

# FLORIDA ATLANTIC UNIVERSITY™

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## Graduate Programs—NEW COURSE PROPOSAL

<b>DEPARTMENT NAME:</b> Basic Science	<b>COLLEGE OF:</b> Charles E. Schmidt College of Biomedical Science
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<b>RECOMMENDED COURSE IDENTIFICATION:</b> PREFIX _____ PCB _____ COURSE NUMBER _____ 6239 _____ LAB CODE (L or C) _____ (TO OBTAIN A COURSE NUMBER, CONTACT ERUDOLPH@FAU.EDU) COMPLETE COURSE TITLE Tumor Immunology	<b>EFFECTIVE DATE</b> (first term course will be offered)  <div style="text-align: center; font-weight: bold; font-size: 1.2em;">SPRING 2011</div>
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<b>CREDITS:</b> 3	<b>TEXTBOOK INFORMATION:</b> <u>Immunology</u> (Sixth Edition) by Goldsby, Kindt, Osborne, and Kuby. WH Freeman ISBN: 1-4292-0211-4 – Recommended.
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**GRADING (SELECT ONLY ONE GRADING OPTION):** REGULAR  PASS/FAIL \_\_\_\_\_ SATISFACTORY/UNSATISFACTORY \_\_\_\_\_

**COURSE DESCRIPTION, NO MORE THAN 3 LINES:** This course will explore the role of the immune system in cancer and the implications for the host. The effect of the tumor-host interactions on the developing neoplasm will be studied by considering related topics such as angiogenesis, MMPs, chemokines and metastasis. Additionally, we will explore the role of the immune system in defense against the tumors and the mechanism by which cancer cells escape the surveillance system.

<b>PREREQUISITES W/MINIMUM GRADE:*</b> PCB 4233 or equivalent  Minimum grade: B-	<b>COREQUISITES:</b>	<b>OTHER REGISTRATION CONTROLS (MAJOR, COLLEGE, LEVEL):</b> Graduate Students Only
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PREREQUISITES, COREQUISITES & REGISTRATION CONTROLS SHOWN ABOVE WILL BE ENFORCED FOR ALL COURSE SECTIONS.  
 \*DEFAULT MINIMUM GRADE IS D-

**MINIMUM QUALIFICATIONS NEEDED TO TEACH THIS COURSE:**  
 Ph.D.

Other departments, colleges that might be affected by the new course must be consulted. List entities that have been consulted and attach written comments from each.  
 Department of Biology

Vijaya Iragavarapu-Charyulu, Ph.D., [iragavar@fau.edu](mailto:iragavar@fau.edu), tel: 297-3304  
  
 Faculty Contact, Email, Complete Phone Number

**SIGNATURES** **SUPPORTING MATERIALS**

<b>Approved by:</b> Department Chair: _____ College Curriculum Chair: _____ College Dean: _____ UGPC Chair: _____ Dean of the Graduate College: _____	<b>Date:</b> 3-16-10 3-16-10 3-16-10 _____ _____	<b>Syllabus</b> —must include all details as shown in the UGPC Guidelines.  <b>Written Consent</b> —required from all departments affected.  Go to: <a href="http://graduate.fau.edu/gpc/">http://graduate.fau.edu/gpc/</a> to download this form and guidelines to fill out the form.
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Email this form and syllabus to [diamond@fau.edu](mailto:diamond@fau.edu) and [eqirjo@fau.edu](mailto:eqirjo@fau.edu) one week **before** the University Graduate Programs Committee meeting so that materials may be viewed on the UGPC website by committee members prior to the meeting.

## TUMOR IMMUNOLOGY

**Course Number: PCB 6239**

**Pre-requisite:** PCB 4233 or equivalent

**Co-requisite:** None

**Course Coordinator:** Vijaya Iragavarapu-Charyulu, Ph.D.

**Instructor's Office:** 309 Biomedical Sciences Building

**Instructor's Phone Number:** 561-297-3304

**E-mail:** [iragavar@fau.edu](mailto:iragavar@fau.edu)

**Office Hours:** Mondays and Fridays: 10-12 noon. As I may be in the laboratory, it is advised that you make an appointment to see me. You can always e-mail me and I will respond as soon as possible.

