HLA DQ A1 GENOTYPES AND ALLELIC POLYMORPHISMS AMONG MAJOR ETHNIC GROUPS: A DNA BASED STUDY FROM THE CENTRAL PROVINCE OF SRI LANKA.

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ABSTRACT

MHC (Major Histo-Compatibility Complex) sited on the short arm of chromosome 6 of the human being, contains a group of genes that code for proteins (antigens) expressed on the surface of a variety of cell types known as the *human leukocyte antigens*, or HLA. This HLA / MHC system can be readily used alone or be used as a supplement to DNA based STR (Short Tandem Repeat) analysis to identify individuals, establish familial relationships in forensic cases. Additionally the typing of HLA is useful in transplant medicine and clinical medicine.

The DNA based HLA typing was not available in Sri Lanka until this study introduced it. Hence, Sri Lanka had to depend on foreign laboratories or the serological testing in this regard. Serological testing has limitations and the DNA based typing provides a better result/opinion.

The DNA based HLA DQ A1 allele and genotype data of Sri Lankans were not available in the local or international literature. Attempts to assess genetic variability amongst ethnic groups in Sri Lanka using molecular genetic data have not been reported.

The main aim of this study was to optimize and introduce/establish DNA based HLA typing in Sri Lanka with a view to facilitate forensic identification purposes and transplant purposes. In this regard the original method described by Olerup, *et al.* 1993 was changed/optimized by using 'Chelex 100' method to extract DNA in this study, while the original method used Phenol: Chloroform based kit method. Additionally the PCR volume was reduced to 10µl in this study while the original method used usual volume of 25 µl. These optimizations significantly reduced the cost per test.

To identify HLA DQ A1 allele types and genotypes in the Sri Lankan population studied, sequence specific /allelic specific primers were used and the extracted DNA was subjected to PCR (Polymerase Chain Reaction) to amplify the HLA DQ A1 loci. The PCR products were run in a 2 % agerose gel (electrophoresis) and the allele type and genotype were documented. To assess whether there were genetic differences among ethnic groups, the established pair-wise Chi Square testing and measurement of genetic distance described by Nei, (1972) were used. The ethnic groups studied in this study were Sinhalese, Sri Lankan Tamils and Muslims in Sri Lanka.

All HLA DQ A1 alleles (ten alleles) described in the literature namely DQA1*0101, DQA1*0102, DQA1*0103, DQA1*0104 DQA1*0201, DQA1*0301, DQA1*0302, DQA1*0401 DQA1*0501 DQA1*0601 were visualized in the Sri Lankan population studied. In comparison with Tamils and Sinhalese, Muslims possessed DQA1*0501 and DQA1*0601 but Sinhalese or Tamils did not possess these alleles.

The optimized method was validated and made available for forensic, transplant and clinical purposes in Sri Lanka. The allele types and genotypes of different ethnic groups were documented. The most frequent genotype identified in the cumulative sample was DQA1*0102 and DQA1*0103. This study observed a statistical genetic similarity between Sinhalese and Tamils ($p > 0.05$) based on HLA DQ A1 data. Significant genetic differences were observed between Muslims and Tamils ($p < 0.05$), and between Muslims and Sinhalese ($p < 0.05$).

In conclusion, this study introduced/established the DNA based HLA DQA1 typing in Sri Lanka. Additionally the allele and genotypes of HLA DQA1 amongst Sri

Lankans were documented. In accordance with the results, it is also apparent that there is a genetic similarity between Sinhalese and Tamils in Sri Lanka, when compared with Muslim population. However this observation needs to be tested with a larger representative sample with a higher number of genetic loci.