

Correlative imaging to resolve molecular structures in individual cells

Label-free chemical imaging of complex living systems is the holy grail of biochemical research. The current analysis techniques require extensive sample preparation, often due to the presence of interfering molecules such as water, making them unsuitable for the analysis of such systems. Here, we examined living tissues and small vertebrates at sub-micron resolution by optical photothermal infrared microspectroscopy. In my talk, I will address recent advances of infrared spectroscopy and explain how it can be used to analyze at submicron resolution fresh, unprocessed, fully hydrated tissue biopsies from diverse organs, to yield structural and compositional insights into spatiotemporal changes with relevance to diseases. I will also show that now infrared information can be extracted from living organisms, such as salamander embryos, without compromising development. Thus, demonstrating time-resolved and in situ investigation of chemical and structural changes of diverse biomolecules in their native conditions.

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