

Homework 1

Please send your answers electronically to epotma@uci.edu by midnight.

- a For biological imaging a crucial factor is the penetration depth of a photon into the biological material. There are two processes that limit the penetration depth: scattering and absorption. Scattering increases for shorter wavelengths (as $|1/\lambda|^4$) while absorption is dictated by certain chromophores in the tissue. Both scattering and absorption need to be small for optimum imaging conditions. Search online and determine the wavelength range for which tissue imaging can be performed at maximum depths.
- b Please read the article ‘Two-photon laser scanning fluorescence microscopy’. List the main advantages of two-photon imaging over one-photon imaging mentioned in the article.
- c Suppose you have a glass slide with a single layer of dispersed cells. You have tagged the plasma membrane of the cells with a fluorophore (absorption 488 nm, emission 530 nm). What microscope would you use, a one-photon confocal or a two-photon microscope? Explain your answer.