

Effect of Acetic, Monochloroacetic, Dichloroacetic, and Trichloroacetic Acids on Oxygen Consumption of Mouse Liver.

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From acute oral toxicity data in mice, rats and guinea pigs¹ it has been shown that monochloroacetic acid is from 25 to 40 times as toxic as acetic acid and its di- and trichloro derivatives. It has not been determined from these studies what causes death nor have chronic feeding experiments indicated any clearly defined functional or organic derangements. While the effect of monoiodoacetic acid on the glycolytic and oxidative functions of tissues has been amply demonstrated, such information on monochloroacetic acid is at best somewhat meager. It has been recorded that monochloroacetic acid has cholagogic action² and Lundsgaard³ states that in comparison to monoiodoacetic acid, monochloroacetic acid inhibits yeast fermentation only feebly. The present experiments were

undertaken to determine what effect, if any, mono-, di- and trichloroacetic acid would have on the respiration of liver tissue.

Method. Liver slices from well fed young adult mice were used. Oxygen consumption was measured by the standard Warburg procedure at 37.5°C. Acetic, mono-, di-, and trichloroacetic acids were neutralized and diluted in phosphate buffered glucose-Ringer, so that the final concentration in contact with the liver slice ranged from 0.03M to 0.00005M. The pH of all solutions was adjusted to 7.4.

Results. Fig. 1 shows in graphic form the typical effects of mono-, di-, and trichloroacetic acids at 0.0005M concentration on the respiration of mouse liver slices. Respiration is promptly and precipitously reduced by

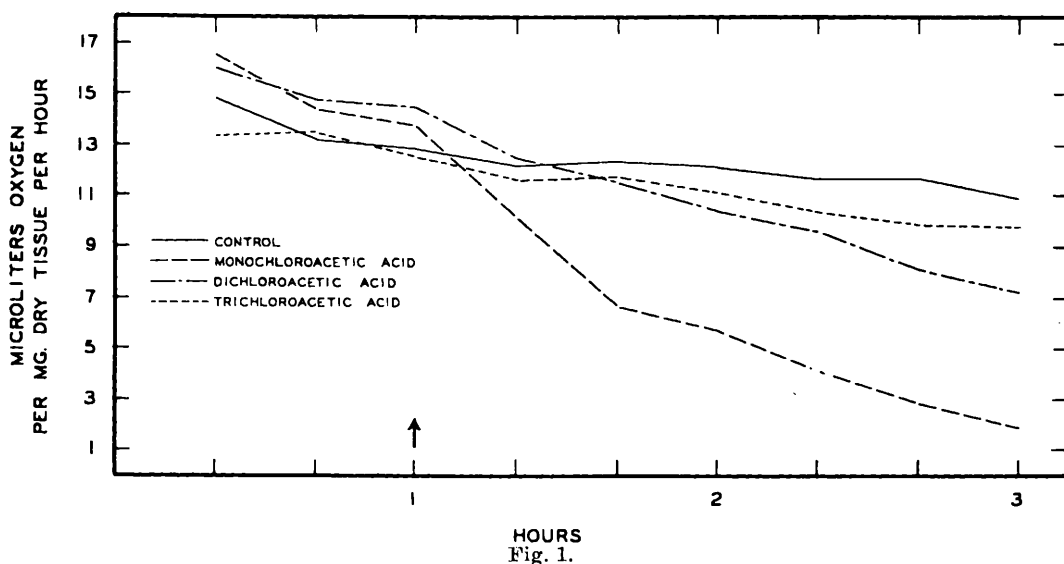


Fig. 1.
Effect of 0.005M mono-, di-, and trichloroacetic acids on oxygen consumption of mouse liver slices. Temp. 37.5° C, pH 7.4.

¹ Woodard, G., Lange, S. W., Nelson, K. W., and Calvery, H. O., *J. Indust. Hyg. and Tox.*, 1941, **23**, 78.

² Chabrol, E., Charonnat, R., Maximin, M., and Waitz, R., *Compt. rend. Soc. Biol.*, 1931, **106**, 17.

³ Lundsgaard, E., *Biochem. Z.*, 1932, **250**, 61.

monochloroacetic acid, and within 2 hours almost completely abolished. The effect of di- and trichloroacetic acids, while clearly defined, is much weaker and more delayed. It is important to note that here, as at all other concentrations studied, the order of decreasing effect on respiration is: monochloroacetic acid > dichloroacetic acid > trichloroacetic acid. Acetic acid in the range of 0.01M to 0.001M showed no effect.

Within the range of 0.001M to 0.03M, the depression of respiration by mono- and dichloroacetic acids is maximal; there is no indication of a progressively increasing effect with increasing concentration. Within the

range of 0.001M to 0.00005M there is a gradually decreasing effect, which ceases below 0.00005M for both acids. This is a concentration of the order of 5 to 10 μ g per milliliter of Ringer solution. At a concentration below 0.005M no effect of trichloroacetic acid has been noted, and at 0.01M evidences of tissue coagulation have been seen.

Summary. At the concentrations studied monochloroacetic acid produces a marked depression in the respiration of mouse liver slices. The order of decreasing effect of the 3 acids is: monochloroacetic > dichloroacetic > trichloroacetic. Acetic acid has no effect.

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Electrophoretic Analysis of Kala-azar Human Serum. Hypergammaglobulinemia Associated with Seronegative Reactions for Syphilis.*

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It is generally recognized that nonspecific positive reactions in tests for syphilis may occur with human sera from normal individuals^{1,2} and from individuals affected with certain diseases³⁻⁵ and conditions not associated with syphilis. The belief has arisen among serologists that nonspecific positive reactions are associated with hyperglobulinemia, and the presence of a high serum pro-

tein or globulin content has been suggested⁶ as a criterion of the nonspecificity of a positive reaction.

The disease, kala-azar, is characterized in part by hyperglobulinemia⁷ associated with the presence in high concentration of abnormal euglobulin, which gives rise to the formol-gel⁸ reaction and a cold-precipitable pathological globulin.⁹ In this disease, also, there has been reported¹⁰ the occurrence of nonspecific positive reaction in tests for syphilis. Recently, in connection with a comparative study

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