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Metabolic Reprogramming and Impaired Liver Metabolism in Hyperinsulinemic male LEW.1WR1 rats.

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Abstract

Metabolic diseases, including insulin resistance and fatty liver disease, are closely intertwined through shared metabolic disruptions. This study investigates early metabolic changes in LWE.1WR1 male rats, an insulin-resistant, hyperinsulinemic strain predisposed to metabolic dysfunction. Despite the absence of overt diabetes, these animals displayed early hepatic abnormalities indicative of metabolic dysfunction-associated steatotic liver disease (MASLD), suggesting a subclinical progression of liver pathology. Proteomic analysis of liver tissue revealed significant reductions in mitochondrial proteins and oxidative phosphorylation components, along with altered expression in pathways regulating branched-chain fatty acid metabolism and beta-oxidation. UBD/FAT10, a stress-response gene linked to inflammation and metabolic imbalance, was notably overexpressed. These changes suggest impaired hepatic energy regulation and lipid handling, both of which are cardinal features of metabolic syndrome. Histological findings from complementary studies confirmed hepatic steatosis, Mallory-Denk body formation, and fibrosis in 23-week-old LEW.1WR1 rats under a standard diet. The convergence of liver dysfunction, insulin resistance, and increased adiposity strongly supports this strain as a robust model of early metabolic diseases. These findings demonstrate that LEW.1WR1 rats exhibit intrinsic mitochondrial dysfunction and early liver damage independent of dietary extremes or diabetes onset. The model offers critical insights into the pathophysiological onset of metabolic disease and the molecular disruptions that precede clinical manifestation.

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A REVIEW OF SOME THERAPEUTIC VALUES OF AFRICAN GIANT SNAIL (*Archachatina marginata*)

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ABSTRACT
African Giant Snail (*Archachatina marginata*) and their secretions, particularly snail mucin, offer a range of therapeutic benefits which include skin health, wound healing and potentially cancer prevention. In folk medicine, the bluish liquid obtained when the meat has been removed from the shell is good for infant development. African Giant Snail meat also contains pharmacological properties of value in countering high blood pressure. This review highlighted some therapeutic values of snails using qualitative methods. African Giant Snail and its constituents (through proximate and mineral composition of its foot and shell) have been used as complete haematinic, anti-inflammatory agent and haemostatic agent to effect its numerous healing actions. There is however, the need for more studies to ascertain the potential risks in snail secretions.

Keywords: African Giant Snail, Therapeutic, Values, *Archachatina marginata*

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SODIUM ACETATE AND METFORMIN AMELIORATE RENAL DYSFUNCTION IN STREPTOZOTOCIN INDUCED DIABETES IN MALE MICE

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Abstract
Diabetes is a metabolic disorder, characterised by chronic hyperglycemia, which can lead to oxidative stress and lipid peroxidation. Diabetes mellitus particularly type 2 contribute to global epidemics which can lead to cardiovascular disease and renal dysfunction. Diabetes mellitus is a growing health concern worldwide, with streptozotocin-induced diabetes being a commonly used model for studying type 1 diabetes. Diabetic nephropathy is one of the major complications of diabetes that is characterized by renal dysfunction and damage. Current treatments have limitations, necessitating the exploration of novel therapeutic strategies. This study investigated the effect of sodium acetate on renal dysfunction in streptozotocin induced diabetic in male mice.The main objective was to evaluate the potential reno -protective effects of sodium acetate and metformin on renal dysfunction in streptozotocin-induced diabetic mice. Twenty male mice were used.Diabetes was induced in male mice using streptozotocin, and the animal were grouped into three group after the induction. One group was treated with sodium acetate for 5 weeks while the other group was treated with the combination of sodium acetate and metformin for five weeks (5 weeks).In assessing the renal function it was done by measuring the creatinine levels and albumin levels.The result showed a significant increase in creatinine and bilirubin level in diabetes group compare to the treated group. The treated group showed a greater improvement in renal function. This suggests the possible use of sodium acetate and metformin to ameliorate renal dysfunction in diabetes, by mitigating oxidative stress and inflammation. Sodium acetate and metformin show anti-diabetic properties by ameliorating renal dysfunction in streptozotocin-induced diabetic in male mice, by reducing oxidative stress and inflammation.

Keywords: Sodium acetate, metformin, streptozotocin and Diabetes

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Gut Microbiota Product, Acetate, modulates lipid peroxidation in Streptozotocin-induced Diabetics in Male Mice

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Abstract
Diabetes mellitus is characterized by hyperglycemia, insulin resistance, and dyslipidemia. This metabolic alteration significantly contributes to oxidative stress and lipid peroxidation. The aim of this study was to investigate the potential effects of sodium acetate on lipid peroxidation and lipid metabolism in a streptozotocin-induced diabetic rat model. Diabetic rats were treated with sodium acetate, and the levels of blood glucose, insulin, HOMA-IR (insulin resistance index), total cholesterol, triglycerides, and high-density lipoprotein (HDL) cholesterol were measured, along with malondialdehyde (MDA), a marker of lipid peroxidation. The result of this study showed that sodium acetate treatment significantly reduced fasting blood glucose and HOMA-IR, indicating improved insulin sensitivity. In addition, sodium acetate significantly decreased total cholesterol and triglyceride levels while increasing HDL cholesterol which indicate improvements in lipid metabolism in diabetes. MDA levels were also significantly lower in sodium acetate-treated rats, indicating reduced lipid peroxidation and oxidative stress. In conclusion, sodium acetate may be a promising therapeutic agent for improving glucose metabolism and lipid metabolism, while also mitigating oxidative stress and boosting anti-oxidant status in diabetes mellitus.