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Greetings From Your President .................................................................3
Joe Griswold

HAPS and SACS: An Update .................................................................6
Ric Martini

Position Statement on Accreditation of Faculty in 2-semester Human Anatomy and Physiology Courses

Body Bag
Cadaver Preparation: Fun and Beneficial ..............................................11
Claire R. Oakley

Call for Nominations .............................................................................12
Margaret Weck

Book Review
Marker by Robin Cook ........................................................................14
Elizabeth Hodgson

Educational Issues
Defining Levels of Student Understanding in Anatomy Using a Relationship Module ..............15
Jane R. Marone, Cynthia M. Misichia, Mary Lou Bareither

Donna White Receives the President’s Award for 2006 .....................................17
Ric Martini

Teaching Tips
Free Muscle Miniature Illustrations ....................................................19
Mark Eberle, Nika Paulson, Jane Kwiatkoski

Committee Report
Grants and Scholarships Committee ....................................................22
Amy Way

HAPS 2006 in Review
The Scavenger Hunt ............................................................................23
Tom Lehman

Sponsors of the 2006 HAPS Annual Conference ......................................25

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HAPS-EDucator is the official publication of the Human Anatomy and Physiology Society (HAPS) and is published four times per year. Major goals of the Human Anatomy and Physiology Society are: to promote communication among teachers of human anatomy and physiology in colleges, universities, and related institutions; to present workshops and conferences, both regional and national, where members can obtain information about the latest developments in the health and science fields; and to encourage educational research and publication by HAPS members. HAPS was established in 1989.

Annual membership dues are $50 for full-time faculty, $35 for retired, part-time faculty, and students. Annual membership renewals shall be due on January 1 or July 1. New members shall renew on whichever date most closely follows the date of their initial membership. HAPS phone: (800) 448-HAPS (4277). Phone: (800) 448-HAPS (4277) for information on membership, meetings, and more! Send correspondence to: HAPS, 8000 Bonhomme, Suite 412, St. Louis, MO 63105. Check out our new webpage at: http://www.hapsweb.org/

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DEADLINES FOR SUBMITTING MATERIAL TO HAPS-EDucator: August 1 (Fall issue); November 1 (Winter issue); February 1 (Spring issue); April 15 (Summer issue).

CONTACT THE HAPS-EDucator Editor: Susan Baxley, HAPS, 8000 Bonhomme, Suite 412, St. Louis, MO 63105. hapsed@hapsweb.org
The memories of Austin linger as I continue to appreciate the fantastic job done by Mary Lou Percy, Dee Silverthorn, and their committees in organizing an excellent conference that provided a great balance of professional activities and fun in Austin. It still amazes me how well our annual conferences flow, and what a high I get from interacting with colleagues from all over North America. This year was exceptional in bringing together a large number of people we had not seen for a while—especially former leaders who gave so much to HAPS in its first two decades. Even though we set an all-time attendance record with well over 400 registrants, I still wish that more A&P instructors could have the experience. Our sincerest thanks to the dozens of folks who worked hard in making Austin such a wonderful 20th anniversary celebration! We have passed our teen years; are we maturing as a society?

“In HAPS we don’t wear ties…. we make them!” Unknown HAPS member

The witty statement above captures one of the most important features of HAPS. We are a society in which there are thousands of connections, or ties, that enable us to be productive both at our home institutions and as a professional organization. HAPS is unusual among academic societies in being primarily collaborative rather than competitive, focusing on mutual enrichment and the building up of all members. We help members become better informed about the material they teach, more skillful as instructors, and more involved in projects and friendships that enrich (grow) our professional and personal lives. And, as in most other aspects of life, the more one participates in HAPS, the greater the returns. After becoming President-Elect in 2005, several friends offered me light-hearted “condolences”. That gave me a chance to talk about why I would want to take this job—especially in my retirement! The words above indicate some of the important reasons. But in many ways, leadership in HAPS allows me to continue what I have been passionate about during most of my professional career: improving the quality of undergraduate science education. My colleague Dan Lemons and I have worked for nearly two decades on funded projects related to that goal.

Many of you may know that one of the “scandals” of higher education in the United States is that so many of the brightest and best high school students go to college wanting to study science and are so “turned off” by their early course experiences that they end up in other majors. Research has clearly shown that the factors most often cited by these “switchers” are the quality of their science courses and the unapproachable science faculty. Dan and I found in HAPS a group of people whose dedication to quality teaching is a driving force in their careers, and we wanted to contribute. We also believed in the “amplification effect.” A relatively small number of people (or powerful molecules like enzymes or hormones) can produce huge effects if they are part of a system that amplifies their actions. HAPS is such a system! At one level, effective new ideas offered by a few people in updates, workshops, HAPS-EDucator articles, or on the HAPS-L listserv can influence the teaching of hundreds of our members. Many of them, in turn, go back to their home institutions and teach, not only hundreds of students, but their colleagues as well. The impact grows again.

Despite all the benefits of being a HAPS member, and part of this powerful system for improving A&P education, we estimate that only one in ten instructors in our discipline is a member of HAPS, and less than half of those actively participate by attending annual and regional conferences, working on committees, contributing to or lurking on the listserv, and so on. Those of us already convinced and dedicated to the HAPS mission of “promoting excellence in the teaching of anatomy and physiology,” have a lot of work to do. It involves sharing our vision with colleagues who do not know HAPS or have yet to join us. It includes convincing administrators of the importance to the success of their programs that they encourage A&P faculty to participate in HAPS. In supporting all our efforts, we need to devise new ways to increase the value of what HAPS offers our members, and we must continue “making ties.” In future columns, I plan to present some of our ideas for achieving these goals.

