Bioinformatics for Glycobiology and Glycomics: An Introduction

The first book to be dedicated to the bioinformatics of carbohydrates and glycoproteins

This book provides an introduction to this emerging field of science both for the experimentalist working in glycobiology and glycomics, and also for the computer scientist looking for background information for the development of highly sophisticated algorithmic approaches. It includes an overview of the state-of-the-art in the field, with reviews on databases, and the tools in use for analysis, interpretation, and prediction of the structures of complex carbohydrates, and demonstrates the value of bioinformatics for glycobiology.

The availability of comprehensive databases and corresponding bioinformatics tools, to access and analyse the large amounts of experimental data relating to the structure of carbohydrates, will be a prerequisite for the success of the large-scale glycomics projects that aim to decipher new, so far unknown, biological functions of glycans. Efficient bioinformatics descriptions and tools can considerably enhance the efficiency of glycomics research, in terms of data quality, analysis and experimental costs.

For a complete understanding of the molecular processes in which carbohydrates are involved, such as protein–carbohydrate interactions and the impact of glycosylation on protein function, knowledge of the 3D structure of the carbohydrate, the protein–carbohydrate complex, or the glycoprotein is often indispensable. This book provides a thorough introduction into methods used for conformational analysis of carbohydrates.