

Letter to the Editor

Effect of Dietary Cholesterol on Serum Cholesterol in Man

Dear Sir:

IN THE MAY 1960 issue of *The Journal of Nutrition*, a paper by Beveridge et al. (pp. 61-65) purports to show that modest additions of cholesterol to a synthetic formula diet fed to students for a short period produced significant increases in the concentration of cholesterol in the serum. The subject of the effect, or lack of it, of dietary cholesterol on the blood concentration in man has been extensively studied, both in surveys and in a wide variety of controlled experiments (*cf.*, *J. Nutrition* 59:39-56, 1956), but from the paper by Beveridge et al. the uninformed reader might conclude that this is a virgin field. Many of the previously reported experiments covered much longer periods than used by Beveridge et al., with the subjects under constant twenty-four hour surveillance, which was not the case in their experiment.

The authors made no attempt to explain the apparent major difference between their study and others which have been reported. Actually, only the conclusions of Beveridge et al. are novel and their data do not warrant them. The real finding is that in all groups of their subjects the rise in serum cholesterol levels was of statistical significance, whether cholesterol was added to the diet or not. Their data indicate that, compared with a fat-free diet, the provision of 30 per cent of calories from a butter oil fraction provoked a rise in the serum cholesterol level during a period of a few days. Even this conclusion could be questioned in the absence of a continuing control group not receiving the butter oil.

However, Beveridge et al. focus on the supposed effect of the added cholesterol. The data indicate that 95 mg. of cholesterol in the daily diet is associated with a rise, in eight days, or 27.6 mg. cholesterol per 100 ml., which is significant by the ordinary statistical test. But a more significant rise was demon-

strated by the control group receiving no cholesterol supplement. The same is true of the serum changes observed in the groups receiving 153 and 293 mg. of cholesterol per day. Only when the intake level was 634 mg. daily is there a suggestion that cholesterol intake plays a part in the blood change, but even in that case statistical analysis fails to show a significant effect of the dietary cholesterol.

Compare the nine subjects in the control group with the nine in group 5, who received 634 mg. of cholesterol daily. The cholesterol changes are reported to have been $+25.3 \pm 5.06$ and $+41.9 \pm 6.74$, respectively. Are these different? The difference is 16.6 ± 8.43 , the *t* value is 1.97 and the difference is not significant (*p* = circa 0.07).

A better case can be made for the idea that daily cholesterol intakes of 1,295 mg. or more may have an effect, but then there is the difficulty that the rise with 4,493 mg. of cholesterol per day is considerably less than that when the supplement is 2,494 mg. per day, so a linear effect cannot be claimed.

The actual finding of Beveridge et al. was that, when the daily formula diet contained an average of 898 mg. of cholesterol, the average concentration of cholesterol in the serum was about 15.9 mg. per 100 ml. higher than when the diet contained an average of only 142 mg. of cholesterol. This serum difference, although trivial, is more than would be expected from the reports of other experiments—not cited by Beveridge et al. It may be concluded that further experiments are needed to determine what, if any, may be the effect on the serum cholesterol level of man from variations in cholesterol intake within the range of natural human diets.

ANCEL KEYS, PH.D.

Director

*Laboratory of Physiological Hygiene
University of Minnesota
Minneapolis, Minnesota*