Uptake of ^{125}I by the thyroid and thymus of newborn and adult rats

Group	Age	No. of animals	Dosis (μCi/animal)	Thyroid (cpm/mg)	Thymus (average)	Thymus/thyroid (%)
1	adult	10	20	19,499	17,8	0,09
2	newborn	10	20	92,170	5760	6,2
3	newborn	6	15	84,100	3780	4,5
4	newborn	9	2	14,930	730	4,9

quantitative results of the individual groups are presented in the Table. Organs were removed 2 h after administration of the isotope. Values of cpm are given per mg dry weight. Three different doses of isotope were tested in 3 groups of newborn animals, to ascertain whether or not the dose of isotope, being identical with that of the adult animals, resulted in the high iodine uptake of the thymus. The thymus and thyroid of groups 1. and 4. were fixed in glutaraldehyde and OsO_4 and after Durcupan embedding half-thin sections were prepared and covered with Kodak K_5 stripping film. Results of autoradiography are presented in the Figures 1–4.

Results of the experiments demonstrate clearly that the iodine uptake by newborn thymus is 50 to 60 times that of the adult thymus. Autoradiograms show that there is hardly any difference in the ^{125}I content of thymic and thyroid cells of newborn animals; the significant quantitative difference results from the fact that, while the thyroid gland accumulates the iodine in the lumen of acini, the thymus is unable to do so. Even so the iodine content of the thymus is 5% of the thyroid. Considering the difference between the weights of the two organs, the total incorporation of the thymus comes near to or even surpasses that of the thyroid. All these facts seem to indicate that the iodine uptake is a general capacity of the entoderm, or at least of the foregut, which becomes confined to the thyroid gland and specialized there in the course of ontogeny and differentiation.

Zusammenfassung. Es wird gezeigt, dass an erwachsenen und neugeborenen Ratten die Jodaufnahme des Thymus bei den letzteren viel höher ist als die Jodaufnahme der Thyroidea. Dies unterstützt die These, wonach die Jodspeicherkapazität der Thyroidea das Resultat einer Differenzierung darstellt, indem auf früherer ontogenetischer Stufe für den ganzen Vorderdarm eine Jodspeicherkapazität besteht.

G. CSABA, J. KISS and SUSANNA U. NAGY

Department of Biology and 2nd Department of Anatomy, Semmelweis University of Medicine, Budapest, IX (Hungary), 31 July 1972.

Temporary Displacement of Plasma Corticoid Circadian Peak Induced by Ablation of Olfactory Bulbs in Dog

Besides in humans and other mammals, circadian variations of plasma corticoids are present in dog[1]. Recently some of us have shown, using a mathematical model, that these variations have an acrophase at 07.00 h 24 min and a basal level of 9.30 ± 0.39 μg/100 ml[2].

Some lesions of nervous central system, as bilateral interruption of optic nerves[3–5], suprapontine brain ablation[6] or hypothalamic lesions[7] seem capable of modifying or abolishing ACTH and corticoids circadian variations in rats and mice. For the importance of the olfactory system to regulate numerous endocrine and vegetative functions, we have studied whether acute anosmia produced by surgical ablation of olfactory bulbs can modify the circadian variations of plasma corticoids in dogs.

Material and methods. Twelve 14–20 kg mongrel dogs, of whom 5 were males, were used in this study. All the animals were housed in individual dog-kennels artificially illuminated from 06.00 h to 21.00 h and kept dark from 21.00 h to 06.00 h. Food and drink were ad libitum. The animals were anesthetized with Nembutal, 30 mg/kg body weight i.p. Olfactory bulbs were removed by suction through a surgical skull window of the frontal sinus. Two mongrel dogs housed in identical periodicitiy dog-kennels were 'sham-operated', that is subjected to the same surgery but without suction of olfactory bulbs to see if skull or meningeal lesions of frontal area could modify adrenocortical activity.

After a period of acclimatization, and few days before surgery, plasma corticoid levels were studied at 4-h intervals, using a fluorometric assay[8]. At 30, 60 and 120 days after surgery, plasma corticoid levels were again studied following the same protocol.

When the experiments were concluded, the skulls were opened to control possible inflammatory or traumatic lesions of the brain and serial histological examinations were performed in all heads fixed in 10% formalin.

