

**PART I. CELLULAR AND MOLECULAR MORPHOGENESIS OF THE NERVOUS SYSTEM**

An Introductory Overview: Cellular and Molecular Morphogenesis of the Nervous System

Cheng Wang

1. Brain Morphogenesis and Developmental Neurotoxicology

Karl F. Jensen and Jeanene K. Olin

2. Neural Cell Adhesion Molecules in Normal and Abnormal Neural Development

Cheng Wang

3. Neurite Development and Neurotoxicity

Zhen He, Sherry Ferguson, Tucker A. Patterson and Merle G. Paule

4. Myelin: Structure, Function, Pathology and Targeted Therapeutics

Joseph Hanig and Geeta Negi

**PART II. DEVELOPMENTAL NEUROBIOLOGY/TOXICOLOGY**

An Introductory Overview

William Slikker Jr.

5. Neurotrophic Factors

Jimcy Platholi and Francis S. Lee

6. Serotonin Signaling as a Target for Craniofacial Embryotoxicity

Robert M. Greene and Michele M. Pisano

7. Neurotoxic and neurotrophic effects of GABAergic agents on the developing brain

Julia M. Gohlke

8. Neural stem cell biology and application to developmental neurotoxicity assessment

Fang Liu and Cheng Wang

9. Apoptosis as a Mechanism of Developmental Neurotoxicity

Pamela J. Lein, Suangsuda Supasai and Michelle Guignet

10. Periods of Susceptibility: Interspecies Comparison of Developmental Milestones during Ontogenesis of the Central Nervous System

John M. DeSesso and Amy Lavin Williams

11. Modeling the Neurovascular Unit in

vitro and in silico

Katerine S. Saili, Todd J. Zurlinden and Thomas B. Knudsen

12. Zebrafish Models of Developmental Biology and Toxicology

Courtney Roper and Robert L. Tanguay

13. Using *Caenorhabditis elegans* to Study Neurotoxicity

Margaret M. Sedensky and Philip G. Morgan

**PART III. SYNAPTOGENESIS AND NEUROTRANSMISSION**

An Introductory Overview:

Synaptogenesis and Neurotransmission

Cheng Wang

14. Human 3D in vitro Models for Developmental Neurotoxicity

Leah Smirnova and Thomas Hartung

15. Ontogeny of Monoamine Neurotransmitters

Sumit Sarkar, Syed Z. Imam and Jennifer L. Walters

16. Developmental Toxicity within the Central Cholinergic Nervous System

David A. Jett, Michelle Guignet, Suangsuda Supasai and Pamela J. Lein

17. Ontogeny of Second Messenger Systems

Syed Z. Imam, Hector Rosas-Hernandez, Elvis Cuevas, Susan M. Lantz, Sumit Sarkar, Syed F. Ali and

Merle G. Paule

18. The NMDA Receptors: Physiology and Neurotoxicology in the Developing Brain

Qiang Gu

**PART IV. NUTRIENT AND CHEMICAL DISPOSITION**

An Introductory Overview: Nutrient and Chemical Disposition

William Slikker Jr.

19. Physiologically Based Pharmacokinetic (PBPK) Models

Jeffrey W. Fisher, Xiaoxia Yang and Charles Timchalk

20. Blood-Brain Barrier: Physiological and Functional Considerations

Hector Rosas-Hernandez, Elvis Cuevas, Susan M. Lantz, Syed Z. Imam, Merle G. Paule and Syed F. Ali

21. Toxicological Mechanisms of Engineered Nanomaterials: Role of Material Properties in Inducing Different Biological Responses

R. L. Salisbury, R. Agans, M. E. Huddleston, A. Snyder, Alexandra Mendlein and Saber Hussain

22. Food and Nutrient Exposure Throughout the Life Span: How Does What We Eat Translate into Exposure, Deficiencies, and Toxicities?

