

COURSE NAME; NUMBER; SEMESTER; MEETING DAYS, TIMES, AND PLACE.

Animal Microtechniques and Tissue Culture

11:067:430 Spring, 2019

Lecture: 12:35-1:55 Mon, 138 Foran Hall

Lab: Section 1 - 9:15 – 12:15 Wed, 104 Foran Hall

9:15 – 10:35 Fri, 104 Foran Hall

Section 2 - 12:35 – 3:35 Wed, 104 Foran Hall

10:55 – 12:15 Fri, 104 Foran Hall

CONTACT INFORMATION:

Instructor(s): Barry Jesse

Office Location: 213C Bartlett Hall

Phone: 848-932-9095 Email: barry.jesse@rutgers.edu

Office Hours: T 9:00-10:30 & Th 9:00-10:45, or By appointment, or By walk-in (when available)

CONTACT INFORMATION:

Instructor(s): Carol Bagnell

Office Location: 126B Foran Hall

Phone: 848-932-6334 Email: carol.bagnell@rutgers.edu

Office Hours: By appointment

CONTACT INFORMATION:

Instructor(s): Mehmet Uzumcu

Office Location: 119 Bartlett Hall

Phone: 848-932-6912 Email: Uzumcu@rutgers.edu

Office Hours: By appointment

COURSE WEBSITE, RESOURCES AND MATERIALS:

- Text (recommended): Culture of Animal Cells, 7th ed., by R. Ian Freshney. Wiley-Liss, Hoboken, NJ (2016).
- Announcements, lab protocols, lecture notes, and additional reading material will be available on the course web page (<http://sakai.rutgers.edu>).

COURSE DESCRIPTION:

This course provides students with the skills and knowledge to work in a modern biological research laboratory making use of cell culture techniques. Emphasis is placed on aseptic techniques for animal cell culture, the requirements for cell growth in vitro, mechanisms underlying cellular differentiation, immunohistochemistry and in situ hybridization, and the expression of transfected DNA in cultured animal cells.

LEARNING GOALS:

Program Learning Goals:

PGL 2 - Apply biological and chemical principles and quantitative reasoning to concepts presented in core subject areas in Animal Science such as physiology, nutrition, genetics, and reproduction.

PGL 6 - Develop oral and written communication skills to effectively deliver scientific and technical information to scientists as well as the public.

Course Learning Goals:

1. To master basic cell culture procedures and their application in experiments typical of a modern biological research laboratory.
2. To effectively analyze experimental data and present the results in an understandable research format using computer based scientific programs.
3. To apply good writing skills to effective scientific communication of experimental results.

ASSIGNMENTS/RESPONSIBILITIES & ASSESSMENT:

Students will be assessed based on their performance on the following tasks:

5 Laboratory Reports @ 10% each	50%
3 Hourlies @ 10% each	30%
Lab Quizzes	15%
Lab Participation	5%

As a laboratory course, the major emphasis in grading will be placed on the skills and knowledge that students will master during the performance of the laboratory exercises and experiments, as assessed by their ability to apply that knowledge in the laboratory reports. There will also be three hourly exams on both the lecture and lab material. In addition, weekly quizzes will be administered at the start of each lab period. Finally, student participation (timely arrival; preparedness) in the lab will also be assessed. Lab reports will be due one week following the completion of each experiment. Both hard copy and electronic versions of each report (the electronic version will be scanned by Turnitin) will need to be submitted.

ACCOMODATIONS FOR STUDENTS WITH DISABILITIES

Please follow the procedures outlined at <https://ods.rutgers.edu/students/registration-form>. Full policies and procedures are at <https://ods.rutgers.edu/>

ABSENCE POLICY

Students are expected to attend all classes; if you expect to miss one or two classes, please use the University absence reporting website <https://sims.rutgers.edu/ssra/> to indicate the date and reason for your absence. An email is automatically sent to me.