Serving on the Board of Directors for a year now has been a steep learning curve for me. Let me share with you a little bit about that experience. Much of the work now is by written communication via the Internet—we occasionally make phone calls and always have two face-to-face meetings per year (prior to the annual conference and over Martin Luther King’s day weekend in January). Each month there is an e-meeting that lasts for about a week using a combination of email exchanges and postings on a website forum that Carl Shuster oversees. Members of the Board participate as their schedules allow, and a great deal of work gets accomplished, ending in a vote on motions at the end of the week.
Greetings - continued from page 3

A very efficient system of reporting minutes, designed by Ric Martini and implemented by our secretary Mark Bolke, enables everyone to keep track of what we did and the tasks before us in the next weeks. One consequence of our mode of operating is that working relationships and friendships form naturally in the flow. Overall, the hard work is balanced by the fun and camaraderie of doing significant work together.

The Board of Directors this year is largely a veteran team. It is hard to over-estimate the amount of effort that Ric Martini expended this past year, principally leading us against threats to A&P programs and faculty in the South caused by the SACS accreditation process gone off track (see the article on pp. 6-8 of this issue). Ric continues on the Board as Past-President replacing Sandy Lewis who gets a reprieve after three years of outstanding service to HAPS. We already know that Sandy will remain active, sponsoring a regional conference this fall, chairing the council of Presidents-Emeriti, and working on special projects. Gail Jenkins was re-elected for another term as treasurer, a job she does with great energy, enthusiasm, and grace. As the longest-serving member of our Board, Gail brings a strong sense of history to our deliberations and continues to have her hand in many activities beyond just keeping financial books. Margaret Weck joins us as President-Elect, and comes in as a veteran in HAPS leadership. She served on the Board in the past as Secretary-Treasurer and chaired the group that organized the wonderful 2005 annual conference in St. Louis. Regional Directors Rich Faircloth (East) and Christine Eckel (West) were re-elected for two-year terms in the 2006 election, while Joseph Gar (South) and Elizabeth Becker (Central) are in the second years of their service. I want to acknowledge the important contributions made by all four Regional Directors during the past year. Doing another outstanding job taking care of us all this past year is the HAPS Business Manager, Tonya Ferguson, at our headquarters in St. Louis.

As I look at the roster of HAPS committee chairs and special positions (see www.hapsweb.org for a complete listing), I am pleased to see a lot of hardworking veterans in place there as well. We do have some newcomers who are already making a difference in our organization. Jon Jackson and Valerie O’Loughlin are co-chairing a very busy Membership Committee, Javni Mody has taken over the critical position of Marketing Manager from 2006 Presidential Medalist Donna White, and Ewa Gorski is the new Regional Conference chair. The veterans and newcomers alike form the HAPS Steering Committee, chaired by Tom Lehman who also heads the Web Committee. After the great presentation at our annual business meeting in Austin, we look forward to an amazing 21st annual conference in San Diego under the leadership of Kevin Petti. He has an outstanding committee organized to bring us another “best HAPS annual conference ever.” I thank all the chairs and committee members for their dedication to HAPS and look forward to interacting with each of you as we go forward. Yes, there are still a few openings on committees for people wanting to get involved in the important and rewarding work of the Human Anatomy and Physiology Society. If you are such a person, log onto www.hapsweb.org, contact the committee chair(s), and find out how you might contribute. There is a lot of work to do and great rewards to be gained in doing it.


A major problem arose in the summer of 2005 when the Commission on Colleges of the Southern Association of Colleges and Schools (SACS) revised their interpretation of their accreditation criteria. Those standards indicated that faculty teaching undergraduate courses should have a Masters degree or above in the discipline taught, plus 18 graduate credit hours in related courses. The new interpretation, as reported by Dr. Margaret Sullivan, the head of the Consulting Network at the time, treated anatomy and physiology as a separate and distinct discipline from biology and required that faculty teaching undergraduate A&P have a degree in human anatomy or human physiology (or both) plus 18 graduate credit hours in those topics. Courses that did not say “human” were inapplicable; thus comparative anatomy, animal physiology, or comparative physiology were out, as were applied courses such as medical physiology (said to be “too clinical”). It was also her position that holders of professional degrees other than M.D. or D.O. were not qualified to teach undergraduate courses in these topics.

The first college at which these criteria were applied was Edison College (FL). The effects were devastating; three-quarters of the A&P faculty failed to meet these criteria. The A&P program was shut down on one campus, and the number of sections at the others cut to an enrollment capacity of 300, as compared with 1300-1500 previously. It was at this point (September ’05) that HAPS became aware of the problem and the threat it posed to A&P courses nationwide.

We, the HAPS Board of Directors, started four initiatives immediately, (1) writing to SACS in an attempt to show them the error of their ways, (2) contacting professional and academic societies whose members might be affected, (3) collecting data on the qualifications of our membership, and (4) using the data collected to create a Position Statement on A&P faculty credentialing, specifically addressing appropriate degrees and relevant coursework. I will address each of these separately.

Communications with SACS

Our first letter was to Dr. Sullivan, asking that we start a dialog on the topic and expressing our concerns. There was no response. A follow-up phone call and message left on voicemail produced no response. A call was then placed to Dr. Belle S. Wheelan, the President of the Commission on Colleges (CoC), the section of SACS dealing with colleges as opposed to schools. This led to a series of snail-mail and email exchanges that continued until May ’06. Toward the end of 2005, I was advised by Dr. Wheelan that the Commission on Colleges revised their printed guidelines to accept a Masters degree in the biological sciences, to reduce the number of graduate credits required, and to state that institutions would have the right to credential their faculty, but they would then need to defend their decisions to the accreditation review team. Although we were optimistic that this would solve the problem, it actually made things more difficult because Dr. Sullivan, who was contracted to advise colleges on accreditation criteria, continued to recommend the disqualification of individuals holding professional degrees, and colleges continued to follow her advice. In early January, we learned that there were comparable problems arising at San Jacinto Community College (TX) where Dr. Sullivan was engaged as a consultant. In essence, a person holding a Masters in Biology with six graduate credit hours in courses related to A&P is considered qualified to teach A&P, but a D.C., D.V.M., P.T., or D.P.M. is not. Because drastic restructuring has resulted at colleges now under accreditation review, other schools in the southern region are left wondering if they should pre-emptively purge their own A&P faculties.

