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**Confocal fluorescence microscopy to evaluate changes in adipocytes in the tumor microenvironment associated with invasive ductal carcinoma and ductal carcinoma in situ.**

*Dobbs JL, Shin D, Krishnamurthy S, Kuerer H, Yang W, Richards-Kortum R. Int J Cancer. 2016 Sep 1;139(5):1140-9. doi: 10.1002/ijc.30160. Epub 2016 May 14*

### ABSTRACT

Adipose tissue is a dynamic organ that provides endocrine, inflammatory and angiogenic factors, which can assist breast carcinoma cells with invasion and metastasis. Previous studies have shown that adipocytes adjacent to carcinoma, known as cancer-associated adipocytes, undergo extensive changes that correspond to an "activated phenotype," such as reduced size relative to adipocytes in non-neoplastic breast tissue. Optical imaging provides a tool that can be used to characterize adipocyte morphology and other features of the tumor microenvironment. In this study, we used confocal fluorescence microscopy to acquire images of freshly excised breast tissue stained topically with proflavine. We developed a computerized algorithm to identify and quantitatively measure phenotypic properties of adipocytes located adjacent to and far from normal collagen, ductal carcinoma in situ and invasive ductal carcinoma. Adipocytes were measured in confocal fluorescence images of fresh breast tissue collected from 22 patients. Results show that adipocytes adjacent to neoplastic tissue margins have significantly smaller area compared to adipocytes far from the margins of neoplastic lesions and compared to adipocytes adjacent to non-neoplastic collagenous stroma. These findings suggest that confocal microscopic images can be utilized to evaluate phenotypic properties of adipocytes in breast stroma which may be useful in defining alterations in microenvironment that may aid in the development and progression of neoplastic lesions. © 2016 UICC. KEYWORDS: breast cancer; cancer-associated adipocytes; confocal fluorescence microscopy