Visium Gene Expression Workshop

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Presented by UCI GRT Hub & 10x Genomics
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Outline

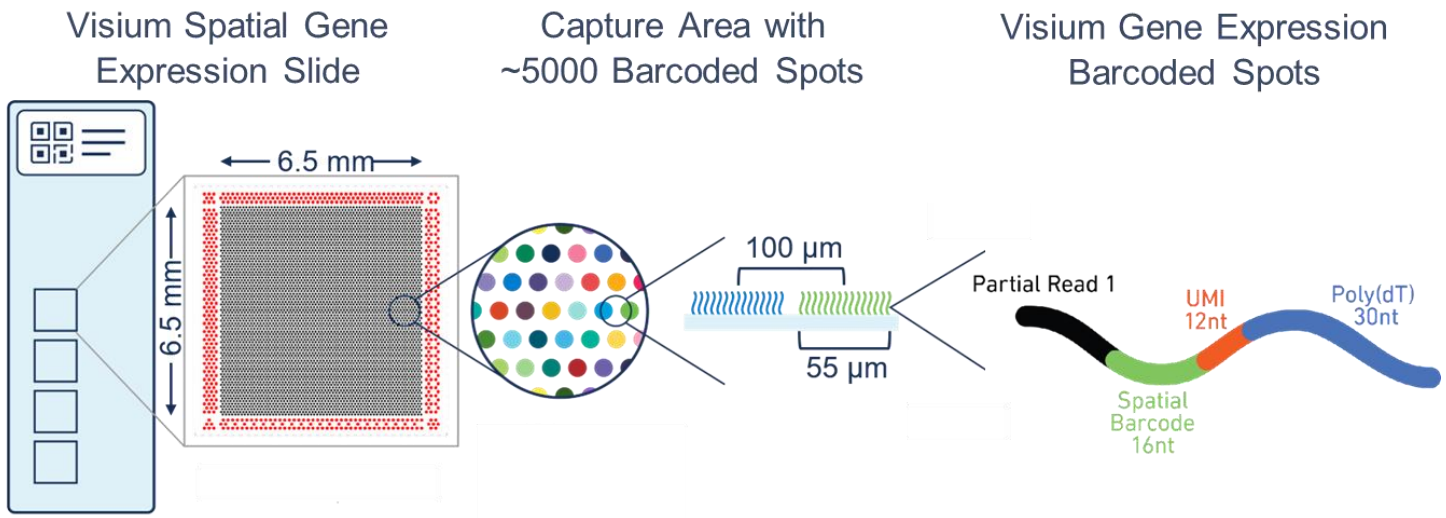
- Overview of Visium
- Tissue & Workflow
  - Slides
  - Tissue/Sample Processing Types
  - Stopping Points
- Sample Preparation
  - RNA QC
  - Prep, Sectioning, & Best Practices
- Visium HD
- Conclusion

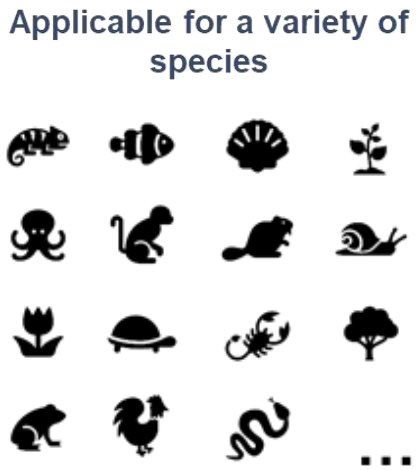
Visium

Overview of Visium

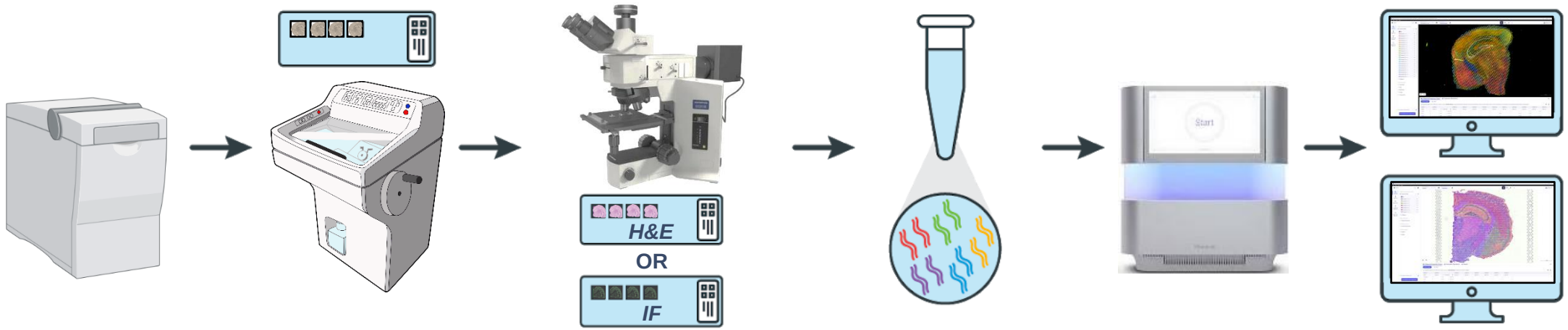
Visium – Direct Placement

No instrument required - Fresh Frozen v1 assay



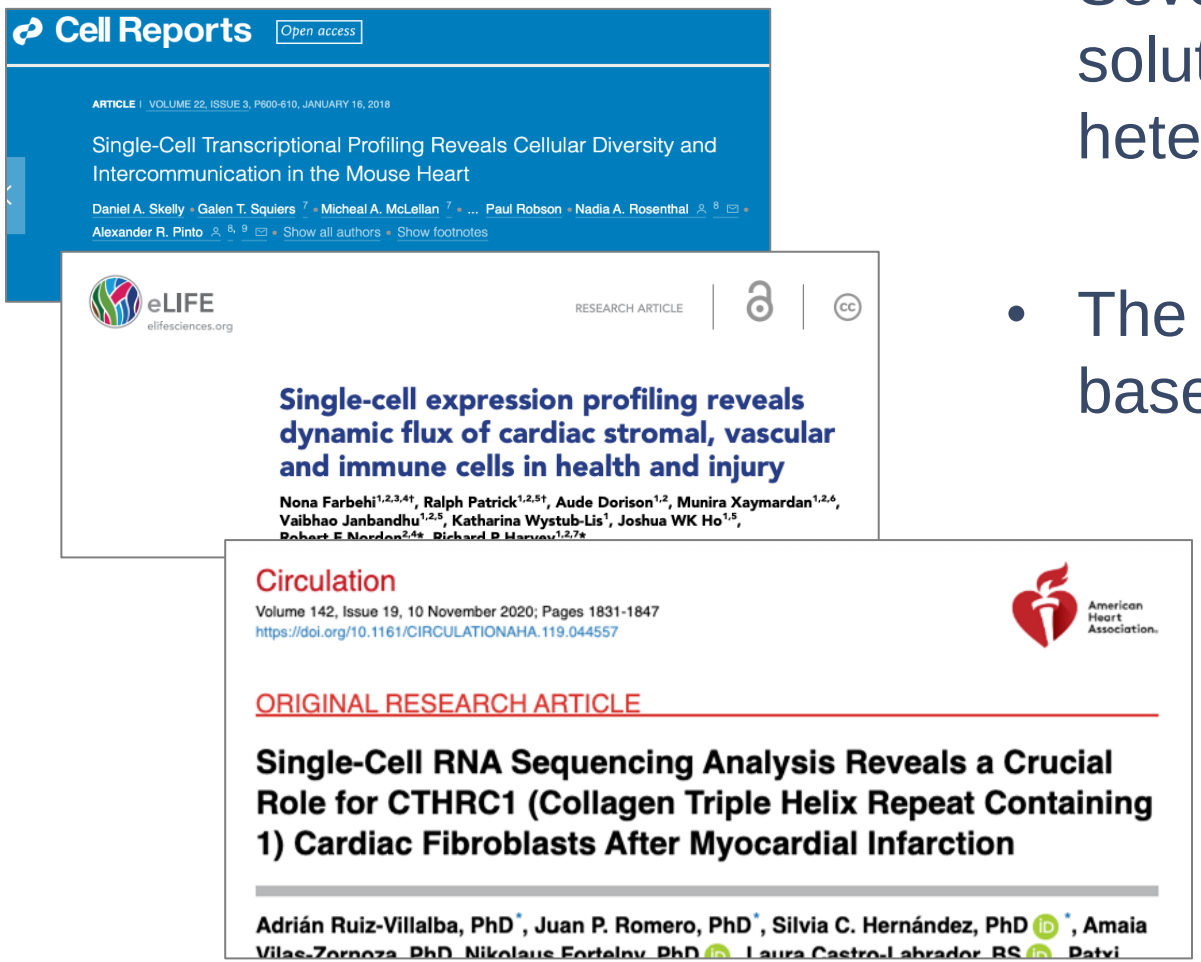


RNA Quality Assessment → **Sample Preparation** → **Imaging & On-Slide Assay Steps** → **Library Preparation** → **Library Sequencing** → **Data Analysis**

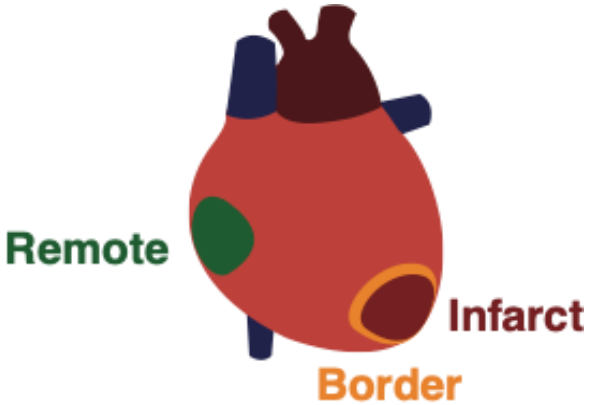


Visium – Spatial Gene Expression Provides Deep Insight

Into Pathological Tissue Architecture - Kuppe et al., (2022), Nature



- Several papers using 10x Genomics single cell solutions have unraveled the cellular heterogeneity during Myocardial infarction (MI)
- The next big question is how cells respond based on their distance to the injury

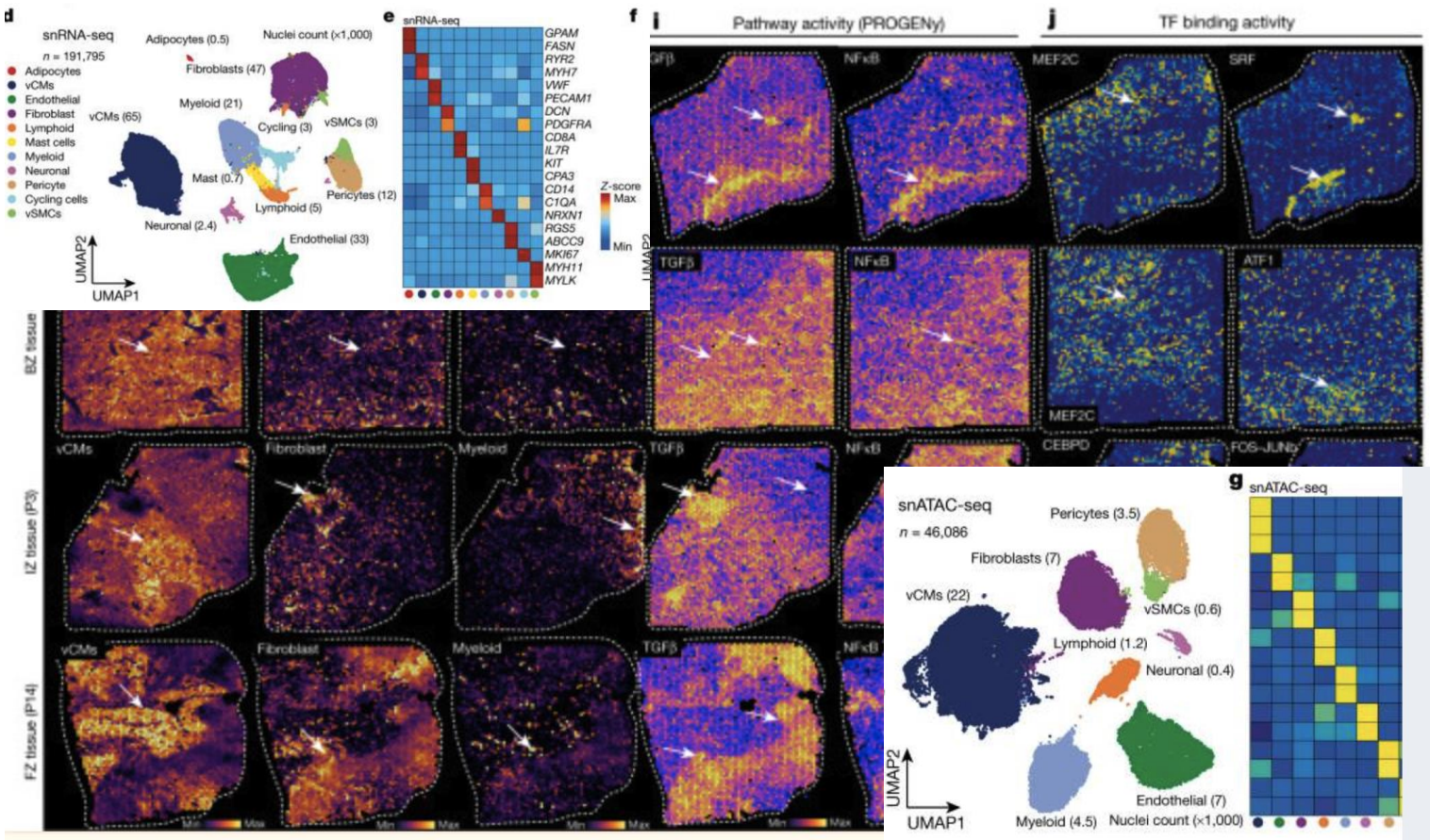


Kuppe et al. (2022) Nature DOI: 10.1038/s41586-022-05060-x

Visium – Spatial Gene Expression Provides Deep Insight

Into Pathological Tissue Architecture - Kuppe et al., (2022), Nature

- **Key Takeaways:**
- Integration of Visium, 3', & ATAC generated high-resolution multiomic map after myocardial infarction (MI)
- Integrating 3' & ATAC with Visium identified different cell states and subtypes
  - e.g., Distinct cardiomyocyte cell states associations
- Combining spatial & single-cell data/technologies present a unique opportunity to determine how cell states are influenced by the tissue microenvironment



Kuppe et al. (2022) Nature DOI: 10.1038/s41586-022-05060-x

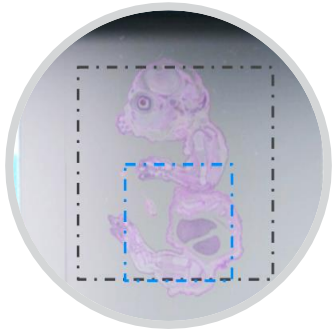
Visium CytAssist – Instrument

Visium CytAssist - get MORE from your FF & FFPE samples

Enables Simplified Sample Preparation

Flexible sample formats

Choice of optimal tissue section



Flexible tissue size

Easier workflow & better-quality data!

Visium CytAssist – Spatial Gene and Protein Overview

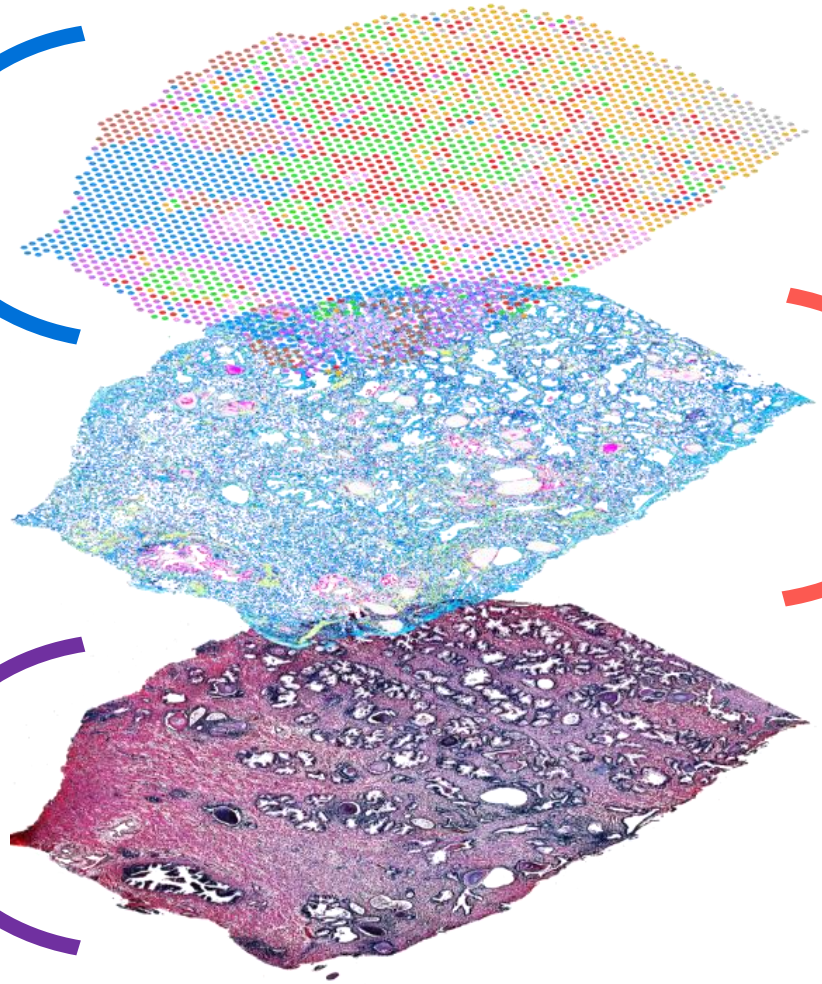
Probes and oligo-tagged antibodies enable RNA and protein co-detection

Whole Transcriptome

Whole transcriptome detection via probe-based RNA-Template Ligation (RTL) technology

