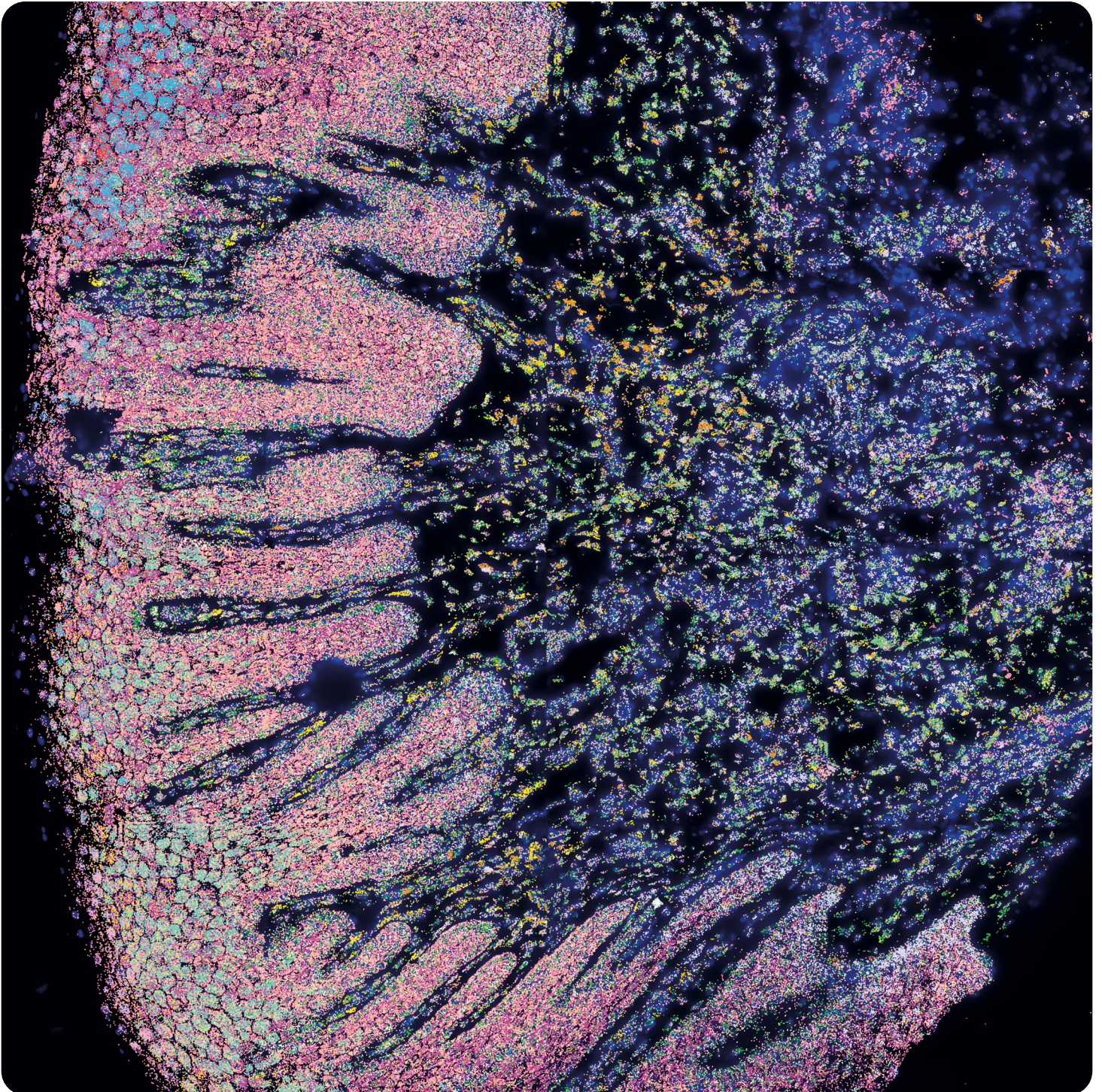




Navigating systems biology

Spatial transcriptomics provides the ability to interrogate complex molecular pathways. The Molecular Cartography™ system delivers a quantitative, spatially resolved view of subcellular biology, with each dot representing a single transcript. This approach maintains sample integrity so you can do more with less.



