Chapter 12
Drug and Chemical Classes

Learning Objectives

- List, describe drugs paramedic may administer according to local protocol
- Integrate pathophysiologic principles of pharmacology with patient assessment
- Synthesize patient history information, assessment findings, form field impression

Learning Objectives (Cont'd)

- Discuss analgesic medications class, including prescription, nonprescription medications
- Discuss anesthetics, including types, administration routes, indications
- Discuss serums, vaccines, antidotes
Learning Objectives (Cont’d)

- Discuss antiinfective agents, including antibiotics, antivirals, antifungals, antiparasitic agents
- Discuss antineoplastic drugs
- Discuss vitamins, minerals
- Discuss fluids, electrolytes

Learning Objectives (Cont’d)

- Discuss, give examples of anxiolytics, antidepressants, mood stabilizers, antipsychotics
- Discuss, give examples of anticonvulsant drugs
- Discuss, give examples of muscle relaxants

Learning Objectives (Cont’d)

- Discuss central nervous stimulants
- Discuss Parkinson’s, Alzheimer’s disease drugs
- Discuss drugs affecting parasympathetic division of autonomic nervous system
Learning Objectives (Cont'd)

- Discuss drugs affecting sympathetic division of autonomic nervous system
- Discuss drugs affecting cardiovascular system, including antiarrhythmics, antihypertensives, vasodilator agents
- Discuss anticoagulants, fibrinolytics, blood components

Learning Objectives (Cont'd)

- Discuss antihyperlipidemic drugs
- Discuss oxygen, mucokinetic, bronchodilator drugs
- Discuss drugs affecting renal system
- Discuss drugs affecting gastrointestinal system

Learning Objectives (Cont'd)

- Discuss drugs affecting eyes, ears
- Discuss drugs affecting endocrine system, including hormone
- Discuss uricosuric drugs
- Discuss drugs affecting reproductive system
Learning Objectives (Cont’d)
- Discuss drugs affecting immunologic system
- Discuss dermatologic preparations
- Discuss drugs of abuse, including alcohols, amphetamines

Learning Objectives (Cont’d)
- Discuss environmental chemicals, including herbicides, rodenticides, insecticides
- Discuss toxic substances, including alcohols, heavy metals, household chemicals, hazardous materials

General Information
- Understanding terminology
  - Indication
  - Contraindication
  - Dosage always checked against protocols, medical direction
- Overdose
  - Depends on drug properties
  - Check for bottles, pills, needles
  - Contact Poison Control
General Information (Cont’d)

- Treatment
  - Airway, vital signs monitored
  - IV access
  - 12-lead ECG
  - Pulse oximetry
  - Gastric lavage
  - Activated charcoal

Medications for Multisystem Application

Analgesics & Antipyretics

- General
  - Analgesia
    - Interactions with other medications patient takes
    - Current physiologic status
    - Follow local protocols
  - Assess pain
Analgesics & Antipyretics (Cont’d)

• Nonprescription analgesics
  ➢ Acetaminophen (Tylenol)
  ➢ Acetylsalicylic acid (aspirin)
  ➢ Toxicity
    ➢ 200-500 mg/kg

Analgesics & Antipyretics (Cont’d)

• Nonprescription analgesics
  ➢ Nonsteroidal antiinflammatory drugs
    ➢ Treat acute, chronic inflammatory conditions
    ➢ Inhibit synthesis, actions of prostaglandins
    ➢ Ibuprofen, naproxen sodium
    ➢ Toxicity

Analgesics & Antipyretics (Cont’d)

• Opioid agonists
  ➢ Phenanthrenes
  ➢ Phenylethylamine
  ➢ Phenylpiperidines
Analgesics & Antipyretics (Cont’d)

- Opioid analgesic combination products
  - Combine nonprescription analgesics with lower potency narcotic
  - Acute pain
  - Abused, street value

Analgesics & Antipyretics (Cont’d)

