Hippokampus und in der Amygdala beobachtet. Im Hypophysenvorderlappen war Radioaktivität in den Zellkernen von Basophilen nachweisbar. Die autoradiographischen Ergebnisse unterstützen das Konzept eines doppelten Androgen-«Feedbacks» auf der Ebene des Zentralnervensystems und der Hypophyse.

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Plasma Adrenocorticosteroid Concentrations Immediately after Birth in the Rat, Rabbit and Guinea-Pig

Circulating plasma concentrations of the principle adrenocorticosteroid are elevated in the period immediately after birth in the lamb[1,2] and calf[3]. In both these species the concentration falls over the next few days. There are few reports of very early steroid levels in the rabbit and guinea-pig in the neonatal period[4], and investigations on the rat have generally been made on animals one or more days after birth. Different methods of assay have yielded very variable results. Fluorimetric techniques, in particular, appear to result in very high values[5,6].

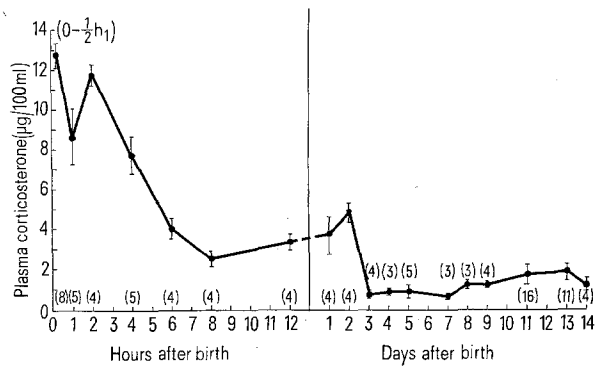

Fig. 1. Plasma corticosterone concentration in the young rat. Experimental points represent mean values ± S.E.M. (Number of animals in parentheses). Ordinate: plasma steroid concentration µg/100 ml. Abscissa: Age after birth in h and days.

In the investigations reported here, animals were maintained under standard conditions and killed by decapitation. Individual guinea-pig samples or pooled blood from at least 5 rats or 2 rabbits were analyzed by competitive protein binding after Sephadex LH 20 separation as described previously[6].

Corticosterone is the main circulating adrenocorticosteroid in the rat. In the first 30 min of extra-uterine life, mean plasma levels were 12.6 ± 0.8 µg/100 ml (Figure 1). Thereafter, the plasma steroid concentration declined steadily over the first 8 h. A further drop occurred between days 2–3.

HOLT and OLIVER[7], using a fluorimetric assay, reported a mean plasma corticosterone concentration in the rat of 200 µg/100 ml 1–5 h after birth. The values observed at unspecified times during the first day after birth by 3 other groups of workers were about 18 µg/100 ml[8–10]. The only previously published values which approach our observed ranges are those of BARTOVA[11] who reported a concentration of 5 µg/100 ml on day 2 of extra-uterine life.

Our finding that cortisol is the major adrenocorticosteroid in the newborn rabbit has not been previously recorded. Concentrations were highest 3–10 min after birth (Figure 2) and had fallen by the end of the first day to levels which remained relatively constant until day 14, at which time the mean value was 0.5 ± 0.1 µg/100 ml. At this age, THORNTON et al[4] found a mean plasma cortisol concentration of 11 µg/100 ml.

Figure 3 demonstrates plasma cortisol levels in the guinea-pig from birth to 14 days. Cortisol is the principle circulating adrenocorticosteroid in this species. Values

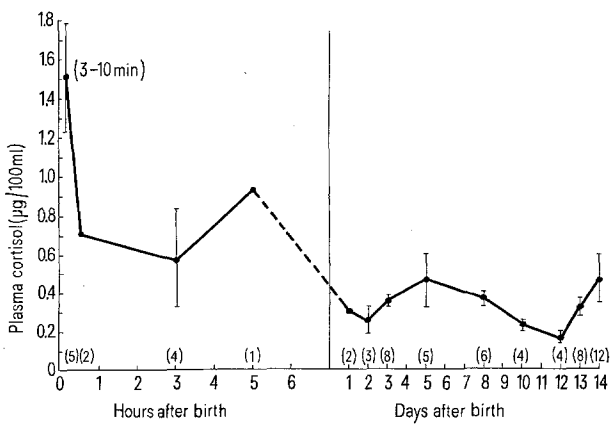

Fig. 2. Plasma cortisol concentration in the young rabbit. Experimental points represent mean values ± S.E.M. (Number of animals in parentheses). Abscissae and ordinates as Figure 1.

