

National

Leg bone yields DNA secrets of man's Neanderthal 'Eve'

Study shows division of species 600,000 years ago

Project to read genetic code of man's ancestor

Ian Sample
Science correspondent

Strands of DNA recovered from the fossilised leg bone of a Neanderthal have shed light on the fragility of the ancient population and pinpointed when they first split from what were to become modern humans. The 38,000-year-old bone was unearthed in a cave in Vindija in Croatia, and has since become part of a landmark project to read the entire genetic sequence of an ancient human ancestor, a feat scientists believe will help reveal how modern humans evolved into the world's dominant species.

Researchers at the Max-Planck Institute for Evolutionary Anthropology in Leipzig, Germany, read the complete sequence of DNA held in tiny biological powerhouses called mitochondria, which provide energy for cells. The mitochondria are only passed down the female line, so can be used to trace the species back to an ancestral "Eve", the mother of all Neanderthals. The team analysed the DNA of 13 genes from the Neanderthal mitochondria and found they were distinctly different to modern humans, suggesting Neanderthals never, or rarely, interbred with early humans. The genetic material shows that a Neanderthal "Eve" lived around 660,000 years ago, when the species last shared a common ancestor with humans.

Further tests on the DNA revealed surprisingly few evolutionary changes, which suggests that the Neanderthals



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may only ever have existed in relatively small numbers, with less than 10,000 alive at any one time.

"This has implications for our picture of Neanderthals and perhaps the reasons for their extinction. If the population was teetering on the brink for hundreds of thousands of years, it may change our impression of what it would have taken to make them go extinct rather than if there were millions of them," said Adrian Briggs, a molecular biologist who co-authored a report on the work in the journal *Cell*.

Theories of what drove the Neanderthals to extinction range from an inability to adapt to a quickly changing environment, to genocide by early humans. The species is thought to have died out in Europe around 30,000 years ago, shortly after the arrival of early humans.

Neanderthals were short and stocky and well adapted to a cold climate. The tallest male, found in a cave in France, was only 5ft 5in (1.71m). Despite having barrel chests, strong ridges above their eyes and a lack of chins, their brains were on average larger than those of modern humans. Some fossil evidence suggests that they were occasional cannibals, though more commonly hunted large animals including horses and mammoths. Remains of Neanderthals dating back 400,000 years suggest they crafted tools and weapons and buried their dead. The last Neanderthals died out nearly 40,000 years ago, as *Homo sapiens* migrated to, and eventually settled throughout, Europe.

The Leipzig team has read 4% of the Neanderthal's entire genetic code and hopes to complete the full sequence by the end of the year. Comparing the Neanderthal genome with the human genetic sequence should highlight subtle genetic differences, such as genes for improved brain capacity and other traits that underpin what it means to be human.

Intense rainfall due to global warming could raise flood risk

Ian Sample
Science correspondent

Climate scientists have issued a fresh warning over the future risk of flooding after research showed heavy rainstorms are likely to become even more intense than predicted.

Rainfall is expected to increase with global warming because the atmosphere can hold more water as it heats up, but the extent to which rainfall patterns will change in the future has been unclear.

Writing in the *US Journal of Science*, researchers warn regions that are already vulnerable to flooding will be hit hardest by rainstorms in the future, and that previous predictions may have underestimated how intense these rainstorms will be.

Researchers from Reading and Miami Universities used satellite data from 1987

to 2004 to see how natural changes in surface and air temperatures caused by El Niño weather events influenced rainfall over the tropics. They found a clear link, with countries experiencing far more rainfall as temperatures rose.

"When we first looked, we saw that the warm periods were associated with the periods of heaviest rainfall, but when we looked more carefully, we found the models underestimated what the satellite data showed by a factor of two to three," said Richard Allan, who led the study.

If other researchers are able to confirm the findings, it suggests areas already prone to flooding may experience far more problems as global temperatures rise.

Yesterday one of the government's chief science advisers, Robert Watson, said the UK must prepare for a 4C rise in average temperatures, despite Europe's declared goal of no more than a 2C rise.

81% of biofuel fails eco-standards

David Adam
Environment correspondent

Under a fifth of the biofuel used on UK roads meets government environmental standards intended to safeguard human rights and guarantee carbon savings, figures released today show.

The Renewable Fuels Agency says 19% of the biofuel supplied under the government's initiative to use fuel from plants to help tackle global warming met its green standard. For the remaining 81%, suppliers could not say where it came from, or could not prove that it had been produced in a sustainable way.

The suppliers began mixing the biofuel into all petrol and diesel supplies in April, under the Renewable Transport Fuel Obligation (RTFO). The figures show that

biofuel accounted for 2.1% of UK road fuel for the first month of the scheme, against a target for the year of 2.5%. Most (86%) was biodiesel, with 14% bioethanol.

Scientists and campaigners have warned that biofuels could cause more problems than they solve, with concerns over the destruction of tropical forests and impact on global food supplies. A spokesman for the Renewable Fuels Agency, which plans monthly updates on the figures, said the environmental standard was intended to address those concerns.

Asad Rehman, biofuels campaigner with Friends of the Earth, said: "The shocking admission that we are unable to identify the origin of nearly half the biofuels used in the UK means that the government cannot assure the British people that the biofuels in their petrol tanks have not destroyed rainforests."

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