- Partial opioid agonist
- Opioid antagonists

Anesthetics

- General
  - CNS depressants
  - Types
    - General
    - Regional
    - Local
Anesthetics (Cont'd)

- General
  - Levels of sedation/analgesia
    - Minimal
    - Moderate
    - Deep
    - General anesthesia

Anesthetics (Cont'd)

- General
  - Stages of general anesthesia
    - Analgesia
    - Excitement
    - Surgical anesthesia
    - Medullary depression/paralysis

Anesthetics (Cont'd)

- General
  - General anesthesia types
    - Inhalation
    - Intravenous
    - Local
Anesthetics (Cont’d)

• Specific considerations
  ➢ Rapid-sequence intubation
  ➢ Conscious sedation
  ➢ Anxiolysis
  ➢ Medications used
    • Etomidate
    • Fentanyl

Immunizations, Vaccines, & Immunoglobulins

• Tetanus
  ➢ Bacterial disease transmitted through cuts, puncture wounds
  ➢ Booster every 10 years
• Bacterial immunizations
  ➢ Close quarters, prisons, work camps, military
  ➢ Haemophilus influenzae type B

Immunizations, Vaccines, & Immunoglobulins (Cont’d)

• Viral immunizations
  ➢ Hepatitis A, B, influenza, rabies, rubella, varicella, measles, mumps
• Immunoglobulins
  ➢ Preformed antibodies to specific virus, bacteria
• Antidotes
  ➢ Chemical, counteracts poison
Antiinfective Drugs

- Antibiotics
  - Penicillins
  - Cephalosporins
  - Macrolides
  - Tetracyclines
  - Miscellaneous

Antiinfective Drugs (Cont’d)

- Antifungal agents
  - Infection causes distress, immunocompromised
  - Distress after antibiotic therapy
  - Fungi

Antiinfective Drugs (Cont’d)

- Antiviral agents
  - Viruses cannot replicate, reproduce on own
    - Use human cell as host
  - Influenza
  - Herpes
  - HIV
- Antimalarial agents
  - Malaria
    - Single-celled parasite, transmitted by mosquitoes
Antiinfective Drugs (Cont’d)

- Antituberculotic agents
  - Mycobacterium tuberculosis
    - Affects lungs, spreads systemically
    - Inhaling infected droplets, TB

Antiinfective Drugs (Cont’d)

- Antimebiasis
  - Amoeba
  - Intestines
  - Entamoeba histolytica
  - Drinking contaminated water

Antiinfective Drugs (Cont’d)

- Antihelminths
  - Parasite
  - Contaminate pets, livestock, water
  - Intestine
  - Symptoms
  - Treatment
  - Toxicity
Antiinfective Drugs (Cont’d)

- Leprostatic agents
  - Bacterium characterized by skin lesions, peripheral nerve damage, progressive debilitation

Antiinfective Drugs (Cont’d)

- Antineoplastic agents
  - Treats cancer

Vitamins & Minerals

- Fat-soluble vitamins stored in body fat, can cause toxicity in excess
  - A, D, E, K
- Water-soluble vitamins
  - C, B
Fluids & Electrolytes

- Cystalloid solutions
  - Normal saline
  - Ringer’s lactate
  - D5W
  - Half normal saline

Drugs that Affect the Nervous System

Drugs for Treating Psychiatric Disorders

- Anxiolytics
  - Benzodiazepines
    - Anxiety
    - Muscle spasm
    - Convulsions
    - Sedation
    - Antidote
      - Flumazenil
Drugs for Treating Psychiatric Disorders (Cont’d)

- Anxiolytics
  - Barbiturates
    - Ultra-short acting
    - Short acting
    - Intermediate acting
    - Long acting

Drugs for Treating Psychiatric Disorders (Cont’d)

- Antidepressants
  - Overview
    - Depression
    - Bipolar disorder
    - Mood disorders
    - Smoking cessation

