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Sommario/riassunto

This handbook, now in a new, second edition, is an essential resource for scientists with an interest in the role of glycosyltransferases and related genes involved in the biosynthesis of glycoproteins, glycolipids, and proteoglycans. The first edition of the Handbook of Glycosyltransferases and Related Genes, published in 2002, contained descriptions of more than 100 mammalian genes by over 100 scientists who originally isolated and/or cloned these genes. Since then, there has been a growing body of evidence concerning the roles of glycosyltransferases, and additional glycosyltransferases have been identified. Now more than 200 glycosyltransferases have been isolated from mammalian tissue, corresponding to approximately 1–2% of the total human genome. Some have been found to be involved in development and reproduction, signal transduction, cell death, higher nervous functioning, immunity, and other important biological processes. Glycosyltransferases have also been implicated in the development of lifestyle diseases such as diabetes, cancer, chronic obstructive lung disease (COPD), neuromuscular diseases, and infectious diseases. A functional glycomics approach using gene targeting in mice and analytical methods utilizing glycan arrays, lectin arrays, HPLC, and mass spectrometry identified the target glycoprotein (s) on which glycans are attached by the catalytic reaction of glycosyltransferases. Most of the target proteins have been shown to be cell surface membrane proteins such as growth factor receptors and transporters. The three-dimensional structures of some glycosyltransferases have also been characterized, making it possible to classify them into retaining and inverting enzymes. Such structural information is also included in this invaluable new edition.
