Vienna BioCenter
CORE FACILITIES

ELECTRON MICROSCOPY

INSIGHTS FROM FAR BEYOND THE WAVELENGTH OF LIGHT

Visible light cannot distinguish between objects closer than 200 nanometers; thus, it cannot reveal the functional components in cells. The electron microscope is one of the most important inventions of the 20th century, and technical advances have been accelerated markedly in recent years. This progress was fueled by a synergy of disciplines, with physics providing aberration correction and advanced detectors, and computer scientists improving image processing and analysis techniques.

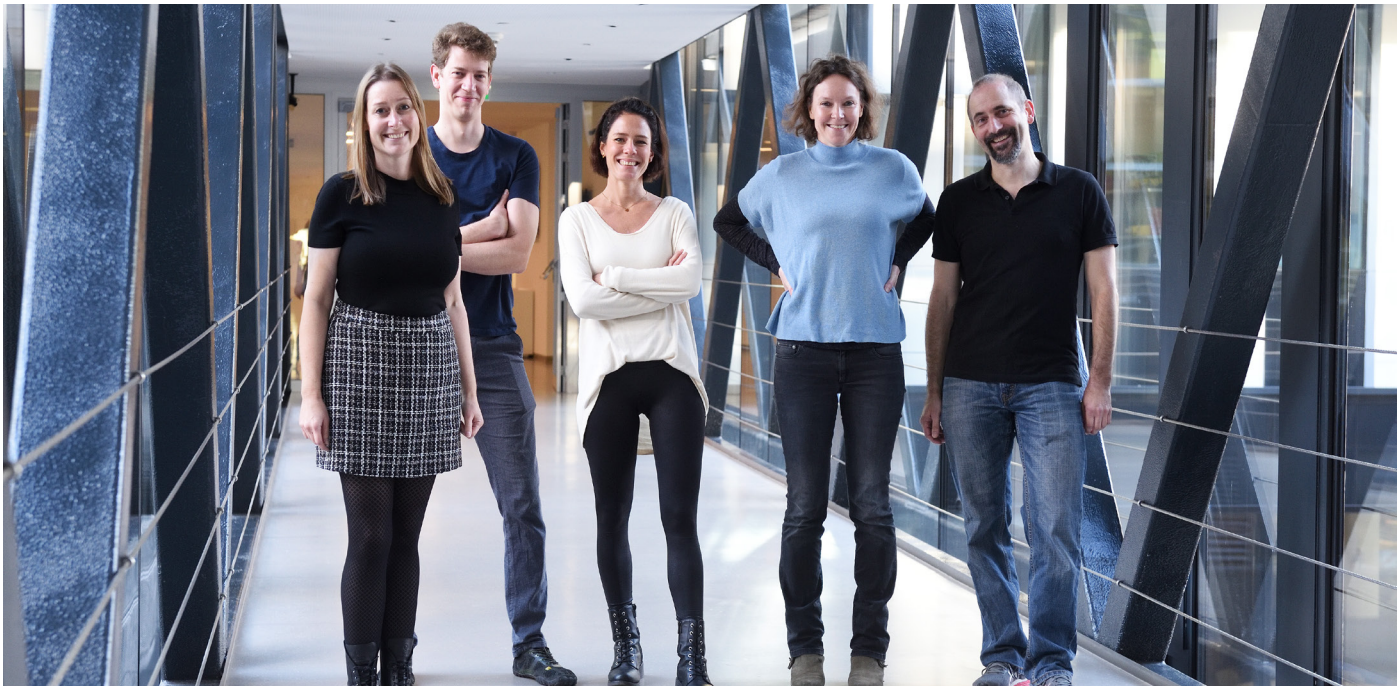
Electron microscopy (EM) can achieve much higher resolutions than light microscopy and allows for studying cellular substructures and even individual biomolecules in the native state. However, EM requires the samples to be analyzed in a vacuum and cannot be used on live samples. Thus, modern cell biology research employs a combination of tools to integrate ultrastructural insights with phenotype, histology, or other microscopy data and answer their specific questions about structure and function.

