

Statins show dramatic drug and cell dependent effects in the brain

October 28 2009

Besides their tremendous value in treating high cholesterol and lowering the risk of heart disease, statins have also been reported to potentially lower the risks of other diseases, such as dementia. However, a study in the October *Journal of Lipid Research* finds that similar statin drugs can have profoundly different effects on brain cells -both beneficial and detrimental. These findings reinforce the idea that great care should be taken when deciding on the dosage and type of statin given to individuals, particularly the elderly.

John Albers and colleagues compared the effects of two commercially used statins, simvastatin and pravastatin, on two different types of [brain cells](#), neurons and astrocytes (support cells that help repair damage). By directly applying the drugs to cells as opposed to administering them to animals, they could eliminate differences in the drugs' ability to cross the blood-brain barrier as a reason for any differing effects.

Albers and colleagues looked at the expression of genes related to neurodegeneration, and found that indeed, despite using biologically equivalent drug concentrations, differences were seen both between cells, and between drugs; for example, simvastatin reduced the expression of the cholesterol transporter ABCA1 by approximately 80% in astrocytes, while pravastatin lowered expression by only around 50%. Another interesting difference was that while both statins decreased expression of the Tau protein -associated with Alzheimer's disease—in astrocytes, they increased Tau expression in neurons; pravastatin also increased the expression of another Alzheimer's hallmark, amyloid

precursor [protein](#) (APP).

While increased levels of these two proteins may account for potential risks of disease, Albers and colleagues also note that large decreases in cholesterol proteins like ABCA1 should be considered. Brain cholesterol levels tend to be reduced in elderly people, and in such individuals the long-term effects of statin therapy could lead to transient or permanent cognitive impairment.

More information: "Differential effects of simvastatin and pravastatin on expression of Alzheimer's disease-related genes in human astrocytes and neuronal cells" by Weijiang Dong, Simona Vuletic and John J. Albers, *Journal of Lipid Research*

Source: American Society for Biochemistry and Molecular Biology

Citation: Statins show dramatic drug and cell dependent effects in the brain (2009, October 28) retrieved 23 April 2024 from <https://phys.org/news/2009-10-statins-drug-cell-effects-brain.html>

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