Comprehensive Care

FOR VOICE, SWALLOWING, AND SPEECH

Top 20 for Otolaryngology

IN *U.S. NEWS & WORLD REPORT*'S BEST HOSPITALS

Translational

AUDITORY RESEARCH

Multidisciplinary

HEAD AND NECK CENTER

3,500+

COCHLEAR IMPLANTS AND ABIs

NYU Langone MEDICAL CENTER

Otolaryngology—Head and Neck Surgery

2015

YEAR IN REVIEW

Contents

Dear Colleagues and Friends:

NYU Langone Medical Center's Department of Otolaryngology—Head and Neck Surgery was ranked 17th in the nation in *U.S. News & World Report*'s 2015–16 "Best Hospitals."

An honor for the specialists in our department, the recognition also reflects our collaborations with experts across the Medical Center, as we strive to better understand and treat complex diseases.

For example, with the recent arrival of otoneurologist Catherine Cho, MD, we can now assess and treat dizziness stemming from both vestibular and neurological dysfunction. Our on-site expertise in this area extends from basic research, with studies of zebrafish brains led by David Schoppik, PhD, across the full spectrum of clinical care, including customized physical therapy provided by Rusk Rehabilitation specialists.

We are also seeing research discoveries translated into meaningful improvements in clinical practice. Investigators at the Voice Center have gained new insight into the underlying causes of recurrent respiratory papillomatosis that may help guide clinical management of this as yet incurable disease. New studies on hearing dysfunction suggest that cochlear implants may help delay the onset of dementia in elderly patients with profound hearing loss. The Cochlear Implant Center also reported results from a national clinical trial demonstrating that hybrid implants may offer the first effective treatment option for patients with severe high-frequency hearing loss.

Basic research on the brain's plasticity led by Robert C. Froemke, PhD, may also lead to the development of better treatments for patients with hearing loss. Among other projects, Dr. Froemke is working with engineers and neuroscientists to build a device that records signals from the auditory cortex, laying the foundation for "smarter" cochlear implants that adapt to individual users' preferences.

As 1 of 13 sites in the Neurofibromatosis (NF) Clinical Trials Consortium, our department is also a national leader in developing treatments for NF2. Matthias A. Karajannis, MD, is leading several clinical trials testing drug treatments for NF2 patients with vestibular schwannomas, which eventually cause hearing loss.

In the surgical arena, we are using advanced instrumentation and minimally invasive techniques to reduce postsurgical morbidity and shorten recovery time. For example, working closely with neurosurgeons, Richard A. Lebowitz, MD and Seth M. Lieberman, MD, remove tumors of the skull base, brain, and orbit using transnasal approaches. Otolaryngologists and neurosurgeons also team up to develop optimal treatment plans for NF2 patients with benign tumors in the internal auditory canal.

Our accomplishments reflect the quality and dedication of our specialists as well as the wealth of expertise surrounding us at NYU Langone Medical Center. By fostering a spirit of investigation, collaboration, and academic achievement, we hope to set new standards of excellence in clinical care going forward.

Please read on to learn more about our team's achievements in research and clinical care over the past year.

J. THOMAS ROLAND JR, MD

Mendik Foundation Professor of Otolaryngology

Professor of Neurosurgery

Chair, Department of Otolaryngology—Head and Neck Surgery

Otolaryngology—Head and Neck Surgery

3,500+
patients received cochlear implants and ABIs

at NYU Langone since 1984

180–200
cochlear implant procedures

performed per year

118 children
under 1 year of age have received cochlear implants

at NYU Langone in the last 14 years

First
pediatric ABI in the country

was performed at NYU Langone in 2012, and 10 have been performed as of the end of 2015

1 of 4 centers
approved by the FDA

to perform ABI surgery in children born without cochleae or cochlear nerves

2nd largest
ABI center

for patients with NF2

#14
in the nation

among otolaryngology departments for the number of active NIH grants and supplements

#17
for Otolaryngology in *U.S. News & World Report*'s 2015–16 Best Hospitals

and #1

in New York State

1 of 13
NF centers

participating in the NF Clinical Trials Consortium

10
active NIH grants

and supplements (up from 2 in 2009)

NYU Langone Medical Center

UHC Bernard A. Birnbaum, MD, Quality Leadership Award 2015 WINNER

#1

overall patient safety & quality for three years in a row

AND

ambulatory care quality & accountability

among leading academic medical centers across the nation that were included in the University HealthSystem Consortium 2015 Quality and Accountability Study

Top 15

in *U.S. News & World Report*

BEST HOSPITALS U.S.News & WORLD REPORT HONOR ROLL 2015-16

#12

BEST HOSPITALS HONOR ROLL

BEST GRAD SCHOOLS U.S.News & WORLD REPORT MEDICAL RESEARCH 2016

#14

BEST MEDICAL SCHOOLS FOR RESEARCH

and nationally ranked in 12 specialties, including top 10 rankings in Orthopedics (#5), Geriatrics (#6), Neurology & Neurosurgery (#9), Rheumatology (#9), and Rehabilitation (#10)

GROWTH AND MOMENTUM

▲ Scott M. Rickert, MD

International NF2 Conferences

Leading experts from around the world will gather at NYU Langone in spring 2016 to discuss advances in research and treatment for Schwannomatosis and neurofibromatosis type 2 (NF2). The International Schwannomatosis Conference, to be chaired by Kaleb H. Yohay, MD, member of the faculties of neurology and pediatrics, will be held on March 16, followed by the Neurofibromatosis 2: State of the Art Conference on March 17–18, chaired by Matthias A. Karajannis, MD, associate professor of pediatrics and otolaryngology and director of the NF Clinical Research Program, and J. Thomas Roland Jr., MD, the Mendik Foundation Professor of Otolaryngology, professor of neurosurgery, chair of the Department of Otolaryngology—Head and Neck Surgery, and co-director of the Cochlear Implant Center at NYU Langone, along with Filippo Giancotti, MD, PhD, from Memorial Sloan Kettering Cancer Center. Participants will learn about the latest developments in NF2 in basic research, clinical trials, and multidisciplinary clinical management.

New Allergy and Immunology Faculty

Ronit Herzog, MD, joined NYU Langone as associate professor of otolaryngology and pediatrics and division chief of the department's Division of Allergy and Immunology. Dr. Herzog specializes in the evaluation and treatment of abnormal immune response in allergy and primary immune deficiency in children and adults. To raise awareness of this important subspecialty, Dr. Herzog recently developed a robust new training curriculum for residents. In collaboration with the NIH, Dr. Herzog's current clinical research is focused on the mechanisms of autoinflammatory disorders and their treatment. These disorders are characterized by recurrent episodes of life-threatening systemic and organ-specific inflammation and, in some cases, sensorineural hearing loss.

Trial of PET/MRI for Detecting Lymph Node Metastases

Sungheon Gene Kim, PhD, associate professor of radiology, is leading a clinical trial to test whether using fludeoxyglucose fluorine-18 (F-18) fludeoxyglucose (FDG) positron emission tomography (PET) and magnetic resonance imaging (MRI) to assess lymph nodes prior to surgery can help diagnose lymph node metastases in patients with head and neck cancers. Patients enrolled in the trial will undergo PET/MRI within four weeks of scheduled surgery, and the results will be compared with pathology analysis postsurgery. The researchers hypothesize that simultaneous PET/MRI will yield a more accurate measure of glucose metabolic rate—which is thought to be higher in metastatic nodes than in inflamed nodes—than the conventional standardized uptake value.

Balance Center Adds New Expertise

When vertigo and dizziness are determined to be symptoms of dysfunction, extensive testing and expert analysis are required to determine the source of dysfunction. Otoneurologist Catherine Cho, MD, clinical associate professor of neurology and otolaryngology, recently joined the faculty and adds her expertise to a newly expanded multidisciplinary balance center. The center offers a full suite of vestibular testing, neurologic care, and rehabilitation services for patients with either central or peripheral vestibular disorders.

