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IMPACT OF HYPOTHYROIDISM ON CuZnSOD AND MnSOD DURING SPERMATOGENESIS IN RATS

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Thyroid hormones play an important role in both testis development and spermatogenesis. While hypothyroidism has been known to generally induce metabolic suppression, lower respiration rate, and reduce free radical formation, recent studies reported an increased production of reactive oxygen species (ROS). First line of antioxidant defense in testes is comprised of two isoforms of superoxide dismutase (SOD), CuZnSOD and MnSOD differently localised in cell. This study aimed to investigate the effects of hypothyroidism on the expression, localisation, and activity of these two SOD isoforms during spermatogenesis. Hypothyroidism was induced in two-month-old male Wistar rats by 0.04% methimazole in drinking water for 7, 15, and 21 days, while euthyroid control group drank tap water. CuZnSOD protein expression was decreased after 15 and 21 days while its activity was decreased by 40% in all examined time points of methimazole treatment in comparison to euthyroid control. At the same time, neither MnSOD protein expression nor its activity was changed by treatment. However, cell and stage-specific CuZnSOD and MnSOD immunoexpression in the rat testes were changed in hypothyroidism and may contribute to the altered spermatic characteristics. Our results suggest that changes in CuZnSOD and MnSOD expression play role in redox disbalance leading to hypothyroidism-induced maturation arrest of spermatogenesis.