significantly different than in patients with healed duodenal ulcer.

3. Twelve-hour nocturnal gastric secretion in patients with healed duodenal ulcer and who are without symptoms is significantly greater than that of normal healthy individuals.

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Can Gonadotrophic Hormones Cross Two Parabiotic Unions in Rats?

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It has been shown that when 3 rats are joined in parabiosis gonadotrophic hormones produced by the middle member of the triplet set affect both of the other rats at the same time.[1] The present experiment was designed to test the ability of gonadotrophic hormones to pass from one lateral member, through the middle animal, and into the opposite lateral triplet of 3 united rats. Preliminary results, reported in abstract form,[2] have been extended and confirmed.

Methods and Results. Results are given for 19 sets of triple parabionts. Eight sets were united on the 25th day of life and 11 on the 40th day. A total of 14 single females, littermates of the parabionts, were used as controls in the two groups. All animals were autopsied at the age of 50 days. The results for the 2 age groups substantiate each other.

In producing triple parabiosis the edges of the abdominal walls were sutured together without establishing a coelio-anastomosis. The scapulae were held together by 3 interrupted sutures. The skin was joined by metal wound clips from ear to base of tail after removing strips of skin from the adjacent sides of each animal.

Two females from the same litter were joined in parabiosis, and a castrated male was attached to the left sister to make the triplet set. In all but 2 cases the male was a littermate of the 2 females in the set. The passage of gonadotrophic hormones from the castrated male to the center female was indicated by the enlarged ovaries and uterus and by the involuted thymus (Fig. 1 and Table I). The female to the right, not directly attached to the male, showed no ovarian stimulation, the ovaries weighing even less than those of the littermate controls. The uterus, however, appeared to be slightly stimulated and the thymus very slightly reduced in size. The stimulated ovaries of the middle female contained large follicles and large corpora lutea.

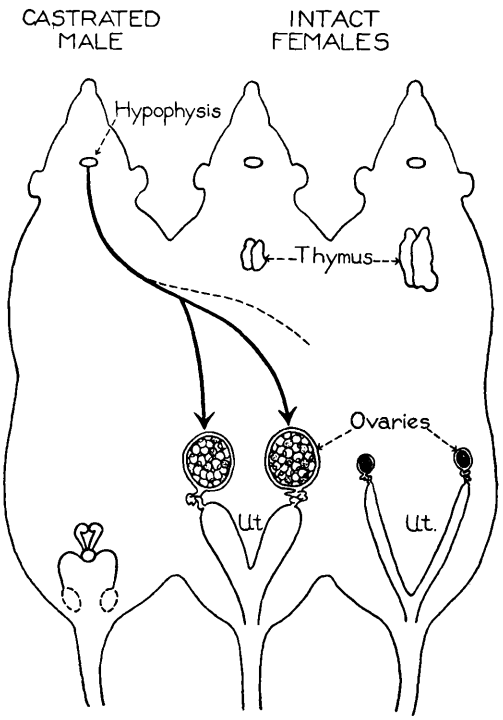

FIG. 1.

[1] Greep, R. O., PROC. SOC. EXP. BIOL. AND MED., 1940, **44**, 214.

[2] Plagge, James C., *Anat. Rec.*, 1946, **94**, 489.

TABLE I.
Some Effects of Triple Parabiosis in Rats—Joined from Days 25 to 50 and from Days 40 to 50.

	Days Joined	No. of Animals	Body wt (g)	Avg organ wt in mg per 100 g body wt		
				Ovaries	Uterus	Thymus
Center female	25-50	8	96	257	333	76
(attached to castrated male)	40-50	11	108	203	264	63
Right female	25-50	8	101	11	200	266
(attached to female)	40-50	11	113	27	170	241
Female controls		6	123	16	95	298
(littermates of parabionts)		8	146	29	152	296

Discussion. In triple parabiotic rats of which the left member is a castrated male, the known ability of gonadotrophic hormones to cross the parabiotic union[3,4,5] is demonstrated by the stimulation of the ovaries of the middle female. The apparent lack of stimulation of the ovaries in the second female suggests that the gonadotrophins are utilized completely by the ovaries of the first female.

The reason for the increase in the weight of the uterus of the second female, in the absence of any enlargement of the ovaries, is not clear. Either there is some transfer of estrogen between the 2 females or the ovaries of the outer female, though reduced in size, are actually elaborating sex hormone. If estrogen from the center female is stimulating the uterus of the other female, a very high concentration of the hormone is indicated since it has been demonstrated that at least 40 times the minimal effective dose must be injected into one member of a pair of ovariectomized females which have been united in parabiosis in order to detect uterine stimulation in the twin.[5] If the small ovaries of the outer female are stimulating its uterus then size of the ovary fails to measure physiological activity.

The slight decrease in the weight of the thymus of the second female is correlated with a proportionate increase in the weight of the uterus and is probably also due to the result of estrogens since gonadotrophins have no direct effect upon the thymus.[6,7]

Summary. Gonadotrophic hormones from a castrated male cross successfully the first parabiotic union to stimulate the ovaries of the middle female of a set of triple parabiont rats. But the gonadotrophins are so completely utilized by the center animal that they produce no detectable ovarian stimulation of the second female.

[3] Kallas, H., *Compt. Rend. Soc. Biol.*, 1929, **102**, 280.

[4] Hill, R. T., *J. Exp. Zool.*, 1932, **63**, 203.

[5] Biddulph, Clyde, Meyer, Roland K., and Gumbreck, Laurence G., *J. Exp. Zool.*, 1941, **88**, 17.

[6] Evans, H. M., and Simpson, M. E., *Anat. Rec.*, 1934, **60**, 423.

[7] Plagge, James C., *J. Morph.*, 1941, **68**, 519.