**Mummy-Making Began Long Before Pharaohs**

The ancient Egyptians began mummifying bodies as far back as 6,000 years ago, analysis of Late Neolithic and Chalcolithic funerary wrappings has revealed.

The finding predates the origins of mummification in ancient Egypt by 1,500 years, indicating that resin-soaked textiles used in the prehistoric period (c. 4500 – 3350 B.C.) are the true antecedents of Egyptian mummification.

Experts have long assumed that in the 5th and 4th millennia B.C. preservation of soft tissues was due to natural processes, since buried bodies were naturally desiccated in the hot, dry desert sand.

The start of true Egyptian mummification is generally dated to the Old Kingdom (2500 B.C.), although the use of preservative resinous recipes became evident centuries later during the Middle Kingdom (c. 2000 – 1600 B.C.).

Detailing their finding in the current issue of PLOS ONE journal, researchers from the Universities of York, Macquarie and Oxford report that complex embalming agents were soaked in linen wrappings covering bodies from Late Neolithic and Chalcolithic period tombs at Badari and Mostagedda in Upper Egypt.

"In 2002, I examined samples of funerary textiles from these sites that had been sent to various museums in the United Kingdom through the 1930s from Egypt," Jana Jones of Macquarie University, Sydney, said.

Preliminary microscopic analysis by Jones revealed resins were likely to have been used. After a number of aborted attempts by other experts, Stephen Buckley, a Research Fellow at the University of York, was able to carry successful biochemical analysis.

Using a combination of gas chromatography-mass spectrometry and sequential thermal desorption-pyrolysis, Buckley examined 23 samples of wrappings from Mostagedda. Radiocarbon dating at the Oxford Radiocarbon Accelerator Unit confirmed the Late Neolithic and predynastic dating of the textiles, with the oldest wrappings dating between 4316-3986 B.C.

Buckley identified a pine resin, an aromatic plant extract, a plant gum/sugar, a natural petroleum source, and a plant oil/animal fat in the wrappings.

"These are embalming agents," Buckley told Discovery News.

Plant oil or animal fat made up the the bulk of the balms, with far lesser amounts of a conifer resin and an aromatic plant extract, or "balsam," and minor amounts of a wax and a plant gum/sugar.

"Ingredients were brought from the North East Mediterranean. For example, the pine resin must have come from what is now south eastern Turkey," Buckley said.

According to Buckley, the mixtures, which had antibacterial properties, show the same ingredients used in approximately the same proportions in mummies from the pharaonic period some 3000 years later, when mummification was at its zenith.

At that time, evisceration and the use of a desiccant had become an integral part of the embalming process.

Buckley says there is no doubt prehistoric Egyptians experimented with artificial mummification. Experts have previously described resin-impregnated linen being used to mold the shape of the bodies around 2800 B.C. as a forerunner to a more complex process, yet this research suggests the use of embalming agents in this way started over a millennia earlier.

"Because these are complex processed mixtures, the idea that by coincidence the pharaonic embalming agents and these prehistoric recipes happen to be the same, yet have no connection, is nonsense," he said.

Early reports of burials at the site of Badari mention seven cases in which the head was wrapped in textile and one example of a pad of textile at the hands. We know that bodies were placed in pit graves and had associated artifacts such as shells, pottery and jewellery buried with them, but unfortunately the remains are now lost.

"The antibacterials would have provided some soft tissue preservation, but it is a shame that we can't do a direct comparison," Buckley said.

He believes the resinous recipes probably started as something symbolic. Then, through observation and subsequent experimentation, the preservative qualities of the recipes would have appeared as vital for the body and the spirit in the afterlife.

"The process evolved, by trial and error, rather than emerging from nowhere fully formed," Buckley said.

According to Egyptologist Joann Fletcher, professor at the University of York's Department of Archaeology, the study is of tremendous importance.

"It shows the Egyptians were doing things far earlier than previously realized," Fletcher told Discovery News.

"Not only were they far more sophisticated in terms of their understanding of preservation techniques at this very early date, but they were using materials imported from far greater distances than they have generally been given credit for," she added.

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