

Stimulation of membrane serine-threonine phosphatase in erythrocytes by hydrogen peroxide and staurosporine

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Indirect evidence has suggested that K-Cl cotransport in human and sheep erythrocytes is activated physiologically by a serine-threonine phosphatase. It is activated experimentally by H₂O₂ and by staurosporine, a kinase inhibitor. Activation by H₂O₂ and staurosporine is inhibited by serine-threonine phosphatase inhibitors, suggesting that the activators stimulate the phosphatase. The present study shows that sheep and human erythrocytes contain membrane-associated as well as cytosolic serine-threonine phosphatases, assayed from the dephosphorylation of ³²P-labeled glycogen phosphorylase. In cells from both species, the relatively low sensitivity of the membrane enzyme to okadaic acid suggests it is type 1 protein phosphatase. The cytosolic phosphatase was much more sensitive to okadaic acid. Membrane-associated phosphatase was stimulated by both H₂O₂ and staurosporine. The results support earlier conclusions that the membrane-associated type 1 phosphatase identified here is regulated