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Book Reviews

Leucocyte Typing V; White Cell Differentiation Antigens, Vols. 1 and 2; Edited by S.F. Schlossman, L. Boumsell, W. Gilks, J.M. Harlan, T. Kishimoto, C. Morimoto, J. Ritz, S. Shaw, R. Silverstein, T. Springer, T.F. Tedder and R.F. Todd, Oxford University Press, Oxford, 1995. Vol. 1, xxvi + 1223 pp. Vol. 2, xii + 2052 pp. £175.00 (hc). ISBN 0-19-2623761.

This edition is the proceedings of the 5th international workshop and conference held in Boston, USA, November 1993. More than 800 have contributed to this important publication, which is the result of an extraordinarily successful international co-operative effort to undertake the serological, biochemical, immunohistochemical and molecular characterization of 150 leukocyte antigens, being mainly of differentiation and functional relevance not to be mistaken for histocompatibility antigens, the HLA antigens.

The book is organized in 10 parts, an appendix with a CD (Cluster of Differentiation) guide, a list of contributors and an index to both volumes. The use of monoclonal antibodies (mAb) to understand the many different molecules that populate the surface of hematopoietic cells has been the goal of all five international workshops on leukocyte differentiation antigens. The book is the result of a very positive process facilitating insight into white cell differentiation antigens. This process enormously clarifies the communication between all involved in the work with human cellular interactions.

Although the production of a book set like this is a long effort it makes it possible for investigators to be updated even if one had not been directly involved in the workshop by creating the data or by participating in the Conference.

The present day status in the scientific community could not have been reached without book sets like the present one. In the beginning, the objective was to identify markers specifically for individual lineages of cells (T-cells, B-cells etc.). In the 5th workshop the concept of the 'blind panel' was introduced and used to make a clarification of which molecules are lineage-restricted and which are expressed on multiple lineages. The 'blind panel' was a comprehensive panel of coded monoclonal antibodies recognizing all known CD structures, other known structures that have not yet received a CD designation as well as a series of unknown monoclonal antibodies which could be provided in a blinded fashion to various investigators. Specificity could then be assigned to unknown mAb. The extensive analysis is the basis for a resource to scientists for understanding the biology of these molecules. A leucocyte differentiation antigen database (LDAD) has been created. This has been the basis for the construction of a poster of antigen expression by cell type from CD1 to CDw130. In addition on the poster and as described in the book, there is an indication of the change upon activation of the individual CDs on the different cell types. This is quite a useful introduction to an overview of the many markers.

The book is of great importance to those working with diagnosing and classification of hematological malignancies and immune deficiencies as well as all investigators experimentally working with characterization of blood cells in physiological and pathologic interactions, especially leukocytes and platelets. During dynamic responses of cells modified by cytokines, the studies and knowledge of receptors for cytokines are important parts. Many of these cytokine receptors have now got a CD number. Many well known CDs are described in a very clear way, for example CD10, the common acute lymphoblastic leukemia antigen (CALLA) already identified in the first workshop, but now there is a description of cellular and tissue distribution, the relationship to lymphoid malignancy, the results of molecular cloning, chromosome location and function.

For the first time an adhesion structure workshop was organized during the 5th international workshop. Many important contributions have been made concerning the adhesion structures for cellular function and disease processes. For example the CD15s is a new CD for the sialyl Lewis X antigen now being brought into context with human leukocytes although the structure was first described in 1976.

The lay-out of the book is of the highest standard with good section reports, tables and figures. Based on the contributions in this book and knowledge from earlier conferences we probably know more about the functional, biochemical and molecular characteristics of the human lymphocyte and related cells than any other cell in the body. Presented in the book are new CD clusters and subclusters and re-definitions of previously established clusters. The presentation of this extensive amount of facts is stimulating. Depending on the state of mind it may be frustrating to realize how much needs to be learned before we fully understand the interactions between CD antigens on the different cells, T-cells, B-cells, myeloid cells, NK (natural killer) and endothelial cells in concert with cytokine receptors and free cytokines in specific disease processes resulting in a clinically manifest disease state in the human being. However, the appearance of a two volume book, such as this *Leucocyte Typing V*, is of utmost importance for keeping in touch with expanding knowledge. This can make it clearer to design diagnostic and monitoring protocols in many diseases with an immunological element. The cross lineage analysis of expression of differentiation antigens as presented in this book will help us to combine the many interactions in health and disease, enabling us to diagnose more precisely and maybe to create new treatment modalities. The present book will help us to show the way. All laboratories doing flowcytometry should immediately provide the *Leucocyte Typing V* book set.

