

LA MICROSCOPIA MULTIFOTONE NELLE APPLICAZIONI BIOMEDICALI

3D imaging di interi organi con risoluzione subcellulare

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Temi

- La microscopia a multifotone: breve introduzione
- Whole Organ Imaging with Subcellular Resolution

Most 3D imaging approaches must accept a tradeoff between imaging small regions of tissues at high resolution or a larger region at much lower resolution. However, many problems in biomedical science would benefit substantially from high-resolution, subcellular imaging across entire organs. We present a approach which combines high speed 3D multiphoton imaging and histological sectioning. It can quantify tissue morphology and physiology throughout an entire organ with subcellular resolution. It offers all the benefits of fluorescence-based approaches including high specificity and sensitivity all in a fully automated instrument.

We will present images of both mice whole heart and brains with subcellular detail. For the heart, the 3D morphology of the heart at the micro, meso and macro scale, spanning almost five orders of magnitude in length and revealing details of the nuclei, myocytes, microvasculature, cleavage planes and gross anatomy. With mice brains, we are able to quickly generate high resolution datasets of gene expression throughout the brain which are suitable for comparison with the Allen Brain Atlas. Finally, we discuss some of the future avenues whole organ imaging opens.

Relatori

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