Letters to these colleges from HAPS on behalf of the affected faculty have not had any apparent remedial effect. As I have explained to Dr. Wheelan on more than one occasion, until it is made clear that Dr. Sullivan’s statements have no basis in fact and that holders of professional degrees meet the basic degree and course criteria for A&P instructors, this matter will continue to disrupt the lives of qualified, dedicated faculty and impede the progress of students intending to pursue careers in the allied health sciences. Dr. Wheelan has assured me that her newsletter and emails to college administrations will specifically address the fact that holders of professional degrees are acceptable as faculty in anatomy and physiology courses and that their degrees meet the minimum course background requirements. However, we are deeply disturbed that reported conversations involving Dr. Thomas Benberg, Vice-President of SACS, and Dr. Gerald Lord, also of SACS, appear to support Dr. Sullivan’s original positions regarding the definition of “discipline,” the number of graduate credit hours expected, and the disqualification of faculty holding professional degrees.

In late May, Dr. Wheelan promised to address the issue head-on in an email newsletter to regional colleges and to provide us with a copy. Because nothing was heard by mid-July, a summary letter requesting immediate action was sent to Dr. H. F. Johnson, the President of SACS, with copies to Dr. Wheelan, Dr. Benberg, Dr. Lord, the Council on Higher Education Accreditation (CHEA), and the Chronicles of Higher Education. As yet no response has been received from anybody, other than a comment from the Chronicles that the issue seemed “technical” which I interpreted as an indication that they were not particularly interested in the subject.

Other Academic and Professional Societies

HAPS is not alone in its concern over this issue. After extensive communication and discussion, the boards and councils of the following organizations have supported the HAPS Position Statement with regard to the degree qualifications for faculty teaching anatomy and physiology at the undergraduate level:

HAPS-EDucator - Fall 2006 - page 6
HAPS and SACS - continued from page 6
The American Association of Anatomists
The American Chiropractic Association
The American Physiological Society
The American Association of Chiropractic Colleges
The American Physical Therapy Association
The American Veterinary Medical Association
The National Association of Biology Teachers

As you can see, these are the academic and professional organizations whose members are intimately familiar with the content of A&P courses and the criteria and coursework for holders of professional degrees. These societies also agree with HAPS that all necessary steps should be taken to obtain (1) a clarification by SACS/CoC of the credentialing requirements for faculty teaching undergraduate A&P courses, and (2) a retraction of (or, under the current circumstances, a disavowal of) the assertions made by Dr. Sullivan, and perhaps supported by others at SACS, regarding the training and competence of chiropractors, veterinarians, physical therapists, podiatrists, and other professionals. The chiropractic associations are providing their members and HAPS with a complete review of the coursework required to obtain a DC degree, with correlation to the topics in A&P. When we receive a final iteration from the chiropractic associations, it will be posted on the HAPS website and available to the membership. The veterinary associations are preparing a similar document.

Data Collection and Position Statement
A survey was conducted via the HAPS website, and data collected on courses, faculty, degree topics, and other relevant information. As the results came in, iterations of a position statement were generated and posted on the website for comment by the membership. By November, when we had data from courses teaching roughly 40,000 students per year, and by which time over a thousand email comments had been received, the Board approved the position statement now available for downloading from the HAPS website. We now have data for courses teaching over 50,000 students, with 307 full-time faculty and 255 part-time faculty. One very interesting observation, other than the importance of professional degree-holders in the part-time faculty pool, was the diversity of backgrounds among other A&P faculty. Table 1 shows the degrees reported by respondents.

What Next?
We are now in a holding pattern awaiting a response from SACS, CHEA, and the media. If problems continue to arise, or if they spread to other accreditation regions, it will become necessary to approach the National Education Association and the congressional representatives of the affected states, as well as other accreditation agencies. Stay tuned for more updates.
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Background:

The 2-semester/3-quarter undergraduate course usually known as "Human Anatomy and Physiology" or simply "Anatomy and Physiology" is a large introductory course that may be offered by the Biology, Zoology, or Natural Sciences departments. Nationally, roughly two-thirds of these courses are taught at community colleges, and the rest primarily at universities. This is one of the larger introductory level courses, with approximately 450,000 students enrolled each year in the US and Canada.

The majority of students taking the 2-semester A&P course are planning a career in the health sciences. The career paths include nursing, occupational therapy, physical therapy, radiation technology, laboratory/medical technology, dental hygiene, pharmacology and other related disciplines. Students majoring in physical education, sports training, or kinesiology make up a smaller component of the classroom population. At community colleges the course is often taken in the first year of college, without college-level prerequisites. Entry into any one of the career programs listed above is contingent upon successful completion of the A&P course with a grade of C or above; in competitive programs, the grade requirements may be much more restrictive.

It is important to note that pre-medical students and biology majors do not typically take this course because it is an option that does not count towards their degree requirements. Instead, they will take Majors Biology (or Zoology/Botany) as freshmen, followed by more specialized and detailed upper level courses in their junior and senior years. However, the distinction between biology majors and allied health majors is an administrative convenience and not an indication that A&P is anything other than an integrative biological science.

