

Studies on the mechanism of inhibition of amphibian oocyte adenylate cyclase by progesterone

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Progesterone treatment induces the meiotic maturation of *Xenopus laevis* oocytes. Previous evidence indicates that this hormonal effect may be due to inhibition of oocyte adenylate cyclase. The present work studies several aspects of the mechanism of adenylate cyclase inhibition by this hormone. Forskolin greatly stimulates oocyte adenylate cyclase in the absence of guanine nucleotides and this activity is not sensitive to progesterone inhibition. In addition the forskolin-activated enzyme is not inhibited by a wide range of guanine nucleotide, in the presence or absence of hormone. The time course of cAMP synthesis catalyzed by oocyte adenylate cyclase in the presence of guanylyl-5'-imidodiphosphate (Gpp(NH)p) shows an initial lag period that does not depend on the concentration of Gpp(NH)p. Progesterone causes a very significant increase in the hysteresis of the reaction, at least doubling the half-time of enzyme activation. The hormonal effect on the lag cannot be reversed by saturati