

Revised January 30, 2020 (Sudha)

**Syllabus**  
**Medical Physiology 481**  
**Translational Physiology 483**  
**Fall Semester 2020**  
**Block 1 - Physiology of Cells and Molecules**

Block Coordinator: Dr. Sudha Chakrapani  
(E-621:Sudha.Chakrapani@case.edu, 216-368-3875)

Classes for the Medical Physiology 481 course are typically scheduled for Mondays, Tuesdays, and Thursdays from 10 - 12. Students should also reserve Wednesdays from 10-12 for special sessions. These typical times are subject to change dependent upon the availability of faculty to give the lectures.

Classes for the Translational Physiology 483 course are typically scheduled for Fridays from 10-12 (Clinical Presentation) and Wednesdays from 12 noon to 1 PM (Research Seminar). However, because of scheduling limitations for clinical faculty, there are exceptions to this rule.

All classes are held in E-501 unless otherwise noted.

PHOL 481 and 483 Quizzes (20 multiple choice questions, 10 cover PHOL 481 material and 10 cover PHOL 483 material) are 30 minutes long and are typically scheduled for 9:00 AM immediately before class each Monday (except for the first Monday of each Block when there is no quiz). The quizzes will cover the material covered in the previous week.

All Quizzes and Block exams will be administered in E-325 – E-328 on the student's personal computer. Quizzes will be administered over Canvas, the course management system we are using for the courses. The Block examination will be administered on the student's personal computer using ExamSoft which will be installed on your computer during the Orientation Sessions. Students should come to the Quizzes and Block exams with their computers, batteries fully charged, and battery chargers in case the battery runs down during the Quiz/Exam.

The PHOL 481 Block 1 Exam will contain 90 multiple choice questions, administered over a 2 hour period.

The PHOL 483 Block 1 Exam will contain 50 multiple choice questions, administered over a 90 minute hour period.

Coffee, tea, and hot water are available outside of E-501 30 minutes before each class.

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**Week 1**

|                 |         |                             |   |
|-----------------|---------|-----------------------------|---|
| Mon<br>(10-12)  | 8/24/20 | Dr. Nosek<br><br>Dr. Dubyak | Chapter 1<br>Welcome and Introduction - What is Physiology?<br>Chapter 2<br>Functional Organization of a Cell |
| Tues<br>(10-12) | 8/25/20 | Dr. Dubyak                  | Chapter 3<br>Signal Transduction  |
| Wed<br>(12-1)   | 8/26/20 | Translational               | Research Seminar<br>Dr. Rajesh Ramachandran<br>“Molecular Mechanisms of Membrane Remodeling”                  |
| Thur<br>(9-11)  | 8/27/20 | Translational               | Diabetes – Dr. Dubyak   |
| Fri<br>(10-12)  | 8/28/20 | Dr. Ziady                   | Chapter 4<br>Regulation of Gene Expression  |

**Week 2**

|                 |         |                              |   |
|-----------------|---------|------------------------------|---|
| Mon<br>(10-12)  | 8/31/20 | 9:00 AM Quiz #1<br>Dr. Jones | E-325 – E-328<br>Chapter 5<br>Transport of Solutes and Water                          |
| Tues<br>(10-12) | 9/1/20  | Dr. Jones<br>Dr. Jones       | Chapter 6 Electrophysiology of the Cell Membrane<br>Chapter 7 Electrical Excitability |
| Wed<br>(12-1)   | 9/2/20  | Translational                | Research Seminar<br>Dr. Witold Surewicz “Protein Misfolding”                          |
| Thur<br>(10-12) | 9/3/20  | Dr. Jones                    | Chapter 6 Electrophysiology of the Cell Membrane<br>Chapter 7 Electrical Excitability |
| Fri<br>(10-12)  | 9/4/20  | Translational                | Water Balance - Dr. A. Boron  |

