

Annual Review of Immunology 1997. William E. Paul, ed. Annual Review Inc., 4139 El Camino Way, P.B. No. 10139, Palo Alto, California, USA. Price: Individuals, \$ 69. Institutions, \$ 138. Volume 15. 917 pp.

The glaring difficulty for a reviewer who has commented on volume 13 of the series is; – what new things does one find to say about volume 15 now? Is it that the things one said about volume 13 no longer apply to volume 15? No; they do, – indeed so well as to be boring. The transition to biochemical-molecular events continues, as does the political rectitude of the volume in terms of representation of both geographical and field diversity. The staid comprehensiveness is still almost official policy. Most reviews still have the air of reporting everything that has ever happened in the small area being described to death. As a result, the volume still remains of interest and use mainly to those workers who need the small details but cannot be bothered to go find them in the original papers. Perhaps the steadily-expanding scales of both effort and publication have begun to justify this shortcut, though. Unfortunately, while the *Annual Reviews of Immunology* can make a virtue of being boring, the reviewer runs grave risks of editorial displeasure should a simple reiteration of previous comments be provided.

So what is new about this volume? Let us start at the beginning, which, for the *Annual Reviews of Immunology*, is always a personal essay by an elder statesman of the discipline. The mantle this year has fallen on Prof. Tomio Tada. The personal essays commissioned by such volumes must, one imagines, cause something of a dilemma to the prospective authors. Should they simply describe their current science, in which case they run the risk of not sounding like elder statesmen? Should they look back and tell fireside tales of the glorious days of their youth in the field, which risks their being laughed at and written off as practising scientists? Or should they draw the mantle firmly around themselves and look down with 'perspective' from the mountaintop at all the struggling little people in the field and, firmly ignoring all the ribald accusations of pomposity, provide words of measured criticism, balanced hope and – dare one say it – wisdom? Tada has

opted for the last, and with his charming humility, has managed to escape any charge of patronizing bossiness while he argues his view of the immune system (and the nervous system and embryogenesis and evolution...) as a sort of organized 'supersystem'. The result is an attempt to look at the field in an 'all-embracing' perspective and to perceive a level of organization in the immune system that makes it an autonomous 'self-satisfied' being, somewhat like Lovelock's Gaia. The trouble is that unified theories which explain every fact and predict none are not of any great use to the struggling professionals in the discipline. It almost makes one wish that Tada had opted instead to tell stories of his early days in immunology; – with his charm, he could have told some wonderful ones.

Curiously, the rest of the volume is conspicuously contrary to his position of seeing the big picture; – almost as though the remaining authors had been repeatedly adjured with the spectre of a god residing in the little details. More realistically, it is probably a result of increasing competitive pressure on workers in science that they tend to restrict themselves more and more to the mechanistic details of their field rather than stick their necks out about the possible relevance of findings in their areas to interfacing disciplines. One odd byproduct of this tendency in immunology is the relative paucity of topics in classical immunology discussed in this volume. Only two processes of classical interest are to be found, – exogenous antigen processing and the Th1/Th2 dichotomy. One cellular oddity – NK-T cells, and one molecular oddity – the H-Y epitopes, are represented. While the former may be significant in some physiological sense, the latter seems to have found a place only as a historical accident. The H-2M3 histocompatibility molecule has been comprehensively described as an element with a preference for N-formylated peptides which have a greater likelihood than most for being of bacterial origin. There is a significant review from von Boehmer and colleagues about the functions of the pre-T-alpha receptor in T cell development. This is an area of many paradoxes, – the receptor is part diverse, part uniform, and its necessity makes it possible for the developing T cell to use a receptor before it has a complete one.

A large chunk of the remaining articles have classically biochemical perspectives (so that they would not be out of place in the *Annual Review of Biochemistry*). That is, they discuss the fallout of the identification and characterization of one or a set of molecules. At one end of this group are the purely genetic identifications with only tenuous mechanistic links to the physiological phenomena they control. Discussions of the *Ikaros* and related genes, the ataxia-telangiectasia gene and a more general update on primary immunodeficiency disorders are examples. The larger bulk of biochemical articles occupying middle ground talk of signaling molecules, – CD22, IL-6 and other chemokines, interferon and its receptor, inducible nitric oxide synthase, thioredoxin, immunoglobulin Fc receptors, protein tyrosine kinases and the IL-2 gene-regulating transcription factor NF-AT. At the more immunological end of this biochemical spectrum, two articles stand out from the herd in being more than compendia. In one, while discussing B cell receptor-mediated signaling, Reth and colleagues propose that there are yet unidentified signal transducers linked to the B cell receptor. In another extensive analysis of signaling pathways in T cells, Perlmutter and colleagues acknowledge that the connection between these biochemical investigations and the functional choices made by T cells in terms of magnitude and quality of immune response are currently hazy enough to be nonexistent.

The easy attraction of trying to explain diseases in immunological terms does not fade, of course. Predictably, HIV takes pride of place – people discuss complement and HIV, dendritic cells and HIV and escape variants of HIV. There are descriptions of virus-immune system interactions with EBV and HTLV-1, and of immunity to (or, more correctly, immunity AND) gut nematode parasites and *Borrelia burgdorferi*. Oddly enough for these times of fix-it-up biology, the review on *Borrelia* is rare in making overt reference to vaccine development. The major exceptions to this uncharacteristic humility and reticence about the 'uses' of immunology are, of course, both the chapters written by workers from industrial organizations. Bolen and Brugge orient their discussion of protein tyrosine kinases to the grail of drug discovery, while Liu and colleagues write,

more explicitly, of 'DNA vaccines'. This is a highly competent, if partisan, documentation of all facts supporting the position that this is the vaccination strategy of the future, in which both the pre-occupations of explaining this exceedingly peculiar phenomenon and those of putting it to use (and profit!) jostle each other.

An undoubted high note of the volume for this reviewer is the piece on anti-viral B cell responses by Zinkernagel and

colleagues, which describes the dichotomy in the behaviour of neutralizing versus non-neutralizing anti-viral antibody responses. The authors move effortlessly, if in dense language and logic, between the implications of the findings for virus-host relationships and vaccine strategies and their significance in explaining the mechanistic control of B cell reactivity. A review that makes connections not obviously and linearly apparent is a joy to read even when it

is an effort. Perhaps that is a requirement the editors of the Annual Reviews should demand of their reviewers rather than simply relying on the god of small things.

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