GeoMx® Protein Assays for Neuroscience

Gene Expression Panel

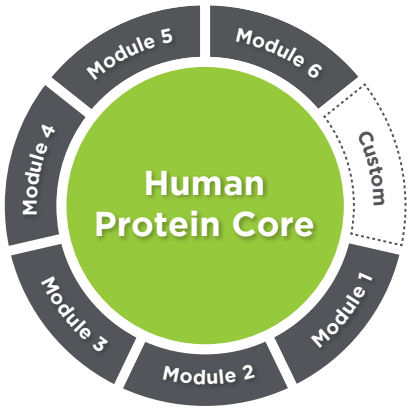
Designed to provide flexible and comprehensive coverage of key neural cell types and neurodegenerative disease pathology. With a modular design, profile up to 96 curated protein targets with spatial resolution from a single tissue section using the GeoMx Digital Spatial Profiler (DSP).

Product Highlights

- Curated content designed for neurodegenerative and neuroimmunological research
- Modular design allows selection of up to six 10-plex modules to add to the Neural Cell Profiling Core
- Pre-validated in multiplex format for use in human and mouse FFPE or fresh frozen tissue
- Customizable with up to 10 additional targets of interest
- For use with nCounter readout and compatible with DSP Data Center Software

GeoMx Protein Assay Design

Designed to profile up to 96 targets simultaneously with spatial resolution. The Neural Cell Profiling Core contains 20 targets designed for broad cell profiling and includes necessary controls for all GeoMx DSP experiments. Up to 6 modules plus 10 custom targets can be added to select the content most relevant to your research. All cores and modules contain validated antibodies conjugated to unique DNA indexing-oligonucleotides via a UV-photocleavable linker. After region of interest (ROI) selection on GeoMx DSP and UV cleavage of the oligonucleotides, each DNA oligonucleotide is recognized by a unique Reporter probe that contains a fluorescent barcode. Reporter probes are imaged and counted by the nCounter® Analysis System to provide a direct, digital readout of spatially resolved protein expression.



- Neural Cell Profiling Panel
- Alzheimer's Pathology Panel
- Parkinson's Pathology Panel
- Alzheimer's Pathology Extended Panel
- Autophagy Panel Panel
- Glial Cell Subtyping Panel

Curated Content for Neuroscience

- **Neural Cell Profiling Core:** Includes relevant markers of neurons, oligodendrocytes, astrocytes, and microglia. Also contains the controls needed to run any GeoMx DSP experiment.
- **Alzheimer's Disease Pathology Module:** Includes proteins and protein products that are associated with Alzheimer's pathology and risk in the literature, including beta-amyloid, Tau, and ApoE.
- **Alzheimer's Disease Pathology Extended Module:** Includes proteins and protein products that are associated with Alzheimer's pathology and risk in the literature, including increased coverage of phosphorylated Tau and amyloid processing proteins.
- **Autophagy Module:** Includes proteins involved in the regulation and process of autophagy.
- **Parkinson's Disease Pathology Module:** Includes proteins associated with Parkinson's pathology and risk in the literature, including several Parkin genes and alpha-synuclein.
- **Glial Cell Subtyping Module:** Includes key markers of all glial cell subtypes, including microglia, astrocytes, and oligodendrocytes.

Accompanying Morphology Marker Kits are available for tissue visualization and ROI selection.

Neural Cell Profiling Panel *Human Protein Core*				**AD Pathology Panel** *Human Protein Module*		**PD Pathology Panel** *Human Protein Module*		**AD Pathology Extended Panel** *Human Protein Module*	
CD68	SYP	Olig2	P2ry12	Amyloid-Beta 1-40	Phospho-Tau (S404)	ApoA1	Park7	Phospho-Tau (T231)	PSEN1
HLA-DR	IBA1	CD40	TMEM119	Amyloid-Beta 1-42	Phospho-Tdp-43 (S409/S410)	Calbindin	Phospho-SNCA (S129)	Phospho-Tau (S396)	NRGN
CD11b	GFAP	CD45		APOE	Tau	FUS	PINK1	Phospho-Tau (S199)	Neprilysin
MAP2	MBP	NEFL		APP	Tdp-43	LRRK2	SNCA	Phospho-Tau (S214)	IDE
Ki-67	NeuN	CD31		P2RX7	UBB	Park5	TH	ADAM10	BACE1
CD163	S100B	CD39		**Autophagy Panel** *Human Protein Module*			**Glial Cell Subtyping Panel** *Human Protein Module*		
Ms IgG2a		Histone H3		ATG12	HSC70	LC3B	C4B	CTSD	EMP1
Ms IgG1		S6		ATG5	LAMP2A	P62	CD9	GPNMB	CD11c
Rb IgG		GAPDH		BAG3	TFEB		CLEC7A	MERTK	
				GBA	VPS35		CSF1R	Vimentin	

