Pharmacology

General Terminologies and Scope

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Pharmacology

‘Pharmakon’ → Drug

‘Logy’ → Study

Study of Drug Pharmacology

Pharmaceutics

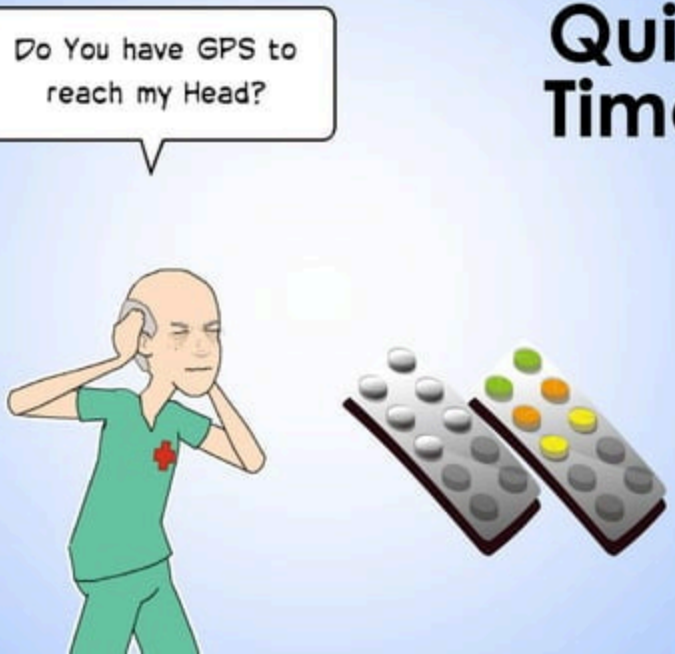
Dosage form Design

Pharmacognosy

Quality Analysis

Pharma chemistry

Quiz Time



The Correct Answer is

RECEPTORS

Drug Receptor Mechanism

Lock Key Mechanism

- This Receptors are Present in Every cells
- They come to cell membrane when any abnormality occurs (HELP/S.O.S)
- Drug comes in Blood stream and acts where there are receptors, rest eliminates
- When Cell becomes normal, Receptors Down Regulate


Adverse-effects
Pathophysiology
Antagonist
Pharmacodynamics
Mechanism-of-action
Receptors
Dose
Contraindications
Animal-Studies
Rat
Guinea-Pig
Pharmacology
Drug-Drug-Interaction
Mice
Agonist
Drug-Food-Interaction
WordItOut

Future of Pharmacology

1. Pharmacology
2. Pharmacokinetics
3. Pharmacodynamics
4. Pharmacogenomics
5. Pharmacogenetics
6. Pharmacovigilance
7. Pharmacotherapeutics
8. Toxicology
9. Clinical Pharmacy
10. Pharmacoepidemiology

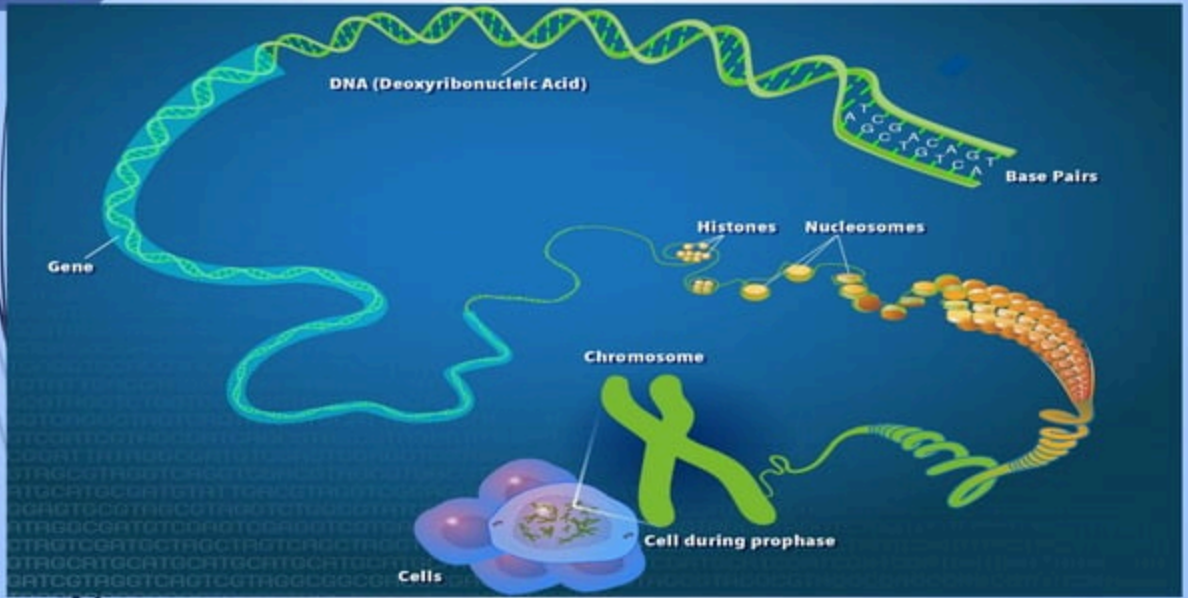
2. Pharmacokinetics

What Body does to a Drug

3. Pharmacodynamics

What Drug does to body

4/5 Pharmaco-Genomics/Genetics



4/5 Pharmaco-Genomics/Genetics

Pharmacogenomics

A Branch of Pharmacology, that deals with complete genome of organism.

