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Effects of the loading of excessive sodium chloride on the pathosis mimicking type-2 diabetes mellitus in Spontaneously Diabetic Torii (SDT) fatty rats

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Type-2 diabetes mellitus had become an international health concern with its growing number of patients globally. At the same time, excessive salt consumption was also seen as a major cause of diseases such as hypertension and may expedite renal complications in diabetic patients. In this study, we investigated the effects of excessive sodium chloride supplementation on the kidney of the Spontaneously Diabetic Torii (SDT) fatty rat, an obese type-2 diabetes model. Male and female SDT fatty rats and normal Sprague Dawley (SD) rats at 5 weeks of age were loaded with 0.3% NaCl in drinking water for 13 weeks. Blood serum and urinary parameters were observed throughout the experiment and kidney samples were examined in histopathological and genetical analyses. Significant changes on the body weight, blood pressure, urine volume, creatinine clearance, BUN, relative gene expressions of TNF-α, IL-1β, MCP-1 and TGF-β were observed in the salt loaded male SDT fatty rats. Urinary L-FABP (Liver type Fatty Acid Binding Protein) and albumin levels were higher observed in the salt loaded male SDT fatty rats throughout the period, but urinary albumin levels in the female SDT fatty rats remain unchanged. In the kidney, slight Armanni Ebstein lesions, tubular regeneration, hyaline cast and inflammatory cell infiltration were observed in female SDT fatty rats while the levels of some findings were higher in the salt loaded group. The kidney of the salt loaded male SDT fatty rats demonstrated higher degree of findings compared to the female group and the male unloaded group. Increased levels of urinary biomarkers and histopathological changes in salt loaded SDT fatty rats' shows that excessive salt consumption may act as a diabetic pathology exacerbation factor, but the pathosis may be influenced by gender difference. Urinary L-FABP levels may act as a useful biomarker to detect slight tubular damages in the kidney.

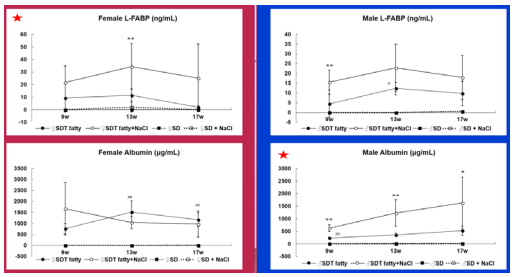

Figure-1: Urinary L-FABP levels increased with salt load in both female and male SDT fatty rats. While urinary albumin levels only increased in male SDT fatty rats.

References

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Biography

Soon Hui Teoh is currently pursuing Master's degree in Food and Nutritional Science in the Graduate School of Tokyo University of Agriculture. She has her expertise in the histopathological analysis of type-2 diabetes mellitus in animal models, especially renal complications.

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