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Nota di contenuto	A. Analytical and Structural Approach - Technical Description for Analyzing Glycan Structures (Reviewed by Yoshiki Yamaguchi): Overview -- EMARS -- Development of glycan array -- Development of glycan array -- Development of glycan array -- Development of glycan array -- Automated programmable one-pot synthesis of glycans -- Lectin array -- Lectin-glycan interaction based on glycan array data -- Glycoform-specific protein staining by lectin and antibody -- Glycosaminoglycans analysis -- Mass analysis -- Mass analysis -- IGOT-lectin capture -- Membrane electrophoresis -- HPLC nucleotide-sugar analysis -- Capillary electrophoresis -- HPLC PA-sugar -- Congenital disorders of glycosylation, analytical aspect -- Quality control of pharmaceutical products and biosimilars -- NMR -- NMR -- STD-NMR -- Conformational analysis of glycans and glycoproteins -- Glycolipid LC-MS -- MALDI-MS -- MALDI-MS -- Sulfoglycolipids -- GAG array -- X-ray -- REMD simulation -- MD simulation and computational screening -- B. Glycoinformatics - New Approach for Informatics and Databases for Glycoscience (Reviewed by Kiyoko F.

Aoki-Kinoshita): Informatics overview -- MIRAGE project -- RINGS -- JCGGDB -- UniCarb-DB -- CIRES -- GLYCOSCIENCES.de -- CSDB, Plant and Bacterial Carbohydrate Structure Database -- MonosaccharideDB -- Glycome DB -- GlycoEpitope -- Sugar Bind DB -- GLYCAM -- CAZY -- 3D Lectines -- C. Chemoenzymatic Synthesis of Glycans - Chemical and Enzymatic Methods of Glycan Synthesis (Reviewed by Yasuhiro Kajihara and Peter Seeberger): Overview -- Chemical synthesis of glycans -- Chemical synthesis of glycans -- Chemical synthesis of glycans -- Synthesis of homogeneous glycoproteins -- Synthesis of homogeneous glycoproteins -- Synthesis of homogeneous glycoproteins -- Synthesis of homogeneous glycoproteins -- Synthesis of homogeneous glycoproteins -- Glycopeptide/glycoprotein synthesis -- Gangliosides synthesis -- Specific Glycosylation -- Furanoside chemistry -- Glycoside synthesis -- Carbohydrate Library Synthesis -- Development of sugar array -- Development of sugar array -- Development of sugar array -- Automated synthesis -- Automation in glycan synthesis -- GPI chemical synthesis -- Oligosialic acid synthesis -- Synthesis of sulfated glycans -- Synthesis of sulfated glycans -- Synthetic antitumor vaccines -- Synthetic carbohydrate antigens for HIV Vaccine Design -- Chemical approach in biology and disease -- Glycoenzyme inhibitors -- Glycoenzyme inhibitors -- Glycoenzymes in glycan analysis and synthesis -- Endo-enzymes -- Oxazoline derivatives -- Large-scale enzymatic synthesis of glycans with cofactor regeneration -- Large-scale enzymatic synthesis of glycans -- Chemoenzymatic synthesis -- Chemoenzymatic synthesis of heparins -- Chemoenzymatic synthesis of glycoproteins -- Multivalent glycan synthesis -- Biosynthesis of A and B blood group -- Glycosyltransferase structures -- Structural biology of oligosaccharyltransferase (OST) -- Chemoenzymatic synthesis of oligosaccharides and cancer and bacterial vaccines -- Neoglycoprotein and oligosaccharide synthesis -- Chemoenzymatic synthesis of glycoconjugates -- Synthesis of O-glycosylated proteins -- D. Imaging of Glycans - New Techniques for Imaging Glycans (Reviewed by Yasuhiro Kajihara and Chi-Huey Wong): Molecular probes for glycosylation: overview Imaging by Click Chemistry -- Imaging by Click Chemistry -- Imaging by Click Chemistry -- Chemical tools to detect *Helicobacter pylori* -- Enzymatic imaging -- PET imaging -- Glycoprotein imaging -- E. Neuroglycobiology - The Role of Glycans in Neurobiology and Neuroscience (Reviewed by Kenji Kadomatsu): Neuroglycobiology overview -- Neurochemistry and developmental neurobiology -- Glycans in neurobiology -- Glycosaminoglycans (GAGs) -- GAGs -- Polysialic acid -- Polysialic acid -- Glycolipids sialidase -- HNK-1 -- Ganglioside -- Single molecule imaging -- Glycolipid -- Heparan sulfate proteoglycans (HSPG) -- HSPG -- N-glycans and glial cells.

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## Sommario/riassunto

The aim of the book is to provide a succinct overview of the current status of glycoscience from both basic biological and medical points of view and to propose future directions, in order to facilitate further integrations of glycoscience with other fields in biological and medical studies. Glycans (carbohydrate oligomers) are the so-called “building blocks” of carbohydrates, nucleic acids, proteins and lipids and play major roles in many biological phenomena as well as in various pathophysiological processes. However, this area of glycoscience has been neglected from the research community because glycan structures are very complex and functionally diverse and as compared to proteins and nucleic acids simple tools for the amplification, sequencing and auto-synthesis of glycans are not available. Many scientists in other fields of research have now realized that glycosylation, i.e. the addition

of glycans to a protein backbone, is the most abundant post translational modification reactions and is an important field of research and sometimes they require a glycobiology and/or glycochemistry approach to be used. It is still difficult, however, for non-expert researchers to use these techniques. This book provides numerous but simple overviews of current topics and protocols for the experiments. The book is aimed at university students and above, including non-experts in the field of glycoscience.

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