Amplification of Ancient DNA and Sex Determination in

Human Medieval Skeletal Assemblages

Jeremy Bird, senior lecturer in the School of Science, Institute of Technology, Sligo, describes another aspect of the analysis being conducted.

Determining the sex of pre-adolescent skeletons by standard morphological methods is not possible because these skeletons have little sexual dimorphism, in other words, the skeleton of a young male will not differ substantially from that of a young female. However, a number of studies have demonstrated the importance of DNA analysis for sex identification in pre-adolescent or juvenile skeletons. This element of the research project aims to perform DNA-based sex identification in juvenile assemblages from Ballyhanna. This MSc research is being carried out by Ms Sheila Tierney BSc, based in the Institute of Technology, Sligo, and led by Dr Jeremy Bird.

The advent of the Polymerase Chain Reaction (PCR) in the field of molecular biology has allowed us to detect and analyse the DNA from ancient remains. This can provide a unique tool for archaeologists to investigate issues in society and culture that could not be addressed previously.

This study aims to use PCR to amplify DNA from the amelogenin gene found on the X- and Y-chromosomes. Initially, it will be used on adult skeletons, the sex of which has already been determined by standard morphological means. It will then be applied to a number of juvenile skeletons from Ballyhanna. The DNA amplification is an extremely sensitive form of analysis and can be used in an archaeological and forensic context to identify sex in human remains. It relies on the fact that the amelogenin gene is slightly smaller on the Y-chromosome than the X-chromosome due to the deletion of DNA near the centromere of the Y-chromosome, but not of the X-chromosome. The results of this study will be related to current post-excavation information from the burial site and osteoarchaeological data on the skeletal assemblage.