

ARTÍCULO ACEPTADO

Journal: Biomedical Optics Express

Paper: Direct identification of breast cancer pathologies using blind separation of label-free localized reflectance measurements

AUTHORS: Alma Eguizabal, Ashley M. Laughney, Pilar Beatriz García-Allende, Venkataramanan Krishnaswamy; Wendy A. Wells, Keith D. Paulsen, Brian W. Pogue, Jose M. Lopez-Higuera, Olga M. Conde

Abstracts: Breast tumors are blindly identified using Principal (PCA) and Independent Component Analysis (ICA) of localized reflectance measurements. No assumption of a particular theoretical model for the reflectance needs to be made, while the resulting features are proven to have discriminative power of breast pathologies. Normal, benign and malignant breast tissue types in lumpectomy specimens were imaged ex vivo and a surgeon-guided calibration of the system is proposed to overcome the limitations of the blind analysis. A simple, fast and linear classifier has been proposed where no training information is required for the diagnosis. A set of 29 breast tissue specimens have been diagnosed with a sensitivity of 96% and specificity of 95% when discriminating benign from malignant pathologies. The proposed hybrid combination PCA-ICA enhanced diagnostic discrimination, providing tumor probability maps, and intermediate PCA parameters reflected tissue optical properties