



Physical Anthropology Section - 2013

H128 Anthropology and Disease Genetics: A New Avenue of Forensic Identification

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After attending this presentation, attendees will better understand the potential utility of disease-specific genetic databases for forensic identification. Attendees will be introduced to the concept that features not previously considered individuating by forensic anthropologists can in fact become vital parts of the identification process with a little background research and collaboration with scientists from other fields. In addition, attendees will be shown both the methodologies required in associating anthropological and genetic practices in this type of identification, and a pilot example of how this may be employed in a real-life scenario.

This presentation will impact the forensic science community by showing how the need for more avenues of forensic identification to increase the likelihood of positive identification of highly desiccated or skeletonized remains under the purview of forensic anthropologists is important. This presentation will encourage a more productive collaboration between forensic anthropologists and geneticists and allow forensic anthropologists the opportunity to expand their avenues of identification by tapping into, until now, under-utilized resources. The concept of utilizing a specific set of medical databases discussed in this presentation provides a new avenue of research that will expand the tools available to forensic anthropologists and drive new research endeavors into exploring the forensic potential of existing medical databases.

Forensic anthropology, especially osteological analysis, has become vital to medicolegal cases in which remains are highly decomposed or skeletonized. One of the main roles of the anthropologist in such cases is the identification of the deceased through the implementation of identification methodologies and the creation of a biological profile of the remains. Unfortunately, there are still few databases to which researchers can compare their findings to help identify the deceased. Without the ability to compare the biological profiles of unidentified remains to potential matches, it is very difficult to give a name to the unknown remains: however, there are many medical patient databases with extensive areas of information that have yet to be utilized by forensic investigators. Collaboration between genetic and forensic researchers can expand skeletal identification techniques and provide new avenues for individual identification through the use of specific medical databases.

This new technique builds relationships between features of the skeleton and medical diseases through common genetic markers which affect the presentation of both aspects in the individual. The interaction of the genetic elements are analyzed for significance and then tested against a sample population. Given the genetic association between the disease and the bony manifestation, the identification of the feature on a set of remains can allow the forensic anthropologist to direct a DNA study in search of the common marker in the gene of interest. Upon finding the marker, suggesting that the individual does have the disease, the anthropologist can then search the local disease-specific patient databases using the biological profile to advance the identification process by composing a subset of potential matches.

A pilot case study on the application of this technique to the relationship between the eye disease Age-Related Macular Degeneration, which is the leading cause of vision loss in older adults, and the bone disease Ossification of the Posterior Longitudinal Ligament, which is the ossification of a ligament in the spinal column will be presented. It is encouraged that forensic anthropologists, while creating their biological profile, note features that may not be considered individuating and research any connections between these features and diseases.

Identification, Anthropology, Genetics