**MCRO614 Immunobiology**

FALL 2023 MWF 11:15 AM – 12:05 PM

6004 Marsico Hall

Course Director: Jason Whitmire, GMRB Room 5062, 919-843-7081,

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Office Hours: By appointment

\*\*SAKAI: <https://sakai.unc.edu/portal/site/ff6515c6-4369-488b-80bb-ee7b792c9cd5> [to be updated]

**Suggested Text**: *Cellular and Molecular Immunology 10th edition* (Abbas, Lichtman and Pillai), but the 9th edition will work as well. It may be purchased at <https://evolve.elsevier.com/cs/>. Students are expected to find relevant material in a textbook on their own. Instructors will place relevant lecture material into SAKAI under the “Resources” tab within MCRO614.001.FA23.

**Goals:** This is a graduate level immunology course that may be suitable for upper division undergraduates. Prerequisites include full courses or their equivalents in cell biology and genetics. A biochemistry or a molecular biology course would be helpful; however, it is not required. By the end of the course, we expect the student to have a solid grasp of general immunology and an appreciation of specialized immune niches that may be applicable to student’s own research. The course provides the fundamentals of immunology in preparation for more advanced special topic classes.

**Expectations and Course Requirements:** Lectures will be in-person and where noted, Zoom lectures will be an alternative for Instructors. Zoom links will be provided by the Instructor through Sakai Messages/Calendar. General questions for the Instructor should be asked in class or through Sakai Messages prior to the next lecture or at Review sessions. Please direct these general messages not only to the specific instructor, but also to all students by clicking ‘Student Role’. Students are encouraged to form study groups to challenge each other on principles learned in class. For successful completion of the course, students should understand the lecture material and concepts of immunobiology.

**Grading:** There will be three 100 point equally weighted written essay exams. Students will generate a four digit identifier for the semester and this number will be assigned to exams to eliminate any perceived bias by the Instructors grading essay answers to written questions. Completed exams should be turned in at the specified date and time deadlines. Failure to meet a deadline may result in points being removed from your exam score. Generally, passing grade (P) for each examination is above 70%. At the end of the semester, students holding the top 5-10% of total scores will be considered for high pass (HP); above 70% is a pass (P); below 70% is low pass (LP); and below 60% will be a fail (F). Students who are at borderlines may be aided by in-class participation. For undergraduate students, letter grades will be assigned on a straight scale. Cheating during an examination may result in a grade of F. At no point should the exam answers be shared; students may not consult with anyone for answers. It is expected that all students follow the UNC Honor Code and conduct themselves in an ethical manner. All material for the class may have copyright concerns and should not be distributed to others outside of the class roster.

**Generative Artificial Intelligence:** If you choose to use generative AI to answer take home questions, then you must acknowledge this in your answers. As always, you are ultimately responsible for the content of the answers. The M&I Curriculum notes the following about the use of AI:

* Do Not Outsource Your Brain. Generative AI is a useful tool but cannot replace your critical thinking skills.
* Missed Educational Opportunities. Generative AI is likely to become a valuable tool for many tasks. However, before you choose to use generative AI for specific tasks, think carefully about the educational opportunities that you might miss as a result of your choice. In particular, you will continue to need scientific writing and thinking skills that are unlikely to be replaceable by generative AI anytime soon.
* (In)Accuracy. Generative AI predicts the most likely next words in a block of text but cannot distinguish fact from fiction. In its quest to create plausible text, generative AI therefore “hallucinates” by making up both false “facts” and fake references to apparently support its claims. Carefully check the accuracy of any claims made by generative AI. You are solely responsible for the accuracy of material in your assignments – you cannot blame the software for false assertions or nonexistent citations.
* Biases & Limitations. The results of generative AI models reflect the biases, limitations, and toxicity of the internet data upon which the models were trained. Furthermore, the training has an end date prior to public release (e.g., 2021 for ChatGPT), so results do not include recent knowledge.
* Attribution. You must provide honest attribution of how the work you submit was accomplished. If generative AI was used to help complete an assignment, then provide a brief statement identifying the software employed and how it was used (e.g., “*I used ChatGPT to suggest possible research topics”*; “*I used Bard to edit my writing”*, etc.).

**Accessibility Resources Services (ARS):** Any student who may need specific considerations while taking this course or the exams should contact the course director. The considerations include but are not limited to disabilities or medical concerns. Further information can be found at: <https://ars.unc.edu/>

**Counseling and Psychological Services (CAPS):** Students may reach out to Dr. Whitmire at any time regarding stressors including the Covid 19 pandemic. Campus Health Services is available, and <https://caps.unc.edu/> may provide useful information.

