

CNS-3D Organoids

Brain organoids enable preclinical safety assessments and efficacy evaluations that deliver critical translational data earlier in the pipeline.

Overview

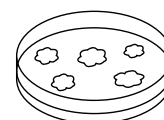
CNS-3D Organoids are a high-throughput *in vitro* human model for investigating neurotoxicity, seizure liability, synaptogenesis, neurogenesis, excitotoxicity, ion channel activity, and neuropharmacology. These brain organoids support multiplexed, high-content analysis across diverse therapeutic modalities, including small molecules, siRNAs, antisense oligonucleotides (ASOs), adeno-associated viruses (AAVs), and antibody-based therapeutics.

CNS-3D Organoids

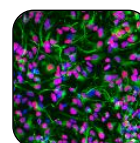
CNS-3D Organoids are derived from donor-induced pluripotent stem cells (iPSCs) that are differentiated into neural progenitor cells (NPCs). These NPCs self-organize into a balanced 50:50 co-culture of neurons and astrocytes, closely recapitulating key features of the human brain. The organoids grow to diameters of 500–800 μm and develop complex, functional neural networks that exhibit spontaneous, electrically driven activity. This coordinated network behavior can be captured in real time using high-throughput functional assessment platforms such as FLIPR. Validated through transcriptomic analysis and subjected to a rigorous quality control process, CNS-3D Organoids deliver consistent, physiologically relevant performance across production lots, ensuring reliability for research and therapeutic screening applications.

Schematic of the CNS-3D organoid generation procedure. Induced pluripotent stem cells (iPSCs) are expanded before being derived into neural progenitor cells (NPCs), which is then cryopreserved to serve as the starting material for each CNS-3D organoid production batch. Over the course of 6-weeks, organoids grow to diameters between 500–800 μm , differentiate into both neurons and astrocytes, and exhibit spontaneous coordinated network activity. Shown above are waveforms measured on FLIPR (Molecular Devices).

