

## How chemistry can reveal the secrets of ancient worlds

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Blackened Egyptian mummy

The day-to-day lives of prehistoric humans have been revealed following new research developed by chemists at the University of Bristol. The research, which combines archaeology with cutting-edge chemistry allowing scientists to reconstruct the past, will be presented at the Royal Society's annual Summer Science Exhibition [30 June 2009].

Led by Professor Richard Evershed from the University's School of Chemistry, the team has developed new methods of forensic-style chemistry enabling the extraction of <u>chemical information</u> from <u>organic</u> <u>molecules</u> that have been preserved in archaeological artefacts and



geological deposits for hundreds, thousands or even millions of years. Using this information the team is able to unravel key aspects of the lives of ancient peoples, particularly their diet and agricultural practices.

Richard Evershed, Professor of Biogeochemistry at the University, said: "While the archaeological record is extraordinarily incomplete, by combining molecular, isotopic and archaeological information we can build up pictures of how people lived in a way that was impossible until now. We use the latest analytical chemical techniques in a forensic approach because of the thousands of years that have passed since the evidence was left behind."

The latest state-of-the-art analytical chemical techniques are required to reveal and identify the invisible ancient molecules — 'biomarkers' — which are then matched to modern reference materials. These molecular and isotopic 'fingerprints' can be used to trace human activities, adding important new pieces to the jigsaw puzzle of past life on Earth.

One of the major challenges the scientists have taken on is the study of organic residues preserved in ancient cooking pots. Degraded animal fats left over from food processing are the most common residues detected. Professor Evershed's group were able to distinguish the chemical and isotopic signatures of milk and body fats of animals.

Professor Evershed continued: "Identifying the milking of animals based on fat residues in Neolithic pottery dating back nearly 9,000 years shows the specificity that can be achieved through these molecular and isotopic approaches."

The scientists will be on hand at the Exhibition, the premier annual showcase for scientific excellence in the UK, which runs from Tuesday 30 June to Saturday 4 July at the Royal Society in London, to talk visitors through their research.



The exhibit, 'The Palaeodetectives: digging up small molecules with big messages from the past', sponsored by the Wellcome Trust, the Natural Environment Research Council (NERC), English Heritage, with additional support from Shimadzu UK Ltd, is located in the Wellcome Trust Lecture Hall.

Visitors to the stand will have the opportunity to interpret the past by ancient identifying molecules found in different artefacts and sediment. The second activity, an interactive computer game, will enable people of all ages to become a Paleodetective. Participants will be asked to choose from one of eight cases including the case of the Blackened Egyptian mummy. The black colour is due a black substance applied to the skin, bandages and other funerary objects. The Palaeodetective will have to find out what the black substances found on the mummy is made of by reviewing the evidence, completing the profile and solving the mystery.

The collaborative group for the exhibit include: Professor Richard Evershed, Drs Fiona Gill, Rich Pancost and Ian Bull from the University's School of Chemistry.

Another exhibit called 'The Chewing Robot', developed by researchers at the University's Department of Mechanical Engineering in collaboration with the Department of Oral and Dental Science, is a new biologically inspired way to study dental wear formation on human teeth and is also being showcased at the Exhibition.

The exhibits have been developed with the support of the University's Centre for Public Engagement, which encourages the University's academics to engage with the public.

Provided by University of Bristol (<u>news</u> : <u>web</u>)



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