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BOOK REVIEW

The Protein Protocols Handbook (2nd edition)

(John Walker, ed., Humana Press, 2002, 1146 p., $125 (Paperback), $175 (Hardcover))

The first edition of this book (1996) is well known among the majority of biochemists and chemists who study proteins. The second edition of the book under review contains a significant amount of new information. The number of chapters in the book increased from 144 to 164, and several old chapters were revised and supplied with additional data.

Here we cannot provide a detailed analysis of each chapter due to the huge volume of the book; therefore, we considered it useful to present this edition to specialists by analyzing its eight major parts.

Part I of the book consists of the chapters that are devoted to the methods of measurement of protein content in different sources. The methods of measurement of protein content using UV absorption, bicinchoninic and nitric acids, silver, the methods of Lowry and Bradford, and cytometric methods are described in this part.

The second part of the book is devoted to electrophoretic methods of separation of proteins and peptides and their detection in gels. Various methods of electrophoresis including non-denaturing electrophoresis of proteins in polyacrylamide gel (PAGE), SDS-PAGE, two-dimensional electrophoresis, separation of proteins in the presence of urea and detergents, isoelectric focusing of proteins in ultrathin polyacrylamide gel layer, immunoblotting, and other approaches are described in detail in 28 chapters. Several methods of quantitative assessment of content of proteins and peptides separated by electrophoresis including autoradiographic methods are also presented in this part.

The third part of the book deals with the technique of preparation of different protein "replicas" that allow for identification of very low concentrations of proteins. The authors describe different types of electroblotting, immune "replicas" with application of antibodies cross-linked with enzymes, biotin, or with other labeled ligands. The highly sensitive methods of detection of proteins on membranes using avidin, streptavidin–biotin, fluorescence, and chemiluminescence are characterized.

The methods of purification and chemical modification of proteins and peptides are represented in fourth part of the book. Certain chapters are devoted to carboxymethylation of cysteine residues, succinylation of proteins, amidation of their carboxyl groups, modification of sulfhydryl groups, and to different procedures of chemical and enzymatic cleavage of proteins.

The fifth part is devoted to the methods of characterization of proteins and peptides and includes the description of such approaches as peptide mapping of proteins by two-dimensional thin layer electrophoresis and thin layer chromatography, SDS-PAGE, determination of molecular weight of proteins by HPLC, different types of mass-spectrometry, and other methods applied for the study of protein structure.

The sixth part summarizes the methods for the study of glycoproteins. The methods of detection of glycoproteins in gels and blots, their binding and identification using lectins, determination of monosaccharide content of glycoproteins by gas chromatography, mass-spectrometry, HPLC, combination of capillary electrophoresis and mass-spectrometry, and many other techniques are included into this part.

Methods for the study of antibodies are discussed in the seventh part. It is focused on the procedures of isolation, purification, and analysis of IgG antibodies.

The eighth part consists of 7 chapters describing the methods of isolation and analysis of monoclonal antibodies. The methods of immunization of mice and rats, hybridoma technology, and technique of affinitive purification of monoclonal antibodies are discussed together with the methods of rapid isolation of significant quantities of highly specific monoclonal antibodies from one mouse.

In general, it is worth noting that this edition represents without any doubt a very useful and valuable handbook for the broad audience of specialists who study proteins: biochemists, bioorganic chemists, and molecular biologists.

Each chapter of this book contains the description of the principle of the discussed method, list of materials for its realization, succeeding steps of the method, notes concerning each step, and references. As a result, this book favors the effective mastering of the methods of protein study and their successful application in practice.

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