CHANGES IN THE CHOLESTEROL CONTENT OF OVARIES AND ADRENALS DURING OVULATION INDUCED BY HOMOPLASTIC PITUITARIES IN THE GREEN FROG, *RANA HEXADACTYLA* (LESSON)

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THERE are different views with regard to the production of steroids by the amphibian ovary and the reports on the presence of steroid-dehydrogenases are contradictory[1–5]. Since the adrenocorticoids play a facilitating role during ovulation[6–7] it is believed that the maturation of oocytes and ovulation in Amphibia may be due to the steroids produced by the adrenals[1]. This investigation is an attempt to find out the relative efficiency of ovaries and adrenals in utilizing cholesterol during ovulation induced by pituitaries administered exogenously since the same may be regarded as an index of steroid production by these organs[8].

Adult frogs, *R. hexadactyla*, weighing 250 to 300 g, were collected from the vicinity of Mysore city (South India) during the breeding season and maintained separately in aerated aquaria at a room temperature of 25±1°C. They were induced to spawn with homoplastic pituitaries which were collected from gravid females of similar weight range. The pituitaries were homogenized in distilled water, in the proportion of five glands per ml and one ml of this homogenate was administered intraperitoneally into the treated ones[9]. Frogs receiving an equal volume of distilled water served as controls. The autopsy was carried out at intervals after the treatment as shown in Table I. Appropriate amounts of the ovarian and adrenal tissues, which were cut and separated as far as possible from the admixed kidney tissue, were weighed and used for the estimation of cholesterol[10]. While calculating the utilization of cholesterol by the ovary, the amount present in the ovulated eggs was added to that of the post-ovulatory stage and the average was calculated. In the case of adrenals the discrepancy between the control level and that of the treated group E was taken.

It may be noted from Table I that the ovary releases eggs within 1½ hours after the treatment and by about 12 hours the ovulation is complete since no eggs are found in the body cavity. The period from three to twelve hours constitutes the active ovulatory phase. A gradual reduction in the cholesterol content of ovary occurs during the process of ovulation and it is significant by about six hours (Table II). Unlike ovaries the adrenals register a rapid decrease in their cholesterol content during the peak period of ovulation (group E) and it is followed by a quick recovery. The per cent utilization of cholesterol is found to be 37·9 for the ovary and 53·6 for the adrenals.

Both the metabolic pathways and the enzymes involved in the synthesis of steroids by ovaries and adrenals in Amphibia are known to bear many similarities

TABLE I

Response of ovary to the pituitary stimulation and ovulation in Rana hexadactyla

Duration of Treatment	Body weight (g) (M ± S.E.)	Weight of ovary (g) per 100 g B.W. (M±S.E.)	* Rate of release of eggs		
			Body cavity	Oviduct	Aquaria
A Control	258±34	4·2±0·9	Nil	Nil	Nil
B Treated ¾ of an hour	325±23	3·2±1·0	..	—	—
C Treated 1½ hours	305± 7	2·6±0·7	+	+	—
D Treated 3 hours	287± 7	1·7±0·2	+	++	—
E Treated 6 hours	294±20	1·4±0·1	+	++	—
F Treated 12 hours	308±12	1·2±0·1	—	++	+++

M±S.E. Mean in relation to standard error.
*+ = 1 to 10 eggs released.
++ = 10 to 50 eggs released.
+++ = 50 or more eggs.

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TABLE II

Changes in the cholesterol content of ovary, adrenals and kidney tissue during ovulation in R. hexadactyla

	Time of Autopsy		Cholesterol mg/100 g weight of tissue (M±S.E.)		
			Ovary	Adrenal	Kidney
A	Control	(8)	0·66±0·03	0·84±0·10	0·39±0·01
B	Treated ¾ of an hour	(6)	0·63±0·02	0·71±0·07	0·37±0·02
C	Treated 1½ hours	(8)	0·72±0·05	0·85±0·05	0·25±0·01
D	Treated 3 hours	(8)	0·61±0·06	0·75±0·10	0·28±0·01
E	Treated 6 hours	(10)	0·44±0·04	0·39±0·04	0·30±0·03
F	Treated 12 hours	(10)	0·43±0·04	0·81±0·11	0·36±0·04
	Ovulated eggs	(5)	0·40±0·09	..	..

Number in parenthesis indicates the number of frogs used.

	Ovary	Adrenal	Kidney
A *vs* C	$t = 1·016$ $P < 0·3$	$t = 0·632$ $P > 0·5$	$t = 18·060$ $P < 0·001$
A *vs* D	$t = 0·756$ $P < 0·5$	$t = 4·021$ $P > 0·002$	$t = 5·386$ $P < 0·001$
A *vs* E	$t = 4·301$ $P < 0·002$	$t = 0·200$ $P > 0·8$	$t = 2·895$ $P < 0·005$
A *vs* F	$t = 4·847$ $P < 0·001$		$t = 1·383$ $P < 0·2$

to those already existing in mammals[11-12]. The results of this study indicate that the administration of homoplastic pituitary homogenates to induce ovulation leads to the production of steroids by both the ovaries and the adrenals. However, the adrenals seem to contribute a major share in the production of ovulatory steroids and the same might explain the facilitatory role played by the adrenocorticoids during ovulation. The physiological status of adrenals is, therefore, an important factor that should be taken into account for evaluating the ovulatory response of ovaries in Anura.

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A NEW TYPE OF EMBRYO SAC ORGANIZATION IN ANGIOSPERMS

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IN the course of our investigation on the development and organization of the embryo sac in Podostemaceae members, we have come across a peculiar type of organization so far not reported in any angiosperm.

The taxon *Willisia selaginoides* (Bedd.) Warming *ex* Willis was collected on 10-2-1973 in a stream flowing at Parambikulam submergible area in Trichur district, Kerala State. Voucher specimen bearing No. 63 *Nagendran* has been deposited in the herbarium