EQUIPMENT

LEM facility features the **JEM 1011, JEOL transmission electron microscope** developed for application in research fields such as medicine, biology, biomaterials.

The lens system permits low magnification/wide field of view/high contrast image observations as well as high magnification imaging.

Scanning electron microscopy core facility is supplied with a **JEOL JSM 6490LV scanning electron microscope and the Energy Dispersion X-ray analyzer**, manufactured by Ametek, Process & Analytical Instruments, allows quantitation of elements within specimens.
The system is capable of producing digital images and mapping the elemental composition of the sample on the image.

Ancillary sample preparation facilities include a **critical point dryer** and a **sputter coater for gold or carbon coating**.

COOPERATION PARTNERS

- **August Kirchenstein Institute of Microbiology and Virology** (Latvia)
- **University of Oslo, Pathology Laboratories, Rikshospitalet-Radiumhospitalet Medical Center** (Norway)
- **Riga Biomaterial Innovation and Development Center** (Latvia)
- **University of Tartu, Biomedicum, Institute of Anatomy** (Estonia)
- **Collegium Medicum, Nicolaus Copernicus University, NCU Torun** (Poland)
- **Laboratory of Electron Microscopy, Institute of Pathology, Regensburg** (Germany)
- **AMETEK Nordic AB/EDAX Business Unit** (the Netherlands)

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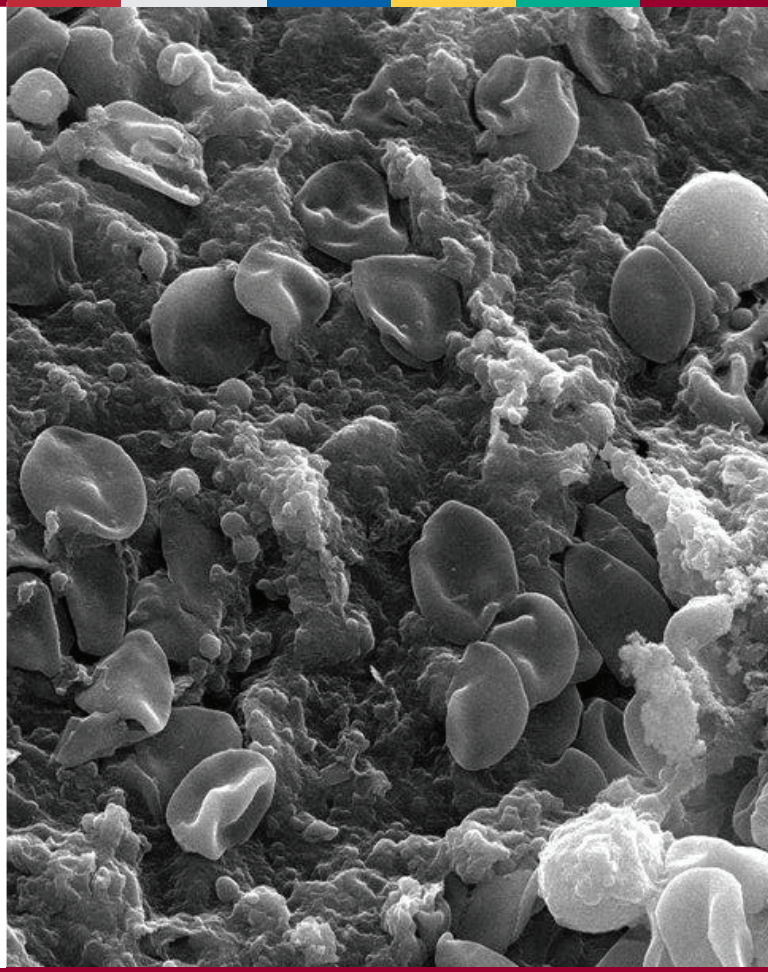
RĪGA STRADIŅŠ UNIVERSITY



LABORATORY OF ELECTRON MICROSCOPY

GENERAL INFORMATION

Laboratory of Electron Microscopy (LEM) was established in 1994 at the Medical Academy of Latvia (now – Rīga Stradiņš University). LEM is a department of the Institute of Anatomy and Anthropology.

LEM services are available to any investigator whose research can be assisted by the ultrastructural techniques offered by this facility as well as for clinical diagnosis of some cases.

LEM provides ultrastructural analysis of tissue cells, microorganisms including viruses and bacteria, biomaterials, nanoparticles using state-of-the-art electron microscopes (EM).

