

new syllabus

018

Washington State University
MAJOR CURRICULAR CHANGE FORM -- COURSE RECEIVED
(Submit original signed form and ten copies to the Registrar's Office, zip 1035.)

JUL 10 2013

Future Effective Date: Spring 2014 New course Temporary course ~~Distance course~~
(effective date cannot be retroactive) There is a course fee associated with this course (see instructions)

- Variable credit _____
- Increase credit (former credit _____)
- Number (former number NEP 510)
- Crosslisting (between WSU departments)
(Must have both departmental signatures)
- Conjoint listing (400/500)
- Request to meet Writing in the Major [M] requirement (Must have All-University Writing Committee Approval)
- Request to meet GER in _____ (Must have GenEd Committee Approval) Fulfills GER lab (L) requirement
- Professional course (Pharmacy & Vet Med only) Graduate credit (professional programs only)
- Other (please list request)

- Repeat credit (cumulative maximum _____ hours)
- Lecture-lab ratio (former ratio _____)
- Prefix (former prefix _____)
- Cooperative listing (UI prefix and number _____)
taught by: WSU UI jointly taught
- S, F grading

PHARMSCI ~~530~~ 530 Foundations of cellular regulation
NEP ~~530~~ 530 *discovered numbering issue while at Registrar's office, and wrote in by hand on copies* KEM

course prefix	3	0	0	course no.	530	title	Foundations of cellular regulation	prerequisite
credit	3	0	0	lecture hrs per week	0	lab hrs per week	0	studio hrs per week

Description (20 words or less) Fundamentals of pharmacology and toxicology; Signal transduction; action and regulation of dietary supplements

Instructor: Kathryn Meier Phone number: 8-7631 Email: kmeier@wsu.edu
Contact: Kay Meier Phone number: 8-7631 Email: kmeier@wsu.edu
Campus Zip Code: 1495

Please attach rationale for your request, a current and complete syllabus, and explain how this impacts other units in Pullman and other branches (if applicable).

Secure all required signatures and provide 10 copies to the Registrar's Office.

[Signature] (Phil Lazarus) July 9, 2013
Chair/date

[Signature] (John White) 7/9/13
Dean/date

[Signature] 7/9/13
Chair (if crosslisted/interdisciplinary)*

[Signature] 7/9/13
Dean (if crosslisted/interdisciplinary)*

[Signature] 7/9/13
Graduate Studies Com/date

OCT 10 2013

~~General Education Com~~/date
Catalog Subcommittee

All-University Writing Com/date Academic Affairs Com/date Senate/date

If the proposed change impacts or involves collaboration with other units, use the additional signature lines provided for each impacted unit and college.

Rationale for cross-listing request:

NEP 510 was originally developed as a course for PhD NEP students. With the consolidation of the College of Pharmacy in Spokane, there is a demand for more graded courses for graduate students on that campus. This course is taught by Dr. Meier, who is a member of the Department of Pharmaceutical Sciences. The course was developed from material that the instructor has taught in pharmacology courses in the past, but was designed to meet the needs of diverse students in the basic sciences. It is therefore very appropriate to cross-list the course in Pharmaceutical Sciences. PhD students in NEP and PharmSci already take some of the same coursework. The PhD NEP program is currently not accepting new students, while the PharmSci program is slated to grow in size with the addition of many new faculty members in Pharmaceutical Sciences.

NEP 510: Foundations of Cellular Regulation

Washington State University Spokane
Program in Nutrition and Exercise Physiology
Spring 2013

Course Logistics

Course Title: Foundations of Cellular Regulation

Course Number: NEP 510

Prerequisite(s): Graduate standing or permission of the instructor.

Course Description: Signal transduction; drug-receptor interactions; toxicology; drug and supplement regulation; cellular and molecular effects of diet and exercise; effects of diet and exercise on inflammation; actions of dietary supplements

Academic Hours (Lecture-Lab-Total): 3-0-3

Instructor of Record:

Kathryn E. Meier, PhD Professor	Office: SCLS 132 Phone: 358-7610 Email: kmeier@wsu.edu
Dan Guerra, PhD Instructor	Office: SCLS 265 Phone: 208-883-8854 Email: djguerra@wsu.edu

Course Communication:

WSU Spokane and Pullman use the Angel LMS (Learning Management System). If you have not used Angel before, please take a few minutes to become familiar with the system prior to the start of the semester. There is a short student orientation video on Angel at

<http://angel.wsu.edu/Tutorials/STudentOrientation/STudentOrientation.html>

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- Visit <http://angel.wsu.edu/> for additional help.

Semester: Spring

Course Time and Location: TU 1:00-3:30 pm, SCLS 147

Course Objectives

As an overview, this course is designed with the following major goals in mind:

- 1) To provide students in the NEP graduate programs with a foundation in advanced basic science as it relates to nutrition and exercise physiology.

- 2) To provide all students, including interested students from other degree programs, with a foundation in principles of pharmacology, toxicology, pharmacotherapy, pathophysiology of chronic disease, and the therapeutic roles of diet and exercise.
- 3) To build critical thinking skills in the biomedical sciences, particularly with respect to ethical consideration of substances with both beneficial and detrimental properties.

