AN ORGAN SYSTEMS APPROACH TO EXPERIMENTAL TARGETING OF THE METABOLIC SYNDROME

Funded by the National Institutes of Health (GM-086771)
Who am I?

• Associate Director of the Vanderbilt Diabetes Research and Training Center
• Associate Director Vanderbilt Mouse Metabolic Phenotyping Center
  – Director Metabolic Physiology Core
• Research Interest: Impact of inflammation on carbohydrate and lipid metabolism
  – Canine and rodent models
Vanderbilt Short Course

• Disease focus
  – Obesity Epidemic
  – Disease that crosses multiple disciplines
    • Hypertension (cardiovascular system)
    • Diabetes (endocrinology and metabolism)
    • Behavior
    • Dyslipidemia and atherosclerosis
    • Cancer
  – Many coexist
    • Metabolic syndrome
Metabolic Syndrome

Risk Factors
• Insulin resistance
• Central obesity
• Dyslipidemia
• Hypertension
Goals

• Give students basic skills to evaluate whether a manipulation (genetic, dietary or pharmacologic) alters
  – Animal behavior
  – Cardiovascular system
  – Glucose and lipid metabolism
  – Energy balance
• Give principles in experimental design that takes into account species differences
• Understand the differences and similarities between humans and other mammals so investigators can begin to translate observations from the bench to the bedside and back
Why this course?

• Junior faculty setting up their lab
• Senior faculty having to expand their research direction
• Students and fellows working in labs in need of trainees with a more physiological training that their institution can not offer
• Educate students about the standard operating procedures generated by the MMPC so they do not repeat errors in the literature
Who has attended (includes 2011)?

- 30 graduate students
- 18 Postdoctoral fellows
- 2 instructors
- 10 faculty (6 Junior, 4 Tenured)
- 36 academic institutions
Vanderbilt’s Core System

- Diabetes Research and Training Center (DRTC)
  - Metabolic Physiology Shared Resource Core (Human, Rat and Dog)
  - Islet Procurement and Analysis Core

- Mouse Metabolic Phenotyping Center (MMPC)
  - Metabolic Pathophysiology Core
  - Subcore: Lipids, Lipoproteins, and Atherosclerosis

- Murine Neurobehavioral Laboratory (MNL)

- Institute of Imaging Science
  - Small animal imaging
Our course

- 10 day course
- Week 1 (Monday-Saturday)
- Week 2 (Monday-Thursday)
  - Lectures
  - 10 Laboratories
  - 9 Group Discussions

Vanderbilt Diabetes Center
www.vanderbiltdiabetes.org
Outline (Week 1)

• Monday –Tuesday
  – Animal behavior (rat and mice; Ip modified irwin screen)
  – Animal care (Autopsy, analgesia, anesthesia)
• Wednesday –Thursday
  – Glucose metabolism
  – Glucose tolerance tests (mice and dog)
• Friday
  – Islet physiology
  – Islet isolation and Characterization
  – Initiate energy balance lab
• Saturday
  – Cardiovascular/renal system
  – CV and glucose lab
Outline (Week 2)

• Monday
  – Lipid metabolism
  – Student presentations
• Tuesday
  – Pharmacology 101
  – Liver perfusion lab
  – Group Dinner at “Wildhorse Saloon”
• Wednesday
  – Energy balance
  – Experimental design
• Thursday
  – Advanced Imaging Technology
    • Echocardiography
    • Body composition
Day 1

8:00-8:30 Introduction and RCR Owen McGinness PhD
8:40-9:30 An overview of the metabolic syndrome in humans: Kevin Niswender MD, PhD
  
  Break
9:45-10:50 What is normal animal behavior? Fiona Harrison PhD
11:10-12:00 How to measure animal behavior and perform a neurological screen: Examples of therapeutics which alter behavior
Fiona Harrison PhD

12:00-1:00 Lunch:
1:00 Tour animal facility (MMPC and then walk over to Neurobehavioral core)

1:30-4:30 Lab I: Working with mice: Murine Neurobehavioral Laboratory

Vanderbilt Diabetes Center
www.vanderbiltdiabetes.org
When is it held?

• Last 2 weeks of July
  – July 18-29, 2011 (Filled)
  – July 16-26, 2012
Questions?