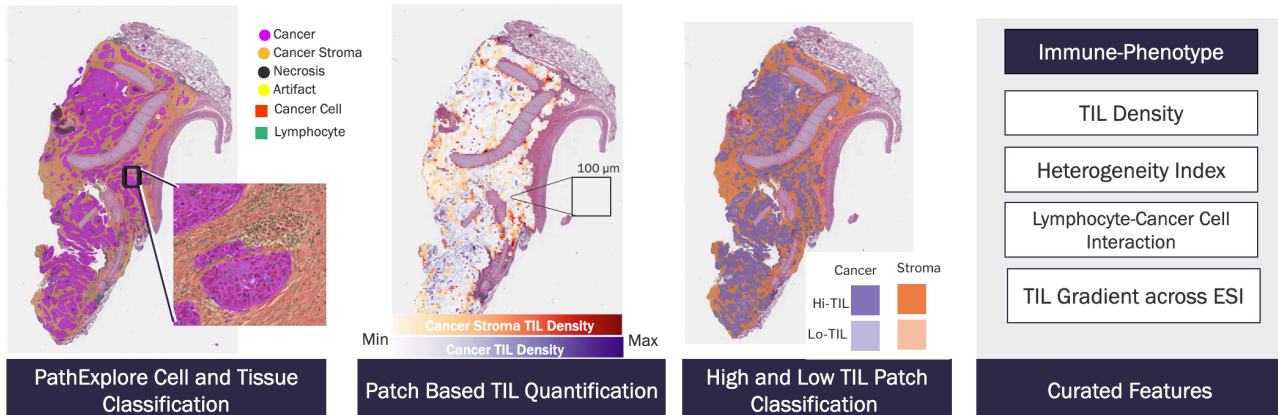# Introducing PathExplore™ IOP

Spatial characterization of tumor-infiltrating lymphocytes (TILs) and Immune Phenotypes (IP) directly from H&E
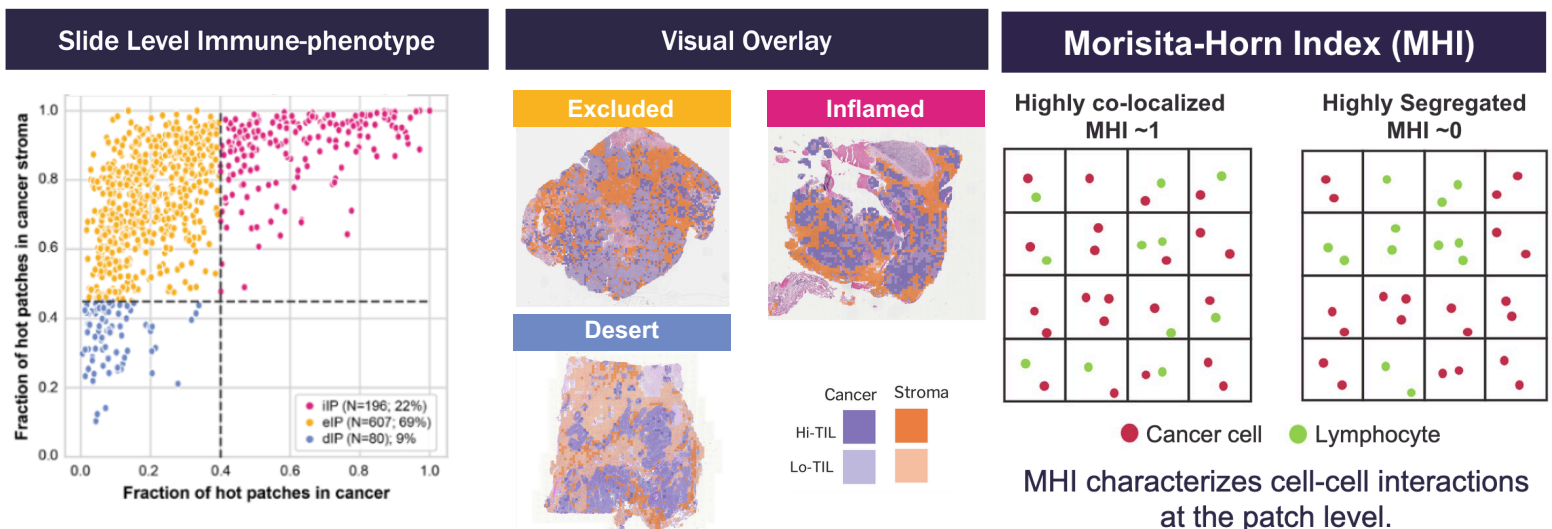
Cancer
Cancer Stroma
Necrosis
Artifact
Cancer Cell
Lymphocyte

100 µm

PathExplore Cell and Tissue Classification

Min — Cancer Stroma TIL Density / Cancer TIL Density — Max

Patch Based TIL Quantification

Cancer | Stroma
Hi-TIL
Lo-TIL

High and Low TIL Patch Classification

Immune-Phenotype
TIL Density
Heterogeneity Index
Lymphocyte-Cancer Cell Interaction
TIL Gradient across ESI

