my career and received an IRB/La Caixa fellowship to perform my PhD at IRB Barcelona in the BioNMR group between 2011 and 2015. There I studied the interaction between an oncogene protein and lipid model membranes to unravel novel biological functions of that protein. Next, I joined IBEC as a postdoctoral fellow in the Cellular and Molecular Mechanobiology group and focused on plasma membrane mechanics and associated cellular mechanotransduction mechanisms using custom made stretching devices. Now, as a senior researcher in the group, I will be focusing on nuclear envelope mechanobiology and leveraging of our stretching device.

Liesa, Marc

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Mitochondria, Metabolism, Redox, Metabolic diseases

In 2013, Dr. Liesa became a junior group leader at Boston University and in 2015 was recruited by the Department of Medicine and the David Geffen School of Medicine at UCLA as an Assistant Professor to lead his lab in the new Metabolism Theme and promoted to Associate Professor. Dr. Liesa recently moved (2022) to Barcelona to accept a tenured position as a Group Leader (Científico Titular) at the Molecular Biology Institute of Barcelona (IBMB-CSIC), located at the Barcelona Science Park.

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Leukemia, Transcription factors, Chromatin

I am interested in decipher those transcription factors that drive the onco-epigenetic modifications leading to leukemogenesis, with the aim of elucidate their impact in disease development and progression, and with the emphasis on finding new therapeutic targets. In my PhD (CNIO, 2009-2014) I focused on identifying the mechanisms driven by the fusion proteins AML1-ETO and MLL-AF9, caused by the translocations t(8;21) and t(9;11) in acute myeloid leukemia (AML). Using a stem cell human model, I defined the onco-epigenetic mechanisms responsible for the transcription deregulation found in these two leukemia subtypes. Then, I moved to the group of Dr Somervaille (CRUK-Manchester Institute, 2014-2019), where I discovered the mechanism of action of LSD1 pharmacological inhibitors, to which MLL-rearranged leukemias are especially sensitive. We decipher that LSD1 inhibition drives rapid changes in transcription by inducing the inactivation of GFI1 transcription factor through the dissociation of the GFI1:LSD1-corepressor complex. Currently, as part of Dr Martin-Subero team (2019-today) I am exploring the mechanisms behind the epigenetic rewiring occurring during chronic lymphocytic leukemia (CLL) development and progression. We are identifying and characterizing those transcription factors associated with CLL pathogenesis and evaluating their functional impact in the disease, with the goal of decipher their potential role as therapeutic targets.

Marco-Rius, Irene

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Nuclear Magnetic Resonance, Metabolism, Molecular Imaging

Irene Marco-Rius earned a BSc in Physics from the Autonomous University of Barcelona (Spain) and an MSc in Medical Physics from Heidelberg (Germany). She pursued a PhD in Biochemistry at Cambridge (UK) under Prof. Kevin Brindle, studying hyperpolarized magnetic resonance (HP-MR) techniques for observing cancer metabolism. Following her PhD, Irene further honed her expertise during post-doctoral positions at the UCSF Radiology department (California) and Cancer Research UK / University of Cambridge (UK). Her work revolved around the development of HP-MR tools to study metabolism, diagnose metabolic pathologies, and assess early treatment response. In 2018, Irene returned to Barcelona, joining the Institute for Bioengineering of Catalonia (IBEC) with a prestigious "la Caixa" Junior Leader fellowship. Here, her efforts centered on advancing the application of HP-MR for real-time studies of metabolism in organs-on-chip. In 2021, Irene took a significant step in her career, establishing her independent research group, the Molecular Imaging for Precision Medicine lab, at IBEC, with support from the BIST-"la Caixa" Chemical Biology program. That same year, she co-founded Vitala Technologies, an IBEC spin-off company. This venture aims to bridge the gap between her lab's technical innovations and society, offering transformative solutions in the field of hyperpolarized magnetic resonance. Irene Marco-Rius' journey highlights her dedication to advancing HP-MR techniques for better understanding metabolism and its applications in healthcare.

