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The effect of Polystyrene Microplastics on Histomorphometric Parameters of Testis in Male Mature Mice

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Abstract

Microplastics as a new persistent environmental pollutant, can cross nutritional barriers and accumulate in different body tissues. However, the histological and histomorphometric effects of polystyrene microplastics on testicular tissue and their mechanisms are unclear. The present study was conducted to evaluate the effects of polystyrene microplastics on the histomorphometric parameters of testicular tissue in mice. In this study, 36 adult male NMRI mice were divided into four groups of 9 each. Three groups of mice received microplastics based on polystyrene with doses of 0.01, 0.1 and 1 mg/kg of body weight through gavage for 42 days. The control group also received 1 ml of distilled water by gavage. Testicular tissue samples were collected from mice 24 hours after the last treatment and used for histomorphometric studies. The present study showed that PS-MPs caused a significant decrease in the parameters of germinal epithelium height, diameter of spermatogenic tubules, number of Sertoli cells, number of Leydig cells, number of spermatocytes, tubular differentiation index, spermiogenesis index, repopulation index, meiosis index, and Johnson's index compared to the control group, Also, PS-MPs caused a significant increase in the parameters of testicular capsule thickness, numbers of mononuclear immune cells, and interstitial tissue thickness compared to the control group. The findings of the present study showed that the administration of PS-MPs causes extensive changes in the size and tissue structure of testicles in mice, which affects the reproductive system and ultimately causes negative effects on fertility in mice.

Key words: Microplastic, Polystyrene, Histomorphometry, Spermatogenesis, Mice

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