

FALL 2018

NIH MedlinePlus

MAGAZINE

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COVER STORY

Soprano **Renée Fleming** partners with
NIH to explore sound, health, and

THE POWER OF MUSIC



Above and below: NIH Director Francis Collins, M.D., Ph.D., and Renée Fleming perform at the 2017 event.

‘Music and the Mind’: Kennedy Center and NIH Event Explores How Sound Impacts Our Health

THIS SEPTEMBER, the National Institutes of Health (NIH) welcomed leading musicians, researchers, and guests from around the country to the John F. Kennedy Center for the Performing Arts in Washington, D.C., to celebrate a unique area of research: How sound impacts our health.

“Music and the Mind: Shaping Our Children’s Lives Through Music Engagement,” featured musicians and neuroscientists exploring how music, rhythm, and brain development work together. This marked the second annual NIH Sound Health event; the first took place in June 2017.

The special event was co-hosted by CNN Chief Medical Correspondent Sanjay Gupta, M.D., and featured the cover star of this issue of the magazine, Renée Fleming. Grateful Dead band member Mickey Hart, jazz pianist Jason Moran, and other well-known artists.

The event also highlights a growing area of research at NIH.

Music therapy has already shown early promise for autism, stroke, and chronic pain. But researchers at NIH—through the Sound Health research initiative—are trying to better understand and track these links.

In this issue, Fleming discusses how she and NIH Director Francis Collins, M.D., Ph.D., developed the sound health partnership. She also shares what it was like working with NIH researchers and undergoing a functional magnetic resonance imaging, or fMRI, scan to see what our brains reveal when we sing.

Keep reading to learn more about this and other promising new research NIH is supporting.

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NIH MedlinePlus magazine is published by
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FALL 2018
Volume 13
Number 3

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NEWS,
NOTES,
& TIPS
FROM NIH

New Shingles Vaccine Over 90% Effective

HEALTH TIPS Recently, shingles has made headlines because of a new vaccine that was approved in 2017: the recombinant zoster vaccine, or Shingrix.

According to the Centers for Disease Control and Prevention (CDC), two doses of the new vaccine are more than 90 percent effective at preventing shingles and its side effects.

Shingles is a painful, often debilitating rash that affects roughly 1 million people each year. Luckily, getting vaccinated can help you prevent it and stop shingles from spreading.

To help explain more about how shingles spreads and what it is, we've gathered key information from MedlinePlus and the National Institute of Neurological Disorders and Stroke.

What is shingles?

Shingles is a rash or blisters on the skin that initially can cause burning, itching, and even numbness. Shingles often happens on one side of the body. Some people may also have a fever, headache, chills, and an upset stomach.

Shingles comes from the same virus—herpes varicella zoster—that causes chickenpox.

Chickenpox usually happens in kids under 15 and creates an itchy, uncomfortable rash that turns into blisters. There is a vaccine for chickenpox that can prevent or lessen symptoms for most people.

After chickenpox goes away, the



Shingles is a painful rash on the skin that comes from the same virus that causes chickenpox.

virus remains in a dormant state in our nerve cells, ready to strike again in later life. This second eruption of the chickenpox virus is called shingles.

Who gets shingles?

Shingles occurs when something triggers the virus to become active again. You can't get shingles unless you've been exposed to chickenpox. Roughly 25 percent of all adults will get shingles during their lifetime, usually after age 50. You're more likely to get it as you get older. In fact, shingles is 10 times more likely to occur in adults over 60 than in children under 10.

Most adults who have the dormant virus in their body never get shingles.

What are the complications?

Postherpetic neuralgia (PHN) is the most common complication of shingles. Symptoms include severe pain in the areas where you had the shingles rash. Some patients' pain is so severe, it hurts to put on clothing. It usually gets better in a few weeks.

Shingles can sometimes cause vision loss or hearing problems if it happens near your eyes or ears. Very rarely, shingles can also lead to pneumonia, brain inflammation, or death.

How is shingles treated?

You can shorten and improve a shingles attack by quick treatment with antiviral drugs. Those include acyclovir, valacyclovir, or famcyclovir.

Pain medicine can relieve some of the pain caused by shingles. Wet compresses, calamine lotion, and oatmeal baths may help relieve some of the itching.

For most healthy people who receive treatment quickly, the pain should subside within three to five weeks and the blisters often leave no scars.

If you think you may have shingles, call your health care provider as soon as possible to discuss treatment options.

Can shingles be prevented?

The only way to reduce the risk of developing shingles or PHN is to get vaccinated.

The new recombinant zoster vaccine, Shingrix, and the zoster vaccine live, Zostavax, are both approved by the Food and Drug Administration to prevent shingles for most adults age 50 and older.

The CDC recommends that healthy adults 50 years and older get two doses of the Shingrix vaccine to protect against shingles and its potential complications. The vaccine is available in pharmacies and doctors' offices. ■

SOURCES: MedlinePlus: Shingles; National Institute of Neurological Disorders and Stroke: Shingles Vaccination; Centers for Disease Control and Prevention: Shingles (Herpes Zoster)

DID YOU KNOW?



There are an estimated **1 million** cases of shingles each year in the U.S.

Falling Back: Seasonal Affective Disorder

BY THE NUMBERS This November most of us will turn back the clocks as daylight savings time ends, a sign that winter, cooler temperatures, and shorter days are approaching.

Despite the holidays and celebrations that take place during this time of year, winter can often take a toll on our mental health.

Seasonal affective disorder, or SAD, is a type of depression that comes and goes with the seasons. Usually SAD affects people during the fall and winter months, when it gets colder and darker. But some people also get it during the spring and summer.

Treatment for SAD can include light therapy, medication, and psychotherapy.

If you think you are experiencing SAD-related depression or any other type of depression, be sure to see a health care provider.

Seasonal affective disorder affects an estimated **10 million** Americans.



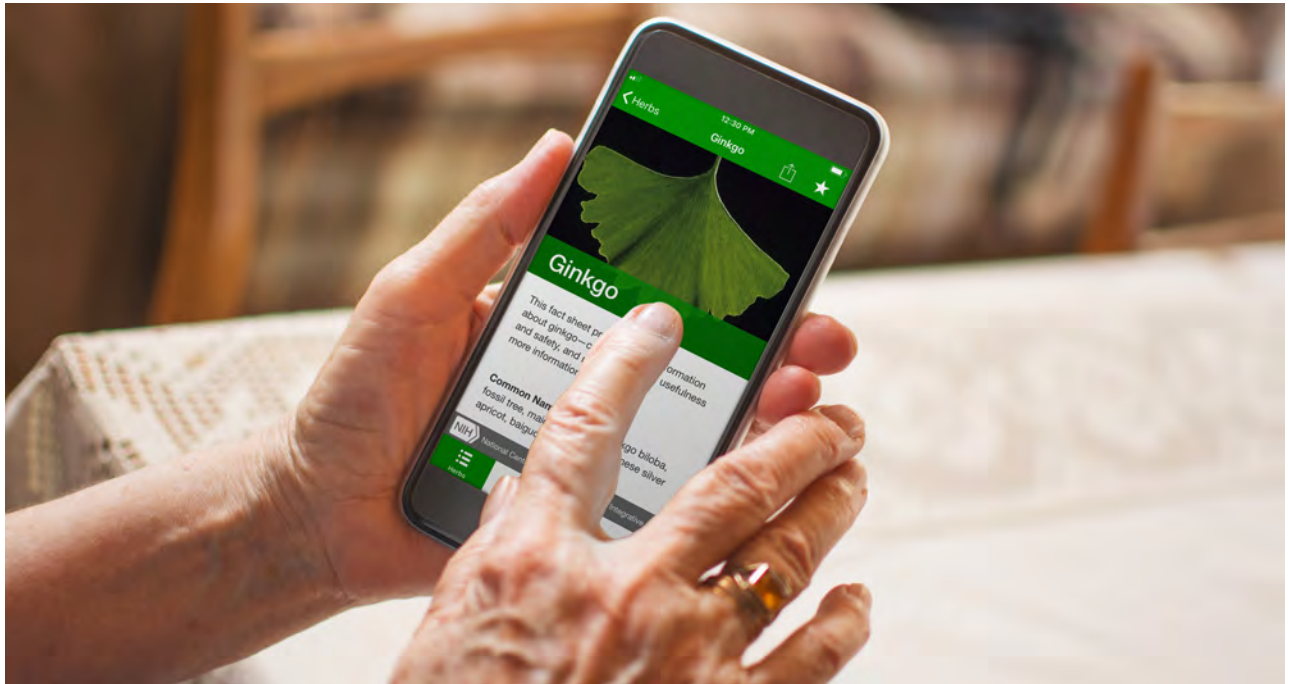
SAD is diagnosed **four times more often in women** than men.

30 minutes of light therapy each day is often prescribed to patients with SAD.



