

Study cautions against statins as general preventive medicine

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Statins' success in reducing atherosclerosis-related events has elevated the medications to wonder-drug status, with some researchers advocating for their wider use as a preemptive therapy for cardiovascular disease. Using statins, however, can have side effects, including memory loss, muscle problems and increased diabetes risk. A new study in the *American Journal of Physiology—Cell Physiology* explains why statins are more beneficial in some cases than others and highlights the importance of weighing individual risk when considering statins as a preventive measure.

Atherosclerosis develops when plaques build up inside blood vessels, which can lead to heart attack, stroke and death. Statins lower the risk by blocking cholesterol production in the liver, reducing a person's "bad" cholesterol.

The immune cells macrophages play a major role in plaque formation and rupture in atherosclerosis. Macrophages ingest fat deposits along the blood vessel wall and attract more macrophages, other cells and inflammation-related proteins to the injury site. The enhanced inflammation builds up the plaque within the vessel wall and further narrows the artery. Macrophages also release enzymes that weaken the fibrous cap that separates the plaque from the blood flow, increasing the likelihood that the plaque breaks open. Plaque ruptures lead to blood clots that result in strokes and heart attacks.

Macrophages primarily develop from stem cells that reside in the [bone marrow](#). In a previous study, the research team from Tulane University School of Medicine observed that macrophages can also develop from [mesenchymal stem cells](#) (MSCs), which are found throughout the body. While bone marrow stem cells mainly become blood cells, MSCs can become all cell types, including bone, cartilage, muscle cells and macrophages.

In this study, the Tulane research team found that long-term statin use prevented MSCs from turning into macrophages, which could decrease inflammation and improve plaque stability in patients with cardiovascular disease. However, [statins](#) also prevented MSCs from becoming bone and cartilage cells. Statins increased aging and death rate of MSCs and reduced DNA repair abilities of MSCs. "While the effect on macrophage differentiation explains the beneficial side of statins, their impact on other biologic properties of stem cells provides a novel explanation for their adverse clinical effects," the researchers wrote.

The risks of statin use are associated with statins' negative effects on stem cell function, according to the researchers. Statin therapy benefits individuals with atherosclerosis, but because of its effects on stem cells, it may not be appropriate as a [preventive measure](#) for those who do not have [cardiovascular disease](#), the researchers wrote.

The article "The impact of statins on biological characteristics of [stem cells](#) provides a novel explanation for their pleiotropic beneficial and adverse clinical effects" is published ahead-of-print in the *American Journal of Physiology—Cell Physiology*.

More information: "The Impact of Statins on Biological Characteristics of Stem Cells Provides a Novel Explanation for Their Pleiotropic Beneficial and Adverse Clinical Effects." *Am J Physiol Cell Physiol*. 2015 Jul 29;ajpcell.00406.2014. [DOI: 10.1152/ajpcell.00406.2014](#)

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