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Effect of Diverting the Portal Circulation Upon Toxicity of Proteose Fractions.

J. T. McCLINTOCK AND H. M. HINES.

From the Department of Physiology, State University of Iowa.

Certain similarities in the pathological changes in the intestine caused by acute ligation of the portal vein to those produced by a lethal dose of toxic proteose fractions suggested to us the following experiments. Toxic material was extracted from the mucosa and content of closed intestinal loops. Its toxicity was tested by giving an intravenous injection of aliquot portions of the material to 4 normal control dogs. All 4 controls developed the characteristic symptoms of vomiting, bloody diarrhea, prostration and coma. Death took place within 10 hours after the injection. At post mortem the mucosa of the small intestine was found to have the typical hemorrhagic condition. Aliquot portions of the same material were injected into 4 dogs in which the portal circulation had been diverted from the liver through collateral veins directly into the systemic circulation by a 2-stage ligation of the main trunk of portal vein.¹ Three of the dogs with portal ligation survived the lethal dose without showing the symptoms of toxemia usually seen after such injections. One of the survivors was sacrificed 48 hours later and the mucosa of the small intestine appeared entirely normal. Three months later one of those which had survived was given a second lethal dose of material of proven toxicity and it again failed to show the usual symptoms. The fourth dog with a diverted portal circulation showed the usual symptoms and died within 15 hours after receiving the toxic material. The characteristic hemorrhagic mucosa was found at post mortem but because of adhesions it was impos-

¹ This modification of the Eek fistula was demonstrated by L. R. Dragstedt at 1930 meeting of Federated Biological Societies.

sible to make certain of a complete diversion of the portal circulation.

The fact that 3 dogs out of 4 with their portal circulation diverted from the liver survived injections of a lethal dose of a toxic proteose fraction is strongly indicative of a more or less complete acute hepatic portal occlusion as the probable cause of the bloody diarrhea and hemorrhagic mucosa which results from such injections. It is believed that this intestinal condition is a major factor in causing the death of such animals.

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Carotene from Lettuce and Its Relation to Vitamin A.

H. S. OLCOVICH AND H. A. MATTILL.

From the Biochemical Laboratory, State University of Iowa.

Carotene was obtained from a methyl alcohol solution of the unsaponifiable fraction of the lipids of lettuce. After recrystallization from petroleum ether, the melting point was 179.5-180°. 200 mg. were obtained from approximately 150 kilos of fresh lettuce.

The crystal form differs depending on the solvent from which it is crystallized: from petroleum ether, rhombohedrons; chloroform and methyl alcohol, needles; carbon disulfide and absolute alcohol, clusters of needles; petroleum ether and methyl alcohol, square plates; acetone, triangular plates. The different crystal habits are all members of the hexagonal system.

On long standing at room temperature, or on heating for 24 hours at 105°, the crystals bleach, without losing their form. This fading is from the outer edge inward, showing a sharp line of demarcation between the unchanged carotene and the bleached or "achroo-carotene". There is no change in weight, and the bleaching is accomplished as easily in nitrogen as in oxygen. Formerly hexagonal, the crystals are now isometric, denoting a radical change in the molecular structure. Achroo-carotene has no physiological activity.

Carotene is efficacious in curing the xerophthalmia, and allowing a resumption of growth, in vitamin A deficient rats. 0.005 mg. per day seems to be the practical minimum dose, although several individual rats have been able to grow on less. The effect of giving carotene continues for some time after the dosage has been stopped, and there seems to be a quantitative relationship between the amount