

## The Hyksos Enigma visits Melbourne

Skeletal material from Middle Bronze Age tombs at Jericho held by the Australian Institute of Archaeology has been studied and sampled by scientists working with the Hyksos Enigma Project <http://thehyksosenigma.oaew.ac.at/> . This project is funded by the European Research Council under the European Union's Horizon 2020 research and innovation program and is led by Professor Manfred Bietak (Austrian Academy of Sciences).

The Institute has skull material from eight individuals. From these, two left temporals provided samples for ancient DNA, and three teeth and an occipital fragment will be sampled for dietary and mobility isotopes. The tombs at Jericho were excavated by Dame Kathleen Kenyon in the 1950s and contained artefacts that have been associated with the Hyksos. It is hoped that the data obtained from the Institute's bone collection will help characterize these people who moved into the Nile Delta from the Near East and ruled parts of Egypt during the Second Intermediate period 1650-1550BC.



*Dr Stantis removing a tooth for analysis. Prior to this the skull was imaged in 3D.*



*One of the Jericho skulls sampled IA10.2114*

The molecular analyses (ancient DNA) of the material will be conducted at the ancient DNA Laboratory of the EURAC - Institute for Mummies and the Iceman, Bolzano, Italy. The repetitive nature of the human genome allows about 79% of an aDNA genome to be mapped confidently; this is generally sufficient to answer most archaeological questions.

The stable isotope analysis aims to trace migration patterns from the Near East/Levant into the Nile Delta through the interpretation of strontium and oxygen isotope ratios, and to reconstruct dietary patterns through carbon, nitrogen, and sulphur isotope analyses.

Two isotopes of strontium, Sr87 and Sr86, are of interest for reconstructing the movement of humans and animals in the past. Sr87 and Sr86 are absorbed into the body from the drinking water. The interpretation of movement rests upon the assumption that Sr87/Sr86 ratios in teeth enamel will generally reflect ratios of the underlying geology of the locality in which the person lived during childhood.

The analysis of the carbon, nitrogen, and sulphur stable isotopes is based on the principle that bodies, including the skeleton, reflect diet. The examination of dentin collagen gives a 'snapshot' of an individual's childhood diet. The time span roughly between five and ten years of age can be captured by sampling from the roots of permanent premolars and molars.

Nina Maaranen's work involved accurate measurements of the skulls and teeth. Several anatomical dimensions are significant for the characterizing of specific populations. Her work is non-destructive and is therefore more attractive to museum curators than the taking of samples; she may be expected to assemble a comparatively large database. The Institute has the view that it is important to seek to know the people who were once associated with its collection and it is therefore prepared to allow the taking of small samples to assist this process.

The synthesis of the Jericho data with the Hyksos project will be published a monograph and the raw data will be made available to the Institute to curate in association with the Jericho tomb information for future researchers.

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