Fall 2008

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HAPS

Fall 2008 Volume 13, No. 1

CONTENTS

Cover art is provided by Jaqueline Gomez. Jackie is a student in the Department of Kinesiology and Nutrition at the University of Illinois Chicago, where she studies with Mary Lou Bareither. Jackie is majoring in kinesiology and is planning a career in occupational therapy.

HAPS-EDucator

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 $65 for full-time faculty, $50 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. Information on additional membership categories, meetings, and more can be found at: http://www.hapsweb.org. Correspondence should be directed to: HAPS, PO Box 2945 LaGrange, GA 30241 or (800) 448-HAPS (4277) or (706) 883-8215 (fax).

SUBMISSIONS TO *HAPS-EDucator*

Papers for publication, requests for information, positions available and wanted, and letters to the editor are welcomed. Articles may be submitted to the editor as a Microsoft Word or Word Perfect file as an e-mail attachment. If references are included, please follow the methods suggested in *Scientific Style and Format: The CSE Manual for Authors, Editors, and Publishers 7*th Edition, Style Manual Committee (Council of Biology Editors) Cambridge, Cambridge University Press 2006 or see the reference guide on the *HAPS-EDucator* page of The HAPS website (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: HAPS, PO Box 2945 LaGrange, GA 30241 or hapsed@hapsweb.org.

GREETINGS FROM YOUR PRESIDENT

Kevin Petti, HAPS President president@hapsweb.org

Greetings from sunny San Diego!

I am so very honored to write my first president's letter to the membership. My term began on July 1 of this year and every day I realize the more I learn about what HAPS is doing, the more amazed I become.

HAPS has evolved into *the* voice of undergraduate human anatomy and physiology education in the United States and Canada. We have established strong ties with other professional organizations such as the American Physiological Society, the American Association of Anatomists, and the National Association of Biology Teachers. These relationships enhance our stature and expand our reach. Further development of these associations will certainly continue for many years.

The single most exciting development in recent years that displays how far HAPS has come from its humble roots over two decades ago is the establishment of the HAPS Institute (HAPS-I). This continuing education program that offers graduate credit from the University of Washington reflects the true mission of our Society by *promoting excellence in the teaching of human anatomy and physiology*. Clearly there was a need for HAPS-I among the membership since all of the courses are in great demand. The high quality of the program is evident by the rave reviews HAPS-I courses and instructors receive.

I find it truly impressive that in a year and half this program has evolved from two pilot courses debuted at the San Diego conference in 2007, to a half dozen courses offered at either the national conference or regional meetings, as well as online. I urge you to consider enrolling in a HAPS-I course soon. Explore the details by surfing over to hapsweb.org and clicking on the HAPS-I link.

Speaking of national conferences, the 2008 New Orleans conference was a great success for our organization, and the 2009 Baltimore conference (May 23 – 28, 2009) should prove to be our best meeting yet. Plan now to attend and enjoy not only the educational and networking opportunities, but also take some time to visit the local attractions. From the Inner Harbor, Fells Point, and Camden Yards, to our nation's capital, the Baltimore area has much to offer. By the time you read this, registration is likely to have begun. So visit the conventions link at our website for information on how to register.

From an administration standpoint many challenges are before the HAPS leadership. Last year we transitioned to the Association Services Group (ASG) for our professional management services. This process was lengthy and complex. Now that the transition is complete, I hope that your membership services are completed smoothly.

Other administrative challenges before us include continued growth of the membership, further development of website content and management, the possible establishment of a foundation, and increasing the number of regional conferences.

Of course our Society would not exist if it were not for the generous sacrifice by members who are willing to come forward and volunteer their precious time and effort. In the next month or so, a slate of candidates will be established for the spring 2009 election. President-Elect John Waters will soon announce details concerning vacant offices. Please consider nominating those individuals who are ready to make a contribution, and please also consider serving if you are asked. Additionally, when the online polls open in the spring, remember that it is the duty of all of us to vote.

On behalf of the entire HAPS Board of Directors, I wish to extend our sincere gratitude to you for your support. Do not hesitate to contact your regional director if you have any questions or concerns. Contact information for all BOD members is listed beside the table of contents of this issue.

I also thank you for your service to HAPS!

2008 President's Medal Award Winner – Kevin Patton

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If you have been to a HAPS conference, you have seen him. You have probably had a lovely chat with him without necessarily knowing who he is. He's always pleasant, low key, and unassuming. Kevin has often been heard declaring, "I learn SO much at these meetings." and then jotting down a note on one of his endless series of note cards. This most usually occurs after someone has just done or said something absolutely outrageous, but worthy of commemoration. Don't ask me how I know this, because I will only lie.

Most people these days know of Kevin through his work as the first Director of the HAPS Institute (HAPS-I). Through sheer determination and hard work, Kevin, together with President Emeritus Joe Griswold and President Emerita Sandy Lewis, negotiated an agreement with University of Washington (Seattle) and propelled the interesting idea of offering graduate biology credits to HAPS members into operational reality. The most amazing aspect of this is that they, along with Jennifer Lundmark and Ellen Arnestad, formed an organizing committee and created HAPS-I from the ground up all in the space of one short year. Truly an example of what can be done by the concentrated effort of a few dedicated people who believe in and are committed to a project.

But HAPS-I is just the deliciously rich butter cream frosting on the multiple layers of Kevin's ongoing service to HAPS. While Kevin is justifiably proud of all his accomplishments, he is not the kind of person to bring them up in normal conversation, not without a couple of drinks first, anyway. It is, therefore, quite possible that newer members of the organization might not be aware of all he has done for HAPS -- even before HAPS-I was a hint of an inkling. Kevin was one of the first class of HAPS members in 1988. Kevin hosted the first St. Louis HAPS annual conference in 1995. He was elected to the position of Secretary-Treasurer in 1995-96, back when we had no management firm, and no credit card capability. All of the memberships, numbering about 1100 at that time, had to be processed in hard copy by one person on a volunteer basis. The next year Kevin ran for and was elected President; he handed over a much improved set of membership files to the next and last Secretary-Treasurer. Thus, Kevin went through the HAPS President cycle (President-Elect, President, Past-President) in 1996-1999. He was president the year we welcomed Tonya Ferguson and Organizational Services Group as our first professional business office. At the suggestion of Steve Trautwein, then President-Elect, he established the office of President Emeritus as a service position for the society. Kevin himself became a President Emeritus in 1999 and has continued to provide his insight and experience as resources for the organization.

In all that he has done and continues to do for HAPS, Kevin has an outwardly calm and stylish demeanor that is unmistakable and the envy of those of us who cannot help but show our inner turmoil and frustration on our surfaces. As stated in our Policies and Procedures Manual, "The President's medal is an award that recognizes a HAPS member who has provided exemplary service to HAPS." President Emeritus Kevin Patton is and continues to be the embodiment of that exemplary service. Congratulations, Kevin!

HAPS 2009
Baltimore, Maryland

Chart Your Course: Neuroendocrinology
Update Seminars and Courses

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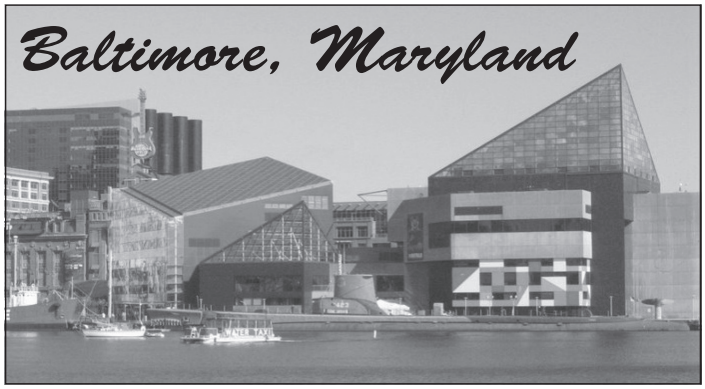
Chart your course to Baltimore, Maryland, and join us for the 23rd Annual Conference of the Human Anatomy & Physiology Society from Sunday, May 24 through Wednesday, May 27, 2009.

