



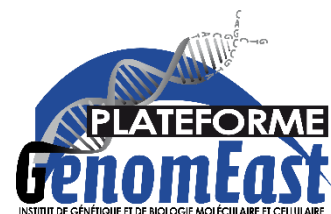
13ème FORUM 2023 , CANCERPOLE Est

9 novembre 2023

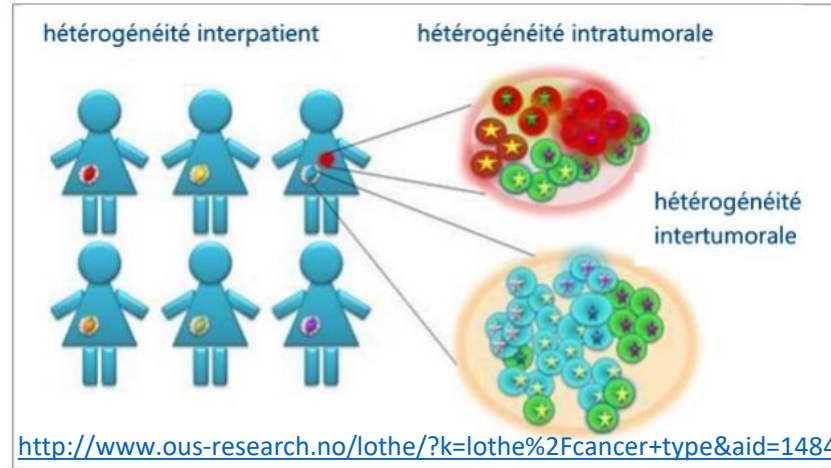


Aperçu des technologies récentes de transcriptomique spatiale

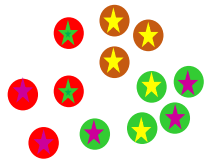
Christelle Thibault-Carpentier



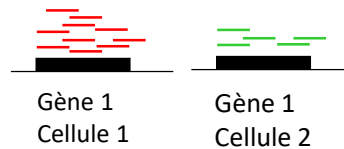
Séquençage du transcriptome sur cellule unique



Dissociation des tumeurs

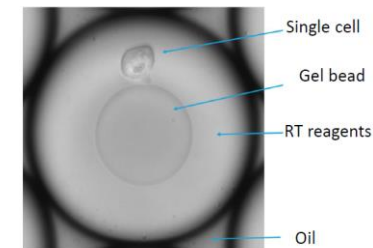
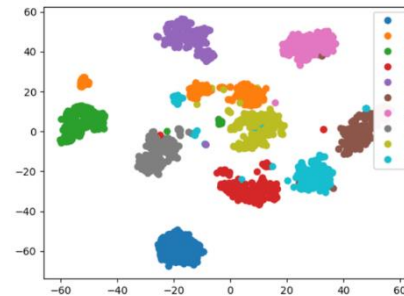
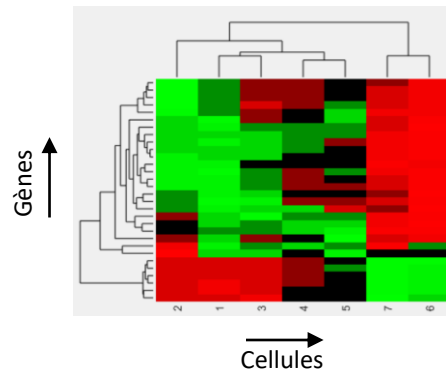


Séquençage du transcriptome de chaque cellule individuelle



Matrice d'expression des gènes

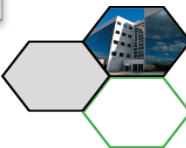
	Cellule 1	Cellule 2	
Gène 1	150	75	
Gène 2	5	300	
Gène 3	12	2	



Gel Bead-in-Emulsion (GEM)

