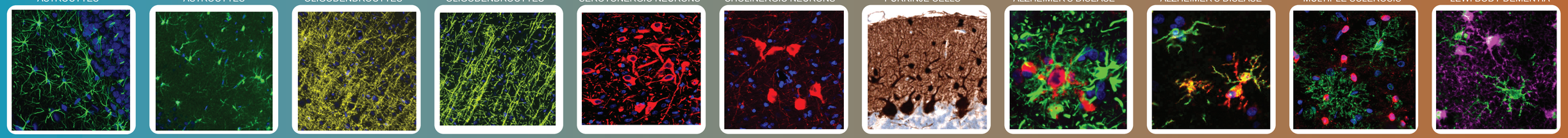
RESOLVING BRAIN ARCHITECTURE WITH SPATIAL PROTEOMICS

The brain is one of the most complex organs in the human body, with countless processes still shrouded in mystery. To tackle neurological diseases at their roots, it is crucial to understand the brain's molecular landscape, particularly its intricate signaling networks. A critical step in this process is identifying the different brain cells and how they interact under healthy conditions.

Establishing a baseline of normal cellular operations and communication provides the insight needed to recognize the changes or abnormalities that occur in neurological disorders. This foundational knowledge is key to pinpointing the root causes of these disorders, ultimately leading to more effective interventions and treatments.

Spatial proteomics can be used to map different types of brain cells such as neurons, astrocytes, oligodendrocytes, and microglia proteins within neural tissues with high precision. These biomarkers can serve as diagnostic tools or therapeutic targets.Central to spatial proteomics are primary antibodies that selectively bind to target proteins, enabling precise localization and visualization.



MAPPING THE BRAIN'S PROTEOME TO UNDERSTANDING BRAIN DISEASES

Proteomic approaches are employed to identify protein biomarkers that are differentially expressed or localized in diseased versus healthy brain tissue. At its core, primary antibodies are used to map different types of brain cells such as neurons, astrocytes, oligodendrocytes, and microglia proteins within neural tissues with high precision. By identifying and characterizing cell type-specific markers, we can establish a baseline of what constitutes a healthy brain. From this knowledge we can detect deviations associated with various neurological disorders.

GLIAL CELLS MARKERS

The human brain is composed of various cell types, and the exact numbers can vary depending on the brain region. It contains roughly 86 billion neurons. Astrocytes, which are a type of glial cell, are more numerous than neurons and make up about 20-40% of all glial cells in the brain. Oligodendrocytes, another type of glial cell, are generally fewer in number than astrocytes.

MICROGLIA

- anti-AIF1 (Cat.AMAb91671)
- anti-CD163 (Cat.AMAb91646)
- anti-CUX1 (Cat.AMAb91352)
- anti-HLA-DRA (Cat.AMAb91674)
- anti-ITGAM (Cat.AMAb90911)
- anti-PTPRC (Cat.AMAb90518)
- anti-SPP1 (Cat.HPA027541)

ASTROCYTES

- anti-ADGRV1 (Cat.HPA067503)
- anti-AQP9 (Cat.HPA074762)
- anti-CD44 (Cat.HPA005785)
- anti-EZR (Cat.AMAb90976)
- anti-FGF2 (Cat.HPA065502)
- anti-FYN (Cat.HPA023887)
- anti-GFAP (Cat.AMAb91033)
- anti-GLUL (Cat.AMAb91101)
- anti-GPC5 (Cat.HPA040152)
- anti-HPSE2 (Cat.HPA044603)
- anti-PTPRZ1 (Cat.HPA015103)
- anti-S100B (Cat.AMAb91038)
- anti-SLC1A2 (Cat.HPA009172)
- anti-SLC1A3 (Cat.HPA037467)

OLIGODENDROCYTES

- anti-ALCAM (Cat.HPA010926)
- anti-CNP (Cat.AMAb91069)
- anti-COL1A2 (Cat.HPA059738)*
- anti-COL9A1 (Cat.HPA074749)
- anti-CRYAB (Cat.AMAb91661)
- anti-CST3 (Cat.HPA013143)*
- anti-GRIK2 (Cat.HPA014623)
- anti-MBP (Cat.AMAb91063)
- anti-OPALIN (Cat.AMAb91685)
- anti-PDGFRA (Cat.HPA004947)
- anti-PLP1 (Cat.HPA004128)
- anti-SOX6 (Cat.AMAb91383)
- anti-STK32A (Cat.HPA040236)
- anti-TLL1 (Cat.HPA060767)
- anti-VCAN (Cat.HPA004726)
- anti-VIM (Cat.HPA001762)*

*Schwann cells

NEURONAL MARKERS

Among brain's cell types, neurons have distinct markers that vary depending on the brain region and specific neuronal subtype. Organizing neuron-specific markers based on the types of neurons they are associated with requires careful interpretation, as some markers can be expressed across multiple neuronal types or subtypes. These markers are not only critical for identifying different neuron types but also play a key role in understanding the functions of various brain regions and the underlying mechanisms of certain brain diseases.

