Multiple Choice:

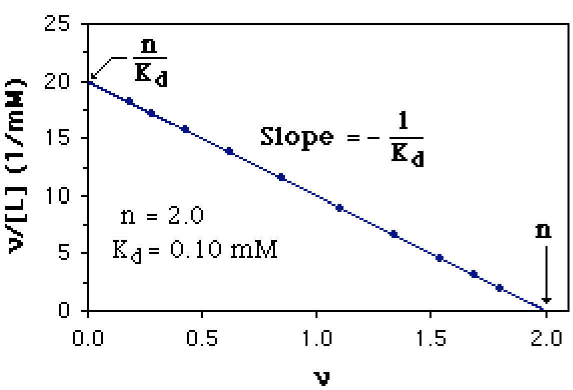
1. A protein that binds two ligands in a non-cooperative manner will:
a**) show a hyperbolic binding curve.**
b) show a curved Scatchard Plot
c) show a curved Hill Plot.
d) show a sigmodial binding curve

2. Once a ligand dissociation constant (KD) has been determined it is possible to calculate:
a) the ligand binding constant (Ka).
b) the DGo for the binding interaction.
c) the concentration of ligand required for half-maximal occupancy
d) All of the above are correct

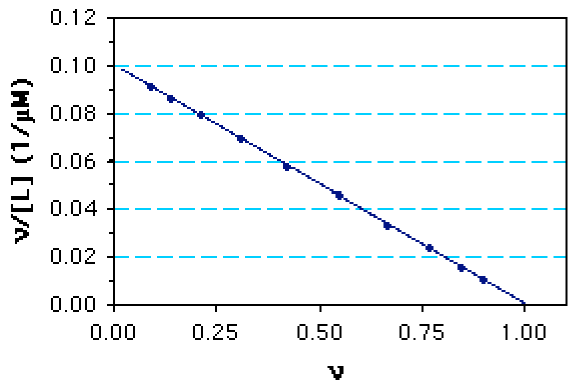
3. In both hemoglobin and myoglobin the oxygen is bound to:
a) the nitrogen atoms on the heme.
b) polar pocket in the protein.
c) histidine residues in the protein.
d) The iron atom in the heme group.

Scatchard Plot Fill-In
The Scatchard equation is:
$\nu/\mathbf{L} = \mathbf{n}/\mathbf{K_d} - \nu/\mathbf{K_d}$, where

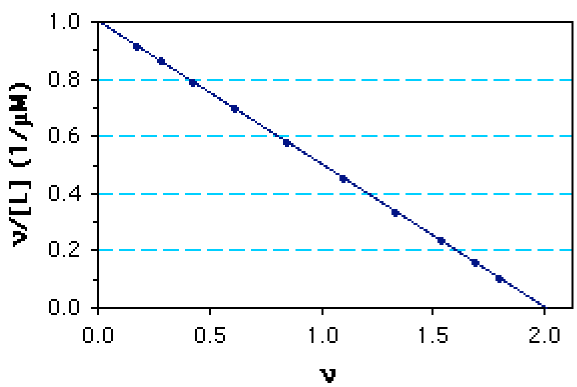
$\nu = [L]_{bound}/[M]_{total}$;
L = $[L]_{free}$;
n = # ligands/macromolecule, *i.e.*the stoichiometry;
$\mathbf{K_d}$ = the dissociation constant.



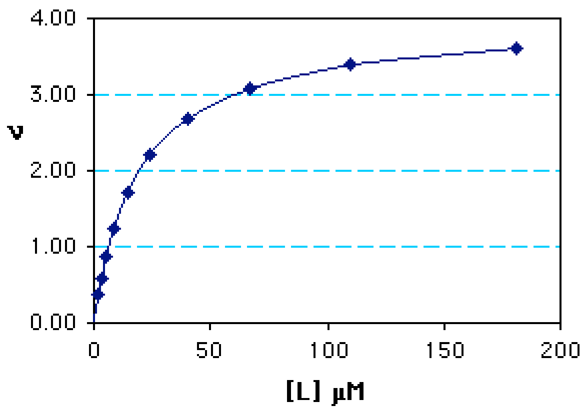
Ligand Binding Curve Problems:



What Type of plot? Scatchard
N=1
Kd = 10

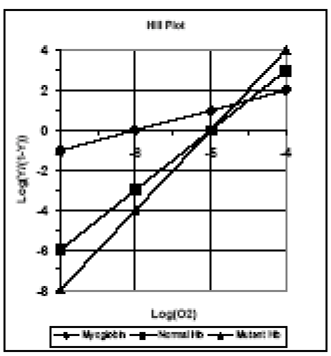


Type of Plot: Scatchard
N=2
Kd= 2



Type of Plot? Saturation binding
n= 4
Kd=.05

Hill Plot problem:



Determine the Hill coefficient and KD for the mutant hemoglobin. Please describe your approach

The hill coefficient is the slop of the line when it crosses the x-axis. So in this case, the hill coefficient is 4/1 =4

The Kd is the ligand concentration when Y=1/2, which is the concentration where the line crosses the X axis. Log (Kd) = -5 on the graph, so Kd = 10^-5M