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Microspectroscopy Tools for Research in Bio-Nanotechnology

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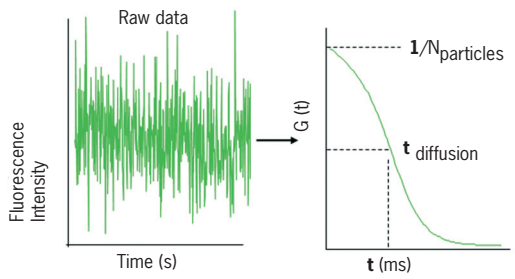
The MicroSpectroscopy Centre (MSC) offers microspectroscopic state-of-the-art facilities in which biomolecular interactions can be studied such as those among proteins, carbohydrates, lipids, nucleic acids, metabolites, either *in vivo* or *in vitro*. The MSC aims at expanding the expertise and knowledge of microspectroscopy with emphasis on experimental plant and food sciences.

In Vitro and *In Vivo* Dynamics by Fluorescence Fluctuation Spectroscopy

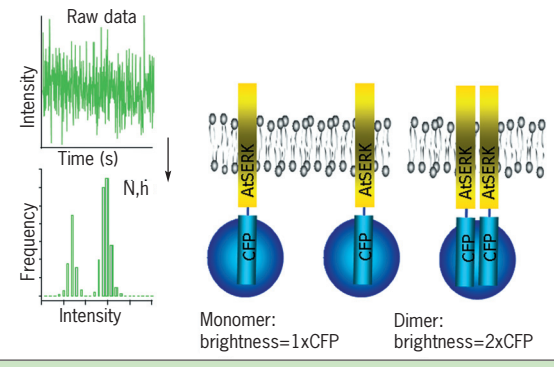
FCS

Fluorescence Correlation Spectroscopy:
- Information on: diffusion, binding, chemical reaction rates, concentrations



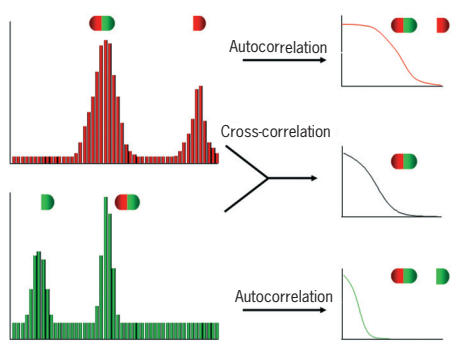
PCH

Photon Counting Histogram:
- Information on: complex formation (Homodimerization)



FCCS

Fluorescence Cross Correlation Spectroscopy:
- Information on: molecular interactions

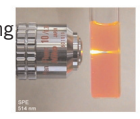


Confocal Imaging: (Co-) localization

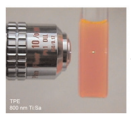
MPE

Single Photon Excitation

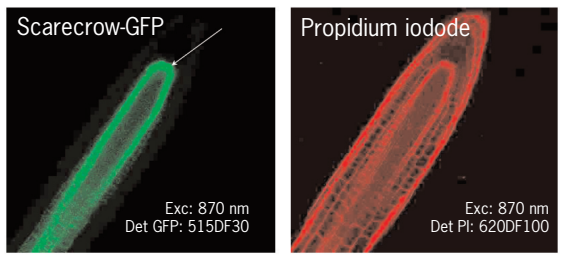
'out-of-focus' bleaching limited penetration



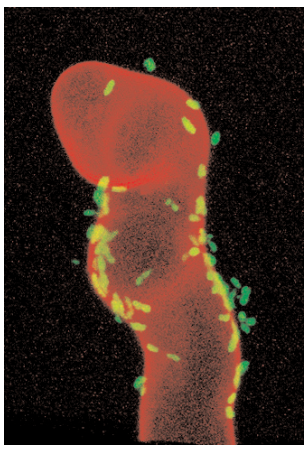
Two Photon Excitation



no pinhole required bleaching only in focal spot enhanced penetration excitation of UV probes

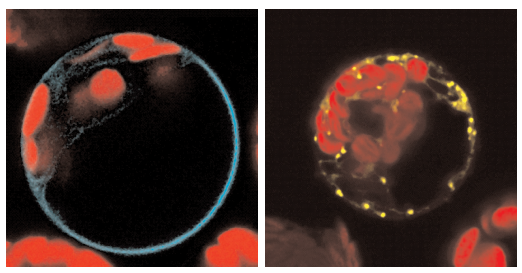


Thick root hair imaging by multi photon excitation



Root hair growth controlled by green rhizobium bacteria.

Courtesy: Rene Geurts



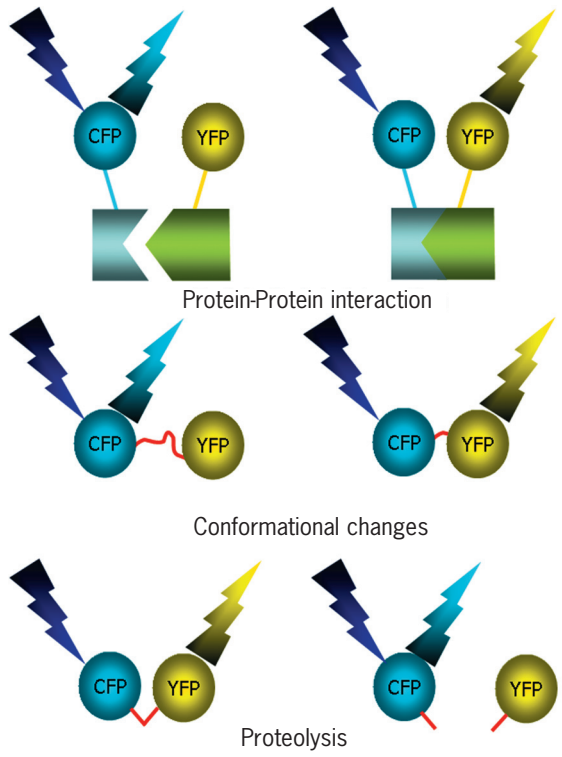
Membrane proteins (Cyan) and endosomes (Yellow) expressed in plant protoplasts.

Courtesy: Jenny Russinov

In Vitro and In Vivo Molecular Interactions by FRET Measured with FLIM

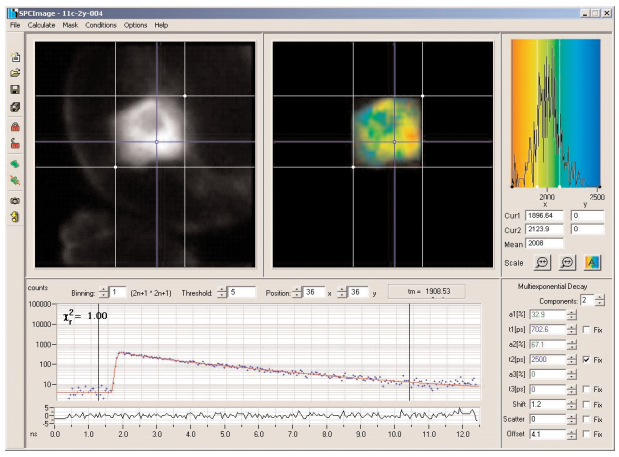
FRET

Förster Resonance Energy Transfer



FILM

Fluorescence Lifetime Imaging Microscopy:
- Information on: spatially resolved molecular interactions (Homo/Heterodimerization)



Fluorescence intensity and lifetime image of nuclear proteins expressed in plant protoplasts.

Courtesy: Isabella Nougalli-Tonaco

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