SPECIAL ARTICLES

THE DESTRUCTION OF COENZYME I AND COCARBOXYLASE IN SKELETAL AND CARDIAC MUSCLE AFTER DEATH

IN the course of studies of coenzyme breakdown in heart muscle after experimental coronary ligation in dogs, the idea was entertained that the amount of coenzyme breakdown after one hour of death might be considered the maximum breakdown that could be expected in that length of time following any experimental procedure. In order to test this hypothesis, six dogs (previously on a standard diet of "Pard" dog food) were anesthetized with pentobarbital sodium, the chests were opened and the hearts removed. Immediately on removal of the heart, a sample of left ventricle and a similar sample of deltoid muscle were removed, heated in boiling water for five minutes, homogenized and subsequently analyzed for cocarboxylase and coenzyme I. One hour later a second sample of each tissue was removed and treated in a similar manner. The dog and excised heart were allowed to remain at room temperature during the hour. Coenzyme I was determined by the method of Axelrod and Elvehjem,[1] as modified by Greig.[2] Cocarboxylase was determined manometrically, using split carboxylase prepared as described by Green *et al.*[3]

The results of these analyses are submitted in Tables 1 and 2.

TABLE 1

COENZYME I IN γ/GM OF DRY MUSCLE

Exp. No.	Skeletal muscle control	Skeletal muscle 1 hr. post-mortem	Per cent. change	Heart muscle control	Heart muscle 1 hr. post-mortem	Per cent. change
II 1.	2730	2650	− 2.9	3120	2150	−30.9
II 2.	2430	3380	+28.1	3180	2540	−20.1
II 3.	1649	0	−100.0	881	155	−82.5
II 4.	2640	2235	−15.1	3920	2375	−39.3
II 5.	924	783	−15.3	642	826	+28.7
II 6.	1173	1725	+47.0	2955	2610	−11.7
Average			− 9.7			−25.9

One may be impressed by the surprising lack of destruction under these conditions. Instead of finding nearly complete breakdown of cocarboxylase and coenzyme I, in the case of cocarboxylase in skeletal muscle at least, there is frequently less breakdown than was found previously in shock.[4]

[1] A. E. Axelrod and C. A. Elvehjem, *Jour. Biol. Chem.*, 131: 77, 1939.

[2] Margaret E. Greig, personal communication.

[3] D. E. Green, D. Herbert, V. Subrahmanyan, *Jour. Biol. Chem.*, 138: 327, 1941.

[4] Margaret E. Greig and Wm. M. Govier, *Jour. Pharmacol. and Exp. Therapy*, 79: 169, 1943.

TABLE 2

COCARBOXYLASE IN γ/GM OF DRY MUSCLE

Exp. No.	Skeletal muscle control	Skeletal muscle 1 hr. post-mortem	Per cent. change	Heart muscle control	Heart muscle 1 hr. post-mortem	Per cent. change
II 1.	23.7	22.5	− 3.4	55.0	61.2	+10.1
II 2.	22.8	20.3	−10.9	68.6	53.3	−22.3
II 3.	28.3	18.8	−33.6	63.9	55.0	−13.9
II 4.	21.1	14.2	−32.7	48.6	35.4	−27.1
II 5.	21.3	20.9	− 1.4	71.0	53.0	−25.4
II 6.	18.4	20.4	+ 9.8	65.8	63.3	− 3.8
Average			−12.0			−13.7

By way of explanation, one may suggest that after death the breakdown products of the coenzymes are not removed from the tissue by the circulation, and consequently by their accumulation may serve to inhibit catabolic enzymes. This explanation may be supported by work showing that thiamin inhibits yeast cocarboxylase phosphatase[5] and that nicotinamide inhibits coenzyme I nucleotidase.[6]

WM. M. GOVIER

BOWMAN GRAY SCHOOL OF MEDICINE,
WINSTON-SALEM, N. C.

AN EXPERIMENTAL METHOD FOR EVALUATING BLOOD SUBSTITUTES

REPORT ON SALINE, PLASMA, POLYVINYL ALCOHOL AND ISINGLASS

THE following conditions are desirable in an experiment designed to evaluate substances which may be used for the intravenous treatment of traumatic shock:

(1) The group of animals which is used for the test should be as nearly homogeneous as possible.

(2) The trauma should be of the same degree in each animal and easy to apply. Complicating factors such as anesthesia and hemorrhage into the injured tissues should be reduced to a minimum.

(3) The injury should be highly fatal in the control animals but mild enough to allow a proportion of the treated animals to recover. Percentage survival is considered to be the best single index of the effectiveness of treatment.

(4) The experiments should be carried out with the animals kept at a constant environmental temperature.[1]

(5) If a large number of animals can be handled at one time, there are the obvious advantages of con-

[5] H. G. K. Westenbrink, D. A. vanDorp, M. Gruber, H. Veldman, *Enzymologia*, 9: 73, 1940.

[6] P. J. G. Mann and J. H. Quastel, *Biochem. Jour.*, 35: 502, 1941.

[1] F. M. Allen, *Arch. Surg.*, 41: 155, 1939.