“Practical and cost-effective multiplexed immunohistochemistry for comprehensive immune complexity analysis of solid tumors”

PI: Takahiro Tsujikawa

Immunohistochemical (IHC) evaluations of solid tumors are a mainstay for cancer diagnosis, as well as for determining biomolecular characteristics of tumors that correlate with therapeutic response. These applications require molecular profiling of tissues at the single cell level with high resolution, and typically utilize one tissue section per biomarker evaluated, thus requiring use of multiple sections when evaluating panels of biomarkers for molecular correlates. To get around this limitation, and to enable simultaneous evaluation of up to 11 biomarkers in one formalin-fixed paraffin-embedded (FFPE) tissue section, we developed high-throughput multiplexed, quantitative IHC imaging. The objectives of this proposal are: 1) to develop an automated and high-throughput workflow for staining, image processing, and analysis; 2) to establish a molecular profiling panel for quantitatively auditing immune complexity of tumors; 3) validate our methodology to quantitatively evaluate molecular correlates in the tumor microenvironment across a diversity of human and murine tumors tissues. Successful completion of this endeavor will significantly impact clinical studies wherein molecular correlates are used for risk stratification, tumor subtyping, and evaluating response to therapy.