



Chronic Pain Treatment

The Search for New Options

Pain can affect people in different ways. It can feel sharp or dull or like a prick, tingle, sting, burn, or ache. You may feel it in one area of your body or all over. Pain can be short-lived or go on for months or years.

Pain that lasts longer than three months is called chronic pain. Chronic pain can affect all aspects of daily life, including your mood, sleep, work, and relationships. And millions of Americans experience it.

Finding what works best to ease your chronic pain is a process. Treatments may include pain medications, medical procedures, devices, and physical therapy. Some people use complementary health options alongside conventional care. These may include acupuncture, yoga, chiropractic care, massage therapy, or tai chi.

But what's available doesn't always work for everyone. Sometimes, treatments may not get rid of pain, but they can still reduce pain and help people function better. Some pain medications have unwanted side effects. Others may lead to addiction.

Researchers are continuing to explore new ways to treat chronic pain. They're looking for safer medications and more targeted therapies.

Developing Safer Medications •

One class of drugs often used to treat pain is called opioids. Opioid drugs can lessen the feeling of pain in one part of the body or throughout the body. However, they can also cause serious side effects,



including overdose and death. The risk is greater when opioids are misused or taken in ways other than prescribed. They can also lead to addiction for some people. Because these risks are widely recognized, opioid prescriptions have been declining in recent years.

"Doctors are less inclined to prescribe opioids for good reasons, but that means that some patients' pain isn't effectively treated," says Dr. Steven Olson, a medicinal chemist at Sanford Burnham Presbys.

Olson and other researchers are trying to develop non-opioid drugs to relieve pain. "Our goal is to find an effective non-opioid drug that people can rely on and not be a danger to them," Olson says.

Opioid pain relievers work by attaching to proteins called opioid receptors. Opioid receptors belong to a protein family called G protein-coupled receptors. When activated, they trigger signals inside cells that cause different effects in the body. These effects include pain relief.

Researchers have found that other types of G protein-coupled receptors can also bring pain relief. One example is neurotensin receptor 1. It's activated by a molecule called neurotensin. But drugs that mimic neurotensin can also cause unwanted side effects. These include severe drops in body temperature and high blood pressure.

Olson and his team have discovered two molecules that can fine-tune the receptor's response. These molecules stimulate

the pain-relieving effects while reducing unwanted side effects. The team is now designing and making hundreds of new molecules to find more that can do both.

"We're trying to develop the next generation of neurotensin receptor 1 drug molecules," he says. Olson hopes to find molecules that they can develop into a new pain-relieving drug.

Targeted Pain Relief • Scientists are also testing a different approach to pain relief: gene therapy. Gene therapy delivers healthy genes into cells or fixes damaged genes in cells.

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Dr. William Renthal is a neurology expert at Brigham and Women's Hospital and Harvard Medical School. His team is developing new strategies to deliver gene therapies to specific nerve cells involved in pain.

Renthal's team first created a cellular map of all the nerve cells in structures along the spine called the dorsal root ganglia. These contain nerve cells that carry sensory information from the body to the spinal cord. Some carry information about temperature or touch. Others carry pain signals from an injury or tissue damage. Those that carry pain signals are called nociceptors.

"We've used these maps to identify unique features about nociceptors," Renthal explains. Those features help researchers design gene therapies that focus on the nerve cells that send pain signals. The goal is to avoid affecting nerves that control other sensations, such as touch.

"We want to be able to turn off the pain-transmitting signals without affecting the other cells in your body," Renthal adds. Sending treatment only to pain-sensing nerve cells may help avoid unwanted side effects.

Complementary Health Options •

Scientists are also looking beyond medicines for managing pain. Research has shown that certain complementary health approaches reduce pain for some people. These include acupuncture, massage therapy, tai chi, and others.

A recent study showed that nearly 1 out of every 2 people use complementary approaches for pain. Researchers are studying several complementary approaches for different types of pain.

Acupuncture is one example. It uses thin needles that are inserted through the skin into specific points on the body. The practice has been part of traditional Chinese medicine for centuries. One condition that acupuncture is being studied for as a form of pain relief is angina. Angina is a type of chest pain brought on by physical exertion or mental or emotional stress.

