Reprogramming the Cerebral Cortex
Plasticity following central and peripheral lesions

Edited by
Stephen G. Lomber, PhD.,
The University of Western Ontario, London, Ontario, Canada
Jos J. Eggermont, PhD.,
The University of Calgary, Alberta, Canada
Contents

List of contributors xi

Part I Vision

1 Reprogramming of striate and extrastriate visual cortices following retinal lesions 3
   B. Dreher

2 Visual cortex reprogramming following retinal lesions or artificial scotomas: perceptual effects and neural circuitry 47
   W. Burke

3 Remodeling of cortical connections and enhanced long-term potentiation after lesions of the visual cortex 61
   Ulf T. Eysel and Thomas Mittmann

4 Redistribution of cerebral functions following primary visual cortex damage during infancy 73
   Stephen G. Lomber and Bertram R. Payne

5 Behavioral and neural alterations following V1 damage in immature primates 91
   Hillary R. Rodman

6 Neurochemical changes underlying motion perception plasticity after lesions of extrastriate visual cortex in adult cats 115
   Krystel R. Huxlin

Part II Audition

7 A time-line of auditory cortical reorganization after noise-induced hearing loss 143
   Jos J. Eggermont

8 Development, maintenance and plasticity of tonotopic projections from cochlea to auditory cortex 159
   Robert V. Harrison

9 Central auditory plasticity in mouse models of progressive sensorineural hearing loss 181
   James F. Willott

10 Recruitment of the auditory cortex in congenitally deaf cats 193
    Andrej Kral, Rainer Hartmann and Rainer Klinke

11 Critical periods for human cortical development: an ERP study in children with cochlear implant 213
    Curtis W. Ponton
Part III Somatomotor

12 Neuronal plasticity after stroke: evidence from animal models of postinjury recovery 231
   Randolph J. Nudo and Ines Eisner-Janowicz

13 Reprogramming surviving motor cortex after stroke 257
   Wolf Muellbacher and Mark Hallett

14 Cerebral reprogramming underlying functional recovery following stroke 273
   Nick S. Ward and Richard S. J. Frackowiak

15 Reorganization of somatosensory and motor cortex following peripheral nerve or spinal cord injury in primates 285
   Jon H. Kaas and Yvonne Rothemund

16 Critical periods for functional recovery after cortical injury during development 297
   Bryan Kolb and Robbin Gibb

17 Reprogramming the motor cortex for functional recovery after neonatal or adult unilateral lesion of the corticospinal system in the macaque monkey 309
   E. M. Rouiller, T. Wannier, E. Schmidlin and Y. Liu

18 Adaptive functional changes in the cerebral cortex during multiple sclerosis 325
   Hasini Reddy

19 Cortical reprogramming: significance for phantom phenomena and clinical implications 333
   Herta Flor and Caroline Koeppe

Part IV Cross-modal

20 Reprogramming cortex: the consequences of cross-modal plasticity during development 349
   Jessica R. Newton, Ania K. Majewska, Charlene Ellsworth and Mriganka Sur

21 Adaptive plasticity and sensory substitution in the cerebral cortex 361
   Josef P. Rauschecker

22 Activation of the visual cortex by Braille reading in blind subjects 377
   Lotfi B. Merabet, Amir Amedi and Alvaro Pascual-Leone

23 Sound localization in early-blind human subjects: evidence for adaptive cortical plasticity 395
   Dave Saint-Amour, Jean-Paul Guillelmeot, Maryse Lassonde and Franco Lepore

Part V Cognition

24 The longitudinal study of spatial cognitive development in children with pre- or perinatal focal brain injury: evidence for cognitive compensation and for the emergence of alternative profiles of brain organization 415
   Joan Stiles, Pamela Moses and Brianna M. Paul

Index 429