Teaching Biochemistry to Students of Medicine, Dentistry & Pharmacy

April 30 – May 4, 2011
Ocean Creek Resort
Myrtle Beach, SC

Sponsored by
the Association of Biochemistry Course Directors (ABCD) and
the Association of Medical & Graduate Departments of Biochemistry (AMGDB)

Organizing Committee:

Peter Ronner, Chair ABCD, Thomas Jefferson University
Richard Sabina, Vice-Chair ABCD, Oakland University William Beaumont School of Medicine
Michael Lea, Secretary ABCD, UMDNJ – New Jersey Medical School
Edward McKee, Treasurer ABCD, Indiana University School of Medicine, South Bend
David Franklin, Webmaster ABCD, Tulane University
Denise Ferrier, Drexel University College of Medicine
Tracy B. Fulton, University of California, San Francisco
Selina Noramly, University of Virginia School of Medicine

Web-site:
abcd.wildapricot.org

Program Overview

Saturday	Sunday	Monday	Tuesday	Wednesday
	6:30 - 7:45 am Breakfast	6:30 - 7:45 am Breakfast	6:30 - 7:45 am Breakfast	6:30 - 7:45 am Breakfast
	8:00 am - 12:00 noon Plenary Session I: **Student-Centered Teaching** (TBL, PBL, Simulation)	8:00 am -12:00 noon Plenary Session II: **Assessment and Remediation**	8:00 am - 12:00 noon ABCD Business Meeting and Plenary Session III **New Curricula** (Integrated curricula, Basic science in years 3+4, MCATs)	8:00 - 10:30 am Plenary Session V **Continuing Education** (Emerging or controversial topics)
	12:00 noon - 1 pm Lunch	12:00 noon - 1 pm Lunch	12:00 noon - 1 pm Lunch	11:00 am Check-Out
	1:00 - 3:00 pm Working sessions (5) to create student **objectives / competencies** in biochemistry	1:00 - 2:30 pm Workshops (2): **Simulation** (repeat), **Resource Exchange**	1:00 - 3:00 pm Plenary Session IV: **Nutrition**	
3:00 pm **Registration** opens	3:00 - 5:00 pm **Poster session** (including videos, websites, etc.)	**Free time**	3:15 - 5:15 pm Working sessions (5) to create student **objectives / competencies** in biochemistry	
5:30-7:00 pm **Welcome Reception**	6:00 - 7:00 pm Dinner	Dinner on your own		
7:00-10:00 pm **Welcome Dinner and Opening Session** (incl. TBL)	7:30 - 9:00 pm Workshops: **Simulation**, **Item Writing**		7:00-10:00 pm **Farewell Dinner** Topics for the next ABCD meeting	

Detailed Agenda

Saturday, April 30

3:00 - 8:00 pm	**Registration Desk Open** Staff: **Sheilah Jewart**	Creekside Foyer
5:30 - 7:00 pm	**Welcome Reception**	Creekside Patio
7:00 - 10:00 pm	**Welcome Dinner**	Creekside Room

Opening Session:

7:45 - 7:55 pm	**Welcome & Overview**: **Peter Ronner**, Ph.D., Department of Biochemistry and Molecular Biology, Thomas Jefferson University, Philadelphia, PA, and Chair of the Association of Biochemistry Course Directors
7:55 - 8:00 pm	**Report from the International Association of Medical Science Educators (IAMSE) - Michael Lea**, Ph.D., Department of Biochemistry and Molecular Biology, University of Medicine and Dentistry of New Jersey, New Jersey Medical School, Newark, NJ
8:00 - 8:05 pm	**Report from the Team-Based Learning Collaborative - Edward McKee**, Ph.D., Indiana University School of Medicine, South Bend, IN
8:05 -8:10 pm	**Report on the American Association of Colleges of Pharmacy (AACP) - James Stoll**, Ph.D., Department of Biomedical Sciences, Texas Tech School of Pharmacy, Amarillo, TX
8:10 -8:15 pm	**The Course Directors' Group in the Association of Professors of Human and Medical Genetics, APHMG - Darrel Waggoner**, M.D., Departments of Human Genetics and Pediatrics, University of Chicago, Chicago, IL, and **Katherine Hyland**, Ph.D., Department of Biochemistry & Biophysics, University of California, San Francisco, CA
8:15 - 8:20 pm	**Resources on the ABCD Website - David Franklin**, Ph.D., Department of Biochemistry, Tulane University, New Orleans, LA, and Webmaster of the Association of Biochemistry Course Directors
8:20 - 8:30 pm	**Defining Objectives and Competencies in Biochemistry** - **Peter Ronner**, Ph.D., Department of Biochemistry and Molecular Biology, Thomas Jefferson University, Philadelphia, PA

8:30 - 8:45 pm **The Process of Developing Competencies in Genetics.**
Darrel Waggoner, M.D., Departments of Human Genetics and Pediatrics, University of Chicago, Chicago, IL, and **Katherine Hyland**, Ph.D., Department of Biochemistry & Biophysics, University of California, San Francisco, CA

8:45 - 9:00 pm **Guidelines on Writing Learning Objectives - Tracy B. Fulton**, Ph.D., Department of Biochemistry & Biophysics, University of California, San Francisco, CA

9:00 - 10:00 pm **Hot Peppers TBL: Active-Learning "Ice Breaker"...Biochemistry-Style**
Richard Sabina, Ph.D., Oakland University, William Beaumont School of Medicine, Rochester, MI, and **Edward McKee**, Ph.D., Indiana University School of Medicine, South Bend, IN

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Developing Learning Objectives

Created by Tracy Fulton, PhD
University of California, San Francisco
tracy.fulton@ucsf.edu
Updated April 26, 2011

This handout is used as part of a workshop that has been provided for many different audiences, including students, trainees, and faculty with content expertise in varied disciplines, and will be available on the ABCD website. Should you wish to use it to run your own workshop, the text of the actual handout is in black Arial font. Notes (a "script" and additional guiding questions, intended for the workshop facilitator) for the facilitator are in blue Times font. A Bloom's taxonomy table can be found on the pages 10-11.

Objectives

The intent of this document is for the learner to be able to:

1. Distinguish a learning objective from a teaching objective/goal
2. Identify whether a given learning objective pertains to the cognitive, affective, or psychomotor domain
3. Recognize and avoid pitfalls of poor objective-writing
4. Design at least one learning objective for their curricular project, course, or lecture that is specific and measurable

References

Bloom BS. Taxonomy of Educational Objectives: Cognitive Domain. New York: Longman; 1984.

Gronlund NE. How to Write and Use Instructional Objectives. New York: MacMillan; 1991.

Kern DE, Thomas PA, Howard DM, and Bass EB. Curriculum Development for Medical Education. Baltimore: Johns Hopkins University Press; 1998.

Questions

How do students/learners use learning objectives?

- Most often, when studying/preparing for exams. Most useful if clear, specific, limited, linked to lecture.
- *Consider: from the student perspective, what learning objectives are NOT useful?*

How do educators use learning objectives?

- Curriculum development and refinement: choosing content, the appropriate teaching method, and designing assessments/exams
- Communicates to others what teaching accomplishes
- *Consider: from the educator perspective, what learning objectives are NOT useful?*

Learning Objectives: What are they? *Different than teaching objectives/goals.*

Goals/teaching objectives:	Communicate the overall purpose of a teaching session or curriculum *This lecture will cover the structure and function of the adrenal gland.*

Learning objectives:	Learner- and outcome-focused; communicate what the learner should be able to *do* as a result of the teaching session or curriculum *After this lecture, students will be able to name the three layers of the adrenal cortex and the hormones they produce.*

A major pitfall is that often learning objectives are not specific and measurable enough – they are really teaching objectives masked as learning objectives. The difference is in how learner-centered the objective really is.

Learning Objectives: Why are they important?

- Guide the educator in choosing content and educational methods
- Clearly communicates to others (students, faculty, others with administrative oversight, individuals from other institutions) what the teaching addresses and hopes to achieve
- Identifies for students what is expected of them
- Enables assessment of learners and learning

Learning Objectives: How to create them?

- Measurable and specific
  - Who will do (how much) of what (how well) by when?
    Example: by the end of X course, students will be able to describe embryonic development of the foregut.
  - Use words not open to interpretation – use Bloom's taxonomy to cultivate higher-order thinking/skill (see pages 10-11)
    Compare the words "list" "define" to "understand" or "know". The word chosen builds in a means of self-evaluation for student and guides development of exams for the educator. You obviously want to choose words that connote exactly what you want the learner to have learned!
- Choose the right domain (and relate to areas of competency)
  - Cognitive: knowledge acquisition and application
    Which competency domain corresponds best to cognitive skill? Generally, Medical Knowledge.
  - Affective: attitudinal
    Refer to specific attitudes, values, beliefs, biases, emotions that can affect learning, performance, and ultimately patient care. These are usually more difficult to express and measure. *(Example: by the end of the biochemistry curriculum, students will be able to describe the importance of the process of discovery in basic/foundational sciences to the advancement of the treatment of disease; or, a non-biochemistry example: By the end of a lecture on withholding/withdrawal of nutrition from pts with advanced dementia, students will have identified their attitudes and beliefs regarding end-of-life care with their colleagues and ID'd how these might influence their care of pts.)*
  - Psychomotor: skill-based (demonstrate a skill) or performance-based (incorporate a skill into continuing behavior)
    Many important objectives in this domain for clinicians-in-training are addressed in basic science courses (communication skills via PBL/TBL/small group work; professionalism skills (respect, dependability) via punctuality; etc).

Note the relationship to ACGME competencies!
Competency in each of the 6 ACGME domains should ideally be demonstrated through a combination of cognitive, affective, and psychomotor (knowledge/attitude/skills) objectives. For example, a biochemistry ***competency*** in the domain of Patient Care might be:

Select and apply preventive, curative, and/or palliative strategies appropriate for common diseases with a molecular or metabolic basis

There should be a large set of learning objectives related to knowledge/attitudes/and skills to ensure achievement of this competency (and not all of them will necessarily fall into the realm of biochemistry). Some specific examples:

Cognitive/knowledge: List two dietary changes predicted to improve blood glucose control for a patient with type 2 diabetes mellitus
Psychomotor/skill: Select the most appropriate pharmacologic treatment for a patient with type 2 diabetes mellitus given their history, lab values, and physical exam
Affective/attitude: Articulate your personal beliefs about the efficacy of diet vs pharmacology management of type 2 diabetes and address how these beliefs could influence your care of patients

How might you improve these learning objectives?

1. Appreciate the role of glycogen as a storage form of glucose

"Appreciate" - not measurable; doesn't actually ask the learner to DO anything other than memorize the objective. To improve, could ask the learner to address the role of glycogen in blood glucose control.

2. Recognize the major carbohydrates in the human body and diet

Vagueness because of "major." To improve, could name the specific carbs in the question.

3. Understand differences and common features in the metabolism of monosaccharides including fructose and galactose

"Understand" is not measurable, and the "including" phrase makes it unclear how many additional monosaccharides are important to mastering this objective. To improve, could use "compare and contrast," and limit question to glucose, fructose, and galactose.

4. Explain the pathogenesis of diabetes mellitus type 1

Too broad and vague. To improve, break down into more specific concrete chunks.

Here are a couple of nice examples… (Could you further improve them?)

1. Distinguish aerobic and anaerobic glycolysis in terms of tissue locations and regulation

2. Explain the mechanism of drug-induced hemolytic anemia in deficiency of glucose-6-phosphate dehydrogenase

Let's write some of our own!
Write a learning objective for learners using your own content.

Share: Is your objective specific? measurable? appropriate for the level of the learner? achievable? Where does your action word fall within Bloom's taxonomy?

Best practices/take-home messages/reflections:
What did you learn today?

These points come up often:

- Reflect with others, plan for several cycles of writing
- Iterative process – plan to redesign content to address newly updated objectives, and plan to redesign objectives that determine expectations about new content, etc etc
- As you write objectives consider what measurement would look like
- A lot of exams dwell in lower levels of Bloom's. Why? Really really hard to design teaching and assessment that hit higher levels.
- Most educational experiences encompass much more than a list of preconceived objectives, and *sometimes an exhaustive list of objectives can be overwhelming, can stifle creativity, and can limit learning*! Ideal: manageable # that interprets goals, focuses and prioritizes components, encourages creativity and learning beyond the stated objectives

Bloom's Taxonomy of Educational Objectives

This hierarchy described by Benjamin Bloom posits that learning goals vary according to the level of understanding and/or skill desired. Learning begins in the hierarchy with simple acquisition of knowledge (shown here at the top) and cumulatively builds toward a deep understanding (as evident through the ability to evaluate information). In any curriculum, learning objectives will likely encompass several levels of this hierarchy.

