Musculoskeletal Module
HEAL-X Curriculum

Overview
This module describes the musculoskeletal (MSK) system from anatomical, physiological, and biochemical viewpoints. The module also includes the discussion and clinical examination that will guide student learning and understanding of the pathophysiological processes involving the MSK system.

Goals
- To develop an understanding of anatomical structure and function of the musculoskeletal system
- To develop an understanding of muscles and bones in terms of: histology, genetics, physiology, embryology, biochemistry, microbiology, pharmacology, pathology, pathophysiology, clinical diagnosis and professionalism in an integrated manner
- To develop skills of observation, interpretation, and integration needed to analyze human disease. Students will learn how to determine the most likely diagnosis and explain the pathogenesis of the disease when they are provided with the clinical presentation, results of the physical exam, and the laboratory data of a patient.

Teaching Philosophy

Teaching Methods
1. The module will run from 4 March to 8 April 2013.
2. The first section (March 4th to 24th) focuses on the anatomy of the musculoskeletal system. Bone dysplasias also will be covered. This material will be delivered through dissection sessions, lab discussion, and small group sessions.
3. The second section, immediately following the anatomy portion (March 26th to April 1st), will describe the electrical properties of excitable cells and the structure, physiology, biochemistry, and diseases of muscles.
4. The final section (April 2nd to April 7th), will describe the structure, physiology, biochemistry, and diseases of bones.
5. The material in this module is delivered in a series of daily interactive sessions involving students and faculty. The session formats include (but are not limited to) PBL (Problem Based Learning), TBL (Team-Based Learning), tutorials (small groups), case studies, JiTT sessions (Just in Time Teaching), laboratory sessions, and question and answer sessions (questions provided by faculty and/or student). Each of these daily interactive sessions is preceded by defined periods of “Student Independent Study”. Faculty participate in all interactive sessions; sessions are held in the afternoon or on the following day (morning or afternoon), generally in Murphy, Room 220.
6. To facilitate Student Independent Study, students will be provided with learning and performance objectives, references and other resources needed to meet the objectives including “Tegrity” recordings. These resources should be used no later than the day indicated on the schedule (Medsource-interactive calendar on TMedWeb: http://tmedweb.tulane.edu/portal/home/healx) in preparation for subsequent interactive sessions.

Materials
- Textbooks
- Handouts
- Tegrity recordings
- TBL
- PBL
- Tutorials
- Laboratory
- Online resources
- Image libraries

Assessments
March 25, 2013
First exam 50% of final grade

April 8, 2013
Second exam 40% of final grade

Mar 4 – Apr 8, 2013
Professionalism 10% of final grade
7. Resources that form the basis for interactive sessions scheduled for Mondays are listed on the schedule for Friday afternoon; students are required to prepare during Saturday and Sunday for interactive sessions on Monday.

8. **This is not a lecture-based course.** It is impossible to cover all of the textbook material in a classroom setting. Students must read and learn from the books, handouts, and other resources provided. It is recommended that you utilize the “Recommended” textbooks or readings in this Block and in subsequent modules.

9. The design of this module takes into account the different learning styles, interests, experiences and knowledge that students bring to the classroom. The design encourages active participation and discussion in the learning and understanding of concepts.

Tutorials, PBL, TBL, JiTT Sessions, and Audience

**Response Sessions**

1. The class will be divided into multiple groups or the class will remain as a single group for some interactive sessions. Each group will be assigned a facilitator and room. During TBL sessions, there will be a single facilitator who will oversee multiple groups. Students **cannot** switch groups without prior permission from one of the Course Directors. The purpose of these sessions is to provide a more personal and interactive kind of teaching and to stimulate active learning. In preparation for each session, students should read material pertinent to the assigned topics before the session. In these sessions, students will take quizzes (IRAT, GRAT, GAE), discuss these topics, and be expected to **actively** participate. In PBL sessions, the assignment is given at the session; for TBL sessions, student assignment with objectives and references will be given prior to the session. At TBL sessions, students are expected to come prepared, as there will be a quiz (IRAT) given at the beginning that each student must take. At tutorials, objectives, readings, quizzes, cases, etc. will be given prior to the session.

2. JiTT (Just in Time Teaching) sessions are interactive sessions in which learning and performance objectives and reference material is provided to the student ahead of time. On the afternoon before the JiTT session, the facilitator will post a quiz online that students take. The exam closes at a designated time and the facilitator reviews class answers prior to the JiTT session. Results of the quiz will determine what is discussed in the JiTT session.

3. Audience response sessions require that students obtain a “clicker” from the Office of Student Affairs. Students are expected to bring the “clickers” to the sessions when instructed to do so by faculty. Questions presented during audience response sessions are answered by students electronically with the “clicker”. Distribution of answers given by students will be provided immediately to the class. The distribution of answers dictates discussion. All student responses remain anonymous.