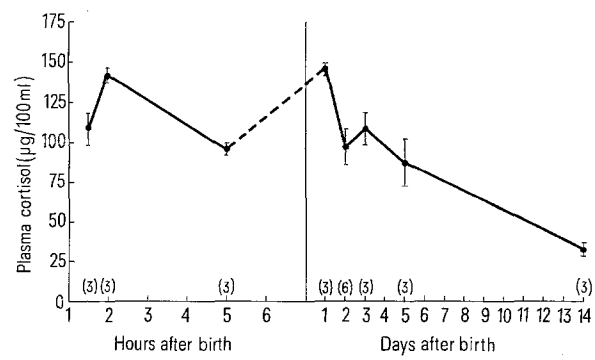

Fig. 3. Plasma cortisol concentration in the young guinea-pig. Experimental points represent mean values ± S.E.M. (Number of animals in parentheses). Abscissae and ordinates as Figure 1.

observed within the first 24 h of life were very much higher than in the rat or rabbit and exceeded 100 µg/100 ml. Furthermore, the subsequent fall in plasma levels is much less precipitous than in the other two species studied.

Plasma adrenocorticosteroids circulating immediately after birth could originate from either the maternal or foetal adrenal. Evidence for the first possibility exists, in that the placenta is permeable to corticosterone in the rat, since labelled corticosterone injected into the mother enters the foetal circulation[12].

Glycogen deposition in the foetal rat liver is impaired more when maternal adrenalectomy is combined with foetal decapitation than after foetal decapitation alone[13]. This argues for the ability of maternal corticosteroids to cross the placenta.

On the other hand, evidence in favour of foetal adrenal secretion comes from the ability of the foetal rat to maintain normal carbohydrate metabolism after maternal adrenalectomy, provided its own adrenal glands are intact, although this does not necessarily prove foetal secretion under normal conditions.

In the newborn rat the present results indicate the half-life decline of plasma corticosterone levels during the first 8 h of life to be 3.44 h. Such a half-life suggests that immediately after birth, the rat is secreting corticosterone into the circulating pool rather than simply clearing the corticosterone which had previously crossed the placenta from the mother. This argument would also seem to hold for the rabbit and especially for the guinea-pig in view of the data we have reported here[14].

Résumé. On a mesuré le taux de cortisol et de corticostérone dans le plasma du jeune rat, du lapin et du rat d'Amérique aussitôt après la mise bas et jusqu'à 14 jours après. Dans toutes ces espèces, la concentration de l'adrénocorticostéroide principal était élevée les premiers jours et diminuait regulièrement par la suite.

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Origin of the Synaptonemal Complex

Chromosomes are attached to the nuclear membrane (NM), in particular to the annuli[1,2]. At the beginning of meiosis, the synaptonemal complexes (SC) were also found to be attached to the nuclear membrane[3,4]. During the pairing process, the DNA fibres are disposed along these structures.

The unknown origin of the SC prompted us to investigate this structure in amphibian and mammal meiotic phases. A new technique permitted a comparative study of the very same cell by both light microscope (LM) and electron microscope (EM). Our findings suggest that the SC may result from NM invagination. Its structure would correspond to a folded double membrane with the lateral elements formed by the inner membrane and the central element by the apposition of the outer NM. In this case, the cavity, corresponding to the SC, would appear as a pore at the surface of the nucleus. The starting point of the glove-finger-like invagination would be an annulus to which homologous chromosomes are attached (Figure A–C).

Small fragments of frog and mouse testis were treated with distilled water for 15 min, fixed in 50% glacial acetic acid for 15 min, maintained 1–3 days in cold Carnoy, and transferred to 50% acetic acid for 15 min. Each fragment was squashed or squeezed on a 1% parlodion coated slide. Scotch-tape with a 3 mm² opening enclosing the preselected phase contrast field was placed over the slide. By removing the tape, the parlodion was transferred to a grid previously immersed in a solution of petroleum ether containing scotch-tape glue, and rapidly air-dried. The grids were stained in 2% uranyl acetate for 30 min, air-dried and examined in a Siemens UM at 60 kV and an Elmiskop I at 80 kV.

Due to the hypotonic and Carnoy treatment, the chromosomes became hypertrophied, and some of the structures, normally visualized only at the EM, could then be detected at the LM level. Enlargement of chromosome fibres in ethanol and hemoglobin solution has been previously reported[5].

We found faceted, annulated structures of 6,000 Å in the mouse, and 12,000 Å in the tetraploid frog *Odontophrynus americanus*[6], showing points of higher density at the periphery, from where the chromatin fibres irradiate. These structures are often found in zygotene nuclei, highly distended by the smear or squash process, each homologue pair showing such a ring at both ends. In the frog they seem to be polarized and to coincide with the region, from where the chromosomes spread in a bouquet configuration.

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