**HISTOLOGICAL AND MOLECULAR ASSESSMENT OF ADIPOSE TISSUE HEALTH AND ITS CORRELATION WITH GLOMERULAR DAMAGE IN THE ZUCKER DIABETIC SPRAGUE DAWLEY (ZDSD) RAT MODEL OF DIABETIC KIDNEY DISEASE**

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Adipose tissue (AT) pathologies arising during the progression of type 2 diabetes mellitus (T2DM) have been implicated in end-organ damage through changes in the levels of circulating metabolites and remote-acting adipocytokines. Adiponectin is an adipocytokine involved in a putative adipose-renal axis. Adiponectin receptor knockout mice develop renal damage similar to that observed in early diabetic kidney disease (DKD). We sought to characterize AT morphological change and adiponectin gene expression in T2DM progression using a ZDSD rat model, and to assess whether changes correlated with structural changes in the glomerulus. Epididymal fat pad visceral AT and renal cortex were obtained from male ZDSD rats (n=32) euthanized at 26, 32 and 38 weeks of age to obtain a spectrum of T2DM severity. AT was processed for histological and qPCR analysis, and renal cortex was processed for transmission electron microscopy. Adipocyte diameter, podocyte foot process (PFP) frequency, PFP diameter and glomerular basement membrane (GBM) thickness were measured. Urinary albumin excretion was measured in a 16-hour time collection. Ten animals progressed to prediabetes (blood glucose 7 – 11 mmol/L), and 8 animals progressed to diabetes (blood glucose > 11 mmol/L). Diabetic animals presented increased urinary albumin excretion. Adiponectin gene expression was significantly decreased in diabetic animals and correlated with reductions in adipocyte diameter (r: 0.6874, p < 0.0001). A negative correlation between adiponectin gene expression and GBM thickness was noted (r: -0.7212, p = 0.02). These association-based data emphasise the potential mechanistic role for a disrupted adipose-renal axis as a contributor to DKD progression.

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