

>NEWS FROM ATAPUERCA IN ENGLISH

A selection of highlights from the previous issue



> **BONES FROM EL SIDRÓN (ASTURIAS)**
ATAPUERCA RESEARCHERS HELP EXTRACT NEANDERTHAL DNA
>Iberian Neanderthals genetically identical to European congeners
>First DNA from Spanish Neanderthal fossil

>A team of researchers has released one of the most important scientific discoveries in Spain in recent years: a DNA sequence from Neanderthal bones found in El Sidrón Cave (Piloña, Asturias). This is the first Neanderthal mitochondrial DNA sequence in Spain, which joins a very short list of countries (Germany and Britain) due to the difficulty of preserving and extracting organic matter.

The El Sidrón scientists include several members of the Atapuerca Research Group (ARG)- young biologists Cayetana Martínez-Maza and Markus Bastir, supervised by palaeontologist Antonio Rosas, director of the CSIC Palaeobiology Department. The El Sidrón site directors are Asturias archaeologists Javier Fortea and Marco de la Rasilla.

>The first conclusions from this study, led by mitochondrial DNA expert Carles Lalueza Fox, show that Iberian Neanderthals were genetically the same as those in the rest of Europe, in contrast to several hypotheses that have suggested the existence of different lineages separated by geographic barriers.

This points to a common ancestor for them all, probably *Homo heidelbergensis*, a very well represented species in the Atapuerca Hills. Another conclusion from this sequencing work is related to the evolutionary history of Neanderthals and *Homo sapiens*: the genetic differences discovered between them support the hypothesis that there was no hybridisation and that they formed two differentiated species more than half a million years ago.

The DNA extraction and analysis was done on an adult molar from El Sidrón at the Evolutionary Biology Unit (UPF) in Barcelona. Previously, computerized axial tomographs (CAT) were done at the Ruber Clinic in Madrid to study the enormous pulp cavity.

Interdisciplinary prehistory research has yielded excellent results in recent years. One of the latest disciplines to join this type of dialectic method is Palaeogenetics, which has an extremely promising future for the development of archaeological research and the discovery of a number of aspects including the genetic variability of past human groups. Research is therefore focusing on the extraction and analysis of mitochondrial DNA, an ideal genetic marker due to its small size, fast evolution rate and its par-

ticular form of transmission, which is almost exclusively maternal.

Neanderthal genetic matter was first sequenced in 1997 at the Max Plank Institute in Leipzig (Germany), using remains of the species prototype found in the Neander valley in 1856.

DNA in Atapuerca

> DNA research at Atapuerca began several years ago with an agreement between the Carlos III Institute and the University Complutense of Madrid to set up a research unit to work on evolution and human behaviour. The Unit, headed by Juan Luis Arsuaga and Manuel Martín-Loeches, is tackling an area of molecular anthropology and fossil DNA to study the various modern human populations and bones, the ancient DNA of European bones and Neanderthal evolution. One of the great challenges being faced is to extract fossil DNA from species dating back more than 100,000 years, begun thanks to the exceptionally good conservation state of the human fossils found in the Bones Pit.

Even at this early stage, the preliminary results are encouraging. If consolidated, they will permit comparison with Neanderthals and *Homo sapiens*, which will be extremely helpful in the study of human evolution in Europe.

Datings and people

>The Atapuerca Hills provide the unique feature of having hosted several hominid species over the last million years. The oldest case, *Homo antecessor*, was discovered at the Gran Dolina site in a well-defined stratigraphic context associated with a large volume of fauna and manufactured stone tools.

> The *Homo antecessor* remains were found at a level (TD6) that is immediately below another (TD7) where an inversion of the Earth's magnetic field was recorded. This is a fundamental reference point due to its ubiquity, dated throughout the world at 780,000 years ago. This is the first discovery in Western Europe of hominid fossil remains from the geological period known as the Lower Pleistocene. Datings yielded by teeth of large herbivores in Paris by the combined ESR/U-Th method (gradual transformation of uranium into thorium) have enabled TD6 to be assigned to a period between 780,000 and 860,000 BP. A few hundred metres from Gran Dolina, at the bottom of an immense network of limestone cavities, an incredible number of human remains were unearthed from the clay levels in the Bones Pit. These humans belonged to the *Homo heidelbergensis* line, the forebears of the Neanderthals. This is the world's largest assemblage of human fossil remains from the Middle Pleistocene. The ESR/U-Th method applied to their teeth and bones yielded an age of between 250,000 and 300,000 years. Recent studies using Thermal Ionization Mass Spectrometry (TIMS) to measure atoms in flowstone covering the



sediment backfill, suggest an age of roughly 500,000 years for the human remains in the Bones Pit.

> The Gallery site, less than 100 metres from Gran Dolina, has yielded tools that were worked on both sides (bifaces), clear evidence of the presence of hominids who elsewhere had already domesticated fire and had also mastered the Levalloisian stone-flaking technique. Combined ESR/U-Th dating of herbivore teeth is yet to be done, and will allow us to place this site in the context of the upper levels of Gran Dolina, which so far have not yielded bifaces.

