

Neuroscience Solutions

Neurodegeneration • Neuroinflammation
Neuronal Development



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Challenges in Neuroscience Research

We are just beginning to unravel the secrets behind the function of the Central Nervous System (CNS). Many different cell types interact with each other in a choreographed manner. Preclinical models and developmental biology give us some insight into the biology of the CNS, but it can be challenging to find suitable animal models. More accurate biomarkers are needed to help predict the onset and progression of disease and identify therapeutic targets. The immune response to infectious disease, neuroinflammation, and neurodegeneration in the CNS doesn't fit the same paradigm as the systemic immune response due to the blood brain barrier. Add to this the fact that brain samples are scarce and neuroscience research becomes particularly difficult to navigate.

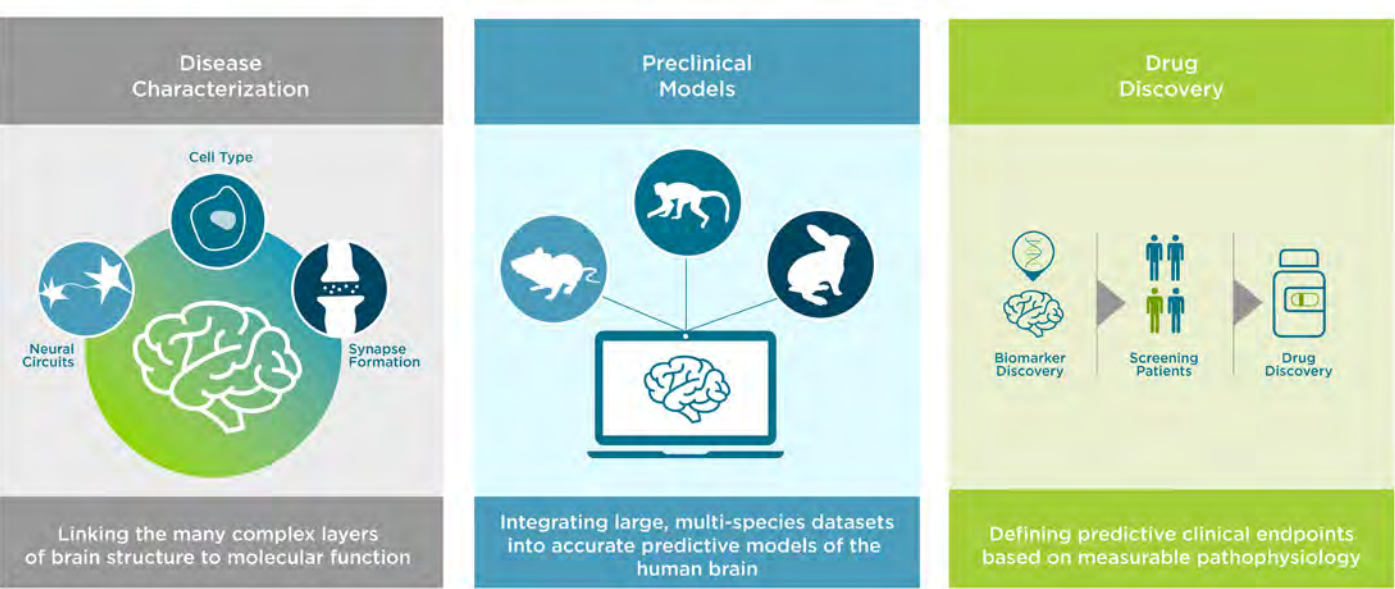
NanoString's integrated, multiomic research solutions allow you to study neurodegeneration, neuroinflammation, and neuronal development from the level of single cells to multicellular tissue compartments and patient cohorts.

Wherever you are headed with your neuroscience research, we can get you there with actionable insights from tissue, *in vitro* cell culture, and biofluids.

- Profile the expression of 800+ genes from a single sample with the nCounter® Analysis System
- Spatially profile the whole transcriptome and 100s of protein targets within distinct tissue compartments and cell populations with the GeoMx® Digital Spatial Profiler (DSP)
- Obtain the highest plex single cell and subcellular spatial multiomics data with the CosMx™ Spatial Molecular Imager (SMI)

NanoString has been developing innovative research tools for over 20 years and we believe in partnering with you to enable your research.

