

Calcium modulation of phosphoinositide kinases in transverse tubule vesicles from frog skeletal muscle

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Highly purified transverse tubule membranes isolated from frog skeletal muscle phosphorylate phosphatidylinositol to phosphatidylinositol 4-phosphate and phosphatidylinositol

(4,5)-bisphosphate. The two phosphorylation reactions have different calcium requirements.

Phosphorylation of phosphatidylinositol to phosphatidylinositol 4-phosphate, which takes place in both isolated transverse tubules and sarcoplasmic reticulum membranes, is independent of calcium in a range of concentrations from 10^{-9} to 10^{-6} M, and is progressively inhibited to 10% of the maximal values by increasing calcium to 10^{-4} M or higher ($K_{0.5} = 5 \times 10^{-6}$ M). In contrast, phosphorylation of phosphatidylinositol 4-phosphate to phosphatidylinositol (4,5)-bisphosphate, a reaction exclusively present in transverse tubule membranes, is maximal at calcium concentrations higher than 2×10^{-6} M and decreases to 30% of maximal values at calcium concentrations of 2×10^{-7} M or lower ($K_{0.5} = 10^{-6}$ M). Unlike frog membranes, transverse t