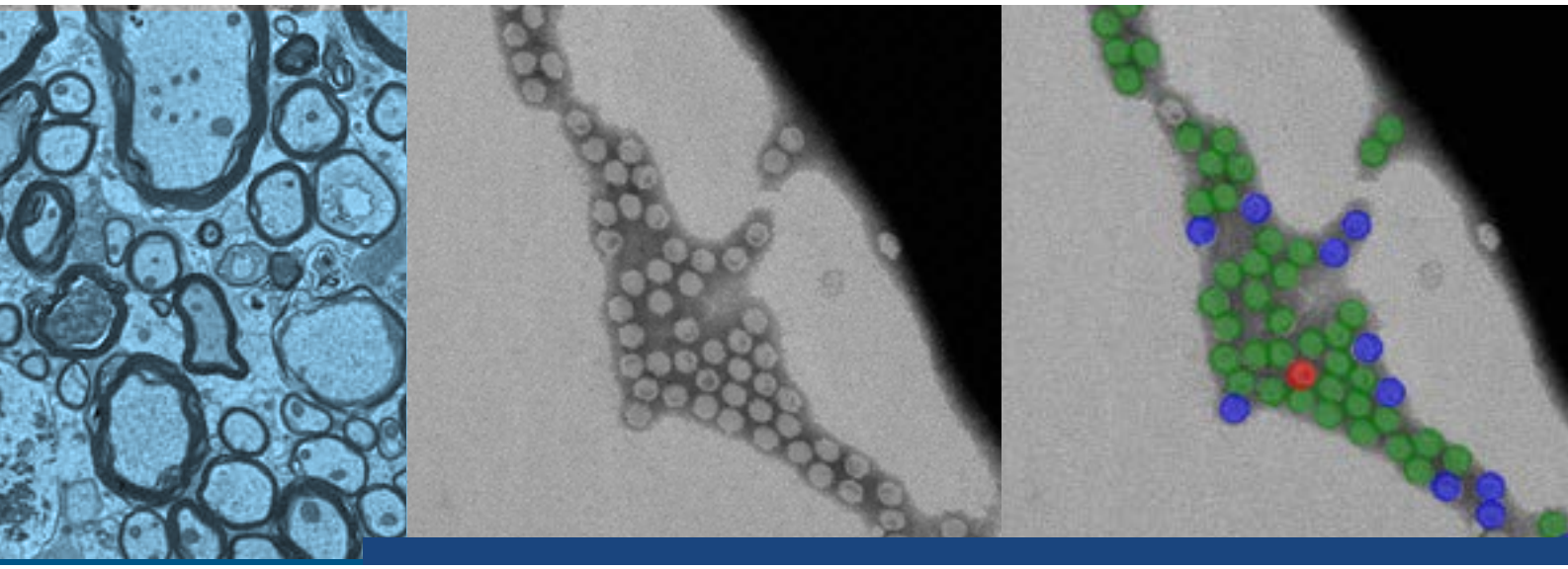
charles river



Electron Microscopy – Supporting Discovery, Safety and Manufacturing

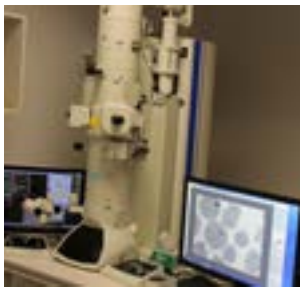
Techniques

- Transmission electron microscopy (TEM)
- Scanning electron microscopy (SEM)
  - Energy dispersive spectrometer microanalysis (EDS)
- Light microscopy
- Nanoparticle/nanomaterial electron microscopy
- Immunoelectron microscopy

Performing electron microscopy can be quite complex so it is crucial to choose a provider with proven experience performing quantitative pathology techniques to avoid program setbacks like compromised study designs, increased costs, and extended timelines.

Recognized for our extensive experience in this field, we offer full-service electron microscopy (EM) with both transmission and scanning capabilities in support of the R&D, preclinical, and manufacturing phases of development. Instead of using light to examine a specimen, EM uses a focused beam of electrons to gain information on structure and composition at the cellular to molecular level. We provide GLP-compliant transmission electron microscopy (TEM) services for ultrastructural pathology as well as viral particle identification, tabulation, quantitation, and characterization in support of the FDA's Points to Consider (PTC) and Guidance documents, as well as the IHC Guideline Q5A(R1). Scanning electron microscopy (SEM) services provide additional topographic detail including the biocompatibility of device products such as ophthalmic implants or drug-eluting stents.

Our experienced staff can guide protocol design for the most appropriate fixation, collection, preparation, and evaluation of biologic samples to ensure sample integrity. Our dedicated EM laboratories feature multiple electron microscope rooms with chiller, processing and microtomy rooms, a darkroom, and digital cameras. On-site veterinary pathologists and technical specialists take advantage of these facilities to offer complete histopathology services.



Applications

- Characterization of animal models
- Proof-of-concept
- Detection and characterization of on/off target tissue, cell, and organelle changes
- Understanding mechanism of action
- Investigation of light microscopic changes
- Characterization of red blood cell morphology
- Investigation of nanomaterial structure and tissue interaction
- Detection of surface deposits and changes
- Cell culture contamination identification
- Biomanufacturing process validation
- Elemental analysis of medical devices
- High-throughput counting of full and empty AAV capsids
- Detection of subcellular therapeutic targets

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 using the low vacuum (low resolution) mode or high vacuum (high resolution) mode. For low vacuum mode, wet tissue samples for SEM are processed, dried with a critical point dryer, placed on a specimen stub and sputter-coated with gold or gold/palladium alloy before microscopic examination. 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 and reviewed by our veterinary pathologists. Elemental sample composition analysis utilizing energy-dispersive X-ray spectroscopy (Edx) technology can also be performed and reported.

Transmission Electron Microscopy (TEM)

Ultrastructural morphology procedures on ultra-thin sections (50nm – 90nm) enable the visualization of unique details of the structure and the quantification of subcellular organelles, test material, or inclusions. TEM specimen preparation, which includes processing, embedding, semi-thin and ultra-thin sectioning, and staining, is critical to visualization at the cellular to molecular levels. This imaging technique gives investigators precise data on mitochondria, peroxisomes, smooth and rough endoplasmic reticulum, Golgi cytoskeletal components, cytoplasmic granules, and inclusion bodies, which assist in determining a compound's mode of action and understanding the pathogenesis of toxicologically-related lesions. Our investigators perform a variety of ultrastructural analyses, ranging from simple qualitative evaluations quantification of organelle or other subcellular number, area, or volume by morphometry or stereology. Lesions at the sub-cellular level, not visible by light microscopy in standard H&E sections, can be observed to identify any likely pathogenic mechanisms. Additional state-of-the-art techniques include immuno-EM to detect subcellular localization of test article and high-throughput quantification of full and empty AAV capsids for cell and gene therapy studies.

Contact Us for any of your Pathology needs or to speak with one of our expert Pathologists.