- Anxiolytics
  - Selective serotonin reuptake inhibitors (SSRIs)
    - Depression, anxiety, OCD, bulimia
    - Block uptake serotonin at nerve synapse
    - Overdose symptoms
Drugs for Treating Psychiatric Disorders (Cont’d)

- Anxiolytics
  - Tricyclic antidepressants
    - Block reuptake of norepinephrine
    - Prolongs compound life
    - Life threatening in overdose

- Monoamine oxidase inhibitors
  - Organic compounds include neurotransmitters in human brain
  - Dopamine, epinephrine, norepinephrine, serotonin
  - Prevent breakdown of monamine neurotransmitters, boosts mood

- Other antidepressants
  - Treat depression, anxiety

Drugs for Treating Psychiatric Disorders (Cont’d)

- Mood stabilizers
  - Mania
  - Dangerous activities
  - Lithium
    - Decreased sodium in cell
Drugs for Treating Psychiatric Disorders (Cont’d)

- Antipsychotics
  - Treat psychosis, schizophrenia
  - Help regulate neurotransmitters
  - Primary action at dopamine receptors, block reuptake
  - Side effects
  - Types

Anticonvulsants

- Overview
  - Treat seizure disorders
  - Epilepsy
  - Depress neuron excitability, terminate abnormal neuronal discharges
- Hydantoins
  - Effective for most seizures, except absence
  - Phenytoin, Dilantin
  - Changes in sodium ion transport

Anticonvulsants (Cont’d)

- Barbiturates
  - Phenobarbital, central-acting depressant
- Succinimides
  - Treats seizures
  - Alter wave spikes
Anticonvulsants (Cont’d)

- Benzodiazepines
  - Initial active seizure control
    - Diazepam, lorazepam, midazolam
- Others
  - Preventative
  - Contact Poison Control, medical direction for overdose

Muscle Relaxants

- Physiology of muscle spasticity
  - Injury
  - Overexertion
  - Disc disease of spine
  - Tetanus
  - Illness

Muscle Relaxants (Cont’d)

- Central-acting skeletal muscle relaxants
  - Do not help healing, ease symptoms
  - Side effects
    - Dry mouth
    - Dizziness
    - Dryness
    - Lightheadedness
    - Restlessness
Muscle Relaxants (Cont’d)

- Direct-acting skeletal muscle relaxants
  - Hydantoin derivatives
  - Phenytoin
  - Inhibits release of calcium

CNS Stimulants

- Block neurotransmitters in brain
- Anorexiants
  - Suppress appetite for weight reduction
  - Side effects

CNS Stimulants (Cont’d)

- Amphetamines
  - Stimulate brain portion responsible for alertness
  - Narcolepsy
  - Attention deficit disorder
  - Controlled substances
Drugs for Specific CNS Peripheral Dysfunctions

- Parkinson’s disease
  - Precursors of dopamine
  - Brain disorder, nerve cells controlling movement damaged
- Alzheimer’s disease
  - Replace acetylcholine
  - Brain disease, affects memory

Drugs for Specific CNS Peripheral Dysfunctions (Cont’d)

- Huntington chorea
  - Imbalance between dopamine, acetylcholine
  - Progressive dementia, involuntary muscle movement

Drugs for Specific CNS Peripheral Dysfunctions (Cont’d)

- Drugs that affect dopamine
  - Anticholinergics
  - Monoamine oxidase inhibitors
  - Dopamine agonists
  - Dopamine substitute
Drugs Affecting ANS

- Drugs affecting cholinergic function
  - Cholinergic blocking drugs
  - Ganglionic stimulants
  - Ganglionic blocking drugs

Drugs Affecting ANS (Cont’d)

- Drugs affecting adrenergic function
  - Adrenergic drugs
  - Adrenergic blocking drugs

Drugs Affecting Cardiovascular System
Antiarrhythmics

- **General**
  - Treat, prevent cardiac rhythm disorders
- **Others**
  - Adenosine
  - Digitalis

