



# Effect of Panax Ginseng on the Liver Tissue of Arsenic-Exposed Syrian Mice

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## ABSTRACT

**Introduction:** Arsenic toxicity is a global health problem that affects a large number of people. Pollution occurs when arsenic seeps into underground water sources and contaminates drinking water. Arsenic is a carcinogen that induces the overproduction of reactive oxygen species (ROS). Panax ginseng (PG), with its anti-inflammatory and antioxidant effects, can improve immune system function by regulating the performance of immune-related organs and cells. The mechanisms of Panax ginseng and its ginsenosides in reducing immune toxicity through antioxidant, anti-inflammatory, and regulatory effects on fatty acids are interconnected. **Methods and Materials:** 28 Syrian mice (20 to 40 grams) aged (8 weeks) were randomly divided into four groups (n=7). The Sham group received an intraperitoneal injection of normal saline; the Arsenic group received an intraperitoneal injection of arsenic (5mg/kg); low-dose treatment group received intraperitoneal injection of arsenic (5mg/kg) + Panax ginseng extract (200mg/kg) orally, High-dose treatment group received intraperitoneal injection of arsenic (5mg/kg) + Panax ginseng extract (400mg/kg) orally for 35 days. The liver tissue was isolated and placed in a 10% formalin solution. The tissue samples were processed, sectioned at a thickness of 5 microns, stained with H&E, and examined under a microscope for histopathological diagnosis. **Results:** The tissue showed standard structure in the control group, and no histopathological changes were observed.

The structure of liver cells and sinusoids was standard, and the cell cytoplasm did not show a vesicular appearance. In the arsenic-exposed group, the cellular structure is disrupted, and the boundaries of liver cells and sinusoidal spaces in some areas are unclear, indicating cellular swelling. The cells showed a hyaline appearance and vesiculated and vacuolated cytoplasm. Additionally, vascular dilation in the portal space and central vein is apparent. In the low-dose treatment group, there is a slight improvement in cellular structure, and vascular dilation decreased compared with the arsenic group. However, the sinusoidal space remains unclear, indicating cellular swelling. Vacuolation showed a significant decrease in this group. In the high-dose treatment group, the tissue appearance is almost similar to the low-dose treatment group. Histopathological changes were decreased, and the cellular swelling and vacuolar appearance in the cytoplasm are still observable. **Conclusion and discussion:** Arsenic causes cellular and tissue damage in the liver. Panax ginseng can significantly retrieve this damage with its anti-inflammatory and antioxidant properties, reducing histopathological changes.

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