This will be a most valuable tool in the process of continuous medical education. We will all eagerly consult this book set to keep in touch with recent progress.

Niels Grunnet

Non-isotopic Methods in Molecular Biology. A Practical Approach; Edited by E.R. Levy and C.S. Herrington, Oxford University Press, Oxford, New York, Tokyo, 1995. xxii + 221 pp. £27.50 (pb). ISBN 019 963 4556.

This book is the newest addition in the well-known 'The Practical Approach Series' from IRL Press. The common denominator for this last volume is the use of non-isotope methods in molecular biology, i.e. visualization of specific DNA and RNA sequences by hybridization of fluorescence- or hapten-labelled probes instead of radioactive probes.

The most pressing need for non-radioactive systems for DNA and RNA detection is undoubtedly felt by those who want to visualize nucleic acid sequences in morphologically conserved structures (in situ hybridization), because radioactive labelling generally give rise to low spatial resolution and often troublesome high background. With regard

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to detection of nucleic acid on filters many researchers will probably claim that this is at present still more easily done with radioactive probes because resolution is not a major problem and you can benefit from the indisputably high sensitivity of radioactive systems.

It is therefore not surprising that–following a chapter on non-radioactive probe labelling–four of the remaining seven chapters deal with in situ applications, namely (1) cytogenetic analysis, (2) in situ detection of DNA in tissues, (3) in situ detection of RNA in tissue and monolayers cells and (4) the combination of non-radioactive in situ hybridization and immunochemistry. Only the last three chapters deal with other applications, namely (5) non-isotope detection of nucleic acids in membranes, (6) non-isotope DNA analysis and (7) PCR analysis of RNA.

The chapter on probe labelling is well written and gives an extensive overview on the many possibilities for nonradioactive labelling together with a number of detailed protocols. The four in situ chapters are in the layout used in this series with detailed protocols interspersed with background information and practical hints for choosing between protocols. Especially the very important issue of pretreatment of samples in order to achieve both conservation of structures and penetration of probes are dealt with in detail in these chapters. On the negative side it may be said that a little more attention to trouble-shooting would have been nice.

Among the last three chapters the section on detection of nucleic acids in membranes is also very detailed with many hints and an extensive troubleshooting guide. The chapter is therefore certainly a very useful guide to the beginner in this field but one is still left with a feeling that the full utilization of non-radioactive techniques in this field must await the development of either simpler staining systems or less expensive high sensitivity image acquisition systems.

The last two chapters give detailed protocols on PCR-based methods for the analysis of DNA sequence variations (the amplification refractory mutation system, the artificial restriction fragment length polymorphism analysis and single stranded conformation polymorphism analysis) and on the PCR-based generation of cDNA (RT-PCR). The protocols in both chapters are detailed with many hints, but since all these methods are based on initial PCR there is no very pressing need for specific non-radioactive detection systems, as also illustrated by the fact that most of the illustrations shown are ethidium bromide stained gels. So these two chapters seem somewhat outside the scope of this book.

The general impression of this book is that most chapters are very useful in their wealth of information and also well written. My main problem is to envision the target group for this book. Clearly the in situ part of the book is the most important and certainly very useful, but if you are a beginner in this field other and more detailed books could probably be recommended including a recent in situ hybridization manual from the same publishers.

S. Kølvraa

Kinetics for the Life Sciences: Receptors, Transmitters and Catalysts; Edited by H. Gutfreund, Cambridge University Press, Cambridge, 1995. xi + 346 pp. $29.95 (pb). ISBN 0 521 48586 X.

This is neither a monograph nor a text book -- it is a book with a message, intended for experimental biologists and biochemists concerned with time dependent phenomena, and its message is that the same mathematical framework can be used to describe, and therefore quantitate, widely different processes in biology. Recognition of this fact may, it is hoped, in the words of the author, 'cross fertilize ideas between different kinetic approaches'.