Antihypertensives

- **Goals**
  - Reduce heart workload
  - Adequate blood pressure for tissue perfusion
  - No undesirable side effects
  - Permit long-term administration

Antihypertensives (Cont’d)

- **Diuretics**
  - Volume reduction in intravascular circulation
  - Loop diuretics
Antihypertensives (Cont’d)

Nephrons of Kidney: Sites of Action of Diuretics

- **Diuretics**
  - Thiazide diuretics
    - Lowers blood pressure
  - Potassium-sparing diuretics
    - Increases sodium, water loss in distal renal tube
  - Osmotic diuretics
    - Pull fluid into vascular space, increasing osmotic pressure

Antihypertensives (Cont’d)

- Adrenergic blocking medications
  - Beta-blockers
  - Centrally acting adrenergic inhibitors
  - Peripheral adrenergic inhibitors
Antihypertensives (Cont’d)

- Angiotensin-converting enzyme inhibitors
  - Affect renin-angiotensin-aldosterone system
  - Cardioprotective after myocardial infarction
- Calcium-channel blocking agents
  - Block calcium, prohibit vasoconstriction of vascular smooth muscle

Antihypertensives (Cont’d)

- Vasodilators
  - Peripheral blood vessel wall, causes dilation, inhibits constriction
  - Decrease blood pressure
  - Other agents
    - Monoamine oxidase inhibitors
    - Ganglionic blocking agents

Anticoagulants, Fibrinolytics, & Blood Components

- Treat strokes, myocardial infarctions
- Anticoagulants
  - Prevent blood clots
  - Antiplatelet agents
  - Anticoagulant agents
Anticoagulants, Fibrinolytics, & Blood Components (Cont’d)

- Fibrinolytic therapy
  - Dissolve clots
  - Reestablish blood flow through blocked blood vessel
- Risks
  - Increased bleeding
  - Intracranial bleeding

Anticoagulants, Fibrinolytics, & Blood Components (Cont’d)

- Antihemophilic agents
  - Provide missing protein factor for clotting cascade
  - Desmopressin, factor VIIa, factor VII, factor IX
- Blood & blood components
  - Crystalloids
    - Attempt to replace volume
  - Colloids
    - Attempt to replace specific deficiencies

Antihyperlipidemic Drugs

- Reduce elevated cholesterol levels
- Decrease risk of atherosclerosis, coronary artery disease
- Usually have "statin" in name
Drugs Affecting Respiratory System

Drugs Used for Nasal Congestion
- Decongestants
  - Shrink swelling of nasal mucosa
  - Pseudoephedrine
- Antihistamines
  - Block effect of histamine, occupy receptor
- Cough suppressants

Mucokinetic Drugs & Expectorants
- Mucokinetic Drugs
  - Break down mucus, more watery
  - Some given by nebulizer
- Expectorants
  - Decrease adhesiveness, surface tension of respiratory secretions, make easier to cough up
Bronchodilators

- Sympathomimetics
  - Beta-selective agonists, beta₂-receptor activation

- Anticholinergics
  - Block acetylcholine action

Bronchodilators (Cont’d)

- Xanthine derivatives
- Leokotreine antagonists
- Prophylactic asthmatic drugs

Drugs Affecting Respiratory Center

- Oxygen
- Direct respiratory stimulants
- Reflex respiratory stimulants
- Respiratory depressants
Drugs Affecting the Urinary System

Renal System Dysfunction
- Medication metabolized, excreted through kidneys
- NSAIDS, contrast dye, aminoglycoside antibiotics can induce renal problems

Drugs Affecting Gastrointestinal System
Antacids

- Acid production controlled
- Buffer acid content, interact with hydrochloric acid

