Efficient Pre-Processing of Single-Cell Assay for Transposase Accessible Chromatin with High-Throughput Sequencing Data

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Abstract : The primary tool currently used to pre-process 10X Chromium single-cell ATAC-seq data is Cell Ranger, which can take very long to run on standard datasets. To facilitate rapid pre-processing that enables reproducible workflows, we present a suite of tools called scATAK for pre-processing single-cell ATAC-seq data that is 15 to 18 times faster than Cell Ranger on mouse and human samples. Our tool can also calculate chromatin interaction potential matrices, and generate open chromatin signal and interaction traces for cell groups. We use scATAK tool to explore the chromatin regulatory landscape of a healthy adult human brain and unveil cell-type specific features, and show that it provides a convenient and computational efficient approach for pre-processing single-cell ATAC-seq data.