Melé, Marta

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Transcriptomics, Gene expression, Inter-individual variation

Since 2019, I am a group leader at the Barcelona Supercomputing Center. My research focuses on developing novel computational approaches to understand how the human transcriptome is regulated in health and disease. Specifically, we try to understand how differences in gene expression regulation between individuals explain human phenotypic variation. We are particularly interested in studying differences between males and females, individuals with different genetic ancestries and aging. To do this, we develop computational approaches to study the human transcriptome, including gene expression variation, alternative splicing and non-coding RNAs from single-cells to bulk tissues. We also apply deep learning methods to study inter-individual variation in tissue architecture based on histological image analysis. I am author of 39 peer-reviewed publications with nearly 5,000 citations and I have received several awards including outreach, communication and trajectory awards such as L'Oréal for Women in Science Award (2019). Before that, I was a postdoctoral fellow at Harvard University (2014-18) where I developed novel computational approaches to study gene regulation.

Mereu, Elisabetta

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Single-cell genomics, Immunotherapy, Multiple myeloma

I am computational biology leading the Cellular Systems Genomics Group at Barcelona's Josep Carreras Leukemia Research Institute. My focus lies in the cellular and molecular characterization of complex tissues, both in their healthy and diseased states. Currently, I am engaged in groundbreaking work that aims to revolutionize cancer immunotherapy, improve patient care, and uncover new targets for non-invasive diagnosis, monitoring, and treatment strategies. My ambitious vision is to bring transformative changes to the clinical management of patients, offering promising avenues for cancer treatment. As the leader of this endeavor, I guide a multidisciplinary team consisting of three PhD students and two research assistants. Together, we employ state-of-the-art techniques such as single-cell multiomics, innovative spatial analysis, and machine learning tools to achieve our ambitious goals. Our strategic focus lies in advancing CAR-T cell therapy in Multiple Myeloma and other blood cancers. To support our research, my team actively collaborates with clinicians at the Biomedical Can Ruti Campus and other hospitals in Barcelona, ensuring access to vital patient samples crucial for our investigations.

Mir, Mónica

Institute for Bioengineering of Catalonia (IBEC)

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Biosensors, Organ on a chip, Point-of-care diagnosis

Dr. Mònica Mir is Assistant Professor of the Department of Electronics and Biomedical Engineering of the University of Barcelona since 2016, member of the Biomedical Research Network on Bioengineering, Biomaterials and Nanomedicine (CIBER-bbn) since 2008 and Senior Researcher in the Nanobioengineering Group of the Institute for Bioengineering of Catalonia (IBEC). Prior to joining IBEC in 2008, she was at the Max Planck Institute from 2007-2008. She is Chemist and received her Ph.D in Biotechnology from the University of Rovira I Virgili in 2006. Dr. Mir has over 80 contributions to international conferences, some of them as invited speaker and has published 50 JCR articles (16 h-index and 1365 citations (Scopus), in high-impact journals. Dr. Mir has been involved in more than 30 European, National and Industrial projects, being the main investigator in some of those. As a result of an Industrial project, she has managed a Join Unit between a company and IBEC, giving as a product a commercialised point of care portable diagnosis device. She is actively working in applied projects in close collaboration with Hospitals, with vivo clinical pre-validation of some of my technology, which has resulted in a Patent and in a Spin off NewCo S.L. of which she is a co-founder. She has a solid track record in training doctoral, Master´s and postdoctoral researchers. She actively collaborates as Congress organising committee and as editorial board. Her research interest is focused on biosensors, biomedical diagnostic devices, implantable sensors, and integrated in microfluidic devices for lab-on-a-chip and organ-on-chip.

Molina, Oscar

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Aneuploidy, B-ALL, Chromosome instability

I have more than 15 years of research experience gained at different institutions in different countries, giving me a unique background in cell biology, human genetics and mouse models for leukemia research. Since my first postdoctoral stage with Prof. William Earnshaw in the University of Edinburgh (UK), I focused my work in the cellular mechanisms involved in the control of faithful chromosome segregation and genome stability in human cells. There, I studied the epigenetic landscape of human centromeres for proper kinetochore assembly and chromosome segregation using the most revolutionary chromatin engineering tools, including a human artificial chromosome (HAC) whose centromere can be epigenetically manipulated. In 2017, I moved to Dr. Pablo Menéndez lab in the Josep Carreras Research Institute (IJC) aiming to apply my skills in basic chromosome biology in more translational research on childhood B-ALL. Here, I developed tools and methodologies to perform in vivo cell biology studies on primary B-ALL samples to study the contribution of aneuploidy to the development of acute leukemias. Since December 2021, I am an AECC-funded research fellow in IJC. My current research line aims to elucidate the presence of chromosome instability, a cellular phenotype that correlates with poorer clinical outcomes, in the distinct aneuploid B-ALL subtypes and its specific contribution to disease outcome. In parallel, I am working on the generation of preclinical models of aneuploid B-ALL using hematopoietic stem and progenitor cells to improve our understanding in the pathogenesis of these subtypes of cB-ALL.

