

## Experimental Glycoscience. Glycobiology

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This book is a logical continuation of the first book by the same editors entitled "Experimental Glycoscience. Glycochemistry."

The book consists of four parts of 24 sections, terminological glossary, and subject index. Part I includes five sections related to glycosyltransferase genes. Section 1 deals with glycosyltransferases. Here there is discussion on synthesis of glycan-related oligosaccharides and their transformation into neoglycoconjugates using enzymatic methods, comparison of glycosyltransferase families using the profile hidden Markov model, fucosyl- and sialyltransferases. The special chapters of this part deal with glycosyltransferases involved in the biosynthesis of glycolipids, heparan-, keratan-, and dermatan sulfates, and gangliosides.

Section 2 contains data related to sugar-modified enzymes. Here such enzymes as N-acetylglucosamine-6-O-sulfotransferases, sulfotransferases involved in sulfation of glycosaminoglycans, sulfatide synthase, and CMP-N-acetylneuraminic acid hydroxylase are considered.

Section 3 deals with sugar transporters. It consists of only one chapter where nucleotide sugar transporter genes and their functional analysis are discussed.

Section 4 characterizes glycosidases. Processing of N-glycans in Golgi complex with participation of glycosidases including  $\alpha$ -mannosidase II and  $\alpha$ -mannosidase IIx is discussed. Sialidase genes, release of sugar chains from glycosphingolipids, heparan sulfate endosulfatase assay, and sphingolipids activator proteins are also discussed.

Section 5 deals with animal lectins. Here there are two chapters: affinity purification of recombinant galectins and Siglec family.

Part II considers functional analyses of sugar chains. Section 6 of this part contains immunological data. Discussed roles of serum lectins in host defense, relationship between galectin and immune system, carbohydrate recognition by cytokines, and others topics related with the role of carbohydrate in immune systems.

Section 7 deals with participation of glycoconjugates in the brain and nervous system. Neuronal function of

sulfatide, chondroitin sulfate proteoglycans, and polysialic acid are discussed.

Section 8 contains data about participation of carbohydrate in quality control of proteins. The problems of degradation of peptides and proteins in the cytosol and in endoplasmic reticulum are discussed.

Section 9 deals with Golgi and lysosomal diseases. This section includes three chapters related to retrograde transport of glycolipid-bound toxins, degradation of hyaluronan and its disorders, and advances in enzyme replacement therapy for lysosomal diseases.

Section 10 highlights involvement of carbohydrate in infection processes of highly pathogenic avian influenza viruses, growth of *Helicobacter pylori*, and binding properties of *Clostridium botulinum*.

Section 11 contains data related to carbohydrates in cancer. There are such topics as fucosylation and cancer, roles of carbohydrate-mediated cell adhesion in cancer progression, biological significance of mucins produced by epithelial cancer cells, and others.

Sections 12 and 13 deal with regeneration medicine and transplantation and fertilization, respectively.

Sections 14 and 15 present materials about development, differentiation, and morphogenesis and muscular dystrophy and carbohydrate disorders of glycosylation.

Section 16 considers lifestyle-related diseases and section 17 deals with IgA nephropathy.

Section 18 highlights growth factor receptors and importance of sugar chains in the function of growth factor receptors.

Section 19 discusses blood group carbohydrate antigens.

Part III contains data on glycosyltransferase genes in knockout mice. Here there is discussion about various types of knockout mice with deficiency of genes of glycosyltransferases: fucosyltransferases, galactosyltransferase, glucuronyltransferase, sulfotransferases, sialyltransferase, and N-acetylgalactosaminyltransferase (section 20).

Part IV highlights infrastructures and research resources for various directions in glycobiology. This part consists of four sections that include data about glycosyl-

transferases and related genes and useful cell lines (section 21), sugar library (section 22), and a database for various simple and complex carbohydrates, including glycosaminoglycans, glycogen, and carbohydrate epitopes and antibodies (section 23). The final section 24 deals with DNA microarrays in glycobiology, lectin microarray,

and carbohydrate microarray for deciphering the information coded in oligosaccharide structure.

The book is a useful manual for many researchers in the field of glycobiology, biochemistry, and biotechnology. This book can be a very useful tool for teachers and students of colleges and universities.

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