The source and a possible function in fertility of seminal prostaglandin-like material, in the mouse

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The level of prostaglandin (PG)-like material in the female reproductive tract of mice increases more than 100-fold after mating, apparently due to the deposition of semen (Marley & Smith, 1974). The aim of this present study was to determine the source of the PG and to investigate the effects on fertility when PG production was inhibited.

Tissues were stored in 96% ethanol at -20°C until sufficient PG-like material had been collected (up to 10 mice). The PG-like material was extracted into ethyl acetate as described by Horton (1972) and bioassayed on the rat stomach strip preparation in terms of PGE_1 equivalents.

The vasa deferentia, removed from males within 1 h of mating, contained 410 ± 97 ng/mouse, whereas those from non-mated males contained 67 ± 14 (s.e. mean four experiments, $P < 0.02$). No other tissue in the male reproductive tract contained as much PG nor showed any change with mating, suggesting that the vasa deferentia might be the source of the seminal PG.

To test this possibility, a silk ligature was placed around each vas deferens, close to its insertion into the prostate gland. The ligatures were tied in half the mice (ligated) and removed in the others (sham). Three to 6 weeks later, half the mice in each treatment were allowed to mate. Both the male and the female were killed within 1 h of mating and various reproductive tissue removed and extracted. The reproductive tracts of females mated with ligated mice contained 18 ± 1 ng/mouse, whereas those mated with sham-operated males contained 752 ± 181 (two experiments). After mating, vasa deferentia of the ligated males contained $1{,}201 \pm 361$ ng/mouse compared with 411 ± 111 in the shams. In non-mated males there was little difference in the PG content of the vasa deferentia.

These results suggest that the elevation of PG in the female after mating is due to secretions derived from the male and suggest that the vasa deferentia or retrograde structures are the source. Our preliminary studies *in vitro* show that the vas deferens has the capacity to convert arachidonic acid into PG in high yield compared with most other tissues (Christ & Van Dorp, 1972).

To investigate the physiological significance of the seminal PG its production in the male was inhibited with indomethacin. Silastic elastomer implants, with or without indomethacin (Marley, 1973) were inserted into the peritoneal cavity on day 0. The males were caged individually and mated with two females between days 3-7. One female was kept for fertility studies and the other was killed within 1 h of mating for determination of the PG-like material. In females mated with control males, 25 out of 31 became pregnant. In those females mated with males receiving initially 146 or 98 μg indomethacin/day, 8 out of 17 (58% of control, $P < 0.05$) and 19 out of 27 (87% of control) respectively became pregnant. The PG levels were reduced to about 6% of controls at both dose levels, however. Thus, the antifertility effect seen with the higher dose does not appear to be due to the inhibition of PG-synthesis and the role of seminal PG in the mouse has yet to be established.

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