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The *APOE* E4 allele is associated with faster rates of mGCIPL thinning in the PROGRESSA cohort

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Abstract

Purpose : This study sought to investigate the association between the apolipoprotein E (*APOE*) E4 allele and longitudinal retinal thinning in the 'Progression Risk Of Glaucoma: RElevant SNPs with Significant Association' (PROGRESSA) cohort, a prospective study of suspect and early manifest glaucoma.

Methods : Apolipoprotein E alleles and genotypes were determined in PROGRESSA, and an age- and ancestrally-matched normative cohort, the Blue Mountains Eye Study (BMES). Structural parameters of neuroretinal atrophy measured using spectral-domain optical coherence tomography (SD-OCT) including the macular ganglion cell complex (mGCIPL) and peripapillary retinal nerve fibre layer (pRNFL) were compared within the PROGRESSA cohort on the basis of genotype and presence of *APOE* E4 allele.

Results : Prospective rates of mGCIPL thinning were faster in participants harbouring at least one copy of the *APOE* E4 allele (beta coefficient=-0.13µm/year; $p=3.6x10^{-4}$). These participants also had a thinner average mGCIPL (70.9µm vs. 71.9µm; p=0.011) and pRNFL (77.6µm vs. 79.2µm; p=0.045) after a minimum of three years of longitudinal follow-up.

Conclusions : The *APOE* E4 allele was associated with faster rates of average mCGIPL thinning and a thinner average pRNFL, suggesting that the *APOE* E4 allele is a risk factor for retinal ganglion cell degeneration.

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