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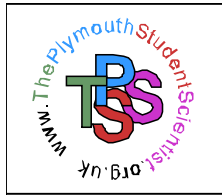
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# The haemolytic effect of verapamil on erythrocytes exposed to varying osmolarity

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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 IM compared to drug free controls. The time-course of haemolytic effects was also investigated. We also briefly determined the haemolytic effects of verapamil in Ca<sup>2+</sup>-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 Ca<sup>2+</sup>-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 Ca<sup>2+</sup>-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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