

Medical > Ex Vivo > Surgery & Pathology

4

Ex Vivo Confocal Fluorescence Microscopy for Rapid Evaluation of Tissues in Surgical Pathology Practice.

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ABSTRACT

CONTEXT:- Optical imaging techniques are currently available for imaging tissues without the need for any type of extensive tissue preparation. There are several applications for their potential use in surgical pathology practice. **OBJECTIVE:-** To evaluate the feasibility of using a confocal fluorescence microscopy (CFM) platform for ex vivo examination of tissues obtained from surgical resections of breast, lung, kidney, and liver. **DESIGN:-** Tissue fragments (0.5-1.0 cm) were immersed in 0.6 mM acridine orange for 6 seconds and imaged using a CFM platform at a 488-nm wavelength. The imaged tissues were subsequently fixed in formalin and processed routinely to generate hematoxylin-eosin-stained tissue sections. Mosaics of the grayscale CFM images were studied at different magnifications for recognition of the tissue and were compared with conventional histopathologic examination of hematoxylin-eosin tissue sections. **RESULTS:-** We imaged 55 tissue fragments obtained from 16 breast (29%), 18 lung (33%), 14 kidney (25%), and 7 liver (13%) surgical excision specimens. Acridine orange labeled the nuclei, creating the contrast between nucleus and cytoplasm and thereby recapitulating the tissue architecture. We could obtain CFM images of good quality within 5 to 10 minutes that allowed recognition of the cytomorphologic details for categorization of the imaged tissue and were similar to histologic examination of hematoxylin-eosin tissue sections. **CONCLUSIONS:-** The ease and speed of acquisition of CFM images together with the resolution and resemblance of the CFM images to hematoxylin-eosin sections suggest that the CFM platform has excellent potential for use in surgical pathology practice. PMID: 29266968 DOI: 10.5858/arpa.2017-0164-OA