promising advancements and deserve a special mention among the available auditory prostheses.

The introduction of genomic analysis into next generation new born screening will definitely enable more accurate diagnosis of hearing loss, more precise assessment of prognosis after implantation and early identification of syndromes even before clinical features become evident, as discussed in chapter 4. Additionally, appropriate genetic counselling in terms of recurrence risk will also have a significant public health impact globally.

A multidisciplinary team approach (including otolaryngologist, audiologist, audioverbal therapist, paediatrician, ophthalmologist, cardiologist, neurologist and geneticists) is indicated in the management of hearing loss especially in children to overcome the diagnostic challenges as discussed in chapter 5. The advent of next-generation sequencing (NGS) techniques has revolutionized the identification of novel mutations and candidate genes but the cost of genetic tests seems to be the major limiting factor in common clinical practice. Hopefully in future, with reduction in the costs, genetic testing will become increasingly available as a routine aid in the assessment of a hearing challenged child. Also deafness screening panels need constant upgradation. However, the NGS techniques are limited by the role of epigenetics and whole-exome sequencing is necessary to thoroughly evaluate intergenic and intragenic regions.

The understanding of the role of genetic modifiers especially the suppressors will help us to understand the complex auditory process and aid in the development of targeted therapy for hearing loss as discussed in chapter 7. There are several animal models employed in auditory research but mouse models are the most common ones as detailed in chapter 9, since all auditory structures present in the humans exist in the mouse. Hence, correction of hearing loss by gene delivery using viral vectors in mouse models is the most appropriate and crucial step in the search for human deafness cure. As mentioned in chapter 10, in recent years Zebrafish is being used as a model to study human deafness and regeneration, because its genome has been fully sequenced and hence targeted gene inactivation is possible. It combines rapid and accessible embryogenesis with a host of genetic and genomic tools for systematic gene discovery and analysis. Vestibular and auditory defects have been detected in adult animals, making the Zebrafish a useful system to tackle the genetic causes of late onset deafness and vestibular disease.

Application of gene replacement therapy in humans can alleviate the disease at the molecular level as discussed in chapter 11. Successful outcomes of cochlear gene therapy in animal models holds the promise of hearing restoration in humans reversing the adverse gene effects. With further refinement and improved methods of gene delivery with a better delineation of viral vectors and with additional improvements in hair cell regeneration, successful gene therapy in humans is well within our reach.

Overall, this is a comprehensive and exhaustive compendium of current knowledge on the subject of “Genetics of Deafness”. It is well referenced with tabulations, illustrations and detailed descriptions of experimental evidence. The book will become an important reference tool for anyone with a research intent in the field of deafness. It is an anthology of current perspectives and opens up new avenues for future research. If one has to point out to deficiencies in the book it could only be to recommend enlarging the scope of the book by adding chapters in future editions on allied topics like, genetics of noise-induced hearing loss, autoimmune inner ear diseases and otosclerosis.

Overall, this book will provide a stimulating and fascinating intellectual journey for the reader elevating the level of the reader’s knowledge profusely and is recommended for every academic department of Otolaryngology.

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Receptor biology, M. F. Roberts, A.E. Krutchen (Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim, Germany) 2016. 264 pages. Price: US$ 95.00

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The ability of living organisms to communicate and modify their behavior is an essential requirement for their survival. This process, which is called signal transduction, begins with the recognition of the 'signal' by the organism. At the molecular level, this process usually involves the detection of the signaling molecule by a 'receptor'. An understanding of the behavior of receptors, their characterization, and appreciation of their functioning, is integral to the development of new drugs and therapeutics. This book attempts to provide a basic appreciation of receptor biology, suitable for undergraduates, as well as researchers who have not been exposed to the molecular basis of signaling mechanisms earlier.

The introductory chapter provides a basic overview of definitions and terms that are used throughout the text. An overview of the material that will be covered is also presented, to orient the reader to the contents of the book. A welcome inclusion in this chapter is a brief overview of the history of receptor theory and enunciation of concepts of pharmacology. Too often, one does not appreciate the fundamental insight that early researchers provided, when basic aspects of protein structure and function were so little understood.

Since many receptors are present on the cell membrane, the following chapters discuss the structure of lipid membranes and proteins. The rather brief overview of protein structure and function is perhaps redundant when the book is clearly directed to those with some knowledge of basic biology. The introduction to 'first messengers', such as hormones and polypeptides is well prepared, as is the brief overview of various types of receptors, including receptor tyrosine kinases and G-protein coupled receptors. What is especially welcome is a chapter devoted to receptor theory. Too often, students use the terms $K_d$, IC$_{50}$ or $B_{\text{max}}$ without a clear understanding of what they mean, or how these are derived from experiments. These concepts are explained in a clear and simple manner here, so that it is accessible to undergraduates and graduates alike.

The third part of the book deals with various signaling systems including ion channels, G-protein coupled receptors, receptor tyrosine kinases and nuclear receptors. The summaries of these complex systems are well written, and clearly illustrated. Almost all receptor families, including the transforming growth factor beta (TGFβ) serine-threonine kinase receptors, and guanylyl cyclase receptors, are briefly described. These chapters would serve as excellent primers in introductory classes on signaling systems. There is a wealth of information that has been obtained in the past decade of the structure and signaling outputs following activation of G-protein coupled receptors, and this has been nicely summarized.

The final sections in this book are directed towards describing biological systems where receptor function has been found to play an important role. This is an interesting section, since it provides relevance in terms of biology to the reader. Important signaling pathways such as the MAPK (mitogen-activated protein kinase) pathway, second messenger-mediated signaling via cAMP, cGMP, gaseous molecules, calcium and inositol phosphates, are all covered with sufficient detail for the reader to appreciate the complexity and cross-talk in cellular signaling. Aspects of receptor-mediated signaling during metazoan fertilization and development, and importantly, aberrations in receptor signaling caused by receptor mutations in diverse diseases such as cancer, cholera, cystic fibrosis, cardiovascular diseases, obesity, depression and diabetes, provide a meaningful and application-oriented turn to the discussion. Finally, given the current interest in neuroscience and functioning of the brain, the last chapter is devoted to the role of receptors in the mind. Here, memory, schizophrenia, addiction and the function of opioid receptors are all presented in a concise and understandable manner.

Overall, this book is a useful addition to presenting fundamental aspects of receptor biology to undergraduate students, as well as graduate students who propose to think about receptors in their research activities. It would also be a good addition to the textbooks recommended for medical students. Most drugs mediate their action by binding to, and regulating the activity of, various receptors. A greater understanding of the molecular basis for drug action would no doubt lead to an appreciation of reasons for side effects of these drugs, and spur medical professionals to direct and maybe pursue research in aspects of receptor biology in future.

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