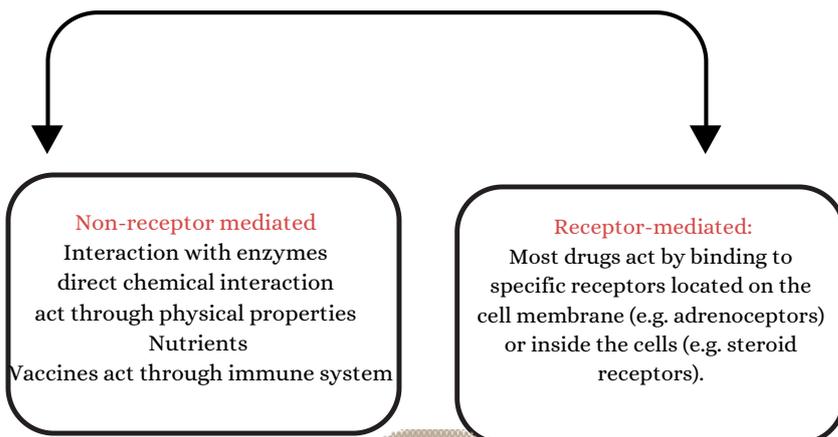


# high yeild pharmacology L7

Pharmacodynamics studies the effects of drugs on the living beings and their mechanisms of action.

## DRUG INTERACTION



### Drug receptor interaction (Lock and key mechanism)

The chemical structure of a drug makes it suitable to bind to a specific receptor and not suitable to bind to other receptors (specificity) like the key and the lock.

The ability of a drug to bind to a specific receptor is called "affinity". The cellular changes occurring due to drug receptor binding is called "efficacy or intrinsic activity".

receptor becomes bound to a ligand-conformational change -interact productively with other components of the cells-alteration in the physiologic state of the cel

Receptor" means any cellular macromolecule to which a drug binds to initiate its effect.

Most drug receptors are protein in nature, or nucleic acids (e.g. DNA and RNA).

The receptor has two functions:

Ligand (drug) binding.

Message propagation (i.e. signaling) to produce the intended response of drugs.

Ligands are molecules (e.g. drugs or endogenous hormones or neurotransmitters) that attach selectively to a particular receptor.

**BINDING OF HORMONE TO RECEPTOR INITIATES A SERIES OF EVENTS WHICH LEADS TO GENERATION OF SECOND MESSENGERS WITHIN THE CELL (THE HORMONE IS THE FIRST MESSENGER).**

**THE SECOND MESSENGERS THEN TRIGGER A SERIES OF MOLECULAR INTERACTIONS THAT ALTER THE PHYSIOLOGIC STATE OF THE CELL. ANOTHER TERM USED TO DESCRIBE THIS ENTIRE PROCESS IS SIGNAL TRANSDUCTION OR COUPLING.**

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## Pharmacological basis of drug-receptor interaction

When a drug binds to a receptor and produces an action like the action of an endogenous regulatory substance already present in the body such as hormones or neurotransmitters, the drug is called  
"Agonist"

When a drug binds to a receptor and leads to inhibition of the action of a regulatory substance on that receptor, it is called  
"Antagonist".

**Inverse agonists:** drugs that bind to the receptors but has negative efficacy.

## Types of receptors and signaling mechanisms

	Type 1 Ligand gated ion channels or ionotropic receptors	Type 2 G-protein coupled receptors or metabotropic receptors	Type 3 Tyrosine -kinase linked receptors	Type 4 Nuclear receptors
Location	Trans membrane	Trans membrane	Trans membrane	Intracellular
Effectors	Ion channel	Channel or enzyme	Enzyme	Gene transcription
Coupling	Direct	G-protein	phosphorylation	Via DNA
Example	Nicotinic receptor and GABA type A receptors	Muscarinic receptor and adrenoceptors	Insulin, growth factor and cytokine receptors	Steroid & thyroid hormone receptors
Response	Very fast (fraction of millisecond)	Fast (few milliseconds)	Long lasting	Long lasting

## ANIMATION

1

2

3

4