$$E^{FADH^-}_{His} \quad \xrightarrow{\text{p}K_a = 8.1^*} \quad E^{FADH^-}_{HisH^+}$$

$E^\circ = -0.12\ \text{V}$

$E^\circ\ (\text{pH 0}) = 0.31\ \text{V}^*$

$E^\circ\ (\text{pH 0}) = 0.36\ \text{V}$

$E^\circ = 0.065\ \text{V}^*$

$$E^{FADH^\bullet}_{HisH^+}$$

$$E^{FAD^{\bullet-}}_{His} \quad \xrightarrow{\text{p}K_a = 7.3^*} \quad E^{FADH^\bullet}_{His} \quad \xrightarrow{\text{p}K_a = 7.2} $$

(Estimated as shown below)

* *From Experimental data*

$$E^\circ = 0.31\ \text{V}$$
$$\mathbf{E}(FAD^{\bullet-}, His) + H^+ + e^- \rightleftharpoons \mathbf{E}(FADH^-, His) \qquad \Delta G^\circ = -0.31\ \text{eV}$$

$$\text{p}K_a = 7.3$$
$$\mathbf{E}(FADH^\bullet, His) \rightleftharpoons \mathbf{E}(FAD^{\bullet-}, His) + H^+ \qquad \Delta G^\circ = 0.43\ \text{eV}$$

$$E^\circ = -0.12\ \text{V}$$
$$\mathbf{E}(FADH^\bullet, His) + e^- \rightleftharpoons \mathbf{E}(FADH^-, His) \qquad \Delta G^\circ = 0.12\ \text{eV}$$

$$-\text{p}K_a = 8.1$$
$$\mathbf{E}(FADH^-, His) + H^+ \rightleftharpoons \mathbf{E}(FADH^-, HisH^+) \qquad \Delta G^\circ = -0.48\ \text{eV}$$

$$E^\circ = 0.36\ \text{V}$$
$$\mathbf{E}(FADH^\bullet, His) + H^+ + e^- \rightleftharpoons \mathbf{E}(FADH^-, HisH^+) \qquad \Delta G^\circ = -0.36\ \text{eV}$$

$$E^\circ = 0.065\ \text{V}$$
$$\mathbf{E}(FADH^-, HisH^+) \rightleftharpoons \mathbf{E}(FADH^\bullet, HisH^+) + e^- \qquad \Delta G^\circ = -0.065\ \text{eV}$$

$$-\text{p}K_a = 7.2$$
$$\mathbf{E}(FADH^\bullet, His) + H^+ \rightleftharpoons \mathbf{E}(FADH^-, His) \qquad \Delta G^\circ = -0.425\ \text{eV}$$