Mondragón Martínez, Laura

Josep Carreras Leukaemia Research Institute (IJC)

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T cell lymphoma, Animal models, Nanomedicines

I am junior group leader of the T cell lymphoma lab at Josep Carreras Leukaemia Research Institute (2021) thanks to a Ramón y Cajal contract. Our main research interest is to unveil the molecular mechanisms leading to T cell lymphoma appearance. Specifically, we are interested in studying the molecular origin of angioimmunoblastic T cell lymphoma (AITL) a rare haematological disease often diagnosed at stages III/IV and a 5-years survival rate of 32%. For this purpose, we are making use of genetically modified animals models which spontaneously developed this disease when aged. We are characterizing these animals' phenotype to validate new potential biomarker and therapeutic targets. With the results obtain we aim at developing more specific and efficient therapeutic strategies to hopefully find a cure or significantly increase the quality of life of AITL's patients. Prior this position, I did my PhD in the laboratory of Prof. Enrique Pérez-Payá where I developed new molecules to inhibit unwanted cell death (2005-2009). Then, I pursued four postdoctorates in the labs of: Prof. Víctor Puntes (2018-2021) and Prof. Ramón Martínez-Máñez (2009-2012) where I designed, synthesized, and tested in vitro and in vivo metal and silica nanoparticles for drug delivery purposes; the laboratory of Prof. Guido Kroemer where I helped unveiling the protumoral role of AIF protein in lung cancer (2016-2018) and the laboratory of Dr. Ricci (2012-2016) where I worked proving the role of GAPDH overexpression in the development of AITL and validating a novel therapy to treat the disease in humans.

Link to video presentation

Moreno Pérez, Yaiza

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Department of Medicine and Life Science

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Regenerative medicine, Dermatopathology, Translational medicine

I recently graduated from the International University of Catalonia (UIC Barcelona) in Biomedical Sciences, where I am currently studying for my master's degree in Experimental Biomedical Research. Despite my young age and short experience compared to colleagues in my field, I consider myself a very active person who is always looking to learn something new or participate in projects and conferences. Throughout my career, I have focused my research on dermocosmetic and dermopathology. I also possess a great interest in the field of regenerative medicine and bioengineering-where I have been able to participate in some projects. Recently, I have discovered that both translational medicine and dealing first-hand with patients motivate me a lot and make me passionate about my work. For this reason, I would love to participate in research environments close to patients where I can interact with them to offer helpful assistance solutions.

Oliver De La Cruz, Jorge

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Mechanobiology, Neuroscience, Alzheimer's disease

I am a Beatriu de Pinòs fellow within the Molecular and Cellular Mechanobiology group at IBEC. Combining my background in neuroscience and mechanobiology, my current research goal is to understand the impact of substrate stiffness on the development of Alzheimer's disease-related alterations in neurons. To this end, I am working in an in vitro model consisting in hiPSC-derived neurons obtained from patients and hydrogels to study the neuronal mechanosensitive apparatus and their involvement in the mechanisms underlying neurodegeneration.

Parra, R. Gonzalo

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Protein folding, Protein function, Human diseases

I am a computational biophysicist interested in the evolution of protein families to understand the emergence of folding, stability and function properties. I develop concepts and tools, many of them around the notion of local energetic frustration. I am interested to use the evolutionary information obtained from protein families to 1) understand the impact of variants in human disease; 2) Apply machine learning methods to generate artificial proteins around known protein families to understand what nature (has not) had time to explore within the sequence/structure space and why; and 3) design novel proteins with desired characteristics.

Pontel, Lucas

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Metabolism, Aldehydes, DNA repair, Ferroptosis, Cancer

I am Junior Group Leader and Ramón and Cajal Fellow at the Josep Carreras Leukaemia Research Institute. We study cancer metabolism, specifically focusing on understanding how cells deal with toxic metabolites produced during their metabolic processes. These metabolites include aldehydes like formaldehyde and reactive oxygen species, which can harm cellular structures and biomolecules such as nucleic acids, proteins, and membranes.

