Research Number 2:

Resveratrol and Dulaglutide ameliorate adiposity and liver dysfunction in rats with diet‑induced metabolic syndrome: Role of SIRT‑1 / adipokines / PPARγ and IGF‑1

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Abstract

Background Adiposity and non-alcoholic fatty liver disease (NAFLD) are common characteristics of metabolic syndrome (MS). Understanding the underlying pathogenesis is crucial for the development of new remedies. Resveratrol controls obesity and glycemic disorders in patients with MS.

Objectives This study aimed to evaluate the efect of resveratrol and dulaglutide on adipose tissues and liver in rats with MS, declaring their possible mechanisms.

Methods Rats allocated as Control, MS (induced by a high fat/ high sucrose diet for eight weeks), MS + Resveratrol (30 mg/kg/day orally), and MS + Dulaglutide (0.6 mg/kg twice weekly SC); drugs administration was in the last four weeks. Serum biochemical measurements were done. Liver and visceral fat were processed for biochemistry, histopathology, and immunohistochemistry.

Results MS results demonstrated signifcantly increased systolic and diastolic blood pressure, anthropometric measurements, serum levels of alanine aminotransferase (ALT), glycemic indices, and lipids with decreased HDL-C. Tissue levels of leptin, malondialdehyde (MDA), and TNF-α reactivity signifcantly increased. Expression of adiponectin, PPARγ, and insulin growth factor-1 (IGF-1) decreased. Also, Western blotting mRNA gene expression of liver SIRT-1 was down-regulated. Resveratrol and dulaglutide signifcantly and efectively reversed MS complexity, ameliorating all fndings, particularly NAFLD and adiposity-induced infammation. Resveratrol signifcantly appears superior to dulaglutide regarding the efects on hemodynamics, lipids, adipokines, IGF-1 levels, and adipocyte size. Parallel, dulaglutide has more infuence on glycemic control.

Conclusion Protective efects of the drugs may be through correlations between SIRT-1/adipokines/IGF-1 and PPARγ, improving the cross-talk between insulin resistance, obesity markers, liver dysfunction, and TNF-α. Promising multi-beneficial therapies of resveratrol or dulaglutide in MS are recommended clinically for this purpose.

Keywords Dulaglutide · Resveratrol · Metabolic syndrome · SIRT-1 · Adipokines · IGF-1