“Very few things bring the fulfillment that a surgeon feels for his or her patient when a cochlear implant is turned on and that patient can either hear again or for the first time,” says Peter Weber, M.D. “As the criteria for cochlear implantation continues to expand, more and more patients are eligible for this life-altering procedure.”

The cochlear implant and implantable hearing device section in the Cleveland Clinic Department of Otolaryngology offers the latest technology for patients with hearing loss who are not good candidates for traditional amplification. “We are at the forefront in continuing to improve these devices through research,” says Dr. Weber.

Cochlear implants can benefit patients of all ages. The youngest patient implanted at The Cleveland Clinic is 12 months old and the oldest is 78 years old. The cochlear implant team has performed implants on several hundred patients, approximately 60 percent were children. Currently, 30 patients are being evaluated for implants.

Dr. Weber recently facilitated the introduction of a third cochlear implant device to the state of Ohio, the Med-EL. The Cleveland Clinic is the only center in Ohio that offers all three cochlear implants: Med-EL, Nucleus and Clarion.

Dr. Weber is also part of a team exploring the ability to implant patients who still have residual hearing. The goal is to preserve this hearing, allowing them to use an implant and a hearing aid.

“In the future, bilateral implants in children will be evaluated. We are also developing a protocol to evaluate MRI compatibility and other exciting aspects of patient care with cochlear implants,” says Dr. Weber. “Outcome studies with both speech and language acquisitions are being implemented as well.”

Other implantable hearing devices, useful in moderate sensorineural hearing losses that are not satisfactorily aided, are offered at The Cleveland Clinic. Symphonix is a device placed much like a cochlear implant, but is actually crimped onto the incus rather than having an electrode implanted into the cochlea. Like a cochlear implant, Symphonix’s processor is magnetically attached to the receiver under the skin. This implant has been approved by the FDA and is reported to offer significant improvement and sound clarity with reduced feedback.

Another implantable device that has been approved by the FDA is the Soundtec implant. This device is placed on the capitulum of the stapes after the incudostapedial joint is separated. The Soundtec implantable hearing aid uses a device in the ear canal to drive the magnet.

A bone-anchored hearing aid (BAHA), is also offered at the Clinic. This device is extremely useful for patients who could not otherwise wear a hearing aid. Candidates for continued on page 2
Cochlear Implants and Implantable Hearing Devices

continued from page 1

this device may have atresia of the ear canals, chronic otorrhea, or unresolved otitis externa due to wearing hearing aids. It also may be used when surgical cavities cannot accept a hearing aid because of a large meatus, which creates too much feedback.

“Basically, an osteo-integrated screw is implanted into the temporal bone with a post that comes through the skin,” says Dr. Weber. “Once osteo integration has occurred, the hearing amplification device is then clipped onto the post, and the patient is able to hear through bone conduction.” This device offers a lot more power than the previous Audiant device of years ago.

Diagram showing placement of a surgically-implanted cochlear implant.
Illustration courtesy of Cochlear Ltd.

Recent Developments

Strong philanthropy leads future of department
Thanks to a generous contribution from Rande H. Lazar, M.D., a former resident, the Department of Otolaryngology will be establishing The Rande H. Lazar Lectureship. This leadership donation will spearhead the campaign for the department’s research and education fund.

Residents win research awards
Two residents in the Department of Otolaryngology were presented awards by the American Academy of Otolaryngology. Lee Akst, M.D., won first place for his research work on “T-lymphocyte Response to HER2neu in Head and Neck Tumors.” Walter Lee, M.D., also received an award for his research work on “Allogenic Tumor Hybrid Cells as a Basis for Tumor Vaccine.”

Martin Citardi, M.D. awarded research grant
Martin Citardi, M.D., staff member of the Department of Otolaryngology, received the American Rhinologic Society New Investigator Research Grant. The $20,000 grant will be used for “Characterization of Eosinophil Peroxidase-Induced and Myeloperoxidase-Induced Tissue Damage in Sinonasal Polyposis and Chronic Rhinosinusitis.”

From the Chairman

Dear Colleagues:

It is my pleasure to present you with the 2002 issue of Otolaryngology Advances. We are pleased to share with you the achievements, research and clinical excellence we have accomplished throughout the past year.