SOURCES: MedlinePlus: Seasonal Affective Disorder; National Institute of Mental Health: Seasonal Affective Disorder

What's in that Supplement? Ask the HerbList App



NEW AT NIH Wandering down the vitamin aisle and have questions about a supplement? The National Institutes of Health (NIH) has an app for that.

NIH's National Center for Complementary and Integrative Health (NCCIH) launched the HerbList™ app this summer.

The app uses research-driven NIH resources to provide overviews of more than 50 herbal supplements for everyone from consumers to health care providers.

We spoke to NCCIH to find out more.

Why did you decide to make the app?

"In a survey NCCIH conducted with the Centers for Disease Control and Prevention, we found that one in five Americans uses herbs or herbal supplements, spending nearly \$13 billion in out-of-pocket costs annually," said David Shurtleff, Ph.D., acting director of NCCIH.

"It's important that people have the most up-to-date, evidence-based information on what we know about how it works, herb-drug interactions, safety information, and possible side effects," added Dr. Shurtleff. "HerbList™ provides this information in an easy-to-use app."

What can I learn from the app?

HerbList™ allows you to quickly access information about the science of more than 50 popular herbs and herbal supplements such as kava, acai, ginkgo, and turmeric.

What resources are on the app?

It features scientific, research-driven, unbiased information to help consumers make informed decisions about supplement use.

The app was built using NCCIH's Herbs at a Glance, a series of fact sheets that provide basic information about specific herbs or botanicals.

This includes common names, what the science says, potential side effects and cautions, and resources for more information.

How can you get the app?

HerbList™ is free. You can download it on your iPhone or iPad from the Apple App Store or to your Android device via Google Play.

When considering any herbal supplement or any complementary health approach, discuss it with your health care provider first. ■

SOURCES: News Releases: NIH launches HerbList, a Mobile App on Herbal Products



St. John's Wort is one of the more than 50 herbs and herbal supplements listed in the app.

New NIH Study Zeroes in on Prostate Cancer in African-American Men

RESEARCH Fifteen percent of African-American men will develop prostate cancer in their lifetime. They're also more likely to be diagnosed with a more aggressive form of the disease than white men.

To help combat this, NIH is launching one of the largest coordinated studies on aggressive prostate cancer in African-American men.

The \$26.5 million study is called RESPOND, or Research on Prostate Cancer in Men of African Ancestry: Defining the Roles of Genetics, Tumor Markers, and Social Stress.

RESPOND investigators aim to enroll 10,000 participants through the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) Program and the Centers for Disease Control and Prevention's National Program of Cancer Registries.

NCI and the National Institute on Minority Health and Health Disparities are supporting the research, along with the Prostate Cancer Foundation. The NCI support will be provided from Cancer Moonshot funding authorized in the 21st Century Cures Act. ■

SOURCES: NIH News Releases: NIH and Prostate Cancer Foundation Launch Large Study on Aggressive Prostate Cancer in African-American Men; National Cancer Institute: Examples of Health Disparity



HERE'S A HEALTH TIP: SIGN UP FOR THE 'MY MEDLINEPLUS' NEWSLETTER

NEW AT NIH Check your inbox every Wednesday for a new newsletter from MedlinePlus and the National Library of Medicine.

My MedlinePlus is a weekly newsletter featuring the latest and greatest from MedlinePlus.

It includes information on diseases and conditions, tips on health and wellness, recipes, and more.

Sign up by visiting <https://medlineplus.gov/mymplusnewsletter.html> or <https://medlineplus.gov/spanish/mymplusnewsletter.html> (en español). ■



A Silent Killer

Exploring the impact of deep vein blood clots

Deep vein thrombosis (DVT) is a blood clot that forms in a vein deep in the body. Blood clots happen when blood thickens and clumps together.

Clots can cause symptoms like swelling, discomfort, cramps, and redness or discoloration on the leg. But many cases—up to 50 percent— may go unnoticed. In fact, some people may not realize they have a clot or symptoms of a clot until it develops into something more serious.

Blood clots most often happen in the veins, instead of the arteries, because blood travels slower than in the arteries. However, blood clots in the arteries can also happen.

Most deep vein blood clots happen in the lower leg or thigh. This is because blood pressure in our veins is lower in the areas of the body that are farther away

from the heart. So, our leg veins are more susceptible to situations where blood flow can be interrupted.

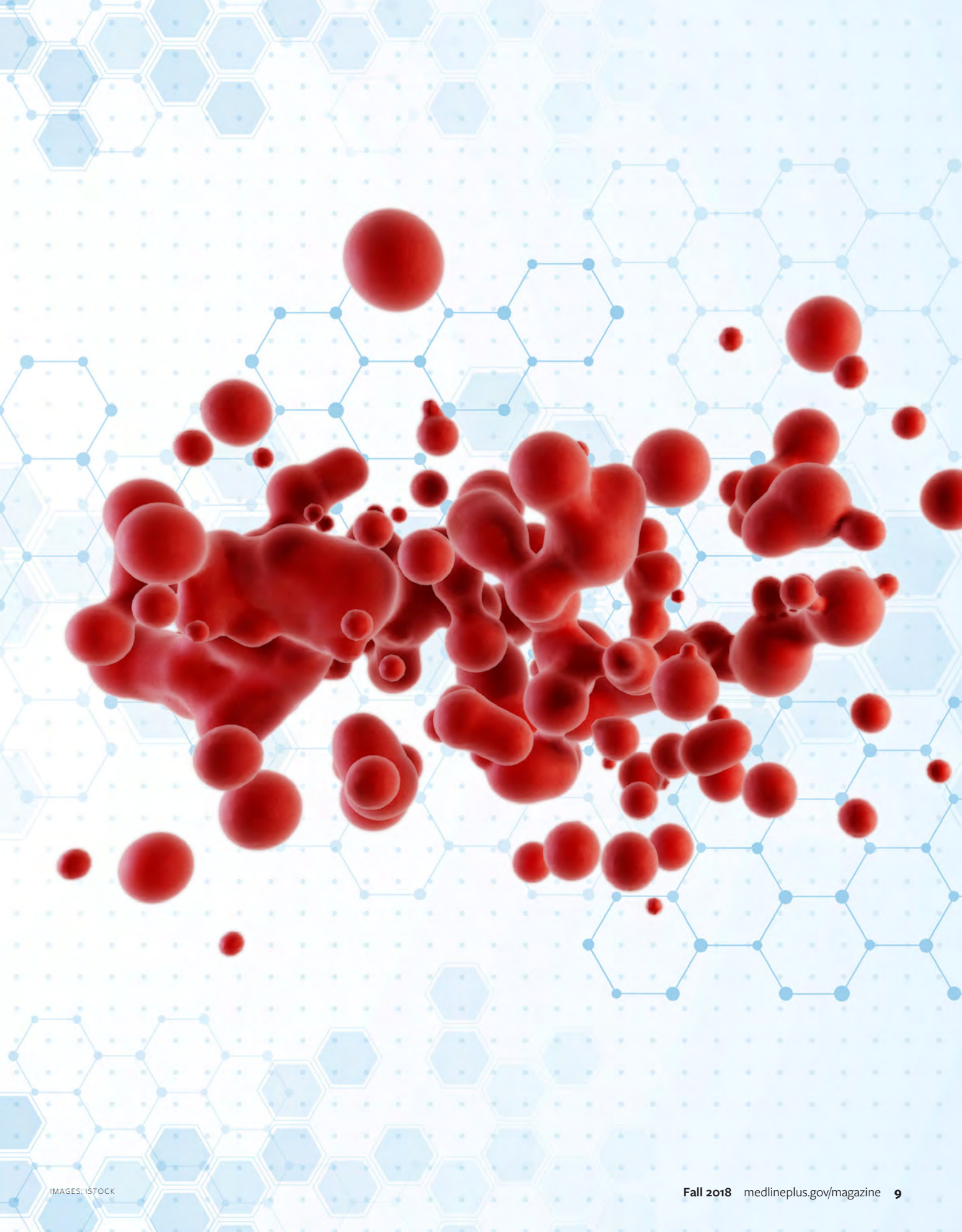
Some blood clots can break off and travel through the bloodstream. This loose clot is called an embolus.

An embolus can be very dangerous. Sometimes they travel to an artery in the lungs and block blood flow. That creates what's called a pulmonary embolism (PE). A PE can damage the lungs and other organs in the body and cause death.

While DVT and PE can affect anyone, your risk of a blood clot is higher if you've been traveling for long periods of time, have been ill and in bed for a while, or have had surgery. Chronic heart conditions, cancer, stroke, and paralysis (not being able to move) can also increase your chances of getting a clot.

“Only about half of the people who have DVT have signs and symptoms.”

