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Tungstate Treatment Improves Leydig Cell Function in Streptozotocin-Diabetic Rats

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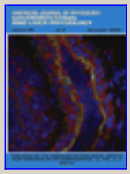
Oral administration of sodium tungstate to adult male streptozotocin-diabetic rats for 3 months normalized serum levels of glucose, insulin, luteinizing hormone, and follicle-stimulating hormone. These effects were accompanied by an increase in reproductive performance, which was related to a strong improvement in Leydig cell function markers, such as the recovery of the number of Leydig cells and serum testosterone levels. Moreover, this in vivo recovery was related to a concomitant increase in the cell expression of insulin receptors. Tungstate treatment did not modify Leydig cell function in healthy rats. Furthermore, the addition of tungstate or insulin to the mTLC-1 cell line from Leydig cell origin increased the phosphorylation states of MAP-kinase and glycogen synthase kinase-3. Our results indicate that tungstate treatment in diabetic rats leads to a recovery of reproductive performance by increasing the number of Leydig cells. This increase contributes to the recovery of their functionality, thereby improving the overall function of these cells. We propose that this improvement is caused by the combined effect of the tungstate-induced normalization of insulin glucose and luteinizing hormone serum levels and a direct action of the effector on Leydig cells through modulation of at least MAP-kinase and glycogen synthase kinase-3 activities.

Key words: Diabetes, male, reproductive performance



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Sodium tungstate decreases sucrase and Na+/D-glucose cotransporter in the jejunum of diabetic rats

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[Abstract] [Full Text] [PDF]