

TABLE I.
Distribution of C^{13} in Urinary Succinic Acid After Administration of Carboxyl Labeled Acetate to Rats. C^{13} Values Are in Atom % Excess.

Exp. No.	Rat No.	Labeled acetate fed mM/100 g	C^{13} in whole succinic acid molecule	C^{13} in degradation fractions		
				Carboxyl carbons 1A	Methylene carbons 1B	2,2
I	1	1.1	0.15			
II	2	3.4	0.14			
III	3-8	3.4	0.10	0.21	0.17	0.00

succinate and fumarate are both symmetrical molecules, is interpreted as due to the oxidation of a certain amount of extraneous carbon by permanganate, but other explanations are possible.¹⁰

These experiments are being extended.

Summary. After the administration of malonate plus carboxyl-labeled acetate to rats, there has been recovered from the urine car-

boxyl-labeled succinate, an intermediate of the tricarboxylic acid cycle. This result is consistent with and additional evidence for the metabolism of acetate via the tricarboxylic acid cycle in the intact mammal.

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¹⁰ Calvin, M., and others. *Isotopic Carbon*, 1949, p. 192, John Wiley & Sons, Inc.

17049

Simultaneous Fluorocardiography and Recording of Intracardiac Pressure.

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Various studies of clinical fluorocardiography have been published in the last three years.¹⁻⁵ This method is based on the photoelectric recording of the motion of selected points of the cardiovascular contour as revealed by the fluoroscope.

Although simultaneous recordings of other graphic tracings (electrocardiogram, carotid tracing, phonocardiogram, etc.) have sup-

ported the reliability of the fluorocardiogram, an incontrovertible demonstration of the accuracy of the latter has been lacking. For this reason, fluorocardiograms of the right auricle or the right ventricle, simultaneous with tracings of pressure in the corresponding chamber, have been taken in the anesthetized dog.

Materials and methods. A Sanborn electrokymograph and a Sanborn electromanometer were used. The former is a standard apparatus for fluorocardiography; the latter is a new apparatus, based on the strain gauge principle, which permits the recording of variations of pressure with controlled amplification. A Sanborn tri-beam cardiette was employed for the transcription of the tracings so that both tracings were recorded by two separate channels while a third recorded the heart sounds through a stethoscopic micro-

¹ Henny, G. C., and Boone, B. R., *Am. J. Roentgen.*, 1945, **54**, 217.

² Luisada, A. A., Fleischner, F. G., and Rappaport, M. E., *Am. Heart J.*, 1948, **35**, 336 and 348.

³ Luisada, A. A., and Fleischner, F. G., *Proc. Soc. Exp. Biol. and Med.*, 1947, **66**, 436; 1948, **67**, 535; 1948, **69**, 23.

⁴ Luisada, G. C., and Fleischner, F. G., *Am. J. Med.*, 1948, **4**, 791.

⁵ Luisada, G. C., and Fleischner, F. G., *Acta Card.*, 1948, **3**, 308.

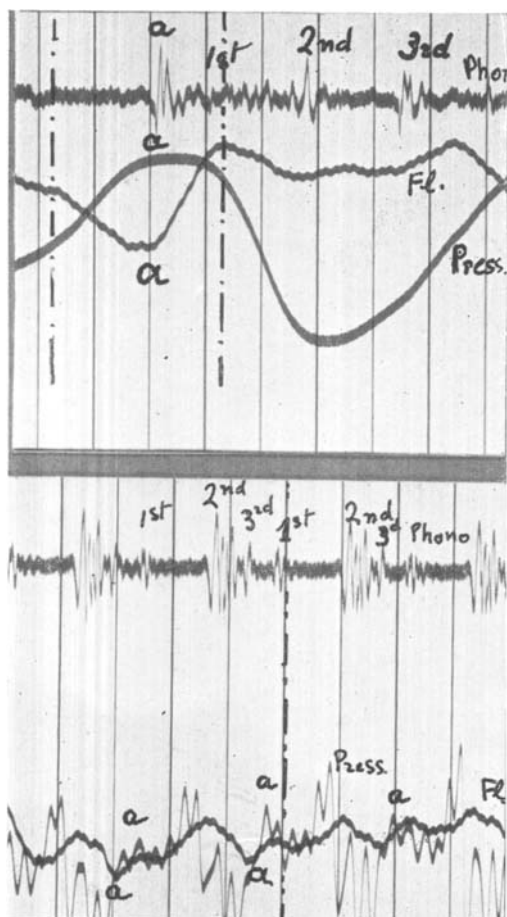


FIG. 1.

Tracings of the right auricle of two dogs. From above: phonocardiogram, fluorocardiogram, pressure tracing (electromanometer).

- (A) Rubber catheter.
(B) Woven catheter.

phone applied to the left chest. Pressure tracings were obtained by introducing either a 14 French rubber catheter or a conventional, woven catheter into the right cardiac chambers through the right external jugular vein under fluoroscopic control.

Results. The heart sounds, the fluorocardiogram of the border of the right auricle, and a pressure tracing from the right auricle are recorded in the first figure.

