Practice problems for myoglobin and hemoglobin

1) Compare and contrast the main ideas of the concerted and sequential models of O_2 binding to hemoglobin.

2) In your own words explain why the O_2 binding curve of hemoglobin looks different from the one observed for myoglobin (Fractional saturation vs pO_2).

3) Prepare a hypothetical scetch of a Hill plot for O_2 binding to myoglobin. Label both axes and indicate the slope(s) on the curve you draw. What is the Hill coefficient?

4) Prepare a hypothetical scetch of a Hill plot for O_2 binding to hemoglobin. Label both axes and indicate the slope(s) on the curve you draw. What is the Hill coefficient?

5) You are studying an enzyme has an allosteric activator molecule X. Using the same technique we used to derive the Hill equation for O_2 binding to hemoglobin, we can derive a similar expression for allosteric binding of an activator to an enzyme. A plot of this type yields a straight line with a slope of 2.1.

Scetch a Hill plot for this binding, label both axes and indicate the slope(s) on the curve you draw. What is the Hill coefficient?

What can you say about the enzyme (be as specific as possible)?

What can't you say about the enzyme (be as specific as possible)?