**Laboratory sessions** will involve light microscopy and the use of glass and virtual microscopy slides, image libraries and image-based quizzes. Access to the online resources is provided through the website of the Department of Structural and Cellular Biology.

**Computer Modules And Image Bank**

Computer-instruction modules (CIM) are available for study on a CD-ROM that students will receive related to Pathology and Pathophysiology.

**Pathology Image Bank**

Some of the sessions may refer to pathology images. These should be available on the Pathology CD-ROM from Doreen Barrett in room M055 (988-5437, 1430 Tulane Avenue, mezzanine level). Several of the CD-modules also contain numerous cases and questions. These modules may also be found on the Pathology website.

Exact images will not be used on the exam but a similar one representing the process may be used. Only rarely will students have to directly identify the process. Students will generally be expected to have knowledge of the process and the question will relate to the process depicted by the image. Clinical vignettes are provided in the question related to the image. It is at the discretion of other Module Directors to decide if the remaining images on this CD-ROM are used.

**Recommended Textbooks**

Recommended textbooks needed for this module and subsequent modules are listed below. Several of these textbooks are available on Clinical Keys through our library, including Robbins and Cotran, Pathologic Basis of Disease and Harrison’s Principles of Pathology.

1. **Histology**

2. **Embryology**
   - The Developing Human: Clinically Oriented Embryology, 8th Edition, Moore – Persaud, Elsevier (7th Edition is also suitable), ISBN # 9781416037064 (Required)

3. **Physiology**
   - **Primary Sources:** Handouts and slides by Dr. Kreisman on “Physiology of Excitable Cells I-VI”. Handouts and slides by Dr. Ming Li on ‘Skeletal Muscle”, “Smooth Muscle”, and “Regulation of Calcium & Phosphate Metabolism.” **Reference Sources:** to be used only when

4. Medical Microbiology
   Required text:
   For the print book, students need to buy the Connect Plus card (which will have the eBook and Learnsmart, and is an additional $6.75 to the book). The eBook is just the Connect Plus card (includes LearnSmart) and can be bought online through McGraw Hill. LearnSmart is an adaptive formative study tool that we will use in class.

5. Biochemistry
   Suggested Texts:
   Basic Medical Biochemistry (BMB): A Clinical Approach, 3rd edition, by Lieberman and Marks
   Lippincott’s Reviews, Biochemistry, 5th edition by Champe et al.
   Other Reading Resources:
   Lehninger, Principles of Biochemistry, 5th edition, by Nelson and Cox

6. Mechanisms of Disease
   Robbins and Cotran Pathologic Basis of Disease, Kumar, Abbas, Fausto. WB Saunders, 8th edition, 2010
   Harrison’s Principles of Internal Medicine, McGraw Hill, 18th edition, 2012. This is also available on Clinical Keys.
   Robbins Review of Pathology, Klatt and Kumar, WB Saunders
   Review of Pathology, Damjanov and Rubin, Lippincott, Williams and Wilkins.
   Henry’s Clinical Diagnosis and Management by Laboratory Methods, 22nd Edition by McPherson and Pincus, ISBN: 9782437709742

7. Pharmacology

8. Genetics
   Thompson & Thompson Genetics in Medicine, 7th edition, Robert L. Nussbaum, Roderick R. McInnes, Huntington F. Willard (eds). Publisher: WB Saunders

9. Clinical Skills
   Bates’ Guide to Physical Examination and History-Taking, 11th Ed. Lippincott Williams & Wilkins. ISBN: 9781609137625. Also available on iPad through the “Inkling” app.
   Pocket Guide to Clinical Skills by the Standardized Patient Center.

Student responsibilities

Study materials
   For laboratory sessions in histology a loan set of 100 microscope slides (slide box) is issued with each microscope to a pair of students for use during this module and subsequent modules. Each pair of students will be held responsible for the safe-keeping of all microscope loan slides issued for use during these modules and will be charged the replacement cost for each broken, damaged, or lost slide.

Learning
   1. Students are expected to complete readings and independent study components prior to coming to class to attend each session. It is the responsibility of the student to learn knowledge described in all objectives including those objectives not covered in “Tegrity Recordings” or interactive sessions.
   2. Student Self-Study (Student Independent Study): Topics during the course will not be taught as lectures. Time is allocated within the schedule for students to learn the topics independently/on their own. Topics may have computer modules, handouts, objectives with references, Tegrity recordings, or any combination as helpful resources. All of the material in the module including material scheduled for student independent learning will be assessed in examinations.

