PROSTAGLANDIN $F_{2\alpha}$ AND LH RELEASE IN FEMALE HAMSTERS*

S. K. SAKSENA,† I. F. LAU AND M. C. CHANG

*Worcester Foundation for Experimental Biology, Shrewsbury, Massachusetts 01545, and
Department of Biology, Boston University, Boston, Massachusetts 02215, U.S.A.*

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Recent studies implicate prostaglandins (PGs) of the E and F series in the release of anterior pituitary hormones (see Carlson, Barcikowski, & McCracken, 1973). Increases in serum levels of LH (Sato, Taya, Tyujo, Hirono & Igarashi, 1974) FSH and prolactin (Sato, Jyujio, Iesaka, Ishikawa & Igarashi, 1974) were observed following a single injection of PG E_1 , E_2 or $F_{2\alpha}$ in rats which were spayed and primed with oestrogen plus progesterone. Intrauterine insertion of a Silastic-PVP implant containing $PGF_{2\alpha}$ has been shown to stimulate the release of LH in rats and hamsters (Saksena, Lau & Chang, 1974). Experiments in which PGs did not affect LH release have also been reported (Chamley & Christie, 1973). Here we report the results of the time sequence of LH release following a single subcutaneous injection of $PGF_{2\alpha}$ in hamsters which were ovariectomized and primed with oestrogen.

Adult hamsters (150 to 175 g) were bilaterally ovariectomized under ether anaesthesia. The females received two injections of 1 μ g oestradiol-17 β (Sigma Chemical Co.) on Days 8, 9 and 10 after ovariectomy and one injection on the morning of Day 11. Eight (0 hr; Text-fig. 1) and twenty-nine hamsters received a subcutaneous injection of 0.1 ml saline and 200 μ g $PGF_{2\alpha}$ (THAM, methoxamine salt corresponds to 75% of $PGF_{2\alpha}$ base), respectively, 1½ to 2 hr after the last injection of oestradiol-17 β . The animals were killed by decapitation at various time intervals (Text-fig. 1) and trunk blood was collected. For comparison, the LH levels were determined in eight hamsters which were not injected with oestradiol and were killed on Day 11 after ovariectomy. Blood samples were centrifuged after standing for 30 to 45 min at room temperature. The serum was stored at –15°C until it was assayed for LH by radioimmunoassay (RIA) using a slightly modified method of Niswender, Midgley, Monroe & Reichert (1968). The LH standard, as determined by RIA, was 0.49 times as potent as NIH-LH-S12. The significance of differences between the means was determined by analysis of variance.

It can be seen from Text-fig. 1 that hamsters bilaterally ovariectomized for 11 days showed elevated levels of LH (232.0 ± 60 ng/ml). Suppression of LH levels by oestradiol-17 β (19.7 ± 4.3 ng/ml) is in accord with the earlier findings (McCann & Taleisnik, 1961; Parlow, 1964). A single injection of 200 μ g $PGF_{2\alpha}$

* Reprint requests to Dr M. C. Chang, Worcester Foundation for Experimental Biology, 222 Maple Avenue, Shrewsbury, Massachusetts 01545, U.S.A.

† Present address: Reproductive Endocrinology Research Unit, Karolinska Institute, Stockholm-60, Sweden.

TEXT-FIG. 1. Serum LH concentration at different time intervals after a single subcutaneous injection of 200 μg $\text{PGF}_{2\alpha}$ (THAM) in hamsters which were ovariectomized and primed with oestrogen. The open column represents the serum LH concentration obtained from hamsters 11 days after ovariectomy. Vertical bars represent the S.E.M. and the figures in parentheses are the numbers of animals.

stimulated the LH release and a significant rise ($P < 0.01$) was obtained as early as 5 min after the injection. A peak value of 460.0 ± 134.5 ng/ml was recorded 15 min after $\text{PGF}_{2\alpha}$ administration. Afterwards, LH levels declined sharply, but the values recorded at 30, 45 and 60 min after administration of $\text{PGF}_{2\alpha}$ were still significantly greater than the control level.

These results clearly indicate that a dose of 200 μg $\text{PGF}_{2\alpha}$ can trigger LH release in ovariectomized oestrogen-treated hamsters within 5 min and significantly increase LH levels for at least 1 hr. In an earlier study we reported a stimulation of LH release in pregnant rats and hamsters 70 to 72 hr after intra-uterine insertion of Silastic-PVP implants containing 200 μg $\text{PGF}_{2\alpha}$ (Saksena *et al.*, 1974). The present observations indicate that increased LH release could have contributed to the abortifacient effect of Silastic implants containing $\text{PGF}_{2\alpha}$. Likewise, administration of LH was reported to cause luteolysis in rats and hamsters (Rothchild, 1965; Greenwald, 1967; MacDonald, Tashjian & Greep, 1970).

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