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Cardiac marker levels of isoproterenol induced Wistar male rats and its attenuation by earthworm powder

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Myocardial Infarction (MI) is a condition in which an imbalance between myocardial oxygen supply and demand. A growing evidence is emerging which suggests that reactive oxygen-derived free radicals play a crucial role in the pathogenesis of isoproterenol induced myocardial infarction. The effects of ISO on myocardium are mediated through β1 and β2 adrenoceptors. Both β1 and β2 adrenoceptors mediate the positive isotropic and chronotropic effects to β adrenoceptor agonists. Thus, ISO produces relative ischemia or hypoxia due to myocardial hyperactivity and coronary hypotension. Additionally, ISO causes myocardial ischemia due to excessive production of free radicals resulting from oxidative metabolism of catecholamine. Further toxic dosage of ISO caused characteristic myocardial damage that subsequently resulted in heart failure. Myocardial proteins, lipids and DNA play an important role in cardiovascular diseases, by modifying the composition, structure and stability of cell membranes. Hence the study was intended to appraise the shielding effect of earthworm powder (EWP) against isoproterenol induced myocardial infarction in Wistar male rats by assessing cardiac markers. The animals were orally pre-treated with EWP (200 mg/kg b.wt.) (Group III) for 30 days and then intoxicated with isoproterenol (85 mg/kg b.wt. administered subcutaneously twice at an interval of 24 hrs) (Group II). Group IV animals were pre-treated with atrovastatin (40 mg/kg b.wt. administered subcutaneously twice at an interval of 24 h) for 30 days, 85 mg/kg b.wt. of isoproterenol was given by subcutaneously injection twice at an interval of 24 h. Animals were orally pre-treated with 200 mg/kg b.wt EWP for 30 days (Group V). Isoproterenol intoxicated myocardial infarction was confirmed by disturbances in serum and cardiac markers namely creatinine kinase (CK), creatinine kinase–muscle brain (CK-MB), and troponin T (CnTn), aspartate aminotransferase (AST), alanine amino transferase (ALT), alkaline phosphatase (ALP) and lactate dehydrogenase (LDH). ISO induced rats showed specific amelioration in the levels of these enzymes in serum and heart which tends them to get elevated in myocardium. Pretreatment with EWP ameliorate the elevation of ISO induced pathological changes, reduced the lipid peroxide formation and retained the myocardial maker enzyme activities at near normal. Thus the result at hand is in concordance with the view that EWP is proficient in combating myocardial free radical damage aggravated by ISO thus proving its protective role.

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A statistical consideration on the evaluation of biomarkers

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As the use of multiple types of biomarkers in companion diagnostics continues to grow, evaluation and validation becomes more critical and often more complicated. While DNA biomarkers are stable over time, proteomic biomarkers can change over time depending on disease progression. Epidemiological variables, such as age, often provide additional predictive capability. Combining these biomarkers can lead to better diagnostics, but statistical analysis becomes more complex. This presentation will present techniques that have proven successful in the evaluation of diverse biomarkers for disease and drug response.

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