We will offer six update seminars. In keeping with our theme of control systems of the body, our speakers will include Dr. David Ginty, Professor of Neuroscience at the Johns Hopkins University School of Medicine; Dr. Dean Wong, Professor of Radiography and Nuclear Medicine at Johns Hopkins University; and Dr. Norbert Myslinski, Associate Professor of Neuroscience at the University of Maryland. Dr. Ginty's research focuses on neuron growth and nervous system development. Dr. Wong uses imaging techniques to investigate neuroreceptor systems. Dr. Myslinski's research includes sensory-motor integration in the human oral-facial region. Dr. Myslinski is also interested in neuroscience education for the public.

HAPS-Institute (HAPS-I) plans to offer four 2-credit, graduate-level courses at the 2009 conference. "Recent Advances in A&P 2009" (formerly "Topics in A&P") will allow you to look more closely at each of the update seminars. This will be the third year for "Advanced Renal Physiology," which takes an in-depth look at learning and teaching renal physiology. HAPS-I will also offer two new courses at the 23rd Annual Conference: "Cardiovascular Regulation" and "Principles of Neuroendocrine Physiology."

We hope you'll chart your course and cruise into Baltimore next May! For further information, contact conference co-coordinators J. Ellen Lathrop-Davis, elathrop@ccbcmd.edu, or Ewa Gorski, egorski@ccbcmd.edu.



Coming soon...

HAPS 2009 registration on the web. Look for the full registration form including all the extras (Sunday evening special event, Monday banquet and Thursday day trip) available online at www.hapsweb.org. Poster session and workshop proposal forms will also be available for your convenience.

See you in Ballmer, Hon!

The HAPS-I Report

HUMAN ANATOMY & PHYSIOLOGY SOCIETY INSTITUTE

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We're already off to a new season of wonderful HAPS Institute courses!

As you read this, our first FALL course–Using Cadavers to Teach A&P–will be underway already! Because of the rapidly increasing interest in our program, we are trying to expand the flexibility of our calendar to accommodate as many HAPS members as possible.

To see our current offerings, go to *hapsweb.org* and click on *HAPS Institute* in the left menu bar. At the top of the HAPS Institute welcome page, click *List of Courses*. At our website you'll see cadaver-based anatomy courses, a reprise of our successful respiratory course (see the related photos) and online courses. We also have new courses in cardiovascular biology and neuroendocrine regulation. And my personal favorite, the "topics" course, is back under a new name: *Advances in A&P 2009*. But we're always adding more, so make sure you *stay tuned* to us!

In addition to bookmarking various HAPS-I pages at *hapsweb.org* you may want to join our **HAPS-I Update** group at Google Groups. The **HAPS-I Update** group is an email-only group that sends you occasional announcements, as information becomes available, about new courses, program developments, and other news and opportunities. The **HAPS-I Update** group receives critical updates, such as new course announcements, shortly before they are announced to the general HAPS membership. Because our courses usually fill rapidly and promise to become even more popular, a head-start of a couple of days could be very handy.

To join the **HAPS-I Update** group, click on the FAQ link at the top of any HAPS Institute page at *hapsweb.org*. Then scroll down to the Google form to join the group. It's really *easy* and you'll be glad that you joined! Of course, you can unsubscribe from the list at any time.

Since we're on the topic of our Google groups, we also have a **HAPS-I Scholars** group for folks who are taking or already have taken one of our courses. This is an interactive, online community of A&P professors in which the learning networks formed during HAPS-I courses can continue, mature, and expand. The point I'm getting to here is that HAPS-I courses are *just the beginning* of a process that just keeps on supporting you!

I'll leave you with a photo from the *Advanced Respiratory Biology* course. This was taken during the workshop portion of the course. As always, we welcome any input, advice, questions, complaints, or other messages at HAPS-Institute@hapsweb.org.

EDU-Snippets

Moving Snippets

A column that survives because you, the members, send us your Snippets

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EDU-Snippets is a column designed to let you, the members of HAPS, share your "ways to make sure your students get it." During these past few years of putting together your ideas into our EDU-Snippets column, we have been continuously amazed at how many teaching and demonstration ideas pop up and are easily transferred from one instructor to another through Snippets. The following Snippets have been coming in over the last few months and we think you will enjoy them. We also think you will find these EDU-Snippets practical and easy to adapt to your own teaching situations. As always we have done a bit of editing so that the ideas blend together.

I. Action Snippets

The nervous system always lends itself to creative ways to help the students learn the multitudinous physiological components of nerve transmission. Several members of HAPS sent us their moving ideas for helping their students learn this critical concept.

A. Wave Potential

To start us out, Elizabeth Hodgson (York College of Pennsylvania, ehodgson@ycp.edu) told us how she uses the "wave" in the classroom.

When I teach action potentials, students have difficulty picturing the movement of an action potential along the membrane. I came up with a way for them to participate in an action potential – the "wave." I ask the students to picture the wave at a sports event; then we do the wave. I am the initial stimulus (the ligand) and I point to the first row of students. As soon as I point, the students in the first row raise their hands and bring them down (like the wave). The raising of the hands in the first row causes the next row to raise their hands and so on. I then explain that the raising of the hands is like depolarization and the lowering like repolarization. When the students see the "wave" across the room they start to understand the concept.

B. Dance Potential

After we finished with the wave, we moved on to the dance. Brian Jensen (College of St. Rose, jensenb@strose.edu) sent us some websites and then told us how we could get our students dancing with their pacemakers.

Interpretive dance can be used to convey complex ideas including scientific ideas. The recently published dissertation dance competition is certainly an example of this concept (http://www.sciencemag.org/cgi/content/full/319/5865/905b).

I have been using what I jokingly refer to as modern interpretive dance to teach students the basics of the conduction. Based upon anecdotal evidence, this dance is rather effective. Students have approached me years after taking the course and told me they still know the dance (and thus the pacemakers of the heart).

The dance goes as follows and can be viewed at http://academic2.strose.edu/Math_And_Science/jensenb/A&P/PaceMakerII.wmv Meanwhile, this is what I do.

Movement	**Words**
Hands over head to the right	SA node
Hands centered at waist	AV node
Hand moving down midline towards knees	Bundle of His & Bundle Branches
Hands move outward and up	Purkinje Fibers

Students typically are reluctant to participate at first; however after the third or fourth time through, they begrudgingly join in as a group. I never dance alone, so during review sessions all must participate.

Finally, if you adopt the dance, watch your students while they are answering the pacemaker question on your exam – some of them will move their fingers in the pattern of the dance, clearly using it to help with recall.

C. Nervously Rooted Potential

Tom Lehman (Coconino Community College, tom.lehman@coconino.edu) sent us some good anecdotes that we can pass along to our students to help them remember a few critical points about nervous system roots.

I use this story to tell the students about the Phrenic Nerve. While in medical school, a teacher gave us a mnemonic for the roots: "C3-4-5 keeps you alive" as these are the roots for the Phrenic Nerve. Actor Christopher Reeve injured his spinal cord at C2. He was kept on ventilation and treated with methylprednisolone, which held promise for preventing complications associated with spinal cord injury. He was able to retain enough of the roots for his

phrenic nerve so that he did not need an iron lung. Unfortunately, he did lose some of the phrenic nerve roots and needed a respirator to help his impaired diaphragm.