Spatial biology: The new standard in single-cell analysis

The Molecular Cartography system developed by Resolve Biosciences offers a new approach to spatial biology analysis. Our technology relies on extremely high-quality Zeiss optics for imaging, combined with patented chemistry, that builds upon the power of single-molecule *in situ* hybridization. Its resolution outperforms that of other spatial biology tools, delivering single-cell data with fine details of subcellular activity.

This approach was specifically designed for the multiplexing needs of most scientists for basic, translational, and clinical research. Our system uses transcript-specific probes to analyze the expression of as many as 100 genes at once – detecting even the rarest transcripts. Most importantly, the method preserves the integrity of the tissue sample or cell culture. Unlike other spatial biology techniques, the Molecular Cartography system provides exquisite sensitivity, specificity, and workflow convenience to elucidate the cell's complex transcriptional landscape.

The Molecular Cartography system is currently used by academic and pharma scientists for spatial transcriptomics. The underlying technology is modular, yet flexible enough to incorporate the future interrogation of DNA, proteins, and metabolites. Already, it has allowed users to make numerous discoveries and confirm theories in oncology, neuroscience, toxicology, and infectious disease.

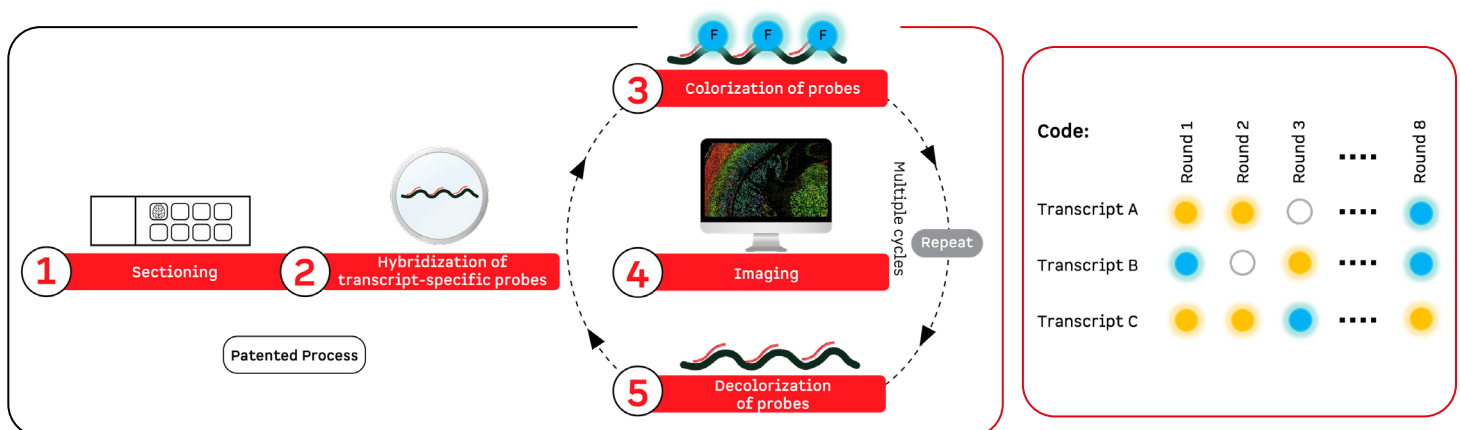
“This Molecular Cartography analysis highlighted the non-random geographical distribution of the melanoma cell states and identified symbiotic interactions between some of these states and cellular components of the TIME [tumour immune microenvironment].”

Jean-Christophe Marine, PhD, VIB-KU Leuven Center for Cancer Biology, Belgium

How does Molecular Cartography work?

“We benchmarked multiple spatial technologies and the Molecular Cartography technology from Resolve Biosciences came out as the very best of the class. Its technical pipeline is rock solid and worked right-first-time on challenging clinical samples. It will be the gold standard for years to come!”

