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New research sheds light on sudden death in people with high cholesterol

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Cholesterol can affect the flow of the electrical currents that generate the heart beat, according to a study from two UBC cardiovascular researchers funded by the Heart and Stroke Foundation of BC & Yukon. The research team has just published the important discovery about the causes of cardiac arrhythmias (abnormal heartbeats) in one of the world's leading scientific journals.

Together with a group from Paris, France, UBC researchers David Fedida and Jodene Eldstrom found that too much cholesterol can affect the electrical currents, perhaps causing the heart to start beating out of rhythm or even stop beating. In contrast, reducing the cholesterol normalized the structures underlying the electrical activity, thus promoting a regular and healthy heartbeat.

The researchers discovered that the key mechanism by which this happens is the Kv1.5 potassium channel, a protein that facilitates the flow of electrical charges through heart cells. Cholesterol blocks the functioning of these proteins while lowering of cholesterol levels enhances their function.

Prior to this research, scientists already knew that cholesterol plays an important role in regulating the heart's electrical system. However, they didn't know how.

"There is recent clinical and experimental evidence that lipid-lowering therapy, such as statins, can restore normal heart rhythms, thus helping

to prevent sudden death," Dr. David Fedida said. "However, these pharmacological effects of statins are poorly understood and could involve other effects than their well-understood reduction of the cholesterol in blood vessels. Here we show that cholesterol regulates the submembrane pool of ion channels readily available for recruitment into the surface membranes of heart cells. This process could be a major mechanism for the tuning of the heartbeat and might contribute to the reduction in the incidence of abnormal and fatal heart rhythms during treatment with lipid-lowering drugs."

"Arrhythmias are a serious problem," said Dr. Jeff Sommers, Manager, Research and Science, Heart and Stroke Foundation of BC & Yukon. "Although they affect people of all ages, this is especially so with an aging population. This is a really exciting development that moves us well along the road of understanding how to target heart rhythm disorders for prevention and treatment."

This discovery points toward a new path for developing therapies that can directly target the causes of arrhythmia both before and after they start. Presently, anti-arrhythmic drugs are non-specific and may have significant side-effects. About 40% of Canadians have high blood cholesterol.

More information: This research is published in the current issue of the *Proceedings of the National Academy of Sciences*.

Source: University of British Columbia (news : web)