SARDINE PROTEINS IMPROVE INSULIN SENSIBILITY, β-CELL FUNCTION AND MITIGATE TISSULAR OXIDATIVE STRESS, IN TYPE 2 DIABETIC RATS

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Objectives: To evaluate the effects of sardine proteins on hyperglycemia, insulin resistance (IR), β-cell dysfunction and tissular oxidative stress, in type 2 diabetic rats. Methods: Diabetes was induced by feeding rats with a high-fat (HF, 30%) diet for 5 weeks followed by an intraperitoneal injection of streptozotocin (STZ, 35mg/kg body weight). The diabetic rats were divided into 4 groups and were fed casein (CAS) or sardine proteins (SP) combined with 5% (CAS, SP) or 30% lipids (CAS-HF, SP-HF), for 4 weeks. Results: HF diet induced hyperglycemia, insulin resistance and β-cell dysfunction. SP with 5% or 30% lipids decreased serum glucose, HbA1c, HOMA-IR and increased HOMA-β. Additionally, insulin concentrations were reduced by 51% with SP vs CAS. Nitric oxide (NO) concentrations increased in heart (100%), kidney (246%), brain (61%) and adipose tissue (AT) in CAS-HF vs CAS while, SP combined with 5% or 30% lipids, induced a decrease. Similarly, an increase in hydroperoxide concentrations was noted in liver (75%), heart (62%), kidney (84%), muscle (88%) and AT (50%). Whereas, SP with 5% or 30% lipids decreased these concentrations in liver, heart and AT. CAS-HF vs CAS, reduced SOD and CAT activities in all tissues. Moreover, GPx and GSSH-Red decreased in the liver and kidney. SP increased SOD, GPx, GSSH-Red and CAT in liver, heart, kidney and AT. Conclusion: SP decrease hyperglycemia, insulin resistance and improve β-cells function. Moreover, SP decrease oxidative stress by decreasing NO and hydroperoxides concentrations and increasing tissular antioxidant enzyme activities.