Complex carbohydrates: the polysaccharides

- Polymers of hundreds or thousands of sugar monomers
  - costs little energy to build
  - easily reversible = release energy when digested
Polysaccharides video clip
Storage polysaccharides

- **Starch** (polymer of glucose)
  - Found in **PLANTS**
  - Formed in roots and seeds as a form of glucose storage

- **Glycogen** (polymer of glucose)
  - Found in **ANIMALS**
  - Formed in the liver as a form of glucose storage

What does it mean to “STORE” something?
Storage polysaccharides

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Structural Polysaccharides

- Cellulose (polymer of glucose)
  - Most abundant organic compound on Earth
  - Found in the cell walls of plants
  - Indigestible for most animals due to orientation of bonds between glucoses
Structural polysaccharides

- Chitin (polymer of modified glucose units)
  - Found in the outer coverings of insects, crabs, and spiders
  - Found in the cell walls of many fungi
• Molecular structure determines function

- in starch
- in cellulose

◆ isomers of glucose
Digesting starch vs. cellulose

**Starch**
- Easy to digest

**Cellulose**
- Hard to digest

(b) Starch: 1–4 linkage of α glucose monomers

(c) Cellulose: 1–4 linkage of β glucose monomers
Cow

*can digest* cellulose well; no need to eat other sugars

Gorilla

*can’t digest* cellulose well; must add another sugar source, like fruit to diet
Helpful bacteria

• How can herbivores digest cellulose so well?
  – **BACTERIA** live in their digestive systems & help digest cellulose-rich (grass) meals
Any Questions??