The animal makes an excellent recovery, and walks normally. We have evidence that the venous return from the posterior half of the body is not impaired. The subsequent fate of the animal is the same as that following hepatectomy by Mann's three-stage operation.[2]

This is a preliminary report.

[1] Mann, F. C., *Ergebnisse der Physiol.*, 1925, xxiv, 379.

[2] Mann, F. C., *Am. J. Med. Sci.*, 1921, clxi, 37.

3670

Concerning the Origin of Glycuronic Acid.

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Recently considerable work has been done in order to determine the probable source of glycuronic acid in the animal body. Some authors[1] contend that glycuronic acid is an intermediary product of glucose catabolism while others[2] believe that it is an unusual product of glucose metabolism produced only under the strain required for the detoxication of some aromatic or aliphatic substance. Other experimenters[3] think that it is derived from the catabolism of exogenous or endogenous protein material, since 58.5% of protein material is convertible into glucose.

Quick[4] found that fasting dogs, fed on benzoic acid, excrete large amounts of the glycuronic acid conjugate, and that depancreatized dogs form glycuronic acid with a decrease in urinary sugar. The excretion of benzoyl glycuronic acid is accompanied by increased endogenous catabolism. These facts indicate that glycuronic acid is made more readily from glycogenetic amino acids than from glucose itself.

Using rabbits, the effect of various amino acids on glycuronic acid formation was tried. The rabbits were fed a week on carrots and a little lettuce. Then total nitrogens (Kjeldahl) and glycuronic acids (Quick's method) were determined. The experiment was divided into three parts. During the first period, menthol was fed while giving a diet of lettuce and carrots. Then food was taken away and menthol only was given, and in the last period menthol and an amino acid were fed. Two grams of menthol as a warm water suspension was administered daily through a stomach tube. The amino acids* in the third period were fed in 1 or 2 gm. doses

on alternate days in conjunction with the menthol suspension. The urine was collected without catheterization in 24 hour periods, and total nitrogens and glycuronic acids were determined. Twelve amino acids and glucose were fed in this way and their influence upon the excretion of glycuronic acid was studied. The ratio of glycuronic acid to the increase in total nitrogen was noted. Five amino acids which form glucose in the animal body were used, namely: glycocoll, alanine, arginine, cystine, and glutamic acid. Glycocoll, alanine, and arginine had a tendency to increase the glycuronic output, while leucine, isoleucine, cystine and glutamic acid seemed doubtful in their action.

Valine, phenylalanine, and tryptophane, which are non-sugar-formers, have little effect on glycuronic acid increase, as might be expected. Two of the amino acids which appeared to have great influence in increasing the glycuronic acid output are tyrosine and histidine. This is rather unusual, inasmuch as tyrosine follows that path of catabolism leading to acetoacetic acid. Histidine forms neither glucose nor autocetic acid. It probably increases purine derivatives in the urine, such as, uric acid or allantoin.

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* The amino acids used in these experiments were purchased from Eastman Kodak Company.

[1] Mathews, "Physiological Chemistry," 1921, iii, 759. Publishers, Wm. Word & Co.

[2] Sherwin, C. P., *Physiol. Rev.*, 1922, ii, 238. Von Fürth, "Chemistry of Metabolism," trans. by Smith, 1916, 318.

[3] Quick, A. J., *J. Biol. Chem.*, 1926, lxx, 59.

[4] Quick, A. J., *J. Biol. Chem.*, 1926, lxx, 397.

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Differential Count of Leucocytes in Vagina of Rat During Oestrous Cycle.

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The quantitative relations of the types of leucocytes found in the vagina of the rat during the oestrous cycle are not yet clear. Long and Evans[1] state that, during the dioestrous cycle, the leucocytes are chiefly polymorphonuclear. Loewe and Lange[2] found that, though polymorphs are predominant, there are about half as many lymphocytes. No mention is made of the monocyte.