



# Perinatal supplementation with thymoquinone improves diabetic complications and T cell immune responses in rat offspring.

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## Abstract:

**BACKGROUND:** Epidemiological studies have shown that the offspring of mothers who experience diabetes mellitus during pregnancy are seven times more likely to develop health complications later in life compared to offspring born to nondiabetic mothers. **AIM OF THE STUDY:** We investigated whether supplementation with a natural antioxidant (thymoquinone; TQ) in female rats with streptozotocin (STZ)-induced gestational diabetes (GD) improved diabetic complications and T cell immune responses in their offspring. **METHODS:** Three groups of female rats were tested: nondiabetics, diabetics treated with TQ during pregnancy and lactation periods and diabetics that were not treated with TQ (n=10 female rats in each group). **RESULTS:** Our data demonstrated a significant decrease in the numbers of neonates born to diabetic rats compared with those born to control rats. GD led to macrosomic pups with several postpartum complications, such as a significant increase in plasma levels of the pro-inflammatory cytokines IL-1 $\beta$ , IL-6, and TNF- $\alpha$  (but not of IL-10); a marked decrease in the plasma level of IL-2; a marked reduction in the proliferative capacity of superantigen (SEB)-stimulated T-lymphocytes; and an obvious reduction in the number of circulating and thymus homing T cells. TQ supplementation of diabetic mothers during pregnancy and lactation periods had an obvious and significant effect on the number and mean body weight of neonates. Furthermore, TQ significantly restored the IL-2 level and T cell proliferation and subsequently rescued both circulating and thymus homing T cells in the offspring. **CONCLUSIONS:** Our data suggest that nutritional supplementation of GD mothers with the natural antioxidant TQ during pregnancy and lactation periods improves diabetic complications and maintains an efficient T cell immune response in their offspring, providing a protective effect in later life.

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