

## PEER REVIEW

### REVIEW ON THE TEXTBOOK BY L. I. OSTAPCHENKO AND V. K. RYBALCHENKO BIOLOGICAL AND BIOORGANIC CHEMISTRY (IN TWO VOLUMES)

*Publishing House of "Kyiv University", Vol. 1 (2014, 1043 p.) & Vol. 2 (2015, 917 p.).*



The authors of the textbook under review (Prof. Lyudmila I. Ostapchenko and Prof. Vododymyr K. Rybalchenko) have a long-term experience in different branches of biochemistry and bioorganic chemistry, beginning from the classical bases of these sciences and finishing with the biochemistry and biophysics of the biological membranes, enzymatic catalysis, and others. The textbook scales really impress: 1<sup>st</sup> volume – 1043 pages, and 2<sup>nd</sup> Volume – 917 pages. It is obvious that the authors' professional experience allowed them to solve successfully the problems of putting together the available data on the molecular organization of living matter (metabolisms and bioenergetics) (Vol. 1) and data on the molecular bases of biological processes and the mechanisms of the intercellular

communications and functioning of the regulatory systems of cells (Vol. 2).

Volume 1 of the reviewed textbook consists of two Parts. The 1<sup>st</sup> Part "Molecular organization of living matter" contains two Sections. Section 1 "Basis of bioorganic chemistry" contains three Chapters: Chapter 1 "Structure and reactive capability of bioorganic substances", Chapter 2 "Biological molecules: carbohydrates, lipids, proteins, nucleic acids", Chapter 3 "Water. Macro- and micro-elements". Section 2 "Cells and enzymes" contains five Chapters: Chapter 4 "Cell, extracellular matrix and intercellular contacts", Chapter 5 "Molecular organization and biological functions of membranes", Chapter 6 "Enzymes", Chapter 7 "Membrane enzymology", Chapter 8 "Kinetics of enzymatic processes".

The 2<sup>nd</sup> Part “Metabolism and bioenergetics” also consists of two Sections. Section 3 “Bioenergetic processes” contains three Chapters: Chapter 9 “Metabolism”, Chapter 10 “ATP-cycle and glycolysis”, Chapter 11 “Bioenergetics”. Section 4 “Anabolism and catabolism of main biomolecules” contains four Chapters: Chapter 12 “Metabolism of carbohydrate”, Chapter 13 “Metabolism of lipid acids and lipids”, Chapter 14 “Amino-acids: oxidative splitting and anabolism”, Chapter 15 “Metabolism of nucleotides”.

The Content of the Volume 1 ends with “Test questions for self-control and examinations”, “List of cited literature, and the alphabetic “Subject indicator”. These Chapters are very important parts of the textbook, and their preparation should take the authors much time and work. The authors of the textbook are directly involved in the education process at the leading university in Ukraine – Taras Shevchenko National University in Kyiv, and the material of the final parts is written very thoroughly and with great knowledge of the deal.

All Chapters of four Sections of the 1<sup>st</sup> Volume of the textbook, as well as the Chapters of the 2<sup>nd</sup> Volume have been written according to a common algorithm: historical introduction containing the family names of the founders of the corresponding field in biology, basic conceptions, description of the participation of the biomolecules in the regulatory processes in cell and organism, conclusions, questions for control, test tasks. Such sequence of presenting the materials in the textbook does not only force the readers to get used to proper systematization of scientific data, but also directs a pass from analysis to synthesis of scientific results, as well a necessity of their application for studying of functioning of specific structure-functional elements of the living matter – cells and their organelles, tissues and organs, organisms and populations of organisms.

The selected elements of the dynamic biochemistry are considered in the 1<sup>st</sup> Volume of the textbook, however, the detailed analysis of these elements has been carried out in the 2<sup>nd</sup> Volume. The 2<sup>nd</sup> Volume consists of two Parts. The 3<sup>rd</sup> Part of the Volume 2 “Biochemical aspects of molecular biology and intercellular communications” contains two Sections. Section 5 “Biochemical basis of molecular biology” contains three Chapters: Chapter 16 “Nucleic acids as carriers of genetic information”, Chapter 17 “Protein synthesis as realization of genetic information”, Chapter 18 “Biochemical genetics”. Sec-

tion 6 “Carcinogenesis and apoptotits” contains two Chapters: Chapter 19 “Cancer as microevolutionary process: molecular-genetic and biochemical mechanisms”, Chapter 20 “Biochemistry of apoptosis”.