Tissue Morphology

Utilize H&E or IF staining to profile tissue structure and biology



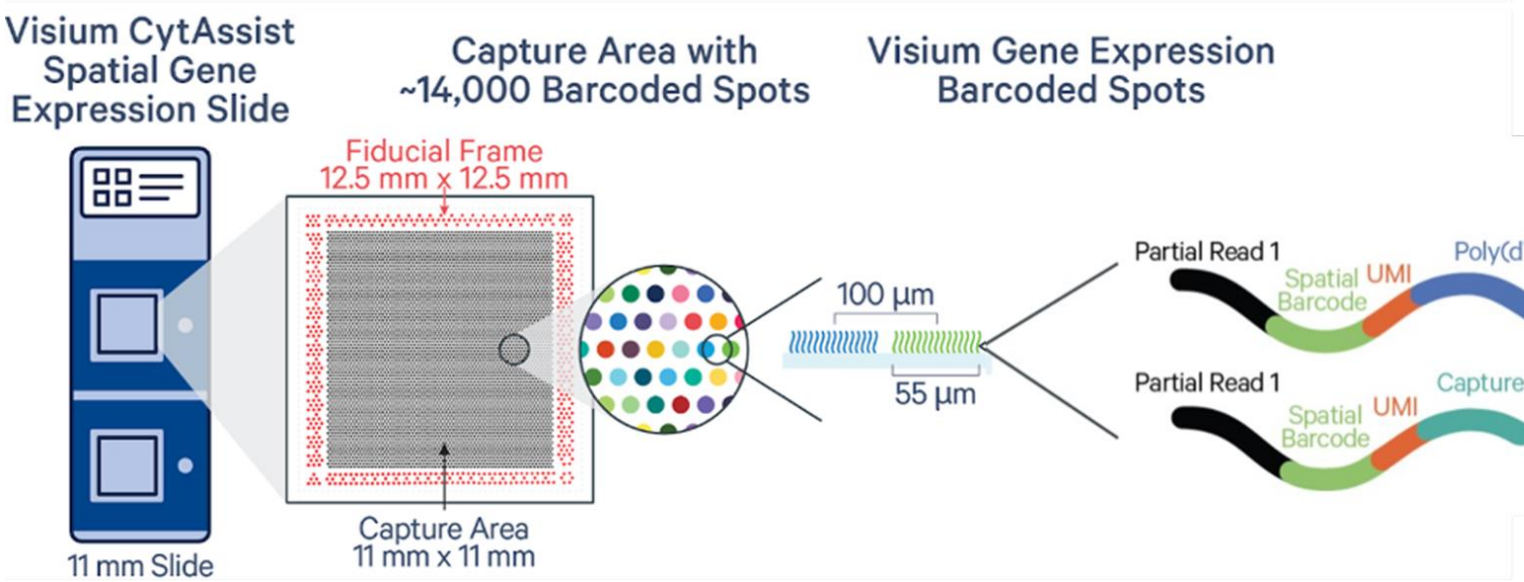
Multiplexed Protein

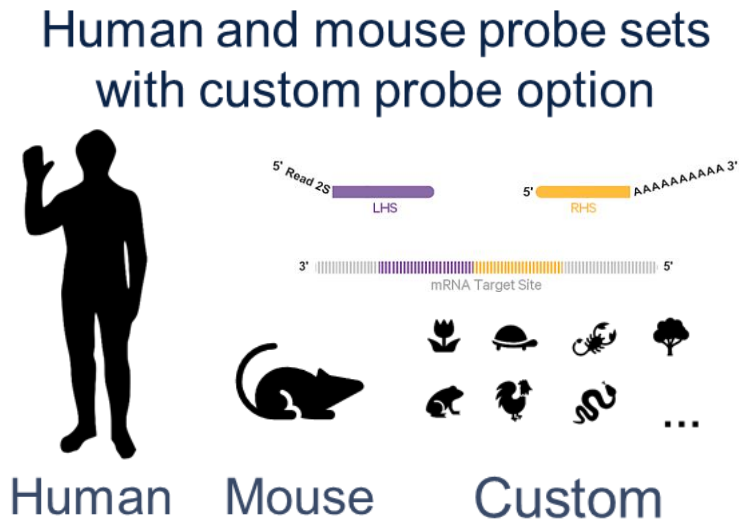
Co-detect intracellular and extracellular immune markers using oligo-tagged antibody panel*

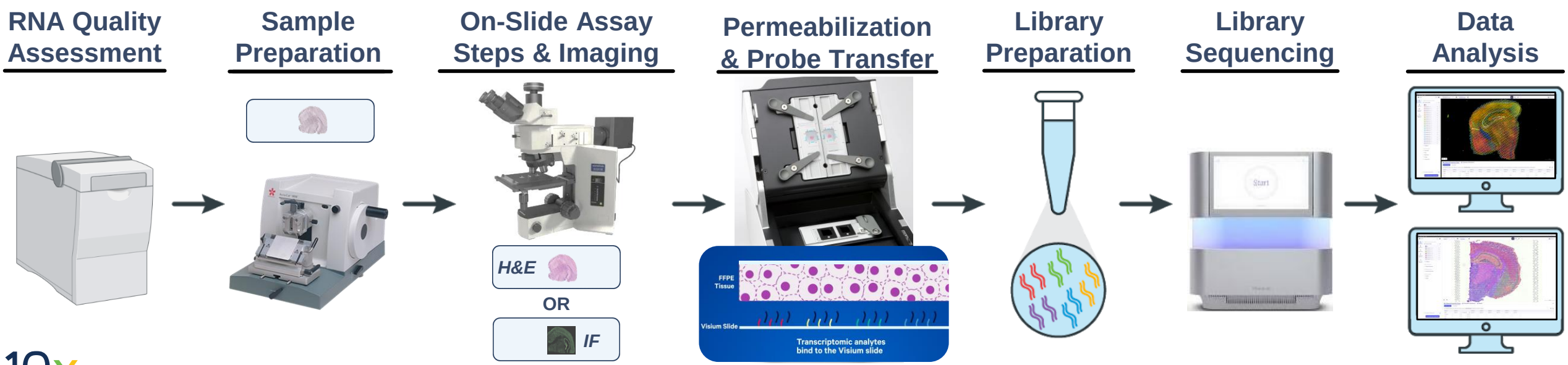
*Additional targets may be detected by spiking in oligo-tagged antibodies

Visium CytAssist – Enabled Gene Expression Technology

Visium CytAssist instrument required – probe-based v2 assay







Visium CytAssist

Tissue & Workflow

- Slides
- Tissue/Sample Types
- Stopping Points

Tissue Slide

Best practices

Visit the 10x Genomics Support Site for the latest documentation

Tissue Slide

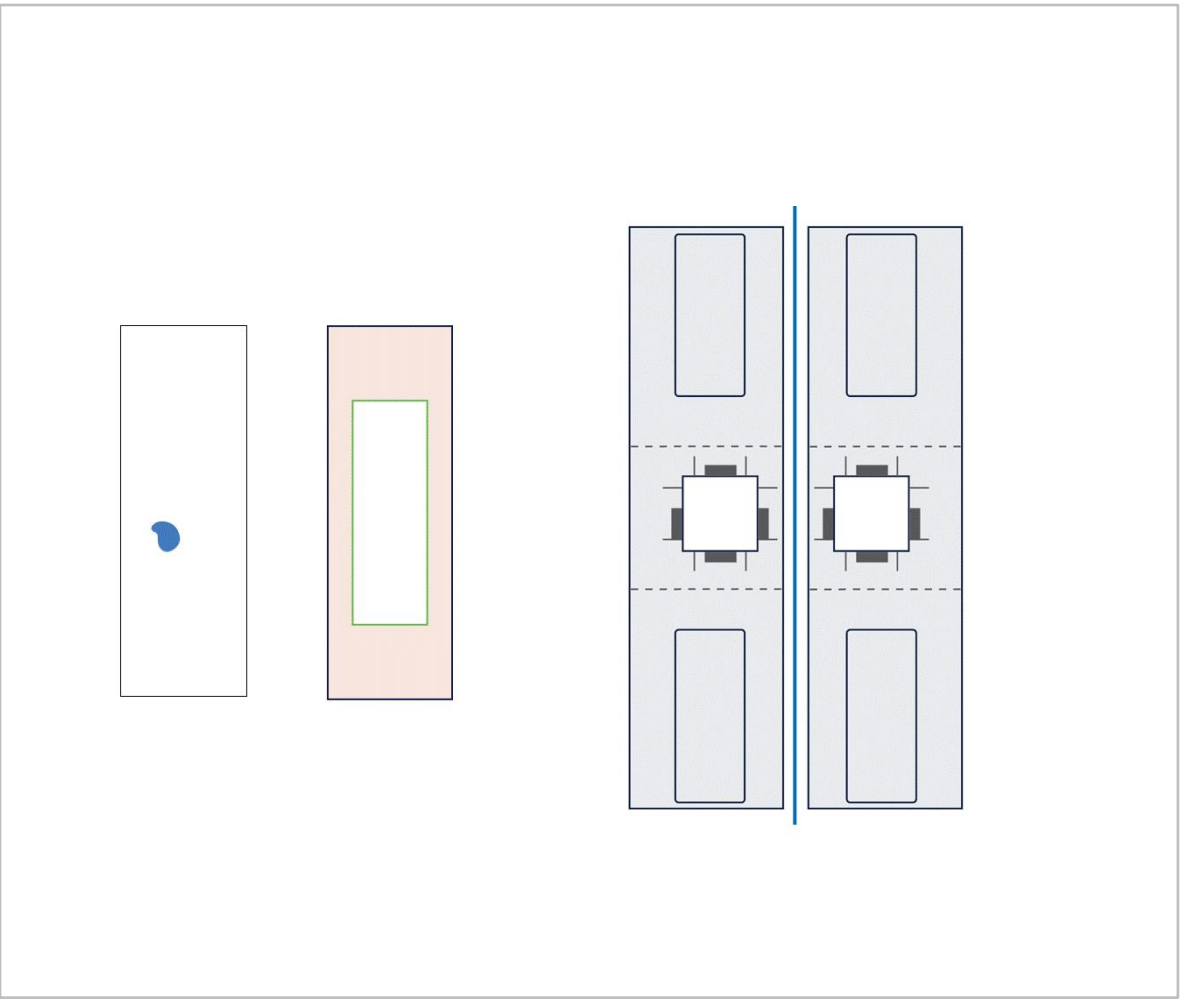
- Tissue sections must be placed in specific areas on plain blank glass slide
- To ensure compatibility, use validated positively charged slides (listed below)

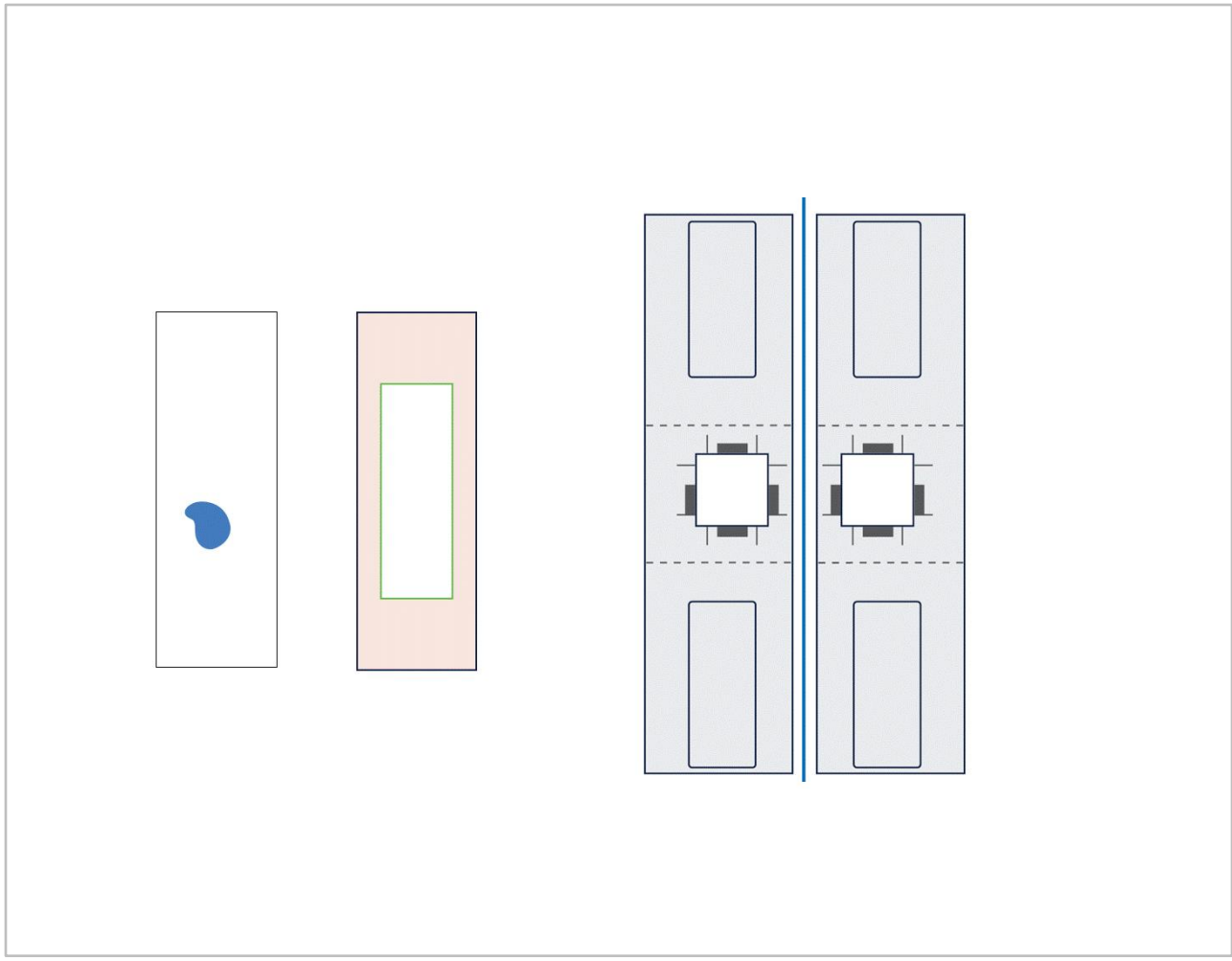
Slide Brand & Name	Catalog Number	Length (mm)	Width (mm)	Thickness (mm)
Epredia Shandon Colorfrost Plus Slides	6776214	75	25	1
Fisher SuperFrost Slides	12-544-7	75	25	1
Sigma-Aldrich Poly-Prep Slides	P0425-72EA	75	25	1
VWR SuperFrost Plus Slides	48311-703	75	25	1

- More information on tissue placement areas and slides are in *Visium CytAssist Tissue Preparation Guide Demonstrated Protocol* and *Visium CytAssist Quick Reference Cards*

Visium CytAssist – Section onto Plain Glass Slides

Proper section placement





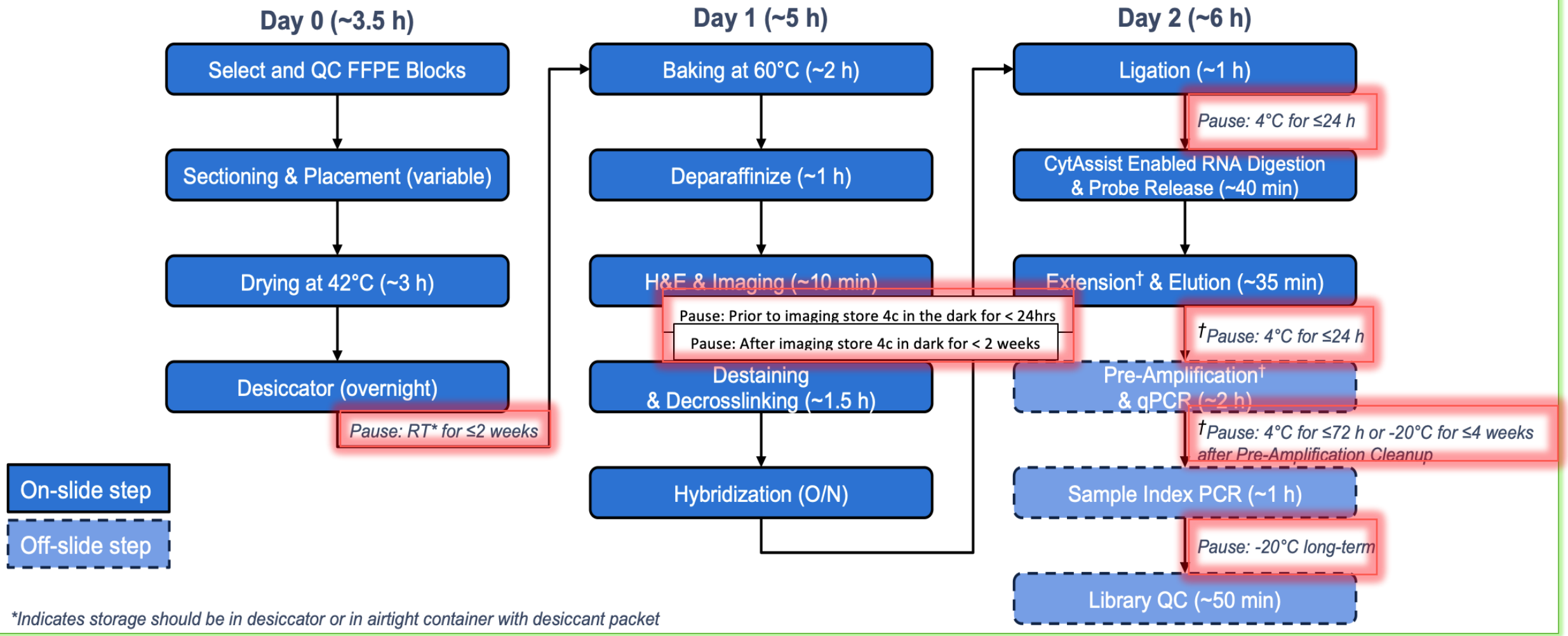
Visium CytAssist Spatial Gene Expression Comparison

Application	Visium CytAssist for FFPE (FFPE)	Visium CytAssist for Fresh Frozen (FF)	Visium CytAssist for Fixed Frozen (FxF)
Species	Human or Mouse	Human or Mouse	Mouse
Tested Tissues	20+	9	6
Capture Area Size	6.5 mm or 11 mm		
Studies Enabled	Whole transcriptome (WT GEX) WT GEX + Protein detection (IF)	Whole transcriptome (WT GEX)	
Transcript Detection	Probe-based capture using 10x Probe Panels: Human Transcriptome Probe Kit v2 Mouse Transcriptome Probe Kit		Probe-based capture using 10x Probe Panel: Mouse Transcriptome Probe Kit
Sample Quality	DV200 of 30% or greater	RIN of 4 or greater	DV200 of 50% or greater
Sample Input	Fresh cut sections on blank slides H&E or IF Stained (archived) slides	Fresh cut sections on blank slides	
Section Thickness	3 – 10 µm	10 - 20 µm	
Tissue Staining	H&E or Immunofluorescence (IF)	H&E	
Sequencing Depth	25k read pairs per tissue covered spot		

CytAssist Spatial Gene Expression for FFPE

Protocol steps and timing – H&E staining (freshly placed sections)

Timing based on transferring analytes from 2 sections to a single Visium Slide

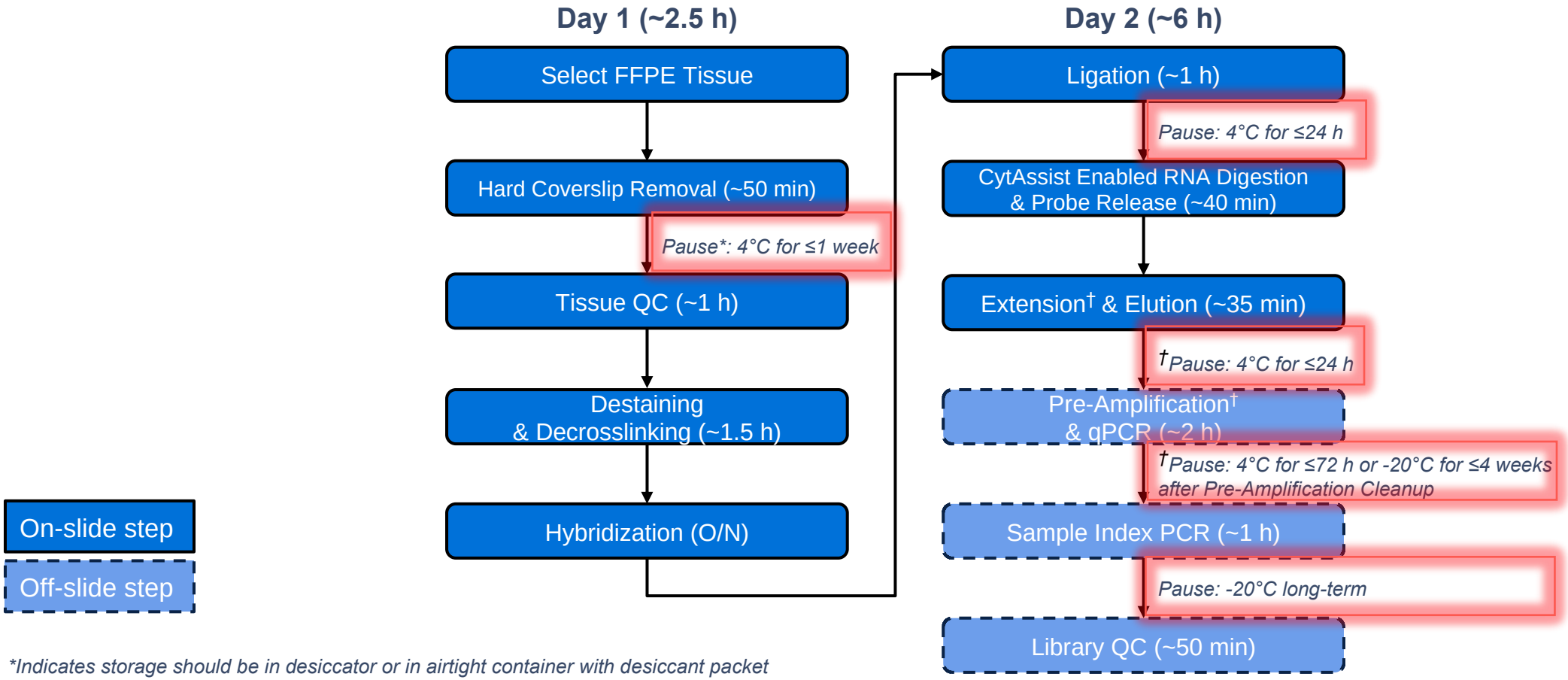


*Indicates storage should be in desiccator or in airtight container with desiccant packet

