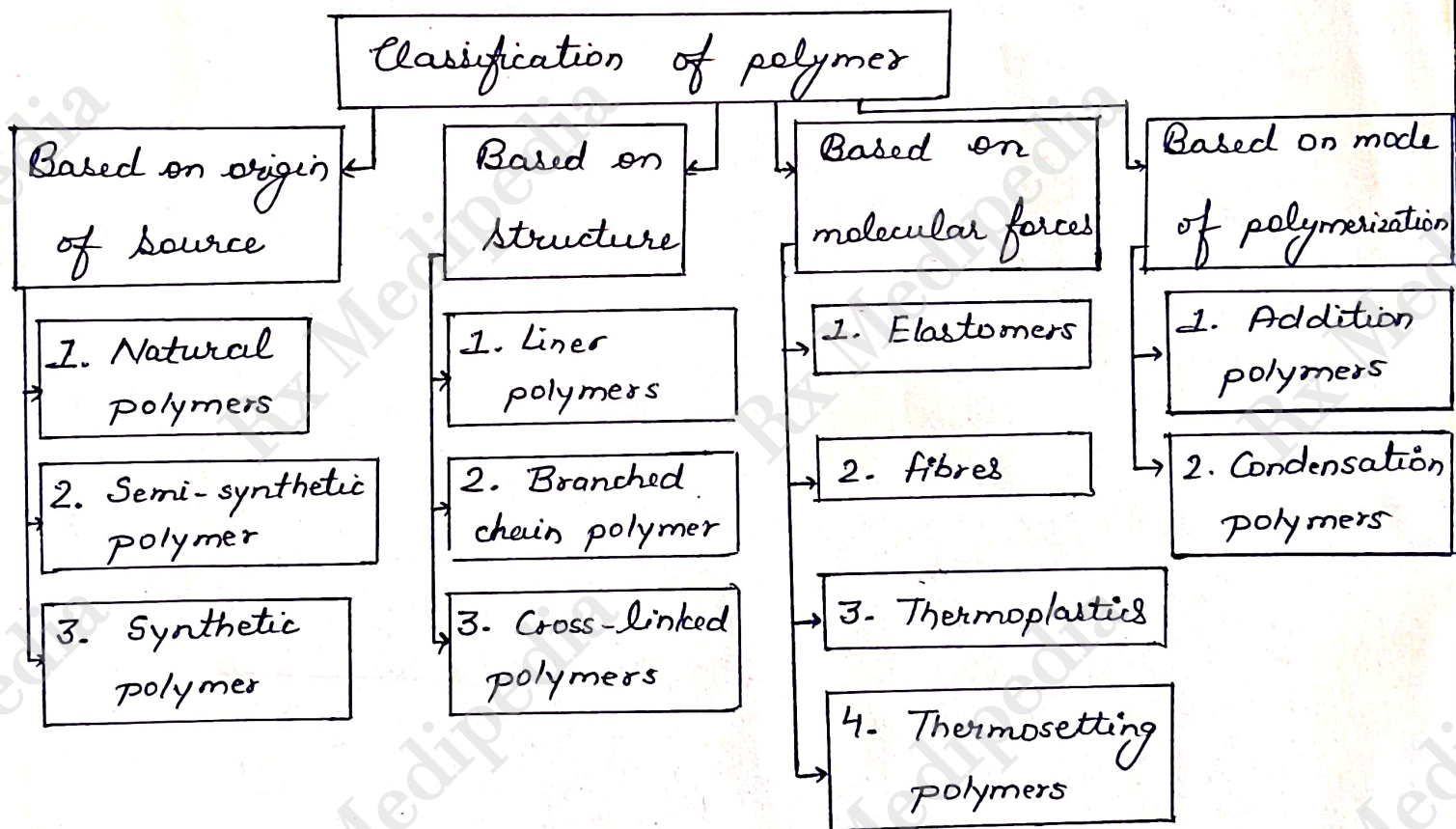


'POLYMERS'

INTRODUCTION

Polymers are the compounds which have high molecular masses and formed by monomers. In greek, the word poly means 'many' and meros means 'units of parts'.

