

1 **Adverse Effects of Reproductive Toxicity and Metabolism in Mice by**
2 **Polystyrene Microplastics**

3 許瑜真(5123)

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5 **Outline**

- 6 1. Introduction
7 2. Reproductive toxicity of polystyrene microplastics: In vivo experimental study on
8 testicular toxicity in mice
9 3. Adverse effects of pristine and aged polystyrene microplastics in mice and their
10 Nrf2-mediated defense mechanisms with tissue specificity
11 4. Conclusion

12 **Abstract**

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14 Microplastics (MPs) are plastic particles with a size of less than 5 mm and are
15 derived from any kind of plastic. Humans may be exposed to MPs by ingesting
16 contaminated food and water, and MPs may infiltrate and accumulate in human tissues,
17 posing a health risk. However, research on the toxic effects of MPs on the reproductive
18 system on mammals is relatively limited as well as health hazards associated with pristine
19 and ultraviolet-aged MPs remain largely unknown. Therefore, this study evaluated the
20 reproductive toxicity and changes in toxicity of pristine and aged MPs to different organs
21 in mice. Both MPs and aged MPs caused structural damage to the mouse gut, liver, spleen,
22 and testis. MPs may cause damage to mouse sperm production through testicular injury,
23 which in turn leads to a decrease in sperm quality. Increases in serum alanine
24 aminotransferase and immunoglobulin A levels in 1 mg/day aged MPs group
25 demonstrated that aged MPs exposure could induce greater liver and spleen functional
26 damage than PS. Nuclear factor erythroid 2-related factor 2 (Nrf2) and heme oxygenase-
27 1 (HO-1) levels in the MPs and aged MPs groups showed significant increases in the
28 liver and testis, and a significant decrease in the spleen, which were analyzed to get a
29 first survey for Nrf2/HO-1-mediated tissue-specific defense mechanisms. In conclusion,
30 exposure to MP and aged MPs induced potential metabolic disorders, and aged MPs
31 could produce more serious immune damage and reproductive toxicity.

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Reference

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- Cui, H., Yang, W., Cui, Y., Qi, L., Jiang, X., & Li, M. (2023). Adverse effects of pristine and aged polystyrene microplastics in mice and their Nrf2-mediated defense mechanisms with tissue specificity. *Environmental Science and Pollution Research*. <https://doi.org/10.1007/s11356-022-24918-1>
- Hou, B., Wang, F., Liu, T., & Wang, Z. (2021). Reproductive toxicity of polystyrene microplastics: In vivo experimental study on testicular toxicity in mice. *Journal of Hazardous Materials*, 405. <https://doi.org/10.1016/j.jhazmat.2020.124028>