

The Mammalian Auditory Pathway Neuroanatomy 1st Edition

The Mammalian Auditory Pathway: Neurophysiology The Mammalian Auditory Pathways The Mammalian Auditory Pathway: Neuroanatomy Integrative Functions in the Mammalian Auditory Pathway The Mammalian Auditory Pathway The Mammalian Auditory Pathway Development of the Auditory System Hearing in the Brain and Auditory Communication in Marsupials Studies with a Neuronal Modeling System for the Mammalian Auditory Pathway Neuronal Mechanisms of Hearing Studies of the Organisation of the Mammalian Auditory Pathway The Central Auditory System Evolution of the Vertebrate Auditory System The ^AOxford Handbook of the Auditory Brainstem THE AUDITORY PATHWAY OF THE EPILEPTIC WALTZING MOUSE. Auditory System Plasticity and Regeneration The Auditory System Anatomy and Physiology of Hearing for Audiologists Information Processing in Mammalian Auditory and Tactile Systems Processing of Complex Sounds by the Auditory System Richard R. Fay Douglas L. Oliver Douglas B Webster Donata Oertel Arthur N. Popper Douglas B. Webster Edwin W. Rubel Lindsay Aitkin Bruce Robert Parnas Lindsay Aitkin Lindsay Michael Aitkin G^nter Ehret Geoffrey A. Manley Karl Kandler PhD MURIEL DOROTHY KARP ROSS Richard Salvi Frank E. Musiek William W. Clark Mark Rowe Robert P. Carlyon

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the springer handbook of auditory research presents a series of comprehensive and synthetic reviews of the fundamental topics in modern auditory research it is aimed at all individuals with interests in hearing research including advanced graduate students postdoctoral researchers and clinical investigators the volumes will introduce new investigators to important aspects of hearing science and will help established investigators to better understand the fundamental theories and data in fields of hearing that they may not normally follow closely each volume is intended to present a particular topic comprehensively and each chapter will serve as a synthetic overview and guide to the literature as such the chapters present neither exhaustive data reviews nor original research that has not yet appeared in peer reviewed journals the series focusses on topics that have developed a solid data and conceptual foundation rather than on those for which a literature is only beginning to develop new research areas will be covered on a timely basis in the series as they begin to mature

the auditory system is a complex neural system composed of many types of neurons connected into networks one feature that sets the auditory system apart from other sensory systems such as

somatosensory or visual systems is the many stages of neural processing that occur between the ear in the periphery and the cerebral cortex each stage is composed of specialized types of neurons connected in specific microcircuits that perform computations on the information about sound to understand this processing all the tools of neuroscience must be employed the proposed text integrates cell biology synaptic physiology and electrophysiology to fully develop the topic presenting an overview of the functional anatomy of the central auditory system it is organized based on the neuronal connectivity of the central auditory system which emphasizes the neurons their synaptic organization and their formation of functional pathways and microcircuits the goal of the book is to stimulate research into the cell biology of the central auditory system and the characteristics of the specific neurons and connections that are necessary for normal hearing future research on the development of the central auditory including that employing stem cells will require such information in order to engineer appropriate therapeutic approaches

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extraordinary progress has been made in recent years in understanding the cellular and molecular basis of development this progress is having a strong influence on our knowledge of the auditory system from the molecular genetics of ear development to the ontogeny of auditory capability great inroads have been made the contributors to this volume on development of the auditory system have provided a detailed and integrated introduction to the behavioral anatomical and physiological changes that occur in the auditory system of developing animals about the editors edwin w rubel is virginia merrill bloedel professor of hearing sciences at the virginia merrill bloedel hearing research center at the university of washington arthur n popper is professor and chair of the department of zoology at the university of maryland richard r fay is associate director of the parmy hearing institute and professor of psychology at loyola university of chicago about the series the springer handbook of auditory research presents a series of synthetic reviews of fundamental topics dealing with auditory systems each volume is independent and authoritative taken as a set this series will be the definitive resource in the field

this monograph evolved from years of research into the auditory pathway and hearing of many species of marsupials its function is to give biologists in particular neurobiologists a broad description and review of what is known of the auditory sensory capacities and processing mechanisms in this large order of mammals my initial interest in marsupials developed from collaborative work with dr richard gates at monash and melbourne universities in the 1970s and by curiosity as to whether concepts about the auditory system was stimulated stemming from experiments mainly on domestic cats could be extended to mammals of other orders my subsequent interest in Australian marsupials aroused by collaboration with dr john nelson at monash university in the 1980s and 1990s concerned their auditory systems and behavior per se and not as primitive cousins of eutherians more recently i have collaborated with dr bruce masterton at florida state university in studies of new world marsupials his sad death in 1996 has robbed neurobiologists of one of our most provocative thinkers and hypothesis testers i would like to thank the department of physiology at monash university for making many facilities available to me the national health and medical research of australia and the Australian Research Council for providing funds for council research and jill poynton and michelle mulholland who illustrated this volume

