

Hemin improves adipocyte morphology and function by enhancing proteins of regeneration

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Scientists at the University of Saskatchewan College of Medicine, Department of Physiology, Saskatoon, Canada, led by Dr. Joseph Fomusi Ndisang have determined that upregulating heme-oxygenase with hemin improves pericardial adipocyte morphology and function. It does so by enhancing the expression of proteins of repair and regeneration such as beta-catenin, Oct3/4, Pax2 as well as the stem/progenitor-cell marker cKit, while concomitantly abating inflammatory/oxidative insults and suppressing extracellular-matrix/profibrotic and remodeling proteins. Visceral adiposity like pericardial fat is correlated to insulin resistance and cardiac disease, and this is amongst the major causes of cardiac complications in obese individuals. By virtue of its anatomical and functional proximity to the coronary circulation, pericardial adiposity can lead to myocardial inflammation, left ventricular hypertrophy and coronary artery disease through paracrine mechanisms that include increased production of inflammatory cytokines, reactive oxygen species and other atherogenic factors.

These findings, which appear in the January 2015 issue of *Experimental Biology and Medicine*, used a laboratory animal model characterized by obesity, hypertriglyceridemia, hypercholesterolemia, insulin resistance, dyslipidemia and excessive pericardial adiposity, all of which are major pathophysiological causes of heart failure and related cardiac complications in patients with obesity. Dr. Ndisang and co-worker

underscored the protective role of heme-oxygenase in obesity and related cardiometabolic complications.

"The rising incidence of obesity and related cardiometabolic complications poses a great health challenge of considerable socioeconomic burden with costs that may become unsustainable to healthcare systems. Thus preventive strategies as well as novel therapeutic remedies are needed" states Dr. Ndisang. "In this study, we showed that treatment with the heme-oxygenase inducer, hemin, suppresses hypertriglyceridemia and hypercholesterolemia; reduces pericardial adiposity; abates pericardial adipocyte hypertrophy; attenuates adipocyte inflammation and oxidative insults; decreases the excessive levels of profibrotic extracellular matrix; while concomitantly potentiating heme-oxygenase, stem/progenitor cells and proteins of regeneration in the pericardial adipose tissue. These results suggest that substances capable of potentiating heme-oxygenase may be explored for the design of novel remedies against [cardiac complications](#) arising from excessive adiposity."

Future studies are needed to determine if preemptive application of hemin to the animals used in this study will retard/and or delay the manifestation of cardiometabolic complications.

Dr. Steven R. Goodman, Editor-in-Chief of *Experimental Biology and Medicine*, said "These studies by Dr. Ndisang and colleagues provide promise for the future testing of heme-oxygenase inducers as potential therapeutics to limit cardiac injury related to excess adiposity in [obese individuals](#). As obesity continues to grow globally, in adults and children, better therapies to control the downstream clinical sequelae are desperately needed, in parallel with preemptive education on diet and exercise."

Provided by Society for Experimental Biology and Medicine

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