
Tell Halula (Syria), seasons 1992–2005

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Tell Halula is a Neolithic site located in the middle Euphrates valley in Syria, east of Halab. It covers 8 hectares and is flanked by two wadis: wadi Abou Qal Qal and wadi al-Fars. Systematic excavations were begun in 1991 under the direction of Dr. Miquel Molist, Professor of Prehistory at the Universitat Autònoma de Barcelona, Spain. Since then, the site has been continuously excavated and has been revealed as one of the largest known Neolithic sites comparable to Ain Ghazal or Abu Hureyra. Archaeological trenches cover an area of 2500 m² and almost 40 levels of occupation. The oldest settlement (levels 1–20) was inhabited around 7700–7600 cal BC (8700 BP), which corresponds to the early and middle PPNB periods. Levels 20/21 to 34 correspond to the Late Neolithic (7600–6900 cal BC). Level 35 is transitional to the Halaf culture (6100 cal BC). This culture is represented by only two levels (36 and 37), dated from 6000 to 5500 cal BC (7000–6500 BP). For the early PPNB phase, represented over a small area of ca. 200 m², there was only one burial in level 7. Subsequent levels 8–15 were excavated over larger area, up to 400 m², which allowed reconstruction of the settlement in this period. Up to date as many as 21 houses have been excavated, and in this nine structures have associated burials. Unfortunately, due to natural erosion and trench sections none of the discovered PPNB skeletons was complete. The minimum number amounts to 107 individuals.

The settlement buildings were organised in several long parallel lines of east–west orientation. Each line contained several houses located 0.4–1.5 meters apart each other, all oriented north–south. Structures were rectangular and consisted of three to five rooms, always a central room (where burials were found near the entrance) and secondary ones in the northern side. This wasn't the case for the inhumations from level 14, and there burials were located outside the house (Molist et al. 2006). Most burial pits contained single primary skeleton, only twelve graves contained remains of more than one individual. The burial pits were dug into the clay floor and plastered with lime. The bodies were placed on the side with both lower and upper limbs flexed. Several fetal positions were also observed, but only in the case of neonates and infants. In some burials remains of vegetable fibres, sacks, mats or baskets were found, so it is possible that the bodies had been covered. All pits were sealed with adobe cover, probably originally visible on the surface. The number of burial pits per house, varied from five up to 13. The mean number of pits per house is 8.5.

Almost all human skeletal remains are stored in the laboratory of the Spanish Tell Halula Archaeological Mission, at Tell Halula, near Abou Qal Qal. Some samples have been recently transported to Barcelona, especially the teeth and bones showing traces of pathology. Dental pathologies have already been published (Anfruns et al. 1996; Oms et al. 2006). During the 2005 fieldwork season, the postcranial bones were studied in the excavation house according

to standard methods (Martin & Saller 1959, Brothwell 1981, Bass 1971). Sex was diagnosed according to Ferembach's method (Ferembach et al. 1980) and the age was assessed through the analysis of the dental eruption pattern (children), of the epiphyseal fusion (juveniles) and of the suture obliteration (adults). Measurements were taken with spreading calliper and mandibulometer, and the long bone lengths were recorded with use of an osteometric board. All measurements were taken with 1 mm accuracy. Nikon D-50 and Sony™ DSC-F505V cameras were used for photographic documentation. For the entire sample, age and sex has been evaluated once more after the preliminary diagnosis done during the excavations. Unfortunately, the bones were severely damaged during the excavation process, transport and storage, and due to bone fragmentation, it was often very difficult to re-evaluate the sex from pelvis. Thus, other dimorphic characteristics had to be used.

The sample consists of 121 individuals from all levels. Due to the fragmentation it was possible only to take a few measurements on case of each skeleton. For example in a sample of 46 adult individuals, only 15 had any long bone preserved well enough to allow height estimation, according to Trotter and Glesser's formulas (1952, 1958). Biometric analysis included the whole set of measurements recommended by Bass (1971). The presence of paleopathological changes (fractures, arthritis, *cribra orbitalia*, porotic hyperostosis etc.) has been recorded.

In addition to the study of human remains from Tell Halula, skeletons from Djâde, Cheik Hassan and Jerf el-Ahmar have been studied in the Laboratory of Anthropology of the University of Barcelona. Dental microwear pattern analysis performed on the skeletal samples from these four sites is a part of the Ph.D. by Muhammad Al-Rousan written under the supervision of Dr. Pérez-Pérez. The aim is to determine the dietary habits of these populations as precisely as possible. Microwear pattern analysis is a fine technique for diet reconstruction through the analysis of the traces left by phytoliths on dental enamel. Few data are available from Near Eastern Neolithic sites and only Abu Hureyra occlusal microwear pattern had been studied (although there is a recent publication focused on Natufian populations, as well; Mahoney 2006). Moulds of all specimens were taken by using Coltène Regular body and the casts were made with Ferropur PR55+E55 for further SEM analysis. Moreover, during the 2007 archaeological season, moulds from Tell Aswad and Tell Ramat were made. Preliminary results will be published in the *Revista Española de Antropología Física* and then prepared for publication in an international journal in 2009. Also a study on the tooth size was published by the S.A.P.P.O. (Seminari d'Arqueologia Prehistòrica del Pròxim Orient) members J. Anfruns and J. Oms at the Universitat Autònoma de Barcelona (Anfruns & Oms in press).

Another detailed study of talus and calcaneus from Djâde and Tell Halula (and, in more limited scope, Cheik Hassan and Jerf el-Ahmar) is being prepared in the Laboratory of Anthropology of the University of Barcelona. Halula's tali and calcanei are enormous, especially if compared to those of Djâde. They could be a good estimator of interpopulational variability for Near Eastern populations. These results are expected to be ready to sent to an international journal by 2008.

Finally, because DNA preservation in Tell Halula has been proved to be exceptional, the aim of future research is to look for new DNA preservation markers and to evaluate the impact of the environment on the molecular preservation. This work will be done at the Molecular Biostratigraphy Laboratory, The Mines School, Polytechnical University of Madrid (Prof. Trino Torres, Prof. José Eugenio Ortiz). Previous DNA analysis (mitochondrial and Y-chromosome), allowed us to know the genetic composition of the first Neolithic settlers (Fernández 2005). The new analysis will be focused on new samples from PPNB levels and also from later Neolithic levels (pre-Halaf and Halaf). This will allow us to evaluate the ge-

netic impact of Neolithic spread over the existing genetic background of Europe. Finally, the development of new techniques has made possible the nuclear genetic typing of very degraded samples. By applying this new brand technology, we intend to obtain DNA fingerprints of some of the individuals to try to infer kinship relationships among them. This paleogenetical research will be done by the Laboratory of Forensic Genetics and Population Genetics, Complutense University of Madrid (Prof. Eduardo Arroyo, Dr. Eva Fernández, Ana María López, Cristina Gamba). The analysis will be funded by the research grant CGL2006-07828/BOS from Ministerio de Educación y Ciencia, Spain.

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