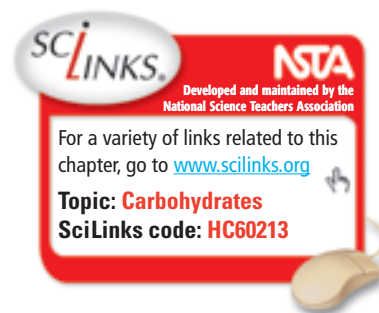


Cooking sucrose with high acid foods, such as berries and fruits, causes it to break down into a mixture of equal parts of glucose and fructose. This new mixture provides the sweet taste in jams and jellies, which is sweeter than the starting sugar. When lactose is broken down, glucose and galactose are formed. Some people do not produce the enzyme needed to break down the milk sugar in dairy products. This condition is called *lactose intolerance*. People who have this may feel ill when they drink milk or eat foods that have milk in them.



Polysaccharides

When many monosaccharides or disaccharides combine in a series of condensation reactions, they form a polysaccharide. A **polysaccharide** is a carbohydrate made up of long chains of simple sugars. Cellulose, starch, and glycogen are *polymers* of glucose, or polysaccharides, that contain many glucose monomer units.

As shown in **Figure 4**, the glucose molecules in cellulose chains are arranged in such a way that hydrogen bonds link the hydroxy groups of adjacent glucose molecules to form insoluble fibrous sheets. These sheets of cellulose are the basic component of plant cell walls. More than 50% of the total organic matter in the world is cellulose. People cannot digest cellulose, but when we eat fiber, which is cellulose, it speeds the movement of food through the digestive tract. Microorganisms that can digest cellulose are present in the digestive tracts of some animals. Cows and other ruminants have a special stomach chamber that holds the plants they eat for long periods of time, during which these micro-organisms can break down the cellulose into glucose.

Starch is the storage form of glucose in plants. Starch from foods such as potatoes and cereal grains makes up about two-thirds of the food eaten by people throughout the world. Starch in food is broken down into glucose during digestion. Glucose is broken down further in metabolic reactions that will be discussed later in this chapter.

FIGURE 4 Glucose is the monosaccharide subunit for glycogen, cellulose, and starch. Notice that these three polymers differ in their arrangement of glucose monomers.

