

Cause of heart arrhythmia discovered using X-rays at CLS

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Using powerful X-rays at the Canadian Light Source synchrotron, scientists have reconstructed the scenario of heart arrhythmia in action, making critical progress towards preventing deadly conditions and saving lives.

The research was published in the prestigious journal *Nature Communications* and presented at the 2013 annual meeting of the American Association for the Advancement of Science (AAAS) in Boston earlier this week.

A 3D model was created using imaging results from the CLS that reveals for the first time how gene mutations affect the pathway in <u>heart muscle</u> <u>cells</u> that control its rhythm.

Arrhythmias are characterized by the heart beating too fast, too slow, or inconsistently, causing a decrease to blood flow to the brain and body that results in heart palpitations, dizziness, fainting, or even death.

The article goes on to explain that the heart runs on calcium and every heart beat is preceded by <u>calcium ions</u> rushing into heart muscle cells. Then, a special protein opens the pathway for calcium to be released from compartments within these cells, and in turn initiates the contraction.

Mutations to this protein have been linked to arrhythmia and sudden cardiac deaths in otherwise healthy people.



"We analyzed several disease mutant forms of a specific calcium channel that has been linked to <u>cardiac arrhythmias</u>," said Filip Van Petegem, <u>molecular biologist</u> from the University of British Columbia. "Thanks to the 3D reconstruction of these new mutant structures, it allows us to look at the detailed effects of each genetic disease mutation."

Van Petegem said that many heart diseases cause much larger structural changes than he originally anticipated and that could directly explain their effect on calcium leaking into the muscle cell and causing arrhythmias.

He is hopeful that the research will lead to new ways of stabilizing the pathway to the heart and preventing deadly conditions and save lives.

More information: www.nature.com/ncomms/journal/... full/ncomms2501.html

Provided by Canadian Light Source

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