Cognitive Domain

Competence	Skills Demonstrated	Question Cues	
Knowledge	Remembering of terminology, facts, and methods	Define Cite Describe Identify Name Repeat Write Quote	Record Draw Show Label Examine Count Tabulate List
Comprehension	Understand the meaning of conceptual information; translate knowledge into new context; interpret facts; predict consequences	Summarize Describe Explain Express Identify Report Discuss Interpret Review Contrast	Predict Associate Extend Translate Estimate Distinguish Differentiate Compute Locate
Application	Use previously learned information in novel situations; solve problems	Apply Demonstrate Calculate Solve Complete Use	Examine Modify Employ Illustrate Interpret Classify
Analysis	Understand the organizational structure of information; see patterns; organize parts	Analyze Debate Appraise Examine Separate Differentiate Infer Question Test Order	Categorize Connect Arrange Diagram Divide Compare Contrast Calculate Select Inventory

Synthesis	Creative application of prior knowledge and skills to produce an original entity.	Adapt Create Assemble Arrange Combine Collect Integrate Modify Prescribe Propose	Generate Design Plan Invent Construct Compose Formulate Manage Organize
Evaluation	Judge relative value of information based on prior knowledge; make choices based on reasoned argument; recognize subjectivity	Appraise Assess Score Compare and contrast Criticize Critique Revise Defend	Judge Choose Estimate Evaluate Measure Rank Rate Select

Affective Domain

Competence	Skills Demonstrated	Question Cues	
Attitudinal	Demonstrating or adopting attitude change	Consider Exemplify Modify Plan	Rank as important Realize Reflect Revise

Psychomotor Domain

Competence	Skills Demonstrated	Question Cues	
Performance or behavior	Skills associated with performing lab techniques, record keeping physical exam, etc.	Calibrate Demonstrate Diagnose Diagram Listen/hear	Measure Operate Perform Record Write

Avoid these verbs because they are vague and open to interpretation:

Appreciate
Believe
Have faith in
Know
Know how
Learn
Understand

Contributions to table by Peter Ronner, PhD, Thomas Jefferson University, 2011; Ref: Goodhart F, Verdi P, Kennedy S.: Assuring Quality in Health Education, 1991

Sunday, May 1

6:30 - 7:45 am	**Buffet Breakfast**	Creekside Room
8:00 am - 12:00 pm	**Plenary Session I: Student-Centered Teaching** Moderators: **Richard Sabina**, Ph.D., Oakland University, William Beaumont School of Medicine, Rochester, MI, and **Edward McKee**, Ph.D., Indiana University School of Medicine, South Bend, IN	Water Oaks
8:00 - 8:45 am	**Concept Mapping in Team Based Learning** - **Kathryn Thompson**, Ph.D., R.D., and **Renee LeClair**, Ph.D., Department of Biochemistry and Nutrition, University of New England, College of Osteopathic Medicine, Biddeford, ME	
8:50 - 9:35 am	**Problem-based Learning - A Small Group, Student-Centered Learning Technique for Integrating Basic and Clinical Sciences** - **W. Marshall Anderson**, Ph.D., Indiana University School of Medicine – Northwest, Gary, IN	
9:40 - 10:00 am	**Within a Lecture-Based Course Environment, a Novel 3-Quiz Paradigm can Promote Student-Centered, Problem-Oriented, Team-Based, Multi-Disciplinary Learning that is Well-Accepted by Both Faculty and Students** – **Steven C. King**, Ph.D., Department of Integrative Biosciences, Oregon Health & Science University School of Dentistry, Portland, OR	
10:00 - 10:20 am	**Break**	
10:20 - 11:05 am	**Applications and Tools for Integrating Biochemistry Courses into Medical Simulation** - **David Pederson**, Ph.D., Director Medical Simulation, Ross University School of Medicine, Commonwealth of Dominica, West Indies	
11:10 - 11:30 am	**Use of Simulation Center Patients in PBL during the 1st-Year of Medical School - Mary Wimmer**, Ph.D., Department of Biochemistry, West Virginia University School of Medicine, Morgantown, WV	
11:35 - 11:55 am	**Enhancing Problem-Based Learning by Inclusion of a Simulation Lab Experience** - **Ralph Keil**, Ph.D., Department of Biochemistry & Molecular Biology, Penn State Hershey Medical Center, Hershey, PA	
12:00 - 1:00 pm	**Luncheon**	Water Oaks Patio

1:00 - 3:00 pm **Working Sessions to create student objectives and competencies in biochemistry (5 concurrent sessions):**

DNA Replication, Transcription, and Translation Water Oaks 1
Moderator: **Michael Lieberman**, Ph.D., Department of Molecular Genetics, Biochemistry & Microbiology, University of Cincinnati, Cincinnati, OH

Fundamentals, Proteins, and Enzymes Water Oaks 2
Moderator: **Edward McKee**, Ph.D., Indiana University School of Medicine, South Bend, IN

Blood Water Oaks 3
Moderator: **Peter Ronner**, Ph.D., Department of Biochemistry and Molecular Biology, Thomas Jefferson University, Philadelphia, PA

Carbohydrate Metabolism Library
Moderator: **Tracy B. Fulton**, Ph.D., Department of Biochemistry & Biophysics, University of California San Francisco, San Francisco, CA

Overarching Competencies Creekside Room
Moderator: **Janet Lindsley**, Ph.D., Department of Biochemistry, University of Utah School of Medicine, Salt Lake City, UT

3:00 - 5:00 pm **Poster** / **Video** / **Website Presentations** Water Oaks
Organizer: **Michael Lea**, Ph.D., Department of Biochemistry and Molecular Biology, University of Medicine and Dentistry of New Jersey, New Jersey Medical School, Newark, NJ

6:00 - 7:00 pm **Dinner** Creekside Room

7:30 - 9:00 pm **Workshop sessions (2 concurrent sessions):**

Workshop 1 Water Oaks 1
Simulation - David Pederson, Ph.D., Director of Simulation, Integrated Medical Education, Ross University, School of Medicine, Dominica
Moderator: **David Franklin**, Ph.D., Department of Biochemistry, Tulane University, New Orleans, LA

Workshop 2 Water Oaks 2

Item Writing

Moderator:
Edward McKee, Ph.D., Indiana University School of Medicine, South Bend, IN

Participants:
Janet Lindsley, Ph.D., Department of Biochemistry, University of Utah School of Medicine, Salt Lake City, UT
Edward McKee, Ph.D., Department of Biochemistry and Molecular Biology, Indiana University School of Medicine, South Bend, IN
Eric Niederhoffer, Ph.D., Department of Biochemistry and Molecular Biology, Southern Illinois University School of Medicine, Carbondale, IL
Clive Slaughter, Ph.D., Department of Biochemistry, Medical College of Georgia, University of Georgia, Athens, GA.

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Monday, May 2

6:30 - 7:45 am	**Buffet Breakfast**	Creekside Room
8:00 - 12:00 noon	**Plenary Session II: Student Assessment and Remediation** Water Oaks Moderators: **Tracy B. Fulton**, Ph.D., Department of Biochemistry & Biophysics, University of California San Francisco, San Francisco, CA, and **David Franklin**, Ph.D., Department of Biochemistry, Tulane University, New Orleans, LA	
8:00 - 8:30 am	**Predicting At-Risk Students Using a Diagnostic Proficiency Examination - Neil Osheroff**, PhD., Department of Biochemistry, Vanderbilt University School of Medicine, Nashville, TN	
8:40 - 9:10 am	**Just in Time Teaching (JiTT) to Teach Apolipoproteins and Cholesterol-Based Diseases - David Franklin**, Ph.D., Department of Biochemistry, Tulane University, New Orleans, LA	
9:20 - 10:05 am	**NBME Comprehensive Basic Sciences Self-Assessment Exam - Agata Butler**, Ph.D., Vice President, Medical Education and Health Profession Services, National Board of Medical Examiners, Philadelphia, PA	
10:05 - 10:20 am	**Break**	
10:20 - 10:50 am	**Remediation in an Integrated Curriculum - Tracy B. Fulton**, Ph.D., Department of Biochemistry & Biophysics, University of California San Francisco, San Francisco, CA	
11:00 - 11:45 am	**Activating Self-Regulated Learning in Medical Education: The Educator's Role - Ryan Brydges**, Ph.D., Department of Medicine, University of Toronto, & The Wilson Centre, Toronto, Ontario, Canada	
12:00 - 1:00 pm	**Luncheon** One table will be reserved for those who want to discuss further collaboration between geneticists (APHMG) and biochemists (ABCD)	Water Oaks Patio
1:00 pm	**Applications for those interested in serving on the Executive Committee are due** (to Edward McKee, the current treasurer of ABCD; if you cannot find Ed, Sheilah Jewart can probably also help you). Officer assignments will be determined at a meeting of the Executive Committee.	
Any time	**Sign up to Share Taxis to Airport** **Sheilah Jewart, Amazing Occasions**	Water Oaks Foyer

1:00 - 2:30 pm **Workshop Sessions:**

Workshop 1 Water Oaks 1
Simulation - David Pederson, Ph.D., Director of Simulation, Integrated Medical Education, Ross University, School of Medicine, Dominica
Moderator: **Edward McKee**, Ph.D., Indiana University School of Medicine, South Bend, IN

Workshop 2 Water Oaks 2
Resource Exchange – **Denise Ferrier**, Ph.D., Department of Biochemistry and Molecular Biology, Drexel University College of Medicine, Philadelphia, PA

Primary Presentations:

Faculty Development for Biochemists and Beyond - Tracy B. Fulton, Ph.D., Department of Biochemistry & Biophysics, University of California San Francisco, San Francisco, CA

Jigsaw: Cooperative Learning in the Pre-Clinical Years at RWJMS - Emine Abali, Ph.D., Department of Medicine and Pharmacology, Robert Wood Johnson Medical School - University of Medicine and Dentistry of New Jersey, New Brunswick, NJ

Peer-Facilitated Break-Out Discussions in Biochemistry - Gemma Geslani, Ph.D., Department of Basic and Pharmaceutical Sciences, St. Louis College of Pharmacy, St. Louis, MO

Independent Explorations in Biochemistry - Denise Ferrier, Ph.D., Department of Biochemistry and Molecular Biology, Drexel University College of Medicine, Philadelphia, PA

Vitamin Jeopardy in a First-Year Medical School Curriculum - David Franklin, Ph.D., Department of Biochemistry, Tulane University, New Orleans, LA

Required Case Studies for the Study of Medical Nutrition – John Swaney, Ph.D., Department of Biochemistry and Molecular Biology, Drexel University College of Medicine, Philadelphia, PA

Free time (some ideas for things to do are listed on pages 18-19)
For intrepid souls, there is a special session, see page 17.

Dinner on Your Own (some restaurants are listed on pages 19-20)

3:00 - 4:00 pm

Special voluntary session: Team-Based Learning in Biochemistry, Successes, Resources, and Problems

*Moderators: **Edward McKee**, Ph.D., Indiana University School of Medicine, South Bend, IN and **Richard Sabina**, Ph.D., Oakland University, William Beaumont School of Medicine, Rochester, MI*

Panelists:

***Janet Lindsley**, Ph.D., Department of Biochemistry, University of Utah School of Medicine, Salt Lake City, UT*

***Kathy Thompson**, Ph.D., R.D., Department of Biochemistry and Nutrition, University of New England, College of Osteopathic Medicine, Biddeford, ME*

***David Franklin**, Ph.D., Department of Biochemistry, Tulane University, New Orleans, LA*

***Casey Bassett**, Ph.D., Department of Cellular and Molecular Biology, Lincoln Memorial University-DeBusk College of Osteopathic Medicine, Harrogate, TN*

***Ralph Keil**, Ph.D., Department of Biochemistry and Molecular Biology, Penn State Hershey Medical Center, Hershey, PA*

Outings to consider on Monday afternoon / evening:

Maps are on pages 21-22

The following attractions are across the highway from Ocean Creek, at Barefood Landing:

Alligator Adventure (http://alligatoradventure.net/)

Tentative hours as of 3-28-11: 9 am - 7 pm (no admission after 6 pm). For current park hours please call (843) 361-0789. Admission: adults $17.95, seniors $15.95, children ages 4-12 $10.95. Children 3 and under: free. Discounts are available. You can receive a 2nd Day Free Pass that is valid for one return admission within 7 days after your initial visit at no additional cost! Click Here (PDF file) for printable coupon for $1.00 Off General Admission.

