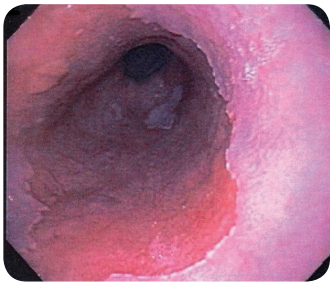
COLLEGE of AMERICAN PATHOLOGISTS
Laboratory Quality Solutions

In Vivo Microscopy for the Evaluation of Barrett Esophagus

In vivo microscopy uses light of various wavelengths to produce 2D and 3D microscopic images of living (in vivo) human tissues. One important clinical application is imaging of the gastrointestinal tract.

Where to biopsy?

Patients with Barrett esophagus are at risk of developing carcinoma. Patients often undergo multiple repeat biopsies. Even using a 1-cm or 2-cm, four-quadrant biopsy protocol, the rate of detecting dysplasia can be low, and many unnecessary biopsies are taken.

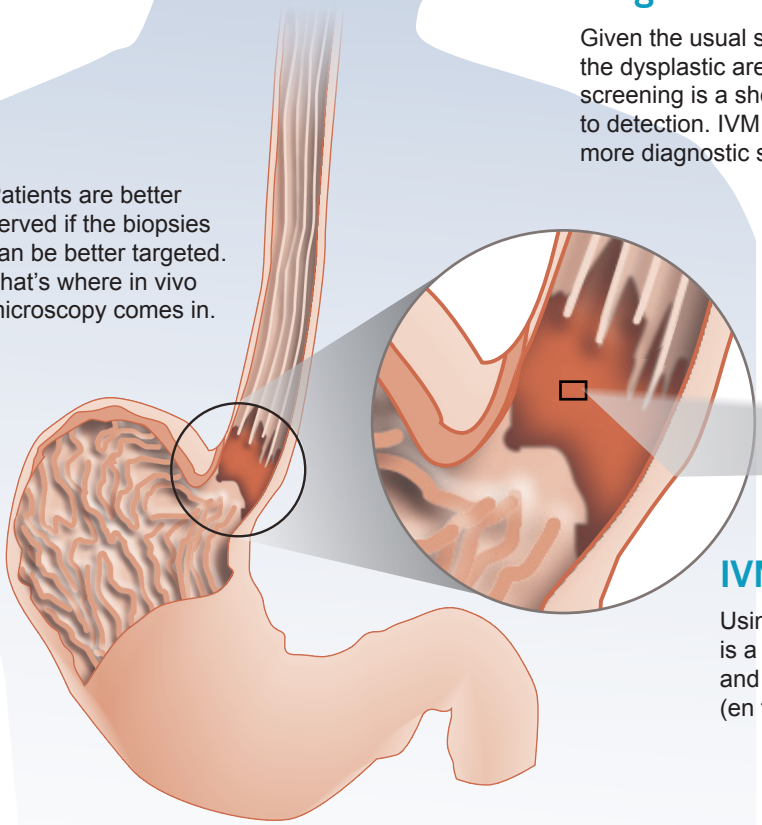


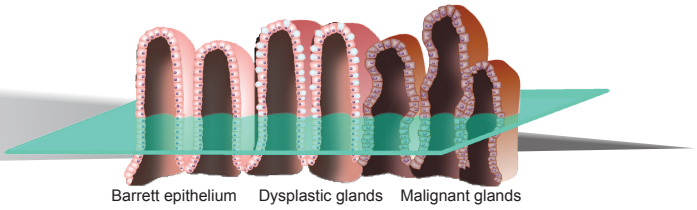
Traditional "white light" endoscopy shows Barrett-type epithelium in the distal esophagus. Surveillance requires numerous biopsies.

Targeted biopsies

Given the usual small size of the dysplastic areas, traditional screening is a shotgun approach to detection. IVM can help target higher-yield, more diagnostic sites.

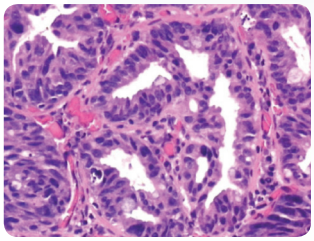
Patients are better served if the biopsies can be better targeted. That's where in vivo microscopy comes in.



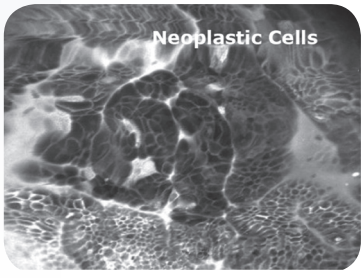


IVM optical biopsy guides site selection

Using confocal laser endomicropscopy for an optical biopsy, for example, is a noninvasive in vivo microscopic assessment of tissue architectural and cellular morphology. It provides 2D images in a parallel tissue plane (en face) with 1–2 µm resolution at a depth of 10 µm.



Traditional surgical biopsy, taken transverse to the tissue plane, shows malignant glands corresponding to the in vivo confocal image on the right.



The architectural and cellular patterns generated by in vivo microscopy are interpretable by pathologists to make differential diagnoses and to identify areas for biopsy, improving diagnostic yield. The image, left, shows a focus of malignant glands.

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