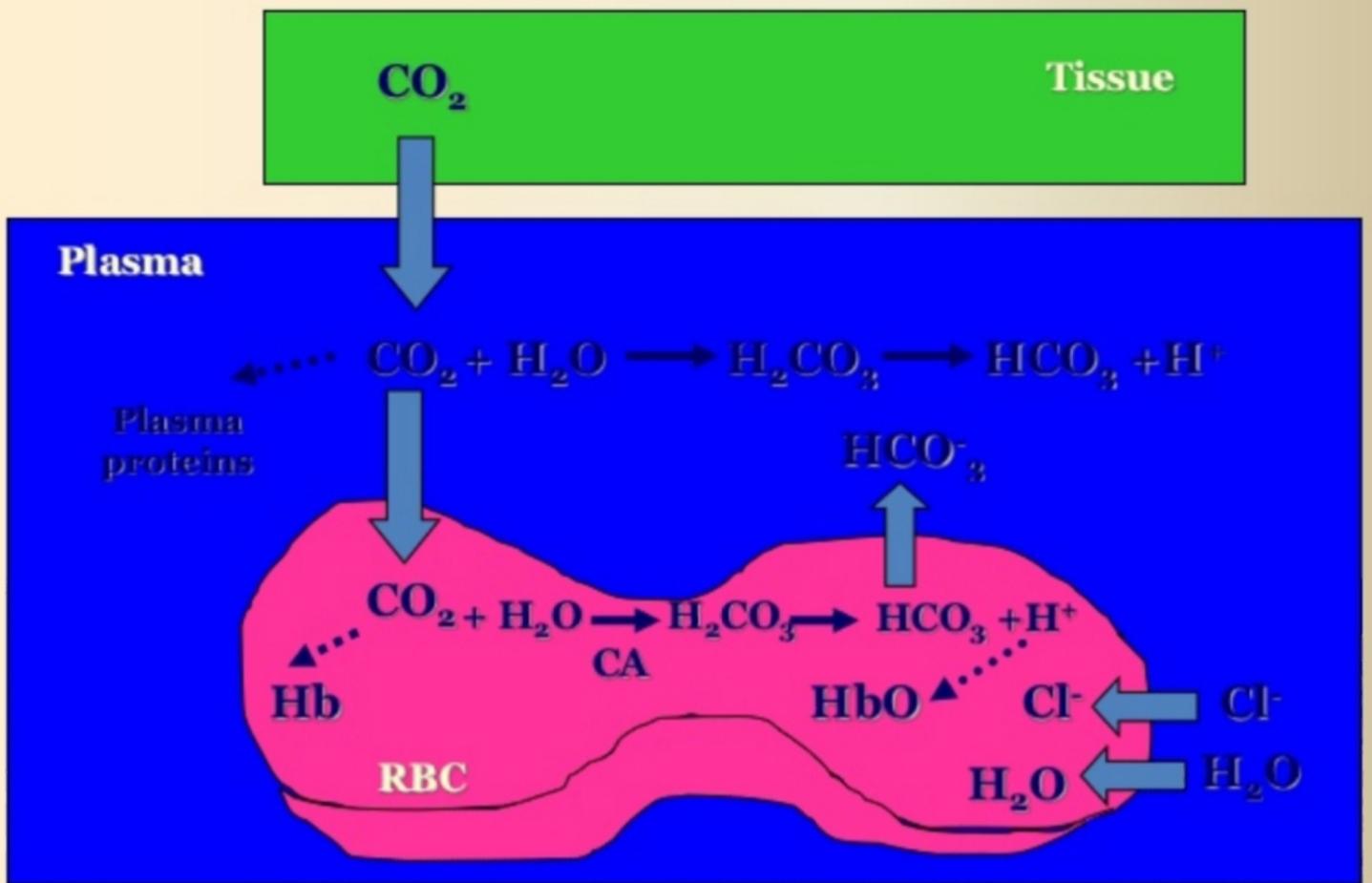


Chloride shift phenomenon

- **Definition:** It is the movement of Cl^- in exchange with HCO_3^- across RBC membrane.
- It is responsible for carrying most of the tidal CO_2 in the bicarbonate form.
- It prevents excessive drop of blood pH.



Chloride shift phenomenon

- **Mechanism:**

- CO_2 entering the blood diffuses into RBCs \longrightarrow rapidly hydrated to H_2CO_3 in the presence of the carbonic anhydrase enzyme.
- H_2CO_3 dissociates into H^+ and HCO_3^- .
- H^+ is buffered by the reduced (not oxygenated) Hb.
- HCO_3^- concentration in RBCs increases.
- some of the HCO_3^- diffuses out to the plasma.
- In order to maintain electrical neutrality, chloride ions (Cl^-) migrate from the plasma into the red cells.

Chloride shift phenomenon

- **Net effect:**
 - Increased HCO_3^- in both the RBCs and plasma.
 - Increased Cl^- inside the RBCs.
 - Increased osmotic pressure inside RBCs \longrightarrow water shift from the plasma.
 - Increase RBCs volume \longrightarrow increase in the hematocrit value.
 - Buffering of the tidal CO_2 with very little change in the pH.

Reverse chloride shift phenomenon

- **Definition:** It is the movement of Cl^- in exchange with HCO_3^- across RBC membrane.
- It is responsible for removal of the tidal CO_2 by lungs.