The major thrust of this issue is otology. The influx of new personnel and mergers with Ph.D.s at the Cleveland Clinic Lerner Research Institute has brought to fruition a long-term goal — otology as a center of excellence at The Cleveland Clinic.

This section embodies the Department of Otolaryngology and fulfills the need for research, education and superb patient care. We are currently among the finest otology units in the country.

More than numbers, our highly selective recruitment process allows us to place leaders as heads of every section. The department as a whole has grown to 27 full-time faculty, including the integration of our Florida campus.

The depth of our expertise ensures the future of otolaryngology as a strong specialty at The Cleveland Clinic for decades to come.

Sincerely,

Marshall Streme, M.D., M.S., F.A.C.S.
Chairman & Professor, Department of Otolaryngology and Communicative Disorders
Research Focuses on Hearing Loss Prevention

“The primary goal of my research has been to elucidate the cellular mechanisms of hearing loss by using agents that cause damage to the hearing end organ, the cochlea,” says Keiko Hirose, M.D. The majority of individuals who suffer from hearing loss cannot be helped by surgical therapies in the current armamentarium because they lose function of the hair cells, the sensory cells of the cochlea, which are not amenable to current surgical or medical interventions. “By studying the cellular mechanisms that result in hair cell damage, the goal is to provide intervention, and to prevent or slow the progress of hearing loss.”

Two well-established methods of inducing hair cell damage and hearing loss are acoustic trauma and administration of aminoglycoside antibiotics. Both methods cause damage to the primary sensory receptors of the cochlea. In the case of aminoglycoside antibiotics, the mechanism of hair cell death has been debated.

“In previous studies, I found that cellular pathways leading to the demise of hair cell-involved mediators was common to apoptotic cell death,” says Dr. Hirose.

Using explanted tissue from the cochlear sensory epithelium of chicks, Dr. Hirose applied fluorescent probes, fura-2 and DCFH, to follow the production of reactive oxygen species and to measure intracellular free calcium concentration in hair cells after gentamicin exposure in vitro. There was a rapid rise in reactive oxygen species and a subsequent rise in intracellular free calcium that occurred within minutes of exposure to gentamicin. Further studies were performed using TUNEL labeling and markers for activation of caspases that suggested that the process of cell death utilized by the hair cells after exposure to the otoxic drug was analogous to apoptosis. Subsequent studies performed have demonstrated activation of caspase 3 after aminoglycoside exposure both in mammalian utricle and in avian cochlear hair cells, further supporting the hypothesis that aminoglycoside-induced hair cell death is apoptotic in nature.

In future studies, Dr. Hirose will continue to examine the deleterious effects of noise and other otoxic agents to the survival of the peripheral auditory system. She plans on investigating the role of inflammatory cells residing in the inner ear and their contribution to both damage and repair of the sensory epithelium after acoustic trauma.

An ongoing, collaborative study is the development of a mouse model of immune-mediated inner ear disease. This clinical phenomenon is one that is poorly understood and has been treated clinically with high dose steroids despite a lack of understanding of the mechanism of disease, she says. As a result, a number of patients are unnecessarily exposed to the risks of high dose steroid therapy without benefit. With improved understanding of the mechanism of the rapid progression of hearing loss associated with autoimmunity, researchers may be better able to determine which patients are good candidates for immunosuppressive therapy.

“We may also be able to tailor more disease-specific treatments,” says Dr. Hirose. “In collaboration with the Clinic’s Department of Immunology, we have initiated the induction of a T-cell mediated immune response to two different proteins expressed in the mature murine inner ear; alpha tectorin and coch. Both proteins have been shown to result in profound hearing loss in cases of genetic mutations in the genes encoding these proteins in mutant mice.”

The myriad of deaf mice recently studied by geneticists and developmental neurobiologists has directed the search for the appropriate peptide to create an immune-mediated sensory deficit in these mice. Dr. Hirose and her team are currently in the process of evaluating the sensory function in these mice using ABR (auditory brainstem responses), and the preliminary data are promising.

“It is the goal of my research program to provide insight into the mechanisms of sensorineural hearing loss by improving our understanding of the role of inflammation and the immune system in the inner ear using methods of cochlear electrophysiology, molecular and cell biology, and histopathologic analysis,” says Dr. Hirose. “We may someday provide a better means of intervention to protect the cochlea and, more specifically, to improve the viability of cochlear hair cells in various conditions that ultimately lead to deafness.”

