Explainer: What are migraines?

March 14 2013, by Lyn Griffiths

Credit: AI-generated image (disclaimer)

If you, or someone close to you suffers from migraine, you'll know it is much more than your average headache – migraine is a debilitating disorder that can even affect your sight and speech.

Migraine without aura is the most common type of migraine, accounting for about 70% of all cases. This migraine is often characterised by recurrent headaches, nausea, vomiting, and sensitivity to light and noise.

Migraine with aura is less common, affecting around a third of sufferers. This type of migraine is accompanied by neurological disturbances such as visual and speech impairment and muscular changes which is often experienced shortly before or during the early stages of a migraine.

Visual auras may appear as shimmering lights around objects or at the edges of a person's field of vision; they may give the appearance of wavy images or even cause temporary loss of vision.

Non-visual effects can include weakness, speech or language abnormalities, dizziness, vertigo, and tingling or numbness of the face, tongue, hands or feet.

Migraine affects approximately 12% of the western population, with 18% of women, 6% of men and 4% of children suffering from the condition. There are considerable differences in the prevalence of migraine culturally, with Caucasian populations having the highest rates globally.

The condition causes a substantial economic burden. In 1990 the Australian Bureau of Statistics estimated the total cost of migraines to the Australian economy was around $721 million per year, mostly due to loss of productivity at work and reduced occupational effectiveness. Health-care costs associated with migraine are also sizable, with millions of dollars spent on medical consultation and treatment for migraines each year.

Causes

Sensitivity to particular foods and smells, fluctuating hormonal levels, stress and fatigue can prompt migraines in sufferers, but the underlying causes are believed to be genetic and are poorly understood.

As a geneticist, I've been studying the molecular genetics of migraine for over a decade and have identified several genes (including the MTHFR, estrogen receptor, Notch 3 and TRESK genes) that increase a person's susceptibility to suffer from migraine. Most migraine sufferers (about 90%) have a close relative – a parent or grandparent – who also suffers from the condition.

Current treatments

There are a number of excellent pharmaceuticals currently available to treat migraine symptoms, but they are not effective for all sufferers. One of the most common class of drugs used to relieve migraine symptoms are triptans, which work by affecting the serotonin or 5HT1 neurotransmitter system within the brain. They relieve headaches in 30% to 50% of sufferers but the headache can reoccur, requiring a second dose.

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But triptans can have unpleasant side-effects including sensations of tingling, heat, heaviness or tightness in the chest and throat, as well as flushing, dizziness, drowsiness, dry mouth and a transient increase in blood pressure. Also triptan overuse can sometimes lead to dependence and subsequent withdrawal syndromes.

Other drugs used to treat migraine symptoms include non-steroidal anti-inflammatory drugs (NSAIDs), anti-nausea and vomiting drugs and pain medication. The problem with these drugs is that they treat the symptoms, rather than the cause of migraine, which generally means that they are less effective.

Many migraine sufferers are concerned about the side-effects of these drugs and are looking for safe and effective alternatives to treat or prevent their condition.

A simple solution

Our research has shown (in papers published in 2009 and 2012) that dietary folate and increased vitamin B levels can reduce the frequency and severity of migraine. We have identified a specific gene that plays a role in causing migraine, in particular, migraine with aura. The gene has a mutation that results in a reduced enzyme level.

In our two clinical trials, results have shown that we can overcome the gene mutation by adding increased levels of the enzyme's "co-factors" to the diet. The co-factors are simple B group vitamins and they enable the enzyme to work better despite the mutation.

We found that Vitamin B supplementation reduced migraine disability over a six month period. Headache frequency and pain severity also decreased significantly. These results are very promising and provide the possibility of a simple but effective targeted treatment for migraine sufferers.

The final phase of this research, in which we are determining the specific required supplement dosages, is currently underway. Based on earlier results, we can expect this relatively inexpensive, non-toxic vitamin therapy to have enormous potential to improve the health and quality of life for many thousands of Australian migraine sufferers.

The results of the final trial will be released in 2014 and we expect the treatment to be available shortly after.

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