### TEXTBOOK:

(Recommended) Immunology (Sixth Edition) by Goldsby, Kindt, Osborne, and Kuby. This textbook or any other up-to-date immunology textbook is recommended for background reading, but is not required. In addition, assigned scientific journal articles for each lecture topic will be provided by the instructor. Additional material for lectures and presentations can be obtained by a Medline search of the assigned topics.

### BIBLIOGRAPHY:

**Textbook:** (Recommended) Immunology (Sixth Edition) by Goldsby, Kindt, Osborne, and Kuby.

#### Journal Articles:

Ai, Weiyun Z., Jing-Zhou Hou, Robert Zeiser, Debra Czerwinski, Robert S. Negrin, and Ronald Levy. *Follicular lymphoma B cells induce the conversion of conventional CD4+ T cells to T regulatory cells*. *Int J Cancer*. 2009 January 1; 124(1): 239–244. doi:10.1002/ijc.23881.

Barber, Amorette, Agnieszka Rynda and Charles L. Sentman. *Chimeric NKG2D Expressing T Cells Eliminate Immunosuppression and Activate Immunity within the Ovarian Tumor Microenvironment*. *J. Immunol*. 2009;183:6939-6947; doi:10.4049/jimmunol.0902000 <http://www.jimmunol.org/cgi/content/full/183/11/6939> accessed January 2010.

Bill, Matthew A., Courtney Bakan, Don M. Benson, Jr., James Fuchs, Gregory Young, and Gregory B. Lesinski. *Curcumin induces proapoptotic effects against human melanoma cells and modulates the cellular response to immunotherapeutic cytokines*. *Mol Cancer Ther* 2009;8(9). September 2009.

Bunt, Stephanie K., Linglin Yang, Pratima Sinha, Virginia K. Clements, Jeff Leips, and Suzanne Ostrand-Rosenberg. *Reduced Inflammation in the Tumor Microenvironment Delays the Accumulation of Myeloid-Derived Suppressor Cells and Limits Tumor Progression*. *Cancer Res* 2007; 67: (20). October 15, 2007. Available from: [www.aacrjournals.org](http://www.aacrjournals.org). Accessed January 2010.

Deng, Shubai Liu and Zhihai Qin, Yu Lu, Wei Yang, Chuan Qin, Lianfeng Zhang, Jingjing.

*Growth via Angiostasis to IFN- $\gamma$  Blocks Tumor Responsiveness of Stromal Fibroblasts.* J. Immunol. 2009; 183:6413-6421; originally published online Oct 19, 2009; doi:10.4049/jimmunol.0901073. <http://www.jimmunol.org/cgi/content/full/183/10/6413>

DeRosa, David C., Paul J. Ryan, Angela Okragly, Derrick R. Witcher, Robert J. Benschop. *Tumor-derived death receptor 6 modulates dendritic cell development.* Cancer Immunol Immunother (2008) 57:777–787.

Dineen, Sean P., Kristi D. Lynn, Shane E. Holloway, Andrew F. Miller, James P. Sullivan, David S. Shames, Adam W. Beck, Carlton C. Barnett, Jason B. Fleming, and Rolf A. Brekken. *Vascular Endothelial Growth Factor Receptor 2 Mediates Macrophage Infiltration into Orthotopic Pancreatic Tumors in Mice.* Cancer Res 2008; 68: (11). June 1, 2008. Available from: [www.aacrjournals.org](http://www.aacrjournals.org). Accessed January 2010.

Gaurnier-Hausser, Anita, Vicki L. Rothman, Svetoslav Dimitrov, and George P. Tuszynski. *The Novel Angiogenic Inhibitor, Angiostatin, Induces Differentiation of Monocytes to Macrophages.* Cancer Res 2008; 68: (14). July 15, 2008. Available from: [www.aacrjournals.org](http://www.aacrjournals.org). Accessed January 2010.

Fridlender, Zvi G., George Buchlis, Veena Kapoor, Guanjun Cheng, Jing Sun, Sunil Singhal, Cecilia Crisanti, Liang-Chuan S. Wang, Daniel Heitjan, Linda A. Snyder, and Steven M. Albelda. *CCL2 Blockade Augments Cancer Immunotherapy.* Cancer Res; 70(1) January 1, 2010. Available from: [www.aacrjournals.org](http://www.aacrjournals.org). Accessed January 2010.

