13036

Activity of Toad Lymph Hearts.

V. G. Foglia and E. Braun-Menendez. (Introduced by C. D. Leake.)

From the Instituto de Fisiologia, Facultad de Medicina, Buenos Aires.

The pulsations of the posterior lymph hearts of the toad, *Bufo arenarum* Hensel, have been recorded[1] by the optical method in the following way: a small funnel was applied over the pulsating zone and connected by rubber tubing to a Frank's capsule covered with a very delicate membrane such as that used for heart sound recording.[2] The records obtained were of good amplitude especially if the skin covering the lymph hearts was previously removed. The characteristic irregularity of the recorded pulsations was found to be due almost exclusively to variations in the duration of diastole. Bi- and tri-geminal rhythms were sometimes observed.

A very remarkable fact, which we have verified in more than 150 observations, is that *the 2 posterior (left and right) lymph hearts have always the same frequency per unit of time.* This occurs in spite of the arrhythmia of individual hearts, the absolute asynchronism between left and right hearts, and the varying frequencies observed at any temperature between 0° to 40°C.

The variation of pressure within the lymph hearts has been also recorded by introducing a fine needle into the cavity and connecting it with the recording capsule as described. The curve of intracardiac lymph pressure shows a rise in pressure together with the beginning of contraction. The rise is first slow and then more rapid; the decline in pressure is not so steep as the rise. It is difficult to ascertain in which point of the curve systole ends. Measurements show that the average period between the first rise in the pressure curve and its return to the base line, lasts from 0.46 to 0.55 sec. (Fig. 1.)

In about 150 normal toads kept in a humid atmosphere, the frequency of the lymph hearts was determined at different temperatures from 0° to 37°C. The frequency increases with the temperature. We noted an average of 15 beats per minute at 0° and 123 beats per minute at 37°C. At room temperature (19°C) the mean

[1] Foglia, V. G., and Braun-Menendez, E., *Rev. Soc. Argent. Biol.*, 1939, **15**, 178; *Compt. rend. soc. biol.*, 1940, **133**, 328.

[2] Orias, O., and Braun-Menendez, E., *The Heart Sounds in Normal and Pathological Conditions*, Oxford University Press, London, 1939, p. 29.

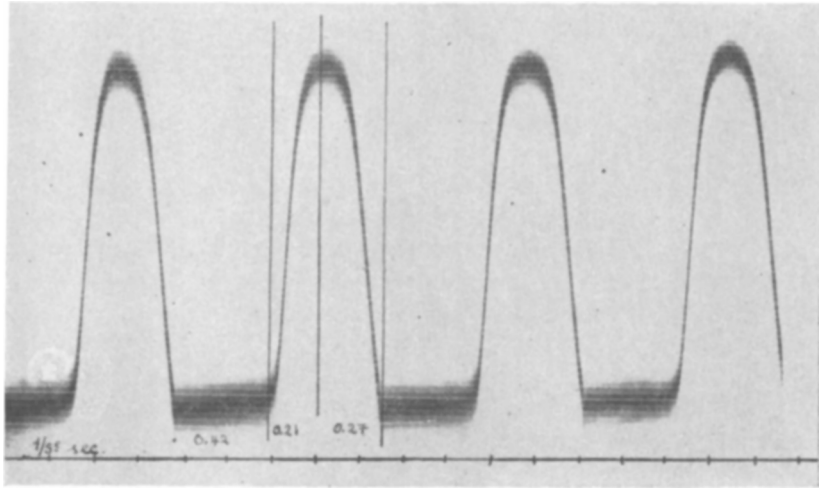

FIG. 1.
Optical record of the variations of intracardial pressure of the posterior lymph heart. Time in fifth of second.

frequency was observed to be 50 beats per minute. The increase in frequency follows the Van't Hoff law between 0° and 20°C.

The frequency of the lymph hearts was found to be less in hypophysectomized and in adrenalectomized toads than in the normal controls (Table I).

TABLE I.
Effects of Hypophysectomy and Adrenalectomy on Frequency of Toad Lymph Heart Contraction.

	No. of toads	Mean frequency of post. lymph hearts per min. at 20°C	
		Right	Left
Hypophysectomized, 8 days	10	40.6	40.4
Controls, " "	8	48	50
Adrenalectomized, 2 "	8	45	45
Controls, " "	4	54	53

The gross effects of certain representative cardiac drugs on the frequency and amplitude of contractions of the posterior lymph hearts was studied after injection of 0.5% to 2% solutions into the dorsal lymph sac. Some observations were made following local application after removing the skin covering the posterior lymph hearts.[3]

[3] Foglia, V. G., and Braun-Menendez, E., *Rev. Soc. Argent. Biol.*, 1939, **15**, 235; *Compt. rend. soc. biol.*, 1940, **133**, 331.

We noted that curare (1%), erythrine (1%), acetylcholine (2%), and nicotine (0.5%) applied locally or injected into the lymph sac produced an immediate stoppage of the contractions of the lymph hearts. Adrenaline (1%), though not constantly, had the same effect. Strychnine (1%) and veratrine (1%) also stopped the heart beats but only after the general symptoms of intoxication had appeared. Eserine (0.5%), veratrine (1%) and ouabain (1%) applied locally caused slight diminution in the amplitude of the beats. Pilocarpine (1%), atropine (1%), pitressin and pitocin did not affect the activity of the posterior lymph hearts.

13037 P

Ovulatory Response of *Rana pipiens* to Mammalian Gonadotropic Factors and Sex Hormones.

WILLIAM B. LANGAN. (Introduced by L. G. Barth.)

From the Biological Laboratories of Columbia and Fordham Universities, New York.

The complete refractoriness of the common frog, *Rana pipiens,* to mammalian gonadotropic factors has attracted considerable attention, especially from point of view of comparative endocrinology and when considering such concepts as species gonadotropic specificity.[1] On the other hand, stimulation of the reproductive tracts of immature mice has been brought about by large doses of fresh anterior pituitary from *Rana pipiens.*[2] For further investigation of this problem the following preliminary experiment was undertaken.

Twenty-nine adult female *Rana pipiens* received abdominal injections, in varying concentrations, of (1) gonadotropic factors of mammalian anterior pituitary, (2) gonadotropic factors of pregnant mare's serum (gonadogen), (3) α-estradiol dipropionate (diovocylin), (4) progesterone (lutocylin), and (5) testosterone propionate (oreton). Injections of distilled water, sesame oil, and homoplastic pituitaries served as controls.

Approximately 72 hours after treatment an attempt to strip eggs was performed, immediately followed by laparotomy. Portions

[1] Creaser and Gorbman, *Quart. Rev. Biol.*, 1939, **14**, 311.

[2] Adams, E. A., and Granger, B., PROC. SOC. EXP. BIOL. AND MED., 1938, **38**, 585.