Martin Guilliams, PhD, VIB-UGent Center for Inflammation Research, Belgium

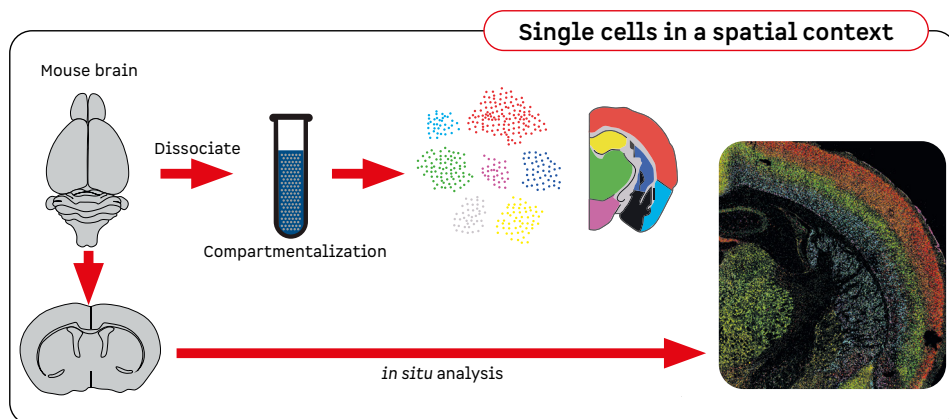


An overview of the Molecular Cartography system

Focus on what matters for your science

Context matters

If you have already generated single-cell RNA-seq data, it might be missing important location context to help identify function. To elucidate the cell's complex transcriptional landscape, transcripts must be visualized in their native environment. With sequencing, the tissue is dissociated, so cells cannot be traced back to their original location. Although current single-cell RNA-seq makes it possible to obtain individual expression profiles at the single-cell level, users cannot put the pieces back together and reassemble the tissue. The position of a cell within the tissue is crucial to understanding its function and purpose.

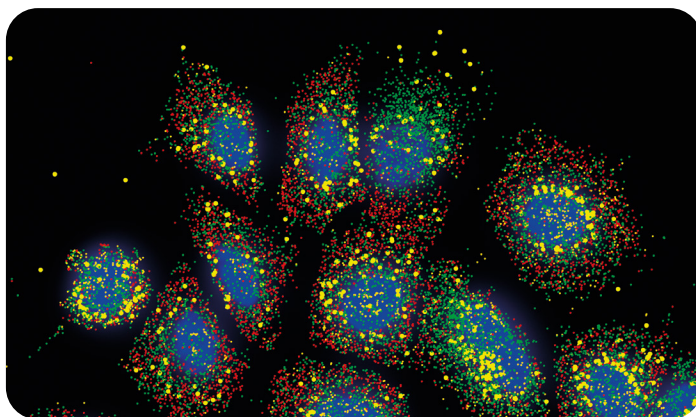


Current methodologies for interrogating cellular functions and gene expression profiles, such as bulk sequencing and single-cell RNA-seq, often involve tissue dissociation and homogenization during sample preparation, which results in the loss of spatial context. Spatial transcriptomics provides granularity regarding cell subtypes and cell states *in situ*. It fully visualizes and quantifies the transcript, allowing researchers to interrogate interactions among cells, and their expressed genes.

The Molecular Cartography system applies spatial transcriptomics technology to even the most challenging samples. Our proprietary probe design process allows you to target your genes of interest with excellent sensitivity and specificity, in addition to mapping your gene clusters of interest to their *in vivo* location, providing valuable functionality data.

Sensitivity matters

In a typical cell, 10,000 genes may be expressed – but most of their gene products are rare, with fewer than 50 transcripts. The Molecular Cartography system offers exquisite sensitivity with low false positive rates, where the failure threshold is 1%, to reliably detect rare transcripts and provide confidence when calling low frequency events.



“By implementing [Molecular Cartography (MC)] on various cell lines together with different SARS-CoV-2 variants, we have gained a thorough comparative understanding of host response dynamics. First, we demonstrate that MC detects single mRNA species at a specificity of >99% and that the sensitivity of mRNA detection is comparable to conventional single-molecule fluorescent *in situ* hybridization techniques.”

Silvia Groiss, PhD, Medical University of Graz, Austria

Resolution matters

Resolution varies significantly across spatial biology platforms, with spatially-barcoded NGS approaches incapable of providing subcellular resolution. The Molecular Cartography system uses advanced optics for direct imaging of a sample, delivering the highest-resolution view of subcellular activity for the best data possible about how cells in a sample are interacting and communicating with each other.

