雄モルモットの恥骨縫合の弛緩に対するリラキシンと性ホルモンの影響

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Effects of Relaxin and Sex Hormones on Relaxation of Symphysis Pubis of Male Guinea Pig

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Relaxin was found in the testes of Rooster (1) and produced artificially in the male animals (2). Then, the relation of relaxin to androgen became to be of interest. This paper is concerned with influence of androgen on the effect of relaxin upon symphyses pubes of guinea pigs, and with the effect of relaxin on male symphsis pubis.

Methods and Materials

This study consists of 3 experiments. The first experiment is concerned with the relation of relaxin to androgen, pertaining to symphyseal relaxation of spayed, adult guinea pigs.

Guinea pigs used in the first experiment were ovariectomized ones of assay colony. Three groups of guinea pigs were primed by injections of 1.2 μg. of estrogen daily for 4 days. On the 5 th, 3 GPU of relaxin in normal saline was injected to each animal of the first group. The same dose of relaxin and 10 mg. of testosterone propionate in 0.1 ml. of sesame oil were given simultaneously to each animal of the second group. The third group was injected concurrently with both hormones in the above doses through the 5 th day.

At 6 hours after the final injection, symphyses pubes of these animals were examined for their relaxation by manual palpation.

The second experiment includes symphyseal response of male animals to relaxin. Male guinea pigs of various ages including immature ones were used. Some of them were castrated. Animals were injected with various doses of estradiol benzoate for the periods of 5 to 16 days, and then injected with a single dose of relaxin. Symphyseal relaxation was examined at 6 hours following the injection of relaxin. Details of the administration and the animals used were shown in individual form in Table 2 and 3.

The third experiment was pertains to the posibility of symphyseal relaxation of immature male guina pigs by treatment of progesterone. Each animal was injected with 50 μg. of estradiol benzoate daily through the entire period of the experiment. From 8 th day animal received daily 15 mg. of progesterone for 8 days, and thereafter 100 mg. of progesterone for 6 days. The symphysis pubis was examined daily through the entire period of the experiment.

Results and Discussions

Results of the first experiment were shown in Table 1. Either the successive administration or a single injection of testosterone propionate did not alter the effect of relaxin on symphyseal relaxation. Thus, the effect of relaxin is independent from

action of androgen.

Table 1. Effect of androgen on symphyseal relaxation of female guinea pig.

Group	Injection					No. of guinea pigs used	Response 6 hours
	1 st.	2 nd.	3 rd.	4 th.	5 th.		
1 (Control)	E	E	E	E	R	8	100%
2	E	E	E	E	TR	8	100
3	ET	ET	ET	ET	TR	8	100

E: Estradiol benzoate 1.2 μg.
R: Relaxin 3 GPU
T: Testosterone propionate 10 mg.

Results of the second experiment were shown in Table 2 and 3. The adult male guinea pigs injected with 0.8 or 1.6 μg. of estrogen daily for 8 days did not respond to 2 GPU of relaxin. Of the adult castrated male, 3 guinea pigs treated with 0.8 or 1.6 μg. of estrogen daily for 8 days did not show any symphyseal relaxation by 3 GPU of relaxin, and thereafter 5 μg. of estrogen was injected for 16 days, but symphyseal rseponse was again negative to 3 GPU of relaxin.

Table 2. Effect of single injection of relaxin upon relaxation of symphysis pubis of immature male and castrated male guinea pig.

Relaxation of pubis symphysis								
Day					1 st.	4 th.	5 th.	
Treatment of hormone			Dose of estradiol daily				Dose of relaxin 10 GPU	
Animal No.	Body weight g.	Days after birth	μg. × days				Initial	6 hrs.
1	420	140	5	4	—	—	—	—
3	430	150	5	4	—	—	—	—
5	180	37	5	4	—	—	—	—
6	220	37	5	4	—	—	—	—
7	220	37	5	4	—	—	—	—
8	180	45	5	4	—	—	—	+
9	310	45	5	4	—	—	—	±

Table 3. Effect of relaxin upon the symphysis pubis of intact and castrated male guinea pig.

Relaxation of symphysis pubis								
Day			1 st to 7 th		8 th	9 th to 15 th		16 th
Treatment of hormone			Dose of estradiol		Dose of relaxin 3 GPU	Dose of estradiol		Dose of relaxin 3 GPU
Animal	No.	Body weight g.	μg. × days			μg. × days		
Castrate	1	310	0.8	7	—			
	2	350	0.8	7	—			
	3	400	1.6	7	—			
	4	390	1.6	7	—			
Intact	5	380	0.8	7	—	5	7	—
	6	440	1.6	7	±	5	7	—
	7	420	1.6	7	—	5	7	—

Two castrated male guinea pigs and 5 immature male guinea pigs between 35 and 45 days of age were injected with 5 μg. of estrogen for 4 days and on the next day with 10 GPU of relaxin. One animal of the immature group showed a considerable simphyseal relaxation and another a slight response.

It was concluded that symphyses pubes of mature male guinea pigs do not respond to relaxin irrespective of intact or castrate, and that some of immatuse guinea pigs respond to relaxin. No response of symphyses pubes of male guinea pigs seems to be due to ossification of symphyses, rather than to sexual charactor. Independence of symphyseal relaxation from actien of androgen was demonstrated as above.

Results of the third experiment were shown in Table 4. Two guinea pigs of 4 did not respond to the prolonged treatment of progesterone, but 2 other animals showed a slight response. Of course, in the female control a marked relaxation was induced. Even if relaxin produetion is stimulated by progesterone treatment, symphyses pubes of male guinea pigs scarcely respond to the hormone, even though they are not adult. This also seems to be due to ossification of the symphyses pubes.

Table 4. Effect of successive treatment of estrogen and progesterone on symphysis pubis of immature male guinea pigs.

Animal No.	pretreatment of estradiol		Treatment				Relaxation	Treatment				Relaxation
			Estradiol		Progesterone			Estradiol		Progesterone		
	μg. × days		μg. × days		mg. × days			μg. × days		mg. × days		
1	50	7	50	8	15	8	±	50	6	100	6	±
2	50	7	50	8	15	8	−	50	6	100	6	−
3	50	7	50	8	15	8	±	50	6	100	6	±
4	50	7	50	8	15	8	−	50	6	100	6	−
5 *	50	7	50	8	15	8	++	50	6	100	6	++

*: Immature female guinea pig.

Summary

No synergism of relaxin and androgen on symphyseal relaxation was demonstrated using guinea pig. The sympysis pubis of the male guinea pig hardly responded to the combination of relaxin and ovarian horsmones after its ossification, but there is a posibility of the relaxation befor the ossification by the treatment of these hormones.

摘　　要

モルモトの恥骨縫合の弛緩に対し，アンドロゼンとリラキシンの共働作用はなかった．

雄のモルモットの恥骨縫合は，化骨後には，リラキシンと卵巣ホルモンの組合せにほとんど反応しないが，化骨前には，これらのホルモン処理により弛緩する可能性がある．

References

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2) Wada H., and M. Yuhara : Jap. J. Zoofech. Sci., (in press)