

OBSERVATIONS ON THE INFLUENCE OF ISOLATED
OVARIES ON THE BODY GROWTH OF THE
ALBINO RAT (*MUS NORVEGICUS*
ALBINUS)

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TWO CHARTS

Previous experiments had shown (Stotsenburg '13) that the removal of both ovaries from a young rat was followed by an acceleration of body growth. When one ovary only was removed, the other being left untouched, the body growth was not modified (Stotsenburg '13) but the remaining ovary underwent a marked hypertrophy (Hatai '13).

The experiments to be reported were designed to test the question whether the exclusion of the reproductive function of the ovary, by isolating it from the uterus, would produce any general change in body growth.

Two series of experiments were made:—one series in which both ovaries were isolated and left in place—designated 'double isolation'—and a second, in which one ovary was isolated and left in place, while the other was completely removed—designated 'single isolation.'

TECHNIC

Each test animal underwent two operations—about ten days apart. In the case of the double isolation the procedure was as follows: About 1 cm. of the right uterine horn was removed at the first operation—and at the second, the same length of the left horn. In the single isolation the first operation was as given above—but the second consisted in the complete removal of the left ovary. All the operations were successful. The albino rats were thirty-two to thirty-five days old at the time

of the first operation and forty-five days old at the time of the second. At the date of the last operation and for the first forty-five days after the last operation, the body weights were taken at intervals of fifteen days, then at intervals of thirty days, until the termination of the experiment at two hundred days.

In the further description of the work the two series of experiments will be treated separately.

DOUBLE ISOLATION

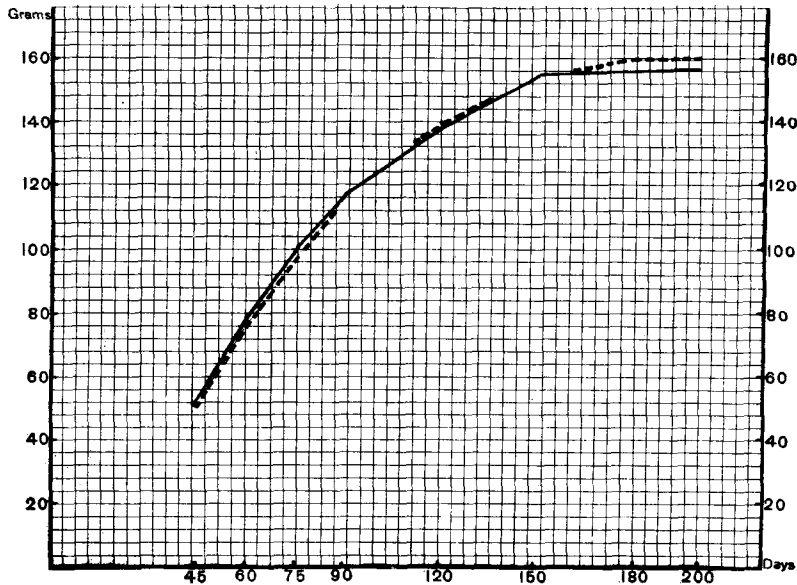
By the method just described, both ovaries were isolated in 20 females which were compared as to their body growth with 16 controls of like age. These 36 animals were from 7 litters, and as far as possible the same litter was made to furnish both control and test animals. The growth of the controls and of the test animals after double isolation is given in table 1 and shown in chart 1.

TABLE 1

Giving the average body weight of 20 test rats—'double isolation' and 16 controls, from which the graphs in chart 1 were plotted

AGE IN DAYS	TEST ANIMALS. NUMBER OF ANI- MALS	DOUBLE ISOLATION AVERAGE BODY WEIGHTS	CONTROLS. AVERAGE BODY WEIGHTS	CONTROLS. NUM- BER OF ANIMALS
		<i>grams</i>	<i>grams</i>	
45	20	49.4	51.1	16
60	20	76.5	79.2	16
75	20	98.5	101.1	16
90	20	116.0	116.7	16
120	20	140.0	138.0	16
150	20	154.0	150.0	16
180	20	160.0	156.0	16
200	20	160.4	156.8	16

From these data it is evident that this operation does not modify the growth of the body in weight. An inspection of the isolated ovaries at the time the test rats were killed yielded the following: There were 20 animals examined, in 7 rats both ovaries were not evidently diseased, but in 6 of these they were under weight and in one animal over weight. On the average these 14 ovaries were 13 per cent less in weight than was to be



expected from the tables for the normal ovaries (Donaldson '15). In 12 rats there were pathological changes. In 3 rats both ovaries were pathological. In 9 rats one ovary was pathological. In one case one ovary had disappeared. There were therefore in all 15 pathological ovaries to be considered. In the 12 rats with pathological ovaries—showing cysts—there were 15 cysts. These were distributed 11 on the left side and 4 on the right side. The first and earlier operation was on the right side.

