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Carbohydrate- Protein Interaction

Edited by
A.E. Clarke and I.A. Wilson

With 35 Figures



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Preface

Carbohydrate as the primary product of photosynthesis has a vital role in the maintenance of life on this planet. Until relatively recently, interest in complex carbohydrates focussed on their structural role in the extracellular matrix/cell wall of animal, plant, and microbial cells and on their role as energy sources (e.g., starch and glycogen) and structural components (e.g., cellulose) in natural products. There was, however, indirect evidence that carbohydrates could play an informational role; this evidence was from the finding last century that plant lectins caused specific agglutination of certain animal cells and, more recently, that the agglutination was mediated by interactions between the plant lectin and cell surface carbohydrates.

It is now clear that endogenous carbohydrate binding proteins are important in cell-cell recognition phenomena in animal systems. Recently, impressive evidence has been presented that complex oligosaccharides, derived from cell walls, are also important in plant recognition events, for example in signalling the defence mechanisms of a plant to respond to attack by insects and microbial pathogens. Plant biologists have consequently become interested in the ways in which these oligosaccharides can interact with other molecules. Another aspect of biology which has generated interest in carbohydrate-protein interactions is the finding that cell surface saccharides are antigenic in animals and that in some diseases the cell surface antigens of the pathogen are the antigenic determinants. Thus, there is wide interest in complex carbohydrates and the way in which they interact with other cellular components.

The purpose of this book is to bring together information on the interaction of carbohydrates with proteins which will be of interest to all biologists, regardless of whether their experimental interests are in plant, microbial, or animal systems. We start with a review of the structure of carbohydrates found in plant and animal systems. This is followed by chapters on the carbohydrate binding sites of lectins, monoclonal antibodies, enzymes, and sugar

transport proteins. This collection of papers gives a comprehensive account of carbohydrate-protein interactions and will be a valuable resource for cell and molecular biologists and structural biochemists alike.

March, 1988

ADRIENNE E. CLARKE
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