



PATHOGENETIC MECHANISMS OF MALE
REPRODUCTIVE SYSTEM DAMAGE IN ULCERATIVE COLITIS
AND MODERN APPROACHES TO THEIR CORRECTION: A
LITERATURE REVIEW

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Abstrakt. This review of the literature analyzed the main pathogenetic mechanisms of pathological changes occurring in the male reproductive system under conditions of ulcerative colitis, as well as modern experimental approaches aimed at their correction. Modern studies show that the effect of ulcerative colitis on the reproductive system is not limited only to local intestinal damage, but is also mediated through systemic inflammation, oxidative stress, impaired immune response, dysbiosis of the intestinal microbiota, and endocrine changes. In experimental models, colitis induced using dextran sulfate sodium (DSS) was accompanied by damage to testicular tissue, impaired spermatogenesis, a decrease in sperm count and quality, DNA damage, and a decrease in epididymal sperm count. Recent data indicate that dysbiosis of the intestinal microbiota can cause inflammatory processes in the testis and epididymis through activation of Th17 cells and production of IL-17A. In correction studies, the potential of agents with antioxidant and anti-inflammatory properties, such as 6-gingerol, cyanidin-3-O-glucoside, naringin, and ozone, to reduce certain pathological changes in the reproductive system was investigated. However, most of these approaches are at the experimental stage, and their effectiveness in correcting damage to the male reproductive system in humans has not been sufficiently determined.



Keywords: *ulcerative colitis, reproductive system, epididymis, spermatogenesis, oxidative stress, intestinal inflammation, correction.*

Main part

Ulcerative colitis (UC) is a chronic, relapsing inflammatory disease of the colonic mucosa, and since it occurs mainly in people of reproductive age, the impact of the disease on male reproductive health is of particular scientific importance. In the literature, reproductive disorders associated with UC have been linked to disease activity, systemic inflammation, nutritional status, the medications used, and certain surgical procedures [1,2].

In explaining the relationship between the microbiota and the male reproductive system, impairment of the intestinal barrier is also of significant importance. Under conditions of inflammation and dysbiosis, the permeability of the intestinal epithelial barrier may increase, microbial components may enter the systemic circulation, and the immune response may be activated. As a result, there is a possibility of increased inflammation and oxidative stress in the reproductive organs [6–7]. A 2024 review showed that the intestinal microbiota can influence male reproductive function through endotoxins, hormones, metabolites, and immune mechanisms [7].

The impact of ulcerative colitis on the male reproductive system is not limited to experimental models alone. In a clinical study, Wdowiak and co-authors compared 50 men with ulcerative colitis and 50 healthy men. In the UC group, the total sperm count, the proportion of morphologically normal spermatozoa, viability, and progressive motility were lower. At the same time, the DNA fragmentation index and the oxidation-reduction potential were higher [4].

However, when evaluating clinical data, it is necessary to distinguish between the effect of the disease itself and that of its treatment methods. In the review by Shin and Okada, it was shown that fertility problems associated with inflammatory bowel disease in men may be influenced by active inflammation,





worsening nutrition, certain medications, lifestyle, and surgical factors [1]. The negative effect of sulfasalazine on male fertility has been noted in many sources, and this effect may be reversible [1, 2].

At the same time, it is not correct to assess all anti-inflammatory medications as equally harmful to the reproductive system. In the 2023 systematic review and meta-analysis by Gubatan and co-authors, no reliable association was found regarding a decrease in sperm count, motility, or morphology in men taking biological agents, thiopurines, or methotrexate compared with an uncontrolled group [5].

There is great interest in experimental correction methods. Farombi and co-authors studied the effect of 6-gingerol in a DSS-induced chronic ulcerative colitis model. The administration of 6-gingerol reduced the decrease in testosterone, luteinizing hormone, and follicle-stimulating hormone, as well as the increase in oxidative stress and proinflammatory cytokines; improvements in sperm parameters and testicular histomorphology were also observed [3].

Conclusion

Elucidating the damage to the male reproductive system associated with ulcerative colitis and developing new correction strategies may represent an important direction.

In correction studies, antioxidant and anti-inflammatory agents such as 6-gingerol, cyanidin-3-O-glucoside, naringin, and ozone reduced certain pathological changes in the reproductive system.

At the same time, the morphological and morphometric changes of the epididymis specifically, the remodeling of its epithelial, stromal, and vascular components, and the potential for recovery against the background of correction have not been sufficiently studied. Investigating these issues using complex morphological, morphometric, and immunohistochemical methods could provide a deeper understanding of the mechanisms by which ulcerative colitis affects the male reproductive system.



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