bio-techne® | R&D SYSTEMS

Assay Insider

FALL 2025 // VOL.1 ISSUE 3

NEUROSCIENCE *Innovations*

Breaking Barriers
Smarter Detection for Neurological Disease

Tackling TBI
Advanced Assays Reveal Early Signals

Ultra-Sensitive Assays
Precise, scalable, automation-ready

Assay Insider

Fall 2025 // Volume 1, Issue 3

Neuroscience Innovations

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From Elusive to Actionable:

Advancing Biomarker Detection in Neuroscience

Early diagnosis demands more than detection—
it demands precision at the edge of what's measurable.

Neuroscience is undergoing a paradigm shift. As our understanding of neurodegenerative diseases deepens, the field is moving decisively toward earlier, more precise detection of disease-related biomarkers. This shift is not just scientific—it's clinical. The ability to detect biomarkers before symptoms emerge opens the door to earlier intervention, more effective monitoring, and ultimately, better patient outcomes.

The High Stakes of Early Detection

Conditions like Alzheimer's, Parkinson's, ALS, and MS progress relentlessly. Yet the biomarkers that signal their early stages—such as neurofilament light chain (NF-L), glial fibrillary acidic protein (GFAP), and phosphorylated Tau (pTau)—circulate at vanishingly low concentrations, often beyond the reach of conventional assays. This creates a critical barrier at the exact moment when sensitivity matters most.

Blood-based biomarkers represent a promising path forward for scalable, non-invasive screening. However, their low abundance demands detection methods that combine ultra-sensitivity with reproducibility. Cerebrospinal fluid (CSF) offers higher analyte concentrations, but its invasive collection and limited sample volume present challenges of their own. Whether working with blood or CSF, the imperative is the same: capture reliable signals from the smallest possible sample, with confidence.

Precision Tools for a New Frontier

At Bio-Techne, we're redefining what's possible in neuroscience research with immunoassay solutions defined by enhanced sensitivity, scalability, and precision—helping you achieve more with less: less sample, less time, less variability.

Our **Simple Plex™ Assays**, powered by the fully automated **Ella™ Platform**, offer sub-picogram detection and up to 5 logs of dynamic range in plasma, serum, or CSF—all in under 90 minutes. Ella minimizes user error and consistently delivers CVs under 10%, revealing even the faintest signals that could drive earlier clinical interventions.

For high-throughput needs, Luminex® Multiplexing assays profile up to 50 analytes from just 25 µL of sample, enabling fast, flexible screening, and detailed phenotyping of neuroinflammation and ATX(N) biomarkers.

And for applications where proven reliability matters most, our **R&D Systems™ ELISA kits**—manufactured in-house with our own reagents—continue to set the standard for quality and consistency in routine and exploratory neuroscience research.

Learn More

Scan the QR Code or Visit:
bio-techne.com/applications/immunoassays

Ultra-Sensitive Detection, Minimal Sample

Pushing the boundaries of biomarker detection requires both innovation and precision. That's why we've partnered with Spear Bio to bring **SPEAR UltraDetect™ Assays** to neuroscience research. Powered by Successive Proximity Extension Amplification Reaction (SPEAR) technology, these assays achieve attomolar sensitivity using just 1 µL of diluted sample.

SPEAR UltraDetect Assays are designed to overcome the limitations of traditional immunoassays. With no wash steps, a built-in two-factor authentication system to minimize background noise, and compatibility with standard qPCR instruments, it delivers ultra-sensitive, fast, and highly reproducible results (CVs <5%). Plasma-validated assays for biomarkers such as NF-L and pTau 217 enable researchers to capture even the most elusive brain-derived signals with confidence.

Powering What's Next

Neuroscience is entering a new era—one where early detection drives intervention and advanced capabilities are helping to reshape how we approach both discovery and diagnosis. As sample volumes shrink and sensitivity requirements rise, the need for advanced immunoassays has never been greater.

Whether you're developing therapeutics, validating biomarkers, or advancing early diagnostics, our solutions are built to move your research forward. From Ella and Luminex to ELISA and SPEAR UltraDetect Assays, Bio-Techne delivers the tools to detect what was once undetectable.

Together, we can accelerate the future of neuroscience—one signal at a time.

Featured Resource

Smarter Tools for Tough Targets: Unlocking Neurological Biomarkers

New capabilities are transforming how researchers detect and track neurological disease.