Researchers are looking at other complementary approaches to reduce pain caused by cancer treatment. Chemotherapy can damage nerves in the hands and feet. This leads to pain, numbness, tingling, loss of balance, and falls. Studies have shown that tai chi can improve balance and help lower the risk of falls. Tai chi involves slow, gentle movements and controlled breathing. Yoga also combines physical poses, breathing techniques, and meditation. Both approaches are being tested to help ease nerve pain from chemotherapy.

Pain often needs to be treated with a range of strategies because it affects the body in so many ways. At NIH's chronic pain clinic, patients are evaluated and treated by a team of specialists.

"When patients come to the clinic, they're seen by the entire team, including neurologists, nutritionists, psychologists, social workers, physical therapists, and rehabilitation medicine specialists," says NIH's Dr. Miroslav Bačkonja, an expert on pain treatment. "Our approach to assessing and treating chronic pain is to take

a whole-person perspective."

Complementary health options are part of this whole-person approach. For example, Bačkonja explains, "A patient might see a recreational therapist and get recommendations to learn tai chi, yoga, boxing, or dancing to improve their symptoms and function." People with chronic pain may see a nutritionist to discuss changes to their diet or herbal options, in addition to other specialists on the team.

"We know there's more to chronic pain than a single disease, joint, or incident," he adds. Researchers are continuing to look for new options to help manage pain. If you're dealing with chronic pain, talk with your doctor about treatment options. The options will differ depending on what's causing the pain. Often, there are non-opioid treatment options that can improve your pain relief and quality of life now. ■

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Ask Your Doctor

Pain Treatments Beyond Medication

Many non-medication approaches can improve pain and function without serious risks. Options may include:

- Exercise such as aerobic, aquatic, or resistance exercises
- Physical therapy
- Mind-body practices such as yoga, tai chi, and qigong
- Weight loss
- Psychological therapies such as cognitive behavioral therapy
- Mindfulness-based stress reduction
- Low-level laser therapy
- Acupuncture
- Massage
- Spinal manipulation



Web Links

For more about treating chronic pain, see "Find More Information" in the online article: newsinhealth.nih.gov/2026/09/chronic-pain-treatment

Addressing ADHD

Support for Parents and Kids

Kids often struggle to pay attention or have too much energy. If these difficulties last a long time and cause problems in multiple situations, they might be signs of attention-deficit/hyperactivity disorder, or ADHD. ADHD makes it harder to learn and get things done. Researchers are finding new ways to help kids with ADHD—and their parents—gain skills to better manage symptoms.

Some kids with ADHD struggle with paying attention. This makes it tough to complete tasks and stay focused in class or conversations. Other kids may show hyperactivity or impulsivity, so they move around and talk a lot. Some kids have both types of symptoms. Symptoms can change over time and follow people into adulthood.

“ADHD can be a lifelong disorder,” explains Dr. Lauren Friedman, a psychologist at Arizona State University. “But it can look a little differ-

ent in adults.” For example, adults with ADHD might feel very restless during a meeting, even if they don’t leave their seat like a kid might.

ADHD can be tough to diagnose because other conditions have similar symptoms. “If someone is anxious, they’re going to have worried thoughts that distract them,” Friedman says. “Depression or a learning disability can also cause difficulty paying attention.”

Seeing a doctor is the first step. A medical exam can rule out other causes of symptoms. But diagnosing ADHD is a process. It can also involve seeing specialists, like mental health professionals, and interviews with family members and teachers. An ADHD diagnosis requires that symptoms persist over time and occur in multiple settings—not only at school or at home.

ADHD treatment includes medications, different types of therapy, or both. Medications may help some kids control behaviors that disrupt their daily life, but they can also have side effects. Therapy teaches skills for managing symptoms and creating routines to support daily life.

Parents of kids with ADHD can also take behavior management training. This teaches parents how to better help their children.

Because genes influence ADHD, many families have both a parent and a child with the condition. Parents’ symptoms can make it hard for them to use the strategies they learn from behavior management training to help their kids. Friedman is studying how to better support those families.

In Friedman’s study, parents with ADHD learn how to assist their kids through standard behavior



management training. But the parents also learn skills to help them manage their own symptoms.

“We give parents skills to help with organization and time management to make it more likely they’ll be able to use the strategies that they learn for their kids effectively and consistently,” Friedman says.

Her study is also testing a smartphone app that reminds parents to use the skills they are learning. The app sends customized reminders when they are most needed. For example, “if mornings are really hectic and they’re forgetting to use their skills at that time, we can push reminders to parents in the morning,” Friedman says.