T.I.G.E.R.S. (The Institute of Greatly Endangered and Rare Species) (www.tigerfriends.com)

You can see adult tigers and apes on display for free. If you want to support conservation and breeding efforts by cuddling up with their animals in a photo session, you will pay $59 for one 8 x 10 in. portrait. Copies of the original cost $20.

Barefoot Princess, Early Dinner Cruise at 5:00 pm (www.mbriverboat.com)

Departs from the Barefoot Landing Marina and presumably cruises the Atlantic Intracoastal Waterway. 1½ hour cruise. Buffet-style meal with one meat, vegetables, starch, iced tea & coffee, and dessert. Live entertainer plays a variety of music for dancing. Cash bar is available. Adults: $33.00, Youths (3-12): $23.00, Children (2 & under): Free. You must make a **reservation** before 12:00 noon on Monday, by calling 843-650-6600.

Alabama Theatre (http://www.alabama-theatre.com/06/onetheshow.html)

"one, the Show" at 7:30 pm, about $35-$46. According to the theatre, "one" continues to evolve year after year as it introduces breath-taking and awe-inspiring dance and visual elements to hit songs from many musical genres. "one" brings you the best in music and entertainment, everything from Country, Gospel, Broadway, Pop and Rock to hilarious family comedy."

Carolina Safari Jeep Tours (www.carolinasafari.com)

606 65th Ave N., Myrtle Beach. Reservations required. 843 497-5330. Free pick up at Ocean Creek Resort, if the group is ≥10 persons. Adults: $40; teenagers: $40; children ≤12 years of age: $30. The Carolina Safari Tour company was founded by a native naturalist, historian and magazine photographer and a Harvard University writer and naturalist. "History, nature, ecology, wildlife and ghost lore all on one trip." Each Jeep accommodates 14 passengers. Tour lasts about 3½ hours.

The following attractions are at some distance from Ocean Creek:

Brookgreen Gardens (www.brookgreen.org)
1931 Brookgreen Drive, Murrells Inlet, SC 29576 (about 45 minutes by car from Ocean Creek). The Gardens close at 5 pm, and it takes several hours to really see them. If you want to see the gardens, you probably have to miss the workshop after lunch.
Open 9:30 am - 5:00 pm. Admission: age ≥ 13 years: $12; children 4-12 years: $6.

Sea Thunder - Dolphin Cruise (www.myrtlebeachwatersports.com)
Myrtle Beach Water Sports, Harbourgate Marina, 2120 Sea Mountain Highway, North Myrtle Beach, SC 29582 (about 15 min / 7 miles from Ocean Creek). Phone: 843.280.8400. Cruise takes 1½ to 2 hours. Call for times. Age ≥13 years: $25, Children 4-12 years: $15 (check website for coupons).

The Carolina Opry Theatre (www.thecarolinaopry.com)
North Kings Highway (at US 17 bypass), Myrtle Beach (a few miles from Ocean Creek). 800-843-6779. Show: Good Vibrations, 8 pm, $35-$50.

Restaurants to consider for Monday evening:

To be doubly sure that the restaurant of your choice is open, please call ahead.

Maps are on pages 21-22.

The following establishments are across the highway from Ocean Creek, at Barefoot Landing:

Greg Norman's Australian Grille (www.shark.com/australiangrille),
843 361-0000. Open daily. Dinner starts at 4:30 pm. Happy Hour: 3:00 - 7:00 PM (Shark Pub & Patio). View of the intracoastal waterway.

Flying Fish Public Market & Grille (www.flyingfishmarket.com)
843 663-3474

Umberto's Pittsburgh Italian Trattoria (www.umbertos.com)
843 272-1176

Preston's (www.prestonsrestaurant.com).
North entrance to Barefoot Landing. Seafood & Country Buffet. (843) 272-3338. Opens daily at 4:00 pm.

T-Bonz Gill and Grill (www.tbonzgillandgrill.com)

House of Blues (www.houseofblues.com)
(843) 272–3000. Dinner starts at 4 pm. Salads, burgers, sandwiches, entrees, dessert. Occasionally has free live music.

Dino's Italian & Greek Cuisine (http://www.dinositalianandgreekcuisine.com/)
Opens at 5 pm. 843-272-2075

Some other restaurants in the larger North Strand area (in order of increasing distance)**:**

Joe's Bar & Grill (http://www.joesbarandgrillonline.com/)
810 Conway Street, North Myrtle Beach (within walking distance; about 0.4 miles east on North Kings Highway, then make a right onto Conway St.); (843) 272-4666. Continental cuisine.

Duffy Street Seafood Shack (3 locations) (www.duffyst.com)
Closest location: 9924 North Kings Highway, Myrtle Beach. About 2 miles on Hwy 17. 843-449-2233

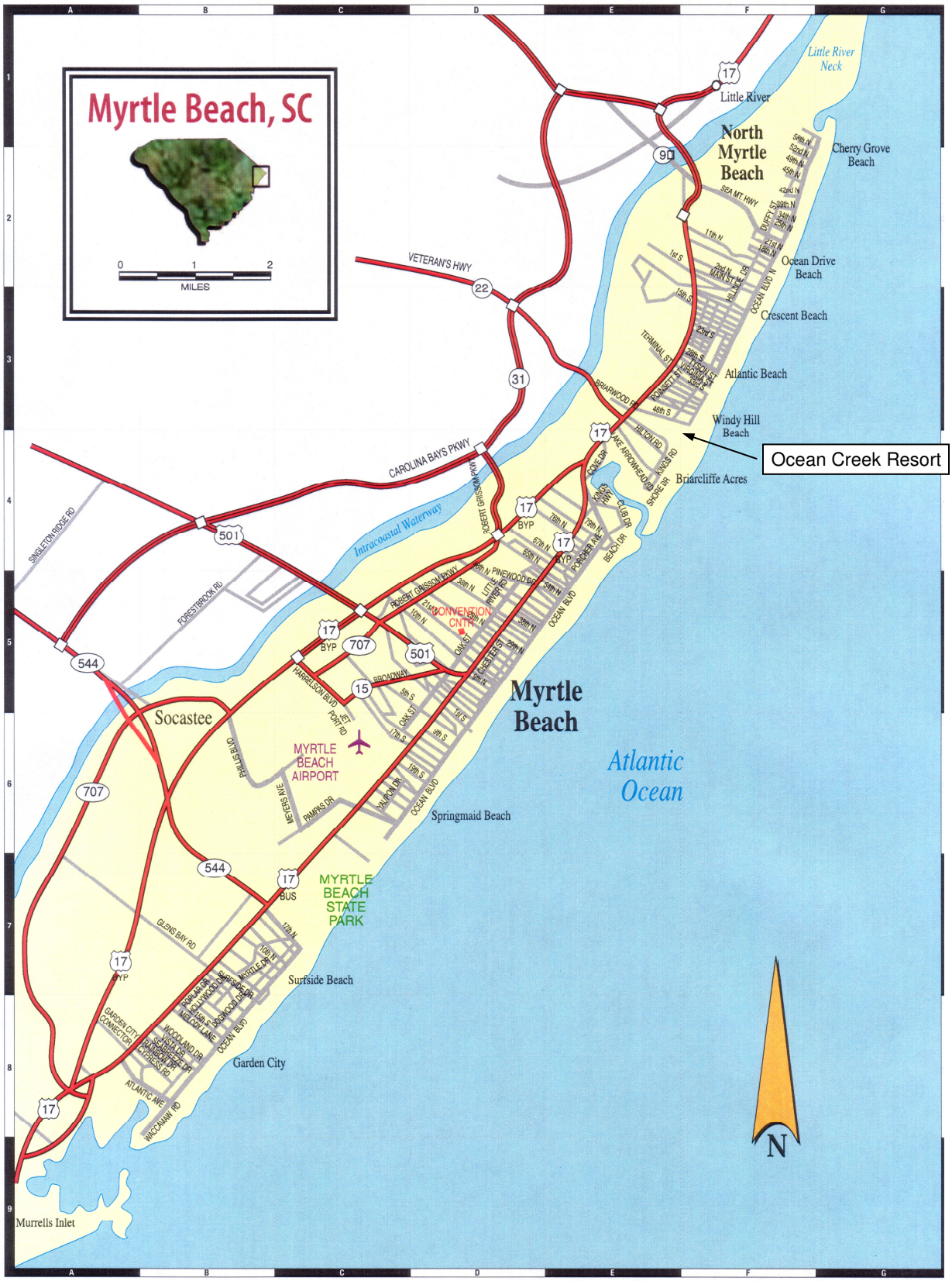
Benito's Brick Oven Pizza (www.benitosnmb.com)
1596 Hwy. 17 South, North Myrtle Beach (from Ocean Creek, about 3 miles east on Kings Highway). 843-272-1414 New York style pizzeria and pasteria.

Benny Rappa's Trattoria (http://www.bennyrappas.com/)
1453 Highway 17S, North Myrtle Beach (from Ocean Creek, east on North Kings Hwy.; about 4.5 miles / 10 min). 843 361-1056. Dinner starts at 5:00 pm. Casual fine dining. Beef, veal, chicken, salads, fresh fish, and a variety of pasta dishes.

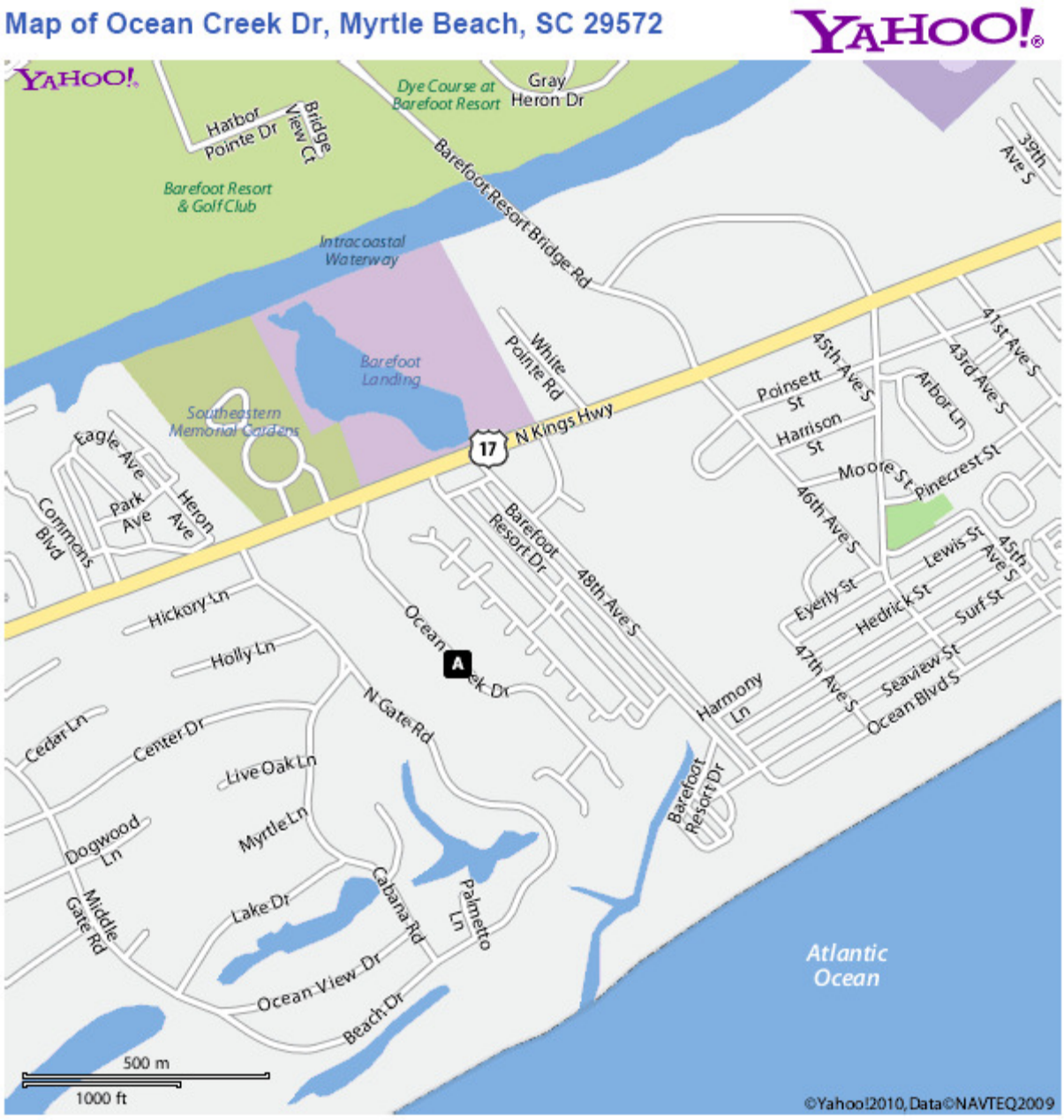
Tony's Italian Restaurant
1407 Old Highway 17N, North Myrtle Beach (from Ocean Creek, about 6 miles / 13 minutes by car), 843-249-1314. Oldest Italian restaurant along the Grand Strand. Please make sure this restaurant is open!

