Table 1. EFFECT OF HEPARIN ON LIPIDS AND ESTERASE ACTIVITY OF PLASMA

Time	Heparin			Control		
	Total lipids	Lipid phosphate	TBEsterase	Total lipids	Lipid phosphate	TBEsterase
Before injection (min)	324 $\pm$ 7.34	9.97 $\pm$ 0.26	351 $\pm$ 14.2	329 $\pm$ 7.24	10.28 $\pm$ 0.32	363 $\pm$ 15.0
5	257 $\pm$ 10.30	9.90 $\pm$ 0.29	419 $\pm$ 15.7	331 $\pm$ 6.40	10.26 $\pm$ 0.26	361 $\pm$ 14.2
60	279 $\pm$ 10.80	9.80 $\pm$ 0.27	384 $\pm$ 15.0	345 $\pm$ 7.72	10.14 $\pm$ 0.30	359 $\pm$ 14.3
180	317 $\pm$ 7.74	9.62 $\pm$ 0.25	356 $\pm$ 14.7	351 $\pm$ 7.18	10.19 $\pm$ 0.29	358 $\pm$ 15.1

during the experiment. Heparin-treated individuals show a significant decrease in total lipids ($P < 0.001$) accompanied by simultaneous increase in esterase activity ($P < 0.02$). These changes are observed 5 min after heparin administration. A return to the initial values was observed three hours after the beginning of the experiment. There was no change in plasma lipid phosphate in both groups. The decrease of plasma lipids and the increase of esterase activity observed indicate that heparin activates the plasma-clearing mechanism not only in states of hyperlipemia but also in non-hyperlipemic subjects.

Furthermore, the decrease of total plasma lipids could suggest that clearing is not only due to a change of the physicochemical properties of lipids but also to an accelerated removal of them from the blood stream. This conclusion is in agreement with the observations that heparin produces a distinct fall in the plasma lipids when given intravenously with different fat preparations¹²⁻¹⁴ and in plasma total fatty acids when given in hyperlipemic rats².

This research was aided partly by a grant from the Royal Hellenic Foundation for Research.

A. N. GRANITSAS
A. S. ACHIMASTOS

Institute of Physiology,
University of Athens,
Athens (609), Greece.

- ¹ Hahn, P. F., *Science*, **98**, 19 (1943).
- ² Levy, S. W., *Rev. Canad. Biol.*, **17**, 1 (1958).
- ³ Grossman, M. I., Palm, L., Becker, G. H., and Moeller, H. C., *Proc. Soc. Exp. Biol. Med.*, **87**, 312 (1954).
- ⁴ Rosenberg, I. N., *Proc. Soc. Exp. Biol. Med.*, **80**, 751 (1952).
- ⁵ Comfort, A., *Biochem. J.*, **58**, 9 (1954).
- ⁶ Bolinger, E. E., Grady, H. J., and Slinker, B. J., *Amer. J. Med. Sci.*, **227**, 193 (1954).
- ⁷ Herbst, F. S. M., and Hurley, N. A., *J. Clin. Invest.*, **33**, 907 (1954).
- ⁸ Swahn, B., *Scand. J. Clin. Lab. Inv.*, **4**, 98, (1952).
- ⁹ Granitsas, N. A., Kuvelas, D. E., and Konstantopoulos, A., *Nature*, **188**, 1115 (1960).
- ¹⁰ Zilvermit, D. B., and Davis, A. K., *J. Lab. Clin. Med.*, **35**, 155 (1950).
- ¹¹ Tuba, J., and Hoare, R., *J. Lab. Clin. Med.*, **38**, 308 (1951).
- ¹² Bragdon, J. H., and Havel, R. J., *Amer. J. Physiol.*, **177**, 128 (1954).
- ¹³ French, J. E., and Morris, B., *J. Physiol.*, **138**, 326 (1957).
- ¹⁴ Grossman, M. I., and Strub, I. H., *Proc. Soc. Exp. Biol. N.Y.*, **85**, 356 (1954).

Effect of Bradykinin on Isolated Coronary Arteries

DURING an investigation of the comparative pharmacology of isolated vascular smooth muscle, it was noticed that the coronary arteries of the sheep were caused to contract by very small doses of bradykinin (Sandoz). Other substances were less active.

Spiral strips 2.5–4.0 cm long were cut from the left circumflex coronary artery of recently killed sheep or dogs, and were suspended in an isolated organ bath containing 10 ml. Tyrode solution, oxygenated with 5 per cent carbon dioxide in oxygen at 38° C. An isotonic frontal writing lever was used, counter-balanced to exert 2g tension. All preparations were left for 2 h before testing.

In 20 sheep coronary strips bradykinin caused a contraction within 15–30 sec. Repeated administration at 20-min intervals did not lead to a decrease in the response, which was usually constant, but sometimes increased in size over several hours. Fig. 1 shows a typical dose-response relationship. Many preparations were very sensitive to bradykinin, responding with a good contraction to as little as 0.001 μ g/ml.; a few preparations required up to 0.1 μ g/ml. Acetylcholine caused a contraction in doses of 0.025–5 μ g/ml., and 5-hydroxytryptamine in doses of 0.3–1.0 μ g/ml. Histamine caused contraction after administration of 100 μ g/ml. The contraction caused by acetylcholine, but not that of bradykinin, was abolished by atropine. Adrenalin and noradrenalin caused relaxation in large doses (100 μ g/ml.). In 2 of 8 isolated strips from dog's coronary arteries bradykinin and acetylcholine caused relaxation; they never elicited a contraction in the doses which were effective in sheep.

Fig. 1

It is interesting that this effect of bradykinin on the coronary vessels appears to vary with the species, and the great sensitivity of the sheep coronary vessels may make this preparation suitable for use in bioassay.

I thank Sandoz Products, Ltd., for supplies of synthetic bradykinin.

V. KOVALČÍK *

Nuffield Institute for Medical Research,
University of Oxford.

* Riker Research Fellow.