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Innovative Tools Supporting Tomorrow's Breakthroughs

Unlock Better Spatial Proteomics Results with Smarter Experimental Design

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In proteomics, success begins long before data collection. It starts with a robust experimental design, the use of good quality samples and analytical expertise. This month, ITSIBio News dicusses what to consider, and how to plan to transform your spatial proteomics studies, and ensure that your results are accurate, reproducible, and biologically meaningful.

Why Experimental Design Matters in Spatial Proteomics

There is tremendous interest in spatial proteomics because it provides unprecedented insight into where proteins are located within tissues or cells and potentially revealing how location influence's function and disease mechanisms. However, even the most advanced technologies can only perform as well as the design behind the experiment. A well-thought-out plan minimizes technical variability, improves sensitivity, and ensures your results truly reflect biological differences rather than experimental noise.

Key Elements of a Strong Experimental Design

1. Ask Clear Biological Questions

Start by identifying the biological problem or hypothesis you want to address.
For example: *"How does protein localization change in diseased vs. healthy tissue?"*
A focused question drives decisions about sample type, number, and analytical approach.

2. Optimize Sample Collection and Preparation

Spatial proteomics require high-quality, well-preserved samples. This could be solid tissue, cells, blood, urine, plant material, or FFPE tissue.

3. Control for Variability

Include appropriate biological and technical replicates, apply randomization, and ensure consistent processing. This step reduces batch effects and strengthens statistical confidence in your findings.

4. Leverage Quantitative Technologies Effectively

Choosing the right technology, e.g. Laser Microdissection, 2D-DIGE and LC-MS/MS depends on your objectives.

5. Plan for Data Analysis Early

Spatial proteomics can generate large and complex datasets. Collaborating with data scientists early helps ensure that statistical power, data normalization, visualization, and interpretation align with your study's goals.

How ITSI Biosciences Can Help

With over 21 years of bioanalytical expertise, ITSI Biosciences supports clients from experimental design to data interpretation. We serve biopharma, pharma, research institutes, government agencies, and academia and ensure that every proteomics experiment yields reliable, reproducible, and publication-ready results. Experts are available to provide end-to-end support in optimizing sample selection, providing good quality specimens, transport media, and preparation protocols to maintain protein integrity and spatial context. The technical experts provide guidance in selecting the best-fit platform to achieve qualitative, relative and absolute protein quantitation, and the bioinformatics team will assist in designing pipelines that translate raw data into actionable biological insights.

Our Services Include:

- Comprehensive experimental planning and consultation
- Sample preparation (tissue, blood, urine, FFPE, and more)
- Standard and spatial proteomics using advanced technologies and workflows
- Statistical analysis, data visualization, and biological interpretation

Partner with ITSI Biosciences

In Summary

A powerful spatial proteomics study begins with intentional design, the right samples, controls, technologies, and analytical strategy. With ITSI Biosciences, you gain not just data, but true biological insight from over 21 years of proteomics experience that advances your research and accelerates discovery. We specialize in end-to-end analytical services, helping clients plan, execute, and interpret experiments across a wide range of sample types and research applications.

Coming Next Month:

"Advancing Drug Discovery: How Quantitative Proteomics Accelerates Target Validation."

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