The Brentwood Restaurant (www.thebrentwoodrestaurant.com)
4269 Luck Avenue, Little River, SC (about 10 miles or 15 minutes from Ocean Creek by car). 843 249-2601. "Low country French cuisine". Happy hour everyday from 4 to 6 pm. Dinner starts at 4:30 pm.

The Parson's Table (www.parsonstable.com)
4305 McCorsley Ave, Little River (from Ocean Creek, about 10 miles / 20 minutes by car). 843-249-3702. Housed in a church. Dinner starts at 4:30 pm (early bird until 5:45 pm). Happy hour 4:30-7:00 pm. Steaks, seafood, lamb, veal, prime rib.



For more maps, please visit www.TRIPinfo.com



A: approximate location of Ocean Creek Resort

Tuesday, May 3

6:30 - 7:45 am **Buffet Breakfast** Creekside Room

8:00 - 8:30 am **Business & Organizational Meeting** Water Oaks
Election of new members of the Executive Committee (applications due by Monday at 1 pm)
Collaboration with Association of Professors of Human and Medical Genetics (APHMG)
Moderator: **Edward McKee**, Ph.D., Indiana University School of Medicine, South Bend, IN

8:30 am - 12:00 pm **Plenary Session III: New Curricula** Water Oaks
Moderators: **Denise Ferrier**, Ph.D., Department of Biochemistry and Molecular Biology, Drexel University College of Medicine, Philadelphia, PA, and **Tracy B. Fulton**, Ph.D., Department of Biochemistry & Biophysics, University of California San Francisco, San Francisco, CA

8:30 am - 9:30 am **Integrated Curricula:**

8:30 am - 8:45 am **Molecular Foundations of Medicine: An Interdisciplinary Biochemistry-Based Course - Neil Osheroff**, Ph.D., Department of Biochemistry, Vanderbilt University School of Medicine, Nashville, TN

8:50 am - 9:05 am **Biochemistry in an Integrated M1/M2 Organ-System Curriculum - Richard Sabina**, Ph.D., Oakland University, William Beaumont School of Medicine, Rochester, MI

9:10 am - 9:25 am **Teaching Biochemistry in an Integrated First Year Medical School Curriculum - Clive Slaughter**, Ph.D., Department of Biochemistry, Medical College of Georgia, University of Georgia, Athens, GA.

9:30 am - 9:45 am **Break**

9:45 am - 10:45 am **Basic Science in Years 3 and 4:**

9:45 am - 9:55 am **Using Clinical Case Conferences as a Means of Delivering Basic Science Content in the Clerkship Years - Steve Ellis**, Ph.D., Department of Biochemistry and Molecular Biology, University of Louisville, Louisville, KY

10:00 am - 10:10 am **Is this an integration or a differentiation problem?** - **Chin-To Fong**, M.D., Department of Biochemistry and Biophysics, University of Rochester, Rochester, NY

10:15 am - 10:25 am **Integration of a Basic Science Assessment into a Clinical Performance Exam - Katherine Hyland**, Ph.D., Department of Biochemistry & Biophysics, University of California, San Francisco, CA

10:30 am - 10:40 am **Integration of Genetics and Basic Science into the 3rd and 4th Years of Medical School Utilizing Clinical Cases - Darrel Waggoner**, M.D., Departments of Human Genetics and Pediatrics, University of Chicago, Chicago, IL

10:45 am - 10:50 am Change over

10:50 am -12:00 pm **The MR5 and Changes to the MCAT: Implications for Teaching Biochemistry in Medical School - Malak Kotb**, Ph.D., Department of Molecular Genetics, Biochemistry & Microbiology, College of Medicine, University of Cincinnati, OH; and Representative of the AMGDB

12:00 - 1:00 pm **Luncheon** Water Oaks Patio

1:00 - 3:00 pm **Plenary Session IV: Nutrition** Water Oaks
Moderators: **Selina Noramly**, Ph.D., Department of Biochemistry and Molecular Genetics, University of Virginia School of Medicine, Charlottesville, VA, and **Denise Ferrier**, Ph.D., Department of Biochemistry and Molecular Biology, Drexel University College of Medicine, Philadelphia, PA

1:00 - 1.10 pm **Experimental Biology Meeting Summary - Martin Kohlmeier**, M.D., Department of Nutrition, University of North Carolina, Chapel Hill, NC

1:10 - 2:10 pm **Using online resources for nutrition education - Martin Kohlmeier**, M.D., Department of Nutrition, University of North Carolina, Chapel Hill, NC

Participants:

Alan Diekman, Ph.D., Department of Biochemistry and Molecular Biology, University of Arkansas for Medical Science, Little Rock, AR

Janet Lindsley, Ph.D., Department of Biochemistry, University of Utah School of Medicine, Salt Lake City, UT

Clive Slaughter, Ph.D., Department of Biochemistry, Medical College of Georgia, University of Georgia, Athens, GA.

2:10 - 3:00 pm **A nutrition exercise in the medical school curriculum - Chin-To Fong**, M.D., Department of Biochemistry and Biophysics, University of Rochester, Rochester, NY

3:00 - 3:15 pm **Break**

3:15 - 5:15 pm **Working Sessions to create student objectives and competencies in biochemistry (5 concurrent sessions):**

Lipid metabolism Water Oaks 1
Moderator: **Michael Lea**, Ph.D., Department of Biochemistry and Molecular Biology, University of Medicine and Dentistry of New Jersey - New Jersey Medical School, Newark, NJ

Signaling, hormones, and diabetes Water Oaks 2
Moderator: **Gwynneth Offner**, Ph.D., Department of Medicine, Boston University School of Medicine, Boston, MA

Protein and amino acid metabolism Water Oaks 3
Moderator: **David Franklin**, Ph.D., Department of Biochemistry, Tulane University, New Orleans, LA

Nucleotide metabolism Library
Moderator: **Richard Sabina,** Ph.D., Oakland University, William Beaumont School of Medicine, Rochester, MI

Nutrition Creekside Room
Moderator: **Selina Noramly**, Ph.D., Department of Biochemistry and Molecular Genetics, University of Virginia School of Medicine, Charlottesville, VA

5:30 - 6:30 pm *Closed-door meeting of outgoing and incoming planning committee members* *Library*

7:00 - 10:00 pm **Farewell Dinner** Creekside Room

Richard Sabina, Ph.D., Oakland University, William Beaumont School of Medicine, Rochester, MI; Chair, Association of Biochemistry Course Directors

Peter Ronner, Ph.D., Department of Biochemistry and Molecular Biology, Thomas Jefferson University, Philadelphia; Outgoing Chair, Association of Biochemistry Course Directors

Vote on overarching competencies in biochemistry

Discussion and vote on topics for the next ABCD meeting - **Elected Planning Committee for 2013**

Wednesday, May 4

6:30 - 7:45 am	**Buffet Breakfast**	Creekside Room
	Sign up to Share Taxis to Airport	Water Oaks Foyer
	Sheilah Jewart, Amazing Occasions (Sign-up is available starting Monday, May 2)	
8:00 - 10:30 am	**Plenary Session V: Continuing Education**	Water Oaks
	Moderators: **Tracy B. Fulton**, Ph.D., Department of Biochemistry & Biophysics, University of California San Francisco, San Francisco, CA, and **David Franklin**, Ph.D., Department of Biochemistry, Tulane University, New Orleans, LA	
8:05 - 8:20 am	**Phosphofructokinase-1 Regulation: Too Much of a Good Theme?** – **Eric Niederhoffer**, Ph.D., Department of Biochemistry and Molecular Biology, Southern Illinois University, Carbondale, IL	
8:30 - 8:45 am	**Serotonin as a Growth Factor: It's Not Just a Neurotransmitter Anymore!** - **Bradford Jameson**, Ph.D., Department of Biochemistry and Molecular Biology, Drexel University College of Medicine, Philadelphia, PA	
8:55 – 9:10 am	***De Novo* Fatty Acid Synthesis in Overfed Humans** - **James Shoemaker**, M.D., Ph.D., Edward A. Doisy Department of Biochemistry and Molecular Biology, Metabolic Screening Lab, Saint Louis University School of Medicine, St. Louis, MO	
9:20 – 9:35 am	**Connecting B_{12} and Folate Deficiency to Neurological Changes - Michael Lieberman**, Ph.D., Department of Molecular Genetics, Biochemistry and Microbiology, University of Cincinnati, Cincinnati, OH	
9:45 – 10:00 am	**CETP Inhibition: Novel Therapy or Lurking Danger? - Michael King**, Ph.D., Indiana University School of Medicine, Terre Haute, IN	
11:00 am	**Check out** / **Departures** (11:00 am is the official deadline to check out of your room at the Ocean Creek Resort) Wait in the Water Oaks Foyer to share taxis to the airport.	

Poster Abstracts

(Listed alphabetically by first author)

Teaching Biochemistry and Molecular Biology at the University of the Sciences

Michael F. Bruist, Associate Professor of Biochemistry
Department of Chemistry & Biochemistry
University of the Sciences, Philadelphia, PA 19083

Context

CH346 Biochemistry (4 credits) is a large lecture class for students in the pharmacy program and pharmaceutical sciences undergraduates. CH356 Molecular Biology and Genetics (3 credits) follows CH346. I teach CH346 with one other colleague; we work in succession. I am the only instructor for CH356. Both classes have teaching assistants, who are graduate students, advanced pharmacy students and undergraduates. These TAs teach, assist and grade 6 recitations sections that meet weekly for both courses.

Objectives

This presentation consists of a discussion of challenges to teaching this course and my response to these challenges. These challenges include:

- Designing basic yet rigorous courses in biochemistry and molecular biology
  - Learning objective - The biology of life can be understood from a chemical perspective. Concepts holding for all living organisms, as well as those addressing individual variations are realized. This understanding enables physicians, pharmacists and scientists to use and develop drugs for the treatment of disease.
- Engaging students in lectures and recitations
- Encouraging students to keep up with studies
- Assessing students' knowledge
- Working with limited resources

Key Message

Keep the students engaged through relevant examples and hands-on problem solving.

Conclusion

Through the use of technology and problem-solving recitations one can connect with willing students. New approaches are constantly needed to maintain a freshness that engages the students.

Target Learners

This large course teaches 250 pharmacy students in their first professional year (third undergraduate year) and 20 pharmaceutical sciences undergraduates. A significant number of these students see biochemistry only as an irrelevant hurdle to be overcome on their way to a career in retail pharmacy.

Lab-tokens: A case-based approach to integrate basic and clinical sciences

E. Buxbaum[1], A. Blanchetot[2], N. Larsen[2], G. Meisenberg[2], A. Yin[3], D.B. Averill[4] & B.E. Wright[5]

(1) Address for Correspondence: Department of Biochemistry, Ross University School of Medicine, Portsmouth Campus, P.O. Box 266, Roseau, Commonwealth of Dominica, West Indies, ebuxbaum@rossmed.edu.dm
(2) Dept. of Biochemistry, RUSM, (3) Dept. of Anatomy, RUSM, (4) Department of Basic Sciences, The Commonwealth Medical College (5) Dept. of Physiology, RUSM

Abstract
In order to help students integrate basic science and clinical concepts, we use an approach where students solve a clinical case and then answer questions relating to the case. In order to arrive at the correct diagnosis, students have to order exams and lab tests, and pay for them from a restricted budget, represented by "tokens". To order tests in a proper sequence (search to confirmatory) students need a good understanding of the science behind the disease, how tests work, and how they are interpreted.
Both students and faculty enjoy this new format, which is very flexible and can be easily adjusted for different learning objectives.

Teaching Biochemistry by Active Learning – a Success Story

E. Buxbaum, Ross University School of Medicine

Background: Students come to Ross often with a weak background in science and mathematics. Quantitative thinking, the interpretation of graphs and chemical formulas ("the three-headed monster") cause anxiety and avoidance. At the same time, Ross works in a trimester-system, i.e., our students have 3 months to study what many other universities teach in 4. It is therefore not surprising, that students performance in Biochemistry Shelf-exams was particularly poor on questions relating to thermodynamics, proteins structure and enzymes, even though their overall performance was similar to the national average.

