

Researchers explore role of fat-carrying lipids in diabetes

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(PhysOrg.com) -- In a review article published this month in *Nature Reviews: Nephrology*, UC Davis cardiovascular specialists elucidate the role of triglyceride-rich lipoproteins — carriers of fats in the blood — in the initiation and progression of diabetic nephropathy, the leading cause of premature death in patients with diabetes and the most common cause of long-term kidney failure in the United States.

While elevated levels of triglyceride-rich [lipoproteins](#) are known risk markers for atherosclerosis — a thickening of arterial walls that eventually blocks blood flow and increases heart-attack risk — the role of these lipoproteins in diabetes-associated kidney failure is not yet well understood.

According to the authors, [diabetic nephropathy](#) is closely linked to atherosclerosis: The two conditions have similar causes, and as each progresses, the other worsens. While lipid-controlling therapies and lifestyle changes are common recommendations for managing atherosclerosis, diabetes treatment typically focuses on correcting blood sugar abnormalities.

"The latest evidence indicates that tightly controlling blood levels of lipoproteins is just as critical for patients with diabetes as controlling their blood sugar," said John C. Rutledge, senior author of the review and UC Davis professor of cardiovascular medicine. "Lipid-lowering medications should be an essential part of routine treatment for diabetes and could help reduce the occurrence of kidney failure among

diabetics."

Diabetic nephropathy is caused by disruptions to tiny blood vessels within the kidney. The syndrome tends to follow a diagnosis of type 2 or [type 1 diabetes](#) and can eventually progress to kidney failure, requiring dialysis or transplantation. Better monitoring of the condition possibly can reduce these outcomes and curb the incidence of heart disease at the same time.

"Not only does diabetic nephropathy affect the kidneys, its appearance signals a dramatic increase in the risk of a [heart attack](#)," said Rutledge. "Understanding what leads to diabetic nephropathy and what can be done to slow its progression or prevent it could make a huge impact on reducing the morbidity and mortality of diabetes."

The review focuses on the mechanisms by which lipids injure the kidney, especially the glomeruli — tiny capillaries that help filter blood to form urine. Triglyceride-rich lipoproteins activate components in the blood or cells that damage the glomeruli and contribute to the progression of diabetic nephropathy. Glomeruli are also damaged by the high blood sugar characteristic of diabetes.

The role of lipids and fatty acids in diabetes and kidney disease has only recently come to the forefront of scientific circles and is a growing area of expertise at UC Davis. George Kaysen, UC Davis professor of biochemistry and molecular medicine, is conducting pioneering work on the role of high-density lipoproteins in [kidney failure](#). Lars Berglund, associate dean for research for the UC Davis Health System, is pursuing research on a blood factor known as lipoprotein-associated phospholipase A2 (Lp-PLA2) and its effects on vascular disease. Rutledge's research focuses on determining the role of fatty acid toxicity on blood vessels.

"Understanding the specific effects of various lipids, glucose, cytokines and other blood components on the vascular wall can eventually lead to more targeted therapies," Rutledge said.

According to Rutledge, lifestyle changes, which are often recommended for patients with heart disease, are important as well for people with diabetes. The most critical are quitting smoking and eating a diet low in salt, animal fats and simple sugars.

"Patients with diabetes should work closely with their doctors on lifestyle factors and medications that can tightly control both [blood sugar](#) and lipids," he said.

Provided by UC Davis

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