BOOK REVIEW

Membrane protein protocols: Expression, purification and characterization, edited by Barry S. Selinsky. 2003. Humana Press. \$99.50.

Integral membrane proteins constitute up to one-third of any eukaryotic or prokaryotic proteome. Despite this overwhelming prevalence, their biochemical and structural characterization is mostly quite cumbersome due to the amphiphilic nature of membrane proteins. After the early period of membrane protein-structure determination passed in the eighties and early nineties with some successes and many frustrations, the now almost limitless amount of genomic information and major advances in structural techniques like X-ray crystallography again attracted much interest, which is reflected by the ever-increasing number of membrane protein structures reported each year. Accordingly, there is a strong demand for up-to-date monographs that focus on technically demanding topics like membrane protein expression and characterization.

One recent, interesting publication in this scientific area is the multiauthor book *Membrane Protein Protocols* that is edited by Barry S. Selinsky. This collection of established methods is divided into four parts as follows: expression, detergent selection, purification, and structure determination. One major criticism might originate from this rather broad scope, because it is almost inevitable for such a book that not all of the aforementioned challenging topics can be treated thoroughly. For example, the last part, which is entitled with structure analysis, presents only two specialized chapters dealing with membrane protein crystallization in lipidic phases and surface-plasmon-resonance spectroscopy. Whereas most readers interested in general membrane protein biochemistry should have no problem here, a structural biologist interested in those methods would certainly go for more specialized treatises like those edited by S. Iwata (*Methods and Results in Crystallization of Membrane Proteins*, IUL) or C. Hunte (*Membrane Protein Purification and Crystallization*, AP). However, it is an annoying shortcoming of *Membrane Protein Protocols* that in the very important section dealing with detergent selection, a good overview about the different properties of detergents is missing. A proper understanding of this issue is almost crucial for every newcomer to the membrane protein field, because most biochemists were previously accustomed only to the

purification of soluble proteins. Instead, one chapter deals with the expression of the glycerol facilitator, which would have fit better into the preceding section, while the two remaining chapters are not generally applicable because of their focus on certain classes of eukaryotic membrane proteins.

The real strength of *Membrane Protein Protocols* are the two other parts dealing with expression and purification, where 20 of the overall 25 chapters are located. Recombinant membrane protein expression is introduced in the first four chapters with *Escherichia coli* as expression host, before presenting more complicated expression schemes in methylotrophic yeasts or insect cells. Although some of the protocols are partly redundant, this might be of some help for the practitioner, because it allows a better case-oriented adaptation of these protocols. The purification protocols cover the whole range of isolating proteins from recombinant expression hosts up to natural sources like complete animal organs. Here, the huge number of contributors is an advantage, because many complementary ideas and insights into the handling of membrane proteins are given. Therefore, the highly diverse scope of these chapters in membrane protein expression and purification should certainly make this book a good resource for the experienced membrane biochemist. Most of the protocols are described in such detail that a transfer of the techniques to the conditions of most laboratories should, in most cases, pose no problem. However, for many newcomers to the field, the resource and expert-like level of this protocol collection might be a considerable disadvantage, because there are no introductory or general chapters that might assist in selecting proper expression and purification strategies from the described ones. At least the inclusion of some appendix information, e.g., a collection of review articles addressing general membrane protein-related issues and/or a summary about the properties of detergents and chromatography media, would have been an easy remedy for this limitation of *Membrane Protein Protocols*.

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