I use two opposite disease actions to demonstrate the dorsal and ventral roots. Much about the function of the spinal roots came from anecdotal observations of people suffering from leprosy and from polio. In leper colonies in Africa and India, it was noted that infected individuals appeared to be resistant to pain and to possess super-human strength. We came to realize that the pathogen that causes leprosy was destroying the dorsal root ganglia (sensory input) while leaving the ventral root (motor output) intact. Infected individuals also appeared to have multiple lesions on their skin and lose digits from their hands and feet. Part of the explanation again points to loss of dorsal root ganglia; without pain reception, someone with leprosy would not notice when a sore occurred until it was so bad that it destroyed surrounding tissues and possibly the digit or skin.

The opposite effect occurs with polio because the pathogen that causes polio attacks the ventral root, destroying motor output while sparing the sensory input of the dorsal root. President Franklin Roosevelt was a long-time sufferer of polio, losing more and more of the motor control of his lower limbs, yet retaining full sensory input throughout his body. President Roosevelt took great strides in battling his own polio as well as polio in general. He helped to establish the March of Dimes campaign to raise funds for polio treatment. In his honor, Congress put his image on the dime.

II. Skeletal Potential

And what would human movement be without a skeleton? Two of our HAPS members sent us approximately the same exercise but each uses it for a different purpose. We're sharing both of their ideas with you.

A. Before the Fact

Jane Johnson-Murray (Houston Community College System – Central College, jane.johnsonmurray@hccs.edu) uses her skeletal exercise as a beginning.

We have a number of disarticulated skeletons (which is great), but we also have many instructors using the material in the skeleton room (which is not so great). So, when I begin A and P I lab, everything is disarranged; bones that are color coded are all mixed up in the various boxes and scattered around the lab in assorted drawers and cabinets. So, I use this puzzle activity as the BEGINNING of the skeletal system lab. Students work in groups to get the various bones back into their correct boxes and they build a skeleton on their lab benches. They know the names of the bones and recognize them individually by the end of the exercise, just as they will have to do on exams (I make everyone at each table responsible for the learning of everyone else at the table.) The students also get an inkling of how the bones function at their articulations, a concept that can be pursued later.

B. After the Fact

Steve Kish (Zane State College, skish@zanestate.edu) uses his exercise at the end.

Students can put the axial skeleton together as if it were a puzzle. I do this as an "ending activity" for the skeletal system. I break the students into groups and have them race against each other to put the entire skeleton together on their tables. It's like a "Survivor" immunity challenge, although no one gets voted out of the lab! They have to put everything together, vertebral column, ribs, girdles, arms, legs. If you have several disarticulated skeletons, this works.

III. And We Hope You Will….

Keep those cards and letters coming! We thank you all for your EDU-Snippet contributions. For the next issue of the *HAPS-Educator*, send your EDU-Snippet experiences and ideas to rfaircloth@aacc.edu as soon as possible. Plan ahead. You can even submit your ideas now and maybe next issue you too will see your EDU-Snippet in print!

ERRATA

Well, members of HAPS, Richard and I missed a couple of points in our last column. In the Table on page 10, the term Melatonin Stimulating Hormone should be Melanocyte Stimulating Hormone. At the top of the same Table, the term GLAND – while technically correct – would be more appropriate as ENDOCRINE TISSUE. Also on the same Table, the more common USA spelling of thymosine is thymosin.

We apologize for any inconvenience.
Roberta M. Meehan

What's a COPUS?

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The acronym COPUS stands for Coalition on the Public Understanding of Science. COPUS is a consortium of schools and organizations working together to increase the general public's accessibility to and understanding of science and how it affects them. A primary goal of the organization is to engage communities in exploration and discussion of how science can be made more accessible, personally meaningful, and locally relevant. COPUS is sponsored by the American Institute of Biological Sciences, the Geological Society of America, the National Science Teachers Association, and the University of California Museum of Paleontology. Any organization in sympathy with the goals of the COPUS is welcome to join. As of August 2008, there were 309 organizational members from AAAS to the Banana Slug String Band and from the National Academy of Sciences to the Lansing Community College Science Department. HAPS joined COPUS as an institutional member in October of 2007.

The current big project of COPUS is "Year of Science 2009: A Celebration of How We Know What We Know." This is a national year-long celebration of science to communicate to the general public how science works, why it matters, and who scientists are. The year 2009 was chosen as the Year of Science because in 2009 we celebrate some amazing anniversaries which include:

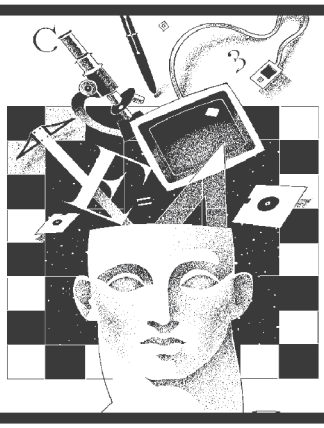
- the 400th anniversary of the publication of Johannes Kepler's first two Laws of Planetary Motion,
- the 400th anniversary of Galileo's first use of a telescope to study the skies,
- the 200th anniversary of Darwin's birth and the 150th Anniversary of the publication of *On the Origin of Species*,
- the 200th anniversary of the birth of Abraham Lincoln (who supported the founding the National Academy of Sciences, and signed the Morrill Act creating the Land grant system of agricultural colleges),
- the 100th anniversary of the discovery of the Burgess Shale by the paleontologist Charles D. Walcott, and
- the 100th anniversary of the establishment of USDA Forest Service Experimental Forest and Ranges, the largest system of dedicated experimental sites in the US.

The missions of COPUS and the Year of Science 2009 are entirely congruent with the mission of HAPS. Our work promoting excellence in Human Anatomy & Physiology instruction rests on and is grounded in science. Whether we teach future healthcare providers or general education human biology students, those in our classes benefit from a good understanding of biological science. The trend seems to be continuing toward evidence-based and outcomes-based medicine. Both health care costs and medical research are pushing medicine in that direction. Treatment decisions in the future will increasingly rely on knowledge of best clinical practices and an understanding of diagnostic technology. Everyone's ability to participate meaningfully in their own health care is increased in proportion to their personal understanding of human A&P and science in general.

You are encouraged to participate in the Year of Science 2009 at your home institution to the degree that you are able, whether your institution is a member of COPUS or not. The Year of Science site (http://www.copusproject.org/yearofscience2009/index.php), as well as the general COPUS home page (http://www.copusproject.org), offers resources and suggestions for how you and your school might become involved. You can check the COPUS website to find either a thematic hub that interests you or the regional hub nearest to you so that you can learn about other activities in your area that might already be planned. Looking forward to an exciting Year of Science in 2009!

YEAR 2009 of SCIENCE
Explore. Empower. Engage…

TEACHING Tips



How Many Muscles Do You Teach? A Survey of HAPS-L Readers

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How many muscles do you teach? Which ones? What about arteries, veins, and nerves? If you've ever wondered how your laboratory checklists compare with what other instructors expect of their students, you're not alone. Such questions are posed occasionally on the HAPS-L forum[1] by others wondering the same thing.

The last time the muscle question arose, I volunteered to take a survey and compile the results. I asked HAPS-L subscribers to email the muscle lists that they give to their classes and tallied their input. I now report those results.

How many muscles are there in the human body? It is difficult to establish a definite number. *Gray's Anatomy* (39th edition) indexes about 319 muscle names; 297 muscles are tabulated at the back of *Dorland's Illustrated Medical Dictionary* (28th ed.) and 206 in *Stedman's Medical Dictionary* (28th ed.). Most of these, of course, are bilaterally paired, and many of the listed names are collective terms for multiple muscles, such as the multifidus, costal levator, interosseous, and lumbrical muscles. The number also depends on how one regards certain multipart muscles; is the quadriceps femoris counted as one muscle or four? The triceps surae as one or two muscles? It seems a safe assumption, however, that there are at least 700 skeletal muscles in the human body and that no A&P instructor teaches more than a few of them.

