GNET 646: Principles and Experimental Approaches of Mammalian Genetics Spring 2013

Tuesday/Thursday 12:30-1:45 PM February 14 – March 21, 2013 Instructors: Fernando Pardo Manuel de Villena (<u>fernando@med.unc.edu</u>) Scott Bultman (<u>scott_bultman@med.unc.edu</u>)

Course goals: This module will focus on the laboratory mouse as a model organism to learn fundamental genetic concepts and understand how state-of-the-art experimental approaches are being used to elucidate gene function and the genetic architecture of biological traits. For Mendelian traits, there will be an emphasis on the importance of genetic screens and gene-targeting technologies to create allelic series. For quantitative genetics, there will be an emphasis on the genetic diversity of mouse strains and how this can be exploited to identify the molecular basis of complex traits. A common theme linking the Mendelian and quantitative parts of the course will be the development and analysis of mouse models of human disease for understanding basic mechanisms and for initiating translational studies in the pre-clinical setting.

Date	Торіс	Readings
Feb 14	Laboratory mouse as a model for mammalian genetics	
Feb 19	Mendelian genetics #1: inbred strains and experimental	
	crosses	
Feb 21	Mendelian genetics #2: From linkage analysis to	
	identification of causative variants	
Feb 26	Targeted genetic modification of the germline #1: general	
	concepts and transgenics	
Feb 28	Targeted genetic modification of the germline #2: Knock-ins,	
	knockouts, and conditional knockouts	
Mar 5	Complex traits #1: standard approaches	
Mar 7	Complex traits #2: genetic reference populations:	
	recombinant inbred lines and the collaborative cross	
Mar 9	Complex traits #3: Mutagenesis and outbred stocks	
Mar 21	Epigenetics	

Grading. Grades (H/P/L) are based 50% on participation and 50% on the final exam (due Thursday March 28th).

Honor Code: The final exam is take-home format. Students may not work together or consult one another.