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**Week 3**

|                 |         |                              |  |
|-----------------|---------|------------------------------|--|
| Mon<br>(10-12)  | 9/7/20  | Labor Day Holiday            | No class   |
| Tues<br>(10-12) | 9/8/20  | 9:00 AM Quiz #2<br>Dr. Jones | E-325 – E-328<br>Action Potential Lab  |
| Wed<br>(10-12)  | 9/9/20  | Dr. Jones                    | Chapter 6 Electrophysiology of the Cell Membrane<br>Chapter 7 Electrical Excitability  |
| Wed<br>(12-1)   | 9/9/20  | Translational                | Research Seminar<br>Dr. Xin Qi<br>"Enhancers of mitochondrial function as<br>candidate therapeutics for Neurodegenerative<br>Diseases" |
| Thur<br>(10-12) | 9/10/20 | Translational                | Epilepsy - Dr. Mu  |
| Fri<br>(10-12)  | 9/11/20 | Dr. Chakrapani               | Chapter 8<br>Synaptic transmission and the Neuromuscular Junction  |

**Week 4**

|                        |         |                              |  |
|------------------------|---------|------------------------------|--|
| Mon<br>(10-12)         | 9/14/20 | 9:00 AM Quiz #3<br>Dr. Nosek | E-325 – E-328<br>Chapter 9<br>Cellular Physiology of Skeletal Muscle |
| Tues<br>(10-12)        | 9/15/20 | Dr. Nosek                    | Chapter 9<br>Cellular Physiology of Cardiac and Smooth Muscle        |
| Wed<br>(10-12)         | 9/16/20 | Translational                | Dr. Katirji<br>Neuromuscular disorders                               |
| Wed<br>(12-1)          | 9/16/20 | Translational                | Research Seminar<br>Dr. Nami Tajima                                  |
| Thur                   | 9/17/20 | Study Day                    | No Class   |
| Fri<br>(9:00AM-1:00PM) | 9/18/20 | Block 1 Exam                 |  |

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**2020**

**Medical Physiology PHOL 481  
Translational Physiology PHOL 483**

**Block 2 – Neuroscience**

Block Coordinator: Dr. Corey Smith, Robbins E521; (216-368-3487)

**Week 5**

|       |         |                            |   |
|-------|---------|----------------------------|---|
| Mon   | 9/21/20 | Dr. LaManna                | Chapter 10: Organization of the Nervous System                                |
| Tues  | 9/22/20 | Dr. Kui Xu                 | Chapter 11: The Neuronal Microenvironment                                     |
| Wed   | 9/23/20 | Dr. LaManna (10-11)        | Research: Cerebral Blood Flow and Metabolism                                  |
| Thurs | 9/24/20 | Dr. Kui Xu                 | Chapter 11, continued   |
| Fri   | 9/25/20 | Svetlana Pundik MD (10-12) | Translational: Neuroplasticity in neurorehabilitation –<br><br>invasive brain |
|       |         |                            | driven by therapies & modulated by non-stimulation                            |

**Week 6**

|      |         |                                  |   |
|------|---------|----------------------------------|---|
| Mon  | 9/28/20 | 9:30 AM Quiz<br>Dr. Jones        | Chapter 12: Physiology of the Neuron and<br>Chapter 13: Synaptic Transmission in the Nervous System |
| Tues | 9/29/20 | Dr. Chris Geiger (10-12)         | Translational: MG and disorders of the NMJ  |
| Wed  | 9/30/20 | Alessandro Serra, MD/PhD (10-12) | Translational: MS/Clinical Immunology   |
| Thur | 10/1/20 | Dr. Jones<br>Dr. Jones           | Chapter 12: Physiology of the Neuron and<br>Chapter 13: Synaptic Transmission in the Nervous System |
| Fri  | 10/2/20 | Dr. Jones                        | NMJ Lab   |

