MSc Internship: Modeling Myelodysplastic Syndromes Using Human Hematopoietic Organoids

Are you passionate about stem cell research and blood disorders? Sanquin Research offers an exciting internship opportunity to contribute to the development of a novel human model for Myelodysplastic Syndromes (MDS). In this project, you will work with induced pluripotent stem cell (iPSC)-derived hematopoietic organoids and patient-derived stem cells to study how blood production becomes disrupted in MDS. This internship has a **minimum duration of 8 months** and will be carried out within the **Sanquin iPSC Facility**, which provides state-of-the-art infrastructure, established protocols, and expert support for stem cell culture and differentiation.

About Sanquin

Sanquin's mission is:"*Together with the donor, we ensure a better life for patients.*" We are a knowledge-driven, not-for-profit organization providing life-saving products and services while conducting cutting-edge research in blood transfusion medicine and immunology. Our research focuses on five medical needs: Anemia, Bleeding and Hemostasis, Cancer, Immune Deficiency and Aging, and Vascular and Inflammatory Diseases. We offer a dynamic, internationally oriented scientific environment with excellent facilities, weekly scientific meetings, journal clubs, and scientific discussions.

About the Project

Myelodysplastic Syndromes (MDS) are a group of blood disorders characterized by ineffective blood cell production, anemia, and an increased risk of progression to acute myeloid leukemia (AML). Despite major advances in our understanding of the genetic basis of MDS, studying disease mechanisms and developing new therapies remains challenging because suitable human model systems are still lacking.

In this project, you will help develop a human hematopoietic organoid co-culture model that combines iPSC-derived bone marrow-like organoids with hematopoietic stem and progenitor cells obtained from MDS patients. This innovative platform will allow us to investigate how diseased stem cells interact with their microenvironment and contribute to defective blood formation, particularly ineffective erythropoiesis.

The project forms part of ongoing efforts to create patient-relevant disease models that can ultimately improve our understanding of MDS and facilitate the development of better treatment strategies. The work is closely aligned with translational research efforts aimed at improving outcomes for patients suffering from chronic anemia and transfusion dependency.

Your Role

You will contribute to establishing and characterizing a novel MDS co-culture system based on hematopoietic organoids (HeOs) and patient-derived cells.

Activities may include:

- Maintenance and differentiation of human induced pluripotent stem cells (iPSCs).
- Generation and characterization of hematopoietic organoids.
- Isolation and culture of primary human hematopoietic stem and progenitor cells.
- Establishment of co-culture experiments using healthy and MDS-derived cells.
- Flow cytometry-based characterization of hematopoietic and erythroid development.
- Immunophenotyping and functional assays.
- Molecular biology techniques, including RNA and DNA analysis.
- Data analysis and interpretation in collaboration with researchers and clinicians.

You will work independently as well as within a multidisciplinary team of stem cell biologists, hematologists, researchers, and technicians. This internship provides broad exposure to stem cell biology, hematopoiesis, disease modeling, and translational biomedical research.

Your Profile

- You are currently enrolled in an MSc programme in Biomedical Sciences, Cell Biology, Molecular Biology, Regenerative Medicine, Bioinformatics, or a related field.
- You have at least 3 months of experience with mammalian cell culture.
- **Because this project relies heavily on culturing and differentiating human iPSCs, prior hands-on experience with iPSC maintenance and culture is strongly preferred.**
- Candidates without iPSC experience should be able to demonstrate substantial experience with mammalian cell culture and a strong motivation to learn stem cell techniques.
- Experience with stem cell differentiation, flow cytometry, molecular biology, bioinformatics, or omics data analysis is considered an advantage.
- You are motivated to work with both primary patient material and advanced stem-cell-derived model systems.
- You are independent, responsible, and capable of working in a collaborative research environment.
- You possess strong communication and writing skills in English.

What We Offer

- A challenging research project at the forefront of stem cell and hematology research.
- Hands-on experience with human iPSC technology and organoid systems.
- Training in advanced cell culture, flow cytometry, and molecular biology techniques.
- Exposure to translational research involving primary patient samples.
- Participation in an internationally oriented and collaborative research environment.
- Opportunities to present your work at lab meetings and departmental seminars.
- Access to the **Sanquin iPSC Facility**, including dedicated infrastructure, established protocols, specialized equipment, and expert support for iPSC culture, differentiation, and organoid development.

Practical Information

- **Duration:** Minimum 8 months.
- **Location:** Amsterdam, The Netherlands.
- **Research environment:** The project will be performed within the **Sanquin iPSC Facility**, a dedicated stem cell research facility providing access to advanced cell culture infrastructure, specialized equipment, validated differentiation protocols, and experienced technical support.
- **Start date:** To be agreed upon.

More Information

For more information about this internship, please contact Micha Nethe (m.nethe@sanquin.nl). If this project excites you and aligns with your skills and interests, please send us your motivation letter

(explaining your interest in the project and how your skillset fits) together with your CV, both in English. Applications will be reviewed on a rolling basis.