FN 605/ANSC625 Nutritional Biochemistry and Physiology 1

4 credits  M,W  10:30 am -12:20 pm

I. Instructors:
Dorothy Teegarden  494-8246  teegarden@purdue.edu
James Fleet  494-0302  fleet@purdue.edu
Connie Weaver  494-8237  weavercm@purdue.edu
Kimberly Buhman  496-6872  kbuhman@purdue.edu
Katie Hill-Gallant  494-0101  hillgallant@purdue.edu

II. Purpose:
Integration of biochemical and physiological functions of nutrients in humans and animals emphasizing interactions in bone and gut.
(1) To provide a foundation in scientific concepts, biochemistry and physiology relevant to nutrient metabolism and nutrient-disease interactions.
(2) To explore, in depth, important and current issues in nutrition.
(3) To increase skills important to a career in nutrition science, e.g. critical thinking skills, reading and discussing current scientific literature, writing scientific works.

III. Content: See Attached sheet for detailed contents

Section 1  Protein Synthesis and Degradation
Core Instructor: J. Fleet

Section 2  Gut Physiology, Digestion and Absorption
Core Instructor: D. Teegarden

Section 2  Mineral Metabolism
Core Instructors: J. Fleet, C. Weaver

IV. Basic concepts to be introduced in this semester:
Cell Communication
  Signal transduction
  Transcriptional regulation
  Endocrine-autocrine-paracrine signalling
Cell Life Cycle
  Proliferation and Cell Cycle
  Differentiation
  Programmed Cell Death/Apoptosis
Balance
  Whole body
  Protein synthesis vs degradation
  Enzymology
Structure-function relationships
  Micronutrients as co-factors and co-enzymes
  Protein-nucleic acid
Protein-protein interactions
Methodology
Nutrient Status Assessment
  Dietary assessment (basics)
  Functional vs Static assessment tests
Molecular analysis of cell biology
Nutrient kinetics
Radioisotopes

V. Skills to be developed in this semester:
  Read research articles
  Critically evaluate research articles
  Discuss the content of research articles
  Write technical summaries of research articles

VI. Evaluation:

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<tr>
<th>Points</th>
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<tbody>
<tr>
<td>Exam 1(^1) (30 min. mini exam)</td>
<td>40</td>
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<tr>
<td>Exam 2(^1)</td>
<td>160</td>
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<td>Exam 3(^1)</td>
<td>200</td>
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<td>Final Exam(^1)</td>
<td>200</td>
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<tr>
<td>Writing Assignments</td>
<td>200</td>
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<td>Class Participation</td>
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<td><strong>Total</strong></td>
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\(^{1}\text{No makeup exams will be given}\)

Exam 1: In-class exam (1/2 hour short exam)
Exam 2: In-class exam
Exam 3: Take-home exam
Final Exam: In-class exam, not comprehensive

A. Writing assignments: There are 4 writing assignments.

Goals of writing assignments:
  Improve scientific writing skills
  Improve communication skills
  Improve critical thinking skills
  Develop experimental design skills

GENERAL INSTRUCTIONS: Write a maximum double spaced page summary of an article to be discussed in class. The instructor will identify which article(s) to summarize. The summaries of the articles are to be written at a level appropriate for other scientists in the field. Use the information included in How to Read a Scientific Paper’ included in this packet to help you with these assignments.
First assignment: Pass/Fail (10 points); based on papers discussed on first day
Summarize the readings on the philosophy of science.
The goal of this exercise is to test your comprehension and to assess you ability to communicate clearly in writing. The format of the assignment is two pages (maximum), double spaced, Arial 11, 1 inch margins. Use your own words to identify and explain the major concepts presented in the articles by Platt and Feinman. Also include how the two articles relate to one another.

Second assignment: based on manuscript (50 points):
Summarize one manuscript discussed in class (to be assigned by Dr. Teegarden).
Assignment should be turned in to secretary in Stone Hall G1 by 4 PM on the day due.
The goal of this assignment is to read and understand a manuscript and then summarize in writing. Understanding the manuscript and writing skills are emphasized. The format of the assignment is two pages (maximum), double spaced, Arial 12 pt type, 3/4 inch margins.

Third assignment: (60 points):
Summarize and critique one manuscript discussed (to be assigned by Dr. Buhman).
Assignment should be turned in to secretary in Stone Hall G1 by 4 PM on the day due.
The goal of this assignment is to read and understand a manuscript and then summarize in writing. In addition, you must include a critical assessment of the work in the summary. Understanding the manuscript, writing skills and critique are emphasized. The format of the assignment is two pages (maximum), double spaced, Arial 12 pt type, 3/4 inch margins.

Fourth assignment: (80 points):
Review and critique two manuscripts which will be discussed in class. Assignment is due the same day as the discussion.
The goal of this assignment is to read and understand two manuscripts. Review both in writing and compare the results, including a critical assessment of the two manuscripts together. Understanding the manuscripts, writing skills and critique are emphasized. The format of the assignment is three pages (maximum), double spaced, Arial 12 pt type, ¾ inch margins.

Summaries will be graded on the criteria below:

Content of summaries:
1. All summaries should include:
   Brief background and description paraphrasing the article which includes:
   • Purpose for studies
   • Hypothesis
   • Experimental design and brief description of primary methods
       This does not need to be a separate section and the extent of the information depends on the article. Methods can be included in the results to make a point
   • Summarize important results
   • Conclusions

2. In addition, the second and third assignments should contain:
   Critique which may include:
- Is the experimental design appropriate and does it test the hypothesis?
- Is the conclusion appropriate?
- How can these conclusions be applied?
- What are the limitations?