**Title IX:** Any student who is facing discrimination, violence, harassment, sexual exploitation or stalking should let Dr. Whitmire know or seek consultation with Director of Title IX Compliance, Adrienne Allison (Adrienne.allison@unc.edu) or consult [safe.unc.edu](https://safe.unc.edu/) for information and reporting.

**Note: Changes to this syllabus may occur if necessary. If so, the Instructors or Dr. Whitmire will provide that information to students as soon as possible.**

**Lectures**

Aug 21st Mon Introduction & Overview (Whitmire)

Aug 23rd Wed Innate Immunity Part I (Robert Hagan)

Aug 25th Fri Innate Immunity Part II (Robert Hagan)

Aug 28th Mon Innate Immunity, Pattern recognition receptors (Emily Chou)

Aug 30th Wed Innate Immunity, Cytosolic sensors (Emily Chou)

Sept 1st Fri Antigen processing, class I (Nilu Goonetilleke)

Sept 4th Mon **Labor Day: No Class**

Sept 6th Wed Antigen processing, class II (Nilu Goonetilleke)

Sept 8th Fri B cell development & maturation Part I (Whitmire)

Sept 11th Mon B cell development & maturation Part II (Whitmire)

Sept 13th Wed Antigen recognition by B cells (Vilen)

Sept 15th Fri Immunoglobulins and their function (Vilen)

Sept 18th Mon Thymus and the Development of T Lymphocytes (Whitmire/Buzzelli)

Sept 20th Wed Positive & Negative Selection:  vs.  lineages (Whitmire/Buzzelli)

Sept 22nd Fri **Review** (Whitmire, Hagan, Chou, Goonetilleke, Vilen, Whitmire). (Give out Exam 1)

Sept 25th Mon **Well-being Day: No Class** (Exam 1 due 10am)

Sept 27th Wed Thymic emigrants, homing and survival of naïve T cells (Whitmire/Buzzelli)

Sept 29th Fri Activation of naïve T cells (Yisong Wan)

Oct. 2nd Mon T effector cells/mechanisms of responses(Yisong Wan)

Oct 4th Wed Termination of T cell responses and memory T cells (Yisong Wan)

Oct 6th Fri T cell homeostasis (Yisong Wan)

Oct 9th Mon Immunity to infection part I (Justin Milner/Genevieve Mullins)

Oct 11th Wed Immunity to infection part II (Justin Milner)

Oct 13th Fri Mechanisms of T cell tolerance (Roland Tisch)

Oct 16th Mon Failure of T cell self-tolerance: Autoimmunity (Roland Tisch)

Oct 18th Wed **Review** (Whitmire, Wan, Milner, Tisch) (Give out Exam 2)

Oct 20st Fri **No class (Fall Break)**

Oct 23th Mon Viral Escape from Immune Function (Nilu Goonetilleke) (Exam 2 due 10am)

Oct 25th Wed Systemic Lupus Erythematosus (Barb Vilen)

Oct 27th Fri Innate and adaptive mechanisms of the mucus barrier (Sam Lai)

Oct 30th Mon IBDs (Jonathan Hansen)

Nov 1st Wed Immune regulation by gut microbiome (Janelle Arthur)

Nov 3rd Fri Respiratory immunology (Jason Mock)

Nov 6th Mon Allergy and Hypersensitivity: Part I (Tim Moran)

Nov 8th Wed Allergy and Hypersensitivity: Part II (Tim Moran)

Nov 10th Fri Infection immunology at the female reproductive tract (Toni Darville)

Nov 13th Mon Neuroimmunology (Ageliki Tsagaratou)

Nov 15th Wed Autoimmunity in the skin (Zhi Liu)

Nov 17th Fri Passive immunotherapies (Zhi Liu)

Nov 20th Mon Active/cellular immunotherapies (Zhi Liu)

Nov 22nd Wed **Thanksgiving Break** No CLASSES

Nov 24th Fri **Thanksgiving Break** No CLASSES

Nov 27th Mon **Review:** (Goonetilleke, Vilen, Tsagaratou, Arthur, Hansen, Lai, Liu, Mock, Moran) (Give out Exam 3)

Nov 29th Wed **No class: Exam continued**

Dec 1st Fri **Final Exam** due by **Friday at midnight**

Dec 2nd Sat Faculty grade exam (Due Dec 7th Thu)

Dec 11th Mon Last day to post grades to Sakai

**MCRO614 Instructors**

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