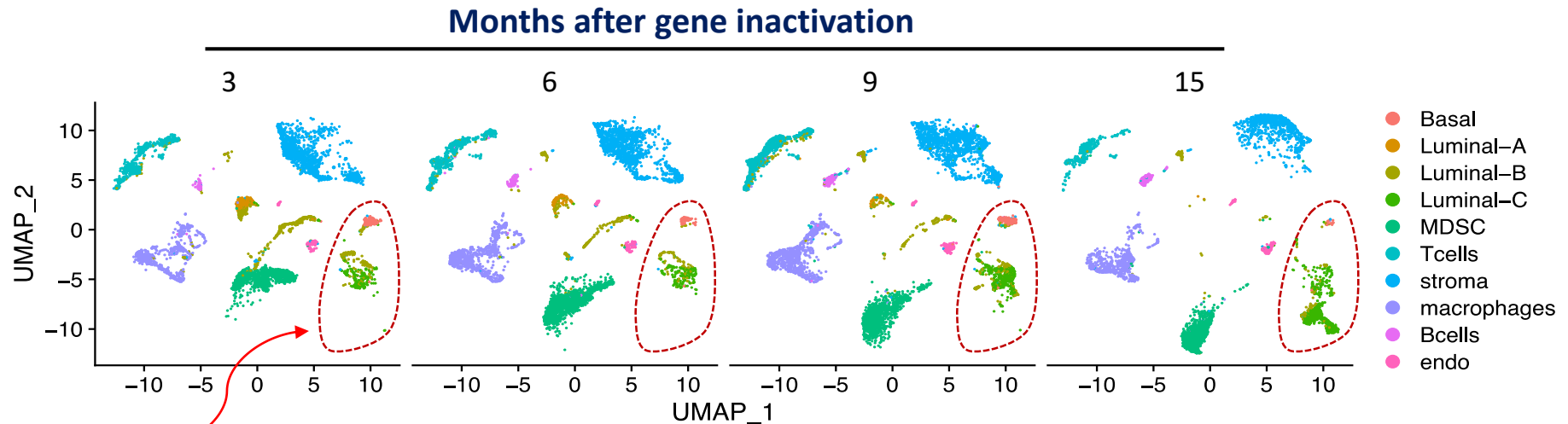
5 à 8000 cellules/éch

Technologie Next GEM

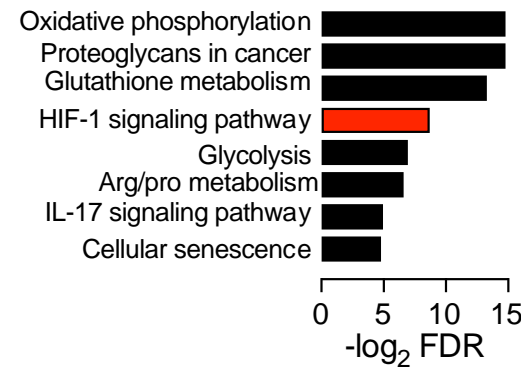
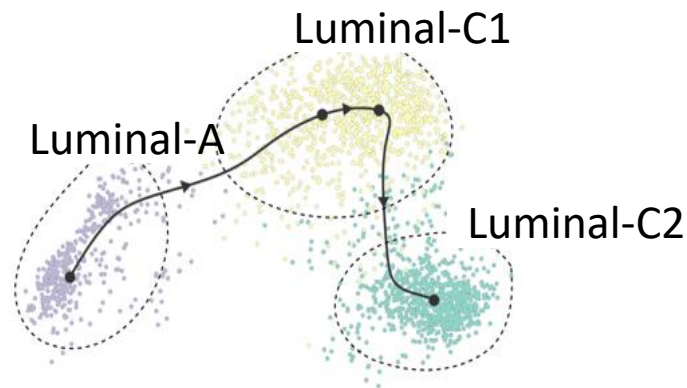


Hypoxia-mediated stabilization of HIF1A in prostatic intraepithelial neoplasia promotes cell plasticity and malignant progression.

Abu El Maaty MA et al. Sci. Adv. 2022 Jul 22; 8(29)



