trogression of atheromatosis in rabbits only after infusion of phospholipid emulsion.

V. FELT and D. GRAFNETTER

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Zusammenfassung

Es wurde der Einfluss von Fettemulsioninfusionen auf das Serumlipoproteinspektrum von atherosklerotischen Kaninchen untersucht. Nach Lipoidinfusionen kommt es zu einer Verschiebung des Cholesterols und der sudanfärbbaren Lipoide aus dem Bereich der β-Globuline in jenen der α-Globuline.

A Consummatory Situation The Effect of Eggs on the Sexual Behaviour of the Male Three-Spined Stickleback (*Gasterosteus aculeatus* L.)

The decrease of a certain motivation after the performance of the appropriate consummatory act (CRAIG[1]) is a well-known phenomenon. There has been much discussion, however, as to how this phenomenon is effected. The original view (LORENZ[2]), that the performance of the consummatory act should actually consume motivation, has largely been abandoned. It has been pointed out that consummatory acts may effect a change in the external and/or internal situation, and it has been proposed that it is this new situation which stops the activity of the appropriate functional complex, rather than the performance as such of the consummatory act (see e.g. BASTOCK *et al.*[3]). In the male three-spined Stickleback fertilization is followed by an immediate decrease of sexual motivation, as measured by the number of zig-zags performed towards a female in a glass-tube ('sex-test', see VAN IERSEL[4]), and in this case the reduced pressure in the gonads, resulting from the decreased amount of sperm, has been proposed to be the 'consummatory situation' which stops sexual activity. Since in my present research on the subject of Stickleback behaviour the causation of this change in sexual behaviour has my special attention, I undertook to determine the exact influence of the act of fertilization experimentally. Two types (1 and 2) were designed such as to differ only in that fertilization did or did not occur.

(1) A male is given a sex-test of 1 min and the number of zig-zags is counted. The average of 10 experiments is 41·5/min. Then a female is introduced in the tank and is courted, until it creeps into the nest to deposit its eggs. When the female comes out the male creeps through the nest and fertilizes the clutch. Immediately the female is taken away, and so is the nest with the cluth. Another male's empty nest is given in return. A second sex-test of 1 min immediately after exchanging the nests (1–2 min after fertilization) yields an average of 4·6 zig-zags/min.

(2) In the second type of experiment the procedure is the same up to the moment when the female is depositing eggs. When it has almost finished with this, a ring of thin copperwire is put in the nest-entrance against the clutch, so that it prevents the male's entering the nest, as the diameter of the ring is about that of the male's head just before or behind the eyes. However, while trying to creep in for fertilizing it can and does amply touch the eggs. It is allowed to 'sniff' at the clutch in this way for 30 s, thus giving it at least as much opportunity to perceive the eggs as in the normal cases, in which the males may spend a similar time before fertilizing. When the ring has been put in position the female is removed as soon as it leaves the nest. After the 30 s period the nest with the eggs is replaced by an empty one. Of 13 experiments, the average number of zig-zags before the introduction of the female is 36·8/min; immediately after exchanging the nests it is 4·4/min.

To test the possible criticism that sperm might be ejaculated during the 30 s period of intention fertilization movements and 'sniffing' at the eggs, 16 clutches which had been subjected to such a period were cultured in glass-jars. My supposition, which was tested and verified by another experiment, was that if sperm were ejaculated it would be attracted by the eggs over the distance of about 2 cm from the male's genital pore to the nest-entrance. In 4 out of these 16 controls the males had been very persistently trying to get into the nest, and succeeded to get half-way through the ring. In 2 out of these 4 cases I found 4 developed eggs, in the remaining 14 controls none at all. So, during the 30 s period at the most very little sperm is ejaculated. Ejaculation of such an amount of sperm has no reducing influence on sexual behaviour: I found, by similar methods, that during 'creeping through' the nest (VAN IERSEL[4]), a movement very similar in form to the movement of fertilization, very often some sperm is ejaculated, and after 'creeping through' the number of zig-zags is higher than before (the average increase being 27%; P. SEVENSTER, personal communication).

From these results I must conclude that the act of fertilization is not the cause of the decrease of sexual motivation as described in this report. Nor can it be ascribed to the performance of the other sexual activities which precede fertilization, comprising zig-zagging, leading, showing the nest-entrance, and finally quivering on the female's tail when it is in the nest. (For description of these movements see TER PELKWIJK and TINBERGEN[5]). This fact is demonstrated a. o. by another of my experiments, in which the male was presented with a fresh clutch obtained by stripping and put into the nest by hand. So in this case no courting occurred (nor fertilization). The few (4) experiments of this type done thusfar yield an average of 40·7 zig-zags/min before, and of 2·5 zig-zags/min after egg presentation.

I then finally propose that the decrease of sexual motivation as described here is due to the male's *exposure to the eggs*, and that hereby an example is given of a real consummatory situation – which is *not* brought about by the performance of a consummatory act.

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A. C. ANGELA BOL

Zoological Laboratory of the Rijksuniversiteit, Leiden, December 23, 1958.

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Zusammenfassung

Das Männchen des dreistachligen Stichlings zeigt unmittelbar nach Balz und Befruchtung der Eier kein sexuelles Verhalten mehr. Die Erniedrigung der sexuellen Motivation wird nicht durch Balzhandlungen oder Befruchtung verursacht, sondern durch die Wahrnehmung der Eier im Nest (Beispiel einer «Endsituation»).

The Response of Costal Cartilage to Changes in Hormonal Environment

The effects of testosterone propionate (T. P.) and hydrocortisone (F) on anabolic and catabolic processes, insofar as nitrogen metabolism is concerned, are well documented. Since nitrogen balance studies are measurements of general metabolism and as such do not give any direct information of hormonal effects on any one tissue, we have focused our interest on metabolic alterations induced by these steroids in a specific tissue.

