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论著

高同型半胱氨酸血症孕鼠与其仔鼠发生先天性心脏病的关系

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摘要：

目的：探讨同型半胱氨酸与哺乳动物先天性心脏病发生的关系，观察不同剂量同型半胱氨酸对哺乳动物心脏发育的毒性作用。方法：将30只SD孕鼠随机分为3组：高剂量组、低剂量组、对照组（每组10只）。从妊娠第7天起，高剂量组腹腔内注射同型半胱氨酸200 mg/(kg·d)，低剂量组腹腔内注射同型半胱氨酸100 mg/(kg·d)，对照组腹腔内注射同等体积的生理盐水，直至孕第20天剖宫取胎。用高效液相色谱电化学方法检测妊娠前及妊娠第20天孕鼠血浆同型半胱氨酸浓度，体视镜观察仔鼠的心脏形态结构，透射电镜观察仔鼠的心肌细胞结构变化。结果：高剂量组、低剂量组与对照组孕鼠妊娠第20天血浆同型半胱氨酸浓度 ［分别为（30.47±1.12），（20.90±1.08），（10.98±0.77）μmol/L］比较，差异有统计学意义(P<0.01)，表明高同型半胱氨酸血症动物模型建模成功。高剂量组、低剂量组与对照组仔鼠先天性心脏病的发生率［分别为14.13%，9.57%，0.76%］ 比较，差异有统计学意义(P<0.01)，透射电镜观察仔鼠心肌细胞，可见低剂量组心肌组织中有凋亡细胞；高剂量组心肌组织中凋亡细胞更加明显。结论：高同型半胱氨酸血症对孕鼠胚胎心脏发育有毒性作用，主要表现为室间隔缺损、心房缺如、心包积液。高同型半胱氨酸血症可诱导大鼠胚胎心肌细胞发生凋亡，可能是其导致心脏畸形的机制之一。

关键词： 高同型半胱氨酸血症；先天性心脏病；动物模型；细胞凋亡

Relationship of hyperhomocysteinemia in pregnant rats and congenital heart defects in the newborn rats

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Abstract:

ObjectiveTo investigate the relationship between homocysteine (HCY) and congenital heart defects, and to observe the toxic effect of different doses of HCY on embryonic heart development in mammalian. MethodsA total of 30 SD pregnant rats were randomly divided into 3 groups: a high dose group ［200 mg/(kg·d)］, a low dose group ［(100 mg/(kg·d)］ and a control group (equal volume of physiologic saline, n=10 in each group). The HCY or vehicle was given intraperitoneally from 7 to 20 days after uterineincision delivery. The contents of HCY in serum were analyzed by high performance liquid chromatogram electrochem before the pregnancy and 20 days after the pregnancy. The structure changes of the newborn rats heart were observed by stereoscope. The ultrastructure changes of cadiomyocyte were observed through transmission electron microscope. ResultsComparing with the control, serum HCY in rats 20 days after pregnancy was significantly increased in the high or low dose group ［(30.47±1.12），（20.90±1.08）vs（10.98±0.77）μmol/L, P<0.01)］, indicating that the hyperhomocysteinemia animal model was successfully established. The incidence rate of congenital heart defects in neonatal was significantly increased in the high or low dose group(14.13%, 9.57% vs 0.76%, P<0.01). The number of apoptotic cells were signicicantly increased in the high dose group. ConclusionHyperhomocysteinemia may exert toxic effect on embryonic heart development in pregnancy rats, which led to congenital heart defects in the newborn rats. Hyperhomocysteinemia induced cardiomyocyte apoptosis may, at least partially, contribute to the heart defects.

Keywords: hyperhomocysteinemia;congenital heart defects;animal model;cell apoptosis

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