

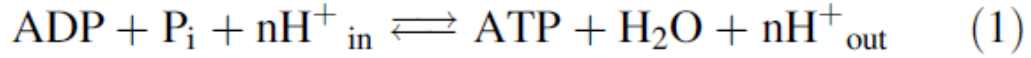
In all these experiments, a transmembrane  $\Delta\phi$  was generated in addition to the  $\Delta\text{pH}$  by the different  $\text{K}^+$  concentrations in the external and internal aqueous phase in the presence of the  $\text{K}^+$ -selective ionophore valinomycin. In the experimental conditions used in this work, the magnitude of  $\Delta\phi$  can be calculated from the Nernst equation:

$$\Delta\phi = 2.303 \frac{RT}{F} \lg \frac{[\text{K}_{\text{out}}^+]}{[\text{K}_{\text{in}}^+]} = 59 \text{ mV} \lg \frac{180 \text{ mM}}{100 \text{ mM}} = 15 \text{ mV} \quad (7)$$

The  $\Delta\text{pH}$  (eq) values shown in [Figure 2](#) were converted into  $\Delta\tilde{\mu}_{\text{H}^+}$  (eq) values according to equation 3, taking into account this constant  $\Delta\phi$  value.

P.419 left column 2<sup>nd</sup> paragraph, equations 1-3:

According to the chemiosmotic theory, the coupling of ATP synthesis and ATP hydrolysis with the transmembrane proton transport is described by equation 1:



The Gibbs free energy of reaction,  $\Delta G_p'$ , is given by:

$$\Delta G_p' = \Delta G_p^{\circ'} + RT \ln Q - n \Delta \tilde{\mu}_{\text{H}^+}, \quad Q = \frac{[\text{ATP}]c^\circ}{[\text{ADP}][\text{P}_i]} \quad (2)$$

$Q$  is the stoichiometric product of reaction 1 without protons, where the activity of water was assumed to be one and  $c^\circ = 1$  M.  $\Delta G_p^{\circ'}$  is the standard Gibbs free energy of reaction (biochemical standard state),  $[\text{ATP}]$ ,  $[\text{ADP}]$  and  $[\text{P}_i]$  are the sums of molar concentrations of all ionic species of each compound and  $\Delta \tilde{\mu}_{\text{H}^+} = \Delta \tilde{\mu}_{\text{H}^+(\text{in})} - \Delta \tilde{\mu}_{\text{H}^+(\text{out})}$  is the transmembrane electrochemical potential difference of protons.  $\Delta \tilde{\mu}_{\text{H}^+}$  is usually expressed in terms of the transmembrane  $\Delta \text{pH} = \text{pH}_{\text{out}} - \text{pH}_{\text{in}}$  and the transmembrane electric potential difference  $\Delta \varphi = \varphi_{\text{in}} - \varphi_{\text{out}}$ , i.e.

$$\begin{aligned} \Delta \tilde{\mu}_{\text{H}^+} &= RT \ln [\text{H}^+_{\text{in}}] - RT \ln [\text{H}^+_{\text{out}}] + F\varphi_{\text{in}} - F\varphi_{\text{out}} \\ &= 2.303 RT (\text{pH}_{\text{out}} - \text{pH}_{\text{in}}) + F(\varphi_{\text{in}} - \varphi_{\text{out}}) \\ &= 2.303 RT \Delta \text{pH} + F\Delta \varphi \end{aligned} \quad (3)$$