Antiflatulents

- Reduce formation of gas in gastrointestinal tract

Digestants

- Helps digestive process
Antiemetics

- Controls nausea, vomiting

Emetics

- Rarely used to induce vomiting after toxic digestion

Cannabinoids

- Appetite stimulant, pain medication
Cytoprotective Agents

- Protect lining of gastrointestinal tract

H₂ Receptor Antagonists

- Blocks histamine release in gastrointestinal tract, reduces gastric acid secretion
- Protect development of stress ulcers

Laxatives

- Increase excretion of stool
Antidiarrheals

- Diarrhea caused by change in diet, infection
- Available over-the-counter

Drugs Affecting Eye & Ear

Drugs Affecting Eye

- Antiglaucoma agents
  - Beta-blockers
  - Carbonic anhydrase inhibitors
  - Prostaglandin analogs
  - Sympathomimetics
  - Glaucoma
Drugs Affecting Eye (Cont’d)

- Mydriatic & cycloplegic agents
- Antiinfective/antiinflammatory agents

Drugs Affecting Eye (Cont’d)

- Topical anesthetic agents
  - Reduce eye pain without systemic effects
- Other ophthalmic preparations
  - Artificial tears, lubricants

Drugs Affecting the Ear (Cont’d)

- Antibiotics
- Antiinflammatory agents
- Analgesics
- Remove wax build-up
Drugs Affecting Endocrine System

Overview
- Controlled by hormones released from 1 organ, traveling to distant organ
- Complex cascades

Drugs Affecting Pituitary Gland
- Affect growth, intravascular volume maintenance, hormones
- Hormones of anterior, posterior pituitary gland exert important effects over entire body
Drugs Affecting Parathyroid & Thyroid Glands

- Regulate metabolic rate, normal growth, development
  - Thyroid function

Drugs Affecting Parathyroid & Thyroid Glands (Cont’d)

- Drugs affecting adrenal cortex
  - Secretes 3 major steroid hormones
    - Glucocorticoids
    - Mineralocorticoids
    - Sex hormones

Drugs Affecting Parathyroid & Thyroid Glands (Cont’d)

- Drugs affecting pancreas
  - Pancreas function
    - Glucocorticoids
    - Mineralocorticoids
    - Insulin
Drugs Affecting Musculoskeletal System

Uricosuric Drugs
- Colchicine
- Nonsteroidal antiinflammatory drugs
- Allopurinol

Drugs Affecting Reproductive System
Drugs Affecting Female Reproductive System

- Contraception
- Ovulatory stimulants & drugs used for infertility

Drugs Affecting Female Reproductive System (Cont’d)

- Drugs for labor & delivery
  - Stop contractions
  - Increase contractions
  - Cortisosteroid therapy

Drugs Affecting Male Reproductive System

- Testosterone
  - Necessary for secondary sexual characteristics
- Drugs that treat erectile dysfunction
  - Phosphodiesterase inhibitors (PDE)
  - Erectile dysfunction
  - PDE-5 inhibitors
Drugs Affecting Immune System

Overview

- Turn off immune system
  - Necessary if body attacking itself
- Regulate function

Immunosuppressants

- Target immune system, inhibit production of immune cells
- Commonly used after transplantation
Immunomodulating Agents
- Increase immune system efficiency
- Vaccines
- Immunoglobulins

Dermatologic Drugs
- Medications applied to skin, work transdermally

Drugs of Abuse & Misuse
Stimulants/Amphetamines

- Methamphetamine
  - Releases large quantities of neurotransmitter dopamine
  - Enhances mood, increased alertness, decreased appetite, hyperthermia, euphoria
  - Orally, IV injection, inhalation
  - Side effects
    - Cardiac dysrhythmia, respiratory, death

Stimulants/Amphetamines (Cont’d)

- Cocaine
  - Exhilaration, increased energy
  - Addictive
  - Chest pain
  - Side effects

Sedative/Hypnotics

- Slows normal body functions, often induce sleep
- Schedule IV controlled
Gamma Hydroxybutyrate

