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Chronic Uterine Distention in Progestin-Treated Rabbits.*†

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The present report deals with the effect of progestin on the distention-growth response of the uterus as described before.[1] Paraffin pellets were inserted into the uterus *per vaginam* in rabbits ovariectomized for one week. At the same time, 200 r.u. of oestradiol were given subcutaneously. Commencing two days later, 6.6 rb.u. of progestin was given in the next 10 days. On the thirteenth day of uterine distention, tissues were taken, prepared and studied in the manner described before.[1] The dosage of progestin was about liminal for maintenance of endometrial proliferation for a period of 10 days.[2] Two groups of rabbits were used. One consisted of 7 mature rabbits from which 13 different distention sites were available; the other group consisted of 9 immature rabbits from which 14 distention sites were available. The uterus:pellet ratio was 2.89 at one extreme and 0.26 at the other. In mature rabbits, growth resulting from distention was regularly obtained. Curve A, Fig. 1, shows the form of the curve in these rabbits, in contrast to that obtained in untreated rabbits, curve B. Here it is seen that the optimum uterus:pellet distention ratio for growth is approximately 1:2 for curve A, whereas that for curve B is 1:1. The extremes of the 2 curves, insofar as they go, bear a similar relationship to each other. Clearly, therefore, increased stretching of the tissues is essential in these rabbits to elicit an amount of growth comparable to that produced by less distention in untreated, ovariectomized rabbits. Thus, progestin serves to raise the threshold for the growth response to chronic uterine distention of the uterus. Although both the endometrium and myometrium contribute to the enlargement which takes place, the myometrium grows perceptibly more than the endometrium.

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† A full report of these findings will be given as part of a paper in the Symposium on Internal Secretions at the Biological Laboratory, Cold Spring Harbor, during the summer of 1937. Publication will be made in the Proceedings of that Symposium.

1 Reynolds, S. R. M., and Kaminester, S., *Am. J. Physiol.*, 1936, **116**, 510.

2 Allen, W. M., and Heckel, G. P., *Anat. Rec.*, 1936, **64**, 2.

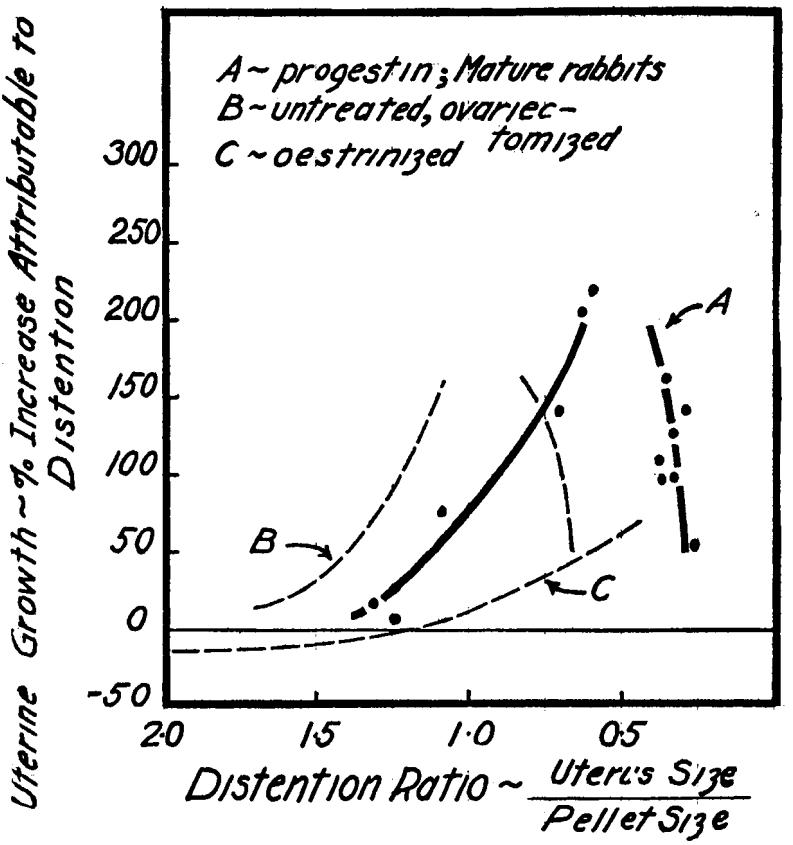

FIG. 1.

In immature rabbits treated with progestin, little or no growth resulting from distention is produced. All points in this series fall along curve C, Fig. 1, and so are classed with the data obtained in oestrin-treated rabbits. All the uteri of these progestin-treated rabbits showed good endometrial proliferation, with the possible exception of the 2 distention sites showing the greatest degree of uterine enlargement (curve A). These tissues were less proliferated than were those with smaller amounts of growth.

Summary. In mature, progestin-treated rabbits, growth resulting from distention is regularly obtained, but greater degrees of distention are necessary to produce growth responses comparable to that obtained in untreated, ovariectomized rabbits with smaller amounts of stretching. It is probable that progestin, through its property of reducing myometrial tonicity, may reduce the tension of the tissues about the pellets to such an extent that greater degrees

of stretching are required in order to produce a degree of tension equal to that obtained by less distention in untreated, ovariectomized rabbits. Hence, an appropriate amount of tension appears to be an essential condition for uterine enlargement to take place as a result of distention. In oestrin-treated rabbits, however, the distention-growth response is much reduced.[3] This has been attributed to impairment of the blood supply about the sites of distention, resulting from the great increase in tonicity of the myometrium due to oestrin. Thus distention appears to be an adequate stimulus for uterine growth when a small degree of tension is produced, but not if the tension is so great as to interfere with the nutrition (blood supply) of the tissues.

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Failure to Obtain in Immature Rabbits Uterine Growth by Chronic Distention.*

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In the course of studying the local growth which takes place in chronically distended uteri in both untreated, ovariectomized rabbits and in progestin-treated rabbits,[1-4] 12 immature rabbits were employed. In the untreated ovariectomized rabbits, 6 separate distention sites were studied, and compared with undistended areas of the same uteri. Lack of sexual maturity was evidenced by the presence of infantile uteri and small, flat ovaries without macroscopic Graafian follicles. It was found that growth resulting from distention was not obtained in any instance, even though the degrees of distention were similar to those which yielded large growth responses in mature rabbits.[2, 4]

In the 9 progestin-treated immature rabbits, 14 distention sites

[3] Reynolds, S. R. M., PROC. SOC. EXP. BIOL. AND MED., 1937, **36**, 453.

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[1] Reynolds, S. R. M., and Kaminester, S., *Am. J. Physiol.*, 1936, **116**, 510.

[2] Reynolds, S. R. M., PROC. SOC. EXP. BIOL. AND MED., 1937, **36**, 453.

[3] Reynolds, S. R. M., and Allen, W. M., PROC. SOC. EXP. BIOL. AND MED., 1937, **36**, 455.

[4] Unpublished data on the rate of the distention-growth response.