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### Reflectance confocal microscopy for characterization of mammary ductal structures and development of neoplasia in genetically engineered mouse models of breast cancer.

*Parrish A, Halama E, Tilli MT, Freedman M, Furth PA.; J Biomed Opt. 2005 Sep-Oct;10(5):051602.*

#### **ABSTRACT**

The earliest steps of breast cancer begin with aberrations in mammary ductal structure. Techniques that enable an investigator to image in situ and then analyze the same tissue using biochemical tools facilitates identification of genetic networks and signaling pathways active in the imaged structure. Cellular confocal microscopy (VivaCell-TiBa, Rochester, New York) is used to image mammary ductal structures and surrounding vasculature in situ in intact wild-type and genetically engineered mice that develop ER alpha-initiated ductal carcinoma in situ (DCIS) and ER alpha-driven invasive mammary cancer. In wild-type mice, normal mammary ductal structures that appear from puberty through lactation are visualized and serially sectioned optically, and a developmental atlas is created. Altering tissue preparation enabled visualization of the vasculature surrounding the ductal structures. In the genetically engineered mice, aberrant mammary ductal structures and cancers are imaged and compared to corresponding normal structures. Different preparation techniques are able to preserve tissue for routine histological analyses and RNA isolation. Comparative studies demonstrate that reflectance confocal imaging provides more cellular detail than carmine-alum-stained mammary gland whole mounts and equivalent detail with hematoxylin and eosin stained tissue sections. In summary, reflectance confocal microscopy is a tool that can be used to rapidly and accurately analyze mammary gland structure.