03-231 Biochemistry SI
Sunday, October 23, 2005

Andy Hsieh AMDyMoN@cmu.edu Thursdays 7:30 – 8:30 PM, OSC 231A
Marciella DeGrace mdegrace@andrew.cmu.edu Wednesdays 7 - 8 PM, *WeH 5403*

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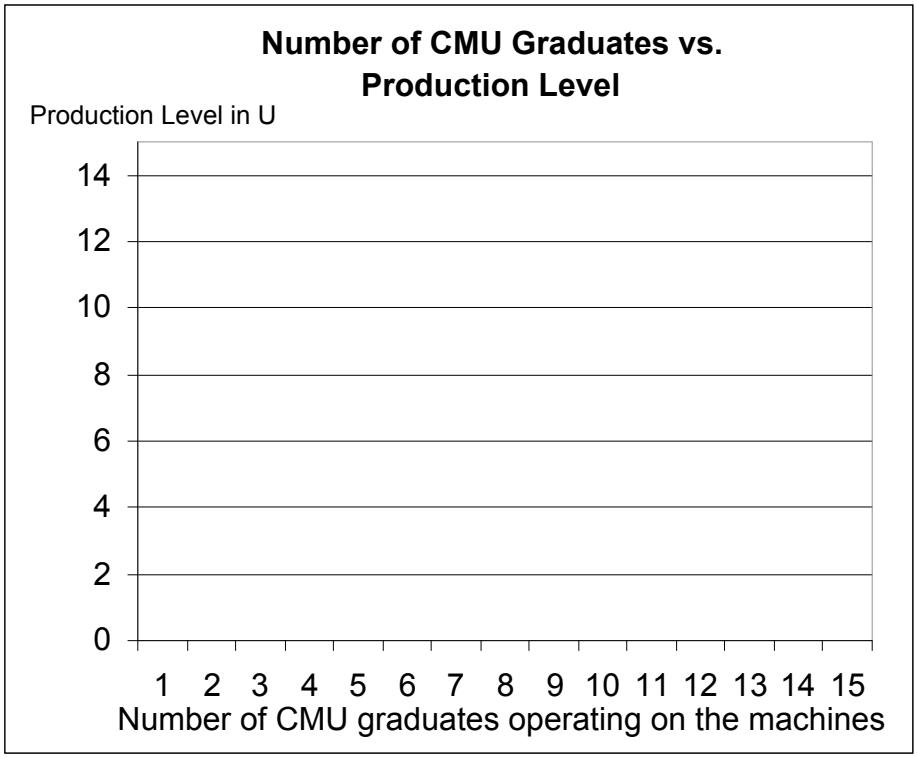
Enzyme kinetics: Factory and workers analogy

Imagine you have a factory with 10 machines; each has to be operated by a skillful CMU graduate. During the first week of the operation, you only have $ (because CMU is a prestigious yet blood-sucking university) to hire one CMU graduate. During the 2nd week, due to your superior managing skills, you're able to hire 2. 3rd week → 3 graduates… The company size increases every week by 1, by the 15th week, you have 15 CMU graduates working for you.

Graph the relationship between production level and number of CMU graduates (hint: the production from machine with no CMU graduate operating on it gives 0 units per week; a machine with a CMU graduate operating on it gives 1 unit per week)