The overall objectives of the course are as follows:

- 1) To understand the basic principles of ligand-receptor binding and the dose-response relationship.
- 2) To understand the signal transduction pathways mediating the actions of xenobiotic agents.
- 3) To know the basic enzymatic steps and tissue sites involved in xenobiotic metabolism.
- 4) To develop an introductory understanding of additional factors relevant to human therapeutics, including drug-nutrient interactions, xenobiotic side effects, and placebo effects.
- 5) To understand the basic principles of toxicology.
- 6) To appreciate regulatory aspects of development and marketing for drugs and dietary supplements in the U.S.
- 7) To know how the most common dietary supplements are used, their mechanisms of action, and their side effects.
- 8) To understand the pathobiology of chronic disease states (diabetes, cancer, inflammation) at a basic cellular level.
- 9) To be able to compile and analyze scientific literature in the areas addressed in the course, and to write an effective summary (with critical analysis) of the information gained.
- 10) To be able to read and discuss original research articles related to material presented in the course.

Required and Optional Textbooks, References and other Resources

- The instructors will provide extensive handouts and/or copies of Powerpoint presentations that substitute for a textbook. Journal articles (for in-class discussion) will be posted on Angel.

Topic Outline

Dates	Module	Topic
Jan. 15	1	Introduction to course (Meier)
	2	Introduction to cell physiology (Meier)
	3	Membrane structure and transport (Guerra)
Jan. 22	4	Ligand-receptor interactions I (Meier)
	5	Ligand-receptor interactions II (Meier)
Jan. 29	6	G protein-coupled receptors (Meier)
	7	Tyrosine kinase and cytokine receptors (Meier)
	8	Nuclear receptors (Meier)
Feb. 5	9	DNA as a xenobiotic target (Meier).
	10	Enzymes and channels as xenobiotic targets (Meier)
Feb. 12		Exam I (material from modules 1-10)
	11	Xenobiotic disposition
Feb. 19	12	Xenobiotic metabolism
	13	Interactions between xenobiotics; side effects
Feb. 26	14	Biological oxidation

Dates	Module	Topic
	15	Mechanisms of cell death
March 5	16	Basic principles of toxicology
	17	Development and regulation of drugs & dietary supplements
March 12	--	No class – Spring Break
March 19	18	Mechanisms of inflammation
	19	Anti-inflammatory agents
March 26		Exam II (material from modules 11-19)
April 2	20	Endocrine regulation of metabolism
		Metabolic dysregulation in diabetes and obesity
April 9	21	Effects of exercise on cellular metabolism I
		Molecular therapeutics of exercise
April 16	22	Dietary supplements I
	23	Dietary supplements II
April 23	23	Dietary supplements III
	24	Dietary supplements IV
Apr. 30		Exam III (material from modules 19-24)

Expectations of students

Students are expected to attend lectures, and are responsible for all material presented in the lectures plus any additional material as directed by the instructor. "Make-up exams" will be scheduled only under the most extraordinary circumstances, after receiving approval of the instructor prior to the exam.

Grading Scale:

A = 93-100%	C = 73-76%
A- = 90-92%	C- = 70-72%
B+ = 87-89%	D+ = 67-69%
B = 83-86%	D = 60-66%
B- = 80-82%	F = < 60%
C+ = 77-79%	

Examinations

There will be three examinations, each comprising 20% of the final grade. The exams will consist of multiple choice and/or short-answer questions.

In-class discussions

There will be in-class discussions of research articles, assigned by the instructor, on a weekly basis or at the discretion of the instructor. Each student will be expected to present one figure from the assigned paper, and to participate in discussion of the paper.

The instructor will assign a recent paper, related to the lecture content, for review each week. The papers will contain at least as many figures or tables as there are enrolled students. During the discussion, the

instructor will provide a brief introduction to the paper, and will then call upon students (or ask for volunteers) to go over each figure of the paper. Students will be expected to explain the figure, including:

- 1) The goal of the experiment
- 2) The methods employed
- 3) The meaning of the results shown in the figure

Additional comments regarding quality of the data or its presentation are welcome; other students can contribute such remarks as well. The overall format will be informal, although participation is expected and required. The purpose of this graduate component is to provide the additional scientific depth required for a graduate course, and to reinforce points made in the didactic component.

Students will be assigned a grade for the in-class discussions based on attendance and participation. The grading scale will be as follows:

Rubric for grading the in-class discussions:

- 5 points: Attendance; providing a valid excuse if unable to attend
- 5 points: Preparation; familiarity with the paper as reflected in general discussion, even if issues remain to be clarified regarding methodology and details
- 5 points: Presentation of figure (clarity, level of understanding)
- 5 points: Critical thinking as reflected in presentation of figures, and in discussion

The journal club portion of the course will comprise 20% of the final grade in the course.

Written Assignments

Purpose: To broaden course participation beyond the traditional exam format, to enhance scientific writing skills, and to build critical thinking skills.

Due dates: A complete 6-10-page draft of the written assignment is due on March 20th by 5 pm; it can be submitted to the instructor by email. Edited drafts will be returned to the students by April 12th. The revised and final version will be due on April 26th at 5 pm.

Assignment: Select a single chemical agent or product that is utilized by humans for potential nutritional, performance-enhancing, or therapeutic benefit. It can be a drug, vitamin, mineral, dietary supplement, nutraceutical, ergogenic aid, etc. The "agent" can consist of a mixture of compounds, if this is the way in which it is marketed. If you choose a well-established agent (e.g., prescription drug, vitamin, or mineral), focus on a particular use of that agent that may be new or is not yet approved. The point is to select something about which there is some level of controversy. Please choose something that is of interest to you, but not directly related to your thesis or non-thesis project or dissertation.

