

Effects of increased or decreased red blood cells on exercise performance in mice

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An increase in red blood cells (RBCs) is believed to improve exercise performance, because RBCs transport O₂ from the lungs to the tissues and deliver metabolically produced CO₂ to the lungs for expiration. In this study, we examined the effects of increased or decreased RBCs on exercise performance in mice. In order to vary the volume percentage of RBCs in blood (hematocrit levels), trained FVB mice were administered darbepoetin alfa (DPA), a long-acting erythropoiesis-stimulating agent, or phenylhydrazine (PHZ), a reagent inducing hemolytic anemia. The exercise performance was evaluated using a forced swimming pool. The administration of DPA or PHZ caused a significant increase or decrease in hematocrit levels, respectively. However, the partial improvement in exercise performance due to increased RBCs was observed only when higher intensity exercise was applied to mice whose hematocrit levels exceeded 70%. In addition, the decrease in exercise performance due to decreased RBCs was limited, even when the hematocrit levels was about 35%. These results suggested that the increase or decrease in RBCs had little effect on exercise performance in mice.