UNC PHARMACY

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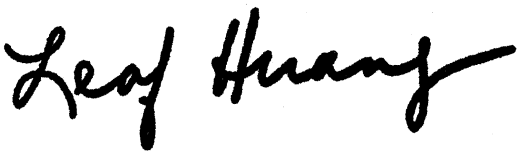
Advances in Drug Delivery

MOPH 864, Fall Semester, 2009

Tuesdays and Thursdays, 2:00 – 3:15 pm

Course Director: Leaf Huang, PhD



The course will be taught by a team of UNC and Duke faculty members.

Outlines of the course:

Block I: Transport and Macromolecules

Physical, chemical and physiological properties of barriers for drug transport will be discussed. For example, the intestine epithelial barrier will be discussed in detail in the context of oral drug absorption. Biochemistry and physiology of the blood brain barrier is another example. The basic physical and chemical properties of macromolecules will also be taught.

Block II: Advanced Drug Delivery Systems

Various drug delivery systems, such as liposomes, micelles, polymers, etc., will be discussed with emphasis in the mechanism of the design and the action. Drugs in development, such as siRNA and gene therapy, will be included.

MOPH 864 (3 CR)

Advances in Drug Delivery

(Fall Semester of 2009)

Coordinator: Leaf Huang, PhD

Instructors: Leaf Huang, Xiao Xiao and guest lecturers

Teaching Assistant

Description: Discuss basic physicochemical and transport properties of the drug with emphasis in macromolecular drugs and drug carriers.

Prerequisite: PHCY 410 (Basic Pharmaceutics I), PHCY 411 (Basic Pharmaceutics II), CHEM 430 (Introduction to Biological Chemistry), or equivalent, are required. Strong background in cell/molecular biology (BIOCHEM 505), immunology (MCRO 614), and pharmacology (PHCO 702, old 202) is desirable but not required. Basic knowledge in organic chemistry (e.g., CHEM 560, 466 and 467) and physical chemistry (CHEM 481) should be supplemented as needed basis.

Time and Place: Every Tuesday and Thursday from 2 till 3:15 PM in Beard 102

Textbook: No text book will be used. But the following books will be used as frequent reference.

B. Albert *et al.*, "Molecular Biology of the Cell," 3rd Ed., Garland, New York, 1994, or H. Lodish *et al.*, "Molecular Cell Biology," 5th Ed., Freeman & Co., New York, 2004.

References specific to a given subject will be distributed in advance. Background in chemistry may include: nature of chemical bond and molecular interaction, acids and bases, structure-chemical reactivity relationship, catalysis, and reactions involved in carboxylic acids, alcohols, and amines.

Examination: There will be a mid-term exam, contributing 25% to the final grade, and a final examination worth 50%. A term paper worth 25% will be due on **Dec 1**.

Lecture Schedule

Lecture No	Date	Topic (Instructor)
		I. Transport & Macromolecules
1	8/25T	Cell Membrane and Membrane Proteins (Huang)
2	8/27Th	Passive Diffusion and Transport (Huang)
3	9/1T	Endocytosis (Huang)
4	9/3Th	Transvascular Transport (Xiao)
5	9/8T	Transdermal Transport (Jay)
6	9/10Th	Transport in Tissues (Yuan)
7	9/15T	Lymphatics (Caron)
8	9/17Th	Blood Brain Barrier (Pollack)
9	9/22T	GI Epithelium (Thakker)
10	9/24Th	Lung Epithelium (Hickey)
11	9/29T	Hepatic Transport (Brouwer)
12	10/1Th	Structure & Function of Nucleic Acid (Jarstfer)
13	10/6T	Protein and Peptide Drugs (Xiao)
	10/8Th	**Mid-Term Exam (Lectures No 1-13)**
		II. Drug Carriers and Macromolecular Drugs
14	10/13T	Nanotechnology for Drug Delivery (DeSimone)
15	10/15Th	Liposomes and Stealth Liposomes (Huang)
16	10/20T	Polymer Drug Carriers (Huang)
	10/22Th	Fall Break, No Class
17	10/27T	Endosome Lysis Mechanism (Huang)
18	10/29Th	Immunoglobulins and Albumin as Drug Carriers (Cho)
19	11/3T	Antibodies & Ligands for Targeted Delivery (Rihe Liu)
20	11/5Th	Cell-Penetrating Peptides (Juliano)
21	11/10T	Oligonucleotides and Antisense Drugs (Juliano)
22	11/12Th	Non-Viral Gene Delivery I (Huang)
23	11/17T	Non-Viral Gene Delivery II (Huang)
24	11/19Th	Vaccine Formulations (Huang)
25	11/24T	Viral Vector I (Xiao)
	11/26Th	Thanksgiving Holiday, No Class
26	12/1T	Viral Vector II (Xiao)
27	12/3Th	Replication Competent Viruses (Xiao)
28	12/8T	Gene Therapy for Genetic Diseases (Xiao)
		Final Exam (All Lectures)