Obtain at least four references concerning benefit/value/risk for the product. One (or more) of these should be a review article (from a journal) or book chapter, but at least two of them must be original scientific articles from the biomedical literature. No web references are allowed, although of course some journal articles can be accessed via the internet. Use numbers (in parentheses) to cite your references within the text; this will require that you number the references in the order in which they are cited in the text. For your reference list, use the following format.

For a journal article:

Brown, J.M., Taniya, E.B., and Liu, X.L. (2004) Toxicity of ephedra products in mouse exercise models. *J. Pharm. Sci.* 31, 56-68.

For a book chapter:

Slomonov, G.F. (2003) Use of ephedra by American athletes. *In: Therapeutics and Toxicology of Herbal Supplements* (V. Whitcomb, ed.), Elsevier, New York, pp. 139-146.

An "original article" refers to scholarly work that describes a study and provides the data upon which the investigators base a conclusion. It should contain graphs, tables, study methods, etc. The authors are the individuals who performed and analyzed the experiments. Such an article may be cited and discussed in later original articles, or in review articles. "Review articles" summarize results from multiple original articles and put them into context relative to each other. They do not generally include actual data.

Write a 10-page critical analysis (12-point font, double-spaced) of this topic. *The page limit does not include the references, which should be on a separate page.* The first submitted draft of the paper can be shorter, if you need input regarding areas to expand. The following components should be included; subtitles are not necessary. At least one page should be devoted to each section; you will need more (or more reference sources) to reach the 10-page minimum.

• Introduction: what is the agent, how is it used, who uses it; mechanism of action (if known); introduce controversy (if any); mention issues that are of particular interest to you. Cite the review article in this section.

• Therapeutic benefit: general overview of use of the compound, further discussion of controversy (if any). This information would likely be derived (in your own words) from one or more review articles.

• Critical analysis of original references (at least one page for each): Describe the purpose of the study, the approach taken by the authors, and the major findings. Use correct scientific nomenclature. Do not provide an analysis of any review article(s); cite the original article in this section. Your analysis should include a critique of the methods (as appropriate), a critique of the authors' interpretation of the results, mention anything that the authors should have addressed but did not, and compare results between references or with other published literature (as appropriate).

• Summary/conclusion: In this section, provide your own analysis of what you have read. Would you suggest that your patients/clients use the product? You do not need to go into mathematical treatments of benefit and risk. Rather, take a common sense but scientific approach in analyzing the available data. For example, an agent may not be particularly beneficial, but it may also present little or no risk...leading to a neutral opinion on your part. On the other hand, the agent may have proven risk, but you may judge that the benefit is so great, or that the risk under normal use is so low, that it is something that you would endorse as a scientist/dietician/exercise specialist/healthcare professional. There might also be cases in which your opinion would be a negative one (e.g., little benefit, too much risk). Please use first person in this section (but not elsewhere in the paper). You can also use this section to suggest your ideas for future directions in this research area. The instructor will be specifically judging how you analyze information and come to a conclusion. You will not be judged on the nature of your conclusion (e.g., positive or negative).

Assistance: This assignment is individual work, completed with the benefit of feedback from the instructor. Any signs of collaboration (i.e., similar references and approach in papers from different students), or of plagiarism from published sources, will result in a poor or failing grade. This applies to the first draft as well as to the final paper. The goal is a clearly written paper, with a scholarly emphasis, that shows evidence of your analytical skills.

Grading: The written paper will comprise 25% of the final grade. Each component of the rubric will be graded as follows.

Rubric for grading of the paper:

- 3 points: Following the directions provided above; i.e., all the correct sections, references are in correct format, length is correct, references are appropriate
- 3 points: Writing mechanics; paper read easily and does not contain grammar/spelling errors
- 5 points: Introductory sections; good summary of background, introduction to key issues

- 5 points: Analysis of references; understands references and discusses key findings clearly
- 3 points: Depth of analysis (i.e., at the graduate level)
- 4 points: Conclusion; provides recommendation, analysis based on scientific reasoning

Additional Comments

Class Format and Schedule: This is a didactic (lecture-based) course that includes in-class discussion. The instructor will use various methods to encourage student discussion. All work in the course is individual in nature. "Individual work" means that the student may not obtain assistance from any other person in completion of an examination. Individual assignments or examinations will specify the types of resources to be used.

Methodology: Lectures, in-class discussions, written assignment, and examinations.

Academic Honesty, Conduct, and Behavior

Student Conduct Code and Standards of Professionalism

The WSU Standards of Conduct for Students (Student Conduct Code) is in the WSU Spokane 2010-2011 Student Handbook, and also at www.conduct.wsu.edu/default.asp?PageID=338 (*Chapter 504-26 WAC*). Any violation of the Student Conduct Code is a disciplinary issue and is within the jurisdiction of the Office of Student Conduct. As such, the Conduct officers or Conduct Board make decisions on sanctions for violations of the code.

With respect to conduct that violates the program's standards of professionalism (see below), the decision to place students on probation or dismiss them from the NEP BS degree shall be made by the Program Director, in consultation with NEP faculty. A student will be notified in writing if he or she has been placed on probationary status or dismissed and will be provided an opportunity to appeal the decision (see below).

Voluntary Student Resignation

1. *Resignation:* If it becomes necessary to resign, the student will submit a signed letter of resignation to the Program Director. Refer to the guidelines as outlined in the WSU Spokane Student Handbook.
2. *Reapplication:* Students who are dismissed may not reapply for admission to the NEP BS degree. Students who resign for personal reasons may reapply and be considered on an equal basis with new applicants.