Our research endeavors to uncover the mechanisms employed by cells to prevent the accumulation of these toxins and repair the damage they cause. We utilize a combination of cell biology, metabolic approaches, and in vivo models to address these questions in blood-derived tumors and also some solid cancers.

Link to video presentation

Prieto, Endika

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Immunodynamics, T cell exhaustion, Computational biology

I am a RyC researcher at VHIO's Tumor Immunology and Immunotherapy Lab. My research focuses on exploring the dynamics of T cell clones in the blood that exhibit responses to immunotherapy. This investigation aims to provide valuable insights into the natural immune responses to ICB treatment and to identify the most promising T cell candidates for therapeutic applications. To achieve this, we analyze T cells extracted from tumor biopsies and PBMCs throughout the duration of the treatment. Clonal trajectories are analyzed via deep TCRB sequencing and filtered using a dedicated bioinformatics pipeline. We then characterize the phenotype of the clones-of-interest at significant time intervals and decipher their complete TCR sequence using single-cell technology (gene expression, TCR and CITE sequencing). Finally, the reactivity of the TCRs against the tumor cell line is validated in vitro. In addition, I lead an independent research line that has identified the proteasome as a key target that can be selectively enhanced under oxidative stress to slow down T differentiation towards exhaustion and to potentiate T cell-mediated anti-tumor immunity in the TME. My past endeavors include research on the adaptation of cancer cells to hypoxia, the biology of SARS-CoV-2, biomarker discovery (exosomes, microRNAs and cell-free DNA) and the application of genetics in forensic science. I take a collaborative approach to research. I'm always open to new concepts and collaborations.

Rodilla, Verónica

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Lineage tracing studies; Cancer research; Cellular heterogeneity

Verónica Rodilla studied Biology at the Universitat Pompeu Fabra. She obtained her PhD in Biomedicine in 2011, basing her thesis on the study of Notch and Wnt signaling pathways in colorectal cancer and intestinal homeostasis. She performed her doctoral thesis at the IMIM-Hospital del Mar under the supervision of Dr Anna Bigas and Dr Lluis Espinosa. Then, she moved to Paris to work as a postdoctoral researcher at the Institut Curie (2011-2015) under the incredible mentorship of Dr Silvia Fre. Back in Barcelona, she performed a second postdoctoral training at Vall d'Hebron Institute of Oncology (2015-2020) before starting her own research group at the Josep Carreras Leukaemia Research Institute (IJC), with a Ramon y Cajal contract. Her newly created group is passionate for cellular hierarchies and cancer heterogeneity. Her laboratory studies the key signals governing cell fate specification during malignant progression and the mechanisms by which different signaling pathways control cell plasticity in both normal and pathological contexts. Concretely, they combine the use of murine transgenic models, human patient-derived xenografts and 3D-organotypic cultures to unravel cellular hierarchies within tumors for better understanding cancer heterogeneity.

Rodriguez, Aida

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Mitochondria, Healthspan, Long-lived cells

After graduating in Biotechnology from the Autonomous University of Barcelona, I moved to London to obtain my MRes in Biomedical Research from Imperial College London. Then, I joined Antonio Zorzano's lab at IRB Barcelona to conduct my doctorate thesis work, where I found the mechanism by which depletion of Opa1 (a mitochondrial fusion protein) in a muscle context results in an inflammatory response triggered by mitochondrial DNA instability. In 2018 I joined Elvan Böke's lab at CRG where I focused on understanding how dormant oocytes keep healthy mitochondria for decades. My main discovery is that mitochondria in dormant oocytes lack complex I, a major component of the electron transport chain, which was thought to be essential for any cell with functioning mitochondria. We believe that inactivating complex I is an essential adaptation of oocytes that protects them from oxidative damage during the many years of dormancy. Now, I am eager to become an independent researcher to discover other novel mitochondrial adaptations employed by long-lived cells to prolong their healthspan for years.

Romero-Ferraro, Octavio A.

