

DNA can't explain all inherited biological traits, research shows

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Characteristics passed between generations are not decided solely by DNA, but can be brought about by other material in cells, new research shows.

Scientists studied proteins found in cells, known as histones, which are not part of the [genetic code](#), but act as spools around which DNA is wound. Histones are known to control whether or not genes are switched on.

Researchers found that naturally occurring changes to these proteins, which affect how they control genes, can be sustained from one generation to the next and so influence which traits are passed on.

The finding demonstrates for the first time that DNA is not solely responsible for how characteristics are inherited. It paves the way for research into how and when this method of inheritance occurs in nature, and if it is linked to particular traits or health conditions.

It may also inform research into whether changes to the histone proteins that are caused by environmental conditions - such as stress or diet - can influence the function of genes passed on to offspring.

The research confirms a long-held expectation among scientists that genes could be controlled across generations by such changes. However, it remains to be seen how common the process is, researchers say.

Scientists tested the theory by carrying out experiments in a yeast with similar gene control mechanisms to [human cells](#). They introduced changes to a [histone protein](#), mimicking those that occur naturally, causing it to switch off nearby genes. The effect was inherited by subsequent generations of [yeast cells](#).

The study, published in *Science*, was supported by the Wellcome Trust and the EC EpiGeneSys Network.

Professor Robin Allshire, of the University of Edinburgh's School of Biological Sciences, who led the study, said: "We've shown without doubt that changes in the histone spools that make up chromosomes can be copied and passed through [generations](#). Our finding settles the idea that inherited traits can be epigenetic, meaning that they are not solely down to changes in a gene's DNA."

More information: Restricted epigenetic inheritance of H3K9 methylation, www.sciencemag.org/lookup/doi/.../1126/science.1260638

Provided by University of Edinburgh

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