luminal epithelial cells

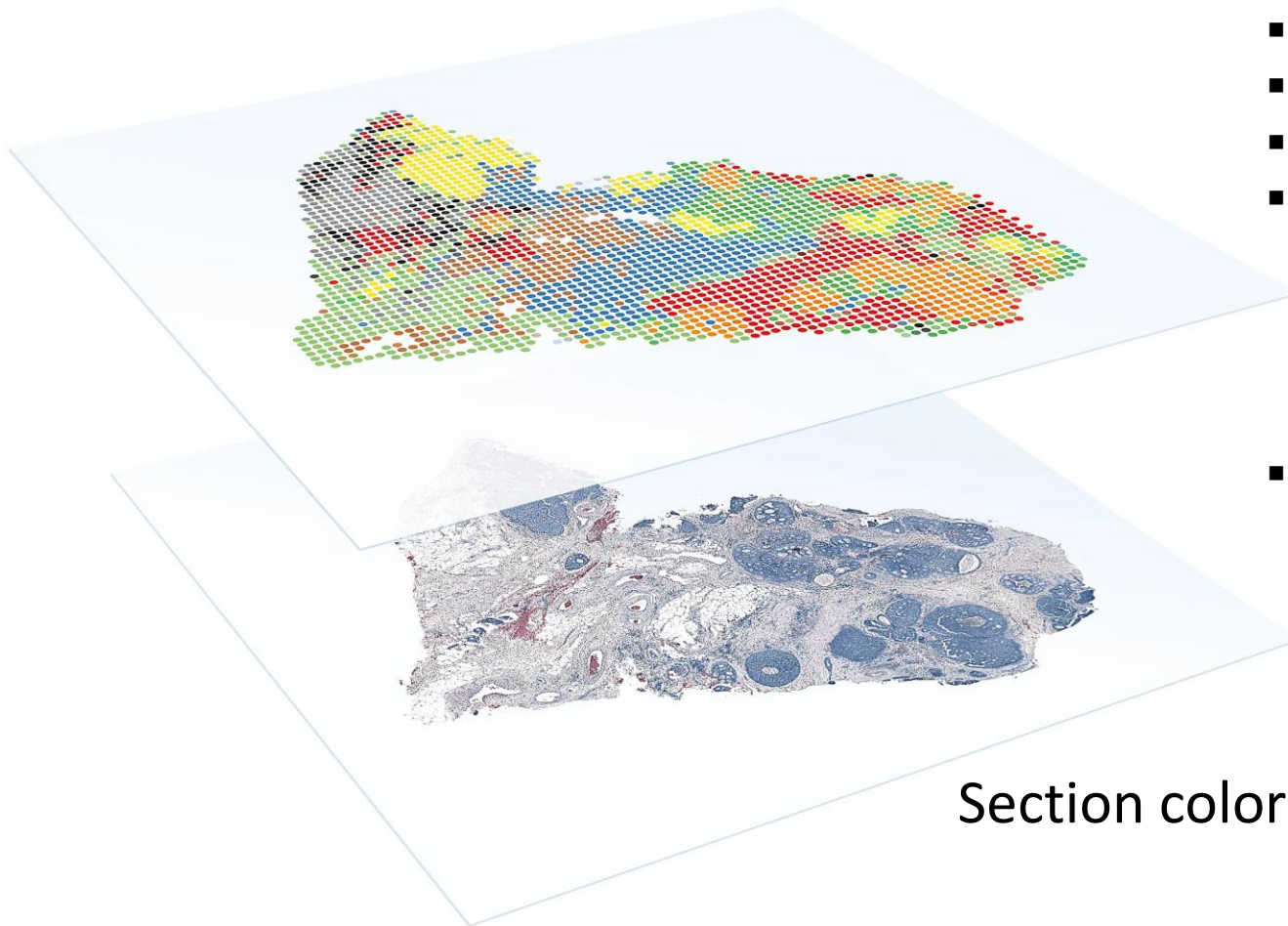


Identification of Luminal-C2 drivers



Profilage spatial du transcriptome sur coupes de tissus FFPE

Technologie Visium – 10X Genomics

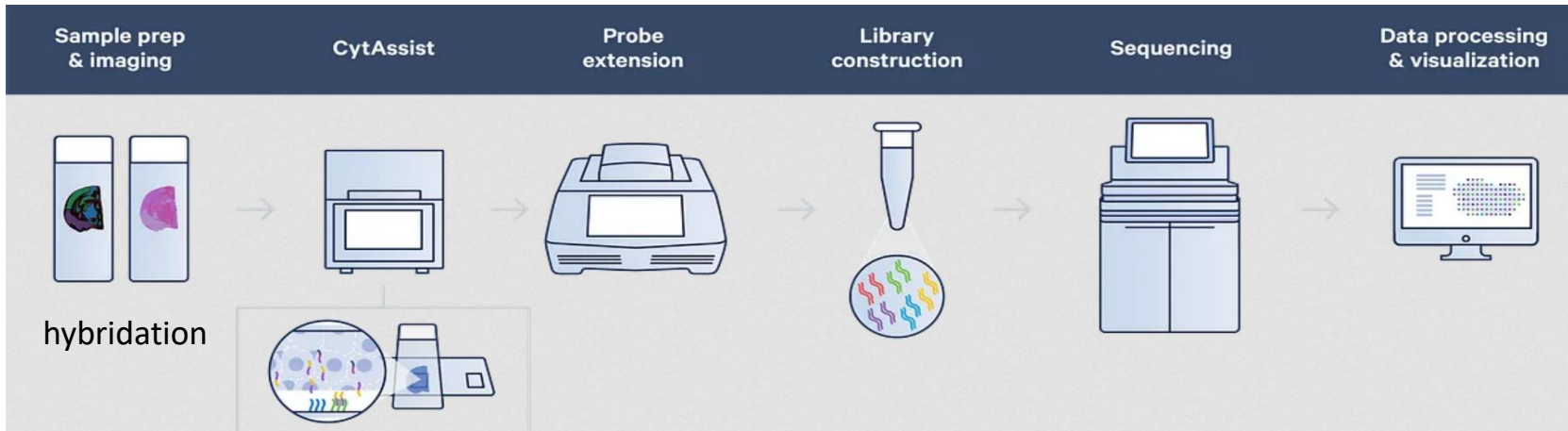
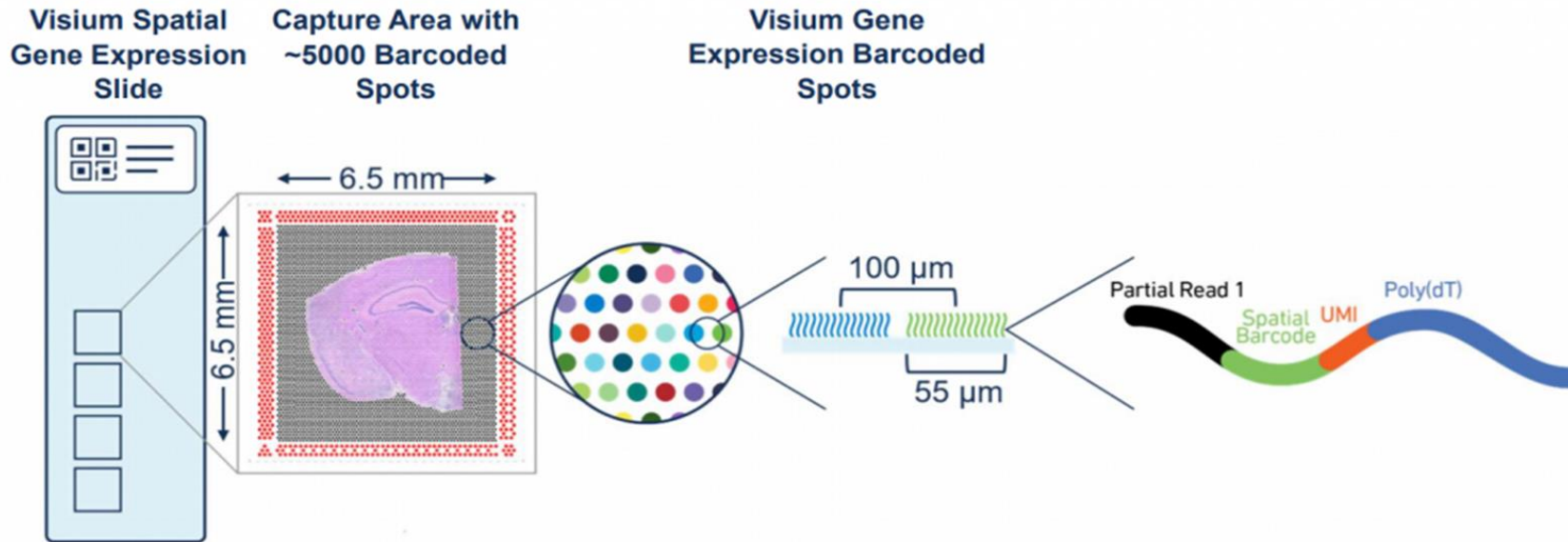