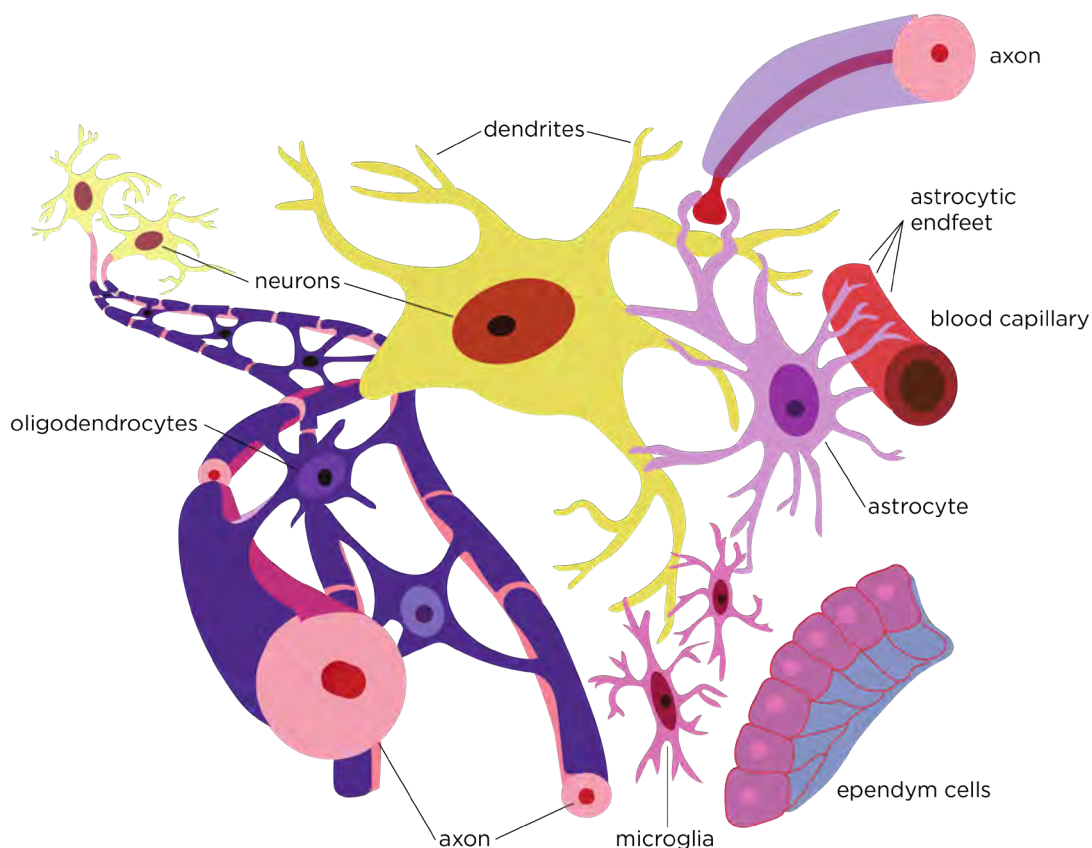
Challenges in Neuroscience Research

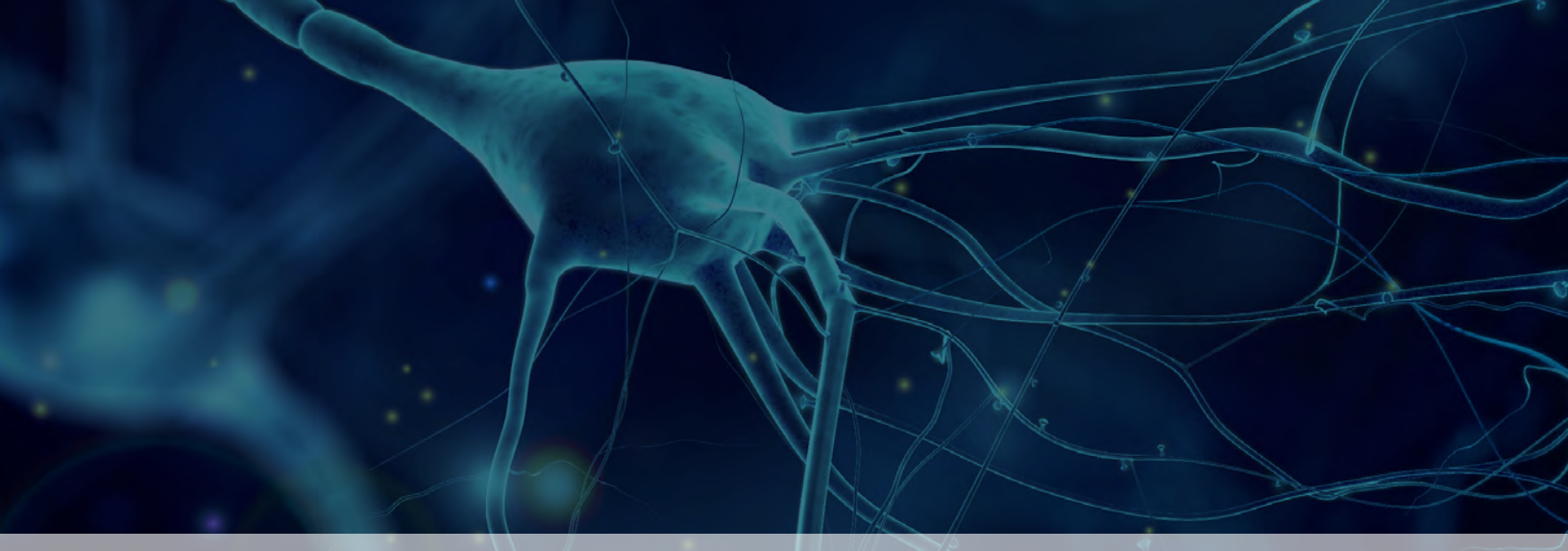


Creating a Framework

Creating a Framework for Neuroscience Research

Neuroscience is an evolving field that involves studying highly specialized cells and tissue structures that work together in concert. Researchers study the morphology and structure of neurons: their development, shape, and spatial organization. They look for relevant biomarkers for the onset and progression of neuronal disorders as well as novel targets for therapeutics. The molecular basis for neuronal plasticity is being uncovered to better understand neuronal aging and death. Cell atlases of the brain are being mapped to explain how different cell types interact. Synapse formation, pruning, and regulation are being explored to uncover how neurons organize into circuits. Studying the metabolism of neurons and glial cells helps understand how these cells signal each other and interact with the peripheral nervous system, the immune system, and endocrine cells.





A Holistic View of Neuroscience Across Multiple Dimensions

