



2024 Call for the IRB Barcelona International PhD Fellowship Programme (ref.01/24.1/IRB)

TERMS & CONDITIONS

Section II, article 6, letters c) and q) of the Articles of Association of the *Fundació Institut de Recerca Biomèdica (IRB Barcelona)* (hereafter referred to as IRB Barcelona or the Institute) establish that the Institute will promote activities that address collaboration and knowledge transfer and also launch fellowship calls and subsequent granting of these awards.

Accordingly, this document is to announce a fellowship call included in the IRB Barcelona International PhD Programme. The fellowships are assigned to students enrolled on a PhD programme who perform and defend their PhD theses under the supervision of group leaders at IRB Barcelona.

I. Objective

These Terms and Conditions serve to regulate the award of PhD fellowships for the academic year 2024-2025.

II. Fellowship Call

All candidates applying to the IRB International PhD Fellowship Programme will be considered for all fellowships offered as part of said international PhD call.

Included in the present call are 5 fellowships co-funded by the European Union's Horizon Europe Marie Skłodowska-Curie Actions Work Programme under grant agreement No. 101126676 (herein referred to as IRB-TARGET fellowships).

Details of funding and requirements for the IRB-TARGET fellowships are provided in Annex 1.

All fellowship awardees will be contracted by IRB Barcelona. Fellowships will be renewable on a yearly basis and up to 4 years from the date of signature of the employment contract by the awardee, provided that he/she complies with all the requirements of point X of this call.

The awardee's supervisor will be the group leader at IRB Barcelona previously assigned and agreed with the awardee before the signature of the fellowship. This group leader will oversee



that the duties assigned to the awardee are fulfilled and will notify IRB Barcelona's Academic Office and the Chair of Graduate Training of any incident, alterations in the fulfilment of the allocated duties, or other pertinent circumstances so that corrective measures can be applied and/or proceedings can be started to withdraw the fellowship.

III. Requirements and Selection Criteria

IRB-TARGET will recruit doctoral candidates of any nationality, gender, culture, religion, sexual orientation or age to undertake a PhD in biomedicine. To be eligible for an IRB-TARGET fellowship, applicants must:

- **Comply with the mobility rule:** meaning that they must not have resided or carried out their main activity (work, studies, etc.) in Spain for more than 12 months in the 36 months immediately before the deadline of the call.
- **Not be in possession of a doctoral degree at the deadline of the call.** Any candidate that has successfully defended their doctoral thesis will not be considered eligible, even if they have not formally been awarded a doctoral degree.
- **Fulfil one of the following options (mandatory requirements according to the Bologna Process to be able to enrol in a doctoral programme leading to the award of a doctoral degree at the time of the effective recruitment):**
 - Completion of studies that lead to an official Spanish (or from another country of the European Higher Education Area) university degree awarding 300 ECTS credits, of which at least 60 must correspond to master level.
 - Completion of a degree in a non-Spanish university not adapted to the European Higher Education Area that gives access to doctoral studies in Biology, Chemistry, Biochemistry, Pharmacy, Physics, Medicine, or related fields in Spain.
- **Submit a complete application before the established deadline** through the IRB-TARGET electronic application platform. Applicants will be asked to upload the following information:
 - Personal information such as first and last name, gender, nationality and contact details. This section will also ask about applications for or intention to apply for other fellowships.
 - Curriculum vitae, including summary of work experience and career breaks.
 - Motivation letter (maximum 2 pages) highlighting their research experience and academic achievements and explaining why they are interested in IRB Barcelona and in a particular research group.



- A scanned copy of their certified academic record. These documents must show the grades attained in exam periods and evidence that the required degree will be obtained by the expected time of recruitment, if it has not already been awarded.
- Any additional files considered relevant to the application.
- At least two recommendation letters from university lecturers or scientists who are familiar with their academic work and who can judge their potential as a doctoral researcher.
- A summary of any work experience and a maximum of three research nodes in which they are interested.

Applicants should indicate the Research Node(s) to which they wish to apply (up to 3). Details of the projects available for the IRB-TARGET fellowships are provided in Annex 2.

Candidates will be selected exclusively on merit, on the basis of their curricula. The academic grades and curriculum vitae of each applicant will be evaluated, as well as recommendation letters and a motivation letter. No selection criteria for positive or negative discrimination will be applied.

IV. Application Procedure

1. Applications can be made online at <http://phd.irbbarcelona.org/>. The application deadline is **15:00 CET on 15 December 2023**.

The calendar for this call is as follows:

Call opening: 23 October 2023
Deadline for candidacies: 15 December 2023
Deadline for referees: 18 December 2023
Remote evaluation: 16 January 2024
Group Leader Panel presentations: 26 February 2024
Interviews at IRB Barcelona: 4-5-6 March 2024
Notification to candidates: 8 March 2024
Start date of fellowships: 1 September 2024

If the application deadline is extended, the updated information will be available on the IRB-TARGET section of IRB Barcelona's website.

2. For more information, applicants can consult IRB Barcelona's webpage or contact IRB Barcelona's Academic Office at phd@irbbarcelona.org





V. Applications

Applicants should send a completed online application form, together with the following documents:

1. Curriculum vitae specifying education and experience, including career breaks, and supported by pertinent documents.
2. A motivation letter (maximum 2 pages) highlighting their research experience and academic achievements and explaining why they are interested in IRB Barcelona and in a particular research group.
3. A scanned copy of their certified Academic Record. These documents must show the grades attained in exam periods. If the certified academic records are not in Spanish or English, applicants should also attach a translation in one of the above-mentioned languages.
4. Any additional files considered relevant to the application
5. Two recommendation letters from university lecturers or scientists with whom they have studied or worked. Candidates are responsible for ensuring that referees submit these letters. Applications not supported by these letters will not be eligible. If the applicant has previously worked with a researcher at IRB Barcelona, any letter of reference from said person cannot be included as one of the two reference letters requested. However, it can be sent to provide additional support for the application.

Applicants will be asked to upload the following documents in English. Please note that all the documents provided should be in PDF format.

VI. Selection

An Evaluation Committee will appraise eligible applications both in the remote evaluation stage and in the interview stage. This committee will include external members and representatives of group leaders at IRB Barcelona. The evaluation will be independent, impartial, objective, and free of conflicts of interest, and the selection will be open, efficient, transparent, fair, and merit-based. The PhD Advisory Committee will oversee the remote and interview stages of the selection process.

