

## ABSTRACT

Atherosclerosis is a disease causing malfunctioning of arteries because of genetic and environmental elements. Present project was planned to evaluate some environmental and genetic factors associating with *MMP9* gene considered as candidate in onset of atherosclerosis, in Pakistani population. Ischemic heart disease individuals n= 101 and healthy individuals n=100 were interviewed for judgment of clinical and physical parameters. Three SNPs from *MMP9* gene rs3918242 (*SphI*), rs17577 (*StyI*) and rs2274756 (*TaqI*) were selected for allelic and genotypic analysis. Age and gender wise cases n=101 and control subjects n=100 were almost same. Basic techniques, *PCR-RFLP* and direct sequencing for genotypic analysis were performed. Males were at higher risk for disease onset as compared to females. High cholesterol, hypertension, diabetes, smoking and positive family history appeared to be important risk agents for onset of atherosclerosis. Genotypic analysis showed that genotype frequency of rs3918242 (*SphI*) polymorphism varied in diseased and control individuals. Allele T and genotype CT and TT of rs3918242 were more frequent in patients. Change in a nucleotide at *SphI* site lead towards -1562C>T polymorphism. The "A" allele and "GA" genotype frequency was more frequent in patients having rs17577 (*StyI*) and rs2274756 (*TaqI*) polymorphism. The co-expression of rs17577 and rs2274756 is significantly related with the onset of atherosclerosis in Pakistani population. No significance was observed with co-existence of rs3918242 (*SphI*) and rs17577 (*TaqI*). These CAA, CAG, TAG and TGG Haplotype are significantly associated for onset of atherosclerosis as the values of these Haplotype are less in patients (<1.00) as compared to controls. While the frequency of CGG genotype in controls is 1.00 more than the patient's frequency 0.524. Hence, this genotype has protective factor against atherosclerosis and is not essentially tied in with atherosclerosis. In conclusion atherosclerosis is disorder causing crucial health hazards in adults. In population of Pakistan the *MMP9* gene is highly significant with atherosclerosis onset along co-expression of rs17577 and rs 2274756.