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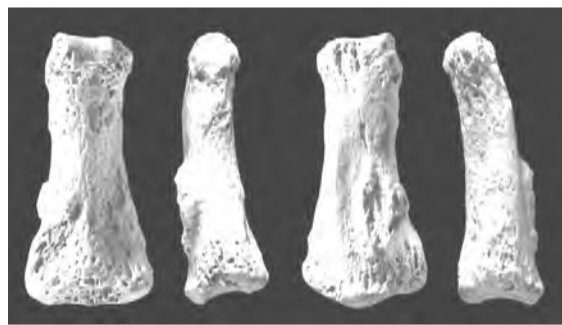
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## SCIENCE

**Finger bone points to early human exodus** New research suggests that modern humans were living in Saudi Arabia about 85,000 years ago. A recently discovered finger bone believed to be Homo sapiens was dated using radio isotope techniques. This adds to mounting evidence from Israel, China and Australia, of a widespread dispersal beyond Africa as early as 180,000 years ago. Previously, it was theorised that Homo sapiens did not live continuously outside Africa until 60,000 years ago. The study is published in Nature

Ecology and Evolution. Previous digs in the Arabian interior have uncovered tools which could have been used by early Homo sapiens. But skeletal evidence of their presence has been lacking. **A trace of evidence** Researchers working at the Al Wusta site in Saudi Arabia came across a single intermediate phalanx (the middle of the three bones that make up a finger) in a preserved lake bed. No other remains of its owner were found. "It's normal," explained Dr Huw Groucutt, the study's lead author. "Almost all humans and animals that ever lived will disappear without trace. "We got very lucky. Generally if you found one piece of an individual you wouldn't be able to tell. But it turns out that bone is quite distinct," the University of Oxford researcher added. The team used CT scanning to build a 3D model of the bone, and compared it to other human and Neanderthal remains from this time period. It was found to most closely resemble Homo sapiens, as Neanderthal bones are shorter and squatter. Other material from the site was dated using two separate dating techniques. **A matter of climate** The climate in Saudi Arabia 85,000 years ago was very different to the modern day. Monsoon rains created lush lakes, inhabited by animals much like hippos. Wild cattle and antelope also appear to have migrated from Africa at this time. The fossil record at Al Wusta shows a rich variety of animal life, alongside stone tools that closely resemble those used by Homo sapiens. Dr Groucutt believes humans may have chosen to move in to this inviting environment. "The interesting thing," he told BBC News, "is that in the past some people have said we couldn't really spread into Asia until we had complex tools. [Our findings] suggest that that kind of migration didn't really reflect a technological breakthrough, but reflects climate change." Recent work in South Africa also points to the influence of changing climate on human evolution. Although it is hard to determine from the Saudi Arabian site, human occupation of the area seems to have been short-lived; restricted to a few hundred or a couple of thousand years. It is not known whether the population died out or simply chose to move on. "The great mystery now is what happened to these people," added Dr Groucutt. Genetic evidence suggests all living non-Africans trace their ancestry to an exodus from the continent around 60,000 years ago. Researchers are now trying to reconcile this DNA data with the mounting archaeological evidence that Homo sapiens was present outside Africa much earlier. One possibility is that these pioneer populations went extinct, to be replaced by a later wave that led to the rest of the world being permanently settled by our species. *BBC*



## SCIENCE

**Origin of 'six-inch mummy' confirmed** Tests on a six-inch-long mummified skeleton from Chile confirm that it represents the remains of a newborn with multiple mutations in key genes. Despite being the size of a foetus, initial tests had suggested the bones were of a child aged six to eight. These highly unusual features prompted wild speculation about its origin. Now, DNA testing indicates that the estimated age of the bones and other anomalies may have been a result of the genetic mutations. Details of the work have been published in the journal *Genome Research*. In addition to its exceptionally small height, the skeleton had several unusual physical features, such as fewer than expected ribs and a cone-shaped head. The remains were initially discovered in a pouch in the abandoned nitrate mining town of La Noria. From there, they found their way into a private collection in Spain. Some wondered whether the remains, dubbed Ata after the Atacama region where they were discovered, could in fact be the remains of a non-human primate. A documentary, called *Sirius*, even suggested it could be evidence of alien visitations. **Genetic investigation** The new research puts those ideas to rest. A scientific team analysed the individual's genome - the genetic blueprint for a human, contained in the nucleus of cells. They had already used this to confirm that the individual was human. Now, the team has presented evidence that Ata was a female newborn with multiple mutations in genes associated with dwarfism, scoliosis and abnormalities in the muscles and skeleton. "What was striking and caused us to speculate early on that there was something strange about the bones was the apparent maturity of the bones (density and shape)," said Garry Nolan, a professor of microbiology and immunology at the Stanford University School of Medicine in California. He told BBC News: "There was proportionate maturation of the bones, making the body look more mature despite the fact that the specimen was itself small. This discrepancy drove much of the research. So, we believe that one or more of the mutated genes was responsible for this." The results revealed four new single nucleotide variants (SNVs) - a type of genetic mutation - in genes that were known to cause bone diseases, like scoliosis or dislocations, as well as two more SNVs in genes involved in producing collagen. Ata also had 10 pairs of ribs, rather than 12 - a feature that has never been seen in humans before. "We actually believe the girl was stillborn or died immediately after birth," said Prof Nolan. "She was so badly malformed as to be unable to feed. In her condition, she would have ended up in the neonatal ICU." However, access to advanced medical care was probably unavailable in the remote Chilean region where she was found. The skeleton's intact condition suggests it may be no more than 40 years old. **Future benefit** Prof Nolan began the scientific investigation of Ata in 2012, when a friend called saying he might have found an "alien". He explained: "While this started as a story about aliens, and went international - it's really a story of a human tragedy. A woman had a malformed baby, it was preserved in a manner and then 'hocked', or sold." The scientists said that future studies of Ata had the potential to improve our understanding of the underlying basis of genetic skeletal disorders - with the potential to help others. "Analysing a puzzling sample like the Ata genome can teach us how to handle current medical samples, which may be driven by multiple mutations," said Atul Butte, director of the Institute for Computational Health Sciences at the University of California, San Francisco. "When we study the genomes of patients with unusual syndromes, there may be more than one gene or pathway involved genetically, which is not always considered." Prof Nolan says further research into Ata's precocious bone aging could one day benefit patients. "Maybe there's a way to accelerate bone growth in people who need it, people who have bad breaks," he said. "Nothing like this had been seen before. Certainly, nobody had looked into the genetics of it." He added: "I think it should be returned to the country of origin and buried according to the customs of the local people." *BBC*



### From the "TRIVIA BOOK"

In the 9th century, craftsmen who made hats were known to be excitable and irrational, as well as to tremble with palsy and mix up their words. Such behavior gave rise to the familiar expression 'mad as a hatter'. The disorder, called hatter's shakes, was caused by chronic mercury poisoning from the solution used to treat the felt. Attacking the central nervous system, the toxin led to behavioral symptoms.