Neural Cell Profiling Panel *Mouse Protein Core*				**AD Pathology Panel** *Mouse Protein Module*		**PD Pathology Panel** *Mouse Protein Module*		**AD Pathology Extended Panel** *Mouse Protein Module*	
CD11b	CD45	MBP	SYP	Amyloid-Beta 1-42	Phospho-Tau (S404)	ApoA1	Phospho-SNCA (S129)	Neprilysin	p-Tau (S199)
CD163	GFAP	NEFL	TMEM119	APOE	Tau	Calbindin	PINK1	BACE1	p-Tau (S396)
CD31	IBA1	NeuN	CD68	APP	Tdp-43	LRRK2	SNCA	IDE	p-Tau (T214)
CD39	Ki-67	Olig2	MHC II	P2RX7	UBB	Park5	TH	Neurogranin	p-Tau (T231)
CD40	MAP2	S100B				Park7		PSEN1	
				Autophagy Panel *Mouse Protein Module*			**Glial Cell Subtyping Panel** *Mouse Protein Module*		
Rb IgG		Histone H3		ATG12	ULK1	LC3B	CD9	GPNMB	SPP1
Rt IgG2a		S6		ATG5	VPS35	P62	CSF1R	ITGAX	Aldh1l1
Rt IgG2b		GAPDH		Beclin-1	TFEB		Ctsd	Mertk	
				PLA2G6	BAG3		Vimentin	MSR1	

Validated Assays Ready for Use

All GeoMx Protein Assays undergo extensive validation to ensure high quality GeoMx DSP data.

Ordering Screen
IHC validation of off-the-shelf antibody in control tissue(s)

Post-Conjugation Screen
IHC testing of conjugated antibody for post-conjugation specificity

Sensitivity/ Specificity Screen
Quantitative nCounter assessment on control FFPE cell pellets

Interaction Screen
Performance comparison of antibodies alone or in high-plex cocktail

TMA Screen
Analysis of normal and disease tissue microarrays to confirm performance in tissue

Spatial Protein Profiling with High Specificity

Protein detection shows high specificity pre- and post- oligonucleotide conjugation **(FIGURE 1).**

