

## PATHOLOGY and IMAGING

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Pathology analysis and sophisticated imaging methods have become increasingly important as the emphasis on translational research has grown. These methodologies also are critical for studies using animal models. Among the services provided by the Pathology and Imaging module are advanced histology, light and electron microscopy, image analysis, image processing and quantitative morphometry of tissue sections and cultured cells. It also is responsible for the collection and maintenance of tissue specimens and providing quality state of the art instrumentation and expertise in labeling and analyzing samples.

### **Tissue processing**

Samples (tissue or cell cultures) will either be fixed by the technician or by the investigator's laboratory personnel if processing is restricted because of a timed tissue culture experiment or need for fresh surgical material. The technician will embed samples in either paraffin, glycol methacrylate, Epon, OCT or gelatin; cut sections and mount them on slides. Routine histochemical staining will be performed to assess the morphological quality of the sections.

### **Immunocytochemical and histochemical evaluations**

Our technician will help the investigator perform post-fixation labeling studies by either labeling the specimen for the client and/or providing guidance. The client will provide any primary antibodies and the core module will provide any secondary antibodies and/or linkers (e.g. streptavidin) necessary for visualization by light, fluorescence, or transmission electron microscopy. Expertise is available for a variety of labeling procedures.

### **Image acquisition**

The Pathology and Imaging core director and the client will review the processed samples to determine their experimental value. Based on their opinion, either the technician or the investigator will acquire the images. If specific images or knowledge is required to select fields, the client or an individual from his/her lab, will be taught how to acquire the image.

The module also will provide assistance for processing the images (printing, labeling with arrows, labels, legends, etc.) using PhotoShop or some other printer management software. Publication quality prints can be provided as either high quality prints (black and white or color) or an electronic file on a Zip disk, CD or DVD. All original images can be stored and easily catalogued by the module or the client investigator.

### **Morphometry**

The Pathology and Imaging module also can conduct qualitative and quantitative morphometry utilizing well-established histologic measures. Ganglion cell loss, apoptosis, loss of cell contacts, changes in cell morphology or the organization of the cellular matrix can be measured. For example, laser protection of retinal ganglion cells in experimental glaucoma can be determined by localizing the positions of surviving ganglion cells on serial sections through the laser spots and performing mathematical 2-D reconstructions and 3-D density plots.