Applicants will receive continuous support from the Academic Office through the IRB-TARGET helpdesk (email, phone), which will notify them of the outcome of the preselection. The candidates with the highest scores will be invited to IRB Barcelona for an interview. Those who do not pass the threshold established will be excluded from further consideration. Applicants who do not pass this evaluation will be informed why and will be provided with the instructions to follow to start a redress procedure.



Short-listed candidates will receive an invitation to a three-day interview process held at IRB Barcelona. Teleconference interviews will be used only for candidates with prior commitments that cannot be rearranged and that thus prevent them from travelling to Barcelona.

Offers of admission will be made to the successful candidates shortly after the interview period. Candidates positively evaluated but with an insufficient score to receive a fellowship will be put on a reserve list to cover possible renunciations and future positions.

The list of awardees will be published on the IRB-TARGET section of IRB Barcelona's website. Awardees will receive a formal invitation letter.

The following **evaluation criteria** will be used by the Evaluation Committee during the remote phase:

| Evaluation criteria | Score (points) | Sub criteria | Weight | Threshold |
|-------------------------------|----------------|---|--------|-----------|
| Academic record and CV | 1-10 | Academic and/or professional curriculum in relation to the stage of the candidate's career (graduate studies, grades, institution), including career breaks. | 50% | 60% |
| | | Research experience (diverse fields /sectors, publications, participation in projects). | | |
| | | International mobility (studies abroad, secondments, etc...). | | |
| | | Scientific-technological quality (courses, workshops...). | | |
| | | Fellowships/awards received, supervision, knowledge transfer, communication and other relevant merits. | | |
| Motivation Letter | 1-10 | Strength and relevance of the candidate's motivation towards the research conducted at IRB Barcelona. | 20% | 50% |
| | | Interest in any specific IRB Barcelona research group, research programme or Nodes. | | |
| Letters of reference | 1-10 | Reference letters supporting the candidacy will be assessed taking into account the relevance of the content and the person who signs the letter in relation to the candidate's target research groups. | 30% | 50% |



The overall score of the remote phase will be calculated by multiplying the score obtained for each criterion (1-10 points) by the weight assigned to each one (as seen in the table). Only applications that are above the thresholds established for all criteria will be considered. This procedure will lead to a score out of 10. A ranking will be obtained in a consensus meeting. In case of a draw in the total score between applications, candidates will be prioritized on the basis of the weight of each criterion. If two candidates have the same scores for all evaluation the criteria, both will be invited to interviews.

During the interview phases, additional criteria (see below) will be taken into consideration:

| Evaluation criteria | Score (points) | Sub criteria | Weight | Threshold |
|---|----------------|---|--------|-----------|
| Candidate's potential | 1-10 | Ability to present complex reasoning in English. | 40% | 50% |
| | | Independent thinking, creativity, and organisation capacity. | | |
| | | Leadership skills, team working capacity, and maturity. | | |
| Motivation | 1-10 | Strength and relevance of motivation for applying to IRB Barcelona. | 30% | 50% |
| | | Motivation towards the research lines offered by the different nodes. | | |
| Academic background and theoretical fundamentals | 1-10 | Suitability of the candidate's academic background to undertake the research lines offering projects in the call. | 30% | 50% |

The overall score in the interview phase will be calculated by multiplying the score obtained for each criterion (0-10 points) by the weight assigned to each one (as seen in the table in %). This procedure will lead to a total score out of 10. A ranked list of candidates will be drawn up. In the event of a draw in the total score, candidates will be prioritized on the basis of the weight of each criterion. When scores on all evaluation criteria are still the same, preference will be given to candidates from under-represented groups (e.g. on the basis of gender, disability or refugee backgrounds).

On 9 December 2014, IRB Barcelona was awarded the "HR Excellence in Research" logo. This recognition reflects the commitment of the Institute to continuously improving its human resources policies in line with the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers. More information about our OTM-R (Open, Transparent, Merit-based Recruitment) policy can be found at the following [link](#).



VII. Documentation

Each candidate selected during the interviews must present the following documents to complete the selection procedure.

1. Degree certificate or official notification of degree award.
Non-Spanish nationals must present: 1) a certified copy and sworn translation of the degree certificate or equivalent obtained in a university abroad; and 2) a certified copy and sworn translation of the certificate showing the subjects studied.

If the certified academic records are not in Spanish or English applicants should also attach a sworn translation in one of the above mentioned languages.

2. A sworn statement expressing intention to enrol on a university doctoral programme.
3. A sworn statement stating that he or she does not receive any other funding or fellowship grant.

(Non-compliance with points 2 and 3 will automatically lead to withdrawal of the fellowship and the awardee must return any amounts received to IRB Barcelona).

VIII. Communication of Fellowship Award

The Head of Human Resources and Academic Affairs department will officially inform successful candidates of the fellowship award.

IX. Rights of Awardees

1. Awardees will have the following general rights:
- a) To be provided with the necessary assistance to perform their studies and research activities.
 - b) To become a member of the research programme in which they will be undertaking PhD studies.
 - c) To participate in bodies governing and representing the student community.
 - d) To participate in complementary calls for funding to attend scientific congresses or to spend training periods in other centres upon approval of their supervisors and the director of IRB Barcelona.



- e) To have their intellectual and industrial property rights regulated in the employment contract with IRB Barcelona.
2. Awardees will have employment and Social Security rights derived from the employment contract with IRB Barcelona.
3. Awardees will be able to exercise intellectual property rights derived from their training activity in accordance with their contribution, as established in the Intellectual Property Law, Royal Decree 1/1996, 12 April. These rights will be independent, compatible, and accumulable with other rights that may arise from the research developed, without negatively affecting the rights of the joint effort when the awardees participate in or are associated with a joint research project.
4. Regarding possible industrial property rights of the awardees, these will be regulated by Law 24/2015, of July 24, 2015, on Patents, and Royal Decree 55/2002, of January 18, 2002, governing the exploitation and license of rights on discoveries made in public research organisations.

Said rights will not be linked to salary.

X. Responsibilities of Awardees

1. To fulfil the terms and conditions established in this call.
2. To enrol on a university doctoral programme.
3. To perform their research activity under the supervision of a group leader at IRB Barcelona for the duration of the fellowship. In addition, they must perform the activities foreseen in the research training and specialisation programmes of the Institute, as well as satisfactorily fulfil the objectives of the training programme.
4. To comply with the internal regulations of IRB Barcelona, particularly regarding working conditions and the prevention of occupational risks.
5. To prepare a report each year informing on the scientific progress of their theses. Moreover, they will present this report to their Thesis Advisory Committee, designated by the Institute.



