A lower level of cholesterol in the liver tissue of regularly swimming rats as reported here, confirms earlier findings. Lowering of liver cholesterol was noted in exercising rats fed a natural diet, as well as in animals fed a high cholesterol, high saturated fat diet[3]. The effect of exercise on lowering liver cholesterol in animals fed a high cholesterol diet which inhibits cholesterologenesis, is further evidence that exercise does not accomplish the lowering of liver cholesterol by inhibiting cholesterol biosynthesis.

The higher acetate incorporation into cholesterol, reported in this article in exercising rats, may be explained by the existence of an inverse relationship between the amount of cholesterol present in the liver and the synthesis of cholesterol from acetate. Higher acetate incorporation into liver cholesterol and its lower incorporation into liver FA were observed in animals fed diets rich in polyunsaturated FA[12,13]. We suggest that the increased incorporation of acetate into liver cholesterol in exercising rats is secondary to the lowering of liver cholesterol which may be affected by unsaturated FA released from depot fat during exercise[14].

Zusammenfassung. Inkorporation von Azetat-1-C^{14} in Lebercholesterol erweist sich bei regelmässig schwimmenden Ratten im Vergleich mit nichttrainierten Tieren als höher. Erstere hatten niedrigere Lebercholesterolwerte. Die höhere Inkorporation von Azetat ins Lebercholesterol wird mit der indirekten Beziehung zwischen Lebercholesterol und der Synthese von Cholesterol in der Leber erklärt.

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Graduate School of Nutrition, Cornell University, Ithaca (New York 14850, USA), 29 December 1969.

[12] J. DUPONT, Lipids *1*, 409 (1966).
[13] R. REISER, M. C. WILLIAMS, M. F. SORRELS and N. L. MURTY, Arch. Biochem. Biophys. *102*, 276 (1963).
[14] This study was undertaken as a part of a research project at the Research Institute of Human Nutrition, Bratislava (Czechoslovakia).

Renal Regeneration in Chloroform-Poisoned Male Mice of Strain C3H/He Treated with di-Sodium Versenate

Chloroform induces necrosis of proximal convoluted tubules in male mice of the strains C3H/He, C57BL/6JN, BN, as well as in those of generation F1 from the crossing ♀♀ C3H/He × ♂♂ C57BL/6JN[1,2]. In males of the strain C3H/He necrosis is followed by tubular calcification and death of animal within 4–8 days after poisoning[2]. In contrast to the males of all other strains mentioned above, those of the strain C3H/He fail to show any signs of tubular regeneration[2]. Assuming that tubular calcification could interfere with the regeneration we wanted to check the effect of a drug used for the elimination of calcium from the body. According to our knowledge trisodium versenate or tetra-sodium versenate are used for clinical purposes[3,4]. Since only di-sodium versenate used as decalcifier in histological laboratory was available for us we decided to use it in our experiment.

Material and methods. 15 male mice of the strain C3H/He, aged 2–3 months and weighing 18–20 g, were pretreated with a single dose of di-sodium versenate $-CH_2 \cdot N\ (CH_2COOH) \cdot CH_2COONa_2 \cdot 2H_2O$ –/2 mg dissolved in 0.2 cm^3 of physiological saline i.p. some min prior to the s.c. administration of a single dose of chloroform (0.1 cm^3 of the solution: 0.05 g of chloroform in 1 ml of ethyl laurate). The animals were killed successively after 24 h/2 mice, 48 h/2 mice (1 mouse died

[1] S. KRUŚ and Z. ZALESKA-RUTCZYŃSKA, Experientia *26*, 101 (1970).
[2] S. KRUŚ and Z. ZALESKA-RUTCZYŃSKA, Polskie Archwm Med. wewn., in print (in Polish).
[3] T. GIZA, Pol. med. J. *8*, 400 (1969).
[4] J. SUPNIEWSKI, Farmakologia, Warsaw (1966).

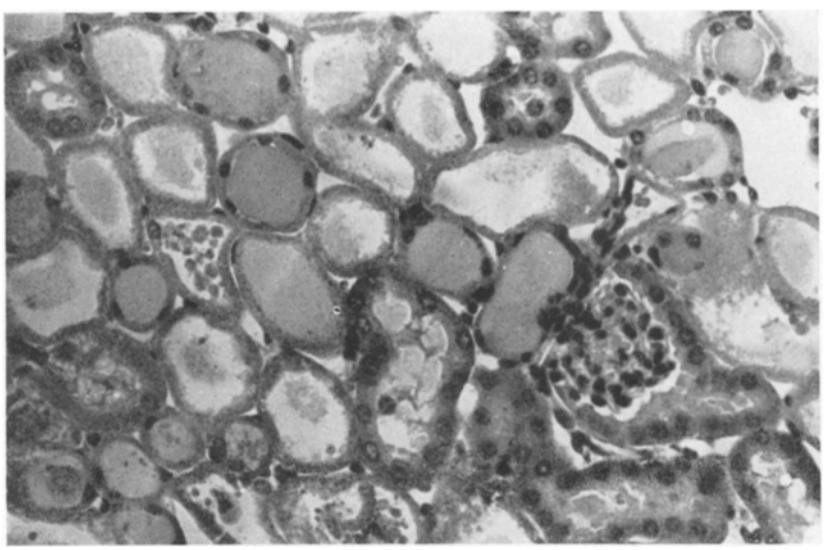

Fig. 1. Di-sodium versenate-treated male mouse of the strain C3H/He 24 h after chloroform poisoning. Tubular necrosis. H.E., × 400.

