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Dynamics of Cell Migration for cells embedded in Collagen using a multimodal platform of Optical Coherence Tomography, Multi-Photon excitation and Second Harmonic Generation¹ KANDICE TANNER, SHUO TANG, ENRICO GRATTON, University of California, Irvine, LFD/BLI TEAM — We developed Raster Image Correlation Spectroscopy (RICS) to analyze the dynamics of cell migration from data obtained on a confocal multi-photon microscope. We assembled a microscope that can simultaneously measure the scattering signal from optical coherence tomography (OCT), multi-photon excited emission (TPEF) and second harmonic signals (SHG) with comparable spatial resolution and the same time resolution. We present data here showing the combined 3-D images of the cells embedded in a collagen matrix. The OCT signal adds fine structural information of the cellular morphology and collagen which is enhanced by the SHG image. The RICS analysis of the TPEF signal gives the dynamics of the GFP –style proteins. We show that the cell morphology and the distribution of cell organelles are different in the collagen matrix than what is observed in cells growing on flat surfaces. Using the three modalities of cell imaging we could reach a more realistic interpretation of cell dynamics in tissue.

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