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1. Introduction

- Definitions of monomer, polymer, chain repeat units
- Polymer types

Synthetic and natural polymers have the properties such as ease of processing, light weight, good insulator, good mechanical properties and this properties can be improved. Therefore they are vital materials used in modern daily life such as food packaging, electronics, medical devices, clothing, vehicles, buildings, textile industry.

Polypropylene is a kind of thermoplastic synthetic polymer which is used in variety of applications such as packaging, stationery, plastics and in reusable containers, laboratory equipments

The Low-Density Polyethylene polymers are the most common kind of synthetic polymers, which are widely used in households.

The PET bottles we use are commonly made up of synthetic polymer called as polyethylene terephthalate.



Polyethylene is used to make plastic sandwich bags



Compact Discs are made from synthetic polymers such as polycarbonate



Polystyrene is used to make Styrofoam cups and cd cases



Milk jugs are made from the synthetic polymer polyethylene (HDPE)



Soda bottles are made from polyethylene terephthalate (PETE)



Synthetic polymers are used to make specialty athletic clothing using polymer such as Polyester, Nylon, Lycra or spandex



Can you think of any other types of man made polymers and their uses?

Cotton from plants is a natural polymer and is used to make clothing



Natural latex from rubber tree is a polymer



Crustacean shells are made of chitin, a natural polymer



Silk from silk worms is used to make cloth



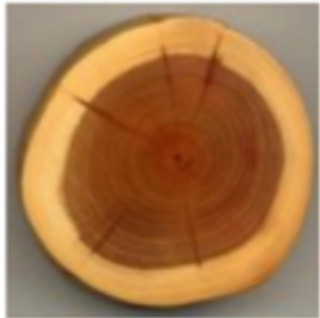
Rubber can be used to make tires



"Carbs" like spaghetti are natural polymers



Wood is a natural polymer used for paper

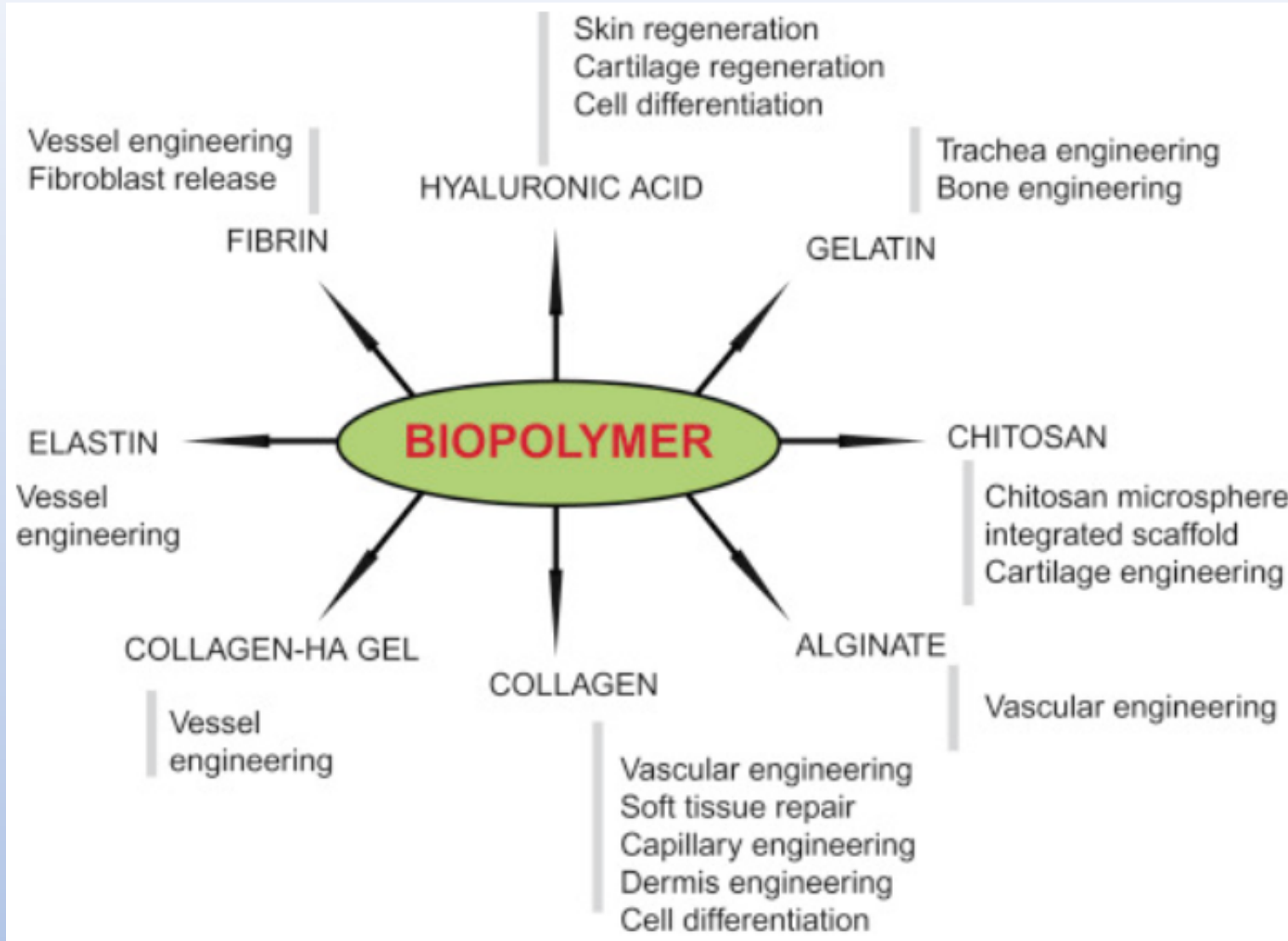


or rubber bands!



Proteins from eggs and other foods are also natural polymers



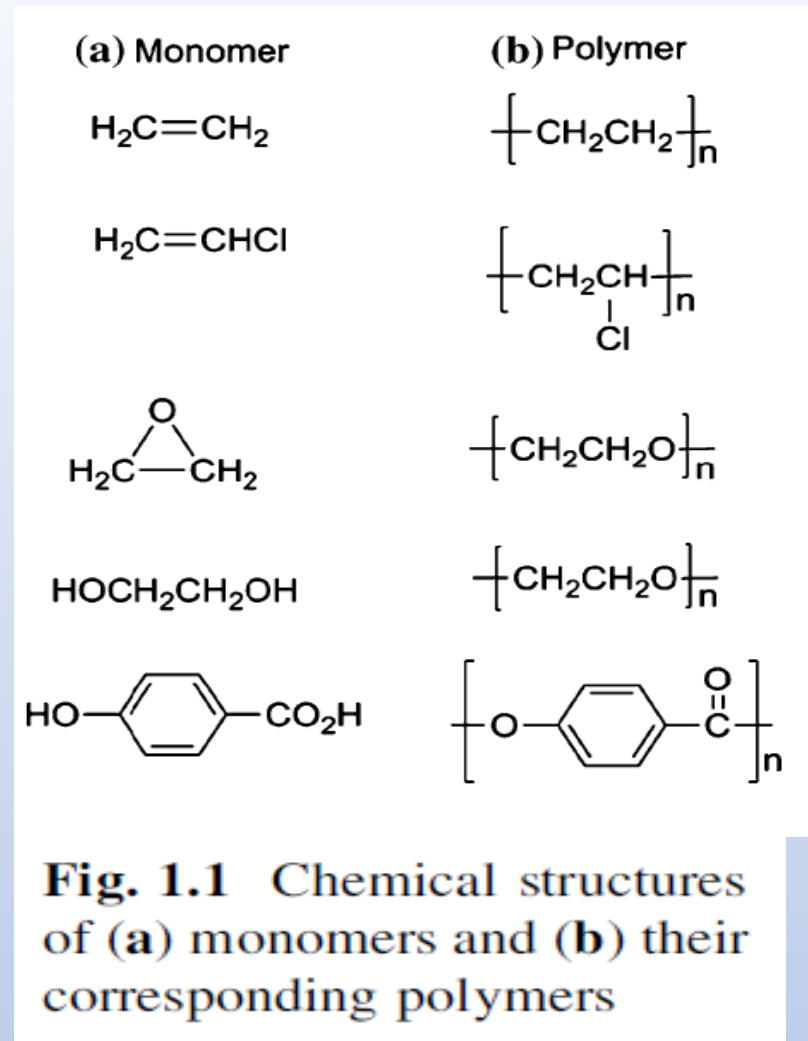


Various types of biopolymers used in tissue engineering

Manju Rawat Singh, ... Deependra Singh, in [Nanobiomaterials in Soft Tissue Engineering](#), 2016

Polymers are macromolecules built up by the linking together of large numbers of much smaller molecules. In other words Polymers are those which consist of repeated structural units known as monomers.

