



Association for Medical School Pharmacology

Knowledge Objectives in Medical Pharmacology - 2002

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AUTOCOIDS/NONSTEROIDAL ANTIINFLAMMATORY/ASTHMATIC DRUGS



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Drug List



First Edition

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1. Histamine (0.5 hr)

- Distribution and synthesis
- Storage and release (immunologic and nonspecific)
- Metabolism and elimination
- Receptors (H1, H2 and H3)
- Pharmacologic actions: smooth muscles, exocrine glands, cardiovascular, and sensory nerve endings

2. Antihistaminic Drugs (1 hr)

- Mechanisms of action: on receptor subtypes

- a. Mechanisms of action: on receptor subtypes (H1, H2 and H3)
- b. Pharmacological properties and side effects (desirable/adverse)
- c. Therapeutic uses

3. Anti-motion Sickness Drugs (0.5 hr)

- a. Understand the mechanisms of motion sickness and the differences in mechanism and action between the phenothiazine neuroleptics and those drugs that affect the vestibular pathway.

4. Serotonin (5-HT) and Pharmacology of Migraine (0.5 hr)

- a. Distribution and synthesis
- b. Storage and release
- c. Metabolism, elimination
- d. Receptors
- e. Pharmacological actions (cardiovascular, cerebral vasculature, gastrointestinal, sensory neurons)
- f. Treatment of migraine (drugs for prophylactic and abortive therapies, relative efficacies, their pharmacokinetics and adverse effects, and primary cellular sites of action)
- g. Treatment of chemotherapy-induced emesis

5. Nitric Oxide, Donors and Inhibitors (0.5 hr)

- a. EDRF
- b. Synthesis (nNOS, eNOS, iNOS); constitutive

b. Synthesis (nNOS, eNOS, iNOS); constitutive vs inducible

c. Pharmacological actions (cGMP; vasculature; erectile dysfunction etc)

6. Eicosanoids (0.5 hr)

a. Synthesis of prostaglandins, thromboxanes, and leukotrienes from arachidonic acid. Know which are the key enzymes in the overall pathway and what drugs affect each enzyme.

b. Pharmacological actions of PGE₂, PGF₂, PGI₂ (PROSTACYCLIN), TXA₂, and the leukotrienes (LTA₄ thru LTE₄): vascular, airway, uterine, and GI smooth muscle; microvascular permeability; platelet function; sensory nerve endings; gastric and intestinal secretions; temperature regulation center.

c. Termination of action.

7. Treatment of Asthma (1.0 hr)

a. Know the disease process of asthma involving airway inflammation, bronchial smooth muscle constriction and mast cell degranulation

b. Mediators (histamine, acetylcholine, proteases, leukotrienes C₄, D₄; prostaglandins; cytokines)

c. Describe the mechanisms of action, adverse effects of each anti-asthmatic drug

d. Know the routes and limitations of drug administration, systemic and inhaled

e. Describe the types of therapy available: short term relief and long-term control

8. Hypersensitivity and Immunopharmacology (0.5

8. Hypersensitivity and Immunopharmacology (0.5 hr)

- a. Role of immunoglobulins (IgE, IgG, IgM) in drug allergy
- b. Differentiate different types of allergic reactions (Type I-IV) and factors (e.g. cytokines, MHC) involved
- c. Learn the release of allergic mediators, and process leading to hypersensitivity
- d. Understand the site of action of selected immunosuppressive agents on the immune response.

9. Bradykinin (0.5 hr)

- a. Synthesis and metabolism of kinins: know what pathophysiological factors trigger kinin formation and how bradykinin can influence the eicosanoid and EDRF pathways.
- b. Pharmacological actions: compare and contrast with actions of histamine and eicosanoids.

10. Analgesic, Antipyretic, Antiinflammatory Drugs (2.0 hr)

- a. Antipyretic-analgesic drugs
 - 1) Understand the physiological basis of body temperature control and peripheral sensory pain fibers.
 - 2) Understand the role of eicosanoids and bradykinin in causing local pain, edema and fever.
 - 3) Opiate analgesics (morphine, etc.) are covered under CNS drugs.

drugs.

4) Understand the difference in mechanisms of action between acetaminophen and aspirin.

5) Compare the pharmacological properties of acetaminophen and aspirin.

6) Understand the metabolism of acetaminophen, the role of cytochrome P450, and the mechanism of acetaminophen toxicity, as well as its reversal by N-acetylcysteine.

7) Understand the adverse effects of aspirin, as well as the acute toxic effects of aspirin overdose.

8) Understand the factors that affect the absorption and elimination of aspirin.

9) Understand the hepatic metabolism of aspirin.

10) Understand the potentially detrimental consequences of plasma protein binding, zero-order metabolism, and irreversible cyclooxygenase inhibition shown by aspirin.

11) Understand the adverse drug interactions possible with aspirin (coumadin anticoagulants, oral hypoglycemic drugs, alcohol, others).

12) Understand the principles of treatment of salicylate intoxication.

b. Antiinflammatory drugs (NSAIDs and glucocorticoids)

1) Understand the pathophysiology of acute and chronic inflammation.

2) Understand the adverse effects

- 2) Understand the adverse effects and potential adverse drug interactions associated with inhibition of the COX1 pathway. Understand the significance of COX2.
- 3) Glucocorticoids are covered under steroid hormones

c. Disease-Modifying Anti-Rheumatic Drugs (DMARDs)

- 1) Understand that these drugs have no analgesic or antipyretic activity; their mechanisms of action are largely unknown.
- 2) Understand that their onset of action is very long and the drugs are very toxic.
- 3) Understand the role of TNF in chronic inflammation.

d. Drugs used to treat gout

- 1) Understand the causes and pathophysiology of acute gouty arthritis and chronic tophaceous gout.
- 2) Compare and contrast the mechanisms of action of colchicine, allopurinol, probenecid, and sulfinpyrazone.
- 3) Understand the dangerous side effects of colchicine.
- 4) Understand the cause and treatment of acute gouty flare-ups associated with the use of allopurinol or probenecid in treating chronic tophaceous gout.
- 5) Understand that NSAIDs except aspirin may be used as substitutes for colchicine. Why is aspirin contraindicated?

contraindicated?

6) Understand the potential adverse drug interactions with allopurinol (i.e. 6-mercaptopurine).

11. Pharmacology of Migraine (0.5)

- a. Discuss the classes of drugs used to treat patients with migraine headache, their primary cellular sites of action, and their relative efficacies as prophylactic vs abortive therapy.
- b. Discuss pharmacokinetic aspects of abortive therapy for migraine.
- c. List the major adverse effects of ergot alkaloids used the treatment of migraine, and supmatriptan and related drugs.