**Week 7**

|      |         |                           |  |
|------|---------|---------------------------|--|
| Mon  | 10/5/20 | 9:30 AM Quiz<br>Dr. Jones | Chapters 12 and 13: continued                      |
| Tues | 10/6/20 | Dr. Jones                 | Chapter 14: The Autonomic Nervous System           |
| Wed  | 10/7/20 | Dr. Smith (10-11)         | Research: Neuropeptide control of adrenal function |

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|      |         |                       |  |
|------|---------|-----------------------|--|
| Thur | 10/8/20 | Dr. Decker            | Chapter 16: Circuits of the Central Nervous System       |
| Fri  | 10/9/20 | Dr. DeGeorgia (10-12) | Translational: Neurocritical Care: Intracranial Pressure |

### **Week 8**

|       |          |                             |   |
|-------|----------|-----------------------------|---|
| Mon   | 10/12/20 | 9:30 AM Quiz                |   |
|       |          | Dr. Smith                   | Chapter 15: Sensory Transduction I                        |
| Tues  | 10/13/20 | Dr. Smith                   | Chapter 15: Sensory Transduction II                       |
| Wed   | 10/14/20 | Brian Appleby (10-11)       | Research: Cortical localization of function and dementias |
| Thurs | 10/15/20 | Camilla Kilbane, MD (10-12) | Translational: Movement Disorders and DBS                 |
| Fri   | 10/16/20 | Block Exam                  |   |

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## **Syllabus 2020-2021 Medical Physiology PHOL 481 Translational Physiology PHOL 483**

### **Block 3 – Cardiovascular Physiology**

Block Coordinator: Dr. Julian Stelzer  
(E522; [julian.stelzer@case.edu](mailto:julian.stelzer@case.edu), 368-8636)

lectures are 10:00 AM -12:00 PM

\*lectures are 12:00 - 1:00PM

! – Monday November 2<sup>nd</sup> only:

10:00 – 11:00 AM: Medical Physiology Lecture

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11:00 – 12:00 PM: Translational Physiology Lecture

**Week 9**

|      |       |               |   |
|------|-------|---------------|---|
| Mon  | 10/19 | Dr. Taylor    | Chapter 17<br>Organization of the CV System |
| Tues | 10/20 | Dr. Boulpaep  | Chapter 19<br>Arteries and Veins            |
| Wed  | 10/21 | Dr. Boulpaep  | Chapter 20<br>The Microcirculation          |
| *Wed | 10/21 | Dr. Proweller | Translational Physiology Lecture            |
| Thur | 10/22 | Dr. Boulpaep  | Chapter 22<br>The Heart as a Pump Part I    |
| Fri  | 10/23 | Dr. Hoit      | Translational Physiology Lecture            |

**Week 10**

|       |       |                           |   |
|-------|-------|---------------------------|---|
| Mon   | 10/26 | 9:00 AM Quiz<br>Dr. Jones | Chapter 21<br>Electrophysiology Part I    |
| Tues  | 10/27 | Dr. Mackall               | Chapter 21<br>Electrophysiology Part II   |
| Wed   | 10/28 | Dr. Stelzer               | Chapter 22<br>The Heart as a Pump Part II |
| *Thur | 10/29 | Dr. Stelzer               | Translational Physiology Lecture          |
| Fri   | 10/30 | Dr. Quealy                | Translational Physiology Lecture          |

**Week 11**

|                  |      |                            |   |
|------------------|------|----------------------------|---|
| <sup>1</sup> Mon | 11/2 | 9:00 AM Quiz<br>Dr. Dunlap | 10:00 AM: Medical Physiology - Chapter 23<br>Regulation of Arterial Pressure and Cardiac Output<br><br>11:00 AM: Translational Physiology Lecture |
| Tues             | 11/3 | Dr. Mamidi                 | Chapter 24  |

