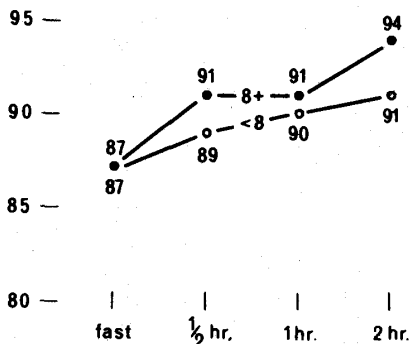## BLOOD-GLUCOSE LEVELS AFTER CAFFEINE

SIR,—We have shown,[1] in a double-blind study, that the level of blood-glucose was significantly raised in relatively healthy males 2 hours after ingestion of 250 mg. caffeine (the equivalent of two cups of coffee). However, considerable blood-glucose-level variation was observed within the group. We here re-examine the sample in the light of the group health status.

Twenty-two junior dental students presented themselves fasting at 10 A.M. A venous blood-sample was obtained and blood-glucose measured.[2][3] Immediately after the blood was drawn, each subject was asked to swallow a capsule containing 250 mg. caffeine (*U.S.P.*) with 5 oz. (140 ml.) of water. Blood-glucose was measured $1/2$, 1, and 2 hours later. In addition, each student completed the Cornell Medical Index Health Questionary (C.M.I.). The total number of affirmative answers can be regarded as a crude measure of ill-health status.

1. Cheraskin, E., Ringsdorf, W. M., Jr., Setyaadmadja, A. T. S. H., Barrett, R. A. *Lancet*, 1967, i, 1299.
2. Nelson, N. *J. biol. Chem.* 1944, **153**, 375.
3. Somogyi, M. *ibid.* 1945, **160**, 69.

Effect of caffeine upon mean blood-glucose levels (in mg. per 100 ml., on ordinate) in ten subjects with less than 8, and twelve subjects with 8 or more, " yes " responses on C.M.I.

Results and Discussion

The students were divided almost equally by the number of positive C.M.I. responses: ten students had C.M.I. scores of 0–7, and twelve had scores of 8–22. The means ($\pm$S.D.) for blood-glucose levels (see accompanying figure) were as follows:

Blood-glucose (mg. per 100 ml.)	C.M.I. 0–7 (no. = 10)	8–22 (no. = 12)
Fasting	87 $\pm$ 6	87 $\pm$ 8
$^1/_4$ hr.	89 $\pm$ 6	91 $\pm$ 7
1 hr.	90 $\pm$ 7	91 $\pm$ 6
2 hr.	91 $\pm$ 6	94 $\pm$ 8

It is clear that, on a mean basis, the blood-glucose values rise with time.

The statistical significance of caffeine supplementation upon blood-glucose concentration in terms of health status, considering fasting against post-caffeine levels, was as follows:

C.M.I.	Time after caffeine (hr.) $^1/_2$	1	2
0–7 (no. = 10)	> 0·400	> 0·200	> 0·100
8–22 (no. = 12)	> 0·100	> 0·100	< 0·025*

* Statistically significant.

The only significantly raised blood-glucose value occurred 2 hours after caffeine supplementation in the students with the poorer C.M.I. response (8 or more " yes " answers), and the hyperglycæmic effect of caffeine was greater than in those with fewer (0–7 " yes " answers) general symptoms and signs suggestive of disease.

Although the blood-glucose response to caffeine reported here is not of great magnitude, coffee-drinking habits are such that cumulative effects may occur during an average day. In addition, the peak glucose level may have occurred during a later hour. This would enhance the possibility of a cumulative response. Thus, as noted previously,[1] the effect of coffee consumption on glucose homœostasis should be carefully explored, since many heavy consumers may have a predisposition to maturity-onset diabetes. Danowski [4] has noted that roughly one out of four people, in the course of a lifetime, develops diabetes, or episodes of hyperglycæmia that are indistinguishable from diabetes. These observations were derived from consecutive studies of individuals from birth to death rather than from the prevalence-rate in a given community at a given time.

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