> Visitors must not overlook the Elephant Pit, a few hundred metres further on, with clear proof of the origins of the Atapuerca hominids. This story began around 1.2 - 1 million years ago. Although some levels have not yet revealed human remains, several very simple tools are evidence of human presence at this site.



trate the different human lineages during the Quaternary are often drawn on a chronological scale that shows how dating methods become a vital part of palaeoanthropology. The Atapuerca sites are an extraordinary example of the potential of methods that allow us to designate an age to the hominids and also reconstruct the environment they lived in.

"Council of Sages" for Museum

> First steps > This council is chaired by the Director Ge-

be appointed by Burgos University will shortly join the group, along with a senior technician from the Museums and Infrastructures Service.

The Museum of Human Evolution will be the first of the three buildings to be completed, and is expected to be operating in 2007. It is planned to work in close collaboration with other major international museums to facilitate scientific exchanges and thus become a world reference point, adding to the attraction of its powerful visual and interactive features.

>Research Centre. There is also fresh news on the National Research Centre for Human Evolution. The Management Committee has recently appointed a team of 17 internationally renowned scientists to advise both the national Ministry of Education and Science and the regional government of Castilla and León on its establishment and subsequent operation.

The Committee also approved the establishment of a small research team to work at a provisional headquarters. The premises, on the grounds of the Purchase College in Burgos, are on loan from the City Council to enable work to begin after summer.

Institute of Human Palaeoecology and Evolution established in Tarragona

> The Institute's aim is to promote research and socialization in the field of human evolution and social behaviour

> On 13 December 2004, the Chancellery Building of the Rovira i Virgili University (Tarragona) hosted the official construction budget ratification for the Institute of Human Palaeoecology and Social Evolution.

This is a private foundation whose patrons include the University, the City Council and Departament d' Universitats, Recerca i Societat de Informació of the Catalonia Government. It aims to promote research and socialization in the area of human evolution and social behaviour. The first construction stage of the building will be funded by the City Council, while the University and the Catalonia Government will finance the Institute's operation and staff.

The Palaeoecology Humana i Evolució Social team in Tarragona will cover a two-pronged approach: research and social aspects on the one hand, and academic work on the other. When the Institute begins, the former area will be run from the headquarters while the latter, focusing on the European Quaternary and Prehistory Master Course, will continue to be based at the University.

In the medium-term future, the basic work team will consist of 40 scientists covering the seven present modules: Technology, Palaeontology, Molecular archaeology, Archaeobotany, Geoarchaeology, Spatial Archaeology and Restoration. These modules cover all research into human evolution and behaviour, as well as the methodological, ex-

perimental, instrumentals and heritage branches. Each module will be led by a senior managing scientist, together with two other researchers and a technician.

Although three institutions will initially play an active role in this centre, collaboration by business groups is being sought to broaden perspectives, improve efficiency and extend the research projects. This is expected to be a flexible institution, and to this end, joint ventures with other teams will be sought to work together on particular projects.

Atapuerca group helping to promote Sahara archaeology

>Several representatives of the ARG and Burgos University were in the Western Sahara from 12 to 18 February as guests of the Polisario Front in collaboration with the Friends of the Sahara Peoples Association, Burgos University and the Atapuerca Foundation.

They visited refugee camps, outposts of the V Military Region and the Tifariti area archaeological sites where Gerona University has conducted a research project in recent years.

During their stay in the Sahara, they detected the presence of numerous above-ground archaeological sites spanning a long period of prehistory. They also visited caves and shelters containing paintings and engravings in the north-eastern Sahara. The major contribution that Burgos University can make is to help the Sahara people manage their own heritage. To do this, the main channels will be to help a number of students gain University training in archaeological skills and heritage management with our research team. These students will be the Directors of a future Sahara Archaeology Institute and the best ambassadors of Burgos that could be wished for.

Bringing young people to Burgos from the refugee camps to learn Spanish and organising a travelling photographic exhibition are also good ways of furthering our understanding of Sahara society and culture.

Atapuerca with the Sahara and the Saharan people

> A first-hand vision of the refugee camps and the deterioration of their heritage has led members of the ARG to begin a joint project with the Sahara people. Suggested initiatives include the donation of computer equipment, twinning Atapuerca with the areas containing cave paintings in the Arab Republic and devoting texts or images in the future Museum of Human Evolution to the rich legacy held for humankind in the former Spanish Sahara. The protection and promotion work that should be done in the area are very difficult to put into practice: they are in a zone that is under the effects of an ongoing armed conflict and under an administration (the UN), which is accused of being partly responsible for the current situation and indeed the destruction of the archaeological heritage.



> The Porch and Lookout sites clearly show the presence of so-called "modern man" (*Homo sapiens*) in this region. The Bronze Age and Neolithic levels are very well represented and their study is giving us an idea about the lifestyle of human society nearly 10,000 years ago.

> The diagrams that illustrate the different human lineages during the Quaternary are often drawn on a chronological scale that shows how dating methods become a vital part of palaeoanthropology. The Atapuerca sites are an extraordinary example of the potential of methods that allow us to designate an age to the hominids and also reconstruct the environment they lived in.