PROCEEDINGS OF THE
British Pharmacological Society

1st–2nd April, 1976

CHELSEA COLLEGE

COMMUNICATIONS

The toxicology of the tetrachloroethanes

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1,1,2,2-Tetrachloroethane (sym-TC1E) is a solvent with wide industrial application whereas the unsymmetrical isomer, 1,1,2-tetrachloroethane (unsym-TC1E) is only occasionally used in the laboratory. The latter isomer has been shown to cause a prolongation of hexobarbitone-induced sleeping time in rats and appears to be a protein synthesis inhibitor (El Tayeb, 1974). The hepatotoxicity of the tetrachloroethanes was studied at the subcellular level by measurement of succinate dehydrogenase, acid phosphatase and glucose-6-phosphatase activity and DNA content. These enzymes and DNA were used as indices of the functions of the mitochondria, lysosomes, endoplasmic reticulum and nucleus respectively. Concomitant haematological studies were also carried out and changes in white and red cell counts and lipid concentrations were noted.

Symmetrical- and unsym-TC1E in a dose range of 100 to 800 μmol/kg body weight were administered by intraperitoneal injection daily for 7 days to male rats. With these dose regimens no toxic symptoms were observed *in vivo*, however, there was a significant ($P \leqslant 0.05$) increase in the activities of all enzymes studied which was accompanied by a decrease in DNA content. At the same time there was an increase in the white cell count and decreases in the red cell count and cholesterol content. All changes observed both in the liver and blood were dose and isomer dependent but showed no predictable pattern. These results are discussed in relation to proposed mechanisms for the toxicity of aliphatic organohalogen compounds.

Reference

EL TAYEB, I.B. (1974). Ph.D. thesis, University of London.