How to Refer Patients

Physicians can schedule appointments for their patients in the Cleveland Clinic’s Department of Otolaryngology and Communicative Disorders by calling 216/444-6691 from 7 a.m. to 11 p.m., seven days a week, or toll-free at 800/553-5056, ext. 46691. Visit our Web site at clevelandclinic.org/otol/
Moving Forward: Otology Update

New faculty and advances in patient care, research and education help fulfill the mission of The Cleveland Clinic and create one of the finest otology-neurotology programs in the country.

Vincent Tuohy, Ph.D., a staff scientist in the Cleveland Clinic’s Department of Immunology in the Lerner Research Institute, is well-known for developing animal models that mimic multiple sclerosis and dilated cardiomyopathy. He has identified several murine and human peptides that target organ-specific autoimmune inflammation. By studying the immune response in autoimmune sensorineural hearing loss, he is developing and characterizing a mouse model for the disease.

Arturo Solares, M.D., a research fellow, and Dr. Tuohy already have induced autoimmune sensorineural hearing loss in mice; control studies to determine organ- and antigen-specificity show no disease. “To our knowledge, this is the world’s first animal model for autoimmune sensorineural hearing loss that targets inner ear antigens to produce organ-specific damage,” says Dr. Tuohy. A 2000-02 grant support from the Samuel Rosenthal Foundation and the Triple T Foundation in Cleveland, Ohio and Deafness Research Foundation in New York City made this research possible. An NIH grant is planned in the near future.

Faculty members Craig Newman, Ph.D., Sharon Sandridge, Ph.D., and their audiology staff also provide excellent clinical support, resident education and research. As co-directors of the Audiology Research Laboratory, Drs. Newman and Sandridge recently received a grant to evaluate hearing aid performance in a variety of speech and non-speech background noises using a newly developed noise reduction algorithm. This project continues their investigation of the benefit, satisfaction and cost-effectiveness of digital signal processing hearing aids.

A significant addition to otology education this year is the new temporal bone lab, conveniently located in the department. The 15-year-old laboratory was completely renovated with seven new state-of-the-art dissection benches and microscopes. A prosector bench at the head of the room is networked to six workstations by flat-screen closed-circuit television, which enables the instructor to demonstrate drilling technique and to review individual progress directly on each screen. The new laboratory enables the department to offer postgraduate temporal bone dissection courses.

Cleveland Clinic Otolaryngology: Florida Update

The first annual Cleveland Clinic Otolaryngology Symposium was a tremendous success, with 150 participants. The meeting ran from March 21-23, 2002, at the Marco Island Marriott. “We focused on issues in sleep apnea, sinusitis and nasal surgery, as well as cutting edge-otology and laryngology,” says David Greene, M.D., section head, CCF Florida, Naples.

Ten staff members from The Cleveland Clinic and three from Cleveland Clinic Florida provided 15 hours of CME lectures, demonstrations and panels. Participants enjoyed outstanding weather, as well as the unique "mini-course" format, in which four separate "courses" were given with in depth focus on each specialty area.

Clinical services at Cleveland Clinic Florida in Naples are progressing well with Jay Roberts, M.D., who joined Cleveland Clinic Florida in January 2002, introducing neurotology services in southwest Florida. In Weston, Gilberto Alemar, M.D., is starting an innovative Voice and Swallowing Center with state-of-the-art diagnostic and therapeutic equipment and facilities.

Research in Florida is moving forward with tongue-base ablation cases numbering well over 100. Analysis of the data is ongoing. “Preliminary results of the ‘Cleveland Clinic Protocol’ for tongue-base ablation in treatment of sleep apnea are very encouraging,” says Dr. Greene. “We hope to have definitive data by next winter, 2003.”

2003 Otolaryngology Symposium
March 14-16
Registry Hotel in Naples, Florida
Cost for hotel room is $269 per night for an ocean-view room. Call 216/444-6689 for more information or to register.
The section of Pediatric Otolaryngology at The Cleveland Clinic continues to expand and grow with the addition of new staff, and advances in research, patient care and education.