The question then is, "Which ones should I teach?" The answer depends partly on the nature of one's course—one semester or two? Human anatomy or combined A&P? An "essentials" course or a course in more depth? One that is entirely human or one that also incorporates the musculature of other species? It depends also on the type of students taking the course. Are they studying for careers in nursing, physical therapy, massage therapy, chiropractic, podiatry, or athletic training? But in any case, the question leads one to wonder, "What are other instructors doing?"

Method and Scope of Survey

I surveyed HAPS-L readers in October 2006. Instructors emailed their checklists to me over a period of 10 days, after which it appeared that no more would be forthcoming. Twenty instructors submitted their checklists (including my own),[2] some of which represented colleges with multiple instructors using a common list. I tabulated the responses in a spreadsheet by body region.

Because of the small sample size, I did not divide the responses by course type (such as a one-semester essentials courses, one-semester anatomy courses, or two-semester integrated anatomy and physiology courses), nor did I limit the survey to those teaching the same type of course. To do so would have resulted in several long lists, some of them representing only two or three respondents. Therefore, I pooled the data without regard to these distinctions. I omitted muscle names that pertain only to nonhuman animals (dissection specimens); accessory structures such as retinacula and aponeuroses that are on many instructors' muscular system checklists; and muscles normally taught with other organ systems, such as the extraocular and middle-ear muscles taught with the sense organs. I did not solicit or collect data on the extent to which respondents teach origins, insertions, or innervations.

[1] To subscribe to HAPS-L, see the Listserv link at www.hapsweb.org. HAPS membership is not required.

[2] Contributors to this data pool are Terri Bidle, Mark Bolke, Sheri Boyce, Dave Canoy, Carol Gavareski, Susan Guffey, Elizabeth Hodgson, Jason LaPres, Tom Lehman, Darren Mattone, Karen McMahon, Terry Meehan, Janice Meeking, James Miller, Izak Paul, Mary Lou Percy, Tinna Ross, Ken Saladin, Kelly Sexton, and Carl Shuster.

Teaching Tips - continued from page 10

Results

There were 185 muscles that rated inclusion on at least one person's list, but individuals taught from a low of 42 to a high of 117 muscles (Table 1). The mode was in the 50s, the median was 59.5, and the mean was 66 muscles. Tables 2-5 list the muscles individually by body region and then alphabetically within each region. Numbers show the percentage of respondents who taught each one, with each respondent representing 5%.

Table 1.
Number of muscles taught by individual respondents

100+	117	107	101				
90-99	No Respondents						
80-89	81						
70-79	71						
60-69	67	64	63	62	60		
50-59	59	58	57	55	54	52	51
40-49	47	43	42				

Discussion

Tables 2-5 require interpretation on the reader's part. For example, most instructors listed individual forearm muscles, but one responded only "flexors" and "extensors." Only one person reported teaching the short head of the biceps femoris and two persons listed the long head, but the next line of the table tells a different story—everyone taught the biceps femoris at least collectively. To judge how many instructors were teaching any particular muscle of interest, one must, therefore, look at different ways that that muscle, its components (such as heads of the quadriceps femoris), or a muscle group might be reported. It may also seem surprising that only 60% reported teaching the diaphragm, but most likely, others teach it in connection with the respiratory system and simply did not include it on their muscular system checklists. One respondent said that he includes the pelvic floor muscles in the unit on the reproductive system, and, therefore, did not list them with the muscular system.

Even though only 20 instructors responded, these results may be of some help to both beginning and seasoned instructors and to authors of textbooks and laboratory manuals, as we all ponder what to include. No one should use this as the sole basis for such decisions—for example, by trimming a lab checklist to 60 muscles simply because that's the median number taught by this small but diverse group. The nature of one's course and students and the relative priority of the muscular system versus other topics on one's teaching agenda all need to be weighed against any such data pool.

Nevertheless, I found the results useful in both my teaching and writing. I confess that my lab checklist proved to be the second-longest of the lot; I was expecting students to learn 107 muscles. When I saw that the average was 66, I did not cut my list back to that extent, but I did cut about 25 muscles—including such cases as the nasalis, corrugator supercilii, and several of the intrinsic hand and foot muscles—when I saw that very few other instructors were including them. Yet the results had a contrasting effect on my textbook writing. Always pressed for space in writing a book, I had omitted the platysma as a relatively unimportant muscle. When I saw that 60% of respondents were teaching it, I felt that was reason to reinstate it to my muscle chapters even though I still do not teach it in my own classes.

I hope that other instructors and writers will gain similar benefit from this survey. It would be helpful to have similar surveys of such structures as arteries, veins, and nerves, and all the more so if larger numbers of instructors would respond whenever such surveys may be taken.

If others endeavor to take such surveys, I would recommend creating a list in advance and asking respondents to check the organs they teach. It would be even better if it could be done as an online survey with a software application that would automatically tally the data. Having predefined response choices would alleviate the problem of how to tally the data when one person, for example, lists "quadriceps femoris" and another lists the muscle heads separately. Does the latter respondent require students to know only the collective name or the names of the individual heads? It could be prohibitively time-consuming to send follow-up queries in hopes of resolving such differences. A write-in allowance for "Others" in each organ grouping would be advisable, as some respondents will feel their teaching lists cannot be shoehorned into the surveyor's defined categories.

It was difficult to get even 20 responses to this survey. Perhaps if HAPS members see the value in having such guidelines, the response rate will be better in the future. It would seem valuable to have such results for muscles, arteries, veins, and nerves archived in the Course Guidelines section of the HAPS web site. Ideally, such surveys should be repeated periodically in order to reflect the impact of instructors retiring, newer ones joining, and instructors being influenced by previous survey data and devising or modifying their lists accordingly.

Muscle Checklists

The following 4 Tables (2-5) list the specific muscles that are taught by the respondents. In each table the muscles are grouped by body region and then listed alphabetically. Numbers indicate the percentage of respondents who reported teaching each muscle (each respondent = 5%).

Teaching Tips continued on page 12

Teaching Tips – continued from page 11

Table 2: Head and Neck Muscles	
Auricularis	10
Buccinator	80
Corrugator supercilii	5
Depressor anguli oris	40
Depressor labii inferioris	30
Digastric	50
Epicranius, collectively	5
Frontalis	70
Genioglossus	5
Geniohyoid	5
Levator anguli oris	5
Levator labii superioris	35
Masseter	100
Mentalis	30
Mylohyoid	30
Nasalis	10
Occipitalis	30
Occipitofrontalis, collectively	10
Omohyoid, inferior belly	5
Omohyoid, superior belly	5
Omohyoid, collectively	5
Orbicularis oculi	95
Orbicularis oris	95
Pharyngeal constrictors	10
Platysma	60
Procerus	5
Pterygoid, lateral	20
Pterygoid, medial	15
Risorius	15
Scalene, anterior	5
Scalene, middle	5
Scalene, posterior	5
Scalenes, collectively	25
Semispinalis capitis	15
Splenius capitis	40
Splenius, collectively	10
Sternocleidomastoid	90
Sternohyoid	25
Sternothyroid	15
Stylohyoid	15
Temporalis	95
Temporoparietalis	5
Thyrohyoid	15
Trapezius	20
Zygomaticus major	35
Zygomaticus minor	15
Zygomaticus, collectively	45

