ISSN 0006-2979, Biochemistry (Moscow), 2006, Vol. 71, No. 6, p. 698. © Pleiades Publishing, Inc., 2006.
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BOOK REVIEW

Neuroglycobiology (Molecular and Cellular Neurobiology)

(Fukuda, M., Rutishauser, U., and Schnaar, R. L., eds., Oxford University Press, Oxford-New York, 2005, 229 p., $98.50)

DOI: 10.1134/S0006297906060174

This book consists of eight chapters. Chapter 1 (written by K. Angata and M. Fukuda) considers characteristic features of structure and biosynthesis of such glycoconjugates as N- and O-glycoproteins, sulfated glycans, and polysialic compounds. Much attention is paid to biosynthesis of polysialic compounds and their roles in the development of nervous systems and also characteristics of sialyl transferases and polysialic acids in normal states and cancer.

In chapter 2, A. Maarouf and U. Rutishauser analyze the effect of polysialic acids in plasticity of the adult human brain. They also consider involvement of polysialic acids in the formation of various brain regions (hypothalamus, hippocampus, and thalamus) and investigate the interrelationship between neural adhesive molecules involved in intercellular interactions.

Chapter 3 (by F. Jungalwala) deals with data on biosynthesis and functions of HNK glycans. This includes structure of HNK-1 glycans, their expression during the development of nervous tissue including HNK-1 glycolipids and glycoproteins, cloning of enzymes involved in biosynthesis of sulfoglucuronyl glycans, and immunocytochemical methods for detection of their localization.

In chapter 4, R. Schnaar considers the main types of brain glycolipids and their ratios in brain tissue. Glycolipids are the most important class of brain glycoconjugates; they represent more than 80% of all glycoconjugates of brain tissue. This chapter contains detailed description of enzymes involved in biosynthesis of brain glycolipids.

Chapter 5 (by K. Furukawa) describes biosynthesis and functions of glycosphingolipids. It also considers glycosyl transferases (and animal models lacking one of these enzymes) and the role of cell membrane glycosphingolipids in apoptotic processes.

Chapter 6 (by G. Kohla and R. Schauer) deals with data characterizing sialic acids and their functions in living systems. Attention is given to the chemical diversity of sialic acids, their metabolism, and structural features in gangliosides.

In chapter 7, H. Schachter considers problems associated with incomplete glycosylation of glycoproteins in humans and mice. It gives examples of incomplete N- and O-glycosylation including mice with defects in genes required for N- and O-glycan biosynthesis. Special attention has been paid to human congenital diseases with defects in genes required for N- and O-glycan biosynthesis.

In chapter 8, T. Kolter and K. Sandhoff summarize data on lysosomal glycosphingolipid storage diseases. The authors consider problems of glycosphingolipid degradation and characterize their activator proteins and deficit of certain lysosomal enzymes causing the development of glycosphingolipid storage diseases. This chapter ends with description of various approaches employed for correction of various forms of these enzymopathies.

This book will be useful for biochemists, molecular and cell biologists, glycobiologists, specialists in human inherited diseases, and biotechnologists.

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