

Glycosylation in Diverse Cell Systems: Challenges and New Frontiers in Experimental Glycobiology

More than half of all proteins are glycosylated and can be glycosylated in different ways, yielding a range of 'glycoforms' that have very different properties. Glycosylation changes under different environmental and physiological conditions, during development and in disease; it is complex, incompletely understood and fascinating. This book is targeted at the non-specialist and introduces some of the groundbreaking developments in this fast growing and topical field. It begins with general chapters, setting the scene and providing the necessary background so that the non-specialist can appreciate the importance of glycosylation and the basic principles underlying its biology. From this starting point, chapters introduce aspects of glycosylation in diverse cell systems (including microorganisms, plants and humans), introducing advances and challenges in engineering glycosylation pathways in these systems (for example for expression systems and protein engineering) and highlights some of the exciting new frontiers in glycobiology research. Approaches to analysis of glycosylation, glycan arrays, bioinformatics and automated synthesis are also covered. Experimental glycobiology is an especially exciting and topical field as it becomes increasingly apparent that different cell types glycosylate proteins very differently. This has enormous implications for biotechnology applications where recombinant proteins – sometimes destined for possible human therapeutic use – are expressed in non-human cell systems. Unexpected or non-human type glycosylation can have profound implications on biological activity, serum half life and toxicity. The potential to understand and ultimately to engineer glycosylation pathways in diverse cell systems represents a challenging new frontier.