NanoString's collection of assays across all three of our platforms delivers a family of multiplex gene and protein expression assays for bulk and spatial analysis that support basic and translational studies on CNS development, health, and disease. Curated content for Alzheimer's Disease, Parkinson's Disease, Amyotrophic Lateral Sclerosis, Stroke, Traumatic Brain Injury, and Multiple Sclerosis enables you to gain a holistic understanding of the function and molecular biology of neuronal cell types across the brain and peripheral nervous system.

Creating Novel Solutions

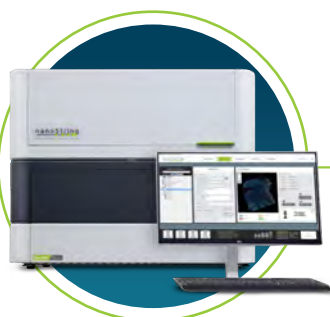
One Suite of Tools. Unlimited Potential.

Whether you are looking to discover and validate biomarkers for disease onset, progression, and treatment, study the immune response in the CNS, or create a cell and tissue atlas of the brain, NanoString has you covered.



nCounter® Analysis System

Pathway-based gene expression profiling of 800+ targets in a single tube. Compatible with a full spectrum of sample types.



GeoMx® Digital Spatial Profiler

Spatial profile the whole transcriptome and 100s of protein targets from FFPE and fresh frozen tissue



