CHEM-643 Intermediary Metabolism
Case Study/PBL Problem Assignment

This course is built in part around Case Study/PBL problems. This assignment asks you to research a significant topic in intermediary metabolism and write a problem based on your study. It should have an informative title, reflect *substantive independent study*, and present a *thoughtful synthesis* of the *primary and secondary literature*. A case study problem provides a pedagogical context for presenting and learning information. Because it requires a different presentation format, it necessitates an *original synthesis*. Creating an original synthesis presents formidable challenges for most students.

What is an ***original synthesis***? Original syntheses often play with ideas, provide an overview of the subject, critique and evaluate research results, and generally display personal input. In other words, the voice of the author is evident throughout. Case studies can take many forms, but good ones have intrinsic general interest, tell a story, and often involve a current controversy or dilemma that requires a decision based on incomplete information. Pedagogically, they should involve higher order thinking skills (analysis, evaluation, and judgment), stimulate group discussion, and require collaborative effort.

Perhaps the best way to construct a case study problem is to consider what you have learned about your topic after a sustained study, decide what are the most important and interesting concepts to know, and then think about ways you could get your peers to discover, experience, and learn that information using a case study/PBL problem format. Creative approaches could include historical themes, relevant current events, chemical demonstrations, illustrative objects, or in class activities.

A case study should be well-organized, clearly written, and about four or five stages long (~1 page each) with “teaching notes” for each stage (1-3 pages each that provide perspective and explain the kind of response expected for each stage and includes references), and a case summary page (≤ 1 page). Relevant compounds, pathways, and mechanisms need to be illustrated. References should be cited in the format of *Biochemistry* or the *Journal of Biological Chemistry*. Your case study problem will be due at the beginning of class the Friday after Thanksgiving Break. Late papers will be assigned lower grades and may preclude an "A" in the course!

You should select a topic from those listed on the next page and hand it in on the "Request for Case Study Topic" form by the end of the fourth week of the semester. Many other topics are acceptable but must be approved by the instructor. Remember, CHEM-643 is a *chemistry* course, so do not neglect the chemistry, i.e. structures, reactions, and pathways need to be illustrated in a figure you create using ChemDraw or similar program. A check list and rubric of things I consider in grading case study problems are on the course web-site. It may help in organizing and writing your paper.

Familiarize yourself with the meaning of plagiarism and the University's policies on academic dishonesty. Your Case study problem should be your synthesis. Don't rely

heavily on one or two secondary sources. Read and reference the original sources in your teaching notes.

The presentation should begin with an overview of the case study problem that discusses the importance of the topic and puts it in a relevant context for a course in intermediary metabolism. Many topics may be obscure but can be made relevant by the general principles illustrated. Following the introductory overview, each page/stage of the problem and its associated teaching notes should be presented successively. The last stage should include an assignment that depends on the content and skill students would have gained. The references should be collected on one or two pages at the end. *Only* references actually accessed and cited in the problem text or teaching notes should be included.

Selection of Case Study:

Case-study topics must be selected and approved by me by the end of September. Before the Thanksgiving Break you will need to meet with me to discuss your plans. Because you will become an expert on your topic by the end of the semester and because a considerable part of your grade will be related to how well you develop your topic, **pick something that interests you**. Some subjects you might consider are listed below; however, please feel free to request other topics. A good places to start your search are the *Web of Science* or *Medline* via *PubMed*, a search engine provided by NIH.

Vitamins & Coenzymes	Antibiotics & Toxins	Pigments	Hormones
biotin	cardiac glycosides	carotinoids	gibberellins
ascorbic acid	actinomycin	anthocyanins	ethylene
Coenzyme A	cholchicine	indigo	prostaglandins
biopterin	erythromycin	porphyrins	steroid hormones
molybdopterin	hypoglycin	**Other Pathways**	serotonin
folic acid	gramicidin	Fe, Cu, or Zn Metab	thyroxine
riboflavin	capsaicin	methanogenesis	**BioPolymers**
pyridoxol	caffeine	terpenes	cellulose
thiamin	penicillin	carnitine	chitin
Vitamin B_{12}	cyclosporin	phospholipid anchors	chondroitin sulfate
NAD(P)	cyanogenic glycosides	sulfur metabolism	peptidoglycans
Vitamin K		selenium metabolism	Asn-linked oligosaccharides
		creatine	melanin