P-17 The Effect of GnRH-I and GnRH-II on Human Chorionic Gonadotropin, Progesterone and Estradiol Secretion from in vitro Culture of Human Placental Explants

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Objectives: We previously reported that GnRH-II is expressed in human placenta in vivo. GnRHs are known to play a key role in the regulation of placental hCG synthesis and secretion. In this study, we investigated the effects of GnRH-I and GnRH-II on the secretion pattern of hCG, P_4 and E_2 from placental explants of first and second trimester in our organ culture system.

Materials and Methods: We used two of first trimester (6 W~7 W) and four of second trimester (20 W~23 W) placental tissues. Fresh placental tissues were minced into small pieces (about 2 mm diameter). Eight to ten pieces of placental tissues (30~50 mg total tissue weight) were placed on a sterile nylon membrane (0.22 μm pore size). The medium was changed daily for 7 days and the conditioned medium was frozen for hormonal assays. To determine the effects of GnRH-I, GnRH-II and antide, each peptide was added to the fresh medium daily after 24 hr of culture. The concentrations of secreted hCG, P_4 and E_2 into medium were measured by radioimmunoassay. The parameter was expressed as hormone concentration per mg tissue weight and per ml. The data was normalized with the value of day 2.

Results: The release of hCG and P_4 was gradually increased in the explants of the first and second trimester. The concentration was from 2,000 mIU/mg (the basal release at day 1) to 1,7000 mIU/mg (the peak at day 4) in the first trimester and from 60 mIU/mg (at day 1) to 400 mIU/mg (the peak at day 6) in the second trimester. Both exogenous GnRH-I and -II slightly induced hCG release (about 1.5 fold by Day 5) in second trimester, but had no effect in first trimester (or down-regulatory effect). The release of P_4 by the culture days was increased from 1 ng/mg (the basal release at day 1) to 6.25 ng/mg (the peak at day 7) in the first trimester, and from 2 ng/mg (at day 1) to 10 ng/mg (at day 7) in the second trimester. Exogenous GnRH-II increased P_4 release (about 1.6 fold at Day 5) in the first trimester but both GnRH-I and -II had no effect in second trimester. In the first trimester, the maximum secretion of E_2 was 5.8 pg/mg at day 2, and then the secretion was decreased by increasing of culture days. In contrast, the E_2 secretion of second trimester was increased from day 5 (about 3 fold) and the peak was about 3 pg/mg at day 7 (about 10 fold), compared with day 1. The secretion of E_2 had not affected by exogenous GnRHs both in the first and second trimester. Antide had no effect on hormonal secretions in our culture system.

Conclusions: In our organ culture condition, the hormonal secretion from placental explants showed a typical patterns related to a gestational age and can be modulated by endogenous products such as GnRHs. Moreover, exogenous GnRHs can regulate the secretion of hCG and P_4. We suggest that this organ culture system can be used for the experimental model of placental physiology.