Anatomy and Physiology as a Biological Science:

As an introductory level survey course, A&P covers a diversity of topics, including not only anatomy and physiology, but introductory biochemistry, cytology, histology, molecular biology, genetics, immunology, nutrition, embryology, and pathology. The coverage is so diverse, and the principles so relevant to a general understanding of modern biology, that a 1-semester version of this course is often used to satisfy the general biology requirements for non-majors students.

Two-semester A&P courses are usually taught from the Biology, Zoology, or Natural Sciences departments; in rare cases, the sequence may be offered by another academic division (e.g. a department within an associated medical school) as a service course. As a result, the diversity of faculty roughly approaches the diversity of topics presented within the course.

The Need for Standardization of Criteria for the Selection and Accreditation of Faculty:

Faculty qualification standards that are too lax make it difficult for the assigned faculty to teach the core curriculum topics, whereas standards that are too restrictive negatively impact both faculty and students. It is in the best interests of all parties to use a standardized set of criteria when evaluating the faculty of anatomy and physiology courses during an accreditation review. For example, at one college the application of overly restrictive standards, which refused to accept comparative, vertebrate, mammalian, or clinical courses among the relevant course credits required for faculty qualification, led to the dismissal of faculty and the elimination of associated A&P and Microbiology courses from the curriculum.

It is our position that Human Anatomy and Physiology is a subset of biology, and the course has extensive overlap with other biological sciences. Opportunities to obtain an M.S. or Ph.D. degree in “human anatomy and physiology” are extremely limited, but there is so much duplication of coverage among courses in modern biology that such specialization is unnecessary. Because the basic anatomical, physiological, histological, and developmental patterns are found across the vertebrate lineage (and often across the major animal phyla), a great diversity of biology courses are directly applicable to human A&P. We also believe that any evaluation of current or potential instructors should consider graduate and postgraduate teaching experience in courses related to anatomy and physiology toward satisfaction of minimum criteria.

HAPS has developed accreditation standards based on a survey of successful anatomy and physiology courses nationwide. We feel that these criteria are sufficient to demonstrate that an instructor is competent to teach a 2-semester anatomy and physiology course. We are therefore encouraging all accreditation agencies and college administrations to use these criteria when evaluating courses or prospective faculty.

The HAPS Standards for Instructors in Anatomy and Physiology:

The HAPS minimum criteria for teaching the introductory level A&P course are (1) a Masters degree in one of the biological sciences and (2) 18 related credit hours as defined below. A professional degree (M.S.N., M.D., D.O., D.C. D.V.M., or other advanced clinical degrees awarded by nationally accredited insti-
tutions) may be accepted as fulfilling the degree and coursework requirements.

Instructors must be prepared to integrate introductory level chemistry and biochemistry not only with anatomy and physiology, but with a variety of other relevant topics in biology, including cytology, cell physiology, histology, organology, microbiology, immunology, embryology, and nutrition. Because of the interrelatedness of topics in biology, a course in any one of the topics above must of necessity include a significant amount of anatomy and physiology. Using the HAPS Curriculum Guidelines as a reference, Attachment 1 lists courses that are relevant to the teaching of anatomy and physiology at the introductory level. This list is intended as a reference and a guide, not as a comprehensive or exclusionary listing of applicable courses.

The 18 related credit hours can be accumulated through a combination of (1) undergraduate and graduate course work, (2) teaching experience as a graduate teaching assistant or as graduate or postgraduate faculty in A&P courses, (3) postgraduate course work in human anatomy and physiology, including continuing education credits, (4) research in the field of A&P as evidenced by publication in peer-reviewed journals.

Credits should be calculated as follows:
- for coursework: the credits awarded on the relevant student transcripts or continuing education certificate
- for graduate TA work or as faculty while a graduate student: the credits awarded on the graduate student transcript or the credit value of the course
- for postgraduate teaching: 3 credits for each semester taught
- for continuing education: the CE credits or units awarded for satisfactory completion of coursework in human anatomy and/or physiology
- for research publications: 3 credits for each peer-reviewed journal article

Any questions regarding this position statement should be directed to the HAPS President and the Board of Directors. A current copy of the Course and Curriculum Guidelines may be downloaded from the HAPS website at [http://www.hapsweb.org](http://www.hapsweb.org).

Attachment 1: Courses relevant to the teaching of human anatomy and physiology*

Anatomy-related:
- Human anatomy
- Comparative anatomy
- Vertebrate anatomy
- Veterinary anatomy
- Surgical anatomy
- Gross anatomy
- Neuroanatomy
- Physical anthropology
- Kinesiology
- Human embryology
- Comparative embryology
- Vertebrate embryology
- Cytology
- Histology
- Organology
- Pathology

Physiology-related:
- Human physiology
- Animal physiology
- Comparative physiology
- Mammalian physiology
- General physiology
- Medical physiology
- Veterinary physiology
- Pathophysiology
- System physiology (i.e. neurophysiology, cardiovascular physiology, endocrinology, immunology, respiratory physiology, etc.)
- Cell physiology
- Exercise physiology
- Molecular biology
- Genetics

Ancillary courses of value**:
- Microbiology
- Nutrition
- Biochemistry
- Pharmacology
- Pharmacophysiology

*Note: This list should not be considered comprehensive. It is meant simply to provide an indication of the diversity of topics directly relevant to human anatomy and physiology, as reflected in the HAPS Core Curriculum Guidelines.

**A maximum of 6 credits from this category may be counted toward the 18-credit requirement.
Preparation for a new cadaver at Rocky Mountain College begins in April. Since the back of my husband’s pick-up truck is open to the air, my father-in-law drives me in his covered truck to Bozeman, Montana, two and one-quarter hours away. Bozeman is the site of Montana State University, operator of the state’s willed body program and the first year medical program offered in conjunction with the University of Washington. The 130 mile drive (one way) takes us from the high plains into a mountainous area of the state. My father-in-law has only two requests—that I buy him lunch at his favorite restaurant and a gift receipt from the college for the cost of gasoline—a substantial donation with today’s high fuel prices. We return with the loan of a cadaver costing $1,100—a cadaver that can be used at Rocky Mountain College for about five years.

