Digital Pathology:
Beyond What the Eye Can See

Understanding Digital Pathology

Digital pathologists are the detectives in the disease diagnosis process. Using biopsy samples, a digital pathologist examines cells on a glass slide under a microscope to make determinations such as disease diagnosis, cause and progression, as well as the presence of predictive biomarkers.

Clinicians rely on pathology for insights into a patient's potential response to treatment and to help determine the most appropriate treatment path.

Using a multitude of technologies, digital pathologists and researchers are able to get the complete story of biology and see disease differently.

Did you know?

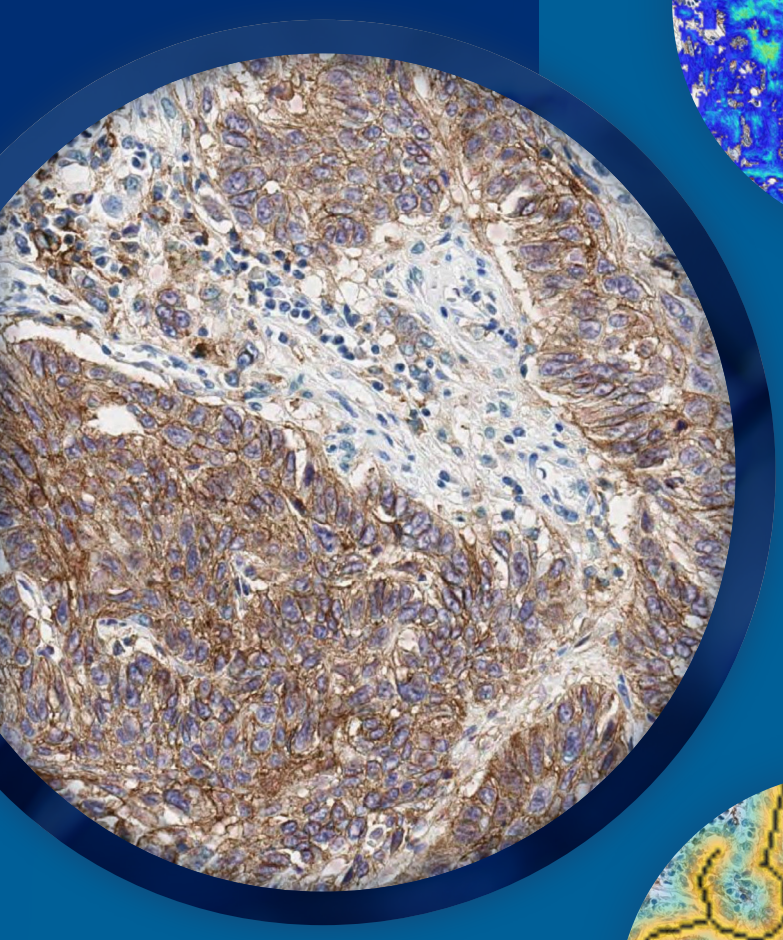
Pathology began as an ancient science written in hematoxylin, a histological stain derived from tree bark.

Under the Microscope

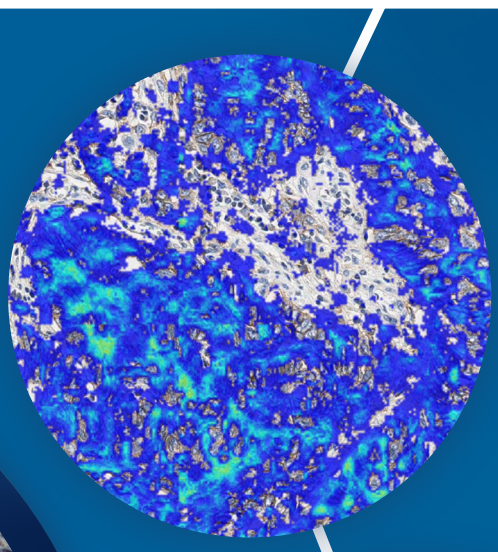
In cancer patients, pathologists are using image analysis and advancements like deep learning (algorithm-based artificial intelligence) to provide specificity, differentiate cell types in the tumor microenvironment and find associations with response.

