The New Direction in Medical Education

• Standardizing learning outcomes while individualizing the learning process
• Integrating formal knowledge and clinical experience
• Developing habits of inquiry and innovation
• Focusing on professional identity formation

“Educating Physicians” (Cooke, Irby, O’Brien – 2010)
Educational Definitions

FEEDBACK

Formative – provides information that allows you to “self-correct”, occurs in a timely manner relative to the experience (e.g. ungraded quiz, audience response in class, reflection on H&P write-up)

Summative – provides information on how you learned in retrospect, typically occurs at the end of a learning experience (e.g. end-of-module exam, USMLE Step 1 exam, clerkship grade)
Educational Definitions

INTEGRATION

Vertical – Coordination of topics/experiences between concurrent courses (e.g. learning about breath sounds in Clinical Skills while dissecting the pleural cavity in Language of Medicine)

Horizontal – Coordination of topics/experiences through time (e.g. learning principles of pharmacokinetics in first semester, applying principles of PK in Synthesis case in second semester, and in a real patient on Medicine clerkship)
MS 1 2011-2012

August
- Anatomy

Biochemistry

Clinical Assessment of the Patient

Histology

Microbiology/Immunology

Physiology

Feb

March

May

Neuroscience
# MS 2 2011-2012

<table>
<thead>
<tr>
<th>July</th>
<th>Dec Jan</th>
<th>April</th>
<th>May</th>
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<tbody>
<tr>
<td><strong>Introduction to the Clinical Sciences 1</strong></td>
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<td><strong>Pathology</strong></td>
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<td><strong>Pharmacology</strong></td>
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<td><strong>Advanced Clinical Examination Skills</strong></td>
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<td><strong>Introduction to the Clinical Sciences 2</strong></td>
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<td><strong>Psychopathology</strong></td>
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## CIRCLE 2 Year Curriculum

### First Year of Medical School 7/30/12-5/24/13

<table>
<thead>
<tr>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
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<th>June</th>
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<tbody>
<tr>
<td>MBS 1 7/30/12-8/03/12</td>
<td>Molecules to Medicine 08/06/12-10/12/12</td>
<td>MBS 2 10/08/12-10/12/12</td>
<td>Attack and Defense 10/15/12-12/14/12</td>
<td>Winter Break 12/15/12-01/06/13</td>
<td>MBS 3 01/07/13-01/11/13</td>
<td>Circulation 01/14/13-03/08/13</td>
<td>Respiratory Health 03/18/13-04/12/13</td>
<td>MBS 4 04/15/13-04/19/13</td>
<td>Renal/Male Reproductive 04/22/13-05/24/13</td>
<td>End of MS1 year Summer Break 05/25/13-06/24/13</td>
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### Second Year of Medical School 6/24/13-2/14/14

<table>
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<tr>
<th>June</th>
<th>July</th>
<th>Aug</th>
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<th>Nov</th>
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<tbody>
<tr>
<td>MBS 5 06/24/13-06/28/13</td>
<td>Mind, Brain, and Behavior 07/01/13-08/30/13</td>
<td>MBS 6 09/02/13-09/16/13</td>
<td>Endocrine/Female Reproductive 09/09/13-10/25/13</td>
<td>Digestive Health and Nutrition 10/28/13-12/13/13</td>
<td>Winter Break 12/14/13-01/05/14</td>
<td>Musculoskeletal and Dermatology 01/06/14-02/14/14</td>
<td>End of MS 2 Year</td>
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MBS= Medicine, Behavior, and Society
What does CIRCLE mean for you?

• Emphasis on Active Learning
  • Checkpoints and Benchmarks to Self-Assess Progress

• Early Clinical Experiences (MS1)

• Integration of Basic and Clinical Sciences
  • Weekly Curricular Theme

• More Options/Electives in Clinical Years
Key Components of CIRCLE

- Module Coursework
- Language of Medicine
- Clinical Skills
- Weekly Synthesis Case
- Technology in Support of Learning
Technology in Support of Learning

- Electronic Textbooks
- Web-based Audience Response (phone app)
- Blackboard Learn
- One45 Curriculum Management
How will you interact with module coursework?