Better Biomarkers for ALS and Alzheimer's

A recently released case study highlights how advanced immunoassay platforms—such as the Ella System with Simple Plex Assays—are enabling researchers to reliably measure low-abundance biomarkers, including NF-L, GFAP, and pTau 217, in both blood and CSF.

In conditions like ALS, MS, and Alzheimer's, early detection can change everything. Yet traditional methods often fall short when it comes to the sensitivity and consistency required to detect early signals. Ella addresses this challenge with microfluidic automation and factory-calibrated cartridges, delivering precise, reproducible results across multiple sites while reducing hands-on time.

Explore the Full Data

Scan the QR Code or Visit to Download:
bio-techne.com/resources/literature/simple-plex-neuroscience-biomarker-assays

Blood-Based Breakthroughs

Recent findings show how Ella's performance stands up under rigorous comparison. In head-to-head studies, the platform demonstrated strong agreement with other leading systems, accurately quantifying neurofilament light (NF-L) in both serum and plasma—even at ultra-low picogram levels.[1]

The newest GFAP assay on Ella also detected significantly elevated levels in patients with Alzheimer's and multiple sclerosis, supporting its role as a reliable, blood-based biomarker for astrocytic injury.[2]

Perhaps most striking, the Simple Plex pTau 217 ALZpath Assay showed exceptional diagnostic potential. With a detection limit of just 0.09 pg/mL and clear separation between control and Alzheimer's samples, it brings accurate, scalable pTau 217 testing within reach for both research and clinical settings.

These findings underscore how Simple Plex Assays on Ella are helping researchers push past traditional limitations—offering the sensitivity, reproducibility, and efficiency needed to accelerate progress in neuroscience.

1. Andreasson et al. (2023) Assessing the commutability of candidate reference materials for the harmonization of neurofilament light measurements in blood. Clinical Chemistry and Laboratory Medicine, 61(7):1245-1254. doi: 10.1515/cclm-2022-1181. PMID: 36709509.

2. Fazeli B, et al. (2024). Quantification of blood glial fibrillary acidic protein using a second-generation microfluidic assay. Validation and comparative analysis with two established assays. Clinical Chemistry and Laboratory Medicine, 62(8):1591-1601. doi: 10.1515/cclm-2023-1256. PMID: 38353147.

Technical Corner

Choosing the Right Immunoassay for Neuroscience Research

Selecting an immunoassay for neuroscience research isn't just about picking the latest technology—it's about matching the platform to your scientific questions, sample types, and study objectives. The right choice can determine whether you capture critical early signals or miss them entirely. Below are the core considerations to keep in mind.

Sensitivity is Critical

Early-stage neurological biomarkers often circulate at ultra-low concentrations, particularly in blood. Choosing a platform with the sensitivity to detect these faint signals is essential for uncovering early disease dynamics.

Multiplexing Saves Time and Sample

The ability to measure multiple biomarkers simultaneously increases efficiency and conserves precious samples, though it's important to ensure cross-reactivity is well-controlled.

Dynamic Range Counts

A broad dynamic range allows accurate detection across disease progression—from subtle changes in early stages to higher levels seen in advanced pathology—providing deeper clinical and research insights.

Ease of Use Drives Efficiency

Streamlined workflows not only save time but also reduce error rates—an advantage in both high-throughput and multi-site studies.

Reproducibility Ensures Trust

Consistency is key, whether across cartridges, assay runs, or study sites. Platforms that minimize variability enable more confident comparisons and conclusions.

Real-World Reliability Matters

Assays should demonstrate parallelism and maintain performance across matrices like serum and CSF, ensuring data you can rely on in both controlled and complex settings.

Find the Right Fit: A Comparison Guide

Every research project has its own demands—from biomarker type and disease stage to study scale and sample availability. The chart below compares key specifications and use cases to help you determine which platform might best fit your needs.

