

NIH News in Health

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Sound Health Music Gets You Moving and More

Music has been around since ancient times. It is part of every known culture. It can get your foot tapping, lift your mood, and even help you recall a distant memory. Did you know that music can bring other health benefits? Scientists are exploring the different ways music stimulates healthier bodies and minds.

“When you listen to or create music, it affects how you think, feel, move, and more,” says neuroscientist Dr. Robert Finkelstein, who co-leads NIH’s music and health initiative.

“Today, modern technologies are helping researchers learn more about how the brain works, what parts of the brain respond to music, and how music might help ease symptoms of certain diseases and conditions,” he explains.

Your Brain on Music • The brain is a complex processing hub. It’s the control center of your nervous system, the network of nerve cells that carry messages to and from your body and the brain. A healthy brain tries to make sense of the world around you and the constant information it receives, including sound and music.

“Sound is an important and profound force in our lives,” explains Northwestern University neuroscientist Dr. Nina Kraus. “The more we exercise our sound processing in the brain, the better the brain becomes

at making sense of sound and the world around us. Music does this more than any other sound.”

Music and other sounds enter the ear as sound waves. These create vibrations on our eardrum that are transformed into electrical signals. The electrical signals travel up the **auditory** nerve to the brain’s auditory cortex. This brain area interprets the sound into something we recognize and understand.

But music affects more than the brain areas that process sound. Using techniques that take pictures of the brain, like fMRI, scientists have found that music affects other brain areas. When music stimulates the brain, it shows up on brain images as flickers of bright light. Studies have shown that music “lights up” brain areas involved in emotion, memory, and even physical movement.

“Music can help facilitate movement,” Finkelstein explains. NIH-funded scientists are investigating whether music can help patients with movement disorders, like Parkinson’s disease. Patients with this condition slowly lose their ability to walk and move over time.

“Studies show that when a certain beat is embedded in music, it can help people with Parkinson’s disease walk,” Finkelstein says. Another study is looking at how dance compares to other types of exercise in



people with Parkinson’s disease.

There’s also evidence that music may be helpful for people with other health conditions, including Alzheimer’s disease, dementia, traumatic brain injury, stroke, aphasia, autism, and hearing loss.

Building Strong Minds • Playing a musical instrument engages many parts of the brain at once. This can especially benefit children and teens, whose brains are still developing. Introducing music to young kids can positively influence their ability to focus, how they act, and language development.

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Definitions

Auditory

Related to hearing.

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Kraus's research team at Northwestern studies how musical training influences brain development. They found that music has positive effects on kids' learning abilities, even when the training starts as late as high school.

"The teens in our study showed biological changes in the brain after two years of participating in consistent music-making activities in school," she explains. Kraus says that these changes affect learning ability and can help improve skills like reading and writing. These benefits can be long lasting, too.

"Once you teach your brain how to respond to sound effectively it continues to do that well beyond when the music lessons stop," Kraus explains. "A little music goes a long way, but the longer you play, the stronger your brain becomes."

Being musical may also protect you from hearing loss as you age. We naturally lose our hearing ability over time. In particular, it becomes harder to hear conversations in a loud environment. But researchers have found that musicians are better at picking out a person's voice in a noisy background.

Music Therapy • Listening to and making music on your own can bring health benefits. But some people may also benefit from the help of a board-certified music therapist. Music therapists are trained in how to use music to meet the mental, social, and physical needs of people with different health conditions.

"Music therapy can take many forms that go beyond listening to music," explains Dr. Sheri Robb, a music therapist and behavioral intervention researcher at Indiana University.

Music therapists can use certain parts of music, like the rhythm or melody, to help people regain abilities they've lost from a brain injury or developmental disability. For example, a person who's had a stroke may be able to sing words, but not speak them.

Music therapists also rely on the social qualities of music. Shared musical experiences can help a family member connect with a loved one who has dementia. Music can also be used to help young people with behavior disorders learn ways to manage their emotions.

Robb's research focuses on developing and testing music therapy interventions for children and teens with cancer and their families. In one study, music therapists helped young people undergoing high-risk cancer treatments to write song lyrics and create music videos about what was most important to them.

