Plasma corticosterone levels during pregnancy in the mouse

S. M. BARLOW*, P. J. MORRISON and F. M. SULLIVAN

Department of Pharmacology, Guy's Hospital Medical School, London SE1

Plasma corticosteroid levels are elevated during pregnancy in the human as a result of both an increase in secretion and an alteration in metabolism of these hormones (Diczfalusy & Troen, 1961) but whether they are of adrenal, ovarian or placental origin is not yet clear. In the rhesus monkey (Wolf & Bowman, 1966) and the macaque (Diczfalusy, 1972) however, no increases in plasma or urinary corticosteroids have been found during pregnancy and in rodents, apart from an isolated report of elevated corticosterone levels in ' grossly ' pregnant mice (Brain & Nowell, 1970) there has been no systematic investigation of plasma corticosterone levels during pregnancy. The present study, part of a wider investigation of the effects of stress on pregnancy, was undertaken to ascertain normal resting levels of corticosterone throughout pregnancy in the mouse.

Blood was taken by cardiac puncture from non-stressed, unanaesthetized mice, animals being killed at approximately 3 day intervals throughout pregnancy. Plasma corticosterone was measured using a fluorescence microassay after separation by thin layer chromatography to eliminate interfering fluorescent steroids such as oestradiol and pregnanediol, present in high concentrations during pregnancy. Individual values were obtained for each mouse, all samples being assayed in duplicate.

Non-pregnant female mice had a resting corticosterone level of $2{\cdot}3 \pm 0{\cdot}9$ μg/100 ml plasma (mean, S.E. of mean, n=5). During the first half of pregnancy plasma corticosterone levels gradually increased, reaching $15{\cdot}2 \pm 2{\cdot}4$ μg/100 ml (n=6) by day 10 of pregnancy. During the second half of pregnancy plasma corticosterone levels increased markedly to reach a peak on day 16 of $138{\cdot}3 \pm 30{\cdot}4$ μg/100 ml (n=8), around 60 times the non-pregnant resting level. Thereafter levels began to fall and by day 19 were down to $92{\cdot}9 \pm 13{\cdot}0$ μg/100 ml (n=10). Following parturition during the night of day 19, plasma corticosterone levels had dropped by the next morning to $18{\cdot}3 \pm 6{\cdot}4$ μg/100 ml (n=6), which is close to the physiological stress levels observed in the strain of mice used. Protein binding studies on pooled plasma taken from mice on day 16 of pregnancy indicated that 2% of the total corticosterone present was unbound hormone.

The sharp increase in plasma corticosterone levels following placentation on day 10 of pregnancy and the abnormally low corticosterone levels found during the second half of 3 pregnancies in which there were only 2 or 3 foetuses per mother together suggested that the placenta might be the major source of the corticosteroid. Subsequent studies have shown that the maternal adrenal glands are the major source of the corticosterone.

REFERENCES

BRAIN, P. F. & NOWELL, N. W. (1970). Adrenal function in pregnant and lactating mice. *J. endocr.*, **48**, xvii–xviii.

DICZFALUSY, E. (1972). Differences in drug metabolism between common laboratory animals and primates. *Acta endocr.*, Copenh., *Suppl.* 166, 422–427.

DICZFALUSY, E. & TROEN, P. (1961). Endocrine function of the human placenta. *Vitams Horm.*, **19**, 229–311.

WOLF, R. C. & BOWMAN, R. E. (1966). Adrenocortical function during pregnancy in the rhesus monkey. *Proc. Soc. exp. Biol. Med.*, **121**, 986–988.

Does stimulation of Na^+-K^+-Mg^{2+}-activated ATP-ase inhibit acetylcholine release from nerve terminals?

E. S. VIZI

Department of Pharmacology, Semmelweis University of Medicine, Budapest 1085, Hungary

Paton, Vizi & Zar (1971) and Vizi (1972) presented evidence that conditions known to inhibit membrane ATP-ase enhanced acetylcholine (ACh) release. It has been shown (Vizi, 1972) that Ca^{2+} ions are not essential in those cases where membrane ATP-ase