Keli M. Hawthorne

23. The Microbiome Gut-Brain Axis

Carl E. Cerniglia

24. Drug and Chemical Contaminants in Breast Milk: Effects on

Neurodevelopment of the Nursing Infant

Tom Leibson, Prateek Lala and Shinya Ito

#### **PART V. BEHAVIORAL ASSESSMENT**

An Introductory Overview: Behavioral Assessment

Merle G. Paule

25. Behavioral Phenotyping in Developmental Neurotoxicology – Simple Approaches using Unconditioned Behaviors in Rodents

Devon L. Graham, Jerrold S. Meyer and Gregg D. Stanwood

26. Psychometric Tools to Study Cognition, Sensory Functioning and Social Behavior in Infant and Adolescent Nonhuman Primates

Thomas M. Burbacher and Kimberly S. Grant

27. Automated assessment of cognitive function in nonhuman primates

John C. Talpos and Merle G. Paule

28. Determining the validity of pre-clinical behavioral assessments for extrapolation to a clinical setting

John C. Talpos and John J. Chelonis

29. Behavioral Outcome as a Primary Organizing Principle for Mechanistic Data in Developmental Neurotoxicity

Christina Sobin and Mari Golub

#### **PART VI. CLINICAL ASSESSMENT AND EPIDEMIOLOGY**

An Introductory Overview: Clinical Assessment and Epidemiology

Jan M. Friedman

30. Evaluation of the Human Newborn Infant

Lilly Bogičević, Marjolein Verhoeven and Anneloes van Baar

31. Neuropsychological Assessment of Children in Studies of Developmental Neurotoxicity

David C. Bellinger and Johanna Calderon

32. Neurodevelopmental Assessment of the Older Infant and Child

William J. Barbaresi and Julie Bickel

33. Longitudinal Studies of the Effects of Prenatal Cocaine Exposure on Development and Behavior

Gale A. Richardson and Nancy L. Day

34. Assessment of Case Reports and Clinical Series

Jan M. Friedman

#### **PART VII. SPECIFIC NEUROTOXIC SYNDROMES**

An Introductory Overview: Specific Neurotoxic Syndromes

Merle G. Paule

35. Fetal Minamata Disease: A Human Episode of Congenital Methylmercury Poisoning

Alessandra Antunes dos Santos, Louis W. Chang, Grace Liejun Guo and Michael Aschner

36. The Developmental Neurotoxicity of Cadmium

Ashley J. Malin and Robert O. Wright

37. Developmental Neurotoxicology of Lead – Neurobehavioral and Neurological Impacts

Stephen M. Lasley

38. Fetal Alcohol Spectrum Disorder

Irena Nulman, Talya Shulman and Feiyuan Liu

39. Developmental Neurotoxicity of Nicotine and Tobacco

Edward D. Levin and Yael Abreu-Villaça

40. Developmental Neurobehavioral Neurotoxicity of Insecticides

Yael Abreu-Villaça and Edward D. Levin

41. Developmental Exposure to Polychlorinated Biphenyls Induces Deficits in Inhibitory Control and May

- Enhance Substance Abuse Risk  
Mellessa M. Miller and Helen J K  
Sable
42. Developmental Neurotoxicity of  
General Anesthetics  
Jennifer L. Walters and Merle G. Paule
43. Maternal Drug Abuse and Adverse  
Effects on Neurobehavior of Offspring  
Diana Dow-Edwards
44. Developmental Neurotoxicology of  
Antiepileptic Drugs  
Jocelyn M. Lutes, Jolene E. Borchelt,  
Patricia A. Janulewicz and Jane Adams

### **PART VIII. RISK ASSESSMENT**

- An Introductory Overview: Risk  
Assessment  
William Slikker Jr.
45. Current Approaches to Risk  
Assessment for Developmental  
Neurotoxicity  
Susan L. Makris and Andrew D. Kraft
46. Animal/Human Concordance  
Larry P. Sheets and William Slikker Jr.
47. Physiologically based  
pharmacokinetic models in the risk  
assessment of developmental  
neurotoxicants  
Kannan Krishnan
48. Application of Quantitative dose  
response data in risk assessment and the  
incorporation of high throughput data  
John C. Lipscomb