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on Wednesday 2 November 2011**

**Earliest modern humans’ in Europe identified by Oxford researchers**

Oxford University researchers have provided important new radiocarbon dates for two milk teeth and a jawbone, which shed new light on when the first modern humans arrived in Europe.

In the first of the two separate research projects, published in the journal Nature, Dr Katerina Douka was part of an international research team re-examining two infant teeth excavated from a prehistoric cave in Italy. The team showed that the teeth are not Neanderthal as previously thought, but belong instead to anatomically modern people. In addition, using the latest dating techniques, she discovered that the teeth are 43,000-45,000 years old – making them the earliest remains of modern humans in the whole of Europe.

In a separate study also in Nature, a team of scientists led by Oxford Professor Thomas Higham and Professor Chris Stringer from the Natural History Museum, London, obtained new dating evidence for a tiny piece of jawbone unearthed from Kent’s Cavern in Devon, England. The jawbone, which was also found to belong to modern people and not Neanderthals, is significantly older than previously thought – at between 41,000 and 44,000 years old.

The new dates, established using the Oxford Radiocarbon Accelerator Unit, are hugely significant as they suggest that modern humans arrived in Europe much earlier than previously believed. That means anatomically modern humans are likely to have co-existed with Neanderthals in this part of the world for several thousand years.

Dr Douka was part of an international team led by Dr Stefano Benazzi and Professor Gerhard Weber from the University of Vienna, working on two milk teeth unearthed in 1964 from the Grotta del Cavallo. The teeth were located in archaeological layers described as ‘Uluzzian’ – a culture characterised by personal ornaments, bone tools and colourants, items typically associated with modern human behaviour. However, previous researchers identified the teeth as Neanderthal and this attribution has been at the heart of the widely held view that the Uluzzian culture, and the complex ornaments and tools within it, were produced by Neanderthals.

The team reanalysed the teeth using digital scanning methods and compared the scans with those of a wide range of other human remains. They are secure in the knowledge that the Cavallo teeth are modern human. This has significant implications for our understanding of the development of fully ‘modern’ behaviour in Europe.

A comprehensive programme of radiocarbon dating has provided the key chronology for the finds. Previous dates for the Uluzzian were problematic and affected by contamination. Since the teeth were too small to date directly and lacked collagen, Dr Douka developed a new approach that focused on the dating of marine shell beads found in the same archaeological levels as the teeth. This showed that the modern human teeth must date to between 43,000-45,000 years ago.

Dr Douka said: ‘Radiocarbon dating of Palaeolithic material is difficult because the levels of remaining radiocarbon are very low and contamination can be a serious problem; our new approach using marine shell eliminates this issue. Shell beads are important objects of body ornamentation and have allowed us to date reliably the presence of the earliest currently-known Homo sapiens settlers of Europe.’

Meanwhile, Professor Thomas Higham and Professor Chris Stringer led a team to establish the date and identification of a fragment of upper jaw (maxilla) containing three teeth which had been excavated in 1927 from Kent’s Cavern near Torquay. The bone was originally dated in Oxford in 1989, but doubts were later raised about the reliability of the date because traces of modern glue (used to conserve the bone after discovery) were found on the surface.

As the remaining uncontaminated area of bone was deemed too small to re-date, members of the team searched through the excavation archives and collection in the Torquay Museum to obtain samples of animal bone from depths recorded as above and below the spot where the maxilla was found. They obtained radiocarbon dates for the bones of wolf, deer, cave bear and woolly rhinoceros, found close to the maxilla, of between 50,000 and 26, 000 years ago. Using a Bayesian statistical modelling method, they were then able to calculate an age for the maxilla of between 41,000 and 44,000 years old.

The new dates placed the jawbone into a period when Neanderthals were still surviving in Europe. It therefore became crucial to confirm the original 1927 identification of the bone as modern human. Natural History Museum scientists Dr Tim Compton and Professor Chris Stringer were able to use a virtual three-dimensional model based on the CT scan of the jawbone, undertaken by researchers from the University of Hull and the Hull York Medical School, to carry out a detailed analysis of the fossil. They found early modern human characteristics in all but three of the 16 dental characteristics, confirming that the fossil is a modern human. Team member Dr Beth Shapiro of Pennsylvania State University earlier had tried to extract mitochrondrial DNA from one of the teeth, but there were insufficient amounts for valid DNA sequencing.