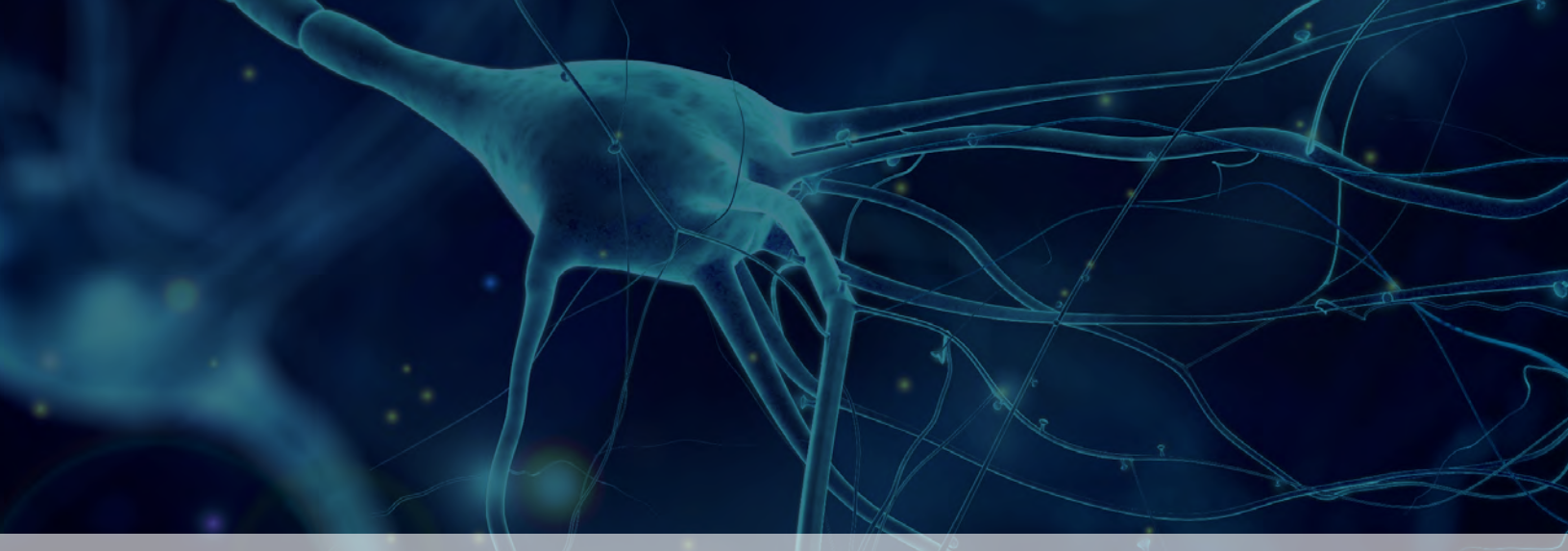
CosMx™ Spatial Molecular Imager

Single-cell profiling of RNA and proteins with subcellular resolution from a single slide.

- Discover predictive and prognostic biomarkers
- Develop signatures associated with neurodegenerative and neuroinflammatory disorders
- Evaluate mechanisms of treatment response
- Monitor disease biomarkers in clinical trials
- Screen cells for drug development

- Discover and develop spatial gene signatures
- Characterize the heterogeneity of brain tissue in health and disease
- Study the effect of plaques and neurofibrillary tangles on astrocytes and microglia
- Characterize the localized treatment response
- Study the localized response to infectious disease in the brain

- Discover unique functions of different cell types in the brain and peripheral nervous system
- Discover unique cell-cell interactions
- Define cellular neighborhoods
- Reveal functional, cellular, and temporal changes spatially at single-cell and subcellular resolution
- Characterize axonal growth, neuronal migration, and synapse formation

