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On Feeding Certain Liver Constituents in Pernicious Anemia.*

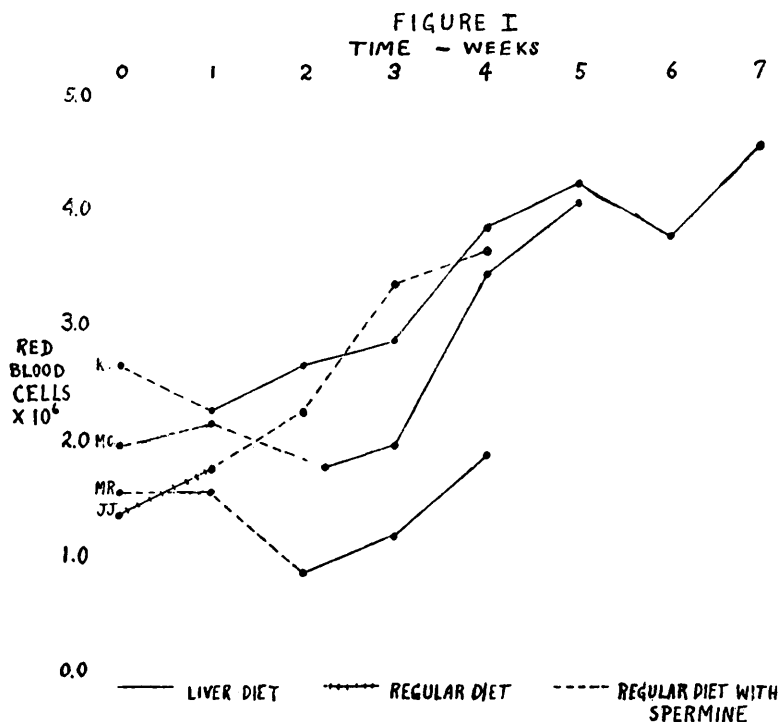
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Since Minot's¹ demonstration that a high liver diet is extraordinarily useful in the treatment of pernicious anemia we have been attempting to find whether certain liver constituents can be used as effectively as whole liver.

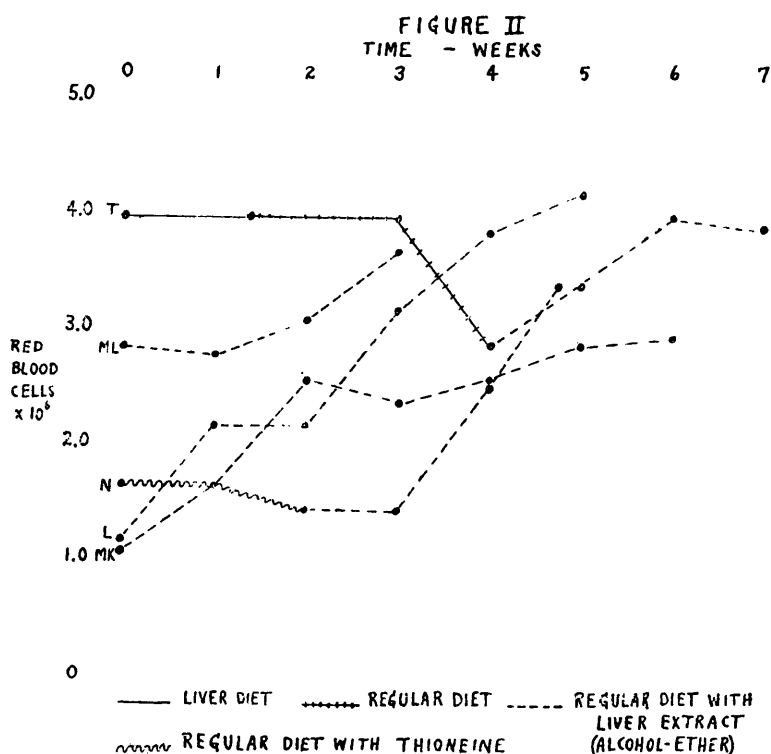
Spermine was prepared from beef pancreas by the method of Dudley² by steam distillation and precipitation as the phosphate. The phosphate was dissolved in weak acetic acid and fed in this solution, 100 to 150 mgm. daily being added to a diet containing no liver, kidney nor sweetbread. The distribution of spermine suggested its trial, for 100 gm. of tissue semen contains 260 mgm., pancreas 25, liver and kidney each 15, muscle and thymus 5.

The clinical results were believed to be negative and are appended. (Fig. I.) Case J. J. was probably in a period of spontaneous improvement.



The alcohol ether soluble fractions of fresh beef liver were used next. Five kilos of liver were obtained fresh from the slaughter house, minced, twice extracted with 4 liters of cold 95 per cent alcohol, then 2 to 3 liters of cold ether, and finally 4 liters of boiling alcohol. The three fractions were filtered separately through filter paper and evaporated almost to dryness *in vacuo*. The yield was 360 to 420 gm. (about 30 per cent water) and 10 to 15 gm. were emulsified with grape juice and fed twice daily.

Five consecutive cases have shown improvement on this regime, as shown on the appended chart. (Fig. II.)



Finally, one patient has been placed on 50 to 100 mgm. thioneine daily. At the end of 12 days he was definitely worse; thioneine was replaced by the liver extract and he has improved.

The alcohol ether soluble fraction has been divided by washing several times with 95 per cent alcohol, then ether, then 95 per cent alcohol again. The residue gives a turbid solution in water and 70 cc. a day has proven active in one case. Per 100 cc. this solution contains 13.8 gm. solids. The solids show no iron, negative

buret, 5.7 per cent N, 2.4 per cent $\text{NH}_2\text{—N}$, 2.0 per cent P, 1 per cent S.

This is a preliminary report.

¹ Minot, G. R., and Murphy, W. P., *J. Am. Med. Assn.*, 1926, **lxxxvii**, 470.

² Dudley, H. W., Rosenheim, M. C., and Rosenheim, O., *Biochem. J.*, 1924, **xviii**, 1266.

³ Newton, E. B., Benedict, S. R., and Dakin, H. D., *J. Biol. Chem.*, 1927, **lxxii**, 367.

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The Metabolism of Acetic Acid in Phlorhizin Diabetes.

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Geelmuyden¹ has stated that acetic acid is convertible into glucose, as demonstrated by the production of extra sugar after the subcutaneous injection of the sodium salt into phlorhizinized dogs. He therefore assumes that it is an intermediary product in the hypothetical conversion of fat to carbohydrate. This investigator fails to call attention to an experiment of Ringer and Lusk² in which the oral administration of 10 grams of sodium acetate failed to elicit any additional sugar formation in a phlorhizinized dog.

The question was of sufficient interest to warrant the carrying out of additional experiments. We have been unable to give large doses of sodium acetate by mouth on account of its non-absorption, due to the violent catharsis which it produces, although in the experiment of Ringer and Lusk absorption was evidently complete. Three experiments have been made in which the substance was introduced intraperitoneally in amounts as great as 27 grams, and six tests in which it was injected subcutaneously. There was no indication from these results on completely phlorhizinized animals of any tendency of this substance to form glucose.

The excretion of volatile acids in the urine increases somewhat after the administration of the sodium acetate, but not sufficiently to account for any considerable percentage of the acetic acid injected. The conclusion is that acetic acid is not convertible into glucose nor largely excreted as such by a phlorhizinized dog. It