1 ☐ General Pharmacological Principles

2 ☐ Obtaining Medical Information

- Patient is best source
- Bottles
- Refrigerator
- Family members
- Home health

3 ☐ Questions to Ask

- Meds prescribed by a physician?
- Why?
- When?
- Compliance vs. Non-compliance
- Over the counter
- Herbals

4 ☐ General Principles

- Drug
  - chemical compound
- Pharmacology
  - study of drugs

5 ☐ Sources of Drugs

- Plants
  - morphine
  - digitalis
- Animals
  - insulin
- Mineral
  - sodium bicarbonate
- Synthetic Chemicals

6 ☐ Drug Classification

- Pharmacological Classes
  - name
  - function
- Legal Classification
  - prescription

- OTC
- Orphan drugs

7 Drug Information Resources

- References
  - US Pharmacopoeia Dispensing Information
  - Physician's Desk Reference
  - Handbook of Non-prescription drugs
  - American Hospital Formulary Service
- Pharmacist
- Drug Information Centers
- Professional Journals
- Internet/TV

8 Routes of Administration

- Oral (PO)
  - tablets
  - capsules
  - liquids
  - suspensions
  - elixirs
  - syrups
  - tinctures

9 Routes of Administration

- Sublingual (SL)
- Buccal (cheek)
- Topical
  - creams
  - ointments
  - patches (NTG)
- Drug Instillation
  - eye drops
- Inhalation

10 Routes of Administration

- Parenteral
  - Intravenous (IV)
  - Intramuscular (IM)
  - Intradermal (ID)
  - Subcutaneous (SQ)
  - Epidural
- Rectal
  - suppositories
  - enemas
- Nasal
  - drops
  - inhalation

11 5 Rights

- Patient
- Drug
- Route

- Dose
- Time

12 Pharmacokinetics

- Number of drug molecules determines intensity
- Related to dose of drug
- 4 Processes
  - absorption
  - distribution
  - metabolism
  - excretion

13 Absorption

- Drug moves from administration to blood stream
- GI Tract Affected by
  - drug solubility (water; fats)
  - drug ionization
  - pH
  - stability
  - blood flow
  - motility

14 Absorption

- SQ or IM affected by:
  - pH
  - properties of drug
  - blood flow
- Other sites
  - mucosal surfaces
  - skin
  - transdermal

15 Absorption

- Parenteral
  - no absorption process

16 Distribution

- Process where drug is delivered to sites of action
- Barriers
  - blood-brain barrier
  - placental barrier
- Sites of accumulation
  - fat
  - bone and teeth
  - kidney

17 Metabolism

- Process where amount of drug is reduced

- Liver is main site

- Other sites
  - kidneys
  - lungs
  - blood
  - GI mucosa

18 Metabolism

- Other factors
  - age
  - nutrition
  - genetics
  - diseases
  - other drugs

19 Excretion

- Process of eliminating drug from body

- Occurs through glomerular filtration and tubular secretion in kidneys

- Other sites
  - GI tracts
  - lungs

20 Single-Dose Kinetics

- Onset of action
  - time between administration and effects

- Half-life
  - time for plasma concentration to fall to 50% of previous concentration
  - same regardless of administration route
  - can be affected by disease state

21 Single-Dose Kinetics

- Half-life exception
  - some drugs have elimination pathway that can be saturated (at higher blood levels)
  - rate of elimination is the same regardless of amount of drug in blood
  - called rate-limited elimination
  - ETOH and ASA

22 Multiple Dose Kinetics

- A drug given repeatedly at same dose will reach plateau
  - steady state
  - takes 4-5 half-lives

- drugs administered each half-life
- half-life helps determine dosing interval

23 Other Dosing Situations

- Loading dose
  - need effective blood concentration immediately
  - followed by maintenance doses
- IV infusion
  - drug administered at constant rate

24 Mathematical Equations

- Used to figure appropriate doses, administration schedules, and dosing changes

25 Pharmacodynamics

- Study of how drugs exert their effects
- Agonists
  - bind to receptor and alter function
    - affinity: drug binds to receptor site; reversible
    - efficacy: ability to cause a response
  - endogenous and exogenous

26 Pharmacodynamics

- Antagonists
  - receptor blockers
  - interact with receptor, but no response
  - show affinity, but no efficacy
- Specificity of drug-receptor interactions
  - interact with 1 receptor or several

27 Pharmacodynamics

- Potency
  - dose needed to produce response
  - not the same as efficacy
- Efficacy vs. Safety

28 Adverse Drug Effects

- These are side effects of drugs
- Contraindications
  - factors predisposing patient to adverse effects

- absolute vs. relative

29 Adverse Drug Effects

- Factors related to adverse effects
  - patient factors
    - diet
    - compliance
    - disease states
    - misunderstanding of directions
  - Iatrogenic
    - errors

30 Adverse Drug Effects

- Factors related to adverse effects
  - pharmacological
    - allergies
    - cumulative effects
    - toxicity
    - tolerance
    - dependence
    - more than one drug
- Multiple drug therapies

31 More than 2 drugs

Additive	1+1= 2
Summation	1+1= 2 (different MOA)
Synergy	1+1= 3
Potentiation	0+1= 2
Antagonism	2+2= 3