



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).

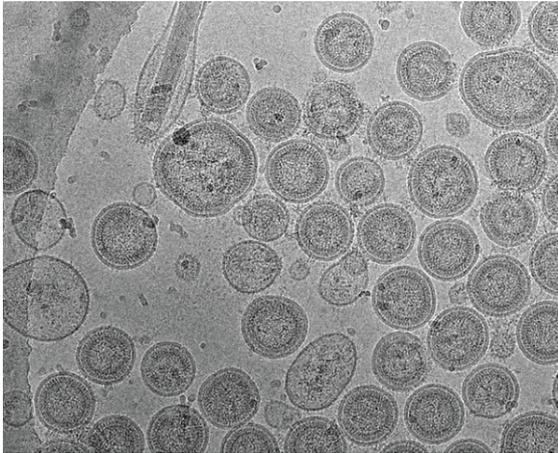
SERVICES AND METHODOLOGIES

EM training and infrastructure usage

Infrastructure users receive thorough training in the techniques/instruments they are interested in. All our instruments - from basic sample preparation equipment to our most sophisticated electron microscopes - are available to users 24/7. We further support our users in planning, execution, and interpretation of all EM-related experiments and regularly organize EM workshops and microscopy training.



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 The 200 kV Thermo Scientific Glacios is a cryo-TEM for high-throughput sample screening and fully automated data recording. The Glacios is exclusively used for cryo-EM (single particle and cryo-tomography).

FEI Tecnai T20 The FEI Tecnai G2 20 (T20) is a 200 kV TEM equipped with an Eagle 4k HS camera and can be used for 2D and 3D (tomography) visualization.

FEI Morgagni 268D The FEI Morgagni 268D is a robust and easy-to-use 100 kV TEM equipped with an 11-megapixel Morada CCD camera. The microscope is easy to use and tailored for sample screening and routine visualization.

CONTACT AND LOCATION

**Electron Microscopy Facility
Vienna BioCenter Core Facilities (VBCF)**

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