

# Molecular membrane organization - a super-resolution fluorescence microscopy study

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Molecular interactions are key in cellular signaling. They are usually ruled by the organization and mobility of the involved molecules. We present different fluorescence spectroscopic tools that are able to determine such organization mobility and potentially extract interaction dynamics. Specifically, the direct and non-invasive observation of the interactions in the living cell is often impeded by principle limitations of conventional far-field optical microscopes, for example with respect to limited spatio-temporal resolution. We depict how novel details of molecular membrane dynamics can be obtained by using advanced microscopy approaches such as the combination of super-resolution STED microscopy with fluorescence correlation spectroscopy (STED-FCS) or spectral detection. We highlight how STED-FCS and spectral STED microscopy can reveal novel aspects of membrane bioactivity such as of the existence and function of potential lipid rafts.