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STUDIES ON THE IDENTITY OF A ~ 40 K SOMATOMEDIN BINDING PROTEIN IN AMNIOTIC FLUID AND SERUM. S. Drop*, D. Kortleve, J. D'Ercole, Dept. of Pediatrics, Erasmus University Rotterdam, The Netherlands, and University of North Carolina, Chapel Hill, U.S.A..

A specific double antibody radioimmunoassay (RIA) was developed for a ~ 40 K somatomedin binding protein (SMBP), purified from midgestational human amniotic fluid (AF) and termed amniotic fluid binding protein (AFBP). ^{125}I -SM-C (300,000 cpm) and AF as well as cord serum and serum of an acromegalic and pregnant patient were cross-linked in the presence of 0.5 mM disuccinimidylsuberate (DSS). Aliquots were reacted with rabbit anti-AFBP antibody and anti-rabbit 2nd antibody. The precipitates were solubilized, boiled and loaded on an SDS polyacrylamide gel. Autoradiography of the gels showed a ~ 40 K band, most densely in AF, followed by cord, pregnancy and acromegalic plasma. Preterm AF (± 25 ug prot.) was subjected to the cross-linking procedure in the presence of unlabeled SM-C. Up to 250 ng SM-C was required to obtain full displacement. Cord serum was chromatographed on Sephadex G-200 at neutral pH. ~ 150 K protein fractions were pooled and concentrated. Acidification did not increase AFBP concentration of this pool. Rechromatography of the 150 K pool at pH 2 did not result in an increment of ~ 40 K AFBP-RIA activity.

Since AFBP antibody recognizes one species of SMBP in human AF and postnatal serum, we conclude that ~ 40 K SMBP in AF and serum may well be identical. AFBP cannot be generated from ~ 150 K SMBP by simple acidification. The elucidation of a relation between ~ 150 K and ~ 40 K SMBP in serum requires further study.

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PULSATILE LH SECRETION DURING RESTRICTED AND "CATCH-UP" GROWTH IN THE DEVELOPING FEMALE SHEEP. Douglas L. Foster* and Deborah H. Olster, Reproductive Endocrinology Program, Department of Obstetrics and Gynecology, The University of Michigan, Ann Arbor, Michigan 48109.

An increase in LH pulse frequency drives the first follicular phase to completion in the female lamb. High frequency LH pulses develop the preovulatory follicle and increase estradiol to levels that trigger the first gonadotropin surge. This pubertal transition normally occurs between 25 and 35 weeks, provided body weight is above 30 kg. Maintenance of low body weight (e.g. 20 kg) by food restriction prevents puberty. The present study examined pulsatile LH secretion in undernourished lambs in the presence and absence of steroid negative feedback. Detailed LH patterns were obtained over a 4-h period (12 min samples) at 28, 31, 33, 35, 37, and 39 weeks of age from agonadal lambs (ovariectomy at 20 weeks). The females were either chronically undernourished (10-39 weeks of age) or were initially undernourished (10-27 weeks) and subsequently fed ad libitum (28-39 weeks). In undernourished agonadal lambs (n=7), LH pulse frequency was slow (0.1 pulse/h). Chronic treatment with low estradiol levels (Silastic capsule) from ovariectomy prevented LH pulses during low nutrition (6 lambs). Ad libitum feeding (6 lambs) between 28 and 39 weeks produced rapid "catch-up" growth (from 20 kg to 45 kg) and increased LH pulse frequency (from 0.1 pulse/h to 1.2 pulses/h). Estradiol during ad libitum feeding (6 lambs) reduced LH pulse amplitude by 70% and retarded the increase in LH pulse frequency. The results raise the possibility that level of nutrition can modulate the timing of puberty through alterations in LH pulse frequency. (Supported by NIH-HD-11311).