

## The Effect of Propranolol and Calcium on Human Erythrocytes

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The addition of DL propranolol (0.5 mM) to heparinized whole blood results in a decrease in both osmotic fragility and oxygen affinity ( $P_{50}$ ). In contrast, EDTA anticoagulated blood does not respond to propranolol. Heparinized blood washed in buffered glucose saline will not change with propranolol unless  $Ca^{++}$  is present. A maximum shift in the osmotic fragility occurs at propranolol concentration of 0.5 mM with 2 mM  $CaCl_2$ .

The increase in resistance to osmotic lysis is mediated through a decrease in potassium content. The change in osmotic resistance is temperature sensitive, inhibited by both EGTA and high concentrations of potassium chloride, but not effected by Quabain (0.1 mM).

The changes in oxygen affinity parallel those observed with osmotic fragility. The decrease in oxygen affinity with propranolol in heparinized whole blood is inhibited by EGTA. Washed red blood cells require  $Ca^{++}$  for propranolol shift the oxygen dissociation curve.

Propranolol does not alter either calcium influx or efflux and appears to alter the membrane permeability for potassium without entering the cell. Several pathological red blood cells, including hereditary spherocytosis and sickle cell, respond similarly.