AbstractID: 11691 Title: Local determination of tissue optical properties: reconstruction based on fiber-array reflectance profiles

Quantitative evaluation of *in vivo* local tissue optical properties including scattering coefficient (μ_s), absorption coefficient (μ_a) and anisotropy (g) is often important in both photodiagnosis and phototherapy. In this study, a reflectance based fast technique was developed to determine the optical properties of turbid media using a linear-array fiber bundle probe. Five 200 um collection fibers were linearly set along from the 200 um illumination fiber with center-to-center separation of 350 um. Spatial reflectance values were sequentially measured by spectrometer connected to a fiber-switch. A model that relates the reflectance profiles to optical properties of a turbid medium was developed based on Monte Carlo simulations and phantom experiments. Simulation results at wavelength of 633 nm showed that μ_s' (2~40 cm-1) and μ_a (0~5 cm-1) can be determined by reflectance spatial profiles. Intralipid and Nigrosin were used to simulate different reduced scattering coefficient (μ_s') and absorption coefficient (μ_a) values within the same range as Monte Carlo simulation. Preliminary results show good correlation between known optical properties in tissue phantom and the measured optical properties, the average error for μ_s' and μ_a was 7.8% and 6.6%, respectively. With same reduced scattering coefficient (μ_s'), changes in the absorption coefficient (μ_a) could be measured within 0.1 cm-1. Accurate extraction of tissue optical properties from *in vivo* measurements could have potential application in noninvasively superficial (pre)cancer detection and phototherapy planning.