Guo, Tai L., J. Ann McCay, Ling X. Zhang, Ronnetta D. Brown, Li You, Niel A. Karrow, Dori R. Germolec and Kimber L. White, Jr. *Genistein Modulates Immune Responses and Increases Host Resistance to B16F10 Tumor in Adult Female B6C3F1 Mice.* The Journal of Nutrition 0022-3166/01 (2001). Downloaded from [jn.nutrition.org](http://jn.nutrition.org) by on February 2, 2010.

Jacob, Jennifer B., Elena Quaglino, Olga Radkevich-Brown, Richard F. Jones, Marie P. Piechocki, Joyce D. Reyes, Amy Weise, Augusto Amici, and Wei-Zen Wei. *Combining Human and Rat Sequences in Her-2 DNA Vaccines Blunts Immune Tolerance and Drives Antitumor Immunity.* Cancer Res; 70(1) January 1, 2010. Available from: [www.aacrjournals.org](http://www.aacrjournals.org). Accessed January 2010.

Kilinc, Mehmet O., Tao Gu, Jamie L. Harden, Lauren P. Virtuoso and Nejat K. Egilmez. *Central Role of Tumor-Associated CD8 + T Effector/Memory cells in Restoring Systemic Antitumor Immunity.* J. Immunol. 2009;182:4217-4225 doi:10.4049/jimmunol.0802793 Available from: <http://www.jimmunol.org/cgi/content/full/182/7/4217>. Accessed January 2010.

Meeran, Syed M., Thejass Punathil, and Santosh K. Katiyar. *Interleukin-12-Deficiency Exacerbates Inflammatory Responses in UV-Irradiated Skin and Skin Tumors.* J Invest Dermatol. 2008 November ; 128(11): 2716–2727. doi:10.1038/jid.2008.140.

Nobuto Yamamoto, Hirofumi Suyama, Nobuyuki Yamamoto and Naofumi Ushijima. *Immunotherapy of metastatic breast cancer patients with vitamin D-binding protein-derived*

*macrophage activating factor (GcMAF)*. Int. J. Cancer: 122, 461–467 (2008). Published online 12 Available from [www.interscience.wiley.com](http://www.interscience.wiley.com) accessed January 2010.

Roland CL, Lynn KD, Toombs JE, Dineen SP, Udugamasooriya DG, et al. (2009) *Cytokine Levels Correlate with Immune Cell Infiltration after Anti-VEGF Therapy in Preclinical Mouse Models of Breast Cancer*. PLoS ONE 4(11): e7669. doi:10.1371/journal.pone.0007669. Accessed January 2010.

Sugasawa, Hidekazu, Takashi Ichikura, Manabu Kinoshita, Satoshi Ono, Takashi Majima, Hironori Tsujimoto, Kentaro Chochi, Sadayuki Hiroi, Eiji Takayama, Daizoh Saitoh, Shuhji Seki and Hidetaka Mochizuki *Gastric cancer cells exploit CD41 cell-derived CCL5 for their growth and prevention of CD81 cell-involved tumor elimination*. Int. J. Cancer: 122, 2535–2541 (2008).

Zhou, Qing, Christoph Bucher, Meghan E. Munger, Steven L. Highfill, Jakub Tolar, David H. Munn, Bruce L. Levine, Megan Riddle, Carl H. June, Daniel A. Vallera, Brenda J. Weigel and Bruce R. Blazar. *Depletion of endogenous tumor-associated regulatory T cells improves the efficacy of adoptive cytotoxic T-cell immunotherapy in murine acute myeloid leukemia*. Blood Journal, 2009 114: 3793-3802. From [www.bloodjournal.org](http://www.bloodjournal.org) accessed on January 28, 2010.

#### **COURSE DESCRIPTION:**

This course will explore the role of the immune system in cancer and the implications for the host. The function of the immune system is to defend the organism against what has been termed “non-self” or in more modern terms “danger” associated with “nonsself”. While this generally refers to invading microorganisms such as bacteria, fungi and viruses as well as eukaryotic parasites, it is also relevant for aberrant cellular structures that arise in the body during the process of neoplastic transformation leading to cancer. The immune system plays a pivotal role in defending against tumor cells in a process called “immune surveillance”.

