BIP_Stem Cells and Regenerative Medicine

UNIVERSITAT DE BARCELONA

Coordinator : Dr. Ana Sevilla, anasevilla@ub.edu

BIP_Stem Cells and Regenerative Medicine

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Directed to: Master and PhD Students

- Genetics and Genomics
- Neurociences
- Biomedicine
- Biotechnology
- Physiology

Lectures
Discussion
Posters
Ethics
Communication

Where they will have Virtual Classes and one week in summer of wet lab

(1st week of July)

BIP_ Stem Cells and Regenerative Medicine

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ORGANIZERS	UNIVERSITY	WEBSITE	EXPERTISE
Ana Sevilla (Coodinator) Anasevilla@ub.edu	University of Barcelona (Spain)	https://sites.google.com/view/sevillalab	Stem Cells, reprogramming and Brain Organoids
Jonathan Arias jonathan.arias@gmc.vu.lt	University of Vílnius (Lithuania)	https://www.gmc.vu.lt/en/lsc-embl/laboratories/96-embl-partnership-institute/1922-the-laboratory-of-dr-jonathan-arias	CRISPR Technology and Immunology
John De Vos **john.devos@inserm.fr**	University of Montpellier (France)	https://irmb-montpellier.fr/about/john-de-vos/	Stem cells, regeneration and Cell Therapy
OPEN			
OPEN			

Open for to more Universities with expertise in Stem Cells !!

Erasmus+
THE EU PROGRAMME FOR EDUCATION, TRAINING, YOUTH AND SPORT

Each University will cover the mobility costs of his students through Erasmus funds $$$

Need 20 Students, minimun from 3 different Universities (Can be from multiple Universities)(aim for 4):

Poster

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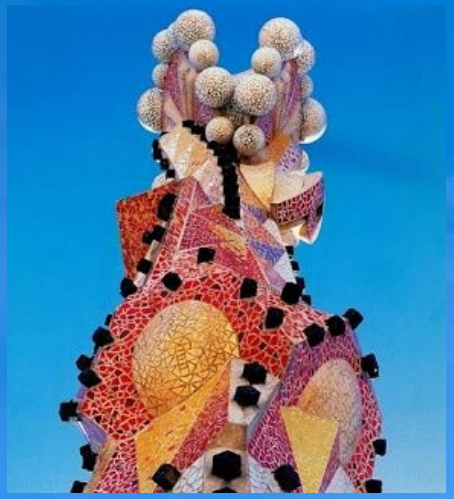
Stem Cell International Summer School 2025



From July lst to the 5th
Biology Faculty
Barcelona
(Spain)

Applications are open

It is a not-for-profit event which is organized by leading figures in the academic stem cell community

You will learn:

The characterization process to depòsit your iPSC in the European Bank
How to make Embryoid Bodies
Strategies for making Brain Organoids
Design of Crispr Cas9 Knock-out and Knock in

Organizers:
Dr. Jonathan Arias (Vílnius University)
Dr. John De Vos (Montpellier University)
Dr. Ana Sevilla Hernández (Barcelona University)

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STEMCELL™ TECHNOLOGIES

CORNING

Academic Plan

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Preliminary considerations

- As far as possible, the gender perspective will be incorporated in the development and activities of the subject.
- Daily and fluid communication between teachers and students will be maintained via Teams / Virtual Campus.
- BIP Erasmus singular subject, which takes place online and one week in Barcelona, the coordinating university,

Academic Plan

ACTIVITIES	SUBACTIVITIES	HOURS
In-person and/or non-in-person activities 24 (Theoretical classes, theoretical and practical classes, laboratories, face-to-face evaluation.)	Online Face-to-Face Theory 12 -	24 HOURS
	In-person theory and practice 4	
	In-Person Seminars 8	
Directed activities, not in person + tutoring		25 HOURS
Autonomous learning (Hours personal study, problem solving, book consultation.)		26 HOURS
	TOTAL	**75 HOURS**

Academic Plan

Skills that students will develop

- CB3 - Students will acquire the ability to gather and interpret relevant data (usually within their area of study) to make judgments that include a reflection on relevant social, scientific or ethical issues.
- CB4 – Students will convey information, ideas, problems and solutions to both a specialized and non-specialized audience
- CB5 - Students will develop the learning skills necessary to undertake further studies with a high degree of autonomy
- CG1 –Acquisition of Ethical commitment doing research (critical and self-critical capacity / ability to show attitudes consistent with ethical and deontological conceptions).
- CG2 - Capacity for learning and responsibility (capacity for analysis, synthesis, global visions and application of knowledge in practice / capacity to make decisions and adapt to new situations).
- CG3 – International and multicultural Teamwork (ability to collaborate with others in an international scenario and to contribute to a common project/ability to collaborate in interdisciplinary and multicultural teams).
- CG6 - Communicative capacity (ability to understand and express oneself orally and in writing in English, with mastery of the specialized language / ability to search, use and integrate information).
- CE5 - Describe the structure and functioning of living beings at the molecular, cellular and tissue level, and also the regulation and integration of functions in organisms.

Academic Plan

Learning objectives

Regarding knowledge:

— Know the different kind of stem cells their potential and its recent applications.

— Learn in detail the different test to characterize an induced pluripotent stem cell.

— Know qPCR data analysis, flow cytometry data analysis and fluorescent image acquision.

— Know the process to register a new iPSC in the European Stem Cell Bank.

Academic Plan

Methodology and training activities

The teaching methodology includes:

— Master classes.

