

Preface

Most of our present knowledge concerning human physiology, microbiology, immunology, pharmacology, pathology, and related disciplines has been gained from studies involving animals—from studies of genetics in fruit flies to studies of cellular processes in genetically modified mice to investigations of life-threatening infections in nonhuman primates. Biomedical research involving animals remains absolutely essential for the advancement of the medical, veterinary, agricultural, and biological sciences. All drugs prescribed for use in humans and animals have been developed and tested in laboratory animals as models. Noninvasive imaging techniques are optimized in animal models. New surgical techniques and materials are evaluated in animals before they are applied in cases that involve humans or domestic animals. The dramatic developments in genetics—the sequencing of the human genome and the genomes of many of the most important laboratory animal species, translational research, and personalized medicines—all rely on access to high-quality laboratory animals as models for humans.

W. M. S. Russell and R. L. Burch (1959) counseled scientists to aim to apply the 3Rs whenever possible: replacing experiments on live animals with alternative methods, reducing the number of animals necessary to obtain valid results within experiments, and refining techniques to minimize the discomfort experienced by the animal participants.* These 3Rs form the cornerstones of laboratory animal science and have been integrated into the numerous laws and guidelines that regulate the use of animals in research across the globe. The 3Rs have also been integrated into almost every chapter in this handbook; replacement, reduction, and refinement are relevant to virtually all areas of laboratory science. Good science can only be performed in environments that promote animal welfare.

Efficient and humane experimental work with animals, in which subjects experience no avoidable pain and mental distress, requires skillful and conscientious staff, including specialist veterinarians.

In many parts of the world, regulatory authorities require that all staff working with laboratory animals must document relevant competencies in the field, many of which are obtained through formal teaching and training programs. Universities around the world have established mandatory courses for scientists who wish to use animals in their research, and some have developed specialist education programs, often master's level courses, for staff to achieve specialist competence in the treatment of laboratory animals.

This handbook is a revised third edition of the handbook first edited by Per Svendsen and Jann Hau, published in 1994. Jann Hau and his old friend and colleague, Gerald Van Hoosier in Seattle, joined forces to edit the second edition. Now, Jann Hau and Steve Schapiro, who have been friends and collaborators on numerous projects for almost 20 years, have teamed up to revise and produce the third edition of *Handbook of Laboratory Animal Science*. The result is a truly international book, and we thank all of the authors for their valuable contributions. Each chapter focuses on an important subdiscipline of laboratory animal science, and the chapters can be read and used as stand-alone texts, with only limited necessity to consult other chapters for information. This approach has resulted in slight overlaps in contents in certain chapters, but we feel that this was a small price to pay to make the book as reader friendly as possible.

It is our hope that this handbook will be useful all over the world as a textbook in laboratory animal science courses for postgraduate and undergraduate students, and as a handbook for scientists who work with animals in their research, for university veterinarians, for regulators, and for other specialists in laboratory animal science.

Jann Hau
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* Russell, W. M. S. and R. L. Burch. 1959. *The principles of humane experimental technique* London: UFAW.