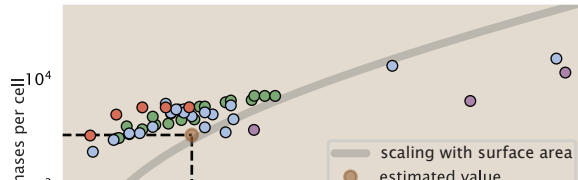
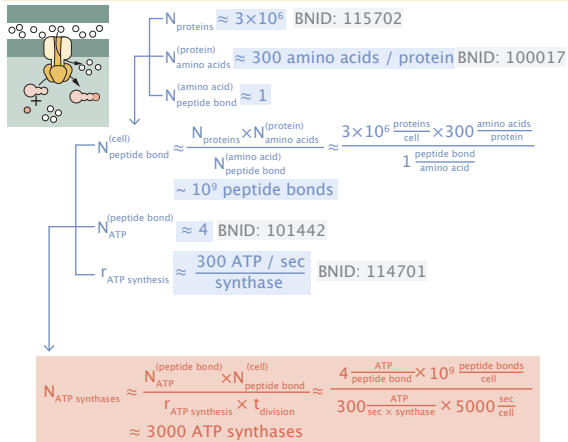


(A)

### ATP synthesis



(B)

### maintenance of proton gradient



$$r_{\text{proton use for ATP synthesis}} \approx N_{\text{ATP synthases}} \times \frac{300 \text{ ATP}}{1 \text{ sec}} \times \frac{4 \text{ protons}}{1 \text{ ATP}}$$

$$\approx 5 \times 10^6 \frac{\text{protons}}{\text{sec}}$$

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$$r_{\text{proton transport}} \approx 1500 \frac{\text{protons / sec}}{\text{electron transport chain}}$$

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$$N_{\text{electron transport chains}} \approx \frac{5 \times 10^6 \text{ protons}}{1 \text{ sec}} \times \frac{1 \text{ sec} \times \text{electron transport chain}}{1500 \text{ protons}}$$

$$\approx 3000 \text{ electron transport chains}$$

