Mechanisms of Human Disease I
2019-20

Orientation

• Course Rationale
• Goals and Objectives
• Course Design
• Attendance
• Textbooks & Resources
• Exams
• Absence from required course activities
• Competency Assessment
• LUMEN site
• Questions

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Mechanisms of Human Disease
Rationale

• Pathology
  — Study of Disease
  • Etiology
  • Pathogenesis
  • Structural and functional changes that occur as a result of disease

• Microbiology
  — Study of microbes
  • Role in human disease

• Clinical correlations
• Bridge to clinical patient care

Epidemiology; Populations at Risk

• Differences in risk among different populations (including smaller definable groups) can provide clues for investigation of what caused one group to have a higher risk

• If causes can be identified, then prevention and control measures can be identified

Course Goals

• Specific educational objectives will be found with each learning activity.

• As active participants in the Mechanisms of Human Disease Course students will be expected to:
Medical Knowledge

- Demonstrate knowledge of the principal pathologic processes, including neoplasia, inflammatory mechanisms, immunological mechanisms, tissue renewal, regeneration and repair, and adaptation and cell death

- Demonstrate knowledge of the epidemiology, etiology and pathogenesis of common and prototypic diseases including the genetic and molecular basis of disease

- Demonstrate basic knowledge of the morphology (gross and histopathologic) of normal organs

- Demonstrate knowledge of the morphology (gross and histopathologic) and abnormal function (pathophysiology) of diseased organs

Medical Knowledge

- Demonstrate ability to correlate the pathology of disease with its clinical manifestations

- Demonstrate ability to develop basic diagnostic and treatment strategies for common diseases

- Demonstrate knowledge of common and prototypic bacteria, viruses, fungi and parasites with respect to their classification, epidemiology, pathogenesis, diagnosis and clinical manifestations of infection and prevention

- Identify factors which may lead to disparities in the diagnosis and management of common and prototypic diseases.

- Demonstrate an understanding of how findings of basic biomedical and translational research are applied to advance knowledge of the pathogenesis of disease.

Patient Care

- Develop a differential diagnosis and diagnosis and explain the pathogenesis of a disease and clinical course when provided with a patient clinical history, physical exam, pertinent diagnostic data, and/or morphologic (gross and histologic) findings.
Interpersonal and Communication Skills

- Communicate effectively and collaborate effectively about common and prototypic disease entities with student peers and faculty during laboratory case presentations and small group case discussions
- Contribute to the education of peers by actively engaging in small group sessions
- Contribute to the education of peers by diligently preparing for and clearly presenting assigned cases during laboratory sessions

Practice Based Learning and Improvement

- Critically evaluate one’s performance in the course to identify strengths and personal limitations in either knowledge of course content or study methods; develop learning goals to address any deficiencies and actively seek out assistance from appropriate and available resources to successfully remediate deficiencies.
- Identify learning needs by developing questions based on course activities, including small group clinical scenarios and lab case scenarios, and locate, evaluate, and effectively use the information found from appropriate resources and relevant information technology to answer the questions.

Professionalism

- Demonstrate professionalism by interacting with course staff, faculty and peers in a courteous and respectful manner at all times
- Demonstrate responsibility and accountability by punctually attending all required course activities, including small group sessions, laboratory sessions and exams
- Complete course evaluations in a timely manner and provide constructive feedback to course faculty and the course director in a professional manner
Professionalism

• Demonstrate professional behavior by reading course-related Outlook email communications on a regular (ie daily) basis.

• Respond to Outlook email communication from the Course Director and Course Coordinator in a timely fashion (within 24 hours).

• Demonstrate professional and ethical behavior by honestly completing course examinations and assignments without attempting to seek advantage by unfair means and by reporting any unethical behavior of peers to the course administration.

Professional and Personal Development

• Engage with required and non-required course activities and resources to develop necessary knowledge and skills related to the course.

