

Modulation of intracellular pH by secretagogues and the Na⁺/H⁺ antiporter in cultured bovine chromaffin cells

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The possible physiological role of cytosolic pH changes in adrenal medullary chromaffin cell secretion was examined by investigating the effects of catecholamine secretagogues on cytosolic pH, which was monitored using the intracellular fluorescent indicator 2',7'-bis-(2-carboxyethyl)-5(6)-carboxyfluorescein (BCECF). Anti-fluorescein antibodies were used to reduce background fluorescence from extracellular 2',7'-bis-(2-carboxyethyl)-5(6)-carboxyfluorescein (BCECF). Stimulation with both cholinergic agonists (acetylcholine, nicotine) and a depolarizing agent (high K⁺) transiently acidified the cytosol of the chromaffin cell. This acidification was antagonized by reducing extracellular Ca²⁺ concentration and by Ca²⁺ antagonists (Co²⁺, verapamil), indicating that it occurred secondarily to Ca²⁺ influx, possibly as a result of exchange of Ca²⁺ ions for protons across organelle membranes. Taken together with previously published data [Kuijpers G.A.J. et al. (1989) J. Biol. Chem. 264, 698-70