	ELISA	Simple Plex Assays	Luminex Assays	SPEAR UltraDetect™ Assays
Assay Format	Matched antibody pair sandwich immunoassay	Microfluidic cartridge-based	Bead-based (multiplex microspheres)	Successive proximity extension and qPCR amplification
Homogenous Assay	No	No	No	Yes
Multiplexing Capability	Single analyte	Up to 8 analytes	Up to 50 analytes	Single analyte
Sample Volume	50 µL	25 µL	50 µL	1 µL
Sensitivity	pg/mL --- fg/mL high sensitivity	pg/mL - fg/mL	pg/mL --- fg/mL high sensitivity	fg/mL-ag/mL
Dynamic Range	2-3 logs	4-5 logs	3-4 logs	4-5 logs
Menu Size	400+ Quantikine Kits --- 1200+ Duoset Kits	380+	490+	4+
Throughput	96-well plate	16-, 32-, and 72-sample cartridge	96-well plate	96- or 384-well plate
Standard Curve Prep Needed	Yes	No	Yes	Yes
Wash Steps	Manual or automated plate washer needed	Built-in automation	Manual or automated plate washer needed	No wash steps
Time to Result	4-6 hours	90 minutes	3-5 hours	4 hours
Instrument Required	Plate reader	Ella System	Luminex System	Formulatrix® F.A.S.T.™ and qPCR
Software	Multiple software packages available	Simple Plex Explorer	Quantist Luminex® Data Analysis Software	SPEARview™ Software
Best Suited For	Single analyte quantification using commonly available plate readers	Up to 8 analytes with a simplified workflow, minimal training needs, and high reproducibility	High-plex (up to 50 targets) for discovery and immune profiling	Ultra-sensitive detection of low abundance targets with limited sample volume
Suitable Biomarkers	Amyloid β 1-40 Amyloid β 1-42 CCL20/MIP-3α NSE/Enolase 2 Park 7 RAGE α Synuclein YKL-40/CHI3L1	Amyloid β 1-40 Amyloid β 1-42 β Synuclein GFAP Neurogranin NFH NF-L S100B Total Tau UCH-L1 YKL-40/CHI3L1 pTau 217	Human, Mouse, Rat, Porcine Discovery Assays Human XL Cytokine Panel Mouse XL Cytokine Panel NHP Cytokine Panel Human High Sensitivity Panel A Human High Sensitivity Panel B	pTau 231 pTau 217 NF-L GFAP