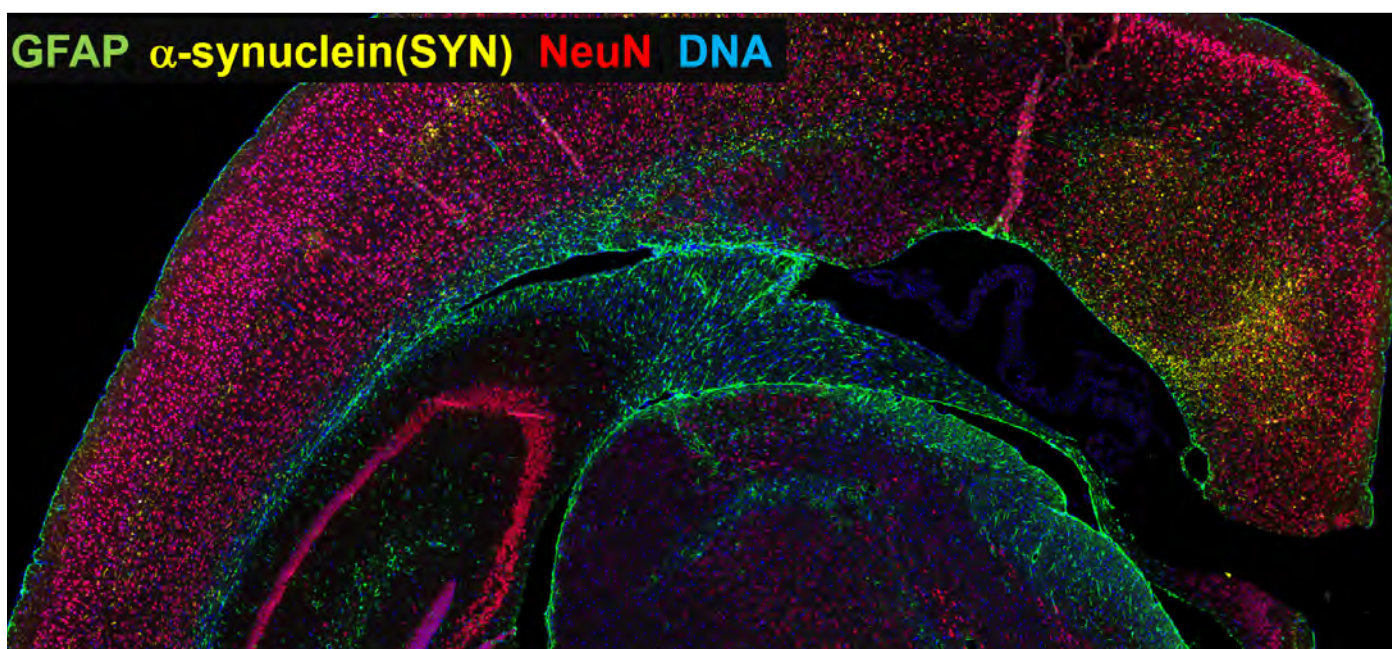


SPOTLIGHT ON SUCCESS

“NanoString instruments have revolutionized my translational neurobiology program. The GeoMx DSP is a workhorse in the lab for hypothesis testing. We use it to profile hundreds of proteins, up to the whole transcriptome, in selected regions of interest across tissues of the central nervous system. Complementing the single-neuron resolution of GeoMx, we rely on the CosMx SMI to achieve true subcellular spatial analyses and uncover cell-cell interactions. Both instruments reliably generate high-quality data from frozen and FFPE mouse and human tissues, which is crucial for our translational research questions. For rapid screening of patient biofluids and tissue lysates, we make use of the nCounter’s curated gene expression panels. NanoString’s consistent advancements in panel development and plexity provide us with the confidence that they will continue pushing technological boundaries, empowering neuroscientists to explore complex questions of today and the future.”

Miranda Orr, PhD, Assistant Professor, Gerontology and Geriatric Medicine

Wake Forest School of Medicine



nCounter[®]

Analysis System



Gene Expression You Can Count On

Accelerate your neuroscience research with confidence and peace of mind with the nCounter[®] Analysis System. Confidently profile gene expression in tissue, cell lysates, and biofluids to assess neuronal health and disease. Identify biomarkers or develop novel therapeutics using a platform with unparalleled flexibility in both content and throughput. With the nCounter Analysis System, you can rapidly translate discoveries into actionable insights that tackle neurological disorders.

Robust Performance

- Gold standard performance on FFPE
- No technical replicates required
- Five logs of dynamic range
- Broad sample compatibility
- No RT or enzymatic steps

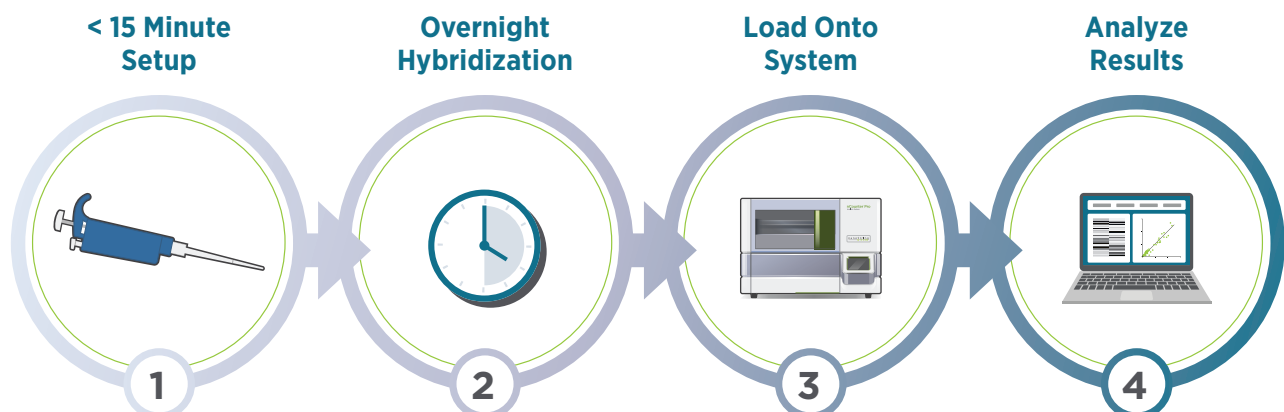
Flexible Assays

- Extensive ready-to-ship panel menu
- Guided by industry experts and the latest peer-reviewed literature
- Bioinformatics support for custom designs
- Customization of ready-to-ship panels with up to 55 targets
- Compatible as a readout for spatial biology assays

Efficient Workflow

- Less than 15 minutes hands-on-time
- Go from sample to answer in less than 24 hours
- Highly scalable set-up
- Simplified data analysis
- Minimal data storage required

Four Simple Steps Produce A Huge Amount Of Data



nCounter Neuroscience Panels

A large portfolio of expression panels with carefully curated content delivers insights into the biology of neuroinflammatory disorders, neurodegeneration, Alzheimer's disease, glial cells, and more.



