

Experimental Hypertrophy Without and With Digitalization on Creatine Content of Rabbit Hearts.*

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In the type of cardiac hypertrophy resulting from nutritional anemia,¹ or following thyroid administration,² produced in rats, the percentage of creatine in the heart muscle has been found to drop; the total amount of creatine in the whole heart seemed to remain the same, the percentage decreasing as the heart muscle increased in weight. In a preliminary note,³ we have recorded the creatine values in hearts in which hypertrophy has been produced by a different method. Using rabbits, the aortic leaflets were torn or punctured, thus producing experimental aortic regurgitation. The degree of hypertrophy has been determined by comparing the Heart-weight/Body-weight ratio with our previously established normal value.⁴ The animals were of nearly the same age, and weighed around 3,000 gm. at the completion of the experiment. Creatine determinations were made following the technique of Seecof, Linegar and Myers.⁵ In Table I summarized are the creatine values for the completed series of these animals. Some of them have been digitalized, in order to note the effect of this drug on hypertrophy; the remainder have had no digitalis. A control group was injected with digitalis, without having been operated upon.

In animals weighing from 2,500 to 3,500 gm., the normal hearts contain 176 mg. % creatine, with a standard deviation of 15.8 mg. %. Solids average 22.1%, S. D. 1.4%. The creatine calculated on the basis of dried weight averaged 825 mg. % $\pm$ 80 mg. %. In the hypertrophied hearts, the average value is slightly higher, with a tendency for the higher values to be found in hearts with moderate hypertrophy, dropping to normal or slightly below as the grade of hyper-

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¹ Cowan, D. W., *Proc. Soc. Exp. Biol. and Med.*, 1934, **31**, 417.

² Cowan, D. W., *Am. J. Physiol.*, 1934, **109**, 312.

³ Decherd, G., Schwab, E. H., Herrmann, G., and Brown, W. O., *Proc. Soc. Exp. Biol. and Med.*, 1936, **33**, 521; Herrmann, George, Decherd G., Schwab, E. H., and Erhard, P., *Proc. Soc. Exp. Biol. and Med.*, 1934, **33**, 522.

⁴ Herrmann, G., Decherd, G., Erhard, P., and Schwab, E. H., *Proc. Soc. Exp. Biol. and Med.*, 1935, **33**, 409.

⁵ Seecof, D. P., Linegar, C. R., and Myers, V. C., *Arch. Int. Med.*, 1934, **53**, 574.

TABLE I.
Creatine Content of Rabbit Hearts in Experimental Hypertrophy.

No. of Animals	Exper. Condition	Left Ventricle				Right Ventricle			
		mg. % Creatine	% Solids	mg. % Dried Value		mg. % Creatine	% Solids	mg. % Dried Value	
14	Controls	176 ± 15.8	22.1 ± 1.4	825 ± 80		170	22	800	
16	Digitalis 0.1 C.U.	203 ± 20.	22.4 ± 0.62	908 ± 58		196 ± 22	23.6 ± .64	831 ± 83	
29	,, 0.3 or 0.5 C.U.	178 ± 15.	21.5 ± 0.79	824 ± 69					
13	Exp. hypertrophy	179 ± 18.	21.7 ± 0.37	828 ± 62		179 ± 26	22.3 ± .54	803 ± 117	
14	Early hypertrophy + digitalis	218 ± 29.	22.6 ± 0.78	962 ± 125		208 ± 26	23.0 ± .92	904 ± 91	
29	Hypertrophy of varying degrees + digitalis	186	23.0	839		185	22.7	822	

trophy increased. This means that the absolute amount of creatine in such hypertrophied hearts is definitely increased.

In those digitalis control animals who received 0.1 cat unit twice weekly, injected as Digalen or Digifoline, there was a distinct increase in the cardiac creatine content. Those that received larger doses, namely 0.3 or 0.5 cat unit, showed no relative elevation.

In one group of digitalized hearts there was found a definite but small lesion, the grade of cardiac hypertrophy being doubtful, however, when judged by the ratio of heart weight to body weight. These hearts show markedly elevated creatine values. In the digitalized hearts with distinct hypertrophy, the degree depending on the size of the experimental lesion, there is on the average slightly higher creatine percentage than normal, demonstrating again the fact that there is an absolute increase in the amount of creatine in these hypertrophied hearts.

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Studies in Histochemistry. VIII. Relationship Between Concentration of Vitamin C and Development of Pineal Gland.

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Although there have been many investigations of the occurrence of vitamin C in animal tissues in recent years, there have been no studies, as far the authors have been able to ascertain, of the vitamin C in the pineal gland. This probably is due to the fact that the gland is very small and usually difficult to obtain. In the fully developed cow it weighs but a few hundred mg.

It should be of interest to compare the vitamin C content of the pineal with that of other nervous tissues or organs of internal secretion such as the adrenal medulla, pars nervosa of the hypophysis, and brain, all of which are somewhat related embryologically. It should also be desirable to determine the concentration of vitamin C in the pineal gland in relation to its various stages of development from fetus to adult. The presentation of these determinations and comparisons is the purpose of the present investigation.

Using the Linderstrøm-Lang, Holter microtitration apparatus,^{1,2}