— Shall we ask the to prepare a seminar from the online part?

— Poster presentations presented by students, which will be prepared during the wetlab week in Barcelona and orally presented in face-to-face sessions in Barcelona.

* The proposed teaching methodology may undergo some modification depending on the circumstances. These changes would be indicated to all students via Virtual Campus, if applicable.

Credential evaluation of learning

The knowledge gained, the degree of utilization and interest, as well as the participation in theoretical and practical classes and seminars are evaluated based on:

- The poster presentations by the students during the face-to-face week in Barcelona
- Students' participation in theoretical and practical sessions and seminars

BIP Stem Cells and Regenerative Medicine (75 H)

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SECOND SEMESTER

CREDITS	MODE	LECTURES	TEACHER
1 hour	On line	T1. Kind of Stem Cells and Reprogramming methods. Pluripotency and cell reprogramming, from embryonic stem cells to iPSC	Ana Sevilla
1 hour	On line	T2. Human embryogenesis and lessons for regenerative medicine	John De Vos
1 hour	On line	T3. Neuronal brain organoid Protocols and Tissue Engineering, Organ on Chip	
1 hour	On line	T4.	
1 hour	On line	T5. Characterization and Regulation and Deposit at the European Bank	
(20 Hours)	On line In groups	Independent Learning. Techniques, design experiments and protocol search	TEACHER SUPERVISION (Ana Sevilla, Jonathan Arias, John De Vos)

JULY 1st WEEK

CREDITS (30 Hours)	MODE	LECTURES	TEACHER
Wet lab and lectures	In place	T6. CRISPR- Cas9 Knock in and Knock out design and Cart T cell Therapies	Jonathan Arias
Wet lab and lectures	In place	T7. MSCs and Cell Therapies. Bronchial Epitelium and primary ciliary dyskinesia (PCD)	John De Vos
Wet lab and lectures	In place	T8.	
		T9	Daniel Tornero/Silvia Acosta/ CRG Stem Cell Bank
		T10 Human animal chimeras: the possibility of producing human organs in animals; technical issues, ethical issues	John De Vos
(20 Hours)	**In place in groups**	**SUPERVISED DOSSIER and POSTER**	TEACHER EVALUATION **(Ana Sevilla,** Jonathan Arias, **John De Vos)**

Speakers for Lectures

Regarding the additional lecturers, I would like to suggest **Prof. Jose Inzunza** from Karolinska Institutet (KI) Sweden, who is managing the organoid core facility and teaches the "**Stem cells and organoids**" course at KI. I frequently teach in his courses in Stockholm. I just chatted with him and he would be very glad to join us. Can reach him on Teams anytime jose.inzunza@ki.se
https://staff.ki.se/people/jose-inzunza
https://orcid.org/0000-0003-0876-6767

Speakers for Lectures

I would also like to suggest **Prof. Józef Dulak** from Jagiellonian University in Krakov who is director of the biotechnology institute. He has 2 courses on the theme of regenerative medicine and teaches in my course in VU "**Advanced Therapeutics and Regenerative Medicine**". I chatted with him last week and he will be back from Boston at that time. This is his contact jozef.dulak@uj.edu.pl
https://scholar.google.com/citations?user=OD3-pPEAAAAJ
https://en.wikipedia.org/wiki/J%C3%B3zef_Dulak
https://zbm.wbbib.uj.edu.pl/documents/134883731/136087500/J.+Dulak+CV+2020/1caf5bba-f44b-4a0d-ae37-ac5332d129b9

Regarding the extra content for course, I could suggest the themes bellow, I think that **Jose an Jozef** could also suggest other great themes.

"**Guided differentiation into exemplary cell types of the three germ layers**" (i.e. cardiac, neuronal)
"**Ongoing studies for clinical translation of iPS cell and regenerative technologies**"
https://www.eurostemcell.org/story/europe-approves-holoclar-first-stem-cell-based-medicinal-product
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5516551/pdf/npjparkd201517.pdf

WET LABORATORY SKILLS (1st WEEK of JULY)

SCHEDULE

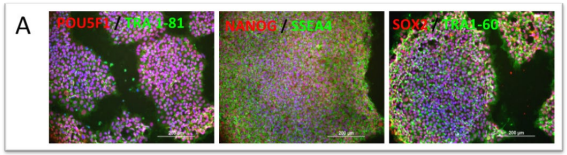
Wet lab_1st week of July at (UB)

(30 Hours)

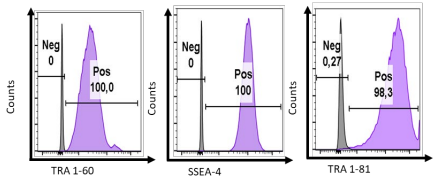
	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
10:00 a 13:00	Hands on culture iPSC Matix and Medias Inmuno preparation pannel Alkaline phoshatase test. Image adquision	Hands on inmunohistochemistry FACS stainig and analysis Visit to the Flow cytomety core	Image adquision Embryoid body formation	qPCR Set up Data analysis	Dosier organization Ethics document submission
13:00 a 15:30	Lunch Break				
16:00 17:00	Discussion Groups (Journal Club)				
17:30 -18:30	Invited talk 1	Invited talk 2	Invited talk 3	Invited talk 4	Invited talk 5

DATA EXPECTED TO BE OBTAINED FROM THE TRAINING

Immunofluorescence



FACS analysis



Embryoid Body Assay Immunofluorescence and qPCR