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### Special Circulations

Wed 11/4 Dr. Senyo Translational Physiology Lecture

Fri 11/6 Dr. Dunlap Translational Physiology Lecture

### Week 12

Mon 11/9 9:00 AM Quiz  
Dr. Schmaier

Chapter 18  
Blood

Tues 11/10 Dr. Rashid Translational Physiology Lecture

\*Tues 11/10 Dr. Laurita Translational Physiology Lecture

Wednesday 11/11 Dr. Taylor Chapter 25  
Integrated Control of the Cardiovascular

Fri 11/13 Exam Day

## Finalized Block 4 Schedule

Here is the schedule for Medical Physiology PHOL 481 and Translational Physiology PHOL 483 in the Department of Physiology and Biophysics MS Program.

PHOL 481 is Monday, Tuesday and Thursday from 10AM to 12PM.

PHOL 483 is Wednesday and Friday from 10AM to 12 PM.

We can shuffle the days around a little if necessary!

### **EXAM QUESTIONS will be DUE MONDAY DECEMBER 7**

#### **Block 4 Renal Physiology**

### Week 13

|            |       |          |                                    |  |
|------------|-------|----------|------------------------------------|--|
| Med Phys   | Mon   | 11/16/20 | Block 3 quiz 9:00 am<br>Dr. Garvin | Chapter 33: Structure-Function-Histology of<br>Kidney                      |
| Med Phys   | Tues  | 11/17/20 | Dr. Sedor                          | Chapter 34: GFR, RBF, Clearance  |
| Trans Phys | Wed   | 11/18/20 | Dr. Srinivas                       | Use of Artificial Intelligence in Nephrology<br>(Administrator: Stanfield) |
| Med Phys   | Thurs | 11/19/20 | Dr. Garvin                         | Chapter 35: Sodium and Chloride (pages<br>754-765)                         |
| Trans Phys | Fri   | 11/20/20 | Dr. Srinivas                       | Transplantation (Administrator: Stanfield)                                 |

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**Week 15: THANKSGIVING VACATION**

**Thanksgiving Vacation NO CLASS**

**Week 15**

|                       |      |          |                            |  |
|-----------------------|------|----------|----------------------------|--|
| Med Phys              | Mon  | 11/30/20 | Quiz 9:00 am<br>Dr. Garvin | Chapter 36: Glucose, Amino Acids,<br>Phosphate, Ca, Mg |
| Med Phys              | Tues | 12/01/20 | Dr. Garvin                 | Chapter 37: Potassium                                  |
| Med Phys              | Wed  | 12/02/20 | Dr. Garvin                 | Chapter 39: Acid-base                                  |
| Trans Phys            | Thur | 12/03/20 | Dr. Schelling              | Diabetic Kidney Disease                                |
| Trans Phys<br>Disease | Fri  | 12/04/20 | Dr. Sedor                  | Precision Medicine and Chronic Kidney                  |

**Week 16**

|            |      |          |                               |   |
|------------|------|----------|-------------------------------|---|
| Med Phys   | Mon  | 12/07/20 | Quiz 9:00 am<br>Dr. Schelling | Chapters 35 & 40: RAAS/Integration of Salt<br>(pages 765-769 and 836-843) |
| Med Phys   | Tues | 12/08/20 | Dr. Zhao                      | Chapters 38 & 40: Regulation of<br>Osmolality (pages 806-820 & 844-847)   |
| Trans Phys | Wed  | 12/09/20 | Dr. Rahman                    | Hypertension  |
| Med Phys   | Thu  | 12/10/20 | Dr. Garvin                    | The Other 37 Topics That Are Important                                    |
| Trans Phys | Fri  | 12/11/20 | Dr. Desai                     | Diabetes Insipidus/SIADH  |

**Week 17**

|  |     |          |                    |  |
|--|-----|----------|--------------------|--|
|  | Mon | 12/14/20 | Block Exam         |  |
|  | Wed | 12/16/20 | Make Up Block Exam |  |