vesicle were fixed in 10% neutral formaline and histologically processed for the study of tissue eosinophilia[11].

*Results.* Estrogen administration induced an increase in the number of tissue eosinophils in both the lamina propria and muscular layer of ductus deferens (table). In other organs, estrogen-induced changes in tissue eosinophilia were not statistically significant (table).

*Discussion.* The estrogen-induced migration of eosinophil leukocytes to ductus deferens, similar to that described in the uterus[12], would be explained by the close ontogenic development of Wolffian and Müllerian ducts in mammalian embryo[13]. Possibly estrogen-induced migration of eosinophils to ductus deferens is mediated by similar mechanisms proposed for the uterus[11].

The role of eosinophils in the male reproductive system is unknown. It was previously proposed that enzymes released from eosinophil leukocytes play a role in sperm capacitation in the female genital tract[14]. It is possible to speculate that eosinophils migrating to ductus deferens release enzymes which may play a similar role in sperm capacitation at this level. Further work is necessary to ascribe this or other functions to eosinophil leukocytes in the male reproductive system.

1 Acknowledgments. This work was supported by grant No. 4002 from the Servicio de Desarrollo Científico y Creación Artística of the University of Chile. We thank Mr D. Sáez and Mr E. Astudillo for technical help.
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## Influence of light on the plasma gonadotropin concentrations in the newborn rat

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*Summary.* The physiological increase in plasma gonadotropin (LH and FSH) levels in newborn rats is indisputably influenced by light. Permanent illumination accentuates this increase, whereas darkness decreases it in 16-day-old female rats. In male rats of the same age, only permanent illumination was tested with the same results.

We have recently shown[2] that an increased plasma level of follicle-stimulating hormone (FSH) and luteinizing hormone (LH) appears in premature born female children treated by light during their first days of life, due to icterus neonatorum[3]. In order to see if light alone was responsable for the increase of gonadotropins, we compared the plasma FSH and LH levels in light-treated groups of male and female newborn rats with those of control groups.

*Material and methods.* 90 newborn Wistar CF rats (40 males and 50 females) were grouped in tens and kept in transparent plastic cages with a nursing mother. The groups were sacrified at 7 days (average weight 13 g) and at 16 days (average weight 22 g). The experiment was carried out in August as follows (figure):

a) 2 control groups A (males and females) were maintained under natural light conditions for 7 days (98 h of light and 70 dark). b) 2 control groups C were maintained under natural light conditions for 16 days (224 h of light and 160 dark). c) 4 groups (2 groups B and 2 groups D) were submitted to constant artificial illumination for the first 7 days of life (168 h). The rats were placed in a cage without bedding and received light from five 20-W fluorescent tubes[4] placed 70 cm above the cage. The light intensity at the level of the skin was between 2800 and 3300 lx. 2 groups B were sacrified after 7 days of these treatment (168 h artificial light). 2 groups D were kept for a further 9 days after treatment under laboratory light (168 h artificial light, 126 h of natural light and 90 h dark). d) Finally, a group E of rats were kept 16 days in complete darkness (364 h). Blood samples were taken by cardiac puncture in rats that had been anaesthetized with fluothane[5].

Blood, collected on heparin, was immediately centrifuged and the plasma was frozen at −20 °C. The measurements of LH (in all cases) and of FSH (when the quantities remaining permitted, that is to say in females of groups D, E and males of groups C, D) were measured by radioimmunoassay under the same conditions[6]. Statistical analysis of the results was made using the nonparametric test of Kolmogorov-Smirnov[7].

*Results.* Individual values of FSH and LH concentrations are given in the figure and the mean and the SD of the different groups in the table.

Males. In the 4 groups of male rats, the LH concentrations are less than the limit of detection (20 ng/ml) and no significant variation appears in the different groups. On the other hand, a significant increase in FSH ($p < 0.02$) appears in the light-treated group D in comparison with the control group C.

