

Membrane transport

Membrane Transport in Red Cells. Edited by J. C. Ellory and V. L. Lew. Pp. 470. (Academic: London and New York, 1977.) £21; \$41.

THE red blood cell is a favourite experimental object for the study of transport across plasma membranes, because of its ease of procurement (one only needs a syringe and a not too accurate aim) and its simplicity (in mammals the red cell is devoid of nucleus, endoplasmic reticulum, mitochondria, and all membranes other than the enclosing plasma membrane). This extreme simplification of structure led early workers to sometimes regard the red cell as a dead cell, nothing more than a bag of haemoglobin. That such a viewpoint is untenable will become clear to anyone who reads this fine new book. The red cell is shown to be bustling with transport activity, and the secrets which can be uncovered in this simple cell are often of much more general application.

What sets this book apart from other such compilations of transport articles is the scope of the topics covered. We range from salamander to duck to dog to man, looking at cations, anions, amino acids, sugars, and even glutathione. Further, the book is not the hasty end-product of a conference but rather a carefully chosen set of original articles. And the authors are not the usual set of symposium speakers—instead, new faces in old fields, as well as experts in more neglected areas. The articles are mostly up-to-date and contain much unpublished material as well as the valuable off-the-cuff comments usually lacking in journal articles. On the whole, the approach is physiological and phenomenological rather than molecular biological, as most of the transport systems considered (apart from the sodium and calcium pumps and the anion exchanger) have yet to be isolated.

Half of the eighteen articles are concerned directly with cation transport. An opening chapter (Cavies) on the well characterised sodium pump is followed by one (Beaugé and Lew) on the little discussed passive fluxes of sodium and potassium. It is made clear that these passive movements are not simply uninteresting leaks as was once thought, but seem to be mediated by specific membrane proteins. There follow two articles by Ferreira and Lew on passive calcium movements and the role of intracellular calcium, which includes the opening of a passive pathway for the release of potassium and thus possibly the modulation of membrane potential.

The use of genetic mutants for elucidating cation transport mechanisms in man (Wiley) and in ruminants (Ellory) is well described. An apparently vestigial system

for facilitating choline movements in human red cells is detailed by Martin. Kregenow presents a comprehensive review on the properties of avian red cells, which are nucleated. A bonus to the reader is the chapter by Parker on sodium and potassium movements across cat and dog red cell membranes. I found this the best and most lucid summary I have seen on this topic (even though my name is misspelt nine times!). These unusual cells lack the nearly ubiquitous sodium pump and have in its place both an apparently unique gated system for downhill sodium movements and a mechanism, probably linked to calcium movements, for active extrusion of sodium.

A chapter on water and small non-electrolyte transport (Sha'afi) tries to reconcile all experimental data to the paradigm of the Solomon "pore school". I found the exercise unconvincing. For example, to be self-consistent one is forced to pursue a rather dubious argument to the conclusion that carrier-mediated urea transport does not occur in human red cells. Naftalin and Holman review current ideas on sugar transport in human red cells in a comprehensive manner, leaving their more speculative new ideas to the end of their chapter. For perhaps the first time, the much neglected field of mammalian red cell amino acid transport is reviewed (Young and Ellory). The physiological function of such transport seems to be related to glutathione metabolism; and the active extrusion of oxidised glutathione, possibly as a pro-

tective mechanism, is described by Srivastava.

The properties of anion movements in red cells are intimately connected with its major physiological functions of oxygen and carbon dioxide carriage and exchange, as described elegantly and authoritatively by Hladky and Rink. The anion exchange system is beautifully discussed at all levels by Fortes, and Motais presents convincing evidence that organic anions ride on the same system. The heroic work of trying to measure directly membrane potentials by penetrating red cells with micro-electrodes is described by a pioneer in this field (Lassen); I would recommend, however, that the reader first look at the succinctly written clarifying note by Hladky.

Perhaps inevitable in a collection of articles spanning so many topics is a general lack of controversy, which may give the reader a mistaken impression of more agreement than actually exists. And although the editors did a superlative job of choosing topics and authors, more attention to indexing, uniform referencing, and improvement of the English of non-native speakers would have been welcomed. But these are small quibbles about an excellent book, which should be welcomed by all those interested in membrane transport.

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Guide to immunological jargon

A Dictionary of Immunology. Edited by W. J. Herbert and P. C. Wilkinson. (Second edition.) Pp. 193. (Blackwell Scientific: Oxford, 1977.) Paperback £3.50.

Go into a room and you know at once if there are immunologists present. Eyes ablaze, fingers itching for blackboard chalk, they epitomise the scientist in passionate love with his subject. But draw closer and you will overhear a language that seems hardly out of the nursery. "PFC". "LPS?" "DNP SRBC". "CBA?" "T6." "TS?" "Thy 1.2." "anti-IJ?" "Ly 2, 3." "FCR?" "FC gamma." You didn't realise they were discussing the ability of cells from the thymus to inhibit an antibody response? Then you need to buy this book, which lists and defines these and some 1500 other pieces of current immunological jargon.

A further source of confusion to the outsider is that some key words have two meanings. "Allergy", for instance, means

any positive immune response to some, only certain unpleasant ones to others; "antigen" can mean an inducer of antibody, or of any kind of immune response, "tolerance" is used to mean clonal deletion, or alternatively to mean any kind of specific unresponsiveness; and so on. All these meanings, and many more, are included without prejudice in this dictionary.

Virtually rewritten since the first edition six years ago, it will no doubt continue to be brought up to date from time to time, thanks to the excellent idea of including a returnable suggestion page at the end. I have found a few omissions, and I object to the small size of one or two figures, but rather than list them here I am filling in my tear-out page so as to keep this excellent venture going.

The only major future improvement I can visualise would be the insertion of foreign terms (French and German especially), but that would perhaps be a different and a more expensive book. As it is, it will be tremendously useful to all para-immunologists — a group which nowadays must include almost all biologists and doctors.

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