EXAMINATION OF CALF CEREBROSPINAL FLUID AND PLASMA FOR THE PRESENCE OF LUTEINIZING HORMONE

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Several adrenohypophysial hormones have been found in cerebrospinal fluid (CSF), thus indicating that the expected blood–CSF permeability barrier (Davson, 1967; Levin & Tradatti, 1976) may not be present for these hormones. Significant quantities of prolactin (2–26 ng/ml) are present in CSF from the cisterna magna of rats and may function in short-loop feedback control of pituitary secretion (Clemens & Sawyer, 1974). In man, low levels of somatotrophin, adrenocorticotrophin, thyrotrophin, prolactin and luteinizing hormone (LH) are present in lumbar CSF from non-endocrine patients while much higher levels occur in patients with pituitary tumours (Linfoot, Garcia, Wei, Fink, Sarin, Born & Lawrence, 1970; Kleerekoper, Donald & Posen, 1972; Kendall, Seach, Allen & Vanderlaan, 1975; Jordon, Kendall, Seach, Allen, Paulsen, Kerber & Vanderlaan, 1976). Leina (1972) reported finding both follicle-stimulating hormone and LH in lateral ventricular CSF from spontaneously aborted human foetuses. We examined lateral ventricular CSF and jugular venous plasma from calves, and although LH was detected in plasma, it was not detected in CSF. These observations suggest that there is at least a partial blood–CSF barrier for LH in the calf.

Five Guernsey bull calves, 7–9 months old and weighing an average of 114 kg, were housed in a controlled environment with an average temperature of 25°C (23–29°C) and 14 h light/day. A maintenance ration was fed twice daily and water was provided ad libitum. About 6 months before this study, the calves were implanted with guide cannulae in the lateral ventricles (Hedlund, Lischko, Rollag & Niswender, 1977). Cerebrospinal fluid samples (3 ml) were obtained from the lateral ventricles while blood samples (6 ml) were obtained from chronic, jugular venous catheters. Cerebrospinal fluid and blood samples were taken concurrently at intervals of 3 h during the day and every 2–3 h at night. In a single assay run, LH concentrations were measured in duplicate on each plasma and CSF sample by a double antibody radioimmunoassay (Niswender, Reichert, Midgley & Nalbandov, 1969; Erb, Monk, Mollett, Malven & Callahan, 1976). The lower limit of detection for this assay was 100–150 pg/ml, while the least detectable difference between samples was about 50 pg/ml.

Plasma concentrations of LH averaged 267±43 (S.E.M.) pg/ml (n = 17) during daylight hours and 225±52 pg/ml (n = 12) at night. In 23 out of the 29 plasma samples, the LH concentration was greater than 100 pg/ml; and of the remaining samples, two were zero while four measured 50–100 pg/ml. None of the 40 CSF samples examined had LH concentrations greater than zero. The plasma LH concentrations are similar to those reported by Rawlings, Hafs & Swanson (1972) for 8-month-old Holstein bulls (300 pg/ml) and to those of Kesler & Garverick (1977) for 3-week-old bull calves (610 pg/ml).

REFERENCES