Designing the course as described below provides many benefits. First, I prepare cadavers for the next year very inexpensively. Second, students experience a fairly unique opportunity to dissect a human cadaver. Third, an informal camaraderie develops between students and myself in a manner not possible during the regular semesters, as the students intensively explore the cadaver for four hours a day for three weeks. And fourth, we maintain a connection with the local medical community as physicians come to the cadaver laboratory to consult on various student findings—and we hope they return to their offices telling their colleagues what the students had found.

Six to seven students who have just completed Biology 321/322, our year long sequence in anatomy and physiology, are selected to participate in the dissection class during which they will perform cadaver procedures. Held during the three-week May Term, the dissection class, Biology 420, is limited to declared biology majors; students earn 3 credits of senior-level coursework.

The goal is to prepare the cadaver for dissection purposes. Students enrolled in the year-long A&P course will study the cadavers, but never with sharp implements in their hands. Anatomy and physiology students must wear a laboratory coat and gloves so they can closely study the cadaver through touch and sight—the only tool allowed for these students is a blunt probe. Three cadavers in various stages of dissection are prepared to be used for study during the 321/322 sequence.

Students select a dissection preference. They can choose to do the large-scale dissection on the newest cadaver, or do a finer, more detailed dissection on one of the older cadavers. With a new cadaver, four students decide who gets which upper or lower extremity—the body is basically divided into four dissection stations. These students will focus on isolating muscles, nerves, arteries, and veins (and if a male cadaver, the reproductive anatomy). This group of students learns how to remove the skin and adipose tissue, separate muscles, and follow nerves and blood vessels. Students are encouraged to recall their experience learning the anatomy and envision what would make it easiest for the next class of students who will be studying the cadavers. Removing the adipose tissue without damaging the underlying structures typically offers the most challenge for the new dissectors. It often takes days for them to appreciate how much blunt dissection can accomplish. Annually, students remark about their misconceptions on the use of a scalpel versus the ease of separating layers with a gloved hand or finger.

For the past 17 years, Rocky Mountain College has always had three cadavers in use at any one time. While four students are dissecting the newest cadaver, the remaining students conduct a more detailed dissection of the remaining two cadavers. In the May Term 2006, one student worked on the thorax removing the anterior chest wall to display the heart and lungs. She removed the left lung to better expose the heart and allow students to see the primary and secondary bronchi and the blood vessels entering and leaving the lung. Dissecting the isolated lung, she demonstrated the bronchiopulmonary tree. Another student worked in the abdominopelvic cavity after the third student removed the gastrointestinal tract for an isolated specimen. A student interested in pursuing dentistry, completed a dissection of the face and neck displaying the facial and mandibular branches of the trigeminal nerve. New for the fall of 2006 are two prosected orbits demonstrating the six extrinsic eye muscles and the associated nerves. Never before have my students seen the peripheral portions of the trochlear and abducens nerves—this is a fascinating addition for the upcoming semesters.

During the third week we choose a day for everyone to work on removing the brain. May 2005’s dissection was exciting because we were looking for evidence of a stroke on the right side due to

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Body Bag - continued on page 12
HAPS-EDucator - Fall 2006 - page 11
atrophy and blanched coloring of the left upper and lower extremity. The previous week a student had borrowed a pair of calipers from the athletic training room to confirm the observation of thinner muscle bellies, and a retired pathologist surveyed the cadaver and validated their hypothesis of a stroke. The pathologist arranged for a complimentary MRI scan of the brain to look for internal evidence of a stroke—I was asked to bring the brain in double zip-locked bags for easy maneuvering on the magnet platform. The images came out beautifully and a radiologist (again complimentary services) diagnosed a right periventricular infarction. The students were very proud to have discovered and figured out a “mystery” of the cadaver.

This same cadaver brought a smile to the face of a retired orthopedic surgeon who came into the cadaver laboratory to answer questions about irregularities found in a knee. The smile was elicited when a student showed the physician an “axillary arch” muscle—something the physician had only read about, but had never seen on a patient or cadaver. Likewise, the flexor accessorius digitorum longus muscle discovered by the 2006 dissection class was a new sight for a local pathologist who serves on the college Board of Trustees. A very important side benefit was the public relations garnered by high profile physicians recognizing the work accomplished by undergraduates at Rocky Mountain College.

To add a different dimension to the course, we read Mary Roach’s non-fiction book, Stiff: The Curious Lives of Human Cadavers. Students were assigned two chapters every two days. While working on the cadavers, we not only discussed the content, but also the writing style and the connotation and denotation of language. Consensus determined that the book added greatly to the course. One student suggested that the introduction to Stiff be required reading for students entering the Anatomy and Physiology sequence—a suggestion that I have adopted.

Each Friday, students orally presents their area of dissection for about 5-10 minutes. Students enhance their anatomical discussions with interesting clinical points; then I pose questions based on their presentation. For the third and final presentation, I often invite the President and Academic Dean to provide a new audience challenge for the students and also to allow the students to “show off” what they know—knowing that the experience is a valuable one for administrators to discuss with potential body donors.

To add a sense of fun, I make a “golden probe”—a mall probe is spray-painted gold and encased in a padded jewelry box with the names of all the participating students. On the last day, the students vote with paper ballots in support of the best dissector. The “golden probe award” is presented to the winning student amid fanfare, cookies, and laughter.

