Tentative Outline

Translational Innovations in Unraveling Tumor Complexity via Single-Cell Multi-Omics

Guest Editor: Dr. Peixin Dong

Scope of the Thematic Issue:

This Thematic Issue encourages contributions on the latest developments in single-cell multi-omics research, which will provide readers with a complete review of the state of the art in single-cell multi-omics and its influence on cancer research.

Single-cell sequencing technologies are revolutionizing cancer research by enabling scientists to resolve cellular heterogeneity and functional variation in unprecedented depth. These advancements have increased our understanding of human cancers, with a particular emphasis on the interconnections between various cell types. Through the use of single-cell multi-omics, this field is making headway in updating current knowledge, notably in precision medicine, where the study of cellular subpopulations might offer insight into responses to anti-tumor treatment.

Deep learning is an effective method for organizing the high-dimensional data produced by single-cell profiling. It does imputation, batch correction, and grouping, as well as improving signal-to-noise ratios. Despite advances in single-cell multi-omics and deep learning, the science continues to provide exciting difficulties and new viewpoints.

Keywords: multi-omics, single-cell, tumor heterogeneity, deep learning, oncology, bioinformatics.

Sub-topics:

- Elucidating the relationships between multi-omics layers at the single-cell level using integrative techniques on single-cell multi-omics data.
- Using state-of-the-art algorithms to analyze single-cell profiling data and detect patterns in cellular heterogeneity are deep learning approaches.
- Using single-cell multi-omics sequencing and machine learning to identify interesting cancer biomarkers.
- Utilizing single-cell multi-omics data to develop new therapeutic approaches and improve current cancer therapies.
- Applying single-cell multi-omics to next-generation immunotherapy and targeted cancer therapy.
- Understanding the genetic characteristics of metastatic and therapy-resistant tumor subpopulations using single-cell multi-omics technology.
- Integration of single-cell sequencing data with clinical pathology information for developing novel diagnostic and prognostic biomarkers and potential therapeutic targets.
- Molecular characterization of circulating tumor cells using a variety of single-cell omics approaches.

Schedule:

➢ Thematic issue submission deadline: **February 28, 2024**

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