

Book Review

Synthetic Multivalent Molecules: Concepts and Biomedical Applications; Seok-ki Choi; John Wiley & Sons, Inc., Hoboken, NJ, 2004.

While most people think of chemistry when valency is mentioned, the term is applied in biological systems to interactions such as those between ligands and receptors. A multivalent interaction occurs when more than one structural unit simultaneously binds to more than one receptor of the complementary entity. Multivalent binding is a natural strategy that provides potent and selective interactions in biological systems. In contrast, analogous monovalent ligands are relatively weak and nonselective in function. Thus, the multivalent molecule is an important subject in the design of ligands, inhibitors, and drugs. The text *Synthetic Multivalent Molecules* discusses basic and advanced principles of multivalent interactions and consolidates numerous examples from the literature.

The first chapter introduces the subject of multivalent interactions. The author defines terms and illustrates concepts while providing a review of the multivalent molecule, its structure, mechanisms of interactions, and its importance in biological systems. The following three chapters form the core of the book, organized by target origin into sections on viruses, bacteria, and mammalian cells. Viral target topics in Chapter 2 include influenza, HIV, and others, as well as nucleic acids of viruses. Chapter 3 covers bacterial targets and discusses cell membrane targets at length. Bacterial toxins and enzymes, and a short section on nucleic acids are also included. For mammalian cellular targets, Chapter 4 covers carbohydrate-recognition receptors, peptide and hormone

recognition receptors, ligand-mediated receptor dimerization, enzymes, G-protein-coupled receptors, ion channels, and nucleic acids. All three chapters discuss relevant synthetic vaccines. The fifth and final chapter of the text examines synthetic methods and combinatorial approaches to developing these multivalent compounds, including structure-based, target-guided, and dynamic combinatorial synthetic techniques. A number of relevant biomedical examples also are touched on in this chapter.

The table of contents offers a complete outline, providing a convenient method for finding specific items of interest. Extensively referenced, the book also contains a list of abbreviations, an index, and a 20-table appendix. Among the latter is a cross-referenced table that allows the reader to compare targets by valency. The graphical work complements the text, with diagrams used to convey concepts in addition to structures. The black and white illustrations are crisp and remain uncluttered, despite the complexity of the molecular structures portrayed. Placement of graphics requires a modicum of page flipping, yet the desired figure is generally within a page of its first reference.

Synthetic Multivalent Molecules covers a large amount of material in a clear, concise, and well-organized manner. The text is targeted to a broad audience in academia and industry, including graduate students, educators, and researchers. Choi works the fundamentals in smoothly, so that it is well suited for those newer to the subject, without sacrificing the usefulness for the experienced researcher.

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