Preejaculatory Stimulation Does Not Induce Luteal Activity in the Mouse *Mus musculus*

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Diamond (1970) produced pseudopregnancy in female housemice by inserting a vibrating brass rod into the vagina on a schedule similar to the pacing and duration of intromissions performed by male mice during mating. Since his results challenge our previous conclusion that preejaculatory stimulation is unnecessary and insufficient for the induction of luteal activity in this species, we repeated one of our experiments. The results again indicated that stimulation provided by a male mouse prior to ejaculation is ineffective in triggering the luteal response in the female.

Several investigations have shown that a minimum number of preejaculatory intromissions is necessary for the induction of luteal activity in female rats (Adler, 1969; Adler, Resko, and Goy, 1970; Chester and Zucker, 1970; Wilson, Adler, and LeBoeuf, 1965). In a series of four papers, my colleagues and I have presented evidence that preejaculatory stimulation is neither necessary nor sufficient for the production of pseudopregnancy in female mice (Land and McGill, 1967; McGill, Corwin, and Harrison, 1968; McGill and Coughlin, 1970; McGill, 1970). After the third of these was published, Diamond (1970) reported success in inducing pseudopregnancy in this species when a rapidly vibrating brass rod was inserted into the vagina on a schedule comparable to the pacing and duration of intromissions performed by male mice during a mating. Since Diamond's results contradict our conclusions, I report here a replication of one of our previous experiments.

As a male mouse approaches the ejaculatory threshold the tempo of his pelvic thrusting increases. Next he shudders strongly while maintaining full penetration of the female. Finally the male falls to his side, frequently carrying the female over with him. He remains in this posture, fully intromitted and holding the female tightly with all four limbs, for about 20 sec.

McGill and Coughlin (1970) allowed female mice in natural estrus to mate with normal males. The mating included all mounts and intromissions up

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to, and including, the shudder that marks the initiation of the male’s ejaculatory response. Certain females were separated from the male within 2 sec of the shudder. These females were isolated for 48 hr and then placed with sexually active “indicator males.” Fifteen of 16 animals thus treated were mated (plugged) by the indicator males 4 or 5 days after the initial treatment, indicating that the complete male mating pattern, exclusive of events occurring more than 2 sec after the ejaculatory shudder, was ineffective in inducing pseudopregnancy.

Since the subjects in the experiment just described were of the genetically heterogeneous B6D2F₂ genotype, it is possible that our results were due to pregnancy (or pseudopregnancy) blocking by the indicator males (the Bruce effect). Therefore, in the replication all subjects were of the genetically homogeneous B6D2F₁ strain. Fifteen females in natural estrus were treated as described above. Thirteen of the 15 were mated 4-5 days after initial treatment. One was mated 3 days after treatment and one 10 days later. Only the latter animal might have been pseudopregnant, or it is possible that the indicator male allowed a heat period to pass without mating.

For both the original study and the replication it might be suggested that the experience of being forcibly separated from an intromitting male blocked pseudopregnancy in the females. Three facts argue against this notion. First, the literature indicates that it is much easier to induce pseudopregnancy than to block it. Second, in the McGill and Coughlin study, 12 females allowed to remain in contact with the male for 5-7 sec after the shudder, and then forcibly separated, were all impregnated. Finally, in our fourth paper (McGill, 1970), females were treated at least as roughly as in the above experiment. They were placed in a restraining apparatus and an artificial penis was inserted into the vagina for 30 sec. This apparatus was designed to mimic the anatomical change that occurs in the male’s penis about 2 sec after the ejaculatory shudder. The penis becomes much thicker, particularly at the apical end where it assumes a cup-like shape. We feel that this “penile cup” is the stimulus for the induction of luteal activity. Eighty-one percent of receptive females treated with the artificial penis became pseudopregnant.

Our concern has been with the discovery of that stimulus which, during a normal mating, results in the induction of luteal activity in female mice. While Diamond was successful in producing pseudopregnancy with a vibrating brass rod, I believe the weight of evidence indicates that preejaculatory stimulation from the male is neither necessary nor sufficient to induce the response.

REFERENCES