6. To request approval from the group leader supervising their activity prior to the submission for publication or disclosure of any abstracts and/or publications based on research carried out at IRB Barcelona.
7. To undertake the duties that correspond to them as a result of being contracted by IRB Barcelona, as well as those associated with inclusion in the Social Security System.
8. To defend their theses and obtain the respective PhD degree by the end of the fourth year after the start of the fellowship. In exceptional cases, an extension of one year may be given for the defence of the thesis.

XI. Termination of Fellowships

The fellowship will be revoked if the awardee has withheld or falsified information. The fellowship will also be revoked if the awardee does not fulfil the responsibilities described in point X.

XII. Incompatibility

Awardees will be devoted exclusively to the research or technical training and specialisation activities defined in this call. The fellowships included in this call are not compatible with any other type of grant or fellowship from other public or private organisations.

XIII. Legal Regime

Awardees will be subjected to the legal regime applicable to PhD fellowships according to the law in force at the time of drawing up the contract.

XIV. Data Protection

In accordance with Regulation (EU) 2016/679 (General Data Protection Regulation), Organic Law 3/2018 of December 5, and other applicable regulations governing personal data protection, any personal data provided by applicants will be incorporated into the Academic file of IRB Barcelona, for which the Institute is the data controller. The purpose of keeping such data is to manage the relationship of the Institute with applicants. Applicants may exercise the rights of access, rectification deletion, opposition, transfer and expiry, as well as limitation in data processing of said information by contacting the Institute at the following e-mail address: dataprotection@irbbarcelona.org, or by writing to the following postal address: C/ Baldiri Reixac, 10, 08028, Barcelona.





XV. Dissemination

Any information regarding this fellowship call will be placed on the announcement board on IRB Barcelona's website.

XVI. Clarification

The Director of IRB Barcelona or a designated representative will be responsible for clarifying queries regarding these terms and conditions.

Barcelona, 23 October 2023

Maribel Labrid
Head of Human Resources and Academic Affairs



ANNEX 1. Specific regulations for IRB-TARGET fellowships

Co-funded by the European Union's Horizon Europe Marie Skłodowska-Curie Actions Work Programme under grant agreement No. 101126676, IRB-TARGET is offering **5 four-year fellowships for the academic year 2024-2025 for researchers interested in carrying out their PhD projects.**

Programme description

IRB-TARGET will offer **10 four-year fellowships** (in two separate calls) to exceptional doctoral candidates who will have the opportunity to build a strong research project within one of the six interdisciplinary research nodes established at IRB Barcelona. The selection and recruitment process will build on best practices implemented institution-wide through lessons learned in MSCA-funded COFUND and ITN projects and endorsed by the HRS4R award held by the Institute since 2014.

To this end, it combines the excellence of the research and facilities offered by the Institute and its 28 research groups with highly competitive employment conditions and a new holistic training and supervision strategy designed to enhance the employability of fellows and their capacity to respond to the challenges faced by the European Research Area in the coming years.

IRB-TARGET integrates innovative aspects in the training of a new generation of researchers that go far beyond technical research skills and that include open science principles and research ethics, gender, and diversity aspects, data management, entrepreneurship and innovation management, and communication skills aimed at engaging with both scientific audiences and the broader society.

IRB-TARGET leverages the expertise of a network of partners that provide training, joint supervision and secondment opportunities, thereby covering the need for interdisciplinary technical skills, international and intersectoral collaboration and networking opportunities.

Doctoral training programme

Each IRB-TARGET fellow will build their own unique doctoral training itinerary that is adapted to their research, academic, professional and personal requirements and will prepare them to excel during and after their doctoral training. The personalised IRB-TARGET itinerary will be composed of several mandatory and optional components, categorised under research, training, and engagement, that fellows will complete to complement their research work. The



itinerary will be defined in collaboration with the supervisory team and will be reflected in their PCDPs (Personal Career Development Plans).

Fellows will need to complete a minimum required dedication (200 hours) in each category and sub-category to complete the IRB-TARGET Programme.

The major components of this itinerary include (see table below):

Overview and content structure of IRB-TARGET training programme

| Principal actions & minimum dedication to be completed by IRB-TARGET fellows | | Partners involved |
|--|---|--|
| RESEARCH | Core Biomedical Research Project Work <i>leading to a PhD from the Universitat de Barcelona</i> | |
| | Collaborations & Research Stays <i>or secondments in academia, clinic or industry</i> | 1-3 months Academic Clinical Industrial |
| TRAINING | Network-wide Training Events <i>organised by & for IRB_TARGET</i> | |
| | Complementary Training Actions <i>from local & other initiatives</i> | 25 hrs |
| ENGAGEMENT | Communication & Dissemination <i>actions to maximise research impact</i> | 50 hrs |
| | Outreach & Stakeholder network <i>engagement for responsible innovation</i> | 25 hrs |

- 1. Core biomedical research project:** Fellows will undertake a research project in a given field under the supervision of a Group Leader leading to a doctoral degree at the University of Barcelona. They will further enrich this research training through weekly participation in group (lab) meetings, interdisciplinary node and plenary seminars, PhD retreats, and symposiums.
- 2. Collaborations & research stays or secondments in academia, clinical setting, or industry (1-3 months):** Either through a secondment or a short stay, IRB-TARGET fellows will be required to complete a mandatory research stay or secondment as part of their doctoral training itinerary, unless explicitly discouraged by their Thesis Advisory Committee (TAC). The specific secondment plan of each fellow will be established as part of the PCDP development. While this itinerary establishes the minimum requirements, the number of short stays/secondments and their length may vary from fellow to fellow, to ensure the relevance of the outcome for the thesis



project to be developed and/or for the training of the fellow. The choice of the host institution (research laboratory, industry, or hospital) will be based on the research projects developed by the fellows and the collaborations that their supervisors have. IRB-TARGET has secured the commitment of 20 Associated Partners from 7 countries to host fellows, thereby providing a wide offer of international secondments (in addition to local/national options).

