SCIENCE OF GLYCOCHEMISTRY

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ABSTRACT

Carbohydrates are the most abundant organic molecules on Earth and are the main products through which the energy of the sun is harnessed and stored. Glucose poly- saccharides, such as starch in plants and glycogen in bacteria and animals, serve as a source of energy for essentially all organisms. However, the complex roles of carbo- hydrates are not limited to simply that of biological fuel stocks or biosynthetic starting materials. DNA and RNA, which transmit and store genetic information, have sugar backbones. Other carbohydrate polymers are essential structural and protective components of the cell walls of plants as cellulose, bacteria as peptidoglycan, and the exoskeletons of arthropods as chitin. They are important constituents of secreted and cell−surface proteins, membrane components in the form of glycolipids and gangli- osides, as well as various types of extracellular matrix molecules . The significance of the carbohydrate domains of glycoproteins and glycolipids is further exhibited in their roles as cell−surface recognition elements and as determinants in blood−group typing. Carbohydrates are also appended to various natural products including antibiotics .