UNIVERSITI TEKNOLOGI MARA

THE PROTECTIVE ROLE OF TOCOTRIENOL ON CORTICOSTERONE-INDUCED OXIDATIVE STRESS DURING PRE-IMPLANTATION EMBRYONIC DEVELOPMENT IN MICE

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ABSTRACT

Excessive amount of glucocorticoid [cortisol in human or corticosterone (CORT) in rodent] induces oxidative stress (OS) in the cell leading to DNA damage and it has been proven by previous studies. Conversely, it is well documented that tocotrienol (TCT), a potent antioxidant was able to protect cells by neutralizing excessive reactive oxygen species (ROS). Hence, this study was designed to determine the effect of TCT supplementation on the quality and development of embryos and DNA damage level in embryos of CORT-treated mice. Female mice were given TCT orally at three different doses i.e. 30, 60, and 90 mg kg^{-1} BW, concurrent with 10 mg kg^{-1} BW of CORT intraperitoneally (ip) for 14 days. Mice were superovulated and paired individually overnight with stud male mice. After 48 hours post-coitum, female mice were euthanized to collect 2-cell stage of embryos. The morphological observation and *in vitro* development of embryos were accessed and monitored under an inverted microscope and the percentage of DNA damage was analysed via Comet assay. It was found that oral supplementation of 90 mg kg^{-1} BW of TCT in CORT-treated mice were able to normalize the number of fragmented embryos and improve the number of embryos that reach the blastocyst stage. No DNA damage was noted in all CORT-treated groups supplemented with TCT. Supplementation of TCT also suppresses the level of 8-hydroxy-2'-deoxyguanosine (8-OHdG) and restored catalase (CAT) activity toward control. The findings of this study indicate that TCT supplementation in CORT-treated mice was able to reverse the effect of CORT-induced fragmentation and oxidative DNA damage in embryos. Thus, the molecular mechanisms by which TCT suppresses oxidative stress and promotes the quality of embryo need to be investigated in detail in future studies.

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