Hepatotoxic effects of perfluorooctanoic acid on female Swiss mice

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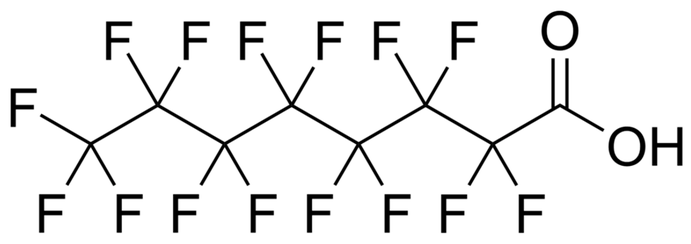
INTRODUCTION

Perfluorooctanoic acid



Perfluorooctanoic acid (PFOA) is a synthetic fluorinated compound found in non-stick and stain-resistant consumer products. As a persistent organic pollutant, PFOA resists degradation and accumulates in biological systems, raising concerns about its effects on human and ecological health.
The aim of our study was to investigate whether PFOA can induce liver damage by affecting relative liver weight and the activity of aspartate transaminase (AST), alanine transaminase (ALT) and alkaline phosphatase (ALP) in blood.

METHODS

In the 14-day study, twenty-four female Swiss mice were divided into 4 groups (n=6): one control group and three experimental groups exposed to 0.06, 1.15 and 22 mg PFOA/kg B.W./day through drinking water. At the end of the treatment period, trunk blood and liver samples were collected from each animal. Relative liver weight was calculated as the absolute liver weight divided by final body weight, multiplied by 100 for each animal. Activities of ALT, AST and ALP in plasma were determined by Dialab Autolyser.

CONCLUSION

Given that elevated liver enzyme levels are widely recognized as biomarkers for hepatotoxicity, and the significant increase in relative liver weight as an indicator of hepatomegaly, these findings underscore the significant liver damage induced by PFOA, following a 14-day exposure period.

RESULTS

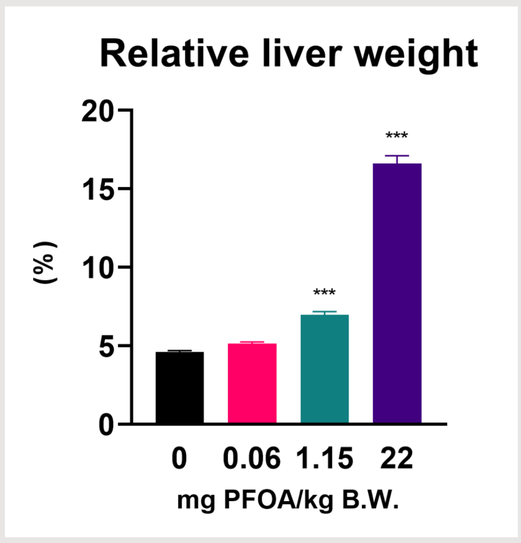


Figure 1. Relative liver weight of female *Swiss* mice following the 14-day PFOA treatment through drinking water. Animals were exposed to 0.06, 1,15 and 22 mg PFOA/kg. At the end of treatment period, liver of each animal was weighted and relative liver weight was calculated. One-way ANOVA with Dunnett's multiple comparison test was used to determine significance for each treatment relative to control.***p<0.001

