

Project openings in cancer precision medicine in Tobias Sjöblom's research group at IGP, Rudbeck Laboratory

Our research spans several topics and provides opportunities for students to explore many different types of molecular laboratory and data analysis approaches. Our main focus is in improving treatment and diagnostics for cancer, but some of our studies also center on other diseases or conditions.

We are looking for motivated students that want to develop their skills in bioinformatics analyses, laboratory work centered on cell signaling or drug screening in cell and organoid models, or data science and machine learning.

Current project proposals are listed below. New opportunities arise regularly so you are welcome to contact the group leader Tobias Sjöblom if you are interested in other aspects of his research that are described on his group's webpage

<https://www.igp.uu.se/forskning/cancerprecisionsmedicin/tobias-sjoblom/>.

1. Multi-omics analysis of a large cohort of colorectal cancer cases

In this project, we perform a detailed characterization of the somatic genomic and transcriptomic landscapes of a large number of primary colorectal tumors from Swedish patients. The project also includes analyses of blood and tissue proteomic data for integrative tumor biology studies and cancer biomarker discovery. The aim is to increase the knowledge of colorectal cancer development and identify new targets for therapy and diagnostics. The study is a collaboration between colorectal cancer investigators at Uppsala University, Umeå University, and KTH that participate in the U-CAN project.

We are looking for students specializing in bioinformatics to participate in the data analyses. We are exploring several research questions and the student will join ongoing analyses as needed at the time. Basic knowledge of Linux and programming and scripting in Python or R is required. Previous experience with genomic, transcriptomic or proteomic data analysis is an advantage.

2. Development of novel precision cancer therapy based on collateral lethality

Tumors with loss of heterozygosity (LOH) may be sensitized to certain anticancer drugs due to loss of enzyme catalytic activities that exist in normal cells. Through bioinformatic analysis of genomic variants, we have identified an enzyme important for metabolizing and eliminating a large proportion of clinically used drugs as a candidate target for novel cancer drug discovery and development. In the project we will 1) perform drug library screening to select drug candidates that show greater potency on cells with low enzymatic activity, 2) carry out extended studies of potential hits, and 3) develop effective therapeutic strategies by combining conventional medicines with identified novel hit compounds.

We are looking for students who want to work with wet-lab techniques, such as immunoblotting, cell and organoid culture, and drug screening. There are also opportunities to work with identification of new potential targets for this novel therapy concept in adult and pediatric cancers through bioinformatic approaches.

Further information and application: Professor Tobias Sjöblom (tobias.sjoblom@igp.uu.se).