The effects of resveratrol on cyclooxygenase-1 and -2, nuclear factor kappa beta, matrix metalloproteinase-9, and sirtuin 1 mRNA expression in hearts of streptozotocin-induced diabetic rats

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ABSTRACT. Resveratrol (RSV) has a beneficial role in the prevention of diabetes and alleviates some diabetic complications, such as cardiomyopathy. We investigated cyclooxygenase-1 (COX-1), COX-2, nuclear factor κB (NF-κB), matrix metalloproteinase-9 (MMP-9), and sirtuin 1 (SIRT1) mRNA expression levels in heart tissue after RSV treatment in streptozotocin (STZ)-induced diabetic rats. After induction of chronic diabetes with STZ, 10 mg RSV/kg per day was administered to DM and DM+RSV groups for four weeks. At the end of the experiment, all rats were sacrificed and heart tissues were stored at -80°C; mRNA expression levels of COX-1, COX-2, NF-κB, MMP-9, and SIRT1 genes were analyzed with quantitative real-time PCR. We did not find any significant effect of RSV on
MMP-9, COX-1, COX-2, or NF-κB mRNA levels among the groups. However, SIRT1 mRNA levels decreased in the DM group compared to controls and increased in the DM+RSV group when compared to the DM group. SIRT1 is activated by RSV treatment in diabetic heart tissue. Activation of SIRT1 by RSV may lead to a new therapeutic approach for diabetic heart tissue. We conclude that RSV treatment can alleviate heart dysfunction by inhibiton of inflammatory gene expression such as SIRT1.

**Key words:** Diabetes mellitus; COX; NF-κB; SIRT1; Resveratrol; MMP-9