EM analysis provides high-resolution ultrastructural information that is difficult to be obtained by any other technique.

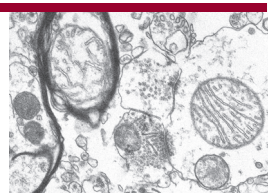
TECHNIQUES

LEM offers electron microscopic analysis using the following techniques:

- Routine semithin and thin-section preparation and analysis of cells and tissues;
- Negative staining;
- Ultrastructural immunocytochemistry (immunoelectron microscopy);
- Scanning electron microscopy (SEM);
- Transmission electron microscopy (TEM);
- Energy dispersive X-ray spectroscopy.

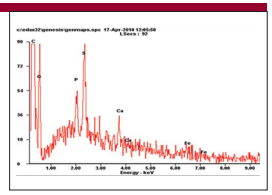
RESEARCH DIRECTIONS AND SERVICES

- Ultrastructural analysis of nerve tissue constituents.



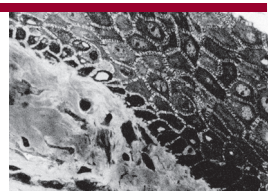
Human brain nerve cell dendrite forms synapses with *axon* terminals

- Elemental analysis.



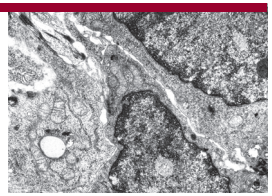
Element peak identification using energy dispersive spectroscopy

- Plastic embedding and semithin sectioning and analysis.



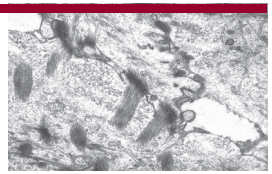
Overview of the oral mucosa

- Ultrastructural analysis of tumours: fine structure of oronasopharyngeal and salivary gland tumours.



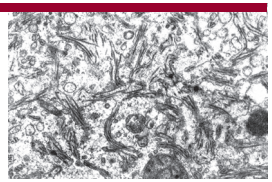
Oral mucosa tumour

- Ultrastructural diagnostics of skin diseases.



Desmosomes visualized by conventional ultrastructural technique

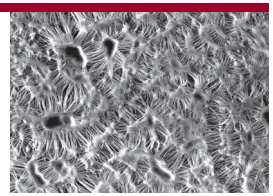
- Virus particle analysis using fine sections: ultrastructural and structural aspects of liver damage in case of hepatitis B and C.



Cisternae of smooth endoplasmic reticulum of hepatocyte houses viral particles (HBsAg)

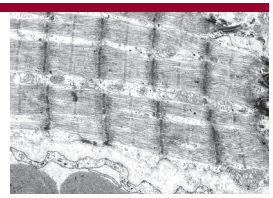
- Renal pathology.

- Surface imaging and analysis of cardiac damage and reconstruction applications in congenital heart diseases.



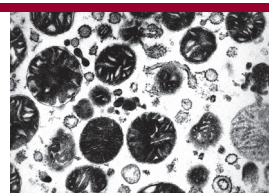
Cardiovascular patch made of expanded polytetrafluoroethylene

- Ultrastructural diagnostics of musculoskeletal pathologies.



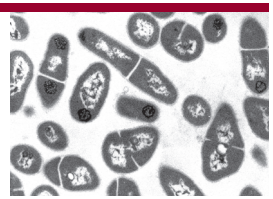
Cardiac muscular cell

- Analysis of subcellular structure – organization of cytoplasmic organelles.



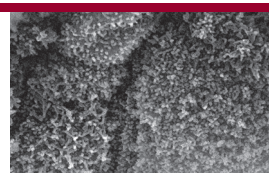
Mitochondria fraction prepared by use of differential centrifugation

- Ultrastructural analysis of microorganisms appearing *in vivo* and *in vitro* conditions.



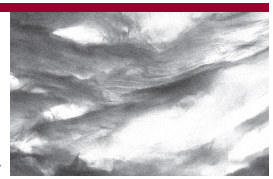
Fine structure of cultured *Conynebacterium diphtheria*

- Surface imaging, ultrastructural and structural analysis of pathologies of the female reproductive system.



Surface of epithelial cells of the uterus wall

- Analysis of fine structure of biomaterials, clays.



Fine structure of clay

- Ultrastructural detection of viruses.