15 min, followed by a slight increase at 1 h, maximal uptake after 6 h, and a considerable amount of label at 24 h, which is markedly different from the case of subcutaneous injection. Skin and tongue mast cells also showed maximal deposition similar to stomach mast cells after 6 h, but their grain numbers were less than those of the stomach. The grain counts in other organs showed that mast cells of the duodenum, small intestine and myocardium had relatively high radioactivity, but the number of mast cells in these organs was too small to be compared with the stomach, tongue and skin, which contained a considerable number (Tables I, II).

From our radioautographic study mentioned above, the uptake of C^{14}-5-HT was characteristically high in the stomach mast cells compared with other tissue mast cells in the case of subcutaneous injection. In this respect it is very interesting that gastric ulcerations were reported to be caused by 5-HT administration (WILHELMI[3], HEDINGER et al.[4], and NIKODIJEVIĆ et al.[5]). Accordingly, we suppose that characteristic high uptake of C^{14}-5-HT in stomach mast cells might be related to the induction of gastric ulcerations.

Our observations also showed that there were some differences of uptake of C^{14}-5-HT in mast cells according to the method of administration. GERSHON et al.[6] found that radioactive serotonin was synthesized and bound in the myenteric plexus of the mouse intestine after intravenous injection of its radioactive precursor 5-HTP, a result which is entirely different from our present result. Therefore, it seems necessary to make a further research on what connections or relations exist between mast cells and the myenteric plexus (or nervous system in general) in the uptake and transport of serotonin.

Zusammenfassung. Nach s.c. und i.p. Injektion von C^{14}-5-Hydroxytryptamin an Mäusen wurde die Radioaktivität verschiedener Organe autoradiographisch untersucht. Eine charakteristische starke Radioaktivität, welche bis zu 6 h anhielt und nach 24 h verschwand, wurde bei s.c. Injektion schon nach 15 min in den Gewebsmastzellen der Magenwand festgestellt. Mastzellen anderer Organe zeigten nur schwache Radioaktivität. Bei i.p. Injektion tritt eine verzögerte Speicherung der radioaktiven Substanz in den Magenmastzellen auf. Die charakteristische Affinität von Serotonin zu den Magenmastzellen dürfte die Ursache des experimentellen Magengeschwürs nach Serotoninbehandlung sein.

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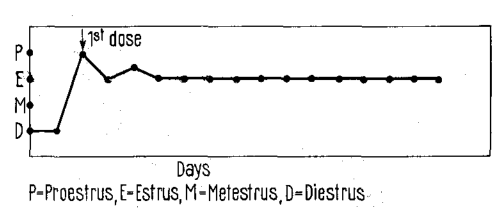
Role of 'Adreno-Ephedrine' in the Induction of Persistent Vaginal Cornification

Adrenalin (epinephrine) is believed to be involved in the normal release of gonadotrophin from the pituitary[1], to cause an increase in size of adrenals in hypophysectomized rats[2], and to decrease the corticotrophic content of both the pituitary and the blood in the adrenalectomized rats[3]. In the present paper, the effect of the *adreno-ephedrine* (a long-acting adrenalin preparation) in the female sex cycle is reported.

Twenty-four normal cyclic female rats were selected for the experiments and were provided with a balanced vitaminized diet and water to drink ad libitum. In the proestrus phase of the cycle, eighteen of the animals were subjected to a chronic treatment of adreno-ephedrine (1 ml = adrenalin 1:1000 and ephedrine 15 mg) subcutaneously at a dose level of 0.2 ml/day/animal for a 15-day period. Six of the identically saline-treated animals were taken as controls. Vaginal smears of both the experimental and control animals were routinely recorded. At the end of the experiments, all the animals of respective groups were sacrificed. At autopsy, the pituitary, uteri and the adrenals of the animals were compared gravimetrically and the liver and ovaries histologically.

Injections of adreno-ephedrine apparently and identically induced constant vaginal cornification in all the experimental animals (Figure). But the estrous cycles of the saline-treated control animals, on the other hand, remained unaltered. The adrenal weight of the experimental animals was significantly greater than that of the controls. But no such difference in the pituitary weight of the respective groups of animals was noted (Table). Histological examination of the liver showed fatty infiltration of the parenchymal cells of the centrilobular areas in the experimental animals. Ovaries of the experimental animals contained follicles of varying size but lacked mature corpora lutea. In addition to constant cornification of vaginal epithelium, a greater uterine weight of the experimental animals compared with that of the controls revealed an increased concentration of circulating estrogen (Table).