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SWI/SNF, Chromatin enzimes, Precision medicine

Since I returned from the United States in 2017, I joined the PEBC-IDIBELL as an Associate Researcher after obtaining a competitive contract Juan de la Cierva Incorporation. I start to develop an independent research line, extending the analysis to a wide variety of cancer models with different genotypes, i.e., tumors with mutations in other members of the SWI/SNF complex and in other epigenetic regulators (KDM6B, KDM6A). In 2019 I obtained a competitive contract AECC Investigator and currently I am developing my research career at Josep Carreras Leukemia Research institute (IJC) My career is addressed to identify novel targetable molecules, to define accurately the epigenetic patterns that predict responsiveness to specific inhibitors. This strategy seeks the "Achilles's heel" of each tumor because inactivating mutations at epigenetic regulators can be exploited as "molecular switches" that when "switched off" cause an epigenetic short-circuit, leaving the tumor vulnerable to treatments against other molecules of the compensatory epigenetic network, causing the death of the tumor. The study of the molecular basis of how inhibition of histone-modifying enzymes in SWI/SNF-deficient tumors, compromises tumor viability, constitute an extraordinary opportunity that could set the basis for the stratification of pediatric tumors according to their epigenetic background, matching patients to therapies, to develop a pediatric precision medicine to design a target specific epigenetic therapy with high efficacy and low toxicity. This innovative strategy could have a significant impact on the field of tumors with mutations in the SWI/SNF complex such as rhabdoid tumors, which currently don't have therapeutic options.

Ros, Oriol

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Axon guidance, cell biology of the growth cone,
Actin dynamics and membrane reorganization

I am currently a Beatriu de Pinós fellow at the University of Barcelona. My career started during my biology degree and spans over almost two decades in academic and research institutions in Barcelona, Paris, Zurich, Manchester and Hradec Králové. I am interested in the cellular mechanisms driving the development of the nervous system connectivity. Brain function relies on a complex network of interconnected neurons that arises during development and remains grossly stable in adults. Target innervation depends on precise decisions of the growth cone, a motile structure at the tip of the growing axon, at choice points. In the visual system, the chiasm is a major choice point where subsets of retinal ganglion cells (RGCs) choose to project to distinct brain hemispheres depending on their localization. The molecular determinants shaping the response of RGC axons in this choice point are known, but how the growth cone orchestrates its internal machinery to execute its precise choices is not understood. Guidance cues modulate second messengers, especially cAMP, cGMP and calcium, which, in turn, activate cellular effectors like membrane remodeling or rearrangements of the cytoskeleton. The mechanisms confining these effectors, enabling the exquisite directionality of the growth cone, are elusive. Lipid rafts, specialized cholesterol- and sphingolipid-enriched domains of the membrane, are perfect candidates to integrate the intracellular signals generated by guidance cues and localize growth cone responses. My current project aims to describe lipid rafts as the platform organizing growth cone decisions at choice points, from signal integration to motile responses.

Rovira, Meritxell

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Pancreatic cancer, Pancreas regeneration, Organoids, Omics

I obtained my PhD in 2007 at IMIM /UPF (Barcelona), working on embryonic stem cells and its differentiation toward acinar pancreatic cells. I moved to Johns Hopkins for my first postdoctoral stage under the supervision of Steve Leach and Mike Parsons, where I studied adult pancreatic progenitors in human, mouse and zebrafish. I came back to Spain with a Marie Curie fellowship to work at IDIBAPS under the supervision of Jorge Ferrer, investigating the epigenome and transcriptome of human fetal pancreatic progenitors and the role of REST in endocrinogenesis. I started my lab as Ramon y Cajal researcher at University of Barcelona /IDIBELL at the end of 2019. In the lab we are interested in studying the role of ductal cells in pancreas regeneration and endocrine-exocrine pancreatic pathologies, by using human samples, mouse and zebrafish as animal models and organoids as ex vivo models.

Santos-Moreno, Javier

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Synthetic biology, Gene circuits, Microbiome engineering

Javier Santos-Moreno studied Biotechnology at the University of Salamanca (2013), and holds a Master's degree in Clinical Analyses from the University Pompeu Fabra (2014). His PhD research at Institutut Pasteur and Collège de France (Paris) focused on the study of bacterial protein secretion (2016). In 2017, he joined the University of Lausanne (Switzerland) as a post-doc, where he worked on the design and construction of CRISPRi-based synthetic gene circuits. In December 2020 he moved to the University Pompeu Fabra, first as a Marie Curie and then as a Juan de la Cierva fellow, to work on the engineering of the human skin microbiome. In 2023 he obtained an ERC Staring Grant to develop the ability to program time in cells.

