Background: In a previous study (Bodryzlova et al.; Alz Dementia 10(4):P151) we demonstrated how 75% of MCI to AD conversion cases could be explained by the interaction between Alzheimer’s disease pathology (ADP) and cardiovascular risk factors (CVR). However, there were limitations to this study, namely our using Mini-Mental State Examination (MMSE) results as a proxy of ADP, and how both exposures could have been overestimated due to using odds ratios instead of relative risk (RR). Further, we did not take apolipoprotein E genotype (APOE) status into account. The objective of the current study was to overcome these limitations by calculating the fraction of conversion cases attributable to the interaction (FAI) between ADP and CVR by APOE strata, using conversion probability as an association measure in groups exposed to ADP only (P01), CVR only (P10), both (P11) or none (P00). Methods: We used data on MCIs from the Alzheimer’s Disease Neuroimaging Initiative (ADNI) 1 dataset (total 404 subjects). We stratified participants according to their APOE genotype into either allele 4 non-carriers, heterozygote, or homozygote carriers. The ADP proxy was chosen as the dichotomized score on either the Wechsler Logical Memory delayed recall test, the Rey Auditory Verbal Learning test, the Alzheimer’s Disease Assessment Scale test, the MMSE, or the MMSE delayed recall. The CVR proxy was a dichotomized sum of normative levels in blood arterial tension, cholesterol and triglycerides (0 – normative level, 1 – moderate increase, 2 – considerable increase) compared to cognitively healthy controls in ADNI. We calculated the FAI as P11/(P11-P10-P01+P00). Results: We found no conversion cases attributable to the interaction between ADP and CVR in APOE4 non-carriers and heterozygote subjects. In homozygote carriers the FAI varied according to the proxy chosen: for the MMSE it reached 68% (p = 0.004); the Wechsler 66% (p = 0.009); the Assessment Scale 58% (p = 0.02); and the Rey Auditory 62% (p = 0.02). The MMSE delayed recall was not significant (47%, p = 0.12). Conclusions: More than half of all conversion cases in the APOE e4 homozygote carriers seemed due to the interaction between ADP and CVR. Further, this was evident using a multitudes of tests assessing functions other than episodic memory.

O-GlcNAcylation is a common posttranslation modification of nucleocytoplasmic proteins with β-N-acetylglucosamine (GlcNAc). It regulates many biological processes and also serves as a nutrient and stress sensor. Recent studies suggest that O-GlcNAcylation may be protective against acute heart ischemia. This study is aimed to investigate whether O-GlcNAcylation is altered during ischemia-induced brain injury, which is associated with the development of Alzheimer’s disease, and whether it is neuroprotective against cerebral ischemia. Methods: We investigated the time-dependent alteration of O-GlcNAcylation and the related key proteins by Western blots and immunohistochemistry in the ischemic brain tissue of mice after permanent and transient middle cerebral artery occlusion (MCAO). Postmortem human brain tissue with ischemic damage was also studied immunohistochemically.