COURSE SCHEDULE:

1/28	Mon	Introduction – History of Tissue / Cell Culture; Cell Preservation; Biology of the Cultured Cell (Chpts.1-7, 20) Laboratory Exercise #1 – Data Plots & Standard Curves (Refresher)
1/30	Wed	Quiz; Laboratory Exercise #2 – Basic Manipulations of Cultured Cells DEMONSTRATION OF STERILE TECHNIQUE & LAB SET UP; PLATING OF MDBK CELLS
2/ 1	Fri	Refeed & Observe Cells
2/ 4	Mon	The Culture Environment (Chpts. 8, 9) Refeed & Observe Cells

2/ 6	Wed	Quiz; Laboratory Exercise #2 – Basic Manipulations of Cultured Cells (cont.) PASSAGE / SUBCULTURE OF MDBK CELLS
2/ 8	Fri	Refeed & Observe Passaged Cells
2/11	Mon	The Culture Environment (cont.; Chpt. 10, 11)
2/13	Wed	Quiz EXPERIMENT #1: CELL GROWTH CURVES: MDBK CELLS – FBS TEST
2/15	Fri	Add MTS, incubate and record A ₄₉₀ for Growth Curve (also Thursday & Monday AM)
2/18	Mon	The Culture Environment (cont.); Established Cell Lines (Chpts. 13, 14)
2/20	Wed	EXPERIMENT #1: COMPLETE CELL GROWTH CURVES
2/22	Fri	Review – Generation of growth curves
2/25	Mon	Cell Differentiation (Chpt. 17)
2/27	Wed	Quiz; Lab Report #1 Due – Cell Growth Curves EXPERIMENT #2: ADIPOCYTE DIFFERENTIATION OF 3T3-L1 CELLS
3/ 1	Fri	Refeed & Observe cells
3/ 4	Mon	Cellular Differentiation (cont.); Primary Cells: Isolation and Culture (Chpt. 12) Refeed & observe cells
3/ 6	Wed	Quiz EXPERIMENT #2: ADIPOCYTE DIFFERENTIATION – ANALYSIS OF DIFFERENTIATION MARKERS
3/ 8	Fri	No follow-up lab
3/ 5	Mon	Hourly #1 (Material from 1/28/2019 through 2/22/2019)
3/11	Wed	Stem Cells (Chpt. 22) DEMONSTRATION: 3D CELL CULTURE
3/13	Fri	Lab Report #2 Due – Cellular Differentiation and Adipogenesis No follow-up lab
3/18		SPRING BREAK
3/25	Mon	Gene Transfer Techniques (Chpt. 27)
3/27	Wed	Quiz EXPERIMENT #3: LIPOSOME-MEDIATED CELLULAR TRANSFECTION
3/29	Fri	Prepare cell extracts; freeze for later analysis
4/ 1	Mon	Gene Transfer Techniques: Analysis of Gene Expression; Gene silencing
4/ 3	Wed	Quiz EXPERIMENT #3 – ANALYSIS OF TRANSFECTION PRODUCTS

4/ 5	Fri	Hourly #2 (Material from 2/25/2019 through 4/3/2019)
4/ 8	Mon	Gonad development and embryo organ culture – Dr. Uzumcu
4/10	Wed	Quiz; Lab Report #3 Due – Transfections EXPERIMENT #4: EMBRYONIC GONAD DISSECTION & <i>Sry</i> PCR GENOTYPING Embryonic gonad dissection, gonadal sex determination and tissue collection for <i>Sry</i> PCR
4/12	Fri	DNA Extraction
4/15	Mon	PCR and Apoptosis detection methods - Dr. Uzumcu
4/17	Wed	Quiz EXPERIMENT #4: EMBRYONIC GONAD DISSECTION & <i>Sry</i> PCR GENOTYPING (cont.) Run PCR
4/19	Fri	Agarose gel electrophoresis, gel imaging, and reviewing the gonadal and genetic sex results
4/22	Mon	Immunohistochemistry - Dr. Bagnell
4/24	Wed	Quiz; Lab Report #4 Due – Embryonic Gonad Dissection & <i>Sry</i> PCR Genotyping EXPERIMENT #5: IMMUNOHISTOCHEMICAL LOCALIZATION OF THE ESTROGEN RECEPTOR
4/26	Fri	Observe results and record data
4/29	Mon	In situ Hybridization – Dr. Bagnell
5/ 1	Wed	Quiz EXPERIMENT #5: IMMUNOHISTOCHEMICAL LOCALIZATION OF THE ESTROGEN RECEPTOR (cont.) Quantify immunostaining data to compare treatments and analyze results
5/ 3	Fri	No follow up lab
5/ 6	Mon	Lab Report #5 Due – Immunohistochemistry Tissue Engineering; Review
5/ 9	Thurs	Hourly #3 (Covers material from 4/5/2019 through 5/6/2019) 9:00-10:30 AM