With the right support, children with ADHD can better manage symptoms and are more likely to reach their goals. See the Wise Choices box for strategies parents can use to help kids with ADHD. ■



Wise Choices

Helping Your Child Navigate ADHD

- Establish a routine for them and help them stick to it.
- Reduce distractions while they try to complete tasks. For example, turn off the television and any music playing in the background.
- Help them plan out tasks. Break tasks down into shorter, smaller steps. With longer tasks, it can help to start early and take frequent breaks.
- Set realistic goals and praise or reward them when they accomplish goals.
- Figure out what they’re good at and encourage them to pursue those activities.



Web Links

For more about ADHD, see “Find More Information” in the online article: newsinhealth.nih.gov/2026/09/addressing-ADHD



Health Capsules

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

Blood Tests May Flag Early Alzheimer's

Alzheimer's disease makes thinking, memory, and the ability to carry out daily tasks more difficult. Early treatment can help people stay mentally sharp for longer. So scientists are looking for ways to identify the disease early on. A new study showed that a blood test may help identify early brain changes related to Alzheimer's in midlife.

Alzheimer's is characterized by the buildup of two proteins in the brain. They're called tau and amyloid-beta. Older adults with more of certain Alzheimer's-related forms of these proteins in their blood tend to do worse on thinking and

memory tests. Researchers recently looked to see if people in midlife show similar effects.

The NIH-funded research team tested blood samples from 1,350 people in their 50s and 60s. None of them had been diagnosed with Alzheimer's disease. The researchers measured the Alzheimer's-related forms of the proteins. The study participants also took cognitive tests. These tests measured their thinking and memory abilities. Most of the participants had taken the same tests five years earlier.

Those with higher levels of the Alzheimer's-related forms were more

likely to have cognitive test scores that fell more dramatically over time. They showed slower thinking speeds and greater memory decline over the five years.

"Alzheimer's disease pathology begins years before symptoms emerge," says Dr. Kristine Yaffe of the University of California, San Francisco. "Detecting the disease early means patients can target modifiable risk factors and maybe seek other care."

But more studies are needed on the blood tests before they can be used in the clinic. ■

Observing Diets in Communities

What we eat has a big impact on our health. Knowing what people in different communities eat can help scientists identify where help is needed and guide nutrition programs. A new study showed that scientists can learn about a community's eating habits by studying its wastewater.

Usually, scientists study what people eat through food diaries and surveys. These are slow, costly, and depend on people remembering what they consumed.

Our food carries the DNA of the plants and animals it is made of.

After we eat, small amounts of this DNA pass through our bodies and end up in wastewater. To see if they could track diets through wastewater, an NIH-funded research team tested 183 wastewater samples from 21 treatment plants in North Carolina. These treatment plants serve more than 2 million people.

The team found DNA from hundreds of foods. Their analysis cost less than 1 cent per person.

The study revealed interesting patterns. Certain fruits and vegetables showed up more when they were in

season. Certain communities ate more tropical fruits and legumes. This included wealthier areas and areas with more foreign-born residents. Coastal communities ate more locally caught fish, while inland cities ate more farmed fish.

"Poor diet drives an enormous share of chronic disease, but measuring what a whole community eats has been slow, expensive, or indirect," says Dr. Lawrence David of Duke University, who co-led the study. "This study helps fill that gap so we can better connect diet to health." ■



Featured Website

Research in Context
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Find in-depth stories about NIH's cutting-edge biomedical research. Learn about the current state of research for many fields and where they may be heading. Research in

Context stories appear quarterly in *NIH Research Matters*. Read the latest story on the exposome and how environmental exposures in life may influence your health.

RESEARCH IN CONTEXT June 9, 2026

Understanding the exposome

Tracking how the environment affects health

The world around us influences our health in countless ways. This special Research in Context feature explores how scientists are using new technologies and approaches to measure the exposome—the total set of environmental exposures people encounter throughout life—and their biological response to them.

More than 150 years ago, a physician named John Snow traced a deadly cholera outbreak to a contaminated water pump in London. In the 1700s, doctors linked soot exposure in chimney sweepers to cancer. In the 20th century, researchers showed that lead harms children's brains.

Scientists have long understood that the environment plays an important role in human health. But measuring the environment's effects in a complete and systematic way has been much harder.



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