CytAssist Spatial Gene Expression for FFPE

Protocol steps and timing – H&E staining (archived)**

Timing based on transferring analytes from 2 sections to a single Visium Slide



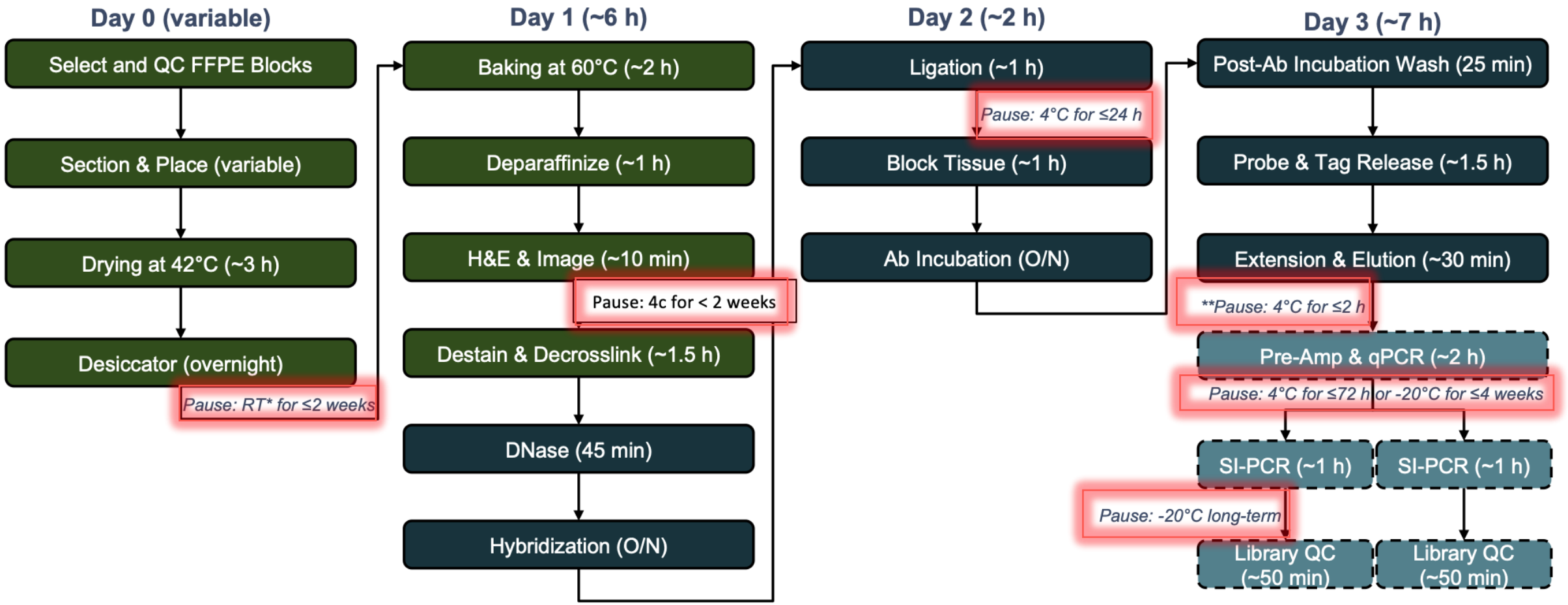
*Indicates storage should be in desiccator or in airtight container with desiccant packet
**Protocol assumes tissue has already been stained and imaged

Spatial Gene and Protein Expression for FFPE

Timing based on transferring probes & tags from 2 slides a Visium slide

On-slide DP Step | On-slide UG Step | Off-slide UG Step

Protocol steps and timing – Tissue Prep, H&E, and User Guide steps

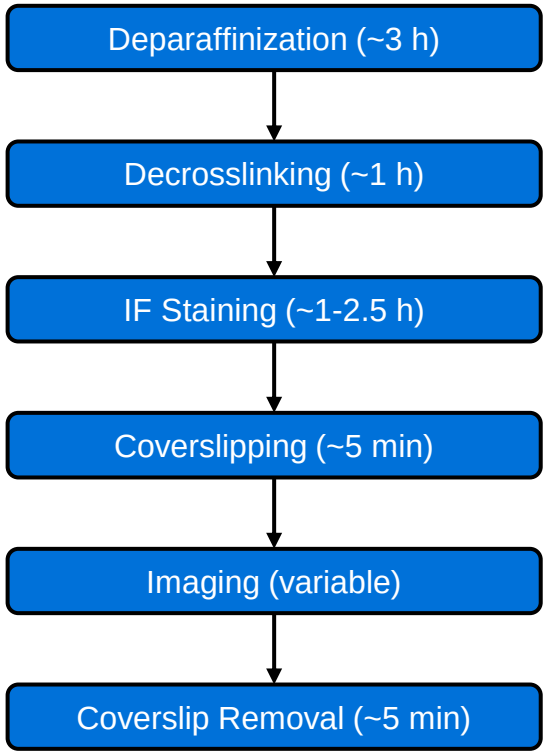


*Storage should be in desiccator or in airtight container

IF Staining Demonstrated Protocol Overview

FFPE

Sectioning & Placement → Staining & Imaging



~5-6.5 h*

Optimize IF antibody staining before staining sections *for library construction*

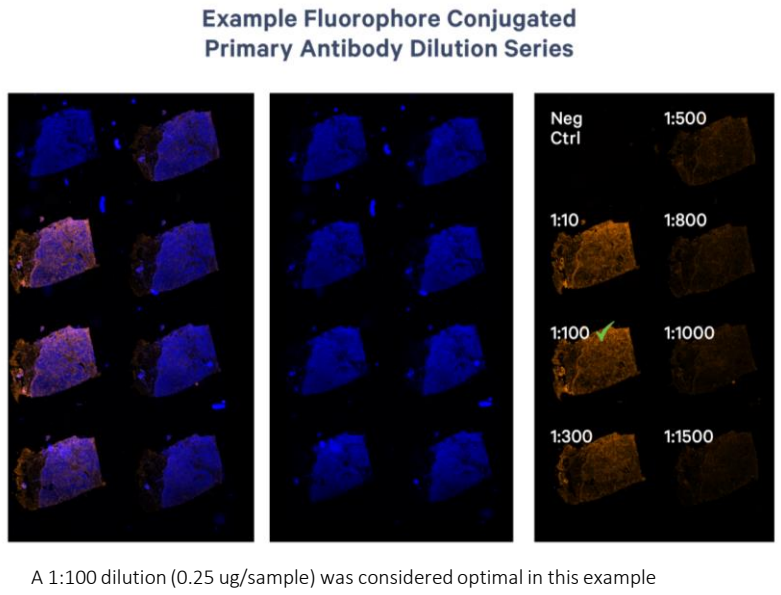
There are no stopping points!

**Time required for imaging is excluded from time estimation; time range due to direct and indirect staining options*

IF Staining Optimization

FFPE

Sectioning & Placement → Staining & Imaging



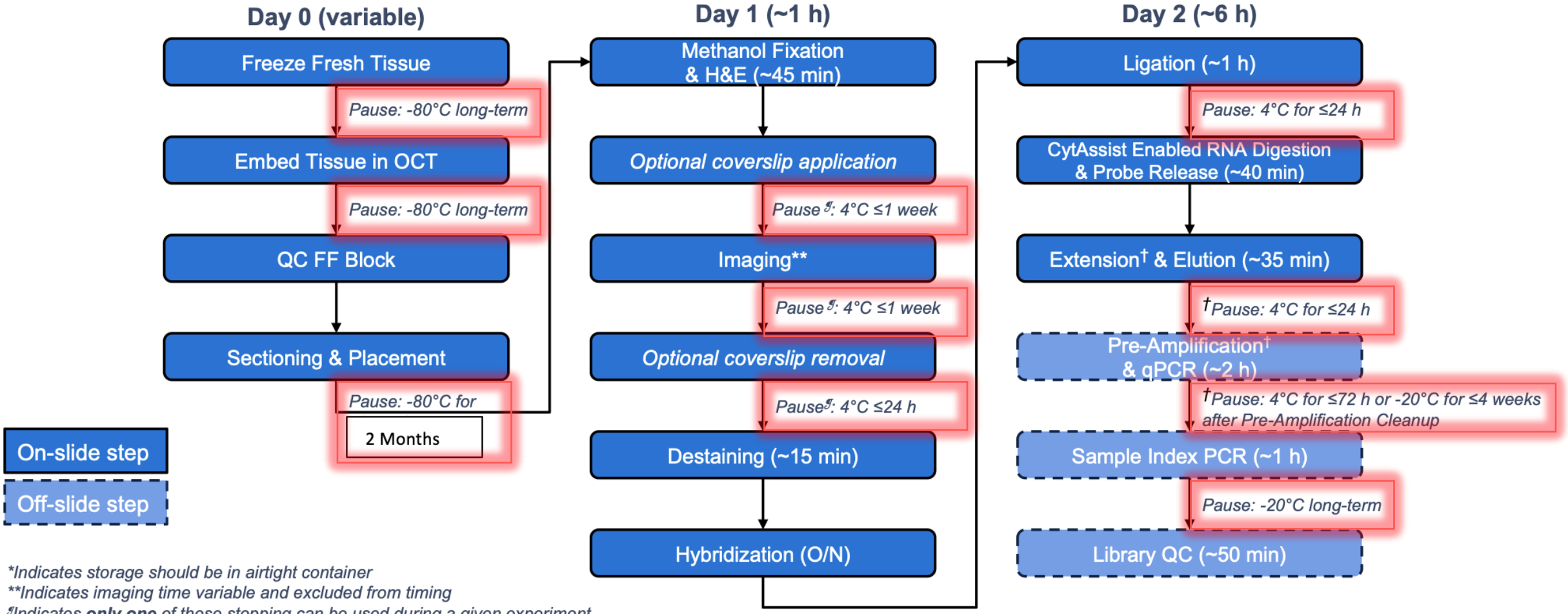
A 1:100 dilution (0.25 ug/sample) was considered optimal in this example

- Visium CytAssist Spatial Gene Expression assay can accommodate reactions for antibody optimization
  - Account for enough reactions for main assay before running optimization experiments
  - Use Visium Slide Cassette, 6.5 mm 4 pack for optimizations, add-on kit will need to be purchased
- To optimize antibody concentration, draw representative frames on the back of a 75 x 25 x 1 mm plain glass slide using the example slide layout
- Execute the Staining Demonstrated Protocol using a range of antibody concentrations
  - A starting concentration of 0.01 µg/µl (0.5 µg/sample) is recommended
- Select antibody concentration that results in specific staining of desired cells, while minimizing nonspecific background staining
  - To reduce autofluorescence, TrueBlack Plus reagent may be added

CytAssist Spatial Gene Expression for FF

Timing based on transferring analytes from 2 sections to a single Visium Slide

Protocol steps and timing – H&E staining



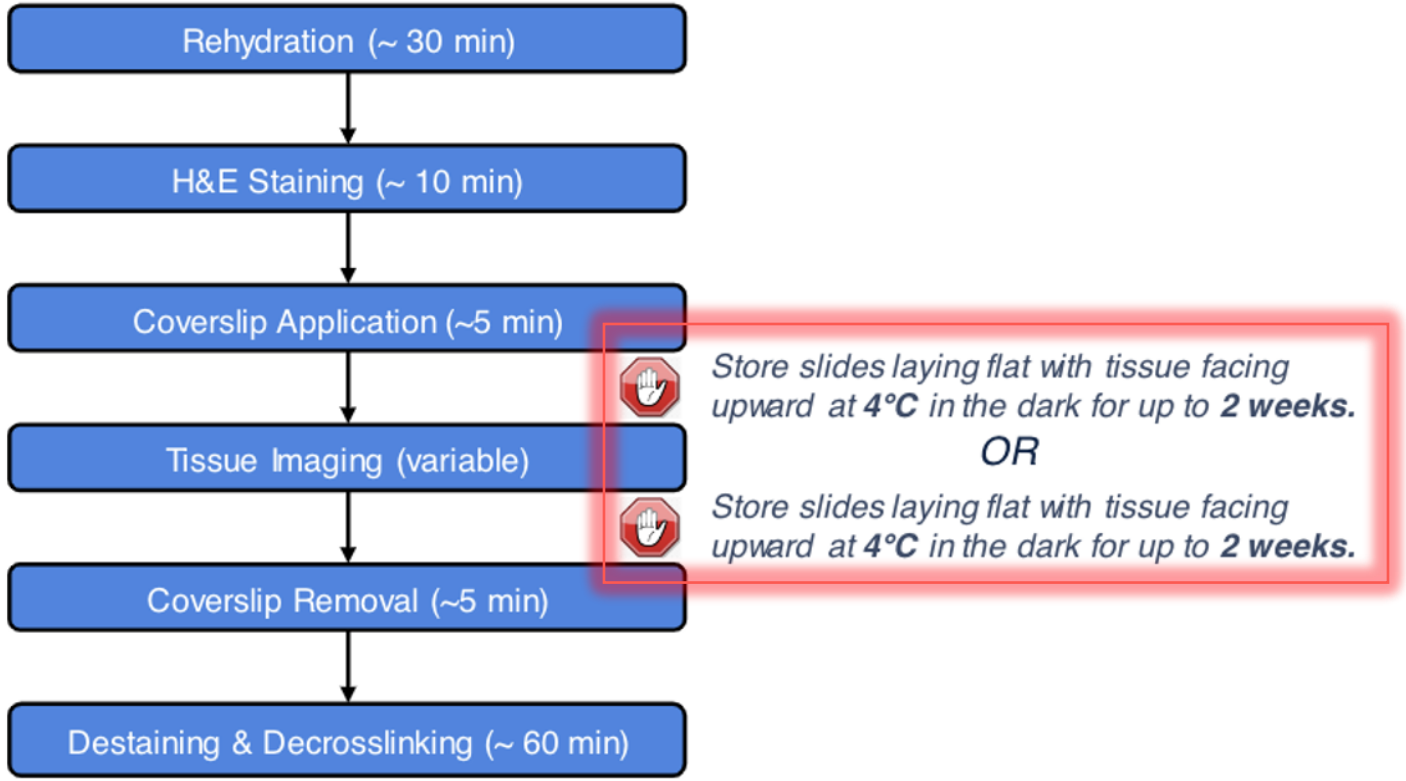
*Indicates storage should be in airtight container
**Indicates imaging time variable and excluded from timing
¶Indicates **only one** of these stopping can be used during a given experiment

Demonstrated Protocol Steps & Timing

Slides must be coverslipped prior to storage

Validated Stopping Points

Fixed Frozen



*Time required for imaging is excluded from time estimation

Visium CytAssist

Sample Preparation

- **RNA QC**
  - FFPE
  - Fresh Frozen
  - Fixed Frozen
- **Prep, Sectioning, & Best Practices**
  - FFPE
  - Fresh Frozen
  - Fixed Frozen

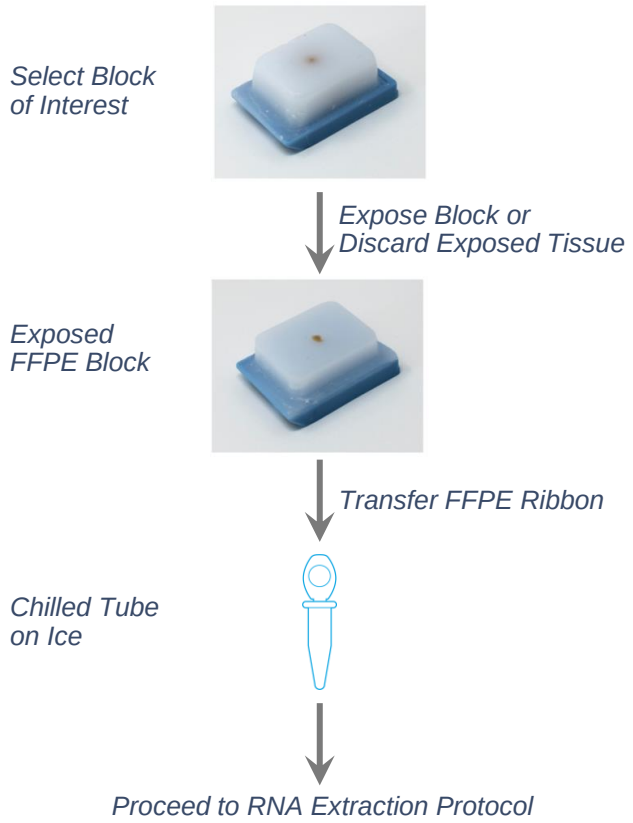
RNA QC

RNA Quality Assessment

FFPE – Fresh Cut Sections

Be sure to remove excess paraffin wax prior to extraction!

