MIT Chemical Engineering

Spring 2024 Seminar Series

Molecular Microscopy with Single Cell Transcriptomic Data Resolves RNA Liquid Biopsies

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4:15-5:00pm
4:00pm Reception

Invasive biopsy is the gold standard for diagnosing several diseases; however, these procedures offer a limited, localized view of the disease pathology to the physician and are not risk-free to the patient. Cell-free RNA (cfRNA) in blood plasma reflects dynamic gene expression changes and can facilitate early disease diagnosis, yet current cfRNA assays fall short of the cellular resolution afforded by an invasive biopsy. In this talk, I will first resolve plasma cfRNA at cell type resolution using single cell transcriptomic data alongside approaches from machine learning and data science, which enable a systems-view into the underlying molecular patterns within these high-dimensional biological data. I will then describe how this molecular microscope can noninvasively reflect changes observed in invasive biopsy across various diseases and facilitate the study of biofluids beyond the blood. These findings expand the achievable resolution of RNA liquid biopsies and broaden opportunities in precision medicine for complex diseases in hard-to-biopsy tissues.

http://cheme.mit.edu/seminar-series/