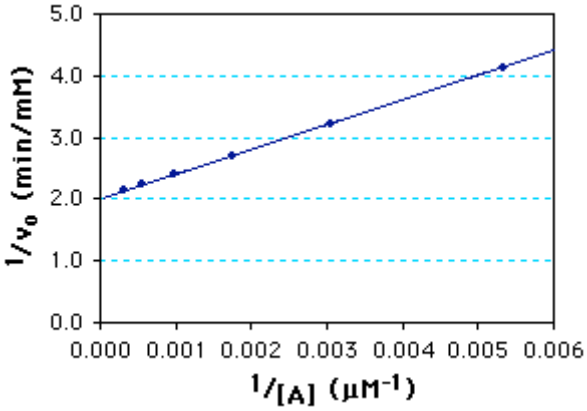


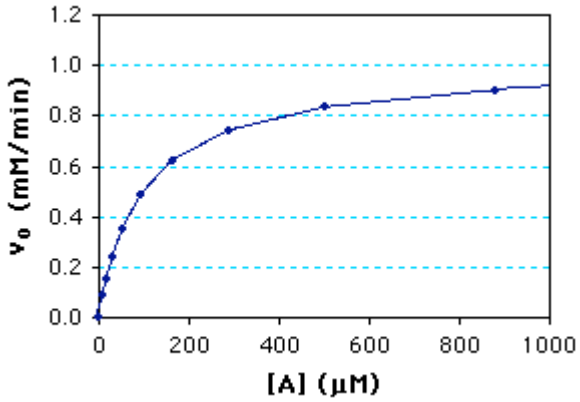
1. Predict how would the graph change if you use Pitt students instead? (lazy: only 50% of them are working at a particular time)

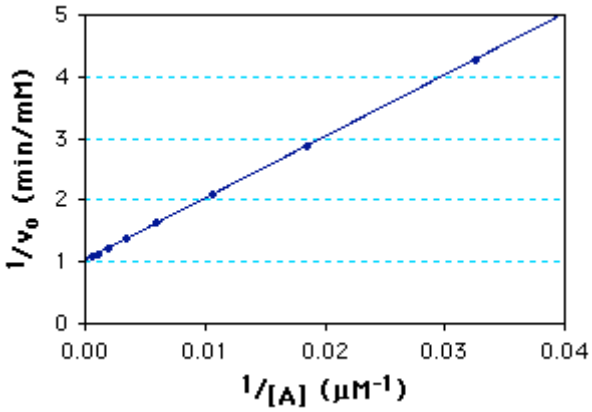
2. Predict how would the graph change if you use Carlow students instead? (clumsy: 5 machines were broken on the first day?)

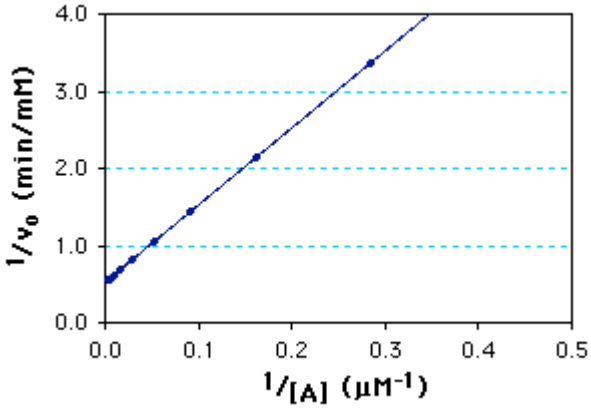
Units
What's the unit for a 3rd order rate constant?

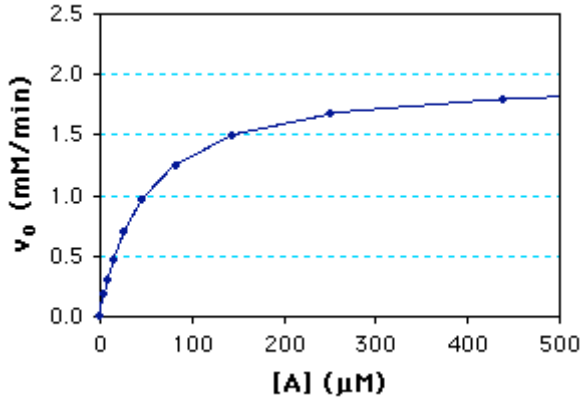
Graphing: Find the V_{max} and K_M for each graph
In a double reciprocal plot, the slope = _____, and y-intercept = _____. Therefore, V_{max} = _____, and K_M = _____