nCounter® Neuropathology Panel

- Profile 770 human or mouse genes involved in six fundamental areas of neurodegeneration.
- Includes CNS cell typing signatures



nCounter® Neuroinflammation Panel

- Study neuroinflammatory disorders or CNS infections with assessment of 23 pathways across 770 human or mouse genes
- Includes CNS and immune cell typing signatures



nCounter® Glial Profiling Panel

- Decipher the role of astrocytes, microglia and oligodendrocytes in health and disease with a panel of 770 human or mouse genes
- Includes CNS and immune cell typing signatures



nCounter® Alzheimer's Disease Panel

- Curated gene list of 770 genes that assess 30 AD-associated gene co-expression modules
- Includes 23 neurodegeneration pathways and processes
- Available only as a custom, made-to-order panel

GeoMx[®]

Digital Spatial Profiler

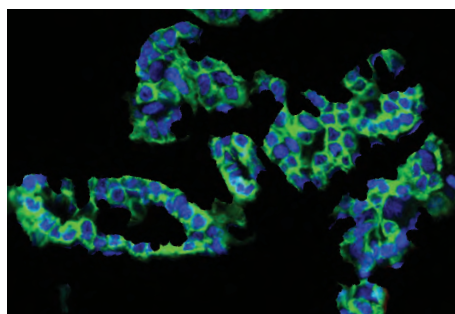


Resolve heterogeneity of the brain. Accelerate discoveries with spatial multiomics at scale.

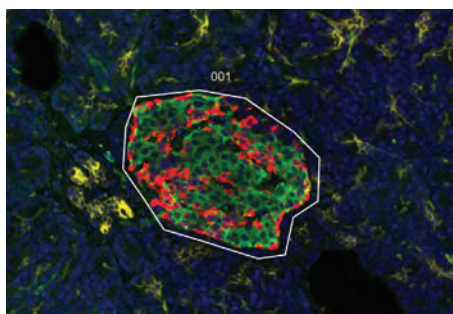
Bridging the gap between tissue imaging and bulk molecular profiling technologies such as RNA-Seq, the GeoMx[®] Digital Spatial Profiler (DSP) allows you to unlock novel biological insights with spatial multiomics in morphologically distinct tissue compartments. Discover spatially-resolved biomarkers for disease and treatment response to biomarkers obscured by bulk expression analysis, spatially profile the microglia response to neuronal disorders, and spatially map the expression patterns and cellular makeup of different structures in the brain.

Biology-Driven Profiling

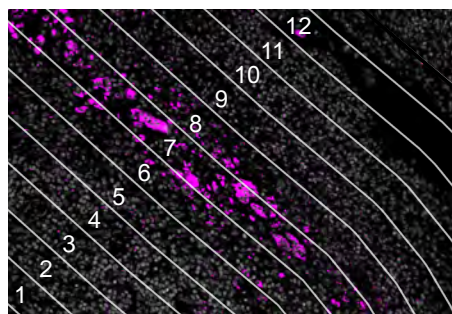
Spatially resolve gene and protein expression from FFPE or fresh frozen tissue sections with flexible profiling strategies that focus on the biology and areas of the tissue that are most relevant to your research questions. Using immunofluorescence staining as a guide, select specific tissue structures or cell populations for spatial profiling of the whole transcriptome, select RNA and protein targets, or RNA and protein simultaneously. Scale up to large cohort studies with flexible sample inputs and automated staining protocols.



Segmentation



Geometric Profiling

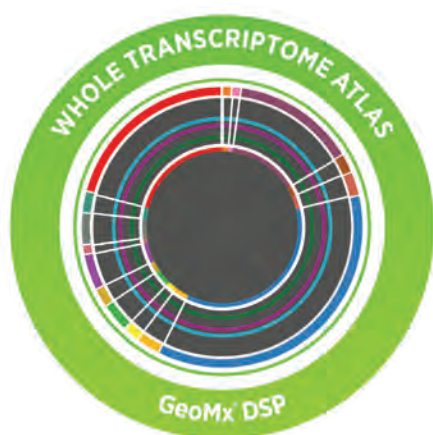


Contour

GeoMx Assays for Neuroscience

Flexible, pre-validated content for spatial profiling

GeoMx RNA and protein assays can be performed separately or together on the same tissue section and include content curated for neuroscience research.



Whole Transcriptome Atlas

- Comprehensively spatially profile all protein-coding genes from human or mouse samples
- Spike-in up to 400 custom RNA targets including non-coding RNAs, exogenous sequences, and/or viral/bacterial transcripts.
- Superior sensitivity: not reliant on poly-A pulldown
- Uses an Illumina NGS system for readout.