— Andrei Kindzelski, M.D., Ph.D., Program Director in the Division of Blood Diseases and Resources at the National Heart, Lung, and Blood Institute



Deep Vein Thrombosis and Pulmonary Embolisms: An Overview

Causes

“Arrhythmias of the heart, certain cancers, sitting for long, uninterrupted periods of time—all are risk factors,” says Andrei Kindzelski, M.D., Ph.D.

Dr. Kindzelski is the program director in the Translational Blood Science and Resources Branch of the National Heart, Lung, and Blood Institute.

During long periods of physical inactivity, exercise can help prevent development of DVT, he noted.

“I’m glad to see certain technologies, like fitness trackers, that monitor your activity and remind you to get up and move around,” he said.

Other causes include:

- A vein’s inner lining is damaged from surgery, serious injuries, inflammation, or immune responses.
- Blood flow is sluggish or slow. Lack of motion can cause slow blood flow. This can happen after surgery, if you’re ill and in bed for a long time, or if you’re sitting on a plane or a long car ride.
- Your blood is thicker or more likely to clot than normal. Some inherited conditions increase the risk of blood clotting. Hormone therapy or birth control pills may also increase the risk of clotting.

Signs and symptoms

Dr. Kindzelski says only about half of the people who have DVT have signs and symptoms. They include:

- Swelling of the leg or along a vein in the leg
- Pain or tenderness in the leg, which you may feel only when standing or walking
- Increased warmth in the area of the leg that’s swollen or painful
- Red or discolored skin on the leg

Some people aren’t aware of a deep vein clot until they have signs and symptoms of a PE. Signs and symptoms of a PE include:

- Unexplained shortness of breath
- Pain with deep breathing
- Coughing up blood
- Rapid breathing and a fast heart rate



Andrei Kindzelski, M.D., Ph.D., is the program director in the Division of Blood Diseases and Resources at NHLBI.

Both DVT and a PE can cause serious or life-threatening problems if not treated.

See your provider right away if you have signs or symptoms of either.

Diagnosis

Your doctor will diagnose DVT based on your medical history, a physical exam, and test results.

He or she will identify your risk factors and rule out other causes of your symptoms. For some people, DVT might not be diagnosed until after they receive emergency treatment for a PE.

Treatment

Doctors treat DVT with medicines and other devices and therapies. The main goals of treating DVT are to:

- Stop the blood clot from getting bigger
- Prevent the blood clot from breaking off and moving to your lungs
- Reduce your chance of having another blood clot

Medicines and treatments include:

Anticoagulants

Anticoagulants are the most common medicines for treating DVT. They're also known as blood thinners. They decrease your blood's ability to clot and prevent clot formation in patients at risk for DVT. They stop existing blood clots from getting bigger and help dissolve them to re-establish the blood flow in the affected area.

Thrombin Inhibitors

These medicines interfere with the blood clotting process. They're used to prevent blood clots in patients who can't take certain blood thinners.

Thrombolytics

Thrombolytics dissolve large blood clots that cause severe symptoms. Because thrombolytics can cause sudden bleeding, they're used only in clinically significant situations. Thrombolytics may be administered generally through a vein or using specialized catheters to deliver medication directly where the clot is located.

Vena Cava Filter

If you can't take blood thinners or they're not working well, your doctor may recommend a vena cava filter. The filter is inserted inside a large vein called the vena cava. The filter catches blood clots before they travel to the lungs, which may lead to a PE. However, the filter doesn't stop new blood clots from forming.

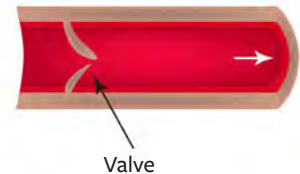
Graduated Compression Stockings

Graduated compression stockings can reduce risk of formation of the blood clot and leg swelling. These stockings are worn on the legs from the arch of the foot to just above or below the knee. They are tight on the ankle and become looser as they go up the leg. This creates gentle pressure up the leg. The pressure keeps blood from pooling and clotting. ■

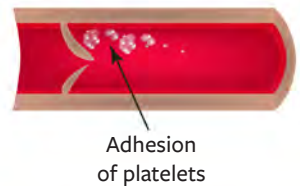
SOURCES: National Heart, Lung, and Blood Institute: Venous Thromboembolism; NIH News in Health: Deep Vein Thrombosis

How a Blood Clot Forms

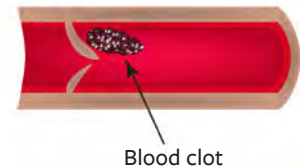
Normal blood flow



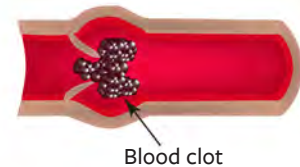
Increased blood platelet



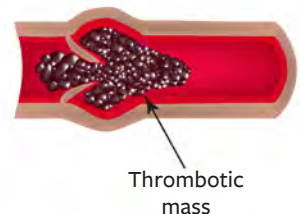
The formation of a blood clot



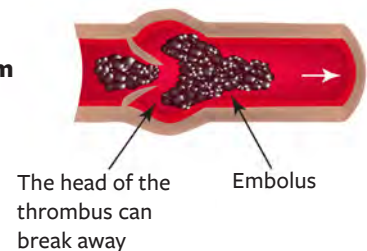
Increased blood clot



Formation of thrombotic masses



Embolism



NIH Searches for Improved Blood Clot Treatment and Diagnosis

Studies work to change outcomes

The Centers for Disease Control and Prevention estimates that nearly 900,000 people each year will develop deep vein thrombosis (DVT) or a pulmonary embolism (PE) in the U.S. Even more startling: Up to 100,000 people may die annually from one or both of these conditions.

Because of the prevalence and seriousness of vascular disorders like these, NIH is working to improve diagnosis, treatment, and prevention through clinical trials and other studies.

ATTRACT trial

DVT—or a blood clot, usually in the legs—can be treated with either a blood thinner or the combination of blood thinners and a procedure that uses catheters to break up clots in a vein. The procedure is called catheter-directed thrombolysis.

During this procedure, health care providers insert a catheter into your leg to administer so-called “clot-busting” drugs directly into the clot, breaking it up, and allowing some of it to be sucked out of the vein through the catheters.

The findings from a recently completed trial—known as the ATTRACT trial for short—suggest that this procedure is often not needed. The trial is supported in part by NIH’s National Heart, Lung, and Blood Institute (NHLBI).

“Many clinics and hospitals rush into using the catheter-directed thrombolysis procedure as a first-line treatment to prevent the long-term complications of chronic swelling, pain, and discomfort, called post-thrombotic syndrome,” said Stephan Moll, M.D. “But we found that rush to be unwarranted.”

Dr. Moll is a professor of medicine and member of the UNC Hemophilia and Thrombosis Center at the UNC School of Medicine.

“The ATTRACT trial also demonstrated that while catheter-directed thrombolysis may not be optimal as a first-line treatment for general DVT, it may be substantially more effective in treating some specific DVT cases,” said NHLBI’s Andrei Kindzelski, M.D., Ph.D.

“This is being investigated currently in another NHLBI-supported clinical trial, known as the C-TRACT,” Dr. Kindzelski added.

VITA program

Another NHLBI-supported research program looking to improve treatment for vascular disorders is the Vascular Interventions/Innovations and Therapeutic Advances (VITA) Program.

One of VITA’s other main goals is developing treatment for those with unmet medical needs. It connects the basic science of disease with human medicine.

“The program is unique in its mission to create innovation and accelerate research across the entire spectrum, bridging basic to clinical, clinical to practice, and population to health impact,” Dr. Kindzelski said.

The VITA program supports a number of translational research projects. One of them is led by Thomas Wakefield, M.D., and Daniel D Myers D.V.M., M.P.H. Their team performs vascular surgery research in the Conrad Jobst Research Laboratory at the University of Michigan. While they’ve been studying DVT for decades, they weren’t able to get funding support needed to translate their discoveries into clinical practice.

That’s where VITA came in.

“The VITA program allowed us to take a concept that we have been working on since the early 90s and move it into a study with human volunteers and two patients who actually had DVT,” Dr. Wakefield said. “It’s a very unique opportunity.”

They are testing new medicines that can prevent or break up blood clots—without increasing bleeding.



Leading vascular researcher Thomas Wakefield, M.D., performs surgery.

Going forward, Dr. Wakefield sees even more change coming to vascular research through programs like VITA. That includes an increased focus on personalized medicine, such as biomarker research, and a greater emphasis on coordinated research.

“I think we will see more team science in the next 10 to 20 years in all areas

of research—including vascular research,” Dr. Wakefield said. “We see the best and fastest answers when a group of people who have different viewpoints and who bring different skills come to the table to address a problem.” ■

SOURCES: Centers for Disease Control and Prevention: Venous Thromboembolism (Blood Clots) <https://www.cdc.gov/ncbddd/dvt/data.html>

Struggling to Breathe: A Battle with Deep Vein Thrombosis

Michael Morizio was close to heart failure following a long-distance flight



Michael Morizio during a trip to Abruzzo, Italy.