Course Design

• Didactics
  – In-class lectures
  – Pre-recorded lectures
  – On-line didactics
  – Assigned reading materials

• Laboratory

• Small Group Case Discussions

• Histology for Pathology

• Independent and Self-Study

• Review Sessions
In-Class Lectures

• Lecture Hall 390
• Faculty
  – Pathology, Microbiology, Clinical Departments
• Concepts
  – Common, model, “testable”
• Integration

Pre-recorded Lectures
On-line didactics

• Scheduled on course calendar

• Some “lectures/lecture hall sessions” will require preparation PRIOR to the session (“Flipped Classroom”)
  – Reading assignment, On-line assignment
  – APPLY knowledge during the session
    • Cases, smaller group discussions
Lecture Resources

- Objectives
- Powerpoint
- Handout
- Recommended Text/Articles Reading

*Materials posted to LUMEN within 2 days of lecture*

“Laboratory”

- Histology review
- Morphologic changes of disease
  - Gross
  - Histopathology
  - Genetics
  - Molecular
  - Radiographic
  - Point of Care Ultrasound

Laboratory

- Case Method Room Lab Presentations – Interactive
  - Rooms 360 or 460, and 390
  - Each lab session will consist of ~4-6 cases
  - 4 students from each room will be assigned to each case
    - Expected to review prior to lab
    - Present key gross, histologic findings and clinical correlates to their classmates
    - All prepared to answer questions from facilitator, classmates
  - Jeopardy Case
    - Each lab session, 4 students from each room will be selected without prior notice to present the case
    - Preparation by ALL students required
  - Active participation in the presentation of your assigned case/jeopardy case is REQUIRED

- Lab "orientation": Friday, August 9, 11:30-12:00pm
- First Lab: Thursday August 15
Laboratory

- "Gross Lab"
  - Opportunity for students to have "hands on" examination of surgical and autopsy patient specimens
  - Correlate gross morphology with clinical, histopathologic and radiographic findings
    - In anatomy lab
    - December 10

Small Groups

- Bacteriology x 2 (August 26, August 28)
- Coagulation x 2 (September 27, October 14)
- Small Groups 1-16

Small Groups 1-16

- Faculty facilitators
- Case based
  - Clinico-pathologic correlations
- Preparation before session required
  - Critical thinking skills
- “Unknowns”
- Times — As scheduled in LUMEN
  - Potentially 7am (based on facilitator)
- “Orientation”
  - August 28, 8:30-8:55am
    - Small Group 1 is on September 9
Histology for Pathology

• Curriculum online via Sakai
• Histology
  — study of microscopic anatomy of tissues and cells
  • Students introduced to Histology as it relates to function in FHB course
• Integrated method to learn normal histology
  — Immediately integrate with findings of diseased organ
  — Learning normal structure and pathology will reinforce each other
  — Revisit during lectures and labs
Histology for Pathology Modules

1. Introduction - a brief orientation to the module topic
2. Learning Objectives - a list of the skills and knowledge that you will attain in the module
3. Learning Materials - a video highlighting key histology of the organ system(s)
4. Under the Microscope - a link to SSOM “Zoomify” Histology digitized image(s) which can be viewed via the virtual microscope. You can navigate the slide to identify key histology!
5. Test Your Knowledge - a self-assessment quiz on key module concepts

Supplementary learning resources
- Study Cards - an interactive “flashcard” style learning resource

Read introduction and watch video on or prior to the day it is scheduled
Histology Primer ("Boot Camp")

- Thursday, August 8, 2019
- Rooms 360/460 and 390
- Required

Self-Study
Independent-Study

- Introduction to Laboratory Medicine
  - On LUMEN
- Why?
  - The clinical laboratory plays a major role in diagnosis, treatment and prevention of disease

- 3 Questions on MHD I End of Semester Exam
Blocks

- General Concepts – Pathology
- General Concepts – Microbiology/Bacteriology
- Bacteriology
- Hemostasis/Thrombosis/Cardiovascular
- Renal
- Hematopathology/Pulmonary/Mycology

Integration with Year 1

- Review of normal
  - 60-90 minute sessions
  - Predominantly Physiology
    - Cardiovascular, Pulmonary, Renal
  - 3 questions on MHD I Exams 4,5,6 based on year 1 material

ATTENDANCE

- Lectures
  - Attendance and active engagement is encouraged
    - Some lectures are not recorded per faculty and/or course director discretion
      - students will be informed ahead of time
Attendance