National Institutes of Health Grants

- *Adaptation to Frequency Mismatch in Cochlear Implant Users (R01)*
  PI: **Mario A. Svirsky, PhD**
- *Behavioral and Physiological Changes in Acoustic-Electrical Pitch Matching (K25)*
  PI: **Chin-Tuan Tan, PhD** Mentor: **Mario A. Svirsky, PhD**
- *Clinical Management of Cochlear Implant Patients with Contralateral Hearing Aids (R01)*
  PIs: **Mario A. Svirsky, PhD, Arlene C. Neuman, PhD**
- *Developmental Influences on the Functional Organization of the Vestibular System (R00)*
  PI: **David Schoppik, PhD**
- *Exploration of Activity of RAD001 In Vivo In Vestibular Schwannomas and Meningiomas (R01)*
  PI: **Matthias A. Karajannis, MD**
- *Exploring the Relationship between Age-Related Pharyngeal Atrophy and Difficulty Swallowing (R21)*
  PI: **Sonja M. Molfenter, PhD** (NYU Department of Communicative Sciences and Disorders)
  Consultant: **Milan R. Amin, MD**
- *Infant-Directed Speech and Language Development in Infants with Hearing Loss (R01)*
  PI: **Derek Houston, PhD** (Ohio State University)
  Consultant: **Mario A. Svirsky, PhD**
- *Investigating the Spatial Representation and Plasticity Rules of a Cortically dri (F31)*
  PI: **Sam Benezra** Mentor: **Robert C. Froemke, PhD**
- *Non-viral Gene Therapy for Cancer Pain (R56)*
  Co-PI: **Brian L. Schmidt, MD, PhD, DDS**
- *Optimal RNA-Based Therapeutics for Vocal Fold Injury and Fibrosis (R01)*
  PI: **Ryan C. Branski, PhD**
- *Reduction in Spread of Excitation as Predictor Multi-Channel Spectral Resolution (R01)*
  PI: **David M. Landsberger, PhD**
- *Synaptic and Circuit Mechanisms of Learned Vocal Production (R01)*
  PI: **Michael A. Long, PhD**
- *Synaptic Basis of Perceptual Learning in Primary Auditory Cortex (R01)*
  PI: **Robert C. Froemke, PhD**
- *The Role of Proteases and Peptides in Cancer Pain (R01)*
  PI: **Brian L. Schmidt, MD, PhD, DDS**
- *Uncontrolled Lower Respiratory Symptoms in the WTC Survivor Program (U01)*
  PI: **Joan Reibman, MD**
  Co-Investigator: **Milan R. Amin, MD**
- *Using TDCS to Promote Speech Motor Learning, (K01)*
  PI: **Adam Buchwald, PhD** (NYU Department of Communicative Sciences and Disorders)
  Mentor: **Mario A. Svirsky, PhD**

Complex Cases, New Fellowships

The Gastroesophageal, Upper Airway, and Respiratory Diseases (GUARD) Center is a multispecialty program of Hassenfeld Children's Hospital that targets complex pediatric aerodigestive disorders. The clinical care team includes pediatric otolaryngologists Robert F. Ward, MD, professor of otolaryngology and pediatrics, Max M. April, MD, professor of otolaryngology and pediatrics, and Scott M. Rickert, MD, assistant professor of otolaryngology, pediatrics, and the Hansjörg Wyss Department of Plastic Surgery. The team works closely with NYU Langone gastroenterologists, pulmonologists, and surgeons to treat a wide range of complex and rare disorders that affect breathing, speaking, and swallowing. When surgery is warranted, the team offers a range of options including laser surgery, cartilage and mucosal grafting, and minimally invasive endoscopic surgery.

The Department of Otolaryngology—Head and Neck Surgery launched a pediatric otolaryngology fellowship in summer 2015 under the direction of Max M. April, MD. A head and neck fellowship is currently in development under the direction of Adam S. Jacobson, MD and builds on the growth of our recently expanded Head and Neck Center. The department also offers fellowships in neurotology, facial plastics and reconstructive surgery, and laryngology.

Appointments

Erich P. Voigt, MD, clinical associate professor of otolaryngology, assumed the roles of chief of the Division of Otolaryngology and director of Practice Expansion for New York's outer boroughs. In addition to his clinical responsibilities, Dr. Voigt is engaged in research on thyroid and parathyroid outcomes, intracapsular tonsillectomy in adults with tonsil hypertrophy, and obstructive sleep apnea.

Babak Givi, MD, clinical assistant professor of otolaryngology and head and neck surgeon, was named Patient Safety/Quality Improvement Officer.

Richard A. Lebowitz, MD, associate professor of otolaryngology and Residency Program director was appointed chief of the Division of Rhinology.

Radio Hosts

Sean O. McMenomey, MD, professor of otolaryngology and neurosurgery and chief of the Division of Otology, Neurotology, and Skull Base Surgery, hosts "The Otolaryngology Show" on channel 110 on Sirius XM's Doctor Radio. Max M. April, MD, professor of otolaryngology and pediatrics, periodically hosts as well. The show airs Wednesdays at 12 pm ET and rebroadcasts Wednesdays at 10 pm, Thursdays at 4 am, and Sundays at 2 pm. The hosts cover a wide variety of topics on the health of the ears, nose, and throat.

NYU LANGONE MEDICAL CENTER NEWS

Groundbreaking Face Transplant Exemplifies Expertise and Multidisciplinary Collaboration

In August 2015, surgeons at NYU Langone Medical Center performed the most complex face transplant to date. The patient, former firefighter Patrick Hardison, had lost all of the skin around his entire face, scalp and neck, including his eyelids, ears, lips, and nose, while trapped in a burning building. Led by Eduardo Rodriguez, MD, DDS, the Helen L. Kimmel Professor of Reconstructive Plastic Surgery and chair of the Hansjörg Wyss Department of Plastic Surgery, the successful 26-hour operation—the first to include transplantation of eyelids capable of blinking as well as functional ears, among other milestones—involved more than 100 physicians, nurses, and technical and support staff. More than a dozen departments contributed to the planning and execution of the procedure and to postoperative care. Members of the Otolaryngology—Head and Neck Surgery team have supported the patient's recovery in the areas of facial nerve, nasal, and otologic functioning as well as in swallowing and voice rehabilitation.

Awards & Recognition

- **Ryan C. Branski, PhD,** served as program chair for the 2015 Fall Voice Conference's Pre-Conference for Speech Pathologists.
- **Robert C. Froemke, PhD,** was appointed to serve on the editorial boards of *Scientific Reports* and *Frontiers in Neural Circuits*.
- **Joseph B. Jacobs, MD,** is associate editor of *International Forum of Allergy & Rhinology* and executive vice president of the American Rhinologic Society.
- **Arlene C. Neuman, PhD,** was elected a Fellow of the Acoustical Society of America for contributions in the areas of classroom acoustics and hearing aid development.
- **J. Thomas Roland Jr., MD,** received an American Otological Society Presidential Citation at the Combined Otolaryngology Spring Meetings (COSM) held in Boston, Massachusetts, April 22–26, 2015.
- **David Schoppik, PhD,** will chair one of the Young Investigator Symposia, "Zebrafish as a Model for Hearing and Balance," at the 2016 Association for Research in Otolaryngology midwinter meeting.
- **William H. Shapiro, AuD,** recently completed a two-year term as membership chair of the American Cochlear Implant Alliance.
- **Mario A. Svirsky, PhD,** was appointed to a six-year term on the Auditory System Study Section for the National Institutes of Health. Dr. Svirsky serves on the editorial boards of *Ear and Hearing, Cochlear Implants International,* and *International Archives of Otorhinolaryngology.*
- **Susan B. Waltzman, PhD,** was named assistant editor of *Cochlear Implants International* and serves on the editorial board of *Otology & Neurotology.*
- **Judy Washington Lee, MD,** was appointed to a two-year term as chair of the American Academy of Facial Plastic and Reconstructive Surgery's Fellowship Research Review Subcommittee.

Select Conference Highlights

- **Milan R. Amin, MD,** delivered presentations at the Masters in Laryngology Conference, Mexico City, Mexico; the Fall Voice Conference, in Pittsburgh, PA; and the NYU Langone NF2 Conference, in New York City.
- **Max M. April, MD,** delivered presentations at the Dialogues in Pediatric Otolaryngology conference in Suduiraut, France. He is also an invited moderator and session chair at the upcoming June 2016 Conference of the European Society of Pediatric Otorhinolaryngology, in Lisbon, Portugal.
- **Ryan C. Branski, PhD,** and **Milan R. Amin, MD,** were invited to speak at the 2015 American Laryngological Association/ Combined Otolaryngology Spring Meetings in Boston, MA.
- **Robert C. Froemke, PhD,** was an invited speaker at the International Society for Developmental Psychobiology Meeting, in San Sebastian, Spain; the Society for Neuroscience meeting, Chicago, IL; the Hearing Communication Neuroscience Symposium, University of Southern California, Los Angeles, CA; In 2016, he will be speaking at the Winter Brain Conference, Breckenridge, CO., and is invited to speak at the 113th International Titisee Conference in Titisee, Germany.
- **Daniel Jethanamest, MD,** has had posters accepted for presentation at the 2016 meetings of The Triological Society Combined Sections Meeting, in Miami Beach, and the American Otological Society Combined Sections Meeting, in Chicago.
- **David M. Landsberger, PhD,** delivered presentations at the 2015 Conference on Implantable Auditory Prostheses, Lake Tahoe, CA; the IX International Workshop on Advances in Audiology, in Salamanca, Spain; the Asia Pacific Symposium on Cochlear Implants and Related Sciences, in Beijing, China; and the Association for Research in Otolaryngology Midwinter Meeting, in Baltimore, MD.
- **Sean O. McMenomey, MD,** was invited to moderate the 2015 Cochlear Implant Symposium pre-meeting in Washington, DC, and was also an invited speaker at the American Neurotology Society meeting in Dallas, Texas. Dr. McMenomey also leads multiple temporal bone training courses throughout the year.
- **Mark S. Persky, MD,** delivered a presentation at the Northeast Regional Scientific Meeting of the Society of Nuclear Medicine and Molecular Imaging, in Newport, RI.
- **J. Thomas Roland, Jr., MD,** was an instructor, lecturer, moderator, panelist, and keynote speaker at the 2015 Asia Pacific Symposium on Cochlear Implants and Related Sciences, in Beijing, China. Dr. Roland also presented at the 7th International Conference on Acoustic Neuroma, in Shanghai, China, and was a panelist at the 12th European Symposium on Pediatric Cochlear Implant in Toulouse, France, in 2015.
- **Mario A. Svirsky, PhD,** delivered the keynote lecture at the IX International Workshop on Advances in Audiology, in Salamanca, Spain, in 2015, and was an invited speaker at the Conference on Implantable Auditory Prostheses, in Lake Tahoe, CA. Dr. Svirsky also delivered presentations at the MASH Cochlear Implant Conference and the midwinter meeting of the Association for Research in Otolaryngology.
- **Susan B. Waltzman, PhD,** was an invited speaker at the 2015 Asia Pacific Symposium on Cochlear Implants, in Beijing, China, and the 12th European Symposium on Pediatric Cochlear Implant, in Toulouse, France. Dr. Waltzman's research team had two abstracts accepted for presentation at the American Otological Society and the American Neurotology Society meetings in 2016.

