Genet. Res., Camb. (1991), **58**, *pp.* 177–182 *Printed in Great Britain*

Book Reviews

Vaccines 91: Modern Approaches to New Vaccines Including Prevention of AIDS. Edited by R. M. CHANOCK, H. S. GINSBERG, F. BROWN and R. A. LERNER. Cold Spring Harbor Laboratory Press. 1991. 441 pages. Paperback $85. ISBN 0 87969 367 3.

This latest offering from the Cold Spring Harbor conference series on vaccine development follows the high standard set by its predecessors. However, it is interesting to note that the number of participants for this conference was significantly lower than for the previous year (down from 274 to 199). One possible explanation for this may be the overriding emphasis laid on AIDS (43% of contributions) and other viruses (34% of contributions) in the conference. For some reason the conference appears to have lost its appeal to parasitologists (7%) and bacteriologists (8%). Perhaps these groups, working as they are on much more complex and difficult systems, are intimidated by the resources and progress emanating from the viral field. It is also evident that the US contributors far outweigh the foreign contributors (by about two to one). This may reflect the apparent bias to research on AIDS and other viruses or may reflect the scarcity of funds available for foreign travel in these trying times of ours. The British contribution is notably down on previous years.

I find these developments rather sad, as the Cold Spring Harbor conference is one of the few international conferences devoted entirely to vaccine research and there is much to be learned by sharing experiences from a broad spectrum of research interests.

A good example of how AIDS research efforts may assist vaccine development in other fields is given in the first article of the book. In a beautifully concise article work emanating from Jay Berzofsky's laboratory is described which may pave the way to synthetic and recombinant vaccines which can induce a cytotoxic T-cell response. By a mechanism which has yet to be elucidated Immunostimulating Complexes (ISCOMS) containing intact gp160 from HIV I were shown to elicit MHC class-1-restricted HIV envelope-specific $CD8^+$ cytotoxic T-lymphocytes. Recent work on a sporozoite vaccine against malaria has shown that cytotoxic T-cells recognizing specific antigens can protect mice from subsequent challenge. ISCOMS may provide a method for generating such a response using recombinant antigen.

Once protective antigens have been identified for a particular virus/organism methods have to be found by which these antigens may be delivered with high immunogenicity. Vaccinia virus is frequently studied as a potential antigen delivery system. Two articles describe the successful improvement of an antigen's immunogenicity in this system by engineering the recombinant protein so that it is targeted to the surface of the infected cell rather than being retained inside the cell or secreted. A concentration of antigen on the cell surface leads to an increase in immunogenicity and, in one case, increased protection. It is becoming increasingly obvious that the immunogenicity of small, defined linear epitopes can be effected by their surrounding molecular environment. Thus a rhinovirus peptide corresponding to a protective epitope is found to be more immunogenic when attached to the N- or C-terminus of the hepatitis B core protein than more conventional protein carriers. When located within the main body of the core protein it is even more immunogenic. Obviously each immunogen will have its own optimal environment and delivery system. Deciding on the appropriate system for a particular antigen continues to rely on an inspired empirical approach.

Perhaps the technical advance which may most affect our approach to studying candidate vaccine antigens is the development of recombinant antibody technology. Of particular importance is the report that immunoglobulin heavy- and light-chain combinations generated by combinatorial libraries may closely resemble those obtained by traditional hybridoma techniques. Coupled with the possibility of humanizing antibodies by genetic engineering techniques, recombinant inhibitory monoclonals may find use in the near future for both immunoprophylaxis and immunotherapy.

Another reported development of universal significance to vaccine research is the development of a new live recombinant vaccine vector based on the mycobacterium BCG (Bacille Calmette-Guérin). The expression of foreign antigens on the surface of this organism may ease the way for a variety of human vaccine trials, as BCG is already widely administered as a vaccine throughout the world.

Finally onew cannot finish a review of this volume

without returning to AIDS. Many of the developments outlined above are already being applied to HIV antigens. However, vaccine delivery still requires the identification of protective epitopes on antigens and the immunological effector mechanisms which generate immunity. The (relatively) small number of AIDS antigens have been dissected *ad infinitum* over the years. For example a relatively highly conserved sequence within the V3 loop of gp120 is one epitope which has attracted a lot of interest. However, this conference saw the report of CD8 cytotoxic T-lymphocyte directed against the Nef gene product which is conserved, produced early during infection and may even be expressed in latently infected cells. It is known that cytotoxic T-cells have a suppressive effect on HIV infection of lymphocytes, and it is tempting to speculate that Nef may be a target for suppressive CTLs. If so, the identification of ISCOMS as carriers capable of generating a CTL response and the development of a BCG delivery system may assume particular significance.

