
BOOK REVIEW

Exocytosis of Proteins (A Lecture Course)

(V. N. Luzikov, Akademkniga, Moscow, 2006, 253 p.)

DOI: 10.1134/S0006297907020150

The Publishing House Akademkniga has issued the book "Exocytosis of Proteins (A Lecture Course)" recommended as a textbook for biochemistry students. For more than a decade, Professor V. N. Luzikov, has been giving a course of lectures (so-called special course) "Topogenesis of proteins and biogenesis of cell organelles" for fifth year students specializing in biochemistry, virology, molecular biology, cytology, and histology at the School of Biology, M. V. Lomonosov Moscow State University. The appearance of this course in the educational programs of several Departments at the School of Biology was originated from our willingness to introduce a relatively new and rapidly developing field of modern physicochemical biology, topogenesis, to the students who have passed courses in biochemistry, molecular biology, and biophysics. Topogenesis is a process of specific sorting of proteins synthesized by ribosomes. Each protein (e.g. hormone receptor, gastrointestinal tract protease, toxin elaborated by a pathogenic microorganism) functions in a right place at a right time. The pathway from biosynthesis of polypeptide to formation of functionally active protein is very complex. Each newly synthesized protein is either exported into the external medium (exocytosis) or functions inside the cells. In eukaryotic cells, the protein should arrive to a particular subcellular compartment (mitochondria, endoplasmic reticulum, nucleus, etc.). Luzikov's lecture course comprises two parts. The first part deals with mechanisms of exocytosis, and the second part discusses intracellular sorting of proteins to organelles. The book covers the first part of the lecture course. It consists of two large chapters. The first considers exocytosis of proteins in eukaryotic cells; the other outlines exocytosis of bacterial proteins. Both chapters give exhaustive information on the current state of the field; the bibliography includes more than 500 references to the original papers. The first chapter describes translocation of synthesized polypeptide into endoplasmic reticulum, transfer of "ready-to-use" proteins via the exocytosis pathway, and molecular mechanisms responsible for vesicular transport of proteins within the cells. The second chapter describes the mechanisms of targeted protein transfer into bacterial cytoplasmic membrane, special systems of incorporation of various cofactors (heme, flavins, metals), and protein secretion to the extracellular space.

Detailed description of the schemes and, what is particularly important, the experimental facts that these schemes are based on, is a true advantage of the book. A reader is able to evaluate critically the reliability of these schemes. Moreover, the author raises problems that cannot be solved within more or less commonly accepted models. This point is especially important. My own teaching experience convinced me that the major goal of higher university education is to teach the students how to "learn the unknown" (i.e. formulate hypotheses which are far from being solved), rather than to feed them with well-known facts. Luzikov's book is not easy reading. It requires rather strong background in biochemistry and protein chemistry. I hope that the author will soon prepare the second part of his lecture course devoted to the intracellular topogenesis of eukaryotic proteins.

There are some shortcomings, which may be taken into consideration during preparation of the second part of the lecture course publication. Modern physicochemical biology is under threat of a "communicative catastrophe". It becomes a regular practice when even well educated professionals cannot understand the content of some publications, just reading their titles, which often contain confusing abbreviations and laboratory slang (or special terms). There is an avalanche-like increase in such abbreviations and terms, and I feel that the International Union of Biochemistry and Molecular Biology should take some measures to limit their use or systematize them. This book is "unreadable" without a "dictionary". Although the author explains all abbreviations used when they first appear in the text, a reader often has to look for explanations of abbreviations and unusual terms when they appear in the text again. This seriously complicates reading. It would be useful to include a glossary section containing the list of terms mentioned in this book. I would also recommend adding a brief summary to each section. (Such summary could be in the very beginning or at the end of sections.) This would really help better orientation in the book and better understanding of its materials.

Luzikov's lecture compilation is a well-written textbook, which lacks analogies either in Russian or in foreign literature. Its content exceeds textbook frameworks and it may serve as a unique source of modern information on topogenesis of proteins for all readers who are interested in this field of physicochemical biology.

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