Sectioning & Placement



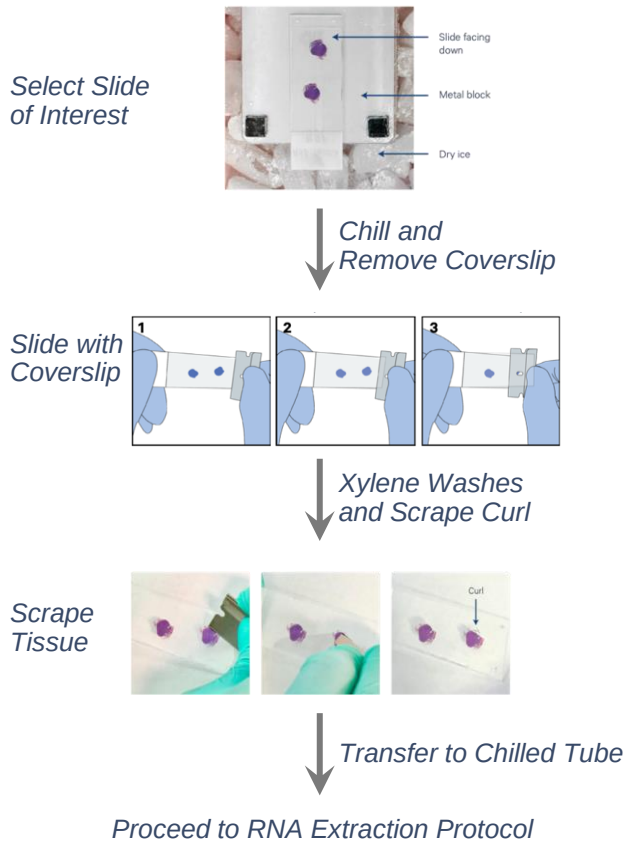
RNA Quality Assessment

- DV200 is defined as the measurement of the percentage of total RNA fragments >200 nucleotides
- Collect 10 µm sections inside a chilled 1.5 ml tube
- Perform extraction by following manufacturer's instructions using RNeasy FFPE Kit
- Using a Nanodrop or Qubit, measure RNA concentration
  - Determine the appropriate dilution for DV200 evaluation
- Store RNA at -80°C or proceed to DV200% evaluation
- DV200 >30% is recommended
  - More likely to generate quality data from the assay
- See *Visium CytAssist for FFPE Tissue Preparation Guide* for details

RNA quality assessment via DV200%

FFPE – Archived Slides

Work slowly in small steps to remove coverslip while keeping slide on metal block; exercise caution with sharp blade



RNA Quality Assessment

- DV200 is defined as the measurement of the percentage of total RNA fragments >200 nucleotides
- Execute Coverslip Removal, as described in documentation
- Scrape FFPE curl from representative tissue* and transfer to chilled 0.2-ml in 8-tube strip
- Perform extraction using third-party reagents and consumables
- Using 1 µl of RNA, perform DV200% evaluation following Agilent's instructions
- DV200 >30% is recommended
- See *Visium CytAssist for FFPE Tissue Preparation Guide* for details

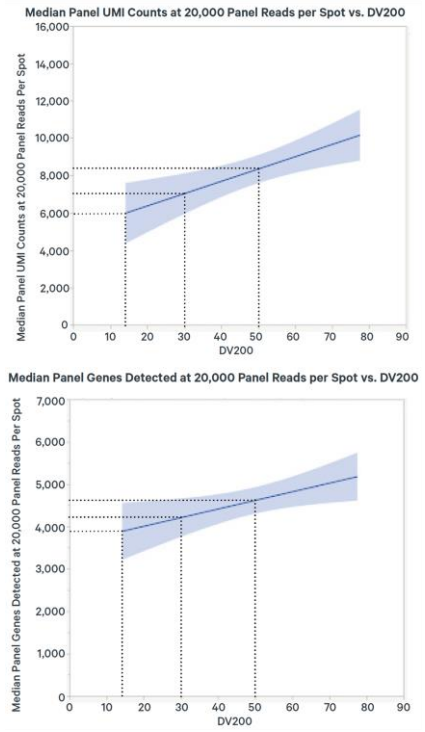
**Isolate curl from section from same block or serial section as tissue of interest on same slide*

RNA Quality Assessment

FFPE

Sectioning & Placement

Positive correlation between DV200 value and UMIs/Genes per Spot



RNA Quality Assessment

- Measurement of the percentage of total RNA fragments >200 nucleotides (DV200) upstream of library preparation
- Our assay is highly sensitive
  - Fragmented RNA is not a liability unless it's degraded beyond our recommendation
- Recommendation: blocks with DV200 >30%
  - DV200% is not a perfect predictive tool of assay performance
  - Using low DV200-scored blocks will still yield data but likely of lower sensitivity (i.e., lower UMIs and Genes per Spot)
- See *Visium CytAssist for FFPE Tissue Preparation Guide* for information on factors that can influence DV200

RNA Quality Assessment

Fresh Frozen

- RNA quality can be assessed by calculating the RNA Integrity Number (RIN)

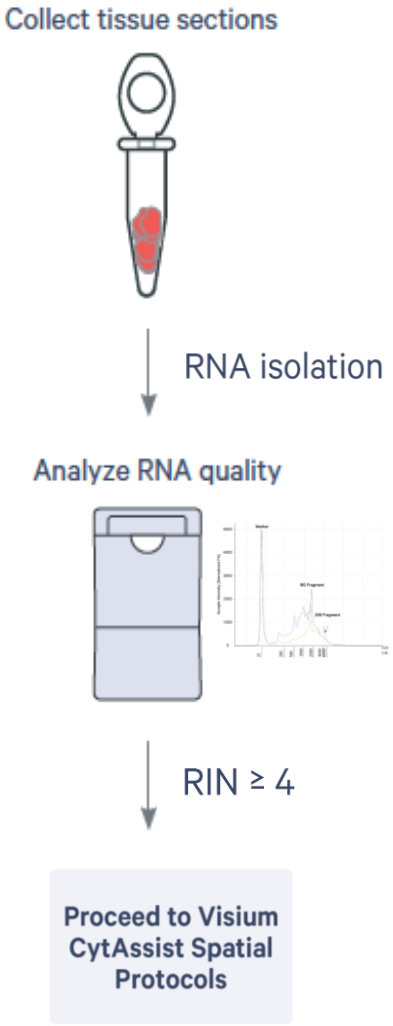
- Cryosection 20-30 mg of tissue block (~4 x 25 µm)
- Remove excess OCT using chilled forceps

- Transfer sections to pre-cooled microcentrifuge tube on dry ice. *Do not allow tissue sections to thaw*
  - *Process immediately or store tube at -80℃*

- Extract bulk RNA using a validated kit following manufacturer's protocol. Place RNA on wet ice

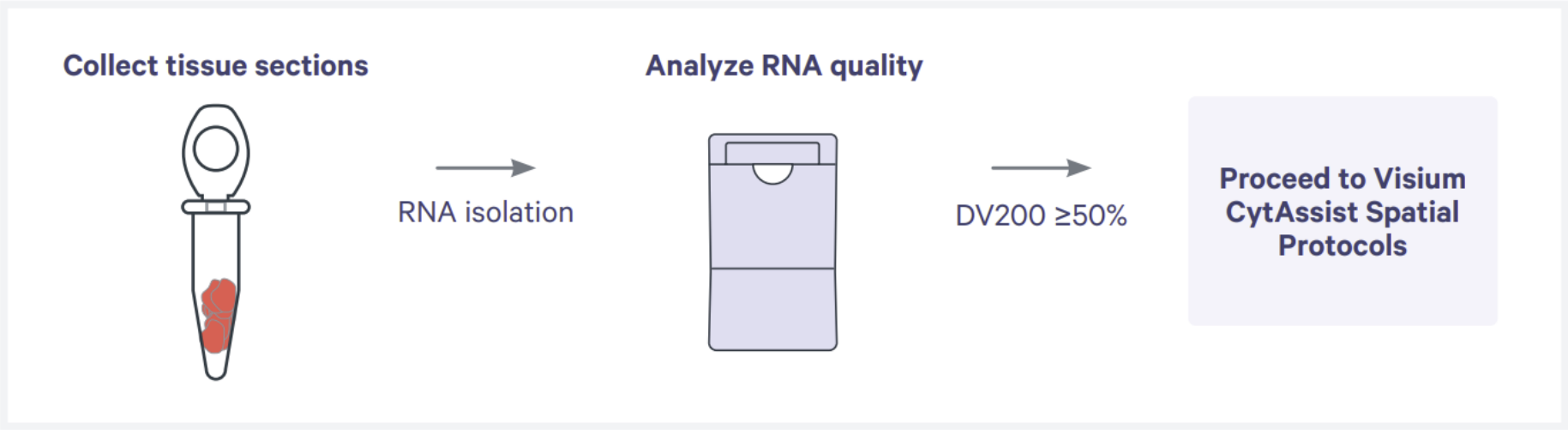
- Calculate RIN score by running RNA on a Bioanalyzer RNA Pico chip or similar

- For optimal assay performance, we recommend using blocks with a RIN ≥ 4



RNA Quality Assessment

Fixed Frozen



- Measurement of the percentage of total RNA fragments >200 nucleotides (DV200) upstream of library preparation
- Cryosection 20-30 mg of tissue block (~4 x 25 µm)
- Remove excess OCT using razor blade or chilled forceps
- Transfer sections to pre-cooled microcentrifuge tube on dry ice
  - *Do not allow tissue sections to thaw; process immediately or store tube at -80℃*
- Extract bulk RNA using Biotium CELLDATA RNAstorm FFPE RNA Extraction Kit following manufacturer's protocol
  - Place RNA on wet ice
- Store purified RNA at –80°C for long-term storage or immediately proceed to DV200 calculation using either BioAnalyzer, TapeStation, or ScreenTape reagents
- *Recommendation: blocks with DV200 >50%*

Sectioning

FFPE

Preparing for Tissue Sectioning and Placement

Hydrate block → Remove bubbles → Section tissue

Minimum requirements:

- Histology-grade
- Must be able to generate thin, consistent section thickness

For FFPE Tissue Sectioning & Section Placement			
Item	**Alternatives/Options**	**Vendor**	**Part Number**
Microtome	Epredia HM 355S Automatic Microtome *Or any standard histology grade microtome*	Fisher Scientific	23-900-672
Microtome blade	Epredia MX35 Premier Disposable Microtome Blades, Low Profile	Fisher Scientific	3052835
Cool-Cut, *Optional*	Thermo Scientific Cool-Cut, *Optional*	Fisher Scientific	77-112-0
Section transfer system (STS)	Thermo Scientific Section Transfer System (STS), *Optional - If using Section Transfer System*	Fisher Scientific	771200
Probes	Fisherbrand Fine Precision Probe	Fisher Scientific	12-000-153
Forceps	Fisherbrand Curved Medium Point General Purpose Forceps	Fisher Scientific	16-100-110
Microscope slides	Fisherbrand Premium Plain Glass Microscope Slides	Fisher Scientific	12-544-4
Water bath	Epredia Digital Round Tissue Section Water Bath *Or any equivalent water bath*	Fisher Scientific	A84600061
Slide dryer	Epredia High Capacity Section Dryer	Fisher Scientific	A84600051
Brushes	Camel Hair Brushes, *Or any equivalent paintbrush*	Ted Pella	11859
Additional Materials			
Razor blades		-	-
Ice bucket		-	-
Ultrapure/Milli-Q Water, *from Milli-Q Integral Ultrapure Water System or equivalent*		-	-

Maintenance of workspace:

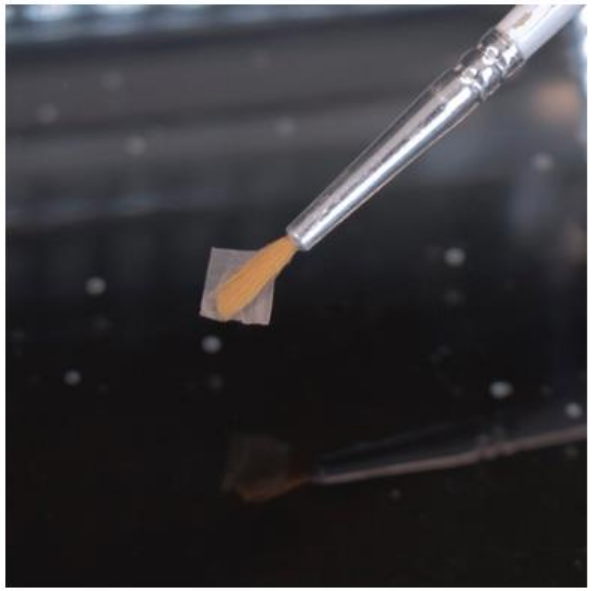
- Clean with RNaseZap RNase Decontamination Solution
- Use a brush for cleaning
- Be sure to wipe off oils with ethanol; let dry before sectioning
- Set clearance angle at 10°

Transfer the Section

Hydrate block → Remove bubbles → Section tissue → Transfer tissue

Only float ribbons if the optimal float time has been determined and placement is well-practiced

Place section in the water bath

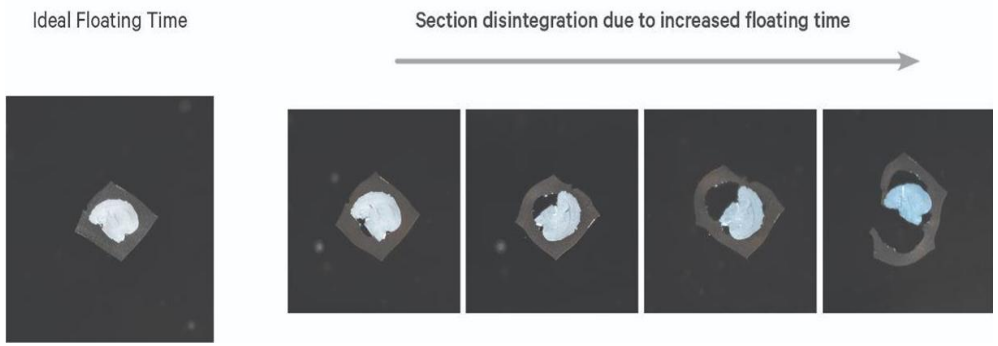


- Use a heated water bath and float sections
- Ensure the water bath is free from bubbles & particulates
- 42°C works well for most blocks and tissues
- Place it on the surface of the water bath
- Make sure that the brush tip goes underneath and away from the section

Floating the Section

Hydrate block → Remove bubbles → Section tissue → Transfer tissue → Float section

Only float ribbons if the optimal float time has been determined and placement is well-practiced



Section Appearance	Floating Time
Section is flat with no wrinkles	Sufficient floating
Section has wrinkles	Insufficient floating; increase the floating time
Section is torn	Section left too long; decrease the floating time

- Let the section float on the water bath until most of it is flat and without wrinkles
- Optimal floating time depends upon the sample type and block.
- Float the section on a plain glass slide and perform a quality check under a microscope
  - Some sections may never be completely wrinkle-free
  - See *Visium CytAssist for FFPE Tissue Preparation Guide* for troubleshooting section floating

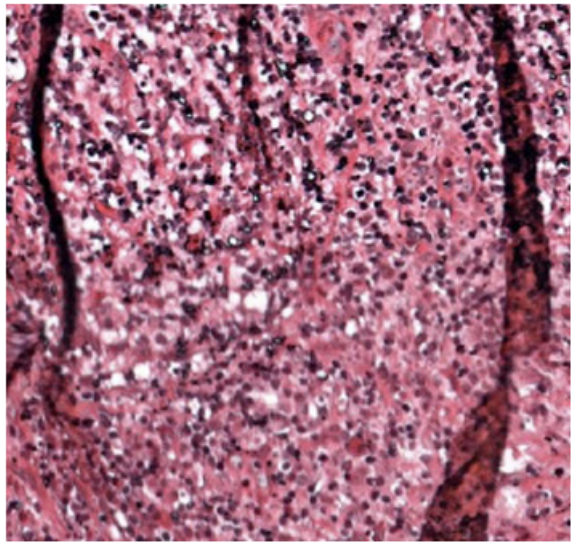
Best Practices

FFPE

Best Practices

Common sectioning/tissue artifacts to avoid

Wrinkles



Causes

- Section compression (due to warm block or dull blade) during sectioning leads to wrinkle formation. These wrinkles become permanent when placed in the water bath.
- Accumulated wax or static electricity on microtome parts also contribute to section compression.
- Incorrect blade/clearance angle may cause compression.

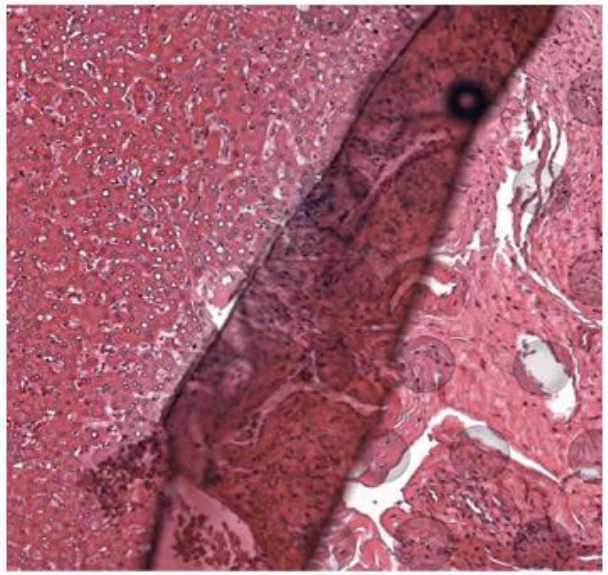
Troubleshooting

- Ensure that the block is well hydrated.
- Adjust temperature down and increase float time.
- Gently and gradually lay FFPE sections onto water bath surface, lengthwise.
- Utilize a new blade.
- Ensure microtome is cleaned with 100% ethanol to minimize static and section compression (bunching on blade).
- Ensure blade/clearance angle is correct prior to sectioning.

Best Practices

Common sectioning/tissue artifacts to avoid

Folds



Causes

- Mostly happens when placing the section on the water bath especially when the section is wavy.
- If the fold is at the edge this most likely can happen during sectioning or mounting on the slide.

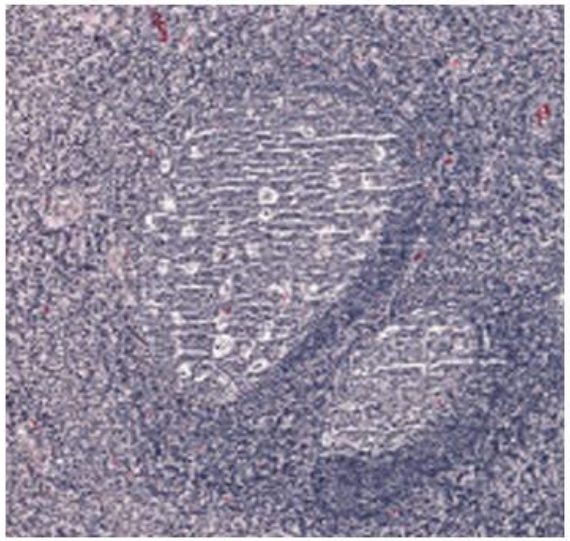
Troubleshooting

- Gently and gradually lay FFPE ribbons or sections onto water bath surface, lengthwise.
- If sections curl during sectioning, gently flatten them with a brush before floating.

Best Practices

Common sectioning/tissue artifacts to avoid

Venetian Blinds or Shatter



Causes

- Parallel lines in the section mostly appear due to dry tissue because of under-hydration of the block in the ice bath.
- Less likely due to dull blade or loose parts of the microtome.

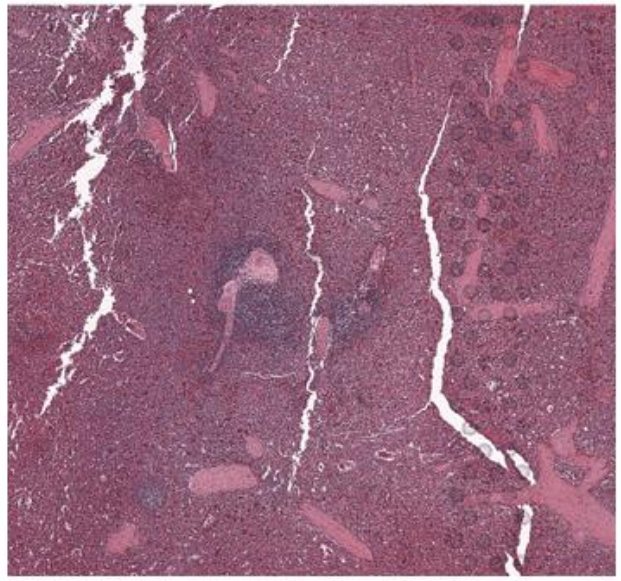
Troubleshooting

- Increase incubation time of the block in ice bath.
- Tighten down components of microtome and make sure the blade is at a correct angle.

Best Practices

Common sectioning/tissue artifacts to avoid

Cracks



Causes

- Dry and over-processed tissue can crack during sectioning.
- The cracks that are created before tissue embedding will be filled with wax when section is observed under the microscope after sectioning and wax will be washed away after deparaffinization or H&E staining.

Troubleshooting

- Prolonged hydration on the ice bath will most likely reduce the cracks.
- There is no solution for cracks created before tissue was embedded in wax.

