

# Drugs: Structure and Function

## 16:720:583

This course will provide a survey of the major pharmaceutical agents in clinical use. Emphasis will be placed on the influence of chemical structure in the elicitation of pharmacological effects.

### Topic Outline:

Lecture 1: Physicochemical Properties/Relation to Pharmacological Effects.

Lecture 2: Receptors/Enzyme Inhibitors/Classification of Drugs

Lecture 3-4. Drug Nomenclature

Lecture 5. Neurotransmitters and Neuroreceptors

a) Parasympathetic

i) nicotinic

ii) muscarinic

b) Sympathetic

i)  $\alpha_1$  receptors

ii)  $\alpha_2$  receptors

iii)  $\beta_1$  receptors

iv)  $\beta_2$  receptors

v)  $\beta_3$  receptors

Lecture 6. Cholinergic Agonists

a) Direct

i) Acetylcholine and related agonists

ii) Muscarinic/Nicotinic

b) Indirect

i) Reversible

ii) Irreversible

Lecture 7. Cholinergic Antagonists

a) Reversible

b) Irreversible

Lecture 8. Adrenergic Agonists

a)  $\alpha_1$  agonists

b)  $\alpha_2$  agonists

c)  $\beta_1$  and  $\beta_2$  agonists

d)  $\beta_2$  agonists

Lecture 9. Adrenergic Antagonists

a)  $\alpha_1$  antagonists

b)  $\beta_1$  and  $\beta_2$  antagonists

c)  $\beta_2$  antagonists

d) Partial Antagonist with ISA

Lecture 10. Cardiovascular Drugs I: Vasodilators

- a) Organonitrates
- b) Calcium Channel Blockers/Calcium Antagonists
- c) Miscellaneous Agents

- Lecture 11. Cardiovascular Drugs II: Drugs Effecting Renin-Angiotensin System
- a) ACE Inhibitors
  - b) Angiotensin II Receptor Antagonists
  - c) Renin Inhibitors
- Lecture 12: Cardiovascular Drugs III: Diuretics
- a) Thiazide Diuretics
  - b) Loop Diuretics
  - c) Potassium-sparing diuretics
  - d) Osmotic Diuretics
- Lecture 13. Cardiovascular Drugs IV: Cardiotonics and Antilipidemic Agents
- a) Cardiac Glycosides
  - b) Inotropes
  - c) Resins and Niacin
  - d) Fibrates (gemfibrozil, fenofibrate, bezafibrate, clofibrate)
  - e) Statins (Mevacor, Pravachol, Zocor, Lipitor)
- Lecture 14. Cardiovascular Drugs V: Antiarrhythmic Agents:
- a) Class Ia-c,II,III, and IV
  - b) Methods to Limit First Pass Metabolism
- Lecture 15. Antihistamines (H<sub>1</sub> antagonists)
- a) H<sub>1</sub> antagonists
  - b) Nonsedating Antihistamines
- Lecture 16. Agents for the Treatment of Peptic Ulcers
- a) H<sub>2</sub> Antagonists
  - b) Proton Pump Inhibitors
- Lecture 17. CNS Stimulants
- a) Antinarcotics
  - b) Anorexics
  - c) Antidepressants
- Lecture 18. CNS Depressants I
- a) Barbiturates
  - b) Benzodiazepines
- Lecture 19. CNS Depressants II
- a) Antiepileptics
  - b) Antipsychotics
- Lecture 20. Narcotic Analgesics
- Lecture 21. Nonsteroidal Anti-inflammatory Agents (NSAIDs)
- Lecture 22. Antibacterial Agents I
- Lecture 23. Antibacterial Agents II
- Lecture 24. Antiviral, Antifungal, and Antiprotozoal Agents

- Lecture 25. Cancer Chemotherapeutic Agents I  
a) Antimetabolites  
b) Alkylating Agents
- Lecture 26. Cancer Chemotherapeutic Agents II  
a) Mitotic Inhibitors and Stabilizers  
b) Topoisomerase Inhibitors
- Lecture 27. Steroids I  
a) Nomenclature  
b) Mineralocorticoids
- Lecture 28. Steroids II  
a) Glucocorticoids  
b) Sex Hormones

## **TEXTBOOKS**

### **Required**

*Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry*, 10<sup>th</sup> Edition, Edited by J.N.Delgado and W.A. Remers, J.B.Lippincott, Philadelphia, 1998.

### **Other Reference Textbooks**

*Principles of Medicinal Chemistry*, Fourth Edition, William O. Foye, Thomas L. Lemke, and David A. Williams, Lea & Febiger, Philadelphia, 1995.

*Medicinal Chemistry Principles and Practice*, F.D. King, The Royal Society of Chemistry, 1994

*Pharmacology*, Mary J. Mycek. Richard, A. Harvey, and Pamela C. Champe, 2<sup>nd</sup> Edition, Lippincott-Raven Publishers, Philadelphia, 1997.

## **CITERIA FOR GRADING**

There will be two exams that will be given outside of the planned lecture schedule. The mid-term exam will cover lectures 1-14. The final exam will be based upon material associated with lectures 15-28. These exams will count equally toward the student's final grade.