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Isolation and quantification of nanovesicles in isoproterenol-induced myocardial infarcted rats

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Myocardial infarction (MI) is one of the leading causes of death worldwide. The pathogenesis and aetiology of MI is still unclear. Cardiac troponin is the only known cardiac-specific marker for the diagnosis of MI but due to the delayed release of troponin in the circulation, a novel cardiac biomarker is needed in the early stages of development of MI to reduce MI mortality. Exosomes are reported to be highly regulated by stress. Thus we assessed the hypothesis that exosome secretion is increased following MI and thereby serve as biomarker for MI. The aim of this study was to quantify exosomes in an isoproterenol (ISO)-induced MI rats. Twelve rats were used in this study, Group-A (n=6) was the normal control rats and Group-B (n=6) was the ISO-treated group. Group-B animals were injected with isoproterenol for two consecutive days to induce MI. Blood pressure, heart rate and body weight were monitored in all animals prior the ISO injection and throughout the experiment. After the second ISO-injection, all animals were sacrificed and blood, heart tissues were obtained. Histopathological analysis was performed in heart tissue samples and levels of cardiac markers were measured from the serum. Exosomes were isolated from the plasma and quantified by differential ultracentrifugation, nanoparticle tracking analysis, transmission electron microscope and ELISA respectively. MI was confirmed by the increase in BP and cardiac markers in ISO-induced rats. The concentration of exosomes was elevated in plasma of ISO-treated animals. The study revealed that exosomes are potential biomarkers of myocardial infarction.

Biography

Aviwe Ntsethe has completed his Honour's degree in Medical Science (Physiology) from University of KwaZulu Natal, School of Laboratory Medicine and Medical Science. He is now doing his Master's degree in Physiology in the same university.

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