



PRESS RELEASE (2026/10/21)

Invisible eland identified from 60,000-year-old ochre-rich sediment

Ancient proteins reveal hidden aspects of technical and symbolic behaviors of early humans

Fukuoka, Japan—Publishing in the journal [Proceedings of the Royal Society B](#), a research team from Kyushu University, Universitetet i Bergen, and the University of Copenhagen reports that they found traces of ancient collagen protein from the common eland, *Taurotragus oryx*, on a 60,000-year-old ochre-rich surface in the Kilpdrift Complex, a Middle and Later Stone Age archaeological site located within the coastal cliffs of the De Hoop Nature Reserve in South Africa.

To better understand how ochre was used by early humans, the team used palaeoproteomics, the high-throughput analyses of ancient proteins, to search for potential proteinaceous traces within this archaeological feature. The study identified collagen from elands in the ochre surface, suggesting that either animal-derived materials were deliberately mixed with the ochre or ochre-treated eland hides were present at the site.

These findings provide new evidence for the complex technical and possibly symbolic behaviors of early Homo sapiens.

The most significant finding is the identification of type I collagen proteins from the common eland, which provides biomolecular evidence that animal-derived materials were associated with ochre use during the Middle Stone Age. Until now, evidence of organic components mixed with ochre has been extremely rare, especially in Africa. This discovery offers a new way to investigate how early humans used ochre and other organic materials in their daily, technical, and potentially symbolic activities.

The team analyzed archived sediment samples taken from the Kilpdrif Complex using palaeoproteomics, a growing field of archaeology and paleontology that examines ancient proteins preserved in materials collected at archaeological sites. The proteins were extracted from the sediments and analyzed using liquid chromatography-tandem mass spectrometry (LC-MS/MS). The resulting protein fragments were then compared to large protein databases and a custom collagen reference database to identify their species of origin.

These findings demonstrate that palaeoproteomics can successfully recover and identify ancient proteins from archaeological sediments, even in challenging African environments where ancient DNA rarely survives. This creates a powerful new tool for archaeologists studying early human behavior, allowing them to investigate biological materials no longer visible in the archaeological record.

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For more information about this research, see "Palaeoproteomic investigation of archaeological sediments associated with ochre use in the Middle Stone Age of southern

Africa," Zahra Haghighi, Takumi Tsutaya, Elizabeth Catherine Velliky, Simon James Armitage, Christopher Miller, Meaghan Mackie, Francesco d'Errico, Gaudry Troché, Jesper Velgaard Olsen, Karen L. van Niekerk, Christopher Stuart Henshilwood, Enrico Cappellini. *Proceedings of the Royal Society B*, <https://doi.org/10.1098/rspb.2025.3300>

About Kyushu University

Founded in 1911, [Kyushu University](#) is one of Japan's leading research-oriented institutions of higher education, consistently ranking as one of the top ten Japanese universities in the Times Higher Education World University Rankings and the QS World University Rankings. Located in Fukuoka, on the island of Kyushu—the most southwestern of Japan's four main islands—Kyushu U sits in a coastal metropolis frequently ranked among the world's most livable cities and historically known as Japan's gateway to Asia. Its multiple campuses are home to around 19,000 students and 8,000 faculty and staff. Through its [VISION 2030](#), Kyushu U will “drive social change with integrative knowledge.” By fusing the spectrum of knowledge, from the humanities and arts to engineering and medical sciences, Kyushu U will strengthen its research in the key areas of decarbonization, medicine and health, and environment and food, to tackle society's most pressing issues.

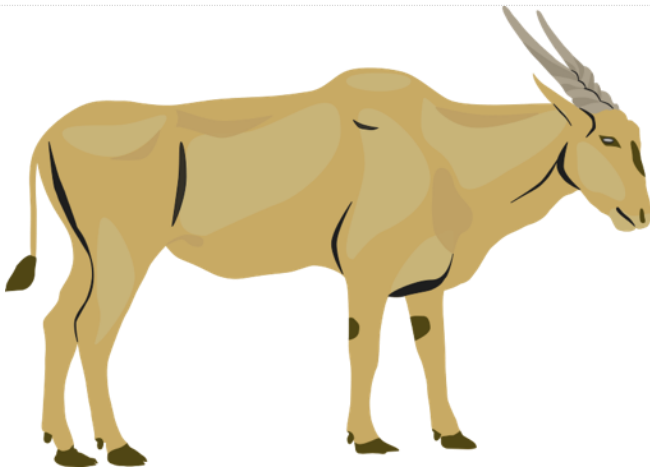


Fig. 1. Illustration of an eland. An eland is a large plains antelope found in East and Southern Africa. (Takumi Tsutaya/Kyushu University)



Fig. 2. Sample preparation. First author Zahra Haghighi pictured preparing a sample in a clean laboratory for palaeoproteomic analysis. (Takumi Tsutaya/Kyushu University)



Fig. 3 Klipdrift Complex, South Africa. A photo of the Klipdrift Complex located within the coastal cliffs in the De Hoop Nature Reserve in South Africa where the samples for the study were collected. (Ole F. Unhammer/Universitetet i Bergen)

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