FN 607 Nutritional Biochemistry and Physiology III

2 credits T,Th (2h each day, 10:30am-12:20) 8 weeks, spring semester, University Hall 101

Instructors: 
Qing Jiang  G-1A Stone  42483  qjiang@purdue.edu 
Rick Mattes  212 Stone  40662  mattesr@purdue.edu 
Kim Kinzig  PSYC3168  68220  kkinzig@purdue.edu 
Kim Buhman  212 Stone  66872  kbuhanma@purdue.edu 
Jim Fleet  G-1D Stone  40302  fleetj@purdue.edu

Purposes:
1. To provide a foundation in scientific concepts, biochemistry, and physiology relevant to nutrient and lipid metabolism with a focus on the role of nutrients in the development of cardiovascular disease.
2. To explore, in depth, important and current issues in nutrition.
3. To increase intellectual skills important to careers in nutrition and animal science, e.g., critical thinking skills, reading, discussing, and interpreting current scientific literature, technical writing skills.

Topics to be introduced:
1. Regulation of ingestive behavior and body weight
2. Lipid and lipoproteins
   a. Chemical characteristics
   b. Physical characteristics
   c. Regulation of homeostasis
   d. Role in cardiovascular disease development
3. Lipid oxidation and bioactive lipids
   a. Non-enzymatic mechanisms and products formed
   b. Enzymatic mechanisms
   c. Physiological impact of eicosanoids (signaling)
   d. Regulation of eicosanoid synthesis
4. Antioxidant protection mechanisms
5. Endothelial physiology, Hematology focusing on blood coagulation mechanisms and regulation
   a. Vitamin K chemistry & function
   b. Lipid mediators affect platelet function
   c. Lipid mediators affect endothelial function
6. Inflammation, immune system and CVD
7. Folate/vitamin B6 & vitamin B12
   a. Chemistry and function review
   b. Role in the regulation of homocysteine & CVD

Evaluation:
1. Attendance – 30 points
2. Class Discussion – 120 points (30 points each time)
3. Final Exam – 120 points: Take home during Final Exam Week
a. Six-ten short essay questions requiring critical thinking skills

4. **Debate/Discussion participation** – **120** points – Each member of the group shall participate in the presentation of the assigned position. The group as a whole will be assessed as follows.
   a. The presentation: Speaking technique? Delivery? Demeanor? 10 points
   b. The understanding of mechanisms: were sound scientific mechanisms provided to support the arguments? 20 points
   c. Organization: Was the presentation organized so that it flowed in logical order from point to point? Was the time used effectively? 30 points

Each student will be assessed individually as follows.
   e. Response to Questions: Did the student answer the questions in an informed manner? Was the answer direct and complete? 20 points
   f. Evaluation by fellow group members: How much did each group member contribute? Did every member of the group provide maximum effort? 20 points

5. **Writing Assignments:**
   a. Paper Critique – **110** points (see a separate description) – due **March 24, 2009**

**Debate/Discussion Format and Group Involvement:**

**Hot Topic:** What is the Best Way to Decrease Heart Disease Risk?

Each group will be assigned a position relative to the overall hot topic as following. Your choice of a specific topic should be based on the literatures: there is strong evidence from clinical or epidemiological, animal and cell-based studies (at least two categories) to support your position.

Group 1 – Emphasize healthy diet approach
Group 2 – Emphasize specific nutrients, supplements, botanicals approach
Group 3 – Emphasize exercise approach
Group 4 – Emphasize medication approach

The Format for the Debate/Discussion on April 28 & 30 will be as follows.
   i. Group 1 – Brief overview of issue, key general and specific facts as well as potential molecular mechanisms to support the assigned position, results of a key study or two that support position. – 20-25 min
   ii. Moderator questions – 10 min
   iii. Questions from group2, everyone – 10-15 min
   iv. Short break – 5-10 min
   v. Group 2 - Brief overview of issue, key general and specific facts to support the assigned position, results of a key study or two that support position. 20-25 min
   vi. Moderator questions – 10 min
   vii. Questions from group 1, everyone – 10-15 min

**References/ Resources for Assigned Readings:**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Complete Reference</th>
</tr>
</thead>
</table>
**Lecture/Discussion Calendar**  
*Note: This sequence may change due to unforeseen circumstances*

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic/Title</th>
<th>Instructor</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 10</td>
<td>Regulation of ingestive behavior and body weight</td>
<td>Kinzig</td>
<td>Handout</td>
</tr>
<tr>
<td>March 12</td>
<td>Regulation of ingestive behavior and body weight</td>
<td>Mattes</td>
<td>Handout</td>
</tr>
<tr>
<td>March 17 &amp; 19</td>
<td><strong>No Class Spring Break</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>April 2</td>
<td>Lipid transport/Lipoprotein Synthesis; role of cholesterol regulation – <strong>Discussion</strong></td>
<td>Buhman</td>
<td>Handout</td>
</tr>
<tr>
<td>April 7</td>
<td>Eicosanoids and other reactive lipids - AA cascade.</td>
<td>Jiang</td>
<td>Handout</td>
</tr>
<tr>
<td>April 9</td>
<td>Platelets; Endothelial, COX inhibitors; Platelets and vitamin K; <strong>Discussion</strong></td>
<td>Jiang</td>
<td>STIP (2006) – chap 28, or STIP (2000) – chap 24; Handout</td>
</tr>
<tr>
<td>April 14</td>
<td>Inflammation, innate and adaptive immune system; <strong>Discussion</strong> - inflammation and atherosclerosis</td>
<td>Jiang</td>
<td>Handout</td>
</tr>
<tr>
<td>April 21 – no class</td>
<td>EB meeting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>April 23</td>
<td>Folate/vitamin B12 neural tube defects, and cancer</td>
<td>Fleet</td>
<td>STIP (2000)– Ch 25&amp;41, or STIP (2006)– Ch 25</td>
</tr>
<tr>
<td>April 28</td>
<td>Student Group Discussion/Debate on decreasing risk for cardiovascular disease</td>
<td>Burgess</td>
<td></td>
</tr>
<tr>
<td>April 30</td>
<td>Student Group Discussion/Debate on decreasing risk for cardiovascular disease</td>
<td>Burgess</td>
<td></td>
</tr>
<tr>
<td>May</td>
<td>Take home exam is due at 10am of May 4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>