Neuroscience Protein Panels

- Take advantage of curated content that includes probes for protein targets involved in Alzheimer's Disease, Parkinson's Disease, and CNS cell biology
- Use a universal human or mouse core module and add-on up to 10 modules each containing probes for 6-10 protein targets
- Uses the nCounter Analysis System for readout

CosMxTM

Spatial Molecular Imager



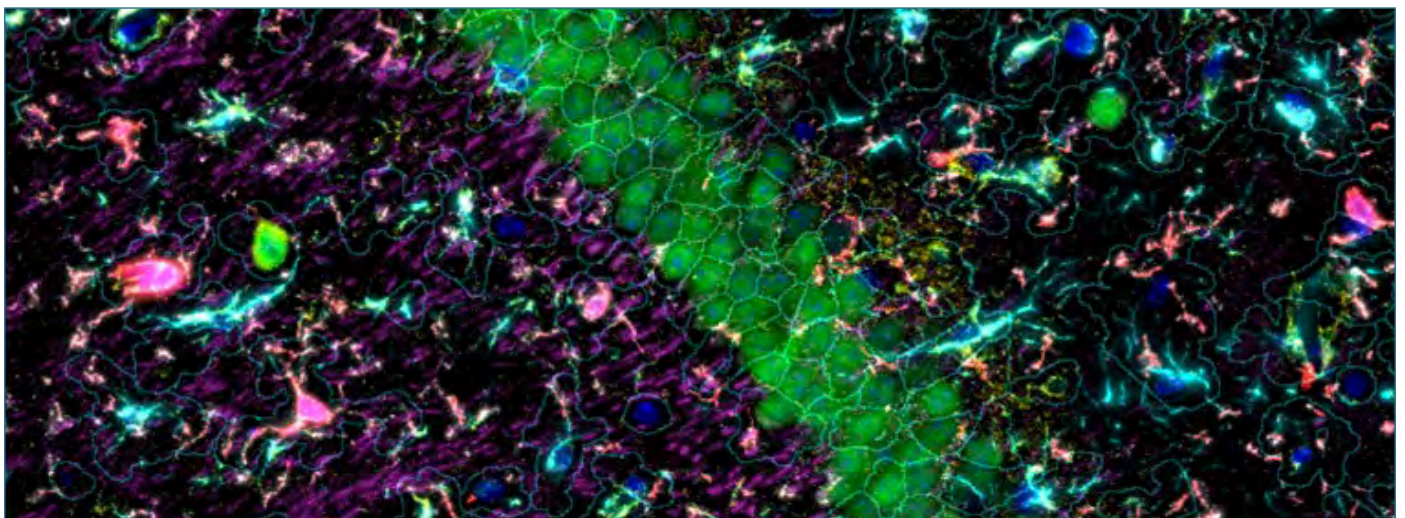
Highest-plex, single-cell and subcellular spatial multiomics

As neuroscience research advances, the importance of understanding the intricacies of individual cells within the CNS has become increasingly clear. Single cell spatial analysis has enabled researchers to delve deeper than ever before into the function and behavior of individual cells, paving the way for groundbreaking discoveries and new therapies in neuroscience. CosMx SMI allows researchers to comprehensively map the expression of 64+ proteins and 1000s of RNAs to individual cells in their native environment enabling deeper insights into the cellular and molecular systems responsible for normal and abnormal brain function.

Uncover Single-cell and Subcellular Insights

With superior cell segmentation that utilizes multi-analyte markers and a machine learning algorithm, CosMx SMI intuitively maps the boundary of astrocytes, oligodendrocytes, microglia, neurons, and endothelial cells. Expression profiling and pathway analysis resolves cell state, cell function, and ligand-receptor interactions.

By further analyzing the spatial distribution of single cells expressing specific receptors and their downstream signaling pathways, CosMx helps researchers understand how CNS cells behave and interact with one another in health and disease. Additionally, researchers can gain a deeper understanding of the proteomic landscape of tissue samples and identify new biomarkers and therapeutic targets for neuronal disorders.

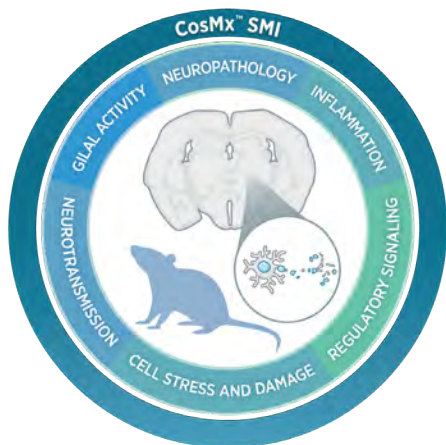


CosMx Assays for Neuroscience Research



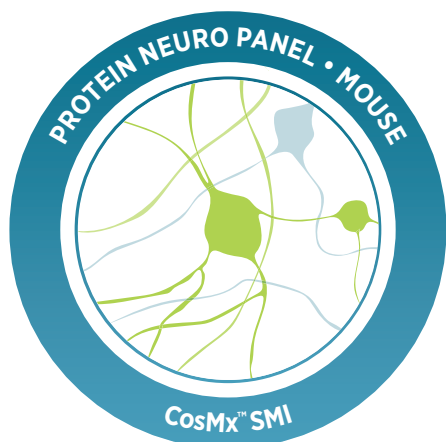
CosMx Human or Mouse Universal Cell Characterization Panel

The CosMx Human or Mouse Universal Cell Characterization Panel is designed to provide robust cell typing and cell-cell interaction analysis among other applications in a wide range of human or mouse tissues and disease states. Profile expression of 1000 highly curated targets at subcellular resolution and customize by adding up to 50 targets. Identify up to 100 unique ligand-receptor pairs.



