Davor Juretić

Bioenergetics: The Work of Membrane Proteins
(Bioenergetika – rad membranskih proteina)

Informator, Zagreb 1997.
275 pages, 3 tables, 64 figures, 620 references
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There are three kinds of books. The first kind are aimed at students. They are textbooks. The second kind of books are aimed at scientists. They are professional books. The books of the third kind are aimed at general public. They are books of popular science.

It is a hard task to classify this book of Davor Juretić, Professor at the Faculty of Science in Split, in such a way. Despite the fact that it was formally published as a textbook for university students, Professor Juretić's book amalgates good properties of all the three kinds of scientific books: it gives a systematic introduction to the field of bioenergetics like a textbook, it shows novel developments in the field (in which the author is very active) like a professional book, and it presents the basic facts and concepts in an easy and simple way like a good popular science book.

In the first chapter, the origin of life is discussed from the standpoint of bioenergetics (biochemical and thermodynamical evolution). In the second chapter, the general concepts of thermodynamics are presented (of reversible and irreversible processes) as well as the interconnection of biochemical reactions. The third chapter is mostly devoted to the three-dimensional structure of proteins and the factors by which it is determined (problem of the unique native protein conformation, hydrophilic and hydrophobic interactions, intramolecular hydrogen bonds *etc.*). After having explained the basic concepts in the first three chapters, in the next nine chapters the author points to the consequences of the basic concepts on the life and death of the living cell. Of greatest importance is the fourth chapter, in which the structure and transport characteristics of cellular membranes are described. The author stresses the fact that the understanding of the energy changes in the cell requires a knowledge of the electrochemical gradient across the membrane (Mitchell's chemiosmotic hypothesis), *i.e.* formation of electric circuit by hydrogen ion movement through the cellular membrane (protonmotive force). Mitchell's hypothesis, dominant in bioenergetics, is presented in the seventh chapter.

Research in bioenergetics enabled the development of new drugs (topic of chapters five and ten), and also an understanding of the molecular mechanism of memory. Other basic concepts of bioenergetics are also presented: accumulation of free energy by means of membrane action (chapter eight), Donnan, diffusion and surface potentials (chapter nine) and experimental methods in bioenergetics (chapter eleven). The methods for predicting the conformation of membrane proteins (among others for elucidation of the action of polypeptide antibiotics of the magainin type) are thoroughly discussed, no doubt because the author is very active in that research field.

Altogether, the book is composed of 12 chapters, with the Conclusion, Abstract in English, and appendices with the data on protein structures, which are available in the form of Internet data bases.

Even from this short presentation of the book content, it is obvious that the *Bioenergetics* covers a very broad field of biophysics; this is a good property for the very narrow Croatian book market. Despite the very different research fields presented, the book is harmoniously composed, showing to the reader the fascinating world of energy conversion in the living organism. Far from being a boring collection of facts, the book attracts with the freshness of scientific discovery and moves the reader by many secrets of Nature. Therefore, I recommend the book not only to the students and young scientists, but also to everybody that does not lack innate scientific curiosity.

Nenad Raos