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The Handbook of Neuroprotection

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Preface

Neuroprotection is an important part of care of the neurological disorders. Treatment of neurological disorders should not be merely symptomatic, but an effort should be made to prevent the progression of the underlying disease and to develop therapies for regeneration. Neuroprotection also covers the protection of the part of the nervous system exposed to trauma and surgery. Neuroprotection has been used in medical practice for the past 50 years. The earliest agents were barbiturates and nonpharmacological approaches such as hypothermia and hyperbaric oxygen. Neuroprotection has been placed on a firm scientific basis during the past decade due to an improved understanding of the molecular basis of neurological diseases. This book is a comprehensive review of neuroprotection based on the knowledge of the molecular basis of neurological disorders. Neuroprotective effects of older, established drugs as well as new drugs in development are documented.

This book has evolved over a decade, starting with a commercial report on neuroprotection. Although there is no cure for several neurological disorders, tremendous progress has been made in understanding the pathomechanism of diseases such as stroke and neurodegenerative disorders. Over 500 drugs are under investigation at various stages from preclinical research to clinical trials. A number of drugs with neuroprotective effects are on the market. Further research has been done on the older methods of neuroprotection such as hypothermia and hyperbaric oxygen. Ongoing clinical trials of innovative methods as well as failed therapies are listed.

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Abbreviations

AAV	Adeno-associated virus
ACh	Acetylcholine
AD	Alzheimer's disease
ADCI	Antibody-dependent cellular inhibition
AED	Antiepileptic drug
ALS	Amyotrophic lateral sclerosis
AMP	Adenosine monophosphate
AMPA	Amino-methyl propionic acid
APC	Activated protein C
ATA	Atmospheric pressure absolute
atm	Atmosphere
ATP	Adenosine triphosphate
BBB	Blood–brain barrier
BDNF	Brain-derived neurotrophic factor
bFGF	Basic fibroblast growth factor
cAMP	Cyclic adenosine monophosphate
cGMP	Cyclic guanosine monophosphate
ChE	Choline esterase
CNS	Central nervous system
CNTF	Ciliary neurotrophic factor
CO	Carbon monoxide
COX	Cyclooxygenase
CREB	cAMP-response element-binding protein
CSF	Cerebrospinal fluid
DA	Dopamine
DHA	Docosahexaenoic acid
EAATs	Excitatory amino acid transporters
eNOS	Endothelial nitric oxide synthase
EPO	Erythropoietin
ESC	Embryonic stem cell