"With the help of music therapists, these teenagers were able to identify their strengths and positive ways to cope, remain connected with family and friends, and improve communication during a challenging time," Robb explains.

Music in Your Life • Music can offer many health benefits, but it may not be helpful for everyone. Traumatic injuries and brain conditions can



Wise Choices Live With Music

Ways to add more music to your life:

- Listen to music during the day, like on your way to work or during exercise.
- Sing and dance while you're doing chores or cooking meals.
- Play a musical instrument. Consider taking lessons or joining friends to make music.
- Attend concerts, plays, and other community music activities in your area.
- Encourage your kids to listen to music, sing, play an instrument, or participate in music programs at school.
- Ask your doctor if music therapy is right for you. Consider working with a board-certified music therapist to improve your health.

change the way a person perceives and responds to music. Some people may find some types of music overstimulating. Others may find that certain music brings up emotional or traumatic memories.

"It's important for healthcare providers to identify and understand when music isn't helpful and may be harmful," Robb says. "And this is an area where music therapists can be helpful."

As scientists continue to learn more about music and the brain, try striking a chord for your health. Whether you're looking to boost your mood, stay connected to others, or improve symptoms of a health condition, add a little music to your life.

"Think of music like physical fitness or what you eat," Kraus says. "To see the most health benefits, try to include music as a regular, consistent part of your life. It's never too late to add music to your life." ■

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**Web
Links**

For more about music and health, see "Links" in the online article: newsinhealth.nih.gov/2018/01/sound-health

Cancer Care Gets Personal

How Tumor Treatments Are Changing

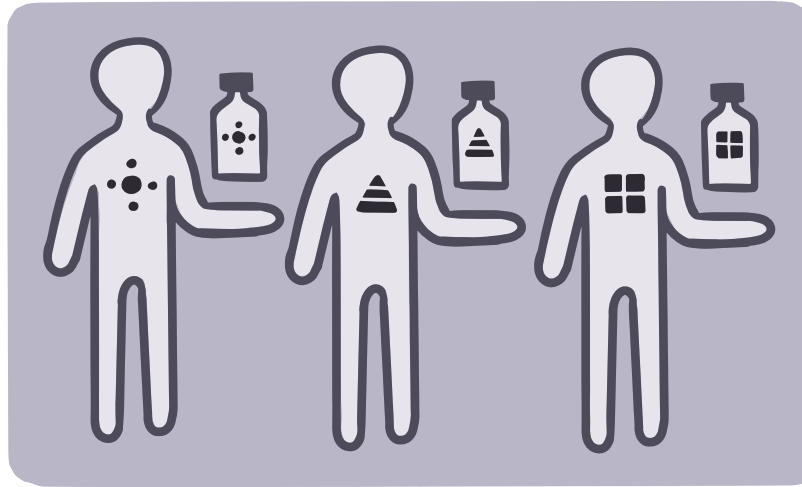
Last year more than 1.7 million people were diagnosed with cancer in the United States. Cancer can be difficult to treat because each tumor is unique. Scientists are now gaining a better understanding of the changes that lead to cancer—and figuring out how to target them for personalized treatments.

“Cancer treatment is changing at a very fast pace,” says Dr. Patricia M. LoRusso, an NIH-funded cancer treatment expert at Yale Cancer Center. “What somebody got a year ago may not necessarily be the same treatment recommended for another person today.”

For decades, doctors have treated cancers based on where a tumor first started, such as in the lung or colon. But often, a treatment that works well for one person doesn't work as well for another.

Research has revealed that each tumor has a unique combination of **genetic** changes. Cancer is caused by changes in genes that control the ways cells grow and survive. The cells begin to divide without stopping. They form growths called tumors, and some spread to other parts of the body.

The genetic changes that cause cancer are most often from exposure to sunlight, tobacco, and other things in the environment that can



Another approach researchers are taking is to use a patient's own disease-fighting cells, called immune cells, to find and kill cancer cells in their body. Scientists have successfully inserted cancer-fighting genes into a patient's immune cells. Two such therapies were recently approved by FDA. They are the first two gene therapies ever approved by FDA.

damage genes. But some cancer-causing genes can also be passed down from your parents.

