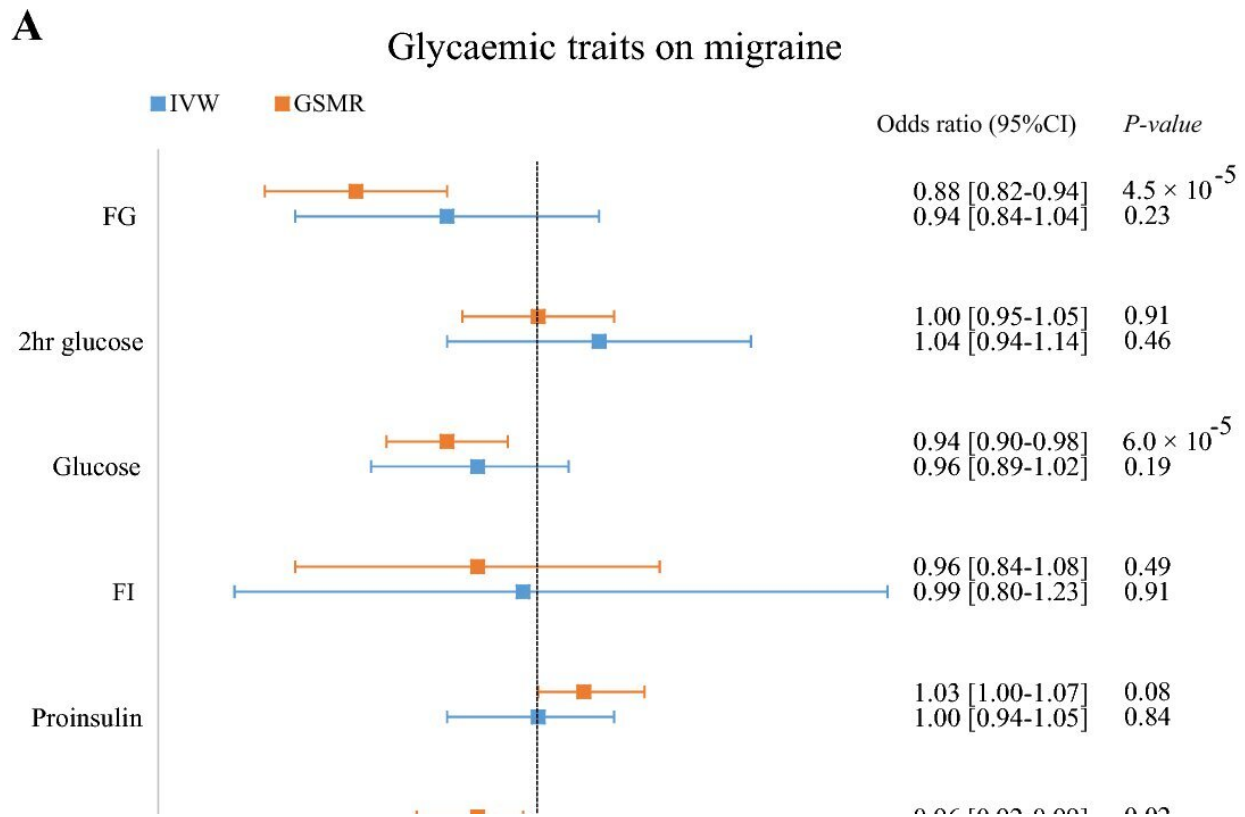


Genetic links between migraine and blood sugar levels confirmed

February 23 2023



The forest plot demonstrates the odds ratios (ORs) and 95% confidence intervals (CIs) for MR analyses examining the causal effects of glycaemic traits on migraine (A) and headache (B). IVW Inverse variance weighted was employed as the primary analysis, GSMR Generalized summary data-based Mendelian Randomisation was used as a sensitivity analysis, FG Fasting glucose, FI Fasting insulin, HbA1c Glycated hemoglobin, HOMA-B Homeostatic model assessment of β -cell function, HOMA-IR Homeostatic model assessment of insulin resistance, T1D Type 1 diabetes. Credit: *Human Genetics* (2023). DOI:

10.1007/s00439-023-02532-6.

<https://link.springer.com/article/10.1007/s00439-023-02532-6>

In a study published in *Human Genetics*, QUT Professor Dale Nyholt and QUT Ph.D. researcher Rafiqul Islam, describe using large-scale genome-wide associations studies (GWAS) summary statistics to analyze hundreds of thousands of human genomes from headache and migraine sufferers and non-sufferers.

Professor Nyholt, from the QUT Center for Genomics and Personalized Health, said the co-occurrence of migraine and glycemc ([blood sugar levels](#)) traits had been reported in observational epidemiological studies but it was unknown how they were genetically linked.

"About 15% of the global population is affected by migraine, and as far back as 1935, migraine was described as a 'glycemc [headache](#),'" Professor Nyholt said.

"Glycemc traits such as [insulin resistance](#), hyperinsulinemia (too much insulin), hypoglycemia (low blood sugar level) and type 2 diabetes are associated with migraine and headache.

"By identifying genetic correlations and shared loci and genes in our analyses we have inferred causal association and thus confirmed and improved understanding of the relationship between migraine, headache and glycemc traits."

Mr. Islam said the researchers performed cross-trait analyses to estimate genetic correlation, identify shared [genomic regions](#), loci, genes, and pathways, and then tested for causal relationships.

"Out of the nine glycaemic traits we looked at, we found a significant genetic correlation for fasting insulin (blood insulin level) and glycated hemoglobin with both migraine and headache, while two-hour glucose was genetically correlated only with migraine," he said.

"We also found regions harboring genetic risk factors shared between migraine and fasting insulin, fasting glucose, and glycated hemoglobin, and for headache, shared regions with glucose, fasting insulin, glycated hemoglobin, and fasting proinsulin.

"Further analyses produced evidence for a causal relationship between migraine and headache with multiple glycaemic traits.

"Our findings provide avenues to develop novel treatment strategies for managing glycaemic traits in migraine and headache patients, particularly increasing fasting proinsulin level to protect against headache."

More information: Md Rafiqul Islam et al, Cross-trait analyses identify shared genetics between migraine, headache, and glycaemic traits, and a causal relationship with fasting proinsulin, *Human Genetics* (2023). [DOI: 10.1007/s00439-023-02532-6](https://doi.org/10.1007/s00439-023-02532-6).
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