

Effects of Continuous Ingestion of Microplastics on Salt Preference and Disposition

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Summary

In recent years, it has become clear that continuous ingestion of microplastics (MP) increases oxidative stress and induces inflammation and abnormal lipid metabolism. We have fed rats a diet containing MP with different particle diameters and found that more MP remained in the digestive tract after ingestion of MP with a particle diameter of 50 μm compared to that with a particle diameter of 200 μm . This suggests that continuous ingestion of small MPs may increase salt preference due to conditions conducive to the induction of oxidative stress, but no reports on this hypothesis have been accepted. However, there are no reports on this hypothesis. Therefore, the purpose of this study was to determine whether the ingestion of MP increases salt preference, and furthermore, to determine whether the ingestion of salt affects the pharmacokinetics of MP.

1. Salt preference experiment

The animals were fed two bottles of purified water and two bottles of low-concentration saline solution (75 mM NaCl solution) in group L and two bottles of purified water and two bottles of high-concentration saline solution (300 mM NaCl solution) in group H, respectively, for 9 days. In both groups, the diet consisted of AIN-93M diet with polyethylene particles with a mean diameter of 50 μm added. As a result, the amount of water consumed by the L group was similar throughout the period, whereas the H group consumed more than twice as much purified water as saline water at all time points.

2. MP excretion in feces

The animals were fed purified water or highly concentrated saline solution (300 mM NaCl solution) as drinking water and MP-added food for 9 days. The MP excretion rate in feces was analyzed based on the number of MP ingested and the number of MP in feces. The results showed that the MP excretion rate increased more in the high-concentration saline diet than in the purified water diet from 0-72 hours and 0-120 hours after ingestion of the MP-added diet. Further studies are needed because of the small number of animals in this experiment and the fact that we have not yet analyzed the MP remaining in the digestive tract.