**Poster Presentation**

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## *Orange Fluorescent Proteins: Filling the Spectral Gap*

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Fluorescent proteins (FPs) have become valuable tools for molecular biology, biochemistry, medicine, and cancer research. Starting from parent green fluorescent protein (GFP), most challenging task of the FPs studies was the development of FPs with longer excitation/emission wavelength. This pursuit was motivated by advantages of so-called red-shifted FPs, namely, lower background of cellular autofluorescence in microscopy, lower light scattering and reduced tissue absorbance of longer wavelengths for in vivo imaging. In addition to FPs with regular spectral properties, there are proteins of other types available, including FPs with a large Stokes shift and photoconvertible FPs. These special kinds of FPs have become useful in super-resolution microscopy, imaging of enzyme activities, protein-protein interactions, photolabeling, and in vivo imaging. According to their emission wavelength, red-shifted FPs could be divided in the following groups: 520-540 nm yellow FPs (YFPs), 540-570 nm orange FPs (OFPs), 570-620 nm red FPs (RFPs), and > 620 nm far-RFPs. Red shift of the excitation/emission bands of these FPs is predominantly achieved by extension of the conjugated system of the chromophore and its protonation/deprotonation. The variety of spectral properties of FPs (excitation and emission wavelength, quantum yield, brightness, photo- and pH- stability, photoconversion, large Stokes shift, etc) results from the different chromophore structures and its interactions with surrounding amino acid residues. In this work we focus on structural studies and molecular mechanisms of FPs with orange emission.

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