

## Human Brain Organoids-on-a-Chip Systems to Model Neuroinflammation

**Authors :** Feng Guo

**Abstract :** Human brain organoids, 3D brain tissue cultures derived from human pluripotent stem cells, hold promising potential in modeling neuroinflammation for a variety of neurological diseases. However, challenges remain in generating standardized human brain organoids that can recapitulate key physiological features of a human brain. Here, this study presents a series of organoids-on-a-chip systems to generate better human brain organoids and model neuroinflammation. By employing 3D printing and microfluidic 3D cell culture technologies, the study's systems enable the reliable, scalable, and reproducible generation of human brain organoids. Compared with conventional protocols, this study's method increased neural progenitor proliferation and reduced heterogeneity of human brain organoids. As a proof-of-concept application, the study applied this method to model substance use disorders.

**Keywords :** human brain organoids, microfluidics, organ-on-a-chip, neuroinflammation

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