The fluorocardiogram presents a deep negative wave in presystole (contraction of the auricle), a sharp rise at the beginning of systole, and a slower drop during systole. The

pressure tracing with the rubber catheter presents a slow rise in early diastole; a more rapid rise in presystole (contraction of the auricle) and a sharp drop in systole. The *presystolic drop* in the fluorocardiogram is simultaneous with the *presystolic rise* of the pressure tracing. The systolic changes, due to the effects of ventricular systole, are revealed by a simultaneous drop in both tracings. The tracing recorded by means of the woven catheter presents multiple vibrations, 2 of which coincide with the presystolic wave of the fluorocardiogram (Fig. 1B).

In the second figure, the heart sounds, a

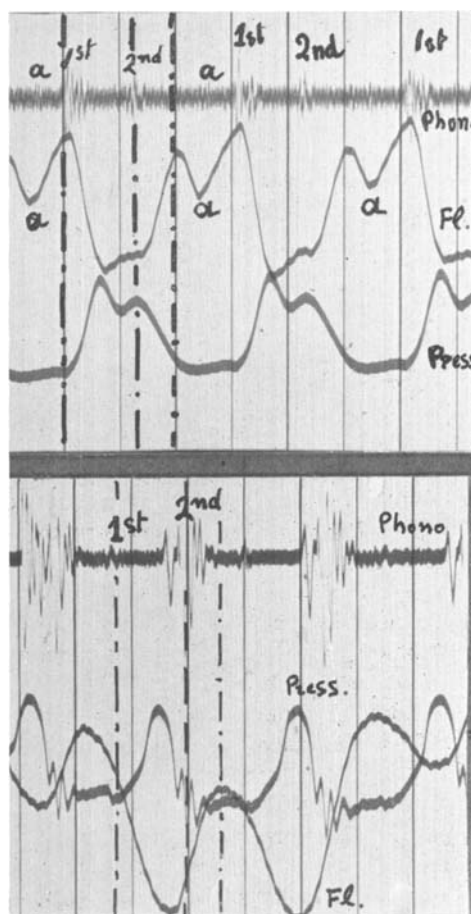


FIG. 2.

Tracings of the right ventricle of 2 dogs. From above: phonocardiogram, fluorocardiogram, pressure tracing.

- (A) Rubber catheter.
(B) Woven catheter.

fluorocardiogram of the border of the right ventricle, and a pressure tracing from the right ventricle are recorded. The fluorocardiogram presents a small presystolic negative wave (transmitted from the auricle); a deep *systolic collapse* (ventricular contraction); and a small, early-diastolic rebound. The pressure tracing presents no waves in diastole. Ventricular systole is accompanied by a *systolic plateau* with a higher initial peak.

The temporal relationship between the negative *ventricular wave* of the fluorocardiogram and the *systolic plateau* of the pressure tracing is precisely the same, allowing for a brief lag because of the fact that the ventricular wave of the fluorocardiogram starts with the beginning of ejection.

The tracing, recorded by means of the conventional catheter, presents a more rounded curve of intraventricular pressure (Fig. 2B).

Discussion. This study reveals a precise coincidence between the auricular and ven-

tricular waves of the pressure tracing on the one hand and the fluorocardiographic waves on the other hand. The *positive wave* in the pressure tracing is due to the rise in pressure on contraction of the chamber while the *negative wave* in the fluorocardiogram is due to simultaneous decrease in volume of the chamber. Since the dog's heart shifts horizontally only very slightly within the chest, being more vertical than the human heart, experimental fluorocardiograms are nearly pure volume tracings. Thus a further proof is given of the accuracy of fluorocardiography in recording volume changes of the heart whenever the complicating elements of motion are absent or minimal.

Summary. Simultaneous fluorocardiograms of the right auricle and ventricle and tracings of intracardiac pressure reveal a precise temporal coincidence between the waves of the two records. Therefore, a further proof is given of the accuracy of fluorocardiography.

17050 P

Use of Radiopotassium for Detection of Minute Amounts of Desoxycorticosterone.*

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This communication is a report of a preliminary study on the use of radiopotassium for assay of adrenal cortical hormones. The fact that adrenalectomized rats tend to retain potassium, which may be reversed by the administration of adrenal cortical extracts or pure adrenal cortical steroids, is well known. With the use of radiopotassium as little as 10 μ g of desoxycorticosterone may be detected in the adrenalectomized rat.

Animals, methods, materials. Albino rats obtained from Carworth Farms, Inc. were

used for these studies. The animals were bilaterally adrenalectomized in one stage under ether anesthesia. Experiments were run 24 hours after adrenalectomy. The diet both before and after the operation consisted of Purina Fox chow without added sodium chloride.

The procedure consisted in the subcutaneous administration of the test material, desoxycorticosterone or desoxycorticosterone acetate,[†] contained in corn oil. The volume of oil was 0.25 cc. One hour after the administration of the steroid, potassium chloride

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† The desoxycorticosterone and desoxycorticosterone acetate were kindly supplied by Ciba Pharmaceutical Products, Inc.