



CELL BIOLOGY

Charting the human cell landscape

Researchers construct a transcriptome-based single-cell human cell landscape for major human organs.

Single-cell sequencing technologies have promoted unprecedented advances in cell profiling and cell-type classification. The ability to dissect cell-type composition in a complex system such as human tissues offers a basic reference for understanding normal and disease cell states.

Guoji Guo and colleagues from Zhejiang University in China previously developed a microwell-based single-cell RNA sequencing platform called Microwell-seq for profiling tissue samples. Microwell-seq combines an agarose array and barcoded magnetic beads to achieve high-throughput and cost-effective transcriptome analysis of single cells. The washing steps in Microwell-seq remove cell debris and floating nucleic acids to minimize the batch effects in high-throughput studies, which

allowed the researchers to construct a mouse cell atlas.

“Microwell-seq is very cheap and scalable.” Guo comments. Beyond the mouse cell atlas, the Guo group now applies Microwell-seq to dissect the cell composition of human organs and thus offer a human cell landscape for revealing cellular hierarchy of tissues including those have not been well profiled.

Comparative analyses between the human cell landscape and the mouse cell landscape reveal a conserved biological mechanism for mammalian cell fate decisions, in which differentiated cells are more transcriptionally distinct and stable than stem and progenitor cells.

The researchers also provide a single-cell analysis pipeline for classifying human cell types, as well as a website for achieving

available human transcriptome references obtained from this human cell landscape study and previously published single-cell datasets.

Looking forward, spatial transcriptomics is critical for cell atlas studies as well.

“Ideally, a human cell atlas should also integrate spatial information, multi-omic data and population analysis. This will require joint efforts of scientists all over the world,” Guo remarks.

Lei Tang

Published online: 5 May 2020

<https://doi.org/10.1038/s41592-020-0834-8>

Research papers

Han, X. et al. Construction of a human cell landscape at single-cell level. *Nature* <https://doi.org/10.1038/s41586-020-2157-4> (2020).

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