

Cyanidin-3-O-glucoside protected against 3-chloro-1,2-propanediol induced testis injury and improved spermatogenesis in male rats**Xinwei Jiang**

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Statement of the Problem: In recent decades, the capability of mankind spermatogenesis is declining due to various threats including environmental factors. Chloropropanol as a group of chemical contamination in food process may cause severe testis damage. Since we still have to face some toxicant exposure which threatens the male spermatogenesis, we could try to find some solutions to reduce the harm of the pollutants. Anthocyanins as colorful polyphenols in plant food can benefit our health, but the effects on male spermatogenesis were not studied yet.

Methodology & Theoretical Orientation: In our study, the protective effects of cyanidin-3-O-glucoside (C3G), which is a representative monomer of anthocyanins, was investigated on the chloropropanol stimulated infertility models. Two kinds of typical chloropropanol were adopted in our studies, 1,3-Dichloro-2-propanol (1,3-DCP) and 3-Chloro-1,2-propanediol (3-MCPD). We firstly used a 1,3-DCP damaged rat R2C Leydig cell model *in vitro*, which could generate progesterone, and was related to the procedure of spermatogenesis.

Results: C3G elevated the cells viability of Leydig cells and ameliorated the apoptosis. Additionally, C3G protected the mitochondrial integrity, reduced the level of oxidative stress, and elevated the expression of progesterone secretion related proteins. We further tested the C3G effects on 3-MCPD caused rat spermatogenic disorders *in vivo*. After four weeks treatment, C3G improved the number and motility of the sperms, alleviated the damage of the seminiferous tubule. C3G barely influenced sexual hormones, meanwhile upregulated the androgen receptor expression. C3G also reduced the oxidative stress, apoptotic cells and improved the blood-testis-barrier in testis. In addition, C3G mediated the activation of p-ERK, p-JNK and p53, which are related to the function of Sertoli cells and the process of spermatogenesis.

Conclusions: C3G can protect against the 3-MCPD caused testis damage and spermatogenic disorders, which indicated the potential protection of anthocyanins on male reproduction.

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