

IBEC-SJD INTERNATIONAL PhD PROGRAMME

Position

1. Project Title/ Job Position title:

Spatiotemporal landscape of childhood cancer initiation using 3D in vitro gastruloid models

2. Research project/ Research Group description:

Childhood cancers are believed to be rooted in aberrant development, yet their exact (and disease-specific) origins remain undefined. This project aims to uncover the spatiotemporal landscape of childhood cancer initiation for cancers thought to originate during early development (specifically malignant rhabdoid tumours, MRT, and Ewing sarcoma, EWS) by leveraging 3D in vitro gastruloid models and advanced tissue imaging technologies.

Gastruloids are 3D in vitro models that recapitulate early mammalian development, including the formation of neural tissue. The Pediatric Cancer Epigenetics group (IRB) will provide expertise in childhood cancer biology and epigenetic regulation. We will genetically engineer gastruloids to model known disease-relevant genetic mutations (e.g., SMARCB1-loss for MRTs; EWSR1-FLI1 translocation for EWS) and analyze their impact on the spatiotemporal development at early stages upon drug perturbation. We will utilize advanced spatial biology profiling techniques developed by the Spatial Biotechnology group (IBEC) to map cell distribution of neuroblastoma-like cells within the context of the gastruloid.

By integrating spatial multi-omics data, genetic engineering, drug screening, and advanced computational analysis, we aim to identify novel drivers and potential therapeutic targets in early childhood cancer development. This project combines the unique strengths of both groups to develop a cutting-edge imaging platform for studying pediatric cancer using physiologically relevant 3D models. The findings will provide fundamental insights into neuroblastoma development and could pave the way for novel therapeutic strategies.

3. Job position description:

This collaborative project offers a unique PhD training opportunity at the interface of developmental biology, cancer, and tissue imaging.

Main tasks and responsibilities:

- Establish 3D gastruloid models for the study of childhood cancer *in vitro*.
- Develop approaches for drug screening of gastruloids compatible with spatial biology technologies.
- Implement pipelines for spatial tissue analysis.

Requirements for candidates:

Essential:

- BSc and MSc in biomedicine, biotechnology, or related fields.
- A strong commitment to scientific research and an excellent academic record.
- Good working knowledge of English.
- The candidates must not yet have been awarded a doctoral degree. The candidates must not have held a PhD contract exceeding twelve months by the beginning of the fellowship on October 2025.
- Good skills in communication, teamwork, proactivity, commitment, integrity, time management, critical and analytical thinking, precision, and focus.
- Willingness to work in a highly multidisciplinary environment.

Advantageous:

- Experience programming and scripting in Python and/or R.
- Previous experience in image analysis.

Group Leader at IBEC

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Group Leader at SJD

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