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High-fat-diet induced insulin resistance and prevention with *Sutherlandia frutescens* – Role of 11 β HSD-1**Ngozi F. Nnolum-Orji**

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The activity of 11 β HSD-1, involving glucocorticoid receptor (GR) and phosphoenolpyruvate carboxykinase (PEPCK), has been implicated in the development of insulin resistance observed with high-fat-diet (HFD). 11 β HSD-1 (11 β -Hydroxysteroid dehydrogenase-1) is an enzyme that converts inactive cortisone to cortisol within peripheral tissues and regulates tissue cortisol levels, thus influences glucose regulation. In a study at NMMU, rats developed insulin resistance (IR) within 56 days of consuming HFD. In the same study, extract of *Sutherlandia frutescens*, a South African plant, prevented IR in rats fed HFD. We investigated the role of 11 β -HSD1 in the development of observed IR and the effect of *S. frutescens* on the enzyme expression. Using quantitative RT-PCR, periodic (days 7, 14, 28, 56, 86) mRNA expressions of 11 β -HSD1, GR and PEPCK were measured in rat liver tissues, while 11 β -HSD1 protein expression was analysed using immunohistochemistry. Our results showed no significant change in 11 β -HSD1 expression up till day 56. However, significant increase in both mRNA and protein levels were observed at day 86 (i.e 30 days after IR had developed). Increased mRNA levels of PEPCK was observed prior to IR in rats fed HFD, indicating increased gluconeogenesis, but did not increase in rats fed HFD and *S. frutescens*. No pattern of GR regulation was observed with mRNA levels of GR. Increased 11 β -HSD1 activity is possibly a consequence of IR rather than cause, but may contribute to the development of type 2 diabetes by exacerbating IR. Other mechanisms induced increased gluconeogenesis in rats fed HFD, which was prevented in rats fed HFD and *S. frutescens*.

Biography

Ngozi F. Nnolum-Orji is currently completing her MSc degree in Biochemistry at Nelson Mandela Metropolitan University. Her research interest is focused on Diabetes prevention and treatment using medicinal plants, hence, has secured admission for her PhD studies on properties of identified anti-diabetic medicinal plant at the Department of Pharmacology, University of Pretoria.

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