

Name: Key

Quiz 4

In a fed human cardiac myocyte, the conversion of 3-phosphoglycerate to 2-phosphoglycerate has:

$$\Delta G = -140 \frac{\text{cal}}{\text{mole}}$$

$$\Delta G^0 = 1120 \frac{\text{cal}}{\text{mole}}$$

1. Is this reaction spontaneous or non-spontaneous under these conditions?
2. Is this reaction favorable or unfavorable under these conditions?
3. What is the ration of 2-phosphoglycerate to 3-phosphoglycerate in these cells?

$$\frac{[2\text{-phosphoglycerate}]}{[3\text{-phosphoglycerate}]} = 0.1297$$

$$-140 \frac{\text{cal}}{\text{mole}} = 1120 \frac{\text{cal}}{\text{mole}} + (1.99 \frac{\text{cal}}{\text{K mole}})(310 \text{ K}) \ln \left(\frac{[2\text{-PG}]}{[3\text{-PG}]} \right)$$

$$-1260 \frac{\text{cal}}{\text{mole}} = 616.9 \frac{\text{cal}}{\text{mole}} \ln \left(\frac{[2\text{-PG}]}{[3\text{-PG}]} \right)$$

$$-2.0431 = \ln \left(\frac{[2\text{-PG}]}{[3\text{-PG}]} \right)$$