

# General Pharmacology

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# Syllabus

- Introduction to pharmacology  
1h
  - Definition of pharmacology and its subdivisions, Sources of drug info and category of info for each source, Sources of drugs and drug nomenclature.
- Pharmaceutics  
1h
  - Routes, Factors determine selection of routes, advantages and disadvantages, of

## Syllabus..

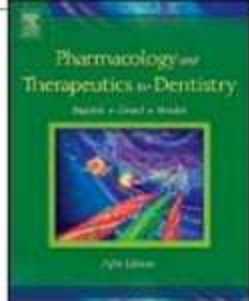
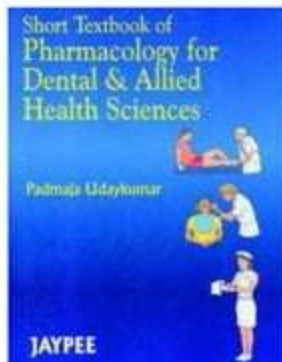
- PK 2hs
  - Membrane transport mechanism, Bioavailability factors and definition, factors influencing drug distribution pattern, Biotransformation,-Definition, phases, sites, Factors affecting,
  - Drug elimination-Routes of excretion, factors affecting renal excretion, half-life definition and importance, dose response and steady state concentration

# Syllabus..

PD

2hs

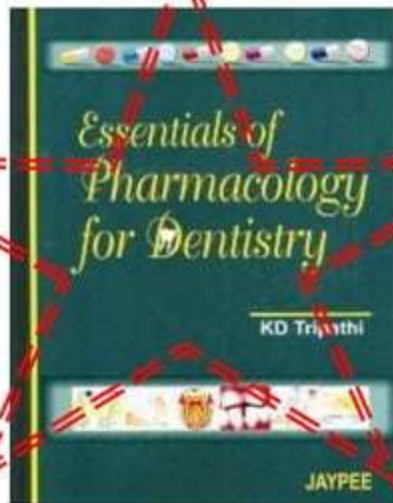
- MO drug action, Factors that modify, drug interaction
- Safety margin and drug toxicity  
1h
- TI, Untoward effects-predictable unpredictable and others, Principles of management of drug toxicity



John Yagiela, Frank Dowd, Enid Neidle



Basic & Clinical  
Pharmacology,  
10th Edition  
Bertram G. Katzung, MD,  
PhD





Study and Chew



Study and Chew

**Three easy steps for  
understanding  
pharmacology !**



Study and Chew

## Definitions

- Pharmacology is a science of drugs. It deals with the study of effect of drugs on living animals, organs or tissue.
  - *Pharmacon*: drug; *logos*: discourse on
- The actions may be beneficial or harmful..
- Drug,- *drogue* = dry herb.

DRUG: A drug is defined as any substance used for the purpose of diagnosis, prevention, relief or cure of a disease in man or animals.

WHO " A drug is any substance or product that is used or intended to be used to modify or to explore physiological systems or pathological states for the benefit of the recipient".



# Why study pharmacology?

- Pharmacology is situated between the basic and clinical sciences and is important for dental students
- There is a growing demand on the dental clinicians to know huge knowledge of drugs and how to use them for patients
- Many medications are prescribed every day by dentists
- Medicines prescribed for other disorders may interact with drugs prescribed for dental disorders.
- Recognizing the drugs helps to identify other illness being suffered by the Pt.
- Emergency management
- Many drugs are used in OT
- Many drugs affect bone and teeth
- Social responsibility and legal necessity

# Subdivisions of Pharmacology

PSYCHOLOGY

CLINICAL MEDICINE  
THERAPEUTICS

VETERINARY  
MEDICINE

PHARMACY

BIOTECHNOLOGY

PATHOLOGY

CHEMISTRY

Psycho-  
pharmacology

Clinical  
pharmacology

Veterinary  
pharmacology

Pharmaceutical  
sciences

Biopharmaceuticals

Toxicology

Medicinal  
chemistry

Pharmacokinetics/  
drug metabolism

Biochemical  
pharmacology

**Pharmacology**

Molecular  
pharmacology

Chemotherapy

Systems pharmacology

Neuro-  
pharmacology

Cardiovascular  
pharmacology

Gastrointestinal  
pharmacology

Immuno-  
pharmacology

Respiratory  
pharmacology

Pharmacogenetics

Pharmacogenomics

Pharmacoepidemiology

Pharmacoeconomics

GENETICS

GENOMICS

CLINICAL EPIDEMIOLOGY

HEALTH ECONOMICS

# Subdivisions of Pharmacology

- Pharmacology
  - History, sources, and physical and chemical properties of different drugs, how drugs affect living systems
- Pharmacodynamics
  - Biochemical and physiological effects of drugs
  - Drugs' mechanisms of action

## Subdivisions of Pharmacology

- Pharmacokinetics

Absorption, Distribution,  
Metabolism, and Excretion

- Pharmacotherapeutics

How drugs are used in the  
treatment of illnesses (for the  
relief of symptoms or cure of  
disease)

# Subdivisions of Pharmacology

- Pharmacognosy:
  - Deals with recognition drugs, sources
- Toxicology
  - Poisons and poisonings—Toxic effects on living organisms and treatment

- PHARMACY: Science of collection, identification, purification, isolation, synthesis, preservation, standardization, compounding and dispensing of medicinal substance.
  - BIOPHARMACEUTICS: Development of new drug delivery systems
- Clinical pharmacy:- involves the cooperation of pharmacist with the physician
  - A. Educating the patient about compliance,
  - B. How to take medication
  - C. Monitoring the errors in taking medication

- Chemotherapy:- Effect of drugs on micro organisms & parasites (living and multiplying in a living organism). It also includes drug treatment of cancers.
- Pharmacoepidemiology:- is the study of effects of drugs in large number of people in the community. It is the application of principles of epidemiology to drug effects and drug use in the community.
- Pharmacoeconomics:- is the analysis of the cost of drug therapy to the health care system and the society



- Pharmacovigilance: process of identifying & responding to issues of drug safety through detection of adverse effects of drugs
- Pharmacogenetics: study of inherited (genetically mediated) differences in drug metabolism & response in humans
- Pharmacogenomics: Deals with relationship of an individual's genetic make-up with his/her response to a drug



## CLINICAL PHARMACOLOGY:

It is the scientific study of drugs in man.

