

Client:	Company X
Target:	histologists, cell biologists, molecular biologists, omics researchers
Tone:	educative
Purpose:	inform scientists how Vis workflow and device-Y can amplify their research

Vis device-Y: Histology Meets Transcriptomics and Unlock Spatial Insights

Histology tells us about tissues and cells, while transcriptomics uncovers the secrets of cellular function. Exploring them is like understanding the architecture of a building and then discovering the secret stories it holds within its walls. And now, imagine if you could combine these to get a bird's eye view of individual cells, all while keeping them in their natural context. Sounds intriguing, right?

Histology has long been the go-to for understanding tissues, cells, and their health. Gene expression omics gave us a deeper understanding of cell function. But there's a catch – when cells are dissociated from their surroundings, they lose critical context on cell-cell interactions, their environment, and triggers.

Enter spatial transcriptomics, a game-changer in understanding the inner workings of cells and where they're located in the tissue.

Picture this: you're enjoying a delicious fruit tart. Each chunk of fruit is perfectly placed, giving you a sense of how they all interact. Now, imagine applying this concept to cells and tissues. That's where spatial transcriptomics comes into play. It's like seeing each fruit chunk in the tart and understanding how they're organized and expressed (metaphors laid out by researchers of the Allen Institute for Brain Science¹).

What's the Buzz about Spatial Transcriptomics?

Spatial transcriptomics analyze gene expression profile in high resolution and assigns the expression profile to the original location of the cells in the tissue. So, instead of general insights that can come from any number of cells and anywhere in the tissue, spatial transcriptomics lets us know what is going on inside a particular cell or group of cells and how they are organized in the tissue of interest.

Spatial transcriptomics is revolutionizing molecular and cellular research by revealing signal pathways, cell alterations, disease mechanisms, and biomarker and drug discovery. Currently published studies on spatial transcriptomics represent only the tip of a potential iceberg.

Let's see how spatial transcriptomics can answer crucial biological questions. Spatial resolution can advance and enhance medical science by:

- Identifying cell types, their differentiation status and locations in tissues from a wide variety of organs
- Detecting drug targets by studying cellular pathways in the context of patient's tissue
- Understanding epigenetics by measuring how cells respond to triggers, such as drugs, stresses, and changes in the environment
- Helping to make informed therapeutic decisions by mapping the tissue microenvironment, such as mapping immune cells in a tumor

If these questions pique your interest, allow us to introduce you to Vis, the platform that's taking the spatial investigation to new heights.

Vis: A Powerful Platform for Spatial Discovery

Vis is a spatial capture platform by 10X Genomics to analyze tissue histology and its real-time transcriptome.

Now, let's get down to the nitty-gritty of how Vis works its wonders. Tissue sections are prepared, stained (H&E or Immunofluorescence), and imaged on standard glass slides. Vis works on both fresh frozen or formalin-fixed, paraffin-embedded tissue sections, offers a precise resolution of 1-10 cells per spot, and can analyze tissue sections as large as 11x11 mm² across various organs and species, including human, mouse, and rat.

Following the standard histology workflow on the glass slides, the stained tissues are transferred to Vis spatial slides to capture and sequence the real-time messenger RNAs of the tissue. The tissue transfer from the glass slide to the Vis slide is facilitated by a small, tabletop device called device-Y.

Inside device-Y, the tissue section on a glass slide is placed on the Vis slide capture area. Vis slides capture areas have thousands of barcoded spots. Each spot is like a treasure chest, containing millions of spatially barcoded capture oligonucleotides. Images are taken to record the spatial orientation of cells on the capture areas. These images will be used soon.

As active mRNAs attach to these capture oligos, they're amplified and sequenced, resulting in a goldmine of gene expression data. And the best part? This data can be precisely mapped back to the original tissue (thanks to the images taken earlier in the workflow), giving you insights like never before.

Challenges Await!

Your scientist brain might already have started to think about how you can integrate Vis into your research. It can feel daunting, you have reasons.

The workflow of histology, followed by library preparation and sequencing sums up to a long, cumbersome pipeline. Optimization and troubleshooting can eat up your precious research time. Besides, you or your team might not have all the expertise. Analyzing the gene expression data with numerous properties per cell can quickly become overwhelming. Errors and nonoptimized pipelines compromise critical data and introduce biases.

The good news is, you do not have to do it all alone! That's where experts come in. Partnering with the experts will save you time and help extract the most meaningful biological significance from your data.

Leading Vis expert, Company X, provides a complete solution for the Vis device-Y workflow.

Company X, the Leading Vis Expert

Company X is here to help you generate and explore the full potential of spatial data. The Vis experts in Company X provide end-to-end workflow services: study design and consultation, wet lab, data analysis, and interpretation. Starting from the pre-screening tissue section to answering what the data mean: the Company X specialist team supports scientists at every stage to meet their needs.

It's time to step into a world where histology meets transcriptomics, and spatial insights await.

Get ready to see the bigger picture!

Reach out to the [Company X team](#) to consult how they can elevate and accelerate your research and answer your key research questions precisely.

References

1. Marx, V. Method of the Year: spatially resolved transcriptomics. *Nat Methods* **18**, 9–14 (2021). <https://doi.org/10.1038/s41592-020-01033-y>
2. <https://Company X.com/spatial-transcriptomics/>
3. <https://www.10xgenomics.com/spatial-transcriptomics>