IMPROVING PATIENT CARE AND OUTCOMES

Our experts are improving the care of patients with complex diseases through basic research and novel approaches to treatment and rehabilitation.

▲ John G. Golfinos, MD, and J. Thomas Roland Jr., MD

Brain's Plasticity Plays a Role in Maternal Bonding

It is well documented that the brain learns to attach meaning to different sounds based on the context in which the sounds are experienced.

New research published in the journal *Nature* by Robert C. Froemke, PhD, assistant professor of otolaryngology, and neuroscience and physiology, and a member of the Skirball Institute of Biomolecular Medicine at NYU Langone, demonstrated that activity in the auditory cortex also influenced how animals learn important social behaviors, even maternal bonding.

"We've seen that the same process of neuroplasticity that underlies how cochlear implants stimulate the brain to recover a sense of hearing is involved in how new mothers learn the meaning of infants' cries," says Dr. Froemke.

Oxytocin is known to play a role in social interaction, but very little is known about how it works in individual brain cells. In the study published in the April 23, 2015, issue of *Nature*, Dr. Froemke's laboratory collaborated with Moses Chao, PhD, professor of cell biology, neuroscience and physiology, and psychiatry, and Mariela Mitre, MD/PhD student, to develop a novel antibody that binds to and illuminates oxytocin receptors, revealing that these receptors concentrate in the left side of the auditory cortex. The findings suggest that this region of the brain, traditionally associated with language processing, may also underlie the ability to process social information.

When given to new rodent mothers, oxytocin enhanced their response to the ultrasonic distress calls of lost pups, the investigators found. It even sensitized mice without offspring that would have otherwise ignored the plaintive cries.

> *"Oxytocin is like a chemical volume control—turning it up allows us to pay more attention to relevant social cues."*
>
> **— ROBERT C. FROEMKE, PhD**
>
> Assistant professor of otolaryngology, and neuroscience and physiology, and a member of the Skirball Institute of Biomolecular Medicine

"Oxytocin is like a chemical volume control," explains Dr. Froemke. "Turning it up allows us to pay more attention to relevant social cues."

Dr. Froemke's work has important clinical implications. A sharper understanding of the mechanisms that govern neurochemical changes in the auditory cortex has the potential to inspire a new wave of therapies for a wide variety of disorders, ranging from social anxiety to schizophrenia.

Dr. Froemke is also using these new insights to advance his efforts to build so-called neuroprosthetics to bridge damaged areas in the brain. Two years ago, his laboratory was part of a team that received the NYU Grand Challenge's $250,000 prize—seed money that is helping the researchers bring such brain implants to the clinic.

Dr. Froemke worked with engineers and neuroscientists across NYU Langone to build a giant electrode array that records signals from the auditory cortex. The device is being tested in animals fitted with cochlear implants, with the goal of developing it for clinical use. Julia King, MD/PhD student in Dr. Froemke's lab, worked with Mario A. Svirsky, PhD, the Noel L. Cohen Professor of Hearing Science and vice chair of Research in the Department of Otolaryngology—Head and Neck Surgery, and J. Thomas Roland Jr., MD, the Mendik Foundation Professor of Otolaryngology, professor of neurosurgery, chair of the Department of Otolaryngology—Head and Neck Surgery, and co-director of the Cochlear Implant Center at NYU Langone, to develop this system.

The project is a true collaboration between biology and engineering, says Dr. Froemke. The team, led by Jonathan Viventi, PhD, assistant professor of electrical and computer engineering at NYU Polytechnic School of Engineering, also includes Michael A. Long, PhD, assistant professor of otolaryngology, and neuroscience and physiology, and Dan H. Sanes, PhD, and Bijan Pesaran, PhD, both professors in the Center for Neural Science.

"We're trying to use signals in the auditory cortex as a richer source of feedback to change how we stimulate the brain with the cochlear implant," says Dr. Froemke. "The goal is to make a smart cochlear implant that adapts to specific users in real time on the basis of their own comprehension, performance, and brain signals."

Hybrid Cochlear Implants Prove Effective for Partial Hearing Loss

Patients enrolled in a national trial led by NYU Langone show major improvements in speech and language recognition.

Patients with severe high-frequency hearing loss have cochlear dead zones—areas where the inner hair cells have been destroyed—that make amplification of sound by hearing aids ineffective. In the past, these patients were not considered good candidates for cochlear implants because of the risk of inner ear trauma and loss of significant residual hearing, but a recent trial suggests that millions may now benefit from a new hybrid device.

HEARING AIDS NOT ALWAYS AN OPTION

In a national study led by NYU Langone, 50 adults with severe high-frequency hearing loss received the Nucleus® Hybrid™ L24 cochlear implant, which was approved by the FDA in 2014. One year after receiving the device, 96 percent of subjects performed the same or better on hearing and understanding speech in quiet settings and 90 percent in noisy environments, and overall patient listening satisfaction jumped from 8 percent to 79 percent. The results were published online in July 2015 in *Laryngoscope*.

"For many of these patients, hearing aids are not an option because they do not sufficiently amplify high-frequency sounds," says the study's lead author J. Thomas Roland Jr., MD, the Mendik Foundation Professor of Otolaryngology, professor of neurosurgery, chair of the Department of Otolaryngology—Head and Neck Surgery, and co-director of the Cochlear Implant Center at NYU Langone. "As a result, many were struggling at work and in social environments because they could not hear or understand speech, especially in the presence of noise."

LOW-FREQUENCY HEARING MADE POSSIBLE

Compared to standard cochlear implants, the hybrid device has a shorter electrode that does not have to be inserted as deeply into the cochlea, which allows patients to retain the low-frequency hearing that is critical to perceiving sound quality and hearing in noisy environments. With the hybrid device, a patient receives electrical stimulation in the nonfunctioning high-frequency area of the cochlea while also benefiting from a hearing aid that amplifies low-frequency sounds.

Standard cochlear implants may still be a better option for most patients with no functional acoustic hearing, Dr. Roland notes. In the study, five patients who did not retain any acoustic hearing chose to have their hybrid electrodes replaced with standard-length implants, and the outcomes were successful in all cases.

For the majority of patients with partial hearing loss, however, the hybrid devices offer new hope for meaningful improvement, says study co-author Susan B. Waltzman, PhD, the Marica F. Vilcek Professor of Otolaryngology and co-director of the Cochlear Implant Center. "Not only does a hybrid device provide better speech understanding," she says, "but maintaining residual hearing offers the possibility of a more natural sound environment and better music appreciation."

One year after receiving a hybrid device, patient listening satisfaction jumped from

8% to 79%

▲ Susan B. Waltzman, PhD

Collaborations

The Cochlear Implant Center's team of researchers, scientists, and therapists are working with industry on electrode development, speech processing paradigms, and device recording capacity designed to enhance patient performance.

Cochlear Implant Center Highlights

COCHLEAR IMPLANTS MAY HELP SLOW COGNITIVE DECLINE

New research examining the relationship between hearing and cognition revealed that alleviation of hearing loss may play a role in delaying the onset of dementia in elderly patients with profound hearing loss.

Hearing restoration may help slow the rate of cognitive decline.

In investigations led by Susan B. Waltzman, PhD, the Marica F. Vilcek Professor of Otolaryngology and co-director of the Cochlear Implant Center, seven elderly cochlear implant recipients were followed and their performance on a battery of neurocognitive tests was assessed before and up to four years after implantation. Participants showed progressive improvement on 70 percent of the tests, with the biggest gains seen in verbal comprehension and memory. The study is pending publication.

The findings corroborate emerging research on the neuroplasticity of the aging brain and suggest that hearing restoration may help slow the rate of cognitive decline, says Dr. Waltzman. "As the population ages, the individual and public health burden of hearing loss and dementia will grow in scope and importance," she adds. "Although the research is still in its early stages, cochlear implants may represent an important opportunity for intervention in patients with severe to profound hearing loss and the possibility of cognitive decline, for whom there are currently no effective treatments."