“I was headed toward pulmonary heart failure.”

— Michael Morizio

Michael Morizio knows how quickly life can change.

In August 2017, Michael was playing the kind of competitive tennis he had enjoyed for most of his life. A month later, he was struggling for every breath. He almost died.

The problem began with a simple fracture of a bone in his right foot, which happened during a tennis match.

“As I lunged for the ball, I made a small misstep and felt something hurt in my right foot,” Michael says. His physical therapist fitted him with a walking cast.

By early September, Michael felt well enough to take off the cast and lead—with wife Nancy—a tour of Italy. The couple had already hosted numerous tours of the country and own a house there.

But after the transatlantic flight from Boston to the Abruzzo region of Italy, two hours east of Rome, he noticed that his breathing was difficult. Every day it seemed to get worse.

“By the fifth day, after increasing breathlessness, I could not go out with our tour group,” he says. “I would take a few steps and have to sit down.”

Michael finally realized something was wrong with his lungs.

A local doctor diagnosed the problem immediately: deep vein thrombosis (DVT). The DVT also resulted in a pulmonary embolism, (PE). The combination of his right leg’s immobility and the long jet flight had resulted in a perfect recipe for DVT and a PE.

One or more blood clots had formed in a deep vein of his right leg. It had then broken free and was preventing blood flow to his lungs and heart.

“I was headed toward pulmonary heart failure,” Michael says.

Michael was immediately taken to Ospedale Santissima Annunziata, the main hospital in Sulmona, Abruzzo. They told his wife that he had less than a 10 percent chance of survival.

He spent the next 11 days there. His doctors, Ezio De Pratti, M.D., and Rosella D’Angelo, M.D., prescribed the precise medications and rest for him as they worked to help the clot shrink and pass.

“My cardiologist there and the entire hospital staff worked miracles on me,” he says.

His health care team told him that if he had he taken a blood thinner, like

aspirin, worn a compression stocking on his right leg during the flight, and got up to walk around every hour or so, he could have most likely avoided DVT.

PERSONAL
STORY

Michael had to avoid flying for several months. Six months later, his breathing was still only about 80 percent normal. He still felt winded while walking. And tennis was out.

Michael and Nancy are planning to lead their next tour to Abruzzo this fall, almost a year to the day of their last trip.

Michael will wear compression stockings and move around more during the long flight. He also remains on a prescribed anti-coagulant. He’ll breathe easier this time. ■

Find Out **More**

- ▶ **MedlinePlus:**
Deep Vein Thrombosis
<https://medlineplus.gov/deepveinthrombosis.html>
- ▶ **MedlinePlus:**
Pulmonary Embolism
<https://medlineplus.gov/pulmonaryembolism.html>
- ▶ **National Heart, Lung, and Blood Institute:**
Deep Vein Thrombosis
<https://www.nhlbi.nih.gov/health/health-topics/topics/dvt>
- ▶ **National Heart, Lung, and Blood Institute:**
Pulmonary Embolism
<https://www.nhlbi.nih.gov/health-topics/pulmonary-embolism>

The **POWER** of Music

Soprano Renée Fleming teams with
NIH on Sound Health initiative

Renée Fleming is one of the most acclaimed singers of our time. She's thrilled audiences around the world in concert halls, opera houses, movies, and on Broadway.

Now she is working with NIH, the John F. Kennedy Center for the Performing Arts (in association with the National Endowment for the Arts) on the Sound Health initiative. This initiative is a new effort to better understand the connection between music and the brain and to improve health and wellness through music. Fleming spoke with NIH MedlinePlus about Sound Health.

Tell us about meeting NIH Director Francis Collins, M.D., Ph.D., and the role it played in getting all this started.

A small group of extraordinary people were having dinner, including several justices of the U.S. Supreme Court. And it just so happened it was the evening after several very divided court decisions were announced. The atmosphere was a bit tense. But music changed that. Dr. Collins had brought his guitar. It turned out to be quite a sing-along.

Singing changed everyone's moods and the atmosphere into a fun, delightful evening. It was a magical experience, which reinforced the power that music has over us. At that dinner the idea for Sound Health was hatched.





Renée Fleming performs at the 2018 “Capitol Fourth” celebration in Washington, D.C.

“I am learning something new every day that I’m involved with this fascinating work.”

— Renée Fleming

Dr. Collins and I started talking about my fascination with recent studies published about the power of music and the brain. I had just taken an advisory position with John F. Kennedy Center for the Performing Arts and suggested that maybe NIH could collaborate with the Kennedy Center to expand what we know about music and health. He enthusiastically agreed, and we have been working together ever since.

What drives your interest in this research?

I feel strongly that the arts have a great deal to offer for improving health and wellness.

For singers, our instrument is internal and very challenging to control. That’s because it is mostly run by involuntary muscles. You’d be amazed at what we have to do to produce a classically trained voice (without the aid of microphones) in a large space like an opera house. My interest is driven by that and my thinking about the psychological aspects of performance pressure.

I am learning something new every day that I’m involved with this fascinating work.

You underwent an MRI at NIH to add to the research on music and health. Can you tell us about that and what you learned?

Yes. I don’t think I quite knew what I had signed up for! I didn’t realize I would be in the machine for two hours. Both the scientists and I were surprised that the MRI showed my brain was most active when I imagined myself singing. More than even when I actually spoke or sang!

What are your dreams about what Sound Health could lead to?

My initial dream had to do with advocating for music in the arts through science. In every city I perform I invite researchers, scientists, and music therapists to present and lead discussions. The audiences are fascinated by these discussions.

I would also like to create a way to bring the disciplines of music and science together. It is happening. Recently we brought music therapists to NIH for the first time to meet with scientists and researchers.

Ultimately I hope that we’ll improve the health and well-being of people. One practical example is that it would be great if music therapy was more widely available to help people.

I saw a video of a man who had a stroke learn to speak again in just two minutes with the help of a music therapist. I wondered how many people have suffered and not regained their speech because they didn’t know about or have access to music therapy.

Do you have a message for our readers about what they can do in their own lives to further the goals of Sound Health?

Play an instrument, join a choir. Making music together is a great way to create community, not through technology, but face to face. It is also great for brain health and vibrancy.

How has Sound Health changed your understanding of the work that NIH does?

Lots of people don’t know what NIH is and what it does. I had no idea how broad a reach NIH has and that it is the largest funder of medical research in the world. We have made great strides in medicine because of the work that NIH has done and is doing. I love that NIH sees its work in terms of how we can make life better and improve the quality of our lives. ■



NIH Director Francis Collins, M.D., Ph.D. (left center), and Renée Fleming (right center) perform at NIH's 2017 Sound Health event with other event leaders.

NIH-Kennedy Center Initiative Explores ‘Music and the Mind’

Work combines workshops, performances, and research

Can music help us learn? Can it ease chronic pain? Can it improve your health in general?

These are important questions being studied by the National Institutes of Health (NIH) and the John F. Kennedy Center for the Performing Arts, in collaboration with the National Endowment for the Arts.

The joint initiative, Sound Health, is exploring the intersection between music, the brain, and wellness. It brings together leading researchers, music therapists, and artists to better understand the impact of art on the mind and body.

Just this fall, NIH announced that it would be supporting up to 5 million dollars for research exploring music's impact on our health.

How sound affects the brain

“One of the aspects that makes this field so exciting is the potential broad impact, from basic science to enhanced therapies, and across the lifespan from newborns to aging populations,” says Thomas Cheever, Ph.D.

Dr. Cheever is staff assistant to Dr. Collins for the Sound Health initiative and director of the Muscle Disorders and Therapies Program at the National Institute of Arthritis and Musculoskeletal and Skin Diseases.

“For example, there are stroke survivors who know what they want to say but can't speak it. That is called Broca's Aphasia,” Dr. Cheever says. “The part of the brain that allows ordinary speech is damaged. In one example, a patient who wants to say, ‘I am thirsty,’ can't say it, but, when it's attached to a melody, can sing it, and this can translate into improved speech during recovery.”

Broca's Aphasia and related topics were included in a June 2017 article about the initiative in the *Journal of the American Medical Association*. The article was written by NIH Director Francis Collins, M.D., Ph.D., and world-renowned soprano Renée Fleming.

Dr. Collins has also established a trans-NIH working group to further support and develop this research area. The response, notes Dr. Cheever, has been remarkably widespread across NIH institutes, centers, and offices.

“We've studied, at some levels, how music and the brain interact, but we really haven't had the tools to look at it as precisely as we can now,” Dr. Collins says.

Using things like music therapy and imaging technology, scientists (including some supported by NIH) are starting to understand how sound impacts health and well-being.

“We can both care about the arts, and we can care about science. And we can look at a place where they intersect as an exciting opportunity to observe what being human is all about.”

– Francis Collins, M.D., Ph.D.