The small molecules that combine with each other to form polymer molecules are termed **monomers**. There may be hundreds, thousands, tens of thousands, or more monomer molecules linked together in a polymer molecule with molecular weights that may reach into the hundreds of thousands or millions.

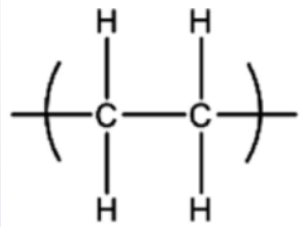


Polyethylene is considered to be as one of the simplest polymer, it has ethene or ethylene as the monomer unit

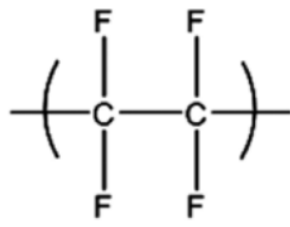
Other definition of **monomer**, they are small molecules with functional groups (organic compounds) and they can react with each other to form a large molecule. The simple reactive molecule from which the repeating structural units of a polymer are derived is called a monomer.

A polymer prepared from one kind of monomer is called homopolymer. A polymer prepared from more than one kind of monomer is called copolymer, including random copolymer, alternating copolymer, block copolymer, and graft copolymer.

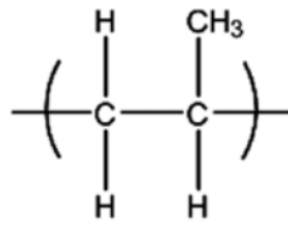
Poly(vinylidene fluoride) or PVDF has the repeat unit $[\text{CH}_2\text{—CF}_2]_n$



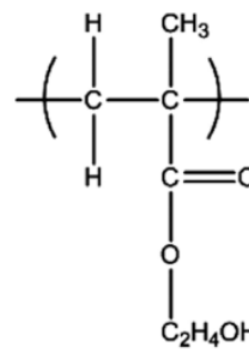
**Polyethylene
(PE)**



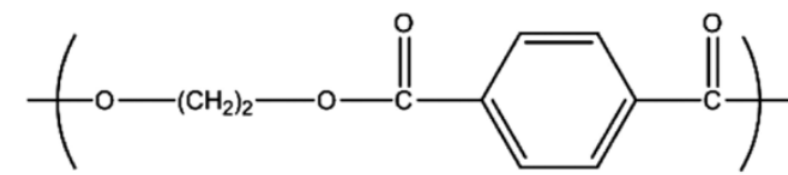
**Polytetrafluoroethylene
(PTFE)**



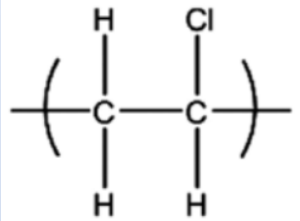
**Polypropylene
(PP)**



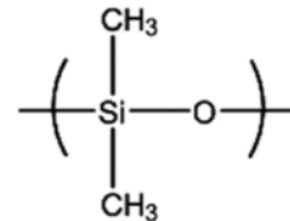
**Poly(hydroxyethyl methacrylate)
(PHEMA)**



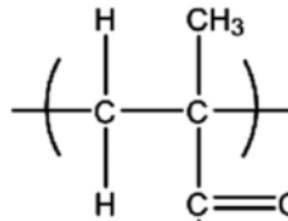
**Polyethyleneterephthalate
(PET)**



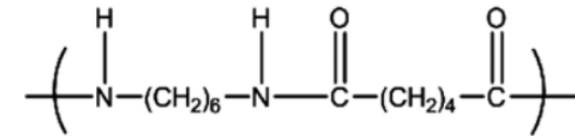
**Polyvinylchloride
(PVC)**



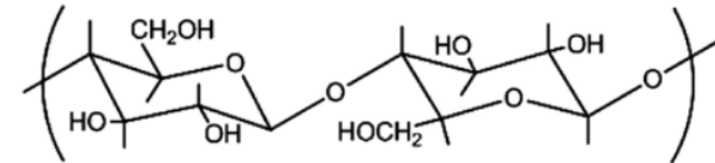
**Polydimethylsiloxane
(PDMS)**



**Poly(methyl methacrylate)
(PMMA)**



Nylon 6,6



Cellulose

Repeat units of some polymers

Chain repeat units

The difference between the monomer and the repeat unit is the loss of the double bond in the former to give the chain-linked repeating group. Thus the molecular masses of both monomer and unit are identical.