At the end of the three-week session, I have a freshly prepared cadaver and detailed prosections ready for the fall term. Each year it seems that a dissector has a specific request that she/he would like to try and so variety is added. Likewise, each cadaver has interesting features that allow us to invite local physicians to come, look, and comment, thereby allowing my students to interface with the local medical community. As a reminder to the teaching function of the cadavers, the dissectors are asked to think back to their first days studying the cadavers in the 321/322 course and to work with the goal of facilitating learning by the next crop of students. It also becomes “a game” to see who can find a pertinent example of a structure not currently listed for students to find, and, thus add to the list of structures the new students will need to identify and study!

Call for Nominations!

Margaret Weck  
Nominating Committee Chair  
4588 Parkview Place  
St. Louis, MO 63110  
(314) 446-8483  
(314)-446-8460 fax  
vp@hapsweb.org mweck@stlcop.edu

I know that it seems like this year’s election results have just been announced, but it is already time to give serious consideration to running for elective office in HAPS for 2007. In this election cycle we will be voting for President-Elect, Secretary, Director from the South Region, and Director from the Mid-West. All of these offices are 2-yr. terms with the exception of the President-Elect which rolls into President, then Past-President for a three-year total commitment.

Not sure what region you are in? You can find a link to the HAPS regions map toward the bottom of the “Member’s only links” section of the Member’s only page of wwwhapsweb.org. Please do not hesitate to nominate yourself. The goal of the Nominating Committee is to recruit at least two candidates for each open position. Not sure what any of these positions entail? Contact me at vp@hapsweb.org or mweck@stlcop.edu for more information or to register your nomination.

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**Book Review**

*Marker by Robin Cook*
Published by Penguin Press, 2005
*Elizabeth Hodgson, reviewer*
York College of Pennsylvania
810 Florida Ave
York, PA 17404
(717)815-1530
(717)849-1653 fax
ehodgson@ycp.edu

This work could be classified as science fiction or medical thriller, but it demonstrates good use of scientific concepts and language. In the novel, there is a series of unexplained deaths in seemingly healthy individuals. These deaths occur in patients who have entered the hospital for elective procedures. The commonality among the patients is that each is insured by the same insurance company, and each has been recently tested for genetic "markers" (hence the name of the book). After much undercover investigation, it is determined that the insurance company has taken matters into its own hands and "terminated" these individuals while they are still healthy, eliminating the possibility that the insurance company will have to pay any major medical costs when these patients later develop the diseases evidenced by their genetic markers. A love story between the two main protagonists is also a major part of the story line. The book has good explanations of genetic testing and brings up some of the possible consequences of "knowing the future."

**Potential uses in class:**
Read the prologue aloud to the class prior to the start of the reproductive system unit. The prologue is an in-depth description of ovum fertilization. The author uses all the good scientific words that are then introduced in the reproductive system. This makes for a good "ice breaker."

Use the genetic testing scenarios in the book as a starting point for a discussion on ethics. You could easily expand that discussion into an understanding of the role of ethics committees in hospitals and communities, as well as legislative issues surrounding genetic testing or even stem cell legislation.

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**HAPS NORTHWEST REGIONAL CONFERENCE**
**PUYALLUP, WASHINGTON**
**NOVEMBER 3-4, 2006**

Pierce College, together with the Human Anatomy and Physiology Society, will be hosting a HAPS Regional Conference on Friday, Nov 3, 2006 and Saturday Nov 4, 2006 on the campus of Pierce College Puyallup. For information on conference registration, speakers and workshops, exhibitors, local hotel room blocks, and directions, please visit the HAPS web site at hapsweb.org, and click on the meetings tab on the left, and then scroll down to regional meetings.

For more information, please contact Sandy Lewis, Conference Coordinator, at slewis@pierce.ctc.edu.

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Defining Levels of Student Understanding In Anatomy Using a Relationship Module

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Introduction
Planning the dissection of a cadaver requires an understanding of anatomy above and beyond simple structural identification. To achieve this level of understanding, one must be able to construct a three-dimensional “mental model” of the body. A mental model is a verbal or diagrammatic representation of a complex problem or system. It serves as a structure onto which new information can be assimilated and can be used to solve problems and predict outcomes.

The undergraduate students enrolled in our human cadaver dissection course usually demonstrate proficiency at visually identifying anatomical structures displayed in a pre-dissected cadaver, prosections, or illustrated in a book. However, when presented with written questions that involve an application of that knowledge, students generally perform poorly. The problem may be a difficulty in assimilating identification knowledge into knowledge where the relationship among structures is understood and can be applied to practical situations.

To identify our students’ depth of understanding, we designed a module that employs a three-step approach to studying anatomy: 1) identification of structures, 2) description of relative structural location, and 3) case study analysis. We hypothesized that students would be able to identify structures accurately, but would encounter difficulty when asked to identify the relative locations of structures or to use this knowledge to solve case studies. We also hypothesized that students who performed better on the modules would perform better on examinations.

Methods
Nineteen students enrolled in a one-semester human cadaver dissection course were recruited to participate in this study. Students entering the course had at least one pre-requisite course in human anatomy/physiology or biology. The experimental methods were reviewed and approved by the Institutional Review Board. All participants provided written informed consent prior to participation.

The class was divided into eight dissection groups; each group was assigned to one cadaver. Dissection assignments were divided into nine different learning units (e.g., superficial muscles of the back, brachial, and lumbosacral plexuses, etc.). Each cadaver dissection group was assigned to present the dissection procedure of one of the nine units prior to dissection of that unit by the class as a whole. (The first unit was presented by the instructors at the beginning of the semester.) The group presentation included preparation of the prosection, oral presentation of the dissection procedure, and preparation of a written handout which was distributed to the remaining students in the class.