“Using new imaging technologies, scientists have documented how early musical training produces actual anatomic changes in the brain,” says Dr. Collins.

“A growing number of reports are appearing where music therapy has provided benefit to individuals with medical conditions as diverse as autism, chronic pain, and stroke,” he explains. “But there is so much we still don’t know about the effects of music in health broadly, and this partnership will help us to explore this uncharted territory.”

‘Music and the Mind’

Music and health research has extended beyond the lab and onto the stage.

On Sept. 6 and 7, 2018, NIH hosted the second annual “Sound Health: Music and the Mind” event, a series of performances, lectures, and hands-on workshops at the Kennedy Center in Washington, D.C.

The event brought leading researchers in the field and performers to explore the intersection of music and science.

“We can both care about the arts, and we can care about science. And we can look at a place where they intersect as an exciting opportunity to observe what being human is all about,” Dr. Collins says.

The event looked at many types of sound and health interactions, including:

- **Science of rhythm:** Neuroscientists Nina Kraus, Ph.D., and Adam Gazzaley, M.D., Ph.D., were joined by legendary drummer of the Grateful Dead, Mickey Hart, to illustrate the art and science of rhythm.
- **Early music education:** Renée Fleming moderated a panel of prominent researchers and educators to discuss how early music training can shape the brain in powerful and lasting ways.
- **Child development:** In this discussion-demonstration, Cognitive psychologist Laurel Trainor, Ph.D., showed how music and rhythms affect learning and revealed the importance of rhythmic movements for social development. She was joined by clinicians who use music and movement with at-risk infants and children with developmental disorders.



Top: Close-up of NIH Director Francis Collins, M.D., Ph.D., and Renée Fleming performing at the Kennedy Center in 2017. Bottom: Fleming participates in a 2017 Sound Health event panel.

- **Sound and creativity:** Neuroscientist Charles Limb, M.D., and special guest performers demonstrated how encouraging and developing musical improvisational skills in children has led to a better understanding of how creativity develops in the human brain.

All performances are available to watch online. Visit the magazine’s website to learn more. ■

How Singing Affects Our Brain

Renée Fleming helps NIH researchers better understand link



National Institute of Mental Health researcher David Jangraw, Ph.D. (left), reviews brain scans with Renée Fleming at NIH.

In 2017, soprano Renée Fleming took part in a remarkable experiment as part of NIH's Sound Health initiative. She went through a functional magnetic resonance imaging, or fMRI, scan and had her brain imaged—all while singing.

The test was conducted by researcher David Jangraw, Ph.D., a postdoctoral research fellow at the National Institute of Mental Health.

"We're trying to understand the brain, not just so we can address mental disorders or diseases or injuries, but also so we can understand what happens when a brain's working right and what happens when it's performing at a really high level," Dr. Jangraw says.

Their research found something interesting: Thinking about singing made the brain more active than singing itself.

"I think one of the more interesting things we discovered with Renée is that there were regions of the brain that were more active when Renée was imagining singing than when she was actually singing," says Jangraw. "And that is something that's been found in larger group studies, as well."

"We are working on initiatives that would support research in this field that are a direct result of the Sound Health partnership."

— Thomas Cheever, Ph.D.

As interesting findings like these continue to come in, Dr. Cheever notes that this is a turning point. Dr. Cheever is staff assistant to Dr. Collins for the Sound Health initiative and director of the Muscle Disorders and Therapies Program at the National Institute of Arthritis and Musculoskeletal and Skin Diseases.

"The field of music and health is poised to take the next steps now, and build upon exciting smaller studies and case reports providing a foundation in this area," Dr. Cheever says. "We are working on initiatives that would support both basic and applied research in this field that are a direct result of the Sound Health initiative." ■

NIH Studies Explore Intersection of Art, Music, and Health

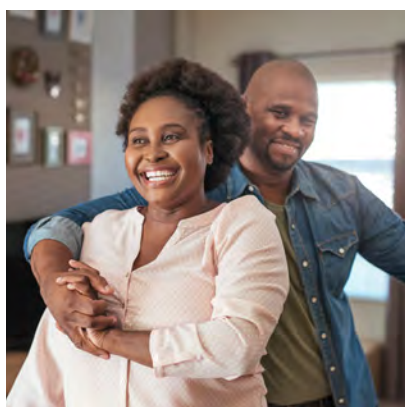
Though funding opportunities supported by NIH and the National Endowment for the Arts (NEA) as part of Sound Health were just announced, separate research related to music, arts, and health is already underway, Dr. Cheever said.

A few of these studies are investigating how music—along with other types of art like theater and dance—can affect brain development in children, treatment for seriously ill patients, and care for aging patients.



The ABCD Study

This research examines how experiences in adolescence shape a child's behavior and development. The study, known as the Adolescent Brain Cognitive Development (ABCD) study, is led by the National Institute on Drug Abuse. With support from the NEA, the study is tracking how childhood arts exposure, including music, impacts development. Researchers also plan to monitor factors such as sports participation, video games, social media, sleep patterns, and smoking. The study will take place at 21 research sites across the country, and researchers plan to enroll more than 10,000 children between the ages of 9 and 10. It's the largest long-term study of brain development and child health in the U.S.



Arts-Based Approaches in Palliative Care for Symptom Management

Researchers are investigating how the arts, including music, dance, theater, and expressive writing, can help patients with chronic or terminal illnesses manage symptoms. The goal of the study is to develop guidelines for future palliative care arts research that can help reach as many patients as possible. That includes patients across age groups and with different types of chronic conditions. The study is supported by multiple NIH institutes, including the National Center for Complementary and Integrative Health and the National Institute of Nursing Research.



Roybal Centers for Translational Research on Aging

Supported by the National Institute on Aging, the Roybal Centers conduct large pilot studies to investigate how some activities or behaviors—such as physical activity, use of technology, and music—can promote the health and well-being of people as they get older. Participating research centers are encouraged to look at how music and the arts can affect stress, anxiety, and the subjective well-being of people as they age. ■

Find Out **More**

- ▶ **NIH: Sound Health**
<https://www.nih.gov/sound-health/>
- ▶ **National Institute of Mental Health**
<https://www.nimh.nih.gov/>

Managing Polycystic Ovary Syndrome:

A Common Health Condition for Women

A family member, friend, co-worker, or neighbor: You probably know someone with polycystic ovary syndrome (PCOS). As many as 5 million women in the U.S.—up to 8 percent—have it.

Like the name sounds, PCOS is a disorder that is associated with multiple small cysts on the ovaries. Those cysts can sometimes make ovaries swell to twice their normal size.

But that's only part of the condition—one of the most common hormonal disorders in women of reproductive age. Other symptoms include irregular menstrual cycles, acne, unwanted facial hair, and weight gain. PCOS is also one of the leading causes of infertility, or trouble getting pregnant.

The disorder stems from a hormone imbalance. All women make small amounts of male hormones, known as androgens, but women with PCOS make even more.

While PCOS has a number of potential complications, it's a condition that many patients can manage, thanks to medication and lifestyle changes.

What are the symptoms?

Health care providers look for three characteristic features to diagnose PCOS: no ovulation, which will result in

irregular or no menstrual periods; high androgen levels, which can result in excess hair on the face or body; and cysts (fluid-filled sacs) on one or both ovaries.

If your medical history suggests that you might have PCOS, your provider will rule out other conditions that may cause similar symptoms.

What causes PCOS?

The exact causes of PCOS aren't known at this time.

High levels of androgens, or male sex hormones, play an important part. Excess weight and family history—which which play a part in insulin resistance—can also contribute to PCOS. Insulin is a hormone that helps us regulate our blood sugar.

How is it diagnosed?

If you or someone you know has one or more PCOS symptoms, make sure to see a health care provider. Many women with PCOS are never diagnosed.

"They just assume that this is normal," said Lisa Halvorson, M.D. "I suspect that many with PCOS never receive a diagnosis."

Dr. Halvorson is the chief of the Gynecological Health and Disease Branch of the



Dr. Lisa Halvorson's NICHD branch funds PCOS research.

Women and girls with this disorder often have a mother or sister who has similar symptoms. Researchers are trying to better understand the genetic link.

Division of Extramural Research at the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development, a division of NIH.

To diagnose PCOS, your health care provider may do a physical exam, pelvic exam, blood tests, and an ultrasound.

When is it diagnosed?

Most of the time, PCOS is diagnosed in women in their 20s or 30s. However, it can also affect teenage girls. Symptoms often begin when a girl's period starts.

Women and girls with this disorder often have a mother or sister who has similar symptoms. Researchers are trying to better understand the genetic link.

What are some complications from the disorder?

Many women with PCOS experience trouble getting pregnant since they may not ovulate, or produce eggs. Working with a health care provider, making lifestyle changes, and taking medication can often help patients get pregnant.

Women with PCOS also have an increased risk for sleep apnea, metabolic syndrome, type 2 diabetes, obesity, heart disease and high blood pressure, and endometrial cancer.

