Title | Cancer Metabolism: The Metabolomics Perspective
Course Directors | Boryana Petrova, PhD and Naama Kanarek, PhD
Curriculum Fellow | Jelena Patrnogić, PhD

Course Description

The field of cancer metabolism has grown tremendously in the past decade, contributing major advancements in our understanding of how to diagnose and treat tumors. Despite this, some of the tools required to study cancer metabolism remain out of reach for many labs. This is particularly true for metabolomics, as it requires deep prior knowledge and sophisticated instrumentation.

This course is designed to acquaint participants with principles and practice of cancer metabolism from the perspective of metabolomics. The approach will be multifaceted. Participants will become familiar with fundamental topics in cancer metabolism directly presented by top researchers in the field. A discussion-based approach on literature review will instruct participants on the essential cancer metabolism toolkit, method advancements and limitations. Crucially, participants will get a first-hand theoretical knowledge and practical experience on designing, analyzing, and presenting mass spectrometry-based metabolomics experiments. This two-part nanocourse aims to bridge this gap; inviting interested students/postdocs/instructors to become familiar with the basic principles of cancer metabolism and metabolomics theory and practice.

The course will be offered as a two-part series. Participants can choose to attend either first, second or both parts of the nanocourse series, based on previous experience and interests.

Part One | Spring 2022

Part One will introduce the cancer metabolism fundamentals, offering a series of keynote lectures that will cover major metabolic pathways perturbed in cancer, and journal club discussions facilitated by Boryana Petrova and/or postdocs on tools and methods used to study cancer metabolism *in vivo* and *in vitro*.

Part Two | Fall 2022

Part Two of the course will introduce a major tool in the cancer metabolism field - metabolomics by LC-MS. Participants will learn how to acquire, analyze, visualize, and present metabolomics data. This part will involve a “hands on” session (COVID-related regulations permitting) and will provide an opportunity to incorporate course participants’ specimens of interest. Pre-collected data will be available for online participants as well.

Part One | Spring 2022

Cancer metabolism – fundamental concepts and techniques

This part will take the form of keynote lectures and an associated journal club discussion. Specific goals are:

1. To understand the fundamental concepts of cancer metabolism
2. To recognize and juxtapose main metabolic pathways perturbed in cancer (or compare and contrast the main metabolic pathways in normal and cancer perturbed state)
3. To recognize and describe the most common cancer metabolism research tools, their limitations, and the scope of biological questions that can be addressed

Session dates, times & location

In order to receive credit, registered students must attend all sessions and complete the assignments. The course will take place in person. Papers for journal club discussions will be shared prior the first session.

Session One Tuesday May 3, 2:30-5:15pm | TMEC 128

- Keynote lecture 2:30-4:00pm
    - Naama Kanarek, PhD | One-carbon metabolism in cancer
- Journal club discussion 4:15-5:15pm

Session Two Wednesday May 11, 2:00-4:45 pm | TMEC 128

- Keynote lecture 2:00-3:30pm
    - Alex Toker, PhD | Oncogenic nutrient signaling
- Journal club discussion 3:45-4:45pm

Session Three Thursday May 19, 1:00-3:45pm | TMEC 128

- Keynote lecture 1:00-2:30pm
    - Raul Mostoslavsky, MD, PhD | Epigenetics, chromatin and their interplay with cancer metabolism
- Journal club discussion 2:45-3:45pm

Session Four Tuesday May 24, 1:00-3:45pm | TMEC 128

- Keynote lecture 1:00-2:30pm
    - Nada Kaalany, PhD | Cancer microenvironment and systemic metabolic state
- Journal club discussion 2:45-3:45pm