CLASSIFICATION



1. Based on Source

a) Natural polymer

These are derived from Natural sources and can be polysaccharides and protein in chemical nature.

ex. Albumin, Starch etc.

b) Semi-Synthetic polymer

These are derived from naturally occurring polymers by chemical modifications.

ex. Vulcanized rubber, Gun cotton etc.

c) Synthetic polymers

These are artificial origin which consist of fibres. They are prepared by Laboratory.

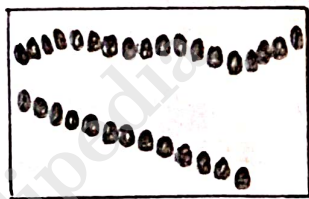
ex. Buna-S, Buna-R etc.

2. Based on Structure

a) Linear polymers

The smallest repeating unit arranged in straight line path is known as linear polymer.

ex. PVC



b) Branched chain polymers

They contain chains having some branches. for ex. low density polymer, Polyethylene.



c) Cross linked chain polymer

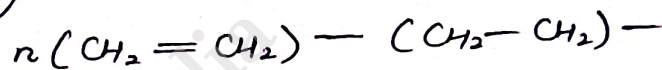
In this, all molecules are chemically bonded together which forms three-dimensional network.



3. Based on Polymerization

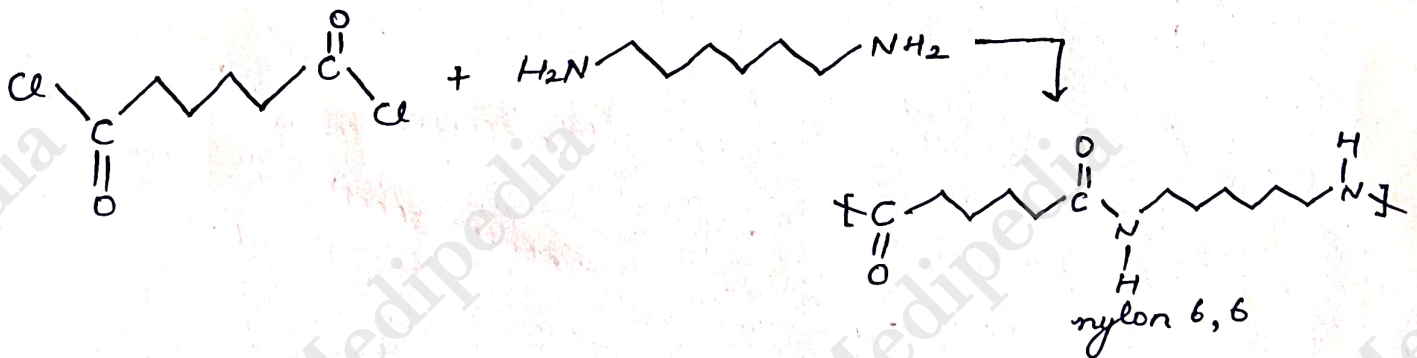
a) Addition polymers

They are formed by the repeated addition of monomer molecules forming double or triple bonds.



b) Condensation polymers

Condensation polymers are formed by repeated condensation reaction between two different bi-functional or tri-functional monomeric units.



4. Based on Molecular force

a) Nylon

These are the condensation polymers of diamine and dibasic acids. They have a protein like structure.

ex. Nylon 6,6

b) Thermoplastic polymers :

These are linear or slightly branched long chain polymers, which can be softened on heating and reversibly hardened on cooling repeatedly.

ex. Polyvinyl chloride

PROPERTIES

- It should be versatile and possess a wide range of mechanical, physical, chemical properties.
- It should be inexpensive and easy to fabricate.
- It should be inert to host tissue and compatible with environment.
- It should be non-toxic and have good mechanical strength and should be easily administered.