Grievance Procedures

Appeal procedures for students who have been sanctioned under the WSU Student Conduct Code are set forth in the Student Conduct Code, WAC 504-26-407 found at <http://apps.leg.wa.gov/WAC/default.aspx?cite=504-26-407>.

If a student is placed on probation or dismissed from the NEP BS degree for academic reasons, including violation(s) of the standards of professionalism, the student may appeal the written decision of the Director to the Dean within twenty (20) business days in accordance with the Academic Complaint Procedures (Regulation 104) set forth in the WSU Spokane Student Handbook.

It is the responsibility of students and faculty to promote academic integrity and intellectual honesty. All assignments should demonstrate independent effort and thought unless otherwise instructed. Evidence of cheating, copying of homework, working as a group on an independent assignment, plagiarism or not citing references properly will result in a conference with the instructor. The possible consequences of breaching academic integrity include the following: failing grade on the quiz or assignment, a full letter grade drop for the course, or a failing grade in the course. The student will also be referred immediately to the office of the Dean and/or the WSU Office of Student Conduct

Course Evaluations

Student evaluations of courses/course modules and faculty effectiveness are a valuable and important component of the College's commitment to provide quality learning experiences and contribute to our efforts to assure that students achieve the objectives of our professional degree program. Thus, all evaluations are given serious consideration as part of the assessment process and are read first by the Department Chair before they are processed, analyzed, and given to the faculty. Because the most effective way to impact positive changes is through constructive comments, we encourage you to provide feedback as you would wish to receive it. This will allow the faculty member to focus on improvements or affirm students' perspective on effective elements of the course.

Students with Disabilities Statement

All students requesting reasonable accommodation must meet with the instructor prior to or during the first week of the course to review all proposed accommodations in relation to course content and requirements. Please note that written evaluations can be accommodated but performance evaluations are considered analogous to job skill performance, therefore expectations will not be adjusted.

Reasonable accommodations are available for students with a documented disability. If you have a disability and may need accommodations to fully participate in this class, please contact Liz West, Assistant Director of Student Affairs, in Academic Center 130 (liz.west@wsu.edu, 509-358-7534). Read more: <http://spokane.wsu.edu/students/current/StudentAffairs/disability/disabilityguidelines.html>

Campus Safety

The WSU Campus Safety Plan, which can be found at <http://safetyplan.wsu.edu>, contains a comprehensive listing of university policies, procedures, statistics, and information relating to campus safety, emergency management, and the health and welfare of the campus community. Please visit this web site as well as the University emergency management web site at <http://oem.wsu.edu/Emergencies> to become familiar with the campus safety and emergency information provided. Everyone should also become familiar with the WSU ALERT site (<http://alert.wsu.edu>) where information about emergencies and other issues affecting WSU will be found. This site also provides information on the communication resources WSU will use to provide warning and notification during emergencies. It should be bookmarked on computers. **Finally, all faculty, staff, and students should go to the zzusis portal at <http://zzusis.wsu.edu> and register their emergency contact information for the Crisis Communication System (CCS).** Enter your network ID and password and you will be taken to the zzusis portal page. Look for the Pullman Emergency Information box on the left side of the page and click on Update Now to be taken to the registration page where you can enter your cell, landline, and email contact information as well as arrange for emergency text messages to be sent to your cell phone.

#018

10/10/13

Final copy

NEP 530: Foundations of Cellular Regulation

Washington State University Spokane
College of Pharmacy
Spring 2014

Course Logistics

Course Title: Foundations of Cellular Regulation

Course Number: PharmSci 530/NEP 530

Prerequisite(s): Graduate standing or permission of the instructor.

Course Description: Signal transduction; drug-receptor interactions; xenobiotic metabolism; toxicology; drug and supplement regulation; actions of dietary supplements

Academic Hours (Lecture-Lab-Total): 3-0-3

Instructor of Record:

Kathryn E. Meier, PhD Professor	Office: SCLS 132 Phone: 358-7610 Email: kmeier@wsu.edu
Dan Guerra, PhD Instructor	Office: SCLS 265 Phone: 208-883-8854 Email: djguerra@wsu.edu

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Semester: Spring

Course Time and Location: TU 1:00-3:30 pm, SCLS 147

Office Hours: 10-12 Mondays and Fridays (Drs. Meier or Guerra)

Course Objectives

As an overview, this course is designed with the following major goals in mind:

- 1) To provide students in the NEP graduate programs with a foundation in advanced basic science as it relates to nutrition and exercise physiology.
- 2) To provide all students, including interested students from other degree programs, with a foundation in principles of pharmacology, toxicology, pharmacotherapy, pathophysiology of chronic disease, and the therapeutic roles of diet and exercise.
- 3) To build critical thinking skills in the biomedical sciences, particularly with respect to ethical consideration of substances with both beneficial and detrimental properties.

