

Heart drug may be effective for managing certain cancers: study

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Researchers at Queen's University have identified a new mechanism that could potentially explain why the body's immune system sometimes fails to eliminate cancer. The new findings shed light on the possible cause of immune resistance in cancer cells, and indicate that nitroglycerin, a relatively safe and low-cost drug used for more than a century to treat angina, may be effective for managing certain cancers.

"This discovery may lead to new approaches for the treatment of patients with certain forms of cancer," said Charles Graham, a professor in the Department of Biomedical and Molecular Sciences who lead the Queen's research team with Robert Siemens of the Department of Urology and Kingston General Hospital.

The researchers looked at the role that [hypoxia](#), or low [oxygen content](#) in tissues, plays in the ability of some cancer cells to escape detection, and subsequent destruction, by the body's immune system.

They discovered that hypoxia in a cancer cell is linked to the overproduction of a key enzyme, ADAM10, which makes the cell resistant to attack by [immune cells](#). However, when cells were treated with a nitric oxide mimicking agent such as nitroglycerin, hypoxic conditions were overcome and the [cancer cells](#) lost their resistance to an immune system attack. The results indicate that nitroglycerin could potentially be used to boost the body's natural immune response to cancer.

The research leading to these findings is funded by the Canadian Institutes of Health Research (CHIR) in partnership with the Terry Fox Foundation Training Program in Transdisciplinary [Cancer Research](#).

The discovery builds on the Queen's team's 2009 findings related to the role of nitric oxide in suppressing tumour growth in prostate cancer. The

researchers conducted the first-ever clinical trial using low doses of nitroglycerin to treat [prostate cancer](#).

More than 10 patents have been issued to Queen's research discoveries involving the use of nitroglycerin and similar compounds in cancer treatments. PARTEQ Innovations, the technology transfer office of Queen's, has licensed some of this intellectual property to Nometics Inc., a Queen's spinoff company, which is developing products and therapies based on this and related research.

More information: Hypoxia Induces Escape from Innate Immunity in Cancer Cells via Increased Expression of ADAM10: Role of Nitric Oxide Cancer Res Published OnlineFirst October 17, 2011; [doi: 10.1158/0008-5472.CAN-11-2104](#)

Provided by Queen's University

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