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Statins: Good for the heart, but do they impact the brain?

High cholesterol, termed hyperlipidemia, is a risk factor for cardiovascular disease. Therefore, keeping cholesterol levels low through diet and exercise has proven benefits for reducing heart disease risk. For adults who cannot meet their cholesterol targets through diet and lifestyle alone, there are many drug options that have proven effective for lowering cholesterol.

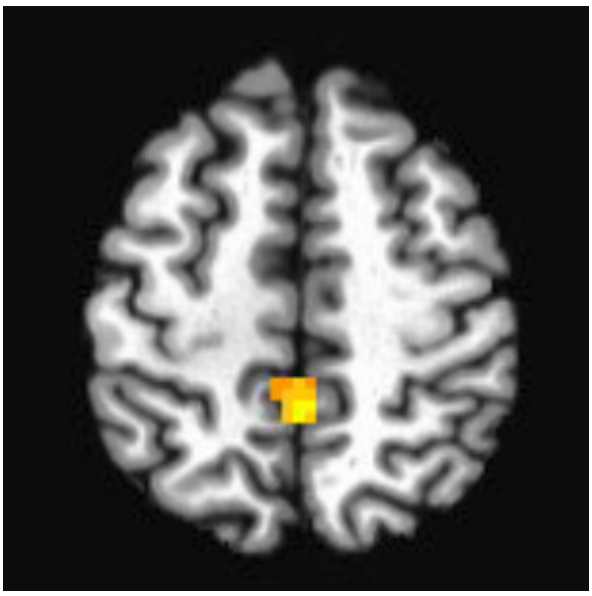

Fig. 1. The highlighted region shows the area where differences in neural activation between the statin and placebo groups were measured with functional magnetic resonance imaging (fMRI) during the Figural Memory Task.

The most popular cholesterol-lowering drugs are the class of drugs called HMG-CoA reductase inhibitors, or statins. Almost half of all American adults are given a prescription for these drugs because statins can lower LDL-C by more than 50%. Statins are also commonly prescribed because they come in generic formulations (so cost is low) and have relatively few major side effects. This latter is very important because drug side effects can diminish quality of life and reduce medication compliance.

However, statin drugs are not completely without side effects. They can evoke a range of mild to moderate muscle side effects. They are also associated with mild memory complaints, such as memory loss and confusion. The cognitive side effects of statins are particularly concerning for older adults, who may already have decrements in cognitive function due to healthy aging or dementia-related diseases.

Despite anecdotal evidence of statin-associated cognitive side effects from individual case studies, the cognitive impact of statins has been hard to determine in large clinical trials. Many large clinical trials of statin therapy have not measured cognitive function, and basic cognitive tests used to diagnose dementia and memory loss may not be sensitive enough to detect small changes associated with statin therapy. Therefore, there is a substantial debate about the potential impact of statin therapy on brain functions such as memory, learning, and recall.

To address the lack of data on statin therapy and cognitive function, Taylor et al. conducted a study in which 150 healthy adults who had never taken a statin before were randomized to the highest dose of atorvastatin (known also by its brand name, Lipitor) or placebo for 6 months. Researchers assessed cognitive function while subjects were on treatment and off treatment through a variety of tests. They used standard neuropsychological tests commonly used to measure cognitive function and dysfunction in clinical settings. However, authors also used a new technique- functional magnetic resonance imaging, or fMRI- to measure neural activation in the brain. Subjects were placed in an MRI scanner that was equipped with a computer screen and keyboard. Two in-scanner tests of memory and learning were administered, and neural activity of the brain was measured as subjects completed the tasks.

Similar to previous studies, authors found no major effects of statin therapy on standard neuropsychological tests. However, they did observe small but significant differences between the groups in neural activation patterns. In one test, patients on atorvastatin had greater activation, and on the other test, patients on placebo had greater activation. These findings were reversed when patients were not on any drug treatment.

Overall, researchers concluded yet again that for most patients, statin drugs are not associated with any obvious indices of cognitive dysfunction. These data continue to support that statins are safe and effective drugs for reducing heart disease risk. However, the small changes in neural activation between the two treatment groups could provide an explanation for the reports of memory loss and confusion observed occasionally in patients taking statins. The results need to be explored and confirmed in larger studies but suggest that techniques such as fMRI could be useful to settle once and for all the debate surrounding statins and their impact on cognitive function.

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Publication

The effect of high-dose atorvastatin on neural activity and cognitive function.
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