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Effect of castration on weight of pituitary in rabbits.

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The object of the present investigation was to observe the effect of castration, in male and female rabbits, on the weight of the hypophysis. Some workers have recorded an increase in the weight of this gland after removal of the generative organs, *e. g.*, Fichera[1] ('05) found this to be the case in guinea pigs, rabbits, domestic fowls, cattle, and buffaloes, and Kon[2] ('08) has observed the same results in man. Marrassini[3] and Luciani ('11), on the other hand, also using guinea pigs, rabbits, sheep, cattle, and domestic fowls deny that this is the case. The question therefore at the present time appears to be an open one.

My observations have been made on two series of rabbits. The first series consisted of fifty animals including about an equal number of males and females. The sexes were separated and kept in adjoining pens, in the open air, under similar conditions as regards feeding and attendance. From approximately one half of each group the sexual glands were removed, the other half being kept as controls. The body weights were recorded weekly, on the forenoon of the same day (Saturday), before the animals had been fed.

They were killed at intervals varying from 26 to 208 days after castration, the body weight, minus the gastro-intestinal contents (the reduced body weight), was determined and the pituitary was removed with special care and weighed at once on a chemical balance. It was found that for the males the average weight of the pituitary, in milligrams per kilo of reduced body weight, was 11.57 mg. for the castrated and 10.23 mg. for the controls; while among the females the average pituitary weight,

[1] Fichera, *Archives ital. de Biol.*, Vol. 43, p. 405, 1905.

[2] Kon, *Ziegler's Beiträge zur pathologischen Anatomie und zur allgemeinen Pathologie*, Vol. 64, p. 233.

[3] Marrassini et Luciani, *Archives ital. de Biol.*, Vol. 56, p. 395, 1911.

for the spayed animals, was found to be 12.74 mg., and for the normals 13.49 mg.—a variation no larger than would probably be found among two groups of normal rabbits.

Several objections might be made to the above experiment: (1) the ages of the animals were uncertain, (2) it was not known whether the females had ever been pregnant, (3) the castrated and control animals were not necessarily of the same litter. For this reason another investigation was undertaken on a second series of rabbits.

In the second experiment most of the operated and control animals were selected from the same litter. It was known that, with a few exceptions, the females had never been pregnant. The animals were also younger than those of the first series, many weighing less than one kilo. The sexes were separated and kept under the same conditions as in the first experiment. At the end of about four months after operation a control and an operated animal were killed by coal gas on the same day, the reduced body weight recorded, and the pituitaries removed and weighed as before.

In the male group there were ten animals which could be controlled by eight of the same litter. The average weight of these pituitaries in milligrams per kilo of body weight is for the castrated 15.3 mg. and for the controls 15.8 mg., which shows a difference so small that it is entirely negligible. Among the females six were controlled by five of the same litter and in this case the average for the spayed animals is 16.49 mg. and in the controls 13.27 mg. or an increase of about 24 per cent. by this grouping.

It is significant to note that the curves of growth plotted from the weights taken each week show a distinct gain of the operated over the control animals in case of the males but not in case of the females, thus agreeing with Hatai's[1] ('13) results from the albino rat in that when castration is followed by an overgrowth in body weight there is no increase in the weight of the pituitary. The average for the whole series of twenty castrated males was found to be 15.94 mg., while the seventeen controls gave an average of 14.38 mg., thus showing a gain by the castrated males of less than

[1] Hatai, *Journal of Experimental Zoölogy*, Vol. 15, p. 297, 1913.

10 per cent. The whole series of females composed of ten spayed and eleven controls gave an average for the operated animals of 16.35 mg. and for the controls 13.71 mg. or a gain of 18 per cent. The curves of growth from this grouping are essentially the same as by the grouping just mentioned.

From these results it would seem that the apparent increase in weight of the pituitary after castration in case of the male rabbits should be entirely neglected, since it is no more than would be readily shown by two groups of normal animals. In case of the females of the second series the increase in weight of the pituitary of the spayed rabbits, although not marked, is quite distinct, and is accompanied by no response in overgrowth of body weight as is shown in case of the males.

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Effect of thyroidectomy followed by thyroid feeding on weight of pituitary in rabbits.

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The object of this experiment was to determine the effect upon the weight of pituitary in the rabbit following the administration of sheep's thyroid. Both males and females were used. The male rabbits were divided into two groups. The animals of one were thyroidectomized and those of the other used as controls. To one half of the thyroidectomized animals and one half of the control group a capsule containing one tenth of a gram of Armour and Company's desiccated sheep's thyroid was administered on alternate days. The females were treated in precisely the same manner and thus each sex was composed of animals under four conditions: first those which were entirely normal, second those normal and fed thyroid, third those thyroidectomized and not fed thyroid, and fourth thyroidectomized and fed thyroid.

The males and females were kept separate but under the same conditions and each animal was weighed once a week. All the animals were killed at the end of about six months after operation