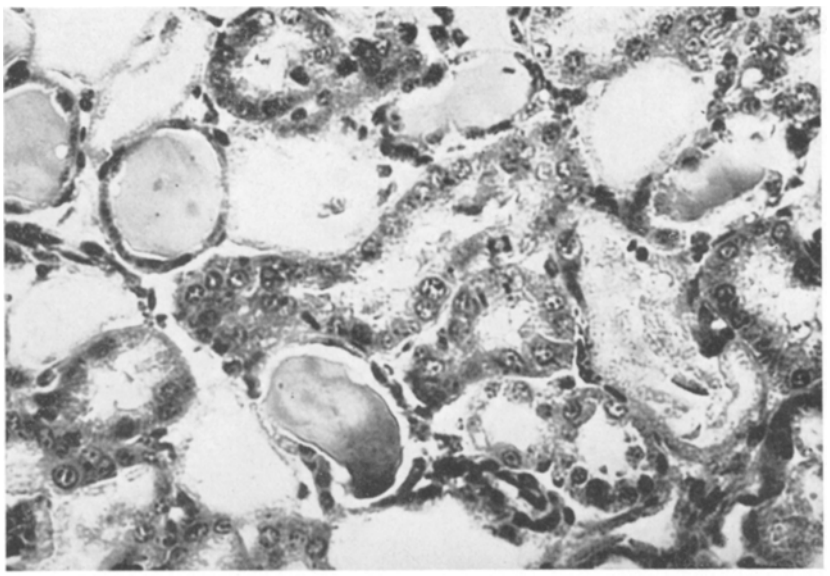

Fig. 2. Di-sodium versenate-treated male mouse of the strain C3H/He 48 h after chloroform poisoning. Tubular necrosis followed by early regeneration. No calcification. H.E., ×400.

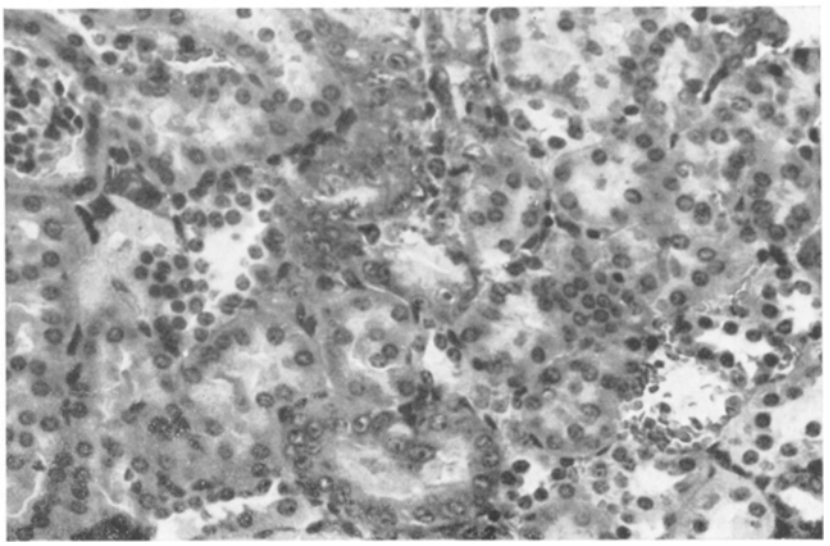

Fig. 3. Di-sodium versenate-treated male mouse of the strain C3H/He 6 days after chloroform poisoning. Far advanced regeneration. H.E., ×400.

spontaneously); 4 days/2 mice; 6 days/2 mice; 8 days/1 mouse; 10 days/1 mouse; 22 days/4 mice). The kidneys were fixed in formalin (1:9), the paraffin sections were stained with hematoxylin and eosin, and after van Kossa.

Results. In contrast to the C3H/He male mice not pretreated with versenate[2], in this experiment all animals but one survived and were killed. In animals destroyed after 24 and 48 h renal tubular necrosis was found (Figure 1). As a rule, the necrotic tubules did not calcify. Starting from the 2nd day, and up, there were present obvious features of the regeneration of tubular epithelium (Figures 2 and 3). The kidneys of 4 mice sacrificed after 22 days were normal.

In 1 mouse which spontaneously died on the 2nd day of experiment, the necrotic tubules were calcified. The same, but to a much lesser degree, was true of another mouse killed on the 2nd day. It is possible that these mice accidentally received smaller dose of versenate.

Discussion. Prevention of calcification of necrotic renal tubules by di-sodium versenate resulted in the regeneration of tubular epithelium. In this respect the versenate-treated male mice of the strain C3H/He became similar to males of the strains C57BL/6JN, BN and of the generation F1 (C3H/He × C57BL/6JN) in which chloroform-induced renal tubular necrosis is not followed by calcification[1]. In the light of this experiment the calcification of necrotic renal tubules seems to impede their regeneration.

Résumé. L'intoxication au chloroforme des souris mâles de la souche C3H/He entraîne la mort due à la nécrose et à la calcification tubulaire rénale. Le traitment par le versenate de sodium prévient la calcification ce qui rend possible la régénération des tubes contournés renaux.

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19 January 1970.