For each unit, a learning module was developed. Each student (including those responsible for the presentation of that unit) was asked to complete and hand in these modules prior to the oral presentation and dissection of the corresponding unit. Modules were graded and returned at the next class session. Verbal and written feedback were provided. Completion of the modules was included as part of class participation; however scores on the modules were not included as part of the overall course grade. Three unit examinations were administered during the semester, each encompassing three sequential learning units. Questions on the examination were divided into simple structural recall, relative relationships of structures, and clinical case questions.

The modules consisted of three components outlined below. Students completed all three components of each module before returning them to the instructor.

Step 1. Diagram Labeling
Students were given diagrams from anatomical atlases. The diagrams were selected by the instructors. A list of structures was provided for students to label on each of the diagrams.

Step 2. Relationships
Students were presented with a series of questions that prompted them to look at the physical location of structures in relation to...
one another. Students were encouraged to use the labeled diagrams to answer the questions. An example is as follows:

The trapezius lies ____________ to the supraspinatus and infraspinatus. (superficial)
The supraspinatus lies in the ____________ of the scapula and is separated from the infraspinatus by the _____________. (supraspinous fossa, scapular spine)

Step 3. Case study questions
Students were given a case study. These were identical in format, but not in content, to the case study questions in the examinations. The case study consisted of questions that required students to apply information drawn from the corresponding diagrams and relationship questions. An example is as follows:

You are working in the emergency room at the local county hospital on a Saturday night. A stab wound victim arrives with a large butcher knife lodged perpendicularly in his left posterior thorax. An x-ray confirms that the butcher knife is lodged in the center of the supraspinous fossa of the left scapula. Given this information answer the following questions:

a. From superficial to deep, through which muscle(s) would that knife be passing? (trapezius and supraspinatus)
b. What bony process prevents the knife from sliding inferiorly? (scapular spine)
c. What muscle lies inferior to this bony process? (infraspinatus)

Results
As shown in Figure 1, the percentage of incorrect responses was greatest for the case study questions and least for the diagram labeling.

The mean (±s.d.) number of questions missed per student for diagram labeling was 5.2 (±3.6) %, for relationship questions was 22.5 (±9.8) %, and for case study questions was 26.6 (±12.4) %. Paired samples t-test demonstrated that performance on each of these modular components was significantly different (p ≤ .0001 diagram vs. relationship and diagram vs. case; p ≤ .003 relationship vs. case). As shown in Table 1, significant correlations were demonstrated between the number of incorrect responses in each component of the module. In addition, a significant correlation was demonstrated between performance on the relationship questions and mean exam performance, but not between diagram questions or case study questions and exam performance.

Table 1. Pearson correlation coefficients r and (p-value). Correlations are between number of incorrect responses in module variables and correct responses on the exams. N= 18 for exam score and 19 for all other variables.

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<td>-.296 (.233)</td>
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<td>---</td>
<td>-.907 (.0001)</td>
<td>.505 (.033)</td>
<td>-.323 (.191)</td>
</tr>
<tr>
<td>Case Study</td>
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Discussion
The purpose of this study was to identify weaknesses in the level of students’ understanding of human anatomy beyond simple identification. Students correctly responded to structural identification questions more frequently than either relationship or case study questions. Performance within each component of the module correlated with other modular components. In other words, students who performed well on the diagram labeling, also tended to perform well on other areas of the module.

The unit exams administered for grades were weighted more heavily in relationship questions than other types of questions. Therefore, it is not surprising that exam scores correlated with performance on the relationship portion of the module and not with diagram labeling or case study questions. During completion of the modules, students were allowed and, in fact, encouraged to look at their diagrams. However, students were denied access to diagrams during written exams. Therefore, the use of the diagram during the module assignment may have served as a “crutch.” Students may not have formed a mental model sufficient to independently answer an exam question. In fact, several students commented on their inability to formulate such mental pictures during their unit examinations.

The correlation between performance on diagram, relationship, and case study questions could be interpreted that student performance tends to be consistent at all levels. However, it could also be that the diagrams themselves mislead some of the students to answer the relationship and/or case study questions incorrectly. Reviewing the modules post hoc, we identified patterns in student responses indicating that two-dimensional diagrams may in fact have led to incorrect interpretations of structural relationships. This raises the concern that students who spend more time studying from textbooks than from three-dimensional anatomical structures and actual cadaver dissections may perform poorly on a laboratory practical examination.

Conclusion
The use of this three-step modular approach to anatomy can help identify deficiencies in levels of student understanding of anatomy. It can also be used as a teaching tool to assist students and instructors in focusing their studying toward increasing the conceptual understanding of human anatomy. Details and specific questions could also be modified to address the learning objectives of instructors’ specific courses.

References

I am pleased to announce that our Marketing Manager, Donna White, has been awarded the 2006 President’s Award. Donna has served over the years on various committees, and she was the Regional Director for the Southern Region prior to assuming the role of Marketing Manager. After successfully serving in that capacity for several years, Donna added to her work load in 2005 by mentoring Javni Mody so that Javni will be ready to take over the Marketing Manager position unassisted as of July 1, 2006.

In her time as Marketing Manager, Donna’s skills, congenial nature, and dedication to excellence enabled us to achieve financial security while maintaining close relationships with both exhibitors and affiliated societies who display at our annual and regional conferences. In view of this, and in consideration of all she has done for HAPS over the last decade, the Board was unanimous and enthusiastic to have Donna White be the recipient of the “President’s Award” for 2006.

This award carries with it not only the honor and respect of the award itself but also a lovely engraved medal with the HAPS logo and the name and year of the award on one side, with the recipient’s name on the other side. It also comes with the following: conference registration fee and annual banquet fee paid by HAPS at a future annual conference of the recipient’s choosing; an article announcing the recipient, written by the awarding President, for the Fall Edition of the HAPS-EDucator, and a formal letter of appreciation sent to the administration of the recipient’s home institution, in this case Collin County Community College, in Plano, TX.

