SINGLE PLANE ILLUMINATION MODULE AND MICRO-CAPILLARY APPROACH FOR A WIDE-FIELD MICROSCOPE

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ABSTRACT Light sheet or single plane illumination microscopy (SPIM) represents a 3D method of low light exposure permitting long observation times and maintaining cell viability. A module for SPIM is described which is easily adapted to an inverse wide-field microscope [1], permitting high flexibility and combination with further microscopic techniques, e.g. transillumination, LSM, spectral imaging, FLIM, or nanosecond ratio imaging. The setup is optimized for 3-dimensional cell cultures, e.g. multi-cellular tumor spheroids (MCTS) and characterized by
- use of advanced micro-capillary approaches for holding and for rotating the samples;
- synchronous adjustment of the illuminating light sheet (in axial direction) and the focal plane of fluorescence detection (using a mechanical feed correction);
- adaptation of a microfluidic system for application of fluorescent dyes, pharmaceutical agents or drugs, minimizing the required quantities and expenses.

Application: 3D imaging of CHO cell spheroids with membrane associated GFP

Application: Spectral imaging and fluorescence lifetime imaging (FLIM) of a chemotherapeutic drug (doxorubicin) applied via microfluidics

REFERENCE