

## Getting help . . .

- First contact an audiologist who will test your hearing.
- If your hearing is ok the audiologist might suggest you contact a brain care specialist, called a neurologist. (S)he might have some advice.
- Brain scientists are only just beginning to tackle these types of problems. Every day we discover new results and new therapies!

## Other Resources

### Hearing Loss Association of America

[www.hearingloss.org](http://www.hearingloss.org)

### Better Hearing Institute

[www.betterhearing.org](http://www.betterhearing.org)

### American Speech Hearing Language Association

[www.asha.org/public/](http://www.asha.org/public/)

### National Institute on Deafness and Other Communication Disorders

[www.nidcd.nih.gov/health/hearing](http://www.nidcd.nih.gov/health/hearing)

National Center for  
Rehabilitative Auditory Research (NCRAR)  
VA Portland Health Care System  
3710 SW US Veterans Hospital Road  
Portland, Oregon 97239

(503) 220-8262, ext. 54525  
[www.ncrar.research.va.gov](http://www.ncrar.research.va.gov)

648PFEM1067 June 2018



# How Does the Brain Help Us Hear?

**Frederick Gallun, PhD &  
Gabrielle Saunders, PhD**



National Center for Rehabilitative  
Auditory Research (NCRAR)

VA Portland Health Care System,  
Portland, OR



**VA**



U.S. Department of Veterans Affairs

Veterans Health Administration  
VA Portland Health Care System

## What does the brain have to do with hearing?

### The ears & the brain are a team

Our ears and brain form a team that allows us to know about the world around us. This team keeps us connected to people and the world.

Sounds need to go from the ear to the brain before they can be heard and understood. This is the pathway they take:

- Sound waves enter your ear and then travel down your ear canal to your inner ear.
- Your inner ear turns the sound waves into electrical signals.
- The auditory nerve then sends those signals to your brain.
- Some brain areas are then used to compare the signals coming from the two ears to figure out where the sounds came from. Other brain areas decode or process language and music.



### Sounds become words

The brain takes signals, and turns them into words and sentences and, then eventually, into ideas. In a few tenths of a second, a sound from your ear can become an idea in your mind. Your ears and brain need to work together to make this happen properly.

### The brain sorts out the sounds

One of the most important jobs the ears and the brain do is to tell us where things are so it can make a mental picture of the world.

First, your brain figures out where a sound came from using a part of the brain called the brainstem. It does this by deciding whether the sound was louder at one ear or the other, and whether the sound arrived at one ear before the other. From this, the brain makes a mental picture of the world around you. If the brain weren't doing this everything would be a big jumble.

When we are outside, in a restaurant, or with a large group of people, many sounds reach our ears at once. It is the brain that helps us to keep it all straight.



### The ears & the brain are vulnerable

As we age, our ears and our brains get older too. Any damage that they have suffered builds up over time.

The brain has a very complex job to do. It needs to get good information from the ears. If the information is distorted because the ears have been damaged from noise or the normal aging process, the brain can't do its job as well. Sometimes, even if the ears are working well and sending the brain good information, the brain may not be able to translate the information correctly because of damage.

### You might need help if

- You are having trouble understanding speech
- It is hard for you to know where sounds are coming from
- You struggle to hear clearly when it is noisy

