

# Carbohydrates: Structure and Function

Examine the diagrams and fill in the letter in each blank below. Some blanks have more than one letter answer.

A

$$\begin{array}{c}
 \text{O} \\
 \parallel \\
 \text{H}-\text{C}-\text{H} \\
 | \\
 \text{H}-\text{C}-\text{O}-\text{H} \\
 | \\
 \text{H}-\text{C}-\text{O}-\text{H} \\
 | \\
 \text{H}-\text{C}-\text{O}-\text{H} \\
 | \\
 \text{H}-\text{C}-\text{O}-\text{H} \\
 | \\
 \text{H}
 \end{array}$$

B

$$\begin{array}{c}
 \text{O} \\
 \parallel \\
 \text{H}-\text{C}-\text{H} \\
 | \\
 \text{H}-\text{C}-\text{O}-\text{H} \\
 | \\
 \text{H}-\text{O}-\text{C}-\text{H} \\
 | \\
 \text{H}-\text{C}-\text{O}-\text{H} \\
 | \\
 \text{H}-\text{C}-\text{O}-\text{H} \\
 | \\
 \text{H}-\text{C}-\text{O}-\text{H} \\
 | \\
 \text{H}
 \end{array}$$

C

$$\begin{array}{c}
 \text{O} \\
 \parallel \\
 \text{H}-\text{C}-\text{H} \\
 | \\
 \text{H}-\text{C}-\text{O}-\text{H} \\
 | \\
 \text{H}-\text{O}-\text{C}-\text{H} \\
 | \\
 \text{H}-\text{O}-\text{C}-\text{H} \\
 | \\
 \text{H}-\text{C}-\text{O}-\text{H} \\
 | \\
 \text{H}-\text{C}-\text{O}-\text{H} \\
 | \\
 \text{H}
 \end{array}$$

D

$$\begin{array}{c}
 \text{H} \\
 | \\
 \text{H}-\text{C}-\text{O}-\text{H} \\
 | \\
 \text{C}=\text{O} \\
 | \\
 \text{H}-\text{O}-\text{C}-\text{H} \\
 | \\
 \text{H}-\text{C}-\text{O}-\text{H} \\
 | \\
 \text{H}-\text{C}-\text{O}-\text{H} \\
 | \\
 \text{H}-\text{C}-\text{O}-\text{H} \\
 | \\
 \text{H}
 \end{array}$$

E

$$\begin{array}{c}
 \text{O} \\
 \parallel \\
 \text{H}-\text{C}-\text{H} \\
 | \\
 \text{H}-\text{C}-\text{O}-\text{H} \\
 | \\
 \text{H}-\text{C}-\text{O}-\text{H} \\
 | \\
 \text{H}-\text{C}-\text{O}-\text{H} \\
 | \\
 \text{H}-\text{C}-\text{O}-\text{H} \\
 | \\
 \text{H}
 \end{array}$$

G

H

- |                         |                    |                           |   |
|-------------------------|--------------------|---------------------------|---|
| _____ 1. Hydroxyl group | _____ 7. Pentose   | _____ 13. Starch          | _____ 19. Broken down within cells for fast energy                        |
| _____ 2. Carbonyl group | _____ 8. Hexose    | _____ 14. Glycogen        | _____ 20. Energy storage molecules found in plant roots                   |
| _____ 3. Glucose        | _____ 9. Ketone    | _____ 15. Cellulose       | _____ 21. Energy storage molecules found in animal muscle and liver cells |
| _____ 4. Fructose       | _____ 10. Aldehyde | _____ 16. Monosaccharides | _____ 22. Strong indigestible molecule used in plant cell walls           |
| _____ 5. Galactose      | _____ 11. Sucrose  | _____ 17. Disaccharides   |   |
| _____ 6. Ribose         | _____ 12. Lactose  | _____ 18. Polysaccharides |   |

# Carbohydrates: Structure and Function

Examine the diagrams and fill in the letter in each blank below. Some blanks have more than one letter answer.

The diagrams illustrate various carbohydrate structures:

- A:** Fischer projection of ribose (5-carbon aldehyde).
- B:** Fischer projection of glucose (6-carbon aldehyde).
- C:** Fischer projection of fructose (6-carbon ketone).
- D:** Fischer projection of fructose (6-carbon ketone).
- E:** Fischer projection of glucose (6-carbon aldehyde) with the carbonyl group circled.
- F:** Fischer projection of glucose (6-carbon aldehyde) with the hydroxyl group on C5 circled.
- G:** Maltose, a disaccharide composed of two glucose units linked by an alpha-1,4-glycosidic bond.
- H:** Sucrose, a disaccharide composed of glucose and fructose units linked by an alpha-1,2-glycosidic bond.
- I:** Starch, a long chain of alpha-D-glucopyranose units linked by alpha-1,4-glycosidic bonds.
- J:** Glycogen, a branched chain of alpha-D-glucopyranose units linked by alpha-1,4-glycosidic bonds, with branches formed by alpha-1,6-glycosidic bonds.
- K:** Cellulose, a long chain of beta-D-glucopyranose units linked by beta-1,4-glycosidic bonds.

- F 1. Hydroxyl group    A 7. Pentose    I 13. Starch    B 19. Broken down within cells for fast energy
- E 2. Carbonyl group    B, C, D 8. Hexose    K 14. Glycogen    I 20. Energy storage molecules found in plant roots
- B 3. Glucose    D 9. Ketone    J 15. Cellulose    K 21. Energy storage molecules found in animal muscle and liver cells
- D 4. Fructose    A, B, C 10. Aldehyde    A, B, C, D 16. Monosaccharides    K 22. Strong indigestible molecule used in plant cell walls
- C 5. Galactose    H 11. Sucrose    G, H 17. Disaccharides
- A 6. Ribose    G 12. Lactose    I, J, K 18. Polysaccharides

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