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http://dx.doi.org/10.15344/2394-1499/2016/120

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Heat Shock Gene Sirtuin 1 Regulates Post-Prandial Lipid Metabolism with Relevance to Nutrition and Appetite Regulation in Diabetes

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New discoveries in medicine are required to understand the importance of appetite regulation that is associated with the overconsumption of food in Type 2 and Type 3 diabetes. Food restriction in diabetes is essential to maintain the hepatic metabolism of dietary fat with relevance to defective post-prandial lipid metabolism and to the global non alcoholic fatty liver disease (NAFLD) epidemic [1,2]. Premature brain aging has become important with the development of Type 3 diabetes and Alzheimer’s disease [3] that is associated with repression of the anti-aging gene Sirtuin 1 (Sirt 1) relevant topost-prandial lipid metabolism, amyloid beta metabolism (peptide involved in amyloid beta plaques) and circadian rhythm abnormalities in the brain biological clock associated with the development of NAFLD. Nutritional interventions such as very low carbohydrate diets have become important to diabetes (Figure 1) to reverse defective post-prandial lipid and amyloid beta metabolism without atherogenic lipoprotein formation [4,5] with the prevention of accelerated atherosclerosis in various communities. Western diets that are high in fat and glucose are linked to diabetes and NAFLD with anti-aging gene Sirt 1 transcriptional dysregulation [6] in cell and tissues associated with, hyperglycemia, mitochondrial apoptosis and delayed hepatic fat and amyloid beta metabolism (Figure 1).
and xenobiotic metabolism[18,36] (Figure 2). In the developing and developed world diabetic treatment has become important with defective Sirt 1 gene expression determined by miR-34a [18, 36] related to defective cell proliferation in the brain and the liver (Figure 2). Defective thermoregulation may be relevant to ingestion of food (Sirt 1 defective) with inappropriate post-prandial lipid and amyloid beta metabolism that inactivate magnesium therapy that may now be relevant to HSP and amyloid beta metabolism with relevance to myocardial infarction [3,37].

![Figure 2: Appetite regulation in diabetes involve the maintenance of the heat shock gene Sirtuin 1 that is essential for thermo regulation function and hepatic lipid metabolism. The repression of the anti-aging gene Sirt 1 involves p53/mTOR dysregulation of the other anti-aging genes (klotho, p66shc, FOXO3a) associated with hepatic lipid, heat shock protein and amyloid beta metabolism. FGF 21 treatment in diabetes has become important to NAFLD [38] and myocardial infarction treatment [39, 40] but defective cell transcriptional ontology in the liver and brain related to miR34a inhibition of Sirtuin 1/transcription factors interactions inactivates hepatic lipid metabolism with the induction of NAFLD, defective amyloid beta metabolism and neurodegenerative disease.](image)

Food restriction and fasting regulate Sirt 1 and FGF21 involved in the prevention of the metabolic syndrome and maintenance of high density lipoprotein levels [39-41]. FGF21 therapy [42, 43] in Type 2 and Type 3 diabetes may be ineffective with the development of cardiac ageing with relevance to core body temperature regulation that is determined by miR-34a/Sirt 1 gene expression with low adiponectin levels [36,44] (Figure 2). Healthy diets that maintain Sirt 1 activity in the brain and liver have become important to many diabetics in the developing and developed world with relevance to food technology that involves hepatic metabolism of bacterial lipopolysaccharides (LPS) that has become important to the reversal of Type 2 diabetes and Type 3 diabetes [45, 46]. Plasma LPS and xenobiotic levels [47] have risen in various developed countries and consumption of activators such as leucine, pyruvic acid and magnesium may supersede LPS inhibition of Sirt 1 [18, 37] with prevention of defective cell transcriptional ontology and membrane transformations in the brain and liver [45, 46]. Appetite dysregulation in diabetes may require these activators of Sirt 1 with relevance to the maintenance of neurons and the treatment of Type 3 diabetes with defective apelinergic system that involves thermo dysregulation.

**Conclusion**

Dyslipidemia is one of the key risk factors for cardiovascular disease in diabetes. The management of dyslipidemia in diabetes continues to remain controversial and improvements in the characteristic diabetic dyslipidemia of high triglyceride and low HDL may not indicate that defective cell ontology is underway early in life. Diabetes and defective hepatic cell transcriptional programs induce delayed post-prandial lipid metabolism associated with Western diets rich in fat and glucose. The clinical management of diabetes in the young and elderly now not only involves appetite regulation with calorie restricted diets that maintain the heat shock gene Sirt 1 expression but also careful core body temperature (37°C) to activate hepatic and brain Sirt 1. The biological active release of FGF21 is connected to Sirt 1 activation and glucose homeostasis with relevance to treatment of dyslipidemia, NAFLD, cardiovascular disease and neurodegenerative diseases. Consumption of Sirt 1 inhibitors such as alcohol, suramin and palmitic acid should be avoided to prevent defective liver and brain cell ontology in the young and the elderly to prevent hyperglycemia induced oxidative stress and myocardial infarction.

**Funding**

This work was supported by grants from Edith Cowan University, the McCusker Alzheimer’s Research Foundation and the National Health and Medical Research Council.

**References**