3. **Network-wide training events organised by and for IRB-TARGET (100 hours):** These mandatory training events will provide fellows with knowledge, skills and expertise in several core areas that are integral to their doctoral training, including research integrity, gender in research, entrepreneurship skills, open science and research data management, and communication.
4. **Complementary training actions from local and other initiatives (25 hours):** Fellows will have the opportunity to choose the training sessions and topics that best suit their needs and interests.
5. **Communication and Dissemination actions to maximise research impact (50 hours):** Having done a mandatory training course on communication given by Scienseed and had opportunities to fine-tune these skills at the institutional level by participation and presentation at group meetings, node seminars and plenary seminars, fellows will be required to further their communication and dissemination skills through the following: (a) participation and presentation (poster and/or talks) in international symposia/meetings/conferences/trade fairs (at least 3 during the IRB-TARGET Programme); and (b) dissemination of their research results as open-access peer-reviewed scientific publications will be highly encouraged and recommended.
6. **Outreach and Stakeholder network engagement for responsible innovation (25 hours):** (a) With the support and guidance of IRB Barcelona's Communication Department and the Public Engagement Officer in particular, IRB-TARGET fellows will contribute to outreach actions to disseminate science to the general public. A total of 2 actions per fellow will be mandatory before the completion of the programme. (b) To engage with the stakeholders and/or end-users of biomedical researchers, IRB-TARGET fellows will organise, conduct and amplify the impact of an online talk show to discuss important themes with respect to science, research and policy with guests representing key stakeholders from the society, including doctors, patients, patients' associations and civil society.



Supervision, career guidance, and career development

Each fellow has the support of the following actors in the implementation and revision of their PCDP: the Group Leader and the co-supervisor(s), including in the secondment lab(s); the Thesis Advisory Committee (TAC); and the Career support team.

Employment and working conditions

IRB-TARGET fellows will be employed by IRB Barcelona in compliance with Spanish legislation and regulations. IRB Barcelona received the HRS4R award in 2014 and its commitment to the principles of this recognition was acknowledged through its renewal in 2022, thus guaranteeing the alignment of the Institute with the values of the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers.

Doctoral contracts are regulated by the Trainee Research Staff Statute (EPIF, acronym in Spanish). All fellows will be hired through a **48-month employment contract**, and the employment conditions related to this contract will be the same as those that apply to all IRB Barcelona employees:

- (i) 40-hour working week;
- (ii) affiliation to the Spanish Social Security system covering sickness, maternity leave, and injuries at work, while also providing entitlement to a pension and unemployment benefit;
- (iii) a free full medical check-up each year and a private Health Insurance (MC Mutual), which covers accidents in the workplace;
- (iv) maternity and paternity leave according to Spanish law;
- (v) special leave for particular circumstances such as breastfeeding, serious illness/accident of a relative, house move, death of a relative, birth and adoption, parental care, and unavoidable public or private duty;
- (vi) holiday leave of 23 working days per year and 9 additional working days per year to attend to personal affairs, upon approval of the direct supervisor;
- (vii) discounts, including private health insurance, in-house yoga lessons, physiotherapy sessions, nearby day-care providers;
- (viii) training on health & safety provisions and courses aimed at preserving the fellows' mental health and well-being; and
- (viii) a UB membership card (Som UB) that gives free access to university facilities and discounts in training and leisure activities).



The amount allocated to cover the salary of the fellows includes:

- Gross annual salary of €37,920 (inclusive of the employer's social security contributions) & contract termination fees at the end of the contract.
- €2,400 /year for the family allowance (for all fellows with dependent family members, including researchers whose family status changes during the project, in agreement with HE MSCA standards).

In addition, the fellows will receive:

- A single payment for "relocation" will be provided to fellows (€1,000 for relocation within the EU and €2,000 for relocation from overseas, linked to prior location, not nationality of the fellow).
- €720/year for the annual university enrolment and other fees
- €1,500/year for travel and networking (costs derived from secondments/short stays and/or international conferences, workshops or other networking events)

Partner institutions

IRB-TARGET has secured the support of a broad range of International partners that have already committed to host fellows in secondment at their premises and open their training activities to them. See the list below:

- [Nostrum Biodiscovery S.L.](#), Spain
- [Fundació de Recerca Clínic Barcelona-Institut d'Investigacions Biomèdiques August Pi i Sunyer](#), Spain
- [Fundació Privada per a la Recerca i la Docència Sant Joan de Déu \(FSJD-CERCA\)](#), Spain
- [Fundació Privada Institut d'Investigació Oncològica de Vall d'Hebron \(VHIO\)](#), Spain
- [Radboud University Medical Centre \(Radboudumc\)](#), The Netherlands
- [Josep Carreras Leukaemia Research Institute](#), Spain
- [European Molecular Biology Laboratory](#), Germany
- [Københavns Universitet](#), Denmark
- [University of Groningen, Groningen Research Institute of Pharmacy \(GRIP\)](#), The Netherlands
- [School of Biomedical Science, McGill University](#), Canada
- [National University of Ireland Galway](#), Ireland
- [University of Twente](#), NL
- [Università degli Studi di Torino, Molecular Biotechnology Center \(MCB\)](#), Italy





Horizon Europe Marie Skłodowska-Curie Actions

The Marie Skłodowska-Curie actions (MSCA) provide grants for all stages of researchers' careers—be they doctoral candidates or highly experienced researchers—and encourage transnational, intersectoral and interdisciplinary mobility. The MSCA enable research-focused organisations (universities, research centres, and companies) to host talented foreign researchers and to create strategic partnerships with leading institutions worldwide.

The MSCA aim to equip researchers with the necessary skills and international experience for a successful career, either in the public or private sector. The programme responds to the challenges faced by researchers, offering them attractive working conditions and the opportunity to move between academia and other settings.

The MSCA are open to all domains of research and innovation, from fundamental research to market take-up and innovation services. Research and innovation fields are chosen freely by the applicants (individuals and/or organisations) in a fully 'bottom-up' manner.