How is PCOS treated?

There is currently no cure for PCOS, but there are ways to manage its symptoms.

For women experiencing infertility who may also be overweight, healthy lifestyle changes can help. Those include a low-carbohydrate diet and regular exercise. A low-carb diet usually focuses on protein, like meat,

Symptoms of PCOS



Trouble getting pregnant or infertility



Excess facial or body hair



Oily skin and acne



Ovarian cysts



Insulin resistance



High androgen levels



Irregular menstrual cycles

poultry, fish, and eggs, and some non-starchy vegetables.

"The best thing that they can do is lose weight," said Dr. Halvorson. "If they lose weight—and not necessarily a huge amount, as little as 10 to 20 pounds—they may start ovulating again, will regularize their menstrual cycles, and may get pregnant."

In addition to lifestyle changes, medication can help some PCOS patients.

For infertility, there are oral medicines that encourage ovulation. Providers may also prescribe medicine traditionally used for type 2 diabetes, to help with ovulation and treat the risk of diabetes.

Other medicines include pills and creams to treat excess hair growth, and birth control pills or anti-androgen pills to help to decrease androgen production. An added bonus: Birth control pills also help protect against endometrial cancer. ■

SOURCES: MedlinePlus: Polycystic Ovary Syndrome; National Institute of Child Health and Human Development: Polycystic Ovary Syndrome; Centers for Disease Control and Prevention: Polycystic Ovary Syndrome

NIH Research Looks Around the World for Clues to Polycystic Ovary Syndrome

Studies examine genetic links, gut microbiome, and related conditions



Louis DePaolo, Ph.D., leads infertility research support at NICHD.

Iceland may be key to helping us understand how and why women get polycystic ovary syndrome (PCOS).

Researchers, with support from the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD), are studying families in the Nordic country to better understand PCOS and how genetics play a role in its development. They are studying Icelandic populations because they historically keep large family trees.

Their results can help guide similar genetic studies on PCOS in the U.S.

“These types of studies have provided and will continue to provide important insights into how PCOS may be inherited, as well as the process that causes the disease in affected individuals,” said Louis V. DePaolo, Ph.D. He is the chief of the Fertility and Infertility Branch of the Division of Extramural Research at NICHD.

We already know that if a woman’s mother or sister was diagnosed with PCOS, she has a much greater chance of being diagnosed herself. But we don’t exactly know why.

Researchers have been trying to answer that question.

“There have been people looking into the genetics of PCOS for quite a while now,” said Lisa Halvorson, M.D. She is the chief of the Gynecological Health and Disease Branch at NICHD. “Studies have implicated abnormalities in genes that are important for hormone production by the ovaries, insulin resistance, and obesity, among others.”

PCOS and your gut

Researchers in another European country, Poland, recently looked at the link between PCOS and a woman’s gut microbiome, or the microorganisms that live in our intestines. Each of us has hundreds of trillions of these bacterial cells in our guts at any given time.

Researchers at the Poznan University of Medical Science, Poland, and the University of San Diego, found that the higher the woman’s levels of testosterone and androgens—which is common in PCOS patients—the less diverse their gut microbiomes tended to be.

The gut microbiome has already been known to play a role in human metabolism, nutrition, and immune function.

Though the results are preliminary, they offer an area of research that may hold clues about the development or treatment of PCOS.

Metabolic syndrome

Genetics and the gut microbiome are just the tip of the research iceberg for PCOS.

“Clinical trials are comparing ovulation-stimulating drugs, lifestyle changes, and even complementary and alternative approaches to managing PCOS,” Dr. DePaolo said.

Other studies want to learn how to prevent patients from developing related conditions, like metabolic syndrome.

Metabolic syndrome can increase the risk for heart disease and stroke. Symptoms include high blood sugar, high blood pressure, and excess body fat around your waist.

One trial in particular is studying how contraceptive pills and Metformin (which helps relieve insulin resistance for diabetes and PCOS) can help prevent metabolic syndrome in overweight or obese PCOS patients.

The researchers, who are supported by NICHD, are looking at contraception and Metformin on their own, and will also look at treatment that combines the two.

“This trial should help determine the best approaches to management of metabolic syndrome in overweight or obese women with PCOS, thereby reducing their risk for developing diabetes or cardiovascular diseases,” Dr. DePaolo said. ■

SOURCE: NICHD: News Releases

“Clinical trials are comparing ovulation-stimulating drugs, lifestyle changes, and even complementary and alternative approaches to managing PCOS.”

— Louis V. DePaolo, Ph.D.

Pushing Through Life with PCOS

Patient uses social media inspiration and lifestyle changes to manage polycystic ovary syndrome

Nicole Strayhorn was diagnosed with polycystic ovary syndrome (PCOS) at age 14. After years of struggling with the syndrome, Nicole, now 28, is managing her symptoms and loving herself. She shared her story with NIH MedlinePlus magazine.

It's understandable that your body changes as you get older.

However, at 13 years old I was battling terrible headaches, bad acne, irregular menstrual cycles, and weight gain. Things you do not want to deal with as a teenager.

I went through so many tests, including a spinal tap, three glucose tests for diabetes, and a glaucoma test to figure out what was wrong with me. It was exhausting.

Finally, I saw an OB-GYN, or obstetrician-gynecologist, a doctor who specializes in women's health. I had an ultrasound and cysts were discovered on my ovaries.

I was diagnosed with polycystic ovary syndrome (PCOS) at 14 years old. Finally, I knew why this was happening to me.

Following my ultrasound, my OB-GYN started me on a diabetes medicine that helps women with PCOS manage insulin resistance. But my OB-GYN told me little information about PCOS. Unfortunately, the pills upset my stomach and made me nauseous.

I stopped taking them after two weeks. I ignored my symptoms from there on.

Fast forward 14 years later, I continue to struggle to manage my symptoms with PCOS, from excess facial hair to weight gain. Weight loss has been the biggest challenge for me. Especially after my father passed away in 2014, my weight spiraled out of control.

I have tried weight loss groups, fitness boot camps, aerobics classes, and even hula hoop classes. It's frustrating when you see little to no results.

But as a proud millennial, I look to social media for inspiration and motivation as I deal with PCOS.

I follow Harnaam Kaur on Instagram and Facebook. She suffers from PCOS but rocks her full beard. Although she has been bullied about her facial hair, Harnaam promotes acceptance and self-love and lives by the phrase "my body, my rules."

With inspiration like this and support from my family, I'm slowly taking back my life and working on lifestyle changes, like exercising more, to help with my PCOS symptoms.



Nicole Strayhorn, left, with her dad.

“As a proud millennial, I look to social media for inspiration and motivation as I deal with PCOS.”

– Nicole Strayhorn

I've started with small steps, like taking breaks to walk during work hours. I also take dance-fitness classes, water aerobics classes, and swim laps.

I have lost 10 pounds along this journey and I'm not done yet. I'm loving myself more every day. ■

Find Out **More**

► **MedlinePlus: PCOS**
<https://medlineplus.gov/polycysticovarysyndrome.html>

► **Eunice Kennedy Shriver National Institute of Child Health and Human Development: PCOS**
<https://www.nichd.nih.gov/health/topics/pcos>



Vikki Owens with
her spin instructor.

Fighting Fibromyalgia

with Complementary Health and NIH

*Vikki Owens
uses exercise,
massage, and
diet to help
her pain*

"I'm a fibro fighter."

That is how 61-year-old Vikki Owens of Seattle, Wash., describes her 25-year battle to manage her fibromyalgia.

Diagnosed in 1993, Vikki at one point was taking nine drugs, including painkillers, muscle relaxants, headache and sleep meds, and antidepressants. None of them gave her much relief. It wasn't until 2009 that she finally developed a regimen that gave her back her life.

Today, thanks to exercise, therapy, massage, herbal and vitamin supplements, and a change in diet, Vikki has been able to slowly wean herself off prescription drugs.

"For the last three years, I have been able to fully function as a normal person," she says. In fact, she adds proudly, "On my 60th birthday last year, I went to an indoor cycling class. And now I go twice a week."

Listening to her, it's hard to believe that this optimistic, energetic woman once could barely walk her three children to school in the morning. "I would walk with them there, but on the way back I would have to stop and sit and cry, I was in so much pain."

Doctors tried to help her. "They would give me medications they thought would help, but it didn't. It just made it hard to function."

The continued pain, depression, and other mental side effects, known as "fibro fog," made it difficult to keep a job or do things with her husband and children. "Some days the pain was so bad, I couldn't get out of bed."

What changed, Vikki acknowledges, was her attitude and determination to find a better way to manage her health.

"As patients, we've been conditioned to expect a magical pill to solve everything, but we have to start owning our own health," she says. She knew that with fibromyalgia, the nervous system amplifies how the body senses pain. The question was how to quiet those pain messages without drugs.

