

Financial stress is associated with migraine, if you have specific circadian gene variants

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Credit: Sasha Wolff/Wikipedia

People with a specific variation in the **CLOCK** gene have more migraines under financial stress. This work, the first time that the

genetics of circadian rhythms has been shown to have an effect on migraine, is presented at the ECNP conference in Paris.

Migraine is a serious and debilitating neurological disease affecting 1 billion people worldwide. Migraine has been estimated to cause a financial cost of around €27 billion every year in the European Union, and \$17 billion every year in the USA. In the UK, 1 in 4 women and 1 in 12 men are [migraine](#) sufferers.

The background of migraine is highly complex involving a large number of [genes](#) and their interaction with environmental effects, and acting via multiple pathways in the central nervous system. Variations of circadian genes (which affect how the body controls and responds to environmental changes—such as changes in light) have previously been shown to affect mood disorders, so it was thought it would be interesting to see if they were associated with migraine.

The group of researchers from Hungary and the UK checked 999 patients from Budapest and 1350 from Manchester, for two variants (single nucleotide polymorphisms, SNPs) of the CLOCK gene, and how these are associated with migraine. The CLOCK gene has an important role in regulating many rhythmic patterns of the body, including body temperature or level of cortisol, the primary [stress](#) hormone. They found that there was no significant direct connection between the gene and migraine, but when they factored in stress ([financial stress](#), measured by a financial questionnaire), they showed that the investigated gene variants increased the odds of having migraine type headaches in those subjects who suffered from financial hardship by around 20%. (odds ratio—see abstract for details).

The researchers looked at functional [single nucleotide polymorphisms](#) within the CLOCK gene that are able to influence how much protein is transcribed from the gene. Because this protein controls the body clock

machinery these variants may impair processes that can prevent migraine in the face of stress.

Researcher Daniel Baksa (Semmelweis University, Budapest) said:

"This work does not show what causes migraine—there is no single cause—but it does show that both stress and genetics have an effect. In the work presented here, we were able to show that stress—represented by financial hardship—led to an increase in migraine in those who have a particular [gene variant](#). What we need to do now is to see if other circadian gene variants in association with different stress factors cause the same effect.

The strength of our study is that we saw the same effect in two independent study groups, in Budapest and Manchester, so we think it is a real effect. The investigated gene variants are present in around 1/3 of the population, so they are common variants with small effect size. Our results shed light on one specific mechanism that may contribute to migraine. What it does mean is that for many people, the stress caused by financial worries can physically affect you. Migraine involves a huge health and financial burden each year, so any steps we can take to help patients understand their condition will be really welcome."

Commenting, Professor Andreas Reif (University Hospital, Frankfurt) said:

"This is a really interesting study on the interaction of genetics with stress in migraine. The studied gene is involved in the circadian system, which has previously been shown to be implicated in mental disorders such as bipolar disorder, which intriguingly is comorbid with migraine. Thus, this study might provide a clue how these diseases might be linked on the genetic level which is interesting as such. But even beyond this, the study demonstrates how an environmental risk factor exerts its effect

only in the presence of a given genetic risk factor. This has not been done to a great extent in migraine, making this study an exciting new lead."

Provided by European College of Neuropsychopharmacology

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