• Each module will have a Blackboard site with a calendar embedded with:
  • Assignments
  • Searchable discipline themes

• Each activity will have the following components:
  • Pre-work
  • Educational Activity
  • Post-work
# Fundamentals: Molecules to Medicine

## Week 1 Building Blocks

<table>
<thead>
<tr>
<th>TIME</th>
<th>MONDAY 08-06-12</th>
<th>TUESDAY 08-07-12</th>
<th>WEDNESDAY 08-08-12</th>
<th>THURSDAY 08-09-12</th>
<th>FRIDAY 08-10-12</th>
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<tbody>
<tr>
<td>8:00 TO 8:50</td>
<td>Introduction to Module King, Loffredo Intro to Case of the Week</td>
<td>DNA Replication &amp; Repair Biochemistry LECTURE Lee</td>
<td>Protein Biosynthesis Biochemistry LECTURE Lee</td>
<td>Team Based Learning RAT Biochemistry Lee</td>
<td>Case of the Week Discussion: Hemoglobinopathies</td>
</tr>
<tr>
<td>9:00 TO 9:50</td>
<td>Basic Cytology and Cell Function I Histo/Biochem/Genetics Interactive LECTURE wiAR system Lee, King</td>
<td>RNA Structure and Transcription Biochemistry LECTURE Lee</td>
<td>Mechanisms of Mutation Biochemistry/Genetics LECTURE Lee</td>
<td>TBL Application Activity Biochemistry</td>
<td>includes biochemistry, genetics, children's health, public health/NIH</td>
</tr>
<tr>
<td>10:00 TO 10:50</td>
<td>Basic Cytology and Cell Function II Histo/Biochem/Genetics Interactive LECTURE wiAR system Lee, King</td>
<td>Self-Study/Group Nucleotide metabolism Biochemistry Lee</td>
<td>Self-Study/Group Protein synthesis Biochemistry</td>
<td>TBL Application Activity Biochemistry</td>
<td>covers all the basic hemoglobinopathies</td>
</tr>
<tr>
<td>11:00 TO 11:50</td>
<td>The genetic material Biochemistry/Genetics LECTURE Lee</td>
<td>Self-Study/Group DNA/RNA Biochemistry</td>
<td>Self-Study/Group Mutations Biochemistry/Genetics</td>
<td>Molecular Biology &amp; Medical Practice Biochemistry LECTURE Lee</td>
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<tr>
<td>NOON</td>
<td>LoM Review Session</td>
<td>M2M Review Session</td>
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<tr>
<td>1:00 TO 1:50</td>
<td>Cranial Cavity Anatomy</td>
<td>The Medical Interview Clinical Skills</td>
<td>Development of Nervous System (Linda Johnson) Anatomy</td>
<td></td>
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<tr>
<td>2:00 TO 2:50</td>
<td>Spinal Cord &amp; Coverings Lab-Anatomy</td>
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<td>Exposure of Brain</td>
<td></td>
<td>Lab-Anatomy</td>
</tr>
<tr>
<td>3:00 TO 3:50</td>
<td>Lab-Anatomy</td>
<td></td>
<td></td>
<td></td>
<td>Lab-Anatomy</td>
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<tr>
<td>4:00 TO 4:50</td>
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MIXED ACID-BASE DISORDERS

Mixed acid-base disorders—defined as independently coexisting disorders, not merely compensatory responses—are often seen in patients in critical care units and can lead to dangerous extremes of pH (Table 47-2). A patient with diabetic ketoacidosis (metabolic acidosis) may develop an independent respiratory problem (e.g., pneumonia) leading to respiratory acidosis or alkalosis. Patients with underlying pulmonary disease (e.g., COPD) may not respond to metabolic acidosis with an appropriate ventilatory response because of insufficient respiratory reserve. Such imposition of respiratory acidosis on metabolic acidosis can lead to severe acidemia. When metabolic acidosis and metabolic alkalosis coexist in the same patient, the pH may be normal or near normal. When the pH is normal, an elevated anion gap (AG; see below) reliably denotes the presence of an AG metabolic acidosis. A direct calculation of AG (actual minus normal AG) and the ΔHCO₃⁻ (normal minus prevailing HCO₃⁻) indicates the presence of a metabolic alkalosis (see example below). A diabetic patient with ketoacidosis may have renal dysfunction resulting in simultaneous metabolic acidosis. Patients who have ingested an overdose of drug combinations such as sedatives and salicylates may have mixed disturbances as a result of the acid-base response to the individual drugs (metabolic acidosis mixed with respiratory acidosis or respiratory alkalosis, respectively). Triple acid-base disturbances are more complex. For example, patients with metabolic acidosis due to lactic...

