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Negative Results of Treatment of Chronic Myelogenous Leukemia as a Deficiency Disease.*

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There is no obvious reason for supposing that chronic myelogenous leukemia is a dietary deficiency disease. Dietary inadequacy or abnormalities of the gastrointestinal tract, almost invariably present in the deficiency group of anemias including pernicious anemia, apparently rarely occur in chronic myelogenous leukemia. On the other hand, the abnormal proliferation of primitive white blood cells in the bone marrow of myelogenous leukemia might conceivably have a physiological analogy in the maturation arrest of the primitive red blood cells crowding the bone marrow of pernicious anemia in relapse. Although gastric anacidity is only occasionally present in myelogenous leukemia, the simultaneous advent of 2 patients with chronic myelogenous leukemia, one of whom was in a leukopenic phase and both of whom had gastric achlorhydria, provided the stimulus for performing the observations described below.

An attempt was first made to supplant an entirely hypothetical defect of the gastrointestinal secretions of the 2 patients by administering alone, or in combination with other tissues, preparations of certain organs known to be effective in pernicious anemia. The daily intramuscular injection for 20 days of liver extract 343 N.N.R., derived from 25 gm. of liver, in each of the 2 patients mentioned above, was without effect. Next, the daily administration for 20 days of combined desiccated preparations derived from 100 gm. of gastric mucosa, from 250 gm. of the mucosa of the small intestine, and from 50 gm. of the pancreas of the hog, respectively, was carried out. In one of these patients the daily administration for 11 days of about 150 gm. of the mixed fresh tissue (except for the head, skin, and extremities) of newborn rabbits was then instituted in an attempt to supply a "shotgun" preparation of normal animal tissues and their metabolic products. All of these procedures were entirely without effect upon the clinical and hematological features of the disease. Similar negative results were obtained by

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Forkner and Taylor[1] with the oral administration of whole liver and calf bone marrow and the injection of aqueous and lipoid extracts of the latter.

Sabin and her associates[2] have reported the maturation of myeloblasts into myelocytes as a result of single transfusions in a patient with subacute myelogenous leukemia who had a large percentage of myeloblasts in the peripheral blood. In an effort to discover whether such a result could be due to substances hypothetically deficient in chronic myelogenous leukemia but present in the circulating blood of normal individuals, a third patient with typical chronic myelogenous leukemia, with, however, few myeloblasts in the peripheral blood, was given intravenously on each of 13 successive days about 320 cc. of citrated human plasma. The plasma was obtained by the centrifugalization, under sterile conditions, of blood obtained daily from normal individuals of the same blood group as the patient. No significant effect upon the blood values or differential myeloid cell count was produced during a period of 20 days. At the expiration of that time the patient was given daily for 5 days a transfusion of 500 cc. of citrated whole blood obtained from similar donors. The patient's red blood cells and hemoglobin were as a natural consequence increased, but during the period of the daily transfusions, and during a subsequent period of 17 days no significant changes in the white blood cell count or formula appeared.

Conclusions. 1. The oral administration of desiccated mucosa of the stomach and small intestine and of desiccated pancreas of the hog, or of mixtures of most of the fresh organs of newly born rabbits was without effect upon 2 patients with chronic myelogenous leukemia. 2. Daily transfusions of the plasma and of the whole blood of normal individuals were without effect upon the total or differential white blood cell counts of a third patient with chronic myelogenous leukemia. 3. No support for the idea that chronic myelogenous leukemia is a deficiency disease was obtained from these observations.

[1] Forkner, C. E., and Taylor, F. H. L., unpublished observations.

[2] Sabin, F. R., Austrian, C. R., Cunningham, R. S., and Doan, C. A., *J. Exp. Med.*, 1924, **40**, 845.