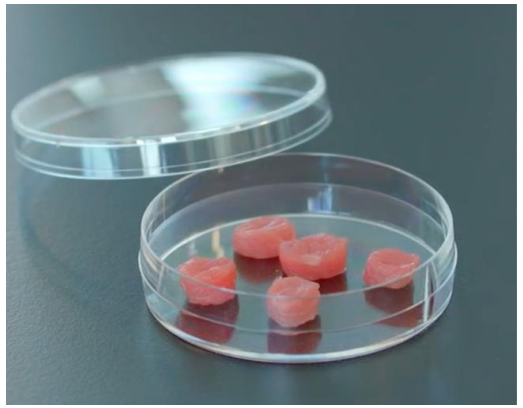
Prep & Sectioning

Fresh Frozen

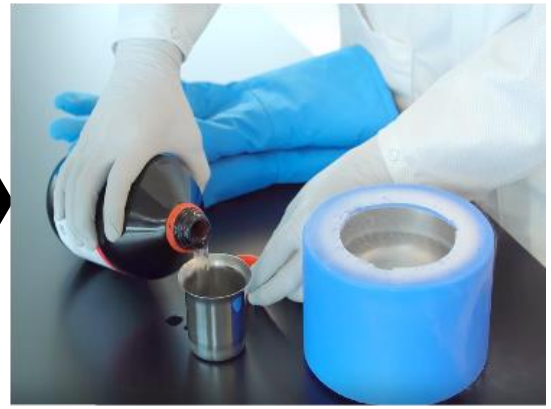
Sample Preparation – Freezing & Embedding

Fresh Tissue is frozen & embedded in Optimal Cutting Temperature Compound (OCT)

1 Obtain fresh tissue

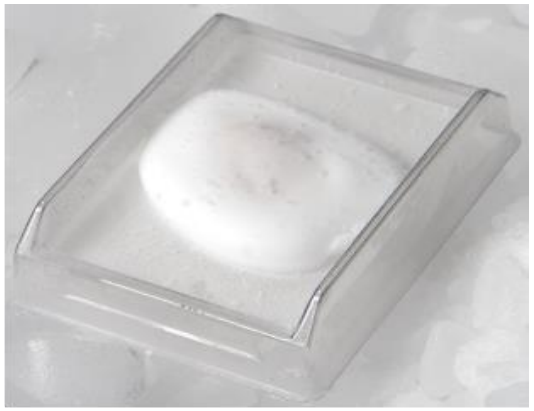


2 Freeze in isopentane bath



*Store frozen block at **-80℃** for **long term storage** or proceed immediately to OCT embedding*

3 Embed in chilled OCT on dry ice



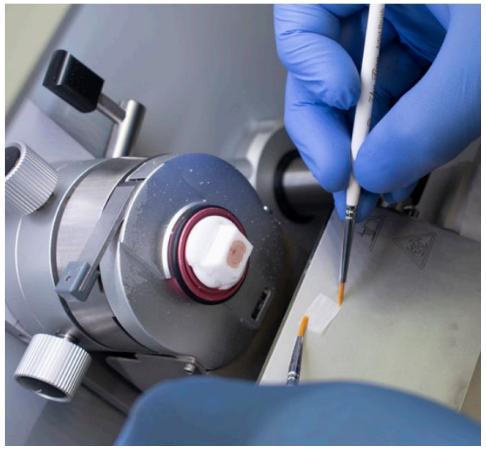
4 Transfer to pre-cooled container

*Store OCT embedded block at **-80℃** for **long term storage** or proceed immediately to Cryosectioning*

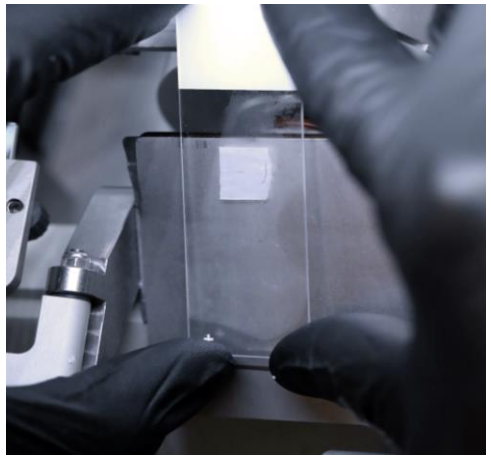
Sample Preparation – Section Placement

FF sections are placed on compatible glass slides

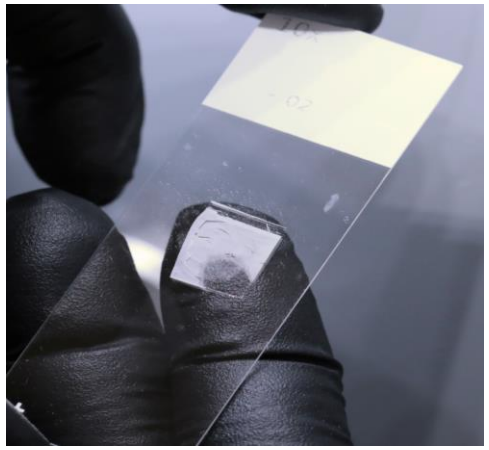
1 Flatten section



2 Transfer section



3 Adhere section



4 Freeze section

*Store tissue slide at **-80℃** for up to **2 months**, or proceed immediately to Staining DP*

Practice tissue section placement before working with precious blocks

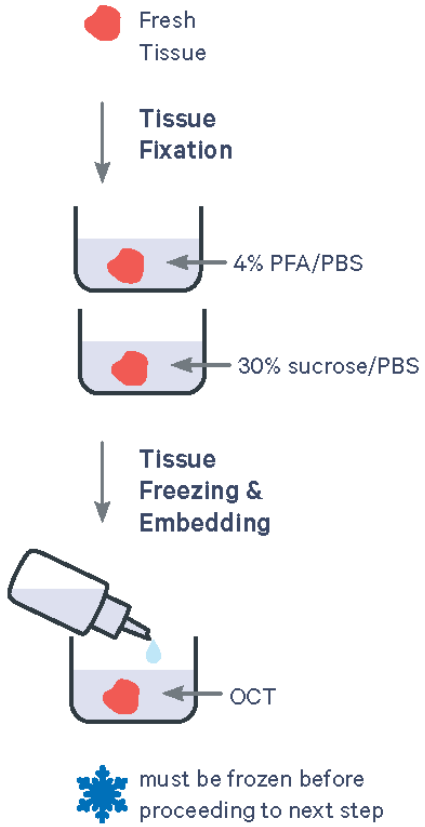
Prep & Sectioning

Fixed Frozen

Sample Preparation Overview

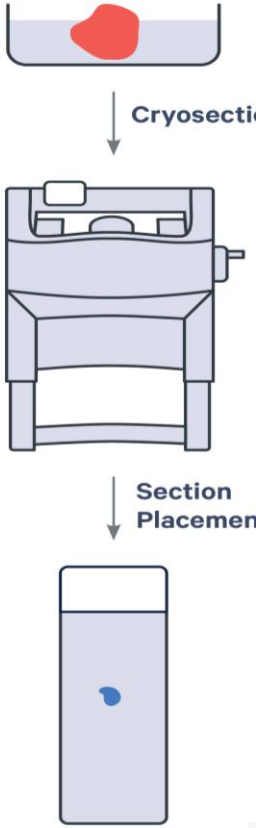
Fixed Frozen

Fixation & Embedding



-80℃ for long term storage

Cryosectioning & Section Placement



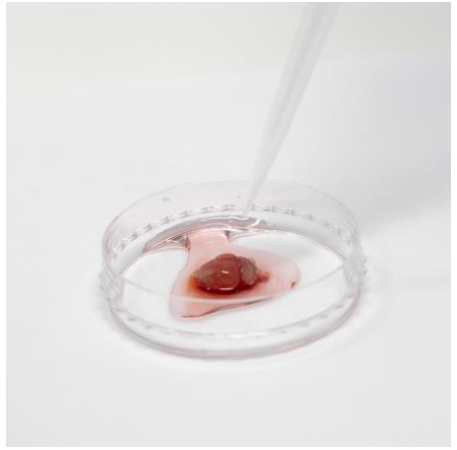
-80℃ for up to 2 months

Sample Preparation – Fixation

Fresh Tissue is fixed in 4% Paraformaldehyde (PFA)

Work quickly between tissue harvest and fixation

1. Harvest then rinse tissue with chilled 1X PBS



2. Transfer tissue to 4% PFA

3. Gently agitate tube on Rocker for 12–16 h at 4℃

4. Confirm tissue has sunk to bottom of tube

Sample Preparation – Cryopreservation

Fixed Tissue is cryopreserved in 30% Sucrose

Proceed Immediately to Tissue Freezing & Embedding

1. Transfer tissue to pre-chilled tube of 1X PBS

2. Carefully discard 1X PBS, perform two additional 1X PBS washes

3. Transfer Tissue to 30% Sucrose Solution

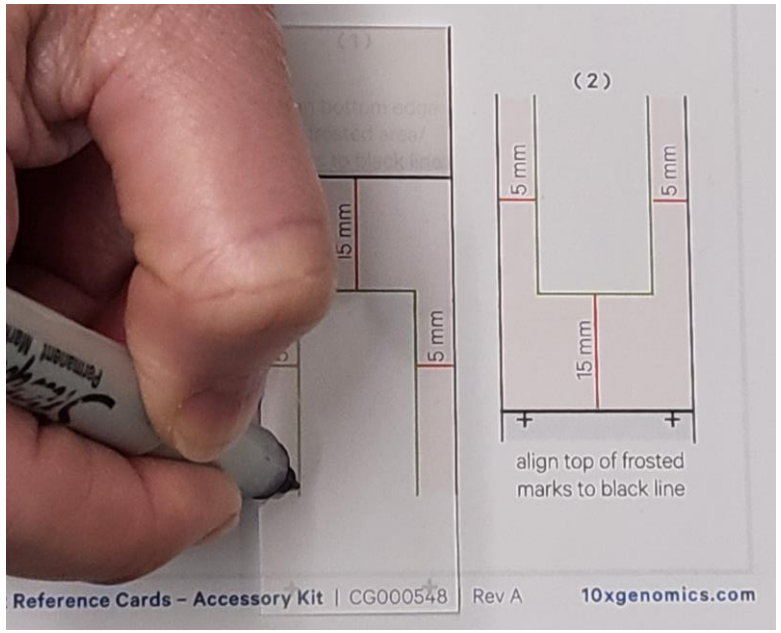
4. Incubate tissue for 6-12 h at 4℃ until tissue sinks to bottom of tube

Best Practices

Fresh & Fixed Frozen

Best Practices

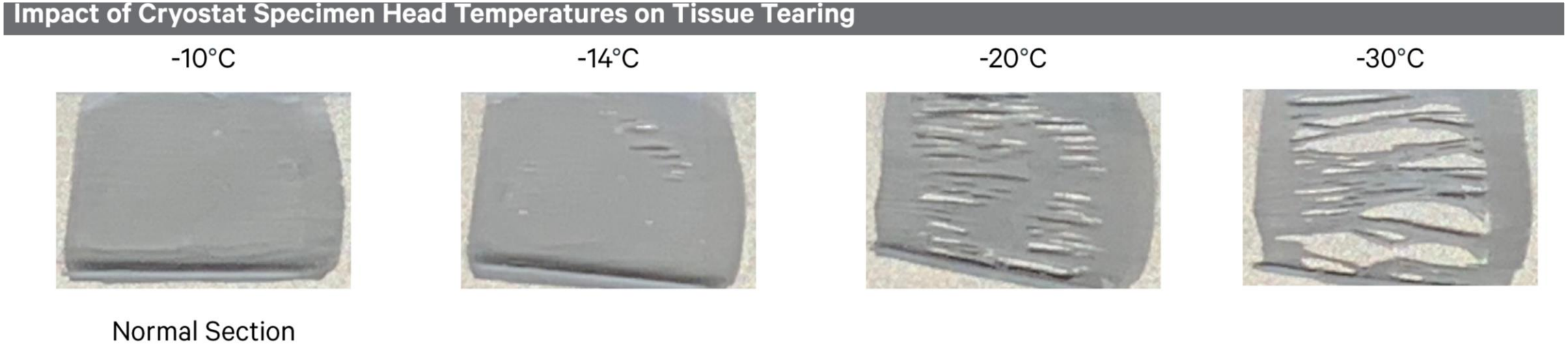
1. Do not allow OCT embedded tissue block to thaw
2. Determine optimal sectioning conditions based upon tissue type
3. Draw allowable area based upon slide type on back of blank slides
4. Pre-chill blank slide and tools prior to cryosectioning
5. Once cold, keep slide in cryochamber throughout placement
6. Practice tissue section placement within allowable area
7. Transfer tissue slides into individual pre-cooled sealed containers
8. Always transport contained tissue slides on dry ice
8. Store sealed container containing Tissue Slides at -80°C for up to 2 months



Best Practices

Determine the ideal cutting temperature for your tissue type

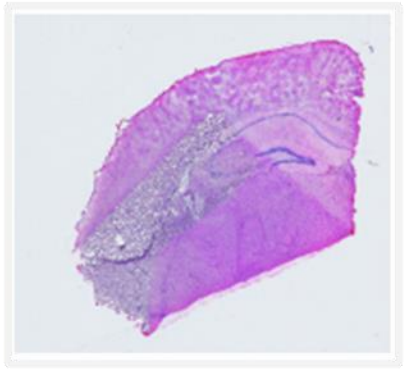
- Colder sectioning temperatures may result in an increase in tissue cracking
- Optimal sectioning temperatures differ across tissue types
  - High fat content tissues require colder temperatures due to lipid structure