FINAL EXAM/PAPER DATE AND TIME

Online Final exam Schedule: <http://finalexams.rutgers.edu/>

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ACADEMIC INTEGRITY

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The university's policy on Academic Integrity is available at <http://academicintegrity.rutgers.edu/academic-integrity-policy>. The principles of academic integrity require that a student:

- properly acknowledge and cite all use of the ideas, results, or words of others.

- properly acknowledge all contributors to a given piece of work.
 - make sure that all work submitted as his or her own in a course or other academic activity is produced without the aid of impermissible materials or impermissible collaboration.
 - obtain all data or results by ethical means and report them accurately without suppressing any results inconsistent with his or her interpretation or conclusions.
 - treat all other students in an ethical manner, respecting their integrity and right to pursue their educational goals without interference. This requires that a student neither facilitate academic dishonesty by others nor obstruct their academic progress.
 - uphold the canons of the ethical or professional code of the profession for which he or she is preparing.
- Adherence to these principles is necessary in order to ensure that
- everyone is given proper credit for his or her ideas, words, results, and other scholarly accomplishments.
 - all student work is fairly evaluated and no student has an inappropriate advantage over others.
 - the academic and ethical development of all students is fostered.
 - the reputation of the University for integrity in its teaching, research, and scholarship is maintained and enhanced.

Failure to uphold these principles of academic integrity threatens both the reputation of the University and the value of the degrees awarded to its students. Every member of the University community therefore bears a responsibility for ensuring that the highest standards of academic integrity are upheld.

STUDENT WELLNESS SERVICES

Just In Case Web App <http://codu.co/cee05e>

Access helpful mental health information and resources for yourself or a friend in a mental health crisis on your smartphone or tablet and easily contact CAPS or RUPD.

Counseling, ADAP & Psychiatric Services (CAPS)

(848) 932-7884 / 17 Senior Street, New Brunswick, NJ 08901 / www.rhscaps.rutgers.edu/

CAPS is a University mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professional within Rutgers Health services to support students' efforts to succeed at Rutgers University. CAPS offers a variety of services that include: individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community and consultation and collaboration with campus partners.

Violence Prevention & Victim Assistance (VPVA)

(848) 932-1181 / 3 Bartlett Street, New Brunswick, NJ 08901 / www.vpva.rutgers.edu/

The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling and advocacy for victims of sexual and relationship violence and stalking to students, staff and faculty. To reach staff during office hours when the university is open or to reach an advocate after hours, call 848-932-1181.

Disability Services

(848) 445-6800 / Lucy Stone Hall, Suite A145, Livingston Campus, 54 Joyce Kilmer Avenue, Piscataway, NJ 08854 / <https://ods.rutgers.edu/>

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: <https://ods.rutgers.edu/students/documentation-guidelines>. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the

accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: <https://ods.rutgers.edu/students/registration-form>.

Scarlet Listeners

(732) 247-5555 / <http://www.scarletlisteners.com/>

Free and confidential peer counseling and referral hotline, providing a comforting and supportive safe space.