Graph of vaginal smears, showing apparently persistent cornification after adreno-ephedrine administration.

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In female rats, persistent cornification of the vaginal epithelium may occur spontaneously in intact individuals[4] or can be induced by transplantation of the testes immediately after birth[5], ligation of oviducts[6], hypothalamic lesions[7,8], and after CCl_4-administration[9]. Hepatotoxicity due to an activation of the sympathetic areas of the central nervous system[10] as well as the adrenal medulla[11] following CCl_4 administration has been documented. Adrenalin (epinephrine) is believed to cause lesions in the liver similar to those seen after CCl_4[12], a constriction of the intrahepatic blood vessels occurs which causes an anoxia in the areas near the central vein and produces centrilobular necrosis accompanied by a fatty infiltration of the parenchymal cells. Fatty liver is known to be directly associated with impaired estrogen inactivation.

Organ weights of adreno-ephedrine-treated experimental and saline-treated control rats (mg/100 g body weight)

Treatment	No. of rats	Adrenals	Pituitary	Uteri
Control	6	18.5 ± 3[a]	4.5 ± 0.2[a]	191 ± 16[a]
Adreno-ephedrine	18	39.0 ± 4	4.6 ± 0.3	300 ± 8

[a] Means ± S.E.M.

Therefore, from the existing evidence and experimental data it may be assumed that the changes induced after adreno-ephedrine administration are primarily due to hepatic lesions[13].

Zusammenfassung. Adreno-Ephedrin bewirkte bei Ratten Daueröstrus und Zunahme des Gewichts der Uteri und der Nebennieren. Die Ovarien enthielten Follikel verschiedener Grösse, aber keine reifen Corpora lutea. Diese Wirkungen des Adreno-Ephedrins werden auf fettige Infiltration des Leberparenchyms zurückgeführt.

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Brain to Body Relationships in Ontogeny of Canine Brain

Recent studies by Kobayashi[1] have demonstrated the relationship of brain development when compared with body weight to other aspects of neuro-ontogeny in the mouse (Kobayashi et al.[2]). A sudden change in the relationship between log brain:log body weight occurred at 17 days; similar changes occurring at different ages were noted in a review of available data from other species. The significance of these findings has been discussed by Fox[3] in a neuro-ontogenetic study of this species. When the mouse attains 17 days of age (± 1 day) marked changes in behavior also take place, which coincide with the onset of the critical period of socialization as described in the ethological study by Williams and Scott[4].

The present investigation was undertaken to determine if such a phenomenon exists in the dog. Earlier studies (Scott and Marston[5] and Fox[6]) have shown that between 3–4 weeks of age there is a sudden change in the behavior of the neonate dog, which is regarded as the onset of the critical period of socialization for this species (Scott[7]).

Brain to body weight ratios were calculated from 83 dogs of different ages and of various breeds. Subjects were anesthetized with intravenous pentobarbital and the body weight was taken, after which the brain was removed and weighed. A linear relationship was found between the log body:log brain weight from 0.2 to 1.5 kg body weight, at which point there was a 'break' at approximately 37 g brain weight. From this point onward there was again a linear relationship between brain and body weight. Although the subjects were of heterogeneous background differing considerably in physical size, the age range at which the break in the brain:body relationship occurred was at approximately 4 weeks of age (Figure).

Behavioral correlates of this macroparameter of neuro-ontogeny can be made. Fox[8] showed that the canine brain develops most rapidly during 3–6 weeks of age postnatally, while the period from 2–4 weeks of age (Fox[9]) was found to be the time when the most rapid changes in brain size and reduction in cell density occurred. The rate of metabolism in the cortex and caudate nucleus increases rapidly between 3–6 weeks of age, by which time the metabolic rate is within the normal range (Himwich and Fazekas[10]). Also the resistance to anoxia decreases rapidly from birth, and by 4 weeks of age the resistance

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