GROWTH HORMONE ASSOCIATED WITH DECLINES IN COCHLEAR IMPLANT FUNCTION

Human growth hormone (hGH) treatment for short stature may trigger declines in speech perception in children with cochlear implants, according to a study by NYU Langone researchers published in *Otology & Neurotology* in July 2015.

Researchers reviewed the cases of two children who received cochlear implants and underwent hGH treatment for short stature. Before hGH treatment, the children scored in the 90 percent range on word recognition tests, but their scores progressively declined as long as they continued treatment. The scores of one of the children dropped from 90 percent to 52 percent in the right ear and from 40 percent to 28 percent in the left, but they began improving after hGH was discontinued; by one month after, they were 74 percent and 68 percent, respectively.

hGH may interfere with the performance of cochlear implants.

The findings suggest that hGH may interfere with the performance of cochlear implants, although the reasons are not clear, says Dr. Waltzman, who co-led the study with J. Thomas Roland Jr., MD, the Mendik Foundation Professor of Otolaryngology, professor of neurosurgery, chair of the Department of Otolaryngology—Head and Neck Surgery, and co-director of the Cochlear Implant Center at NYU Langone. The researchers hypothesize that hGH may affect the microenvironment between the cochlear nerve and the electrodes in the device, interfering with electrical transmission.

"Since hGH treatment has become more prevalent in recent years, physicians should ask about its use in children with cochlear implants so that these children may be appropriately monitored," says Dr. Waltzman.

DATA WARRANT WIDER USE OF PEDIATRIC COCHLEAR IMPLANTS

Current federal guidelines restrict the use of cochlear implants to children over age one with profound bilateral hearing loss, making the technology inaccessible to many patients who might benefit from it. To change this situation, more data on the safety and efficacy of the devices are desperately needed, according to a commentary by NYU Langone researchers published in April 2015 in *Otolaryngology–Head and Neck Surgery.*

Many insurers refuse to cover off-label use of cochlear implants.

Many children under age one have already benefited from cochlear implants and, while not yet sanctioned by the FDA, the safety and efficacy of implantation in this age group are supported by extensive research, note co-authors Dr. Roland and Dr. Waltzman. In addition, many children with residual or near-normal hearing in one ear receive cochlear implants in the opposite ear.

However, treating these children carries financial risk for providers because many insurers refuse to cover off-label use of approved devices, the authors note. It is crucial that medical/surgical teams at NYU Langone and elsewhere continue to collect and report outcomes of off-label use and submit those data to the FDA to facilitate approval of new indications. "Good-quality, well-conducted studies are imperative if we are to expand accepted therapies to those in need," the authors write. "Rigorous data collection coupled with accurate reporting of results will hopefully lead to the expansion of guidelines."

Multidisciplinary Team Tackles Dizziness from All Angles

Dizziness is a common complaint, especially among the elderly, but diagnosis can be complicated. After ruling out factors like medication side effects or an underlying cardiac condition, physicians often suspect vertigo—which then requires extensive testing and expert analysis to determine the source of dysfunction.

Vertigo—which triggers a sensation of swaying or spinning even when the body is still—can be peripheral, caused by vestibular dysfunction, or central, due to an underlying neurological condition, such as concussion or stroke. With the addition of otoneurologist Catherine Cho, MD, clinical associate professor of neurology and otolaryngology, NYU Langone offers a full range of expertise to diagnose and treat both variations.

EVALUATING CENTRAL AND PERIPHERAL ASPECTS OF BALANCE

"Many centers that treat dizziness have vestibular expertise, but very few offer a full suite of vestibular testing that includes neurological care," says Daniel Jethanamest, MD, assistant professor of otolaryngology, who is board certified in otolaryngology and neurotology. As part of our new Balance Center, "Dr. Cho's expertise adds another layer of interpretation to tests that evaluate both the central and the peripheral aspects of the balance system," says Dr. Jethanamest.

Patients with central vertigo often show no abnormal test findings, but an otoneurologist may be able to recognize impairments in eye movement that are distinct from those seen in peripheral disease, says Dr. Cho, who specializes in gait and balance impairment due to neurological disease, including Parkinson's disease, central vertigo, and Mal de Disembarquement Syndrome (MdDS).

For example, patients with chronic dizziness after a peripheral injury often do not adapt to the vestibular deficits and thus experience a constant feeling of imbalance or unsteadiness, Dr. Cho explains. In these cases, a patient may experience an episode of vertigo when there has been no damage to the inner ear. This is often diagnosed as chronic subjective dizziness.

Dr. Cho helped develop the first effective treatment for MdDS, a rare condition that causes persistent feelings of swaying or rocking, usually following episodes of seasickness, and that is often difficult to diagnose through conventional testing. The procedure, described online in the July 15, 2014, issue of *Frontiers in Neurology*, involves moving the patient's visual surroundings as the patient's head is slowly rolled from side to side at the same frequency as their symptomatic swaying or rocking. In the study, three to five treatments per day for one week produced a cure in the majority of subjects.

"We are now looking at how this re-adaptation affects the brain," Dr. Cho says. "Our hope is that this technique can be modified and applied to other forms of central vertigo."

FULL SUITE OF VESTIBULAR TESTING

Patients referred to NYU Langone's balance center undergo a series of vestibular tests to assess the integrity of the balance system in the inner ear, says William H. Shapiro, AuD, the Lester S. Miller, Jr. & Kathleen V. Miller Clinical Assistant Professor of Hearing Health and clinical associate professor of otolaryngology. Many of the tests look for abnormal eye movements in response to vestibular stimuli, which may indicate defects in the vestibulo-ocular reflex pathway.

- **Videonystagmography** (VNG), for example, measures how a patient tracks visual targets displayed through goggles equipped with infrared cameras. Technicians also assess how each ear responds to stimulation by placing cool and warm air into the ear canals and monitoring the patient's eye movements.
- **Vestibular evoked myogenic potential** (VEMP) testing involves stimulating the ear with high-pitched sounds or taps on the head and recording the resulting contractions in the muscles that control the neck (cervical VEMP) and eye (ocular VEMP). Results from the tests can help in diagnosing and assessing stroke, acoustic neuromas, and Meniere's disease.

Understanding Dizziness: From Basic Research to Rehabilitation

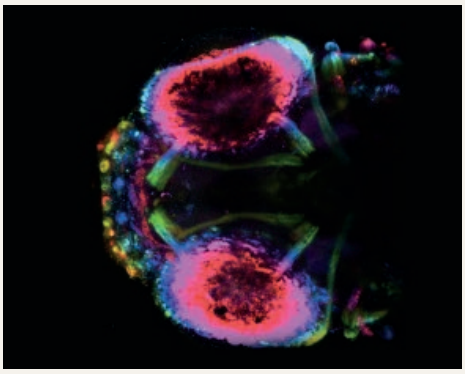
ZEBRAFISH PROVIDE WINDOW INTO HUMAN BALANCE SYSTEM

The diminutive zebrafish may not appear to have much in common with humans, but scientists have found that its unique structure makes it an ideal model for uncovering the inner workings of the nervous system. Research led by David Schoppik, PhD, assistant professor of otolaryngology, and neuroscience and physiology, suggests that studying the zebrafish brain may help explain the mechanisms of normal human balance—and ultimately help treat dysfunction.

"Fish and humans use similar neural architecture and strategies to maintain postural stability," says Dr. Schoppik. "We aim to leverage the simplicity and molecular control of the fish model to understand and ultimately treat disease states."

Zebrafish larvae are transparent, a major research advantage because it allows scientists, using advanced imaging technology, to view cellular activity in the live fish. Fish and humans share much of their genetic architecture, facilitating the study of diseases stemming from genetic mutations.

Dr. Schoppik's team has developed a set of protocols that allows them to molecularly target individual neurons at every stage of the vestibular circuit in the larval zebrafish. The researchers monitor the circuit as sensations such as force are translated into movement, such as eye rotations. In one study, the team measured the ability of larval zebrafish to stabilize their gaze following body rotations and identified the neurons responsible for this vital reflex. The study was published in the July 24, 2012, issue of *Current Biology*.



▲ The unique structure of the zebrafish makes it an ideal model for uncovering the inner workings of the nervous system.

Recently, Dr. Schoppik began to characterize balance and posture as larval and juvenile zebrafish develop. Much like toddlers, larval zebrafish heads are large relative to their bodies. "Consequently, fish must learn to stabilize themselves as they swim," says Dr. Schoppik. "Many human developmental disorders in humans have a motor component. By perturbing common pathways, we can understand these diseases and ultimately, discover novel therapies."

SMARTPHONE APP MAY HELP ASSESS DIZZINESS

One of the challenges of treating patients with dizziness is interpreting the nuances of their symptoms, which are difficult for many patients to articulate. To overcome this barrier and in keeping with the adage that a picture is worth a thousand words, otologist Daniel Jethanamest, MD, assistant professor of otolaryngology, developed a mobile device–based questionnaire that lets patients report their symptoms visually.

