

## MORPHOLOGY OF THE SPLEEN IN ADULT ALBINO RATS AFTER WHOLE-BODY EXPOSURE TO LOW-LEVEL OF TOLUENE

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### ABSTRACT

**Background:** Spleen is a secondary lymphoid organ that is highly sensitive to different chemicals. Toluene is an aromatic hydrocarbon commonly used as an industrial solvent and can be considered as a potential immunotoxin.

**Aims and Objects:** We aimed to investigate the organometry and histology of spleen from rats exposed to toluene.

**Materials and Methods:** The toxicity of toluene was evaluated in male albino rats (6/group) via whole-body exposure. The animals were exposed to target concentrations of 0 (air control) and 133 parts per million (ppm) of toluene in air for 5 hours/day, 5 days/week, for 2 month. The animals were weighted and decapitated at different time points (one, seven, sixteen, thirty one and sixty one day) post-exposure. The weight, length, width and thickness of the spleen were measured. It was studied absolute and relative weight of the spleen. Histological examination of the spleen was made by light microscope.

**Results:** Statistically significant difference between the mean of body weight from the control and experimental animals was observed seven days after last exposure to toluene. Thus, the body weight of animals exposed to toluene was 254.17 g, that was 7.18% ( $p = 0.048$ ) below control data. The histological findings showed increased area of the white pulp of spleen from rats exposed to toluene had increases compared to that from the control. The numbers of siderophages were higher in the spleen from rats exposed to toluene. The relative area of germinal centre in the structure of the splenic lymph follicles of rats exposed to toluene increased. We found that in the first and second experimental groups of animals the indication was at the level 10.86% and 10.26% respectively. These are 24.11% ( $p = 0.002$ ) and 26.04% ( $p < 0.001$ ) above control data, respectively. Inhalation exposures to toluene vapor at 133 ppm produces hyperplasia of lymphoid tissue of the rat spleen.

**Conclusion:** Our data demonstrated that whole-body exposures to low-level of toluene led to hypertrophy of white pulp of the spleen.

**KEYWORDS:** Toluene; Toxicity; Rats; Spleen; Histology.

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### INTRODUCTION

Immunotoxicology deals with the study of the potential effects of xenobiotics on the immune system. An immunotoxic compound is defined as a compound that can alter one or more immune functions resulting in an adverse effect.

The immune system is a very complex and regulated system [1] that involves the cooperation and interaction of a number of

different cell types, cell products, tissues, and organs. The immune system consists of fixed primary (i.e., thymus and bone marrow) and secondary (i.e., spleen, lymph nodes, and gut-associated) lymphoid tissue, and various circulating immunocompetent cells. This unique organization may contribute to the immune system's vulnerability as a target organ for xenobiotics. For example, cells of the