# Changes in luminal pH caused by calcium release in sarcoplasmic reticulum vesicles

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Fast (milliseconds) Ca2+ release from sarcoplasmic reticulum is an essential step in muscle contraction. To electrically compensate the charge deficit generated by calcium release, concomitant fluxes of other ions are required. In this study we investigated the possible participation of protons as counterions during calcium release. Triad-enriched sarcoplasmic reticulum vesicles, isolated from rabbit fast skeletal muscle, were passively loaded with 1 mM CaCl2 and release was induced at pCa = 5.0 and pH = 7.0 in a stopped-flow fluorimeter. Accompanying changes in vesicular lumen pH were measured with a trapped fluorescent pH indicator (pyranin). Significant acidification (~0.2 pH units) of the lumen occurred within the same time scale (t(1/2) = 0.75 s) as calcium release. Enhancing calcium release with ATP or the ATP analog 5'-adenylylimidodiphosphate (AMPPNP) produced >20-fold faster acidification rates. In contrast, when calcium release induced with calcium with or without AM PPNP was