

Exercise 5: Efficiency of aerobic respiration

1. Calculate the ΔG° of the oxidation of glucose by oxygen to carbon dioxide and water. Use the following values for ΔG_f° :

glucose $\Delta G_f^\circ = -917.2 \text{ kJ/mol}$

oxygen gas $\Delta G_f^\circ = 0 \text{ kJ/mol}$

carbon dioxide $\Delta G_f^\circ = -394.4 \text{ kJ/mol}$

water $\Delta G_f^\circ = -237.1 \text{ kJ/mol}$

2. Calculate the ΔG° for the making of 34 ATP from 34 ADP; use the values in Table 14-4.

3. Calculate the percentage efficiency of the aerobic respiration of glucose (in other words, how much of the free energy released by the oxidation of glucose is captured by high-energy compounds?). Comment on this number by comparing it to the efficiencies of anaerobic respiration.