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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  $\text{Ca}^{2+}$  concentration ( $[\text{Ca}^{2+}]_{\text{in}}$ ) and ionic channel currents were also examined in isolated adrenal chromaffin cells.
2. Cortisol (10–300  $\mu\text{M}$ ) and dexamethasone (10–300  $\mu\text{M}$ ) produced dose-dependent inhibition of nicotine (20  $\mu\text{M}$ )-induced CA secretion with the apparent  $\text{IC}_{50}$  values of 132  $\mu\text{M}$  and 30  $\mu\text{M}$ , respectively.
3. Cortisol (10–300  $\mu\text{M}$ ), but not dexamethasone (10–300  $\mu\text{M}$ ), inhibited muscarine (20  $\mu\text{M}$ )-induced CA secretion with an apparent  $\text{IC}_{50}$  value of 169  $\mu\text{M}$ . The increase in  $[\text{Ca}^{2+}]_{\text{in}}$  evoked by muscarine (20  $\mu\text{M}$ ) was not affected by both glucocorticoids.
4. High  $\text{K}^+$  (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  $\text{K}^+$ .
5. In whole cell voltage-clamped cells, voltage-dependent  $\text{Na}^+$  currents evoked by depolarizing pulses were not affected by both glucocorticoids. Dexamethasone, but not cortisol slightly depressed the  $\text{Ba}^{2+}$  currents through voltage-dependent  $\text{Ca}^{2+}$  channels.
6. At a holding potential of  $-70$  mV, nicotine (10–100  $\mu\text{M}$ ) caused transient inward currents in a dose-dependent manner. The dose-response curve for nicotinic currents was downwardly shifted by cortisol (30  $\mu\text{M}$ ) and dexamethasone (10 and 30  $\mu\text{M}$ ). Nicotine (50  $\mu\text{M}$ )-evoked inward currents were dose-dependently inhibited by cortisol (3–100  $\mu\text{M}$ ) and dexamethasone (3–100  $\mu\text{M}$ ) with the apparent  $\text{IC}_{50}$  values of 132  $\mu\text{M}$  and 30  $\mu\text{M}$ , 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