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The Ameliorative Effects of Ferulic Acid against Methotrexate Induced Testicular Damage in Rats



ABSTRACT:

Methotrexate (MTX), an extensively used chemotherapeutic and immunosuppressive agent, is well-documented for its gonadotoxic effects. Ferulic acid (FA), a natural phenolic compound with potent antioxidant properties, has shown protective effects in various organ systems. This study aimed to assess the protective and therapeutic potentials of FA against MTX-induced testicular damage in a rat model. Twenty-four adult male rats were allocated into four groups: control, MTX-only, MTX plus FA (protective), and MTX followed by FA (therapeutic). Testicular tissues were assessed histologically for tubular integrity and germ cell preservation. Histomorphometric parameters, including seminiferous tubule diameter and germinal epithelial height. Also, the level of Caspase-3 expression was analyzed using immunohistochemistry to examine apoptosis activity. The group treated with MTX showed testicular damage and a significant decrease in germ cells along with lower histomorphometric measures and increased Caspase-3 expression levels. On the other hand, both groups treated with FA displayed noticeable improvements in both histology and molecular aspects. The treated group showed normal testicular structure, along with restored histomorphometric values and minimal Caspase-3 expression similar, to the control group. **Conclusion:** FA successfully reduced the effects of (MTX) in the testicles by maintaining their structure and preventing cell death processes. This suggests that FA could be an addition to protect men's reproductive health during chemotherapy treatments