

Preface

Inner ear diseases such as sensorineural hearing loss (SNHL), tinnitus, and dizziness are very difficult to treat, especially in cases with highly severe hearing disturbance.

While the use of cochlear implants in profoundly deaf patients has been encouragingly useful, further improvement in the efficacy of this device is desirable. Recently, regenerative medicine has made great progress in application; however, clinical applications of regenerative medicine in the field of otolaryngology are limited as yet.

In this book, possible novel therapeutic strategies for the treatment of inner ear diseases, especially using regenerative medicine, are summarized. Most of the studies undertaken have been performed in the Department of Otolaryngology, Head and Neck Surgery of Kyoto University, Japan.

In early-phase inner ear damage, self-repair should be promoted to prevent inner ear cell death. Together with experimental results, recent findings of clinical trials using local drug application in the inner ear with neurotrophic factors have been established. In addition to induction of transdifferentiation as a possible next strategy, induction of cell proliferation is a useful alternative approach. In fact, cell transplantation therapy for the inner ear using embryonic stem cells and autologous cell sources, such as bone marrow stromal cells and induced pluripotent stem cells (as donor cells), have recently been initiated. Transplantation of these cells improves auditory function. Therefore, cell transplantation therapy is a useful method for the treatment of inner ear disorders. Apart from these approaches, a novel therapeutic method that involves implantation of an artificial auditory epithelium has been established for SNHL. This new artificial device is implantable and self-propelling by exploiting oscillations of the cochlear basilar membrane. A combination of these novel strategies may facilitate and improve the treatment of inner ear disorders and restoration of hearing ability in the near future.

Many of the issues proposed and discussed in this book are still controversial; however, the contributors are merely driven by their good intentions to contribute their recent findings in the hope of facilitating and realizing the important goal of treating inner ear diseases by medical caregivers.

It is my earnest hope that this book will serve as a useful beacon to shine light on the path of research for preclinical and clinical personnel involved in the pursuit of understanding inner ear function and treating relevant disorders. In addition, this work may also serve as a useful guide for doctors who deal with patients complaining of inner ear diseases.

Last but not least, I would like to thank all the authors for their valuable time and tireless efforts in contributing their findings to making the compilation of this book possible. The efforts and patience on the part of Springer Japan in publishing this book are much appreciated.



Juichi Ito, M.D., Ph.D.
Department of Otolaryngology,
Head and Neck Surgery
Kyoto University

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