

Genes linked to being right- or left-handed identified

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The front and back of a human right hand. Credit: Wikipedia.

A genetic study has identified a biological process that influences whether we are right handed or left handed.

Scientists at the Universities of Oxford, St Andrews, Bristol and the Max Plank Institute in Nijmegen, the Netherlands, found [correlations](#) between handedness and a network of [genes](#) involved in establishing left-

right [asymmetry](#) in developing embryos.

'The genes are involved in the [biological process](#) through which an early embryo moves on from being a round ball of cells and becomes a growing organism with an established left and right side,' explains first author William Brandler, a PhD student in the MRC Functional Genomics Unit at Oxford University.

The researchers suggest that the genes may also help establish left-right differences in the brain, which in turn influences handedness.

They report their findings in the open-access journal *PLOS Genetics*.

Humans are the only species to show such a strong bias in handedness, with around 90% of people being right-handed. The cause of this bias remains largely a mystery.

The researchers, led by Dr Silvia Paracchini at the University of St Andrews, were interested in understanding which genes might have an influence on handedness, in order to gain an insight into the causes and evolution of handedness.

The team carried out a genome-wide association study to identify any common gene variants that might correlate with which hand people prefer using.

The most strongly associated, statistically significant, variant with handedness is located in the gene PCSK6, which is involved in the early establishment of left and right in the growing embryo.

The researchers then made full use of knowledge from previous studies of what PCSK6 and similar genes do in mice to reveal more about the biological processes involved.

Disrupting PCSK6 in mice causes 'left-right asymmetry' defects, such as abnormal positioning of organs in the body. They might have a heart and stomach on the right and their liver on the left, for example.

They found that variants in other genes known to cause left-right defects when disrupted in mice were more likely to be associated with relative hand skill than you would expect by chance.

While the team has identified a role for genes involved in establishing left from right in embryo development, William Brandler cautions that these results do not completely explain the variation in handedness seen among humans. He says: 'As with all aspects of human behaviour, nature and nurture go hand-in-hand. The development of handedness derives from a mixture of genes, environment, and cultural pressure to conform to right-[handedness](#).'

More information: The paper 'Common variants in left-right asymmetry genes and pathways are associated with relative hand skill' is to be published in the journal *PLOS Genetics* with an embargo of 22:00 UK time on Thursday 12 September 2013.

Provided by Oxford University

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