## Contents

*Preface* .......................................................... v  
*Contributors* ...................................................... ix  

**PART I  NOVEL APPROACHES FOR THE TREATMENT OF EPILEPSY**

1  Inflammatory Cytokines as Targets for Epilepsy Drug Therapy  
   *María-Leonor López-Meraz, Jesús-Servando Medel-Matus,*  
   *and Jerome Niquet*  
   3

2  The Use of Anti-inflammatory Drugs in Epilepsy  
   *María Guadalupe Valle-Dorado, Laura Elena Córdova-Dávalos,*  
   *Daniel Pérez-Pérez, Rosalinda Guevara-Guzmán,*  
   *and Luisa Rocha*  
   23

3  Carbonic Anhydrase and Epilepsy  
   *Luciana Gavernet*  
   37

4  Synaptic Vesicle Protein 2A as a Novel Pharmacological Target  
   with Broad Potential for New Antiepileptic Drugs  
   *Luz Adriana Pichardo-Macías, Itzel Jatziri Contreras-García,*  
   *Sergio R. Zamudio, Edgar Mixcoba,*  
   *and Julieta G. Mendoza-Torreblanca*  
   53

5  Do Cannabinoids Represent a Good Therapeutic Strategy for Epilepsy?  
   *Cecilia Zavala-Tecuapetla and Luisa Rocha*  
   83

6  Glutamate Receptors as Targets for Novel Antiepileptic Drug Therapy  
   *Manola Cuéllar-Herrera, César E. Santana-Gómez,*  
   *Francia Carmona-Cruz, Daruni Vázquez-Barrón, Francisco Velasco,*  
   *and Ana L. Velasco*  
   97

7  Neurosteroid Regulation of Seizures: Role of GABAA Receptor Plasticity  
   *Suchitra Joshi and Jaideep Kapur*  
   127

8  Erythropoietin as Potential Neuroprotective and Antiepileptogenic  
   Agent in Epilepsy and Refractory Epilepsy  
   *Amalia Marelli, Liliana Czornyj, Luisa Rocha,*  
   *and Alberto Lazarowski*  
   147

9  Caloric Restriction and Dietary Treatments of Epilepsy:  
   Mechanistic Insights for Drug Discovery  
   *Karla G. Carvajal Aguilera*  
   *and Bryan V. Phillips Farfán*  
   163

10 Gene Therapy in Epilepsy  
    *Miguel A. López-García, Iris A. Feria-Romero, Julia J. Segura-Uribe,*  
    *David Escalante-Santiago,*  
    *and Sandra Orozco-Suárez*  
    181
PART II  INNOVATIVE SOLUTIONS FOR THE SCREENING
OF NEW ANTIEPILEPTICS DRUGS AND ADDRESSING
MULTI-DRUG RESISTANT EPILEPSY

11 Human Brain Tissue as a Model for the Study of Epilepsy ................. 203
Leonardo Lara-Valderrábano, Ivette Bañuelos-Cabrera,
Víctor Navarrete-Modesto, and Luisa Rocha

12 The Blood–Brain Barrier and the Design of New Antiepileptic Drugs .... 221
Gabriela Rogel-Salazar and Hiram Luna-Munguía

13 Virtual Screening Applications in the Search of Novel Antiepileptic
Drug Candidates .................................................... 237
Alan Talevi and Luis E. Bruno-Blanch

14 Discovering New Antiepileptic Drugs Addressing the Transporter
Hypothesis of Refractory Epilepsy: Ligand-Based Approximations ........ 259
Manuel Couyoupetrou, Mauricio Di Ianni, Melisa Gantner,
Guido Pesce, Roxana Peroni, Alan Talevi, and Luis E. Bruno-Blanch

15 Discovering New Antiepileptic Drugs Addressing the Transporter
Hypothesis of Refractory Epilepsy: Structure-Based Approximations .... 281
Pablo Palestro and Luciana Gavernet

16 Nanoformulations of Antiepileptic Drugs: In Vitro and In Vivo Studies. .... 299
María E. Ruiz and Guillermo R. Castro

PART III  POTENTIAL CONTRIBUTIONS OF NETWORK PHARMACOLOGY
AND DRUG REPURPOSING IN ANTIEPILEPTIC DRUG DISCOVERY

17 Side Effects of Antiepileptic Drugs ................................... 329
Hana Kubova

18 Network Pharmacology and Epilepsy ..................................... 351
Alan Talevi

19 The Importance of Drug Repurposing in the Field of Antiepileptic
Drug Development ..................................................... 365
Alan Talevi

Index ................................................................................. 379