Analysis of therapeutic effects of the Japanese herbal medicine ninjinyoeito on oxidative stress-induced cardiotoxicity with in vitro experimental system

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Oxidative stress is known to be involved in various pathologies such as heart failure and cancer. Mitochondria, which produce oxygen species (ROS) as a type of oxidative stress, are abundantly expressed especially in the cardiac cells. Once mitochondrial damage occurs, produced ROS is accumulating and causes mitochondria damage and subsequently lead to cardiac dysfunction. Recently, cardiac dysfunction caused by anticancer drugs and cancer itself has become a concern, and it has been suggested that oxidative stress is involved in one of these causes. The anthracycline antitumor antibiotic doxorubicin (DOX) induces severe adverse effects to non-tumor tissues including cardiac cells. DOX causes cardiomyopathy in a dose-dependent manner and consequent heart failure often limits DOX-based chemotherapy. The Japanese Kampo medicine ninjinyoeito is known to improve the quality of life (QOL) in cancer patients because of its antioxidative effects. However, molecular mechanisms of ninjinyoeito for the preventive effects of oxidative stress remain unclear. In the present study, we sought to determine the effect of ninjinyoeito on oxidative stress in the heart and DOX-induced cardiotoxicity in *in vitro* experimental system. The effects of ninjinyoeito on the oxidative toxicity in cultured cardiac cells induced by DOX will be presented.