

ALZHEIMER DISEASE

High serum levels of the pesticide metabolite DDE —a potential environmental risk factor for Alzheimer disease

Elevated serum levels of DDE (dichlorodiphenyldichloroethylene), a metabolite of the pesticide DDT, could be a risk factor for Alzheimer disease (AD), according to a report in *JAMA Neurology*. The results indicate that individuals with the *APOE4*ε4* allele are especially susceptible to the effects of DDE.

Lead author Jason Richardson and his colleagues previously showed that serum levels of DDE were significantly higher in

a small cohort of patients with AD than in controls. In the new study, the researchers measured the levels of DDE in serum from 86 patients with AD and 79 controls recruited from AD research centres in Dallas, TX and Atlanta, GA, USA. They assessed cognitive function with the Mini Mental State Examination, and measured relative levels of brain and serum DDE. They also examined the effects of DDE on the expression of amyloid precursor protein (APP) in neuroblastoma cells.

Richardson and co-workers found that mean serum levels of DDE were 3.8-fold higher in patients with AD than in control individuals. By analysing the serum concentration of DDE in tertiles, they determined that the risk of diagnosis of AD was significantly increased in patients with the highest levels of DDE. Overall, *APOE4*ε4* carriers had an increased risk of AD and were more likely than non-carriers to exhibit significant cognitive

impairment in the presence of high serum levels of DDE.

Concentrations of DDE in the brain correlated with those in the serum, and APP expression was increased in cells cultured with DDE. The findings suggest that DDE exposure is a risk factor for AD, and that the *APOE4*ε4* allele might increase susceptibility to AD in some individuals.

“We hope to be able to replicate our findings in much larger cohorts, including expansion into community-based cohorts,” Richardson notes. “We also hope that others will take into account potential environmental contributions to AD and how they may interact with genetic susceptibility.”

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Original article Richardson, J. R. *et al.* Elevated serum pesticide levels and risk for Alzheimer disease. *JAMA Neurol.* doi:10.1001/jamaneuro.2013.6030



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