ROBERT RIDLEY
Institute of Cell and Molecular Biology
University of Edinburgh
Edinburgh EH9 3JR

Genetic Monitoring of Inbred Strains of Rats: a Manual on Colony Management, Basic Monitoring Techniques, and Genetic Variants of the Laboratory Rat. Edited by HANS J. HEDRICH. Gustav Fischer Verlag, Stuttgart and New York. 1990. 539 pages. Hardback. DM 198. ISBN 3 437 30620 0.

The laboratory rat has been making an increasingly important contribution recently both to mammalian genetics and to biomedical research, the latter instanced by the fact that almost all vital organs of the rat can now be transplanted. A major problem for the research worker, particularly in biomedicine, has been the difficulty in extracting the needed information on rat genes, rat strains and inbred lines from the scattered literature; and the aim of the book under review was to fill this need and also to include full details of colony management and laboratory techniques. The editor and other contributors have succeeded admirably in this task, and their book will be of great interest to a variety of geneticists as well as helping those in applied research to improve their experimental techniques, in many cases dramatically: the reason for this is that choice of the most suitable strains and detailed knowledge of their characteristics are essential for obtaining convincing results.

The first half of the book discusses the use of inbred strains in biomedical research, genetic monitoring and colony management, types of marker gene available, and laboratory methods for identifying the alleles of polymorphic loci and other genetic variants. The marker genes include immunological markers, MHC and non-MHC alloantigenic cell-surface markers, biochemical, cytogenetic and DNA markers, and morphological and physiological traits. The chapter on laboratory methods gives detailed protocols for identifying variants in each of these classes of marker; for example, photographs and schematic interpretations of electropherograms are given for each of the 42 biochemical marker systems available. This chapter ends with an extensive discussion of the important technique of cryopreserving rat embryos and setting up an embryo bank.

The second half of the book (chapters 5 and 6) begins with a catalogue of mutant genes and polymorphic loci of the rat – covering about 330 loci of which some 200 have been mapped to linkage groups or chromosomes, compared with over 1300 loci reported and nearly 1000 of them mapped on chromosomes in the mouse. The rat gene catalogue is arranged alphabetically by locus symbol and gives detailed information about each gene: its known or probable function or effect, the alleles and their effects, and references. This arrangement sensibly mimics that for mouse genes in the new edition of *Genetic Variants and Strains of the Laboratory Mouse*, making homology comparisons easier, subject to historical differences in choice of names. As an example, I could not find the equivalent of any of the rat hooded alleles in the mouse catalogue – there is a mention of the piebald mouse in the discussion of hooded, but I was unable to run down a piebald locus or allele of the mouse. I suspect comparisons of this sort will become quite popular, particularly as gene mapping in the rat has increased recently using somatic cell hybridization.

The 116 pages of the rat gene catalogue are followed by a linkage map, a catalogue of inbred strains of rats giving colour, number of generations inbred, origin, characteristics (e.g. very docile, or aggressive towards handlers), etc., and holders, as far as all these are known. Some 140 inbred strains are described, of which 29 have no known holder; but it is hoped that holders of some of these strains will own up on seeing the book (or reading this review).

The book ends with some very useful tables, detailing Congenic and Segregating Inbred Strains, Recombinant Inbred Strains, Mutant-bearing Strains and Stocks, and Strain Distribution of Polymorphic Loci, with, finally, a roster of abbreviations and an index. One should also mention the fine set of colour photographs of different rat genotypes on pages 62 and 63.

This book obviously makes a very important contribution to mammalian genetics, and should find a place on the shelves of all biological libraries and in many laboratories. Rat genetics can now be said to have come of age.

An intriguing point is raised by Fig. 3.3.7 on page 56, which compares the lengths of the Y chromosome (standardized against the length of chromosome 20) in 18 rat strains. Clearly there are large and doubtless