

HANDS-ON SESSION

Widefield fluorescence and Confocal Laser Scanning Microscopy (CLSM)

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In the life sciences light microscopy is a widely used technology to study the fine detail in cells, tissues and organisms. Fluorescent labels can be introduced by expressing specific fluorescent proteins or by immunohistochemistry using organic dyes.

Fluorescence microscopy can be used to observe labeled molecules in live or fixed specimen within the focal plane of the objective or even within a 3D.

The optimization of the key parameters *resolution*, *magnification* and *contrast* might be a challenge especially in thick fluorescent specimen like tissue sections or zebrafish embryos. Laser Scanning Confocal Microscopy can be used to retrieve high contrast 2D images or 3D volumes of structures within thick specimen.

In this hand-on session, we will image tissue sections provided by research groups in Dresden (e.g. tissue sections stained by immunohistochemistry for developing and regenerating osteoid) with the help of

fluorescence and CLSM. We will compare the pros and cons of widefield fluorescence microscopy and CLSM setups and discuss their respective optics.

In this tutorial we will:

- use light microscopy to image tissue sections stained by immunohistochemistry
- get to know different microscope setups used in the life sciences
- learn about the principles underlying widefield fluorescence microscopy and CLSM
- acquire knowledge on the use of fluorescent dyes and fluorophores to label proteins and structures of interest