

Cancer Neuroscience

T32 Course Series

2026 (Virtual)



Course #1 – Wednesday, February 11th 1:00-2:30PM (ET) ZOOM TBD

Contemporary metabolic imaging tools

Nathalie Agar, PhD, Brigham and Women's Hospital

Ovidiu Andronesi, MD, PhD, Massachusetts General Hospital

Metabolism is a key regulator of tumor growth and evasion from immune surveillance. We will discuss two complementary label-free imaging technologies to visualize and quantify the distribution of metabolites in biological tissues. Specifically, magnetic resonance spectroscopy (MRS) imaging provides in vivo imaging of metabolites non-invasively inside the patients, while mass spectrometry imaging (MSI) provides ex vivo imaging of metabolites from tissue specimens. Applications of the technologies to support the development of brain tumor therapeutics will be presented with discussion of technical specifications and instrumentation, together with technical presentations going from standard routine protocols to the most advanced state-of-the-art developments.

Course #2 – Wednesday, March 18th 9:00-10:30AM (ET) ZOOM TBD

Basic principles of single cell and spatial genomic profiling

Mario Suvà, MD, PhD, Massachusetts General Hospital

Intratumoral heterogeneity represents one of the most formidable obstacles in the treatment of brain tumors. Diverse malignant and nonmalignant cells interact to generate a complex ecosystem that governs tumor biology and response to treatments. Recent technological advances have enabled the genomic profiling of tumors at single-cell resolution, providing a compelling strategy to dissect their intricate biology. In this nano course, we will discuss recent developments in single-cell expression profiling and the studies applying them in brain tumors. We will highlight some of the powerful insights gleaned from these studies for tumor classification, stem cell programs, tumor microenvironment and response to therapies.

Course #3 – Wednesday, April 8th 9:00-10:30AM (ET) ZOOM TBD

Neuron/glia interactions

Chenghua Gu, PhD, Harvard Medical School

Beth Stevens, PhD, Boston Children's Hospital

Humsa Venkatesh, PhD, Brigham and Women's Hospital

We will discuss reciprocal interactions between tumor cells with surrounding cells in the brain parenchyma especially astrocytes, oligodendrocytes, microglia. Moreover, considering the blood-brain barrier being the bottle neck for therapeutic treatment, we will also discuss the heterogeneity of the barrier permeability with different tumors in different brain regions as well as a discussion on mass spectrometry imaging as a powerful tool for this line of studies. Dr. Stevens will discuss the role of microglia and brain-associated macrophages in brain cancer and gliomas and approaches to interrogate cell states and function. Dr. Humsa Venkatesh will discuss electrical and synaptic integration of glioma into neural circuits. Dr. Gu will discuss the basic biology of the blood brain barrier and related methods and technology.

Contact: Olga Katsovskiy (okatsovskiy@bwh.harvard.edu)

This course is supported by the National Cancer Institute of the National Institutes of Health under Award Number T32CA272386