- Rapidly acting synthetic CNS depressant
- Euphoria, relaxation
  - Respiratory depression
  - Nausea, vomiting
  - Coma
  - Death

Hallucinogens

- Affect perception of time, reality, environment
- Can affect cardiovascular system
- Dilated pupils, rapid heart rate, incoherent speech, sweating, loss of appetite, sleeplessness, dry mouth
- Ethanol

Environmental Substances
Herbicides

- Kill weeds
- Toxic to humans
- Absorption, transdermal, inhalation, ingestion
- Kidney, liver dysfunction

Rodenticides

- Kills rodents
- Interrupt normal blood clotting functions, cause internal hemorrhage

Insecticides

- Chlorinated hydrocarbons
  - Skin, inhalation, ingestion
  - Tremors, convulsions
  - Disrupts sodium channel, rapid firing in neurons
Insecticides (Cont’d)

• Organophosphates
  ➢ Skin, respiratory tract
  ➢ Inhibit acetylcholinesterase
  ➢ Signs, symptoms
  ➢ Use PPE
  ➢ Thorough decontamination
  ➢ Atropine, 2-PAM

Insecticides (Cont’d)

• Carbamate
  ➢ Inhibit acetylcholinesterase
  ➢ Pralidoxime not recommended

• Botanicals
  ➢ Nicotine
Alcohols

- Ethanol
  - Beer, wine, spirits
  - Loss of airway, primitive reflexes
  - Supportive care
- Isopropyl alcohol
  - Rubbing alcohol, used as disinfectant
  - Skin, absorption, ingestion, inhalation
  - Toxicity symptoms

Alcohols

- Ethylene glycol
  - Antifreeze, deicing solutions
  - Toxic if ingested
  - Renal failure
- Methanol
  - Paint remover, glass cleaner, deicing solutions, antifreeze, shellac
  - Toxic if ingested
  - Ingestion symptoms

Heavy Metals

- Weigh 5 x water
- Lead, mercury, arsenic
- Iron toxicity
Heavy Metals (Cont’d)

- Iron ingestion stages
  - Gastroenteritis
  - Vomiting
  - Abdominal pain
  - Diarrhea
- Symptoms
- Treatment

Hazardous Materials

- Irritants
  - Interact with mucous membranes of respiratory tract, eyes, mouth, throat
  - Combined with moisture, corrosive substance
  - Airway, respiratory tract affected
- Asphyxiants
  - Gases that displace oxygen
  - Dilute oxygen concentration in air

Hazardous Materials (Cont’d)

- Nerve agents
  - Affect CNS
  - Respiratory system
- Carcinogens
  - Cancer
Household & Industrial Chemicals

- General
  - Toxic through absorption by mucous membrane, eyes, skin
  - Cleaning substances, suicidal ingestion
- Ignitable substances
  - Combustible, flammable

Household & Industrial Chemicals (Cont'd)

- Corrosive substances
  - Extremes of pH scale
  - Acids, bases
- Reactive substances
  - Have effect when mixed with another substance

Household & Industrial Chemicals (Cont'd)

- Toxic substances
  - Harm body
  - Cause burns, respiratory problems, cancer
  - Hydrofluoric acid
Chapter Summary

- Indication is appropriate drug use, contraindication is when drug should not be used
- Poison Control Centers can be accessed by phone for information on overdose, poisons
- Gastric lavage is cleansing of stomach through pump, irrigation with water

Chapter Summary (Cont’d)

- Activated charcoal binds medications, cannot be absorbed into systemic circulation
- Acetaminophen toxicity affects liver
- Acetaminophen, analgesic and for fever
- Salicylates used as antiplatelet, analgesic for fever

Chapter Summary (Cont’d)

- NSAIDs used for fever, analgesia
- Morphine is opioid,
  - Fentanyl, does not have profound effect on blood pressure
- Opioid combinations are medications that combine 2 different types
Chapter Summary (Cont’d)

