Abstract Submitted
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**Simulating the hemodynamic effect in imaging brain tissue using two-photon laser scanning microscopy**[1] SILAS IFEANYI, THOMAS SAUER, WINSLOW COTTON, PEIFANG TIAN, Departmen of Physics, John Carroll University, ANNA DEVOR, ANDERS DALE, University of California, Davis, LANA RUVINSKAYA, DAVID BOAS, SAVA SAKADZIC, Massachusetts General Hospital — Data interpretation of two-photon fluorescence microscopy on dyes with small signal change such as *β-nicotinamide adenine dinucleotide* (NADH) faces enormous challenge because the measured signal change is often highly distorted by hemodynamic changes. Prior work modeled two-photon NADH fluorescence with precise maps of cortical microvasculature and corrected for the measured NADH signal change by using the fluorescence change of Sulforhodamine 101 (SR101), a functionally inert dye. The correction scheme, however, was not performed for a realistic three dimensional (3D) microvasculature. Here, we extend the prior work to calculate the point to point correction factor using a 3D microvasculature. We use ray tracing scheme and consider the effects of light scattering and absorption due to blood vessels. We will present the correction factors from multiple animal models and dyes; show its effect on data interpretation; and compare this correction scheme with the simple one-value approach. Our study allows more accurate interpretation of functional imaging studies.

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