Progesterone synthesis by human luteal cells: Modulation by estradiol

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To assess the role of estradiol (E2) upon progesterone (P4) synthesis, a well defined human midluteal cell system was used. A dose-dependent inhibition of P4 synthesis with and without hCG was induced by E2. In addition, E2 had a dose related cumulative effect on pregnenolone as compared with control experiments (2-fold, $P < 0.05$) as well as in hCG- stimulated conditions (3-fold, $P < 0.005$). On the other hand, the concentrations of 20?-hydroxyprogesterone obtained in all experimental conditions were similar to control values, indicating that the catabolism of P4 was not modified. 3?-Hydroxysteroid dehydrogenase activity was significantly diminished ($P < 0.05$) in the presence of E2. Finally, the kinetic studies on P4 synthesis from pregnenolone showed a competitive type of inhibition with a K1 of 2.22 x 10-6 mol/L. These data indicate an inhibition of 3?-hydroxysteroid dehydrogenase on human corpus luteum by E2.