Chronic Ingestion of PET Microplastics from Marine Pollution: Impacts on Male Reproductive Health and Hormonal Balance

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Abstract

Plastic pollution in oceans, particularly from discarded bottles, has led to a rise in microplastics (MPs) that pose environmental and health risks. Polyethylene terephthalate microplastics (PET-MPs) are particularly concerning as they persist in marine environments and enter the food chain, posing potential health hazards. This study explores how chronic ingestion of PET-MPs affects male reproductive health.

We exposed 5-week-old male mice to PET-MPs for 29 weeks at levels equivalent to human annual intake (5 mg/week). The results showed significant damage to the seminiferous tubules and reduced epididymal duct size, both essential for sperm development. RNA transcriptome analysis revealed disruptions in pathways related to gonadotropin-releasing hormone (GnRH) secretion, testosterone production, and the Meiosin gene, which are crucial for spermatogenesis.

The study concludes that long-term exposure to PET-MPs from marine pollution can harm male reproductive health, reduce sperm production, and cause hormonal imbalances. These findings highlight the need to address marine plastic pollution to protect human reproductive health and future generations.

Keywords: Marine Pollution, PET Microplastics, Male Reproductive Health, Spermatogenesis, Hormonal Disruption, Environmental Health.

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