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Imaging Live Drosophila Brain with Two-Photon Fluorescence Microscopy SYEED AHMED, YU DING, Department of Physics, University of Texas at El Paso, El Paso, TX 79968, JOSE GUTIERREZ, KYUNG-AN HAN, Department of Biological Sciences, University of Texas at El Paso, El Paso, TX 79968, CHUNQIANG LI, Department of Physics, University of Texas at El Paso, El Paso, TX 79968, DEPARTMENT OF BIOLOGICAL SCIENCES, UNIVERSITY OF TEXAS AT EL PASO, EL PASO, TX 79968 COLLABORATION, DEPARTMENT OF PHYSICS, UNIVERSITY OF TEXAS AT EL PASO, EL PASO, TX 79968 COLLABORATION — Cyclic adenosine monophosphate (cAMP), a second messenger molecule, is responsible for triggering many physiological changes in neural system. However, the mechanism by which this molecule regulates responses in neuron cells is not yet clearly understood. When cAMP binds to a target protein, it changes the structure of that protein. Therefore, studying this molecular structure change with fluorescence resonance energy transfer (FRET) imaging can shed light on the cAMP functioning mechanism. FRET is a non-radiative dipole-dipole coupling which is sensitive to small distance change in nanometer scale. In this study we use a two-photon fluorescence microscope for imaging mushroom bodies inside live drosophila brain cell. We have genetically encoded green fluorescent protein (GFP) color variants cyan fluorescent protein (CFP)-yellow fluorescent protein (YFP) pair to the host protein as fluorophores. We also develop a quantitative method for analysing both CFP and YFP fluorescence emission level.

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