Foreword

It is now 120 years since the first report on a lectin appeared and more than 60 years since the term "lectin" was coined. For a long time, attention was focused almost exclusively on plant lectins, and it was intensified by the demonstration in the 1960s that these sugar-binding proteins are invaluable tools for the study of carbohydrates in solution and on cell surfaces. Broad interest in animal lectins began only two decades ago and is currently growing at an explosive rate, fueled by the realization that they act as cell recognition molecules, a feature originally demonstrated for bacterial surface lectins. A key reason for the accelerated progress in this field is the application of recombinant DNA techniques, which have also permitted the construction of animals deficient in particular lectins. Another factor is the vast improvement in the methods of structural analysis of the carbohydrates of glycoconjugates. Last but not least is the availability of glycoarrays with hundreds of different saccharides, which greatly facilitates the detection of lectins and identification of lectin specificity. By now, numerous animal lectins, classified into nearly 20 families, have been isolated and characterized, and the functions of a number of these lectins have been clarified. Among others, these lectins have been shown to control the biosynthesis of glycoproteins and their targeting to subcellular organelles, to participate in cell signaling, monitor the migration of leukocytes in blood vessels, serve as innate immunity agents against microbial pathogens, and contribute to tumor progression.

The National Institutes of Health recognized the importance of animal lectins and in 2001 awarded a megagrant of $75 million for a 10-year period to the Consortium for Functional Glycomics, the aim of which was to study the role of carbohydrate–lectin interactions at the cell surface and in cell–cell communication. At present, over 350 glycobiology research groups are affiliated to the consortium.

The knowledge accrued about animal lectins is certain to have a considerable impact on medical practice, by improving the pharmacokinetics of glycoprotein drugs and blocking the undesirable migration of leukocytes to sites of inflammation, as well as for disease diagnosis, in the treatment of cancer, and in lectin replacement therapy. There is no doubt that in the future the list of animal lectins will continue to grow and that novel functions and applications will be found for these fascinating proteins.

The editors should be commended for assembling a book that contains authoritative reviews on various aspects of the present state of knowledge of animal lectins. In such a rapidly expanding field, no review is likely to be exhaustive or up-to-date in a few years time. However, I am confident the book will be helpful to many readers and will stimulate them to further work in this exciting field.

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