Sica, Valentina

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Metabolism, Circadian rhythms, Muscle stem cell

During my PhD and first postdoc in Paris, I studied essential homeostatic pathways like autophagy and metabolism in the context of cancer and obesity. I found a synergistic cytotoxic treatment that targets mitochondrial metabolism in cancer and unraveled the mechanism through which a peptide secreted by autophagy during starvation modulates lipid metabolism and food intake. Since I have been in Barcelona for my second postdoc I have been focused on another essential homeostatic pathway, the regulation of circadian rhythms in the context of muscle stem cells. These cells, also known as satellite cells, are a small but powerful subpopulation of the cells of the muscle and are the main effector of muscle repair. Recent findings have indicated that circadian rhythms dictate the efficiency of muscle regeneration, though their roles in satellite cells remain poorly defined. Satellite cells live in a quiescence state in the absence of injury, perturbation of quiescence is associated with impaired regeneration and diseases like dystrophia and cachexia. The focus of my research is to elucidate the regulation and role of circadian rhythms in quiescent satellite cells.

Smith, Jacob

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Circadian, muscle, Inter-organ crosstalk

I seek to determine how circadian clocks coordinate metabolism within and between organs, the ways this can go wrong in disease, and how we can fix it. Virtually all cells within the body contain a 24-hour molecular circadian oscillator, 'clock', and combine to generate endogenous rhythms that pervade all levels of physiology. Circadian rhythms are of central importance to overall homeostasis – their disruption drives development of devastating diseases such as diabetes, cancer, cardiovascular disease, and neurodegeneration. Whilst much progress has been made towards understanding organ-specific roles of clock proteins, how these clock proteins generate rhythms that are coordinated across cells, organs, and at the systemic level is not well understood. I believe that a thorough understanding of these processes will drive the development of therapeutic interventions effective at counteracting circadian disturbances and the associated disease risks. My postdoctoral studies at University of California Irvine then Universitat Pompeu Fabra (current center) have revealed that skeletal muscle clock function is not only a major regulator of muscle function and metabolism, but a major regulator of distal organs like the liver. However, the molecular mediators, signalling pathways and pathophysiological consequences of organ crosstalk involving the muscle clock are largely unknown. Long term, I will explore this in the context of signalling to the brain, linking to my PhD training in neuroscience at University College London. Overall, my focus is to use novel technologies to delineate endocrine connections under control of the muscle clock, and work out how they can be harnessed to fight disease.

Stammnitz, Max

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Deep mutational scanning, Drug-protein interactions, Cancer genetics

Postdoc @ CRG – Deep mutational scanning. Chemical biology. Small molecule-protein interactions. Mainly wetlab. PhD @ Cambridge Uni – Transmissible tumours. Tasmanian devil, dog and sea turtle cancer genetics. Mainly bioinformatics. Afterhours – Nanopore sequencing. Environmental DNA. Meta-genomics.

Tornero, Daniel

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Stem cells, Brain repair, Stroke

I have a PhD in Neuroscience from the University of Castilla-La Mancha (Spain) and more than twenty years of experience in this field. My scientific interest has been focused on exploring new strategies for the study and treatment of neurological diseases, in particular brain stroke. In 2010 I started my Postdoctoral stage at the Lund Stem Cell Center (Sweden), in the Laboratory of Stem Cells and Restorative Neurology, where I developed cell therapies based on induced pluripotent stem cells (iPSC) in a model of ischemic stroke. In parallel, I investigated the role of different populations of immune cells in the inflammatory response after ischemic stroke. Since 2019, I am an Assistant Professor in the Department of Biomedicine at the University of Barcelona and Head of the Neural Stem Cells and Brain Damage laboratory that belongs to the Institute of Neuroscience. My projects focus on the study of repair mechanisms associated with cell therapies applied to brain injury and neurodegenerative diseases. In particular, I explore the functional integration of transplanted cells and the reconstruction of damaged neuronal circuits. I also participate in projects related to the development of models, both in vivo and in vitro, that help to understand neurodegenerative processes and diseases that affect neurodevelopment.

