

***Molecular Biology of Membranes: Structure and Function* by Howard R. Petty**

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It should be made clear from the start that this is a membrane biology book and not a molecular biology book. It is aimed primarily at upper-level undergraduates and beginning graduate students. The coverage is reasonably broad: the topics range through bioenergetics, transport systems, receptors (including membrane adhesion), fusion, targeting and trafficking in biosynthesis, and end with a chapter on membranes in cancer. The introductory chapters (1–4) deal mostly with composition and structure, including a welcome additional chapter on carbohydrates and the cytoskeleton. The usual lipid-bilayer topics do not appear, but the book is none the worse for this; the emphasis is on membrane biology rather than on biophysics. Along these lines, the structure of membrane proteins is not dealt with in great biophysical depth, but molecular structures are introduced where required and ultrastructural studies take their proper part.

It is difficult not to draw parallels, even if these are not entirely appropriate. The book is aimed at a quite different level from the multi-author tome edited by Yeagle (*The Structure of Biological Membranes*), although many of the topics overlap. Closest perhaps is the classic graduate-level text by Gennis (*Biomembranes: Molecular Structure and Function*) against which inevitably all subsequent productions must be matched. The style of the present book is less densely and less rigorously action-packed and hence—lacking also the seamless integration of biophysics that characterizes Gennis' presentation—is more appropriate as a starting point for a broad range of students with diverse biological backgrounds. This is the author's stated aim: to introduce topics stepwise at many different stages and thus to reinforce the learning process. In spite of the different readership that is targeted, Petty's book is complementary in many aspects to the other texts mentioned. There is, for example, far more on photosynthetic membranes, also more on lipid biosynthesis and the post-translational modification of

glycoproteins. The treatment of the recognition, targeting and translocation of secretory, mitochondrial, and integral proteins has also benefited much from the more recent developments in this fast-moving area. The book therefore deserves its place also in the armory of texts on the practitioner's bookshelf.

Of course there are questions and quibbles to be addressed to any undertaking at this level, and of this scope, in a rapidly progressing field. Does the elegant pore structure presented in Fig. 2.12 really represent what is now believed to be the aggregation state of polyene antibiotics in bilayers? Is the number of transmembrane segments of the α -subunit of the Na,K-ATPase (Fig. 6.6) really likely to be seven? In Table 2.3, which provides a very useful summary with references of the molecular weights, putative number of transmembrane domains, and locations of the N and C termini for many sequenced proteins, it is actually stated to be eight. Cannot the question marks in the same table for the sodium and potassium channels now be filled in with reasonable certainty? The older, lower-resolution structure of bacteriorhodopsin still takes pride of place, and for porin we have to make do with a predicted structure, although references to the high-resolution structures are given (in one case incorrectly). Voltage-gated ion channels receive short shrift; the acetylcholine receptor is treated in some detail but, at this level, I would have liked a mention early on of the importance of this and the glycine and GABA receptors in synaptic transmission. In an attempt to be up to date while remaining introductory, the author sometimes falls between two stools. For instance, NMR and EPR results are mentioned in some places without sufficient background really to appreciate what is going on.

I didn't find a single reference to my own work—reason enough for me to read this book. Surely this is true for others besides myself, not only students. Definitely recommended.