The smartphone app displays a series of five-second video clips and asks patients to choose which ones best mirror their symptoms.

"Clinicians need to know exactly what patients are feeling or sensing in order to refer them to the appropriate specialist," says Dr. Jethanamest. "However, the descriptive terms used in standard patient questionnaires can be confusing and difficult to distinguish, especially for non-English speakers."

Dr. Jethanamest, a former software engineer, developed an application for smartphones and tablets that displays a series of five-second video clips depicting various motions, such as rocking or swaying, and asks patients to choose which ones best mirror their symptoms as they experience them.

Once the pilot test of the device-based questionnaire has been completed at NYU Langone, Dr. Jethanamest will compare the results with the results of text-based questionnaires and objective vestibular tests, such as video nystagmography and rotational chair testing. If the application is proven effective, it may become a valuable tool in speeding the diagnostic process and guiding patients to appropriate specialists. Says Dr. Jethanamest, "Our goal is to develop an inexpensive, noninvasive method to aid differential diagnosis and potentially help reduce delays in treatment."

RUSK REHABILITATION: USING PATIENTS' NATURAL MOVEMENT TO RESTORE BALANCE

For patients with balance disorders such as benign paroxysmal positional vertigo (BPPV) or Meniere's disease or those caused by traumatic brain injuries, the quest for balance can affect every move they make. To help restore balance in everyday movement, NYU Langone otolaryngologists work closely with vestibular physical therapists and psychologists at Rusk Rehabilitation to create customized treatment plans for patients based on their condition and symptoms.

The emphasis of these treatment plans is to leverage the body's natural ability to compensate for balance problems. To this end, Rusk therapists and psychologists lead patients through a series of exercises, including:

Canalith repositioning in people with BPPV, to dislodge the tiny inner ear crystals that have become displaced and upset balance. A therapist moves the patient's head in a series of positions, including turning the patient's head to one side, then having the patient roll onto that side and hold the position for 15 to 20 seconds.

Balance retraining exercises to improve the coordination of muscles, joints, and vision and help steady patients' movements.

Gaze stabilization exercises involving specific eye movements to help patients' ocular muscles adapt to changes in the vestibular system.

Sensory organization training to help patients integrate visual, proprioceptive, and vestibular cues in order to regain posture stability. Activities might involve performing a task with the eyes closed or while turning the head.

Voice Center Research on Recurrent Respiratory Lesions Guides Clinical Management

About 7 percent of the general population tests positive for oral human papillomavirus (HPV) at any given time, but oral HPV is found almost universally among adults with recurrent respiratory papillomatosis (RRP), a rare disease of the larynx caused by HPV infection.

This discovery is among several recent insights of researchers at the Voice Center at NYU Langone that may contribute to the development of more effective treatment strategies for patients with RRP.

Although benign, RRP has no cure, is associated with significant morbidity, and typically requires multiple surgical interventions to keep symptoms at bay. Knowing that patients with RRP also have active HPV DNA in the oral cavity, researchers investigated the possibility that these patients have more global immune system deficiencies than the general population. Since HPV exposure is ubiquitous, the investigators looked for factors that underlie the acquisition of RRP in otherwise healthy patients.

ORAL DNA SAMPLES COLLECTED FOR TRIAL

In a multicenter study published in December 2014 issue of *Laryngoscope*, Ryan C. Branski, PhD, associate professor of otolaryngology and associate director of the Voice Center, Milan R. Amin, MD, associate professor of otolaryngology, chief of the Division of Laryngology, and director of the Voice Center, and colleagues collected oral DNA samples from 27 adults with RRP and found that 96 percent tested positive for oral HPV infection. In addition, 67 percent of samples taken from long-term sexual partners of RRP patients tested positive for oral HPV. "These patients appear to have diffuse viral infection along the upper aerodigestive tract," says Dr. Branski. Although RRP is classified as a sexually transmitted disease, whether the infection spreads solely through sexual contact is unclear. One possibility is that the virus is transmitted during birth—as is hypothesized in juvenile-onset RRP—and remains latent until adulthood.

▲ Shirley Gherson, MA, CCC-SLP, (left) with patient

Interestingly, another multicenter study led by the Voice Center, published in October 2014 in *Laryngoscope*, found that adult RRP patients are no different from matched controls with regard to birth history, suggesting that the juvenile and adult versions of the disease have distinct routes of transmission. In addition, contrary to previous studies, this study's data indicate that laryngeal HPV may be transmitted via mouth-to-mouth, rather than orogenital, contact.

Although not the primary goal of the study, the researchers uncovered some compelling demographic data indicating that RRP appears to predominantly affect relatively healthy, affluent, Caucasian males. In contrast, no gender disparity has been found among children with RRP.

COUNSELING PATIENTS IS CRITICAL

In a subsequent article, published in January 2015 in *JAMA Otolaryngology–Head & Neck Surgery*, Voice Center researchers offer guidance to clinicians on how to counsel patients, who often have myriad questions about disease acquisition, course, and transmission. Among the researchers' recommendations: inform patients that their RRP may be related to a new or latent HPV infection.

Dr. Amin and Dr. Branski are expanding on their previous work. Supported by a grant from the American Society of Pediatric Otolaryngology, the team is seeking to determine the duration of oral HPV infection in RRP patients. The researchers will analyze DNA extracted from oral rinse samples taken every three months in order to determine whether oral HPV infection persists beyond six to seven months, which is the typical duration in the general population.

Voice Center Highlights

CLINICAL TRIAL TESTS CELL THERAPY FOR VOCAL CORD SCARRING

A clinical trial under way at the Voice Center is testing an innovative, experimental therapy for dysphonia associated with vocal fold scarring and age-related vocal fold tissue changes. The industry-funded trial employs autologous fibroblasts harvested from post-auricular skin, which are then injected into the vocal fold.

The Voice Center is one of three sites nationwide participating in the phase II trial led by Exton, Pennsylvania–based Fibrocell Science. The company developed an autologous fibroblast technology platform, known as azficel-T, which enables clinicians to extract fibroblasts, cultivate them in the laboratory, and inject them into the patient's vocal folds. The use of autologous cells decreases the chance of rejection by the immune system.

"Since current therapies only address poor vocal fold closure, but do not address the underlying issue of tissue changes, the clinical implications for this therapy could be quite significant," says Ryan C. Branski, PhD, associate professor of otolaryngology and associate director of the Voice Center. "Fibroblasts could potentially 'regrow' normal tissue and improve voice quality."

The trial has enrolled 22 patients across 3 sites, including 8 patients at NYU Langone. Already FDA-approved for esthetic indications to improve the appearance of the nasolabial folds, the treatment is being tested for other medical uses, including burn scarring.

STUDY DEVELOPS FIRST MODELS FOR LARYNGEAL BURN INJURIES AND HEALING

Despite the fact that patients who survive inhalation burns are at risk for long-term voice and laryngeal dysfunction, most burn research focuses on acute lung injury. Supported by a grant from the American Laryngological Association, researchers at the Voice Center embarked on a study to better understand laryngeal burn injuries, with an eye toward development of improved treatments.

Under the leadership of Gregory R. Dion, MD, a fellow in laryngology at the Voice Center, a custom heat and smoke delivery device was created to quantify healing patterns in an animal model following different laryngeal burn exposures. Previously, no models existed to study these injuries and subsequent repair processes, likely underlying the lack of data to guide care in this challenging patient population. Dr. Branski and Milan R. Amin, MD, associate professor of otolaryngology, chief of the Division of Laryngology, and director of the Voice Center, are mentors and co-investigators on the project.

By quantifying differences in injury and wound healing patterns as well as in the role of smoke exposure, the researchers hope to learn more about how inhalation burn injuries affect laryngeal tissues and function. The work will lay a foundation for future interventional studies, with the goal of improved treatments for this underserved population. Says Dr. Dion, "Our data will provide critical foundational information about the mechanisms underlying this specialized injury. It will provide a model for developing effective therapeutic approaches to improve and control the wound healing process."

▲ Milan R. Amin, MD, and Ryan C. Branski, PhD

Targeted Therapies Offer Hope for NF2 Patients

Until recently, surgery was the only option for patients diagnosed with neurofibromatosis type 2 (NF2), a rare genetic disorder associated with multiple benign tumors of the nervous system.

However, new insights into the biological underpinnings of the disease spurred the development of molecularly targeted therapies that offer the first glimmers of hope for a cure.

NYU Langone physicians are leaders in developing drug treatments for NF2 patients with bilateral vestibular schwannomas, which cause gradual hearing loss. The Comprehensive Neurofibromatosis Center at NYU Langone is 1 of 13 U.S. clinical trial sites in the Neurofibromatosis Clinical Trials Consortium, which is dedicated to testing emerging NF2 therapies.

INSIGHTS TRIGGER NEW CLINICAL TRIALS

Matthias A. Karajannis, MD, associate professor of pediatrics and otolaryngology and director of the NF Clinical Research Program, recently reported on the progress of developing novel therapies tailored to NF patients in a review published in *Current Opinion in Pediatrics* in February 2015. He notes that recent insights into the biology of tumors with mutations in the NF2 gene have triggered a number of clinical trials using molecularly targeted agents already approved by the FDA for other tumors.

