Scientists identify 5 genes that determine facial shape

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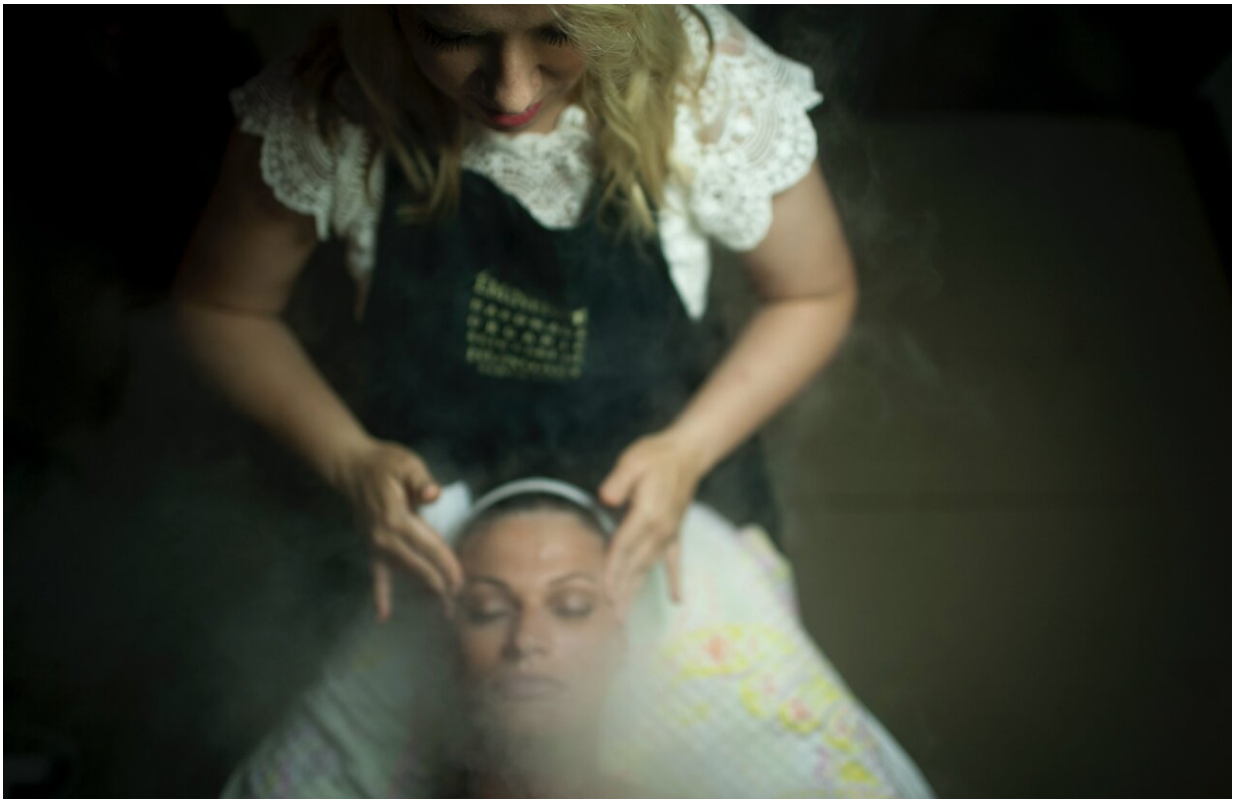

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(Medical Xpress)—European researchers have discovered that five genes play a key role in determining human facial shapes. Presented in the journal *PLoS Genetics*, the genome-wide association study on facial phenotype can help scientists identify more genes for other complex

human phenotypes, including height.

The research can help advance understanding of the complex molecular interactions governing normal and pathological differences in facial shape (when combined with sophisticated three-dimensional imaging techniques).

The study was partially funded by the GEFOS, ENGAGE and GENOMEUTWIN projects. GEFOS ('Genetic factors for osteoporosis') and ENAGE ('European network for genetic and genomic epidemiology') are both funded under the Health Theme of the EU's Seventh Framework Programme (FP7) to the tune of EUR 3 million and EUR 12 million, respectively. GENOMEUTWIN ('Genome-wide analyses of European twin and population cohorts to identify genes in common diseases') received over EUR 13.6 million under the 'Quality of life and management of the living resources' Thematic programme of the Fifth Framework Programme (FP5). The project used European strengths in genetics, epidemiology and biocomputing to identify critical genetic and lifestyle risk factors.

We all know that the faces of identical twins are hugely similar. Siblings also have more similar faces than people who are not related to one another. So, genes are a big part of how the human face appears. But there has been a lack of research into the role genes play in facial morphology in humans.

Enter scientists from Australia, Canada, Germany, the Netherlands and the United Kingdom who performed this latest study, on behalf of the International Visible Trait Genetics (VisiGen) consortium. They used head magnetic resonance images together with portrait photographs to map facial landmarks, from which facial distances were estimated. They later applied a genome-wide association (GWA) approach, with independent replication, and identified deoxyribonucleic acid (DNA)

variants involved in facial shapes in almost 10,000 people.

Three of the five genes the team identified were already implicated by other approaches in vertebrate craniofacial development and disease. One of these three was reported to be involved in facial morphology in a GWA study on children published earlier this year. The researchers said the other two genes may represent completely new players in the molecular networks governing facial development.

'These are exciting first results that mark the beginning of the genetic understanding of human facial morphology,' said lead author Professor Manfred Kayser from the Erasmus University Medical Center in the Netherlands. 'Perhaps some time it will be possible to draw a phantom portrait of a person solely from his or her DNA left behind, which provides interesting applications such as in forensics. We already can predict from DNA certain eye and hair colours with quite high accuracies.'

More information: Liu, F. et al., 'A genome-wide association study identifies five loci influencing facial morphology in Europeans', *PLoS Genetics*, 2012; 8 (9): e1002932. doi:10.1371/journal.pgen.1002932

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