

Formation of an Epinephrin-like Substance in Autolysing Adrenal Glands.

A. R. LARRAIN, R. G. ROBERTS, AND M. M. KUNDE.

From the Departments of Physiology and Pathology, Chicago Medical School.

Fresh whole adrenal glands (20 gm. portions) were thoroughly crushed in a mortar with sand (3 gm. sand per gm. of gland) and 50 cc. distilled water, until a very finely divided pulpy mass was formed. This pulp was placed in collodion bags and dialyzed repeatedly against 200 cc. portions of distilled water. Dialyzing for 5 minutes results in a bluish dialysate, 5 cc. of which causes a powerful pressor response when injected intravenously in a 10 kg. dog. The dialysates have been removed and fresh portions (200 cc.) of distilled water added daily at varying intervals for 35 days. Intravenous injections in a 10 kg. dog of $\frac{1}{2}$ to 5 cc. of the different dialysates causes a rise in blood pressure comparable to the effect obtained by injecting $\frac{1}{2}$ to 1 cc. of 1/20,000 P. D. and Co. adrenalin. Chemical analysis, according to the iodine thyosulphate titration, indicates that the total yield per gram of fresh gland over 30 days' dialyzing is equivalent to 10 mg. P. D. and Co. adrenalin. Biological assay as determined by the blood pressor effect on anesthetized dogs, shows even a greater physiological effect than the quantitative chemical analysis indicates.

If autolysis of the crushed adrenal glands in the dialyzing bag be held in abeyance by potassium cyanide, the dialysate contains no pressor principle. On the other hand KCN did not affect the pressor activity of untreated dialysates nor that of P. D. and Co. adrenalin. Boiling for 1 minute does not destroy the pressor effect of the dialysate; neither does digestion with pepsin or trypsin. Passing the dialysate through animal charcoal removes the pressor principle, as does adsorption on aluminum hydroxide.

The pressor substance contained in the dialysate is not precipitated by concentrated NH_4OH , although a heavy flocculent precipitate forms. The mother liquor from this precipitate contains a powerful pressor substance.

Conclusion. Autolysis of crushed, whole adrenal glands gives rise to a powerful pressor substance which may be obtained by dialysis. This substance gives all the ordinary chemical tests for adrenalin, but differs from it in that it is not precipitated by concentrated

ammonium hydroxide. It does not give a biuret reaction; is not destroyed by boiling; is adsorbed by animal charcoal and aluminum hydroxide and does not lose its physiological effect if exposed to air at room temperature for 30 days. Glacial acetic acid does not destroy its pressor effect. Inhibiting autolysis of the crushed adrenal glands by the addition of potassium cyanide prevents the formation of the pressor substance as determined by chemical and physiological tests.

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Effect of Pancreatectomy on Glutathione Content of Blood.

M. M. KUNDE, T. J. BECKER, F. S. SARUK AND R. D. KEARNEY.

From the Department of Physiology of the Chicago Medical School.

Complete pancreatectomy in the dog causes an increase of over 100% in the non-glucose reducing substance of venous blood. (Table.) This substance is determined quantitatively by the iodine

TABLE I.
Effect of Removal of Pancreas on Blood Glucose and Glutathione.

Dog No.	Before removal of pancreas		After removal of pancreas									
			4 days		6 days		10 days		13 days		15 days	
	Glucose mg. %	Glutathione mg. %	Glucose mg. %	Glutathione mg. %	Glucose mg. %	Glutathione mg. %	Glucose mg. %	Glutathione mg. %	Glucose mg. %	Glutathione mg. %	Glucose mg. %	Glutathione mg. %
5	83	24.6	247	28.8	229	46.0	280	31.9	272	27.6	200	28.2
6	80	19.6	256	35.0	165	41.1	260	36.6	254	21.7	241	30.0

titration method of King *et al.* for blood glutathione as modified by Mancorps and Schmid.¹ At this stage of the research we assume this substance to be glutathione; however, the method employed is not specific but may include such substances as thioneine and cystein. Ascorbic acid also interferes with this titration. The above mentioned interfering substances are probably not present in quantities sufficiently great to cause appreciable error in our interpretations. Further work on this phase is in progress.

¹ Mancorps, C., and Schmid, R., *Hoppe-Seyler's Z. fur Physiol. Chemie*, 1932, 205, 141.