The spectrum of clinical problems seen by section physicians is diverse and challenging. Of special interest has been the management of difficult airway problems among the high volume of children with complicated medical conditions admitted to our Pediatric Intensive Care Units.

“We have been applying lessons learned in the postoperative management of sinus cavities, which facilitate the rapid remucosalization of these cavities, to the larynges of children,” says Peter Koltai, M.D., section head of Pediatric Otolaryngology. “Early endoscopic care of the post-intubated glottic and subglottic mucosa, with sequential gentle debridement, local steroids and topical mitomycin has reduced the incidence of subglottic stenosis and the need for tracheotomy in this vulnerable population.”

Research Updates

Congenital cholesteatoma Clinical pediatric otolaryngology researchers working with colleagues in France have refined the understanding of the natural history of congenital cholesteatoma and developed a new clinical classification system based on these insights. The data suggest that congenital cholesteatoma can be classified into three types. Type I lesions are confined to the anterior and middle ear and can be managed with exploratory tympanotomy without the need of a “second look” procedure. Type II lesions involve the ossicular mass in the attic and/or in the posterior superior quadrant of the middle ear, and can be managed by an exploratory tympanotomy often with mastoidectomy. Type III lesions involve the mastoid and require mastoidectomy. Both Type II and Type III lesions should have a “second look” re-exploration.

Mitochondrial cytopathy Clinic pediatric otolaryngologists have been working with colleagues in the Department of Pediatric Neurology in an effort to understand the otolaryngologic manifestation of this heterogeneous group of metabolic disorders that can adversely effect hearing, swallowing, and speech and language development. Their findings suggest that frequent ear, nose and throat infections appear to have a significant impact on these afflicted children and may increase the progression of their neurodegenerative symptoms.

Intracapsular tonsillectomy The technique of intracapsular tonsillectomy has been shown to decrease postoperative discomfort and promote early recovery following tonsillectomy in a recently completed retrospective study. Clinic pediatric otolaryngologists, who developed the procedure, are conducting a prospective randomized study comparing intracapsular versus standard extracapsular tonsillectomy to evaluate the utility of the new technique in a more scientifically rigorous way.

Ultrasound detection of fluid viscosity in otitis media Researchers are well into the first phase of an NIH-supported study of utilizing a thin ultrasound probe for detecting the various consistencies of middle ear fluid. Early results are encouraging, and a Phase II Device Development Grant is currently under preparation.

Pediatric Otolaryngology Fellows

Another significant step forward has been the establishment of a fellowship in Pediatric Otolaryngology. We are pleased to announce that our first fellow, Abbas Younes, M.D., graduated from the program. He will return to his homeland as the first fellowship-trained pediatric otolaryngologist in Lebanon. Paul Krakovitz, M.D., who has completed a otolaryngology residency at the University of Vermont, is the second Pediatric Otolaryngology fellow at the Clinic.

Nasal and Sinus Surgery Fellowships

“The Section of Nasal and Sinus Surgery continues to grow as Martin Citardi, M.D., and I offered our first clinical and research fellowship positions this past year,” says Donald Lanza, M.D., Section Head of Nasal and Sinus Disorders. “Both fellows, Ryan Gallivan, M.D., and Hwan-Jung Roh, M.D., Ph.D., have infused the section with significant energy.”

In November 2001, the first “Advances in the Endoscopic Management of Nasal & Sinus Disorders” was presented. Course evaluations indicated that this continuing medical education program was a great success. “There were nearly 180 otolaryngologists registered, and our 72 laboratory stations, each equipped with an image guided system, were fully utilized,” says Dr. Lanza. “This was one of the largest meetings of its kind.” Although most registrants were from the mainland United States, there were also some attending from Alaska, Puerto Rico, Canada, Mexico, Venezuela, Italy, Sweden and South Korea.

