

Light sheet imaging going versatile: a Leica DLS case study

Petra Haas, Wernher Fouquet, Florian Fahrbach, Werner Knebel
Leica Microsystems CMS GmbH
Am Friedensplatz 3, 68165 Mannheim, Germany
E-mail: petra.haas@leica-microsystems.com

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We are presenting approaches to investigate 3D cell cultures like spheroids or cleared whole organs using light sheet imaging. Light sheet imaging has in the last few years attracted growing attention in the field of biological research. The increase in focus is a result of two major features that are inherent to this imaging technology: optical sectioning at high frames rates thanks to an area detector and a reduction of photo-damage since only the volume of interest is illuminated.

Here, we will show a few case studies, both on live and on cleared fixed samples, that demonstrate how a holistic workflow approach, from sample handling, acquisition, data handling and data visualization can help to apply light sheet imaging as a routine research technique. Using the Leica TCS SP8 DLS (Digital LightSheet) with its open and accessible design enables straightforward sample mounting. We will discuss tools, from molds to u-shaped glass capillaries, that standardize the mounting procedure and help the researcher to minimize preparation time before each imaging session. Efficiency is further enhanced by the system's inbuilt multi-position and tilescan capabilities.

The presentation will focus on the versatility of the light sheet module, however, since it is launched from the TCS SP8 platform, each user is given the choice between a state-of-the-art point scanning confocal or the light sheet modality or even the combination of both.