Results and discussion. Before surgery, plasma corticoid levels presented a maximum at morning decreasing slowly until evening. At 30 days after surgical ablation of olfactory bulbs, plasma corticoids presented a maximum at 20.00 h and a minimum at 08.00 h (Figure). After

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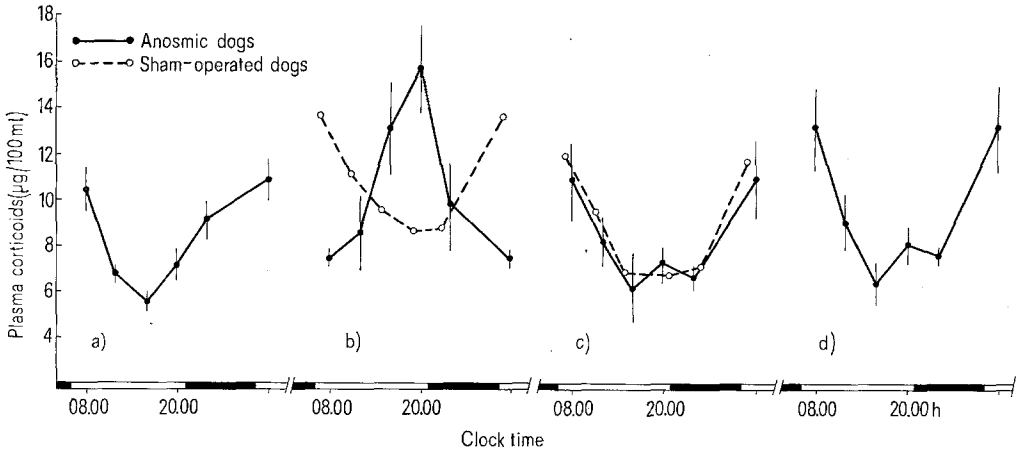

Diurnal variation of plasma corticoid levels in the dog before (a) and at 30 (b), 60 (c) and 120 days (d) after surgical ablation of olfactory bulbs (●—●: mean ± E.S.) and 'sham' operation (○---○).

2 months, circadian variations similar to those observed before surgery reappeared and this pattern was still observed at 4 months. In 'sham-operated' dogs, surgical operation has never modified the circadian pattern of plasma corticoids during the period of our study.

The displacement of plasma corticoid peak from morning to evening observed after 30 days from the surgical ablation of olfactory bulbs seems similar to the inversion described by HAUS et al.[4] in mice after blindness, calling to mind that in these small mammals normal acrophase is reversed as compared with dogs.

The loss of an external synchronizer as olfactory stimuli in our experiments, and visual stimuli in other researchs[3-5], could explain the inversion of plasma corticoid peak. The new rhythm could indicate a new equilibrium between endogenous and exogenous synchronizers or the expression of primordial endogenous rhythm, because in humans during early life corticoid peak was observed at evening[9].

However, regarding the easy adaptation of olfactory receptors, it seems not probable that these stimuli are synchronizers of a circadian rhythm. More probably the removal of the sense of smell, so important for vegetative and environmental life of the dog, or anomalous signals from injured olfactory pathways, could determinate a period of functional derangement of neurovegetative system, strictly linked to of laction in macrosmic animals.

In fact after 2 months we have observed again in anosmic dogs a normal circadian rhythm of plasma corticoids with acrophase at morning. Similar pattern has been seen after blindness in rats[3] and mice[4]. Moreover a normal circadian rhythm of adrenocortical activity was described in blind men[10].

The temporal normalization of corticoid circadian variations observed 2 months after surgical ablation of olfactory bulbs of the dogs could be a consequence of the reequilibrium between different endogenous and exogenous synchronizers and/or the preminence of rhythmic enviromental activities[11].

Résumé. L'extirpation des bulbes olfactifs du chien produit 30 jours après l'intervention chirurgicale une altération des rhythmes circadiens des corticoïdes plasmatiques avec un maximum à 20.00 h et un minimum à 08.00 h du matin. Cette altération de l'activité rhythmique adrénocorticale est temporaire, car après 2 mois, les variations circadiennes des corticoïdes plasmatiques sont pareilles à celles qui précédaient l'intervention chirurgicale.

P. ARCANGELI, V. DIGIESI, G. MADEDDU[12] and R. TOCCAFONDI

Istituto di Patologia Medica (R), Università di Firenze, via Pieraccini 18, I–50139 Firenze (Italy), 11 August 1972.

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[12] Present adress: Clinica Medica Universitaria, Via San Pietro 8, Sassari, Sardinia, Italy.

Chromosome Secondary Constrictions in Different Stages of Development[1]

Karyotype studies are usually done in adult specimens. With relatively few exceptions, the karyotype is constant in the same species, and the chromosome morphology is characterized by its size, centromere position, and secondary constrictions. Presence of satellites is one of these constants, and has been often used in the identification of one or more chromosome pairs.

On the other hand, the secondary constrictions that give rise to the satellites have been frequently identified as nucleolar organizers, containing rDNA cistrons for rRNA synthesis. These cistrons may, in some instances, through amplification, allow a higher rate of ribosomal RNA production, resulting in a more intense protein synthesis[2].

Animal protein metabolism is subject to a wide range of variation during its development, from zygote up to the adult stage. In search of a correlation of these biochemical aspects with the specific morphology of the chromosomes, we decided to make a comparative study on karyotypes of specimens from different species, in the various