

## Letters to the Editor

### EFFECT OF A SYNTHETIC TRIGLYCERIDE ON LIPID METABOLISM

Dear Sir:

Previous reports from this laboratory<sup>1-2</sup> have indicated that the administration of unsaturated vegetable fats would produce a profound fall in plasma cholesterol and phospholipid, as compared to the level existing on diets containing equal amounts of saturated vegetable fats or certain animal fats. So long as *natural* fats were used, there was some question in our minds as to whether the lipid-lowering effect was attributable to the unsaturated fatty acid content *per se*, or whether the effect might be related, in part at least, to the sterol and/or phospholipid content of the administered fat.

In Figure 1 is shown the first study carried out with a chemically constant formula diet in which a synthetic triglyceride has been the source of the dietary fat. The particular fat in question was prepared by, and supplied to us through, the kindness of Dr. L. A. Goldblatt of the Southern Regional Research Laboratory, United States Department of Agriculture. Its fatty acid composition was oleic acid, 74 per cent; palmitic acid, 19 per cent; stearic acid, 5 per cent; and linoleic acid, 2 per cent. The 24-hour linoleic acid intake was approximately 2 grams. A prompt and profound decrease in plasma cholesterol occurred during the administration of the synthetic fat. Administration of 10 grams of cholesterol (emulsified with the formula) resulted in a very slight elevation of plasma cholesterol. Following discontinuance of cholesterol, there was some fall in plasma cholesterol and phospholipids. Substitution of saturated vegetable (coconut) oil for the synthetic fat resulted in a progressive rise of plasma cholesterol and phospholipids.

The foregoing is compatible with the concept that the plasma cholesterol and phospholipid levels are a function of the relative or absolute intake of essential fatty acids. It is postulated that plasma phospholipids and esterified chole-

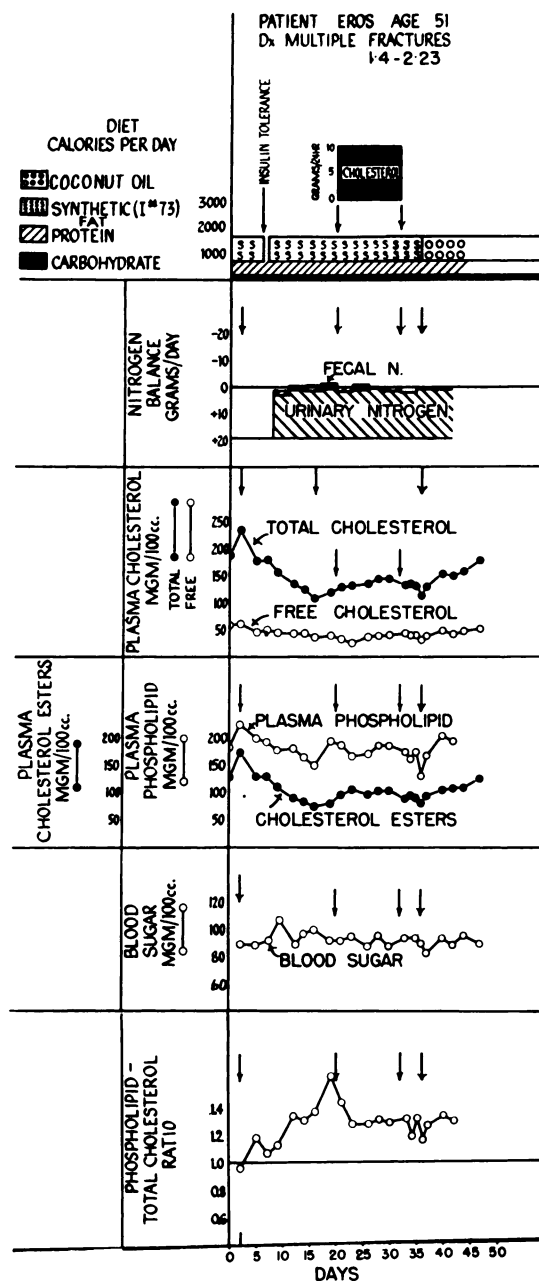


Fig. 1. Changes in plasma cholesterol and phospholipids during the intake of a synthetic triglyceride containing (per 24 hours) approximately two grams of linoleic acid. The shifts in phospholipid/cholesterol ratio are of interest.

Approximately 30 per cent of the administered cholesterol was absorbed (stool analysis).



terol represent a major part of the fatty acid transport system between liver, depots, and periphery. An adequate amount of essential acids is necessary to make this system function at maximal efficiency, with consequent reduction in unit concentration of circulating lipids. This hypothesis is currently being subjected to experimental evaluation.

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#### REFERENCES

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#### THE ROLE OF AMINO ACIDS IN KWASHIORKOR

Dear Sir:

We have reported elsewhere<sup>1</sup> the results of some dietary therapeutic trials on kwashiorkor (a syndrome of protein malnutrition in recently weaned infants). We had hoped that a clinical test could be evolved which might be analogous to the reticulocyte response in pernicious anemia used for the fractionation of liver extracts. Our trials have indeed shown that the infant with kwashiorkor can be used in an analogous way for testing the curative capacity of synthetic milk substitutes. The rate of rise of serum albumin and, in some recent cases (at the suggestion of R. F. A. Dean) of serum amylase, can be used as objective measures of the curative efficiency of the formula, although they have less mathematical accuracy than has the reticulocyte curve in pernicious anemia.

It is hoped that other laboratory criteria can be evolved for making the test more sensitive and accurate. The test has been called a test for "initiation of cure." It represents the

change from a downward course in the illness into the beginning of recovery. Conclusions drawn from this test would not apply to what we have called "consolidation of cure," which presumably requires a prolonged use of all known essential nutrients in suitable combination and quality.

The existing test for "initiation of cure" has, however, already established certain conclusions about the nature of the curative nutrients or fractions contained in skimmed milk.

We have reported "initiation of cure" with (a) Labco "vitamin free" casein as 38 per cent of the diet with and without the addition of known vitamins, (b) a mixture of eighteen crystalline amino acids as 59.5 per cent of the diet with added vitamins including all those known to be necessary for healthy development.<sup>1</sup> The "initiation of cure" thus represents an extension of the depletion method for the study of amino acids.

Since our publication further tests have shown "initiation of cure" with a diet containing 16 per cent of a mixture of eleven amino acids (Rose's eight essential amino acids plus arginine, histidine, and tyrosine) and the same vitamin mixture. In four cases out of eight we obtained satisfactory "initiation of cure," without any adjunctive treatment other than the basic sulfonamide and penicillin cover which is used in all trials.

In four more cases treated with the same amino acid mixture *without* the vitamins, improvement was very much slower and less complete than we are accustomed to observe. There was less of edema, regeneration of serum protein, and slower healing of skin lesions, but the children after a week on this diet again became apathetic and anorexic. We do not regard this as satisfactory "initiation of cure."

Either these latter four cases were unusually severe or complicated or, as seems more likely, we are reaching the lower limit of amino acid formulation at which cure can be initiated by vitamin-free protein or amino acids.

We feel that the cases previously published suggest with a fair degree of certainty that the limiting nutrients in the diets which cause kwashiorkor are amino acids and that provision of these amino acids is capable of initiat-