SpearBio

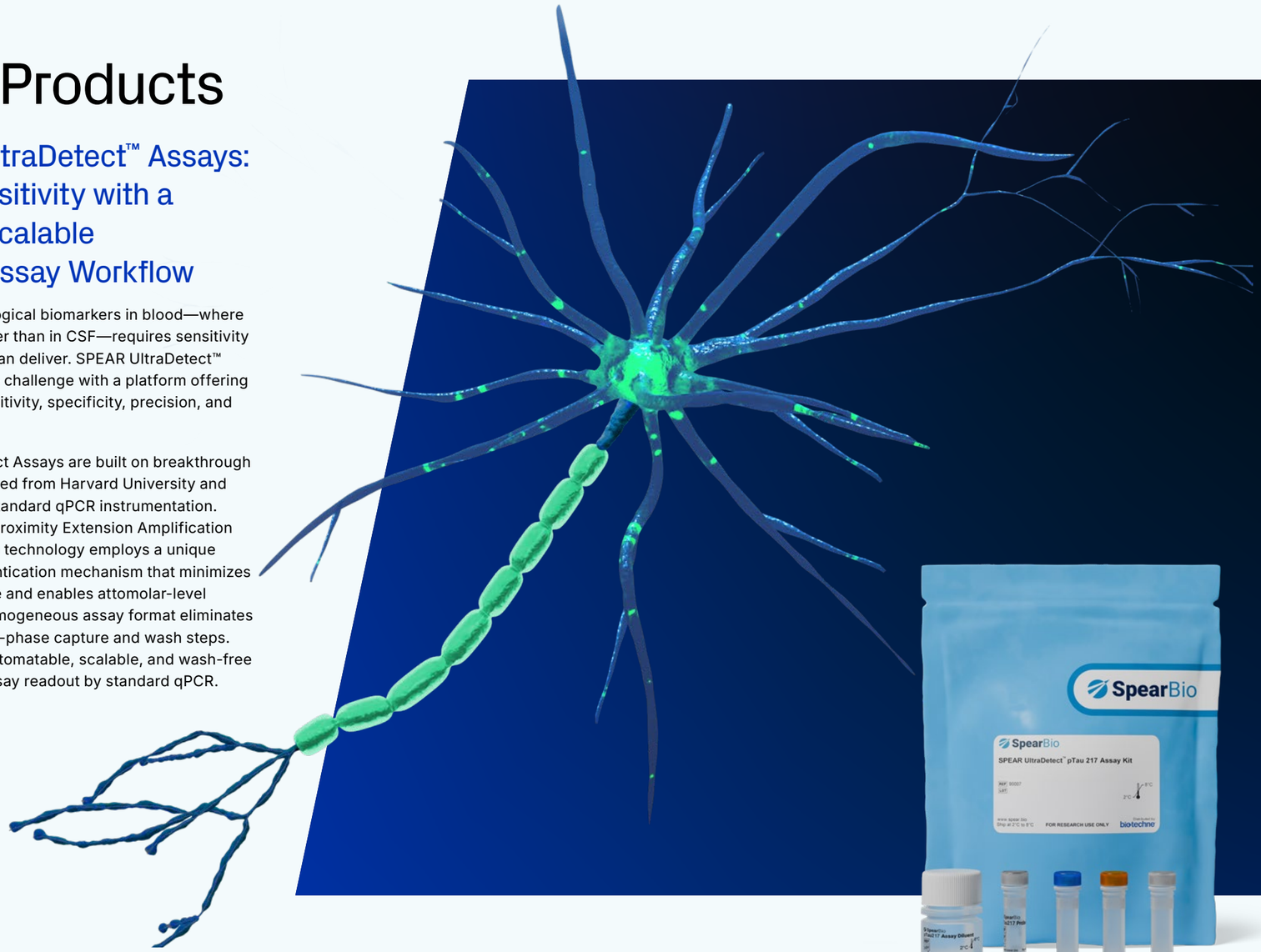
Distributed By
biotechne

New Products

SPEAR UltraDetect™ Assays: Ultra-sensitivity with a Simple, Scalable Immunoassay Workflow

Detecting neurological biomarkers in blood—where levels are far lower than in CSF—requires sensitivity that few assays can deliver. SPEAR UltraDetect™ Assays rise to the challenge with a platform offering unparalleled sensitivity, specificity, precision, and robustness.

SPEAR UltraDetect Assays are built on breakthrough technology licensed from Harvard University and amplified using standard qPCR instrumentation. The Successive Proximity Extension Amplification Reaction (SPEAR) technology employs a unique two-factor authentication mechanism that minimizes background noise and enables attomolar-level sensitivity. Its homogeneous assay format eliminates the need for solid-phase capture and wash steps. The result? An automatable, scalable, and wash-free workflow with assay readout by standard qPCR.



High Sensitivity, Minimal Sample, Maximum Simplicity.

- **Unparalleled Sensitivity**
  SPEAR is the only homogeneous ultrasensitive immunoassay platform capable of attomolar detection with 1 µL of diluted sample.
- **Unparalleled Specificity**
  SPEAR's two-factor authentication ensures target-specific binding, and its homogeneous format ensures no false positives associated with non-specific binding to solid surfaces.
- **Unparalleled Precision**
  The wash-free workflow makes SPEAR UltraDetect easy to automate, driving highly precise measurements from 1 µL of diluted sample.
- **Unparalleled Robustness**
  SPEAR UltraDetect assays are compatible with most qPCR instruments, demonstrating consistent performance across different qPCR platforms and formats.

Validated for Key Neurologic Markers:

pTau 231

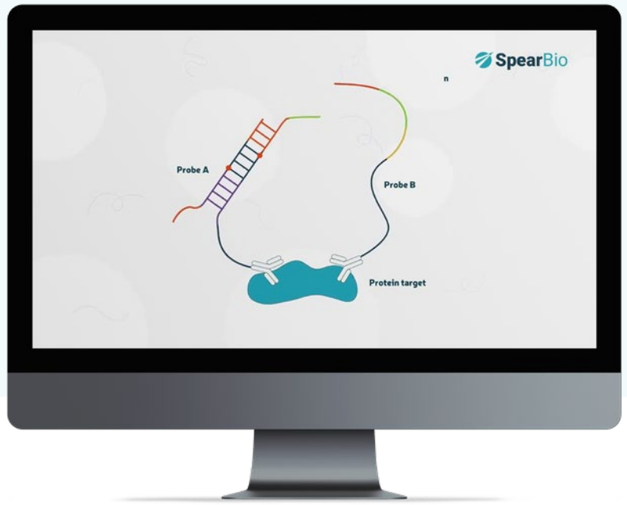
Superior sensitivity, with industry-leading, verified plasma quantifiability of 97% of healthy samples.

pTau 217

AUC of 98.3% in Alzheimer's vs. control; 5.41x signal separation.