Upon completion of the course students will be able to:

- 1) Describe the basic principles of ligand-receptor binding and the dose-response relationship.
- 2) Delineate signal transduction pathways mediating the actions of xenobiotic agents.
- 3) Explain basic enzymatic steps and tissue sites involved in xenobiotic metabolism.
- 4) Describe basic principles concerning drug-nutrient interactions, xenobiotic side effects, and placebo effects.
- 5) Apply the basic principles of toxicology.
- 6) Describe regulatory aspects of development and marketing for drugs and dietary supplements in the U.S.
- 7) Explain how the most common dietary supplements are used, their mechanisms of action, and their side effects.
- 8) Discuss the pathobiology of chronic disease states (diabetes, cancer, inflammation) at a basic cellular level.
- 9) Compile and analyze scientific literature in the areas addressed in the course, and to write an effective summary (with critical analysis) of the information gained.
- 10) Read and discuss original research articles related to material presented in the course.

Required and Optional Textbooks, References and other Resources

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Topic Outline		
Dates	Module	Topic
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	2	Introduction to cell physiology (Meier)
	3	Membrane structure and transport (Guerra)
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Jan. 29	6	G protein-coupled receptors (Meier)
	7	Tyrosine kinase and cytokine receptors (Meier)
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Feb. 5	9	DNA as a xenobiotic target (Meier)
	10	Enzymes and channels as xenobiotic targets (Meier)
Feb. 12		Exam I (material from modules 1-10)
	11	Xenobiotic disposition
Feb. 19	12	Xenobiotic metabolism
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Feb. 26	14	Biological oxidation
	15	Mechanisms of cell death
March 5	16	Basic principles of toxicology
	17	Development and regulation of drugs & dietary supplements
March 12	--	No class – Spring Break
March 19	18	Mechanisms of inflammation
	19	Anti-inflammatory agents
March 26		Exam II (material from modules 11-19)
April 2	20	Endocrine regulation of metabolism
		Metabolic dysregulation in diabetes and obesity
April 9	21	Effects of exercise on cellular metabolism I
		Molecular therapeutics of exercise

Dates	Module	Topic
April 16	22	Dietary supplements I
	23	Dietary supplements II
April 23	23	Dietary supplements III
	24	Dietary supplements IV
Apr. 30		Exam III (material from modules 19-24)

Expectations of students

Students are expected to attend lectures, and are responsible for all material presented in the lectures plus any additional material as directed by the instructor. "Make-up exams" will be scheduled only under the most extraordinary circumstances, after receiving approval of the instructor prior to the exam.

Grading Scale:

A = 93-100%	C = 73-76%
A- = 90-92%	C- = 70-72%
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Examinations

There will be three examinations, each comprising 20% of the final grade. The exams will consist of multiple choice and/or short-answer questions.

In-class discussions

There will be in-class discussions of research articles, assigned by the instructor, on a weekly basis or at the discretion of the instructor. Each student will be expected to present one figure from the assigned paper, and to participate in discussion of the paper.

The instructor will assign a recent paper, related to the lecture content, for review each week. The papers will contain at least as many figures or tables as there are enrolled students. During the discussion, the instructor will provide a brief introduction to the paper, and will then call upon students (or ask for volunteers) to go over each figure of the paper. Students will be expected to explain the figure, including:

- 1) The goal of the experiment
- 2) The methods employed
- 3) The meaning of the results shown in the figure

Additional comments regarding quality of the data or its presentation are welcome; other students can contribute such remarks as well. The overall format will be informal, although participation is expected and required. The purpose of this graduate component is to provide the additional scientific depth required for a graduate course, and to reinforce points made in the didactic component.

Students will be assigned a grade for the in-class discussions based on attendance and participation. The grading scale will be as follows:

Rubric for grading the in-class discussions:

- 5 points: Attendance; providing a valid excuse if unable to attend
- 5 points: Preparation; familiarity with the paper as reflected in general discussion, even if issues remain to be clarified regarding methodology and details
- 5 points: Critical thinking as reflected in presentation of figures, and in discussion

The journal club portion of the course will comprise 15% of the final grade in the course.

Written Assignments

Purpose: To broaden course participation beyond the traditional exam format, to enhance scientific writing skills, and to build critical thinking skills.

Due dates: A complete 6-10-page draft of the written assignment is due on March 20th by 5 pm; it can be submitted to the instructor by email. Edited drafts will be returned to the students by April 12th. The revised and final version will be due on April 26th at 5 pm.

Assignment: Select a single chemical agent or product that is utilized by humans for potential nutritional, performance-enhancing, or therapeutic benefit. It can be a drug, vitamin, mineral, dietary supplement, nutraceutical, ergogenic aid, etc. The "agent" can consist of a mixture of compounds, if this is the way in which it is marketed. If you choose a well-established agent (e.g., prescription drug, vitamin, or mineral), focus on a particular use of that agent that may be new or is not yet approved. The point is to select something about which there is some level of controversy. Please choose something that is of interest to you, but not directly related to your thesis or non-thesis project or dissertation.

Obtain at least four references concerning benefit/value/risk for the product. One (or more) of these should be a review article (from a journal) or book chapter, but at least two of them must be original scientific articles from the biomedical literature. No web references are allowed, although of course some journal articles can be accessed via the internet. Use numbers (in parentheses) to cite your references within the text; this will require that you number the references in the order in which they are cited in the text. For your reference list, use the following format.

For a journal article:

Brown, J.M., Taniya, E.B., and Liu, X.L. (2004) Toxicity of ephedra products in mouse exercise models. *J. Pharm. Sci.* 31, 56-68.

For a book chapter:

Slomonov, G.F. (2003) Use of ephedra by American athletes. *In: Therapeutics and Toxicology of Herbal Supplements* (V. Whitcomb, ed.), Elsevier, New York, pp. 139-146.