NEURONS (ALL)

- anti-MAP2 (Cat.HPA008273)
- anti-NeuN (Cat.HPA070789)
- anti-NEFM (Cat.AMAb91027)
- anti-NSE (Cat.AMAb90556)
- anti-SYP (Cat.HPA002858)
- anti-TUBB3 (Cat.AMAb91394)

GLUTAMATERGIC

- anti-GRIA1 (Cat.HPA035202)
- anti-GRIA3 (Cat.HPA058659)
- anti-GRIA4 (Cat.HPA063282)
- anti-GRID2 (Cat.HPA058538)
- anti-GRIK1 (Cat.HPA073879)
- anti-GRIK4 (Cat.HPA074453)
- anti-GRIK5 (Cat.HPA074001)
- anti-GRIN1 (Cat.HPA067773)
- anti-GRIN2B (Cat.HPA069762)
- anti-SLC17A6 (Cat.AMAb91086)
- anti-SLC17A7 (Cat.AMAb91041)

GABAERGIC

- anti-GAD1 (Cat.AMAb91076)
- anti-GAD2 (Cat.AMAb91048)
- anti-GABBR1 (Cat.HPA050483)
- anti-GABBR2 (Cat.HPA013820)
- anti-SLC6A1/GAT1(Cat.AMAb91043)

NORADRENERGIC

- anti-DBH (Cat. HPA070789)
- anti-SLC6A2/NET (Cat. HPA076311)

SEROTONERGIC

- anti- (Cat. HPA074728)
- anti-SLC6A4/TPH2 (Cat. HPA074728)

PEPTIDERGIC

- anti-CCK (Cat. HPA069515)
- anti-NPY (Cat. HPA044572)
- anti-SST (Cat. HPA019472)
- anti-VIP (Cat. HPA017324)

CHOLINERGIC

- anti-CHAT (Cat. AMAb91130)
- anti-CHRNA5 (Cat. HPA054381)

DOPAMINERGIC

- anti-FOXA2 (Cat. HPA066846)
- anti-NR4A2/Nurr1 (Cat. HPA000543)
- anti-SLC6A3/DAT (Cat. AMAb91125)
- anti-TH (Cat. AMAb91112)

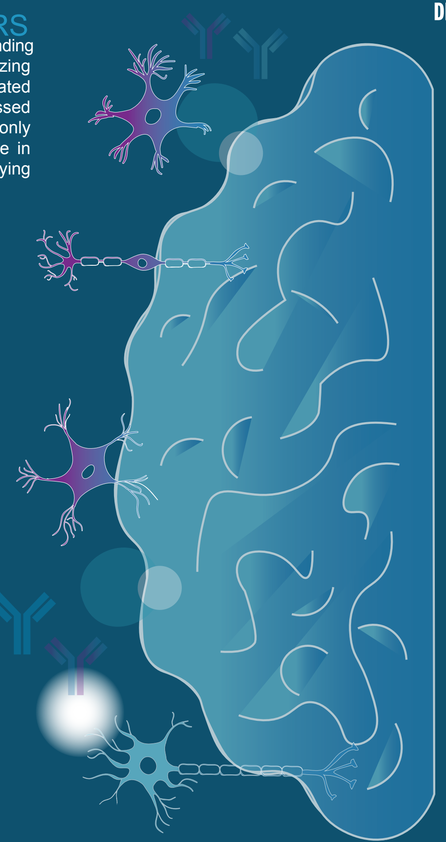
AT-A-GLANCE : CELL-TYPE RELATED DISEASES

