PNS-3D Organoid Services

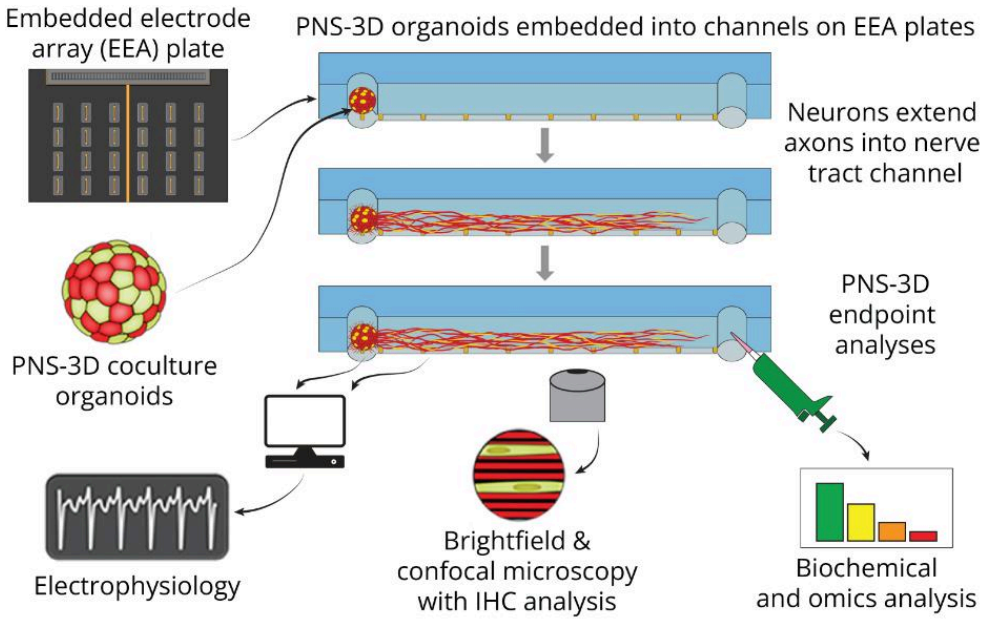
Peripheral nerve organoids enable preclinical assessments of neuropathy and neurotoxicity, generating human-relevant data to support clinical translation.

Overview

PNS-3D Organoid Services use a human-derived, *in vitro* organoid model for preclinical assessment of neuropathies induced by disease, medications, or toxins. The model incorporates custom-designed, electrode-embedded plates to generate functional data relevant to peripheral neuropathy and neuroprotection.

PNS-3D Organoids

PNS-3D Organoid Services feature a physiologically relevant coculture of human-derived sensory neurons and Schwann cells, organized in a biomimetic 3D structure designed to emulate the peripheral nervous system. Organoids grow laterally within an engineered matrix, producing 10 mm long nerves capable of nerve conduction electrophysiological analysis. The hallmark of this model is the ability to perform the nerve conduction tests with a human nerve *in vitro*, delivering clinically translatable metrics like nerve conduction velocity and compound action potential amplitude.



PNS-3D Organoids are cultured in custom 24-well embedded electrode array (EEA) plates to create 10 mm long, functional human nerves for nerve conduction electrophysiology and other analyses. These peripheral organoids are comprised of a mix of human-derived sensory neurons Schwann cells.

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Assays

Electrically Evoked Electrophysiology (EEA)

Clinically translatable human electrophysiology data is generated using a custom 24-well embedded electrode array system. It measures key functional endpoints of peripheral nerve activity, including nerve conduction velocity, stimulus threshold, and response amplitude, which are integrated into a single quantitative metric known as the Velocity Density Index (VDI).

Morphological Neurite Degeneration Analysis

A quantitative assessment of structural changes in nerve fibers captures subtle functional and morphological alterations induced by diseases or therapeutic agents.

Sample Collection For Downstream Analysis

Samples are available for advanced mechanistic analyses, including RNA sequencing, western blotting, and mass spectrometry, facilitating deeper understanding of molecular responses and therapeutic effects.

Endpoints

Functional, Structural, and Molecular Endpoints for Neurotoxicity and Therapeutic Assessment

Electrophysiology

Endpoint	Description
Velocity Density Index (VDI)	Integrates nerve conduction velocity, response amplitude, and number of compound action potentials into one clinically predictive metric.
Stimulus Threshold	Determines nerve responsiveness sensitivity to electrical stimulation to characterize hyper- or hypo-excitability.
Nerve Conduction Velocity (NCV)	Evaluates nerve health through compound action potential transmission speed.
Response Amplitude	Indicates nerve signal strength and integrity through measurement of compound action potential amplitude.

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Morphology & Omics

Endpoint	Description
Nerve fiber length	Measurement of nerve fiber length distinguishing healthy and degenerating axonal structures.
Degeneration Index	Quantification of small particles generated as nerves fragment due to chemical or other insult.
Organoid Size and Roundness Analysis	Ensures consistency and reproducibility between replicates.
Downstream Sample Collection	Peripheral neuropathy (electrophysiology and nerve morphology), cytotoxicity (LDH-Glo), high-content imaging, transcriptomic profiling

Technical Specifications

Specification	Details
Organoid Size	Organoids form a functional 10 mm long nerve over 42 days of culture
Cell Composition	Human sensory neurons (primarily nociceptors) and Schwann cells
Hardware	Custom 24-well embedded electrode array (EEA) microplates with 10 microelectrodes for stimulation and recording per well.
Microphysiological Environment	PNS-3D Organoids self-organize into a functional nerve growing down a tissue culture channel inside each well, providing compartmentalized data
Assays	Peripheral neuropathy (electrophysiology and nerve morphology), cytotoxicity (LDH-Glo), high-content imaging, transcriptomic profiling
Compatible Modalities	Small molecules, antibody-drug conjugates, proteolysis targeting chimeras, and others

Service Types

PNS-3D Organoid Standard Services

PNS-3D Organoid Standard Services provide a physiologically relevant 3D nerve model combining sensory neurons and Schwann cells to study peripheral neuropathy, neuroprotection, and electrophysiological function.

PNS-3D Organoid Custom Services

PNS-3D Organoid Custom Services offer tailored 3D nerve models with the ability to incorporate motor neurons, astrocytes, and disease-specific modeling for advanced studies in peripheral neuropathy, neuroprotection, and nerve regeneration.

Ordering Information

Service Component	Capacity
Test Articles	Unlimited
Dose Response	5 or greater
Timepoint	2-5
Endpoints	• Nerve Conduction, Only • Nerve Conduction & Nerve Degeneration

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

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