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### Molecular mechanism of colorectal cancer

#### Abstract

With increasing incidence and mortality, cancer is the leading cause of death in my country China and is a major public health problem. The incidence of colorectal cancer in China is increasing year by year. Colorectal Cancer is a highly heterogeneous disease.

Single-cell genomics is an approach to investigate cell heterogeneity and to identify new molecular features correlated with clinical outcomes. The purpose of our project is to understand the molecular mechanisms of gastrointestinal cancer especially colorectal cancer using single-cell genomics. My host institute Karolinska Institute is one of the world's top universities in the medical field. In Department of Physiology and Pharmacology, scientists are doing research using advanced technologies.

I would like to learn single-cell sequencing technique in my host institute, so that related research can be carried out in gastrointestinal cancer. In my host institute, I will participate in single cell isolation with FACS, single-cell genomics using Strand-Seq, single-cell epigenetics using bisulfite sequencing, microdroplet-based single-cell transcriptomics and single cell NGS data analysis, which will cover established techniques from sampling through sequencing, protein analysis and data analysis. In order to build further cooperation with my host institute, the future research direction and the relevant work will be discussed.

We will discuss how to use single-cell transcriptomics to help understand the molecular mechanisms of gastrointestinal cancer, especially colorectal cancer. My home institution is equipped with ultraviolet detection scanning, protein analysis and purification equipment, -80 C ultra-low temperature refrigerator, SIGMAK15 desktop low temperature high speed centrifuge, flow cytometer, Real-time PCR instrument, etc. We also have long-term partnerships with many well-known universities and research institutes, which can provide the necessary material and technical support for the sustainability of our project.

In summary, we are able to continue the work to evaluate the molecular mechanisms of gastrointestinal diseases, including gastrointestinal cancer, especially colorectal cancer.