- Aspirin/acetaminophen often combined with narcotic
- Partial opioid agonists (agonist-antagonists) provide some effect, block effect of full agonist when given together
- Opioid antagonists block effects of agonists

Chapter Summary (Cont’d)

- Anesthetics, deep sedation during procedures, including surgery, rapid-sequence intubation
- Conscious sedation, patient maintains airway but not aware of procedure, pain
- Benzodiazepines used for anxiety, induce sleep

Chapter Summary (Cont’d)

- Flumazenil (Romazicon) is an antidote for benzodiazepine, be cautious because of risk of seizures
- Anticonvulsants used to prevent seizure, treat seizure disorders
- Antidepressants, treat depression, bipolar disorder
Most antidepressants can cause cardiac dysrhythmias
CNS stimulants include anorexiants, amphetamines
Antipsychotics used to treat schizophrenia

Medications designed to treat Parkinson's, Alzheimer's disease alter acetylcholine, dopamine levels in the brain
Cholinergic drugs rarely used therapeutically, include physostigmine
Cholinergic drugs such as those used in advanced cardiac life support

Sympathomimetics/catecholamines, advanced cardiac life support, other medical conditions
Class I antiarrhythmics affect sodium channel work on slow conduction
Class II antiarrhythmics, beta-blockers, which block beta-receptors, lower heart rate, conduction velocity, limit force of contraction
Chapter Summary (Cont’d)

- Class III antiarrhythmics block potassium channel
  - Amiodarone
- Class IV antiarrhythmics block calcium channel, used for blood pressure control
- Adenosine used to slow supraventricular tachycardias

Chapter Summary (Cont’d)

- Digitalis used for dysrhythmias, blocks ion pumps
- Diuretics often used to control pulmonary edema, blood pressure
- Anticoagulants used to inhibit clot formation
  - Thrombolytics (fibrinolytics) used to break up existing clot

Chapter Summary (Cont’d)

- Antihemophilic agents used to treat bleeding after trauma in patients deficient in clotting cascade components
- Bronchodilators used to help stop bronchospasm, improve respiratory function
- Mucokinetic drugs used to loosen mucus, expelled
Chapter Summary (Cont’d)

- Antihistamines used to block release of histamine, helps reduce tissue edema
- Antacids treat overproduction of acid, heartburn
- Antiemetics used for protracted vomiting, nausea

Chapter Summary (Cont’d)

- H₂ receptor antagonists used to block histamine in gastrointestinal tract
- Ophthalmic agents used for diagnosis, treatment of eye diseases
- Otic preparations used for analgesia, treatment of ear diseases

Chapter Summary (Cont’d)

- Hormones used to treat various endocrine problems
- Antibiotics used to treat bacterial infections, many different types available
- Antivirals used to treat viral infections, many types used to treat HIV
Chapter Summary (Cont’d)

- Antifungals used to treat fungal infections which can affect skin, entire systemic circulation
- Gout, painful type of arthritis treated with uricosuric drugs, including NSAIDS
- Vitamins, minerals necessary for normal body function

Chapter Summary (Cont’d)

- Crystalloids include normal saline, Ringer’s lactate, D₅W, D₅¹/₂ NS, D₅NS
- Immunizations designed to prevent infection
- Immunoglobulins used to treat infection; preformed antibodies
- Antidotes used to treat poisons, toxins

Chapter Summary (Cont’d)

- Drugs of abuse include stimulants, benzodiazepines, narcotics, hallucinogens, sedative/hypnotics
- Ethanol, drug of abuse, can cause respiratory depression
- Herbicides, rodenticides, insecticides can be highly toxic to human beings
Chapter Summary (Cont’d)

- Isopropyl alcohol, ethylene glycol, methanol in alcohol family, can be highly toxic if ingested, absorbed
- Hazardous materials can cause significant toxicity to human beings

Questions?