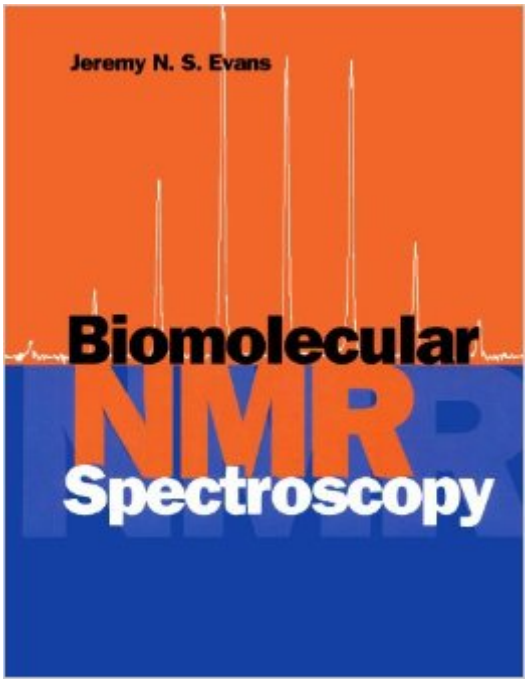
Biomolecular NMR Spectroscopy



Synopsis

The technique of nuclear magnetic resonance (NMR) spectroscopy is an important tool in biochemistry and biophysics for the understanding of the structure and, ultimately, the function of biomolecules. This textbook explains the salient features of biological NMR spectroscopy to undergraduates and postgraduates taking courses in NMR, 4iological NMR, physical biochemistry, and biophysics. Unlike other books in the general field of NMR (except the advanced treatises), the approach here is to introduce and make use of quantum mechanical product operators as well as the classical vector method of explaining the bewildering array of pulse sequences available today. The book covers two-dimensional, three-dimensional, and four-dimensional NMR, and their application to protein and DNA structure determination. A unique feature is the coverage of the biological aspects of solid-state NMR spectroscopy. The author provides many selected examples from the research literature, illustrating the applications of NMR spectroscopy to biological proteins.

Book Information

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Customer Reviews

I needed quick education in the basics of how NMR helps understand structure in proteins, DNA, and RNA. I have only a general background in science, but hoped I could pick up an outsider’s knowledge of the basics.This book has been helpful. Any problems are in my own preparation for reading it, not in the book itself. This dives straight in at the deep end, going over the quantum mechanics of spin-coupled nuclei. Given that base, it follows an orderly path through the menagerie of biomolecules. That starts with structures of single proteins, even in cases where they can’t be

crystallized. The discussion includes a number of brief case studies of specific proteins. Next, it covers enzymes in bound and unbound states, also in terms of case studies. This section makes clear some of NMR's advantages over other techniques: cryological studies of intermediate states, in vivo studies, and information from light-isotope tagging. The following section discusses DNA at length. I guess that interest in RNA secondary structure entered the main stream after this book was published - more discussion of RNA structure would have been helpful. This section also addresses DNA/drug interactions, a topic of clear interest. The chapter ends with a short discussion of saccharides and glyoproteins. This is an area that I keep my eye on. Sugar chemistry is more complicated than DNA or proteins - it can be non-linear, for one thing - and just as important in a functioning organism. (Because of polysaccharides' complexity and indirect connection to genetic molecules, they are not well studied. I look for this to change in coming years.) The next section follows logically: protein interactions with lipids, as found in cell membranes and virus interactions.