Section colorée H&E

- Complexité/hétérogénéité tumorale
 - Organisation des cellules luminales et basales
 - Localisation des cellules immunes
 - Identification de biomarqueurs
-
- Annotations du pathologiste



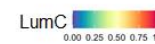
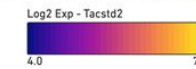
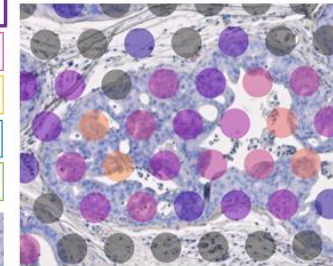
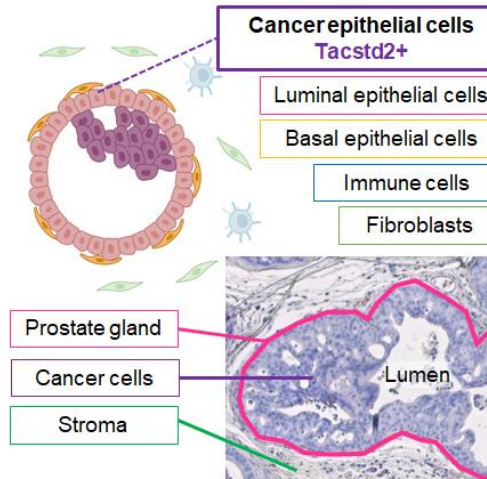
Technologie Visium – 10X Genomics



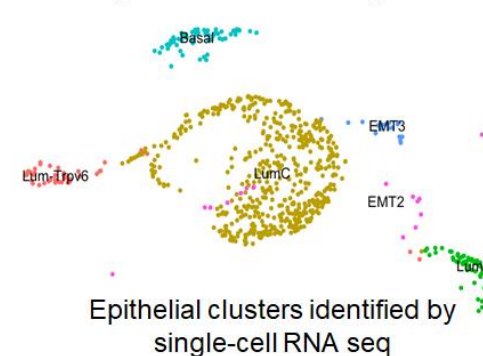
Exemple : Analyse spatiale d'expression sur des sections de prostate murine (Darya Yanushko et al.)

Localization of cell populations

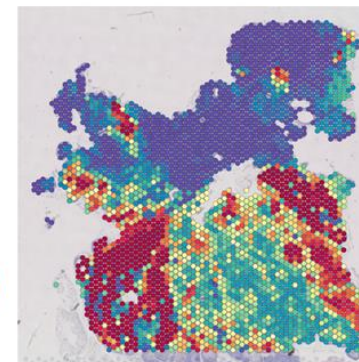
- Expression of marker genes



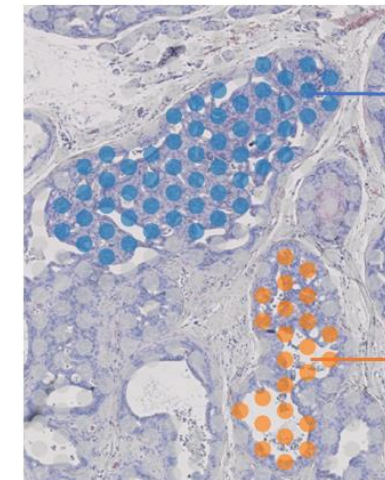
- Single cell RNA-seq clusters



Epithelial clusters identified by single-cell RNA seq



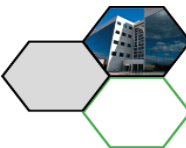
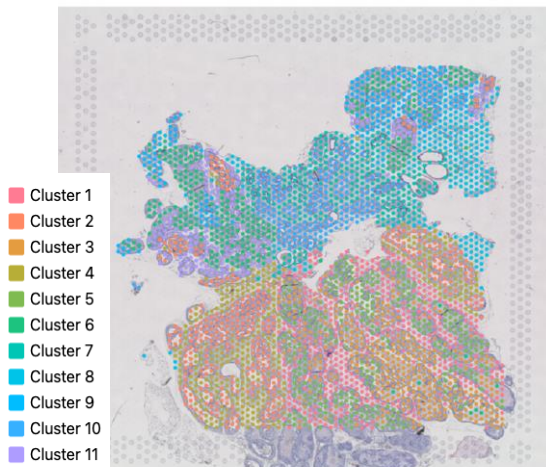
Gene expression in regions of interest



Aggressive tumour region

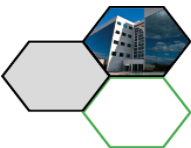
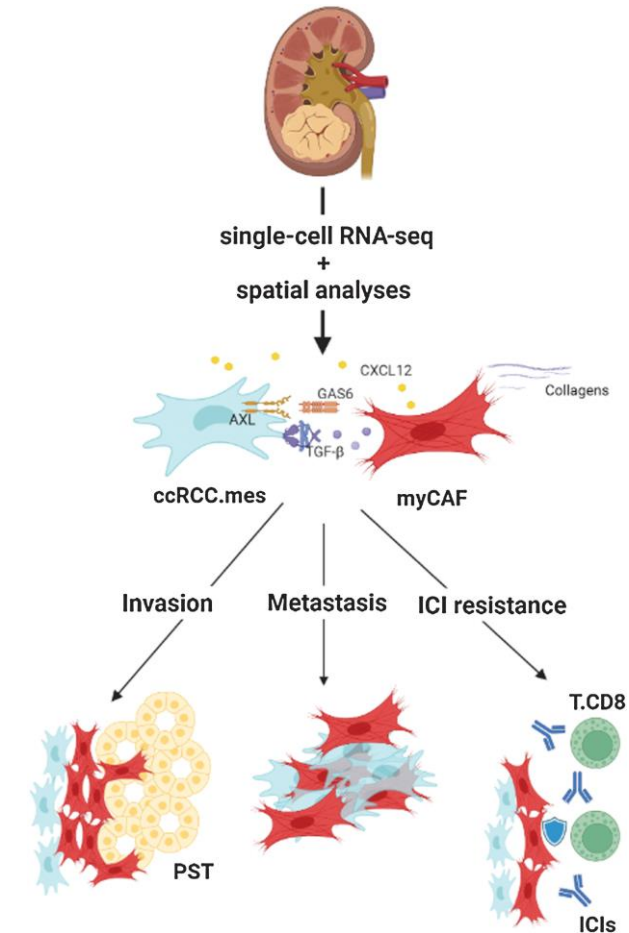
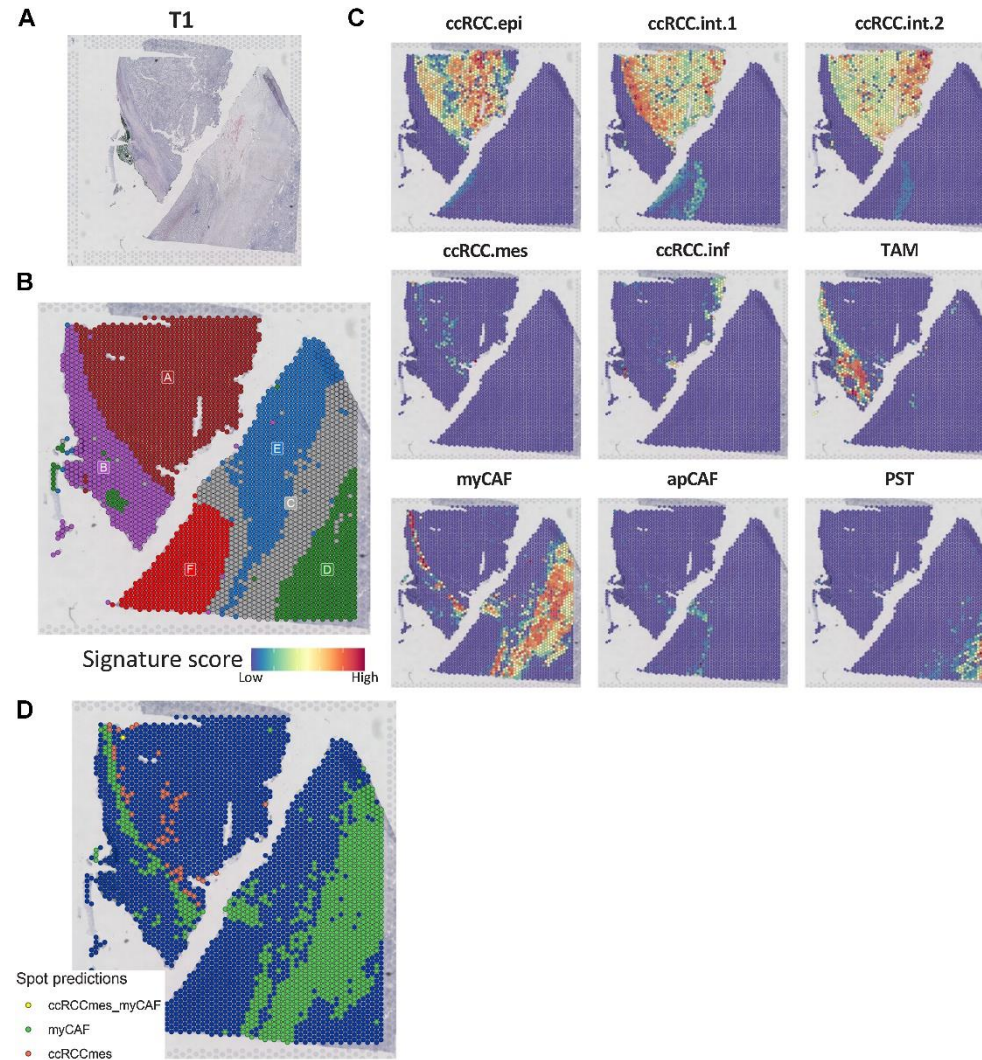
Differentially expressed genes

Non-invasive neoplasia



Mesenchymal-like Tumor Cells and Myofibroblastic Cancer-Associated Fibroblasts Are Associated with Progression and Immunotherapy Response of Clear Cell Renal Cell Carcinoma.

Davidson G, Helleux A et al. Cancer Res. 2023 Sep 1;83(17)

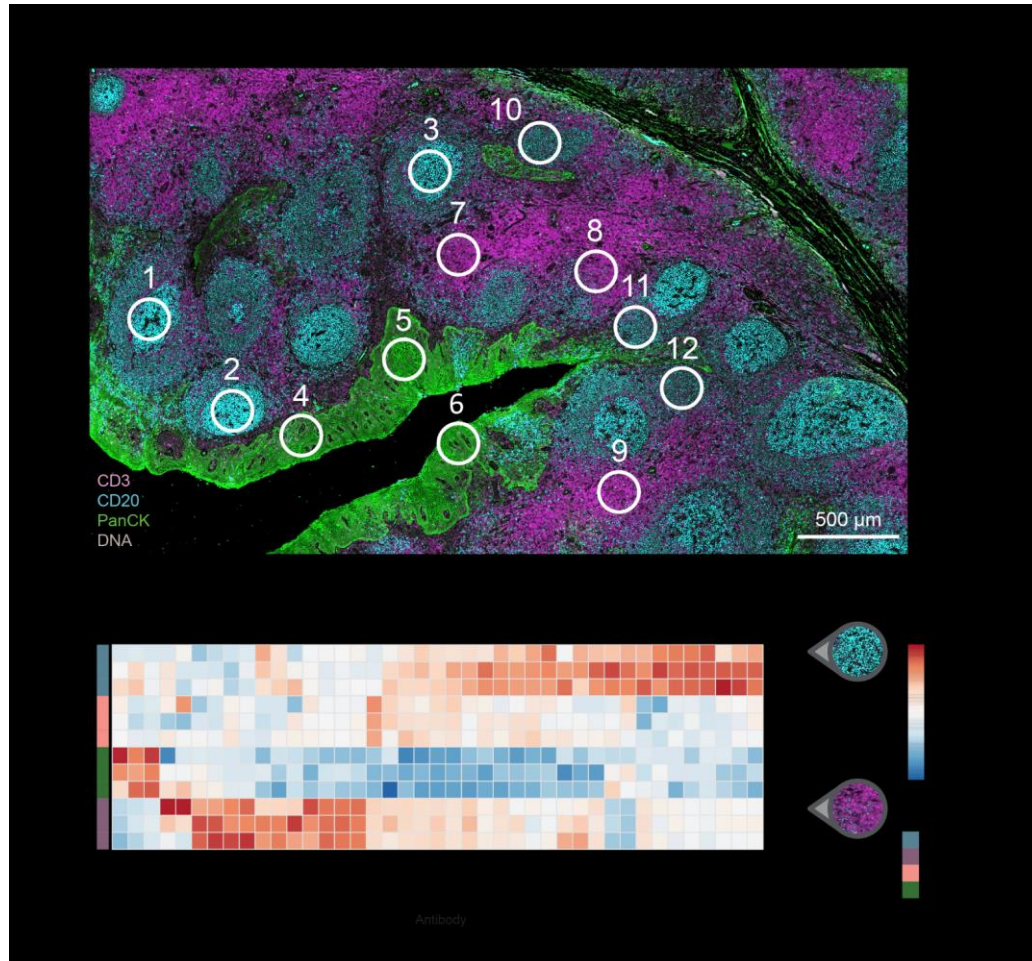


Profilage transcriptomique de régions ciblées

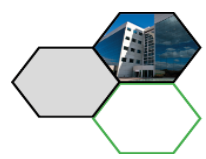
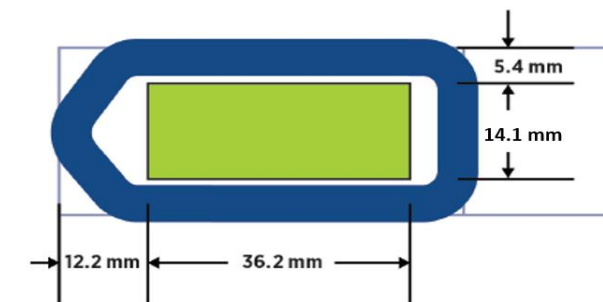
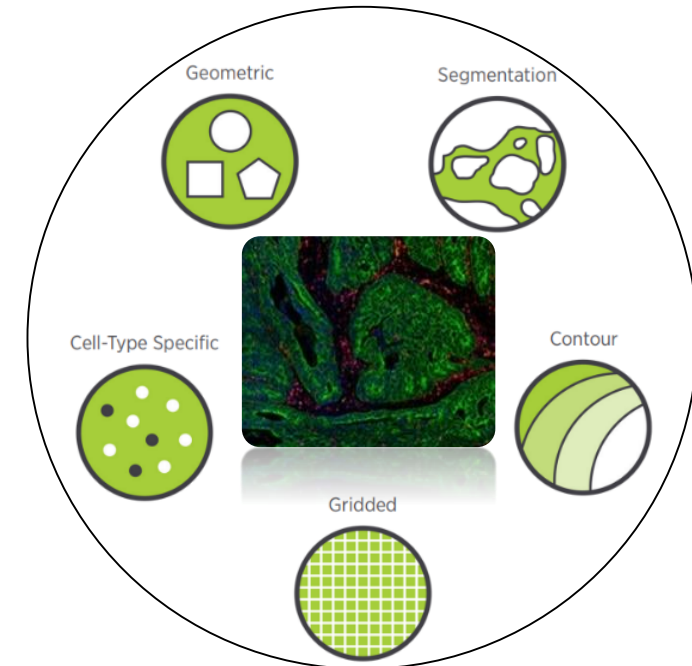
Technologie GeoMx DSP – Nanostring

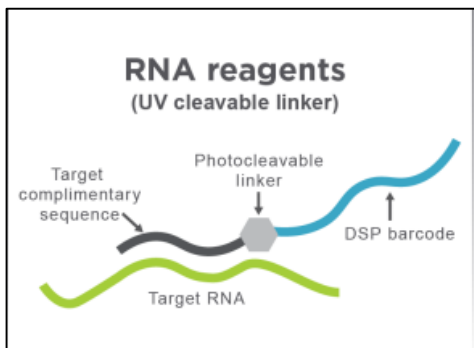
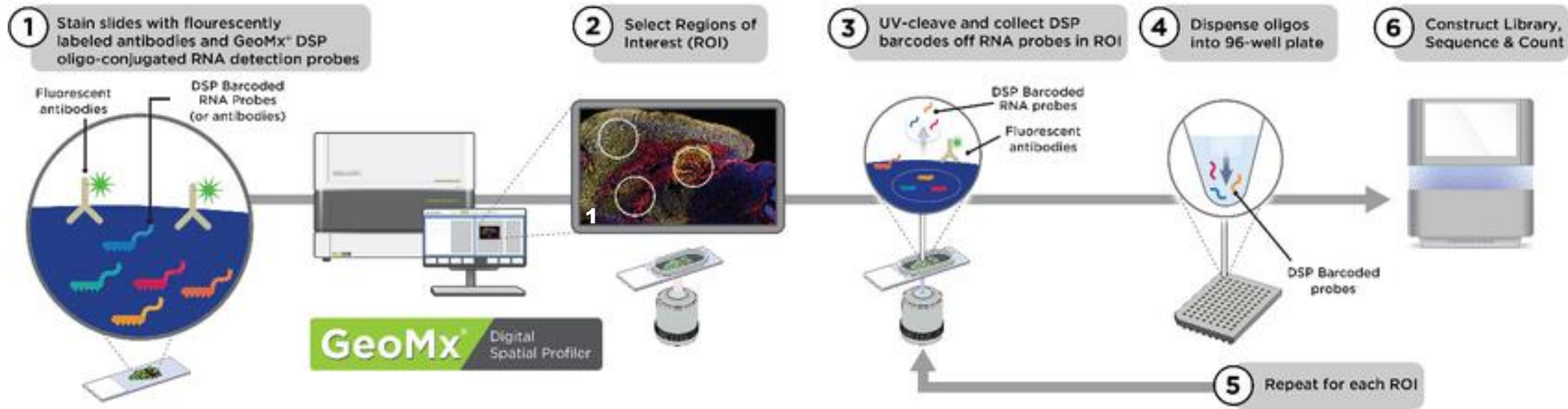


Identification des régions d'intérêt (ROI) à l'aide de marqueurs morphologiques par immunofluorescence

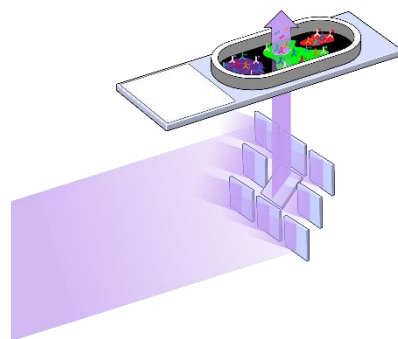


Stratégies de sélection des ROIs





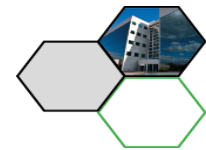
Chaque transcrit est identifié par un barcode spécifique



Miroirs de 1 μm^2 pour diriger les UV

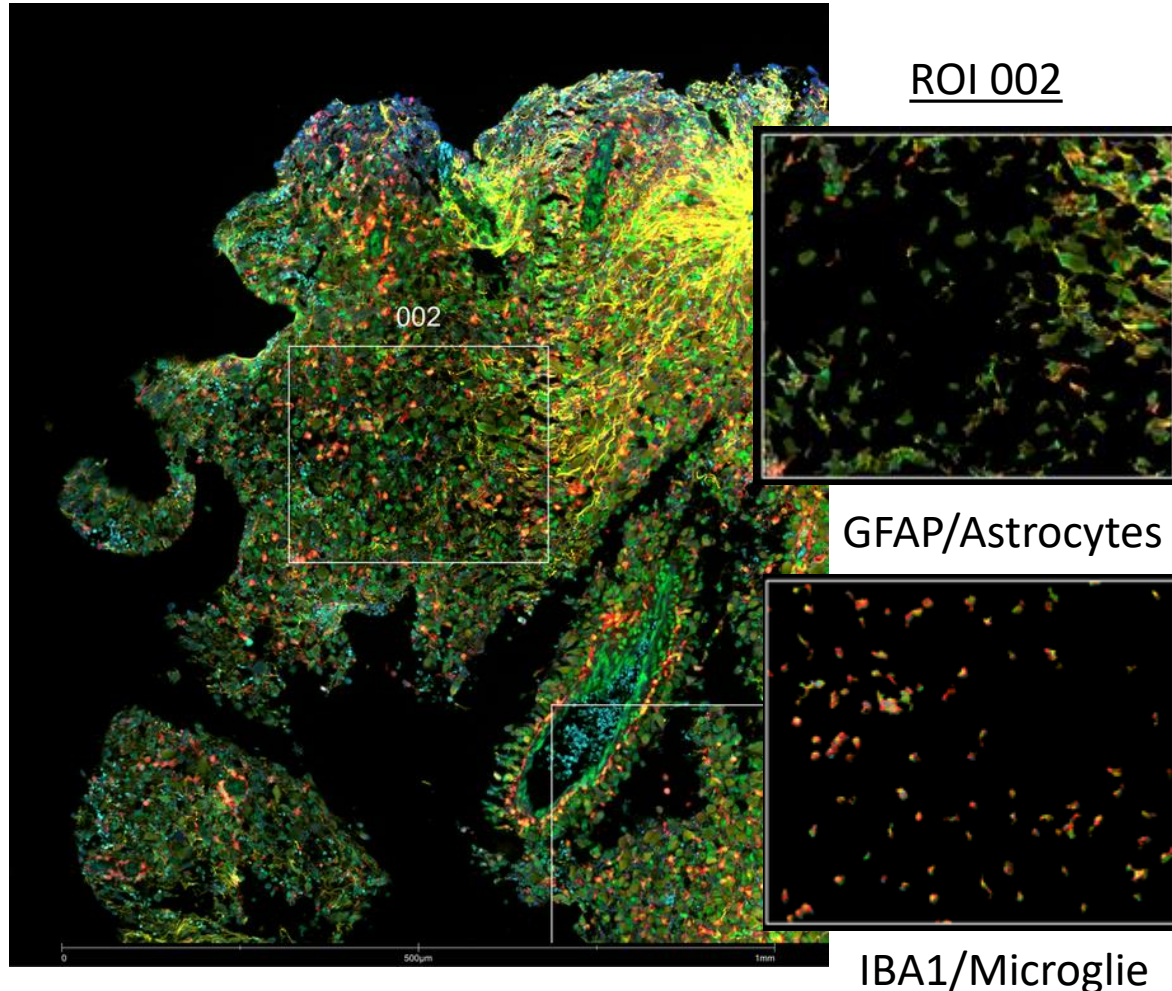
Chaque puits de la plaque 96 recevra un index distinct lors de la production des bibliothèques

- ROI 1 → Puits A1
- ROI 2 → Puits A2
- ROI 3 → Puits A3



Exemple: Immunomarquage sur tumeurs cérébrales humaines

H. Dubois-Pot-Schneider, H. Dumond, CRAN UMR 7039



ROI selection guideline

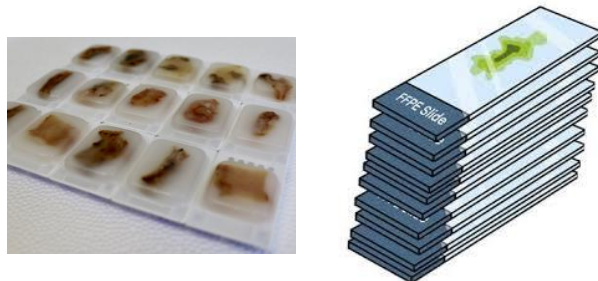
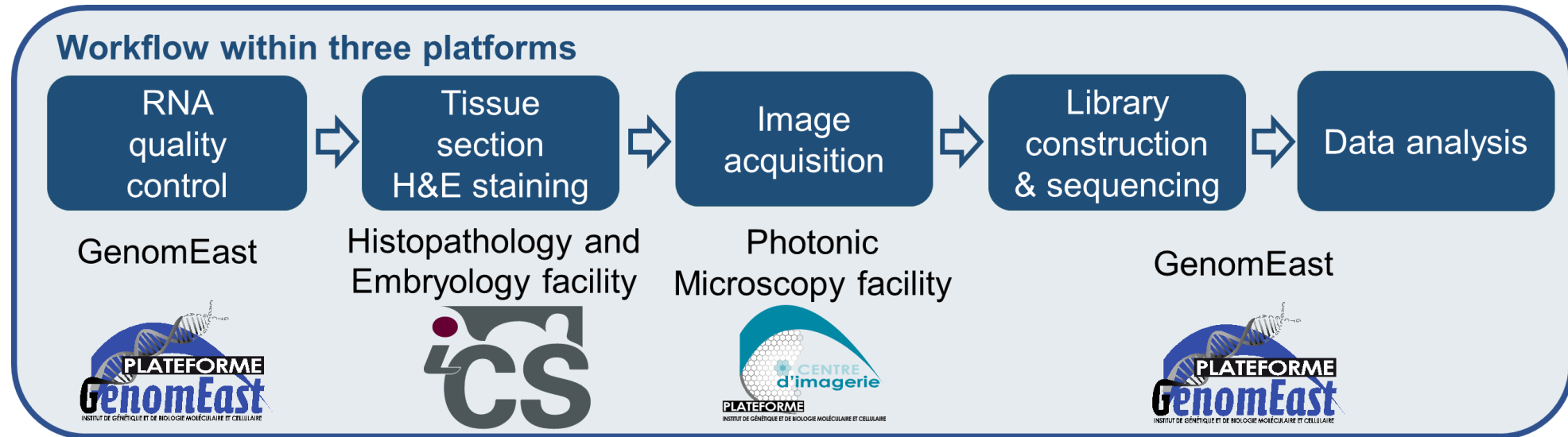
Minimal size (recommended):
50µm diameter

Smaller possible as long as:
- 100-200 cells for WTA/CTA

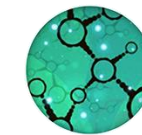
Maximal ROI size:
660x785µm



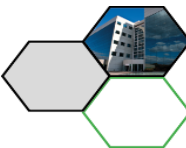
Plateforme spatial-omics : Intégration de 3 plateformes de l'IGBMC



Matériel de départ



FRANCE-BIOIMAGING



Acknowledgments

Our colleagues from IGBMC platforms

- Olivia Wendling, Hughes Jacob, Patrice Goetz (Histologie)
- Bertrand Vernay, Yves Lutz, Elvire Guiot (Imagerie)
- Claudine Ebel, Muriel Phillips (Cytométrie)

All our users

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- Hélène Dubois-Pot-Schneider/ Hélène Dumond ,
Julien Pierson

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**Merci pour
Votre attention !!**

<https://genomeast.igbmc.fr/>