Professor Higham said: ’We believe this piece of jawbone is the earliest direct evidence we have of modern humans in northwestern Europe, at a site at the very outermost limits of the initial dispersal of our species. It confirms the presence of modern humans at the time of the earliest Aurignacian culture, and tells us a great deal about how rapidly our species dispersed across Europe during the last Ice Age. It also means that early humans must have co-existed with Neanderthals in this part of the world, something which a number of researchers have doubted.’

For information or photographs of the milk teeth or the maxilla from Kent’s Cavern, please contact the University of Oxford Press Office on +44 (0)1865 280534 or email press.office@admin.ox.ac.uk.

Alternatively contact *katerina.douka@rlaha.ox.ac.uk* or *Thomas.higham@rlaha.ox.ac.uk*Mobile contact for both: 07595380202.

For enquiries to Professor Chris Stringer, please contact the Natural History Museum Press Office on *press@nhm.ac.uk* or 0207 942 5654

**Notes for Editors**

**\*Publication is STRICTLY EMBARGOED until 6pm London time /2pm US Eastern Time on Wednesday 2 November 2011**

**\*PRESS BRIEFING**

**There is a press briefing, organised by Nature, about both papers on 2 November at 11am.**

**Katerina Douka, Thomas Higham, Stefano Benazzi and Chris Stringer will be speaking at the briefing. It will take place at the Forum Room at the Wellcome Collection, 183 Euston Rd, London, NW1 2BE. See map** <http://www.wellcomecollection.org/visit-us/getting-here.aspx>

**\*Photographs are available (and can be downloaded from the Nature website):**

1.Mesial view of the specimen Cavallo-B (baby tooth: left upper first molar), the first European anatomically modern human. The white bar in the figure is equivalent to 1 cm. Credit: Dr Stefano Benazzi.

2. A photograph of the maxilla including three teeth, of the earliest known modern human in Europe, discovered during excavations at Kent’s Cavern, Devon, in 1927.
Credit: Chris Collins (NHM) and Torquay Museum.

\*‘The early dispersal of modern humans in Europe and implications for Neanderthal behaviour’ by Stefano Benazzi et al and ‘The earliest evidence for anatomically modern humans in northwestern Europe’ by Thomas Higham et al are due to be published in Nature on November 2.

\*Professor Higham’s project was undertaken as part of the Ancient Human Occupation of Britain (AHOB) project, funded by the Leverhulme Trust and led by Professor Chris Stringer.
For more information, see <http://www.ahobproject.org/> .
Also: <http://www.leverhulme.ac.uk/>

\*Dr Benazzi and Dr Douka’s work was supported by the NSF 01-120 Hominid Grant 2007, A.E.R.S. Dental Medicine Organisations GmbH FA547013, the Fondation Fyssen and the DFG INST 37/706-1 FUGG, the NERC Grant (NE/D014077/1) and doctoral grants by the Greek State Scholarships Foundation and the Leventis Foundation.

\*The Oxford Radiocarbon Accelerator Unit) is part-funded by the Natural Environment Research Council (NERC). Funding was provided for both projects through a NERC–standard research grant. See: <http://www.nerc.ac.uk/>

\*Dr Katerina Douka is a post-doctoral researcher at the Oxford Radiocarbon Accelerator Unit, Research Laboratory for Archaeology and History of Art, University of Oxford, and Junior Research Fellow of Linacre College, Oxford. She is currently employed by the Ancient Human Occupation of Britain (AHOB) project, For her profile go to <http://www.arch.ox.ac.uk/KD1.html>

\*Professor Thomas Higham is the Deputy Director of the Oxford Radiocarbon Accelerator Unit, Research Laboratory for Archaeology and the Histroy of Art and interim Director of the Advanced Studies Centre at Keble College, Oxford. For his profile, go to <http://www.arch.ox.ac.uk/TH1.html>

\*Professor Chris Stringer is an expert on human origins at the Natural History Museum, London, and he leads the Ancient Human Occupation of Britain (AHOB) project. He is author of a new book on human evolution, The Origin of our Species. For his profile, go to [http://www.nhm.ac.uk](http://www.nhm.ac.uk/)

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