Vazquez, Berta Nieves

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Genome integrity, Epigenetics, Aging

The focus of my scientific career is understanding the crosstalk between the epigenome and the environment and its relationship to the mechanisms of cancer and aging. I started studying chromatin regulation during my graduate work at the Laboratory of Dr. Lauzurica (UB, Barcelona, and ISCIII, Madrid) and Dr. Krangel (Duke University, US). I studied early transcriptional induction upon stress in immune cells, with important implications for efficient anti-tumoral and anti-infective responses. I obtained a competitive predoctoral FPU fellowship to conduct my research and three bursary grants for internships in the US. As a postdoctoral researcher at the laboratory of Dr. Serrano (Rutgers University, US), I focused my research efforts on genome integrity with particular emphasis on the repression of jumping genes, the repair of DNA damage, and chromosome segregation. I studied a family of NAD+dependent deacylases called Sirtuins, which play important roles in chromatin regulation, health span, and cancer. My various accomplishments include the identification of novel epigenetic programs pivotal in determining the onset of organismal and reproductive aging. To develop my postdoctoral work, I obtained a MICINN/Fulbright Postdoctoral Fellowship. In September 2018 I returned to Spain (first IDIBELL and then I moved to the Josep Carreras Leukemia Institute) to initiate my research lines with the support of the career integration programs Beatriu de Pinós (2018-2020) and Marie S. Curie-Horizon 2020 (2020-2022). Here I am pioneering studies to further understand the molecular mechanisms behind genome maintenance, placing significant emphasis on those linked to reproductive longevity and fertility preservation.

Link to video presentation

Velasco-Hernandez, Talía

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Leukemia stem cells, Mouse models, Novel therapies

I have more than 15 years of research experience gained at institutions in different countries (Spain, USA, Sweden), giving me a unique background in leukemia research, mouse models, hematology, hypoxia signalling, immunotherapy and stem cells. For the last 6 years, I have been working as a senior postdoc at the Josep Carreras Leukemia Research Institute (Barcelona) and currently I am starting my own research group at University of Barcelona, at the Immunology department. During my career, I have focused my research projects in the study of different subtypes of leukemia, mainly in Acute Myeloid Leukemia (AML) and the role of hypoxia signalling over the initiation and maintenance of this disease. I am particularly interested in the study of the biology of the leukemia stem cells (LSCs), the cells responsible for the relapse of the AML patients, and the identification of novel targets to be used therapeutically to eliminate this subset of cells, to increase the therapeutic outcome avoiding the relapse of the patients. Currently, I have generated a single-cell RNA sequencing atlas from pediatric AML patients from different cytogenetic subgroups at diagnosis and relapse, from which we have managed to identify potential candidates whose modulation affects the proliferation and clonogenic capacity of the AML cells. In my research, I am using both advanced in vitro techniques (shRNA, CRISPR/Cas9, single cell RNA sequencing, lentiviral transduction) and in vivo strategies, such as knock-in mouse models, xenografts and bioluminescence techniques.

Villacampa, Pilar

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Pericytes, Retina, Vasculopathy

My expertise is mainly focused on retinal vascular biology and the study and optimisation of new models of disease. I did my PhD in UAB (Dr Fàtima Bosch's lab) working on the pathophysiology of diabetic retinopathy. This allowed me to acquire essential skills in animal work, molecular biology, electrophysiology, histology and microscopy and a wide expertise in diabetic retinopathy and gene therapy. In 2013, I was awarded with a Marie Curie IntraEuropean Fellowship. The fulfillment of this fellowship at UCL (London, Dr James Bainbridge's lab) gave me the opportunity to increase my expertise elucidating the role of myeloid-derived HIF factors in pathological neovascularization. Our results showed that HIFs from myeloid cells are not essential for ocular neovascularisation, but, instead, improve revascularization in ischemic conditions. In 2016, I joined IDIBELL (Dr Mariona Graupera´s lab, moved to IJC in 2021), where I have focused my research on pericyte biology during physiological and pathological contexts. This project has allowed me to go in depth in the characterization of pericytes in different status of maturity. In 2021, I was awarded with a Ramon y Cajal contract, that I am developing from 2022 at Universitat de Barcelona (Facultat Medicina Campus Bellvitge). Our lines of research are focused on unravelling the role of pericytes in ophthalmologic diseases; we aim to combine mouse and in vitro models of disease with human samples obtained from our clinical collaborators.