For more information, please visit the following web pages:

<https://ec.europa.eu/research/mariecurieactions/>

<https://www.mariecuriealumni.eu/>



ANNEX 2. Research projects for IRB-TARGET fellowships

| IRB Barcelona research group | Group Leader | Research Node | Description of the research project |
|---|------------------------|--|--|
| Microtubule organization in cell proliferation and differentiation | Dr. Jens Lüders | Cell Pathophysiology; Preclinical Models of Disease | <p>Microtubule organization during differentiation of human stem cells</p> <p>Microtubules mediate various essential cellular processes such as intracellular transport, segregation of chromosomes during cell division, and cell polarization during tissue formation. Microtubule organizing centers (MTOCs) such as the centrosome organize the microtubule network by recruiting and activating microtubule nucleation factors and by anchoring microtubule ends. By controlling the shape and distribution of MTOCs, cells assemble microtubule arrays with distinct geometry and polarity, to carry out cell cycle stage- or cell type-specific functions.</p> <p>A process that strongly depends on proper organization of the microtubule network is vertebrate neural development. Highly polarized neural progenitor cells are vertically aligned, extending a basal process that contacts the basal lamina, and an apical process with a centrosome that is localized underneath the apical membrane.</p> |



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| | | | <p>We hypothesize that generation of the interphase microtubule network in these cells requires both centrosomal and non-centrosomal factors. In this project, we will (i) characterize candidate factors for nucleating interphase microtubules, and (ii) probe the roles of these factors in highly polarized neural progenitors including their contribution to cell and tissue integrity. To this end, we will employ genome editing and advanced microscopic imaging of polarized progenitors in fixed and live neuroepithelium-like neural rosettes obtained by differentiation of human iPSCs in vitro.</p> <p>This pioneering project will explore fundamental questions at the interface of cell biology and development, namely how non-mitotic microtubule arrays are established and how they contribute to tissue formation and integrity. These questions are also relevant in the context of disease since defects in the microtubule cytoskeleton have been linked to various neurodevelopmental disorders.</p> |
| <p>Cell Signaling</p> | <p>Dr. Francesc Posas & Dr. Eulàlia de Nadal</p> | <p>Cell Pathophysiology</p> | <p>Unraveling the Effects of Stress Responses on Cell Physiology</p> <p>We aim to unravel how cells detect and respond to environmental changes. We focus our studies on the characterisation of stress signal transduction pathways, especially those regulated by MAP kinases of the Hog1/p38 family, also known as the stress-activated MAP kinases (SAPKs). Proper adaptation to stress involves the modulation of several basic aspects of cell biology, among them the cell cycle and gene</p> |



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| | | | <p>expression. Using <i>S. cerevisiae</i> budding yeast as a model organism, as well as higher eukaryotic cells, we are dissecting the molecular mechanisms underlying cell response to changes in the extracellular environment and characterising the adaptive responses required for cell survival. Based on our knowledge of signal transduction and using synthetic biology, we also seek to modify cell behaviour to reprogram cell response to specific inputs/stimuli.</p> <p>Research lines:</p> <ul style="list-style-type: none">- SAPK targets: Using proteomics, biochemistry and genetics, our main goal is to identify new targets for SAPKs and thus widen our understanding of cellular adaptation to stress. This information is expected to facilitate the characterisation of the bases of adaptation in eukaryotes.- Cell cycle control: SAPKs act in several phases of the cell cycle to allow prompt response to extracellular stimuli and the maintenance of cell integrity. We are uncovering the mechanisms by which Hog1 and p38 SAPKs regulate the cell cycle.- Regulation of mRNA biogenesis: SAPKs control critical steps of mRNA biogenesis and are thus key regulators of stress-responsive gene expression. Our main aim is to determine the contribution of multiple factors to overall gene expression in |
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| | | | | response to stress. We are also using genome-wide CRISPR screening to identify essential genes for stress adaptation. |
| Colorectal Laboratory | Cancer | Dr. Eduard Batlle | Preclinical Models of Cancer | <p>Residual disease and metastatic relapse in colorectal cancer</p> <p>30-40% of colorectal cancer (CRC) patients undergoing curative resection of the primary tumor will relapse in the following years. In these patients, disseminated tumor cells are undetectable until they regenerate the disease in foreign organs, such as the liver and lungs. The identity and features of the residual tumor cells responsible for CRC relapse have remained elusive due to the impossibility of analyzing this clinically occult population in patients. By analyzing the transcriptomes of individual tumor cells in multiple primary CRC patient samples, we discovered that genes associated with an elevated risk of relapse are expressed by a defined subset of tumor cells that we named High Relapse Cells (HRCs). HRCs are abundant at invasion fronts, retain an epithelial program, and express genes involved in cell adhesion, locomotion and extracellular matrix remodeling.</p> <p>To investigate HRCs, we established a human-like CRC mouse model that undergoes metastatic relapse following surgical resection of the primary tumor. We also developed a methodology to isolate residual disseminated tumor cells before metastases are detectable. Single-cell profiling demonstrated that residual tumor cells occult in mouse livers after primary CRC surgery resembled the HRC population present in</p> |



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| | | | <p>patients. Over time, HRCs gave rise to multiple cell types, including Lgr5+ stem cell-like cells, and generated macrometastases that can kill the host. Genetic ablation of HRCs prior to extirpation of the primary CRC prevented metastatic recurrence and mice remained disease-free after surgery. The project will focus on the tumor microenvironment niche that specifies HRCs. We will study determinants of tumor cell plasticity during metastatic progression and develop therapies that can prevent metastatic recurrence in CRC.</p> |
| <p>Laboratory of Molecular Biophysics</p> | <p>Dr. Xavier Salvatella</p> | <p>Chemical and Structural Biology</p> | <p>Transcriptional condensates as drug targets for oncology</p> <p>We have recently shown how the transcriptional condensates formed by the androgen receptor can be targeted by drug-like small molecules for treating castration-resistant prostate cancer (in press in Nat Struct Mol Biol). The student joining our laboratory will investigate the mechanism by which this small molecules inhibit the function of the androgen receptor.</p> |
| <p>Pediatric Cancer Epigenetics Lab</p> | <p>Dr. Alexandra Avgustinova</p> | <p>Preclinical Models of Cancer;</p> <p>Cell Pathophysiology</p> | <p>Childhood cancer in context - determinants of the oncogenic niche</p> <p>Childhood cancers are believed to be rooted in aberrant development, a notion supported by their (i) generally low mutational burden, (ii) high prevalence of single (often epigenetic) driver events and (iii) occurrence during confined developmental periods. Yet, the exact origins of developmental tumours remain one of the principal enigmas of pediatric oncology.</p> |



