

# COMET™

**The only high-throughput, hyperplex platform: scalability & reproducibility without the need for antibody conjugation**





## A universal solution for all stages of your research

Spatial biology enables the study of cells' presence, abundance and spatial distribution in their tissue microenvironment. A deep-dive into complex cell interactions support a wide range of applications in immunology, immunology, neuroscience and infectious diseases. Although many research institutions are already pushing the boundaries of discovery with spatial biology, the road towards the development of clinical applications in personalized medicine is still in its infancy.

Lunaphore's goal is to accelerate the wide adoption of spatial biology technology by addressing the existing challenges. Scalability issues such as low throughput, reproducibility and versatility of existing solutions can hinder many labs in their journey to making spatial biology a mainstream application. In addition, high complexity in setting up experiments, including lengthy assay development times, or the use of complex antibody chemistries, add to the requirements for skilled and dedicated personnel. Lunaphore's innovative technology offers a groundbreaking solution, streamlining the transition from discovery to translational and clinical research. COMET™ can perform proteomics, transcriptomics and multiomics applications. This document focuses on its hyperplex spatial proteomic capabilities. For more information on the multiomics application please see <https://lunaphore.com/multiomics>.



## Scalability & reproducibility with freedom of target choice



### True reproducibility and tissue preservation

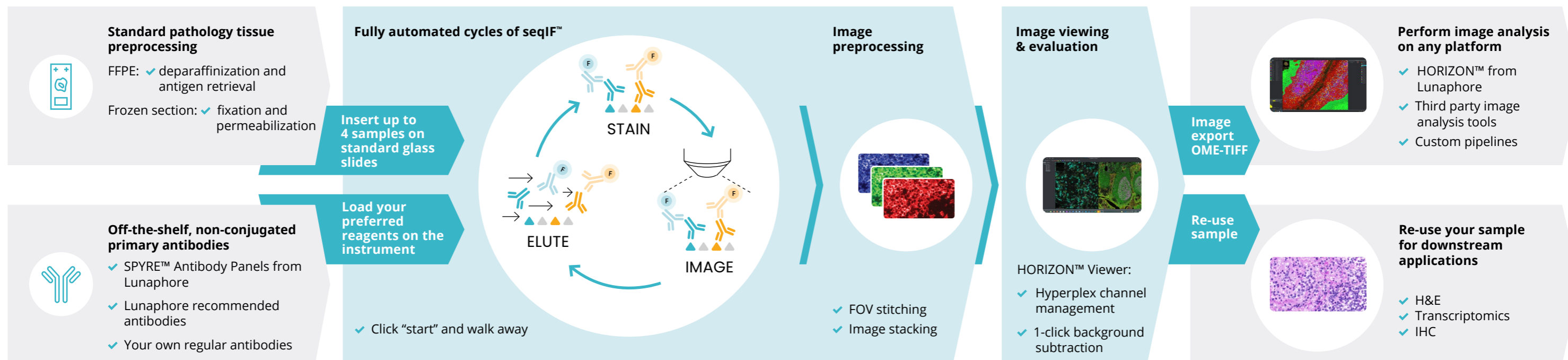
- Maximize reproducibility thanks to a fully automated workflow and precision microfluidics.
- Tissue morphology and epitope stability are fully preserved for downstream applications.
- Avoid undesired variability thanks to no upstream antibody conjugations.



### Unmatched hyperplex throughput with walk-away automation

- Perform a 20-plex protein panel on cohorts of 20 samples in just 1 week.
- Virtually unlimited plex level capability. Perform multiple additional runs on the same slide.
- Slide in, OME-TIFF image out with background already subtracted.

System integration across the entire workflow, from staining, to image acquisition and image pre-processing **without user intervention.**



This workflow captures the proteomics capabilities of COMET™.



