

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) α_1 receptors

ii) α_2 receptors

iii) β_1 receptors

iv) β_2 receptors

v) β_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) α_1 agonists

b) α_2 agonists

c) β_1 and β_2 agonists

d) β_2 agonists

Lecture 9. Adrenergic Antagonists

a) α_1 antagonists

b) β_1 and β_2 antagonists

c) β_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 (H₁ antagonists)
 - a) H₁ antagonists
 - b) Nonsedating Antihistamines
- Lecture 16. Agents for the Treatment of Peptic Ulcers
 - a) H₂ 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, 10th 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, 2nd 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.