Beyond Bulk: Single-Cell Data for Biological Discovery

Abstract

Traditional bulk RNA sequencing examines gene activity within entire tissue samples, masking the rich diversity hidden within individual cells. Single-cell RNA sequencing (scRNA-seq) offers a groundbreaking approach to explore this cellular heterogeneity. We will delve into the technical intricacies of scRNA-seq, and navigate the complex landscape of scRNA-seq data analysis, covering essential steps such as data preprocessing, quality control, dimensionality reduction, clustering, and differential gene expression analysis. Through concrete examples, we will explore how scRNA-seq is reshaping our understanding of biology by revealing intricate cellular mechanisms underlying health and disease.