monosaccharide units. They can be either branched or unbranched and serve various functions:

- **Starch:** A storage polysaccharide in plants, composed of amylose (unbranched) and amylopectin (branched). It serves as an energy reserve that can be broken down into glucose units when needed.
- **Glycogen:** The storage form of glucose in animals, primarily found in liver and muscle cells. It is highly branched, allowing for rapid release of glucose during periods of high energy demand.
- **Cellulose:** A structural polysaccharide found in the cell walls of plants. It consists of long chains of glucose molecules linked by β(1→4) glycosidic bonds, providing rigidity and strength to plant cell walls.
- **Chitin:** Found in the exoskeletons of arthropods and the cell walls of fungi. Chitin is similar to cellulose but has N-acetylglucosamine units instead of glucose.

Biological Significance:

Monosaccharides like glucose are vital for energy production in organisms. Glucose undergoes glycolysis, yielding ATP, which cells use as a primary energy currency. Additionally, ribose and deoxyribose are essential components of nucleotides and nucleic acids (DNA and RNA), playing crucial roles in genetic information storage and transfer.

Polysaccharides serve various structural and storage functions. For instance, starch and glycogen act as energy reserves in plants and animals, respectively. Cellulose provides structural support in plant cell walls, and chitin contributes to the structural integrity of arthropod exoskeletons and fungal cell walls.

Conclusion

Carbohydrates are a diverse group of biomolecules essential for life. They serve as energy sources, structural components, and signaling molecules, making them indispensable to both plant and animal life. Understanding their structure, classification, and functions is crucial in the study of biochemistry and molecular biology.