Attendance at EACH Small Group and Laboratory Session is a Course Requirement

Attendance
Small Groups and Labs

• Each student is responsible for
  — attending the small group, lab to which they have been assigned
  — signing the designated attendance sheet for each session before the session ends

Signing in for a session and leaving before its completion OR having a student sign an attendance sheet for another student are considered forms of academic dishonesty

Small Group and Lab Sessions

• Attendance sheets for each session will be reviewed.
• Repeated absences will result in a “Concern” being noted within the “Professionalism” Competency Assessment.
• A pattern of excessive absences will result in a “Does Not Meet Expectations” for the “Professionalism” Competency.
Required Texts

10th Edition

Raven's BASIC PATHOLOGY

8th Edition

MEDICAL MICROBIOLOGY

Additional Resources – Histology

Atlas of Histology with Functional and Clinical Correlations
Cui D, et al.

Additional Resource - Histology

- Wheater’s Basic Pathology
  – On line, via LUHS library
Additional Resources - Pathophysiology

Pathophysiology of Disease: An Introduction to Clinical Medicine
McPhee and Hammer
on-line via LUHS Health Sciences Library

Self-Assessment/Review/Supplemental Resources

- Robbins and Cotran Review of Pathology
- First Aid for USMLE Step 1
- "Pathoma"
- "Sketchy" series
- On-line question banks

“Utah Web Path” – online, free
Block Exams

- 6 MHD I Block Exams
  - Computer
  - Multiple choice
    - BEST answer

- Lectures
  - Average 3 questions/lecture

- Lab sessions
  - 2-3 questions per lab

- Histology for Pathology
  - 2-3 questions from each module

- Year 1 Physiology Reviews
  - 2-3 questions/Review

- Small groups: Goal: Sessions help students synthesize material from block material
  - 1 question per small group
  - related to the disease process

End of Semester
Final Cumulative Exam

- Covers ALL LECTURE material from the beginning of MHD I to the end
- Covers ALL material from MHD I Laboratory Sessions
- Introduction to the Principles of Laboratory Medicine (3 questions)
  - Multiple choice
  - Free Text

Absence from Required Course Activities

- Unexpected/Emergency Absences from Required Activities
- “Examinations or other required academic activities (in MHD small group and laboratory sessions) missed due to illness or other legitimate, serious, extenuating reasons may be made up only if the Course Director and Associate Dean for Student Affairs or designate have received notice of the absence, in advance if non-emergent or as soon as possible if emergent, and granted permission for an excused absence. Absence due to illness requires written documentation from the Student Health Service and/or the physician caring for the student submitted to the Office of Student Affairs.”
### Absence from Required Course Activities

- **Non-Emergent Absences from Required Activities**
  - "Petitions for approved absences for serious but non-emergent reasons from activities in which attendance is mandatory (i.e., examinations, and in MHD small group and lab sessions) must be submitted in writing to the Course Director, Course Coordinator, and Associate Dean or Assistant Dean for Student Affairs at least thirty days prior to the start of the course in which the absence will occur. A student must have a serious reason for an excused absence or request for a change in an exam date. The petition should detail the nature of the conflict and available supporting documentation should be attached (e.g., copy of a jury summons or invitation to present a poster). A petition for permission to be absent is a request, requires review, and is not automatically approved simply by submission. In granting permission, the logistics and feasibility of rescheduling the missed academic activity are weighed and the student is notified of the decision.
  - Approval to reschedule an examination specifies a date later than the original test date on which the test must be taken. An examination cannot be rescheduled to a date earlier than the original exam date.
  - Non-emergency absences not requested at thirty days in advance of the start of the course may not be able to be accommodated and may be denied."

### Absence from Required Course Activities

- For any MHD small group or laboratory session that is not attended
  - in addition to following the SSOM policy outlined
  - Students to submit their answers to the small group cases and/or laboratory jeopardy case questions to the course coordinator by 9:00am on the day of the scheduled session.

### Competency Assessment

- Medical Knowledge
- Interpersonal and Communication Skills
- Professionalism
- Patient Care
- Practice Based Learning and Improvement
### Medical Knowledge

Assessment of the Medical Knowledge Competency and the final course grade will come from the sum of the exam scores.

