

## Migraine: The Basics

### WHAT IS MIGRAINE?

Migraine is a neurologic condition defined by intense head pain, often only on one side, that may occur with other symptoms such as nausea, vomiting, or sensitivity to light, sound, and smells. Some headaches are preceded by warning symptoms, called an aura, which may include flashing lights, zigzag lines, temporary vision loss, or weakness and impairments in sensation and speech. Stress, hormonal changes, bright or flashing lights, lack of sleep, and certain foods can trigger recurring attacks. Migraine affects more than 10 percent of people worldwide and is three times more common in women than in men. Up to 2 percent of people experience chronic migraine, which is associated with 15 headache days (eight migraine days) per month for at least three months.

### WHAT CAUSES IT?

Experimental evidence suggests migraine may be associated with the activation and sensitization of parts of the brain known as the trigeminovascular system, which consists of connections between nerve cells and cerebral blood vessels. In addition, increased levels of a peptide, calcitonin gene-related peptide (CGRP), have been reported in migraine disorders. Migraine in some women may relate to changes in hormones during their menstrual cycle. Genetic and environmental factors also appear to play a role as well as imbalances in multiple brain chemicals, which help regulate pain in the nervous system.

### HOW IS IT TREATED?

Drug treatments include acute medications, used to treat pain as soon as symptoms start; preventive medications, taken regularly to reduce the frequency of attacks; and preemptive treatments, taken before engaging in a known trigger, such as exercise or right before the menstrual period. Acute medications include analgesics, which ease the pain, and abortive medications, which are designed to stop a headache before it starts.

Narcotics, such as codeine and meperidine (Demerol), are also sometimes prescribed for migraine but should not be a first choice because of a potential for addiction, medication overuse, and aggravation of migraine.

Abortive medications are thought to work directly on certain migraine pathways and contain triptans, drugs that may constrict blood vessels and are therefore contraindicated in vascular disease.

Preventive medications include calcium channel blockers and beta-blockers, which are both blood-pressure drugs. Propranolol (Inderal) and timolol (Blocadren) are beta-blockers that have been approved specifically for migraine prevention by the US Food and Drug Administration (FDA). Antidepressant medications are also sometimes prescribed as preventive medications. Two antiepileptic drugs—divalproex sodium (Depakote) and topiramate (Topamax)—have been approved by the FDA for migraine prevention. The FDA has also approved three external devices that stimulate the brain or nerves of the head and face using electrical or magnetic pulses—the transcranial magnetic stimulator (TMS), the Cefaly headband, and a vagus nerve stimulator called GammaCore. For the treatment of chronic migraine, diagnosed as more than 15 headache days per month over three months, the FDA has approved botulinum toxin type A (Botox) for injection into the forehead, the back of the head, and the shoulders. A new type of drug that uses monoclonal antibodies to block the CGRP or its receptor shows promising results in phase 3 clinical trials, and the FDA is expected to approve it in the near future for chronic and episodic migraines.

### WHAT RESEARCH IS BEING DONE?

The National Institute of Neurological Disorders and Stroke ([ninds.nih.gov](http://ninds.nih.gov)) supports research, including the search for genetic mutations that might contribute to migraine. For example, in 2010, a team of researchers found a common mutation in the gene TRESK, which contains instructions for a potassium channel. Potassium channels are important for keeping a nerve cell at rest. Mutations in these channels can lead to overactive cells that respond to much lower levels of pain. Large genetic analyses similar to the one used to identify TRESK will most likely lead to the identification of a number of other genes linked to migraine. Several large population-based genome studies have revealed single nucleotide polymorphisms (SNPs) that might be relevant for migraine.

For more *Brain & Life* articles on migraine, go to [BrainLifeMag.org/Migraine](http://BrainLifeMag.org/Migraine).

For resources and support, contact:

- American Migraine Foundation: [americanmigrainefoundation.org](http://americanmigrainefoundation.org); 856-423-0043
- Migraine Research Foundation: [migraineresearchfoundation.org](http://migraineresearchfoundation.org); 212-249-5402
- National Headache Foundation: [headaches.org](http://headaches.org); 888-NHF-5552 (888-643-5552)

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