## Myology Course 2015 – Lab Descriptions

### Basic electromyography and nerve conduction studies in mouse models
Participants will learn the basic concepts of electrophysiological recordings of peripheral nerve and muscle for clinical and preclinical assessment of neuromuscular function.  Interpretation of the parameters commonly assessed for axonal function and action potential propagation will be reviewed.  Standardized approaches for sciatic motor nerve conductions and electromyography will be demonstrated in a hands-on manner.
Course size:  12 participants
Instructor: Dave Arnold

### Advanced electromyography and nerve conduction studies in mouse models
The principles of motor unit number estimation (MUNE) will be reviewed. The key steps to performing MUNE will be presented, and the potential pitfalls will be highlighted.  Our standardized approach for sciatic MUNE will be demonstrated in a hands-on manner. Depending on time and interest neuromuscular junction techniques including repetitive nerve stimulation/SFEMG may be presented as well.
Course size: 8 participants
Instructor: Dave Arnold

### Introduction to Flow Cytometry to Study Muscle Progenitor Cells
Participants will learn the basics of cell visualization and isolation using a Fluorescence activated cell sorter. This course will go over the essential parts of the machine, technical parameters that are essential for experimental success, how to properly design a cell sorting experiment, how to set gates for cell isolation and check for sample purity, and how to analyze data with the FlowJo Software. Participants will be able to see the actual internal components of a cell sorter. They will learn about the importance of proper machine calibration and sample compensation.
This course does **not** include a demonstration on how to prepare mononuclear cell preparations from muscle, although a detailed protocol will be provided. Participants interested in learning how to process muscle samples to isolate mononuclear cells are strongly encouraged to also take the wet lab on muscle fiber and cell isolation provided by the Guttridge lab.
Course size: 8 participants
Instructor: Federica Montanaro

### Intramuscular, Intravascular, and Intracoronary Injections in Mice: A Primer
Participants will be introduced to 3 routes of delivery for viral (or other) agents in mice in this hands-on course. Intramuscular injections will target the tibilias anterior, gastrocnemius and quadriceps muscles while systemic delivery will focus on intraperitoneal and intravenous injections. Specialized delivery routes will also be covered including cardiac delivery and isolated limb perfusion.
Course size: 12 participants
Instructor: Louise Rodino-Klapac and associated staff

### Muscle Histopathology
Students will learn the importance of proper muscle biopsy processing by experiencing the technical aspects of the trade (hands-on). We will start with the optimal surgical practices and tissue requirements for a thorough panel of testing. This course will highlight the significance of tissue handling, precise freezing methods and cryostat sectioning. These techniques can be applied to both human and animal tissues. Students will also gain the knowledge of special staining and analyzing approaches used for the diagnosis of neuromuscular disorders.
Course size: 12 participants
Instructor: Sarah Lewis

### Zebrafish Wet Lab
The zebrafish lab will teach students how zebrafish are used to study neuromuscular diseases and give them some hands-on experience. Students will first get a short lecture describing the basics of zebrafish development and genetics and experimental approaches. They will then go into the zebrafish facility and see how zebrafish are maintained and bred. They will collect embryos, sort them, and remove their chorions. They will examine different stages of zebrafish under the compound microscope, look at structures, and analyze transgenic lines highlighting the neuromuscular system. They will then learn how to inject adult fish with EdU to look at dividing cells.
Course size: 12 participants
Instructor: Christine Beattie

### Primary Myoblast/Myotube Preparations
Participants will learn how to isolate muscle mononuclear cells from intact mouse muscle in this hands-on course. Methods for culturing both mouse and human muscle mononuclear cells will be discussed, including ways to enrich mononuclear cell preps for myoblasts and methods for differentiating myoblasts into myotubes.
Course size:  12 participants
Instructor: Denis Guttridge

### Single Myofiber Preparation
Participants in this course will learn to isolate and culture single muscle fibers in this hands-on lab. Single fibers are useful in the study of muscle mononuclear cells. Fixation and staining of single fibers will also be discussed.
Course size:  12 participants
Instructor: Denis Guttridge

### Detection methods for muscle protein post-translational modifications
Participants will learn the theory and practice of gel based methods to detect and quantify muscle protein post-translational modifications. The discussion will primarily focus on phosphorylation, but will also include methods to detect general post-translational modifications, S-nitrosylation and oxidation. Detailed methods and hands on techniques will include sample preparation, basic SDS-PAGE and Western blot, fluorescent imaging, ingel and offgel 2-D IEF and advanced gel detection techniques (phos-tag, biotin switch).
Course Size: 12 participants
Instructor: Brandon Biesiadecki

## Muscle Physiology Lab

This course will give a survey of the various methods that can test cardiac and skeletal muscle function.  We will discuss the various levels at which function can be tested, and highlight differences between various approaches.  This will be complemented by a small group demonstration in the lab of several of the techniques that can be used to assess contraction in isolated muscle preparations from the mouse heart and murine skeletal and diaphragm musculature.
Course size: 15 participants
Instructor: Paul Janssen

## Ventricular Myocyte Isolation

This course will demonstrate techniques for isolation of living ventricular myocytes. These cells can subsequently be used for functional measurements which will be discussed.
Course size: 15 participants
Instructor: Mark Ziolo