Diving into structure and function of biological systems with 3D-EM and CLEM techniques

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The application of emerging light and electron microscopy techniques allow us to study architecture and function of biological systems in unprecedented detail. My group applies electron tomography as ultra high 3D resolution imaging technology to study synaptic architecture. We use a synergistic combination of two highly tractable models where most appropriate: The *C. elegans* nervous system for efficient candidate identification and manipulation and the nervous system of the zebrafish larva as vertebrate model to allow a view on evolutionary conservation of function. In the *C. elegans* model we recently added a focus of research directed to the Dauer larva which represents an alternative route in the life cycle of the nematode when facing adverse environmental conditions. A further special interest of our research is to combine microscopy techniques in a so called correlated light and electron microscopy (CLEM) approach. Thereby one can profit from the advantages of both techniques, allowing access to the ultrastructural context and the precise localisation of multiple molecular factors. Recently, we also adapted our sample preparation protocols for Focused Ion Beam Scanning Electron Microscopy (FIB/SEM) in order to understand architectural building principles of nervous systems at a larger scale than possible with electron tomography.