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Optical and Photoacoustic Characterization of BODIPY as Novel Molecular Contrast Agent for In Vivo Tomography. OLIVIER DANTISTE, SAMIR LAOUI, STEPHANIE BELLINGER-BUCKLEY, University of Massachusetts Boston, JONATHAN ROCHFORD, Chemistry Department, University of Massachusetts Boston, CHANDRA YELLESWARAPU, Physics Department, University of Massachusetts Boston — Proper imaging of tumors and nodules is of utmost important in cancer diagnostics as it provides information about their location and metabolic activities. In contrast to existing clinical imaging Photoacoustic imaging/tomography (PAI) has been developed in the recent past as a key in vivo imaging technique. PAI is a cost effective techniques offering several distinct advantages such as use of non-ionizing near-infrared radiation as source, providing good contrast of biological structures based on optical absorption and low scattering of ultrasound in biological media. PAI is based on the photoacoustic effect, a process in which the target absorbs incident light and release part of that energy which is eventually converted into sound waves. To image objects of interest such as tumors for cancer detection, the photoacoustic signal needs to be significant compared to that of the surrounding tissue. Hence exogenous contrast agents are administered. We are working on developing molecular photoacoustic contrast agents (MPACs) through chemical modification of efficient and established fluorescent probes. Using a bottom-up approach, non-emissive functionalities are being conjugated to well-known BODIPY fluorescent probe so that the absorbed energy is directed into a nonradiative decay pathway. Our optical and photoacoustic characterization of MPACs indicate increase of the photoacoustic response of MPACs, compared to the corresponding fluorescent probes.

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