Table 3: Muscles of the Trunk	
Abdominal oblique, external	95
Abdominal oblique, internal	90
Coccygeus	55
Diaphragm	60
Erector spinae	35
Iliacus	55
Iliocostalis lumborum	10
Iliocostalis thoracis	10
Iliocostalis, collectively	10
Iliopsoas, collectively	20
Infraspinatus	90
Intercostals, external	70
Intercostals, internal	70
Intercostals, collectively	10
Latissimus dorsi	100
Levator ani	10
Levator scapulae	65
Longissimus thoracis	15
Obturator externus	10
Obturator internus	5
Pectoralis major	100
Pectoralis minor	80
Pyramidalis	5
Quadratus lumborum	25
Rectus abdominis	90
Rhomboideus major	50
Rhomboideus minor	30
Rhomboids, collectively	25
Rotator cuff, collectively	10
Serratus anterior	90
Serratus posterior inferior	5
Serratus posterior superior	5
Sphincter, external anal	5
Sphincter, external urethral	5
Spinalis thoracis	15
Subclavius	10
Subscapularis	85
Superficial transverse perineus	5
Supraspinatus	85
Teres major	70
Teres minor	65
Transverse abdominis	90
Transversus thoracis	5
Trapezius	80

Teaching Tips continued on page 13

Teaching Tips – continued from page 12

Table 4: Muscles of the Upper Limb	
Abductor digiti minimi	10
Abductor pollicis brevis	10
Abductor pollicis longus	10
Adductor pollicis	15
Anconeus	10
Biceps brachii, long head	5
Biceps brachii, short head	5
Biceps brachii, collectively	95
Brachialis	85
Brachioradialis	30
Coracobrachialis	40
Deltoid	95
Extensor carpi radialis brevis	25
Extensor carpi radialis longus	35
Extensor carpi radialis, collectively	5
Extensor carpi ulnaris	45
Extensor digiti minimi	15
Extensor digitorum	55
Extensor indicis	10
Extensor pollicis brevis	10
Extensor pollicis longus	15
Extensors, collectively	25
Flexor carpi radialis	45
Flexor carpi ulnaris	40
Flexor digiti minimi brevis	5
Flexor digiti minimi	5
Flexor digitorum profundus	25
Flexor digitorum superficialis	25
Flexor digitorum, collectively	15
Flexor pollicis brevis	20
Flexor pollicis longus	15
Flexors, collectively	25
Interosseus muscles, dorsal	15
Interosseus muscles, palmar	10
Lumbricals	15
Opponens pollicis	10
Palmaris longus	30
Pronator quadratus	15
Pronator teres	55
Supinator	55
Triceps brachii, lateral head	15
Triceps brachii, long head	15
Triceps brachii, medial head	15
Triceps brachii, collectively	85

Table 5: Muscles of the Lower Limb	
Abductor digiti minimi	5
Abductor hallucis	5
Adductor brevis	25
Adductor longus	80
Adductor magnus	70
Adductors of the femur, collectively	25
Biceps femoris, long head	10
Biceps femoris, short head	5
Biceps femoris, collectively	90
Extensor digitorum brevis	10
Extensor digitorum longus	50
Extensor hallucis longus	20
Fibularis (peroneus) brevis	30
Fibularis (peroneus) longus	70
Fibularis (peroneus) tertius	20
Fibularis (peroneus) collectively	5
Flexor digiti minimi brevis	5
Flexor digitorum brevis	10
Flexor digitorum longus	40
Flexor hallucis brevis	5
Flexor hallucis longus	15
Gastrocnemius	95
Gemellus inferior	5
Gemellus superior	5
Gluteus maximus	100
Gluteus medius	85
Gluteus minimus	35
Gracilis	85
Interosseus, dorsal	10
Interosseus, plantar	10
Lateral rotators, collectively	5
Lumbricals	10
Pectineus	25
Piriformis	25
Plantaris	10
Popliteus	10
Psoas major	60
Psoas minor	5
Quadriceps femoris	10
Rectus femoris	100
Sartorius	95
Semimembranosus	95
Semitendinosus	95
Soleus	60
Tensor fasciae latae	70
Tibialis anterior	65
Tibialis posterior	25
Vastus intermedius	80
Vastus lateralis	100
Vastus medialis	100

The Cutting Edge

Aortic Dissection: A Medical Emergency

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What do comedians Lucille Ball and John Ritter have in common with cardiac surgeon Michael E. DeBakey and King George II of England? They all suffered an aortic dissection– a tear in the wall of the aorta that allows blood to flow between the tunica intima and the tunica media, creating a blood-filled channel between the two layers, forcing the layers apart. When the blood-filled channel tears the aorta completely open, the dissection is usually fatal. If the channel doesn't open to the outside, the condition can sometimes be treated with emergency surgery or medication.[1,2] Only DeBakey survived the event and eventually recovered enough to return to his work after having life-saving surgery that he himself had pioneered.

Fortunately, aortic dissections or dissecting aortic aneurysms are relatively rare occurrences. Men between the ages of 40 and 70 are the most common victims, with a male to female ratio of 2:1. Of females with aortic dissections, roughly 50% are previously healthy, under the age of 40, and have either recently given birth or are in the third trimester of pregnancy.[2] The primary risk factor for aortic dissection is uncontrolled high blood pressure, which can stress the walls of the aorta. It is seen in approximately two-thirds of cases. In rare instances, traumatic injury to the chest area from car accidents or other trauma may trigger aortic dissection. The presence of atherosclerosis, a pre-existing aneurysm, an aortic valve defect, or coarctation (constriction) of the aorta may predispose people to aortic dissection.[2]

The first step in the process of aortic dissection is thought to be bleeding of the vasa vasorum. It is followed by tears in the aortic wall that create two blood stream channels – a true lumen where blood continues to flow and a false lumen where blood pools and remains still.[3] The true lumen can be identified by its expansion during systole and collapse during diastole as seen in a diagnostic imagining device such as an echocardiogram. The primary tear is usually greater than 50% of the circumference of the aorta and it only extends to the full circumference in rare cases. Aortic dissections are classified as Type A or Type B depending on what part of the aorta is affected. Type A dissections usually begin in the right anterior region of the ascending aorta and spiral around the arch of the aorta before moving into the descending thoracic aorta and the abdominal aorta on the posterior left. In about 11% of cases, the dissection may move backwards and interfere with the opening of the coronary arteries. Type B dissections begin in the descending aorta and continue along its length for a variable distance.[4,5]

The pain associated with aortic dissection is significant and most often described as a sudden, severe, sharp pain with characteristics of tearing or ripping. Researchers believe the tearing or ripping sensation goes along with the progression of the dissection down the length of the aorta. The pain commonly starts deep to the sternum and moves under the scapulae. It may continue to move into the shoulder, neck, arm, abdomen, or hip area. Patients are typically extremely pale with a very rapid pulse and profuse sweating. They may be very thirsty and suffer from nausea and vomiting. Dizziness, fainting, and shortness of breath are also commonly seen. The dissection can usually be seen on diagnostic screening devices such as an echocardiogram, a transesophageal echocardiogram, a chest x-ray, a chest MRI, a CT scan, an aortic angiography, or a Doppler ultrasound.[4]

Aortic dissection is a medical emergency that requires immediate treatment if survival is to be a possibility. The type of treatment usually depends on the area of the aorta that has been affected by the dissection. Surgery is the treatment of choice for Type A dissections. Since a dissection that travels far down the aorta can put pressure on the arteries that normally branch from the aorta causing extensive tissue damage, kidney damage, stroke, and/or paralysis, the goal of surgery is to remove as much of the dissected aorta as possible, block entry of blood into the aortic wall, and reconstruct the aorta with an appropriate synthetic graft. If the aortic valve is leaking, surgeons can repair or replace it.[2,6] Under certain conditions, an endovascular stent-graft can be inserted through a catheter via blood vessels in the groin area and positioned in the aorta just as a stent might be placed in a blocked coronary artery. Removal and repair of the damaged sections of the aorta usually takes 3 to 6 hours followed by a 7 to 10 day hospital stay. If a stent-graph is used, the procedure for positioning it takes 2 to 4 hours and the hospital stay is usually 1 to 3 days.[6]