[Diagram of acid-base balance showing different regions for metabolic acidosis, metabolic alkalosis, chronic respiratory acidosis, acute respiratory acidosis, chronic respiratory alkalosis, and acute respiratory alkalosis.]

Highlighter: Important

Dr. Dyer discussed this figure in class - anion gaps must be calculated when assessing all acid-base problems.
Language of Medicine Longitudinal Module

• Occurs over the first semester

• Monday and Thursday afternoons

• Coordinated with the physical exam skills you are learning in the Clinical Skills Module

• Extremities will be covered in the Musculoskeletal/Dermatology Module 01/2014
Clinical Skills Module

• Runs through all preclinical modules.

• You will begin seeing patients during your first semester of medical school.

• You will know how to perform a complete history and physical exam at the end of your first semester of medical school.

• You will then learn to apply these skills to pathologic conditions to generate a differential diagnosis and evaluation of common presenting complaints.
Friday Synthesis Case

• Every Friday morning
• A “capstone” case-based clinical reasoning exercise related to the weekly theme
• Longitudinal small groups for discussion
• Facilitated by a clinical (MD) faculty member
  • Selected for their proven teaching skills
  • Longitudinal participation with students
How will I receive formative feedback?

• Audience Response

• Graded and ungraded on-line quizzes

• Weekly Individual and Group Readiness Assessments

• Your Synthesis Cases facilitators
### Circulation Module

Week 2: January 14, 2013. Cardiac output, heart failure, and anemia

Reading: Costanzo, (Ch. 4, pp. 138-147, and Ch. 5, pp. 209-215), Harrison (Ch 57, e17, 103-106 and 113, and 234-235, 357?, 358?), Nelson (Ch 97.1, 436, 449, 452, 456.1-456.3, 456.9, 457, 702); Ch. 28, “Pharmacotherapy of congestive heart failure” section, pp. 789-813.

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<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
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<tr>
<td>8:00 AM</td>
<td>Intro to case/Cardiac output and its control; <strong>Lecture</strong> 3.102; Dr. Proppe</td>
<td>Hematopoeisis <strong>Lecture</strong></td>
<td>Physical exam and imaging in heart failure; laboratory; Dr. Moody and Radiology</td>
<td>Weekly case; Small Group TBL: Weekly Case Groups; <strong>Thalassemia major anemia and HF</strong></td>
</tr>
<tr>
<td>9:00 AM</td>
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<td>Peripheral Blood Smear/Morphology <strong>Lecture</strong> Presentation 3.102; Dr. Clare</td>
<td>Key CC Dyspnea; group discussion; Dr. Moody</td>
<td></td>
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<tr>
<td>10:00 AM</td>
<td>Oxygen delivery and Hb struct and function; <strong>Lecture</strong> 3.102; Dr. Proppe, Dr. Chongwoo Kim</td>
<td>Anemia Cases 3.102; Dr. Clare</td>
<td>Heart failure and shock meds; blackboard; Pharmacology</td>
<td>Patho-Histology Lab (blood smears, blood tests, ddx of anemias “anemia, hemoglobinopathies”)/Peripheral Blood smear/Morphology;</td>
</tr>
<tr>
<td>11:00 AM</td>
<td>Heart failure; <strong>Lecture</strong> 3.102; Dr. Lange</td>
<td>Anemia Cases Dr. Clare 3.102</td>
<td>Shock transplant /ethics; <strong>Lecture</strong> 3.102; Dr. Lange</td>
<td>11:00 AM: Weekly case; Small Group TBL; 3.102; entire class</td>
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<tr>
<td>12:00 Noon</td>
<td>Optional Review</td>
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