Pharmacogenetics

A Branch of Pharmacology, that deals with individual genes of organism

6. Pharmacovigilance

Study of Adverse Drug Reactions

7. Pharmacotherapeutics

Study of Drug Therapy management

8. Toxicology

Study of overdosing and toxicity

9. Clinical Pharmacy

Study of drugs/Therapy on Humans

10. Pharmacoepidemiology

Study of Drug on populations

Exact Definitions

1. **Pharmacology:** *Pharmacology is a branch of medicine and pharmaceutical sciences which is concerned with the study of drug or medication action, which exerts a biochemical or physiological effect on the cell, tissue, organ, or organism.*

2. **Pharmacokinetics:** *It is a branch of pharmacology dedicated to determine the fate of substances administered to a living organism. Pharmacokinetics is the study of how an organism affects a drug.*

3. **Pharmacodynamics:** *Pharmacodynamics (PD) is the study of the biochemical and physiologic effects of drugs. Pharmacodynamics (PD) is the study of how the drug affects the organism.*

4. **Pharmacogenomics:** *Pharmacogenomics is the study of the role of the genome in drug response. Its name (pharmaco- + genomics) reflects its combining of pharmacology and genomics. Pharmacogenomics analyzes how the genetic makeup of an individual affects his/her response to drugs.*

Exact Definitions

5. **Pharmacogenetics:** *A Branch of Pharmacology, that deals with individual genes of organism and its affect in pharmacological Therapy.*

6. **Pharmacovigilance:** *Pharmacovigilance (PV), also known as drug safety, is the pharmacological science relating to the collection, detection, assessment, monitoring, and prevention of adverse effects with pharmaceutical products.*

7. **Pharmacotherapeutics:** *It is a branch concerned with the study of the therapeutic uses and effects of drugs (Therapy).*

8. **Toxicology:** *It involves the study of the toxic effects of chemical substances on living organisms and the practice of diagnosing and treating exposures to toxins and toxicants.*

Exact Definitions

9. **Clinical Pharmacy:** *A Branch of Pharmacology, that deals with evaluation of drug effect on humans (Clinical Trials)*

10. **Pharmacoepidemiology:** *Pharmacoepidemiology is the study of the uses and effects of drugs in well-defined populations (Demography)*

Basic Terminologies

1. Drug
2. Receptor
3. Affinity
4. Efficacy
5. Agonist
6. Antagonist
7. Inverse Agonist
8. Partial Agonist
9. Receptor Sensitization
10. Receptor Downregulation
11. Adverse Effects
12. In-vitro
13. In-vivo
14. Ex-vivo

Drug

A medicine or other chemical substance which has a physiological effect when ingested or otherwise introduced into the body.

Nomenclature of Drug:

- Chemical name: Para-aceta amino phenol
- Generic name: Paracetamol
- Brand name: Calpol, Dolo-650, Panadol, Tylenol
- Prototype name: Unique code given during discovery

