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IMMUNOTOXIC EFFECTS OF CARBON TETRACHLORIDE – THE EFFECT ON MORPHOLOGY AND FUNCTION OF THE IMMUNE SYSTEM IN MICE

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SUMMARY

Carbon tetrachloride (CCL_4), a polychlorinated hydrocarbon, is known for its hepatotoxicity, neurotoxicity and skin irritancy. Some epidemiological studies suggest possible carcinogenicity of CCl_4. This substance is still present in industrial wastes and in the environment. As the major role of the immune system is immunosurveillance against cancer, we decided to follow the morphological and functional changes of the immune system during acute and subchronic exposures to CCL_4 in mice. Mice (A/PhJ) were exposed i. p. to 1.7 mmol CCl_4/kg b. w. /day administered in olive oil (total volume 0.2 ml) for 2, 7, 14, 23 days. We evaluated: morphology of thymus, spleen and peripheral lymph nodes, immunopathology (thymus and spleen weight, spleen cellularity, number of peripheral blood leukocytes), non-specific immunity (phagocytosis, NK activity), humoral immunity (number of PFC after SRBC immunization, LPS mitogen response), cell-mediated immunity (PHA, ConA mitogen response). Morphological examination showed significant activation of lymphoid tissues in T-cell dependent areas. B-cell areas were also activated, but the formation of active germinal centers in lymphatic follicles has not been observed. The natural immunity was affected in a time-dependent manner. A slightly hepatotoxic dose of CCl_4 had a singnificant stimulative effect on phagocytosis and natural killer activity when administered in short-term schedule ("acute" exposure). Subchronic administration of the same dose led to suppression of phagocytosis and NK activity. Simllarly, the lymphocyte response to non-specific mitogens was enhanced during short-term exposure and significantly impaired when CCl_4 was administered in long-term schedule. Antigen specific immune response to SRBC was impaired immediately after short-term exposure to CCl_4 which suggests that the substance might affect the immunoglobuline proteosynthesis at the cellular level.

Key words: carbon tetrachloride, immunotoxicity

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