NUTR63400/FN59000: Nutrition and Cancer Prevention

2 credits

Facilitators: Qing Jiang, Ph.D. and Silvia Stan, Ph.D.

**Wed 3:30-5:20pm; REC 116**

Contact Info: qjiang@purdue.edu (Qing Jiang, Ph.D.) and stand@purdue.edu (Silvia Stan, Ph.D.)

**Purpose:** The risk for many forms of cancer is increased by environmental variables including inadequate diet. Over the past 30 years, the molecular basis for several forms of cancer has been clarified; at the same time, population based trials have suggested candidate nutrients that may regulate the risk of these same cancers. Progress has been made to understand the molecular basis of diet and cancer relationships and the utility of dietary factors in chemoprevention and chemotherapy. The goal of this course is to give you an overview of the principles of cancer biology, to identify approaches to study the role of specific nutrients or bioactive compounds in molecular pathogenesis of cancer, and to discuss existing research on the influence of dietary factors on cancer disease risk.

**Format:** This will be a discussion based course. There will be few formal lectures. As such, you will need to read all assignments prior to attending class and you will need to come equipped with questions re: concepts, implications, methodology, and interpretation. You must also be prepared to state your opinion on the subject being discussed. If you do not understand the issue to be discussed due to lack of background in physiology, biochemistry, nutrition, or genetics, we expect that you will conduct additional research and reading in the area.

**Assignments and Grading:**

1) **You will write a brief critical review paper on a specific dietary factor-cancer interaction.**

The criteria for choosing a specific dietary factor is that there should be solid evidence to support the role of this compound in cancer prevention or treatment in two of the following areas: clinical intervention studies (epidemiological studies alone are not enough), animal studies in preclinical models, and mechanistic studies.

During this process, you will report your choice of the nutrient and the studies to support your position in an informal presentation on MARCH 7, 2012.

In the paper, we would like for you to:
- Demonstrate that a relationship between the dietary factor and cancer exists
• Demonstrate and discuss potential molecular bases for the relationship
• Explain where the relationship is likely to influence cancer development
• Explain prospects for using the dietary factor for the prevention or treatment of a specific cancer
• Take a clear position regarding whether you believe the relationship is strong and reliable (and provide support for your position)
• Identify gaps in our understanding that you believe need to be clarified in the future

We do not want you to convince us that your area has promise. Rather we want you to critically evaluate the relationship that you choose.

Paper formatting:
• 15 pages (not including citations or a cover page)
• double spaced
• 12 pt type
• 1 inch margins
• ≥ 10 primary research papers as citations
• number each page and include your name at the top of each page

Paper due: April 25

2) Formal presentation on the topic you have chosen (25min in class, powerpoint presentations)

Organize a 25-30min formal presentation to discuss the role of a dietary factor in cancer prevention. The presentation should focus on 2-3 research papers with other papers for background. You may discuss the same dietary factor that you chose for the term paper.

3) Participation:

Each student will be required to participate in discussions of class material and research articles. While voluntary participation will be appreciated, we will also call upon students for their 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 = no points
• participation only when called upon
  o response demonstrating a lack of understanding of the material = 260 pts
  o response providing only the minimum (correct) information = 300 pts
  o response providing insightful or thoughtful information = 340 pts
• voluntary participation
  o response demonstrating a lack of understanding of the material = 260 pts
  o response providing minimum (correct) information = 340 pts
  o response providing insightful or thoughtful information = 400 pts
Grading

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<td>Class participation</td>
<td>40%</td>
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<td>BCR</td>
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<td>Presentation</td>
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In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor’s control. Ways to get information about changes in this course include first, the course web page or second, the instructors (see contact information above).

Policies:

**General:**
This course and its instructors will follow policies as provided in *University Regulations*.

Dishonesty (cheating, plagiarism, or providing false information) will not be tolerated in this course and will subject the student(s) involved to disciplinary action and/or failure in this course.

It is the policy of the instructors in this course (as well as the department, school and University) not to discriminate against any person based on their race, religion, sex, age, national origin or ancestry, disability, or status as a disabled or Vietnam era veteran.

Discrimination, harassment, or intimidation of any person for any reason will not be tolerated in this class.
TENTATIVE COURSE SCHEDULE:

PART I: ESSENTIALS OF CANCER BIOLOGY AND PATHOPHYSIOLOGY

Jan 11:  
Class Business (Jiang and Stan)  
The Nature of Cancer (Stan)  
Principles of Cancer Biology

Jan 18:  
Nature of Cancer cont’ (Jiang)  
Molecular Genetic and Pathophysiology of Colon Cancer

Required Readings:


Jan 25:  
Epigenetics and the Nature of Mutation (Jiang)  
Immunity, Inflammation and Cancer

Required Readings:


Additional resources

PART II: NUTRITION AND CANCER PREVENTION

Feb 1:  
Nutrition and Cancer Prevention Overview (Stan)

Required Reading:


**Feb 8:** Beta carotene, vitamin A and lung cancer (Jiang)

**Discussion Questions:**
What level of evidence is necessary to make a reliable link between a dietary factor and cancer prevention? To justify an intervention trial? To influence public health and medical practice?

**Required Reading:**


**Feb 15:** Beta carotene and lung cancer: Molecular actions (Jiang)

**Required Readings:**


**Feb 22:** Vitamin E and cancer: epidemiology (Jiang)

**Required Reading:**


**Feb 29:** Vitamin E, cancer and mechanisms (Jiang)

**Required Reading:**


**March 7:** Selection and Discussion of the term paper (Students)

Isothiocyanates and cancer prevention: epidemiology (Stan)

**Required Reading:**


**March 14:** Spring Break / No Class
March 21: Isothiocyanates and cancer prevention: mechanisms of action (Stan)

Required Reading:


March 28: Vitamin D and cancer prevention (Stan)

Required Reading:


April 4: NO CLASS DUE TO AACR

April 11: Soy Isoflavones and cancer prevention (Stan)

Required Reading:


**April 18:** Student Presentations

**April 25:** Student Presentations and BCR paper due
Reference Text: (not required)

Weinberg, R.A. “The Biology of Cancer” 2006 Garland Science Publisher

Cancer Related Web sites:

National Cancer Institute - http://cancer.gov/
Cancer Genome Anatomy Project (cgap) - http://cgap.nci.nih.gov/