Question: Can Active Learning improve students grasp and long-term retention of these basic science concepts?

Method: Comparison of Shelf-results on pertinent question between students taught by active learning with historic results of students taught the
same material by conventional lectures.

Conclusions: As far as can be seen from the data available, students do significantly better (P0 < 0:1%) when taught by active learning rather than by
conventional lectures. Since the Shelf exams were given almost 2 semesters after the classes, this represents an increased long-term retention. Improvement is not restricted to the fields thought in this fashion, rather, student learning style is generally improved.

Gene Structure and DNA Sequence Analysis Problem Solving Session

Carmen L. Cadilla, Ph.D. Professor, University of Puerto Rico School of Medicine, Department of Biochemistry, PO Box 365067, San Juan PR

When teaching medical and graduate students, we have observed difficulties in understanding gene structure and interpretation of DNA sequence data. In order to address these problems and integrate other concepts and techniques discussed in this area, we designed a problem solving exercise for 1rst year medical students. In the first part of the 2hr exercise, students are provided a diagram of a gene structure, location of relevant restriction enzyme recognition sites and of fragments of the gene used to generate subclones in plasmids. With this diagram, students answer a series of multiple choice questions that require interpretation of the restriction map and prediction of fragments detected in Southern blots, the size of the mRNA product detected in Northern blots as well as questions on probe design for such hybridizations. The second part of the exercise provides Sanger automated sequencing chromatograms for the *HPS1* gene and the reference sequences of the analyzed regions. Students interpret the sequences and predict the changes in the protein products as well as discuss briefly the rare genetic disorder caused by mutations in this gene, which causes a form of albinism frequently found in the Puerto Rican population. When students were tested on these topics in exams, where they were asked to interpret gene maps or DNA sequences, the majority of students successfully answered these questions. The skills acquired will allow them to better assess gene analysis results that they may encounter in their future practices. Reference: Hermos CR, Huizing M, Kaiser-Kupfer MI, Gahl WA (2002) Hum Mutat 20(6): 482.

Team-based Learning Approach to Integrating Biochemistry in a Pharmacy Core Curriculum

Peter Clapp, PhD; Stephen Luckey, PhD
Regis University School of Pharmacy, Rueckert-Hartman College for Health Professions, Denver CO 80221

Context: The Regis University School of Pharmacy (RUSOP) offers a four-year Doctor of Pharmacy (PharmD) degree program with innovative approaches to learning and curricular structure. Foundational topics of biomedical, pharmaceutical and clinical sciences are delivered to students in a series of twelve 8-week courses that combine integrated, disease state-specific content with a Team-Based Learning (TBL) model of instruction.

Objectives: 1) To describe the integration of biochemical learning objectives within the disease unit sequence of the Integrated Pharmacotherapy (IP) course series. 2) To compare student learning outcomes between courses administered by TBL or traditional lecture-based approaches.

Key Message: In a single 8-week course, biochemical topics within the disease state sequence (dyslipidemia, diabetes mellitus, major depressive disorders, anxiety and sleep disorders, and allergic rhinitis) were delivered as a part of a standard TBL unit schedule that consists of pre-class readings, Readiness Assurance Testing (RAT), Applied-knowledge Exercises (AE), and traditional examinations. Class hours and faculty workload were roughly equivalent to a previously administered, lecture-based biochemistry course given to a comparison group of first-year physician-assistant students. Learning objectives were divided and assigned to the most relevant disease units within the course. Individual first-year pharmacy students demonstrated comprehension of biochemical topics through successful completion of RAT assessments. Student teams demonstrated an ability to apply biochemical concepts and analyze complex biochemical relationships during in-class AE activities. Performance on summative examinations was equivalent between comparison groups.

Conclusion: Integrating biochemical topics with pathophysiological, pharmaceutical and clinical sciences in a single course does not require a reduction in the depth or variety of learning objectives. The ability of students to demonstrate higher-order cognitive domain learning in class activities does not appear to alter performance on examinations that assess similar learning outcomes.

Target Learners: Professional year one (P1) students in a four-year Doctor of Pharmacy program.
References: Michaelsen LK, Parmelee D, McMahon K, Levine RE. 2008.Team-based learning in health professions education. Sterling, VA: Stylus Publishing.

Successful Implementation of Biochemistry Curriculum Improvements to Address Deficiencies Inherent in an Organ Systems-Based Educational Platform

Sheri F.T. Fong, M.D., Ph.D.
Assistant Professor, Department of Anatomy, Biochemistry and Physiology *and* Office of Medical Education, John A. Burns School of Medicine, Honolulu, HI

The John A. Burns School of Medicine (JABSOM) switched their main educational platform in 1989 from a lecture-based traditional curriculum to a problem-based learning (PBL) curriculum organized by organ systems. Lectures were eliminated, as students were expected to learn all basic sciences fundamental to medicine through self-study. It became apparent that there were inherent deficiencies for a subject-based field like biochemistry in a PBL curriculum. Students have a greater difficulty recognizing clinical relevance on their own, and because students determined their own learning, there were gaps of knowledge. These deficiencies were reflected in a drop of biochemistry proficiency from the top ten in the nation to below the national mean on USMLE Step 1 and low ratings of perceived preparedness for clinical clerkships related to biochemistry instruction. The first curricular improvement in 2003 targeted all basic sciences with the introduction of the Basic Science Lecture Series. This provided about 17 hours of biochemistry instruction over the two pre-clinical academic years, and led to modest improvement in both biochemistry USMLE Step 1 scores and perceived preparedness for clinical clerkships. However, a survey administered to beginning 3rd year students (MS3s) in 2007 revealed that biochemistry ranked lowest of all basic science disciplines for how well the curriculum prepared them for USMLE Step 1, with only 15.4% of students rating adequately or well-prepared. We instituted two curricular improvements. First, ten lectures were embedded into one of the first year curricular units as a biochemistry "concentration". These lectures, whose topics did not necessarily relate to the curricular unit, provided foundational knowledge in biochemistry and incorporated case reports to indicate clinical relevance. The second, a 4-week summer selective in biochemistry, was offered to beginning MS2s. This organ-systems biochemistry course reviewed clinically relevant topics using small groups to discuss case studies and review articles. A repeat survey in 2009 to capture the MS3s who experienced the curricular changes, revealed that 61.8% of students felt adequately or well-prepared for the USMLE Step 1, and USMLE Step 1 scores from 2009 and 2010 demonstrated the highest margin above the national mean since implementation of PBL.

Association of Biochemistry Course Directors Website: Accomplishments to Enhance Education of Biochemistry in Schools of Medicine, Pharmacy and Dentistry.

David S. Franklin, PhD
Associate Professor and Director for Cellular and Metabolic Biochemistry Courses.
Tulane University Health Sciences Center, School of Medicine, Biochemistry Department, 1430 Tulane Avenue, New Orleans, LA 70112

Purpose

The Association of Biochemistry Course Directors (ABCD) was officially created in April 2008 at the conclusion of the 1st Medical Biochemistry Education Strategies Workshop. The initial mission of the ABCD was to bring together course directors from all medical schools across North America and the Caribbean. This has now expanded to also include biochemistry from Schools of Pharmacy and Dentistry. Through common interests to improve education, interactions at ABCD conferences and through dissemination of resources critical to education of biochemistry topics, the ABCD wishes to (A) develop objectives to improve biochemistry curricula, (B) utilize effective interactive teaching methods, (C) apply adult learning principles to biochemistry, (D) provide continuing education in recent and/or controversial areas of biochemistry, and (E) provide expanding educational resources to ABCD members.

Methods

To assist in accomplishing these goals, the ABCD website (www.abcd.wildapricot.org) was unveiled in March 2010. This website allows instructors of biochemistry to apply on-line for membership to the ABCD, expanding its member base. The site also provides contact information to ABCD members, and allows a channel for communication, and dissemination of information. Finally, the site contains a secure section for depositing of educational resources, which are available only to ABCD members. At present, ABCD membership is free.

Results

As of the first conference of biochemistry course directors in 2008, the ABCD consisted of 77 members, expanding to 106 after the second conference in 2009. Topics discussed at these conferences included the role of biochemistry in integrated and non-integrated curricula, teaching modalities, defining course content, resource exchanges, and teaching basic science in clinical years. The next conference is planned for April 2011. Since its inception, the ABCD website has accepted 49 new on-line members, increasing the ABCD by 46% to 155 members. 76 of the 106 original members (71.7%) are registered through the website, bringing total on-line membership to 125 individuals. 145 members represent 100 different schools from 37 US states. 7 members represent 2 Caribbean schools, and 3 members represent 2 Canadian schools. The breakdown of members by school type includes 127 from traditional medical schools, 18 from osteopathic medical schools, 8 from schools of pharmacy and 2 from dental schools. Resources that are presently posted include Essential Topics in Biochemistry (generated at the 2009 conference), and 137 pages of test questions (broken down according to these Essential Topics). Future resources may include content from ABCD conferences (past and present), enhanced educational content (lectures, study guides, clinical vignettes, active learning modules, novel approaches to teaching) and samples of course syllabi and school curricula.

Conclusions

There was valuable interaction between ABCD members at each of the conferences. However, there is a need for continued dialogue and exchange of ideas and resources. The ABCD website will play a critical role in helping to enhance these interactions for the benefit of our students, our courses and our institutions of higher education.

Increasing Active Learning of Metabolic Biochemistry Topics through the TBL Format

David S. Franklin, PhD
Associate Professor and Director for Cellular and Metabolic Biochemistry Courses.
Tulane University Health Sciences Center, School of Medicine, Biochemistry Department,
1430 Tulane Avenue, New Orleans, LA 70112

Purpose
Team-based learning shifts the roles of education from a passive lecture format by an instructor, to active application of course material by student teams. This enables students to self-teach themselves and their team members, providing a more concrete form of active learning, holds students responsible for their understanding, and shifts their emphasis from passive learner to active participants.

Methods
Over the past two years at Tulane University School of Medicine, eight Metabolic Biochemistry course lectures have been converted to an active-learning TBL format, including two amino acid metabolism lectures, two nucleotide metabolism lectures and four diabetes lectures. The genesis of this began with several TBL workshops to learn the TBL process; how to cover metabolic pathways and complex topics such as Inborn Errors of Metabolism or Diabetes in a traditional TBL format. The amino acids and nucleotides lectures were each converted into 2-hour TBL sessions, consisting of IRAT/GRAT and GAE case study questions. The diabetes lectures were converted into two 2-hour TBL sessions, each with a different set of learning objectives.

Results
These four TBL sessions were recently completed. As anticipated, there was a statistically significant increase in the team-based GRAT scores, compared to the individual IRAT scores ($p<0.0001$, for all four TBL sessions). The results from the team-based GAE case study questions were also similarly high. TBL topics were also assessed in a multiple choice block examination. Although all statistically insignificant ($p>0.05$), exam scores increased for the amino acid and diabetes topics, and decreased for the nucleotide topic (comparing TBL vs. lecture exam scores).

Conclusions
Overall, student evaluations were positive, appreciating the change to active learning. Our results and student evaluations suggest how these TBLs may be further improved for future use.

Medical Chemistry is NOT Graduate Biochemistry "Lite": Integration with Clinical Correlates

Marc J. Glucksman, PhD - Professor and Course Director
Rosalind Franklin University of Medicine and Science/ Chicago Medical School
North Chicago, IL 60064

Teachers of modern Medical Biochemistry are currently challenged with the need to instill in their students both a mastery of the underlying clinical principles of medicine while simultaneously building a solid understanding of biochemistry. Early introduction of clinical correlates into the biochemistry modules reinforces both the basic scientific and clinical core principles that need to be retained for later use in years 3 and 4 of the patient-based medicine curricula. Conceptual understanding of the basic biochemical foundation supports the scaffolding created by further application of principles in clinical correlates. This process encourages critical thinking by the integration of clinical correlates introduced in Medical Biochemistry as well as by further expansion through the additional basic science courses of physiology, pharmacology, genetics, pathology, molecular and cell biology. This educational approach discourages rote memorization of structures and formulas and seeks to emphasize the "big picture" without "watering down" content to become a mere "lite" form of a graduate biochemistry course. Exam questions also revolve around the clinical vignette setting.

Several high-yield text resources were created to facilitate use of this combined approach and to augment the classic textbooks already in use. Two examples are: an adjunct review and clinical-case compendium created with former medical students. The books in use are: "*Biochemistry, Molecular Biology and Genetics, Board Review Series*" and "*Underground Clinical Vignettes- Biochemistry*" published by Lippincott, Williams and Wilkins (Wolters Kluwer).

