Clinical and Research Interest

Daniel W. Nuss, MD FACS
Professor & Chairman, Department of Otolaryngology-Head and Neck Surgery
Skull Base Surgery/Head and Neck Oncology

Dr. Nuss' chief clinical interests are in the domains of Head and Neck Oncology, Surgery of the Cranial Base, and Head and Neck Reconstructive Surgery. Special areas of interest include surgical resection of tumors involving these areas, and also the functional and rehabilitative aspects of reconstructive surgery of the head and neck and cranial base, including diagnosis and management of cerebral spinal fluid fistulas.

Research interests include the utilization of topical anti-neoplastic agents for irrigating surgical wounds prone to high risk of tumor recurrence. Additional areas of basic research with clinical applications have included the refinement of an animal model for management of pleomorphic adenoma of the salivary glands, and the role of entubulation neurorrhaphy for the management of cranial nerve injury.

Previous research interests have also included canine laryngotracheal reconstruction using free tissue transfer as well as autotransplatation of adipose tissue for reconstruction of complex of head and neck defects.

Paul L. Friedlander, MD FACS
Assistant Professor, Department of Otolaryngology-Head and Neck Surgery
Head & Neck Oncology

Dr. Friedlander's clinical interests center primarily on the treatment of patients afflicted with Head and Neck Cancer. These include patients with tumors of the upper aerodigestive tract, salivary glands, and endocrine tumors. Other areas of interest include the treatment of adult laryngotracheal stenosis and the diagnosis and management of the difficult airway.

Dr. Friedlander's research interest center upon translational research for head and neck cancer. Dr. Friedlander is currently collaborating with the division of Gene Therapy. Current research projects include tumor targeting using modified adenoviral vectors as well as immunomodulation of tumors. The latter project involves the use of gene therapy to enhance the immune system through the delivery of co-stimulatory molecules to tumors. These research projects rely upon immunodeficient and immunocompetent animal models. Dr. Friedlander has established a head and neck tumor bank that is a repository for tissues obtained from cancer patients.

Dr. Friedlander's other areas of interest involve biological therapy for patients afflicted with squamous cell carcinoma of the head and neck. He currently is involved with two protocols that utilize biological agents to treat head and neck cancer.

Richard Bobbin, Ph.D. Director of the Kresge Hearing Research Laboratory
Professor of Otorhinolaryngology and Biocommunication, and Pharmacology and Experimental Therapeutics, LSU Health Sciences Center
Ph.D., Tulane University, 1969

Pharmacology of sensory systems, espicially the cochlea: Dr. Bobbin's research activities are concerned with neurotransmitter pharmacology, physiology and biochemistry using the peripheral auditory organ as a model system. In addition, minor activities concern the mechanism of action of ototoxic drugs and noise induced deafness. Current investigations are being carried out to discover: 1) the identity and mechanism of action of the chemical transmitters at the hair cell to afferent nerve junction; 2) the mechanisms of action of ototoxic drugs such as aspirin; and 3_ the mechanisms by which intense sound produces damage to hair cells in the cochlea. In vivo experimental approaches include single and whole nerve recordings while applying drugs into the cochlea and sampling of cochlear fluids for subsequent biochemical analysis utilizing high pressure liquid chromatography and mass spectrometry. In vitro techniques include whole cell voltage clamp recordings of isolated cells from the cochlea and monitoring of the contraction of the outer hair cells.

RESEARCH EFFORTS AT
KRESGE HEARING RESEARCH LABORATORY

HAIR CELLS

The process that turns sound waves into nerve impulses occurs in the hair cells of the inner ear, about which so much has been learned in recent years.

There are new development almost daily from the Molecular Hearing Division directed by Richard P. Bobbin, Ph.D. They are isolating individual, living hair cells from the rest of the ear and recording their responses to various stimuli. In these studies, they are asking three questions about hair cells:

- What are the molecular mechanisms that allow them to change sound into nerve impulses?
- How do drugs affect their functioning?
- Do they play a role in tinnitus - the peculiar type of hearing loss in which one hears "ringing" or other noises in the ear?

The outer hair cells normally produce faint sounds, called otacoustic emissions, which have been the subject of much interest.

