

The effect of prenatal exposure to a single dose of testosterone on cardiac function of male and female rats in adulthood

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Context

Androgens can have an effect on cardiovascular function, they exert biological effects on cardiac myocytes through androgen receptors. Studies have shown that testosterone therapy has been associated with significant increases in cardiac output, improved cardiac function capacity, reduced symptoms in men with heart failure, and also preventive effects of androgens against cardiovascular diseases have been reported. Prenatal testosterone exposure can lead to increased expression of androgen-producing enzymes and increased levels of androgens in both males and females offspring in later life. Therefore it is important to study the consequences of androgen exposure in uterus on cardiac function in adult life.

Objective

The objective of this study was to evaluate whether prenatal testosterone exposure leads to changes in cardiac function in male and female offspring in adult life or not.

Methods

Pregnant rats in the experimental group (n=10) received 5 mg of free testosterone, by s.c. injection on the 20th day of pregnancy and controls (n=10) received solvent. Cardiac function in both male and female offspring (prenatally androgenized (PNA) rats) was examined and compared between two genders in adulthood. Isolated hearts were perfused with Langendorff setup and values of the left ventricular systolic pressure (LVSP), left ventricular developed pressure (LVDP), rate pressure product (RPP), and maximum and minimum rate of rise and decline in the left ventricular ($\pm dp/dt$) were recorded by power lab system.

Results

In PNA adult male rats, some parameters indicating cardiac function such as LVSP, LVDP, RPP, and $\pm dp/dt$ were significantly higher compared to controls. While in PNA adult female rats only LVDP and RPP were significantly higher compared to controls.

Conclusion

Prenatal exposure to a single dose of testosterone during critical period of fetal life increases cardiac function especially in male rats in adulthood.

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