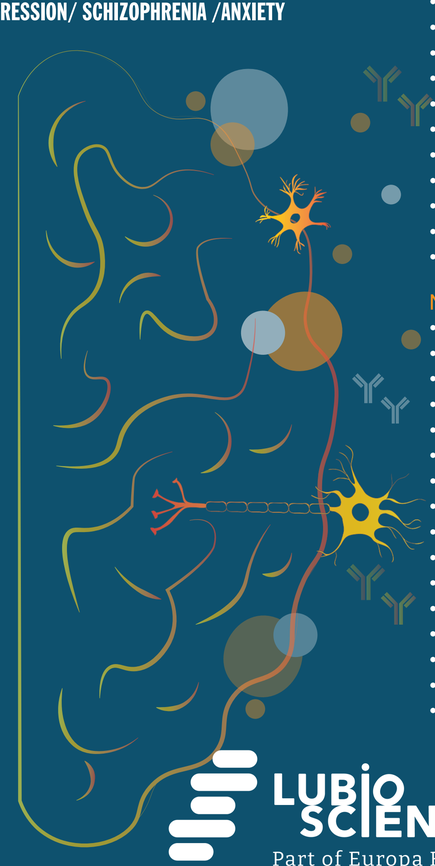
GLIA RELATED DISEASES

- ALZHEIMER'S DISEASE
- AMYOTROPHIC LATERAL SCLEROSIS
- AUTISM
- EPILEPSY
- FRONTOTEMPORAL DEMENTIA
- GLIOBLASTOMA
- PARKINSON'S DISEASE

NEURON RELATED DISEASES

- ALZHEIMER'S DISEASE
- ATTENTION DEFICITS
- AUTISM
- COGNITIVE DEFICITS /DEMENTIA
- FRONTOTEMPORAL DEMENTIA
- HUNTINGTON'S DISEASE
- PARKINSON'S DISEASE
- TOURETTE SYNDROME
- DEPRESSION/ SCHIZOPHRENIA /ANXIETY





COMMON BRAIN DISEASES MARKERS

Understanding changes in protein levels in the brain are a powerful tool for the clinical management of brain diseases. It aids in early detection, precise diagnosis, monitoring disease progression, personalizing treatments, and understanding disease mechanisms. This approach not only enhances patient outcomes but also advances the development of targeted therapies and biomarkers, paving the way for better management of brain health.

GLIOMAS

- anti-EZH2 (Cat.AMAb91752)
- anti-FGFR1 (Cat.HPA056402)
- anti-FOXO3 (Cat.AMAb91872)
- anti-GLI1 (Cat.AMAb91772)
- anti-GFAP (Cat. AMAb91033)
- anti-ID1 (Cat.AMAb91757)
- anti-IL33 (Cat.AMAb91858)
- anti-NF1 (Cat.AMAb91741)
- anti-POSTN (Cat.AMAb91764)
- anti-PTEN (Cat.AMAb91735)
- anti-RUNX2 (Cat.HPA022040)
- anti-SLC6A6 (Cat.HPA016488)
- anti-ZEB2 (Cat.AMAb91862)

NEURODEGENERATION

- anti-APOE (CatHPA065539)
- anti-APP (CatHPA001462)
- anti-CDK5 (CatHPA064535)
- anti-CLU (CatHPA000572)
- anti-CREB1 (Cat.HPA019150)
- anti-GAPDH (Cat.AMAb91153)
- anti-GRN (Cat.AMAb91385)
- anti-GSK3B (Cat.HPA028017)
- anti-HDAC6 (Cat.HPA026321)
- anti-MAPT (Cat.HPA069524)
- anti-NOS1 (Cat.HPA069509)
- anti-NRGN (Cat.HPA038171)
- anti-NTRK1 (Cat.HPA035799)
- anti-PARK2 (Cat.HPA036012)
- anti-PSEN1 (Cat.HPA030760)
- anti-SNCA (Cat.HPA005459)

NEUROINFLAMMATION

- anti-AGER (Cat.AMAb91635)
- anti-GAP43 (Cat.AMAb91664)
- anti-GZMB (Cat.AMAb91650)
- anti-IL17RA (Cat.AMAb91617)
- anti-ITGA4 (Cat.HPA074961)
- anti-MBP (Cat.AMAb91063)
- anti-MS4A1 (Cat.HPA014391)
- anti-P2RX4 (Cat.HPA039494)
- anti-P2RX7 (Cat.AMAb91714)
- anti-PLP1 (Cat.AMAb91639)
- anti-S100A8 (Cat.HPA024372)
- anti-S100A9 (Cat.AMAb91690)
- anti-SORT1 (Cat.AMAb91428)
- anti-TCF7L2 (Cat.AMAb91716)
- anti-TLR2 (Cat.AMAb91631)
- anti-TREM1 (Cat.AMAb91459)
- anti-TSPO (Cat.AMAb91854)

ATLAS ANTIBODIES

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