IDENTIFYING DEAFNESS GENES

One child in thirty is born with an hereditary disease or disability - including several forms of deafness - which is caused by abnormal genes; many more develop genetically induced problems, including deafness, later in life. To help alleviate these problems, the Human Genome Project was born; it is a deafness world-wide effort to systematically map all human genes. Within the next decade, the medical technology that results form this project can be expected to revolutionize health care. For instance, once a particular gene has been identified, a simple blood test can reveal whether or not an individual carries that gene. If the gene is defective and causes a disease or disability, methods can then be developed, in at least some cases, to substitute a normal gene and avoid the disorder. Kresge's Bronya Keats, Ph.D., is one of many scientists who have been successfully working on the genetic causes of certain hearing disorders, several of which have now been identified. After years of painstaking work, she is now close to identifying a gene for human Usher syndrome, a major cause of deaf-blindness, and is working toward identifying genes that cause hearing impairment in very young children.

BRAINSTEM AND INNER EAR INFECTIONS

The auditory nerve carries sound information from the inner ear to centers in the brainstem, which interact with the hair cells by sending information back to them. For instance, sound played into one ear triggers a mechanism which suppresses the oto-acoustic emission of the other ear. In some unusual pathological situations, these emissions are not suppressed and the person is unable to hear or understand sounds when there is a noisy background. Kresge Lab's Charles I. Berlin, Ph.D.., and, Linda J. Hood, Ph.D. were among the first to quantify this suppression and its characteristics of time, frequency, and intensity. Using a powerful computer program developed at Kresge by Engineer Han Wen, Berlin and Hood have been studying the phenomenon of suppression and persons in who it does not occur. While this investigation is still in its early stages, it has aroused world-wide interest. It promises to help us understand some feedback mechanisms of the nervous system auditory system in general and of the auditory system in particular.

STUDYING NEURAL CODES

Kresge's auditory physiology single neuron laboratory was established in 1988 when Charles W. Parkins, MD, moved to this institution. Its facilities allow investigators to measure responses from individual nerve cells in the auditory nerve, as well as more general electrical responses in the brain. Parkins and Li Li, MD, are presently studying the response code of auditory nerve single neurons when stimulated by cochlear implants which are used clinically to restore hearing in deaf patients. These studies are germinal to design changes in future cochlear implants leading to the implanted patient's improved ability to understand speech.

COCHLEAR PHARMACOLOGY

The pharmacology of the cochlea is the main interest of Dr. Bobbin. His research activities are concerned with the effect of drugs on all aspects of cochlear function, including the motility of outer hair cells and neurotransmitters. This laboratory was the first to demonstrate that drugs (e.g., glutamate and glutamate like drugs) could abolish neuronal function while maintaining organ of Corti function, i.e., a model of auditory neuropathy. In addition, the laboratory has demonstrated that some classes of drugs will attenuate the effects of intense sound (e.g., ATP antagonists). Other experiments have described the pharmacology of various neurotransmitter receptors such as the receptors for glutamate, acetylcholine and ATP. Such studies can eventually lead to the use of drugs to alleviate the symptoms of tinnitus, and dizziness.

Linda J. Hood, Ph.D.
Professor, Department of Otolaryngology, Department of Communication Disorders, LSU Health Sciences Center
Director, Cochlear Implant Program
Ph.D., 1983, University of Maryland, Hearing Science

Research area physiological studies of the peripheral and central auditory pathways. Research activities include study of otoacoustic emissions with particular emphasis on development of suppression in infants, effects in patients with neural and central auditory disorders, effects of aging, and contributions of the efferent system to auditory function. Auditory evoked potential studies, including auditory brainstem responses, middle latency responses, and cortical potentials, investigate central auditory disorders in humans, objective methods of hearing assessment in infants, effects of aging, and applications of objective auditory measurements in animal subjects. Current specific research projects focus on (1) hereditary hearing loss involving studies of auditory function in human carriers of genes for syndromic and non-sydromic recessive hearing loss and (2) development of efferent function in human infants using suppression of otoacoustic emissions as the method of study. Further studies investigate characteristics and management of patients with auditory neuropathy, performance of patients with cochlear implants, and relationships between physiologic and behavioral measures of auditory function.

