Introduction

Founded by German Professor Rudolf Buchheim (1820-1879)

He introduced 2 important prinicples:
- The natural system of drug classification based on their mode of action
- experimental pharmacology

Milestones
- 1806: Morphine
- 1908: Sulfanilamide (first-antibacterial)
- 1912: Phenobarbital (first ant-epileptic)
- 1921: Insulin

1956: Tolbutamide (first oral anti-hyperglycemic)
- 1957: Propanolol (first Beta blocker)
- 1961: L-DOPA (Parkinson's disease)
- 1975: ACE inhibitors (first-line for HTN)

Pharmacology before 19th Century	- Made at home, by apothecary, by unregulated commercial interests - marketed w/o evidence or understanding - Spiritual-based healing was popular and successful
Pharmacology in the 21st Century	- Emphasis on molecules and cells as targets vs tissues, organs, and whole animals Human Genome Project (individualized medicine) - Drugs designed around a disease specific target - Examines interactions b/w drugs & living organisms

Introduction (cont)

Definitions
- *Pharmacology*: Scientific discipline that investigates the interactions b/w living organisms and 'drugs'
- *Drug*: Chemical substance used in the treatment, cure, prevention, or diagnosis of disease.
- *Pharmacokinetics*: what the body does to drugs
- *Pharmacodynamics*: what the drugs do to the body
- *Molecular Pharmacology*: experimental pharmacology
- *Clinical Pharmacology*: science of using drugs in humans (clinical research), based on lab studies, seeks to understand how a drug should be used in practice
- *Pharmacogenetics*: why people respond to drugs differently

Drug Classification
- Anatomical
- Therapeutic use
- Pharmacological mechanism
- Chemical group
- Chemical substance

Drug Nomenclature
- Chemical name
- Generic name
- Brand name

Physical Nature of Drugs
- Pills are mainly inactive ingredients which help with the admin. of active ingredients
- When molecules are very big they cannot be absorbed very well orally bc they cannot pass through the lipid bilayers
- There may be different isotopes of drugs. Not all isotopes will be effective (D- form vs. L-form)

Pharmacodynamics

Drug Targets
- Receptors
- Enzymes
- Carrier Molecules
- Voltage-gated ion channels

Pharmacodynamics (cont)

Receptors
- ***Ionotropic***: ion channel receptors, ions flow into the neuron, **mediates fast transmission**
  - Eg: cholinergic (nicotinic), GABAa
- ***Metabotropic***: G protein coupled (secondary messengers), **mediates slow transmission**, change enzyme activity, protein expression, open slow ion channels
  - Eg: adrenergic, cholinergic (muscarinic), GABAb

Secondary Messengers: intracellular compounds that help to transduce ligand-binding to a physiological or pharmacological effect (cAMP, cGMP, PKA, PDE, Ca^{2+})
- Ligands or agonists are considered 'first messengers'

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