**Technical points to consider:**
- Write in complete sentences.
- Use topic (introduction) and conclusion sentences for each paragraph. Generally, the topic sentence should cover what will be in the paragraph. The conclusion sentence summarizes what was in the paragraph, and can relate it to the overall goal of the manuscript.
- Every sentence should lead into the next sentence; avoid choppy statements.
- Every sentence at the end of a paragraph should lead to the introductory sentence of the next paragraph.
- Do not refer to tables, figures or materials that are not in your write-up. This is a stand-alone document.
- Define abbreviations the first time used such as: arachidonic acids (AA). Then you can use the abbreviations throughout.
- Conclusion/summary sentence or paragraph should be included at the end of the summary. This should state the overall implications of the research reviewed.

**Avoid:**
- Spelling or grammatical errors.
- Jargon (e.g. words that have a meaning in a scientific context that isn’t obvious outside that context –do not use “they ran a gel” rather than, “they conducted SDS-PAGE electrophoresis”)
- Methods should be avoided in topic sentences, unless the method is the research

**Overall:**
- We strongly suggest that you prepare a detailed outline to organize your ideas. Write from the outline.
- Tell a story. There should be a beginning, middle, and end that fit together and which engages the readers attention.
- Do not turn in your first draft. Great writing is not in the initial writing, it is in the RE-writing.
- Be concise. Simplify sentences-try to remove unnecessary words.

**Common errors:**
- Say what you mean.
- Keep the verb and appropriate subject noun close together in the sentence.
- Each sentence should have one subject and one verb.
- Remember who does the work. ‘The paper’ or ‘the study’ don’t do the work, the investigators do.
B. Participation:

You are required to participate in discussions of class material and research articles. While voluntary participation will be appreciated, instructors will call upon you for your answers/insights/opinions. Failure to actively participate will negatively influence your grade. The following guidelines will help you understand the level of participation that is required for each grade level:

- no participation = F
- participation only when called upon
  - response demonstrating a lack of understanding of the material = D
  - response provides only the minimum (correct) information = C
  - response provides insightful or thoughtful information = B
- voluntary participation
  - response provides minimum (correct) information = B
  - response provided insightful or thoughtful information = A

Discussions of articles:
The instructors will select all of the articles utilized in the course. The articles will be distributed to you in advance of the discussion period. You are expected to have read the article and be prepared to discuss the article in class. You will be called upon in class to answer questions if you do not participate on your own. Please review the attached sheet “How to read a paper for FN590B” in this packet for guidelines on how to prepare for these discussion.

C. Study Groups
Students will be assigned to study groups and will be expected to meet regularly to discuss class materials (i.e. not just before the exams). This will ensure that you are prepared to participate in classroom discussions. After the first section, the instructor will evaluate the study group participation, and the groups reassigned if needed. Participation in the study group is a requirement of the course, and will be considered in your grade.

Resource Material:

Required References:
*Note: You do not necessarily need to purchase these books as they will be available on reserve in the library. We will discuss which or both that you may want to purchase on the first day of class.*


General References Available on Reserve in the Life Sciences Library:

How to Read Scientific Papers for FN 590B

(1) **READ for general comprehension**
- Start with the abstract (This is what the author has decided is important)
- Identify the methods used and what they are supposed to show. Do not get caught up in the details, especially on the first reading
- Read the results to help you understand the figures. Read the discussion to see what the author has to say about his or her data.

(2) **SUMMARIZE (do this on a separate piece of paper)**
- What is the research question/hypothesis?
- What are the major findings?
  - Look at the figures and tables, these often represent individual experiments. What purpose does each figure and table have? Does it test/answer a hypothesis/question that is being tested? What is the question? How does the figure/table relate to the question?
- How does the paper relate what you know?

(3) **INTERESTING POINTS:**
All papers have weak points, but many flawed papers raise interesting questions. Look for these interesting points in whatever you read.

(4) **CRITICIZE:**
- Was the hypothesis clearly stated?
- Were the methods appropriate? (knowing this usually comes from experience)
- Is the study well designed? (i.e. proper controls)
- Did the author make valid assumptions?
- Are the conclusions supported by the data?

(5) **TAKE THE NEXT STEP**
- Can you think of any potential research ideas after critically reading the paper?

**HELPFUL SUGGESTIONS**

(1) Don’t wait until the last minute!!!!!

(2) Make notes clearly on an index card or sheet of paper.

(3) Don’t be afraid to ask someone for help.
# NUTR 60500: Nutritional Biochemistry and Physiology

## 6-May-14

### Two 2 hour sessions per week

<table>
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<tr>
<th>Mth</th>
<th>Date</th>
<th>Day</th>
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<th>Topic</th>
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<tr>
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<td>25</td>
<td>M</td>
<td>Teegarden/Fleet</td>
<td>Introduction/Scientific Method</td>
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<td>Gene expression</td>
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<td>Gene expression continued</td>
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<td><strong>Discussion: Protein Synthesis and Degradation</strong></td>
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<td><strong>Optional extra session</strong> <strong>Test review</strong></td>
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<td>Nov</td>
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<td>Renal physiology and electrolyte P&amp;T</td>
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<td>26 W</td>
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<td>Dec 1</td>
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