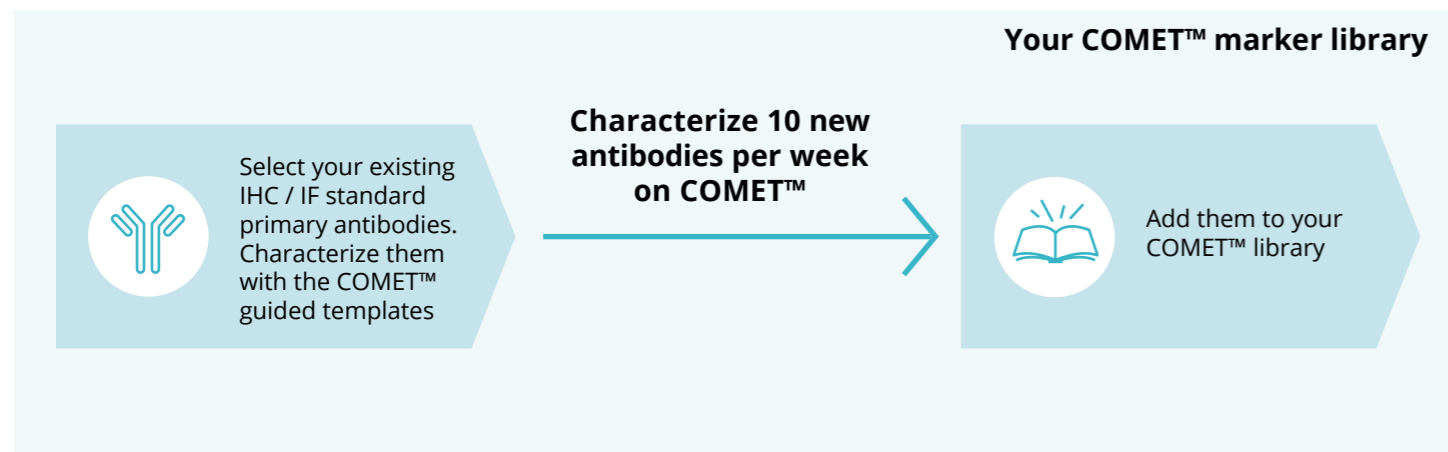
# An assay development companion that simplifies your spatial biology onboarding

Kick-start your spatial proteomics adaption with an intuitive and automated platform, and a comprehensive product suite, including the SPYRE™ Antibody Panels, Secondary Antibodies, Buffers and the Panel Builder.

Whether you start with your own standard antibodies (including regular IVD antibodies), with SPYRE™ Antibody Panels, or with any of Lunaphore's antibody recommendations, you can develop your assays and create any custom panel of choice with full flexibility, getting robust data in no time. **Be up and running in days.**

