

Preface

This book intends to facilitate among its readers the understanding of the importance of mercury pollution in the environment and the health consequences associated with exposure to this metal. The knowledge on methylmercury (MeHg) toxicity collected over the years is undoubtedly robust creating an impression all that is to be learnt about this metal has already been accomplished. However, in large measure, past knowledge has merely laid the ground for interesting questions that have yet to be fully addressed and concepts have yet to be deciphered. One of our major goals was to make a valiant attempt to include state-of-the-art information on the mechanisms of mercury toxicity, describing its effects on cultured cellular systems as well as in whole living organisms, starting from the lessons learned from the tragic events in Minamata Bay, Japan. A special focus of the book is on the neurotoxic effects of MeHg. The nervous system is a unique organ that can be visualized as an assemblage of interrelated neural systems that regulate their activity in a dynamic and complex manner. An understanding at the cellular level is necessary to gather information on the structural and functional alterations induced by MeHg and how they possibly become unmasked and evident at the behavioral level. We organized the sequence of the 20 chapters having these considerations in mind. In Chaps. 1–3 timely epidemiological data are presented opening with an update on Minamata disease. Chapters 4–7 address the mechanisms of MeHg toxicity, with special emphasis on potential protective mechanisms, oxidative stress, and thyroid hormone impairments. Chapters 8 and 9 provide an overview of neurodevelopmental toxicity studies, in monkeys and rodents respectively, focusing mostly on the behavioral alterations induced by MeHg. Chapter 10 discusses the recent evidence for epigenetic changes induced by exposure to MeHg and other toxic agents. Chapters 11–16 are devoted to *in vitro* studies on MeHg mechanisms of toxicity in various cell types, including neurons, glia, and neural stem cells. In Chaps. 17–19 data from “alternative” *in vivo* models are reviewed to show relevant and novel information about the mechanisms of MeHg toxicity can be gathered from phylogenetically lower animals. We close the book with the Chap. 20 discussing how fish-eating wildlife can be used for public health strategies to assess the neurotoxic risks of MeHg.

Methylmercury and Neurotoxicity

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