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A new analysis interpreting Nilotic relationships and peopling of the Nile Valley

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ABSTRACT

The process of the peopling of the Nile Valley likely shaped the population structure and early biological similarity of Egyptians and Nubians. As others have noted, affinity among Nilotic populations was due to an aggregation of events, including environmental, linguistic, and sociopolitical changes over a great deal of time. This study seeks to evaluate the relationships of Nubian and Egyptian groups in the context of the original peopling event. Cranial nonmetric traits from 18 Nubian and Egyptian samples, spanning Lower Egypt to Lower Nubia and approximately 7400 years, were analyzed using Mahalanobis D^2 as a measure of biological distance. A principal coordinates analysis and spatial-temporal model were applied to these data. The results reveal temporal and spatial patterning consistent with documented events in Egyptian and Nubian population history. Moreover, the Mesolithic Nubian sample clustered with later Nubian and Egyptian samples, indicating that events prior to the Mesolithic were important in shaping the later genetic patterning of the Nubian population. Later contact through the establishment of the Egyptian fort at Buhen, Kerma's position as a strategic trade center along the Nile, and Egyptian colonization at Tombos maintained genetic similarity among the populations.

Introduction

Interactions of Nilotic populations have been the subject of much scientific inquiry over the last 120 years. Differing opinions exist as to the nature and mechanisms of the relations. In 2005, Keita proffered a novel method to view Nubian-Egyptian relationships; he suggested that military interactions could not alone account for the biological similarities among the two populations. Rather, Keita (2005) saw the relationship as a continuum, dating back to the late Pleistocene and mid-Holocene, placing importance on the peopling of the Nile Valley as the initial cause for genetic similarity. Linguistic family dispersals, environmental pressures, and other sociopolitical events were tied to occupation and subsequent affinity. Later interactions between the populations were seen as secondary to these early events for shaping biological relationships. Here, later Egyptian relationships are examined through the perspective of these early population events.

The long history of contact between Egypt and Nubia is documented in the archaeological record. Post-peopling of the Nile Valley, trade with Nubians and trade routes from more southern areas to Egypt provided opportunity for contact between the two populations. Extending back to the A-Group/Early Dynastic, Nubians controlled trade routes (Edwards, 2004; Trigger, 1976), while later time periods (e.g., Meroitic/Graeco-Roman Period) saw a large trade complex located in Meroë, Nubia for the two regions (Edwards, 2004). Moreover, the military provided opportunity for contact as Nubians were mercenaries in the Egyptian army and the Egyptian army fought against Nubians (Trigger, 1976).

The extensive contact has led to detectable genetic and therefore skeletal and dental similarities among the two populations.

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Samples cluster along population lines in many studies (e.g., Berry and Berry, 1972; Godde, 2009a), but they can also show a more complex relationship. For example, a closer affinity has been detected of the wealthy Nubian A-Group to elite Egyptians than elite Egyptians were to other Egyptians (Prowse and Lovell, 1996). At Tombos in Lower Nubia, long term Egyptian occupation led to homogenization of the two different populations over the Napatan period (Smith and Buzon, 2014). Smith and Buzon (2014) describe peaceful interactions that likely led to the biological similitude formed over time.

Along with the prolonged contact and interactions, each population experienced its own individual history that shaped its genetic composition. The Nubian archaeological record was viewed for years as being peppered with multiple hiatuses in which the region was abandoned by the inhabitants for 100 years or more, likely due to environmental reasons or Egyptian interference. A proposed early 100-year hiatus between the Neolithic A-Group and Middle Nubian Horizon C-Group is negated by evidence of continuous occupation from A-Group to C-Group at multiple sites in Saras (Nördstrom, 1966). The second hiatus was a 1000-year gap after the fall of the Kerma civilization from Egyptian conquest ordered by Thutmosis III (Edwards, 2004). Kerma, a state-level society (Smith, 1998), was a massive trade center on the Nile that oversaw importation of goods from the south to the north (Welsby, 1996). Evidence from the post-Kerma hiatus suggests that the Kerma inhabitants moved southwest after its fall (Edwards, 2004). Burials in a cemetery at el-Kurru, which spans through the building of first pyramids of the kings of Napata, hold similarities with mid-second millennium BCE elite burials, thus potentially dating them to the Late Kerma period (Edwards, 2004). Moreover, one of the early tumuli from el-Kurru date to approximately mid-second millennium BCE (Edwards, 2004) and burials at Tombos date to 1400 BCE (Smith and Buzon, 2014) providing further evidence of the movement of the Kerma Nubians areas further south.