ADVANTAGES

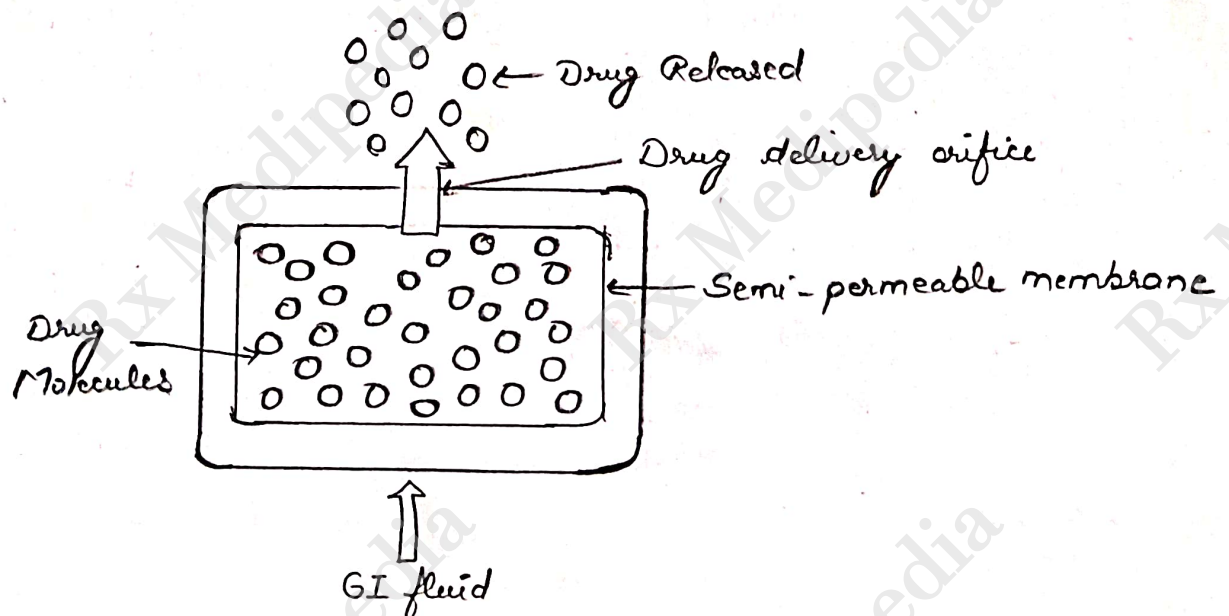
- The polymer can protect the drug from physiological environment and improve its stability.
- The product can be inserted directly at the site where drug action is needed.
- The drug encapsulated is released over long periods.
- Reservoir based polymers increases the solubility of incompetently soluble drugs.

- Gold nanoparticles have capacity to attach with other biomolecules without changing their properties.
- Polymer gave a distinctive property which is not achieved by any of the materials.
- Current polymers [Poly 2-hydroxy ethyl methacrylate, polyvinyl alcohol] are used because of their inert characteristics.
- Dextro is the common polymer used for coating of Iron oxide.

APPLICATIONS OF POLYMERS

1. Osmotic pressure - controlled GI delivery system

In this device, an osmotic agent is contained within a fixed container. One wall of fixed container is made of semi-permeable membrane. When drug interact with Gastro-intestinal fluids, fluids will force the active agent out of device through the delivery orifice.

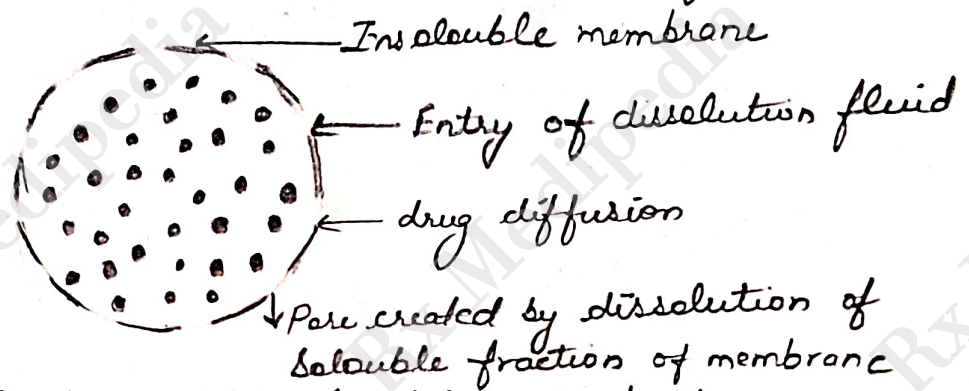


2. Gel diffusion controlled Gastro-intestinal delivery System

→ In this drug is covered in a partially soluble membrane.