The effect of the tumor-host interactions on the developing neoplasm will be studied by considering related topics such as angiogenesis, MMPs, chemokines and metastasis. Additionally, we will explore the role of the immune system in defense against the tumors and the mechanism by which cancer cells escape the surveillance system.

#### **PREREQUISITES: IMMUNOLOGY**

Prior knowledge of the basic concepts concerning the biology of cancer and immunology will be helpful to fully understand the assigned material. The first portion of this course will be lecture-based and latter portion will be a scientific journal article and class discussion-based. Although there is no required text book, a basic immunology such as Kuby’s Immunology or Janeway’s Immunology is strongly recommended.

#### **INSTRUCTIONAL OBJECTIVES:**

After this course the student will be able to:

1. Describe the cells involved in the immune response against a tumor.
2. Explain the effects of tumor growth on the immune system and conversely, the effects of immune system on tumor growth.
3. Define angiogenesis and how it affects tumor growth.

4. Describe how MMPs may contribute towards tumor metastasis or conversely inhibit tumor growth
5. Describe how tolerance can be achieved.
6. Describe mechanisms by which tumors evade the immune system.
7. Explain how the immune system may be manipulated to achieve proper responses against the tumor.
8. Most importantly, read and understand scientific papers and present them to the class.

**SCHEDULE:**

<b>DATE</b>	<b>TOPIC</b>
January 12	Introduction Cancer Induction
January 14	Review of immune response: innate and adaptive cont.
January 19	Review of Immune Response cont.
January 21	Immunosurveillance & therapy
January 26	Inflammation and cancer
January 28	Cytokines/chemokines
February 2	Angiogenesis
February 4	MMPs & metastasis
February 9	The role of macrophages in tumor immunity
February 11	Regulatory T cells & suppressor cells (myeloid)
February 16	Exam 1
February 18	The role of dendritic cells in tumor immunity: Antigen presentation and tolerance
February 23	The role of death receptors and apoptosis in cancer
February 25	Presentation of Journal articles – Dr. Iragavarapu
March 2	Presentation of Journal articles
March 4	Presentation of Journal articles
March 8-14	Spring Break
March 16	Presentation of Journal articles
March 18	Presentation of Journal articles
March 23	Presentation of Journal articles
March 25	Exam 2
March 30	Presentation of Journal articles
April 1	Presentation of Journal articles
April 6	Presentation of Journal articles
April 8	Presentation of Journal articles
April 13	Presentation of Journal articles
April 15	Presentation of Journal articles
April 20	Guest Lecture
April 22	Presentation of Journal articles
April 27	Presentation of Journal articles
April 29	Exam 3

Papers for discussion, as well as a review article for background will be assigned one week in advance by the instructor.

**GRADING POLICY:**

Final Grade will be based on 3 exams (30%), quizzes (15%) journal article presentations (30%), submission of test questions (10%), & class participation in discussions (15%).

Two to three multiple choice type of questions & two to three short answer questions are required to be submitted by the student on the subject of their presentation. These questions form the basis for part of the exams/quizzes.

**GRADING CRITERIA:**

**90-100=A**

**80-89 = B**

**70-79 = C**

**60-69 = D**

**< = F**

**ATTENDANCE POLICY:**

Attendance is absolutely required as this is a discussion-based class. However, if you are unable to attend due an emergency situation that must be appropriately documented, you can make up the missed class by writing a 4-5 page report of the assigned papers. You are allowed to miss a total of 2 class periods before your grade drops by a letter grade for each of the missed classes unless excused.

**Date to withdraw (Drop/Add) without consequences: January 15th.**

**ACADEMIC HONOR CODE:**

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards because it interferes with the University mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the University community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility.

The FAU Honor Code requires a faculty member, student, or staff member to notify an instructor when there is reason to believe an academic irregularity is occurring in a course. The instructor must pursue any reasonable allegation, taking action where appropriate. The following constitute academic irregularities:

1. The use of notes, books or assistance from or to other students while taking an examination or working on other assignments, unless specifically authorized by the instructor, are defined as acts of cheating.
2. The presentation of words or ideas from any other source as one's own is an act defined as plagiarism.
3. Other activities that interfere with the educational mission of the University.

