Faculty Name:

Sanja Vickovic

Faculty Email:

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Lab:

Technology Innovation

Project Title:

Spatiotemporal dynamics of aging

Description:

Tissue structure and molecular circuitry in the colon can be profoundly impacted by systemic age-related effects, but many of the underlying molecular cues impacting such complex alterations remain unclear. We built a cellular and spatial atlas of the colon, encompassing ~1,500 mouse gut tissues profiled by spatial transcriptomics and ~400,000 single nucleus RNA-seq profiles. We developed a new computational framework, cSplotch, which learns a hierarchical Bayesian model of spatially resolved cellular expression associated with age, tissue region, and sex, by leveraging histological features to share information across tissue samples and data modalities. Using this model, we identified cellular and molecular gradients along the colonic tract and across the main crypt axis, and the temporal dynamics impacting multicellular programs in the aging large intestine. Our work presents a multi-modal framework for the investigation of cell and tissue organization that can aid in the understanding of cellular roles in tissue-level pathology. During the project, we will further develop statistical and computational methods for integration tissue level histology into spatial transcriptomics and multi-omics data.

Location of Research:

On Site

# of hrs/week:

40

Department/Program:

Computer Science

Eligibility:

BS, Third Year, BS, Fourth Year, MS

To apply, please contact:

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