The Cutting Edge continued on page 15

Most Type B dissections can be treated with medications alone. Commonly beta blockers or calcium channel blockers are prescribed along with ACE inhibitors to decrease blood pressure and relieve some of the stress on the aortic wall. If the patient has atherosclerosis, cholesterol-lowering drugs may also be prescribed along with diet modifications.[3] Type B dissections are less likely to progress once heart rate is reduced and blood pressure is lowered. However, survivors may have to take blood pressure medication for the rest of their lives and require follow up diagnostic scans at regular intervals. Patients are closely watched for complications whether they are treated surgically or with medication only. Possible complications include development of aneurysms in the weakened aorta and increased aortic valve leakage. Either of these events would require surgical repair.[2] "Myocardial ischemia and rupture into the pericardium are the cause of death" in 80% of patients with acute aortic dissection.[5] Death is also associated with rupture of the dissection into the thoracic or abdominal cavity which results in severe internal bleeding.[2]

In the wake of reported increased incidence of aortic dissection in people with inherited connective disorders such as Marfan syndrome, Turner syndrome, and Ehlers-Danlos syndrome, recent research has focused on the molecular basis of acute aortic dissection. A recent study[3] compared the ascending aortas of a group of surgical patients who had Type A dissections with aortas obtained from multi-organ donors who did not have aortic dissections, with respect to gene expression. The study centered on 24 cardiovascular genes that are thought to play a role in the structure and function of the aorta. The researchers were able to identify several up-regulated genes in the aortas of those who had Type A dissections, including genes for inflammation (interleukin-2, -2, and -8) and extracellular matrix proteolysis. They identified down-regulated genes that coded for the production of the extracellular matrix, cell to cell adhesion, and production of cytoskeleton proteins, primarily actin. Actin is a major cytoskeletal protein and its absence or significant reduction would affect the cell's ability to maintain its shape and bear tension. With respect to the formation of the extracellular matrix, the study found decreased levels of integrin in the areas where dissection had taken place. Intgegrins are cell surface proteins that bind the extracellular matrix to the cell. Decreased numbers of integrins would make it difficult for cells of the aorta to integrate changes occurring outside the cell with those occurring inside the cell. That could disrupt cell signaling pathways inside the cell, ultimately affecting the cell's ability to function properly.[3,7]

The study also reported high levels of elastase activity in the diseased aortic wall, which resulted in a significant reduction in the elastin content of the blood vessel wall, potentially greatly decreasing elasticity in the area of the aorta close to the heart where elasticity is most needed. Gene expression of collagen IV was found to be down-regulated in the dissected aorta possibly leading to local changes in the basement laminae of the medial layer of the aorta. Increased amounts of matrix metalloproteinase (MMP), which cause the breakdown of collagen fibers, were reported by another group of researchers cited in this study. The increased levels of MMP were seen at the beginning of the dissection but not in other areas of the aorta. This finding may help researchers eventually understand how aortic dissections get started. Other findings point to the up-regulation of a gene related to apoptosis in the area of the dissection. These findings support the view that smooth muscle cells in the tunica media, where dissection occurs, seem to produce fewer proteins to maintain the stability of the aortic wall. It may also be that the number of smooth muscle cells expressing these genes is reduced. Based on the high percentage of down-regulated genes that support the makeup of the extracellular matrix and the cytoskeleton, the study suggests that the pathology of aortic dissection results from loss of gene function.[3]

"Aortic dissection was exclusively a postmortem diagnosis until the first part of the 20th century"[5] and even today, if treatment is not available, about 75% of people who have aortic dissections die within the first two weeks following the event.[6] With the availability of cardiopulmonary bypass surgery, pioneered by Doctors Michael DeBakey and Denton Cooley in the 1960's, the natural history of aortic dissection was forever altered, and today, about 70% of people with Type A dissections and 90% of those who have Type B dissections are able to leave the hospital after treatment. About 60% of people who survive the first two weeks are still alive five years after treatment and 40% can be expected to live for 10 years.[5,6]

As with most medical conditions, prevention of aortic dissection is easier than trying to treat it. The most important step in the prevention of aortic dissection is to keep blood pressure within acceptable limits. People who are diagnosed with high blood pressure should be vigilant in taking prescribed medication and blood pressure should be constantly monitored. Because of its ability to temporarily raise blood pressure, cocaine use is also considered a risk factor for aortic dissection and should be avoided. Other preventative measures are common sense steps for healthy living: stop smoking, maintain a healthy weight, keep cholesterol low, and wear seatbelts to prevent chest trauma. With proper preventative measures and high-tech diagnostic and treatment options, doctors can look forward to saving more and more people with the potentially life threatening condition of aortic dissection.

References

1. Aortic Aneurysm [Internet]. Mayo Clinic; c2001-2008 [cited 2008 Sept 17]. Available from: http://www.mayoclinic.org/aortic-aneurysm/types.html
2. Aortic Dissection [Internet]. Mayo Clinic; c2001-2008 [cited 2008 Sept 17]. Available from: http://www.mayoclinic.com/health/aortic-dissection/DS00605
3. Weis-Mueller BT, Modlich O, Drobinskaya I, Unay D, Huber R, Bojar H, Schipke JD, Feindt P, Gams E, Muller W, Goecke T, Sandmann,W. 2006. Gene Expression in Acute Stanford Type A Dissection: A Comparative Microarray Study. Journal of Translational Medicine [Internet]. [cited 2008 Sept 17]; 4:29. Available from: http://www.translational-medicine.com/content/4/1/29
4. Berger A. c1997-2008, rev. 2008 May 12. Aortic Dissection. In: Medical Encyclopedia, Medline Plus. [Internet] US Library of Medicine and the National Institutes of Health. [cited 2008 Sept 17]. Available from: http://www.nlm.nih.gov/medlineplus/print/ency/article/000181.htm
5. Reece TB, Green GR, Kron IL. 2008. Aortic Dissection. In: Cohn LL, editor. Cardiac Surgery in the Adult. 3 ed. New York (NY): McGraw-Hill. p. 1195-1222.
6. Hallet Jr JW. c1995-2007, rev. 2008 Jan . Aortic Dissection: Aneurysms and Aortic Dissection. In: Merck Home Manual of Medical Information. 2 ed. [Internet] [Whitehouse Station NJ]: Merck and Co, Inc; [cited 2008 Sept 17]. Available from: http://www.merck.com/mmhe/print/sec03/ch035/ch035c.html
7. Campbell NA, Reece JB. 2005. Biology. 7 ed. New York (NY): Pearson Education, Inc. p. 119-120.

HAPS COMMITTEE REPORT

Grants and Scholarship Committee News

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The HAPS Faculty and Student Grant Recipients for 2008 were announced at the New Orleans Annual Business meeting. The names and projects follow.

Congratulations to **Angela Jorgenson**, University of Minnesota, recipient of the HAPS Student Grant, for her project titled "Radiographic Teaching Software" and to **Kevin Ragland**, Nashville State Community College, recipient of the HAPS Faculty Grant for his project "Transdermal permeability of nutrients using permeation enhancers." Look for updates on these projects at future HAPS conferences or in future issues of the HAPS-EDucator.