Vikki began looking into research involving complementary health practices.

She read about supplements that could be helpful as well as other kinds of approaches—such as massage therapy, tai chi, yoga, and cognitive behavioral therapy—on the website for NIH's National Center for Complementary and Integrative Health.

Cognitive behavioral therapy helped her feel more stable, she says. And an herbalist she consulted suggested some supplements and dietary changes.

She also forced herself to become more active.

"I didn't want to exercise because I was in so much pain, but you have to move," she says. She began slowly, first with tai chi, then yoga and dance before finally trying the high-energy, indoor cycling classes. She credits exercise with increasing both her stamina and her emotional stability.

Today, Vikki and her husband run an IT consulting firm. Her days are busy and satisfying. When asked for advice for other fibromyalgia patients, she's forthright: "Don't be a victim. Take it one day at a time and find something that works for you." ■

"As patients, we've been conditioned to expect a magical pill to solve everything, but we have to start owning our own health."

– Vikki Owens

Fibromyalgia: What You Need to Know

Fibromyalgia is a painful and often misunderstood condition that has frustrated both providers and patients for decades.

In recent years, however, understanding of the disorder has grown, along with both drug and nondrug treatment options.

There is no cure for fibromyalgia, but it typically won't get worse over time. Patients who learn to manage their symptoms can even improve.

What is it?

Fibromyalgia is a long-lasting condition that causes muscle pain and tenderness all over the body. Fibromyalgia can also cause extreme exhaustion and other symptoms. These include problems with sleeping, headaches, stiffness, and trouble thinking clearly (often called "fibro fog").

Who gets fibromyalgia?

The condition affects an estimated 4 million American adults. Most people are diagnosed in middle age. Women are twice as likely to develop it as men.

What causes it?

The exact cause of fibromyalgia is unknown, but NIH research suggests it's a problem of the brain and spinal

cord misinterpreting messages from the body so that normally nonpainful signals are felt as painful. This causes people with fibromyalgia to become ultra-sensitive to touch or movement. The condition can run in families, so genetics may also play a role.

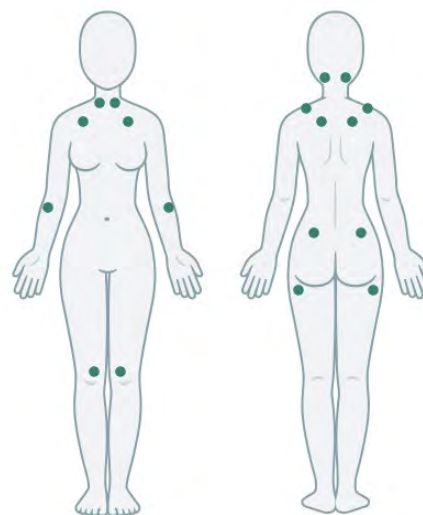
How is it diagnosed?

There are no lab tests or X-rays that can easily diagnose fibromyalgia. Patients may need to see several health care providers to rule out conditions that have pain and fatigue symptoms similar to fibromyalgia. Providers will also ask patients if they have:

- Widespread body pain lasting more than three months
- Fatigue, stiffness, trouble sleeping, problems with memory or thinking
- Pain and tenderness in 11 or more of 18 possible "tender points" throughout the body

How is it treated?

New medicine that works on pain messages from the brain have shown to be effective in treating fibromyalgia.



Fibromyalgia patients have what are known as "tender points" (pain points) throughout their bodies. These points are specific places on the neck, shoulders, back, hips, arms, and legs (pictured).

Pain relievers and antidepressants can also be used to relieve symptoms.

Recent NIH-supported studies show growing evidence for nondrug treatments as well. That includes cognitive behavioral therapy, to help patients manage the psychological effects of fibromyalgia, and regular exercise like tai chi to reduce pain. ■

SOURCES: MedlinePlus: Fibromyalgia; National Institute of Arthritis and Musculoskeletal and Skin Diseases: Fibromyalgia

5 Ways to Manage Your Fibromyalgia

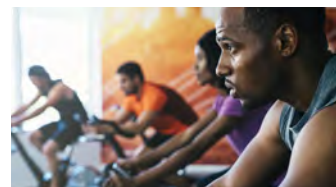
NIH-supported experts explain how you can help relieve symptoms



Daniel Clauw, M.D., studies chronic pain at the University of Michigan.

Lifestyle changes and self care are critical to improving your quality of life with fibromyalgia. We asked two top fibromyalgia experts and NIH grantees—Leslie Crofford, M.D., of Vanderbilt University, and Daniel Clauw, M.D., of the University of Michigan—for tips on the best things patients can do for themselves.

1 Exercise regularly. It may hurt to move at first, but research shows that gradually increasing exercise can reduce pain. Start slowly with gentle movements like tai chi or yoga, says Dr. Crofford. “Communication between the brain and body is abnormal in fibromyalgia, but regular exercise helps the brain become more normally accustomed to your body’s movements.”



2 Understand that there’s no magic pill. “There’s no easy fix with chronic pain,” says Dr. Clauw. Similar to other chronic conditions, like diabetes or asthma, patients must take an active role in managing their symptoms with lifestyle changes. “Doctors who treat fibromyalgia or other chronic pain conditions with drugs alone will fail,” he says.



3 Reduce stress. Identifying stressful triggers in your life is important because stress can worsen fibromyalgia, says Dr. Crofford. She recommends cognitive behavioral therapy to teach ways to cope with emotional stress and depression. These strategies can include avoiding negative self-talk, learning to relax, prioritizing tasks to conserve energy, and coping with pain flare-ups.



4 Get enough sleep. Fibromyalgia’s fatigue and pain are linked, with each one worsening the other. That’s probably because the same neurotransmitters that control pain also control sleep, mood, and memory, says Dr. Clauw. This makes getting enough sleep essential by following good sleep habits: go to bed and wake at the same time each day, reduce daytime napping, and get enough exercise.



5 Try other non-drug treatments. Research funded by NIH’s National Center for Complementary and Integrative Health shows mind-body practices can have benefits for fibromyalgia. In addition to tai chi and yoga, there has been encouraging evidence for cognitive behavioral therapy, massage therapy, and acupuncture in improving pain, stiffness, fatigue, and depression. ■



What's New in Fibromyalgia Research?

Studies look at genetics, complementary health, and chronic pain

Researchers at NIH's National Center for Complementary and Integrative Health (NCCIH) and National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) are investigating how to improve treatment, diagnosis, and pain management for fibromyalgia patients. We've summarized a few of these NIH-supported studies and how they're working to improve patients' lives today and in the future.

Better tools for diagnosis

NIH is supporting studies at various institutions that use molecular diagnostics—looking at a person's DNA to diagnose disease—to differentiate fibromyalgia from other pain conditions.

These blood tests would detect patterns of molecules unique to fibromyalgia, says Leslie Crofford, M.D., director of the Division of Rheumatology and Immunology at Vanderbilt University School of Medicine. “This would be a huge advance over diagnosing based only on what patients tell their doctor.”

Researchers are also working on a genetic test for the disorder, Dr. Crofford added. She explained that fibromyalgia is not due to a single gene, like cystic fibrosis, but a combination of genes, “which makes a test harder to develop.”

More nondrug treatments

A new study from Tufts University and Brown University, partially funded by NCCIH, found that doing the gentle movements of tai chi twice a week resulted in the same or

greater improvement in fibromyalgia symptoms than more strenuous aerobic exercise.

Patients were also more likely to stick with tai chi than aerobics, researchers noted.

To encourage more fibromyalgia patients to exercise, Vanderbilt's Dr. Crofford is working on a NIAMS-funded study that uses Transcutaneous Electrical Nerve Stimulation (TENS) to help people move more comfortably.

TENS sends small, painless electrical pulses to the back of the neck and lower back, “which we hope can normalize pain messages between the body and brain,” Dr. Crofford explained.

At the University of Michigan, NIAMS is funding research into whether fibromyalgia patients, as well as those with other chronic pain conditions, would respond better to drug and nondrug therapies aimed at the brain. This is instead of standard anti-inflammatory drugs, opioids, steroid injections, and surgery, says Daniel Clauw, M.D., director of the university's Chronic Pain and Fatigue Research Center.

“We are also using brain imaging to develop a better pain guide for diagnosing and treating those who suffer chronic pain,” he says.

New pain research

NIH recently launched HEAL (Helping to End Addiction Long-term) Initiative, aimed at helping stem the national opioid crisis. The initiative's push for new pain treatment and research on chronic pain could greatly benefit those with fibromyalgia. ■



Leslie Crofford, M.D., is studying how genetics can help diagnose fibromyalgia.