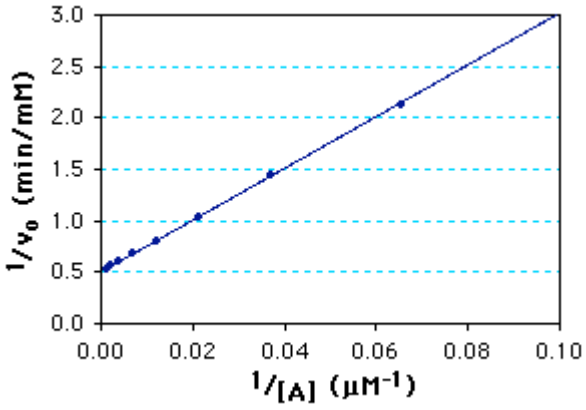


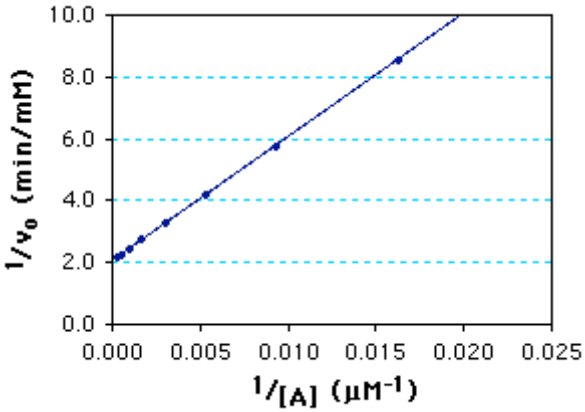








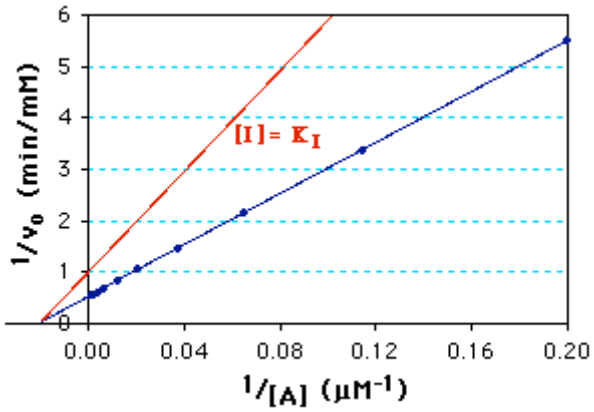


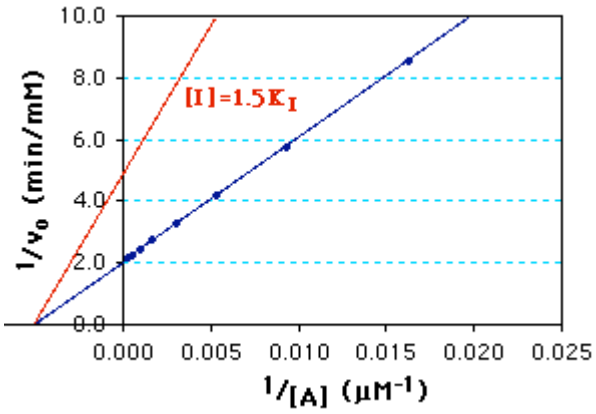


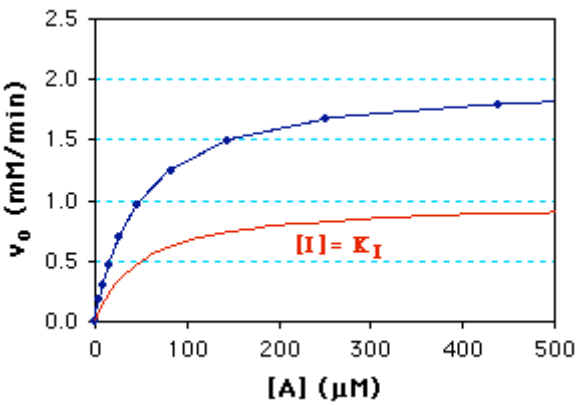
Competitive Inhibitors: Find the V_{max} and K_M for each graph, calculate _ or _', if applicable. Also, indicate if the inhibitor is competitive or non-competitive