### Clinical trials:

1. Phase I-----Healthy volunteers
2. Phase II-----Small group of patients
3. Phase III----Large group
4. Phase I V ----Post marketing

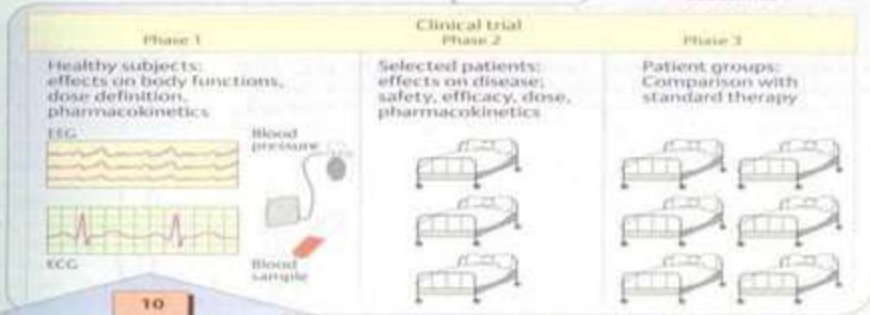


Clinical trial Phase 4

General use  
Long-term benefit-risk evaluation



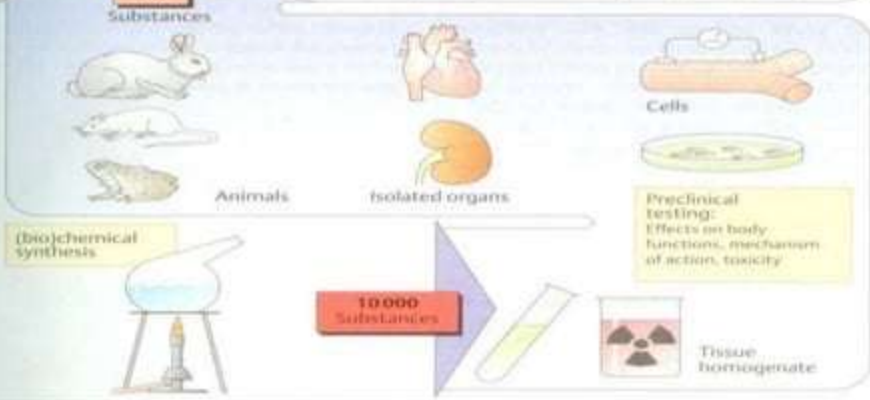
**\$800 million to Bring a new drug**



**\$800 million did not Yield new drug**

**1:10000 success rate**

**10-12 years**



# Sources of information of drugs



Text Books



Journals



Library



Websites



CME

# Sources of information of drugs

- PHARMACOPIEA:

It is an official code containing a selected list of the established drugs with the tests for their identity, purity & potency.

I.P., B.P., U.S.P., E.P.

- **Formularies** : Information on products available to prescribers in the respective countries

National Formulary-by American Pharmaceutical Association.

British National Formulary(BNF)- by British Medical Association & Pharmaceutical Society of Great Britain.

National Formulary of India (NFI)-by Govt. of India.

# NOMENCLATURE OF DRUGS

- **Chemical Name:-**
  - Describes drug chemically: Acetyl salicylic acid  
*Isopropylamino naphthoxy propan-2-ol* =  
*Propranolol* !
- **Non Proprietary /generic name: [Approved name]**
  - Name approved by scientific body (US Adopted name Council)
    - Acetaminophen or Paracetamol
    - Pethidine or Meperidine
  - ❖ When included in an official pharmacopoeia: **Official name**
- **Brand name [Proprietary name] :**
  - Name given by Mfr.
    - Paracetamol-"Crocin", 'Calpol'

# Essential drug[Medicine] concept

- **WHO** defined essential drugs as those that satisfy the healthcare needs of majority of population:  
Should be available at all times in adequate amounts and required dosage forms
- National list of essential medicines-  
2003, 354 Medicines

70,000 preparations available in INDIA!

## SOURCES OF DRUGS.

- **MINERAL** :  $MgSO_4$ , Mg.trisilicale,  
Liquid paraffin
- **ANIMAL** : Insulin, Heparin, Thyroid extract
- **PLANT** : Morphine, Atropine, Digoxin
- **SYNTHETIC** : Aspirin, Sulfonamides,
- **MICRO-ORGANISM**: Penicillin.
- **DNA RECOMBINANT TECHNOLOGY.**  
Human Insulin, Human Growth Hormone.
- **Hybridoma technique**:- Monoclonal antibodies.



## Drug categories

- ❖ Non-prescription drugs: (OTC drugs)
  - Vitamins, antacids
- ❖ Prescription drugs:
  - Antibiotics, anxiolytics
- ❑ Orphan drugs: drugs or biological products for rare diseases