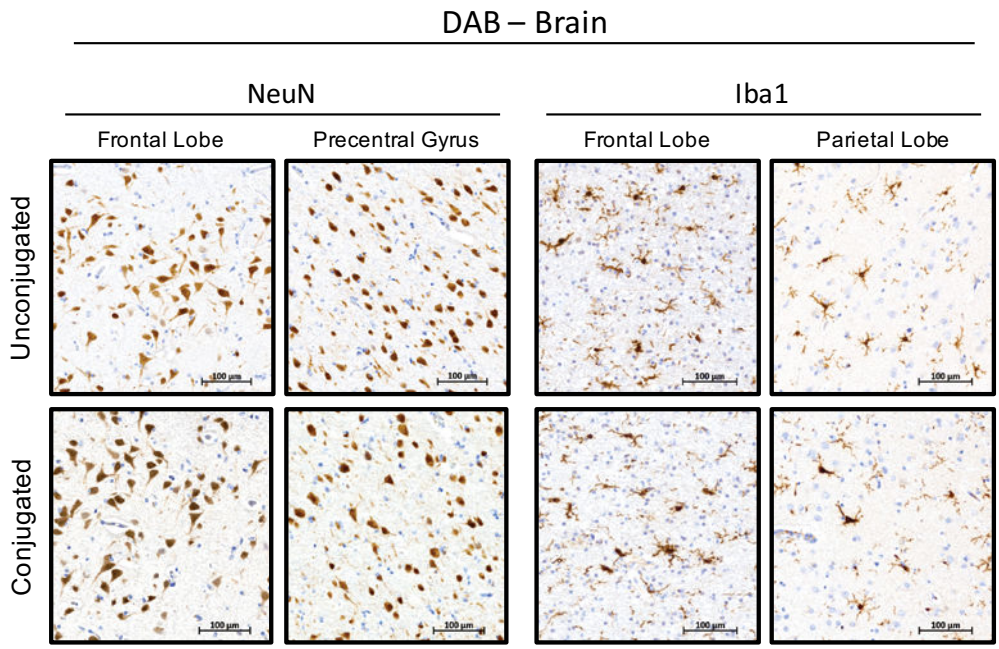


FIGURE 1: Example NeuN (DPROT_00101.1) and Iba1 (DPROT_00098.1) are tested for specific staining pre- and post-conjugation to a specific indexing oligonucleotide to ensure conjugation does not alter specificity.

Additionally, spike-in of each module to the Neural Cell Profiling Core does not alter specificity of the antibodies, demonstrating robust multiplex performance **(FIGURE 2).**

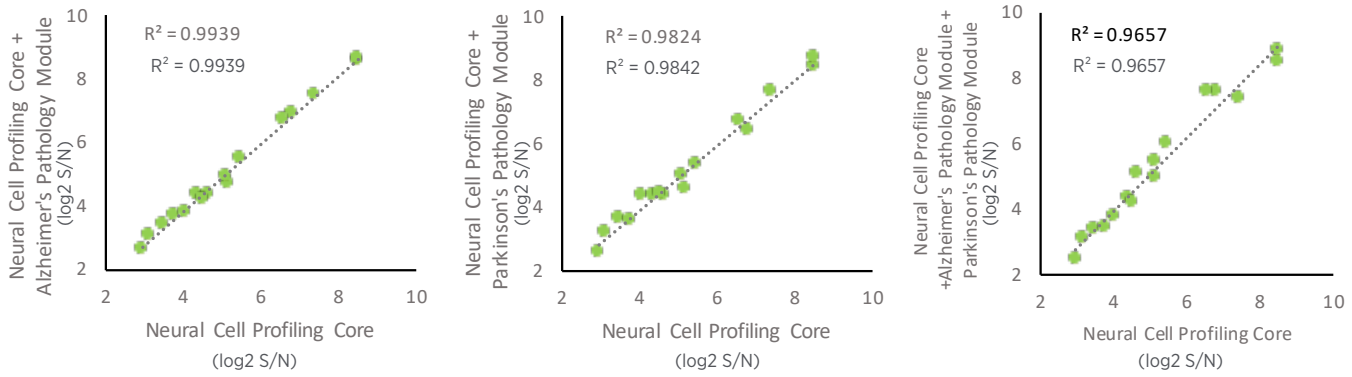


FIGURE 2: Example signal for the Neuro Cell Profiling Core is compared to the Neuro Cell Profiling Core plus individual Modules to ensure no antibody-antibody interference. Single antibody interference testing is also performed prior to core + module testing.

Reveal Tissue Heterogeneity

Analysis of ROI containing amyloid beta and Iba1 from Alzheimer's disease samples show distinct protein expression profiles in each segment respectively **(FIGURE 3)**.

