



UNIVERSITY OF OTTAWA
HEART INSTITUTE
INSTITUT DE CARDIOLOGIE
DE L'UNIVERSITÉ D'OTTAWA

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Researchers Discover Cellular Process that Clears Cholesterol and Could Reverse Major Cause of Heart Attack

OTTAWA – Sept. 8, 2011 – Researchers at the University of Ottawa Heart Institute (UOHI) have discovered that an ancient pathway called autophagy also mobilizes and exports cholesterol from cells.

A team led by Yves Marcel, PhD, Director of the HDL Biology Laboratory, UOHI, has shown that autophagy, a pathway preserved during evolution, functions to engulf and digest cholesterol accumulated in artery walls. This process facilitates the removal of cholesterol and may provide an entirely new target to reverse atherosclerosis, the main cause of heart attack and stroke.

Cholesterol accumulates in the walls of arteries leading to atherosclerosis, also known as narrowing of arteries and which causes blockages and reduces blood flow to the heart. This often culminates in heart attacks and strokes.

The autophagy pathway, which means self-digestion, developed early in single-cell organisms to allow the clearance of accumulated dysfunctional molecules. “The finding that autophagy also functions to digest and liberate cholesterol from cells and the fact that we know this pathway is regulated offers hope for the development of new drugs that could activate export of cholesterol from the walls of arteries,” said Marcel.

“There is an urgent need to understand how cholesterol accumulation in arteries can be reversed,” said researcher Mireille Ouimet, who was a major contributor to the study.

Details of the research were published online earlier this summer in the journal *Cell Metabolism* (*Cell Metab.* 2011; 13(6):655-67) and illustrate how cholesterol buildup itself triggers autophagy, facilitating the release of cholesterol for transport back to the liver for elimination from the body. It is possible that some patients with CAD have an impaired ability to clear arterial cholesterol by the autophagy pathway, said Marcel.

Marcel's work lends a greater understanding to the underlying biochemical complexities involving cholesterol. Cholesterol is important to cell structure. Problems arise when too much cholesterol is deposited inside the walls of the coronary artery – the origins of coronary artery disease (CAD). Researchers now are investigating how this process is involved in the development of atherosclerosis, a step that could help experts in cardiovascular medicine understand and find a new way to halt the progression of heart disease.

Marcel's research career has focused on lipoproteins – the biochemical mechanism to transport cholesterol and fats through the body. In 1997, he received the highest medal of honour by the Royal Society of Canada for his contribution to medical science including research related to pathways for polyunsaturated fatty acids. This was the McLaughlin Medal, considered one of the country's most prestigious tributes for research excellence.

About UOHI

The University of Ottawa Heart Institute is Canada's largest and foremost cardiovascular health centre dedicated to understanding, treating and preventing heart disease. We deliver high-tech care with a personal touch, shape the way cardiovascular medicine is practiced, and revolutionize cardiac treatment and understanding. We build knowledge through research and translate discoveries into advanced care. We serve the local, national and international community, and are pioneering a new era in heart health. For more information, visit www.ottawaheart.ca

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