Donna’s willingness to assume the important responsibility of Marketing Manager is a tribute to her personally, as well as to the college she represents. She has contributed significantly to our organization’s growth, fostered partnerships with other organizations, enhanced our financial position, and improved our abilities to communicate and function more efficiently! It has been my privilege and pleasure to work with Donna this past year, and it is my honor to award her the President’s Award for 2006. Donna, on behalf of HAPS, I want to say thank you most sincerely for all you have done for us.
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The other set which will be published in the Winter 2007 HAPS-EDucator, illustrates vertebral disk dilemmas, in other words, how disks are squeezed by poor posture, poor muscle tone and tight hamstrings. They are useful for understanding the mechanics of lower back pain, which is difficult to explain with words.

If you would like to use these illustrations, send Mark a request by e-mail and you will receive the illustrations back as attachments that can be saved, resized, and pasted into any document you wish. There is no copyright because we want to encourage their use.
Applications for the 2007 Robert Anthony and Adjunct Faculty Scholarships are now available on the HAPS web site.

Do you know someone who is:
1. A HAPS member in good standing, attending a HAPS meeting for the first time
2. A full-time faculty member
3. Teaching a load that includes at least one section of Human Anatomy and Physiology

If so, that member may be eligible for the Robert Anthony Scholarship.

If you know someone who is:
1. A HAPS member in good standing, attending a HAPS meeting for the first time
2. Has adjunct (part-time) status at their institution
3. Teaching a load that includes at least one section of Human Anatomy and Physiology

If so, that member may be eligible for the Adjunct Faculty Scholarship.

Detailed information can be found on the HAPS web site (www.hapsweb.org). Please support your new colleagues by encouraging them to join HAPS and apply for these scholarships! The deadline for both scholarships is November 15, 2006. Questions can be sent to Amy Way, Chair of the Grants and Scholarships Committee (away1@lhup.edu).

Congratulations to:
- Zarina Tchinibekova, who received the Student Grant for her project entitled, “Bone mineral density of the ultra-distal radius in young women.” Zarina is a student at the University of Illinois at Chicago and is sponsored by Dr. Mary Lou Bareither, HAPS member.
- Dr. Barry Wolf and Dr. Carol Reinson from the University of Scranton, who received the Faculty Grant for their project entitled, “Visual perceptual function and student academic performance in neuroanatomy.”

Now is the time to consider applying for these grants! Applications are due February 1, 2007, and details about how to apply can be found on the HAPS website (www.hapsweb.org). Questions can be sent to Amy Way, Chair of the Grants and Scholarships Committee (away1@lhup.edu).
In an effort to introduce HAPS members attending their first Annual Conference to the HAPS Committees, the HAPS Steering Committee decided to hold a Scavenger Hunt. The purpose of the hunt was for the First-Timers to get the signature of each HAPS Committee Chair at the meeting. While getting the signatures, the Committee Chairs told the seeker a little about his/her committee. Many of the First-Timers found a committee in which they were interested, and joined that committee either as a member or friend of the committee. All met members whom they might not have met otherwise and formed new friendships and networks.

Congratulations to all of the First-Timers who successfully completed the Scavenger Hunt at the 2006 HAPS conference in Austin! You demonstrated the enthusiasm and dedication that we like to see in our profession. We look forward to seeing each of you at San Diego in 2007.

Dayo Adeeko
John Andreucci
Stephanie Baiyasi
Cindy Belles
Manuel Daniels, Jr.
Meg Dischiavo
Cindy Dove
Greg Erianne
Molly Fiechtl
Christina Gentile-Renda
Juan C. Gutierrez
Rachel Hopp
Kebret Kebede
Steve Kish
Crystal Lemmons
Robert Leopard

Darren Mattone
Russell Moore
Karen Murch-Shafer
Pat Ostlund
Elizabeth Pennefather-O’Brien
Wendy Rappazzo
Sandy Robinson
Vickie Roettger
Guillermo Salas
Kartika Tjandra
Amy Troyer
Margot Williams
Barry Wolf
Amie Yenser
Amy Zink

Several members of the Steering Committee 2004-2005: (front, left to right) Rema Suniga-Safety, Valerie O’Laughlin-Membership, Phil Tate-Presidents Emeritus, Susan Baxley-HAPS-ED Editor, Don Kelley-Cadaver Use, Amy Way-Grants and Scholarships, Donna White-Marketing, Tom Lehman-HAPS Website and Steering; (back, left to right) Carl Schuster-HAPSWeb Master, Nancy Kincaid-HAPS-ED, Chris Farrell-Testing, Carol Veil-Curriculum and Instruction, Jon Jackson-Membership
Monroe Community College, in conjunction with the Human Anatomy & Physiology Society, and the American Association of Anatomists, will host a regional HAPS meeting on Saturday, November 11th in the R. Thomas Flynn Campus Center in the Warshof Conference Center.

Two keynote speakers will be featured. Dr. John Treanor will address the issue of vaccine development in conjunction with the avian flu. The second speaker will be announced at a later date. There will be breakout workshops, exhibitors, door prizes, and much sharing with colleagues.

If you are interested in presenting a workshop, please contact Atif Wahba at awahba@monroecc.edu or (585-292-2732).

For additional information on the conference please contact Dick Connett at rconnett@monroecc.edu or (585-292-2729).
The members of HAPS wish to thank the sponsors of the 2006 HAPS Annual Conference for their generosity and support of HAPS. We truly value your friendship as well as all that you do to make our teaching and students’ learning easier and more interesting.

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