
Advances in multiphoton imaging of developing tissues

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Abstract

Modern issues in systems biology require tissue-scale measurements of multiple cell parameters. Multiphoton fluorescence microscopy has proven invaluable for tissue studies with its ability to provide subcellular resolution in thick/live samples. However established methods are still limited in terms of speed, depth, innocuity, and ability to simultaneously probe multiple parameters.

We will discuss some recent advances, such as efficient combination of fluorescence with coherent contrasts (THG, SHG) [1,2], multicolor two-photon excitation using wavelength mixing and its application to brainbow tissue imaging [3,4], and high-throughput two-photon imaging using light-sheet excitation [5,6]. We will illustrate the benefit of these strategies for high-information content imaging of developing tissues and embryos.

Refs: [1] Olivier, Science (2010). [2] Zimmerley, Phys Rev X (2013). [3] Mahou, Nat Methods (2012). [4] Loulier, Neuron (2014). [5] Truong, Nat Methods (2011). [6] Mahou, Nat Methods (2014).

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