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ONE WEEK TREATMENT OF IMMATURE LAMBS WITH LONG DAYS RESTORES PUBERTY TO THE NORMAL AGE. S.M. Yellon* and D.L. Foster, Reproductive Endocrinology Program, The University of Michigan, Ann Arbor, MI 48109.

In many mammalian species, photoperiod is an important environmental cue that synchronizes puberty to the appropriate season. The sheep is a short-day breeder, and the female lamb begins reproductive cycles during the short days of autumn at 25-35 weeks of age. Surprisingly, however, lambs reared solely under artificial short days (9L:15D) from birth delay puberty (ca 52 weeks). We have found that 5 or 10 weeks of long days (15L:9D) ending at 22 weeks of age lead to the onset repeated cycles by 35 weeks of age in lambs under short days at other ages. In order to understand the minimum long-day requirements for puberty under subsequent short days, lambs in the present study were challenged with only one week (week 22 of age) of long days. Control lambs received 5 weeks of long days (weekS 17-22). Both groups were housed under short days before and after exposure to long days. Twice weekly blood samples were collected and serum progesterone patterns were used to assess the onset of ovarian cyclicity. Treatment with 1 week of long days effectively synchronized the onset of consecutive cycles to 35 $\pm$ 0.3 weeks (n=5). This age was similar to the onset of cycles in control lambs (32 $\pm$ 2 weeks, n=5 of 6) exposed to 5 weeks of long days. These findings raise the possibility that long days, experienced by the spring-born lamb during summer, are necessary for the later onset of puberty during the short days of autumn. The specific requirement for long days may depend upon some critical number of long days at a critical period during development to time the onset of reproductive cycles. (Supported by NIH HD-06471 and HD-11311.)

RELATIVE BINDING OF CERTAIN ESTROGENS TO SEX HORMONE-BINDING GLOBULIN(SHBG) A. Philip and B.E.P. Murphy, Reproductive Physiology Unit, Montreal General Hospital, and Centre for the Study of Reproduction, McGill University, Montreal.

Estradiol is known to bind strongly to SHBG, but estrone binds poorly and estriol not at all. A recent report by Dunn et al (J Clin Endocrinol Metab 51:404, 1980) suggested that 2-methoxyestradiol also binds to SHBG with high affinity. We have tested a series of estrogen metabolites for their binding to SHBG according to their efficacy in displacing tritiated testosterone. Cross reactivity at 50% displacement relative to testosterone was:

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| testosterone | 100 |
| estradiol | 50 |
| estrone | 3 |
| 2-methoxyestradiol | 120 |
| 2-methoxyestrone | 81 |
| 4-methoxyestradiol | 6 |
| 4-methoxyestrone | 4 |
| 3-methoxyestradiol | 0.4 |
| 3-methoxyestrone | 0.5 |
| 3-acetoxyestradiol | 16 |
| 3-acetoxyestrone | 0.5 |
| 17-acetoxyestradiol | 0.04 |
| 3,17-diacetoxyestradiol | 0.02 |

These studies indicate that binding is considerably enhanced by the presence of a 2-methoxy group, but decreased by 4-methoxy, 3-methoxy, and 3 or 17-acetoxy groups. Recent investigation suggests that such estrogen metabolites may be produced in significant amounts during human pregnancy and that they can potentially be converted back to the active parent compounds [Ball et al, Acta Endocrinol 93:1 (Suppl. 232), 1980]. Binding to SHBG may thus provide an important reservoir for some of these compounds in pregnancy serum where SHBG levels are increased 10-fold over non-pregnant levels.