NEUROMETHODS 32

In Vivo Neuromethods
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In Vivo Neuromethods

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Preface to the Series

When the President of Humana Press first suggested that a series on methods in the neurosciences might be useful, one of us (AAB) was quite skeptical; only after discussions with GBB and some searching both of memory and library shelves did it seem that perhaps the publisher was right. Although some excellent methods books had recently appeared, notably in neuroanatomy, it was a fact that there was a dearth in this particular field, a fact attested to by the alacrity and enthusiasm with which most of the contributors to this series accepted our invitations and suggested additional topics and areas. After a somewhat hesitant start, essentially in the neurochemistry section, the series has grown and will encompass neurochemistry, neuropsychiatry, neurology, neuropathology, neurogenetics, neuroethology, molecular neurobiology, animal models of nervous disease, and no doubt many more “neuros.” Although we have tried to include adequate methodological detail and in many cases detailed protocols, we have also tried to include wherever possible a short introductory review of the methods and/or related substances, comparisons with other methods, and the relationship of the substances being analyzed to neurological and psychiatric disorders. Recognizing our own limitations, we have invited a guest editor to join with us on most volumes in order to ensure complete coverage of the field. These editors will add their specialized knowledge and competencies. We anticipate that this series will fill a gap; we can only hope that it will be filled appropriately and with the right amount of expertise with respect to each method, substance or group of substances, and area treated.

Alan A. Boulton
Glen B. Baker
Preface

In Viva Neuromethods is one of three volumes that represent an update of the original volume 1 of Neuromethods, General Techniques. The expansion to three volumes was necessitated by the rapidly increasing number of techniques being used by neuroscientists and the general tendency of neuroscience research to become more multidisciplinary and collaborative in recent years. The two companion volumes are concerned primarily with in vitro neuromethods: molecular neurobiological methods in one case, and cellular methods in the other.

Even with three volumes, the coverage of General Neuromethods is obviously not exhaustive. We have attempted to cover those techniques that seem particularly popular in multidisciplinary neuroscience research. Though some important techniques may have been omitted, we believe that most of these have been covered in detail in other recent volumes of Neuromethods or will be the subject of upcoming volumes.

The editors anticipate that this volume devoted to in vivo techniques, as well as the two on in vitro methods, will prove extremely useful to neuroscientists across a wide range of fields—e.g., neurochemistry, neuropsychopharmacology, neurology, psychiatry, and neuroanatomy. Each chapter has been written by well-known neuroscientists with active research programs. Experienced researchers in the specific areas treated will appreciate the present updates on those topics, and neuroscientists expecting their research programs to become more multidisciplinary or to expand into new areas of research should find these volumes of enormous value, particularly those sections offering protocols with useful hints about the advantages and potential pitfalls of a particular technique.

In Viva Neuromethods begins with a chapter by A. Adell and F. Artigas on in vivo brain microdialysis, a technique that has proven very useful for studying brain function in general, and the mechanisms of action of psychotropic drugs in particular. A practical overview of in vivo methods for studying receptors is provided in the chapter by R. S. Neuman. S. P. Dunnett has provided a comprehensive chapter on applications and protocols related to neural transplantation, a surgical technique with widespread potential applications in neurobiology, particularly as it relates to neurological disorders. There has been great interest in recent years in the development of animal models of psychiatric and neurological disorders,
both for studying possible causes of these disorders and for screening potential drugs for their treatment. Comprehensive chapters on animal models of anxiety and depression (D. Treit and J. Menard), neurological disorders (K. G. Todd and R. F. Butterworth), and schizophrenia (S. A. Josselyn and F. J. Vaccarino) are also provided in this volume.

Drugs of abuse are a major concern to society, and N. J. DeSousa and F. J. Vaccarino have written a chapter on preclinical behavioral approaches for assessing the reinforcing properties of drugs of abuse. Teratogenicity is also a matter of grave concern to society, and A. J. Nazarali and R. Puthucode have prepared an overview on in vivo animal models of teratogenicity. Antisense oligodeoxynucleotide technology has a wide range of applications to the neurosciences, and A. M. Ouagazzal, J. M. Tepper, and I. Creese discuss the use of such technology, particularly as it relates to central nervous system pharmacology. The volume concludes with chapters on two techniques that have been utilized for many years in the neurosciences, but that continue to have widespread use in studies on central nervous system function and on the mechanisms of action of psychotropic drugs. C. H. Vanderwolf and L.-W. S. Leung discuss the relation of brain electrical activity to behavior, and A. J. Greenshaw has provided a chapter on electrical and chemical stimulation of brain tissue in vivo.

Many of the techniques described in In Vivo Neuromethods involve the use of animal models, and, as has been emphasized in previous Neuromethods volumes, researchers must take the care and well-being of the laboratory animals involved very seriously. Any studies involving animals must conform to national and local welfare regulations and receive formal approval from a legitimate ethics review committee before experiments begin. It is imperative that each individual researcher examine his/her own research from a critical moral standpoint before engaging in it, taking into consideration the animals' welfare as well as the anticipated gains. Furthermore, once a decision to proceed with research is made, it is the researcher's responsibility to ensure that animal welfare remains of prime concern in terms of appropriate housing, feeding, and the maximal reduction of any uncomfortable or distressing effects of the experimental conditions, and that these conditions undergo frequent formalized monitoring.

Alan A. Boulton
Glen B. Baker
Alan N. Bateson
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