

ATP stimulation of Na⁺/Ca²⁺ exchange in cardiac sarcolemmal vesicles

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In cardiac sarcolemmal vesicles, MgATP stimulates Na⁺/Ca²⁺ exchange with the following characteristics: 1) increases 10-fold the apparent affinity for cytosolic Ca²⁺; 2) a Michaelis constant for ATP of ~500 μM; 3) requires micromolar vanadate while millimolar concentrations are inhibitory; 4) not observed in the presence of 20 μM eosin alone but reinstated when vanadate is added; 5) mimicked by adenosine 5'-O-(3-thiotriphosphate), without the need for vanadate, but not by γ,γ-methyleneadenosine 5'-triphosphate; and 6) not affected by unspecific protein alkaline phosphatase but abolished by a phosphatidylinositol-specific phospholipase C (PI-PLC). The PI-PLC effect is counteracted by phosphatidylinositol. In addition, in the absence of ATP, L-α-phosphatidylinositol 4,5-bisphosphate (PIP₂) was able to stimulate the exchanger activity in vesicles pretreated with PI-PLC. This MgATP stimulation is not related to phosphorylation of the carrier, whereas phosphorylation appeared in the phos