in contrast to the level of interest which is paid to the organization of meetings about the structure and function of the auditory periphery the central auditory system has received little attention in the last several years however much recent data accumulated during this period has provided auditory physiologists with new ideas about the function of the central auditory system the successful exploration of new anatomical tracing techniques tritiated amino acids horseradish peroxidase 2 deoxyglucose together with the collection of electrophysiological data obtained with intracellular and extracellular recordings from the receptors and neurones in the auditory pathway have considerably deepened our understanding of central auditory function particular interest was concentrated upon the development of the auditory system under normal conditions and in conditions of auditory deprivation although from the methodological point of view the conditions of reversible auditory deprivation are complicated promising new data appeared in this field similarly the specific ability of the auditory system to encode communication signals and speech sounds has been examined in many laboratories all over the world a very fruitful method based upon the results of electrical stimulation of cochlear nerve fibres in experimental animals is the application of neuroprostheses in deaf patients at the present time the method still does not meet all requirements and many improvements will be necessary undoubtedly the exploration of the results of recent physiological experiments may help in the further improvement of neuroprostheses

this is a graduate level text on the neurobiology of hearing covering the structure and function of the central auditory pathway of all mammals

the function of vertebrate hearing is served by a surprising variety of sensory structures in the different groups of fish amphibians reptiles birds and mammals this book discusses the origin specialization and functional properties of sensory hair cells beginning with environmental constraints on acoustic systems and addressing in detail the evolutionary history behind modern structure and function in the vertebrate ear taking a comparative approach chapters are devoted to each of the vertebrate groups outlining the transition to land existence and the further parallel and independent adaptations of amniotic groups living in air the volume explores in depth the specific properties of hair cells that allowed them to become sensitive to sound and capable of analyzing sounds into their respective frequency components evolution of the vertebrate auditory system is directed to a broad audience of biologists and clinicians from the level of advanced undergraduate students to professionals interested in learning more about the evolution structure and function of the ear

the sense of hearing plays an important role in navigating the environment avoiding predators finding mates and communicating with others to quickly and accurately process the tiny rapid eardrum

vibrations that are elicited by sound mammals and birds evolved a complex network of brain pathways each of which is specialized to extract certain sound features this book is a compilation of authoritative chapters written by leading auditory neuroscientists summarizing our current knowledge about the anatomy physiology and function of the major auditory brainstem pathways special emphasis is given to recent progress in understanding the processes and underlying mechanisms by which these pathways are modulated during development and aging also included is coverage of pathological conditions including hearing loss and the perception of phantom sounds

this volume contains contributions from international specialists who document the progress achieved in understanding plasticity and regeneration of the adult auditory system it should be of interest to audiologists otolaryngologists hearing scientists and neuroscientists

from well known author frank musiek comes a new text designed to aid audiology students through the clinical portion of their experience the auditory system anatomy physiology and clinical correlates takes an easy to understand approach to the anatomy and physiology of the auditory system bull increases appreciation of the entire auditory system by providing balanced coverage between peripheral and central auditory systems bull chapter 1 provides a quick reference and overview to the entire text bull integrated clinical correlates for anatomical and physiological information provide clinical relevance bull generous use of review articles and secondary sources enhances general understanding of the subject bull facilitates learning with a balanced mixture of anatomical sketches and photographs

the first anatomy and physiology text just for audiologists this new text brings together some of the best professional minds in the field to consider the structures and mechanisms of the auditory system basic science is covered in the foundations section of the text giving a much needed examination of the biological processes in terms the audiologist needs most detailed examination of the anatomy and physiology of hearing follows with diagrams and in depth discussions the text concludes with chapters on the pathology of hearing covering the different causes of hearing loss from noise induced hearing loss to genetic aspects of hearing loss from start to finish this text is written specifically for the audiologist making it an essential foundational resource

this text explores the shared and contrasting strategies for signalling and processing sensory information within auditory and tactile systems and describes their physiologic organization it brings together researchers in aspects of sensory physiology whose studies are linked by their reliance upon mechanoreceptor mechanisms the book has a strong functional emphasis and is based on electrophysiological analyses from the receptor level to the anatomic level probing the sensory and motor areas of the cerebral cortex it presents recent research data on mechanisms of auditory transduction efferent control of cochlear function the coding of information about sound intensity directional aspects of hearing frequency parameters of simple and complex vibrotactile stimuli development and reorganization within auditory tactile systems the application of fundamental sensory research to the problems of deafness

this book comprises a selection of review papers and original research from leading scientists with interests as diverse as the psychology of music perception and inner ear biology rather than attempting a complete coverage of the vast field of hearing research the book probes the subject with a series of in depth papers that deal with the most exciting developments in each discipline the result is a multidisciplinary sketch of the field that should act as both a useful reference and a stimulating basis for discussion among research workers and advanced students in the fields of hearing biophysics and physiology

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