Ultramicroscopy at CIF Epalinges: The CIF offers now the possibility to do light-sheet microscopy

Contributed by Yannick KREMPP
Tuesday, 23 June 2015
Last Updated Tuesday, 23 June 2015

The CIF offers now the possibility to do light-sheet microscopy with the Light Sheet UltraMicroscope II from LaVisionBioTec which has recently been installed at CIF Epalinges.

Imaging large samples into the depth of the tissue needs certain procedures to reduce the opacity. The tissue has to be virtually transparent. Some samples like Zebra Fish are mostly transparent by nature but the majority of samples are opaque. This counteracts all attempts to image the sample in total. Nowadays, two main principles of creating translucent samples called clearing procedures have been established (either using organic solvent or aqueous buffer). Thank to its transparent properties, the sample can then be imaged very deeply with a light sheet microscope.

Light sheet fluorescence microscopy is a fluorescence microscopy technique with good optical sectioning capabilities and reasonably high speed. In contrast to epifluorescence microscopy only a thin slice of the sample is illuminated (by the light sheet) perpendicularly to the direction of observation.

A few technical facts about the system currently installed:

- The UltraMicroscope II has a bidirectional triple light sheet technology.

- This technology allows to generate 6 focused light sheets to excite samples from the side while the fluorescence light is detected by a sCMOS camera perpendicular to the illumination plane.

- The dynamic horizontal light sheet focus guarantees excellent Z-resolution covering the entire field of view.

- Moving the sample through the light sheet generates a 3D image stack. Selective excitation of the focal plane reduces bleaching and photo toxicity significantly.

- The open setup allows the analysis of cleared samples in any clearing solution (organic solvent or aqueous buffer) or in vivo data acquisition in aqueous media.

- The sample size can vary from mm3 up
to 1 cm3. Different working
distances also contribute to better image large samples into the depth of the tissue.

- Four lasers light sources (405 nm, 488 nm, 561 nm and/or a 640 nm laser) are available to adapt to your own applications.

- The combination of a 2x
objective together with a zoom allows variable magnification from to 1.26 to 12.6x.

- Higher magnification objectives will be added soon.

If you plan to use this system, or just have some questions relative to the science behind it, please ask Florence Morgenthaler at the CIF Epalinges.

You can also find more information about that technology right here:

http://www.lavisionbiotec.com/ultramicroscope-overview.html