

HRC APOM Research Laboratories- CA-1 Rotation

Name: _____

Dates: _____

Overall Objective: Residents will rotate through APOM Core Molecular Research Laboratories at Hatfield Research Center (HRC5) for 1-2 weeks at the end of their CA-1 year to familiarize themselves with molecular and cell-based research projects and methodology.

Specific Goals:

- Obtain an overview of studies conducted at HRC through meetings with PIs, postdoctoral fellows and research assistants.
- Obtain an overview of background studies through reading and discussion of selected articles.
- Obtain an overview of OHSU's Responsible Conduct of Research (RCR) guidelines through the completion of educational modules 1-6, specifically as it relates to tissue cultures and research with radioactive isotopes, recombinant DNA and viral vectors <http://www.ohsu.edu/research/rda/rcr.shtml>
- Obtain an overview of basic principles and techniques of molecular biology used at HRC. Observe and learn at least one technique:
 - Sample preparation: DNA, RNA and protein extracts
 - Cell fractionation, density gradient and differential centrifugation: cytosolic, nuclear and mitochondrial compartment separation
 - Gene expression analysis techniques: Northern blot, RNase protection assay, RT-PCR
 - Protein expression and activity assays: Western blot and immunoprecipitation
 - Mapping and localization techniques: ICC, IHC and ISH
 - Protein/DNA interactions: EMSA, ChIP
 - Probe selection: cDNA probes, riboprobes, primers and antibodies
 - Labeling: radioactive, fluorescent, GFP, enzyme based (alkaline phosphatase, peroxidase), luciferase and ethidium bromide
 - Imaging techniques: UV transillumination, autoradiography, phosphoroimager, fluorescent microscopy, chemiluminescence and spectrophotometry
 - Plasmid construction, bacterial cloning, propagation and isolation
 - In vitro gene delivery and transduction: DNA transfection, lipofectin, TAT fusion protein
 - Gene promoter activity reporter assay (luciferase)
- Observe and learn basic cell culture procedure: aseptic techniques, cell harvesting and plating, feeding and maintaining cultures, passaging.
- Observe and learn the principles of in-vitro modeling of neural injury, signaling and cell-cell interactions in primary cultured neurons and astrocytes
- Observe and participate in data collection and analysis (perimetry, grain counting g and densitometry using MCID and ImageQuant)
- Observe and participate in data management and presentation (Excel and Powerpoint)

- Observe and learn basic bioinformatics strategies: acquisition of genomic and mRNA sequences through accession and search of public databases (GenBank, UniGene and PubMed), Blast homology search, sequencing and PCR primer selection (Oligo) and gene promoter consensus DNA binding site search (SD Gene)
- Attend relevant Wednesday research conference, special seminars and journal club taking place during the rotation
- Select and complete a project (*two-week rotation only*):
 - Journal Club presentation: critically evaluate and present an original research article, which uses a molecular approach to answer a clinically relevant research question.
 - Background and previous studies
 - Research question
 - Experimental approach
 - Methodology
 - Summary of results
 - Conclusions and clinical implications
 - Unanswered questions
 - Review article: critically review literature and summarize studies examining molecular and cellular mechanisms of disease and actions of drugs and anesthetics. An example includes:
 - Introduction
 - Summary of clinical studies
 - Summary of animal studies
 - Summary of cellular and molecular studies
 - Integration: synthesize information in a unified conceptual framework, pointing out consistencies and discrepancies
 - Future studies: propose new approaches, unanswered questions etc
 - Research proposal: draft a research proposal, which should include the following sections:
 - Clearly stated hypotheses and aims
 - Background and Significance
 - Experimental design and methods
 - Proposed plan for data collection, management and analysis, including statistical testing
 - Study procedures, protocols and measurements, followed by discussion of expected results, limitations and alternatives

Research Conference:

Anesthesia Research Conference

Wednesdays, 9-10 AM

3NW Classroom

Journal Club

3rd Tuesday of the month, 4-5 PM
OGI, Paul Clayton Bldg, room 401

PIs:

Nabil J. Alkayed, MD, PhD
Patricia Hurn, PhD
Ansgar Brambrink, MD
Paco Herson, PhD
Mingyue Liu, MD, PhD
Marjorie Grafe, MD

Lab manager:

JohnHromco, MS

Research Coordinators:

Robin Feidelson
Cindee Gray

Research Fellows:

Ines Korner, MD
Jian Chen, PhD

Research Assistants:

Jennifer Young, BS
Kristina O'Connor, BS
Ardi Ardeshiri, BS
Sufang Yang, MD
Nina Woodworth, MS
Xiao Jing Nie, BS
Nahideh Nilforoushan, MS