2.5 Starch and Cellulose: Polymers of Sugars

- Carbohydrate: a compound of carbon, hydrogen, and oxygen, with a general formula $C_x(H_2O)_y$ or $C_xH_{2x}O_x$
- Aldose: a sugar molecule with an aldehyde functional group at C1 (glucose)
- Ketose: a sugar molecule with a ketone functional group usually at C2 (fructose)
- Monosaccharide: a carbohydrate consisting of a single sugar unit.
- Disaccharide: a carbohydrate consisting of two monosaccharides.
- The presence of both –OH and C=O groups on a flexible backbone also allows the molecule to react with itself.
- Once the ring is formed, a trans (chair) configuration is formed and free rotation can no longer occur. The functional groups are fixed into position.
- E.g. Glucose Fructose

- Polysaccharide: a polymer composed of monosaccharide monomers.
- Starch: a polysaccharide of glucose; produced by plants for energy storage. (usually a spiral helix see page 127)
- Glycogen: a polysaccharide of glucose; produced by animals of energy storage.
- Cellulose: a polysaccharide of glucose; produced by plants as a structural material. (usually a chain see page 127)
- E.g. Common disaccharide: table sugar
  galactose + glucose → sucrose

- Humans can digest starch and glycogen but cannot digest cellulose since we do not have the necessary enzymes to break it down.

Homework

Practice 1,2,3,4 Questions 1,2,3,4,5,6,7,8