NF-L/GFAP

Highly sensitive and precise measurement of GFAP and NF-L for a wide range of neurological conditions; broad dynamic range.



Future-Ready, Lab-Friendly

The homogeneous, automation-compatible format streamlines workflows and enables reliable measurement—a growing menu of neurological biomarkers—bringing high-sensitivity detection into routine neuroscience studies.

Watch the video to see how SPEAR UltraDetect assays simplify precision biomarker quantification in neurology research.

Watch Video
Scan the QR Code or Visit:
youtu.be/kO4OF8FY7xY

Assays in Action

Accelerating TBI Research With Ella

"More people in the lab can run assays confidently."

Dr. Ed Needham
University of Cambridge

Traumatic brain injury (TBI) remains a major global health challenge, with inflammation increasingly recognized as a key driver of ongoing neurological damage. At the University of Cambridge, Dr. Ed Needham and his team are exploring how immune dysregulation influences recovery and long-term outcomes.

To tackle this complex biology, they use Simple Plex Assays on the Ella™ Platform to profile a broad range of cytokines and neural biomarkers, including low-abundance targets like NF-L and GFAP. The platform's sensitivity, reproducibility, and ease of use allow the team to generate high-quality data quickly—unlocking new research directions and pointing toward targeted interventions.

Their findings highlight a strong link between inflammation and worse TBI outcomes, paving the way for future therapies and real-time patient stratification in clinical trials.

Download the full case study to see how Ella is helping advance neuroinflammation research.

Read the Case Study
Scan the QR Code or Visit:
bio-techne.com/resources/testimonials/how-fast-reproducible-simple-plex-assays

We Want to Hear Your Story!

We're looking for inspiring stories to feature in our upcoming newsletter. Whether it's a breakthrough moment, a creative application, or a standout achievement, your story could be the one to motivate and inform others in our community.

Have an amazing success story or unique experience with our products or services? Share it with us!

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https://forms.office.com/r/Znt1yZBh7E

From the Field

Unlocking Reliable Fluid Biomarkers in Neuroscience

Fluid biomarkers from blood, cerebrospinal fluid, saliva, urine, and exosomes are transforming neurological disease research. From neurofilaments and phosphorylated tau to GFAP, these biomarkers support earlier detection, precise monitoring, and faster clinical development.

In this on-demand webinar, Yoav Noam, John Canfield, and John Allinson share practical strategies for generating robust, reproducible biomarker data and key analytical considerations for clinical studies.

Watch to learn about:

- Automated immunoassay platforms that enhance sensitivity, dynamic range, and transferability
- Analytical and reproducibility considerations for fluid biomarker immunoassays
- Why in-study parallelism is essential to reliable results
- How industry partnerships can help accelerate study success

Explore the innovations shaping neuroscience—watch the presentation now.

Watch the Presentation

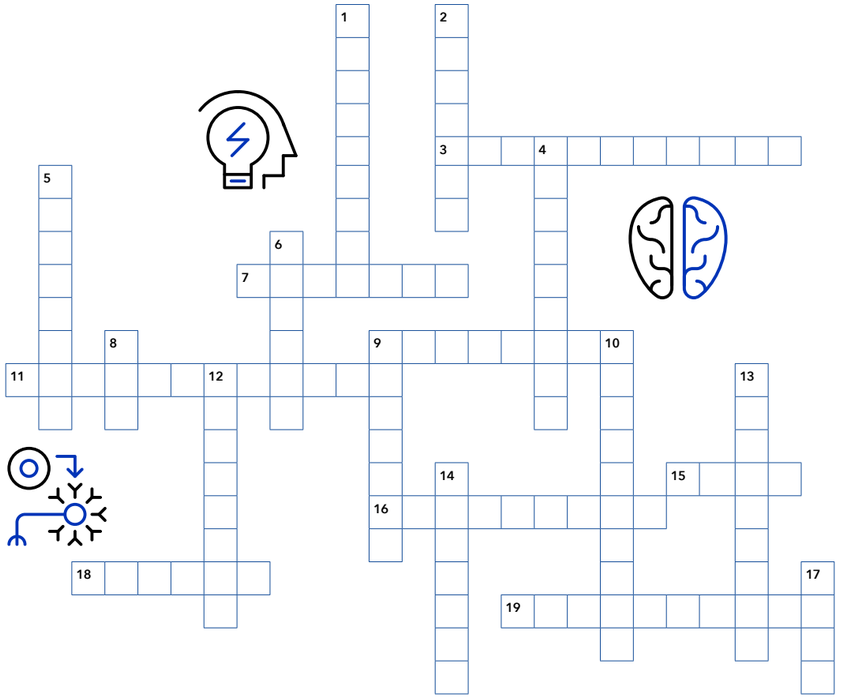
Scan the QR Code or Visit:
bio-techne.com/resources/webinars/fluid-biomarker-detection-for-neurological-detection

