

New genes linked with bigger brains identified

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A depiction of the double helical structure of DNA. Its four coding units (A, T, C, G) are color-coded in pink, orange, purple and yellow. Credit: NHGRI

A number of new links between families of genes and brain size have been identified by UK scientists, opening up a whole new avenue of research to better understand brain development and diseases like dementia.

A team of scientists from the Universities of Bath and Lincoln compared the genomes of 28 mammals with differing sizes of neocortex - the region of the brain that is involved in higher cognitive behaviours such as language and decision-making. The size of this region differs hugely between species, and is the part of the brain that has grown the most in the human lineage over [evolutionary time](#).

The study, published in the Royal Society journal *Open Biology*, identified a number of gene families - which can grow and contract through [gene duplication](#) and deletion - that have expanded in line with the growth of the neocortex relative to the size of the brain. The research highlighted a host of new genes that haven't previously been linked with brain development, including those known to be involved in cell signalling and immune response.

The researchers hope this discovery might give a better understanding as to which genes are key in human brain development, which could lead to new insights into what goes wrong in a variety of [mental health disorders](#), including dementia.

Dr Araxi Urrutia, from the Milner Centre for Evolution at the University of Bath's Department for Biology & Biochemistry and Dr Humberto Gutierrez from the School of Life Sciences at Lincoln University, led the research.

Dr Urrutia said: "Most research on brain development uses mice as a model, but this approach could be missing some genes that are key for human brain development as our brains differ from those in mice in

many aspects, most notably in the size of the neocortex.

"By comparing the genomes of many different species with large and small brains, and correlating the expansion of gene families with size of neocortex in these species, we've identified several new families of genes that could be involved in brain development in species with a large neocortex such as elephants, dolphins and, of course, ours.

"We hope this could help scientists better understand [brain development](#) and what goes wrong in conditions such as dementia."

More information: *Open Biology*, [DOI: 10.1098/rsob.160132](https://doi.org/10.1098/rsob.160132)

Provided by University of Bath

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