Acknowledgement: Dr. Todd A. Swanson MD, PhD, Dept. of Radiation Oncology, University Texas Medical Branch, Galveston, TX for spearheading the efforts of this and other USMLE Board materials.

An Integrated and Compact Medical Biochemistry and Nutrition Curriculum at The University of Illinois at Chicago (2006-2011)

Yee-Kin Ho, Department of Biochemistry and Molecular Genetics, UIC

The College of Medicine at University of Illinois at Chicago has implemented a newly designed M-1 basic sciences curriculum with emphasis on course alignment for the past five years. Medical Biochemistry and Nutrition is taught as a single course for 12 weeks with a total of 113 lectures at the beginning of the Fall semester. Other major courses such as Anatomy have been moved back for six weeks allowing students to concentrate in learning the molecular and cellular knowledge which are applied to all others subjects in the M-1/M-2 years. This course integrates knowledge in biochemistry, cell biology and molecular genetics and each basic science topic is immediately followed with clinical implication in disease etiology, diagnosis and treatments. A small group active-learning (five students per study group) on "Clinical Case Files" is run in parallel with the plenary lectures which covers over eighty five diseases. The new curriculum resulted in a 4-6 point increase of the average USMLE STEP-1 score in the past three years. Students with "Outstanding" grade in Medical Biochemistry and Nutrition (24% of a class of 200) have an average STEP-1 score of 242. The Pros and Cons of the UIC curriculum and its future direction will be discussed.

INTEGRATION OF A BASIC SCIENCE ASSESSMENT INTO A CLINICAL PERFORMANCE EXAM

Katherine Hyland, PhD[1], Marieke Kruidering-Hall, PhD[2], Brian Niehaus, MD[3], and Karen Hauer, MD[4]

(1) Department of Biochemistry and Biophysics, (2) Department of Cellular and Molecular Pharmacology, (3)School of Medicine, (4) Department of Medicine; School of Medicine, University of California, San Francisco, CA 94143

INTRODUCTION/CONTEXT:
We have previously developed integrated exercises in the preclerkship years that combine basic science content with a standardized patient experience. Now we have developed a basic science assessment for one case of the CPX. Here we describe the results of a pilot that address the level of retention and ability to apply basic science to a clinical situation after clerkships.

OBJECTIVE:
To assess retention of and ability to apply basic science in the context of a clinical performance exam (CPX).

METHODS:
Development of exercise:

- Basic science faculty and CPX committee developed five questions that were integrated into a CPX interstation. Two evaluation questions were included.
- MS4s were required to complete the exercise, but were informed that their scores would not count.

Scoring and analysis:

- Student short answers were scored using a rubric we developed through an iterative process using real student answers.
- Scoring was computer assisted based on key words.
- Research assistant reviewed all answers and complied final scores.

RESULTS:
Average student performance for the five questions was: 37%, 34%, 31%, 36.5% and 74.5% (n=140). Students mildly agreed that this exercise helped them appreciate the clinical relevance of basic science (3.4 out of 5, sd 0.8) and reinforced its application (3.3 out of 5, sd 0.8).

DISCUSSION:
Evaluation responses demonstrate that students found value in this exercise. Low scores may suggest that students either have difficulty retaining or applying basic science knowledge relevant to the case. They may also reflect an inability to elaborate, which may be a negative consequence of multiple-choice exams. In addition, students may not have taken the exercise seriously.

TARGET LEARNERS: 3rd/4th year medical students

A Marriage of Biochemistry and Nutrition

Kevin R. Kearney, Ph.D.
Professor of Pharmaceutical Sciences
Massachusetts College of Pharmacy and Health Sciences
School of Pharmacy-Worcester/Manchester

Introduction

The poster will describe how two courses – Biochemistry II (Intermediary Metabolism) and Nutrition – were merged into one course, offered in the first professional year in a pharmacy school curriculum. The merger was necessitated by a curricular re-alignment, but provided an opportunity to remove some redundancies and to interweave complementary material from the two courses. The new course has by now been offered 6 times and has been 'fine-tuned.'

Objective

After viewing the poster, meeting participants will have a sense of how Biochemistry and Nutrition material can be combined in a single course.

Key Message

Some aspects of Nutrition were interwoven with the treatment of intermediary metabolism: carbohydrates, lipids and proteins in the diet and their health effects, and enzyme cofactors and their vitamin precursors. Others were treated following completion of the metabolism part of the course: nutritional standards, energy balance and weight control and age-specific nutritional issues. The course concluded with an introduction to food-drug interactions. The poster presentation will include a course schedule, sample Powerpoint slides, Clicker questions, and exam questions.

Conclusion

A merger-of-necessity provided an opportunity for combining material from two courses, resulting in a more streamlined course integrating two related disciplines.

Target Learners

Course Directors interested in including Nutrition material in a Biochemistry course.

References (textbooks used for the course)

David L. Nelson and Michael M. Cox, *Lehninger Principles of Biochemistry* (5th Edition, W.H. Freeman & Co., 2008)

Sharon R. Rolfes, Kathryn Pinna, and Ellie Whitney, *Understanding Normal and Clinical Nutrition* (8th Edition, Thompson Wadsworth, 2009)

Tweaking TBL: Engaging Students in a Team-Based Learning Session

Ralph L. Keil[1], Ph.D. and Barbara E. Ostrov[2], M.D.
[1]Department of Biochemistry and Molecular Biology; [2] Division of Rheumatology, Departments of Medicine and Pediatrics
Penn State Milton S. Hershey Medical Center; 500 University Dr.; Hershey, PA 17033
[1]rkeil@psu.edu; [2]bostrov@hmc.psu.edu

We designed a team-based learning (TBL) session presenting nucleotide metabolism related to gout for first-year medical students (MS1). Following the initial, poorly received presentation of the TBL, modifications were made that dramatically enhanced student evaluation of the session. These modifications included decreasing the class and group sizes and making this a low-stakes grading situation. Adding the opportunity for students to interact with gout patients after the session was extremely well received. This session is now highly evaluated by students with more than 98% saying the session should be offered annually.

"Utility of a Preliminary Basic Science Examination for Providing Early Intervention to Enhance Student Success in Required Biochemistry Courses Taken by First-Year School of Pharmacy Students"

Thomas L. Lemke*, Rashid Mosavin and Willie L. Davis****
*** Department of Pharmacological and Pharmaceutical Sciences, University of Houston College of Pharmacy**
**** Department of Pharmaceutical Sciences, Loma Linda University School of Pharmacy**

Introduction: The first (PY-1) year of the Pharm.D curriculum at the Loma Linda University School of Pharmacy (LLUSP) includes a two-quarter biochemistry sequence. To roughly assess the relative academic preparation of entering students, we give incoming PY-1 students a multiple-choice "Pre-Test" which covers college-level biology, chemistry and math topics. This same instrument is administered to PY-1 students at several other schools of pharmacy.

Objectives: Our objectives are to compare the relative performance of our entering PY-1 students with students at other comparable schools of pharmacy and to determine whether student performance in the two PY-1 biochemistry courses correlates with performance on the "Pre-Test".

Methods: Entering PY-1 students were administered the "Pre-Test" during their orientation period. Students were given no information regarding the content of the examination. The students' performance in Biochemistry I and II were compared to their scores on sections of the "Pre-test" to assess whether there was correlation between the two.

Results: LLUSP PY-1 students perform as well as other cohorts. Students who scored in the bottom 25th percentile in Biochemistry I were more likely to have performed relatively poorly on specific sections of the "Pre-Test" and on the "Pre-Test" as a whole. Data from Biochemistry II is being analyzed.

Preliminary Conclusion: The "Pre-Test" may prove to be a valuable tool in determining those students who need preemptive assistance to ensure their success in the PY-1 biochemistry course sequence.

Paired Clinical Cases: an active learning method

Janet Lindsley & Sara Lamb, University of Utah School of Medicine, Salt Lake City, UT 84112

PURPOSE

With the adoption of a competency-based, integrated curriculum, we needed to develop new methods for student learning and assessment. In order to help students progressively develop clinical reasoning skills, we needed to provide first and second year students with new learning resources. We have also begun to use structured oral and written cased-based exams, and needed a mode for student practice and self-assessment in this format.

METHODS

In order to achieve the above goals, faculty in our medical school have developed a series of clinical cases, each followed by structured clinical reasoning questions. Students work in pairs, each student having the opportunity to be "questioned" by the other, similar to a structured mock-oral exam. The two cases within a pair are designed to compare and contrast related clinical situations. After the activity is completed, the "ideal" answers and a grading rubric are posted on-line. Each paired activity lasts approximately 50 minutes.

RESULTS

Paired cases related to the diagnosis/treatment of pneumonia, chest x-ray interpretation, anemia, leukemia/lymphoma, dyspnea, diabetes and colon cancer has been used in several year 1 and 2 units. A pair of diabetes mellitus cases (a type 1 and a type 2) has been used during both years; these will be displayed on the poster.

CONCLUSIONS

Based on student feedback, the use of paired clinical cases has been a popular addition to the curriculum. This method addresses three of our school's competencies, namely (1) to apply scientific knowledge for clinical reasoning, (2) to engage in self-directed learning, and (3) to practice self-assessment.

Incorporating Biochemistry into an Integrated Patient-Focused Curriculum

Deborah W. Louda, Associate Professor of Integrated Medical Science
Zhongwei Li, Associate Professor of Biomedical Science

Charles E. Schmidt College of Medicine, Florida Atlantic University, Boca Raton FL 33431

Context and Objectives: The Florida Atlantic University Charles E. Schmidt College of Medicine (FAU COM) recently received preliminary accreditation as an independent medical school after functioning for seven years as a regional campus of the University of Miami Miller School of Medicine. Based on positive experiences with Problem-Based Learning (PBL) while acting as a regional campus, the FAU COM has developed a new curriculum that combines clinically-oriented PBL cases, patient interactions, small group activities, and lectures.

Key Message: Biochemistry appears as a theme throughout the M1 and M2 courses, with key concepts presented though PBL cases and coordinated lectures. Fundamental biochemical principles are introduced early in M1, and then are developed, reviewed, and extended as the curriculum progresses. Efforts have been made to effectively organize biochemistry activities throughout M1 and M2 courses to ensure complete coverage of important topics while avoiding unnecessary redundancy. The detailed structure of the FAU COM's curriculum, the integration of the biochemistry theme, and specific examples of incorporating biochemical concepts will be presented.

Conclusion: This approach is designed to enable students to experience an authentic medical environment throughout their education with all important disciplines integrated in a patient-focused curriculum. Program evaluation will begin with the first entering class in 2011.

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Designing and Implementing Team-Based Learning Exercises in a Medical Biochemistry and Molecular Biology Course

Edward E. McKee, Ph. D. Indiana University School of Medicine – South Bend, 1234 Notre Dame Avenue, South Bend, IN 46617

Context: Team-Based Learning [1] is a well-characterized and highly interactive pedagogy that has been used for some time in a variety of disciplines. However, its use in medical education and in Medical Biochemistry is more recent [2]. The popularity of Team-Based learning appears to be growing as medical education strives to become more interactive. I "discovered" TBL in my own search for a more interactive teaching strategy that could be delivered by a single faculty member. I have made extensive use of TBL for the past 5 years in my course in Medical Biochemistry and Molecular Biology.

Objectives: The poster will describe the basics of TBL and how TBL has been used in my course to integrate and apply content. The added value of TBL in a competency based curriculum is also described. TBL is a basis for students to practice, refine, and assess their peers on a variety of competencies required for team interaction, including: communication, life-long learning, self awareness, ethical and moral reasoning, problem solving, and professionalism.

Conclusion: The sessions were highly valued by the students and provided a highly interactive environment for learning content and perfecting team skills.

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Teaching Peer Feedback Techniques to Medical Students as part of Team-Based Learning Peer Evaluation

Edward E. McKee and Stacey A. Jackson, Indiana University School of Medicine –South Bend, 1234 Notre Dame Avenue, South Bend, IN 46617

Introduction: Assessment tools that test for basic knowledge and basic skills have been well-described and discussed. However, assessment tools that provide information on other desirable competencies have not been as well developed [1]. Team-Based Learning (TBL) [2] is used extensively in the Medical Biochemistry and Molecular Biology course at IUSM-South Bend. During TBL, students are given continual opportunities to practice and refine their skills in seven of the nine IUSM competencies: communication, science in guiding diagnosis, life-long learning, self awareness, ethical and moral reasoning, problem solving, and professionalism. It is important in this process that students receive quality feedback to determine how well they are meeting the expectations of the competencies. Peer evaluation and written feedback from one's team mates can be a powerful tool to provide this information. However, first year medical students are not always equipped with the skills to give appropriate feedback.