Dr. Karajannis was the first to lead and complete a prospective clinical drug trial specifically for patients with NF2. In the trial, lapatinib, an epidermal growth factor receptor inhibitor approved for breast cancer, was well tolerated and led to tumor shrinkage and prolonged disease stabilization in some patients. Although hearing improvement was also observed in some patients, the hearing responses were generally minor and not sustained over the long term.

Bevacizumab, an anti-vascular endothelial growth factor monoclonal antibody, which is approved to treat several types of cancer, is also under investigation for NF2, says Dr. Karajannis. According to anecdotal clinical experience in patients treated on a compassionate care basis, the drug, which is the focus of several ongoing clinical trials sponsored by the NF Clinical Trials Consortium and others, may have the potential to dramatically improve hearing and shrink tumors.

Dr. Karajannis is leading a "phase 0" trial, funded by the National Cancer Institute, in which volunteers take a short course of everolimus prior to scheduled surgery. It is hoped that the data from this study will provide valuable information about the drug's penetration and effects within the tumor tissue. Dr. Karajannis is also conducting a clinical trial of axitinib, the first human study to test a multikinase inhibitor for treatment of NF2-related tumors.

"Axitinib is a drug that attacks several points along the tumor proliferation pathway in NF2," says J. Thomas Roland Jr., MD, the Mendik Foundation Professor of Otolaryngology, professor of neurosurgery, chair of the Department of Otolaryngology—Head and Neck Surgery, and co-director of the Cochlear Implant Center at NYU Langone.

NF2 PRESENTS UNIQUE CHALLENGES

One of the major challenges in treating NF2 is battling multiple tumors that progress at different rates, says Dr. Roland. In addition, NF2 mutations affect multiple cellular signaling pathways, many of which are poorly understood and have not yet been successfully targeted pharmacologically.

"A patient might have 20 tumors, but only 3 that respond to drug treatment," Dr. Roland says. "We've seen amazing cases of tumors shrinking to half their original size and hearing completely restored, but we also see patients who have no response at all to drug treatment."

PERSONALIZED THERAPIES ON THE HORIZON

The eventual goal is to develop personalized therapies based on the unique biology of patients' tumors, says Dr. Karajannis. "Although a number of molecular targets have been validated preclinically in NF2 tumors and some agents have already shown promise in the clinical realm, effective medical therapies for NF2 that achieve sustained tumor regression remain elusive," he says. "Progress will require a better understanding of the biology of NF2 tumors, development of more potent and specific drugs, and identification of biomarkers that help us understand which patients will most likely benefit from a given therapy."

Clinical Highlights

PSYCHOSOCIAL ISSUES MAY BE UNDERTREATED IN NF2

Although NF2 is a benign disease, patients often report significantly higher levels of stress and anxiety than patients with cancer, according to a study led by NYU Langone researchers. Their findings suggest that psychosocial support should be a key part of effective NF2 clinical management.

Using a 63-item questionnaire, the researchers assessed quality of life (QOL) in 11 domains and found that the areas most predictive of overall QOL were psychosocial factors, including depression and anxiety, future uncertainty, and pain. Many patients who completed the questionnaire added comments describing their significant depression and guilt about passing on the genetic disease to their children. The results were published in October 2015 in *Otolaryngology–Head and Neck Surgery*.

Although the questionnaire used in the study required a significant time commitment, simpler tools can also be effective in assessing QOL, the authors noted. The NF2 Impact of QOL, or NFTI-QOL, for example, has eight items and takes less than three minutes to complete.

Pain and anxiety appear to be undertreated in this population, says the study's senior investigator J. Thomas Roland Jr., MD, the Mendik Foundation Professor of Otolaryngology, professor of neurosurgery, chair of the Department of Otolaryngology—Head and Neck Surgery, and co-director of the Cochlear Implant Center at NYU Langone. "Multidisciplinary NF2 teams should consider greater use of mental health providers and pain management specialists, as treating these symptoms can greatly improve overall QOL," he says.

CASE STUDY: TEAM EFFORT SAVES HEARING FOR PATIENT WITH A NEW TUMOR

Patients with NF2 can develop benign tumors on the nerves running between the inner ear and the brainstem, often leading to hearing loss. NYU Langone neurosurgeons and neurotologists work together to remove many of these tumors and are often able to restore—and even improve—patients' ability to hear.

In a recent case, a 38-year-old woman with an acoustic neuroma and childhood-onset progressive bilateral hearing loss, was referred to neurosurgery after experiencing a sudden deterioration in hearing on her left side. The patient, who had been using hearing aids in both ears, had very poor hearing in her right ear and scored only about 16 percent on word recognition tests with her left ear.

Magnetic resonance imaging revealed that the patient had a small acoustic neuroma growing inside her left internal auditory canal that was compressing the auditory nerve. Although radiation might have shrunk the tumor, there was a risk that it would also destroy any remaining hearing in that ear, says John G. Golfinos, MD, associate professor of neurosurgery and otolaryngology and chair of the Department of Neurosurgery.

Looking for options, Dr. Golfinos consulted Dr. Roland, a neurotologist, about the possibility of placing a cochlear implant in the patient's right ear. "Having a successful cochlear implantation would alleviate our anxiety about operating on the left ear, because the patient would have hearing regardless of the surgical outcome," says Dr. Golfinos.

"This patient came to us fearing she would never hear again and left tumor-free with 80 percent word recognition."

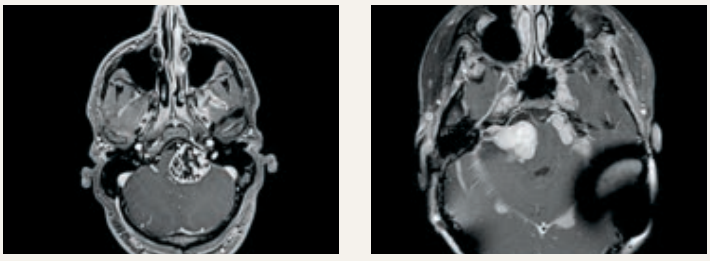
— J. THOMAS ROLAND JR, MD

The Mendik Foundation Professor of Otolaryngology, professor of neurosurgery, chair of the Department of Otolaryngology—Head and Neck Surgery, and co-director of the Cochlear Implant Center at NYU Langone

Dr. Roland performed a promontory stimulation test, which involves sending electrical pulses via a needle threaded through the eardrum to test the auditory nerve. The results showed that the patient had enough auditory perception to benefit from a cochlear implant. The procedure turned out to be extremely successful, increasing the patient's word recognition in her right ear to 80 percent.

The patient subsequently decided to undergo surgery to have the tumor on her left side removed. Dr. Golfinos and Dr. Roland took a middle fossa approach, making an incision above the ear in the lateral skull bone in order to uncover the internal auditory canal and access the tumor. The successful operation not only saved her residual hearing but also improved it by relieving pressure on the auditory nerve.

"This patient came to us fearing that she would never hear again," says Dr. Roland. "Instead, she left tumor-free and with 80 percent word recognition. She now functions very well in her work and social environments."



▲ MRI images of NF2 tumors

Techniques, Trials, and New Faculty Enhance Head and Neck Cancer Care

Multidisciplinary team expands to address the complex needs of patients with head and neck cancer.

Mark S. Persky, MD, director of the Head and Neck Center, continues to build a multidisciplinary team that includes Zujun Li, MD, clinical associate professor of medicine, and Kevin Hu, MD, associate professor of radiation oncology. They join existing head and neck surgeons Mark D. DeLacure, MD, the George E. Hall Associate Professor of Head and Neck Cancer Research, associate professor of neurosurgery, and associate professor in the Hansjörg Wyss Department of Plastic Surgery, Babak Givi, MD, clinical assistant professor of otolaryngology and Patient Safety/Quality Improvement Officer, Adam S. Jacobson, MD, associate professor of otolaryngology, David Myssiorek, MD, professor of otolaryngology, and Theresa Tran, MD, assistant professor of otolaryngology. Sungheon Kim, PhD, associate professor of radiology, and Yan Shi, PhD, clinical assistant professor of pathology, are also members of the team.

Plans are also under way to launch a new head and neck fellowship under the direction of Adam S. Jacobson, MD, associate professor of otolaryngology.

Emphasis on Patient Well-Being

With a keen sensitivity to concerns about function and physical appearance, our head and neck experts strive to minimize physical and emotional stress and ease potential side effects through:

- Speech and swallowing rehabilitation
- Occupational and physical therapy
- Social work services
- Support groups
- Integrative health services (massage/acupuncture)
- Specialized nursing

Innovative Techniques

Our experts offer:

- Transoral robotic surgery to treat oropharynx cancer
- Endoscopic approaches for skull base tumors
- Organ-sparing, voice-preserving treatments
- Minimally invasive approaches (used whenever possible) to achieve a shorter recovery time and maximize functioning
- Radiation therapy and chemotherapy

We are continually pursuing pathways to better care through clinical trials and ongoing research in cancer genetics.

