## Cardioprotective role of sesamol – A molecular pharmacological study T S Mohamed Saleem

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## Abstract

**Background:** Sesamol is lignin obtained from sesame oil with potent antioxidant property. Sesamol has been reported as cardioprotective molecule in various experimental models by reducing oxidative stress and augment endogenous antioxidants.

**Purpose:** The present study was designed to investigate the effect and protective mechanism of sesamol on myocardial ischemic reperfusion injury in experimental rats.

Method: Doxorubicin (DOX) is one of the most efficient anticancer antibiotics. The clinical use of DOX is limited due to the extensive adverse effects. Chronic administration of DOX to cancer patients causes dose-dependent cardiotoxicity which leads to heart failure and cardiomyopathy. It is reported that 41% of cancer patients who received DOX are affected with various cardiac problem. DOX treatment increases the morbidity and mortality of cancer patients due to the heart failure. Sesamol was administered to Wistar albino rats (200-220 g) in two different doses (n=6), by intra peritoneal route at a dose of 25 mg/kg b.w. (S1) and 50 mg/kg b.w (S2) daily for thirty days. Control and Sesamol treated rat hearts were subjected to in-vitro global ischemic reperfusion injury (5 min perfusion, 9 min nofl ow and 12 min reperfusion) by langendorff apparatus. The injured cardiac tissues were removed for microscopic examination after reperfusion. The plasma concentrations of nitric oxide (NO) and endothelin (ET-1), inflammatory cytokine tumor necrosis factor alpha and tissue concentration of endogenous antioxidants were estimated. The heart is distinctively susceptibility to oxidative damage. DOX-induced cardiomyopathy is strongly linked to an increase in cardiac oxidative stress, as indicated by the depletion of endogenous antioxidant enzymes, and accumulation of free radicals in the myocardium which increases the chance of DOX-induced cardiomyopathy. Several therapeutic interventions implemented to protect the heart from DOX-induced cardiomyopathy. However, higher mortality through abnormal cardiac activity limited the ability of protective role of these therapies. So the search of novel molecule to ameliorate the DOX-induced cardiotoxicity is exceedingly urgent. Administration of antioxidant drugs to protect the heart from free radical damage getting more attention in cardiovascular disease research. Sesamol is a potent phenolic antioxidant which is a component of sesame oil. It is white crystalline powder, sparingly soluble in water, and miscible with most of oils. Antioxidant property of sesamol has been shown earlier to exhibits radioprotective, antimutagenic, gastroprotective, neuroprotective, and antiplatelet activity. It is reported that administration of sesamol protect the myocardium from isoproterenol-induced myocardial injury via antioxidative mechanism. In the light of the above literature, the present study was undertaken to evaluate the effect of sesamol on DOX-induced cardiomyopathy.

**Results:** Sesamol improved cardiac function and plasma nitric oxide (NO) and reduced infarct size after myocardial ischemic reperfusion injury. Sesamol significantly attenuated tumor necrosis factor- $\alpha$  expression, endothelin (ET-1) and increased endogenous antioxidant activity.

**Conclusions:** Sesamol shows significant myocardial protection against experimentally induced myocardial ischemic reperfusion injury. The protective role via augmentation of antioxidant enzymes, inhibiting endothelial cell injury and inhibition of inflammatory cytokines.

Note: This work is partly presented at 14th International Conference on Pharmacology and Toxicology during on July 18-19, 2019 held at Zurich, Switzerland