# BIOPHOTONICS AND LASERS SHINING LIGHT INTO DISEASES

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Light-tissue interaction became the basis of many sciences. The development of new diagnostic and therapeutic methods in Dentistry and Medicine based on Photonics, have been performed at the Center for Lasers and Applications, IPEN-CNEN/SP, Brazil in the last 27 years, in close cooperation with School of Dentistry and Faculty of Medicine of USP, UNIFESP, etc, as well as other Physics departments such as UFPE and FFCLRP-USP. The study of the spectroscopic properties of biological tissues can be used as a diagnostic tool for various diseases, as well as to determine their different stages. My group has been studying normal, precancerous and tumor tissues, such as thyroid, lung, skin, as well as hard dental tissues by FTIR. Results of studies that have become clinical methods, such as the prevention of dental caries or the diagnosis of various stages of dental enamel lesion, will be presented. Fluorescence spectroscopy was used to monitor carious lesions. The evaluation of optical coherence tomography (OCT) images obtained during the during the caries or erosion development process, or after the ionizing irradiation of bones, provide information on the optical attenuation coefficient, which is related to the lesion stage. The application of ultra-short high intensity laser (femtosecond laser) to ablate hard tissue, resin, ceramics, or burned skin is underway.