Do you have a project in mind? Check out the Call for Proposals on the HAPS website (www.hapsweb.org) or contact Richard Faircloth, Grants and Scholarships Committee Chair at rfaircloth@aacc.edu.

The deadline for the next round of Faculty and Student Grants is February 1, 2009. Be sure to check out the Web site for details.

Do you know someone who fits this description?

1. HAPS member in good standing
2. Full-time faculty member
3. In his/her first three years of teaching anatomy and/or physiology
4. Has a teaching load that includes at least one section of Human Anatomy and Physiology

Or maybe you know someone who fits this description?

1. HAPS member in good standing
2. **Adjunct** or **part-time** faculty member
3. In his/her first three years of teaching anatomy and/or physiology
4. Has a teaching load that includes at least one section of Human Anatomy and Physiology

If you do, please encourage them to apply for either the **Robert Anthony Scholarship or the Adjunct Faculty Scholarship**. The deadline for both is November 15, 2008. Full details can be found on the HAPS website (www.hapsweb.org).

The following are the reflections of the New Orleans meeting from the Robert Anthony Scholarship recipients.

Teresa Alvarez

"What an experience! I couldn't believe how nice and helpful everyone was. The people that I met were ready to talk about teaching and teaching ideas. The conference was probably one of the most well-organized conferences I have been to. I am also a student in the HAPS-I courses; they have been a great experience as well. I left New Orleans with new friends, a new passion for teaching, and new ideas that I am incorporating into my class. Thank you for the Robert Anthony Scholarship; I truly couldn't have made the conference without it and I am looking forward to Baltimore."

Aron Drake

"First, I would like to thank the HAPS Grants and Scholarships Committee for this opportunity to attend my first HAPS conference. The award made it financially possible for me to attend. Having been to conferences in the past, I'm never sure what to expect in terms of the quality and content the first time I go to a conference. I was very pleased with the warm welcome that I and the other first time attendees received from HAPS, as well as from the other attendees at the conference. Many times, I was offered help, advice, or just a quick welcome from others who noticed the "first timer" banner on my nametag. This struck me immediately as a sign of good things to come in the conference. The update seminars and workshops were both interesting and informative. The workshops in particular were a great help to me as someone who is new in teaching anatomy and physiology. Everyone seemed enthusiastic and willing to share ideas, which I appreciated greatly. I feel that I was able to take away some great ideas to incorporate into my course as well as learning some new things; it's always great to have more educational tools in the toolbox. I also want to

HAPS Committee Report continued on page 17

express how great it was to have the conference in New Orleans. This was the first time I had been there and it was such a great place to have a conference. There was always something to do and the food in New Orleans was awesome. I also appreciate that, as a group, HAPS was helping out a city still in need."

Jared Gilmore

"My first of many HAPS conferences was such an enlightening experience. I had the pleasure of accompanying a couple of my colleagues while attending this extraordinary conference. At this unique conference, I was enlightened on the vast range of resources that are available to anatomy professors as well as cutting-edge technology used to teach anatomy. I truly enjoyed the sessions that presented the clinical research relevant to the applications of anatomy. Finally, I would be remiss if I didn't speak about the kindness of the HAPS personnel and the relaxed atmosphere fellow anatomy instructors displayed throughout the conference. I sincerely look forward to next year's conference, where I am sure to participate! Until our paths cross again, anatomers."

Amanda Nelson

"My first experience at the HAPS annual meeting was unmatched to any conference that I had attended in the past. The atmosphere was relaxed and fellow anatomists/physiologists were very forthcoming with ideas and suggestions to strengthen my teaching style. The workshops exceeded my expectations. I had the opportunity to explore potential software packages, review the iWorx system and meet my sales representatives, entertain the possibility of setting up a plastination lab, and obtain a list of references to embed discussions of the history of anatomy into my course. Mary Manhein's banquet presentation on forensic anthropology provided insight into a field that I was unfamiliar with and was intriguing for the entire audience (HAPS members and non-HAPS attendees alike).

Thank you for helping provide the opportunity to attend my first (and definitely not my last) HAPS meeting!"

Thomas Pefok

"New Orleans 2008 was quite an enriching experience for me. As a first timer, I wasn't quite sure what to expect and consequently harbored some degree of apprehension. However, I quickly realized there was absolutely no reason for this the moment I walked into the first gathering. I was particularly impressed by the camaraderie that flourished from start to finish, the willingness of participants to share ideas and to simply have fun.

The presentations were very enriching and the workshops provided a smaller setting for participants to share classroom experiences, learn from each other, and discuss strategies to improve teaching. The keynote speaker's presentation was very interesting and appropriately spiced with humor. The food at the banquet was a true reflection of everything I had heard about New Orleans cuisine. This coupled with the music by the appropriately named band, Soul Vaxxenation, created a very relaxed atmosphere.

My interaction with a full spectrum of professionals was pleasant and educative. What I gleaned from these individuals, in a very short time, is quite immeasurable. The relationships thus created and the memories from this meeting will definitely last a lifetime.

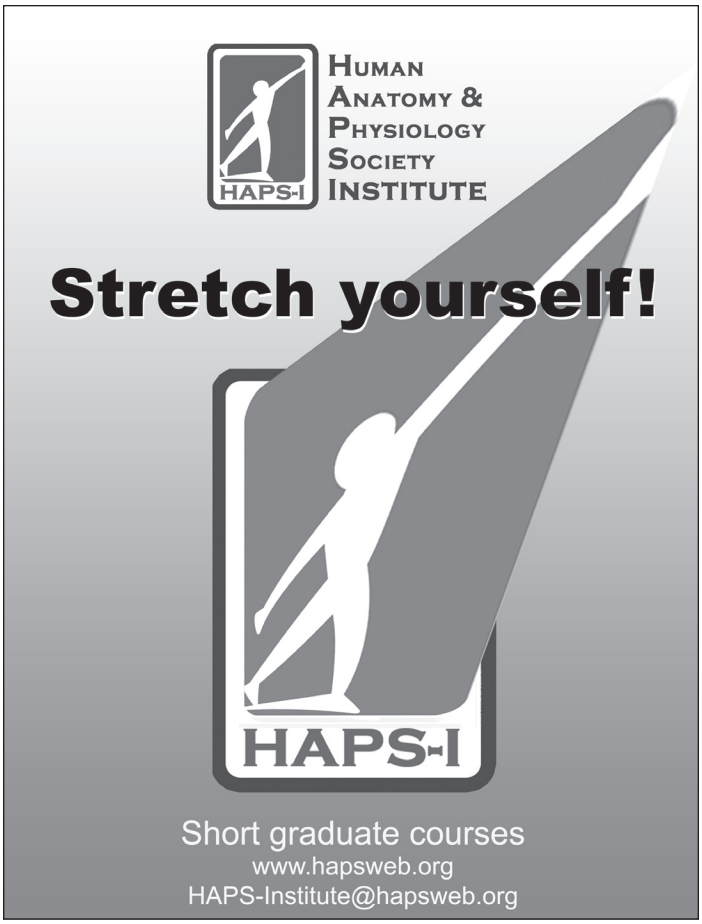
I am thankful to HAPS for giving me an opportunity, as a Robert Anthony Scholarship recipient, to interact with and learn from members in this "great family." My views have been broadened as I acquired some simple techniques that will go a long way to enhance my performance as an A&P educator. I'll remain an advocate for HAPS and look forward to Baltimore 2009."

Announcing something new this year:
The HAPS-I Scholarship!

Purpose: To encourage instructors to participate in the continuing education opportunities offered by the HAPS Institute.

Award: Each award is for one-half of the tuition fee for any HAPS-I course that begins within one year of the award notification.

Complete details and application forms are available on the HAPS Website.



