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An Innovative Spatial Biology Biomarker Discovery Approach to Enable Acceleration of Drug Development

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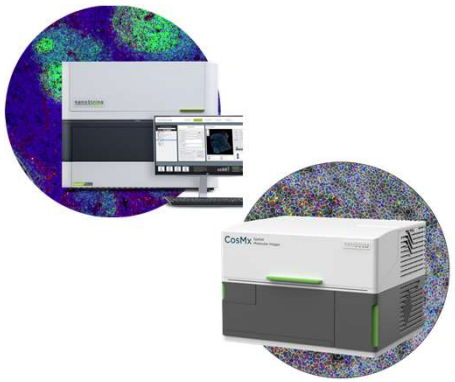
Background and Introduction

Biomarker development in the clinical trial setting is frequently limited by the availability of small tissue specimens, such as core needle biopsies. To enable forward and reverse translational assays to best understand patient-specified biomarkers, high-plex assays which can be performed on individual slides are critical. We've developed the GeoMx® Digital Spatial Profiler (DSP) and CosMx™ Spatial Molecular Imager (SMI) to allow researchers to explore more hypotheses simultaneously from standard histopathology slides.

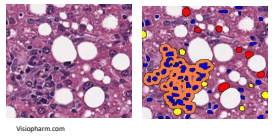
Methods

We demonstrate on standard FFPE sections how the GeoMx and CosMx platforms integrate within the context of biomarker discovery. The GeoMx platform can resolve transcriptome-wide RNA expression profiles or 150+ protein targets from tissue structures selected by pathological review. The CosMx platform allows subcellular profiling of up to 1000 RNA transcripts or 64 proteins from a single-slide.

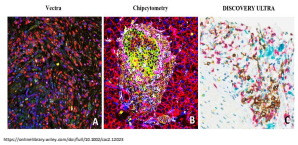


H&E -- Histopathology Annotation

High Resolution Imaging

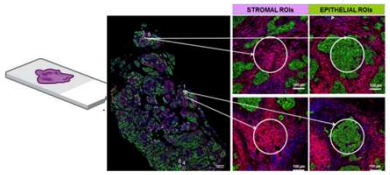


(m)IHC -- BM & Phenotypic Characterization

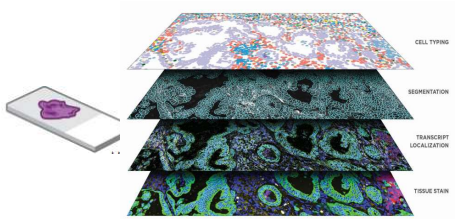


AI guided ROI selection

Spatial Whole Transcriptome and HighPlex Protein Profiling

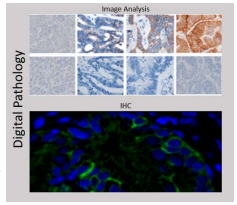


Spatial Single Cell and Sub-cellular Gene and Protein Profiling

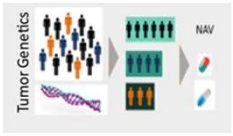


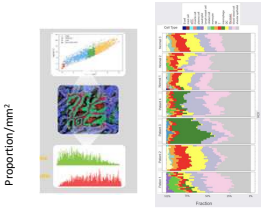
Assays

AtoMx™
Spatial Informatics Platform

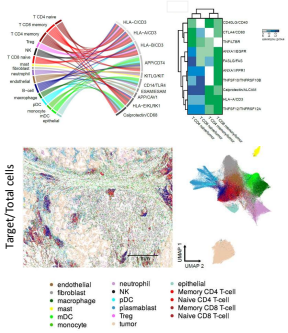


Tumor Genomics





Receptor-Ligand Interactions



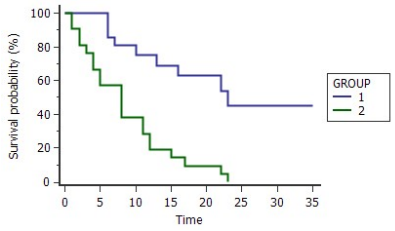
Multi-omic Data

Artificial Intelligence & Machine Learning

Results

We demonstrate the integration of GeoMx and CosMx into a multi-modal approach for how high-plex spatial platforms can complement conventional diagnostic assays for translational research. This includes integration with downstream analytical tools such as digital pathology suites as well as machine learning approaches to model patient outcome.

Improved drug target and candidate pair selection and higher accuracy in patient stratification



Conclusions

Spatial technologies, such as GeoMx and CosMx, present groundbreaking opportunities for improving accuracy in biomarker discovery and for providing rich biological insight beyond low-plex profiling approaches.

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