

## **A STUDY OF SKELETAL HUMAN LEUCOCYTE ANTIGEN-DR AND MITOCHONDRIAL DNA IN A 3RD-4TH CENTURY AD ROMANO-BRITISH PAGAN AND CHRISTIAN CEMETERY IN COLCHESTER**

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*Report by Richard Todd*

The final lecture of the 2013-2014 programme attracted a large audience.

Professor Fernandez opened with a brief description of the Major Histocompatibility Complex, and of Mitochondrial DNA. The former, also known as the Human Leucocyte Antigen system (HLA), has evolved over millions of years as a defence mechanism against bacterial and viral infection and has gained additional relevance in recent times in the field of transplant surgery. These genes, comprising one per cent of the human genome, are specific to the individual. The other ninety nine percent, about 30,000 genes in total, are common to us all. HLA genes are found on chromosome 6 and are divided into two classes and several sub-groups. Each gene can occur in many different forms, accounting for our immunological individuality.

Mitochondrial DNA, found in those cytoplasmic organelles that are responsible for energy production within the cell, contains only 37 genes but is of particular significance in tracing ancestry because it passes down the generations only in the female line (embryonic cytoplasm is derived solely from the ovum while the ovum and sperm each contribute half of the nuclear material). Patrick Spencer then gave an overview of the excavations at the Butt Road Romano-British cemeteries, both the police station site, first excavated by William Wire in 1846 and more extensively by the Colchester Archaeological Trust in the 1970's and 1980's, and the former Artillery Barracks site dug in 2012-2013. He explained that legal, social and religious customs influenced the manner of disposal of bodies. At the police station site there were two cemeteries, one superimposed on the other, the first pre-Christian and the second, dating from the early 4<sup>th</sup> century, showing evidence of Christian influence. The majority of deposits were inhumations with coffins, and some graves were grouped in clusters or rows or were stacked one on another. In particular there were some timber vaults, possibly for the interment of priests or deacons or other prominent citizens, each containing two or more burials, with other graves, perhaps for family members, placed closely around them.

Professor Fernandez then resumed to report the results of DNA testing of 26 skeletons from some of those graves around two timber vaults. This involved purification and two stage amplification of the extracted DNA. The findings of the HLA group DRB and of the mitochondrial DNA support the presence of family groups in these graves. He noted that

the study was limited by the small number of specimens so that statistical analysis was not possible. He expressed his ambition to establish a laboratory at the university for the examination of "Ancient Bones" but explained this would be an expensive project not only in setting up the laboratory but also in terms of the ongoing cost of skilled personnel and reagents.

In response to questions he said that most vertebrates had a similar immune system that was essential to survival. The skeletons examined were all of a broadly Caucasian type but he could not be more specific. He could not speculate about the likely findings in burials at other types of site, for example rural as opposed to urban. More generally he explained that successful organ transplantation depends on achieving as close a match as possible between donor and recipient and then relying on immuno-suppressive drugs to prevent rejection. With regard to possible inheritance of specific diseases most depend on multiple genes which, even when present in any individual, may or may not be "switched on".

Philip Crummy commented that at the Butt Road sites there was archaeological and osteological evidence for family grouping of graves and that the DNA findings correlated well with osteological identification of gender. With regard to the geographic origin of individuals, examination of tooth enamel minerals was the most informative technique.