Master project in bioinformatics and cancer genomics in Ann-Christine Syvänen's Molecular Medicine group, Uppsala University

We are looking for a dedicated student interested in working with identification of genetic markers that predict both response to drug treatment and clinical outcome of patients with acute lymphoblastic leukemia (ALL), the most common childhood cancer. The project includes work with cutting-edge technology in an international research environment.

Background

200-250 children per year are diagnosed with ALL cases in the Nordic countries. Despite treatment improvements in recent years, 20% of patients do not survive the disease. Rapid identification of patients that require alternative treatment would improve the survival.

All cancers arise because of genetic modifications, and analysis of cancer genomes is therefore essential for understanding the disease. We study the genomics of ALL by whole-genome sequencing of cells from both the cancer cells and normal cells from the same patients. By comparing these data sets, we identify mutations that are unique to the cancer cells, which could be involved in the development of the disease. In addition, we compare the difference in DNA methylation pattern (epigenetics) between cancer and healthy cells. Methylation occurs naturally at some cytosine bases in the human genome, and cancer cells often have aberrant methylation patterns compared to normal cells and thus methylation could affect the development of the disease.

Project details

The student project involves analysis of large-scale sequence data sets, generated with "Second Generation" Sequencing technology (Illumina) to identify differences between genomes of cancer cells and healthy cells. For this project, both programming experience (*e.g.* Perl) and biological/medical training is required. We particularly encourage students from the Molecular Biotechnology or Bioinformatics engineering programs, or other students with a background in both programming and biology or medicine to apply.

Professor Ann-Christine Syvänen's research group in Molecular Medicine is located at the Uppsala University Hospital. Prof. Syvänen also heads the SNP&SEQ Technology Platform in Uppsala, which uses the latest sequencing technologies. All sequencing within the research projects is performed at the platform.

The project will also be assisted by Dr. Eva Berglund, who is responsible for the bioinformatic analysis in this project. She graduated from the Molecular Biotechnology program in 2004, and performed her PhD studies in prof. Siv Andersson's group in Uppsala.

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Duration of project: 20-30 weeks (30-45 hp)