Objectives: We will describe the training methods we employed in a Team-Based Learning format as well as our peer evaluation tool and our rubric for grading and critiquing comments.

Methods: To help students develop the skill of writing quality feedback, we have developed a peer evaluation tool which places a significant weight on writing appropriate feedback and have developed a simple Team-Based learning training exercise in writing feedback comments. Following this training, students complete our evaluation tool as a formative and then summative exercise in which their feedback comments are graded and critiqued by instructors.

Conclusions: Our experience suggests that this approach to training students to write quality feedback is the first step in providing the appropriate foundational training necessary to master core competencies in effective communication, self-awareness and professionalism.

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Internet-based problem-based learning modules: electronic patients for an organ system based multidiscipline integrated curriculum.

Eric C. Niederhoffer, Ph.D., Biochemistry and Molecular Biology, MC 6503, 600 Agriculture Drive, Southern Illinois University School of Medicine, Carbondale, IL 62901.

The following abstract is for a computer-based demonstration during poster sessions.

Context: The Problem-base learning curriculum has been in existence at Southern Illinois University School of Medicine for over 25 years. During this period of time, our core vehicle for student centered learning has been the Problem-based Learning Module (PBLM). The PBLM is a collection of history, physical examination, laboratory, and patient progress data that focuses on an important clinical condition. Initially, the PBLM was available in printed copy for data abstraction, but since 2005, our collection of more than 200 patient cases has become available for access over the Internet. Qualified faculty are able to edit and update the patient databases.

Objectives: Participants should become familiar with access requirements, data requirements, and editing features.

Key Message: Electronic PBLMs are useful databases that can be used to facilitate learning in either single discipline or multidiscipline integrated curricula. Editing features can be used to focus patient cases in response to changes in curricular objectives.

Conclusion: The use of patient cases can serve important and critical roles to facilitate curricular objectives of both students and faculty.

Problem-solving session on hypoglycemia

Peter Ronner, Ph.D., Thomas Jefferson University, Philadelphia, PA 19107

Introduction

Most students need to learn how to apply theoretical knowledge to practical clinical situations. A weekly clinicopathological exercise from the New England Journal of Medicine was used for a whole-class problem-solving session on hypoglycemia.

Objective

To provide medical students with an opportunity to apply their knowledge of metabolism to determine the cause of hypoglycemia in a patient.

Methods

After appropriate background lectures on laboratory values, pancreatic hormone secretion, carbohydrate metabolism, and lipid metabolism, students were presented with the case history of a 58-year old woman who had recurrent episodes of confusion. Information and questions about the case were broken down into manageable steps in such a fashion that the students could eventually make a diagnosis of insulinoma. Towards the end of the session, the case was summarized. Then, the students were shown how this information could be applied to related cases. After the session, the students were provided with written answers and supplementary material.

Results and Discussion

First-year students liked this activity, because they love to figure out a medical case. Knowledge of such cases will eventually help the students gain early clinical experience.

Insulinomas develop in only about 1:2,000 persons. However, this case has much broader applications. The students learn about the evaluation of hypoglycemia, which is an important skill.

This problem-set has been used for a discussion among ~200 students, but students would presumably show greater benefit, if the discussion took place in a smaller group.

Target learners

First-year medical students.

References

RE Scully et al., NEJM 318: 1523-1532, 1988: Case Records of the Massachusetts General Hospital; Weekly Clinicopathological Exercises; Case 23-1988.

Acknowledgments

This session is based on a precursor that had been developed by Dr. Annemarie Weber at the University of Pennsylvania.

Opinions about teaching modalities: comparison between faculty and students

Shilpa Shah, Ph.D., Gerhard Meisenberg, Ph.D.
Ross University School of Medicine, Dominica

Context
Little is known about the acceptance of different teaching/learning modalities by students and faculty. We report the results of an anonymous survey at Ross University Medical School, where most of the currently popular instructional methods are used. The school's basic science curriculum of four trimesters is taught on the Caribbean island of Dominica. 400 students are admitted each trimester. Approximately 100 of these are enrolled in a Progressive Academic Education (PAcE) program emphasizing team-based learning (TBL). Lectures, handouts, textbooks and mediasite (videotaped lectures) are optional for all students. PBL, simulation and Introduction to Clinical Medicine (ICM) practicals (mainly physical diagnosis) are mandatory for all students. TBL is mandatory for PAcE students only.

Procedure
Study subjects included 327 PAcE students and 30 faculty members. 5 questions each were asked about lecture, handouts, textbooks, mediasite, simulation, PBL, TBL, and ICM practicals, scored on a 5-step Likert scale. Response rates were approximately 80% for students and more than 50% for faculty.

Results
Students gave the highest scores to mediasite followed by simulation, handouts and ICM practicals. Lowest student scores were for PBL followed by TBL and textbooks. PBL scores were significantly higher for 3rd and 4th trimester students than for 1st and 2nd trimester students ($p<.001$).
Faculty gave highest scores for lecture, followed by ICM practicals and textbooks. They gave the lowest scores for TBL followed by mediasite and PBL. Differences between students and faculty were statistically significant for lecture ($p<.001$), mediasite ($p = .001$), textbooks ($p = .002$), and PBL ($p = .043$).

Conclusions
There are substantial differences in perceptions about teaching modalities between faculty and students. A striking finding is the dislike of 1st and 2nd trimester students for PBL.

An Integrated Biochemistry Course for First Year Pharmacy Students

Fred Tejada, Ph.D.
University of Maryland Eastern Shore
School of Pharmacy and Health Professions
School of Pharmacy
Somerset Hall
Princess Anne, MD 21853

The UMES School of Pharmacy utilizes a three-year modular curriculum. The two major components of the program are the didactic and the experiential components. The 1st year didactic material is composed of integrated basic science modules, with clinical correlates while the 2nd year focuses on integrated clinical science modules with basic science correlates. The experiential component begins in the 1st year with Introductory Pharmacy Practice Experiences (IPPEs) and continues throughout the 2nd year and culminates with Advanced Pharmacy Practice Experiences in the 3rd year.

Effective integration has been linked to increased student learning skills, improved depth of understanding and enhanced student motivation particularly if they view the course as relevant to pharmacy. The goal was to develop an integrated biochemistry course that will enable 1st year pharmacy students to master and apply the basic science material to the clinical setting.

The course is team-taught by basic sciences and pharmacy practice faculty. Educational activities included lectures, active-learning sessions, presentations, formative and summative assessments (individual and team). It incorporated materials from biochemistry, medicinal chemistry, pharmacology, physiology, pathophysiology and clinical science. Students were required to complete two "classroom connection assignments" (CCAs) during their IPPE. Faculty designed an activity which the students completed during their IPPE. The activity focused on a topic discussed in class and can be applied toward their experiential activities. During the IPPE seminar, course faculty facilitated the discussion of the assignment.

The majority of students agreed (>90%) that their knowledge of the subject increased as a result of this course and that the materials contributed to the understanding of the content. The majority (87-94%) also agreed that CCA promoted critical thinking and self-directed learning skills and contributed to their appreciation of the course.

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The Integration of Biochemistry into a Clinical Scheme-Based Medical School Curriculum

Amy Trott, PhD (Assistant Professor of Biochemistry) and Tanis Hogg, PhD (Associate Professor of Biochemistry)

Department of Medical Education, Paul L Foster School of Medicine, Texas Tech University Health Science Center, El Paso TX

Context:

The Paul L. Foster School of Medicine (PLFSOM) is a new four-year medical school that was initiated in El Paso, TX as a branch of Texas Tech University (Lubbock, TX). While we maintain strong ties to our parent institution, we have been encouraged to adopt a new and innovative approach to medical education that deviates strikingly from that of traditional medical schools. Termed a "scheme-based approach", the first two years of basic science education are delivered within the context of clinical schemes or presentations. This approach allows the integration of relevant basic science concepts within a clinical framework and has been demonstrated previously to be an effective method of curricular design (1). We discuss here methods and approaches used at PLFSOM for the integration of medical biochemistry within this curriculum style as well as the advantages and disadvantages of the clinical scheme-based curriculum for the delivery of content within this discipline.

Objectives:

(1) To define the concept and organization of a clinical scheme-based medical school curriculum.

(2) To discuss approaches used to integrate medical biochemistry into a clinical scheme-based curriculum

(3) To discuss advantages and disadvantages of teaching biochemistry in an integrated format.

Key Message:

The scheme -based curriculum style is an innovative approach that allows the effective delivery of medical biochemistry within a clinically relevant framework.

Conclusions:

The delivery of biochemistry concepts within the first two years of a medical school curriculum traditionally follows a siloed format in which the clinical relevance of the presented material is reserved or omitted until a stronger background in the basic sciences is established. We have found that the careful integration of biochemistry within a scheme-based curriculum allows for the discussion of the discipline in a manner that most directly correlates with its medical relevance. That said, we also acknowledge that biochemistry delivered in an integrated format over the course of a two year period may appear "dispersed" and disorganized for a student who must simultaneously master the integration of multiple basic science disciplines.

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Clinical Cases Used to Teach Basic Science: Integration of Biochemistry, Cell Biology, and Genetics

Darrel Waggoner M.D. and Karl Matlin Ph.D. University of Chicago

Context

Cells, Molecules, and Genes (CMG) is a course in the Pritzker School of Medicine that integrates Cell Biology, Biochemistry, and Medical Genetics as a concept-based course with decreased lecture time and discipline integration, which utilizes small-group discussions using a novel case-based format.

Objectives

To facilitate small group discussion and self-based learning, the curriculum of CMG was designed around 9 clinical cases. The cases were selected based on the specific disrupted cellular mechanisms underlying the diseases to illustrate principles of biochemistry, cell biology and genetics.

Key Message

Each case was presented by a clinician who focused on a single patient and included a complete medical history and diagnosis. Students had no knowledge of the case topic prior to the presentation. After the presentation, the class split into prearranged small groups of 8-9 students together with a discussion facilitator, and spent two one-hour sessions discussing the case over the next 3-4 days. In the first session, groups were charged to develop hypotheses to explain the fundamental cellular or molecular processes underlying the disease phenotype. In the second session, the groups reconvened and, utilizing information from self-study, lectures, and other course material, assessed the original hypotheses and provided final closure to the case. Overall, the case presentation and discussion format was designed to model physician learning by challenging students to assimilate large amounts of information from diverse sources to resolve a clinical case.

Conclusion

This approach to the use of small-group discussions of clinical cases is a positive addition to basic science teaching. The format allows students to examine their own knowledge base, communicate with their peers, develop critical thinking skills, and assimilate information from many different sources.

Assessing Knowledge of Genetics by the United States Medical Licensing Examination™ (USMLE™)

Darrel Waggoner MD[1], M.G. Blitzer PhD[2], G. Feldman MD[3], M.S. Watson PhD[4], R.E. Pyeritz MD[5]
[1] The University of Chicago [2] University of Maryland School of Medicine [3] Wayne State University [4] American College of Medical Genetics [5] University of Pennsylvania

Context

American medical students and recent graduates take 3 Steps of the USMLE. Step 1 assesses understanding and application of sciences basic to the practice of medicine; Step 2 assesses patient care under supervision; and Step 3 assesses unsupervised medical practice.

Objectives

Four times in the past 12 years representatives of the Association of Professors of Human and Medical Genetics (APHMG), American College of Medical Genetics (ACMG) & American Society of Human Genetics (ASHG) worked with the National Board of Medical Examiners (NBME), which creates and administers the USMLE, to assess the focus on genetics in each Step.

Key Message

Exams in 1995 had few questions that assessed knowledge of genetics, and most (2/3) were in Step 1. Genetics societies counseled the NBME, and medical geneticists volunteered and were selected for item-writing committees. Subsequent audits documented gradual progress in incorporating genetics questions. Currently, questions that address basic genetic principles or knowledge of hereditary disorders and congenital malformations were more frequent on all Steps, with the greatest increases on Steps 2 and 3. Importantly, even when a genetic term or disease was the incorrect answer (a 'distracter,' which did not qualify the question as 'genetic'), it was much more relevant to the sense of the question compared to previous audits. The NBME identifies in Step 1 'genetic' questions to report an average 'genetic score' for students at each medical schools. We independently confirmed the validity of all questions the NBME classified as genetic, but also identified additional questions that could have been so categorized.

Conclusion

Assisting the NBME in classifying questions will improve the reliability and utility of the genetics performance report. When the content of the genetic questions was evaluated in reference to 2001 APHMG & ASHG core curriculum guidelines for medical schools, certain areas were overrepresented (e.g., specific facts about diseases), and other areas were not assessed.

