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Chemical and Pathological Changes in Livers of Copper-Fed Animals.

WILLIAM C. VON GLAHN AND FREDERICK B. FLINN.

From the College of Physicians and Surgeons, Columbia University.

A study of the chemical and pathological effects of copper on the liver was made on a series of guinea pigs, albino rats and rabbits. Different groups of matured Belgian hares, kept on a standard diet of hay and oats, with cabbage and carrots on alternate days were fed daily doses of various copper salts.

In each of the rabbits, yellow or yellowish brown refractile pigment was found in the liver cells. In some, pigment was also present in phagocytes in the portal areas and occasionally in connective tissue cells in the same region. In a few animals, some of the endothelial cells of the sinusoids contained pigment. Iron was not found in the pigment, which stained with fuchsin, but not with Sudan III, Scharlach R. nor osmic acid. Nile blue sulphate colored the pigment greenish blue to deep blue. The amount of connective tissue in the portal areas varied in different portions of the same sections and in different animals. It was nowhere sufficiently increased to justify a diagnosis of cirrhosis. The amount of copper in the livers showed considerable variation even within the same group, though in general the livers of those animals receiving metallic copper had the largest amounts.

Livers of rabbits dosed with sodium acetate contained pigment which had the same staining reaction as the copper fed animals. The livers of normal rabbits contained pigment and identical variation in the quantity of connective tissue in the portal areas as were observed in copper fed rabbits.

Rabbits fed carrots alone showed a marked increase in the quantity of pigment present over that present in the piece of liver removed before the animals were kept exclusively on a carrot diet. Rabbits on a carrot diet did not show an increase in the pigment when fed copper over that observed in rabbits which were kept on carrots for only 14 days. Turnip fed rabbits also showed a small amount of pigment.

The results on guinea pigs and albino rats were entirely negative. *Conclusions:* From the above experiments it has been concluded that copper does not cause pigmentation nor cirrhosis of the livers of rabbits, rats, or guinea pigs; and that the pigment found in the liver of rabbits is probably of exogenous origin.