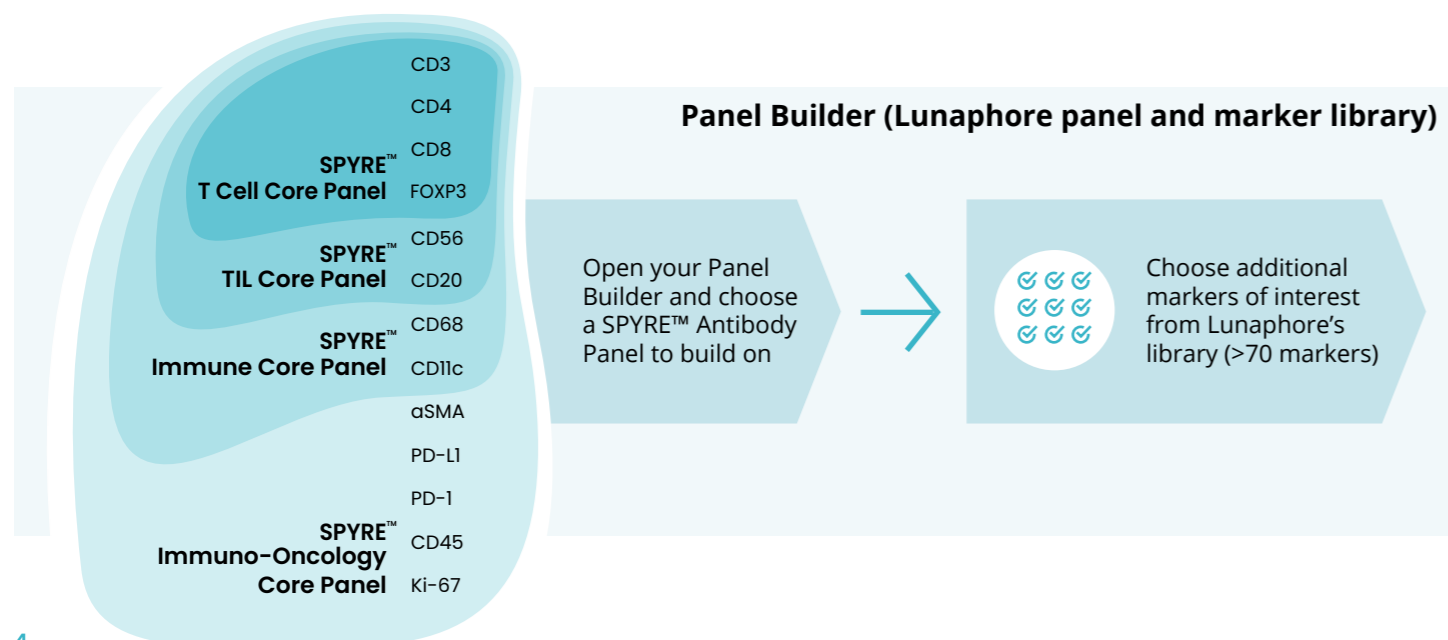
## Use your own antibodies

Create your markers library on COMET™ and build new panels



## Use Lunaphore's know-how

Build new panels in a few seconds



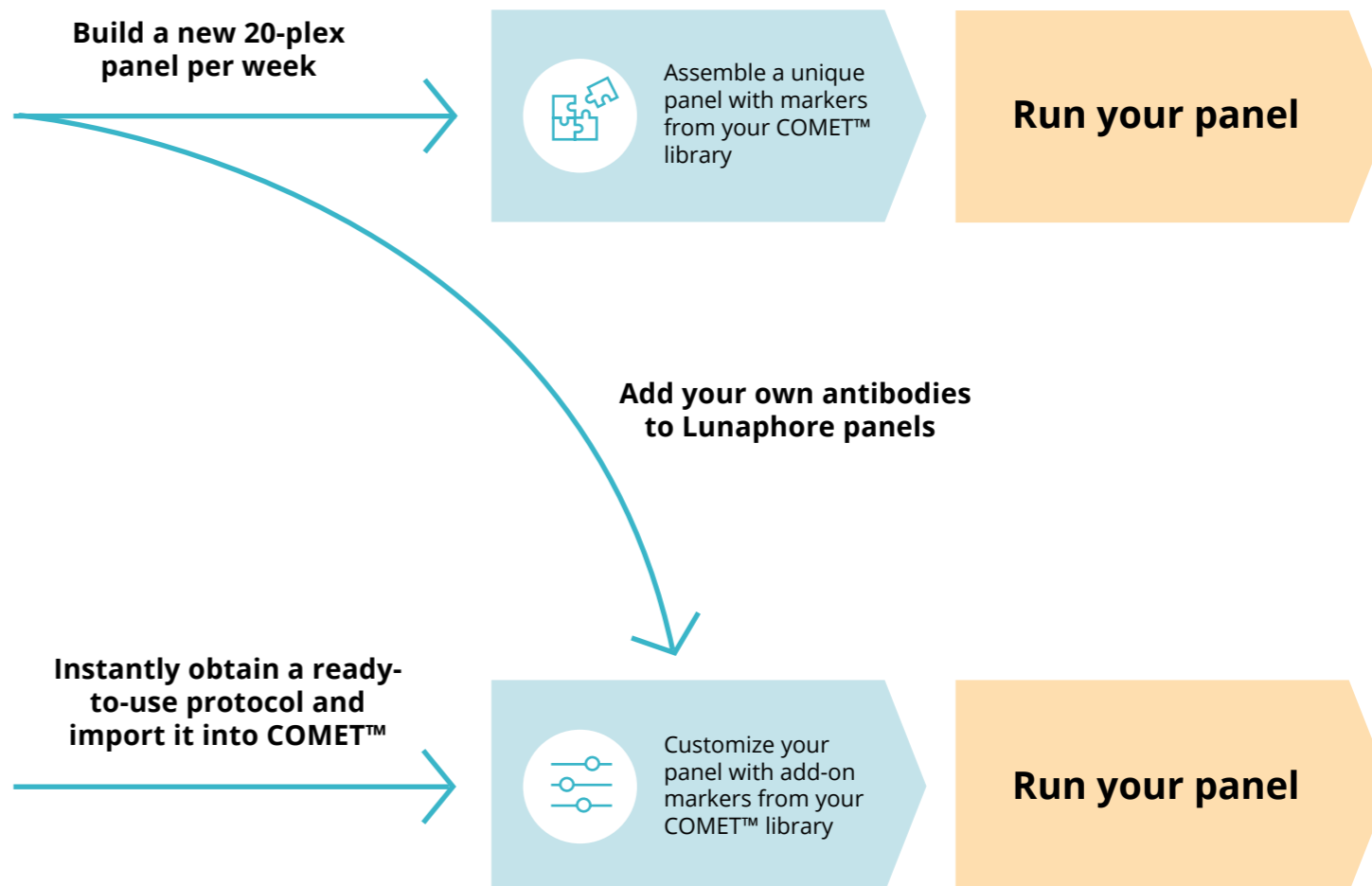
## Rapid and flexible panel development using label-free antibodies