An "original article" refers to scholarly work that describes a study and provides the data upon which the investigators base a conclusion. It should contain graphs, tables, study methods, etc. The authors are the individuals who performed and analyzed the experiments. Such an article may be cited and discussed in later original articles, or in review articles. "Review articles" summarize results from multiple original articles and put them into context relative to each other. They do not generally include actual data.

Write a 10-page critical analysis (12-point font, double-spaced) of this topic. *The page limit does not include the references, which should be on a separate page.* The first submitted draft of the paper can be shorter, if you need input regarding areas to expand. The following components should be included; sub-titles are not necessary. At least one page should be devoted to each section; you will need more (or more reference sources) to reach the 10-page minimum.

Introduction: what is the agent, how is it used, who uses it; mechanism of action (if known); introduce controversy (if any); mention issues that are of particular interest to you. Cite the review article in this section.

Therapeutic benefit: general overview of use of the compound, further discussion of controversy (if any). This information would likely be derived (in your own words) from one or more review articles.

Critical analysis of original references (at least one page for each): Describe the purpose of the study, the approach taken by the authors, and the major findings. Use correct scientific nomenclature. Do not provide an analysis of any review article(s); cite the original article in this section. Your analysis should include a critique of the methods (as appropriate), a critique of the authors' interpretation of the results, mention anything that the authors should have addressed but did not, and compare results between references or with other published literature (as appropriate).

Summary/conclusion: In this section, provide your own analysis of what you have read. Would you suggest that your patients/clients use the product? You do not need to go into mathematical treatments of benefit and risk. Rather, take a common sense but scientific approach in analyzing the available data. For example, an agent may not be particularly beneficial, but it may also present little or no risk...leading to a neutral opinion on your part. On the other hand, the agent may have proven risk, but you may judge that the benefit is so great, or that the risk under normal use is so low, that it is something that you would endorse as a scientist/dietician/exercise specialist/healthcare professional. There might also be cases in which your opinion would be a negative one (e.g., little benefit, too much risk). Please use first person in this section (but not elsewhere in the paper). You can also use this section to suggest your ideas for future

directions in this research area. The instructor will be specifically judging how you analyze information and come to a conclusion. You will not be judged on the nature of your conclusion (e.g., positive or negative).

Assistance: This assignment is individual work, completed with the benefit of feedback from the instructor. Any signs of collaboration (i.e., similar references and approach in papers from different students), or of plagiarism from published sources, will result in a poor or failing grade. This applies to the first draft as well as to the final paper. The goal is a clearly written paper, with a scholarly emphasis, that shows evidence of your analytical skills.

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Additional Comments

Class Format and Schedule: This is a didactic (lecture-based) course that includes in-class discussion. The instructor will use various methods to encourage student discussion. All work in the course is individual in nature. "Individual work" means that the student may not obtain assistance from any other person in completion of an examination. Individual assignments or examinations will specify the types of resources to be used.

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1. *Resignation:* If it becomes necessary to resign, the student will submit a signed letter of resignation to the Program Director. Refer to the guidelines as outlined in the WSU Spokane Student Handbook.
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quiz or assignment, a full letter grade drop for the course, or a failing grade in the course. The student will also be referred immediately to the office of the Dean and/or the WSU Office of Student Conduct.

Course Evaluations

Student evaluations of courses/course modules and faculty effectiveness are a valuable and important component of the College's commitment to provide quality learning experiences and contribute to our efforts to assure that students achieve the objectives of our professional degree program. Thus, all evaluations are given serious consideration as part of the assessment process and are read first by the Department Chair before they are processed, analyzed, and given to the faculty. Because the most effective way to impact positive changes is through constructive comments, we encourage you to provide feedback as you would wish to receive it. This will allow the faculty member to focus on improvements or affirm students' perspective on effective elements of the course.

Students with Disabilities Statement

All students requesting reasonable accommodation must meet with the instructor prior to or during the first week of the course to review all proposed accommodations in relation to course content and requirements. Please note that written evaluations can be accommodated but performance evaluations are considered analogous to job skill performance, therefore expectations will not be adjusted.

Reasonable accommodations are available for students with a documented disability. If you have a disability and may need accommodations to fully participate in this class, please contact Liz West, Assistant Director of Student Affairs, in Academic Center 130 (liz.west@wsu.edu, 509-358-7534). Read more:

<http://spokane.wsu.edu/students/current/StudentAffairs/disability/disabilityguidelines.html>

Campus Safety

The WSU Campus Safety Plan, which can be found at <http://safetyplan.wsu.edu>, contains a comprehensive listing of university policies, procedures, statistics, and information relating to campus safety, emergency management, and the health and welfare of the campus community. Please visit this web site as well as the University emergency management web site at <http://oem.wsu.edu/Emergencies> to become familiar with the campus safety and emergency information provided. Everyone should also become familiar with the WSU ALERT site (<http://alert.wsu.edu>) where information about emergencies and other issues affecting WSU will be found. This site also provides information on the communication resources WSU will use to provide warning and notification during emergencies. It should be bookmarked on computers. **Finally, all faculty, staff, and students should go to the zzsis portal at <http://zzsis.wsu.edu> and register their emergency contact information for the Crisis Communication System (CCS).** Enter your network ID and password and you will be taken to the zzsis portal page. Look for the Pullman Emergency Information box on the left side of the page and click on Update Now to be taken to the registration page where you can enter your cell, landline, and email contact information as well as arrange for emergency text messages to be sent to your cell phone.