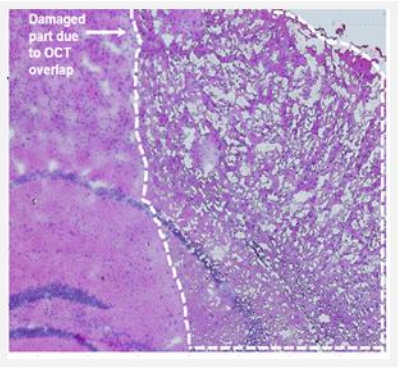
Best Practices

Common sectioning/tissue artifacts to avoid

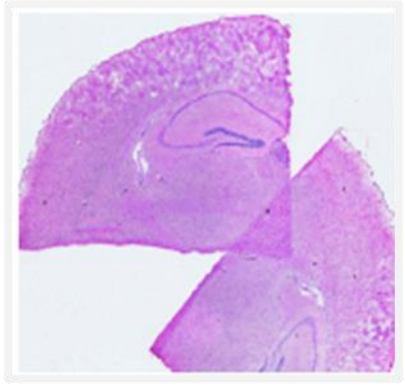
- **Folded section**



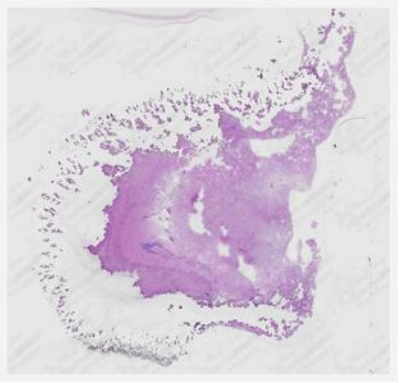
- **OCT overlapping tissue**



- **Overlapping sections**



- **Condensation formation**



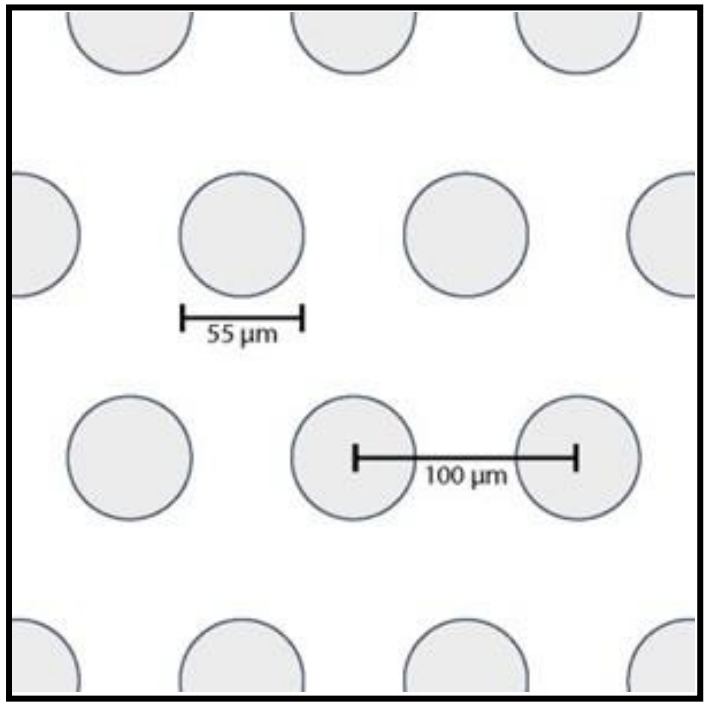
Visium HD

Discovering Spatial Biology at High Definition

Visium HD – Resolution

Putting Visium HD in perspective

Visium



55 µm spots

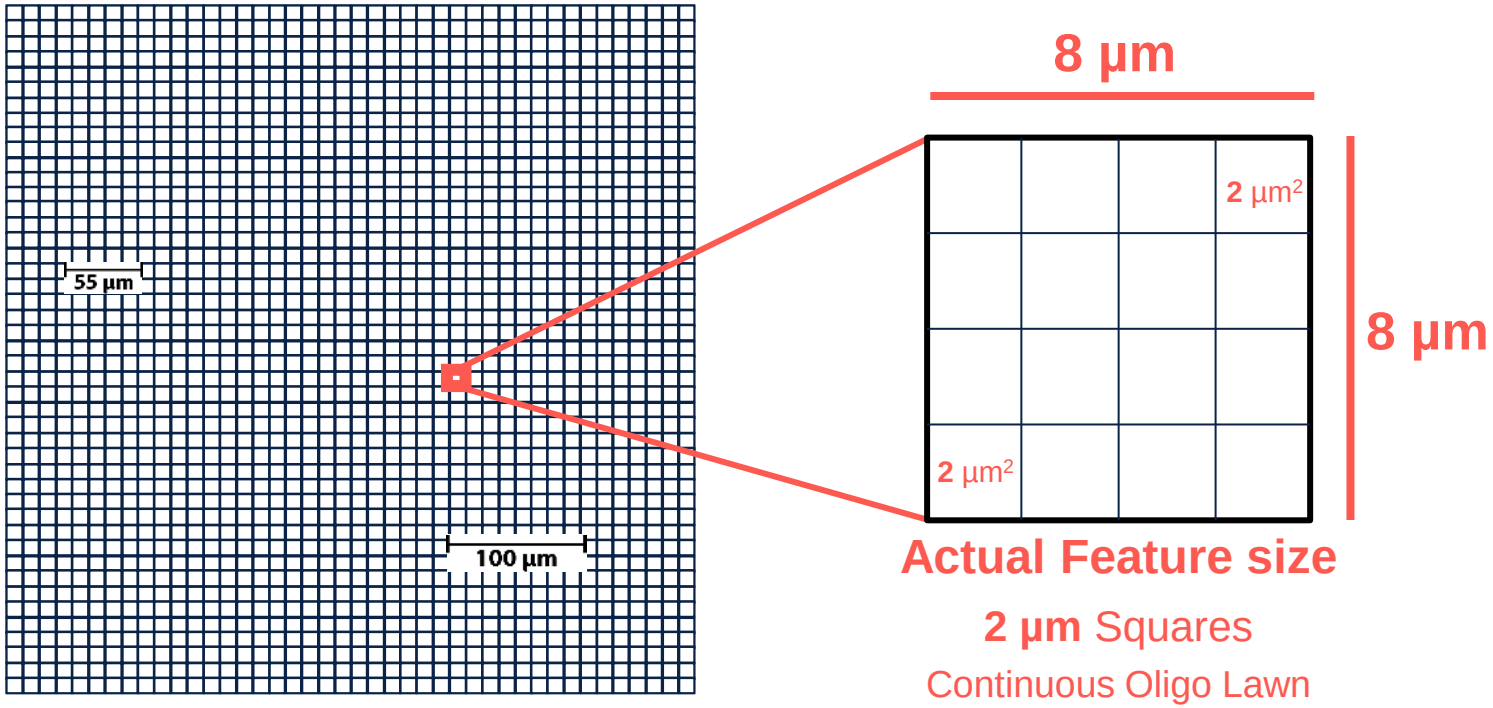
Hexagonally arranged

with 45 µm gaps

5,000

Features

Visium HD



Actual Feature size

2 µm Squares

Continuous Oligo Lawn

with ***No Gaps***

8 µm Square bins

Continuous grid-pattern

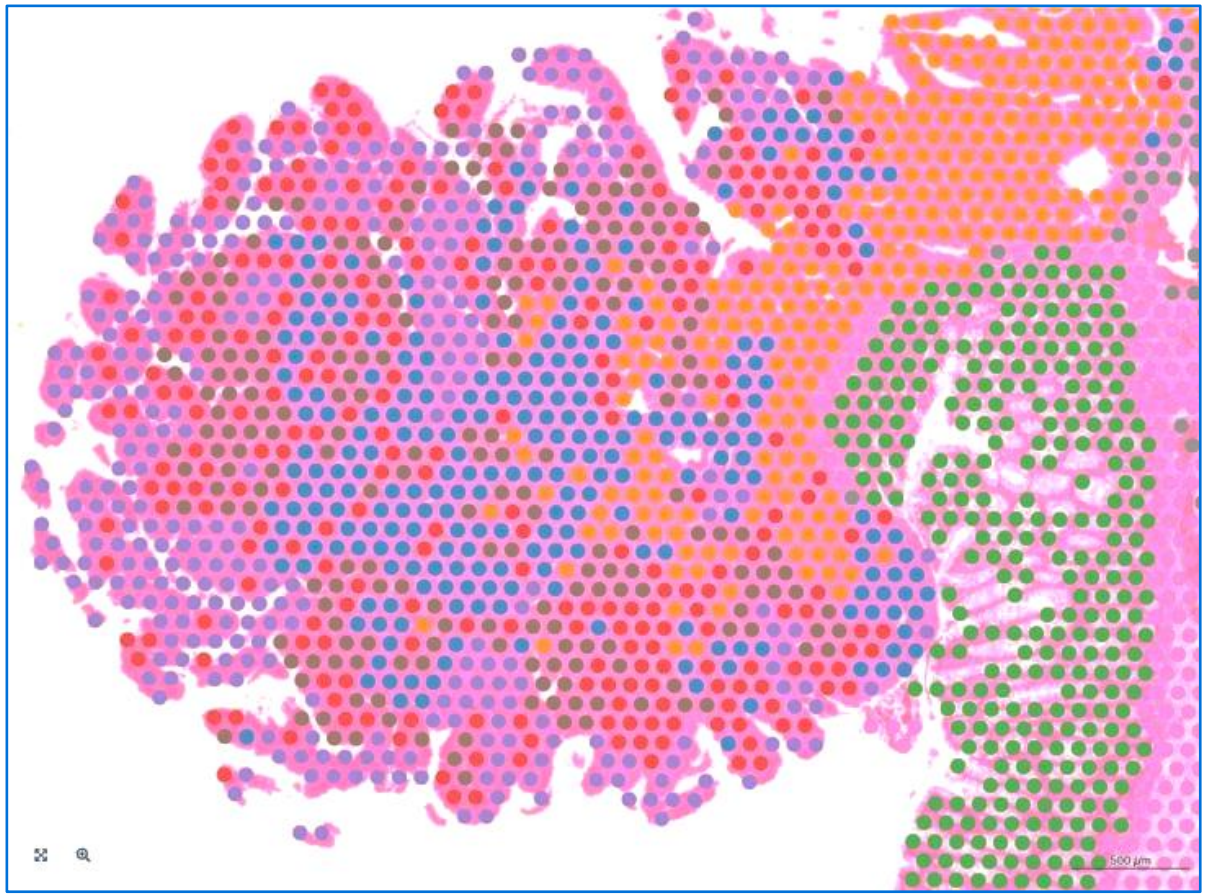
with ***No Gaps***

11,000,000

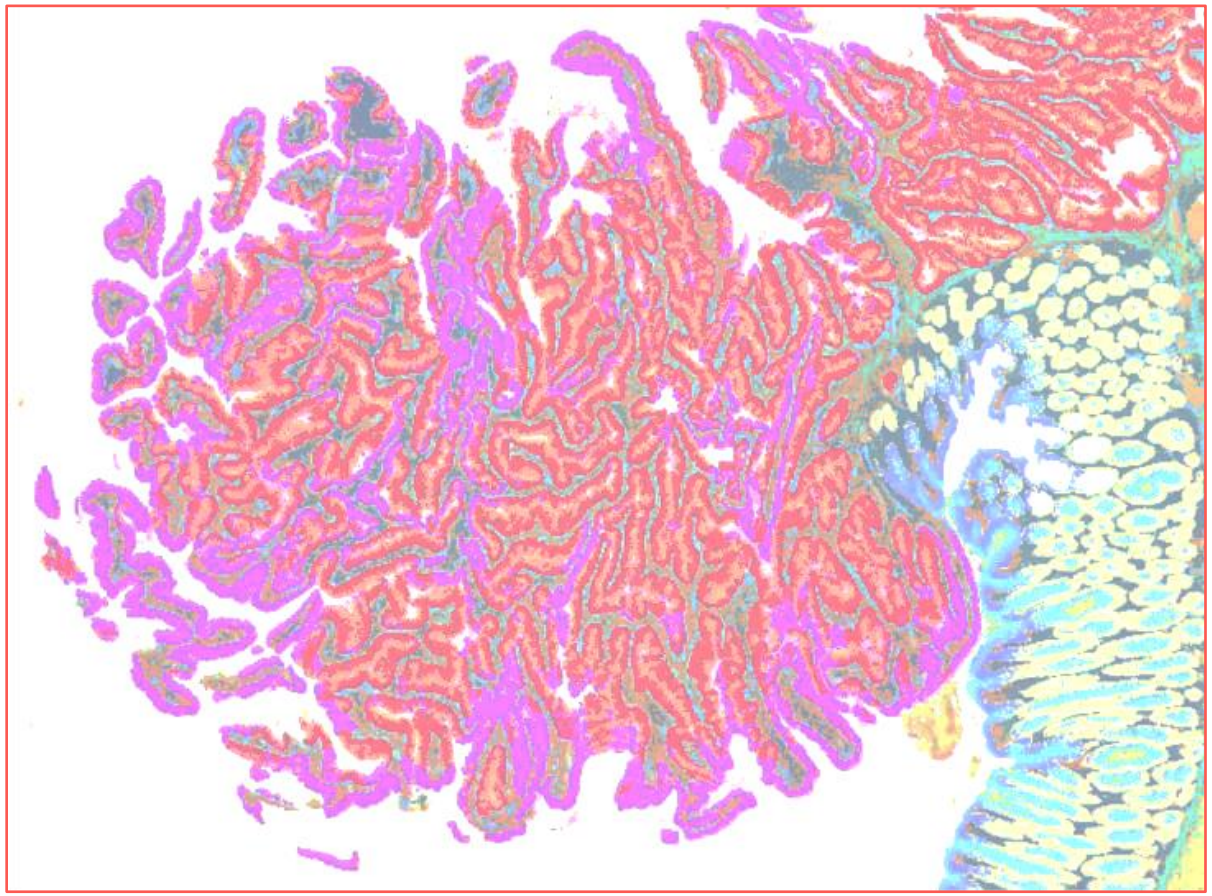
Features

Visium HD – Comparison to Standard Visium

Visium

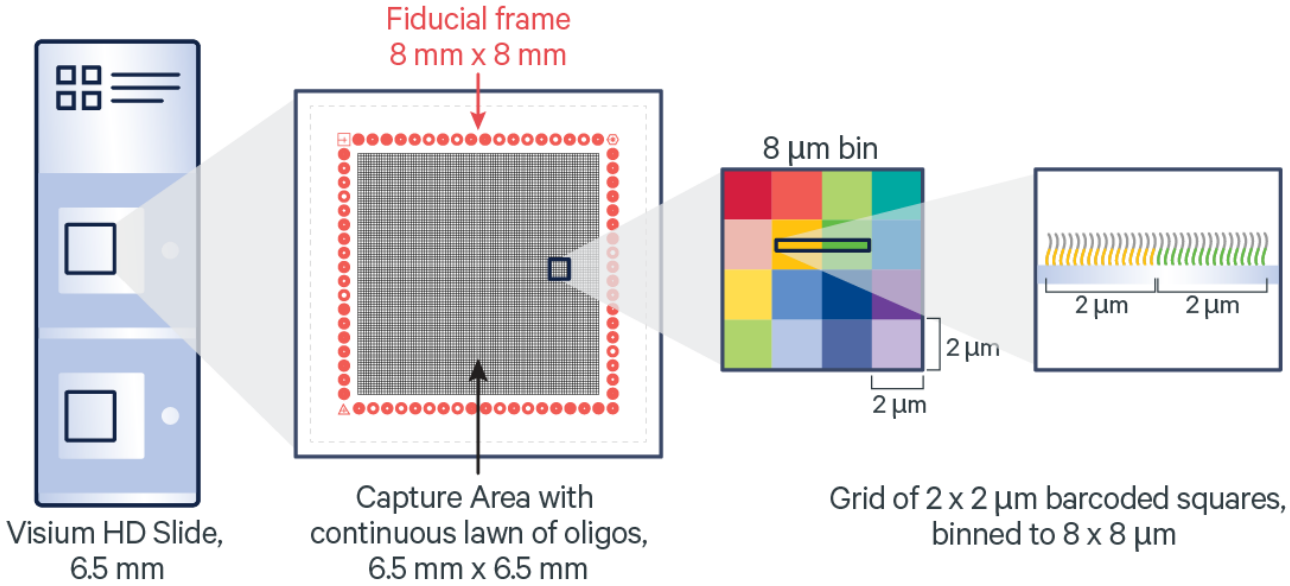


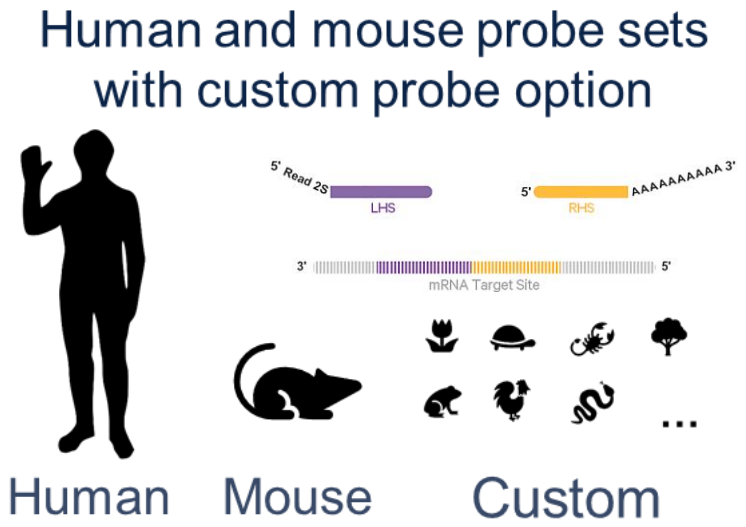
Visium HD



Visium HD – CytAssist-Enabled Gene Expression Technology

Visium CytAssist instrument required – probe-based v2 assay

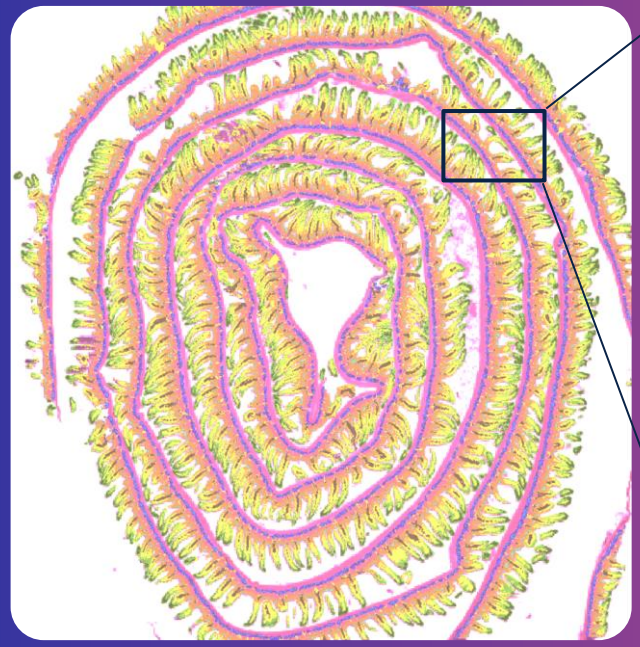




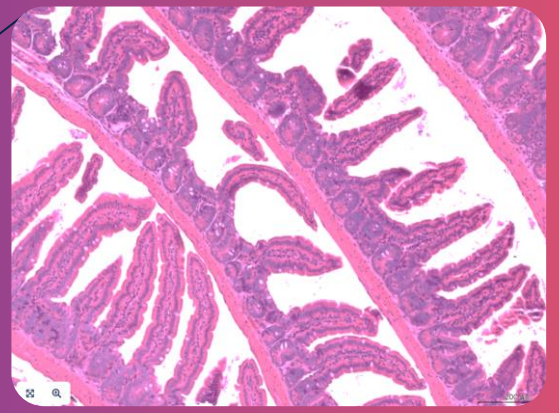
RNA Quality Assessment → **Sample Preparation** → **On-Slide Assay Steps & Imaging** → **Permeabilization & Probe Transfer** → **Library Preparation** → **Library Sequencing** → **Data Analysis**

Visium HD – Generate Accurate & Specific Spatial Maps

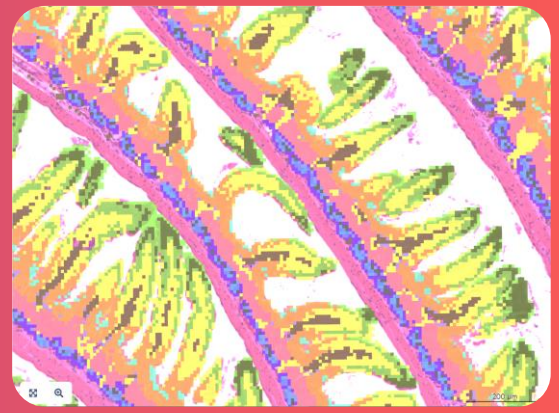
Visium HD precisely replicates known biology



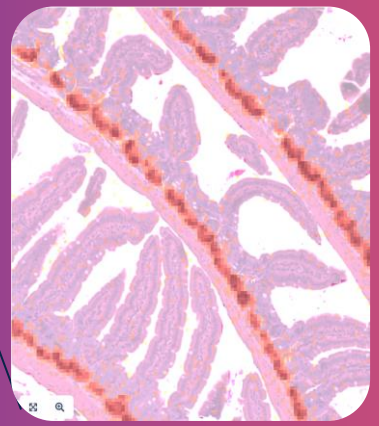
Mouse Intestine
Gene Expression
Clustering



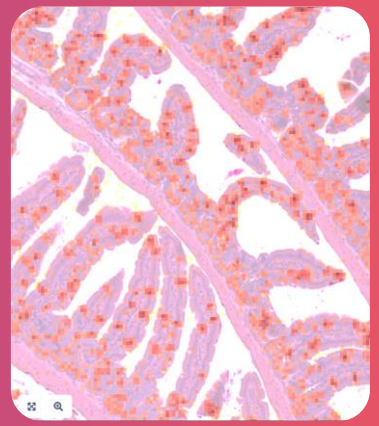
H&E image



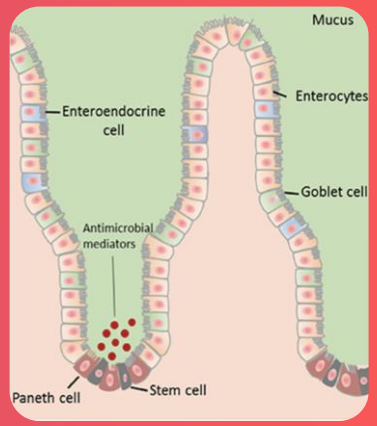
HD: Unbiased Clustering



Lyz1
(paneth cell marker)



Muc2
(goblet cell marker)

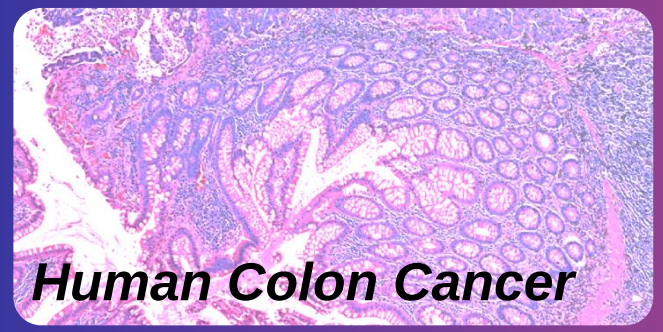


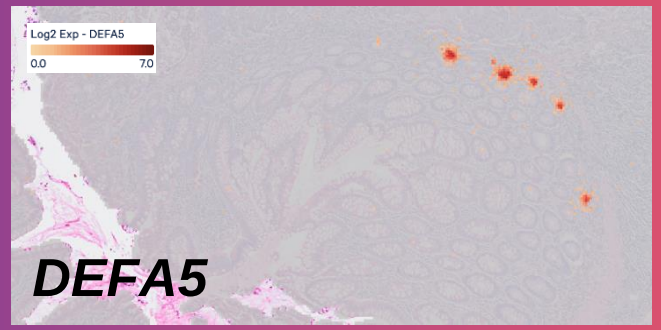
Small Intestine

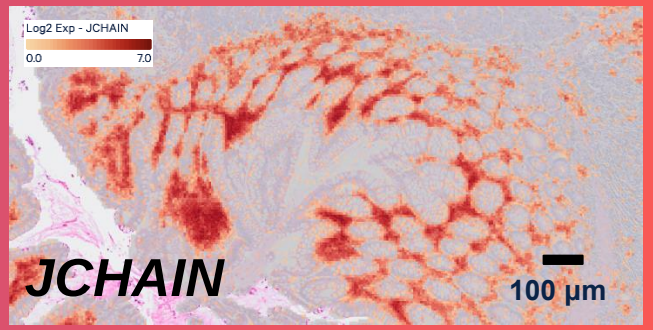
Herath *et al. Front Cell Infect Microbiol* (2020).