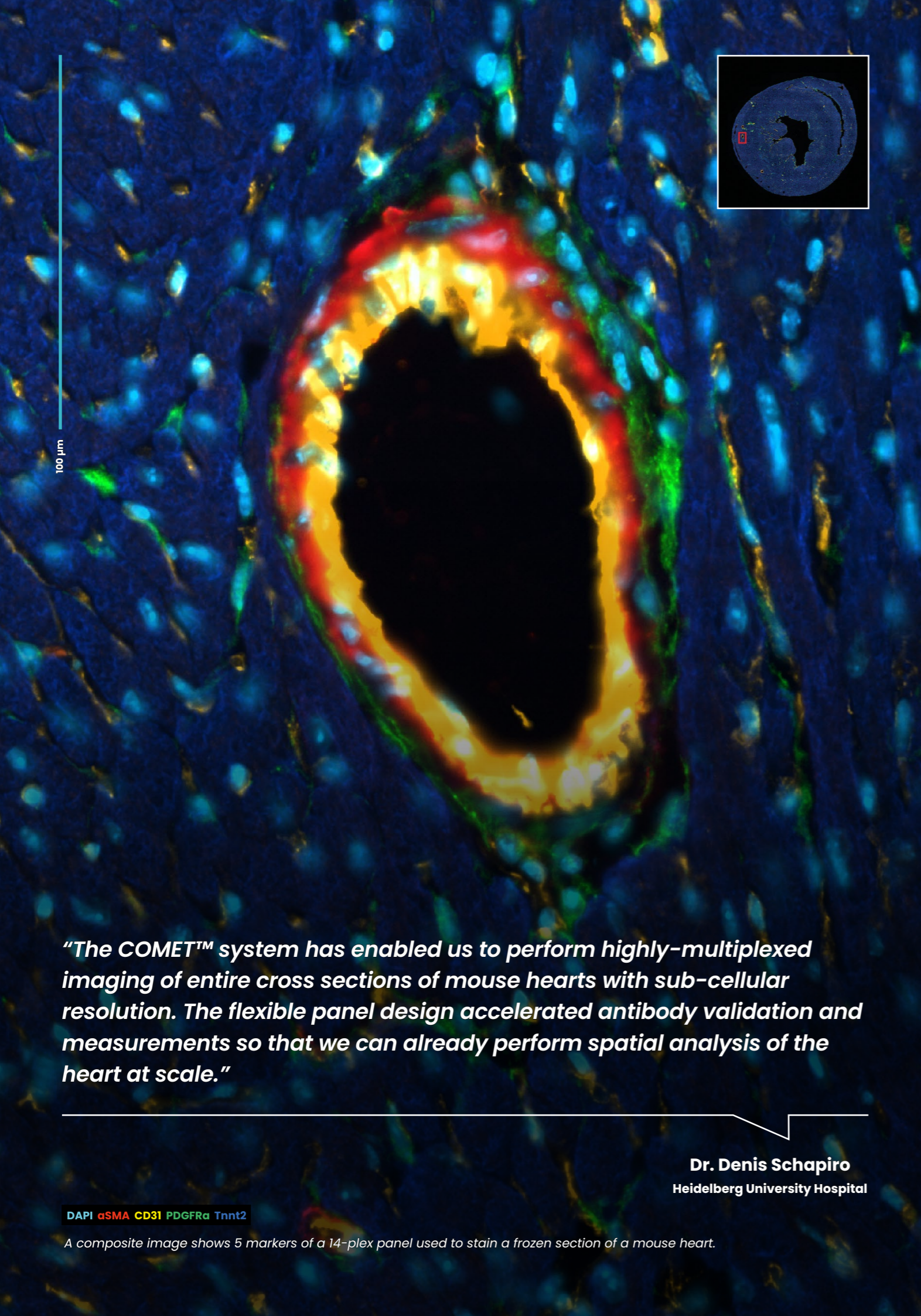
- Use standard, off-the-shelf, label-free primary antibodies. No conjugation or barcoding needed.
- Transfer your existing know-how of IHC / IF antibodies to your COMET™ library.
- Generate hyperplex protocols automatically in just a few clicks.