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NEP 510: Foundations of Cellular Regulation

Washington State University Spokane
Program in Nutrition and Exercise Physiology
Spring 2014

Course Logistics

Course Title: Foundations of Cellular Regulation

Course Number: NEP 510

Prerequisite(s): Graduate standing or permission of the instructor.

Course Description: Signal transduction; drug-receptor interactions; xenobiotic metabolism; toxicology; drug and supplement regulation; actions of dietary supplements

Academic Hours (Lecture-Lab-Total): 3-0-3

Instructor of Record:

Kathryn E. Meier, PhD Professor	Office: SAC 525B Phone: 358-7610 Email: kmeier@wsu.edu
Dan Guerra, PhD Instructor	Office: SCLS 265 Phone: 208-883-8854 Email: djguerra@wsu.edu

Course Communication:

WSU Spokane and Pullman use the Angel LMS (Learning Management System). If you have not used Angel before, please take a few minutes to become familiar with the system prior to the start of the semester. There is a short student orientation video on Angel at

<http://angel.wsu.edu/Tutorials/STudentOrientation/STudentOrientation.html>

How do I access Angel?

1. Go to lms.wsu.edu
2. Log in with your WSU Network ID and Password

Where can I find more information on Angel?

- Inside Angel, look for the question mark button on the left hand edge "powerstrip."
- Visit <http://angel.wsu.edu/> for additional help.

Semester: Spring

Course Time and Location: TU 1:00-3:30 pm, SCLS 147

Office Hours: Dr. Meier, 10-12 Mondays and Fridays

Course Objectives

As an overview, this course is designed with the following major goals in mind:

- 1) To provide students in the NEP graduate programs with a foundation in advanced basic science as it relates to nutrition and exercise physiology.
- 2) To provide all students, including interested students from other degree programs, with a foundation in principles of pharmacology, toxicology, pharmacotherapy, pathophysiology of chronic disease, and the therapeutic roles of diet and exercise.
- 3) To build critical thinking skills in the biomedical sciences, particularly with respect to ethical consideration of substances with both beneficial and detrimental properties.

Upon completion of the course students will be able to do the following:

[means for assessment is provided in brackets]

- 1) Describe the basic principles of ligand-receptor binding and the dose-response relationship [exams].
- 2) Delineate signal transduction pathways mediating the actions of xenobiotic agents [exams].
- 3) Explain basic enzymatic steps and tissue sites involved in xenobiotic metabolism [exams].
- 4) Describe basic principles concerning drug-nutrient interactions, xenobiotic side effects, and placebo effects (exams).
- 5) Apply the basic principles of toxicology [exams; written assignment].
- 6) Describe regulatory aspects of development and marketing for drugs and dietary supplements in the U.S. [exams].
- 7) Explain how the most common dietary supplements are used, their mechanisms of action, and their side effects [exams; written assignment].
- 8) Discuss the pathobiology of chronic disease states (diabetes, cancer, inflammation) at a basic cellular level [exams].
- 9) Compile and analyze scientific literature in the areas addressed in the course, and to write an effective summary (with critical analysis) of the information gained [written assignment].
- 10) Read and discuss original research articles related to material presented in the course [in-class discussions].

Required and Optional Textbooks, References and other Resources

- The instructors will provide extensive handouts and/or copies of Powerpoint presentations that substitute for a textbook. Journal articles (for in-class discussion) will be posted on Angel.

Topic Outline

Dates	Module	Topic
Jan. 15	1	Introduction to course (Meier)
	2	Introduction to cell physiology (Meier)
	3	Membrane structure and transport (Guerra)
Jan. 22	4	Ligand-receptor interactions I (Meier)
	5	Ligand-receptor interactions II (Meier)
Jan. 29	6	G protein-coupled receptors (Meier)
	7	Tyrosine kinase and cytokine receptors (Meier)
	8	Nuclear receptors (Meier)
Feb. 5	9	DNA as a xenobiotic target (Meier)
	10	Enzymes and channels as xenobiotic targets (Meier)
Feb. 12		Exam I (material from modules 1-10)
	11	Xenobiotic disposition

Dates	Module	Topic
Feb. 19	12	Xenobiotic metabolism
	13	Interactions between xenobiotics; side effects
Feb. 26	14	Biological oxidation
	15	Mechanisms of cell death
March 5	16	Basic principles of toxicology
	17	Development and regulation of drugs & dietary supplements
March 12	--	No class – Spring Break
March 19	18	Mechanisms of inflammation
	19	Anti-inflammatory agents
March 26		Exam II (material from modules 11-19)
April 2	20	Endocrine regulation of metabolism
		Metabolic dysregulation in diabetes and obesity
April 9	21	Effects of exercise on cellular metabolism I
		Molecular therapeutics of exercise
April 16	22	Dietary supplements I
	23	Dietary supplements II
April 23	23	Dietary supplements III
	24	Dietary supplements IV
Apr. 30		Exam III (material from modules 19-24)

Expectations of students

Students are expected to attend lectures, and are responsible for all material presented in the lectures plus any additional material as directed by the instructor. “Make-up exams” will be scheduled only under the most extraordinary circumstances, after receiving approval of the instructor prior to the exam.

Grading Scale:

A = 93-100%	C = 73-76%
A- = 90-92%	C- = 70-72%
B+ = 87-89%	D+ = 67-69%
B = 83-86%	D = 60-66%
B- = 80-82%	F = < 60%
C+ = 77-79%	

Examinations

There will be three examinations, each comprising 20% of the final grade. The exams will consist of multiple choice and/or short-answer questions.

