**Lehninger Principles of Biochemistry, 5th Edition**

P566 10, 11, 16

P611 4, 5

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or

**Lehninger Principles of Biochemistry, 6th Edition**

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or

**Lehninger Principles of Biochemistry, 7th Edition**

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**Extra question:**

1. Write the net reaction for the following processes.

glucose → 2 pyruvate (glycolysis)

glucose → 2 lactate (fermentation)

Compare the processes in terms of these characteristics:

**a**. Starting carbohydrate

**b**. Final carbon product

**c**. Yield of ATP

**d**. Yield of NADH

1. The compound 2,3-bisphosphoglycerate (2,3-BPG) acts as a coenzyme in the glycolytic reaction catalyzed by phosphoglycerate mutase. Through in most cells 2,3-BPG is present only in race amounts - enough to act in its role as coenzyme - it is present in relatively high concentration in erythrocytes, where it acts as a regulator of the affinity of hemoglobin for oxygen. Because erythrocytes synthesize and degrade 2,3-BPG via a detour from the glycolytic pathway, the rate of glycolysis and therefore the rate of generation of glycolytic intermediates has an impact on the concentration of 2,3-BPG. It follows that defects in the glycolytic pathway in erythrocytes can affect the ability of hemoglobin to carry oxygen.
2. How would the concentration of 2,3-BPG, and therefore the affinity of hemoglobin for oxygen, be affected in erythrocytes with a deficiency of hexokinase?
3. How would a pyruvate kinase deficiency affect hemoglobin’s affinity for oxygen?