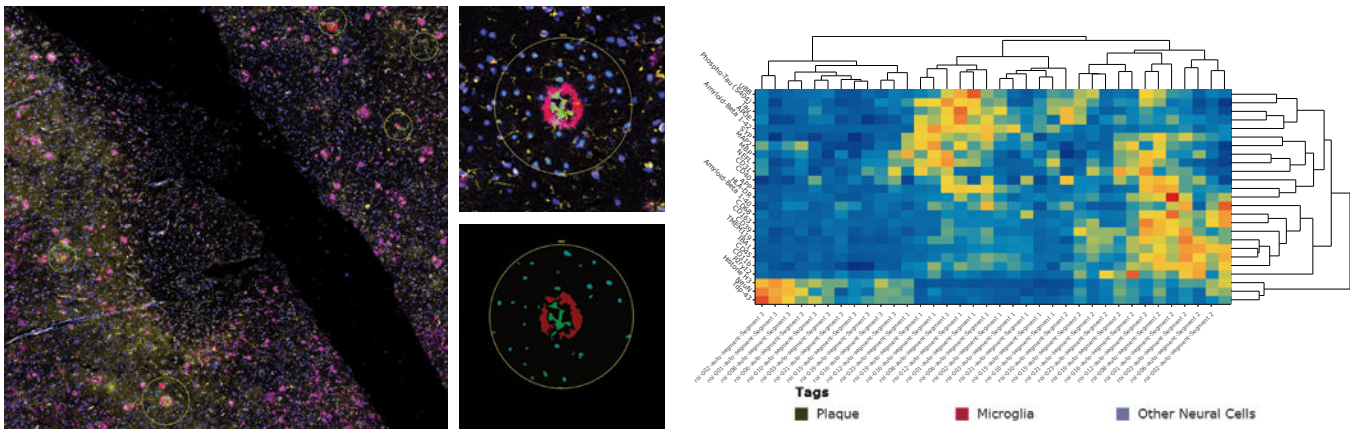


FIGURE 3: 12 ROI were selected with prominent amyloid beta plaques, microglia, and other neural cells in Alzheimer's positive cortex human FFPE tissue. ROI were segmented based on Amyloid Beta/Iba1/Nuclei morphology stain. Protein expression shows strong clustering by compartment.

GeoMx® Data Center

Unique GeoMx software combines whole tissue visualization at single cell resolution with advanced ROI selection to enable comprehensive spatial profiling of tissue sections. The fully integrated workflow tracks image data to corresponding profiling data, allowing users to easily go from data collection to data analysis and to interact with either dataset in real time.

The data analysis module assesses the quality of the raw data and provides a number of options to normalize data sets. Moreover, a variety of data visualization formats are enabled to export publication-quality figures. Visualization plots include: heatmap, cluster, bar graph, box plot, scatter plot, line/trend plot, strip plot, volcano plot, and PCA.

To view the protein probe list contact us: nanostring.com/GeoMxAssays

Ordering Information

Gene Expression Panels arrive ready-to-use and generally ship within 24 hours following purchase.