Battling Pain

The Department of Otolaryngology—Head and Neck Surgery is also collaborating with the NYU Bluestone Center for Clinical Research on a variety of trials addressing the pressing issues of oral cancer pain, oral mucositis, and other disease or treatment complications.

▼ Zujun Li, MD, Mark S. Persky, MD, Kevin Hu, MD, and Allison Most, NP

Surgical Team Takes Transnasal Path to Treat Diseases of the Skull Base

Open craniofacial surgery was once considered standard practice for resecting skull base tumors, but today, minimally invasive procedures, which reduce morbidity and recovery time, can be used to remove these tumors in many patients.

A team of NYU Langone neurosurgeons and otolaryngologists at uses state-of-the-art surgical technology to perform a variety of transnasal approaches to tumors of the skull base, brain, and orbit.

Endonasal endoscopic procedures involve using the transnasal and trans-paranasal sinus corridors to access the ventral skull base, brain and brainstem, orbit, infratemporal fossa, and cervical spine, with the use of an endoscope to visualize the tumor and surrounding nerves and blood vessels.

In a recent case, Seth M. Lieberman, MD, assistant professor of otolaryngology and associate director of the Otolaryngology Residency Program, worked with Donato R. Pacione, MD, assistant professor of neurosurgery, and Payal Patel, MD, clinical instructor of ophthalmology, to successfully remove a rare V2 schwannoma that was compressing the normal orbital structures of a 51-year-old man referred by his ophthalmologist for proptosis.

"This V2 schwannoma was especially challenging because it extended from the orbit into the intracranial cavity to the root of the nerve where the nerve emanates from the trigeminal ganglion," says Dr. Lieberman. "Removing the tumor carried significant risk because of its proximity to the optic nerve and internal carotid artery."

Over six hours, Dr. Lieberman's team successfully performed a complete gross total resection of the schwannoma exclusively through the transnasal corridor. The oculoplastics team, led by Dr. Patel, then performed a staged reconstruction of the orbit to restore the patient's appearance and normalize his vision. "The oculoplastics team used a prefabricated plate in the shape of the patient's normal contralateral orbit to reconstruct the bony cavity of his eye," notes Dr. Lieberman.

NYU Langone's multidisciplinary team is experienced in several other types of complex transnasal surgeries, including transnasal odontoidectomy to decompress the brainstem in patients with basilar invagination, endoscopic craniofacial resection to remove tumors involving the cribriform plate, and endoscopic approaches to the infratemporal fossa.

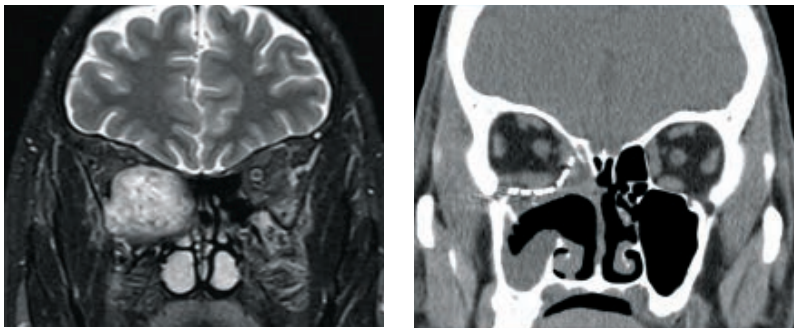
In another recent case, Dr. Lieberman performed an endoscopic modified Lothrop procedure to treat a frontal mucocele that had developed over two decades. The procedure involves drilling out the floor of the frontal sinus to maximize the dimensions of the outflow tract and decrease the chances of mucocele recurrence.

The patient, now in his seventies, had been in a horse riding accident 20 years earlier and suffered a severe facial fracture, which ultimately led to his frontal mucocele. The slowly enlarging mucocele eventually eroded through surrounding bone of the orbit and anterior and posterior tables of the frontal sinus.

Dr. Lieberman had to navigate plates and screws from the patient's past facial reconstructions in order to drill out the floor of the frontal sinus; however, he was able to avoid open surgery, which would have involved a large scalp incision and an overnight hospital stay. The operation successfully enlarged the dimensions of the surgical outflow tract, relieving the patient's headaches and restoring normal vision.

"Surgeries such as lateral rhinotomy incision or midfacial degloving are still in our armamentarium," says Dr. Lieberman. "But we are now able to do a lot more transnasally because of our experience with advanced endoscopic instrumentation and techniques."

▼ Pre-op MRI and post-op CT scan



PREPARING TOMORROW'S LEADERS

NYU Langone offers an unmatched educational experience in diverse settings. Trainees are mentored by leading experts in the field and benefit from state-of-the-art facilities and technology.

▲ Zahrah Taufique, MD, Mark Fritz, MD, and Adam S. Jacobson, MD

Curriculum

UNDERSTANDING ALLERGIES

Ronit Herzog, MD, associate professor of otolaryngology and pediatrics and chief of the Division of Allergy and Immunology, developed a robust new curriculum to train residents in the evaluation and treatment of abnormal immune response in allergy and primary immune deficiency in children and adults.

Diverse Residency Experience

Otolaryngology residents undergo a rigorous five-year program beginning with one year of rotations through general surgery, neurosurgery, anesthesiology, plastic surgery, and emergency medicine and followed by four years of training in otolaryngology. Residents have the opportunity to treat diverse and unique patient populations as they rotate through four hospital systems in the New York metropolitan area: the VA NY Harbor Healthcare System, Bellevue Hospital Center, NYU Langone Medical Center's Tisch Hospital, and Lenox Hill Hospital. Clinical and laboratory research opportunities are abundant and encouraged throughout the residency program. Residents benefit from a 3-month research rotation led by director of resident research, Ryan C. Branski, PhD, associate professor of otolaryngology and associate director of the Voice Center.

Expanding Fellowship Options

NYU Langone offers four fellowships: laryngology, otology/neurotology, pediatrics, and facial and plastic reconstructive surgery. Several additions and improvements were made recently, including:

- A new fellowship in pediatric otolaryngology, under the direction of Max M. April, MD, professor of otolaryngology and pediatrics.
- A revamped fellowship in facial and plastic reconstructive surgery, under the direction of Philip J. Miller, MD, clinical assistant professor of otolaryngology.
- A new fellowship in head and neck cancer is in the planning stages, under the leadership of Adam S. Jacobson, MD, associate professor of otolaryngology.

Specialty Conferences

TREATING HEARING LOSS

More than 180 international cochlear implant professionals attended a course on "Maximizing Performance in Cochlear Implant Recipients: Programming Concepts" at NYU Langone in December 2015. The course addressed routine and special programming issues and methods in pediatric and adult recipients. Also covered were new and promising techniques to assist in programming, including genetic algorithms, CT-guided imaging, and the use of objective measures.

ADVANCES IN NF2

Leading experts from around the world will gather at NYU Langone in spring 2016 to discuss advances in research and treatment for neurofibromatosis type 2 (NF2). The international Schwannomatosis Conference, to be chaired by Kaleb H. Yohay, MD, member of the faculties of neurology and pediatrics, will be held on March 16, followed by the Neurofibromatosis 2: State-of-the-Art Conference on March 17–18, chaired by Matthias A. Karajannis, MD, associate professor of pediatrics and otolaryngology and director of the NF Clinical Research Program, and J. Thomas Roland Jr., MD, the Mendik Foundation Professor of Otolaryngology, professor of neurosurgery, chair of the Department of Otolaryngology—Head and Neck Surgery, and co-director of the Cochlear Implant Center at NYU Langone, along with Filippo Giancotti, MD, PhD, from Memorial Sloan Kettering Cancer Center. Participants will learn about the latest developments in NF2 in basic research, clinical trials, and multidisciplinary clinical management.