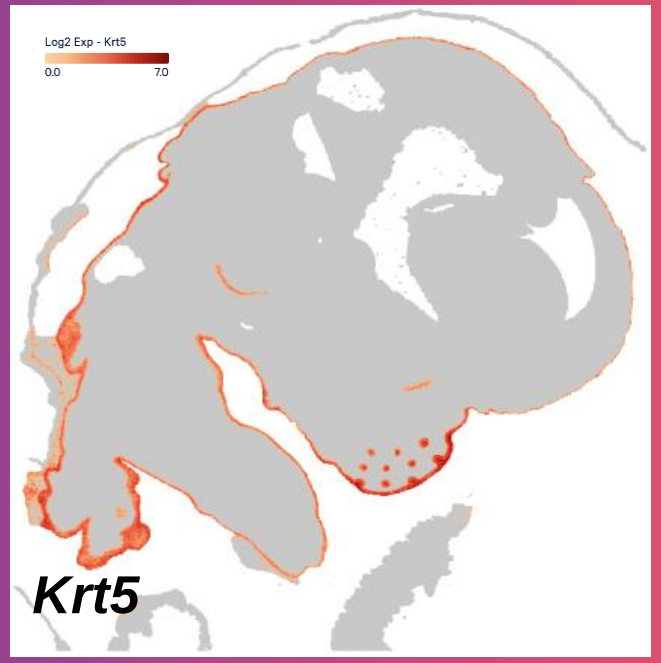
Visium HD – Achieve High-Quality Data with Confidence

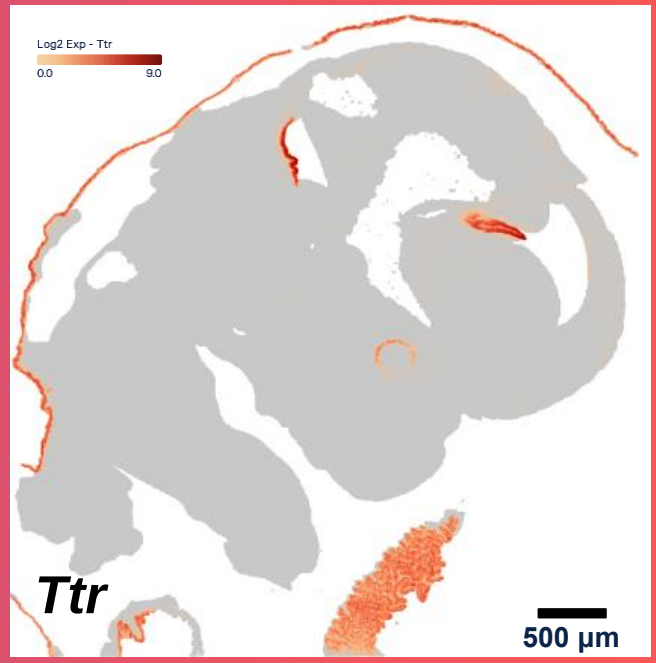
Accurate and precise transcript localization enabled by CytAssist





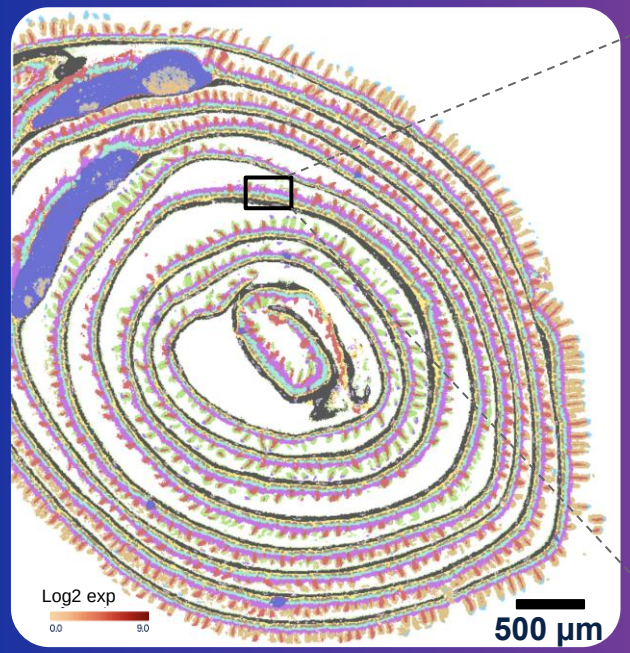




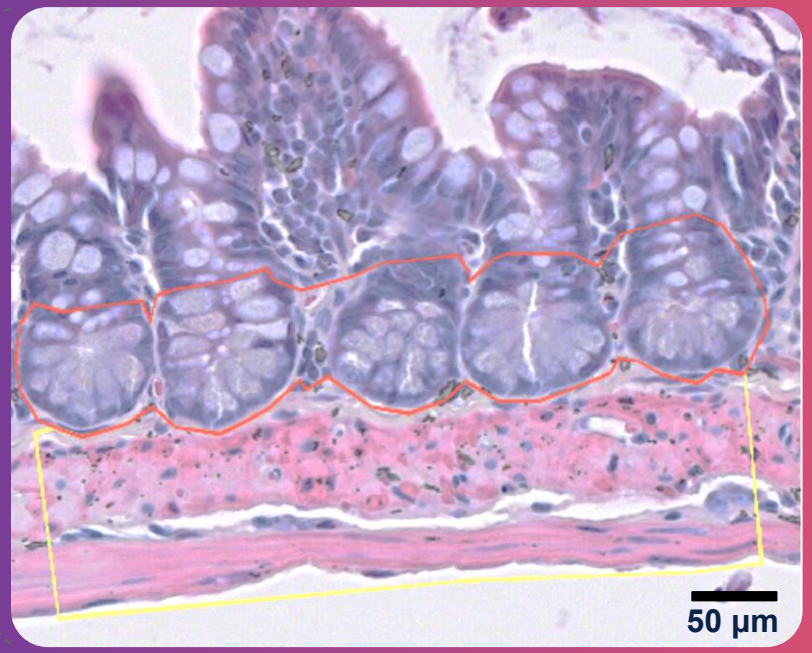


Visium HD – Achieve High-Quality Data with Confidence

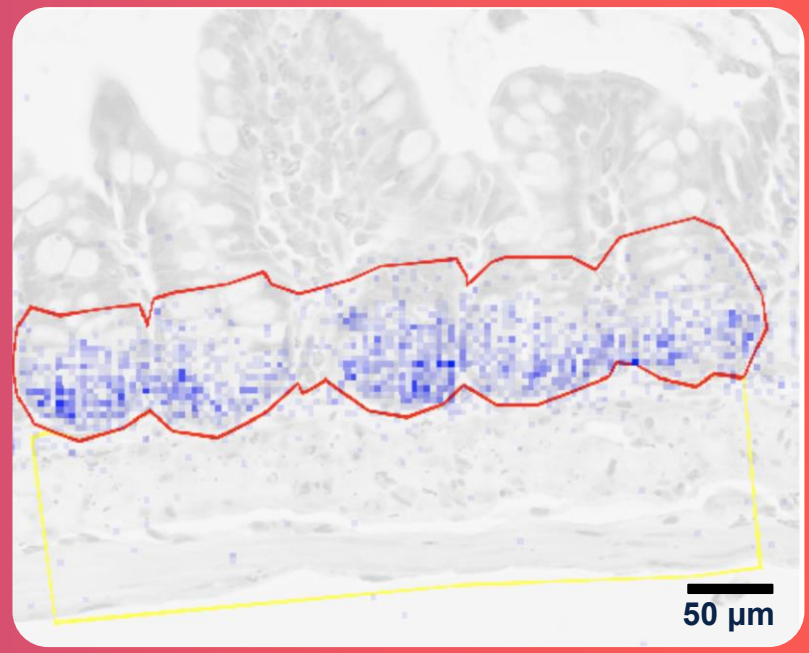
Accurate and precise transcript localization enabled by CytAssist



Mouse intestine
Graph-based clusters



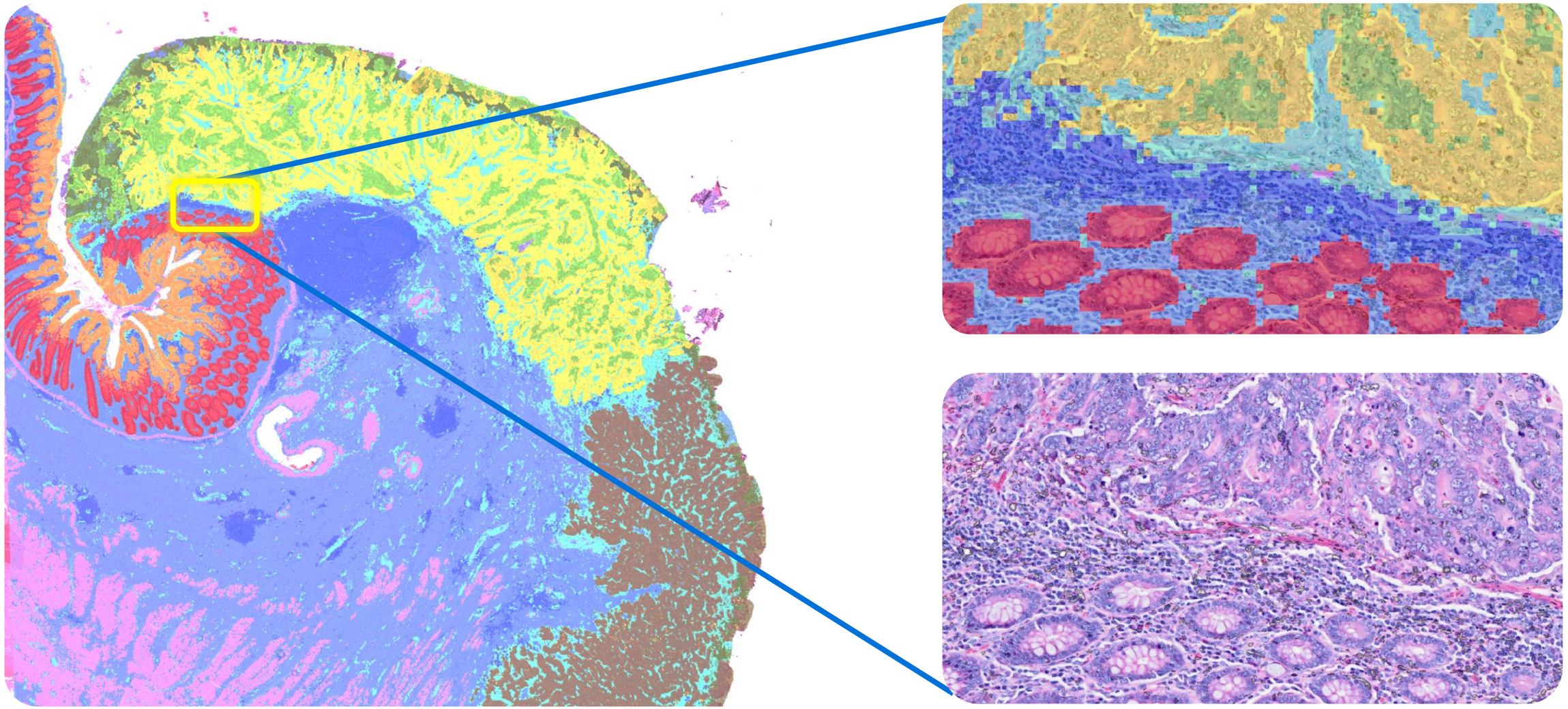
- Crypts containing paneth cells (Lyz1 + Defa21 expression expected)
- Non-epithelial layers below the crypt (Lyz1 + Defa21 expression not expected)



95% of Lyz1 and Defa21 transcripts localized in the crypt region

Visium HD – Enhanced Histology with Whole Transcriptome

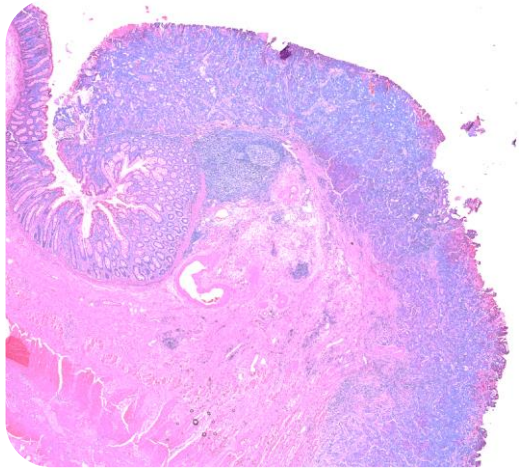
Colon Cancer FFPE: 18,058 genes detected



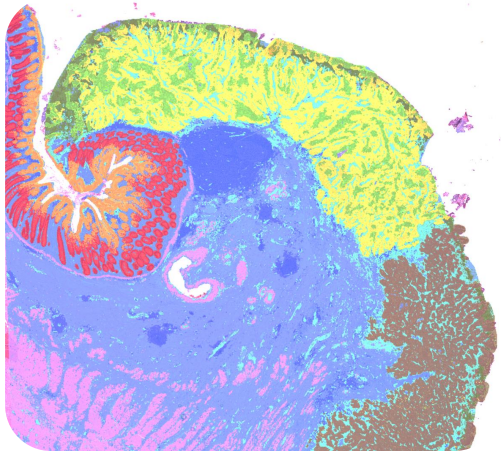
Visium HD – Transcript Density & Tissue Morphology Correlation

Colon Cancer FFPE: 18,058 genes detected

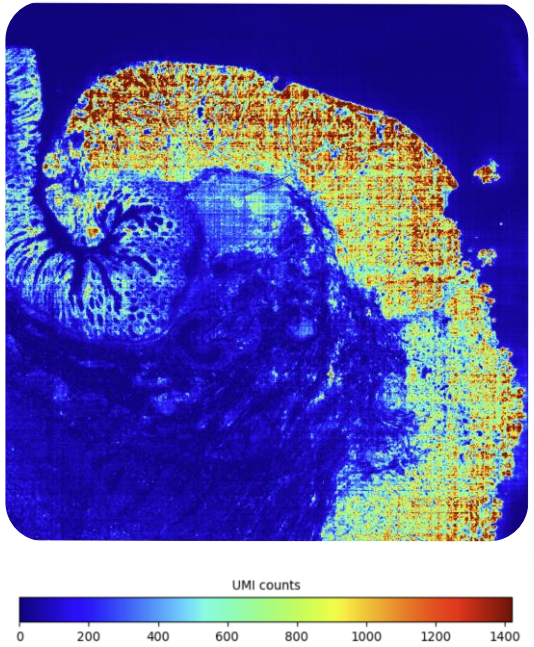
H&E Stain

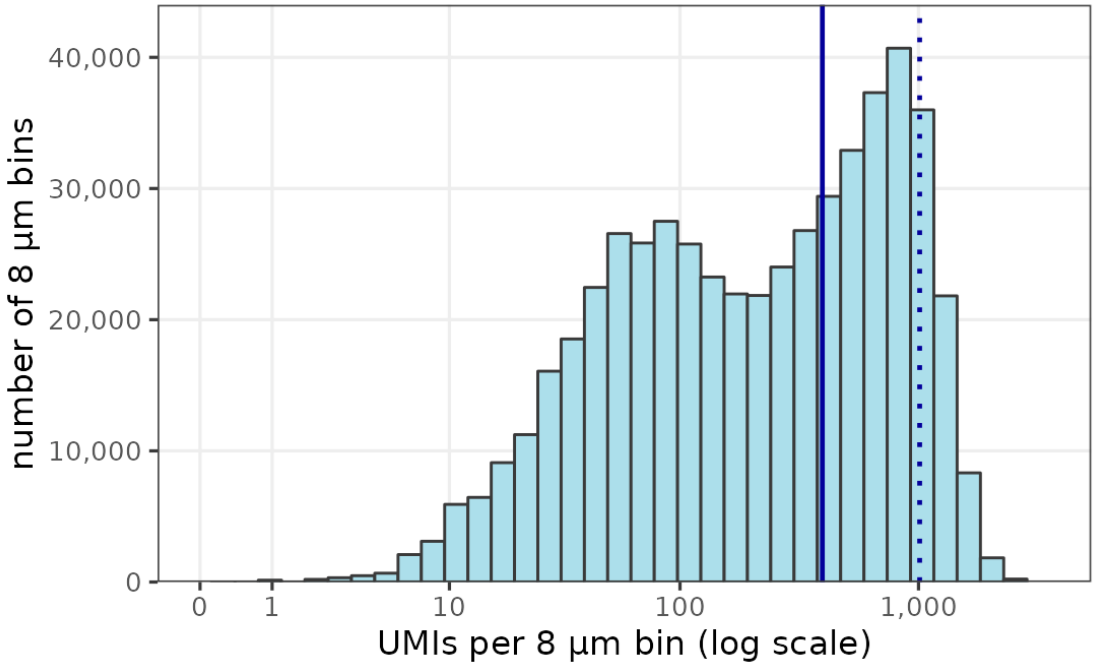


Gene Expression Clustering



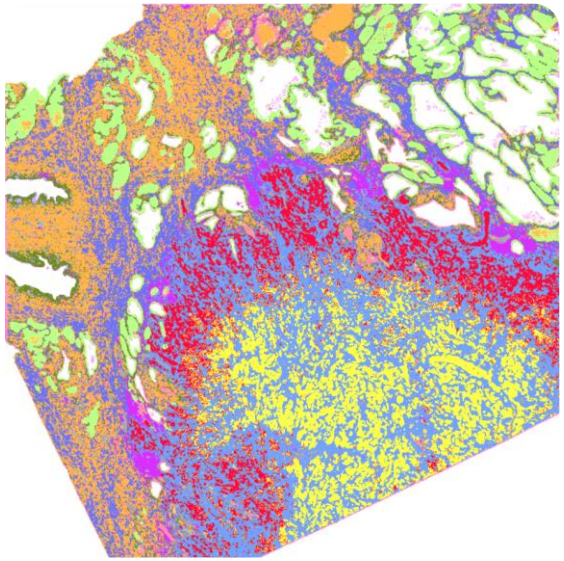
UMI Heat Map (per 8 µm bin)





Visium HD – Deep Sequencing Increases Transcript Recovery

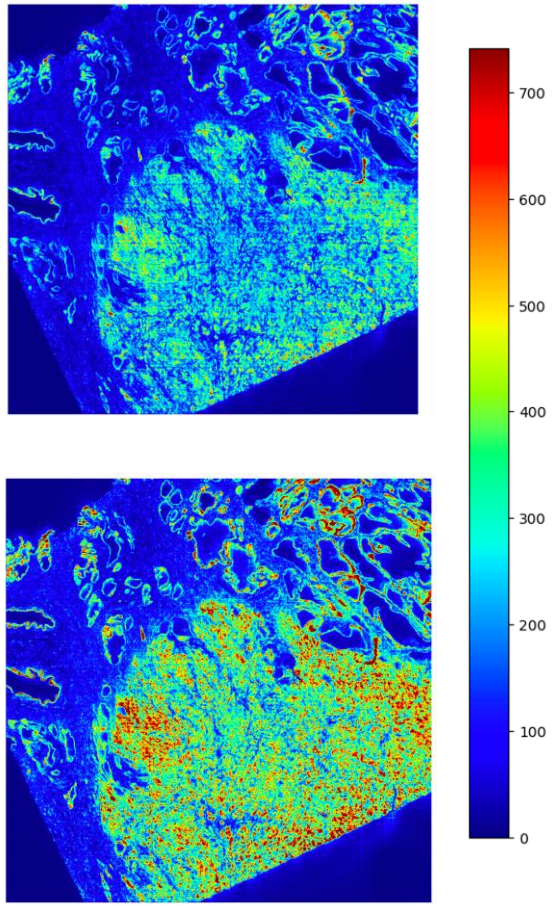
Prostate Cancer
Gene Expression Clustering

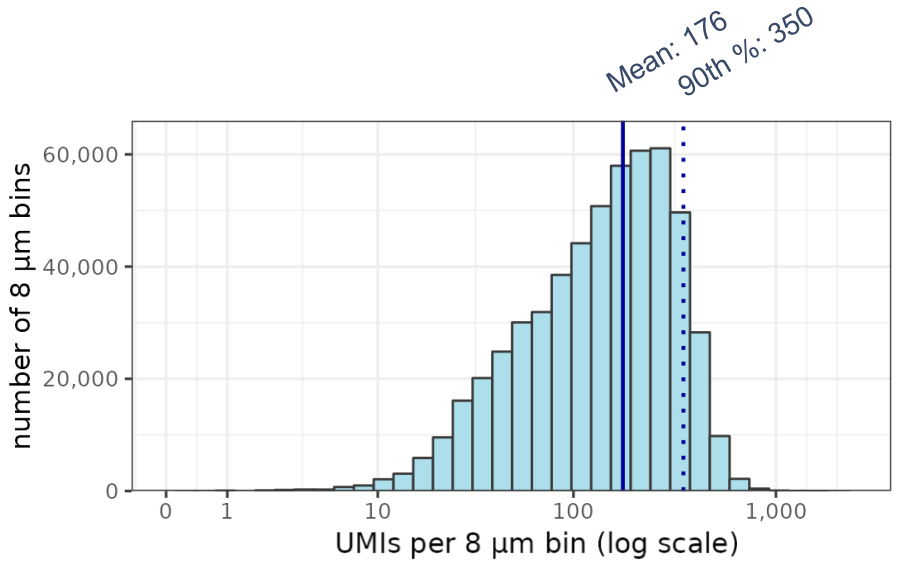


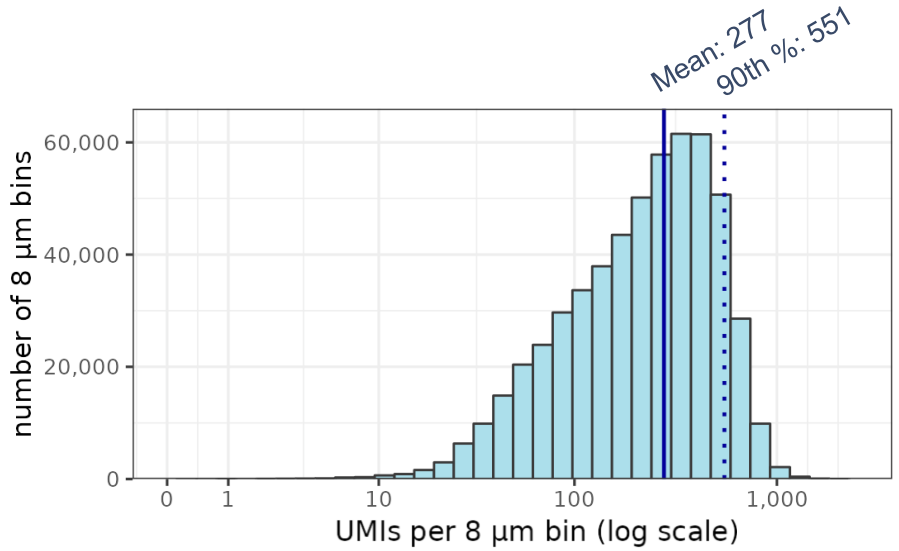
44% Saturation
~213M reads

77% Saturation
~816M reads

UMI Heat Map (per 8 µm bin)

