PREFACE

Epilepsy is a neurological disorder and around 65 million people worldwide are affected. Although antiepileptic drugs (also known as antiseizure drugs) provide sufficient control of seizures in circa 70% of patients with epilepsy, the remaining 30% are resistant to monotherapy. Combinations of antiepileptic drugs may improve seizure control in some patients, but still a significant proportion of patients suffer from drug-resistant seizures. There are numerous efforts aimed at improving treatment outcomes. For instance, novel therapeutic targets are being searched based on neurobiological mechanisms involved in drug-resistant seizures. Also, many studies are devoted to pathophysiology of various genetic epilepsies. Some antiepileptic drugs exert their protective effects via potentiation of GABA-mediated inhibition or suppression of glutamate-induced excitatory events. Other drugs may target ion channels for Na^+, Ca^{2+} or K^+. Novel targets for antiepileptic drugs have been emerging, for instance TGF-β, m-TOR signaling, inflammatory pathways, or multidrug efflux transporters. Apart from pharmacological treatment, alternative methods for the management of epilepsy are in use – ketogenic diet, vagus nerve stimulation, or deep brain stimulation. Considering epileptogenesis as a process responsible for converting normal brain into epileptic brain, an intriguing therapeutic possibility arises. Specifically, antiepileptogenic drugs (not available at present) could inhibit epileptogenesis, thus stopping the development of epilepsy. Much hope is associated with antisense nucloetides (antagomirs) in this regard.

This book is devoted to various aspects of epilepsy. Let me express my sincere thanks to the authors for their significant and reliable contribution to the presentation of timely and important data in this field. The chapters deal with pathophysiological mechanisms leading eventually to seizures and discuss anatomical basis of seizure activity. The common areas involved in seizures are presented (the hippocampus, amygdala, frontal and temporal cortex). In some chapters, epileptogenesis is also mentioned. Complex relationships between inhibitory and excitatory neurotransmitters, as well as their interactions with various ion channels in the development of excitatory neuronal circuits provide a basis for understanding the nature of epilepsy. The problem of genetic epilepsies has not been overlooked. Dravet syndrome has been discussed in terms of *SCN1A* gene mutation and interestingly, mutations in genes from non-overlapping pathways may eventually yield a similar phenotype to Dravet syndrome. Noteworthy, genetically determined aberrant $GABA_A$ receptors may be involved in circa 150 epilepsy-associated variants. Management of epilepsy and status epilepticus with the use of pharmacological and alternative methods are also presented.

I am strongly convinced that this book dealing with both preclinical and clinical aspects of epilepsy will be a significant source of relevant knowledge. In my opinion, it may stimulate further research eventually leading to a significant improvement of epilepsy therapy.

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