These insights have led scientists to look for the unique genetic features of each person's tumor and then attack those specifically.

“Many times, we're trying to turn off certain pathways in the tumor that are activated and that cause it to continue to grow,” LoRusso says. This type of treatment is called “targeted therapy” because the drugs target the specific changes in cancer cells that help them to survive and spread.

Doctors can now send a sample of the tumor to a lab to identify important genetic changes. The doctor can then match the unique changes with the treatment that is most likely to help.

“There are several drugs that are now on the market that have made a huge impact in the treatment of several types of cancer,” LoRusso says.

Genetic testing isn't available yet for many types of cancer. NIH-funded studies are looking for ways to develop targeted therapies for more cancer types.

Cancer treatment is changing very quickly. Ask your doctor about the newest treatments for your type of cancer.

“It's your right and responsibility to make sure you're getting the right treatment, and that may involve wanting to get a second opinion,” LoRusso advises. Most doctors welcome a second opinion.

For tips on how to find a cancer specialist and learn about your treatment options, see the Wise Choices box. ■



Wise Choices

Find a Cancer Doctor

To find a cancer specialist, you can ask for help from:

- your doctor.
- a nearby hospital.
- your local or state medical society.
- a nearby medical school.
- NIH's National Cancer Institute. Visit www.cancer.gov/contact or call 1-800-4-CANCER.

Definitions

Genetic

Having to do with genes, stretches of DNA you inherit from your parents that define features, like your risk for certain diseases.



Web Links

For more about cancer treatments, see “Links” in the online article: newsinhealth.nih.gov/2018/01/cancer-care-gets-personal



Health Capsules

For links to more information, please visit our website and see these stories online.

Experts Lower “High” Blood Pressure Numbers

You probably get your blood pressure checked every time you go to the doctor. Having high blood pressure increases your chances of heart attacks, strokes, kidney disease, and other serious health problems. After studying the results from hundreds of studies, experts recently changed the definition of high blood pressure.

Blood pressure is measured in two numbers, like 120/80 mm Hg. The first number is the pressure that the heart uses to push blood through your arteries. The second number

is the pressure when the heart is at rest between beats. Normal blood pressure for an adult is below 120/80.

NIH-sponsored research played an important role in providing evidence that the definition of high blood pressure should be changed. Before the guideline changed in November, the definition of high blood pressure was 140/90. Now, high blood pressure is defined as 130 or higher for the first number, or 80 or higher for the second number.

If you have high blood pressure, your doctor may suggest changes to your diet and physical activity. If lifestyle changes don't work, medicines can help.

“Only about half the people in the country who have high blood pressure are controlled to recommended levels,” says NIH heart disease expert Dr. David C. Goff, Jr. “We could prevent a lot more heart attacks and strokes if more people had their blood pressure well controlled.” ■

Become Your Healthiest Self

Make better health your resolution all year round. You can learn simple ways to prevent disease and improve your relationships, emotional well-being, physical health, and surroundings.

Check out NIH's “Your Healthiest Self: Wellness Toolkits” for science-based health tips in five different areas. Each area has checklists of

tips you can print for yourself or share with others. The wellness toolkits also link to dozens of NIH resources, fact sheets, and articles for more information.

For example, find out how to limit your exposure to harmful substances in your home. Get advice for managing stress and adapting to change. Or learn how friends

and family can help you gain better health habits.

Good health means more than preventing and treating disease. It also means striving for well-being in all areas of your life. Small changes can add up fast. Find ways to start becoming your healthiest self. Go to www.nih.gov/wellnesstoolkits. ■



Featured Website

PregSource

pregsource.nih.gov

How common is morning sickness? How does pregnancy affect sleep? Does chronic disease or disability change the pregnancy experience?

Pregnant women are helping researchers answer questions like

these by joining the PregSource research project. It is free to join, and all information is kept confidential. Plus, it offers health trackers, reliable health information, and the chance to share your experiences.



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