Latest Assay Releases

ELISA Kits	Simple Reader™ Compact ELISA Plate Reader	**IA-051123**
	Human SP-D QuicKit ELISA	**QK1920**
	Human CD25/IL-2 R alpha QuicKit ELISA	**QK0223**
	Human Perforin Quantikine QuicKit ELISA	**QK8011**
	Human MIP-3 beta QuicKit ELISA	**QK0361**
	Human FAP Quantikine QuicKit ELISA	**QK3715**
	Human TIGIT DuoSet ELISA	**DY7898-05**
	Human Neurogranin DuoSet ELISA	**DY79471-05**
Luminex Panels	Mouse IL-9 Discovery Assay	**LXSAMSM**
	Mouse SOST Discovery Assay	**LXSAMSM**
	Mouse CXCL9 Discovery Assay	**LXSAMSM**
	Human Tumor Biomarker Luminex Performance Assay	**FCSTM25**
	Non-Human Primate XL Cytokine Performance Panel User Mix	**LNHPXL000**
Simple Plex Assays	Discovery Assays - 35+ New Analytes	**Discovery Assays**
	Human alpha-Synuclein Cartridge	**SPCKC-PS-011989**
	Human CXCL1 Cartridge	**SPCKB-PS012007**
	Human Phospho-Tau (T217) ALZpath Cartridge	**SPCKB-PS-011938**
	Human Neutrophil Elastase Cartridge	**SPCKB-PS-011934**
	Non-Human Primate IFN-gamma Cartridge	**SPCKB-NP-012059**
	Human Neutrophil Elastase/ELA2	**SPCKB-PS-011934**

Neuroscience Crossword

Test your knowledge with this neuroscience crossword puzzle.



Across

3. Stores memories
7. Junction between two neurons
9. Processes emotional information
11. Unusual swelling of the brain
15. Supportive cells of the nervous system
16. Selective _____ reuptake inhibitors
18. Disorders affecting balance and speech
19. Species with the largest brain

Down

1. Connection between the brainstem and spinal cord
2. Neuron found in human but not rodent brains
4. The master gland
5. Neurotransmitter lacking in Parkinson's
6. Primary target of immune attacks in ms
8. Test for electrical brain activity
9. Species with the smallest brain to body ratio
10. Most common cause of dementia
12. Nervous system that regulates unconscious functions
13. Lobe that processes visual information
14. Smallest type of neuron
17. Largest neurons in the human brain

Upcoming Events

Connect with us at upcoming events and discover how Bio-Techne's latest innovations are driving the future of science!

xMAP
October 1 - November, 2025
Virtual
labroots.com/virtual-event/xmap-connect-2025-virtual-series

SfN
November 15-19, 2025
San Diego, CA Booth #1319
sfn.org/meetings/neuroscience-2025

CTAD
December 1-4, 2025
San Diego, CA
ctad-alzheimer.com

ATW: Phacilitate
February 9-12, 2026
San Diego, CA
phacilitate.com/advanced-therapies-week

Analyte Menu

Check out our comprehensive selection of immunoassays optimized for accurate biomarker quantification.