The 4<sup>th</sup> Part of the 2<sup>nd</sup> Volume of the textbook “Biochemistry of main regulatory systems” contains four Sections. Section 7 “Nerve and immune systems” contains two Chapters: Chapter 21 “Biochemistry of nerve system”, Chapter 22 “Biochemistry of immune system”. Section 8 “Informones and vitamins” contains two Chapters: Chapter 23 “Informones and biochemical peculiarities of intercellular interactions with their participation”, Chapter 24 “Vitamins”. Section 9 “Blood, nutrition and digestion” contains two Chapters: Chapter 25 “Biochemistry of blood and blood flow”, Chapter 26 “Digestion”. Section 10 “Medical aspects and perspectives of applied biochemistry” contains two Chapters: Chapter 27 “Medical aspects of metabolism and its regulation”, Chapter 28 “Generalization of achievements and perspectives of biochemistry”.

All Chapters of the 2<sup>nd</sup> Volume of the textbook under review were written in accordance with the same scenario as the Chapters of the 1<sup>st</sup> Volume. They consist of the historical introduction, basic conceptions, generalization, control questions and test tasks. It is easy to understand why the 2<sup>nd</sup> Volume of the textbook, especially its 4<sup>th</sup> Part, pays much more attention to analysis of problems related to a direct application of gained knowledge in medicine. This Volume also contains “Test questions for self-control and exams”, “Auxiliary tables for material learning”, “List of literature” and the alphabet “Subject indicator”.

There are some critical remarks for the textbook under review. Among them are relatively short list of cited literature that counts only 32 sources for the 1<sup>st</sup> Volume of the textbook and 89 sources for the 2<sup>nd</sup> Volume. It should be noted that in the list of sources other known textbooks in biochemistry, bioorganic chemistry, molecular and cell biology dominate. The question is – what was the reason for listing so many well known textbooks in biochemistry? Instead of that, it was reasonable to cite most fundamental review and experimental articles of the leading biologists that were published in such scientific journals as *Nature*, *Science*, *Journal of Biological Chemistry* or in the periodical editions such as *Annual Review of Biochemistry*, *Annual Review of Cell Biology* and others, as well as in such scientific popular magazines *Scientific American*, etc.

In Chapter 22 “Biochemistry of immune system” there is a Sub-Chapter 22.8 “Abzymes – catalytical antibodies” from which it is not clear where the corresponding literature can be found. At the same time, the authors of the textbook under review could mention the papers of known Ukrainian scientist doctor Yuri Kit who is one of the leaders not only in Ukraine but also in the world in this field, namely in the detection of novel catalytically active antibodies. Among his works, one can find the articles that were published also in *The Ukrainian Biochemical Journal* and describe purifying and characterizing for the first time the abzyme capable of hydrolyzing the histone H1 or the abzyme with sialidase activity (see also papers in the international scientific journals).

Summarizing the analysis of the materials presented in the textbook of L. I. Ostapchenko

and V. K. Rybalchenko «Biological and bioorganic chemistry» (Kyiv: Publishing House of «Kyiv University», Vol. 1 - 2014, Vol. 2 - 2015), one should stress the fundamental and thorough character of this textbook which could really be considered as an encyclopedia in Biochemistry due to its volume – almost two thousand pages. This textbook is a valuable source of information for students who listen to the courses of biochemistry and bioorganic chemistry, molecular and cell biology, as well as the PhD students, young and experienced scientists in different fields of modern biology. The alphabet “Subject lists” in both volumes of the textbook are of great value for the readers. Finally, we should congratulate the authors of the textbook with accomplishment of their titanic work on preparing and writing this textbook. No doubt, the textbook deserves to be awarded as one of the best in its field in Ukraine.

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