

# Figure 7-12

- Disaccharide formed by condensation of hemiacetal (pyranose, furanose) with hydroxyl of another sugar
- Hemiacetal becomes stable acetal
- Hydroxyl group can be any -OH in sugar, even of anomeric carbon
- Arrows between numbers represent the connectivity of different sugars

# Summary 7.1

- Contains much useful information about sugars and oligosaccharides
- Don't worry too much about reducing sugars except as it identifies aldehydes/ketones not in acetal/ketal structure

# Figure 7-13

- Polysaccharides can be branched, unbranched, made from one type or multiple types of sugars, and can result from acetal formation at several different hydroxyl groups
- Different polysaccharides have remarkably different properties
- Significant use: sugar storage
  - Starch and glycogen
  - Reduce osmolarity of sugars

# Figure 7-15

- Starch contains branched and unbranched polysaccharides
- Glucose stored in polymer
- $\alpha$ 1-4 linkage, with  $\alpha$ 1-6 branches
- Glycogen has very similar connections, but different spacing between branches

# Figure 7-16

- Cellulose is unbranched polysaccharide
- Glucose connected in  $\beta$ 1-4 linkage
- Extensive hydrogen bonding and extended conformation gives cellulose its rigid structure
- Enzymes for breakdown of cellulose different from those that break down starch or glycogen

# Figure 7-18

- Chitin is a polymer of N-acetylglucosamine
- What is the linkage between sugars?

# Figure 7-31

- Glycosylation connect aldehyde/ketone functional group with protein alcohol (O-linked) or amide (N-linked)
- Serine/Threonine for O-linked
- Asparagine for N-linked
- What is the 1-letter abbreviation for asparagine?
- Glycosylation sites are typically on outer membrane proteins

# Figure 7-32

- Sugars can also be connected to lipids
- Typically associated with outer cell membrane



# Figure 7-35

- Lectins bind carbohydrate structures specifically
- Carbohydrate structures serve as recognition sites for interactions with other cells

# Figure 7-36

- Carbohydrates serve as mediaries of interactions between cells of the same organism and among cells of different organisms
- Antigen recognition
- Immune response