

Unravelling a genetic mystery

March 2 2005

Research by a University of Nottingham expert has shed new light on a genetic mystery that has its origins millions of years ago.

A study by Dr Angus Davison has helped to uncover new facts about the most common organic compound found on earth - a substance called cellulose.

Cellulose is found in large amounts in all crops and plant life, making it one of the foundations of modern farming, human diet and the global economy. There is just one problem with it: most animals are unable to directly digest it in their own stomachs, because they lack a key gene to enable them to do this.

Up until now, only a tiny number of animals have been found to possess the gene — called a cellulase gene — that allows them to do this themselves. Instead, scientists have believed for decades that most animals rely on bacteria living in their gut to break down the cellulose so it can be converted into ‘fuel’ for the body. Humans fall into this category.

But new research by Dr Davison shows that cellulase genes are far more common than previously thought. His study has identified them in many other creatures including earthworms, sea urchins, lobsters and bees.

These surprising findings could mean a radical overhaul for much current scientific thinking about the most common organic compound on earth. They also suggest that at some point in the past, the distant ancestors of modern humans were able to break down cellulose too. And at some point between then and now, we mysteriously lost the ability to

do it.

Dr Davison, of the University's Institute of Genetics, said: 'We found that not only are cellulases common and widespread in animals, but they can also be traced back to the last common ancestor of all animals — including Homo sapiens — more than 600 million years ago. "So in fact cellulases are not rare at all — and they have not been acquired from bacteria."

Dr Davison searched the genetic data on hundreds of species, in the search of cellulase genes. He then traced the evolutionary history of those creatures to show that the genes must have originally evolved in one of the earliest animal species.

The study, carried out jointly with Dr Mark Blaxter at the University of Edinburgh, is published online in the journal Molecular Biology and Evolution.

Source: University of Nottingham

Citation: Unravelling a genetic mystery (2005, March 2) retrieved 12 July 2024 from <https://phys.org/news/2005-03-unravelling-genetic-mystery.html>

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