

Migraine

Making a Difference Today

A skipped meal, stress at home or work, or a change in the weather might set it off: throbbing pain around the eye or temple that lasts for hours, even days. Typically, sensitivity to light or noise and nausea accompany this pulsating migraine pain. Many find it too painful to brush their hair or shave. And at least 20 percent of migraine sufferers regularly experience a telltale aura—wavy lines, dots, flashing lights, or a blind spot—up to an hour before an attack.

Migraine is a disabling condition that affects some 30 million Americans. One US study found that among those reporting migraine attacks, about one-third had missed a day or more of school or work in the previous three months, and just over half reported that their productivity had dropped by 50 percent or more. In the United States, missed workdays and impaired work function due to migraine cost employers about \$13 billion a year; an additional \$1 billion is spent on medical care.

Research Leads To Understanding

Fortunately, research funded by the National Institutes of Health (NIH) has given doctors effective tools to relieve migraine pain and has led to a greater understanding of what happens in the brain during a migraine attack.

Specifically, triptans, a class of drugs that has proved pivotal in migraine treatment since first approved in the early 1990s, were developed based on research showing that blood vessels in the brain dilate and cause pain during a migraine attack. Scientists thought triptans helped relieve pain by bringing these vessels back to their normal size. Research now shows that this dilation may not be the primary source of pain; instead, many scientists believe that chemicals released in the brain cause inflammation and secondary dilation of the blood vessels, and make nerve fibers extremely sensitive to painful stimulation.

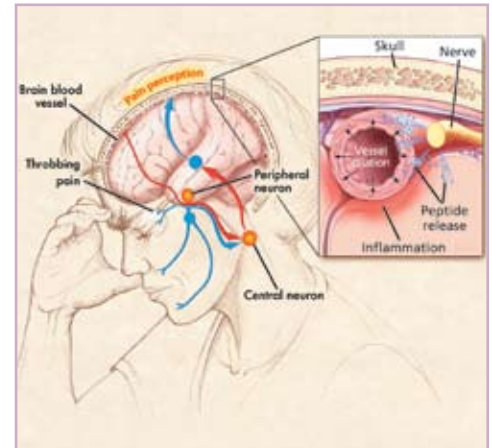
As the migraine develops, scientists have found, sensitivity to pain signals arriving from peripheral nerves increases in central pain neurons in the spinal cord and brain stem. This phenomenon is called central sensitization. Early studies by government-funded researchers show that for the majority of migraine sufferers, anti-migraine drugs can offer relief only in the earlier stages of the attack, but not later, when the central pain neurons in the spinal cord and brain stem have become sensitized. Based on these findings, treatment guidelines now stress early intervention—treatment within 20 minutes of an attack and while migraine pain is still mild.

Researchers also have traced changes in the brain that parallel the visual disturbances seen during an aura; some speculate, based on animal studies, that the same mechanism leads to full-blown migraines even in those who do not experience aura.

Promising Strategies

Triptan drugs are considered the most effective treatment for an acute migraine attack. For many sufferers, they provide pain relief and elimination of symptoms such as nausea or sensitivity to light and sound, and allow them to return to normal functioning. Yet triptans are unsuitable for people with a risk of stroke or heart disease, and as many as 40 percent of people taking triptans for a migraine attack experience headaches again within 24 hours. Based on advances in understanding the biology of migraine, scientists are investigating many new treatment approaches, targeting chemicals released at the early stages of an attack, and examining the genetic basis of the disease. With continued funding, effective migraine treatments could bring greater relief from the debilitating pain that keeps sufferers from work and school.

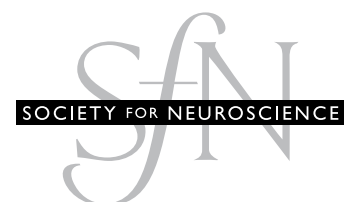
For more information please email brss@sfn.org.



Research shows that chemicals released in the brain cause inflammation and make nerve fibers extremely sensitive to painful stimulation (see Inset). As a secondary response, blood vessels dilate. As illustrated in the main image above, nerves' sensitivity to pain progresses from fibers on the periphery of the nervous system to central neurons in the brain stem and the brain itself.

Continued funding for research could lead to:

- Better ways to prevent migraine attacks.
- Pain relief for a greater number of migraine sufferers.
- Migraine treatments tailored to individuals based on their genetic makeup.



www.sfn.org

Migraine

Making a Difference Tomorrow

Drugs that effectively alleviate migraine headaches, specifically the triptan medications first introduced in the early 1990s, have proved to be powerful treatment tools. But although current therapies help many, often they do not provide consistent relief from pain. Many patients are unable to use these drugs because of other conditions or they have not been properly diagnosed. Research shows half of migraine sufferers in the United States go undiagnosed.

Did you know that:

- During any three-month period, an estimated 9 million Americans miss work or school because of migraine.
- Absences and lost productivity cost American businesses \$13 billion each year.
- A 2001 report by the World Health Organization ranked migraine 19th among the leading causes of disability worldwide.

Migraine remains disabling, underdiagnosed, and undertreated. With continued funding from the National Institutes of Health, the 30 million Americans thought to suffer from migraines could free themselves from the pain of attacks, and improved diagnosis could reach more sooner.

Research Brings Hope For The Future

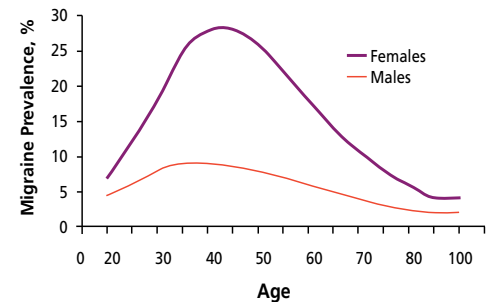
In recent years researchers have changed their thinking about the biological basis of migraine—seeing it as a disturbance in brain function rather than a disorder of the brain's blood vessels. And such advances have shown doctors how to give their patients faster, longer-lasting relief. Now, scientists are using new models of the disorder to find better solutions for the relief and prevention of migraine attacks.

They are focusing, for example, on neurotransmitters and neuropeptides, chemicals in the brain and spinal cord that convey nerve messages. In migraine, these substances are thought to play a role in relaying messages of pain, causing inflammation, or increasing the sensitivity of nerves. Scientists hope that disrupting these signals will prevent migraines from developing in the first place. Research suggests that botulinum neurotoxin, popularly known as the cosmetic treatment Botox, can help prevent migraine attacks by blocking the release of inflammatory peptides that relay pain messages. Clinical trials to further this research are ongoing.

Similar peptides in the nervous system may also be effective targets for relieving the pain of an ongoing attack. In the search for treatments, researchers are targeting receptor cells for a substance that acts to dilate blood vessels and is one of the main neuropeptides released in the brain during a migraine. And others are trying to block the activity of glutamate, which is processed through the primary relay station for pain signals from the head and face.

Researchers also hope, especially since migraines tend to run in families, that further studies into their complex genetic basis could one day allow doctors to tailor treatments more specifically to individual patients. Continued funding for the National Institutes of Health could one day give these leads shape in the form of new treatments, providing more relief to a greater number of people.

Age-specific prevalence of migraine by sex



Three times as many women have migraine attacks as men, with prevalence for both sexes peaking between ages 25 and 55, one's most productive years.

Already research has led to:

- Drugs that effectively relieve migraine pain and associated symptoms.
- A new understanding of what happens during a migraine attack.
- Treatment guidelines that have led to greater relief.

For more information please email brss@sfn.org.