DBT - AIST International Laboratory for Advanced Biomedicine

Classroom for Advanced & Frontier Education
Title: AMD Genetics in India - the missing links

Age related macular degeneration (AMD) is a degenerative eye disease. Photoreceptors present in macular region begin to degenerate due to accumulation of drusen between retinal pigment epithelium (RPE) cells and Bruch’s membrane (BM). Further pathological deterioration can stimulate choroidal blood vessels to leak. We described the knockout study of CCL2 gene mice which develop the AMD like features prompting us to examine associated SNPs in Indian population. This showed positive results. Both environmental and genetic factors are found to equally contribute to AMD pathobiology. Recently, GWAS done by Dr Swaroop (Nat Gen, 2016), about 52 genetic loci have been identified as a independently causative agent of AMD in Caucasian populations. ARMS2 and CFH have been explored in various populations and also found to be associated with AMD pathogenesis. Other genes are also being investigated in AMD pathogenesis in various populations, some with conflicting and unverified reports, others which are validated, however, equally large comprehensive genetic studies from India, particularly from North-West India remain limited thus impacting India’s reduced role in pioneering AMD diagnostics and therapies. We have investigated various genetic SNPs like CFH, MCP-1, VEGFR2, CCR-3 in Indian population which were significantly associated with AMD pathology. We also plan to investigate the impact of environmental factors and associated comorbidities with genetic data and/or expression levels of various protein in these Indian AMD patients. Our aim is to incorporate the integrative approach in AMD genetics by including gene-protein, gene-gene, gene-socio-demographic data, follow up studies, statistical modeling and bioinformatics approach to deal such complex nature of AMD is ongoing.
Abstract:
Age related macular degeneration (AMD) is a degenerative eye disease. Photoreceptors present in macular region begin to degenerate due to accumulation of drusen between retinal pigment epithelium (RPE) cells and Bruch’s membrane (BM). Further pathological deterioration can stimulate choroidal blood vessels to leak. We described the knockout study of CCL2 gene mice which develop the AMD like features prompting us to examine associated SNPs in Indian population. This showed positive results. Both environmental and genetic factors are found to equally contribute to AMD pathobiology. Recently, GWAS done by Dr. Swaroop (Nat Gen, 2016), about 52 genetic loci have been identified as independently causative agent of AMD in Caucasian populations. ARMS2 and CFH have been explored in various populations and also found to be associated with AMD pathogenesis. Other genes are also being investigated in AMD pathogenesis in various populations, some with conflicting and unverified reports, others which are validated, however, equally large comprehensive genetic studies from India, particularly from North-West India remain limited thus impacting India’s reduced role in pioneering AMD diagnostics and therapies. We have investigated various genetic SNPs like CFH, MCP-1, VEGFR2, CCR-3 in Indian population which were significantly associated with AMD pathology. We also plan to investigate the impact of environmental factors and associated comorbidities with genetic data and/or expression levels of various protein in these Indian AMD patients. Our aim is to incorporate the integrative approach in AMD genetics by including gene-protein, gene-gene, gene-socio-demographic data, follow up studies, statistical modeling and bioinformatics approach to deal in complex nature of AMD is ongoing.