

Volume Preface

To date, the middle ear has not been the focus of any single SHAR volume despite its importance in auditory function. In this volume, however, we take a broad look at this structure from a wide range of interdisciplinary perspectives, starting with basic science and evolutionary approaches and ending at clinical issues.

In Chap. 2, Manley and Sienknecht discuss the evolution and embryonic development of the middle ear, while in Chap. 3 Rosowski compares the middle ears across diverse vertebrate species.

In Chap. 4, Voss, Nakajima, Huber, and Shera review the overall physiological functioning of normal and diseased middle ears. In Chap. 5, Dirckx, Marcusohn, and Gaihede focus on mechanisms by which the balance of pressure is maintained between the middle ear and the atmosphere, while Stenfelt, in Chap. 6, focuses on mechanisms of bone conduction. In Chap. 7, Funnell, Maftoon, and Decraemer describe the role of computational approaches in helping to further our understanding of middle ear structure and function.

Clinical issues are more specifically discussed starting in Chap. 8, where Popelka and Hunter describe the clinical techniques for measuring and diagnosing the human middle ear. In Chap. 9, Merchant and Rosowski follow this with a description and discussion of the various middle ear pathologies that clinicians are able to repair as well as the surgical procedures they use. Finally, in Chap. 10, Puria describes various types of hearing devices that operate by mechanically vibrating the middle ear.

While the middle ear has not been the focus of past volumes, it has been discussed in chapters throughout the series. These include a chapter on the outer and middle ears by Rosowski in Volume 4, *Comparative Hearing: Mammals* (edited by Fay and Popper, 1993) and a chapter in Volume 6, *Auditory Computation* (edited by Hawkins, McMullen, Popper, and Fay, 1996) on models, also by Rosowski. The middle ear in birds and mammals was discussed in a chapter by Saunders et al. in Volume 13, *Comparative Hearing: Birds and Reptiles* (edited by Dooling, Fay, and

Popper, 2000), and the middle ear in amphibians was covered in a chapter by Mason and Narins in Volume 28, *Hearing and Sound Communication in Amphibians* (edited by Narins, Feng, Fay, and Popper, 2007).

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