Attendance
   1. Student attendance at tutorials, PBL, TBL, JiTT and other interactive sessions, and examinations is mandatory. Attendance and participation in these sessions will influence your final grade (see section on Assessment below).
   2. Excused absences must be documented. To obtain an excused absence from Student Affairs, students must fill out a CHIT form at http://tmedweb.tulane.edu/portal/student-guide/help-a-campus-resources/item/excused-absences-and-chit.
   3. Occasionally, the day and time of tutorials, PBL sessions, TBL sessions, and small group sessions, etc., are subject to change with short notice. Attendance at these sessions is still mandatory.
Assessment

Important: Exam dates are fixed before the course begins and cannot be changed unless there are unforeseen emergencies such as evacuations for a hurricane.

Competency (Student Assessments)
At tutorials, TBL and PBL sessions, facilitators will grade students on preparation, knowledge, participation, professionalism, ethics, team work skills, etc. The grades will be turned in to the course directors and used for final grading and comments submitted to the Dean of Student Affairs Office. Participation in OWL Club surveys is also considered under professionalism. After each exam, a survey will be provided to students through email. To receive credit, students must respond to the survey. Names of students who do not respond to the Owl Club survey will be given to the course directors. Results of students who participate in the Owl Club survey are anonymous. Course Directors value student opinion, which may have an affect on future changes in the course.

Content
Examinations for this module will assess material represented by all objectives and material covered in “Tegrity” recordings, computer lessons, images, tutorials, PBL sessions, TBL sessions, and recommended textbooks with all exam questions matching an objective. If an objective is not covered in a Tegrity recording or in an interactive learning session, it is the responsibility of the student to learn what is covered in that objective as independent study. The format will include multiple-choice questions. Visual recognition skills will be tested in the examination by the projection of images of microscopic or gross material presented in the module included in the image bank.

Methods
1. A student’s grade on exams is determined by the number of questions answered correctly and divided by the total number of questions on the exam.
2. The anatomy exam includes a written question portion as well as a lab practical.
3. Clinical vignettes are utilized in exam questions. All exam questions employ the format utilized by the National Boards of Medical Examiners (NBME) for USMLE STEP 1 licensing exam.

Examination Schedule for Musculoskeletal Module 2013

<table>
<thead>
<tr>
<th>Exam</th>
<th>Date</th>
<th>Time</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Exam - MSK Anatomy</td>
<td>March 25, 2013</td>
<td>1:00 - 5:00 pm</td>
<td>March 4 to March 24, 2013</td>
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Grade Structure
The first exam in this course will be worth 50% of the final grade and the second exam will be worth 40% of the final grade. The remaining component of the final grade will be determined by professionalism, including attendance to required sessions, coming prepared, participation, teamwork skills, peer evaluation, responding to Owl Club Surveys, and attitude. There will be quizzes given at least weekly along with IRAT, GRAT, GAE on TBL sessions that will also be used in the professionalism grade. The professionalism component represents 10% of the final grade. Students will receive a separate final grade for this module that will go on their official Tulane School of Medicine transcript from the Office of Student Affairs.

First Exam 50%
Second Exam 40%
Professionalism 10%

Grade Reporting
Grading system is as follows:
Pass: 100 – 70%
Condition: 69 – 65%
Fail: below 65%

Make-up Examinations
Make-up examinations for students with an excused absence approved by Dr. Marc Kahn, Dean of Student Affairs, will be given at the discretion of the Course Directors. Make-up exams occur after a regular exam date, at a date, time, and location decided by Course Directors. Exams are not given on days prior to the regular scheduled date.

Ownership of Exam and Session-related Material
All exam questions, TBL quizzes (IRAT, GRAT, GAE), PBL cases, tutorial cases and quizzes are owned and copyrighted by Tulane University School of Medicine. Any reproduction, including photographs or reproduction from memory, is prohibited. If such infringement occurs, the event will be reported to the Tulane University School of Medicine Honor Board and Student Affairs Committee for appropriate action for possible academic dishonesty and may include dismissal from medical school.
**Educational Research**
Data obtained from surveys, exam, quiz, IRAT, GRAT, GAE, etc. results may be used for educational research. When data from such surveys are used, the source of all information will remain confidential and non-identifiable. Full disclosure and notification of study details as well as formal requisitions for consent will be provided to students on each occasion when such educational research is to be conducted.

**Problems**
If problems arise during the musculoskeletal module, particularly, if a student does not understand something, we want to know about it right away. Consult textbooks, discuss with fellow students, instructors, program coordinator, or course directors. Contact us via e-mail:

Dr. Kreisman ([nkreism@tulane.edu](mailto:nkreism@tulane.edu))
Dr. Chakraborti ([cchakrab@tulane.edu](mailto:cchakrab@tulane.edu))
Dr. Jerrett ([djerrett@tulane.edu](mailto:djerrett@tulane.edu))

**HEAL-X coordinator:**
Mary Tigner-Rasanen ([mtignerr@tulane.edu](mailto:mtignerr@tulane.edu))