

WEDNESDAY, MARCH 28, 2018

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Discriminating Tissues Based on Ultrastructure Nonlinear Optical Properties of Molecules, Aggregates and Tissues

Abstract

Information regarding the structure and function of living tissues and cells is instrumental to the advancement of biochemistry and biophysics. Nonlinear optical microscopy can provide such information, but only certain biological structures generate nonlinear optical signals. Therefore, structural specificity can be achieved by introducing dyes for nonlinear optical microscopy. To this end, carotenoids and chlorophylls were investigated as potential labels for third harmonic generation (THG) microscopy. A technique was established to measure the average second hyperpolarizability of potential molecular labels and THG enhancement due to labeling of cultured cells with carotenoid incorporated liposomes was observed. In subsequent investigations, polarization-sensitive second harmonic generation (SHG) and THG microscopy techniques were used to study the nonlinear optical properties and structure of aggregates containing chlorophylls and carotenoids in orange carrots and algae, as well as collagen in and around tumor tissue. These studies demonstrated that polarization-sensitive SHG and THG microscopy can provide quantitative structural information of a number of molecules and polymers found within biological organisms and tissues.

SCIENCE COMPLEX ROOM 115

11:00 AM

All Welcome!

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