## Platform versatility across samples and applications

- Choose between proteomics, transcriptomics or multiomics spatial tissue analysis.
- Develop your protocols for FFPE and frozen tissue samples.
- Use verified protocols for human and mouse samples. COMET™ is compatible as well with any other animal samples.





100 μm

*“The COMET™ system has enabled us to perform highly-multiplexed imaging of entire cross sections of mouse hearts with sub-cellular resolution. The flexible panel design accelerated antibody validation and measurements so that we can already perform spatial analysis of the heart at scale.”*

**Dr. Denis Schapiro**  
Heidelberg University Hospital

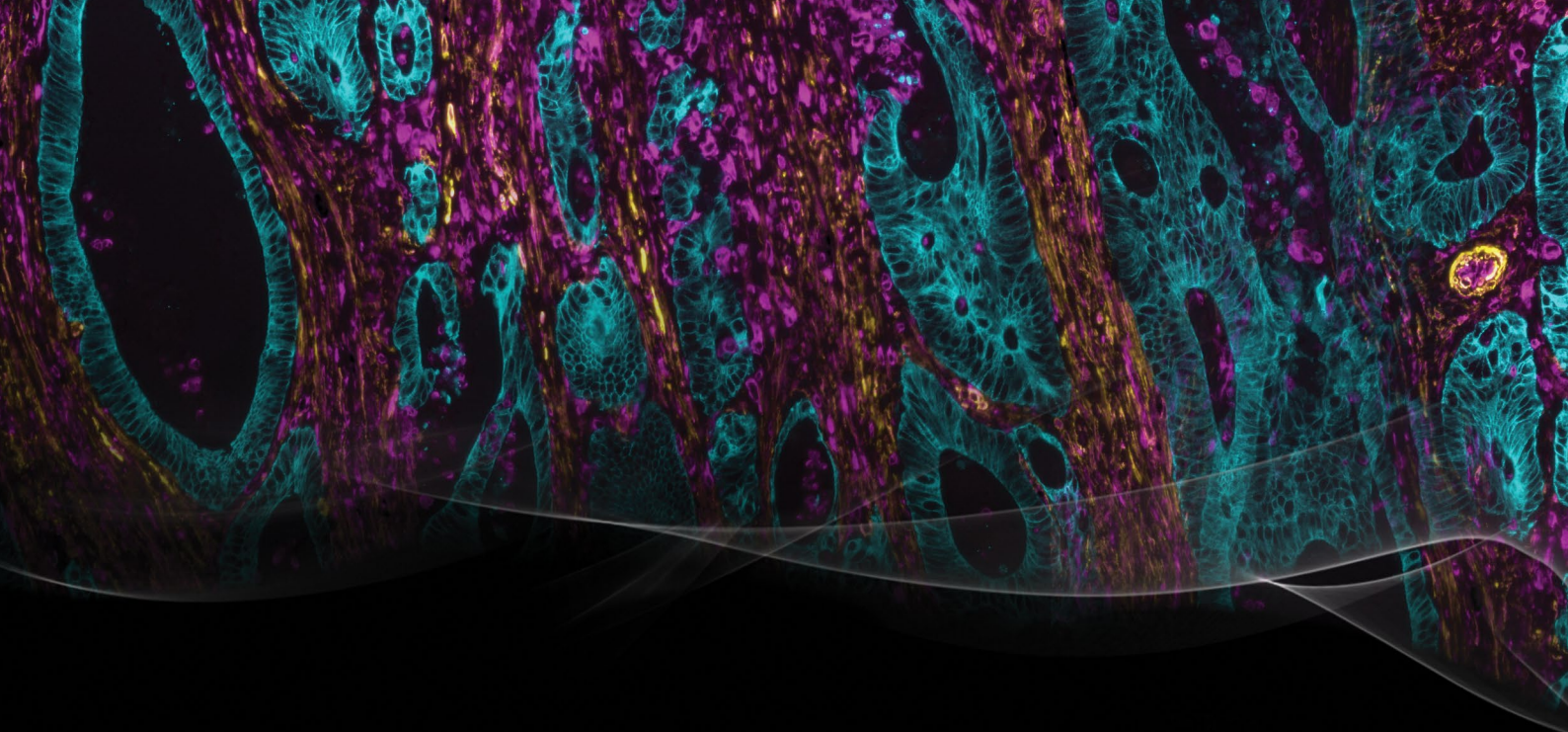
DAPI αSMA CD31 PDGFRα Tnnt2

A composite image shows 5 markers of a 14-plex panel used to stain a frozen section of a mouse heart.



