

Module 03: Biomolecules — Study Questions

Macromolecule Concepts

1. What is the difference between a monomer and a polymer?
2. Describe how dehydration synthesis builds larger molecules from smaller ones. What does the name tell you about the process?
3. How does hydrolysis break down polymers? How is this related to digestion?
4. What four classes of organic macromolecules are essential to life?

Carbohydrates

1. What is the general formula for carbohydrates, and what does it tell us about their composition?
2. Give examples of a monosaccharide, a disaccharide, and a polysaccharide.
3. How are starch and glycogen similar? How are they different?
4. Why can humans digest starch but not cellulose, even though both are made of glucose?
5. What role do carbohydrates play in providing quick energy for cells?
6. A marathon runner eats a large pasta dinner the night before a race. How does this relate to carbohydrate storage in the body?

Lipids

1. What are the building blocks of a triglyceride?
2. What is the difference between saturated and unsaturated fatty acids? How does this affect their properties at room temperature?

3. How is the structure of a phospholipid different from a triglyceride, and why is this important for cell membranes?
4. Besides energy storage, name two other important functions of lipids in the body.
5. Why are trans fats considered harmful to health?

Proteins

1. What is the monomer of proteins, and how many different types are commonly found in living organisms?
2. What type of bond holds amino acids together in a protein chain?
3. Describe the four levels of protein structure. Why is each level important?
4. What does it mean when a protein is "denatured"? Give an example of what can cause this.
5. Enzymes are proteins. How does an enzyme's shape relate to its function?
6. Why might a single amino acid change have a dramatic effect on protein function?

Nucleic Acids

1. What are the three components of a nucleotide?
2. How does the structure of DNA differ from RNA?
3. What is the relationship between DNA, genes, and proteins?
4. Why is the double helix structure of DNA important for copying genetic information?