Thierry Morlet, Ph.D.
Assistant Professor, Department of Otolaryngology, LSU Health Sciences Center

Chief among Dr. Morlet's many research projects at Kresge is the development of the human auditory system. Dr. Morlet believes that, although some children might have tested as having normal hearing (i.e. tested normal for tympanometry, emissions and a normal audiogram), the audiological tests given failed to detect a malfunction in the auditory system in higher centers of the brain. Helping these children develop language skills is Dr. Morlet's primary goal.

Anthony Ricci, Ph.D.
Assistant Professor, Department of Otolaryngology, Neuroscience Center, LSU Health Sciences Center
Dr. Ricci's primary interest is transduction, the first step necessary for hearing to take place. In both vestibular and auditory systems, the transduction mechanism converts sound energy into neural codes in the hair cells. His award winning research centers on the role of calcium and calcium dependent processes in the transduction mechanism. Helping understand the transduction process can unlock the secrets of how the hair cells work and provide insight into mechanisms of genetic and noise induced hearing loss.

Bronya J. B. Keats, Ph.D.
Director, Center for Molecular and Human Genetics,
Professor and Head, Department of Genetics, and Professor of Department of Otolaryngology, LSU Health Sciences Center
Dr. Keats, head of the Genetics department and member of the Kresge lab, is one of many scientists successfully working on the genetic causes of certain hearing disorders, several of which have now been identified. After years of painstaking work, she is now close to identifying a gene for human Usher syndrome, a major cause of deaf-blindness, and she is working toward identifying genes that cause hearing impairment in very young children. Eighty percent of hearing loss is genetic, so Dr. Keats' work will have a profound impact on the incidence of this disorder in the population.

Charles Parkins, Ph.D., M.D.
Professor, Department of Otolaryngology, LSU Health Sciences Center
Dr. Parkins, a physician scientist, is primarily interested in the cochlear implant (i.e. artificial ear), that has revolutionized the treatment of hearing loss. Physicians like Dr. Parkins use the cochlear implant to restore hearing in totally deaf patients. He is presently studying the respose code of auditory nerve single neurons when stimulated by cochlear implants.

Charles I Berlin, Ph.D.
Professor Department of Otorhinolaryngology; Kenneth & Frances Barnes Bullington Professor of Hearing Research, LSU Health Sciences Center
Ph.D., U. of Pitt. 1958

Charles I. Berlin, Ph.D., is professor emeritus of Otorhinolaryngology and Physiology. Dr. Berlin retired in September 2002 from his position as the first Director of the Kresge Hearing Research Laboratory of the South at LSU Medical School in New Orleans. He is a practicing licensed audiologist who sees patients weekly in the audiology clinic he directs, which was selected by Family Circle magazine in 1987 as the Best Place in the United States for hearing Problems. He is the author of more than 100 peer-reviewed publications, editor or author of eight books, and has taught courses at the American Academy of Otolaryngology for 33 of the past 34 years. He is the recipient of the American Academy of Otolaryngology, Head and Neck Surgery's highest award, the Presidential Citation; the recipient of the Frank J. Kleffner Award for Lifetime Clinical Achievement from ASHA; recipient of The Honors of the Association from ASHA and the recipient of the Jerger Lifetime Career Research Award from the American Academy of Audiology. He was the recipient of both the Robert J. Ruben MD Award from the Society of Ear Nose and Throat Advances in Children and the James P. Snow, MD award from SHHH. He was a founding Member of the Advisory Board to the National Institute of Deafness and Other Communication Disorders and a founding member of the Association for Research in Otolaryngology. He currently serves as an ad hoc member and occasional Chair of the Scientific Advisory Committee for the House Ear Institute.

Shanda Brashears, M.C.D.
Instructor, Department of Otolaryngology, LSU Health Sciences Center
Shanda Brashears is a clinical audiologist and musician. Her primary functions at the Kresge Lab include subject recruitment for the Hereditary Hearing Loss study as well as data analysis and management. The main focus of this study, which is a collaborative effort between the Genetics Department and the Kresge Lab, is on Acadian Genetics, recessive hearing impairment and Usher syndrome. As a musician and former music therapist, Shanda is also interested in hearing conservation and auditory differences in musicians. She has recently spear-headed a hearing conservation program for the Louisiana Philharmonic Orchestra, providing them with custom ear protectors as well as hearing evaluations and counseling. She is actively helping maintain the special auditory needs of many other members of the New Orleans community of musicians by virtue of her collaboration with the New Orleans Musicians' Clinic.