

Imaging and Analysis Method to Detect and Analyze the Spatial Distribution of Structural Proteins on H&E-Stained Slides

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Technology description

Excess collagen deposition plays a major role in organ dysfunction and is most commonly associated with cancer and liver and kidney pathologies. Reliable detection and reproducible quantitation of collagen is important in the diagnosis and clinical management of such pathologies. Current methods to detect and quantify collagen abundance and organization, especially on conventional histology preparations (i.e., formalin-fixed, paraffin-embedded and sectioned tissue specimens mounted on glass slides) have varying degrees of reliability, cost, and ease of use. There is a need for a simple, inexpensive, easy-to-use method for detection and characterization of collagen in whole H&E-stained tissue sections, as well as other tissue macromolecules (such as elastin).

Researchers at the University of California, Davis have developed a combined imaging and analysis method for detecting the spatial distribution of collagen and other structural molecules on standard H&E-stained slides. The method combines feature extraction with image processing and quantitative metrics to identify, display and characterize collagen and/or structural macromolecule-related tissue components. This method removes the need for additional stains or expensive optics, such as those involved with second-harmonic generation imaging systems. A prototype has already been developed and successfully tested on a number of H&E slides from a variety of specimen types including healthy and cancerous human breast, cervical and pancreatic tissue. It can capture individual fields and scan entire specimens on slides ("whole-slide imaging").

Researchers at the University of California, Davis have developed imaging and analysis methods to detect and characterize the spatial distribution of collagen and other macromolecules on hematoxylin and eosin (H&E)-stained slides without the need for additional staining or expensive optics.

Additional Technologies by these Inventors

[Simple All-in-One UV Waveguide Microscope with Illumination Sectioning for Surface Morphology and Fluorescence Imaging](#)

[Method for Extending Depth of Field for Microscopy Images](#)

[Microscopy with UV Surface Excitation for Histology-Grade 3D Tissue Imaging](#)

Application area

Extracting and highlighting the distribution of collagen and other tissue structural components on H&E stained paraffin-embedded slides

Quantification of the orientation and overall morphological properties of collagen and their correlation with clinical patient outcome

Quantitation of collagen patterns per-tumoral regions in cancer

Stromal fibrosis score to evaluate donor kidney health

Advantages

Decreases cost—no extra sections or staining procedures required

Accelerates diagnosis process

Sensitive to multiple collagen subtypes

Direction-independent collagen signal detection

Does not alter the slide and is compatible with existing collections for both prospective and retrospective studies

Analysis can include AI-powered approaches

Institution

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