Medical University of Graz

Characterization of metastases-associated non-coding and protein-coding genes in colorectal cancer

Summary

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Supervisor:	Prof. Dr. Martin Pichler
Availability:	This position is available.
Offered by:	Medical University of Graz
Application deadline:	Applications are accepted between August 03, 2022 00:00 and September 20, 2022 23:59 (Europe/Zurich)

Description

Background:

Colorectal cancer (CRC) is the third most common cancer and the third leading cause of cancer death in men and women in the United States and Europe.
For three decades, alterations of protein-coding oncogenes and tumor suppressor genes have been considered as the main cause of tumorigenesis. Recent advances proved without doubts that cancer is a complex genetic disease involving structural and expression abnormalities of both coding and non-coding genes. Recently, the discovery of long non-coding RNAs in cancer and the fact that this class of molecules is located in around 70% of the whole genome sequence, underline the huge potential of these molecules in cancer medicine as diagnostics, prognostics and therapeutic targets. The aim of this proposal, therefore, is to identify long non-coding RNAs and corresponding protein-coding genes and characterize the interplay in the process of cancer metastases.

Hypothesis and Objectives:

The central hypothesis of this project is to determine the role of long non-coding RNAs in CRC with a special focus on cancer metastases. The following aims should be followed to achieve new insights: (1) First, based on preliminary genome-wide expression data derived from cell lines, we will determine the biological function of several key long non-coding RNA and protein-coding candidates. (2) Second, long non-coding RNAs relevant in CRC biology will be further tested for molecular interaction partners with a special focus on druggable proteins/signaling pathways.

Methodology:

Methods in RNA biology, RNA-protein interactions, cell culture, animal models, RNA therapeutics

References:

Therapeutic potential of FLANC, a novel primate-specific long non-coding RNA in colorectal cancer. Pichler M, et al.Gut. 2020 Oct;69(10):1818-1831.
N-BLR, a primate-specific non-coding transcript leads to colorectal cancer invasion and migration.Rigoutsos I, Genome Biol. 2017 May 24;18(1):98. doi: 10.1186/s13059-017-1224-0.

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