Research Update

Dr. Roh’s work with inverted papilloma and malignancies of the skull base continues to yield useful information. “Dr. Citardi’s bridge project into the role of eosinophil peroxidase in rhinosinusitis is just getting off the ground, but we are anticipating interesting findings from this work,” says Dr. Lanza.
Meet Our Staff

Marshall Strome, M.D.
Chairman & Professor
Otolaryngology and Communicative Disorders
Clinical Interests: Head and neck surgery with special interests in laryngology, thyroid and parathyroid surgery
Phone: 216/444-6686; Fax: 216/445-9409

Tom Abelson, M.D.
Solon and Beachwood Family Health Centers
Clinical Interests: Voice medicine, pediatric otolaryngology, sinus disease, general otolaryngology
Phone: 440/519-6950; Fax: 440/519-1364

Gilberto Alemar, M.D.
Cleveland Clinic Florida in Weston
Clinical Interests: Surgery of the nose and sinuses; sinusitis; voice and swallowing disorders; surgery of the head and neck tumors; sleep apnea and snoring; surgery for airway reconstruction
Phone: 877/463-2010

Steven Ball, M.D.
Strongsville Family Health and Surgery Center
Phone: 440/878-2500; Fax: 440/878-2750

Martin Citardi, M.D.
Subspecialty: Rhinology (nasal & sinus disorders)
Clinical Interests: Revision sinus surgery, frontal sinus surgery, sinonasal neoplasia, computer-aided sinus surgery, endoscopic orbital decompression, endoscopic CSF leak repair
Office: 216/444-4515; Fax: 216/445-9409

Isaac Eliachar, M.D.
Section Head, Laryngotracheal Reconstruction
Clinical Interests: Head and neck reconstructive surgery, laryngotracheal stenosis and reconstruction, general otorhinolaryngology, nose and sinus, sleep apnea, tracheostomy, middle ear surgery, pediatrics
Phone: 216/444-8231; Fax: 216/445-9409

Ramón Esclamado, M.D.
Vice Chairman
Section Head, Head and Neck Surgery
Clinical Interests: Head and neck surgery, microvascular reconstruction, laryngotracheal reconstruction
Phone: 216/444-6695; Fax: 216/445-9409

Edward Fine, M.D., Ph.D.
Westlake Family Health Center
Clinical Interests: Laryngology, sinonasal disease, facial cosmetics and reconstruction
Phone: 440/899-5630; Fax: 440/899-5636

Richard Freeman, M.D., Ph.D.
Westlake Family Health Center
Clinical Interests: General otolaryngology, head and neck surgery, sinonasal disease
Phone: 440/899-5635; Fax: 440/899-5636

David Greene, M.D.
Head, Department of Otolaryngology
Cleveland Clinic Florida in Naples and Weston
Clinical Interests: Sleep apnea and snoring surgery, rhinoplasty, facial plastic surgery, sinus surgery, laser surgery, facelift, blepharoplasty, skin cancer surgery and reconstruction
Phone: 941/348-4000; Fax: 941/348-4355

Catherine Henry, M.D.
Clinical Interests: Medical otolaryngology, preventive medicine, women’s health issues, asthma Joint Appointment: General Internal Medicine
Phone: 216/445-8464; Fax: 216/445-9409

Douglas Hicks, Ph.D.
Section Head, Speech and Language Pathology Director, Voice Center
Clinical Interests: Voice science, voice disorders, care of the professional voice
Phone: 216/444-5773; Fax: 216/445-9409

Keiko Hirose, M.D.
Clinical Interests: Pediatric ear surgery, hearing loss evaluation, cochlear implantation, basic science research in causes of deafness, general pediatric otolaryngology
Phone: 216/444-6689
Gordon Hughes, M.D.  
Section Head, Otology  
Clinical Interests: Ear surgery for deafness and infection, facial paralysis, immunology of the ear, pediatric ear diseases, vertigo diagnosis and management, tumors of the ear  
Phone: 216/444-5375; Fax: 216/445-9409

Steve Hunyadi Jr., M.D.  
Independence and Solon family health centers  
Clinical Interests: General otolaryngology, sinonasal disease and allergy, head and neck surgery, plastic and reconstructive surgery  
Independence phone: 216/986-4000  
Solon phone: 440/519-6885; Fax: 440/519-1364

Robert Katz, M.D.  
Section Head, Community Otolaryngology  
Solon Family Health Center  
Clinical Interests: Pediatric otolaryngology, otology, head and neck surgery, general otolaryngology  
Phone: 440/519-6950; Fax: 440/519-1364