In-class discussions

There will be in-class discussions of research articles, assigned by the instructor, on a weekly basis or at the discretion of the instructor. Each student will be expected to present one figure from the assigned paper, and to participate in discussion of the paper.

The instructor will assign a recent paper, related to the lecture content, for review each week. The papers will contain at least as many figures or tables as there are enrolled students. During the discussion, the instructor will provide a brief introduction to the paper, and will then call upon students (or ask for volunteers) to go over each figure of the paper. Students will be expected to explain the figure, including:

- 1) The goal of the experiment
- 2) The methods employed
- 3) The meaning of the results shown in the figure

Additional comments regarding quality of the data or its presentation are welcome; other students can contribute such remarks as well. The overall format will be informal, although participation is expected and required. The purpose of this graduate component is to provide the additional scientific depth required for a graduate course, and to reinforce points made in the didactic component.

Students will be assigned a grade for the in-class discussions based on attendance and participation. The grading scale will be as follows:

Rubric for grading the in-class discussions:

- 5 points: Attendance; providing a valid excuse if unable to attend
- 5 points: Preparation; familiarity with the paper as reflected in general discussion, even if issues remain to be clarified regarding methodology and details
- 5 points: Critical thinking as reflected in presentation of figures, and in discussion

The journal club portion of the course will comprise 15% of the final grade in the course.

Written Assignments

Purpose: To broaden course participation beyond the traditional exam format, to enhance scientific writing skills, and to build critical thinking skills.

Due dates: A complete 6-10-page draft of the written assignment is due on March 20th by 5 pm; it can be submitted to the instructor by email. Edited drafts will be returned to the students by April 12th. The revised and final version will be due on April 26th at 5 pm.

Assignment: Select a single chemical agent or product that is utilized by humans for potential nutritional, performance-enhancing, or therapeutic benefit. It can be a drug, vitamin, mineral, dietary supplement, nutraceutical, ergogenic aid, etc. The "agent" can consist of a mixture of compounds, if this is the way in which it is marketed. If you choose a well-established agent (e.g., prescription drug, vitamin, or mineral), focus on a particular use of that agent that may be new or is not yet approved. The point is to select something about which there is some level of controversy. Please choose something that is of interest to you, but not directly related to your thesis or non-thesis project or dissertation.

Obtain at least four references concerning benefit/value/risk for the product. One (or more) of these should be a review article (from a journal) or book chapter, but at least two of them must be original scientific articles from the biomedical literature. No web references are allowed, although of course some journal articles can be accessed via the internet. Use numbers (in parentheses) to cite your references within the text; this will require that you number the references in the order in which they are cited in the text. For your reference list, use the following format.

For a journal article:

Brown, J.M., Taniya, E.B., and Liu, X.L. (2004) Toxicity of ephedra products in mouse exercise models. *J. Pharm. Sci.* **31**, 56-68.

For a book chapter:

Slomonov, G.F. (2003) Use of ephedra by American athletes. *In: Therapeutics and Toxicology of Herbal Supplements* (V. Whitcomb, ed.), Elsevier, New York, pp. 139-146.

An "original article" refers to scholarly work that describes a study and provides the data upon which the investigators base a conclusion. It should contain graphs, tables, study methods, etc. The authors are the individuals who performed and analyzed the experiments. Such an article may be cited and discussed in later original articles, or in review articles. "Review articles" summarize results from multiple original articles and put them into context relative to each other. They do not generally include actual data.

Write a 10-page critical analysis (12-point font, double-spaced) of this topic. *The page limit does not include the references, which should be on a separate page.* The first submitted draft of the paper can be shorter, if you need input regarding areas to expand. The following components should be included; subtitles are not necessary. At least one page should be devoted to each section; you will need more (or more reference sources) to reach the 10-page minimum.

Introduction: what is the agent, how is it used, who uses it; mechanism of action (if known); introduce controversy (if any); mention issues that are of particular interest to you. Cite the review article in this section.

Therapeutic benefit: general overview of use of the compound, further discussion of controversy (if any). This information would likely be derived (in your own words) from one or more review articles.

Critical analysis of original references (at least one page for each): Describe the purpose of the study, the approach taken by the authors, and the major findings. Use correct scientific nomenclature. Do not provide an analysis of any review article(s); cite the original article in this section. Your analysis should include a critique of the methods (as appropriate), a critique of the authors' interpretation of the results, mention anything that the authors should have addressed but did not, and compare results between references or with other published literature (as appropriate).

Summary/conclusion: In this section, provide your own analysis of what you have read. Would you suggest that your patients/clients use the product? You do not need to go into mathematical treatments of benefit and risk. Rather, take a common sense but scientific approach in analyzing the available data. For example, an agent may not be particularly beneficial, but it may also present little or no risk...leading to a neutral opinion on your part. On the other hand, the agent may have proven risk, but you may judge that the benefit is so great, or that the risk under normal use is so low, that it is something that you would endorse as a scientist/dietician/exercise specialist/healthcare professional. There might also be cases in which your opinion would be a negative one (e.g., little benefit, too much risk). Please use first person in this section (but not elsewhere in the paper). You can also use this section to suggest your ideas for future directions in this research area. The instructor will be specifically judging how you analyze information and come to a conclusion. You will not be judged on the nature of your conclusion (e.g., positive or negative).

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