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| | | | <p>A prime example are malignant rhabdoid tumours (MRTs): they are astoundingly genomically simple but extremely deadly childhood cancers that arise almost exclusively in the first two years of life and are driven by biallelic inactivation of the SWI/SNF chromatin remodelling complex subunit SMARCB1 (>95% of cases). We still do not know what determines oncogenic competence upon SMARCB1-loss. The PhD student will investigate the defining features of the local and systemic niches that support MRT initiation and tumour growth, using cutting-edge methods, including transgenic mouse models, single-cell resolution wholemount imaging and computational modelling. Ultimately, we seek to disrupt the MRT niche integrity in search of novel treatment strategies for MRTs.</p> |
| <p>Stem Cells and Cancer</p> | <p>Dr. Salvador Aznar-Benitah</p> | <p>Preclinical Models of Cancer;</p> <p>Cell Pathophysiology</p> | <p>The PhD student will be able to choose from several projects. One aimed at understanding the role of circadian rhythms in adult stem cell homeostasis and aging (Cell 2017a, Cell 2017b, Nature 2011, Cell 2019a, Cell 2019b).</p> <p>Other projects are related to our identification of metastasis-initiating cells in many types of tumours (Nature 2017; Nature 2021; Nature 2022; Nature Metabolism 2023; Cell Metabolism 2022). We now want to study how metastatic cells systemically affect the metabolism of the host. In addition, we want to study how the diet during gestation may epigenetically predispose to liver disease and cancer during adulthood.</p> |



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| <p>Development and Growth Control Laboratory</p> | <p>Dr. Marco Milán</p> | <p>Invertebrate Models of Disease</p> | <p>Drosophila as a model in cancer biology: Chromosomal instability and Tumorigenesis</p> <p>Chromosomal Instability (CIN), defined as an increased rate of changes in chromosome structure and number, is a feature of most solid tumors in humans. Our lab has developed a tumor model of CIN in <i>Drosophila</i> where the relevant cell populations and pertinent cell interactions involved in the response of an epithelial tissue to CIN have been identified and where the underlying molecular mechanisms have started to be elucidated. This model has led to the identification of emerging, tumor-like, cellular behaviors such as epithelial to mesenchymal (EMT)-like cell fate transitions, senescence, cell invasiveness, metastatic behavior, and malignancy. References: Dekanty et al. PNAS (2012); Clemente-Ruiz et al. Dev Cell (2016); Muzzopappa et al. PNAS (2017); Benhra et al. Dev Cell (2018); Joy et al. Dev Cell (2021); Romao et al. Current Biology (2021); Gracia et al. Nat Comm (2022); Barrio et al. Current Biology (2023).</p> <p>The PhD candidate will use the <i>Drosophila</i> CIN model to further characterize the genetic program underlying CIN-induced tumorigenesis. The first aim is to define the underlying transcriptional changes associated with the initiation and establishment of a CIN-induced tumor. The second aim is to functionally identify the genetic pathways, transcription factors and target genes underlying the CIN-induced emergence of tumor-like cellular behaviors in the interacting cell populations. The third aim is to identify and functionally</p> |
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| | | | <p>characterize which of these pathways, transcription factors and target genes are also involved in buffering the deleterious effects of CIN-induced DNA damage and CIN-induced production of highly aneuploidy karyotypes.</p> <p>The proposal combines genomic approaches, live imaging, allograft transplantations, and high-throughput genetics, and the results will pave the way for the functional identification of the Achilles' heel of most solid tumors.</p> |
| Structural Bioinformatics and Network Biology | Dr. Patrick Aloy | Computational Biology | <p>Expanding the small molecule repertoire towards precision drugs through AI generative models</p> <p>Artificial intelligence (AI) has the potential to transform drug discovery incorporating the global context of biological systems, as it is reshaping other areas of science and technology. We have recently presented the Chemical Checker (Duran-Frigola et al. Nat Biotechnol 2020; Bertoni et al. Nat Commun 2021) and the Bioteque (Fernández-Torras et al. Nat Commun 2022), two resources that collect and harmonize complex bioactivity data in a format readily amenable for modern AI. However, these resources lack detailed data on how the cell proteomes react to pharmacological perturbations. During this PhD project, we plan to incorporate this data into our knowledge graphs (the most comprehensive in biomedical knowledge to date) and implement an AI-based strategy to de novo design chemical compounds with specific pharmacological properties.</p> |



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| | | | | <p>If successful, our approach will be the first attempt to design small molecules to modulate high-order complex biological activities (i.e. global systemic properties or even phenotypes), overcoming the many limitations of target-based approaches. In addition, we will vastly expand the potential therapeutic chemical space from the few thousand current drugs to billions of synthetically accessible molecules. From a more applied perspective, we will deliver a set of small molecules to selectively modulate pancreatic cancer cell lines, thus providing an important chemical toolbox for cancer biology and, hopefully, a source of hit compounds for the development of novel drugs. Additionally, the proposed strategy to design NCEs that specifically modulate a particular molecular profile can be easily adapted to work with clinical data, which could finally boost the transition from precision to personalized medicine (i.e. from choosing the most promising drug among the current repertoire, to developing a specific drug for each patient).</p> |
| Innate Biology | Immune | Dr. Stefanie Wculek | <p>Cell Pathophysiology;</p> <p>Preclinical Models of Cancer</p> | <p>Studying the metabolism and function of innate immune cells in distinct tissues in youth and aging</p> <p>Myeloid cells, such as macrophages, dendritic cells (DCs) and neutrophils, reside in various organs to respond to insults and they are key to controlling immunity and inflammation. However, their aberrant activities in the elderly can cause immunosenescence and inflammaging. Different tissues comprise highly distinct milieus that</p> |



