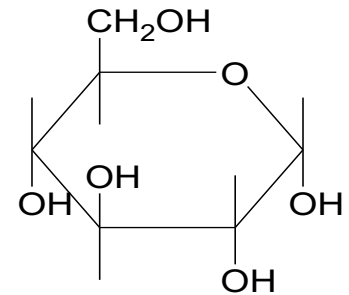


# Polysaccharides (Glycan)

## Polysaccharides

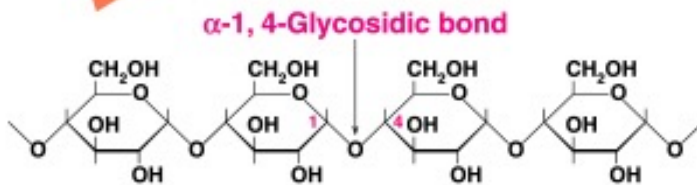
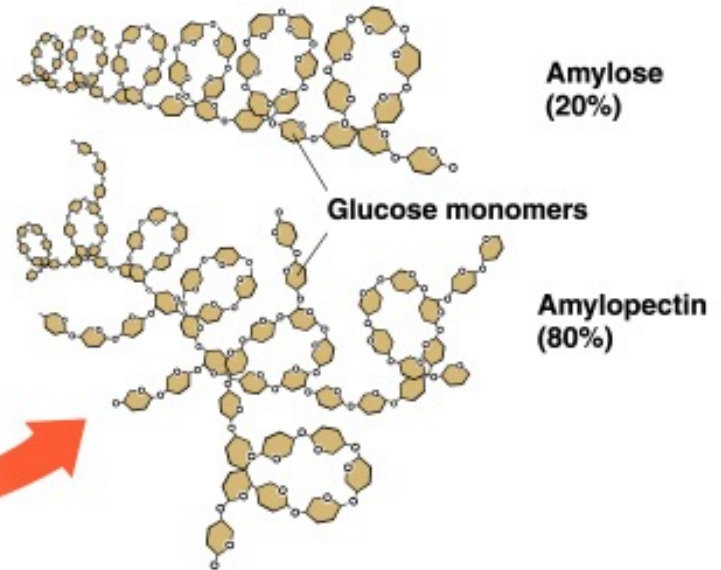
### :Homopolysaccharides:

- Are polymers of D-glucose.
- Include amylose and amylopectin, starches made of  $\alpha$ -D-glucose.
- Include glycogen (animal starch in muscle), which is made of  $\alpha$ -D-glucose.
- Include cellulose (plants and wood), which is made of  $\beta$ -D-glucose.