iPSC Adaption
& Expansion



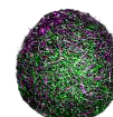
NPC Derivation
& Biobanking



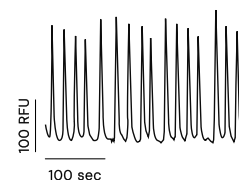
Growth



Organoid
Characterization

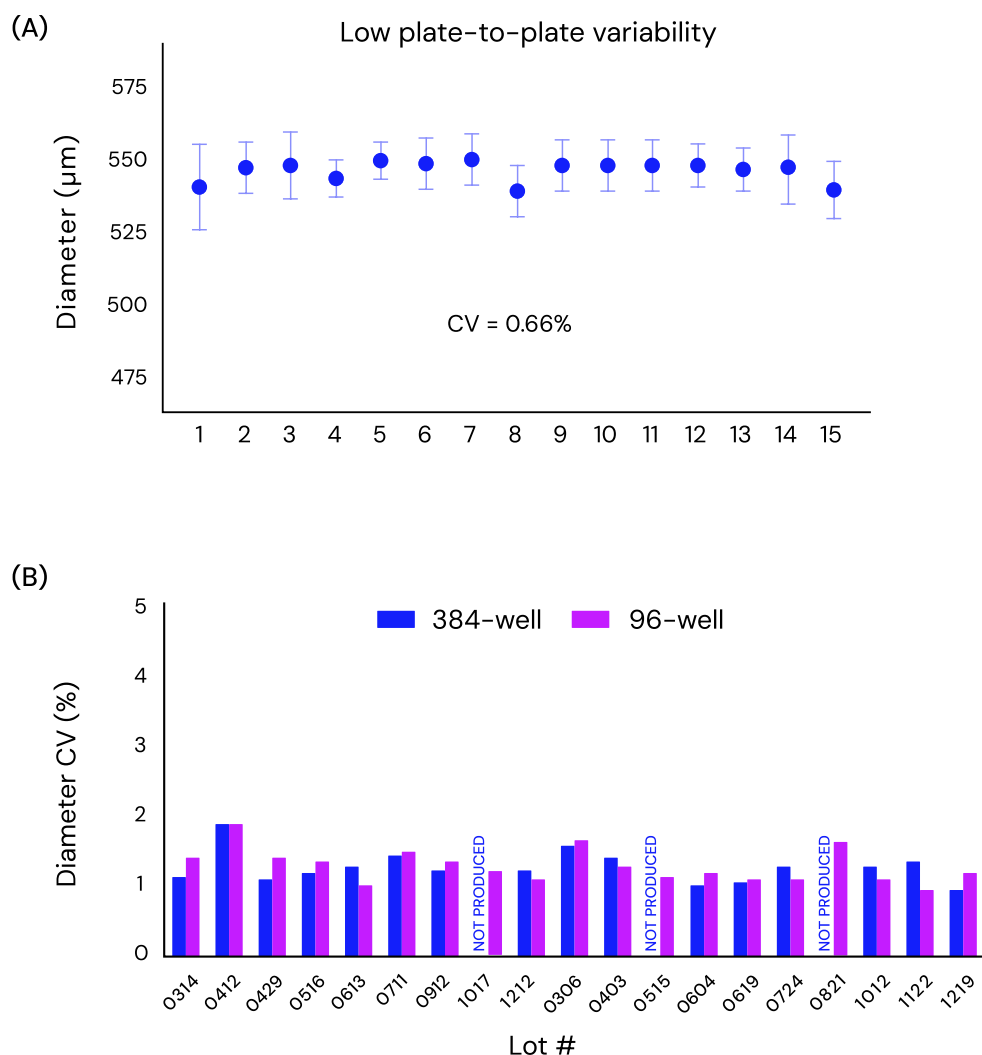


Spontaneous
Activity



Reproducibility & Stability

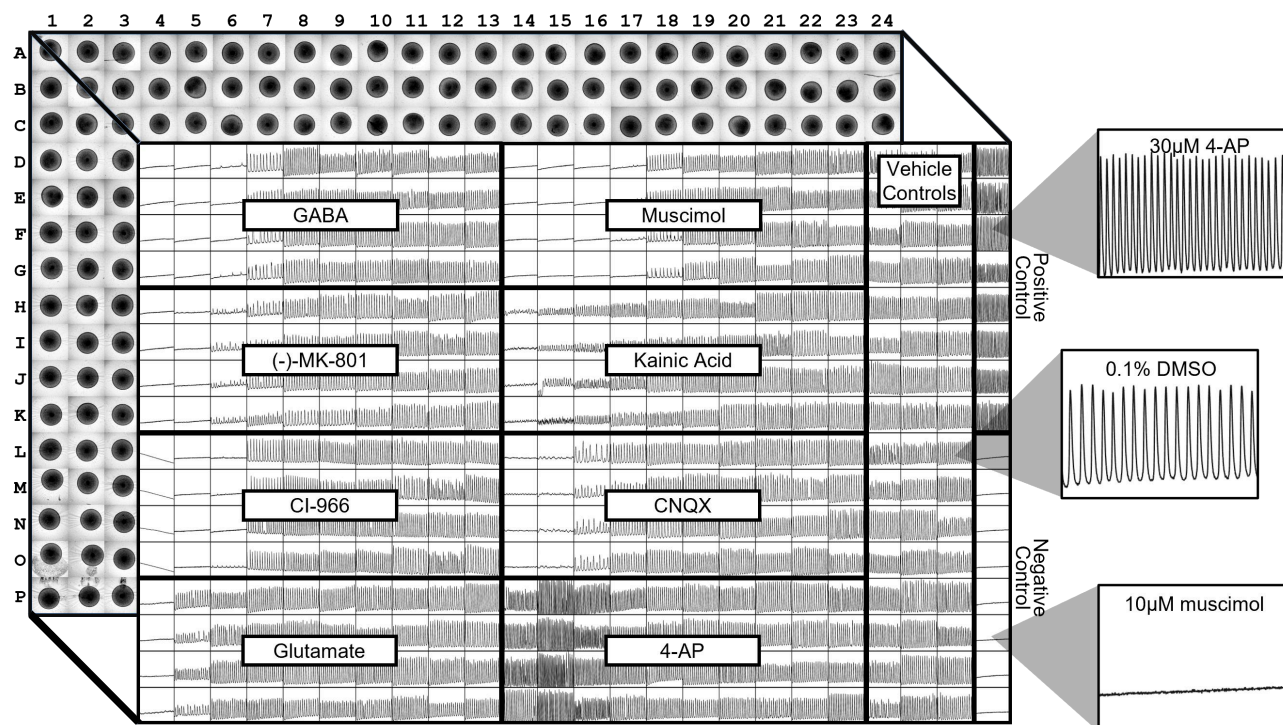
CNS-3D Organoids demonstrate consistent performance, reducing the need for repeated experiments. Their stable pharmacological responses enable longitudinal and chronic treatment paradigms over several weeks. A validated four-week use window allows for flexible assay workflows while maintaining data quality.



(A) CNS-3D organoids are batch-produced in monthly builds and exhibit exceptional uniformity in diameter—both within individual plates and across plates in a single batch—overcoming the morphological variability that typically plagues organoid biology. (B) The remarkable batch-to-batch reproducibility in organoid diameter has been demonstrated across both 384-well and 96-well lots historically, with CVs across batches guaranteed under 5%.

Quality Control Of Organoid Production

Organoid production undergoes rigorous quality control, including functional characterization and brightfield imaging to verify consistent organoid size (500–800 μm diameter with <5% CV within plate) and a high presence rate (98%). Immunocytochemistry (ICC) is used to confirm the expected neuron-to-astrocyte ratio, and sterility is ensured through testing for mycoplasma, anaerobic, aerobic, and fungal contaminants. Each shipment includes a certificate of analysis detailing these metrics, along with EC/IC50 values and robust Z-prime scores for FLIPR-based functional screening.



384-wells of functional activity can be captured simultaneously using high-throughput kinetic plate readers such as FLIPR. Shown above are the dose-dependent changes in waveform activity in response to 8 neuromodulators including positive control K⁺ blocker, 4-AP, and GABA analog, muscimol. The waveforms demonstrate remarkable reproducibility between replicates, enabling the use of as few as 4 organoids per condition.

Technical Specifications

Specification	Details
Formats	96-well and 384-well microplates
Organoid Size	500–800 µm diameter, CV <5% within and between plates
Cell Composition	Excitatory (glutamatergic) neurons and supporting astrocytes
Use Window	Validated assay window from week 6 to week 10 of maturation
Assays	Neuromodulation (FLIPR), viability (CellTiter-Glo), cytotoxicity (LDH-Glo), high-content imaging, transcriptomic profiling
Compatible Modalities	Small molecules, siRNAs, antisense oligonucleotides (ASOs), adeno-associated viruses (AAVs), and antibody therapeutics

Ordering Information

CNS-3D Organoids are available in ready-to-use 96- and 384-well microplate formats, CNS-3D organoids are compatible with automated liquid handling systems, seamlessly integrating into compound screening workflows and streamlining time to data acquisition.

A proprietary media hibernation system allows for shipping to any lab around the world.

Product Name	Description	Modality Type	Catalog Number
CNS-3D Organoids	96-well, assay ready microplates	Human	500096
CNS-3D Organoids	384-well, assay ready microplates	Human	500384

→ To learn more, visit: 28bio.com/products-services/cns-3d-technology