Chemistry 4000/5000/7000 Fall 2010 Assignment 2

Due: Friday, Sept. 24, 4:00 p.m.

Marks: 18

1. One of the challenges in modeling biochemical networks is finding parameters for our models. Some are simply not available. Others are scattered throughout the literature and can be difficult to find. Recently, several web sites have been developed to collect quantitative data about biological systems. One that is particularly useful for miscellaneous quantitative data is BioNumbers (`http://bionumbers.hms.harvard.edu`). Even with such resources, it's sometimes difficult to estimate some quantities.

   Your challenge in this question is to find or to estimate the concentration of ribosomes (number of ribosomes per unit volume) in the cytoplasm of the yeast *Saccharomyces cerevisiae*. Report all data used to estimate the concentration, as well as the *original literature* sources of these data. [10 marks]

2. Find one other database on the web that you think could be useful for someone developing models of biochemical networks. Provide the name and URL, and describe (briefly) what kind of data this database holds. [5 marks]

3. Write down rate equations for all the chemical species in the following mechanism: [3 marks]

$$A \underset{k_{-1}}{\overset{k_1}{\rightleftharpoons}} 2B$$
$$B \xrightarrow{k_2} P$$