BRAIN RESEARCH SUCCESS STORIES

# Pain

## *Making a Difference Today*

Maybe you slammed your funny bone into the desk, pulled your back moving the couch, or cracked your head on the hatchback. Regardless of the exact scenario, we've all felt it. Pain.

For an estimated 50 million Americans, the experience is particularly excruciating and debilitating. They suffer from a type of persistent pain, including back pain, headaches, arthritis pain, and cancer pain, that lasts for months, even years. A recent survey showed that more than 60 percent of sufferers from pain reported having the pain for more than a year.

Left unchecked, pain can destroy a person's quality of life and ability to work. Pain sufferers must often have help with daily activities such as dressing and often must move to a home that is easier to manage. Pain costs U.S. employers about $80 billion a year in sick days and lost productivity.

## Research Equals New Treatments

Fortunately, research has helped scientists build an arsenal of treatments that can sometimes treat pain conditions. For example, the potent painkillers termed narcotics, such as morphine and codeine, are used for severe pain.

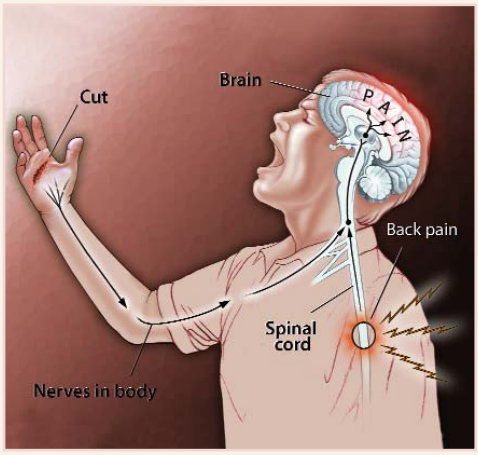
Some research has helped create spin-offs of these therapies that have further improved patient care. One group of scientists backed by funding from the National Institutes of Health (NIH) discovered, through animal studies, that narcotics introduced within the spine can produce profound pain relief. In the past, the drugs were typically taken orally or by injection into the blood or muscle.

It appears that this spinal technique, now used in people with some types of severe pain, creates a more direct effect on the internal pain machinery than the oral method. Patients with cancer pain who underwent the spinal administration technique experienced better pain relief, significantly fewer side effects, and lived longer than patients who were treated without the spinal technique, according to a recent large study.

## Expanding Benefits

While today's therapies help many, they still cannot effectively treat every person's pain. Insights into the mechanisms that underlie pain, however, are helping researchers get closer to developing even more options.

Already researchers have identified several molecular components that aid different pain mechanisms and show particular promise as new targets for pain relief. With the help of NIH funding, researchers could take these findings to the next level and help a greater range of people.




We all feel pain through a communication system that includes nerves in the body, the spinal cord, and brain. Normally the sensation, say from a cut, lasts only a few days or weeks and forces you to rest, avoid further injury, and heal. In contrast, the pain system in people who feel persistent pain, from some types of back injuries, for example, seems to malfunction and go into overdrive, creating an actual illness. Continued insights into how pain arises are helping scientists develop new treatments for a range of pain conditions.

## Continued funding for research could lead to:

- A further understanding of the fundamental mechanisms that underlie the complex perception of pain.
- An increase in the translation of basic research into clinical research.
- New approaches for pain control that will help relieve suffering in a greater range of people.

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BRAIN RESEARCH SUCCESS STORIES

# Pain

## *Making a Difference Tomorrow*

Despite much progress in pain research, the advances are not nearly enough. Available approaches do not adequately treat everyone, particularly those who suffer from lasting pain conditions.

Pain continues to disable Americans. It harms people's ability to socialize, perform chores around the house, exercise, concentrate, get a good night's sleep, and do their job. The emotional toll is also large. Many sufferers feel depressed, irritable, listless, useless, and unable to cope.

Did you know that:

- Conservatively, an estimated 50 million Americans suffer from some persistent type of pain, according to the American Chronic Pain Association.
- In a recent survey, more than 75 percent of respondents reported that within the year prior to the survey they either personally experienced persistent pain themselves or had a close family member or friend who suffered from lasting pain.
- In the survey, fewer than 60 percent of sufferers with persistent pain said that they were satisfied with the treatment of their pain.
- Pain costs U.S. employers about $80 billion a year in sick days and lost productivity.

With continued funding from the National Institutes of Health (NIH) for research, scientists could develop additional pain control options that would offer relief to a greater range of people.

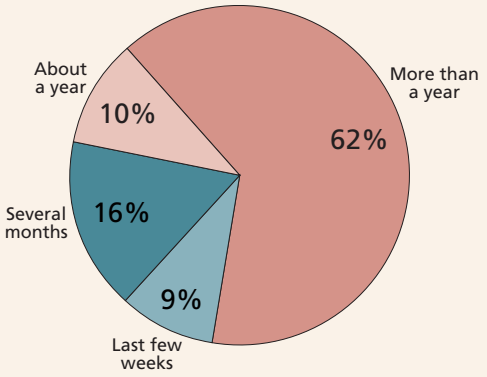
## Research Equals Hope for the Future

Already, studies funded by the NIH and others have helped identify promising new leads. In one line of work, researchers found that certain entryways on nerve cells in the spinal cord, termed calcium channels, seemed to help relay pain messages to the brain. What's more, scientists developed a synthetic replica of a compound found in the venom of a sea snail, which has a knack for blocking the activity of the channels, and thus blocking the pain, in animals. In a recent study, scientists found that infusions of the compound into the spinal cord area produced significant relief in patients with persistent pain from cancer or AIDS who did not respond to available painkillers.

Several other newly identified targets in the pain system may also offer ways to treat persistent pain. Included are subsets of proteins termed vanilloid receptors, glutamate receptors, and sodium channels. Recent animal research indicates that methods that reduce the activity of any of the three protein types can alleviate persistent pain.

Continued support will hasten the translation of this type of basic knowledge into new treatments that ultimately will improve the lives and finances of many Americans.

**Duration of pain suffering**




A recent survey found that more than 60 percent of pain sufferers reported having pain for more than a year. Such unrelenting disability has led people to take leave from work or change jobs, get help with daily activities like dressing, and move to a home that's easier to manage. Fortunately, research aims to improve sufferers' lives by finding new ways to treat their discomfort.

## Already research has led to:

- Advances in the understanding of how to best target the pain system for different types of pain.
- Increased options for pain relief.
- The identification of several molecular components that aid different pain mechanisms and show promise as new treatment targets.

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