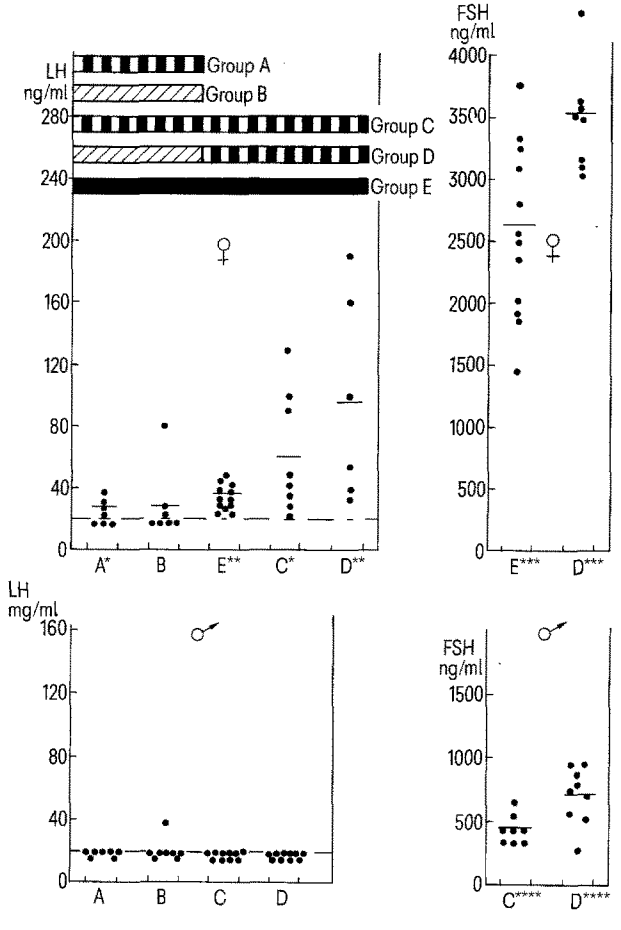
Females. In the control group A the LH concentrations are low and less than 40 ng/ml: In the group B also the concentrations are low and not significantly different to A ($p > 0.1$). In the group C the concentrations vary from 26 to 130 ng/ml and differ significantly from those observed in the control group A ($p < 0.05$). However, the values ob-

Mean values and SD of the plasma LH and FSH concentrations (ng/ml) obtained for each group and each sex

| | | A | | B | | E | | C | | D | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ♂ | ♀ | ♂ | ♀ | ♂ | ♀ | ♂ | ♀ | ♂ | ♀ |
| LH | n | 8 | 8 | 8 | 8 | – | 12 | 10 | 8 | 10 | 7 |
| | m | < 20 | 28.70 | < 20 | 29.40 | – | 36.40 | < 20* | 60.80* | < 20** | 96.30** |
| SD | | – | 3.00 | – | 8.50 | – | 2.80 | – | 14.20 | – | 22.30 |
| FSH | n | – | – | – | – | – | 12 | 8 | – | 9 | 7 |
| | m | – | – | – | – | – | 2596 | 434 | – | 706*** | 3515 *** |
| SD | | – | – | – | – | – | 204 | 41 | – | 74 | 18.0 |

*Comparison for LH means between males and females significantly different in the group C ($p < 0.001$). **Comparison for LH means between males and females significantly different in the group D ($p < 0.001$). ***Comparison for FSH means between males and females significantly different in the group D ($p < 0.001$).

served in the group E are low (between 20 and 50 ng/ml) and are not significantly different to those of group A ($p > 0.1$). The light-treated group D shows a significant increase ($p < 0.05$) when compared with the group E which was maintained in the dark. The FSH values for group D are also higher ($p < 0.02$) than those of group E. There are important differences between the sexes and in the same group (table). The LH concentrations observed in the 2 female groups C and D are significantly higher ($p < 0.001$) than those in the same male groups. Also in the D-groups the FSH concentrations are significantly higher in the female rats.




Individual values of the plasma LH and FSH concentration observed in the different female groups (above) and male groups (below). The dashed line indicates the limit of undetectable values. The continuous line indicates the mean value of each group. Females: *Averages A and C significantly different ($p < 0.05$) (Kolmogorov-Smirnov test). **Averages E and D significantly different ($p < 0.05$). ***Averages E and D significantly different ($p < 0.02$). Males: ****Averages C and D significantly different ($p < 0.02$).

*Discussion.* In this experiment we confirm the results of other authors who have shown a physiological increase in plasma gonadotropin levels between the 8th and 21st day of life in the rat[8] and the existence of a sex difference in the plasma concentrations of FSH and LH[9]. We have shown that the increase of gonadotropins is influenced by light: in 16-day rats, maintained in the dark, there is no increase in LH. The direct link that exists between light, gonadal function[10,11] and the pineal gland[12,13] is well-known. The interpretation of these results is nevertheless complex. The age of the rats, their sex and the moment in which the experiment is performed in relation to their sexual development, all influence neurohormonal regulation. Further investigations, to compare the variation in the pineal and plasma concentrations of melatonin with the concentrations of circulating hormones appear to be necessary to understand this regulating mechanism.

1 Acknowledgments. We would like to thank Dr C. Kordon (Unité de Neurobiologie, INSERM, rue d'Alésia, F-75014 Paris) who welcomed us in his laboratory and advised us on these experiments.

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