



EM

Electron Microscopy

What we do

We help our users to answer their scientific questions utilizing a wide range of EM methods ranging from every-day classical methods, such as negative staining or classical chemical fixation, to cutting edge techniques, such as cryo-electron microscopy and tomography. Here are two examples of what we do:

Do birds have a biological compass?

Birds use the earth's magnetic field to navigate. Using EM and electron energy loss spectroscopy (EELS) we helped researchers from the IMP (Vienna Biocenter) to show that frequently found electron dense structures in tissue sample are more likely heavy metal contaminations from the used tools than the long sought-after biological compass (Edelman et al., 2015 PNAS).

How do cells fuse vesicles in intracellular transport?

Intracellular transport is an essential function for the survival of cells, but many key processes are not well understood. Working together with scientists from the Max Planck Institute of Molecular Cell Biology and Genetics in Dresden, Germany we utilized rotary shadowing to visualize an endosomal tether which plays an important role in recognizing and fusing vesicles (Murray et al., 2016 Nature).

Services and Methodologies Provided

The EM Facility can be used in two different ways:

Infrastructure users receive thorough training and can work independent in the facility when ever they wish – the facility is open 24/7.

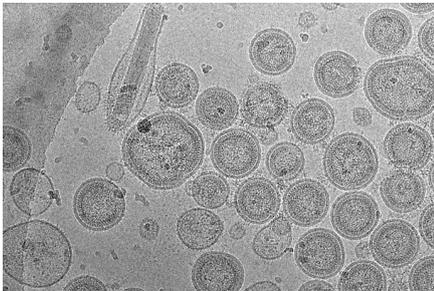
Service users drop off their samples and experienced EM facility personnel will carry out all required steps – from sample preparation, to EM to image processing and analysis.

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FEI/Thermo Scientific Glacios:

Cryo-electron microscope with direct electron detector for near atomic resolution imaging.



Baculovirus & Virus-Like Particles:

Near-native state cryo-EM image (sample courtesy: Wolfgang Ernst, BOKU/acib, Vienna)



FEI Tecnai T20:

electron microscope 2D and 3D visualisation of biological samples at room temperature.

Sample Preparation Methods:

- critical point drying (for SEM)
- negative staining
- conventional chemical fixation
- high pressure freezing and freeze substitution
- rotary shadowing
- freeze fracturing and etching
- immersion freezing (“cryo plunge freezing”)
- immunolabeling
- (cryo)-ultramicrotomy

EM Techniques:

- Scanning Electron Microscopy (SEM)
- Transmission Electron Microscopy (TEM):
 - conventional 2D EM
 - tomography - 3D EM
 - cryo-electron microscopy/tomography
 - correlative microscopy

Equipment

- FEI/Thermo Scientific Glacios
- FEI Tecnai T20
- FEI Morgagni 268D

Contact and Location

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