GeoMx Protein Assays			
Product	**Product Description**	**Quantity**	**Catalog Number**
GeoMx Neural Cell Profiling Panel *Human Protein Core for nCounter*	Protein core including 20 targets for human neural cell profiling plus positive and negative controls. Includes AbMix and Probe R1 for 48 AOI per slide. Can be run as a standalone panel.	12 slides	GMX-PROCO-NCT-HNCP-12
GeoMx Alzheimer's Pathology Panel *Human Protein Module for nCounter*	Protein module including 10 targets for human AD pathology. Includes AbMix and Probe R2 for 48 AOI per slide. Must be run with a protein core.	12 slides	GMX-PROMOD-NCT-HADP-12
GeoMx Alzheimer's Pathology Extended Panel *Human Protein Module for nCounter*	Protein module including 10 targets for human AD pathology. Includes AbMix and Probe R4 for 48 AOI per slide. Must be run with a protein core.	12 slides	GMX-PROMOD-NCT-HADEP-12
GeoMx Parkinson's Pathology Panel *Human Protein Module for nCounter*	Protein module including 10 targets for human PD pathology. Includes AbMix and Probe R3 for 48 AOI per slide. Must be run with a protein core.	12 slides	GMX-PROMOD-NCT-HPDP-12
GeoMx Autophagy Panel *Human Protein Module for nCounter*	Protein module including 10 targets for human autophagy. Includes AbMix and Probe R5 for 48 AOI per slide. Must be run with a protein core.	12 slides	GMX-PROMOD-NCT-HA-12
GeoMx Glial Cell Subtyping Panel *Human Protein Module for nCounter*	Protein module including 10 targets for human glial cell subtyping. Includes AbMix and Probe R6 for 48 AOI per slide. Must be run with a protein core.	12 slides	GMX-PROMOD-NCT-HGCS-12
GeoMx Neural Cell Profiling Panel *Mouse Protein Core for nCounter*	Protein core including 19 targets for mouse neural cell profiling plus positive and negative controls. Includes AbMix and Probe R1 for 48 AOI per slide. Can be run as a stand alone panel.	12 slides	GMX-PROCO-NCT-MNCP-12
GeoMx Alzheimer's Pathology Panel *Mouse Protein Module for nCounter*	Protein module including 8 targets for mouse AD pathology. Includes AbMix and Probe R2 for 48 AOI per slide. Must be run with a protein core.	12 slides	GMX-PROMOD-NCT-MADP-12
GeoMx Alzheimer's Pathology Extended Panel *Mouse Protein Module for nCounter*	Protein module including 9 targets for mouse AD pathology. Includes AbMix and Probe R4 for 48 AOI per slide. Must be run with a protein core.	12 slides	GMX-PROMOD-NCT-MADEP-12
GeoMx Parkinson's Pathology Panel *Mouse Protein Module for nCounter*	Protein module including 9 targets for mouse PD pathology. Includes AbMix and Probe R3 for 48 AOI per slide. Must be run with a protein core.	12 slides	GMX-PROMOD-NCT-MPDP-12
GeoMx Autophagy Panel *Mouse Protein Module for nCounter*	Protein module including 10 targets for mouse autophagy. Includes AbMix and Probe R5 for 48 AOI per slide. Must be run with a protein core.	12 slides	GMX-PROMOD-NCT-MA-12
GeoMx Glial Cell Subtyping Panel *Mouse Protein Module for nCounter*	Protein module including 10 targets for mouse glial cell subtyping. Includes AbMix and Probe R6 for 48 AOI per slide. Must be run with a protein core.	12 slides	GMX-PROMOD-NCT-MGCS-12
GeoMx Morphology Kits			
Product	**Product Description**	**Quantity**	**Catalog Number**
GeoMx Alzheimer's Morphology Kit *Human & Mouse Protein Compatible*	Morphology kit for visualization of human and mouse AD or other brain samples. For use with protein assays. Includes fluroescent antibodies against amyloid-beta, Iba1, and a nuclear stain.	12 slides	GMX-PRO-MORPH-HAD-12
GeoMx Parkinson's Morphology Kit *Human & Mouse Protein Compatible*	Morphology kit for visualization of human and mouse PD or other brain samples. For use with protein assays. Includes fluroescent antibodies against alpha-synuclein, MAP-2, and a nuclear stain.	12 slides	GMX-PRO-MORPH-HPD-12
Additional Assay Reagents			
Product	**Product Description**	**Quantity**	**Catalog Number**
GeoMx Protein Slide Prep Kit for FFPE	Sample prep reagents for GeoMx DSP protein analysis. Includes Buffer W and Buffer S.	12 slides	GMX-PREP-PRO-FFPE-12
GeoMx Hyb Code Pack *Protein*	nCounter readout reagents for GeoMx DSP protein analysis. Includes Hyb Code A-H, Probe U, and additional hybridization buffer.	96 AOI	GMX-PRO-HYB-96
GeoMx DSP Collection Plate	Barcoded collection plates for use on the GeoMx DSP. Required for AOI tracking. Kit includes 4 plates covering 384 AOI.	1 Pack	GMX-DSP-COLL-PLT-4
GeoMx DSP Instrument Buffer Kit	Buffer kit for the GeoMx DSP. Includes Buffer S and Buffer H. Sufficient for ~48 samples with ~18 AOI each. Volume requirements may vary based on experimental design.	1 Kit	GMX-DSP-BUFF-KIT
nCounter Master Kit (Max or FLEX Systems) Reagents and Cartridges	Reagents, cartridges, and consumables necessary for sample processing on nCounter MAX and FLEX Systems	96 AOI	NAA-AKIT-012
nCounter SPRINT Cartridge	Sample Cartridge for nCounter SPRINT System	96 AOI	SPRINT-CAR-1.0
nCounter SPRINT Reagent Pack	nCounter SPRINT Reagent Pack containing Reagents A, B, C, and Hybridization Buffer	1,536 AOI	SPRINT-REAG-KIT

Selected Panel References

1. Prokop S, Miller KR, et al. Impact of TREM2 risk variants on brain region-specific immune activation and plaque microenvironment in Alzheimer's disease patient brain samples. Acta Neuropathologica 2019.

See more at nanostring.com/GeoMxPubs

For more information, please visit nanostring.com/GeoMxDSP

NanoString Technologies, Inc.
530 Fairview Avenue North
Seattle, Washington 98109
T (888) 358-6266
F (206) 378-6288
nanostring.com
info@nanostring.com

Sales Contacts
United States **us.sales@nanostring.com**
EMEA: **europe.sales@nanostring.com**
Asia Pacific & Japan **apac.sales@nanostring.com**
Other Regions **info@nanostring.com**

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