

## **Lab 5: Histological Examination of Biomaterials Implanted *in vivo*: Graduate Student**

In this lab students will learn about histological staining and examination of cells and tissues. This lab will focus on the cells prevalent in the foreign body response such as neutrophils, macrophages and foreign body giant cells. Students will use microscopy techniques to investigate polyanhydrides that were implanted *in vivo* in a murine femoral defect model.

Rather than participate in the traditional lab that the undergraduates will be performing, the graduate students will be conducting a research project, preparing a group presentation, and assisting the undergraduates in the lab section. This research project will count for one full lab grade (100 points) and even though it is a group project, grades will be assigned individually based on: the final project, each student's section of the project, participation and assistance with the undergraduates during the lab section, and anonymous peer evaluation.

The research project will be divided up into five sections. Each student will be responsible for covering one of the following sections:

- 1) Fixing/embedding and sectioning
- 2) Staining with Hematoxylin and Eosin, Toluidene Blue/Fast Green, LacZ
- 3) Staining with Alcian Blue/Orange G, TRAP, Gram staining
- 4) Staining with Mason's Trichrome, Safranin O/Fast Green, Von Kossa
- 5) Immunohistochemistry/immunostaining

Students will need to prepare:

- A presentation for their section (≤5 minutes) and associated powerpoint slides. This presentation should cover the different methods available, a rough outline of procedure for the method, and how to interpret results. The slides and presentation should be assembled into one uniform presentation, and will be presented at the beginning of each lab section. As the grad students are split between the two days, you will need to teach each other your slides so that the entire presentation can be given each day even though not everyone is present.  
**Due:** 4/9 and 4/10
- A brief writeup about your section. This should be 1- 2 pages/section and will be given to the undergraduates to help them understand histology. While each student is responsible for writing their own section, all the sections should be compiled into a well formatted, uniform document for submission.
  - The two stains that we will be looking at in the lab are H&E and AB/OG, so it is very important that whoever gets sections 2 & 3 do a good job explaining how to look at these stains, and what the different colors indicate.  
**Due:** 4/2
- A "histological interpretation" worksheet for the undergraduates to use when investigating the slides in lab section. This should help guide students in their analysis of the slides- what are the important characteristics they should be looking for with each stain? What are important aspects of the healing process and foreign body response that they should be looking for? We will be requiring the undergraduates fill these out and submit them with their lab reports, as evidence that they considered all the important aspects of the histological results. It should not be more than a page long.  
**Due:** 4/2

Anonymous feedback on the performance of and contribution by your team members. All documents should be submitted electronically. The histology slides which will be used in lab will be available, as they might be helpful in designing the worksheet.