

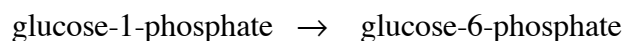
# Chem 352, Fundamentals of Biochemistry

## Lecture 1 – Supplemental Questions

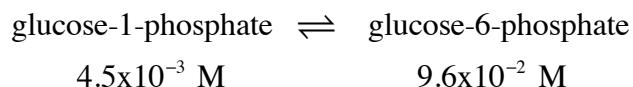
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1. In Carl Zimmer's News Focus article in *Science* titled "On the Origin of Life of Earth",
  - a. What evidence is cited that all living systems on earth have evolved from a common ancestor?
  - b. What do researchers now believe was the composition of the earliest cells?
  - c. Summarize our current understanding on how these components first arose on earth.

2. If a solution of 0.1M glucose-1-phosphate is incubated at 25°C with the enzyme phosphoglucomutase, the glucose-1-phosphate will spontaneously isomerize to glucose-6-phosphate:



At equilibrium, the following concentrations for glucose-1-phosphate and glucose-6-phosphate were determined:



- a. Calculate  $K_{eq}$  and  $\Delta G^\circ$  for this reaction
  - b. Under standard state condition, is this reaction favorable?
  - c. Will this reaction be spontaneous in a solution containing 100 mM glucose-6-phosphate 1 mM glucose-1-phosphate? Explain
3. We often take antibiotics to eliminate microbes in our bodies which are deemed harmful to us. Taken to the extreme, why would the elimination of all microbes from our body not be a good idea? (In answering this question, refer to Penicilli's editorial in the December 17, 2011 edition of *Science*.)