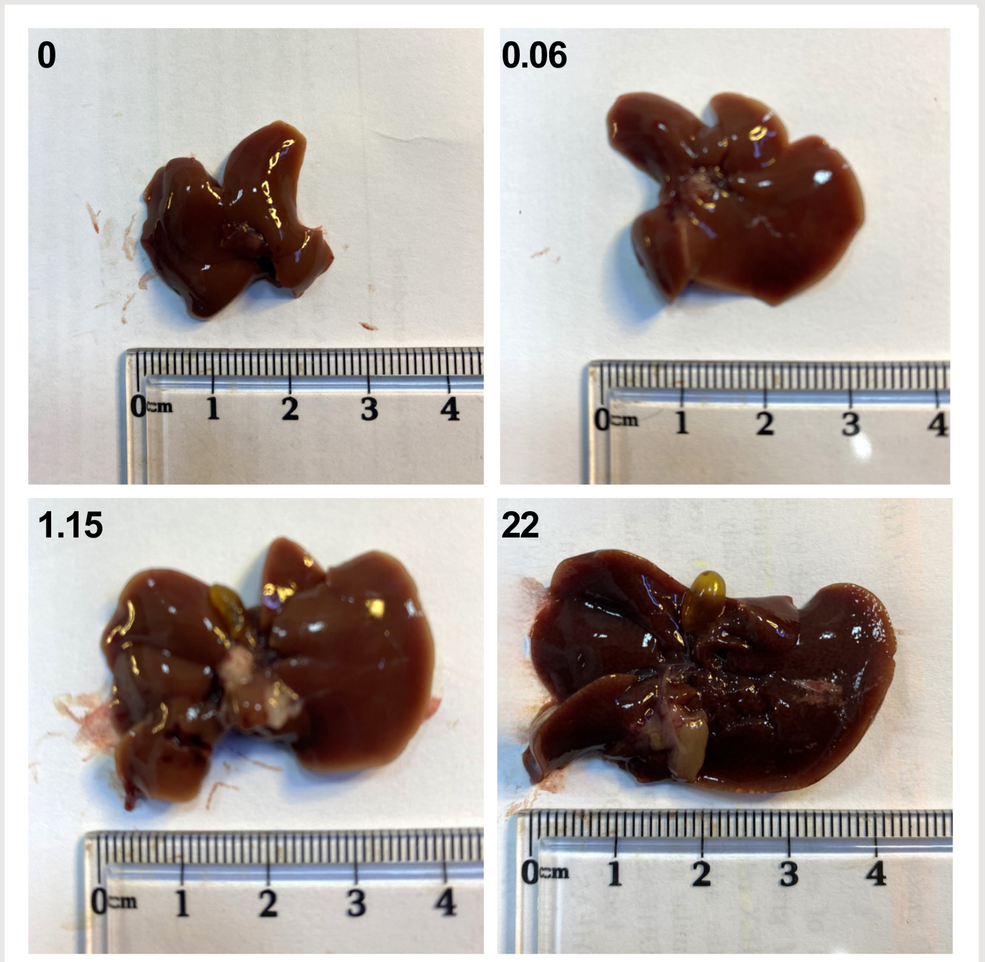


Figure 2. Liver morphology of female *Swiss* mice after 14 days of exposure to PFOA at 0, 0.06, 1.15, and 22 mg PFOA/kg BW/day through drinking water. Visual inspection reveals dose-dependent changes in liver appearance, with higher doses associated with more pronounced tissue irregularities and alterations in size. Each image includes a ruler for scale.

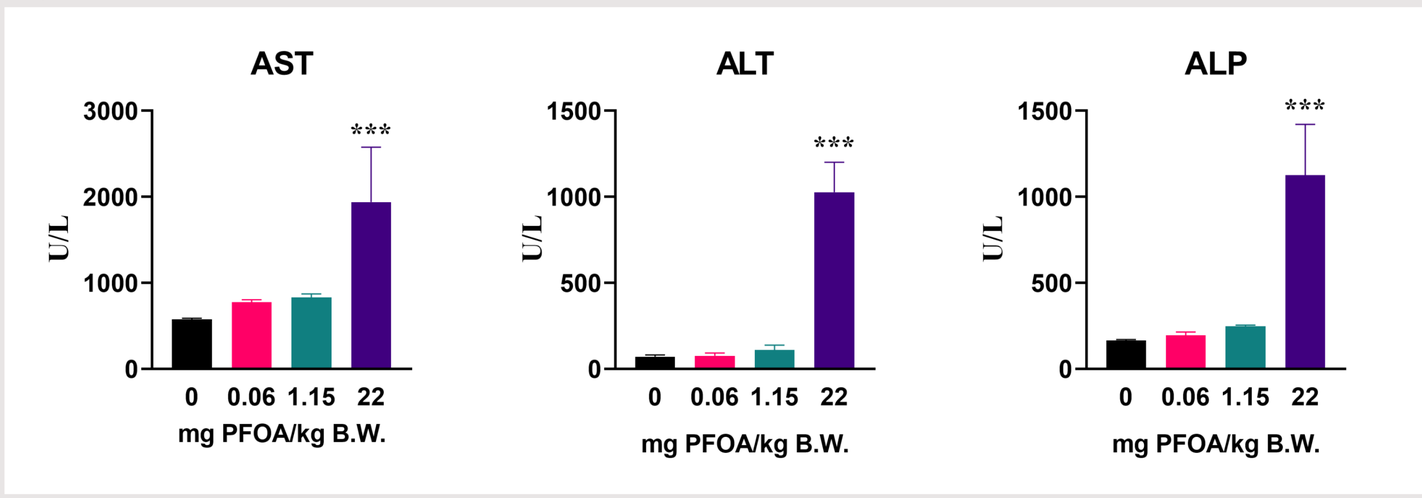


Figure 3. Serum levels of aspartate aminotransferase (AST), alanine aminotransferase (ALT), and alkaline phosphatase (ALP) in female Swiss mice treated with 0, 0.06, 1.15, or 22 mg PFOA/kg BW/day for 14 days. Results are presented as mean ± SEM, with significant increases observed at the highest dose (22 mg/kg BW) across all markers, indicating potential hepatocellular injury. ***p < 0.001 compared to control.

Aknowledgements
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