Sample matters

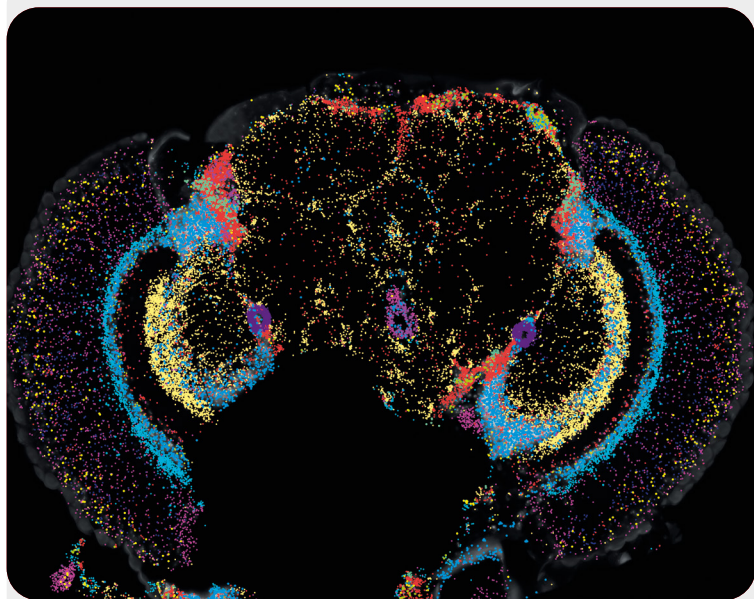
Too many spatial biology methods destroy the sample during the sample prep or analysis process, preventing scientists from going back to the same sample to ask a follow-up question or to confirm data that might seem anomalous. Molecular Cartography chemistry maintains the sample integrity for future use, enabling follow-up analysis with additional probes, antibody staining, or hematoxylin and eosin stains. Furthermore, because of its simple protocol and native approach, the Molecular Cartography system can be optimized for a wide variety of tissue types and species.

Throughput matters

Go beyond fluorescence-activated cell sorting for a higher-throughput analysis of your genes of interest. The Molecular Cartography system can be deployed to analyze up to 100 genes per sample, and our unique technology can multiplex as many as 24 samples at a time to make quick work of your project.

Analysis matters

With the Molecular Cartography system, scientists get exquisite data with intuitive bioinformatics that can be easily integrated with widely used spatial biology analysis tools. The system provides an extensive data report, including QC metrics, to give researchers a feel for their experimental data quality even before starting analysis. Furthermore, Resolve Biosciences has an experienced scientific team available to help with any analysis questions that may arise.



“With the spatial maps obtained using Molecular Cartography, we were able to match different clusters with distinct gene expression patterns in the central brain of drosophila, providing insight in its structure. ... These high-quality spatial data will be complementary to existing single-cell datasets, validating marker genes and providing the missing link between cluster and cell type.”

Jasper Janssens, PhD, VIB-KU Leuven Center for Brain and Disease Research, Belgium

Molecular Cartography as a service

Interested in evaluating Molecular Cartography technology to see how this spatial biology tool could make a difference in your research.? This technology is available through a service program currently covering North America and Europe. Contact us to learn how easy it is to get started.



Molecular Cartography

If you're ready to bring this versatile spatial transcriptomic system into your laboratory, reach out to Resolve Biosciences to learn more.



About Resolve Biosciences

Resolve Biosciences is applying the power of Molecular Cartography™ to enable scientists to gain new insights based on the highest-resolution view of spatial biology. The platform features the company's proprietary, highly multiplexed, single-molecule detection technology, which offers full spatial context at subcellular resolution, all in a fully automated workflow that preserves the sample tissue. The Molecular Cartography technology offers unparalleled sensitivity and specificity that helps scientists detect individual transcripts and rare signals to interpret fundamental biology and rapidly advance the understanding of complex biological questions in critical fields such as oncology, neuroscience, infectious disease, and agriculture. Resolve Biosciences is privately held and based in Monheim am Rhein, Germany, with a North American facility and laboratory in San Jose, California.



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