Simple Plex Menu
bio-techne.com/SimplePlexMenu

ELISA Menu
bio-techne.com/ELISA

Luminex Menu
bio-techne.com/luminex-assays

Contact an Immunoassay Specialist
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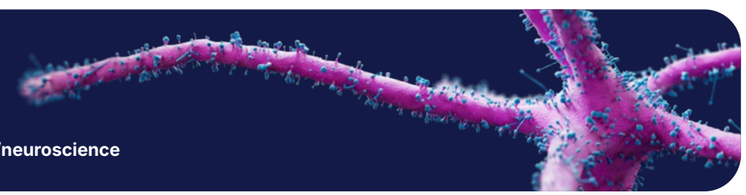
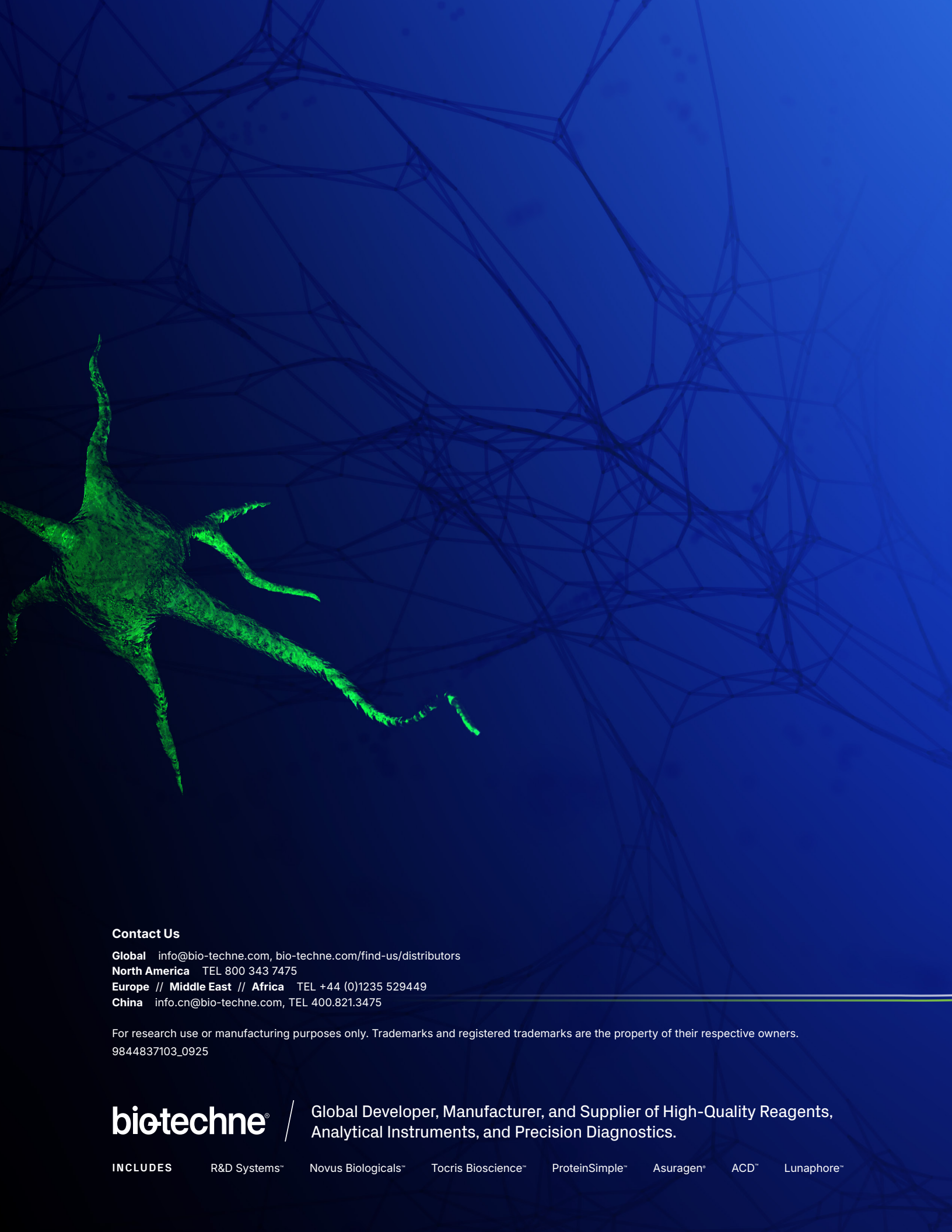


Crossword Solutions
Across 3. Hippocampus 7. Synapse 9. Amydala 11. Encephalitis 15. Glia 16. Serotonin 18. Ataxia 19. Spermwhale
Down 1. Oblongata 2. Rosehip 4. Pituitary 5. Dopamine 6. Myelin 8. EEG 9. Assfish 10. Alzheimer's 12. Autonomic 13. Occipital 14. Granule 17. Betz



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