Find Out **More**

- ▶ **MedlinePlus: Fibromyalgia**
<https://medlineplus.gov/fibromyalgia.html>
- ▶ **National Institute of Arthritis and Musculoskeletal and Skin Diseases: Fibromyalgia**
<https://www.niams.nih.gov/health-topics/fibromyalgia#tab-overview>
- ▶ **Centers for Disease Control and Prevention: Fibromyalgia**
<https://www.cdc.gov/arthritis/basics/fibromyalgia.htm>

from
the

lab

LATEST
RESEARCH
UPDATES
FROM NIH

Most Women with Early-Stage Breast Cancer Don't Need Chemotherapy

CHEMOTHERAPY IS ONE OF THE CORNERSTONES OF MODERN DAY CANCER TREATMENT.

But in some cases, it may not be essential to treatment success.

New research funded in part by the National Cancer Institute has shown that chemotherapy does not increase the likelihood of favorable outcomes after surgery when added to regular hormone therapy for a large number of women who have ER+, lymph node negative breast cancer.

The Trial Assigning Individualized Options for Treatment (Rx), or TAILORx, compared whether hormone therapy alone is less successful than hormone therapy plus chemotherapy in certain breast cancer patients.

The study evaluated patients with HR-positive, HER2-negative, axillary lymph node-negative breast cancer.

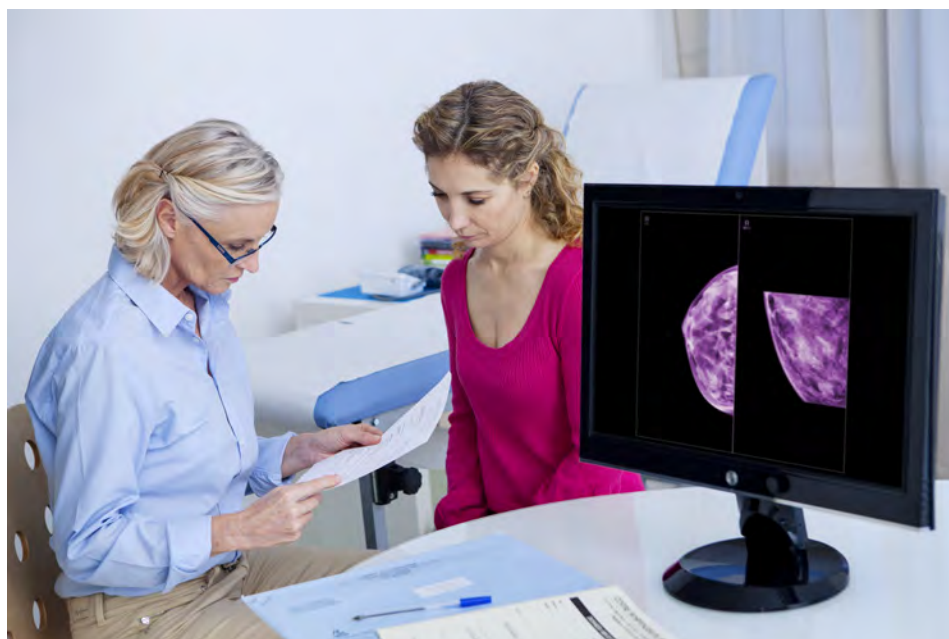
"Until now, we've been able to recommend treatment for women with these cancers at high and low risk of recurrence, but women at intermediate risk have been uncertain about the appropriate strategy to take," says Jeffrey Abrams, M.D.,

associate director of the Cancer Therapy Evaluation Program at NIH's National Cancer Institute. "This will go a long way to support oncologists and patients in decisions about the best course of treatment."

The clinical trial is one of the first large-scale studies

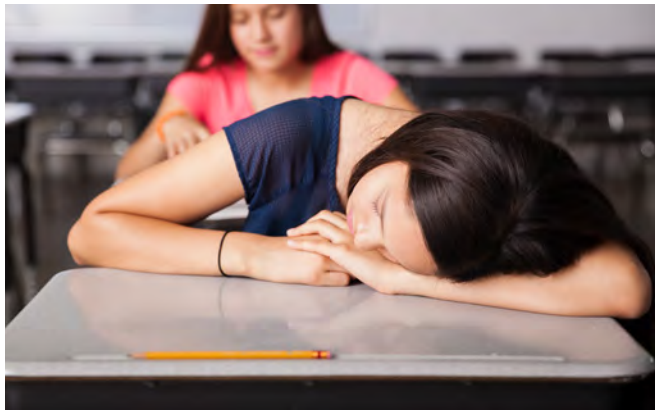
aiming to personalize cancer treatment. It launched in 2006 and has since re-enrolled more than 10,000 patients with this type of breast cancer. ■

SOURCE: NCI News Releases: <https://www.cancer.gov/news-events/press-releases/2018/tailorx-breast-cancer-chemotherapy>



The trial is one of the first large-scale studies aiming to personalize cancer treatment.

IMAGE: ADOBE STOCK



Bad Sleeping Patterns Early in Life May be Linked to Future Health Problems

COULD ADOLESCENTS WHO DON'T GET ENOUGH SLEEP be setting the stage for heart-related health risks later in life? That's one of the risks identified by a large-scale research study supported by NIH.

Previous research has linked lack of sleep to obesity and other issues. But this new observational study found that poor sleep quality can also lead to heart problems and other cardiovascular issues.

The study tracked adolescents between the ages of 11 and 13. They wore sleep tracking devices on their wrists to record their sleep times for at least seven days, which is long enough to get an idea of their sleep patterns.

The findings? When compared with well-rested adolescents, their sleep-deprived peers had higher

blood pressure, bigger waistlines, and lower levels of high density lipoprotein (HDL), or "good" cholesterol.

Researchers in the study also measured participants' waist sizes, blood pressure levels, cholesterol, insulin resistance, and triglycerides.

How can everyone sleep better?

To help improve sleep issues for kids, teens, and adults, the Centers for Disease Control and Prevention recommends a consistent bedtime in a dark, quiet, and comfortable room free of electronic devices.

For adolescents in particular, allowing enough time for sleep, 9 to 10 hours, is also key. ■

SOURCE: NIH Director's Blog: <https://directorsblog.nih.gov/2018/06/19/poor-sleep-habits-in-adolescence-correlated-with-cardiovascular-risk/>

Keeping Teens Safe Behind the Wheel

A RECENT NIH STUDY found teens were more likely than older drivers to crash within the first three months of getting their driver's license.

One key takeaway from a new study suggests that young drivers may benefit from a more gradual decrease in adult supervision during the first few months after obtaining a license, instead of an abrupt change from a learner's permit to an independent license.

Teenage drivers were eight times more likely to have a crash or a near-crash during the first three months after getting a driver's license, compared with the previous three months on a learner's permit, the study found.

Researchers followed 90 teen drivers as they got their learner's permits and then their driver's licenses. It's one of the first studies of its kind to follow the same participants over time.

To gather data, in-car cameras and software were placed in the cars. In addition, the study tracked their parents' driving during the same period to evaluate how they drove in similar situations.

The study was led by the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development. ■

SOURCE: NIH News Releases: <https://www.nih.gov/news-events/news-releases/teen-crash-risk-highest-during-first-three-months-after-getting-drivers-license>



NIH on the web

Social Media Corner: Basic Research Nobel Prizes at NIH

➡➡ **Did you know** the National Institute of General Medical Sciences (NIGMS) has supported **87 Nobel prize winners** since it launched in 1962? You can read the full list of winners and learn facts about the Nobel prize on the institute's website. NIGMS supports key basic research, which is conducted by scientists in labs and sets the stage for clinical research in patients.



How Meditation May Help Pain

➡➡ **Can focusing on pain** actually help suppress it? Maybe, say researchers in a new video called **“Meditation: Addressing Pain”** from the National Center for Complementary and Integrative Health (NCCIH).

By concentrating on pain during mindfulness and meditation practices, we may be able to lessen our emotional responses to it.

This is according to Richard J. Davidson, Ph.D. He is the founder and director of the Center for Healthy Minds at the University of Wisconsin–Madison.

In the video, which is on the NCCIH's YouTube channel, Dr. Davidson speaks to former NCCIH Director Josephine Briggs, Ph.D., and explains how our brains process pain and how researchers are working to better understand it.



IMAGES: ISTOCK

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Look at NIH Research Funding in Your Area

➡➡ **Want to know** how much NIH funding went to research institutions in your state this year?

A website run by the National Library of Medicine, the **Research Portfolio Online Reporting Tools (RePORT) website**, provides quick access to data on NIH research from around the world.

You can filter by year, U.S. state or territory, congressional district, and institute. There's even an interactive map. Visit NLM's website to learn more.

NIH Is Here to Help

The National Institutes of Health (NIH)—the nation’s medical research agency—includes 30 Institutes and Centers and is a part of the U.S. Department of Health and Human Services. It is the primary federal agency for conducting and supporting basic, clinical, and translational medical research, and it investigates the causes, treatments, and cures for both common and rare diseases. For more information about NIH and its programs, visit www.nih.gov.

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