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Delmic cryo-CLEM solutions for Cryo-ET and multibeam volume EM: Speed up your understanding of biological systems on a nanometer scale

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Abstract

Delmic is a company that specializes in integrative solutions for scanning electron microscopy (SEM) - adding (cryo) CLEM, cathodoluminescence measurements or multibeam imaging capabilities to your SEM setup. In this workshop, we will firstly discuss how our METEOR and ENZEL systems can boost your success with cryo-electron tomography (cryo-ET) through gaining integrated cryo-CLEM capabilities. Secondly, we will explain how our FAST-EM multibeam volume EM system helps you get detailed molecular information and context from large biological samples 100x faster.

Cryo-ET uniquely provides high-resolution structural information on biomolecules within their native environment. However, the technique requires a challenging lamellae milling process using a focused ion beam (FIB). The lamella fabrication yield is currently dampened by the difficulty in region of interest (ROI) targeting as well as ice contamination and devitrification of the sample during sample transfer. In this workshop, we will show how our integrated cryo CLEM solutions guide lamella milling in situ, increase milling precision and allow for ROI inclusion verification. We will explain how integrated cryo-CLEM streamlines the cryo-ET workflow, and increases sample yield with examples from yeast cells, HeLa cells and Dropsophia myofibrils.

Electron microscopy can often represent a bottleneck in the quest for answers to various scientific questions in fields such as cell biology, pathology, toxicology and neurobiology. The limited throughput of current technology prevents imaging of large volumes of biological material in reasonable timeframes, hence relegating EM to providing only qualitative information. FAST-EM enables a shift towards using EM as a fast quantitative analysis tool. Higher throughput drastically shortens the time needed to acquire project data, and opens the door for projects of unprecedented scale, which were previously too time-consuming to consider. We will demonstrate high-throughput imaging of a variety of tissues and experimental systems, showing how high-resolution data can be placed within a large-scale context.