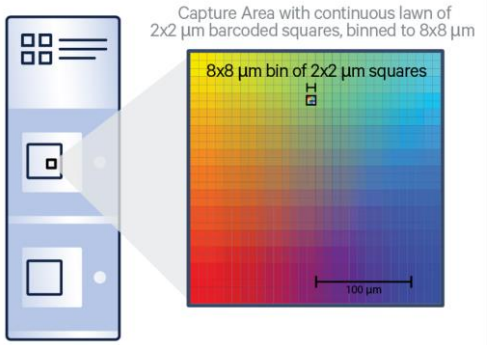






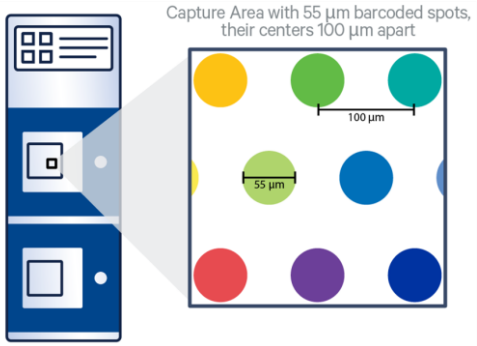
Visium HD – Deeper Insight with Higher Resolution

Visium HD Slide



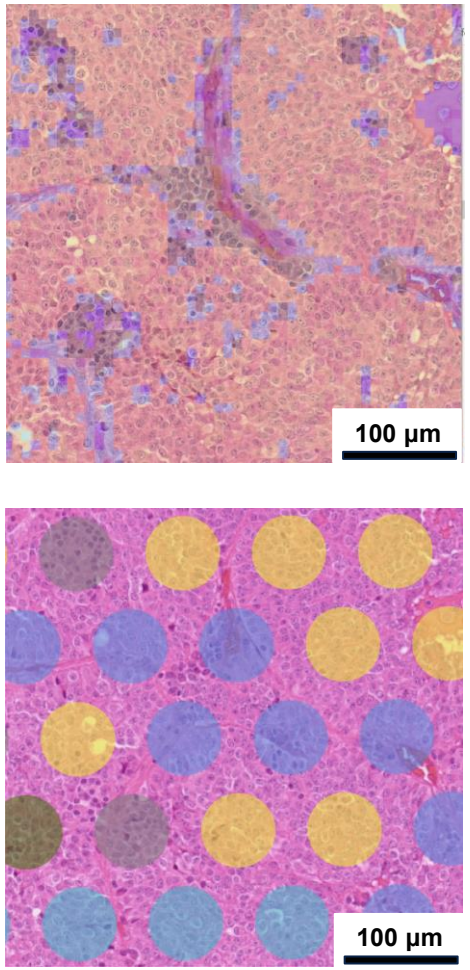
Visium v2 Slide

(Visium CytAssist Spatial Gene Expression for FFPE)



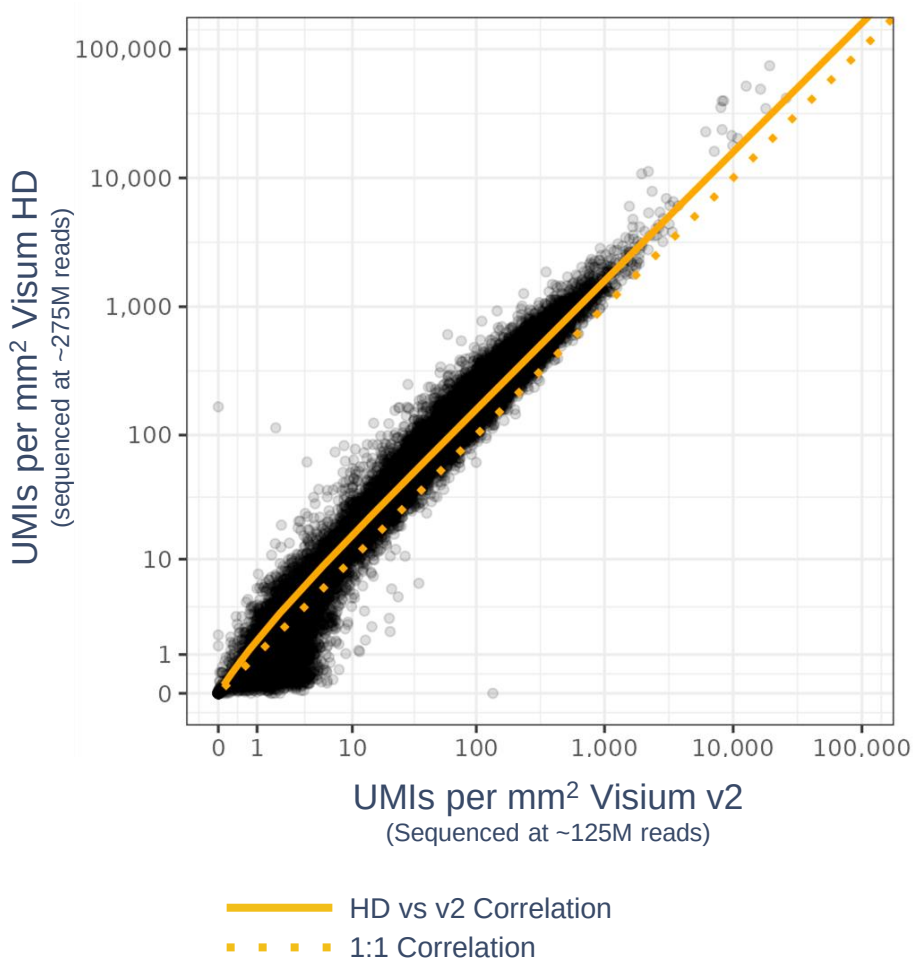
Graph-Based Clustering and H&E Overlay

Matched Lung FFPE Sections

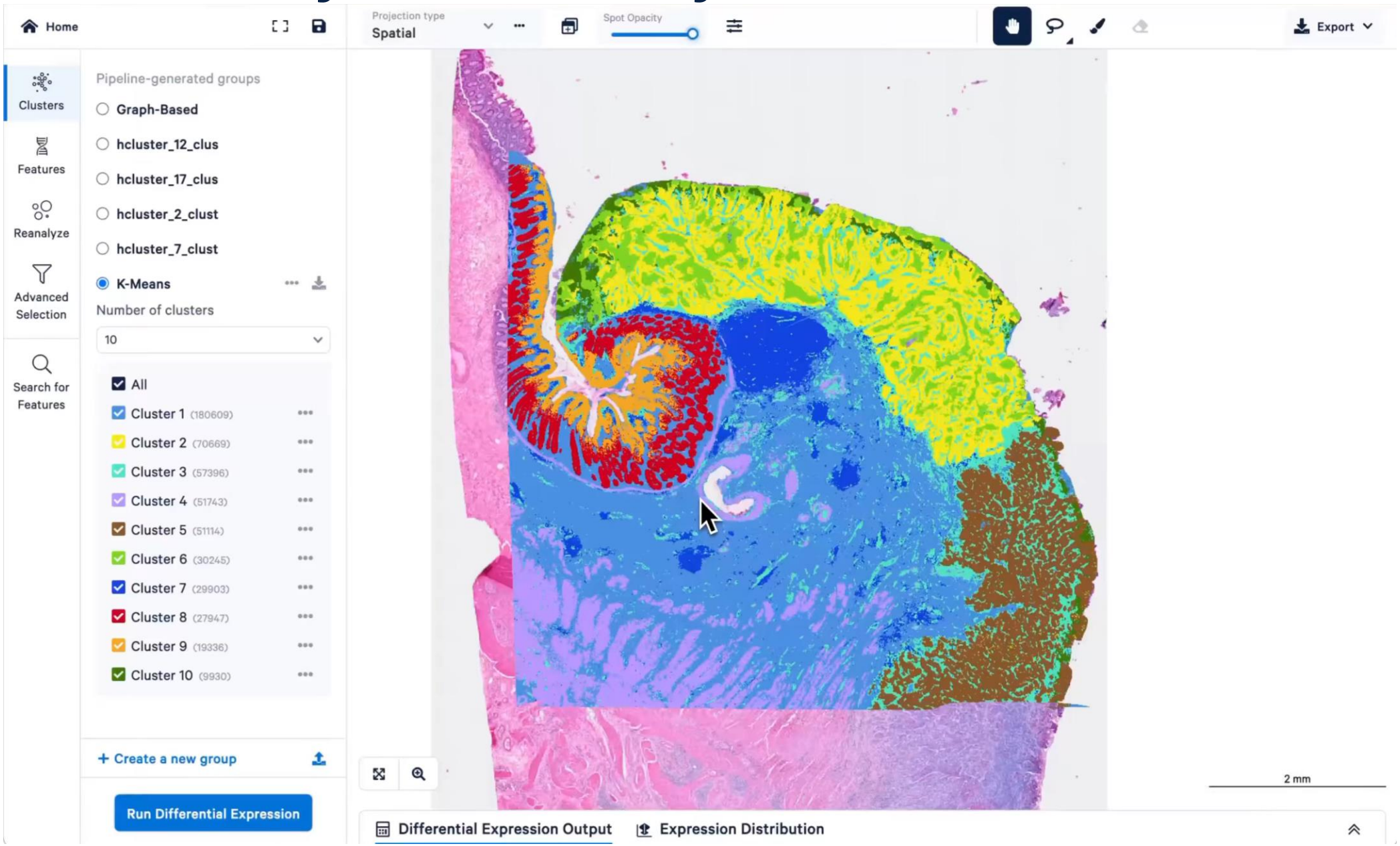


HD and v2 Correlation

Matched Lung FFPE Sections

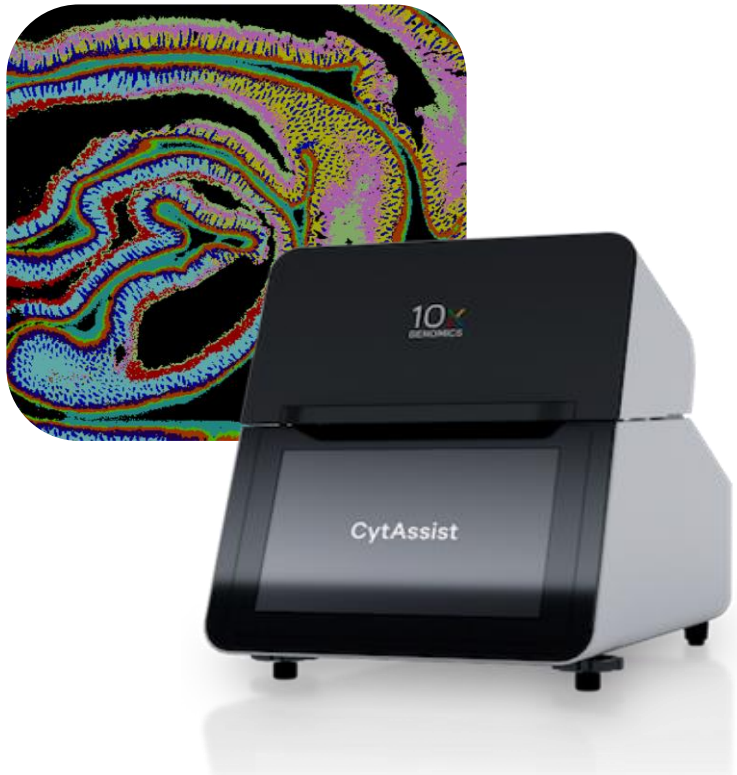


Visium HD – Easy-To-Use Analysis Tools Hastens Discovery



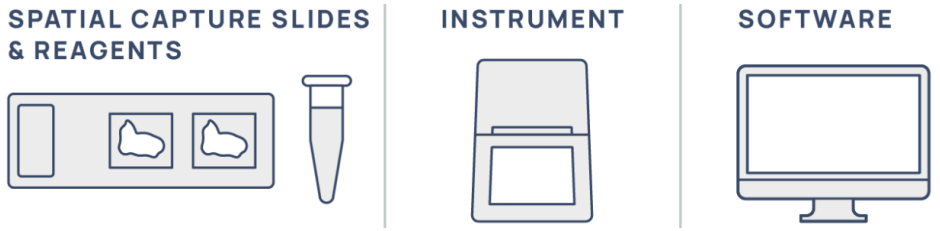
Visium HD – Visium at High Definition

All the discovery power you want with the resolution you need



Preorder Now!!
Ships End of Q1 '24

- **Whole transcriptome unbiased** analysis from an entire tissue section at single cell scale
- Slide contains arrayed barcoded oligos **leveraging NGS** while preserving spatial locations
- **FFPE** compatibility at launch
- **6.5 x 6.5 mm** capture areas (2 per slide)
- The **capture area is grid of 2 x 2 µm** barcoded squares (no gaps)



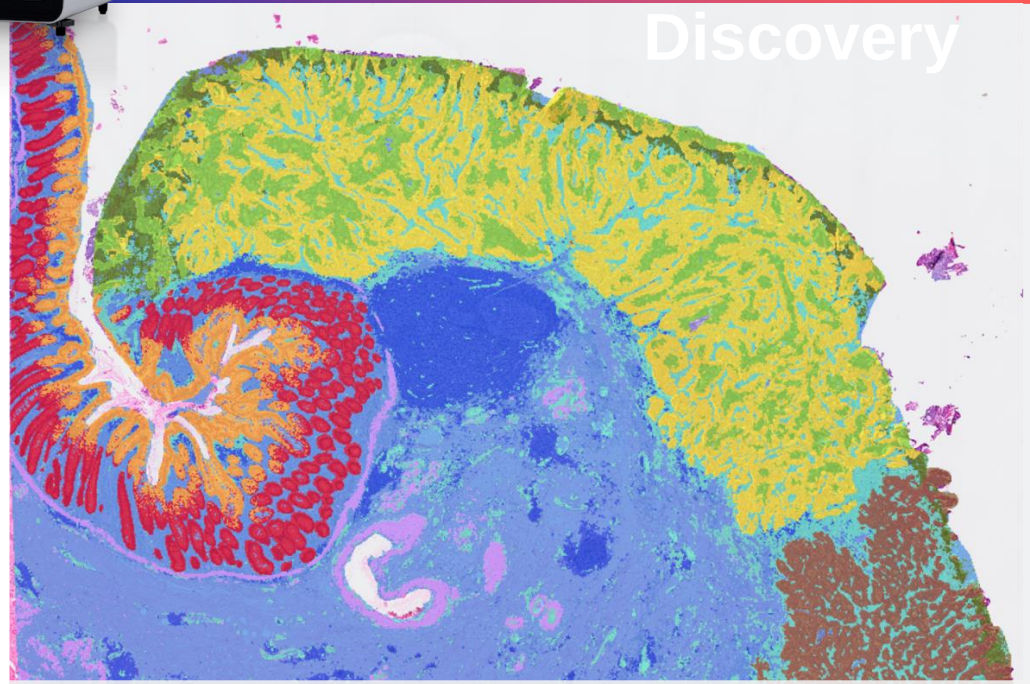
Conclusion

Visium Has Powered Impactful Research

Cumulative Visium publications

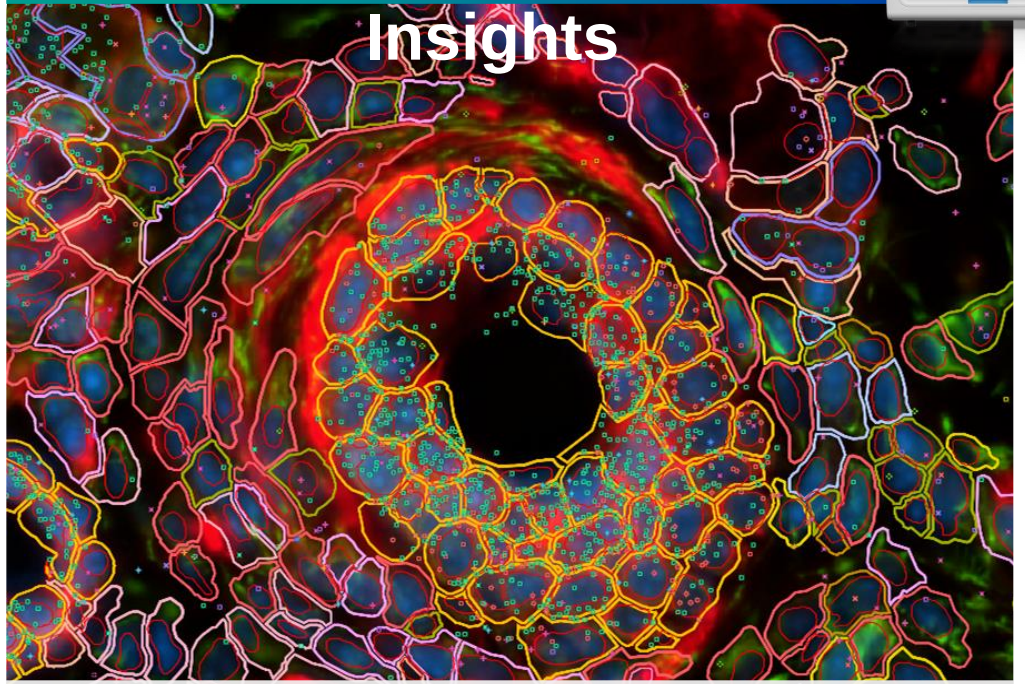
Unlock the Full Spectrum of Spatial Biology

Visium HD is Unbiased Discovery



- Whole transcriptome
- Sequencing based
- Transcripts assigned to multi-micron areas

Xenium is Precision Insights



- 100s–1000s of transcripts
- High-resolution imaging based
- Transcripts assigned to cells

Biology’s Most Comprehensive Toolkit

Visium CytAssist: Ready to Explore More

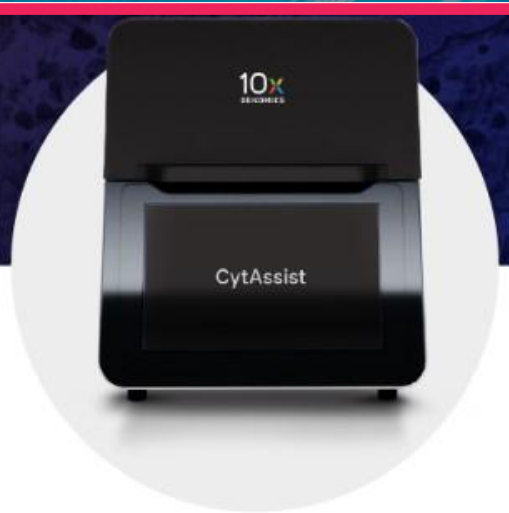
Simplifying spatial sample preparation and broadening sample access

Your Sample, Your Spatial Story

- ☑ Spatial Gene Expression for FFPE
- ☑ Spatial Gene & Protein Expression for FFPE
- ☑ Spatial Gene Expression for Fresh Frozen
- ☑ Spatial Gene Expression for Fixed Frozen
- ☑ Spatial Gene Expression for Tissue Microarrays
- ☑ Spot Deconvolution
- ☑ Validation of Xylene Alternatives
- ☑ Visium HD Spatial Gene Expression

Coming Soon ☑ Sample Prep Recommendation for Skin & Bone

Thank you
Want to Know More?
We are always happy to schedule a meeting!



Chromium
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In Situ

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