Scholarly Pursuits

In the last 5 years, 90 percent of residents have chosen to continue their training. Recent residents have been accepted at leading institutions, including:

Georgia Regents Medical Center

NYU Langone Medical Center

Oregon Health and Science University

UCLA Health

University of Illinois at Chicago Medical Center

University of Miami Health System

University of Pittsburgh Medical Center

Select Publications

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Locations

As of December 2015

1
Voice Center at NYU Langone
345 East 37th Street
Suite 306
New York, NY

2
Head and Neck Center at Perlmutter Cancer Center
160 East 34th Street
Seventh Floor
New York, NY

3
Ambulatory Care Center
240 East 38th Street
14th Floor
New York, NY

NYU Langone Facial Plastic and Reconstructive Surgery
240 East 38th Street
14th Floor
New York, NY

4
NYU Langone Otolaryngology and Audiology at Long Island
173 Froehlich
Farm Boulevard
Woodbury, NY

NYU Langone Huntington Medical Group
180 East Pulaski Road
Huntington Station, NY

5
NYU Langone Otology, Neurotology, and Skull Base Surgery
550 First Avenue
Suite 7Q
New York, NY

Rhinology at NYU Langone
530 First Avenue
Suite 7Q
New York, NY

6
Cochlear Implant Center at NYU Langone
660 First Avenue
Seventh Floor
New York, NY

Select services are available on-site at the New York School for the Deaf in White Plains, NY, and at 173 Froehlich Farm Boulevard in Woodbury, NY

7
Neurofibromatosis Center at NYU Langone
160 East 32nd Street
New York, NY

8
NYU Langone at Columbus Medical
97-85 Queens Boulevard
Rego Park, NY

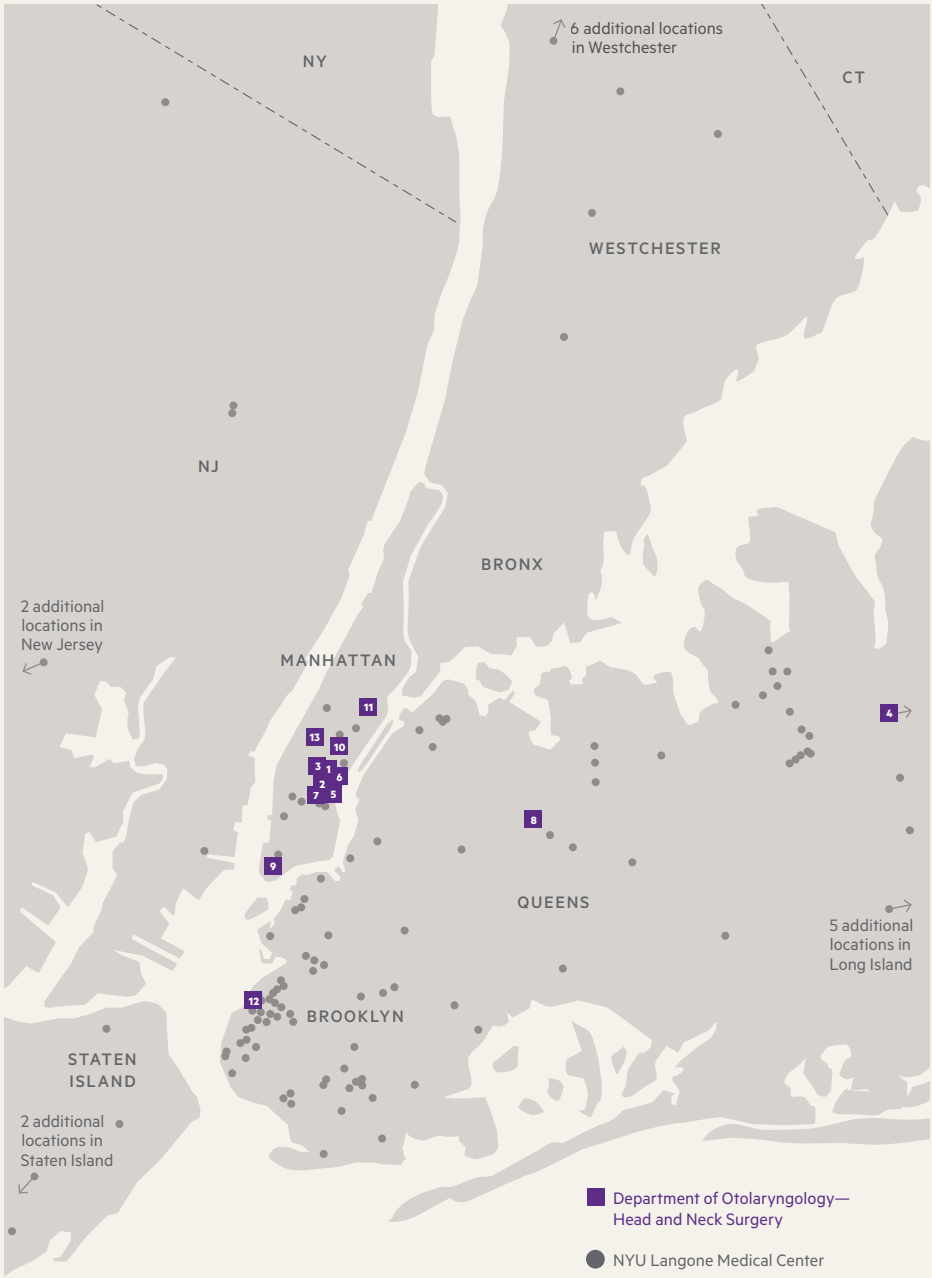
9
NYU Langone at Trinity
111 Broadway, 2nd Floor
New York, NY

10
Preston Robert Tisch Center for Men's Health
555 Madison Avenue
Second Floor
New York, NY

11
Joan H. Tisch Center for Women's Health
207 East 84th Street
New York, NY

12
NYU Lutheran Medical Center
150 55th Street
Brooklyn, NY

13
NYU Langone Ambulatory Care West Side
355 West 52nd Street
New York, NY



CONTACT INFORMATION

J. Thomas Roland Jr., MD
Chair, Department of Otolaryngology–Head and Neck Surgery
Mendik Foundation Professor of Otolaryngology
550 First Avenue – NBV 5E5
New York, NY 10016
212.263.7338 J.Thomas.RolandJr@nyumc.org

For more information about our expert physicians, visit **nyulangone.org**

Faculty

J. Thomas Roland Jr., MD
Mendik Foundation Professor of Otolaryngology
Professor of Neurosurgery
Co-Director, Cochlear Implant Center at NYU Langone
Chair of the Department of Otolaryngology—Head and Neck Surgery

ALLERGY

Ronit Herzog, MD
Associate Professor of Otolaryngology and Pediatrics
Division Chief, Allergy and Immunology

FACIAL PLASTIC AND RECONSTRUCTIVE SURGERY

Judy Washington Lee, MD
Assistant Professor of Otolaryngology

Philip J. Miller, MD
Clinical Assistant Professor of Otolaryngology
Program Director, Facial Plastic Reconstructive Surgery Fellowship

W. Matthew White, MD
Assistant Professor of Otolaryngology
Division Chief, Facial Plastic and Reconstructive Surgery

GENERAL OTOLARYNGOLOGY AND SLEEP SURGERY

Anthony Cornetta, MD
Clinical Assistant Professor of Otolaryngology

David Kaufman, MD
Associate Professor of Otolaryngology

Stephen G. Rothstein, MD
Clinical Associate Professor of Otolaryngology

Kenneth L. Schneider, MD
Associate Professor of Otolaryngology

Michael Slippen, MD
Clinical Assistant Professor of Otolaryngology

Erich P. Voigt, MD
Clinical Associate Professor of Otolaryngology
Division Chief, General/Sleep Otolaryngology

Gerald West, DO
Clinical Assistant Professor of Otolaryngology

HEAD AND NECK SURGERY AND ONCOLOGY

Mark D. Delacure, MD
George E. Hall Associate Professor of Head and Neck Cancer Research (Otolaryngology)
Associate Professor of Neurosurgery and Hansjörg Wyss Department of Plastic Surgery
Division Chief, Head and Neck Surgery

Babak Givi, MD
Clinical Assistant Professor of Otolaryngology
Patient Safety/Quality Improvement Officer

Adam S. Jacobson, MD
Associate Professor of Otolaryngology

David J. Myssiorek, MD
Professor of Otolaryngology

Mark S. Persky, MD
Professor of Otolaryngology
Director, Head and Neck Center

Theresa Tran, MD
Assistant Professor of Otolaryngology
Program Director, Bellevue Hospital Center

COCHLEAR IMPLANT CENTER, OTOLOGY, NEUROTOLOGY, AND SKULL BASE SURGERY

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J. Thomas Roland Jr., MD
Mendik Foundation Professor of Otolaryngology
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Program Director, Pediatric Otolaryngology Fellowship

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Robert F. Ward, MD
Professor of Otolaryngology and Pediatrics
Vice Chair of Clinical Affairs
Division Chief, Pediatric Otolaryngology

RESEARCH

Mario A. Svirsky, PhD
Noel L. Cohen Professor of Hearing Science
Vice Chair of Research

Mahan Azadpour, PhD
Adjunct Professor of Otolaryngology

Robert Froemke, PhD
Assistant Professor of Otolaryngology and Neuroscience & Physiology

David M. Landsberger, PhD
Assistant Professor of Otolaryngology

Michael A. Long, PhD
Assistant Professor of Otolaryngology and Neuroscience & Physiology

Arlene C. Neuman, PhD
Research Associate Professor of Otolaryngology

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*Numbers represent FY15 (Sept 2014–Aug 2015)

1,069
Total Number of Beds

77
Operating Rooms

38,554
Patient Discharges

1,216,428
Hospital-Based Outpatient Visits

5,766
Births

2,900,000
Faculty Group Practice
Office Visits

1,469
Full-Time Faculty

1,392
Part-Time Faculty

2,627
Voluntary Faculty

128
Endowed Professorships

2,740
Physicians

3,465
Registered and Advanced
Practice Nurses

730
Allied Health Professionals

611
MD Candidates

79
MD/PhD Candidates

272
PhD Candidates

400
Postdoctoral Fellows

1,063
Residents and Fellows

3,800
Publications

550,000
Square Feet of Research Space

$178,000,000
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$295,000,000
Total Grant Funding

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