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Volume 3D Imaging
-New EM Imaging Method for Cell and Organella-

Date/Venue 13th May 2013 16:00 – 17:00, RIKEN CDB Seminar Room A7F

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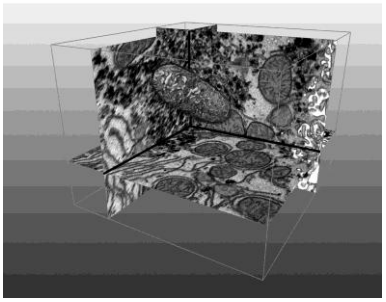
Summary

Over the last two decades electron microscopy techniques have been developed from delivering 2D information to 3D information with a main focus on the architecture of organelles on a subcellular level. These techniques have yielded important new insights in intracellular architecture and connectivity of organelles. However, understanding complex biological systems requires knowing how a whole cell is organized and even how multiple cells are organized in a 3D network because their 3D organization determines how cells can interact.

TEM tomography is a major technique for high resolution ultrastructure 3D analysis of parts of cells. However, this technique has a limitation in the volume of sample. Recent studies have explored an alternative method for large volume image acquisition. Serial image of the block face of resin-embedded neural tissue was acquired within a scanning electron microscope (SEM). Sections were either removed from the imaged face in the microscope using an ultramicrotome or by focused ion beam milling and then immediately imaged by the SEM. This provides a series of aligned images of the tissue in the block face and has the clear advantage that image acquisition can be fully automated. This allows you to visualize large volume of 100 µm3 to 1 mm3 with a resolution of 10 nm.

In this presentation we will give an overview of the latest 3D techniques in electron microscopy for large volume imaging with life science applications in neuroscience, developmental biology and cell biology.

FIB/SEM
For Volume 3D Imaging



3D Image of Hepatocyte;
Courtesy of Dr. Ohta,
Kurume University School
of Medicine

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