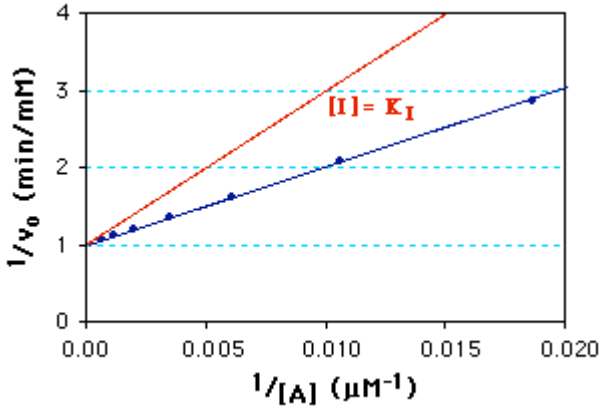
_ = the ratio between _____, and _____, and _'= the ratio between _____, and _____

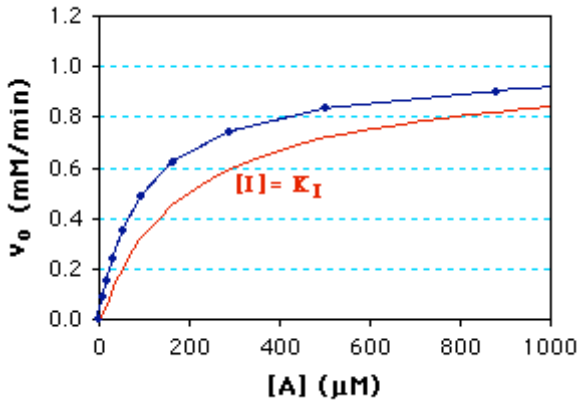
What's the difference between a competitive inhibitor and a non-competitive inhibitor? What enzyme kinetic factor(s) does each one affect?

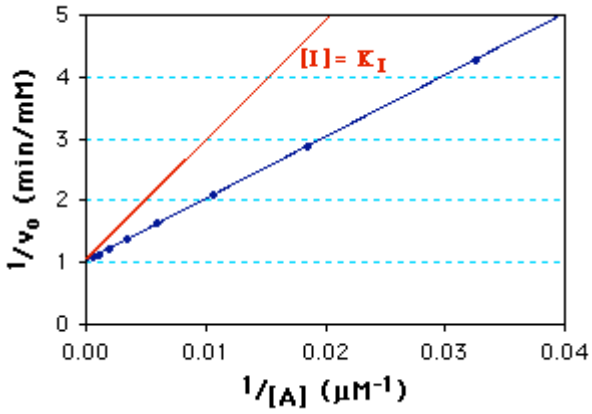






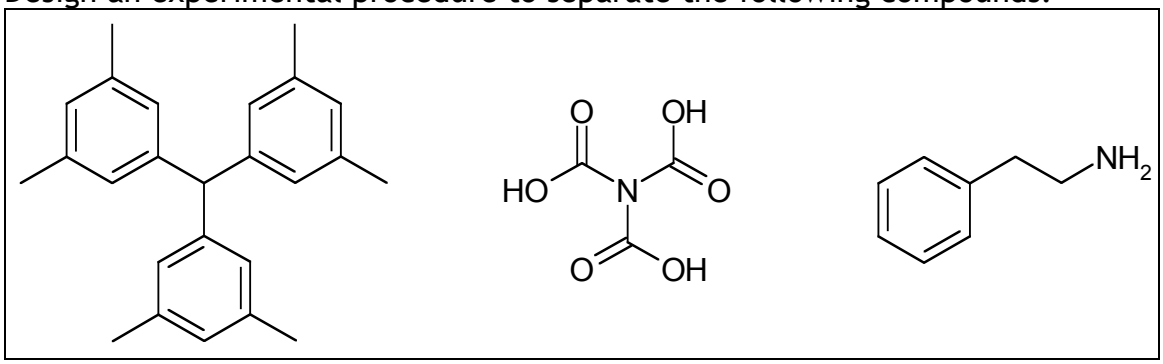






Protein Purification

Design an experimental procedure to separate the following compounds:



Briefly describe the procedure:

Protein Structure Prediction

A sample of protein is separated into two portions, one is treated with SDS and placed in lane 1, and the other is treated with _-Mercaptoethanol and transferred to lane 2. Predict the number of subunits along with their corresponding molecular weights. Try to sketch a cartoon-version of this protein ☺