One of the most interesting and important facets of Egyptian history (which also has implications on the genetics of the population) is the shift from widespread, small agricultural communities dispersed along the Nile to political unification under the first pharaoh. To describe Predynastic Egypt, one must tell of the independent development of two regions, Lower (represented by Naqada) and Upper (e.g., Maadi-Buto), whose political, social, and material remains are distinctive. Little is known about the transition from small agricultural groups to political unification (Bard, 1994), as the archaeological record is limited primarily to cemeteries and grave goods in Upper Egypt (Bard, 1992; Savage, 2001) and the reverse in Lower Egypt (Savage, 2001). Thus, knowledge of this pivotal time is constrained by mortuary contexts that are not necessarily representative of the great society in Upper Egypt. Despite this limitation, much has been derived from what remains and theorized into the greater context of state formation in Egypt.

Three models have been put forth to explain the sociopolitical unification of the north and south that have drastically different genetic implications. The assimilation model (Buchez and Midant-Reynes, 2011) states that a “Naqadization” of the north (originally hypothesized by Kaiser (1957)) where the southern Egyptian groups migrated to the north and engaged in military conquest, leading to genetic swamping of the north by the south, was not necessarily the mechanism for cultural and political unification during the Predynastic period. Instead, the assimilation model posits Lower Egypt adopted cultural practices of Naqada willingly from contact between the two regions, which would eliminate the need for mass migrations and conquest (Buchez and Midant-Reynes, 2011). Similarly, the interactionist model proffers that the north and south are one culture, with different regional variations, whose similarities are a result of their socioeconomic relationship (Köhler, 1995, 2008). The assimilation and interaction models are supported by archaeological evidence (c.f., Buchez and Midant-Reynes, 2011; Köhler, 1995, 2008) and biological evidence modeled from Predynastic groups (Keita and Godde, 2016). A recent article that examined the genetics of Egyptian mummies suggests great early contact with the Near East near this formative time (Schuenemann et al., 2017), but the results must be viewed with caution as only 151 individuals from a single site were examined, and thus making broad conclusions across Egyptians as an entire population is premature.

With these major events in mind (lack of hiatuses, potentially peaceful political unification), this study seeks to investigate Keita’s (2005) model from modern interpretations of Y-chromosome data through cranial nonmetric data. Concurrently, this paper will analyze certain sociopolitical, socioeconomic, and sociocultural events that would have shaped Egyptian and Nubian population history. It is hypothesized that Keita’s model using a modern perspective will be supported through the close relationship of Nubian and Egyptian groups extending back to the Mesolithic in Nubia, and the genetic composition of the samples will be reflective of their respective histories. This hypothesis was constructed from the patterns found in earlier work (Godde, 2004, 2009a, 2009b, 2010, 2013a, 2013b, 2018) as the best model to describe the variation and changes found in the Nile Valley. To meet these goals, an investigation using biological distance analyses, among other measures of population structure, is completed, which focuses on variation between samples and measures the relationship of samples to one another.

Materials and methods

Samples and variables

A total of 18 Nubian and Egyptian groups (n = 1846 individuals) were analyzed, representing temporally, culturally, and/or geographically distinct groups (Table 1; Fig. 1). These data were originally collected by the author (available upon request), provided to the author (by Dr. Tsunehiko Hanihara and Dr. Nancy Lovell), or were published (Strouhal and Jungwirth, 1984). Seven nonmetric traits, distributed across the cranium, were common among all the samples: tympanic dehiscence (TD), precondylar tubercle (PCT), supraorbital foramen (SOF), accessory infraorbital foramen (AIOF), ossicle at lambda (OL), parietal notch bone (PNB), and asterionic bone (ASB). The number of traits was limited due to the antiquity and state of the Mesolithic remains, whose fragmented nature prevented many nonmetric traits from being observed. Other samples were not subject to this limitation and boasted mostly complete crania. These traits have been used in many studies of the region (e.g., Godde, 2009a, 2009b, 2013a, 2013b; Prowse and Lovell,

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