The book as a whole does not provide much new material. Its value lies in giving, in a single volume, a considerable number of examples of sometimes elegant kinetic investigations which in their time were landmarks in quantitative biochemistry, and in showing what kind of information, such as the number and character of intermediates, can be obtained in such investigations. As such, the book should be useful for anyone wanting an overview of the general field of kinetics in biology, and the insight obtainable in biological systems, during the last 40 years. Most of these examples are from the authors extensive work with proteins, and enzymes in particular, and all are concerned with transient kinetics rather than steady state methods.

The book may be thought of as consisting of 3 parts, varying somewhat in sophistication and detail. Part 1, encompassing chapters 1–3 (about 100 pages) establishes the 'ground rules' in kinetics. It describes some kinetic principles, at a level often found in elementary textbooks, as well as some mathematical introduction for use in the following part, consisting of chapters 4–6 (130 pages). This part constitutes the main methodological section of the book, dealing with the methods for treating systems of differential equations. This part contains the majority of the examples. The third part, chapters 7–8 (70 pages), is concerned with factors influencing rates of chemical reactions, such as temperature and viscosity (chapter 7), while chapter 8 reviews the methods involving different kinds of applications of light for initiating or monitoring reactions. The book contains about 400 references.

As indicated above, the main part of the book is really part 2, the part in which the mathematical procedures necessary for treating kinetic experiments and for extracting quantitative information from the data are described. The basic mathematical methods are specially marked in the text, and although it is specifically stated that these marked sections of the book should be considered 'advanced' and not necessary reading, it is probably unavoidable that the eager reader, trying to enlarge his or her kinetic expertise, would study these sections, at least as an introduction to the methods. It is therefore unfortunate that these sections are marred by a number of errors which will, in some cases, prevent the reader from being able to use the methods described. Four examples are mentioned below.

The author is aware of the fact that some biologists have a considerable 'energy barrier' when it comes to learning or applying mathematics. He therefore attempts to provide short cuts by devising 'black box math'. This is not to be recommended.

1. On p. 112–116 the so called matrix method for solving coupled first order differential equations is discussed. But it is confusing to the uninitiated reader to state that we can set $dc_i/dt = \lambda c_i$, where c_i is the basic dependent variable, and λ is an eigenvalue of the coefficient matrix. It simply does not make sense when comparing this equation with that of the kinetic model in question. This equation is true for the *transformed* variables, and the original variables are then obtained as linear combinations of these. The author persists in using this confusing notation, e.g. on p. 212 in the discussion of relaxation methods.

2. The solution to the numerical example pp. 116–118 is not quite correct. The correct values for the amplitudes are more easily obtained from the boundary conditions, including those for the rates at $t = 0$, as an alternative to the introduction of the not very useful, and perhaps somewhat confusing, eigenvectors.

3. The method of Laplace transforms for solving coupled differential equations is discussed on pp. 148–151. It is introduced as a 'black box' method as follows: (i) The original differential equations are rewritten by replacing the derivative dc_i/dt by $sc_i(t)-sc_i(0)$, where 's' is considered an 'operator'. (ii) The new equations are solved for the variables $c_i(t)$, which now appear to be expressible as functions of s only! (iii) A table of Laplace transforms is consulted and the real solution is obtained. This procedure is, however, wrong. First of all, the derivatives dc_i/dt should be replaced by $s \cdot c_i - c_i(0)$ – note the absence of the factor s in the second term. Secondly, the author overlooks the fact that when transforming the original equation, a constant b becomes b/s in the transformed equation (this can in fact be seen in the extract of the table on p. 150). Thirdly, the transforms are not functions of t, i.e. one can not, as in the book, write the $c_i(t)$ as functions of the variable (or 'operator') s. The procedure described in the book leads to erroneous equations. When it is further noted that, out of 11 entries in the table of Laplace transforms on p. 150, five are wrong, it is a complete mystery that actually the correct solutions are obtained.

4. On p. 119 the author attempts to explain data from experiments with calcium activation of aequorin by pointing out that the intermediate concentration reaches a maximum with a rate constant which is the sum of individual rate constants. However, looking at the