BOOKS RECEIVED

Current Topics in Microbiology and Immunology. ADP-Ribosylating Toxins

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I thoroughly enjoyed the opportunity of reviewing volume 175 in this series. The standard of technical editing was very high, with very few typographical or grammatical errors. To achieve this with a multi-authored volume is no small achievement for which those responsible are to be congratulated.

The volume is timely, authoritative and up to date, and, in the words of the editorial preface which this reviewer fully endorses, "offers an exciting and comprehensive account of recent developments in the field of ADP-ribosylating toxins and should inspire both further research in this area and the use of these toxins as tools in biological research." Despite their diversity in size, subunit composition, cell specificity and substrates, all such toxins studied to date have a multi-step mechanism: (1) they bind to a receptor on the membrane of the target cell; (2) the catalytic domain is translocated into, or at least comes in contact with, the cytoplasm; and (3) the catalytic domain is then able to modify the target substrate.

Much is known about step 1. Less is known about step 2; for diphtheria toxin the evidence is strong, for *Pseudomonas aeruginosa* exotoxin A it is convincing, and for cholera toxin it is suggestive that membrane translocation is preceded by an intermediate endocytic step. Attempts to elucidate the transmembrane step are being conducted with a panoply of physico-chemical methods and membrane-labelling tools. In parallel, an increasingly sophisticated understanding of protein structure is emerging from genetic sequence analysis and X-ray crystallographic data to complement existing biological and developing biochemical knowledge. Together, these approaches will, hopefully, yield the detailed understanding of membrane translocation required to solve

fundamental questions, provide the rational basis for successful development of toxin chimeras for therapeutic use, and engineered toxoids for incorporation into multivalent live vaccines. In addition to recognising functional domains involved in cell recognition and membrane translocation, these approaches are beginning to yield exquisite insight into the nature of the catalytic sites which bind and promote the cleavage of NAD.

The nature and functions of the growing list of ADP-ribosylation factors (ARFs) are extensively discussed as are the various targets of the ribosyltransferases. In addition to dealing with the well known diphtheria, cholera, CT, *Pseudomonas* A, and pertussis toxins, excellent coverage is provided for *Pseudomonas* exoenzyme S, a range of clostridial toxins (the so-called binary toxins in which the A-B functional units are not associated either covalently or non-covalently and currently typified by *Clostridium botulinum* C2 and *C. perfringens* iota toxins), and some more recently described clostridial ADP-ribosyltransferase exoenzymes such as the non-toxic *C. botulinum* ADP-ribosyltransferase C3.

My main criticism of this otherwise excellent volume is the lack of diagrams and the quality of some of those included. For example, a substantial part of the book rightly deals with the function and toxin-induced disfunction of regulatory G-proteins. In recent years this topic has stood in cognate relationship with cholera and pertussis toxins. It would have helped the non-expert intelligent reader into an easier understanding of some quite complex biochemistry if some tracts of text had been replaced with or accompanied by good clear diagrams.

The book represents a very useful read into the subject for those being introduced to an exciting research area and those entrusted with the privilege of teaching advanced course material to students.

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