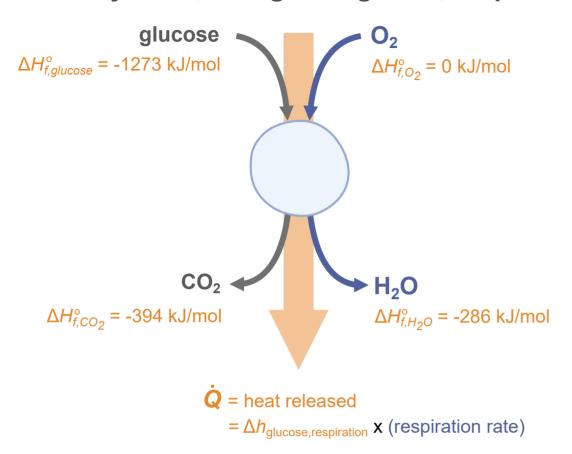
A

steady-state, non-growing cells, respiration



net reaction of glycolysis and respiration:

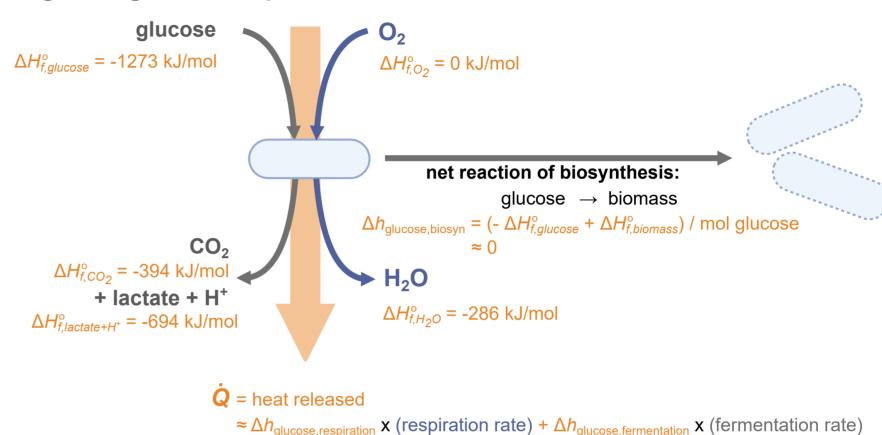
glucose + 6 O₂
$$\rightarrow$$
 6 CO₂ + 6 H₂O
$$\Delta h_{\text{glucose,respiration}} = (-\Delta H_{f,glucose}^{\circ} - 6\Delta H_{f,O_2}^{\circ} + 6\Delta H_{f,CO_2}^{\circ} + 6\Delta H_{f,H_2O}^{\circ}) / \text{mol glucose}$$

$$\approx -2800 \text{ kJ / mol glucose}$$

respiration rate = oxygen consumption rate / $(6 \text{ mol } O_2 / 1 \text{ mol glucose})$

В

growing cells, respiration and fermentation



net reaction of glycolysis and respiration:

glucose + 6 O₂
$$\rightarrow$$
 6 CO₂ + 6 H₂O
$$\Delta h_{\text{glucose,respiration}} = (-\Delta H_{f,\text{glucose}}^{\circ} - 6 \Delta H_{f,\text{O}_2}^{\circ} + 6 \Delta H_{f,\text{CO}_2}^{\circ} + 6 \Delta H_{f,\text{H}_2\text{O}}^{\circ}) / \text{mol glucose}$$
 \approx -2800 kJ / mol glucose

respiration rate = oxygen consumption rate / (6 mol O_2 / 1 mol glucose)

net reaction of glycolysis and fermentation:

glucose
$$\rightarrow$$
 2 lactate + 2 H⁺

$$\Delta h_{\text{glucose,fermentation}} = (-\Delta H_{f,glucose}^{\circ} + 2\Delta H_{f,lactate+H+}^{\circ}) / \text{mol glucose}$$

$$\approx -110 \text{ kJ / mol glucose}$$

fermentation rate = lactate production rate / (2 mol lactate / 1 mol glucose)