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: Antiarrythmic 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) Antinarcoleptics
   b) Anorexients
   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 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


Other Reference Textbooks

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


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.