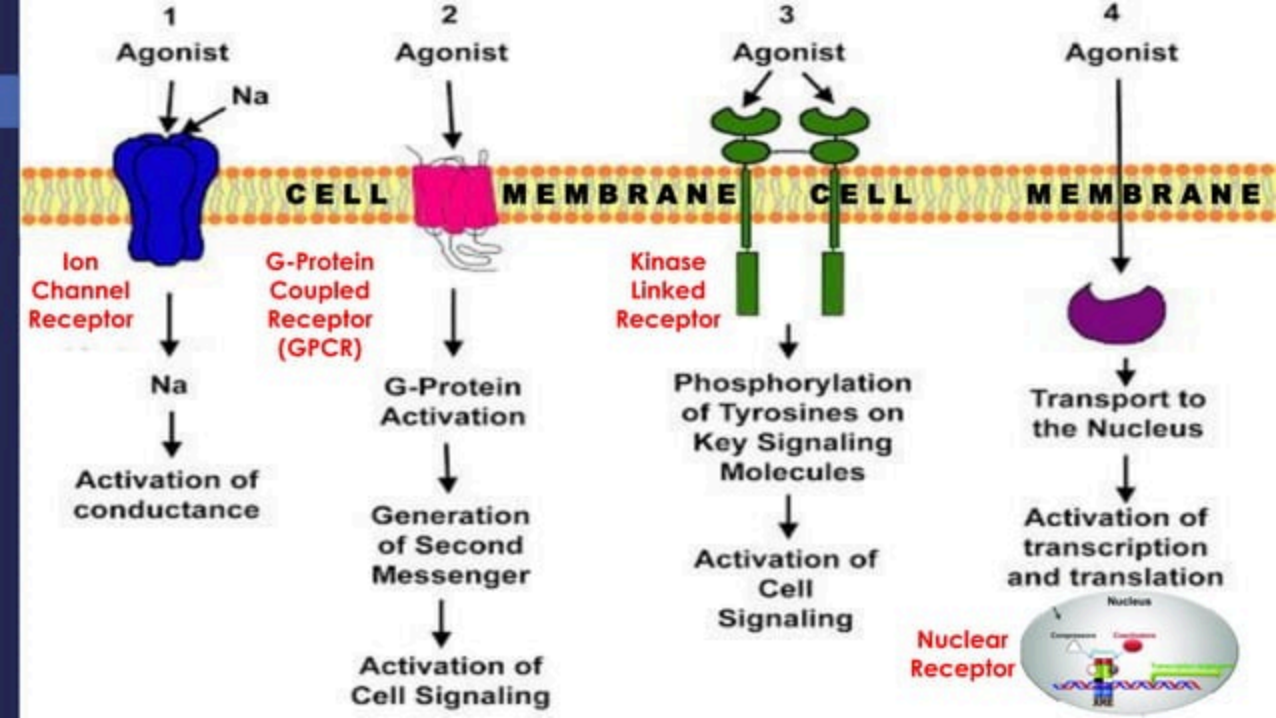
Receptor

A receptor is a protein molecule that receives chemical signals from outside a cell. When such chemical signals bind to a receptor, they cause some form of cellular/tissue response.

All Receptors are Proteins, but not all proteins are receptors

Examples of Receptors: alpha, beta, Thyroid receptors, muscarinic receptors, nicotinic receptors, μ receptors

Main Classes: Ion channels, GPCR Family, Kinase Linked, Nuclear Receptors


1
Agonist
Na
2
Agonist
3
Agonist
4
Agonist
CELL MEMBRANE
CELL MEMBRANE
Ion Channel Receptor
G-Protein Coupled Receptor (GPCR)
Kinase Linked Receptor
Na
Activation of conductance
G-Protein Activation
Generation of Second Messenger
Activation of Cell Signaling
Phosphorylation of Tyrosines on Key Signaling Molecules
Activation of Cell Signaling
Transport to the Nucleus
Activation of transcription and translation
Nuclear Receptor
Nucleus

Affinity

The ability of drug to bind with receptor is termed as affinity.

Efficacy/Intrinsic activity

The capability of drug to initiate or trigger the pharmacological action in cells or tissue is termed as intrinsic activity or Efficacy

Agonist

The molecule, which posses both Affinity and Efficacy with the receptor is agonist.

- Inverse Agonist
- Partial Agonist

Antagonist

The molecule, which has affinity but NO efficacy, is termed as Antagonist

- Competitive Antagonism
- Non-Competitive Antagonism

↓ ↑	AFFINITY	EFFICACY
AGONIST	↑	↑
ANTAGONIST	↑	○
INVERSE AGONIST	↑	↓
PARTIAL AGONIST	↑	↑

Receptor Sensitization

Whenever any abnormality takes place, the cells gets sensitized and releases receptors from lysosomes, this receptors reaches to cell membrane and protrude outside the membrane. This phenomenon is called Receptor Sensitization.

Receptor Downregulation

When all drug molecules are consumed and cell returns to normal physiology, the receptors on surface gets back inside cytoplasm and gets packed into lysosomes. This phenomenon is called receptor downregulation.

Adverse Effects/Event

An unexpected medical problem that happens during treatment with a drug or other therapy. Adverse effects may be mild, moderate, or severe, and may be caused by something other than the drug or therapy being given. Also called adverse event.

Classification of ADRs.... Wills and brown

- Type A (Augmented) Insulin - Hypoglycemia
- Type B (Bizarre) Penicillin – Skin Rash
- Type C (Chronic) Paracetamol - Hepatotoxicity
- Type D (Delayed) Teratogenic Effects
- Type E (Exit/End of treatment) Relapse on withdrawal of drug
- Type F (Failure of Therapy) Tuberculosis MDR
- Type G (Genotoxicity) Because of mutations in Genes
- Type H (Hypersensitivity) Histamine over release
- Type U (Un classified) Idiosyncratic reactions

IN VIVO VS IN VITRO

DEFINITION

IN VIVO describes a medical experiment or a test that is performed on a living organism, e.g. a human being or a laboratory animal.

DEFINITION

IN VITRO is a medical experiment or a study that is performed only in a laboratory dish or a test tube.

Ex Vivo

A biological process, made to occur in or on a biological tissue but in an artificial environment, outside the organism, with the minimum alteration of natural conditions


Thank
You