

## Chemistry 4055 (Spring 2013)

### Biochemistry I- Introduction to the Chemistry of the Animal Cell

Due: April 4<sup>th</sup>, 2013

**Paper Assignment.** You are being asked to write a paper on a specific enzyme and to discuss the general knowledge about the structure and function of this enzyme. You will also have to discuss a recent research article on the enzyme (within the last seven years) that focuses on anything concerning the structure, function, or mechanism of action of the enzyme. Your written assignment is to be NO LONGER than 10 pages double-spaced (or five pages single-spaced) and must be written in 12 pt. Times New Roman font. Please include figures that are necessary to convey an important argument. Remember to properly cite any figures that are NOT your own original creation. Note that figures do not count as part of the page limit.

The purpose of this paper is to expose you to journal search engines and to scientific writing in the form of research articles. There is a reasonable selection of full-text biochemistry journals available on-line through the University's webpage at <http://atoz.ebsco.com/Titles/3734> but please note that papers from review journals (those that summarize a topic but do not present original work) or non-referenced sources (for instance, an entertainment magazine) will not be accepted. I also recommend using the Web of Science and Google scholar to help you find references. In addition, refer to the Protein Data Bank ([www.rcsb.org/](http://www.rcsb.org/)) to obtain references on the structure(s) of your enzyme. This assignment will constitute 15% of your final grade and will be graded on a 15 point scale. Any indication that you have copied the work of another student will result in you and the other student losing all credit for this assignment.

**How to reference.** Please cite your sources by referencing them in the following way.

In the text cite any information that you obtained from a journal in numerical order by placing a number superscript next to the information. If there two authors address them by their last names. If there are more than two authors, then address them by writing the last name of the first author followed by the phrase et al. For example:

“Rodriguez and Montes studied chymotrypsin and observed abnormal kinetic behavior.<sup>1</sup>”

“Tinoco et al. studied this awesome enzyme.<sup>2</sup>”

The 1 and 2 would indicate that these are the first and second reference that you acknowledge. You will from then on refer to these reference as 1 and 2 in your superscripts.

At the end of your assignment, you must have a Reference section. In the reference section please cite your sources in the following way.

# listing for your reference. Last name (written completely), First name (abbreviated). (You will do this for all the authors). Name of the article. Abbreviated name of the journal written in italics. The journal number written in bold followed by a comma. The pages corresponding to the article and immediately followed by the year the article was published in parenthesis. As an example:

3. Hager, L.P., Morris, D.R., Brown, F.S. & Eberwein, H. Utilization of halogen anions. *J. Biol. Chem.* **241**, 1769-1777 (1966).

**Choose an enzyme from this list or one of your finding.**

1. Dipeptidyl peptidase 4
2. Carbonic anhydrase
3. Alcohol dehydrogenase
4. Catalase
5. Trypsin
6. Prolylendopeptidase
7. 3-dehydroquinase synthase
8. Vanadium(V) bromoperoxidase
9. Alkaline phosphatase
10. Amylase

**Grading Scheme.**

**A. General questions to address. (5 points)**

Try to address as many of these questions as you can as per availability in the literature and properly cite your sources. You will not be penalized for any information that you are unable to find.

1. What type of enzyme is your enzyme?
2. What reaction does your enzyme catalyze? How much does it improve the rate of the reaction?
3. What biological role does it play?
4. What is the active site of the enzyme?
5. Does your enzyme have a prosthetic group?
6. What are the natural substrates or general substrates of your enzyme?
7. Is your enzyme synthesized initially as a proenzyme? If so, how is your enzyme activated?

8. What are the Michaelis-Menten kinetic parameters of your enzyme for a particular substrate?
9. Are there any known inhibitors of your enzyme? Do these inhibitors serve any biomedical purpose?
10. What are the structural characteristics of your enzyme (secondary, tertiary, quaternary)? If there is something unique about the primary structure, for instance several unusual amino acid residues then comment on it.

**B. Specific points to address about your recent article. (6 points)**

Please address the following with regard to the recent research article that you find about your enzyme. Avoid explaining every experiment in the paper because I am testing your understanding of the article not your ability to paraphrase it.

1. What organism was the enzyme isolated from?
2. How was the enzyme purified? Was it purified as the complete enzyme or a smaller version of it?
3. What is(are) the **MAJOR** finding(s) of the researchers?
4. How does the finding contribute to or challenge our current understanding about the enzyme function?

**C. Paper format. (4 points)**

With this assignment I want you to tell me a story, the story of a specific enzyme and how a research team has tried to tackle understanding of some aspect of the enzyme. You must avoid treating this assignment as list of questions that you answer without any coherence. Try to use the format below.

**Introduction:** Present a general overview of your enzyme and place the recent research article in a context that helps to advance the understanding of the enzyme

**Body:** The first part of the body should discuss the questions listed in part A. The second part should be devoted to the questions of part B.

**Conclusion:** Personalize the conclusion by highlighting what new information you have obtained about enzymes that I did not present in class and also comment on any new insight about the enzyme you have chosen to study.

You will also be graded on proper referencing.