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| | | | <p>impose context-dependent biochemical challenges on their resident cells, which further change when tissues age. Yet it is poorly known how innate immune cells survive in their different homing organs and maintain their functionality.</p> <p>We hypothesize that macrophages, DCs and neutrophils have to adjust their metabolism to the distinct environments of their tissues of residence. This is important because metabolic changes upon stimulation were shown to affect the functions of these cells in vitro. Given the power of macrophages, DCs and neutrophils to orchestrate immune responses, it is now vital to reveal the precise metabolic adaptations of these cells to their distinct homing organs and to determine how that affects their activities.</p> <p>This project will uncover and characterize the relevance of tissue-dependent metabolic adjustments for the presence and functions of macrophages, DCs or neutrophils to young and aged tissues, and dissect the underlying molecular mechanisms. Independent innovative approaches and adapted cutting-edge techniques, including multicolour flow and mass cytometry, single-cell RNA sequencing, multiplex microscopy and various metabolic assays, will be used to analyze mouse models and human samples.</p> <p>The discovery of tissue-dependent metabolic adaptations by innate immune cells that impact their functions will transform translational immunology research to integrate the tissue-context and reveal novel</p> |
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| | | | organ-specific therapeutic strategies to combat immune dysfunction in aging and beyond. |
| Signalling and Cell Cycle Laboratory | Dr. Ángel R. Nebreda | Preclinical Models of Cancer; Cell Pathophysiology | Exploring tumor vulnerabilities by targeting stress kinase signaling We are investigating molecular mechanisms of tumorigenesis, especially regarding how protein kinases in general, and the stress-activated p38 MAPK pathway in particular, regulate tumor development, metastasis generation, and the response to cancer therapies. Ongoing projects in the group address two main topics: (1) Cancer cell homeostasis and chemoresistance mechanisms, and (2) Cross talk between cancer cells and stromal cells. Our work combines biochemical approaches and experiments in cultured cancer cells with studies using mouse models and chemical tools. We are currently performing a number of chemical genetic and genetic screenings to find new actionable targets that can be used to boost current cancer therapies as well as to design new targeted therapies for particular cancer types. The group has the ambition to identify therapeutic opportunities based on the modulation of p38 MAPK or other kinases, either alone or in combination with other therapeutic agents. |
| Inflammation, Tissue Plasticity & Cancer | Dr. Direna Alonso-Curbelo | Cell Pathophysiology; Preclinical Models of Cancer | Decoding systemic determinants of cancer initiation and metastasis Our lab studies the interplay between genetic mutations and environmental signals that promote malignant transformation and immune evasion, focusing on pancreatic and liver cancers – two clinical |



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| | | <p>challenges needing more effective early detection and treatment strategies. As tumor cells hijack mechanisms that can also be key to safeguarding normal tissue homeostasis (e.g., wound healing, regeneration, immunity), we use bulk/single-cell epigenomic profiling and flexible disease models to expose molecular and cellular traits that are unique to tissues undergoing neoplastic transformation and metastatic progression, and we apply functional genomics tools (RNAi/CRISPR) to pinpoint the specific mechanisms responsible for disease pathogenesis.</p> <p>The available PhD projects will focus on dissecting, at a molecular and functional level, the interplay between cancer-predisposing mutations and inflammatory signals associated with cancer risk, with a focus on systemic tumor-immune interactions. The research plan builds upon our recent discovery of epigenetic mechanisms that mediate the cooperation between oncogenic mutations and tissue damage (Alonso-Curbelo et al. Nature 2021; Burdziak*, Alonso-Curbelo* et al. Science 2023), and which can be reprogrammed to unleash anti-tumour immunity (Chen et al. Cancer Disc 2023). Through this opportunity, the student will acquire training in general cancer biology, molecular cloning, functional genomics tools (e.g., RNAi/CRISPR), spatial analyses (immunofluorescence/immunohistochemistry), flow cytometry, culture of organoids and cell lines, and experimental design, data analysis and reporting. The student will also work with a dynamic team of cancer biologists, biotechnologists, and computational scientists to set up experimental pipelines in our lab,</p> |
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| | | | benefit from interdisciplinary collaborations, and contribute to an enriching and stimulating working environment. |
| Translational Control of Cell Cycle and Differentiation | Dr. Raúl Méndez | Preclinical Models of Cancer; Cell Pathophysiology | <p>Reactivating the chronic integrated stress response to prevent liver cancer in obesity and aging</p> <p>Liver cancer is the second leading cause of cancer deaths worldwide and treatment options are extremely limited. Its incidence is rising rapidly, linked to the global epidemic of obesity and an aging population. Liver metabolic adaptation to a high-fat diet and the microenvironment of hepatocellular carcinoma (HCC) activate the integrated stress response (ISR). The ISR is a homeostatic mechanism that decreases global protein synthesis while activating the translation of specific mRNAs encoding proteins implicated in stress resolution.</p> <p>Most of the studies until now have focused on the “acute” phase of the IRS, aimed to resolve the stress or trigger cell death. However, obesity and cancer generate “chronic” stress to which the liver must adapt. We have recently unraveled a unique and previously unrecognized chronic ISR program that protects liver cells from a high-fat diet and aging-induced stress. Preliminary results indicate that this circadian-chronic-ISR is also antitumoral while allowing translational reprogramming that permits simultaneous hepatocyte cell division and differentiation and promotes liver regeneration. Disruption of this chronic branch of the ISR leads to hepatic steatosis, increased liver damage, and HCC. Here we aim to understand whether, when and how abnormalities in the</p> |



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| | | | <p>balance between the acute IRS and the novel chronic ISR programs predispose to fatty liver-to-liver cancer progression and tumoral niche establishment upon high-fat diet and aging.</p> <p>We will use clinically meaningful and genetically modified in vivo mouse models and in vitro systems, combined with cutting-edge techniques (multi-omics data), to identify druggable targets/pathways that will be further validated in human samples.</p> |
| <p>Comparative Genomics</p> | <p>Dr. Toni Gabaldón</p> | <p>Computational Biology</p> | <p>We are looking for a PhD candidate to join any of our ongoing research lines (see www.cgenomics.org):</p> <ul style="list-style-type: none"> - Phylogenomics and genome evolution: In the genomic era it has been possible to move from the evolutionary analysis of single protein families (phylogenetics) to that of complete genomes and proteomes (phylogenomics). To achieve this transition new tools have been developed that allow the large-scale reconstruction of thousands of phylogenetic trees in an automatic way. - Comparative genomics and population genomics of fungal pathogens: Fungal infections constitute an ever-growing and significant medical problem. Diseases caused by such pathogens range from simple toe nail infections, to life-threatening systemic mycoses in patients with impaired |