<table>
<thead>
<tr>
<th>GRADES</th>
<th>% of Final Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple Choice Exams</td>
<td>90%</td>
</tr>
<tr>
<td>End of Semester Exam</td>
<td>10%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

The final course grade will be calculated based on the following formula:

\[
\text{Final Course Grade} = \left( \frac{\text{Sum of Multiple Choice Block Exams Points}}{\text{Total Number Points}} \times 0.9 \right) + \left( \frac{\text{Final End of Semester Cumulative Exam Points}}{\text{Total Number Points}} \times 0.1 \right)
\]

Pass: a score of greater than or equal to 70%
Fail: a score of less than 70%

### Interpersonal and Communication Skills;
Professionalism; Patient Care; and Practice Based Learning and Improvement

- Assessed in small group sessions
- Facilitators will note attendance; punctuality; satisfactory preparation; active participation; respectful and courteous interaction with peers and faculty; ability to synthesize pertinent facts from small group case histories, physical exam findings and diagnostic data; and an investigatory and analytic thinking approach to course work during small group discussions.
- Faculty will complete the Small Group Sessions Competency Assessment and note whether a student "Meets Expectations", "Meets Expectations with Concerns", or "Does Not Meet Expectations" for the relevant competencies and will provide narrative comments.
Professionalism

• Failure to come prepared and participate in discussions (small group), in assigned presentations and Jeopardy cases (lab) will result in a “Concern” being noted within the “Professionalism” Competency Assessment.

• Repeated poor preparation will result in a “Does Not Meet Expectations” for the “Professionalism” Competency.

LUMEN

• PLEASE familiarize yourself with and utilize content and resources on the MHD LUMEN site
Course Evaluations

- Opportunity to provide constructive feedback for faculty and course directors in a professional manner

IMPORTANT!

- There will be changes to the schedule
- Check Outlook email
- Check Outlook email
- Note exam times
- Check Outlook email
Emailing Faculty
LUMC/LUHS vs LUC Outlook
• Completely separate systems
• Address books are different
• Most clinical faculty only use LUMC/LUHS Outlook
  – but a .luc address comes up in LUC Outlook
• If someone not answering your email, re-check email address

Recommendation from MHD I 2016-17
Student Review Panel
Brief introduction at the start of each block by course director
• Emailed
  – Overview of block
    • Rationale for some things
  – Highlight components
    • Flipped classroom
    • On-line modules

M2 Year Advice

Mutations of Human Disease (MHD):
This course will provide you with an excellent foundation for both the USMLE Step 1 exam and for third year clerkships. Below are some tips for success:
1. Strive to achieve a thorough understanding of the mechanisms that underlie different disease pathways. Simply memorizing the findings associated with a disease alone may not be an effective strategy for short-term retention of information; however, it is not the most effective learning strategy in the long run. In my personal experience, developing an understanding of different pathways at a mechanistic level not only allows you truly master the material you are studying, but also develops a foundation that will make learning easier as the course progresses. The best way to achieve this is to ask yourself a very simple question when you are studying: “Why?”
Suppose we are presented with the following statement:

"Emergency removal of part of the vagus nerve has been associated with vitamin B12 deficiency."

We have two choices:

1. Memorize the association (and most likely forget it later).
2. Trace the steps that link vagus nerve and Vitamin B12 deficiency.

**Background information (from the MBB course):** The vagus nerve releases acetylcholine, which stimulates parietal cells in the stomach to produce HCl and intrinsic factor.

**Steps:**

1. Vagus nerve is severed.
2. No more acetylcholine stimulation of parietal cells.
3. Decreased production of HCl and intrinsic factor.
4. Loss of intrinsic factor available to bind to B12 in the bloodstream.
5. If B12 complex binds to a bile receptor in the small intestine, triggering absorption of B12. Loss of the B12 complex demineralizes B12 absorption, leading to B12 deficiency.

3.) For associations that need to be memorized (ie. Tumor markers, HLA subtypes associated with different diseases), consider making flashcards using Anki. I personally used Anki for this purpose and it worked very well. The memorization in First Aid are also helpful.

3.) Use the online modules (ie. Histology for Pathology) or Sokol. They are a great educational resource. Some examination questions will be derived from these modules.
I was ill and you cared for me
Matthew 25:36

Have a wonderful M2 year!

"We're All In This Together"