News Release

New finding could “knock out” heart-damaging side effect of cancer treatment

(December 9, 2014) The drug Doxorubicin (DOX) may be an effective anticancer treatment, but like other anthracyclines it has a toxic effect on the heart – a considerable limitation. Dr. Lorrie Kirshenbaum, principal investigator, Cardiac Gene Biology, Institute of Cardiovascular Sciences at St-Boniface Hospital Research Centre, professor of physiology, and Canada Research Chair, Molecular Cardiology, University of Manitoba, has just published evidence of a protein mechanism apparently responsible for the side effect. His laboratory results recently showed that when this protein is “knocked out” the cancer treatment can proceed - without damaging the heart.

Kirshenbaum’s publication, “Bnip3 mediates doxorubicin-induced cardiac myocyte necrosis and mortality through changes in mitochondrial signaling” was published today by Proceedings of the National Academy of Sciences of the United States of America.

“Our findings have important clinical implications not only for preventing heart failure by targeting a specific protein in cancer patients undergoing chemotherapy, but also for understanding other diseases in which cell function is compromised” says Kirshenbaum.

Anthracyclines are used to treat many cancers, including leukemias, lymphomas, breast, uterine, ovarian, bladder cancer, and lung cancers. Kirshenbaum’s objective is to minimize “DOX’S toxic effects on the heart without compromising its ability to attack cancer cells.

“It is well established that cancer patients undergoing DOX treatment are susceptible to acute and chronic cardiac side effects, including arrhythmias, ventricular dysfunction, and heart failure” says Dr. Davinder Jassal, a cardiologist at St-Boniface Hospital and one of several co-authors of the publication. “Finding the pathway to this additional disease process is the first step to developing effective treatment”.

Professor Andre Terzic, Director of the Mayo Clinic Center for Regenerative Medicine, agrees. “This comprehensive work is exciting. By resolving the molecular underpinnings of cardiotoxicity induced by the anti-cancer drug doxorubicin, this study underscores the promise of targeted mitochondrial medicine for heart failure prevention in the context of chemotherapy” says Terzic.

“We are very proud of what Dr. Kirshenbaum and his laboratory have accomplished at St-Boniface Hospital Research. His results will undoubtedly push research to the next step of resolving this devastating side effect” says Dr. Grant Pierce, executive director of research at St-Boniface Hospital.
Proceedings of the National Academy of Sciences (PNAS)
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