Of the various tissues studied, we have observed, as have others[1,2,3] that costal cartilage has a strong affinity for radiosulfate and that this tissue is sensitive to changes in hormonal environment. The present report describes some of our observations on the effect of T. P. and F on the radiosulfate uptake by costal cartilage in the intact or hypophysectomized male rat.

Methods. A. *Animal treatment.* Albino rats of the Holtzman strain were hypophysectomized[4] at 21 ± 2 days. Ten days post-hypophysectomy (8 days after arrival in the laboratory) the animals were dosed subcutaneously 1 ×/day/7 days. T.P. was given in cottonseed oil, F as a suspension in carboxy-methylcellulose vehicle and growth hormone, intraperitoneally, in saline solution. When T.P. was administered concurrently with F, the injection site was in an area removed from the site of F injection. S^{35} [5], as sodium sulfate in saline, at a dose of 3 μc was injected intraperitoneally daily. (For exceptions see Tables.)

24 h after the last injection, the animals were sacrificed, VII rib cartilage removed, cleaned of adhering tissue, weighed and digested. Body weight was taken prior to and at the end of the experiment. Animals showing abnormal growth curves or any other gross indication of incomplete hypophysectomy were discarded.

B. *Analytical methods.* Individual rib cartilage specimens were digested in a water bath at 80–85°C in covered test tubes containing 1 cm³ 0·2 *M* Na_2SO_4 and 1 cm³ conc. HCl. Following digestion, 10 cm³ distilled water was added to each tube, and after the solution reached water bath temperature, the sulfate was precipitated as a barium salt by addition of 10 cm³ 1% $BaCl_2$ in 1–2 cm³ aliquots at 10 min intervals. The supernatant and precipitate were quantitatively transferred to a tared filter disc (S & S No. 586, 59/64 in. diameter) using a Tracerlab metal filter. The tube and precipitate were washed with distilled water followed by 95% ethanol. The filter paper with precipitate was then transferred to a tared planchet and dried under infrared light. The samples were counted using an end window gas flow counter. Self-absorption was calculated to infinite thinness and the counts reported as counts per min per mg wet weight (cpm/mg tissue).

All experiments were repeated 2–3 times with 8–10 animals per group. The results presented are those of a representative group and not the average of all the experiments.

Table I

Radiosulfate Uptake by Costal Cartilage (cpm/mg) in Intact and Hypophysectomized Male Rats Following Administration of Hydrocortisone and Testosterone Propionate

Group	Hypophysectomized cpm/mg*	Body Weight (g)		Intact** cpm/mg	Body Weight (g)	
		Intact	Final		Intact	Final
Control	39·3 ± 2·5	60	70	15·8 ± 1·9	65	85
T.P., 5 μg	46·1 ± 2·2	60	73	17·8 ± 0·7	63	82
25 μg	54·5 ± 1·4	59	70	21·7 ± 1·0	60	87
50 μg	55·4 ± 2·9	58	60	17·2 ± 1·0	66	89
100 μg	57·9 ± 2·8	60	75	21·2 ± 0·7	61	84
Control	38·6 ± 5·2	60·9	71·8	43·1 ± 2·2	47·4	71·6
F, 25 μg	29·8 ± 3·3	61·9	72·2	40·5 ± 2·8	47·0	71·0
50 μg	28·2 ± 1·3	60·5	70·0	42·1 ± 2·7	45·0	66·6
100 μg	21·8 ± 1·3	60·6	64·3	40·4 ± 1·6	47·4	65·0
200 μg	14·7 ± 1·1	61·1	59·6	32·7 ± 2·0	48·2	62·0
500 μg	12·9 ± 1·0	59·6	55·6	45·0 ± 1·4	47·6	49·2

Group	Hypophysectomized cpm/mg	Body Weight Intact	Change Final
Control	38·3 ± 2·9	63	70
T.P., 50 μg	51·5 ± 3·4	63	73
F, 25 μg	31·7 ± 3·5	65	73
50 μg	21·7 ± 2·7	63	70
500 μg	12·6 ± 2·7	66	60
F, 25 μg + T.P. 50 μg	40·7 ± 2·4	67	77
50 μg + T.P. 50 μg	30·1 ± 1·9	62	70
500 μg + T.P. 50 μg	13·0 ± 1·7	63	59

* S^{35}–3 μc/day/7 days, I. P. ** S^{35}–1 μc/day/7 days, I. P.

Table II

Effect of Age at Hypophysectomy on Radiosulfate Uptake (cpm/mg Tissue) by Cartilage in Male Rats

Age (Days)	Control*	50 μg T. P.	100 μg T. P.
26	24·9 ± 3·8	27·8 ± 4·0	—
31	13·6 ± 3·0	16·3 ± 2·8	19·5 ± 1·0
36	10·5 ± 1·0	11·7 ± 1·4	—
41	5·9 ± 0·9	7·7 ± 0·7	10·5 ± 1·2
		20 μg G.H.**	100 μg G.H.
26	20·2 ± 2·7	48·4 ± 6·0	68·9 ± 4·7
31	13·0 ± 3·1	30·1 ± 3·0	41·6 ± 2·8
36	8·8 ± 6·0	34·3 ± 4·0	46·8 ± 3·8
41	5·6 ± 0·8	—	30·4 ± 2·5

* S^{35}–3 μc/day/7 days, I. P.
** Growth Hormone – 1 × day/7 days, I. P.

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[5] The assistance of N. A. DRAKE, of the Upjohn Co., for procuring and handling the isotope is appreciated.