BRIEF COMMUNICATION

**ABLATION OF THE COAGULATING GLAND AND
SUBSEQUENT BREEDING IN THE ALBINO RAT***

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(Received 23rd June 1964)

It has been known for many years that in certain animals, particularly rodents, a firm coagulated mass forms in the vagina after copulation. It was called a vaginal plug or copulation plug by Moore & Gallagher (1930) who described the anterior lobes of the prostate as the source of the coagulating enzyme and called these 'coagulating glands'. This anterior portion differs physiologically and histologically from the middle and posterior lobes. In the albino rat the coagulating glands lie on the margins of the seminal vesicles, extending from their extremity to the base near the prostate.

Scott & Dziuk (1959) concluded that the coagulating gland in the albino rat was a major obstacle to electro-ejaculation since the plug blocked the urethra and caused death from uraemic poisoning. These authors removed the seminal vesicles and the attached coagulating glands and obtained samples of semen relatively free from the accessory fluids.

Birnbaum & Hall (1961) collected semen from rats using 30 cyc/sec and low voltage. The semen was without the coagulum and it was assumed that the small volume collected was due to the absence of seminal fluids. These authors also stated that the coagulating glands regenerated readily, but no data were given.

In our initial study the coagulating glands were removed from forty sexually mature albino rats (Holtzman strain) weighing from 300 to 350 g for studies of regeneration. The animals were anaesthetized by an intraperitoneal injection of 4 mg nembutal/100 g body weight. A midline laparotomy was performed and the coagulating glands were dissected away from the seminal vesicles. Haemostats were applied at the base of the glands, which were severed just above this point. The coagulating glands are not richly vascularized, and there was little haemorrhage. The rats were maintained for 20 weeks before being killed.

A rating of 0 to 4 was established to evaluate regeneration of the coagulating glands. 0 indicated no regeneration; 1, a small portion on each side left at the

* Technical Article No. 4703, Texas Agricultural Experiment Station.

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site of the haemostats; 2 indicated half of the gland regenerated; 3 indicated three-quarters of the gland; and 4 indicated complete regeneration.

Two different breeding trials were conducted. The first trial compared four normal male albino rats with four male albino rats from which the coagulating glands had been removed. The animals were allowed a recuperating period of 28 days before mating. The control group and the operated group were each mated with a total of 10 females. Each male was placed with two or three females for a period of 12 days. This allowed for at least two full oestrous cycles. After this the females were placed in single cages to litter. After the litters were weaned, the females were mixed and randomly assigned to eight males in the same proportions as for the first mating. They were again allowed to mate and litter.

TABLE 1
LITTERS FROM NORMAL MALES WITHOUT COAGULATING GLANDS

	<i>No. litters</i>	<i>Total No. born</i>	<i>No. born alive</i>	<i>No. born dead</i>	<i>Av. wt of off- spring (g)</i>
Control	20	205	188	17	5.64
Operated	20	209	190	19	5.97

The second breeding trial consisted of mating six male and seventeen female albino rats. Two or three females were assigned at random to each male. The mating period was the same as in the first trial and each female was allowed to litter. After the mating period the coagulating glands were removed from all six males. After the litters were weaned, the females were again placed with the same males as for the first mating. They were allowed to mate and litter as before.

A comparison was then made of litters using the following criteria: total number born, number born alive, number born dead, and average weight of those born alive. The removal of the coagulating glands proved to be a simple, quick operation. The entire procedure, excluding anaesthesia, took less than 5 min per animal, and no adverse effects were noticed. Libido and mating activity were normal in both unoperated and operated animals. No regeneration was observed beyond the crushed portion left by the haemostats. The coagulating gland was absent on one side in two of the animals that were given a rating of 1. The twenty-nine animals rated 0 had no coagulating gland present which meant the portion that was crushed by the haemostats at the time of removal apparently degenerated.

The first breeding trial, comparing normal males with males from which the coagulating glands were removed, resulted in normal litters from all the females (Table 1). Statistical analysis using the 't' test for comparison showed no significant differences in any of the criteria used for evaluation.

The second breeding trial, comparing the same males before and after removal of the coagulating gland, resulted in normal litters from all females included in the trial. The results are presented in Table 2. Statistical treatment

using the 't' test for comparison showed no significant difference in any of the criteria used.

The simplicity with which the coagulating gland can be removed and the apparently normal results of these two breeding trials indicate that the removal of the coagulating glands does not inhibit the reproductive capacity of the male albino rat.

TABLE 2
LITTERS FROM PRE- AND POST-OPERATED MALES

	<i>No. litters</i>	<i>Total No. born</i>	<i>No. born alive</i>	<i>No. born dead</i>	<i>Av. wt of off- spring (g)</i>
Pre-operated	17	181	160	21	6.04
Post-operated	17	161	137	24	5.73

The coagulating gland evidently does not regenerate following removal under the conditions of the experiment. The absence of coagulation in the ejaculate certainly indicates that these glands are responsible for coagulation. Removal of the gland therefore makes possible an efficient method of collecting semen through electro-ejaculation, and should facilitate the use of the albino rat as an experimental animal in semen evaluations and fertility studies.

REFERENCES

- BIRNBAUM, D. & HALL, T. (1961) An ejaculation technique for rats. *Anat. Rec.* **140**, 49.
 MOORE, C. R. & GALLAGHER, R. F. (1930) Seminal-vesicle and prostate function as a testis-hormone indicator; the electric ejaculation test. *Amer. J. Anat.* **45**, 39.
 SCOTT, J. V. & DZUIK, P. J. (1959) Evaluation of the electroejaculation techniques and the spermatozoa thus obtained from rats, mice, and guinea pigs. *Anat. Rec.* **133**, 655.