Peter Koltai, M.D.  
Section Head, Pediatric Otolaryngology  
Clinical Interests: Laryngotracheal reconstruction, post-traumatic craniofacial reconstruction, chronic middle ear disease, chronic sinusitis, head and neck neoplasms  
Phone: 216/445-5022; Fax: 216/445-9409

Alan Kominsky, M.D.  
Beachwood Family Health Center  
Clinical Interests: Adult and pediatric general otolaryngology, sinonasal disease  
Phone: 216/444-1948; Fax: 216/445-9409

Donald Lanzia, M.D.  
Section Head, Nasal and Sinus Disorders  
Clinical Interests: Treatment of recalcitrant sinusitis, revision sinus surgery, assessment and treatment of nasal obstruction, cerebrospinal fluid rhinorrhea, tumors of the anterior skull base  
Phone: 216/444-4939; Fax: 216/445-9409

Craig Newman, Ph.D.  
Section Head, Audiology  
Clinical Interests: Geriatric communication disorders, tinnitus, evoked potentials, hearing aids, outcomes research  
Phone: 216/445-8520; Fax: 216/445-9409

John G. Oas, M.D.  
Section Head, Vestibular & Balance Disorders  
Clinical Interests: Otolith disorders, benign paroxysmal positional vertigo, adult and pediatric vestibular and balance disorders, cervicogenic dizziness, vestibular rehabilitation  
Phone: 216/444-7001; Fax: 216/445-9409

George Ozbarakaci, M.D.  
Lorain Family Health and Surgery Center  
Clinical Interests: Sinus problems, hearing loss, hearing aids, snoring, sleep apnea, tonsils and adenoids  
Phone: 440/204-7400; Fax: 440/204-7396

Sharon Sandridge, Ph.D.  
Clinical Interests: Electrophysiologic assessment, state-of-the-art amplification options including assistive listening devices and digital hearing aids, tinnitus and older adults  
Phone: 216/445-8517; Fax: 216/445-9409

Suyu Shu, Ph.D.  
Research Interests: Cellular immunology, cancer immunotherapy, molecular biology  
Joint Appointment: Director, Center for Surgery Research  
Phone: 216/445-3800; Fax: 216/445-3805

Peter Weber, M.D.  
Program Director  
Clinical Interests: Surgery for pediatric and adult ear disease including cochlear implants, implantable hearing aids, infectious cholesteatomas, acoustic neuromas, ear tumors, skull bone lesions, facial nerve disorders and vertigo.  
Phone: 216/444-6689

Benjamin G. Wood, M.D.  
Clinical Interests: Oncologic surgery of the head and neck, skull base surgery, nasal/paranasal sinus surgery  
Phone: 216/444-5700; Fax: 216/445-9409
Regional Otolaryngology Serves Patient Needs

In 1995, The Cleveland Clinic opened the first regional Family Health Center and formed the Regional Medical Practice. In 1996, Marshall Strome, M.D., Chairman of the Cleveland Clinic Department of Otolaryngology and Communicative Disorders, placed the first otolaryngologist at one of these growing community health centers. Dr. Strome advocated making services more accessible to patients.

“Marshall Strome’s visionary melding of main campus and regional practice provides a model for other Cleveland Clinic departments,” says Tom I. Abelson, M.D., director, Cleveland Clinic Beachwood Otolaryngology. “With the highly successful research and resident training aspects of the program, the Department of Otolaryngology has become one of the most successful at the Clinic.”

Regional otolaryngologists practice in offices around Cleveland, including Lorain, Independence, Solon, Strongsville and Westlake.

In August 2002 the Department of Otolaryngology and Communicative Disorders will open a new office in the Cleveland Clinic Beachwood Family Health Center. The office will be well-staffed by a number of Clinic otolaryngologists, audiologists and voice care specialists.

In addition to general otolaryngology, pediatric otolaryngology, rhinology, otology, audiology, and hearing aids, the office will eventually house vestibular and allergy laboratories.

The Beachwood Family Health Center has an ambulatory surgery center including five operating rooms, soon to expand to seven. Some other services offered at this facility include: family medicine, general internal medicine, pediatrics, anesthesiology, cardiology, colorectal surgery, general surgery, medical oncology/hematology, and plastic surgery.

Cleveland Clinic Regional Medical Practice: Otolaryngology sites. Visit www.clevelandclinic.org/fhc.