Wculek, Stefanie

Institute for Research in Biomedicine (IRB)

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Innate immunity, Immunometabolism

Stefanie K. Wculek was born in Austria and studied Molecular Biology at the University of Vienna with research stays in Austria, Canada and Spain. She completed her Master's thesis on the mechanisms of skin inflammation at the Spanish National Cancer Research Center (CNIO) in Madrid. In 2011, Stefanie moved to London to work on the role of neutrophils in cancer at the London Research Institute of Cancer Research UK/The Francis Crick Institute and obtained her PhD from the University College London in 2016. During her postdoctoral work at the Spanish National Center for Cardiovascular Research (CNIC) in Madrid, Stefanie further specialized on the biology and metabolism of innate immune cells in homeostasis and chronic diseases such as cancer and obesity. She developed an effective pre-clinical cancer immunotherapy based on dendritic cells as part of an international consortium of industrial, clinical and basic scientists. Moreover, Stefanie discovered metabolic differences of tissue macrophages that depend on their organ of residence, which leads to therapeutically exploitable vulnerabilities of those cells. In February 2023, Stefanie joined the IRB Barcelona "Aging and Metabolism" research program as Junior Group Leader to head the Innate Immune Biology laboratory, which is supported by "LaCaixa" and an ERC starting grant. Overall, her work established the surprising diversity of functions and dependencies of innate immune cells in vivo in health and non-infectious (inflammatory) diseases. Currently, her team studies the biology and immunometabolism of dendritic cells, macrophages and neutrophils in aging, cancer and obesity to uncover novel therapeutic opportunities.

Winkler, René

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Epigenetics, Leukemia, Bone marrow niche

I am René Winkler, a passionate post-doctoral biochemist fascinated by inflammation, the bone marrow microenvironment, and hematopoiesis. My academic journey started in Germany where I studied Biology and Biochemistry at the University of Jena. In 2018, I completed my PhD studies in Molecular Biomedicine, undertaking groundbreaking research in Germany and Canada, uncovering novel approaches to target MYC in B cell lymphoma. Currently, I am part of the Josep Carreras Leukaemia Research Institute in Barcelona, Spain. Within the Chromatin, Metabolism and Cell Fate Group, I perform cutting-edge research to unravel cell-to-cell heterogeneity and to explore the profound impact of epigenetic regulation within the bone marrow microenvironment. My goal is to intercept leukemia development, seeking innovative strategies to combat this disease. In recognition of my dedication to scientific pursuit, I am honored to be a holder of the prestigious Walter Benjamin Fellowship from the German Research Foundation (DFG). Additionally, I actively contribute to the Innovative Training Network "INTERCEPT-MDS" and the COST Action CA21135 "IMMUNO-model," both funded by the European Union, enabling me to foster exceptional collaborations.

Zaffagnini, Gabriele

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Protein homeostasis, Female fertility, Biomolecular condensates

Throughout my career I studied how cells manage harmful protein aggregation. For this, I employed a wide range of experimental approaches, ranging from in vitro reconstitutions to animal models. During my PhD, I reconstituted the autophagic clearance of misfolded protein aggregates in vitro. Autophagy is an essential degradation route, during which cargos are sequestered inside membrane organelles formed de novo. Defective autophagy leads to the accumulation of protein aggregates and is a hallmark of aging and neurodegenerative diseases. I discovered that the human cargo receptor p62 forms biomolecular condensates with aggregated proteins, which then drive the local formation of an autophagic vesicle. Thus, my research uncovered a key mechanism for the autophagic degradation of protein aggregates. In 2018 I moved to the lab of Elvan Böke at the CRG in Barcelona, to study how protein aggregation affects female reproduction. Oocytes are the precursors of fertilizable eggs. In mammals, oocytes survive for decades before fertilization. Thus, oocytes need to remain damage-free for a long time to ensure reproduction. Protein aggregation is a major threat for long-lived cells. How oocytes cope with protein aggregation has been unknown. I discovered that mouse oocytes store and degrade protein aggregates inside novel compartments which I have named ELVAs. ELVAs host the major degradative organelles inside a liquid-like matrix. While largely inactive in immature oocytes, ELVAs activate protein degradation shortly before fertilization, thereby disposing of the stored aggregates. Thus, my research defines a new paradigm for preventing harmful protein aggregation in long-lived cells.

Organizers

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- Berta Nieves Vazquez
- Lucas B. Pontel

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