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Effects of glucocorticoids on catecholamine secretion and electrical activity of guinea-pig adrenal chromaffin cells

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1. Effects of cortisol, a natural glucocorticoid, and dexamethasone, a synthetic one, on secretagogues-induced catecholamine (CA) secretion were investigated in perfused guinea pig adrenal glands. The effects of glucocorticoids on the intracellular Ca^{2+} concentration ($[\text{Ca}^{2+}]_{\text{in}}$) and ionic channel currents were also examined in isolated adrenal chromaffin cells.
2. Cortisol (10–300 μM) and dexamethasone (10–300 μM) produced dose-dependent inhibition of nicotine (20 μM)-induced CA secretion with the apparent IC_{50} values of 132 μM and 30 μM , respectively.
3. Cortisol (10–300 μM), but not dexamethasone (10–300 μM), inhibited muscarine (20 μM)-induced CA secretion with an apparent IC_{50} value of 169 μM . The increase in $[\text{Ca}^{2+}]_{\text{in}}$ evoked by muscarine (20 μM) was not affected by both glucocorticoids.
4. High K^+ (56 mM)-induced CA secretion was not affected by both glucocorticoids. Dexamethasone, but not cortisol, slightly depressed an increase in $[\text{Ca}^{2+}]_{\text{in}}$ evoked by high K^+ .
5. In whole cell voltage-clamped cells, voltage-dependent Na^+ currents evoked by depolarizing pulses were not affected by both glucocorticoids. Dexamethasone, but not cortisol slightly depressed the Ba^{2+} currents through voltage-dependent Ca^{2+} channels.
6. At a holding potential of -70 mV, nicotine (10–100 μM) caused transient inward currents in a dose-dependent manner. The dose-response curve for nicotinic currents was downwardly shifted by cortisol (30 μM) and dexamethasone (10 and 30 μM). Nicotine (50 μM)-evoked inward currents were dose-dependently inhibited by cortisol (3–100 μM) and dexamethasone (3–100 μM) with the apparent IC_{50} values of 132 μM and 30 μM , respectively.
7. These results indicate that glucocorticoids have short-term inhibitory effects on nicotine-induced CA secretion probably by the inhibition of nicotinic receptor channels in guinea-pig adrenal chromaffin cells. The inhibitory action of cortisol on secretory response to muscarine remained to be clarified.

Preparation of a Panel of M13 Phages Reconizing Influenza Virus Proteins

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Influenza A viruses distribute among a variety of animals including humans, pigs, and birds.

Pigs act as the intermediate host generating genetic reassortants between human and avian