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JOURNAL ARTICLE

The ethane dimethanesul fonate-induced decrease in the fertilizing ability of cauda epididymal sperm is independent of the testis

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Several decades ago it was reported that when adult male rats were exposed to a single injection of 50 mg/kg body weight ethane dimethanesul fonate (EDS) and mated with untreated females, average litter size was significantly reduced as early as 2 weeks later.

Recently, we demonstrated that EDS exerts multiple effects in the epididymis of adult rats. Some of these effects were independent of reduced serum testosterone (T) levels. Later we found that EDS has direct effects on epididymal epithelial cells in vitro. Herein, we sought to determine whether EDS perturbs the fertilizing ability of cauda epididymal sperm. Four days after exposure to 50 mg/kg EDS, sperm from the proximal cauda epididymidis were inseminated into adult receptive females in utero; on the next day the percentage of fertilized eggs was determined. Exogenous T administration and castration were used to determine what role, if any, androgen deprivation and the testis had on the fertilizing ability of proximal cauda epididymal sperm. Sperm motion parameters, serum T, T in the caput/corpus epididymidis, and detergent-extracted sperm protein were evaluated and correlated with fertilizing ability. We found that both castration and EDS exposure significantly compromised the fertilizing ability of sperm in proximal cauda epididymidis 4 days after exposure. Exogenous T, sufficient to maintain serum T, completely restored the fertilizing ability of sperm following castration, but not after EDS exposure. Moreover, exogenous T failed to restore fertilizing ability when castrated animals were exposed to EDS. Thus, the effects that EDS exerts on sperm maturation in vivo are independent of the testis. Finally, the only endpoint that was well correlated with fertilizing ability was the relative amount of an acidic 18-kDa sperm protein.

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