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| | | | <p>immune systems. The molecular mechanisms driving invasion of mammalian hosts by fungal pathogens poses many scientifically challenging problems, which are as yet little understood.</p> <ul style="list-style-type: none"> - Microbiome-host interactions in health and disease: As a natural progression of our interest in the role of fungi in health and disease, the group started working on the analysis of the microbiome. Our main focus within this field is quantifying and understanding the role of the fungal component, which is usually neglected by mainstream analyses. - Evolutionary genomics of long, non-coding RNAs: Recent genomics analyses have facilitated the discovery of a novel major class of stable transcripts, now called long non-coding RNAs (lncRNAs). A growing number of analyses have implicated lncRNAs in the regulation of gene expression, dosage compensation and imprinting, and there is increasing evidence suggesting the involvement of lncRNAs in various diseases such as cancer - Evolution of eukaryotes: Every eukaryotic organism shows a high level of sub-cellular compartmentalization that is significantly more intricate than the most complex prokaryotic cell. How such degree of complexity came to be is still not fully |
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| | | | <p>understood. In this context, endo-symbiotic events with bacterial organisms have been proposed to be the source of a number of organelles including mitochondria, chloroplasts and peroxisomes.</p> |
| <p>Gene Translation Laboratory</p> | <p>Dr. Lluís Ribas</p> | <p>Cell Pathophysiology</p> | <p>Human transfer RNAs, connectors of protein synthesis to inflammation, cancer and aging</p> <p>Our laboratory investigates medical conditions caused and regulated by alterations of the protein synthesis apparatus. Our current focus is on inflammation, cancer, and aging. In inflammation research, we have developed a new biomedical model that allows us to investigate the onset and progression of inflammation directly in human tissue. This is a unique approach that offers unprecedented access to the molecular events that trigger the inflammatory response.</p> <p>In cancer, we are engineering tRNAs to induce wide proteome alterations in tumor cells. Our goal is to develop new tools to induce cancer cell toxicity and boost the immunological rejection of tumors. Finally, in aging, we have recently discovered that tRNA genes are mutagenic hot spots in somatic cells, and we hypothesize that this phenomenon significantly contributes to the degeneration of cells and tissues during aging. We seek an enthusiastic PhD student to work in one of these research projects.</p> |



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| <p>Research Unit on Asymmetric Synthesis</p> | <p>Dr. Antoni Riera</p> | <p>Chemical and Structural Biology</p> | <p>Synthesis of new protein degraders</p> <p>Targeted protein degradation (TPD) approaches to drug discovery have experienced an exponential growth in the last decade. The possibility to target proteins that were considered undruggable, as well as the advantages of the event-driven mechanisms vs the occupational-driven mechanisms of traditional inhibitors, are the main factors of this success. The so-called protein-targeting chimeras (PROTACs) are the most general chemical approaches to TPD.</p> <p>PROTACs are bifunctional compounds able to bring the protein of interest in proximity to ubiquitinating enzymes, with the final scope of inducing its poly-ubiquitination and degradation via the proteasome pathway. Structurally, PROTACs consist of one end that binds to the protein of interest (warhead) covalently linked to an E3 ubiquitin ligase ligand. Our group, in collaboration with several biology groups, has already developed PROTACs of the oestrogen receptor and p38. The project will consist of the design, synthesis, and biological evaluation of new PROTACs of several proteins of pharmacological interest.</p> |
| <p>Molecular Modelling and Bioinformatics</p> | <p>Dr. Modesto Orozco</p> | <p>Computational Biology</p> | <p>Artificial Intelligence for the description of 3D and 4D chromatin structure</p> <p>Massive genomic studies have provided full 1D information on DNA, even at the single-cell level. The next frontier is to determine how this sequence fold, i.e. understand the structure and dynamics of</p> |



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| | | | <p>chromatin. This will allow us to understand how DNA functionality is regulated and the connection between DNA lesions and pathologies.</p> <p>The MMB group has been very active in developing state-of-the-art simulation tools to study chromatin using physical models supplemented by experimental information including 3C-technologies, MNase_seq, ultra-resolution microscopy, DNase_seq, CHIP-seq, 1D sequencing,... We now plan to explore how chromatin structure changes depending on the presence of lesions and on the epigenetic imprinting in both DNA and histones. At this stage, we plan to complement standard physical simulation engines with Artificial Intelligence methods, which would allow us to recognize hidden connections between 1D information (lesions, epigenetic imprinting, mutations,...), expression level, and 3D conformations.</p> <p>We are looking for a motivated PhD student, with training in theoretical and computational methods and interest in learning about new-generation AI methodologies applied to a translational research framework.</p> |
| <p>Growth Control and Cancer Metastasis</p> | <p>Dr. Roger Gomis</p> | <p>Preclinical Models of Cancer</p> | <p>Understanding metastasis drug resistance</p> <p>We now propose to elucidate drug-tolerant persister BCa cells, which develop following treatment, can persist in the body in a latent state, and can metastasize. We believe that there is an extensive phenotypic heterogeneity and plasticity present in BCa cells/tissues prior to</p> |



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| | | | <p>treatment, which influences chemotherapy resistance and promotes resistant cancer cell development. Research has been hindered by their heterogeneity and the technical difficulties presented by the extremely low number of cells necessary for disease progression and by the requirement of an extra-cellular environment for drug resistant plasticity.</p> <p>We now propose to gain previously unappreciated understanding at the genetic, epigenetic, biochemical, and cellular levels of the chromatin and transcriptional regulatory mechanisms that establish drug resistant latent state and subsequent metastasis progression, and then to exploit this information for therapy.</p> |
| <p>Mitochondrial Biology and Tissue Regeneration Lab</p> | <p>Dr. Ana Victoria Lechuga Vieco</p> | <p>Preclinical Models of Disease;</p> <p>Cell Pathophysiology</p> | <p>Metabolic Resilience: Exploring Mitochondria in Immune and Cardiac Health</p> <p>Despite advances in preventive medicine, cardiovascular disease remains the leading cause of global mortality. This fact highlights the persistent existence of cardiovascular risks that have yet to be fully addressed. Many age-related diseases are predominantly influenced by a persistent low-level inflammation known as 'inflammaging'. As tissues age, they tend to accumulate senescent cells that release pro-inflammatory cytokines and other proteins, collectively referred to as the senescence-associated secretory phenotype. Loss of mitochondria integrity might cause inflammaging, either in immune cells themselves, cell-intrinsically, or by cardiomyocytes in a cell-extrinsic fashion. This</p> |



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| | | | <p>study will provide new insights into the mechanisms underlying cardiac physiopathology through understanding the interaction between mitochondrial fitness and intercellular signaling.</p> <p>The PhD candidate will have the opportunity to join a new dynamic research group that will elucidate the role of mitochondrial quality control mechanisms in shaping the transcriptional and metabolic programs of immune cells in complex tissues. The project includes investigations in both preclinical and human disease models, aiming to explore the connection between inner mitochondrial membrane stress and immune aging, as well as its effects on maintaining the health of cardiac tissue.</p> <p>This PhD opportunity offers a chance to engage in cutting-edge research that integrates metabolism, mitochondrial biology and immunology within the context of cardiovascular diseases.</p> |
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