

Preface

As the average life expectancy of many populations throughout the world increases, so to does the incidence of such age-related neurodegenerative disorders as Alzheimer's, Parkinson's, and Huntington's diseases. Rapid advances in our understanding of the molecular genetics and environmental factors that either cause or increase risk for age-related neurodegenerative disorders have been made in the past decade. The ability to evaluate, at the cellular and molecular level, abnormalities in postmortem brain tissue from patients, when taken together with the development of valuable animal and cell-culture models of neurodegenerative disorders has allowed the identification of sequences of events within neurons that result in their demise in specific neurodegenerative disorders. Though the genetic and environmental factors that promote neurodegeneration may differ among disorders, shared biochemical cascades that will ultimately lead to the death of neurons have been identified. These cascades involve oxyradical production, aberrant regulation of cellular ion homeostasis and activation of a stereotyped sequence of events involving mitochondrial dysfunction and activation of specific proteases.

Pathogenesis of Neurodegenerative Disorders provides a timely compilation of articles that encompasses fundamental mechanisms involved in neurodegenerative disorders. In addition, mechanisms that may prevent age-related neurodegenerative disorders are presented. Each chapter is written by an expert in the particular neurodegenerative disorder or mechanism or neuronal death discussed. Chapters that consider the role of oxidative stress as a central feature of all neurodegenerative disorders and the fundamental mechanisms of neuronal apoptosis and excitotoxicity, two forms of cell death central to many different neurodegenerative disorders, open this volume. Subsequent chapters focus on specific neurodegenerative disorders. Each chapter presents information on genetic and environmental factors that may contribute to these disorders and cell death cascades involved in these disorders are detailed. Chapters focus on Parkinson's disease, trinucleotide repeat disorders (including Huntington's disease), Alzheimer's disease and Down's syndrome (two disorders that appear to involve shared mechanisms), amyotrophic lateral sclerosis, ischemic stroke, spinal cord injury, and Duchenne muscular dystrophy.

Pathogenesis of Neurodegenerative Disorders will provide a valuable working reference for graduate students and postdocs beginning their careers in this field. In addition, because each chapter presents the most up-to-date specific information in the field, this book is valuable for senior scientists in allowing them to integrate information on cellular and molecular mechanisms across the wide field of neurodegenerative disorders.



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