Streamlining and accelerating biomarker discovery and validation with Bruker Spatial Biology platforms and Abcam antibody portfolio

Spatial biology is transforming biomarker discovery by enabling high-resolution, multiplexed proteomic profiling within intact tissue architecture. This approach not only identifies biomarker presence but elucidates spatial context and functional relevance, driving the development of clinically actionable biomarkers and advancing precision medicine.

Antibody-based assays remain the gold standard for biomarker discovery and validation due to their high specificity, sensitivity, and translational utility. However, limitations such as low multiplexing capacity, extensive antibody qualification requirements, and restricted antibody availability for orthogonal validation—particularly for novel or low-abundance targets—can impede progress.

We present a workflow designed to streamline and accelerate the discovery and validation of spatial protein biomarkers by leveraging the following key components:

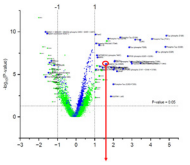
Features

1.GeoMx® Digital Spatial Profiler (DSP) Proteomic Depth
GeoMx Discovery Proteome Atlas (DPA) is the highest-plex proteomics panel for spatial biology applications comprising over 1,200 carefully curated antibodies. This panel has been tested on more than 40 human tissue types, includes annotations for over 120 biological pathways, and covers more than 130 post-translational modifications (PTMs), thus enabling comprehensive spatial profiling of protein expression and function in situ.

2.Abcam Antibody Quality and Portfolio Breadth
Each antibody incorporated into the GeoMx DPA Assay is sourced from Abcam's rigorously validated portfolio, ensuring high specificity and reproducibility. These antibodies are also readily available as standalone reagents in different formats, facilitating rapid follow-up studies and orthogonal validation of candidate biomarkers.

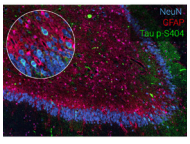
3.CellScape™ Precise Spatial Proteomics Platform
A flexible and scalable multiplex immunofluorescence platform that streamlines custom assay development by using commercially available and pre-validated fluorochrome-conjugated antibodies with no need for antibody or assay modifications and/or extensive additional validation.

Biomarker Discovery → **Biomarker Identification** → **Follow-Up Panel Design** → **Biomarker Validation**



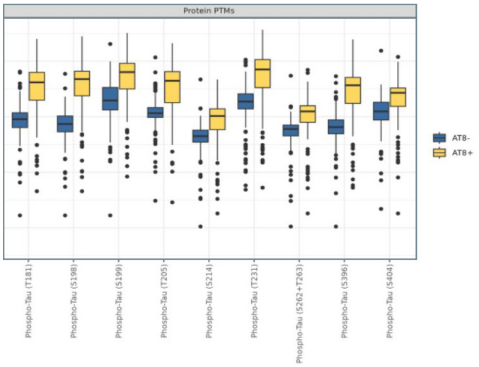
abcam
Anti-Tau (phospho S404) antibody [EPR2605]

abcam
Alexa Fluor® 555 Anti-Tau (phospho S404) antibody [EPR2605]



In this experiment, an anti-AT8 (pTau) antibody was used to discriminate AT8+ neurons with neurofibrillary tangles (NFT) from AT8- normal neurons in an Alzheimer's Disease brain sample. Screening 1200+ targets with GeoMx DPA revealed significant differences in the expression of Tau protein phosphorylated at different residues between AT8+ and AT8- neurons, along with several other biomarkers that are linked to neurodegenerative disease.

(Data courtesy of Dr. Miranda Orr, Washington University in St. Louis)



Markers of interest based on GeoMx DPA results

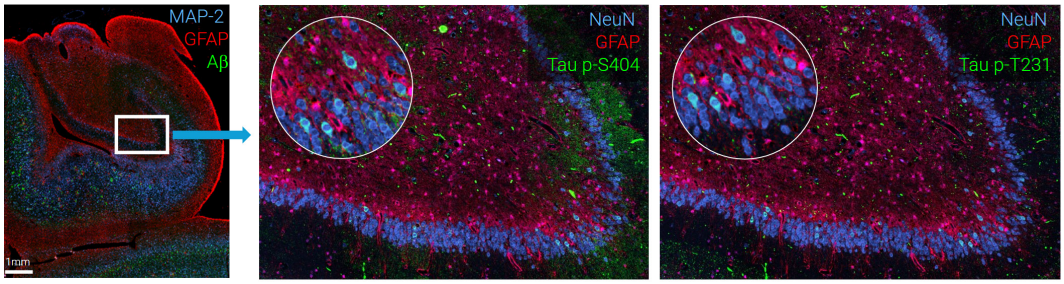
Marker	Clone	Conjugate	Readout	Vendor	Cat. No
pTau(S404)	EPR2605	Unconjugated	NGS	abcam	ab196364
pTau(S214)	EPR1884(2)	Unconjugated	NGS	abcam	ab196358
pTau(S396)	EPR2731	Unconjugated	NGS	abcam	ab156623
pTau(T231)	EPR2488	Unconjugated	NGS	abcam	ab156624
A-beta 1-42	mOC64	Unconjugated	NGS	abcam	ab271968
BACE1	EPR19523	Unconjugated	NGS	abcam	ab238937
Ubiquitin	EPR8830	Unconjugated	NGS	abcam	ab230145
MMP9	EP1254	Unconjugated	NGS	abcam	ab204850
CD14	SP192	Unconjugated	NGS	abcam	ab230903
LEF-1	EPR2029Y	Unconjugated	NGS	abcam	ab215999

Same-Clone validation panel designed for CellScape

Marker	Clone	Conjugate	Readout	Vendor	Cat. No
pTau(S404)	EPR2605	Alexa Fluor® 555	mIF	abcam	ab313142
pTau(S214)	EPR1884(2)	Unconjugated	mIF	abcam	ab313142
pTau(S396)	EPR2731	Alexa Fluor® 555	mIF	abcam	ab302570
pTau(T231)	EPR2488	Alexa Fluor® 555	mIF	abcam	ab313128
A-beta 1-42	mOC64	Alexa Fluor® 488	mIF	abcam	ab224026
BACE1	EPR19523	Unconjugated	mIF	abcam	ab183612
Ubiquitin	EPR8830	Alexa Fluor® 488	mIF	abcam	ab205467
MMP9	EP1254	Alexa Fluor® 647	mIF	abcam	ab310122
CD14	SP192	Alexa Fluor® 594	mIF	abcam	ab305119
LEF-1	EPR2029Y	Unconjugated	mIF	abcam	ab137872

Alexa Fluor is a registered trademark of Thermo Fisher Scientific Inc.
Custom labeling and/or secondary antibody detection was used to detect unconjugated antibodies

Orthogonal validation of markers of interest (left table) was performed using the same antibody clones in fluorescent formats (right table) compatible with CellScape multiplex immunofluorescence (mIF). Data was generated in less than 4 weeks after the initial panel design with sourcing of antibodies. For the targets listed in Table 1 above, we observed a 100% success rate in translating antibodies for mIF detection onto the CellScape platform. As shown in the figure below, the results confirmed Tau protein hyper phosphorylation at different residues within hippocampal CA3 neurons and additionally provided single cell and subcellular spatial context.



By uniting Bruker's spatial biology platforms with Abcam's rigorously validated antibodies, researchers can streamline biomarker discovery and validation while gaining the spatial insights that drive translational breakthroughs. Together, we enable faster, more confident paths to precision medicine.

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