Title: Finding molecular mechanisms behind the activation of stellate cells. (NCN/OPUS)

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www: https://olab.com.pl/ https://shorturl.at/JNT69

Project description:

Liver fibrosis accompanies chronic liver diseases of various aetiologies, and it has a high prevalence in the population, as many of the underlying causes are common. The fibrous tissue, primarily composed of collagen, replaces the normal functional tissue of the organ, disrupting its structure and function. This results in organ stiffening, chronic inflammation and loss of hepatocytes. The main culprits behind fibrosis are stellate cells, specialized liver pericytes that upon damage become activated and start producing collagen. The impact of the gut microbiota on human health is undeniable. The liver is particularly interesting in the context of the microbiota because of its exposure to bacterially derived products. Together with nutrients from digested food, microbiota-derived molecules and metabolites, reach the liver *via* portal circulation. This makes the liver uniquely exposed to microbiota, without having direct contact with live bacteria. It is unclear which signals from the microbiota impact stellate cells of the liver to drive profibrotic responses.

Aim:

The overarching aim of this project is to investigate the mechanisms of hepatic stellate cell activation, their role in liver fibrosis and the impact of microbiota on these processes, with a goal in mind to identify potential treatment avenues and druggable candidates. There will be two paths for the prospective PhD student: (1) multi-omic analysis of the fibrotic processes in the host, which entails mostly genomics (RNAseq, single-cell genomics) and (2) analysis of the impact of the microbiota, which entails gut microbiota analyses including both Illumina and nanopore sequencing data.

Requirements:

- MSc or MEng degree in biology, biotechnology, engineering, computer science, mathematics, physics or related fields
- Strong interest in molecular biology, microbiology and physiology
- Proficiency in written and spoken English
- Excellent interpersonal skills, initiative, good work organization, good collaboration skills
- Prior experience in following techniques will be an advantage (but not a prerequisite):
    - Sequencing libraries generation (Illumina, ONT, RNAseq, single-cell genomics, metagenomics)
    - Cell culture (cell lines, organoids, CRISPR-based cell line modification techniques)
    - Microbiology (culturing bacterial isolates, phenotyping, working anaerobically)
    - Working with mice (handling, injections, oral gavage, dissection, perfusion)
    - FACS, cell sorting
- Ability to code in R and/or Python, experience in data science will be an advantage
- Prior experience in sequencing data analysis or writing pipelines will be an advantage

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