Drug Screening
Methods
Drug Screening Methods

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and
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Preface to the Second Edition

It is my pleasure to introduce the much-awaited second edition of the book *Drug Screening Methods*. The first edition of the book was very well received by the students and professionals from the academia and industry, from across the world. The book was a pioneering endeavor in 2004 and was written keeping in mind the widespread need and limited availability of the consolidated screening methods for biological systems in drug discovery and development. In the first edition, techniques of practical importance were elaborated and the second edition is in tune with that.

Numerous valuable suggestions and comments for enhancing the quality of the book and our personal critical evaluation of the book to take up the areas, which were left untouched, helped in bringing about this second edition of *Drug Screening Methods*.

Several modifications, additions and deletions have been made in this edition keeping in view the need of the hour. In this era of ultra-high throughput screening, a book on the subject would be incomplete without chapters on this area. Consequently, the chapter *Newer Tools for Drug Screening* was penned and provides an update on novel concepts like cassette-dosing, virtual screening, application of LC-MS/MS in bioanalysis, etc. The readers should find the chapter on *Stem Cell Therapy*, interesting and informative to read. A comprehensive chapter on *Multimodal Approaches for the Screening of Antistroke Agents* has been another addition in this edition. A combined but well-elucidated chapter on *Screening Methods for Renal and Liver Fibrosis* has been written by researchers actively working in the area. Similarly, the chapter on *Antifertility Agents* has been written by one of the stalwarts in the field, possessing over three decades of research experience. For the first time, chapters on difficult and challenging areas of research like *Diabetic Retinopathy* and *Ocular Toxicity* have been compiled, and I hope it would open up renewed interest for research on these topics.

I hope that like the first edition, the readers will benefit and appreciate this edition of the book. A consolidated effort has been made to present the information in succulent manner that is easy to read and comprehend. The figures, diagrams, tables and flowcharts have spruced up the book and given the first edition a makeover.

The book will be useful for the postgraduate students, industry professionals and those engaged in the research and development at various laboratories.

It is obvious that an enterprise of this magnitude has been possible due to the cooperation and assistance of a large number of individuals across the globe. As an editor, I express my heartfelt gratitude to the contributors of the chapters, dedicated team of editorial board and the production staff at M/s Jaypee Brothers Medical Publishers (P) Ltd, New Delhi, who all joined to convert this dream project into reality.

SK Gupta
Preface to the First Edition

Drug discovery and development is a challenging field of research requiring the synchronized efforts of medicinal chemists, natural chemists, pharmacologists, toxicologists and clinicians, to name a few. The ultimate target of this team is to generate a safe and biologically active drug that is capable of stalling, if not reversing, the pathological events leading to disease condition. In the drug discovery program, the battery of tests and assay systems that evaluate the efficacy and safety of the novel molecule in biological system occupy the center stage. Thus, these assays or ‘screening methods’ are critical as it is on their basis that the molecule sees the light of the day or is consigned to obscurity.

Advances in the field of drug discovery program has seen the graduation of simple screening methods of yore to automated methods utilizing molecular techniques spanning across in vitro, in vivo and clinical systems. There has been an explosion of available information making it essential for the professionals working in this area of research to keep pace with the advancing times. It has become an uphill task for researchers focusing on a particular field to scan realms of literature regarding developments in other fields. This often curtails synchronized research and delays results. At this juncture, it has become of utmost importance to consolidate our present knowledge and review its validity and ascertain the future direction.

In view of this widespread need and limited availability of consolidated screening methods for biological systems, the Herculean task of penning a book on Drug Screening Methods was undertaken. It is hoped that the First Edition of this book will enjoy a broad readership ranging from professionals to students of pharmacology.

Keeping in tune with the practically used techniques used in both academia and pharmaceutical industry, this book outlines numerous methods utilizing molecular and fluorescence techniques. A complete section has been devoted to the concept and basic techniques involved in novel drug discovery program. It is hoped that this will at least provide a theoretical exposure to students of pharmacology who may tomorrow be in a position to use them practically. Special attention has been given to novel methods based on genetically modified animals that simulate the human condition as these help in not only understanding the pathogenesis, but also develop targets for therapeutic modalities. Additionally, an overview has been provided for major fields of investigation like drug absorption and metabolism, cancer biology, angiogenesis, apoptosis, AIDS and autoimmune disorders.
As a pharmacology teacher for over 40 years now, I have always felt the need for simple screening procedures that explicitly demonstrate the nuances of sympathetic, parasympathetic nervous system and gut motility to the students, and I hope by way of this book, this lacuna has been addressed. As a researcher, the fields of ocular and cardiovascular pharmacology have been very close to my heart and special care has been taken to develop chapters regarding these areas. Considering the renewed interest in outsourcing novel drugs from natural source, a separate chapter dealing with assay procedures for screening the pharmacological activity of herbal drugs has been written.

Every drug has a therapeutic effect, that is desired, along with an unwanted side effect. This book would be incomplete and lend a myopic view to drug discovery program without the methods for assessing safety of novel molecules. Toxicity studies are critical as it is on their basis that the toxicity and efficacy profile of a novel molecule can be weighed and its future determined.

It is obvious that an enterprise of this magnitude has been possible due to the cooperation and assistance of a large number of individuals across the globe. As the editor, I express my heartfelt gratitude to the authors of the chapters, dedicated team of editorial board and the production staff at M/s Jaypee Brothers Medical Publishers (P) Ltd., New Delhi, who all joined to convert this dream project into reality.

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