

MULTISAMPLE LIGHT-SHEET MICROSCOPY FOR IN VIVO IMAGING OF MICROGLIAL CELLS

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KEY WORDS: Light-sheet microscopy, SPIM, Image Analysis, Microglia, Brain Imaging.

Abstract:

In recent years, mounting evidence has indicated that the brain and the immune system are mutually connected and engage in extensive molecular communication[1]. Microglia, the macrophages of the brain, play a critical role in this crosstalk by fulfilling both immune- and glial cell functions[2].

Here, we are applying semi-high throughput light-sheet microscopy to better understand dynamic cell-cell interactions in the developing central nervous system, focusing on the complex interplay between microglia and neurons using the larval zebrafish as model system. The microscope combines dual-view imaging in an upright SPIM setup [3,4] with electronic confocal slit detection (eCSD) [5,6]. The setup enables long-term multisample imaging of large specimens, e.g. with a capacity to monitor up to 10 zebrafish larvae in one experiment. The analysis pipeline permits convenient browsing and analysis of TB sized datasets, enabled by fast streaming of disk resident data employing ImageJ's virtual stack functionality.

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