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# The haemolytic effect of verapamil on erythrocytes exposed to varying osmolarity

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**Abstract**

The haemolytic effect of verapamil on red blood cells (RBCs) exposed to varying osmolarity was investigated. The experimental approach used a modified red cell haemolysis assay with concentrations of verapamil ranging from 50–1500 lM compared to drug free controls. The time-course of haemolytic effects was also investigated. We also briefly determined the haemolytic effects of verapamil in Ca2+-free conditions (with added EGTA). In conditions representing decreasing osmolarity (dilution from 140–0 mM NaCl) there was a significant increase in erythrocyte haemolysis that was also dependent on verapamil concentration (ANOVA, $p < 0.05$). The red cells also showed a significantly increased rate of haemolysis over 5 h with increasing verapamil concentration (ANOVA, $p < 0.05$). The degree of RBC hypotonic haemolysis was significantly increased in a Ca2+-free medium (+EGTA) compared to normal saline and this effect was exacerbated by additions of verapamil (ANOVA, $p < 0.05$). Overall the data suggested that verapamil can cause haemolysis of RBCs in a predictable time- and concentration-dependent manner, and that verapamil increases the fragility of the erythrocytes further during hypotonic osmotic stress and Ca2+-free conditions. The mechanism of verapamil-dependent haemolysis could be directly related to the observed biphasic concentration-effect and could consequently involve several ion transport pathways.

Keywords: Verapamil; Haemolysis; Equine red blood cell; Calcium; Osmotic stress



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