

HST 110 RENAL PATHOPHYSIOLOGY

2019 GENERAL INFORMATION

Welcome to Renal Pathophysiology! We hope to make the course a great adventure into the mysteries of this remarkable organ. Contact information for the course directors and TA is below.

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COURSE OBJECTIVES

Our goal is to help you learn renal physiology and pathology in order to understand renal disease and abnormal renal function; and ultimately to evaluate, treat and investigate these disorders.

Methods to reach this goal include:

- Lectures
- Tutorials
- Readings
- Invited patients
- Exams
- Clinical cases

Specific objectives include learning the following areas:

1. Gross and microscopic anatomy of the kidney
2. Normal control of the content and distribution in the body of Water (and control of osmolality)
Sodium and Chloride (& extracellular fluid volume control)
Acid & Base
Potassium
Calcium,
Phosphate and Vitamin D (renal aspects)
3. Abnormalities in this control and the resulting disorders, including “channelopathies”
4. Glomerular filtration mechanisms and control
5. Tubular reabsorption mechanisms and control
6. Pathophysiology of acute and chronic renal failure
7. Classification and description of kidney diseases including: acute and chronic glomerulonephritis, nephrotic syndrome, tubulo-interstitial nephritis, infections, vascular disease, tumors, cysts and congenital abnormalities
8. Immunologic mechanisms underlying renal disease
9. The kidneys' role in blood pressure control and hypertension

COURSE METHODS AND DESIGN

The class schedule

Tuesday and Thursday mornings 8:00am - 10:30am (From February 5 to March 28, 2019) Tuesday and Thursday mornings 11:00am – 12:30pm (From April 2 to May 16, 2019)

Out of respect for the lecturers and the directors of the course that follows ours, please be on time – lectures will begin at **8:00 am sharp**, regardless of the number of students present. Please be seated and in the classroom by **7:55 am**.

Texts

The basic physiology text this year is Renal Physiology by Koeppen and Stanton (K&S, 5th edition). This is the 13th year this text has been used for the course – but we would appreciate continuing comments on the book.

You should also buy Renal Pathophysiology - the Essentials by Rennke and Denker (R&D). This shorter, more concise text, which includes renal disease and renal failure as well as renal physiology & pathophysiology, was written as a syllabus for the regular HMS renal Pathophysiology course and is an excellent overview; but is not detailed enough for our needs in the physiology portion of the course.

Please go over the material prior to each class session. Use the Objectives, the Problem Sets and the next day's lecture notes as guides to what must be learned. This is really necessary for you to be able to understand the material, especially early in the course. It is not the sort of material that can be crammed before an exam. Note that the first part of R&D has brief chapters on physiology. Some students find it useful to read those before going to the more detailed K&S. They are not sufficiently detailed for our use however. It is also extremely important to have the salt and water physiology down solidly before venturing upon acid-base.

Kidney physiology is hard! In comparison with other organ systems the physiology is more complex to get an initial grasp of, but very interesting and satisfying once one is over the initial hurdle. Work hard on the initial physiology topics! The course is front-loaded with problem sets to help you do this. Notes are supplied for most lectures. Most of these are included in this course syllabus. They should be considered outlines and illustrations or extensions of the text material. They do not cover all of the material.

GRADING

Evaluation is based largely on exams, but problem sets, tutorial and conference participation will also be given weight in grades and in narrative evaluation. Roughly the weighting will be:

Attendance & participation 20%

Tutorials 20%

Midterm exam 25%

Final exam 35%

We expect all students to attend class regularly and participate actively in class, conferences and tutorials.

Official grades of Pass or Fail are used for students enrolled in HST-110. Letter grades are used for those graduate students enrolled in HST-111. For internal use, "excellent", "satisfactory", and "unsatisfactory" and a note of "marginal" passing for those just squeaking through are given for all students. If you are on the brink of receiving a "marginal," the TA will contact you to help you with the course material or any other issues you might have.

The faculty will give you feedback, both as a class and individually when problems appear or changes seem necessary. Please give us feedback too. When there are problems we want to hear promptly so that we can correct them!

We will plan a mid-course feedback session to collect your thoughts and suggestions, but don't wait until then if there is a problem.

Remember, our goal is for you to learn about kidneys and to enjoy doing it! We all love kidneys and we hope that you will too.