→ Pores are created due to dissolution parts of membrane.

→ It permits entry of aqueous medium in drug dissolution.



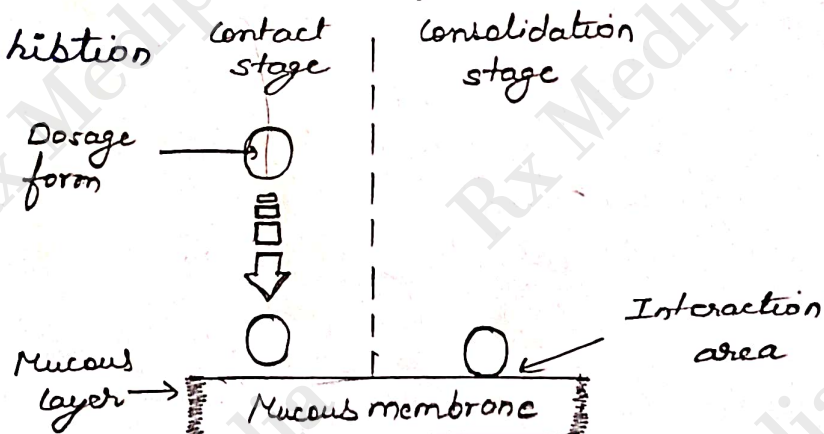
3. Mucoadhesive Gastro-intestinal delivery System

Mucoadhesive polymers are used for buccal drug delivery.

advantages →

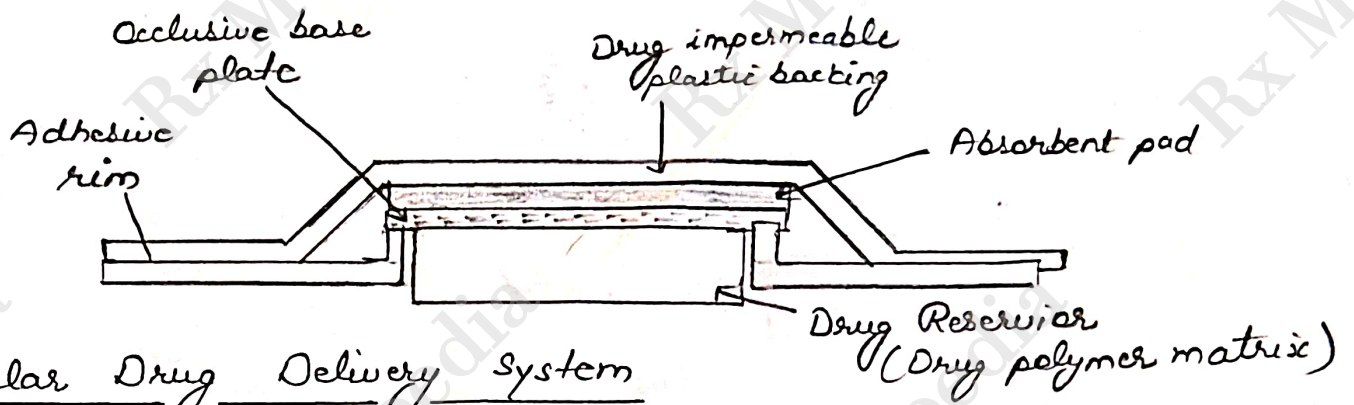
→ increase in residence time of polymer

→ Enzymatic inhibition



4. Transdermal Drug delivery System

Transdermal drug delivery System is a self-contained dosage forms, which apply to intact (unbroken) skin, which delivers the drug at a controlled rate to the systemic circulation.



5. Ocular Drug Delivery System

It allows prolonged contact of drug with corneal surface of eye. ex. pilocarpine in treatment of glaucoma.

In this, Mucoadhesive polymers are used as a barrier to control the drug release.

ex. Polyacrylic Acid