A model of collaboration between international medical institutions

Dianzheng Zhang, Han-Chun Chen, Weimin Zeng, Hui Sun, Ruth Thornton, Richard Kriebel, and Jun Jiang

Philadelphia College of Osteopathic Medicine, Philadelphia, PA and Central South University, China

Reform of medical education in China in response to the globalization of medicine and economic improvements has encountered many challenges to its medical education infrastructure including the ever-increasing demand of English-speaking faculty. Here we report a model in medical education which is mutually beneficial between the Philadelphia College of Osteopathic Medicine Philadelphia (PCOM) in the United States of America and the Central South University (CSU) in China. We provide background characteristics of both institutions. We introduce one responsible faculty initiating the collaboration, and describe the efficiencies needed for a person and institution to accomplish this collaboration. Finally, a collaboration of this sort has opened a new avenue for students from an American medical school to learn about medical education and the practice of medicine in another country, and enhancement of inter-institutional research can result.

Meeting Attendees

Last name	First name	Institution	E-mail address
Aamodt	Eric	Louisiana State University Health Sciences Center, Shreveport, LA	eaamod@lsuhsc.edu
Alley	Tiffany	DeBusk College of Osteopathic Medicine, Harrogate, TN	tiffany.alley@lmunet.edu
Anderson	Marshall	Indiana University SOM, Gary, IN	wanders@iun.edu
Baleja	Jim	Tufts University SOM, Boston, MA	jim.baleja@tufts.edu
Bassett	Casey	Lincoln Memorial University, Harrogate, TN	casey.bassett@lmunet.edu
Bateman	Robert	William Carey University, Hattiesburg, MS	rbateman@wmcarey.edu
Bridges	Christie	West VA School of Osteopathic Medicine, Lewisburg, WV	kbridges@osteo.wvsom.edu
Broome	Carolyn	Howard University College of Medicine, Washington, DC	carolynbroome@aol.com
Bruist	Michael	University of the Sciences, Philadelphia, PA	m.bruist@usp.edu
Brydges	Ryan	University of Toronto, & The Wilson Centre, Toronto, ON	r.brydges@gmail.com
Butler	Agata	National Board of Medical Examiners, Philadelphia, PA	AButler@NBME.org
Buxbaum	Engelbert	Ross University, Roseau, Dominica	ebuxbaum@rossmed.edu.dm
Cadilla	Carmen	University of Puerto Rico, San Juan, PR	carmen.cadilla@upr.edu
Chazotte	Brad	Campbell University, Buies Creek, NC	chazotte@campbell.edu
Clapp	Peter	Regis University School of Pharmacy, Denver, CO	pclapp@regis.edu
Coffee	Carole	University of Central Florida, College of Medicine, Orlando, FL	coffeecj@aol.com
Davis	Willie	Loma Linda University, Loma Linda, CA	wldavis@llu.edu
Diekman	Alan	University of Arkansas for Medical Sciences, Little Rock, AR	diekmanalan@uams.edu
Ellis	Steven	University of Louisville, Louisville, KY	srellis@louisville.edu
Everse	Stephen	University of Vermont, Burlington, VT	stephen.everse@uvm.edu
Ferrier	Denise	Drexel University College of Medicine, Philadelphia, PA	dferrier@drexelmed.edu
Fillingame	Robert	University of Wisconsin, Madison, WI	rhfillin@wisc.edu
Fong	Chin-To	University of Rochester, Rochester, NY	chinto_fong@urmc.rochester.edu
Fong	Sheri	John A. Burns School of Medicine, Honolulu, HI	sherif@hawaii.edu
Fontes	Joseph	University of Kansas Medical Center, Kansas City, KS	jfontes@kumc.edu

Last name	First, name	Institution	E-mail address
Franklin	David	Tulane University HSC, New Orleans, LA	franklin@tulane.edu
Fulton	Tracy	University of California San Francisco, San Francisco, CA	tracy.fulton@ucsf.edu
Geslani	Gemma	St. Louis College of Pharmacy, St. Louis, MO	ggeslani@stlcop.edu
Glucksman	Marc	Chicago Medical School, N. Chicago, IL	marc.glucksman@rosalindfranklin.edu
Gunther	Michael	West Virginia University, Morgantown, WV	mgunther@hsc.wvu.edu
Hibbert	Jacqueline	Morehouse School of Medicine, Atlanta, GA	jhibbert@msm.edu
Ho	Yee-Kin	University of Illinois, Chicago, IL	ykho@uic.edu
Hogg	Tanis	Texas Tech University, El Paso, TX	tanis.hogg@ttuhsc.edu
Hosler	Jonathan	University of Mississippi, Jackson, MS	jhosler@umc.edu
Hyland	Kathryn	University of California San Francisco, San Francisco, CA	katherine.hyland@ucsf.edu
Jameson	Brad	Drexel University College of Medicine, Philadelphia, PA	bjameson@drexelmed.edu
Joseph	Cecil	AMS College of Pharmacy, Brooklyn, NY	cecil.joseph@liu.edu
Kearney	Kevin	Massachusetts College of Pharmacy, Worcester, MA	kevin.kearney@mcphs.edu
Keil	Ralph	Penn State University, Hershey, PA	rkeil@psu.edu
King	Michael	Indiana University SOM, Terre Haute, IN	miking@iupui.edu
King	Steven	Oregon Health & Science University, Portland, OR	kingst@ohsu.edu
Kohlmeier	Martin	University of North Carolina, Chapel Hill, NC	mkohlmeier@unc.edu
Koroly	Mary Jo	University of Florida, Gainesville, FL	korolymj@ufl.edu
Kotb	Malak	University of Cincinnati, Cincinnati, OH	malak.kotb@uc.edu
Lea	Michael	New Jersey Medical School, Newark, NJ	lea@umdnj.edu
LeClair	Renee'	University of New England, Biddeford, ME	rleclair@une.edu
Lee	Insong	College of Notre Dame, Baltimore, MD	ilee@ndm.edu
Levenson	Cathy	Florida State University, Tallahassee, FL	cathy.levenson@med.fsu.edu
Li	Zhongwei	Florida Atlantic University, Boca Raton, FL	zli@fau.edu
Lieberman	Michael	University of Cincinnati College of Medicine, Cincinnati, OH	lieberma@ucmail.uc.edu
Lindsley	Janet	The University of Utah, Salt Lake City, UT	janet@biochem.utah.edu
Louda	Deborah	Florida Atlantic University, Boca Raton, FL	dlouda@fau.edu

Last name	First name	Institution	E-mail address
Mahajan	Pramod	Drake University College of Pharmacy, Des Moines, IA	pramod.mahajan@drake.edu
McKee	Edward	Indiana University SOM, South Bend, IN	edemckee@iupui.edu
Meisenberg	Gerhard	Ross University, Roseau, Dominica	gmeisenberg@rossmed.edu.dm
Morrissey	James	University of Illinois, Urbana, IL	jhmorris@illinois.edu
Niederhoffer	Eric	Southern Illinois University, Carbondale, IL	eniederhoffer@siumed.edu
Noramly	Selina	University of Virginia, Charlottesville, VA	sn8d@virginia.edu
Nunez	Sabrina	University of Virginia, Charlottesville, VA	sn6m@virginia.edu
Offner	Gwynneth	Boston University SOM, Boston, MA	goffner@bu.edu
Olson	Susan	New York Medical College, Valhalla, NY	susan-olson@nymc.edu
Orlando	Robert	University of New Mexico, Albuquerque, NM	ROrlando@salud.unm.edu
Osheroff	Neil	Vanderbilt University SOM, Nashville, TN	neil.osheroff@vanderbilt.edu
Panini	Sankhavaram	Emory University, Atlanta, GA	spanini@emory.edu
Pederson	David	Ross University, Roseau, Dominica	DPederson@RossMed.edu.dm
Prochaska	Lawrence	Wright State University, Dayton, OH	lawrence.prochaska@wright.edu
Putnam	Elizabeth	University of Montana, Missoula, MT	elizabeth.putnam@umontana.edu
Puttur	Prasad	Georgia Health Sciences University, Augusta, GA	pprasad@georgiahealth.edu
Robinson	Mitchell	East Tennessee State University, Johnson City, TN	robinson@mail.etsu.edu
Ronner	Peter	Thomas Jefferson University, Philadelphia, PA	peter.ronner@jefferson.edu
Roth	William	Morehouse School of Medicine, Atlanta, GA	wroth@msm.edu
Sabina	Richard	Oakland University, Rochester, MI	terrien@oakland.edu
Sancar	Gwen	University of North Carolina, Chapel Hill, NC	gwendolyn_sancar@med.unc.edu
Sands	John	Ross University, Roseau, Dominica	jfsands@yahoo.com
Schechter	Nisson	Stony Brook University, Stony Brook, NY	nisson.schechter@stonybrook.edu
Seifert	William	University of Texas Medical School, Houston, TX	william.e.seifert@uth.tmc.edu
Shiemke	Drew	West Virginia University, Morgantown, WV	ashiemke@hsc.wvu.edu
Shoemaker	James	Saint Louis University SOM, Saint Louis, MO	shoemajd@slu.edu
Slaughter	Clive	Medical College of Georgia, Athens, GA	cslaught@uga.edu

Last name	First name	Institution	E-mail address
Spicer	Eleanor	Medical University of South Carolina, Charleston, SC	spicer@musc.edu
Stoll	James	Texas Tech University, Amarillo, TX	james.stoll@ttuhsc.edu
Swaney	John	Drexel University College of Medicine, Philadelphia, PAA	john.swaney@drexelmed.edu
Symes	Karen	Boston University SOM, Boston, MA	symes@bu.edu
Tejada	Frederick	University of Maryland, School of Pharmacy, Princess Anne, MD	frtejada@umes.edu
Thompson	Kathryn	University of New England College of Osteopathic Medicine, Biddeford, ME	kthompson@une.edu
Trott	Amy	Texas Tech University, El Paso, TX	amy.trott@ttuhsc.edu
Vaghy	Pal	Ohio State University, Columbus, OH	vaghy.1@osu.edu
Waggoner	Darrel	University of Chicago, Chicago, IL	dwaggone@genetics.uchicago.edu
Wang	John	Michigan State University, East Lansing, MI	wangj@msu.edu
Wimmer	Mary	West Virginia University, Morgantown, WV	mwimmer@hsc.wvu.edu
Worthylake	David	Louisiana State University Health Sciences Center, New Orleans, LA	dworth@lsuhsc.edu
Zhang	Dianzheng	Philadelphia College of Osteopathic Medicine, Philadelphia, PA	dianzhengzh@pcom.edu

Evaluation of ABCD Conference 2011

Please note that the organizing committee will share your comments with the moderators/presenters of the various sessions.

Please answer the following 2 questions for some or all of the individual speakers (please identify the speaker, the subject of the presentation, and the day of the week):

Presenter/ subject/day	**What did you like about this speaker's presentation?**	**How could this speaker improve her/his presentation?**

Presenter/ subject/day	What did you like about this speaker's presentation?	How could this speaker improve her/his presentation?

Please let us know your thoughts about the conference overall:

This conference met my expectations.

(Strongly agree / agree / neither agree nor disagree / disagree / strongly disagree)

Comments:

The facilities in Myrtle Beach met both my professional and my personal needs.

(Strongly agree / agree / neither agree nor disagree / disagree / strongly disagree)

Comments:

There was sufficient diversity of topics at this meeting.

(Strongly agree / agree / neither agree nor disagree / disagree / strongly disagree)

Comments:

There was sufficient diversity of speakers at this meeting.

(Strongly agree / agree / neither agree nor disagree / disagree / strongly disagree)

Comments:

I was given sufficient opportunities to contribute at this meeting.

(Strongly agree / agree / neither agree nor disagree / disagree / strongly disagree)

Comments:

There was an appropriate amount of unscheduled time during this meeting.

(Strongly agree / agree / neither agree nor disagree / disagree / strongly disagree)

Comments:

The communications from the organizing committee were appropriate.

(Strongly agree / agree / neither agree nor disagree / disagree / strongly disagree)

Comments:

Please describe the major impact this meeting has on you and the way you perform your job:

Would you prefer a different time of year for the meeting?

Would you prefer that the meeting take place in a different location?

Should the next meeting be shorter, longer, or the same length?

I plan to attend the next meeting in 2013.

(Strongly agree / agree / neither agree nor disagree / disagree / strongly disagree)

If you like, please enter your name here: _____

Please return this evaluation to Sheilah Jewart.

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