Drug Discovery and Evaluation: Pharmacological Assays

Franz J. Hock
Editor

Drug Discovery and Evaluation: Pharmacological Assays

Fourth Edition

With 26 Figures and 28 Tables

Springer Reference

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In Memory of Hans Gerhard Vogel 1927–2011.

Preface to the Fourth Edition

The fourth edition of the book *Drug Discovery and Evaluation: Pharmacological Assays* is presented here.

The concept of the book has changed since the third edition, and we have now split the chapters for better reading and web search. The volume data has again risen considerably compared to the third edition. In particular, a large number of assays and new topics have been added.

Several chapters are new, and most of the chapters have been revised and have been thoroughly updated as well. I am indebted to my colleagues rewriting and updating the chapters and I also thank the authors who provided new topics for this book.

The approach to drug discovery has changed continuously during recent years. Decades ago, most of the drugs were found by serendipity in clinical trials. New drugs, however, were found in animal experiments by a classical approach. This classical approach has advantages and disadvantages. The main advantage was the relatively high predictability of success. The major disadvantage was that we got little or no information about the molecular mechanisms involved in the observed effects. New mechanisms always required new models.

The costs of developing new drugs are exploding, while the output is decreasing. A change in paradigm, the target-based or mechanism-based drug discovery approach, was welcomed with great enthusiasm. Combinatorial chemistry could generate thousands of new compounds. They were tested in high-throughput systems. This made it highly effective for the identification of target-selective compounds. Although this technique showed very great advantages from a scientific and practical viewpoint, it did not translate into higher success rates. The target-based approach has therefore been replaced again by the physiology-based approach – the classical drug discovery – or the function-based approach, which seeks to induce a therapeutic effect by normalizing a disease-specific abnormality.

I am aware that the rapid progress in biology will once again change the methodological approaches in the coming years. In addition, electronic media will continuously help scientists to access and share information. However, on the other hand, it is becoming more and more evident that many young pharmacologists have only limited training in classical pharmacological methods. When searching for these classical methods, researchers will find only insufficient information on the methodological details in electronic

databases. To this end, I hope the current book may bridge this gap by comprehensively covering those classical pharmacological methods, sometimes utilized for over 100 years, with modern pharmacological methods.

At this point, I would like again to express my sincere thanks to all colleagues who contributed to the new edition of this book. Their names and affiliations are given in alphabetical order.

A special thanks goes to Hans Gerhard Vogel, who was the Editor-in-Chief of the first three editions. He was furthermore the initiator of the *Drug Discovery and Evaluation* titles at Springer consisting of *Pharmacological Assays, Safety and Pharmacokinetic Assays*, and *Methods in Clinical Pharmacology*. Gerhard Vogel passed away in 2011. Personally, I am personally very much indebted to him. He introduced me to pharmacology and was always my mentor thereafter. It is an honor to continue his work.

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About the Editor

Franz Jakob Hock Since retiring from Aventis in 2002, Dr. Hock has leveraged his experience as a freelance consultant specializing in Safety Pharmacology. Dr. Hock was a research scientist at Hoechst, Hoechst Marion Roussel, and Aventis from 1976 to 2002. He initially worked on methods in general pharmacology and nephrology, before becoming Head of a Laboratory devoted to pharmacological methods for drugs influencing memory and learning. He was ultimately Head of Laboratory for General/Safety Pharmacology at the Frankfurt site of Aventis Pharma Deutschland GmbH.

Dr. Hock received his MSc in Neurobiology from the Technical University Darmstadt and his D.Sc. in Zoology from the University Kassel, Department of Biology, Institute of Neuroethology and Biocybernetics.

He received the degree of Fachpharmakologe DGPT ("certified expert pharmacology") in 1981. In 1983, he spent a sabbatical year at the University of California, Irvine, at the Center for the Neurobiology of Learning and Memory (Director Prof. Dr. James L. McGaugh).

He lectured for several years to students of Biology at the University of Kassel and the Technical University of Darmstadt. He has published over 100 original papers on methods in pharmacology and on new compounds. Furthermore, he held 28 patent applications to protect or broaden the application of lead structures.

He is currently a member of the Task Force General/Safety Pharmacology German/Swiss Pharmaceutical Companies. A member of several national and international scientific societies, Dr. Hock is a founding member of "Safety Pharmacology Society," "Neurowissenschaftliche Gesellschaft e.V.," and "European Behavioural Pharmacology Society." For several years, he served as a member of the Program Committee of the Safety Pharmacology Society. He is a member of several domestic and international scientific societies.

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