

WELCOME TO THE VIRGINIA MERRILL BLOEDEL HEARING RESEARCH CENTER

THE EAR IS A PROFOUNDLY COMPLEX SYSTEM, one with multiple functions. Not only does the ear allow us to hear, but it also allows us to maintain our balance and sense of equilibrium.

In addition to its own complexity, the ear is also subject to a wide range of influences, some that originate within the body, others without. Consequently, there are many factors to weigh when evaluating debilitating, complicated medical conditions such as hearing loss and balance disorders — disorders that affect more than 36 million adults in the U.S. alone.



Sarah Malmquist, a graduate student in the lab of David Raible, Ph.D., professor of biological structure, is pictured with a “Secrets of the Hair Cell” exhibit. The exhibit, created by Arminda Suli, Ph.D., was displayed at the 2012 Brain Awareness Week, an event held for schoolchildren at the Museum of History and Industry in Seattle.

At the Virginia Merrill Bloedel Hearing Research Center at the University of Washington, our researchers and physicians work to understand how people lose their hearing and why. To learn what factors disturb a person’s sense of balance. And to figure out what approach will work best in treating people with disorders of the ear.

This approach is multidisciplinary and collaborative, involving research in genetics, engineering and many other areas, and its purpose is to improve quality of life for people with ear-related disorders. What follows is a brief description of some of the Bloedel Center’s projects.

The Cure: Hair Cell Regeneration

It was an exciting day when Edwin Rubel, Ph.D., professor of otolaryngology and the Virginia Merrill Bloedel Chair in Basic Hearing Research, realized that chickens can do what human beings can’t: regrow damaged hair cells that are essential to hearing.

News of this discovery was the genesis of the Virginia Merrill Bloedel Hearing Research Center, a thriving research community that comprises 69 affiliates in 18 different departments at the University of Washington.

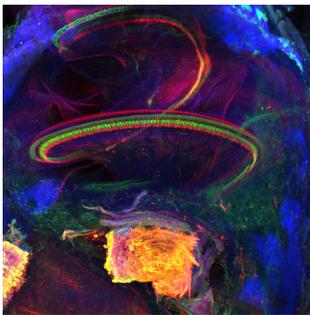
Dr. Rubel, research director of the Virginia Merrill Bloedel Hearing Research Center, leads a diverse team of scientists who are committed to the regeneration of hair cells in the human ear.

The Root of the Problem: Heredity

Some hearing loss is genetic, and researchers have realized that hearing loss is connected to multiple genetic pathways — rather than simply being attributable to one gene. Bruce Tempel, Ph.D., professor of otolaryngology, and his colleagues at Bloedel study the genes that cause hearing loss, including the genetics of noise resistance. Some mice, for instance, are genetically predisposed to have hardier hair cells — delicate, easily damaged cells in the inner ear that facilitate hearing. Their cells remain undamaged even after prolonged exposure to loud noise, leading researchers to wonder if — given the right genetic manipulation — this attribute could be fostered in regular mice and, eventually, humans.

The Symptoms: Existing Hearing Loss and Disequilibrium

Jay Rubinstein, M.D., Ph.D.'s lab blends the disciplines of medicine and engineering to create cochlear implants, devices that restore partial hearing in those with profound hearing loss. In 2011, Rubinstein, professor of otolaryngology, director of the Bloedel Center, and the Virginia Merrill Bloedel Chair in Clinical Hearing Research, and James Phillips, Ph.D., research associate professor of otolaryngology, devised a new twist on existing cochlear implant technology to produce a new implanted device that combats the debilitating vertigo of Ménière's disease. Clinical trials of the device are now under way.



This photo shows the path taken by sensory information — from a mouse's inner ear on its way to the brain. The yellow, rose-like structure at the bottom of the photo is composed of nerve cells and nerve fibers; the sensory cells are green, and the nerve cells are red.

Photo by Glen MacDonald, research scientist at the Bloedel Center

All About Education

In addition to conducting groundbreaking research and treating patients, our faculty members do something more: they mentor and train tomorrow's physicians and researchers, from undergraduates, to M.D. students, to Ph.D. candidates. The Bloedel Center nurtures this synergy — from junior faculty to senior faculty, from learners to experts, all from many different disciplines — through its campus-wide lecture series, its Travelling Scientist Program, and the Bloedel Scholar Program, which allows a faculty member to pursue research with greater-than-normal intensity for a three-year period.

Outreach: the Community and the Scientific Community

Today's children are tomorrow's scientists and physicians, and Bloedel faculty regularly participate in community outreach events, such as Brain Awareness Week and others. They also speak to groups who have an interest in hair cell regeneration and cochlear implants. Our faculty also publish more fundamental research in the field of hearing regeneration than any other research group. Learn more about our work at depts.washington.edu/hearing.

You Can Help

Interested in learning how you can help conquer hearing loss and other conditions? Please contact Colin Ware, director of philanthropy, at 206.685.5412 or warec2@uw.edu, or Carolyn Higgins, business and development manager at Bloedel, at 206.616.4105 or crh25@uw.edu. Thank you for your interest in our work.

The Hearing Loss Quiz

Which of the following experts might help find a cure for hearing loss?

- a. A biologist specializing in fish
- b. A mathematician
- c. An electrical engineer
- d. A psychologist
- e. All of the above

Answer: if you guessed "e.", you're right!

Bloedel draws on the expertise of scientists in many other fields, too. Our affiliates are faculty in the fields of linguistics, bioengineering and physiology, among others. (Why a fish biologist? We've found that zebrafish provide an ideal model for studying hair cells.)