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**Treatment of erectile dysfunction in the obese type 2 diabetic ZDF rat with adipose tissue-derived stem cells.**

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**Abstract**

**INTRODUCTION:**Erectile dysfunction (ED) is a major complication of type 2 diabetes, and many diabetic men with ED are refractory to common ED therapies.

**AIM:**To determine whether autologous adipose tissue-derived stem cells (ADSCs) injected into the penis of impotent type 2 diabetic rats improve erectile function.

**MAIN OUTCOME MEASURES:**Blood glucose levels, intracavernous pressure (ICP) increase upon cavernous nerve (CN) electrostimulation, and immunohistochemistry.

**METHODS:**Twenty-two male Zucker diabetic fatty (ZDF) rats were used. At 22 weeks of age, all the animals underwent unilateral CN electrostimulation and ICP measurement to confirm impotence. Paragonadal adipose tissue was harvested to procure ADSCs. The impotent animals were randomized to ADSC treatment and sham control groups. At 23 weeks of age, the treatment group animals underwent a penile injection of 1 million ADSCs; the control group animals received vehicle only. Erectile function studies were repeated at 26 weeks of age, followed by tissue harvest.

**RESULTS:**The rats developed diabetes within the first 10 weeks of age. At 22 weeks of age, 20 out of the 22 rats presented with ED. The post-treatment ICP increase during CN stimulation and ICP increase/mean arterial pressure were significantly higher in the treatment group compared with controls. Three weeks after injection into the corpus cavernosum, only a small number of BrdU-labeled ADSCs was detectable within corporal tissue of the treatment group. There was a significant increase in neuronal nitric oxide synthase (nNOS) in the penile dorsal nerve and in the number of endothelial cells in the corpora cavernosa of the rats in the treatment group.

**CONCLUSION:**Autologous ADSCs injected into the penis were effective to improve erectile function and to alter the microarchitecture of the corpus cavernosum. Since the number of ADSCs retained in the corpus cavernosum is very small, we postulate that their paracrine function, not trans-differentiation to smooth muscle or endothelial cells, is responsible for the improvement in penile function.

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