CosMx Mouse Neuroscience Panel

Profile the expression of 1000 RNA targets that enable the identification of 42 distinct cell types in the mouse brain and cover targets involved in the biology of neuroinflammatory and neurodegenerative diseases such as AML, Huntington's, Parkinson's, and Alzheimer's. Customize with up to 50 targets.



CosMx Mouse Protein Neuro Panel

Profile the expression of 64 protein targets in mouse models of Alzheimer's disease and other neurodegenerative disorders. Coverage includes markers for disease pathology, immune response, and neural, glial, and immune cell typing. Customize with up to 8 additional protein targets.

Integrating Platforms

Across the Neuroscience Research Continuum

By offering a portfolio of complementary solutions that span the entire neuroscience research continuum, NanoString provides innovative tools that enable a multiomic, holistic view of CNS development, health, and disease. This deeper understanding of structure and function of the brain and the impact of different neural cell expression programs can be applied to multiple stages of neuroscience research, from discovery to preclinical models, translational research, and clinical trials.

	Discovery	CNS Development	Disease Pathogenesis	Translational Research	Clinical Trials
Key Applications	<ul style="list-style-type: none">• Cell atlasing• Tissue atlasing• Identification of novel cell types• Ligand-receptor pair analysis• Cell-cell interaction analysis• Cell phenotyping• Cell state determination	<ul style="list-style-type: none">• Stem cell differentiation• Brain organoids• Neuronal development• Neuronal aging and death• Neuronal migration• Neural network mapping• Synapse formation	<ul style="list-style-type: none">• Preclinical animal models• Disease mechanisms• Dysregulation• Metabolism• Neurotransmitter Modulation	<ul style="list-style-type: none">• Novel target identification• Biomarker discovery and validation• Drug development and Mechanism of Action (MOA) Studies	<ul style="list-style-type: none">• Recruitment and selection• Risk factor assessment• Toxicity studies• Paired tissue and liquid biopsy studies• Retrospective analysis
Key Platforms	GeoMx, CosMx	GeoMx, CosMx	nCounter, GeoMx, CosMx	nCounter, GeoMx, CosMx	nCounter, GeoMx

Data Analysis

Options for Discovery and Decision Making

Having access to a comprehensive range of analysis tools and services transforms your valuable data to bring insights, test hypotheses, and deliver publication-quality results.

Expedite analysis and accelerate discoveries with on-system data analysis tools, secure cloud-based platforms, expert bioinformatics support, and data analysis services.

nCounter Analysis Tools

Rosalind

- Cloud-based analysis tool
- Secure platform with flexibility for internal or external collaboration
- T Cell Receptor (TCR) Diversity Analysis

nSolver Analysis Software

- On-premises analysis tool
- Available at no-charge
- Advanced Analysis Module for additional statistics

GeoMx DSP Data Analysis Tools

GeoMx DSP Data Analysis suite (DSPDA)

- On-instrument
- Data visualization and analysis

GeoScript Hub Open-Source Software

- Developed by NanoString R&D
- Supplements capabilities of DSPDA

AtoMx™ Spatial Informatics Platform

- A cloud-based, integrated informatics platform for spatial biology
- Analyze and visualize, large amounts of spatial multiomics data
- Preset analysis modules and pipelines
- Advanced analytics support global data sharing and collaboration

Analysis Services

Data Analysis Service:

- nCounter differential gene expression data fully analyzed

Spatial Data Analysis Service (sDAS):

- Work one-on-one with NanoString computational biologists
- Fully interpreted GeoMx data to answer biological questions.



For more information, please visit nanosttring.com/neuroscience

NanoString Technologies, Inc.

530 Fairview Avenue North
Seattle, Washington 98109

T (888) 358-6266
F (206) 378-6288

nanosttring.com
info@nanosttring.com

Sales Contacts

United States us.sales@nanosttring.com
EMEA: europa.sales@nanosttring.com

Asia Pacific & Japan apac.sales@nanosttring.com
Other Regions info@nanosttring.com

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