



#### CEITEC

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# Cryo-electron Microscopy and Tomography

# What we do

### Single particle electron cryo-microscopy

Single particle electron cryo-microscopy enables determination of near-atomic resolution structures of purified mono-dispersed protein or protein-RNA/ DNA complexes or viruses. A set of micrographs containing 2D projections of different but structurally similar entities is acquired in automated manner and subsequently used for reconstruction of three-dimensional model. The technique is applicable to proteins and their complexes large than ~200 kDa in size. Utilizing phase plate technology, structures of <100 kDa complexes can be obtained from single particle data.

### Cellular electron cryo-tomography

Electron cryo-tomography is the only method to address structural characterization of pleiomoprhic objects in close-native state. Specimen is rotated and imaged in electron microscope and the data are back projected to create a three-dimensional model of studied object. The method thus enables structural studies of protein complexes, virus, and organelles within the context of the cell under the near-native conditions.

### Focused ion beam micro-machining

Electron cryo-tomography studies of proteins or viruses within the context of the cell are often hampered by cell dimensions which prohibits electron penetration especially in the case of large eukaryotic cells. Focused ion beam micro-machining is employed to perform precise ablation of parts of cellular content to produce a thin cellular cross-section which is suitable for the purposes of structural biology studies in situ by electron cryo-tomography.



#### Titan Krios

high-end transmission electron microscope equipped with phase plate, Falcon3 and post-GIF K2 direct electron detectors.



Vitrobot IV vitrification robot

## Services and Methodologies Provided

- specimen vitrification
- TEM/cryo-TEM imaging
- SEM imaging
- automated single particle electron cryomicroscopy
  data collection
- electron cryo-tomography
- focused ion beam micro-machining of vitrified biological specimen

# Equipment

- Titan Krios cryo-TEM
- Talos Arctica cryo-TEM
- Tecnai F20 cryo-TEM
- Versa 3D cryo-FIB/SEM
- Vitrobot IV



#### Versa 3D FIB/SEM microscope with Quorum PP3010T preparation system



**Tecnai F20** transmission electron microscope for cryo -electron microscopy

# **Contact and Location**

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