SINGLE ISOLATION

For this series 17 test animals were subjected to the operation for 'single isolation' as previously described. There were 14 controls, and 7 litters were represented in the entire series. Test and control animals were taken as far as possible from the same litter. The growth in body weight of the rats after single isolation is given in table 2 and represented in chart 2.

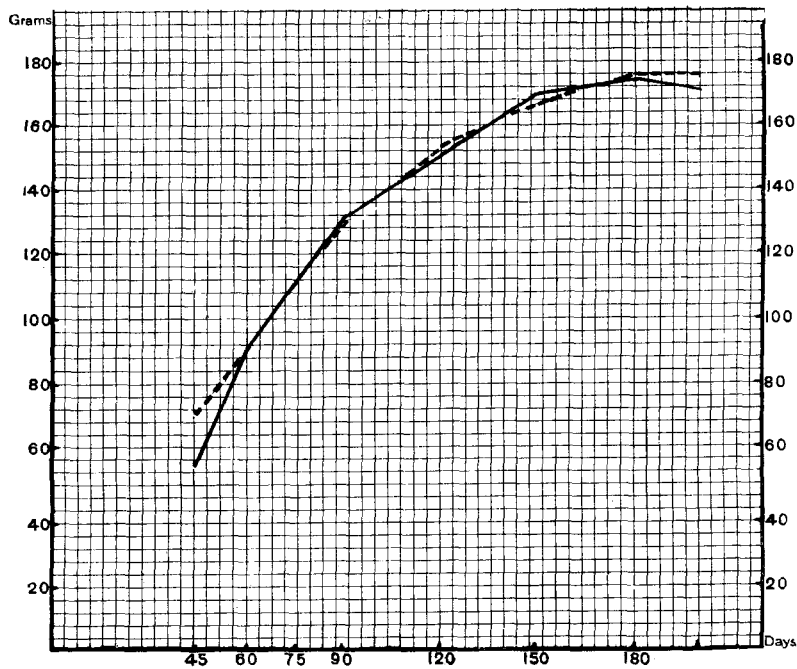
As shown by these data, isolation does not modify the body growth. An inspection of the isolated ovary at the time these rats were killed yielded the following:

TABLE 2

Giving the average body weights of 17 test rats—'single isolation'—and 14 controls, from which the graphs in chart 2 were plotted. Several animals in the test series were removed at one hundred and eighty days because of lung infection, and several after one hundred and fifty days from the control series for the same reason. Test animals—single isolation.

AGE IN DAYS	NUMBER OF ANIMALS	TEST ANIMALS. AVERAGE BODY WEIGHTS	CONTROLS. AVERAGE BODY WEIGHTS	CONTROLS. NUMBER OF ANIMALS
		<i>grams</i>	<i>grams</i>	
45	17	69.6	56.9	14
60	17	90.0	90.7	14
75	17	112.3	113.9	14
90	17	130.3	131.4	14
120	17	144.6	150.9	14
150	17	166.9	171.0	13
180	14 ¹	175.6	174.0	12
200	15	175.3	171.1	11

¹ Weighing of one rat accidentally omitted.



There were 15 test animals examined. In 10 the ovary was not diseased. In 5 the ovaries were pathological, being represented by cysts. The weights of the 10 normal ovaries were as follows: one was 44 per cent less than the table value, the remaining 9 were all above the table values. On the average these 9 remaining ovaries weighed 148 per cent more than normal. They were therefore considerably over twice the normal weight to be expected from the reference tables (Donaldson, '15). It is to be noted that in the reference tables the weights are given for both ovaries taken together.

CONCLUSIONS

1. Both the double and single isolation experiments show that the glandular function of the ovary which affects body growth is unmodified when the ovary is isolated from its connection with the uterus—since the isolated, acts like the normal ovary to inhibit growth.

2. This inhibition of growth is exercised in the case of 'double isolation' by ovaries that appear under-size or pathological at the end of the experiment (200 days), while in the case of the single isolation experiment—ovaries, for the most part greatly hypertrophied, exercise the same control.

3. From the fact that the same effect follows from ovaries in such different conditions it would appear that they probably exercise their control through the mediation of some other less modified member of the endocrine system.

LITERATURE CITED

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