

Màster Biomedicina

Programa de l'assignatura.

Sessions teòriques

- . Characteristics of visual information in Biomedicine. Fundamentals and optical principles. Resolution 2D and 3D. Light sources. Fluorescence. Fluorochromes. Fluorescence microscopy. Fading. Applications
- . Bioimaging. Monitoring gene function by image. Fluorescent labeling in proliferation and apoptosis. Studies of "loss and gain of gene function" with fluorescence microscopy. Applications in research of embryonic development cell differentiation and cell growth.
- . Microscopy of living cells. How to maintain living cells under a microscope. Molecular labeling with fluorescence. Transmitted light contrast techniques. Capture of images in time interval (time lapse microscopy).
- . Fluorescence photobleaching. Study of molecular dynamics. FRAP (Fluorescence Recovery After Photobleaching) and inverse FRAP. FLIP (Fluorescence Loss In Photobleaching). Fluorescent labeling. How to perform an experiment of photobleaching: microscope settings, parameters to consider. Image analysis and kinetic parameters.
- . Resonant energy transfer between molecules in fluorescent microscopy (FRET, Fluorescence Resonance Energy Transfer). Study of molecular interaction. Concepts. Methodology: acceptor photobleaching method. Labeling molecular FRET pairs. How to perform an experiment with FRET microscopy: settings, microscope parameters to take into account. Image analysis, representation and interpretation of results.

Sessions pràctiques de laboratori

- . Working with the Huygens program: Concept of deconvolution (Scientific Volume Imaging).
- . Software Imaris (Bitplane) and 3D reconstruction.
- . ImageJ (NIH): combination of different channels, projections etc.
- . Time-lapse experiments

- . FRAP experiments
- . FRET experiments

Nom de l'assignatura. **Tècniques de Microscòpia de Fluorescència**

Crèdits : **3 ECTS**

Coordinador: **Dr. Jesús Mariano Ureña Bares, Dr. Florenci Serras**

Blocs temàtics:

Fundamentals in Fluorescence Microscopy

Bioimaging

Microscopy in living cells

FRAP

FRET

Bibliografia:

<http://www.olympusmicro.com/primer/techniques/fluorescence/fluorhome.html>

<http://www.microscopyu.com/articles/fluorescence>

Current Protocols in Cell Biology. John Wiley and Sons. Somerset, NJ. ISSN 1934-3639. 2012.

<http://www.currentprotocols.com/WileyCDA/Section/id-810292.html>