Digital pathology utilizes a number of different technologies to generate data and provide a total composite picture of disease biology, which can help inform clinical development programs in cancer research.

For example, here is a traditional view of a tissue biopsy from a cancer patient. The tissue is stained to show a biomarker that may indicate likelihood to respond to certain therapies.

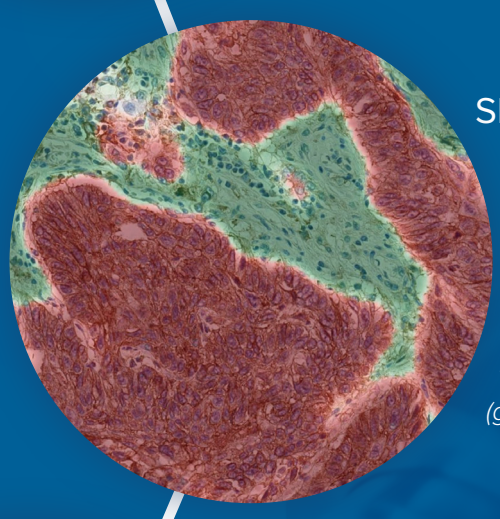


With digital pathology, researchers can apply different image analyses and algorithms to the same piece of tissue in order to:



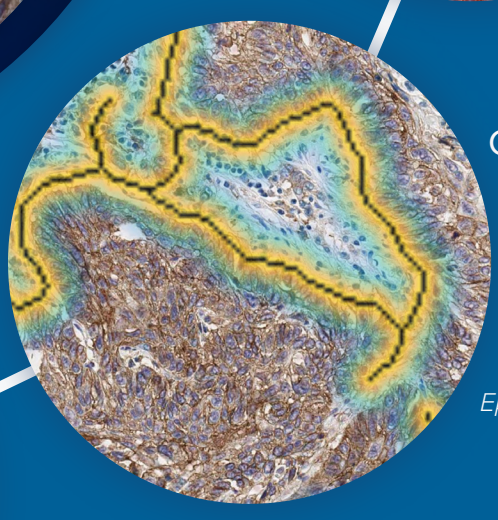
Quickly and precisely quantify the amount of the biomarker

Biomarker positive regions



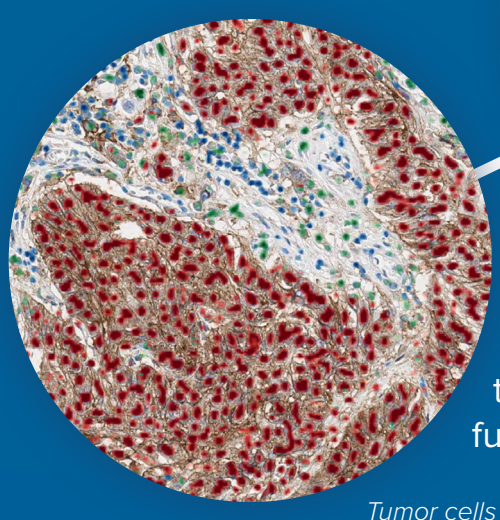
Show with specificity the different cells in the microenvironment, which helps us to understand their role in tumor progression

Tumor-epithelium (red), tumor-stroma (green) and necrosis (black)



Gain insight into interactions in the tumor and visualize how its shape and structure is changing, which can also inform us as to how a tumor is progressing

Epithelium/stroma interface (ESI)



Compare and contrast immune and tumor cells in the sample to evaluate the tumor microenvironment, characterize the tumor as hot or cold and further understand its potential to respond to immunotherapy

Tumor cells (in red), lymphocytes (in blue) and macrophages (in green)

Through digital pathology, biomedical researchers are using a multitude of technologies to see a complete view of disease biology and implement new insights in clinical trials to help identify the right treatments, for the right patients, at the right time.

Click here to learn more about Bristol-Myers Squibb's translational research.

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