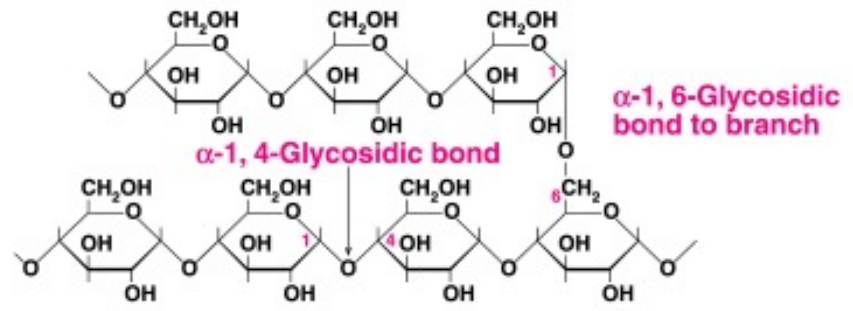


$\alpha$ -D-glucose

# Structures of Amylose and Amylopectin



(a) Unbranched chain of amylose

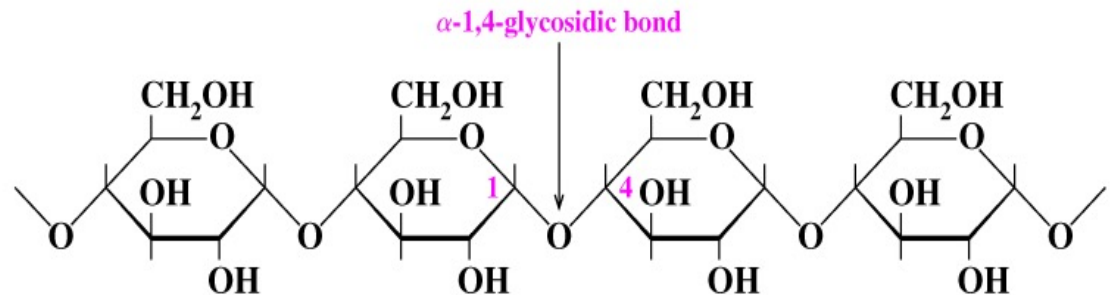


(b) Branched-chain of amylopectin

# Amylose

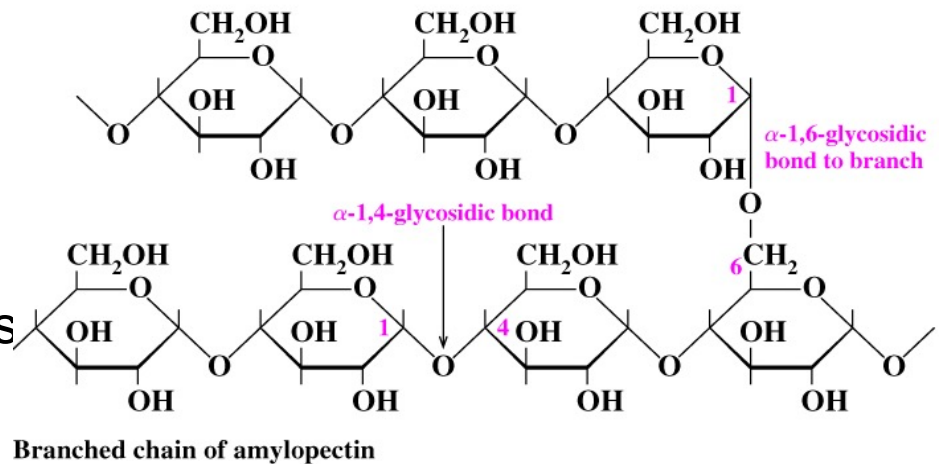
## Amylose is

- A polymer of  $\alpha$ -D-glucose molecules.
- Linked by  $\alpha$ -1,4 glycosidic bonds.
- A continuous (unbranched) chain.



# Amylopectin

- Is a polymer of  $\alpha$ -D-glucose molecules.
- Is a branched-chain polysaccharide.
- Has  $\alpha$ -1,4-glycosidic bonds between the glucose units.
- Has  $\alpha$ -1,6 bonds to branches



- **Glycogen**
- Is the polysaccharide that stores  $\alpha$ -D-glucose in muscle.
- Is similar to amylopectin, but is more highly branched.

# Cellulose

## Cellulose

- Is a polysaccharide of glucose units in unbranched chains.
- Has  $\beta$ -1,4-glycosidic bonds.
- Cannot be digested by humans because humans cannot break down  $\beta$ -1,4-glycosidic bonds.
- Learning Check

