Spring 2-1-2007

BMED 644.01: Fundamentals of Immunotoxicology

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Course Outline

**Basic Immunology:**

**Week 1**
- Lecture 1: Jan. 22-26
  - General course info. and immunology survey
- Lecture 2
  - Innate vs Adaptive/Tissues & Organs/Hematopoiesis
- Lecture 3
  - Cellular players, secreted molecules & their functions

**Week 2**
- Lecture 4: Jan. 29-Feb. 2
  - Cell surface molecules
- Lecture 5
  - Intracellular interactions and signaling
- Lecture 6
  - Inter-cellular signaling & Immune networks

**Week 3**
- Lecture 7: Feb. 5-9
  - Inflammation
- Lecture 8
  - Acute phase response/liver connection
- Lecture 9
  - Miscellaneous immunology (skin, lungs, gut)

**Week 4**
- Feb. 12-16
  - Exam
  - Midterm #1

**Immunotoxicology:**

- Lecture 10
  - Immune Dysfunction/Basic Toxicology Review
- Lecture 11
  - Immunotoxicological methods

**Week 5**
- Feb. 19-23
  - Holiday
  - No class on Monday – President’s Day
  - Assessment of Immunotoxicity (Tier testing)

**Week 6**
- Feb. 26-March 2
  - Chemicals Related to Autoimmunity (Dr. Jean Pfau)
  - Chemicals Related to Autoimmunity (cont.)

**Week 7**
- March 5-9
  - Chemicals Related to Hypersensitivity (Dr. Jean Pfau)
  - Chemicals Related to Hypersensitivity (cont.)

Journal Club 1#
Journal Club 2#
Journal Club 3#
Week 8  March 12-16
Lecture 17  Immunosuppression I: Intentional Modulation of the Immune System
Lecture 18  Immunosuppression II: Benzene
Journal Club 4#

Week 10  March 19-23
Lecture 19  Immunosuppression III: Dioxin
Lecture 20  Overview of other immunosuppressive compounds
Exam

Week 9  March 26-30
No class — Spring break; SOT meeting in Charlotte, NC.

Week 11  April 2-6
Lecture 21  Immunopharmacology (Dr. Jerry Smith)
Lecture 22  Immunomodulation by Edible Things (Ava Rhule)
Grant topics must be selected and approved by this date!
Journal Club 5#

Week 12  April 9-13
Lecture 23  Immunotoxicological Data in Risk Assessment (Dr. C. Noonan)
Lecture 24  Immunogenetics & Immunotox. Susceptibility (Dr. L. Putnam)
Workshop
Grant proposal writing workshop

Week 13  April 16-20
Lecture 25  Endocrine/Immune Interactions (Dr. Jean Pfau)
Lecture 26  Neuro/Immune Interactions (Dr. Celine Beamer)
Journal Club 6#
Wildlife Immunotoxicology
Dr. Bob Luebke (invited speaker- EPA)

Week 14  April 23-27
Lecture 27  Occupational Immunotoxicology (Dr. J. Schumpert)
Journal Club 7#
Lecture 28

Week 15  April 30-May 4
Lecture 29  Immunotoxicology in Non-mammalian Models
Workshop#
Grant reviews/presentations
Journal Club 8#
Developmental Immunotoxicology
Dr. Beth Vorderstrasse (invited speaker- WSU)
Week 16      May 7-11       Finals week--Research proposals are due!

# denotes graded class participation projects.

PROPOSALS ARE DUE BY 5 PM ON TUES., MAY 8th.

COURSE GRADING:

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<thead>
<tr>
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<th>Undergrads</th>
<th>Grads</th>
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<tbody>
<tr>
<td>Midterm #1</td>
<td>33%</td>
<td>25%</td>
</tr>
<tr>
<td>Midterm #2</td>
<td>33%</td>
<td>25%</td>
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<tr>
<td>Journal club assignments and participation</td>
<td>33%</td>
<td>25%</td>
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<tr>
<td>Research proposal</td>
<td>NA*</td>
<td>25%</td>
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<td><strong>100%</strong></td>
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* Undergraduate students may elect to write an immunotoxicology report or grant for extra credit (50 or 100 points possible, respectively).

Some useful books (NOT required):

Basic Immunology

Kuby, J. (2007) Immunology. W.H. Freeman Co.--note: this text is currently used in the basic Immunology course taught at UM.
Annual Reviews of Immunology

Immunotoxicology

Investigative Immunotoxicology (2005), [Helen Tryphonas, Eds.], Taylor & Francis.
Immunotoxicology and Immunopharmacology, 3rd Ed. (2006), from the Target Organ Tox Series. [House and Luebke, Eds.], Raven Press.
Annual Reviews of Pharmacology and Toxicology
PROPOSALS ARE DUE BY 5 PM ON TUES., MAY 8th.

• RESEARCH PROPOSALS
You have just been hired by the government as an immunotoxicologist. Your first assignment is to assess the (potential) immunotoxicity of a compound that the government has received a mandate to regulate. You may assume that you have 2 years and unlimited financial support.

The outcome of this written project should be your proposed research plan. For this plan, you need to investigate what is known about the general toxicity and immunotoxicity of a chemical, including what is known as well as what is hypothesized regarding the impact this chemical has or could have on the immune system. A simple review of the literature is unacceptable. You will be expected to take the available information, combined with your understanding of the immune system and the principles of immunotoxicology, and determine what questions remain to be answered about the effects this compound has or may have on the immune system. You should then propose how you would conduct the research to answer these questions. That is, your final product should contain a research plan that could ultimately be used to conclude that, based on what you have found, this compound is or is not immunotoxic. Therefore, it is important that you also summarize for the government how your research plan, when combined with the information that is currently in the literature, will lead to a clearer understanding of effects of this chemical on the immune system.

To save paper for the government, your report must be brief (5-7 pages not including references), and you should use the standard proposal format, including:

• Background and Significance
• Specific Aims
• Proposed Research
• Summary
• Literature Citations (INCLUDING TITLES)

• SUGGESTED TOPICS: You may either choose a chemical from the list of suggested topics below or come up with one on your own.*
  arsenic  cigarette smoke
  dihaloethanes  cocaine
  asbestos  benzo(a)pyrene
  ethanol  ozone
  pentachlorophenol  pesticides (either a specific one or a class)
  heavy metals (i.e. lead, cadmium, mercury)
  “xenoestrogens” (either a specific one or a subgroup)

*NOTE: While it is okay to get ideas from lecture topics, cyclosporin A, dioxin and benzene are not topics available for your research proposal as they will be thoroughly covered in class. Also, topics must be approved by the instructor on or before April 4th.
All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University.

All students need to be familiar with the Student Conduct Code. The Code is available for review online at http://www.umt.edu/SA/VPSA/index.cfm/page/1321.