The VBCF Electron Microscopy Facility offers access to an extensive range of instruments, techniques, and expertise to visualize the ultrastructure of your favorite model system. We analyze diverse biological samples, from molecules, such as RNA, DNA, or protein, to organelles to entire prokaryotic or eukaryotic cells and tissues. The most recent addition to our EM equipment is the Thermo Fisher Scientific Glacios, a cryo-EM for high-throughput sample screening and fully automated data recording. We are currently setting up a Correlative Light and Electron Microscopy (CLEM) workflow, enabling us to switch between optical and EM contrast in one system.

The VBCF EM facility is more than a service provider that performs all customer steps, from sample preparation and visualization by EM to image analysis and processing. We also provide access to our EM infrastructure to those interested in working independently, contributing to developing the EM community in Austria. Moreover, we are partnering with other EM facilities, nationally and internationally, to organize regular EM seminars, workshops, and international symposia. These platforms provide the opportunity to discuss exciting cryo-EM research, including the latest developments in the field and their application to biological questions.

Ultimately, the most important aspect of our daily work is close collaboration with researchers on the VBC campus. Thus, our work is a crucial contribution to enabling cutting-edge research at the VBC, and we are excited to make the technical opportunities of modern EM accessible to customers from academia and industry.

VBCF ELECTRON MICROSCOPY TEAM

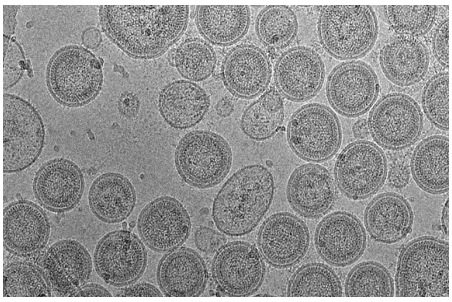


SERVICES AND METHODOLOGIES

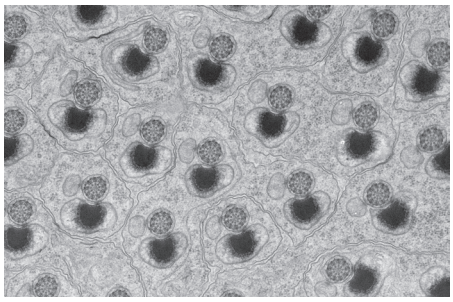
- **EM training and infrastructure usage**
- **Sample preparation and imaging**
  - Negative staining of proteins
  - Chemical fixation of cells and tissues
  - High pressure freezing-freeze substitution
  - Plunge freezing and cryo-TEM workflow
  - Immuno-EM (e.g. Tokuyasu method)
  - Sample preparation for SEM
  - Freeze fracturing
  - Rotary shadowing
  - Correlative Light and Electron Microscopy (CLEM)

EQUIPMENT

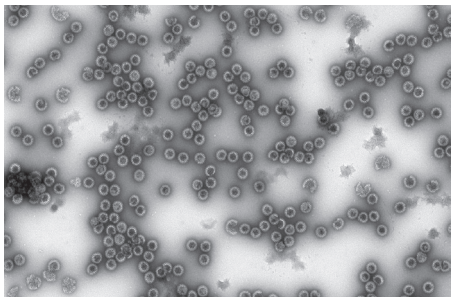
- **200 kV Thermo Fisher Scientific Glacios** cryo-TEM for high-throughput screening and automated data recording
- **200 kV FEI Tecnai G2 20** with Eagle 4K HS camera for 2D and 3D visualization
- **100 kV FEI Morgagni** with Megaview II camera
- **Hitachi TM-1000** table-top microscope to study surface properties
- **Additional equipment:** high vacuum evaporators, high pressure freezers, automated freeze substitution devices, grid plunger, (cryo-)ultramicrotomes, critical point dryer, sputter coater, etc.



Baculovirus and virus-like particles



Drosophila testicles



Virus-like particles

CONTACT

Electron Microscopy
Vienna BioCenter Core Facilities [VBCF]
https://www.viennabiocenter.org/vbcf/electron-microscopy/
thomas.heuser@vbcf.ac.at

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