Co-Q10 deficiency may relate to concern with statin drugs, higher risk of diabetes

April 10 2013

(Medical Xpress)—A laboratory study has shown for the first time that coenzyme Q10 offsets the cellular changes that are linked to a side-effect of some statin drugs - an increased risk of adult-onset diabetes.

Statins are some of the most widely prescribed drugs in the world, able to reduce LDL, or "bad" cholesterol levels, and the risk of heart attacks or other cardiovascular events. However, their role in raising the risk of diabetes has only been observed and studied in recent years.

The possibility of thousands of statin-induced diabetics is a growing concern, which led last year to new labeling and warnings by the Food and Drug Administration about the drugs, especially when taken at higher dosage levels.

The findings of the new research were published as a rapid communication in *Metabolic Syndrome and Related Disorders*, and offer another clue to a possible causative mechanism of this problem.

Pharmacy researchers at Oregon State University who authored the study said the findings were made only in laboratory analysis of cells, and more work needs to be done with animal and ultimately human studies before recommending the use of coenzyme Q10 to help address this concern.

"A number of large, randomized clinical trials have now shown that use of statins can increase the risk of developing type-2 diabetes by about 9

percent," said Matthew K. Ito, an OSU professor of pharmacy and president-elect of the National Lipid Association.

"This is fairly serious, especially if you are in the large group of patients who have not yet had a cardiovascular event, but just take statin drugs to lower your risks of heart disease," Ito said.

A suspect in this issue has been altered levels of a protein called GLUT4, which is part of the cellular response mechanism, along with insulin, that helps to control blood sugar levels. A reduced expression of GLUT4 contributes to insulin resistance and the onset of type-2 diabetes, and can be caused by the use of some statin drugs.

The statins that reduce cholesterol production also reduce levels of coenzyme Q10, research has shown. Coenzyme Q10 is needed in cells to help create energy and perform other important functions. And this study showed in laboratory analysis that if coenzyme Q10 is supplemented to cells, it prevents the reduction in GLUT4 induced by the statins.

Not all statin drugs, however, appear to cause a reduction in GLUT4.

The problems were found with one statin, simvastatin, that is "lipophilic," which means it can more easily move through the cell membrane. Some of the most commonly used statins are lipophilic, including simvastatin, atorvastatin, and lovastatin. All of these statins are now available as generic drugs, and high dosage levels have been most often linked with the increase in diabetes.

Tests in the new study done with a "hydrophilic" statin, in this case pravastatin, did not cause reduced levels of GLUT4. Pravastatin is also available as a generic drug.

"The concern about increasing levels of diabetes is important," Ito said. "We need to better understand why this is happening. There's no doubt that statins can reduce cardiovascular events, from 25-45 percent, and are very valuable drugs in the battle against heart disease. It would be significant if it turns out that use of coenzyme Q10 can help offset the concerns about statin use and diabetes."

Before that conclusion can be reached, the researchers said, additional studies are needed on coenzyme Q10 supplementation and the pathogenesis of statin-induced diabetes.

Provided by Oregon State University