For full details of the FAU Honor Code, see University Regulation 4.001 at [www.fau.edu/regulations/chapter4/4.001\\_Honor\\_Code.pdf](http://www.fau.edu/regulations/chapter4/4.001_Honor_Code.pdf).

**STUDENTS WITH DISABILITIES:**

In compliance with the American Disabilities Act (ADA), students who require special accommodations due to a disability to properly execute coursework must register with the Office for Students with Disabilities (OSD) – in Boca Raton, SU 133 (561-297-3880); in Davie, MOD 1 (954-236-1222); in Jupiter, SR 117 (561-799-8585); or at the Treasure Coast, CO 128 (772-873-3305) – and follow all OSD procedures.

## Julie Sivigny

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**From:** David Binninger [binninge@fau.edu]  
**Sent:** Wednesday, March 17, 2010 11:47 AM  
**To:** Julie Sivigny  
**Cc:** Rodney Murphey  
**Subject:** Fwd: Biomedical Science New Course Proposals

Good morning,

I circulated the syllabi for the new courses listed in your e-mail (see below) to the faculty who could make comments. I did not receive any responses that raised questions or noted a significant overlap with any of our graduate courses. Please let me know if you have any questions.

I hope this is helpful and good luck with the remainder of the process toward approval of the courses.

Regards,  
David

David M. Binninger, Ph.D.  
Associate Professor and Associate Chair  
Department of Biological Science  
and  
Center for Molecular Biology and Biotechnology  
Florida Atlantic University  
777 Glades Road  
Boca Raton, FL 33431 USA  
Phone: (561) 297-3323  
FAX: (561) 297-2749

Begin forwarded message:

**From:** Julie Sivigny <[jsivigny@fau.edu](mailto:jsivigny@fau.edu)>  
**Date:** March 15, 2010 1:38:27 PM EDT  
**To:** 'David Binninger' <[binninge@fau.edu](mailto:binninge@fau.edu)>  
**Subject:** **Biomedical Science New Course Proposals**

Dear Dr. Binninger,  
Thank you for your assistance with this process. We are submitting a total of 10 new course proposals and 2 changes. All syllabi were forwarded to Dr. Murphey but in multiple batches so if you are missing any please let me know and I'll send to you immediately.

**Biomedical Science New Course Proposals:**  
Host Defense & Inflammation – Dr. Yoshimi Shibata  
Molecular Neuropsychopharmacology – Drs. Isgor and Tao  
Macromolecules and Human Disease – Drs. Brew and Li  
Adult Neurogenesis – Dr. Jianning Wei  
Molecular Basis of Disease & Therapy – Dr. Caputi



Tumor Immunology – Dr. Vijaya Iragavarapu  
Molecular Genetics of the Cell – Dr. Kantorow  
Molecular Basis of Human Cancer – Dr. Lu  
Problem-based Immunology – Dr. Nouri-Shirazi  
Fundamentals of General Pathology – Dr. Levitt

The integrated morphology courses will be processed as changes. We previously offered two 3-credit courses: Human Gross Anatomy – Trunk and Human Gross Anatomy – Extremities. We are changing these to 4-credit courses with the titles *Integrated Morphology I and II* taught by Drs. Willis Paull, Rainald Shmidt-Kastner and Deborah Cunningham.

The graduate college submission deadline is Wednesday March 17<sup>th</sup> at noon. I apologize for the lateness of some of these requests and appreciate your effort to assist us.

Please let me know if I can provide any additional information.  
Thank you.  
Julie

*Julie A. Sivigny*  
*Academic Program Specialist*  
*Charles E. Schmidt College of Biomedical Science*  
*Florida Atlantic University*  
*(561) 297-2216*

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**From:** David Binninger [<mailto:binninge@fau.edu>]  
**Sent:** Monday, March 15, 2010 11:16 AM  
**To:** Julie Sivigny  
**Cc:** Rodney Murphey; Jay Lyons  
**Subject:** Fwd: Biomedical Science New Course Proposal - Macromolecules & Human Disease

Good morning Julie,

I forwarded the syllabi for the new courses to the appropriate faculty last week. It's my opinion that there will not be any issues or conflicts. So far, I have had only one response and that was that there were no concerns. Please confirm the full list of new courses and when you need a statement from me.

I hope this is helpful and please let me know if you have any questions.

Regards,  
David

David M. Binninger, Ph.D.  
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and  
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