

Experimental procedures, including injection and sampling techniques, and surgical procedures are covered in only 19 pages. Considering the importance of proper techniques and procedures for both animal welfare and experimental results this chapter is disappointing. It should be realized that textbooks on laboratory animal science are mainly for medical and biology graduates, with no experience in handling animals, carrying out even the simplest procedures, or performing surgery.

The brief chapter on alternatives to animal experiments adds little to the usual arguments carried forward by those opposed to animal experiments. Some of the examples mentioned are strange, eg that the production of monoclonal antibodies is an alternative method to standard antibody production in rabbits. Using this method, mice rather than rabbits are immunized and in addition hybridoma cells are inoculated into the peritoneal cavity of other mice, causing severe pain and distress to the animals. It is very difficult to see this as an improvement to animal welfare compared to the conventional method of producing polyclonal antibodies by immunization and bleeding rabbits. If a true alternative were to be suggested, it could be the production of antibodies in birds and the extraction of the antibodies from their eggs.

The final chapter in the publication deals with ethical aspects of animal experimentation. In my opinion this should have been the first one in the book. Being at the end, the reader may be less inclined to read it thoroughly: this is a pity since an important purpose of courses in laboratory animal science is to change attitudes, but especially because it is a well-written, unbiased chapter.

As stated in the preface, the target group for this book is scientists responsible for the design and conduct of animal experiments. In spite of the minor critical points mentioned, I feel that the book is suited as a basic textbook for such courses. It should, however, be mentioned that the most important parts of such courses are the practical exercises in handling the animals, including injection and sampling techniques. The students should also be given practical training in anaesthetizing animals, in performing basic surgical procedures, and in doing post-mortem examinations.

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Refinement and Reduction in Animal Testing

Edited by Steven M Niemi and John E Willson (1993). Scientists Center for Animal Welfare: Bethesda. 138pp. Paperback. Obtainable from the publishers, 4805 St Elmo Avenue, Bethesda, MD 20814, USA. Price US\$40.

This book contains the proceedings of a conference held by the Scientists Center for Animal Welfare on 17-18 September 1992, in Philadelphia, Pennsylvania. After a brief introduction on the '3R's' of Russell and Burch (who, I suspect, would join me in lamenting the intrusion, yet again, of that totally unnecessary apostrophe), in which one of the editors explains that the meeting was not about *replacement*, but about the neglected 2Rs, *reduction* and *refinement*, the book is divided into five sections.

Section 1, on animal models and efficacy testing, contains three papers, on refinement in the care of dogs with gastric fistulas; on non-human primate models for HIV, and on the frog embryo teratogenesis (FETAX) model. The dogs were female mongrels, described as a 'random source', so one further refinement would be to use only purpose-bred dogs from defined sources, and it is questionable whether simian Immunodeficiency viruses (SIVs) are good models for human Immunodeficiency viruses (HIVs), and whether the best way forward is to use human volunteer studies in drug and vaccine development, and *in vitro* methods in trying to understand the basis of AIDS. The FETAX model is really a potential replacement for some teratogenicity studies in laboratory mammals.

The second section, called ADME/Pharmacokinetics, comprises three very useful papers, on using biokinetic studies to refine animal toxicology protocols; on evaluating devices for continuous administration, and on minimizing stress during physiological monitoring.

Section 3, on husbandry, consists of only one paper, on the group housing of dogs on Good Laboratory Practice toxicology studies – the message is clear: dogs on many such studies; can be housed in groups. There is, however, another question – how scientifically justifiable are many such studies in the first place?

The fourth section, on toxicology, has four papers – on the low volume eye test as a refinement of the classical Draize eye irritancy test; on animal use in immunotoxicology studies; on the mouse local lymph node assay, and on neurotoxicity testing. The first paper illustrates how very difficult it can be to gain acceptance even of a sensible refinement of a regulatory animal test, and should serve as a warning to those of us who are seeking to *replace* such tests altogether. In the last paper in this section, the author appears to claim that the 3Rs definition of *alternatives* was first published in the 1986 report of the Office of Technology Assessment (OTA) of the US Congress. This is a classic example of nationalistic narrow-mindedness and ignorance of the literature – the definition referred to was suggested by David Smyth in 1978, as was recognized in the OTA report itself.

The four chapters of the final section, on acute and general toxicology (which is really a rather misleading section title), deal rather briefly with the activities of the pesticides office of the US Environmental Protection Agency; the 1991 IRAG (Interagency Regulatory Alternatives Group) workshop on refining the Draize eye test, and the first International Conference on the Harmonization of Medicines Testing Guidelines and its recommendations on reproductive toxicity/teratology.

These proceedings conclude with a short summary by the other editor, in which an important truth is repeated, ie that much animal suffering could be avoided by a more vigorous application of the principles of *reduction* and *refinement*, while we all await the development, validation and acceptance of non-animal, ie *replacement* technology.

This is a useful little book, though an index would have been helpful. However, I suspect that this is an example of where actually attending the meeting will probably have been more stimulating than merely reading the published proceedings.

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