

Differentiative trajectory of hippocampal neural stem cells and interneurons by snRNA-and scRNA-sequencing

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Received: January 19, 2021, Editor Assigned: January 22, 2022, Reviewed: January 28, 2022, QC No. COS- AA0007;
Proceeding No: Volume: 10, 2022 Published: April 05, 2022, Invoice No. JND-0000F7

Abstract

Alzheimer's disease (AD) is a normal degenerative disease with deficit in adult neurogenesis. However, there is a severe conflict in adult AD neurogenesis. To draw the panoramic view of adult neurogenesis in the process, and to reveal the effect of adult neurogenesis on AD process, we traced the neuronal progenitors, neuroblast and neural stem cell (NSC) pool from postnatal 17 to 12 months of APP/PS1 transgenic mice. NSC differentiative trajectory was depicted based on single cell sequencing, which included five sequential stages from quiescent to activation. Further, we found an obvious alteration of topologic-specific cell diversity and gene expression in hippocampus, and based on these, we found significant changes in interneurons diversity, especially in hippocampal dentate gyrus and CA3 regions. The further gene set enrichment analysis, qRT-PCR, immunofluorescence and immunoprecipitation detected the significant expression alteration of proliferation-related and cytoskeleton-related genes during AD process. These indicated the proliferation and cytoskeleton-related factors probably participate in the NSC and interneuron differentiation process and involved in the disease process.

Biography

Dr. Tingting Sun has been engaged in the research on the mechanism of neurodegenerative diseases and neurogenesis. In the past five years, she has presided over one youth project of the National Natural Science Foundation of China, one key project of the natural science foundation of Shandong Province, participated in three projects of the National Natural Science Foundation of China, and applied for one international PCT and one domestic invention patent. She is a communication review expert of the National Natural Science foundation of China, Expert of science and technology expert database of Shandong Province and Guangdong Province, special commissioner of science and technology of Shandong Province.