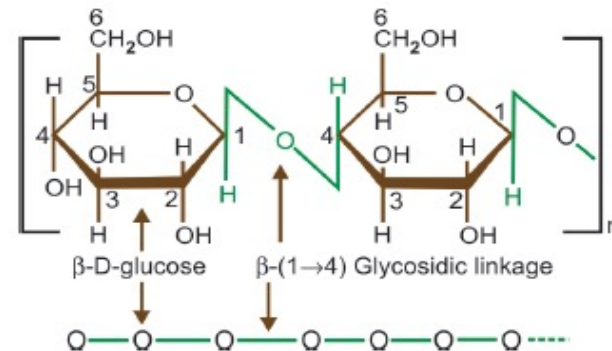
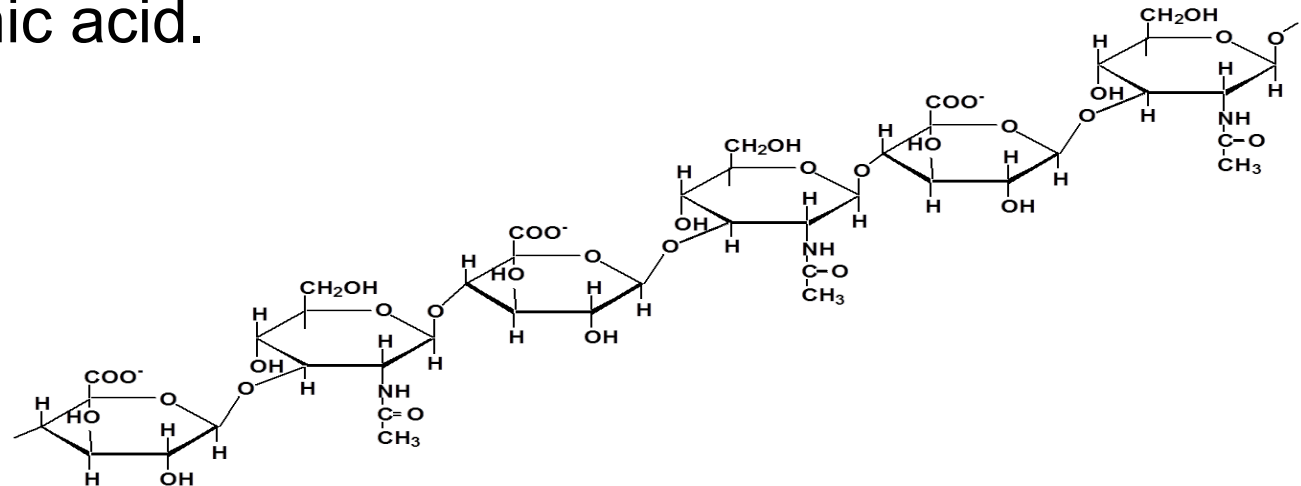


Figure 2.20: Structure of cellulose

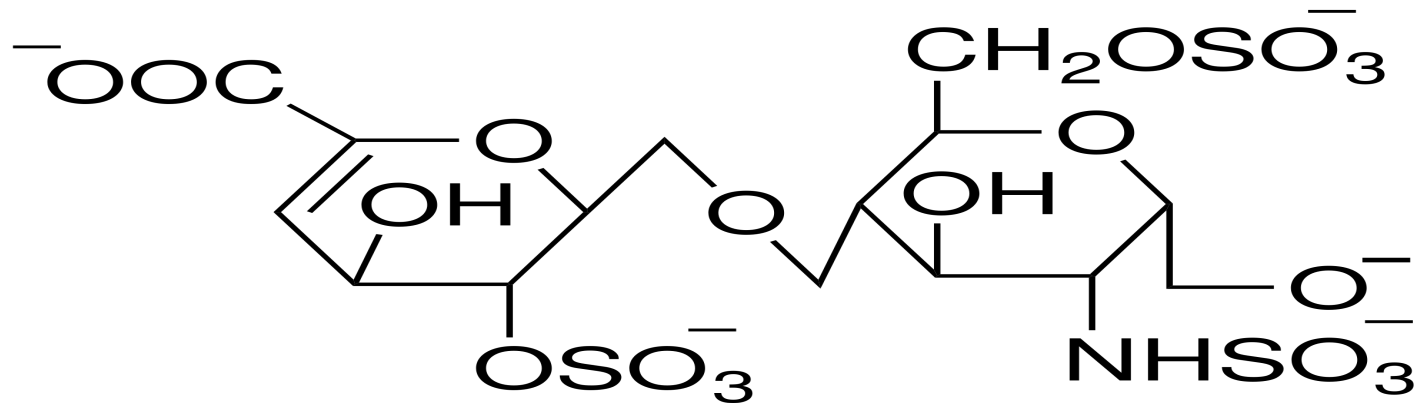
# Heteropolysaccharides: Mucopolysaccharides(hyaluronic acid )

- These materials provide a thin, viscous, jelly-like coating to cells. The most abundant form is hyaluronic acid.



- Glycoproteins** are proteins which contain oligosaccharide chains (glycans) covalently attached to amino acid side-chains

# Heteropolysaccharides: Mucopolysaccharides (Heparin)



- Heparin is a blood anticoagulant that increases the activity of antithrombin.<sup>[5]</sup> It is used in the treatment of heart attacks and unstable angina. It can be given intravenously or by injection under the skin
- Heparin appears to be relatively safe for use during pregnancy