The oxyhemoglobin dissociation curve illustrates the affinity of hemoglobin for oxygen. The loading of oxygen onto the hemoglobin molecule is minimally altered by changes in the $P_{50}$. However, the release of oxygen to the tissues is profoundly affected by the $P_{50}$.

A rightward shift of the curve (shown in red) is reflected by an elevation in the $P_{50}$ and this improves delivery of oxygen to the tissues. A rightward shift is seen with: acidosis, hypercarbia, hyperthermia, increased 2,3-DPG and hemoglobin S. A leftward shift (shown in green) is seen with: alkalosis, hypocarbia, hypothermia, decreased 2,3-DPG and hemoglobin F.

2,3-DPG (2,3-diphosphoglycerate) is present in RBCs and reduces hemoglobin’s affinity for oxygen. 2,3-DPG levels are increased with chronic hypoxemia and anemia; levels progressively decrease during the storage of blood.

Additional Reading: