
The strength of this paperback book lies in the protocols for 89 laboratory exercises that occupy half of the volume. The goal of the author is to provide students with an understanding of how clinical biochemistry instruments work and to “dispel the black-box mentality”. Toward that end, some exercises are about instrument characteristics, e.g., determination of spectral band width; effects of temperature on fluorescence; quench correction for tritium counting; response time and leakage current of an oxygen electrode; and determination of the retention index of benzene on an OV-17 column. The 14 chapter titles are “Spectrophotometry”, “Fluorometry”, “Enzymology”, “Atomic Emission and Absorption”, “Ion Selective Electrodes”, “Oxygen and Carbon Dioxide Electrodes”, “Chromatography”, “TLC and Extraction Techniques”, “Gas Chromatography”, “HPLC”, “Electrophoresis”, “Molecular Diagnostics”, “Immunological and RIA Techniques”, and “Coulometry–Osmometry–Refractometry”.

The exercise protocols are based on directions to students in the degree and masters courses in medical laboratory science and clinical toxicology at the Royal Melbourne Institute of Technology. Consequently, the exercises assume the availability of instruments that have been used during the 27 plus years that the author has taught at the Royal Melbourne Institute of Technology. Students who master all 89 experimental exercises should have a fine understanding of the principles of instrumental analyses performed in clinical biochemistry laboratories.

The book, however, has weaknesses. The editing left some awkward features. Two are related to abbreviations. Many abbreviations are used to indicate multiple terms, e.g., “M” has eight alternative meanings in the abbreviations list, and none is for “molar”, although it is used in the text. Some terms have multiple abbreviations, e.g., “molar absorption coefficient” is introduced as both K and ε. The seven brief appendices should have been edited to remove segments that are unique to the Royal Melbourne Institute of Technology, e.g., “You are responsible for the apparatus in your locker... You will be charged the... replacement cost”. For many exercises, human sera or plasma are the samples, but neither the exercise protocols nor the appendix “Laboratory Rules”, which deals with safety procedures, require that students use gloves. General and protocol-specific references are at the end of each chapter. Some references refer to instrument manuals; almost no references are cited in the narrative.

The first halves of the chapters, which precede the experimental protocols, conclude with interesting clinical examples of uses of analyses. Educational programs that adopt this text may consider the need to include biochemistry and pathophysiology courses with separate texts to broaden the scope of this clinical orientation.

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Since the description of RIAs 40 years ago, the use of ligand-binding assays to quantify analytes has come a long way. Along the way, the development of monoclonal antibodies, availability of receptors, and the reluctance to use radioisotopic tracers have been driving forces in the development of this sector of diagnostics. This book is not a manual of protocols for RIA and radio-receptor assay methods. Englebienne has crafted a very easy-reading, user-friendly, and informative text, which I think could be used in teaching a methods course in this area. This text covers a lot of ground, but the reader will find that certain reagents and approaches to assay conditioning are shared, regardless of the binding protein used.

As a testimony to the book’s concept building and completeness, the first two chapters introduce the reader to the biochemistry of receptors and signaling and their biosynthesis and ligand-binding properties. This will be a welcome introduction to readers new to the field. Chapter 3 is entirely about how to get or make the two reagents that are needed most for these assays, the antibody and the receptor, and this chapter assists the reader in locating sources. It catalogs cell lines, which contain various receptors, and also includes a discussion on recombinant DNA methodology for receptor expression. Although the list is not complete, it provides the reader with a sense of what is available and provides some useful leads. Methods for cross-linking haptens to carrier proteins, immunization, titer determination, and monoclonal antibody production round out the reagent-gathering aspect. A nice description of properties of detergents and the principles of use for preparing soluble receptors is also given, including the implementation of various types of chromatography to purify solubilized receptors.

The molecular basis of ligand–receptor interactions is covered in Chapter 4. Here concepts of receptor occupancy and mathematical analysis of the interaction are discussed by giving several examples using raw data. These examples make it easy to follow the data analysis and transformation of data to obtain binding constants. With the use of steroid analogs to explain principles of structure–activity relationships to free energy changes, the topic of quantitative structure–activity relationships is covered. Importantly, the effects of pH, salt concentration, temperature, and affinity on the interaction are also discussed.

Assay design is essential and varies depending on the intended use of