Curated Features

Identify, quantify, and classify TILs & immune phenotypes within the tumor microenvironment (TME) in single-cell, spatial resolution
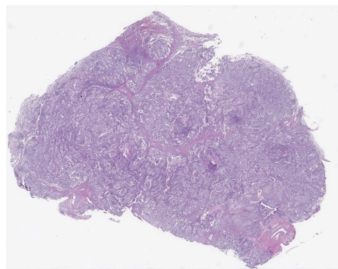
- **Visualize** the density & spatial distribution of TILs with single-cell resolution
- **Identify** High and Low TIL density regions within tissue regions
- **Analyze** TIL populations and distributions by tissue compartments
- **Quantify** cell-cell interactions between tumor and immune cells
- **Curated features** designed to characterize the tumor-immune microenvironment

Immune phenotypes are assigned using patch-based cell & tissue features alongside disease indication-specific thresholds
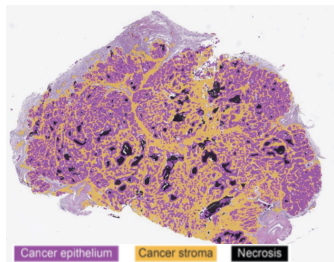
- **Characterize** the spatial arrangement of TILs within the tumor core and periphery
- **Gain** quantitative insight into immune-inflamed, desert, or excluded phenotypes
- **Evaluate** the cell-to-cell interactions at high resolution

Slide Level Immune-phenotype

Fraction of hot patches in cancer stroma

iIP (N=196; 22%)
eIP (N=607; 69%)
dIP (N=80; 9%)

Fraction of hot patches in cancer

Visual Overlay

Excluded

Inflamed

Desert

Cancer | Stroma
Hi-TIL
Lo-TIL

Morisita-Horn Index (MHI)

Highly co-localized MHI ~1

Highly Segregated MHI ~0

● Cancer cell   ● Lymphocyte

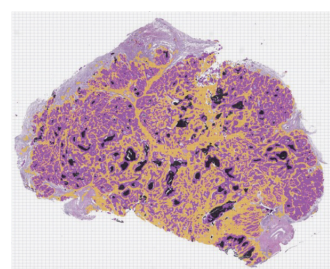MHI characterizes cell-cell interactions at the patch level.

PathExplore™ IOP captures the complex heterogeneity of the TME to provide unprecedented insight into mechanisms shaping the tumor-immune landscape
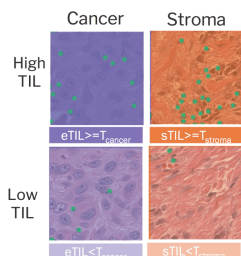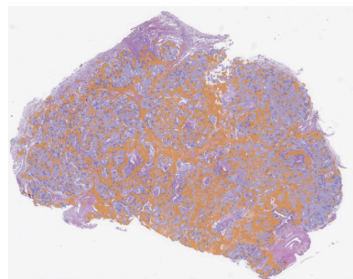

1. H&E-stained WSI is selected for analysis

Cancer epithelium | Cancer stroma | Necrosis

2. Tissue regions and cell types are identified by PathExplore™

3. WSI divided into 0.01mm² patches for **ultra-high resolution analysis**

Cancer | Stroma

High TIL

$eTIL \geq T_{cancer}$ | $sTIL \geq T_{stroma}$

Low TIL
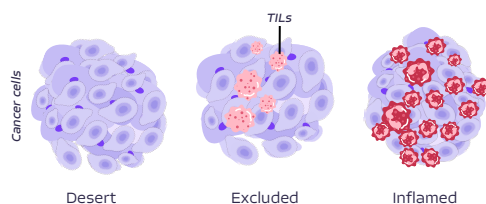
$eTIL < T_{cancer}$ | $sTIL < T_{stroma}$

4. TIL density is calculated in each patch designated as cancer or cancer stroma

5. Patches are designated "High-TIL" or "Low-TIL" based on defined thresholds for cancer & stroma

Patch-based immune phenotype
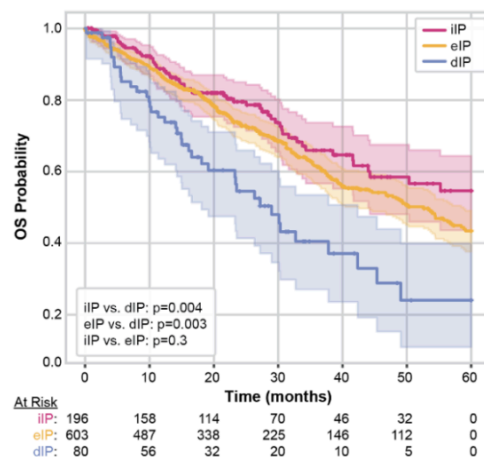
TILs

Cancer cells

Desert | Excluded | Inflamed

6. Each slide is assigned an Immune phenotype classification based on the % of High-TIL patches in cancer & cancer stroma

Application

Novel biomarkers for patient stratification

PathExplore™ IOP distinct immune profiles stratifies patient prognosis and treatment response

PD-L1 is suboptimal for predicting immune checkpoint inhibitor efficacy due to its variable tumor expression and inducibility by inflammation, causing inconsistent therapy response predictions. Quantifying TILs and characterizing the immune phenotype offer a more reliable alternative, providing a comprehensive view of the TME.

iIP vs. dIP: p=0.004
eIP vs. dIP: p=0.003
iIP vs. eIP: p=0.3

At Risk						
iIP:	196	158	114	70	46	32	0
eIP:	603	487	338	225	146	112	0
dIP:	80	56	32	20	10	5	0

Learn more at **www.pathexplore.com**

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