Hemorheological effects of recombinant human erythropoietin therapy in normal rats

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Recombinant human erythropoietin (rHuEPO) is used to treat chronic kidney disease anemia and, illicitly, in sports doping. Our aim was to study the effect of increasing rHuEPO doses on erythroid cells, blood pressure (BP) and endothelial nitric oxide synthase (eNOS) that might affect hemorheology, using a rat model.

Wistar rats were divided in 5 groups: control (vehicle) and rHuEPO-treated groups (100, 200, 400 and 600 IU/kg bw/wk), 3 times/week, along 3 weeks. Blood was collected for hematological analysis. BP was measured by tail-cuff method. Kidney tissue was collected for protein analysis by western blot.

A dose-dependent increase in erythrocytes, hematocrit and hemoglobin levels was found with rHuEPO therapy, in rHuEPO200, rHuEPO400 and rHuEPO600 groups, after 1 week of treatment that was enhanced at the end of protocol. BP raised in all groups receiving rHuEPO. A reduction in kidney eNOS phosphorylation was observed in the rHuEPO200 and rHuEPO600 groups.

Excessive erythrocytosis increases blood viscosity which led to an increase in BP. Reduced eNOS activity was associated with increased levels of systolic BP.