### Instrument Specifications

<b>Application</b>	Multiplex sequential immunofluorescence (seqIF™) and RNAscope™ HiPlex
<b>Technology</b>	Patented microfluidic FFeX™ technology
<b>Plex-level</b>	<ul style="list-style-type: none"> <li>• Virtually unlimited plex level capability of technology</li> <li>• Proteomics application: performs 40-plex protocols per automated run</li> <li>• Multiomics application: performs 12 RNA plus up to 24 protein targets, or 4 RNA plus up to 28 protein targets</li> </ul>
<b>Slide capacity</b>	4
<b>Automation level</b>	Fully automated: staining, target probe hybridization, image acquisition and image preprocessing
<b>Maximum imaging area and staining area</b>	Max imaging area: 12.5 mm x 12.5 mm / 0.49 in x 0.49 in Staining area: 21 mm x 21 mm / 0.82 in x 0.82 in
<b>Throughput</b>	Measured for a 9 mm x 9 mm imaging area: 20 slides/week for 20-plex protein panel ; 12 slides/week for 40-plex protein panel
<b>Reagents</b>	<p><b>Open choice of primary antibodies (non-conjugated):</b></p> <ul style="list-style-type: none"> <li>• Offered by Lunaphore: SPYRE™ Antibody Panel kits &amp; Tumor Markers</li> <li>• Other standard primary antibodies of choice</li> </ul> <p><b>Other reagents and buffers:</b></p> <ul style="list-style-type: none"> <li>• Offered by Lunaphore: Secondary Antibodies, Buffers, DAPI</li> <li>• Alexa Fluor™ Plus matching FITC, TRITC, Cy5 and Cy7 channel characteristics are highly recommended as detection systems</li> <li>• Offered by ACD: RNAscope™ HiPlex Pro detection kit, RNAscope™ HiPlex probes</li> </ul>
<b>Software and apps</b>	<p><b>Offered by Lunaphore:</b></p> <ul style="list-style-type: none"> <li>• COMET™ Control Software – for instrument operation</li> <li>• Panel Builder – online application for automated generation of ready-to-use protocols</li> <li>• HORIZON™ Viewer– for image visualization and quality control</li> <li>• HORIZON™ Software – for image analysis (optional)</li> </ul> <p><b>Compatible image analysis solutions:</b> Oncotopix® Discovery (Visiopharm), HALO® &amp; HALO, AI™ (Indica Labs), Nuclei AI-powered solutions, QuPath</p>
<b>Microscope: magnification and numerical aperture</b>	20X / 0.7 NA
<b>Image resolution</b>	0.28 μm/pixel
<b>Channels</b>	DAPI, FITC, TRITC, Cy5, Cy7
<b>Output file format</b>	OME-TIFF – Supported by most image analysis tools
<b>Slide compatibility</b>	Standard histology slides - 75 mm x 25 mm (3 in x 1 in), 1 mm thick, positively charged
<b>Sample thickness</b>	3-10 μm



## Visit our website



## Talk to our scientists

Discover how we can help you integrate hyperplex spatial biology into your lab. Get in touch at [info@lunaphore.com](mailto:info@lunaphore.com). Our team will be happy to support you.

## Browse our Resources

Access our publications, technical notes, markers library and much more by visiting our resource center: [lunaphore.com/resource-center](https://lunaphore.com/resource-center)

## Access Lab

If you are interested in acquiring a COMET™ platform, our Access Lab can simplify your decision-making process by generating proof-of-principle data, using your samples and reagents. Learn more at: [lunaphore.com/access-lab](https://lunaphore.com/access-lab)

## Selected publications

Research in spatial biology has yielded remarkable outcomes. Discover how top-tier researchers are leveraging COMET™ to produce ground-breaking advancements. Have a look at this list of publications:

1. Guo C, et al. Nature. 2023. doi: 10.1038/s41586-023-06696-z.
2. Hou D., et al. Frontiers in Immunology. 2023. doi: 10.3389/fimmu.2023.1295218
3. Youngblood M., et al. Nature Communications. 2023. doi: 10.1038/s41467-023-41926-y.
4. Ren X., et al. JCI. 2023. doi: 10.1172/JCI170733.