

Electron Microscopy

The more detailed information you can collect from a specimen, the better prepared you can be to ensure the success of your drug research. Charles River offers full-service electron microscopy with both transmission and scanning capabilities in multiple locations. These instruments use a focused beam of electrons instead of light to examine a specimen at a very detailed level to gain information as to its structure and composition.

Recognized for our experience in this field, we provide GLP-compliant transmission electron microscopy (TEM) services for ultrastructural pathology and viral particle identification, tabulation, quantitation, and characterization in support of the FDA's Points to Consider (PTC) documents. Scanning electron microscopy (SEM) services provide additional topographic detail for the evaluation of device products, such as tissue luminal surfaces and stent-implanted vessels.

Specimen preparation, which includes processing, embedding, sectioning, and the selection of a fixative, is critical to visualization at the cellular level. Our experienced staff is available to provide guidance in protocol design for the most appropriate collection, preparation, and evaluation of biologic samples to ensure sample integrity.

Typical Applications

- Ultrastructural pathology
- Quantification of peroxisomes
- Viral particle identification, characterization, and tabulation
- Cell culture contamination identification
- Evaluation of tissue/medical device interface
- Characterization of red blood cell morphology
- Sectioning of peripheral nerves for neurotoxicology

Scanning Electron Microscopy (SEM)

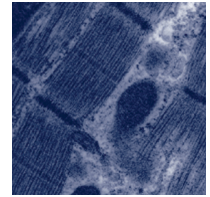
SEM enables the investigator to examine the surface topography and morphology of cells, tissues, or medical devices by scanning a beam of electrons across a sample. This imaging technique may be employed in studies in which exterior damage or integrity is of concern. Tissue samples can be mounted such that alterations in cellular growth can be monitored. Samples can be photographed on an SEM and reviewed by our veterinary pathologists.

Microscopy/Imaging

- Transmission electron microscopy (TEM)
- Scanning electron microscopy (SEM)
- Light microscopy
- Dual-energy X-ray absorptiometry (DEXA)
- Quantitative computed tomography (QCT)
- Micro-computed tomography (Micro-CT)
- Digital radiography

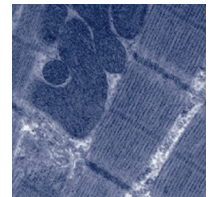
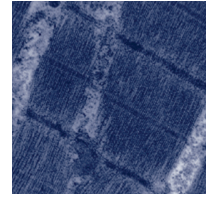
Facilities

- Dedicated EM laboratories
- Multiple electron microscope rooms
- Chiller room
- Processing room
- Microtomy room
- Darkroom
- Full-service histopathology
- On-site veterinary pathologists



Transmission Electron Microscopy (TEM)

Ultrastructural morphology procedures enable the visualization of unique details of the structure and the quantitation of cellular organelles. This imaging technique gives investigators precise data on mitochondria, peroxisomes, smooth and rough endoplasmic reticulum, cytoplasmic granules, and inclusion bodies, which assist in determining a compound's mode of action, understanding the pathogenesis of toxicologically related lesions, and establishing "no observable effect" levels. Our investigators perform a variety of ultrastructural analyses, ranging from simple qualitative evaluations to enumeration of lysosomes and peroxisomes, and morphometric studies measuring collagen and amyloid fibrils. Subtle lesions not visible in standard H&E slides can be observed and likely pathogenic mechanisms may be identified.



TEM Specimen Applications

Specimens	Thickness	Scope
Tissues	Ultra-thin (70-90 nm)	Cellular ultrastructure
Cells and cell culture		Virus quantitation and characterization
Negative stain on cell culture		Virus particles, bacteria, bacteriophage, or cell fragments

Resin Embedding for Light Microscopy

For fine-detail light microscopy, very thin resin-embedded sections can be prepared in our laboratories. Our scientists agree that tissues fixed in osmium tetroxide, embedded in epoxy resin, and sectioned with a diamond knife at one micron allow for the visualization of greater cytological and nuclear detail than paraffin sections. Epoxy resin produces little shrinkage, so it is the preferred medium for tissues requiring measurements.

Other Imaging Equipment

In addition to our microscopy capabilities, we have extensive imaging laboratory services that can support your research and development efforts. Dual-energy X-ray absorptiometry (DEXA), quantitative computed tomography (QCT), micro-computed tomography (Micro-CT), and digital radiography are available.