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Scientists narrow search for genes associated with the ability to 'see' sounds

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A new study identifies specific chromosomal regions linked to auditory visual synaesthesia, a neurological condition characterized by seeing colors in response to sounds. The research, published online on February 5th in the *American Journal of Human Genetics*, makes major strides towards identifying the genes that underlie synaesthesia and may eventually lead to improved understanding of typical and atypical cognitive development.

In synaesthesia, which affects less than 1% of the population, stimulation of one sensory pathway results in experiences in another pathway (e.g. hearing sounds triggers colors) or in a different facet of the same pathway (e.g. reading black text trigger colors). "Synaesthesia is known to run in families but the genetics of synaesthesia are not well understood," says lead study author Dr. Julian E. Asher from the Department of Genomic Medicine at Imperial College London.

Dr. Asher designed a study to look for genes linked to auditory visual synaesthesia. The research, performed as part of Dr Asher's PhD in Prof. Anthony Monaco's laboratory at the Wellcome Trust Centre for Human Genetics at the University of Oxford in collaboration with Prof. Simon Baron-Cohen at the Department of Psychiatry at the University of Cambridge, involved a sophisticated genome-wide screen to search for susceptibility genes linked to auditory-visual synaesthesia.

The research team identified four candidate regions linked with susceptibility to synaesthesia but no support was found for an earlier

theory of linkage to the X-chromosome. Although the resolution of the scan makes identifying candidate genes challenging, the researchers identified a number of interesting genes.

"The region on chromosome 2 with the strongest linkage is particularly interesting as it has been previously linked to autism," offers Dr. Asher. "Sensory and perceptual abnormalities are common in autism spectrum conditions and synaesthesia is sometimes reported as a symptom." Candidate genes associated with epilepsy, dyslexia, learning and memory are also located in the candidate regions.

The findings indicate that the genetic basis of auditory-visual synaesthesia is more complex than originally believed and may be due to a combination of multiple genes subject to multiple modes of inheritance. "This study comprises a significant step towards identifying the genetic substrates underlying synaesthesia, with important implications for our understanding of the role of genes in human cognition and perception," concludes Dr. Asher.

Source: Cell Press

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