HST110: Renal Pathophysiology 2019 Spring Semester

| Block 1: Fundamentals of Renal Physiology | | | | |
|---|------------|--|-----------------|-------------------------------------|
| Date | Time | Lecture Topic | Lecturer | Suggested Readings |
| February 5, 2019 | 8-8:30 | Course Overview | Yeung/Prochaska | Course description |
| | 8:30-10:30 | Introduction to Kidney Structure and Function | Yeung | K&S Chapter 2 |
| February 7, 2019 | 8-9:15 | Glomerular Filtration | Yeung | K&S Chapters 1&3 |
| | 9:15-10:30 | Renal Clearance | Yeung | K&S Chapters 1&3 |
| February 12, 2019 | 8-10:30 | Tubular Transport** | Prochaska | K&S Chapter 4 |
| February 14, 2019 | 8-10:30 | Small Group Session 1: GFR, Clearance, Tubular Transport | | |
| February 19, 2019 | 8-10:30 | Osmoregulation and Disorders of Water Balance** | Prochaska | K&S Chapter 1,5 R&D Chapters 2,3 |
| February 21, 2019 | 8-9:15 | Sodium Balance and Disorders of Extracellular Volume | Prochaska | K&S Chapter 6 |
| | 9:15-10:30 | Diuretics | Prochaska | R&D Chapter 4 |
| February 26, 2019 | 8-10:30 | Small Group Session 2: Sodium and Water Balance | | |
| February 28, 2019 | 8-10:30 | Acid-Base Physiology and Disorders** | McMahon | K&S Chapter 8 R&D Chapter 5,6 |
| March 5, 2019 | 8-10:30 | Potassium Homeostasis and Disorders** | Yeung | K&S Chapter 7 R&D Chapter 7 |
| March 7, 2019 | 8-10:30 | Regulation of Calcium and Phosphorus Homeostasis | Prochaska | K&S Chapter 9 |
| March 12, 2019 | 8-10:30 | Small Group Session 3: Electrolytes and Acid-Base | | |
| March 14, 2019 | 8-10:30 | MIDTERM | | |
| Block 2: Diseases and Pathology of the Kidney | | | | |
| March 19, 2019 | 8-10:30 | Introduction to Renal Disease: Acute Kidney Injury, Hematuria, and Proteinuria | Prochaska | R&D Chapter 8,11 |
| March 21, 2019 | 8-10:30 | Introduction to Renal Disease: Chronic Kidney Disease | Yeung | R&D Chapter 12, 13 |
| March 26, 2019 | 8-10:30 | Small Group Session 4: AKI and CKD | | |
| March 28, 2019 | 8-10:30 | Introduction to Renal Histology/Biopsy | Rennke | |
| April 2, 2019 | 8-10:30 | Intro Case Study -Yeung The Nephrotic Syndrome | Rennke | R&D Chapter 9 |
| April 4, 2019 | 8-10:30 | Intro Case Study -Prochaska The Nephritic Syndromes Part I: Immune-complex diseases | Rennke | R&D Chapter 9 |
| April 9, 2019 | 11-12:30 | Small Group Session 5: Renal Pathology (nephrotic) | | |
| April 11, 2019 | 11-12:30 | The Nephritic Syndromes Part II: Rapidly progressive glomerulonephritis/ Asymptomatic hematuria | Rennke | R&D Chapter 9 |
| | | April 15-19, 2019: SPRING BREAK (No classes) | | |
| April 23, 2019 | 11-12:30 | TBD | Weins | |
| April 25, 2019 | 11-12:30 | Small Group Session 6: Renal | | |

| | | Pathology (nephritic) | | |
|----------------|----------|---|--------------|--|
| April 30, 2019 | 11-12:30 | Intro Case Study -Yeung Tubulointerstitial Diseases | Rennke | |
| May 2, 2019 | 11-12:30 | Systemic Disorders of the Kidney | Rennke | |
| May 7, 2019 | 11-12:30 | Kidney Stones | Curhan | |
| May 9, 2019 | 11-12:30 | Frontiers: TBD | Beck/Olabisi | |
| May 14, 2019 | 11-12:30 | Renal Pathophysiology Case Vignettes | Seifter | |
| May 16, 2019 | 11-12:30 | Small Group Session 7: Putting It All Together | | |
| May 20, 2019 | | FINAL EXAM | | |

Small Group Session Leaders:

Mark Zeidel
 Salman Ahmed
 Ragnar Paalson
 Vivek Kasinath

*** Tues/Thurs 8:00-10:30 in first half of term; reverts to 11:00-12:30 in second half

Important Dates:

Tues 3/12: Soma Weiss
 Wk of 4/15: HST Yr1 spring break
 Wk of 5/13: HST classes end this wk
 Mon 5/20: HST110 final exam