HAPS 2008 *In Review*

Summary of Update Seminar 1
Genomic Medicine: The Future of Addiction Medicine

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Dr. Charles O'Brien of the University of Pennsylvania School of Medicine delivered an engaging seminar on addiction disorders and lent a fresh perspective on how these diseases should be viewed by the medical community, as well as by society in general.

His initial emphasis was to point out that when people become addicted to a drug of abuse, whether it be nicotine, alcohol, cannabis, or cocaine, they have reached a point where they have simply lost physiological control and no amount of "motivation" will be sufficient to stop the cravings for the addictive substance. Unfortunately, society (and the medical profession) has tended to continue with the conventional way of thinking (i.e., that these patients could stop usage of the drugs if they "only had enough motivation").

To the contrary, Dr. O'Brien gave evidence of studies that show that the reward system area (reptilian brain) of these patients actually becomes chemically conditioned by simple, brief, even unconscious stimuli, which can occur within milliseconds and create an intense craving for the addictive drug. All drugs of abuse seem to stimulate this effect once true addiction has developed. Thought alone can cause the release of dopamine, which causes a cascade effect of increasing feelings of craving. Once developed, this conditioning seems to last for years, even in the abstinent addict, and accounts for the frequency of relapse in these patients.

Dr. O'Brien also discussed the fact that each addict is unique, not only genetically, but also in socioeconomic status, the medications he/she may be receiving, the environment to which he/she is exposed, and the presence or absence of regular psychotherapy. He also stressed that there are unknown differences between individuals and that given similar early behaviors of addictive drug usage, one person may be much more likely to fall into the addiction spiral than another person.

Dr. O'Brien's research supports the use of medications in treatment of addiction, as an additional tool to suppress the "automatic cravings" experienced by a certain subset of these patients, and to, therefore, reduce the incidence of relapse. Unfortunately, major drug companies are not as eager to fund this type of research as they might be for other pharmacological applications.

He discussed two major classes of drugs found to block the reward system: GABA enhancers and receptor antagonists. While their modes of action vary, their net effects are similar: to decrease the craving in the addicted individual.

Alcohol is considered a "dirty drug," meaning it is fairly nonspecific, affecting cell membranes and neurotransmitters throughout the body. He spoke about the difference among alcoholics in respect to the genome and to family history. His research has focused on the opiate receptors in the brain, specifically the delta (δ), kappa (κ), and mu (μ) receptors. Those with a variance in the μ opiate receptor gene (specifically the A118G allele) seem to be more susceptible to developing alcohol addiction. Certain ethnic groups seem more prone to this variance (Korean, Malaysian, and Native American), while others are less prone (African, European). Patients with this genetic variance and a strong family history of addictive behaviors also seem to be the population that responds best to medical therapy with naltrexone, as discussed below.

While there are a variety of drugs that might be used to treat addictive behaviors that Dr. O'Brien mentioned, he focused primarily on alcoholism and naltrexone, an endogenous opiate blocker. This drug has been shown in animal models to block "stress drinking." It has also shown promise for reducing cravings in certain alcoholics. Those with a high index of craving and a strong family history (and the A118G allele) seem to be the most responsive. Naltrexone actually seems to block the euphoric effect of the drug (by blocking the opiate receptors), which reduces the craving for more alcohol, breaking the cycle and decreasing the chances for relapse.

Dr. O'Brien went on to emphasize that psychotherapy was an essential part of the treatment plan for any addict. Perhaps genotyping of addicts would be a very useful tool in determining the best plan of treatment. Alcoholics with the μ allele variant should definitely be considered for medical therapy with naltrexone. Undoubtedly, there are other alleles that predispose to addictive disease, and, if these can be identified, other drugs with the potential to improve treatment and, therefore, decrease the incidence of relapse may be discovered. His hope is that more physicians, pharmacologic companies, and health care professionals will begin to realize the significance of the "medically responsive" part of addiction and that the use of medications and genomics will become more routinely incorporated into treatment of these patients. He certainly left us with a feeling that there is much hope for improved treatment regimens in patients suffering from addictive behaviors.

In Review continued on page 19

Summary of Workshops #303 & #702 Groovin' in the Hippocampus: Teaching A & P with Music

Lisa Jones Bromfield, presenter and summarizer
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Words introduced into our brains with music have incredible staying power. Many struggling students effortlessly remember song lyrics. This workshop introduced participants to the CD, "Groovin' in the Hippocampus: Songs to Learn Anatomy & Physiology By." The workshop discussed some research regarding the power of music in facilitating learning, presented techniques that draw on the CD and on other art forms to encourage participatory learning, and introduced the attendees to some of the 14 songs included on the CD. Songs introduced were: "Give Me Some Bones" which covers bone physiology and the nomenclature of the axial skeleton; "Groovin' on the Nephron Line" which follows filtrate through a nephron; and "Cranial Nerve Boogie" which teaches function and assessment of the 12 cranial nerves. Time was also spent considering the skills of "good students" that might be engendered in "not-so-good students" through creativity. Lisa Jones Bromfield, the presenter, writer, and singer of the songs, is a graduate of the Lord Fairfax Community College Nursing Program, has taught special education to upper elementary students in Virginia, and has been a professional musician for 20 years.

A standing room only audience enjoyed the first workshop. Both groups participated in activities ranging from adding their own lyrics to the axial skeleton song to physically arranging themselves to look like a nephron. Participants also offered suggestions for songs that would be helpful to include on volume 2.

Some comments from attendees (in response to being asked what they liked about the workshop) were:

- "Making learning of A&P fun! Hopefully to stimulate further learning."
- "It was very clever and creative. Lisa is very poised and has a terrific voice. Very entertaining workshop."
- "(I liked) the examples of songs; informal: easy to ask questions."
- "Very creative all the way with colors (lyric sheets), use of instruments, pitch, etc. I love it."
- "I like that the songs try to use multiple ways – instruments, order & colored lyrics to teach."

Summary of Workshop #206: Teaching Hip and Shoulder Joints by Building Anatomy in Clay

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The Anatomy in Clay™ system, developed by Zahourek Systems Inc., provides an alternative to cadaver dissections for the study of anatomy. The Manikens can easily be adapted to any teaching situation and used in conjunction with any textbook and ancillary materials currently available. The workshop that I delivered in New Orleans this year focused on the anatomy of the hip and shoulder joints. The participants were able to review the bony anatomy of the hip and shoulder joints before building the muscles that act on these joints. Once the building began, everyone had a great time. We started by building the muscles of the rotator cuff and then moved on to the larger muscles that help move the humerus. During the process of building the muscles, basic concepts, such as origins, insertions, and muscle actions were discussed. Participants were better able to visualize the muscles and how they are arranged around a joint in order to move that joint. We also had an opportunity to look at some of the more common errors that students make when building muscles, such as building a muscle that does not cross a joint. We then moved on to build the hip joint. Unfortunately, we had such a good time building the shoulder we only had the opportunity to build two of the muscles that act on the hip.

The members who participated in my workshop had a great time. While a few had some reservations about building the muscles, others jumped right in. The nice thing about the Manikens is that, as an instructor, you only have to show people how to build a few muscles before they start taking off on their own. Once we started, the construction went quickly. Participants were collaborating with each other, looking at how one another built their muscles, and complaining about how their muscles were all "squished together," but it was fun. With the number of people taking out their cameras and snapping pictures, you would have thought it was a Hollywood movie premier.

The nice thing about using the Manikens is that there is no limit to how they can be used. They can be tailored to your students' needs. And they are not limited to muscles. You can build blood vessels, nerves, lymphatics and organ systems as well. The comments that I received about the workshop were very positive, as were the suggestions on how to make the next one better. I look forward to seeing everyone again next year in Baltimore.

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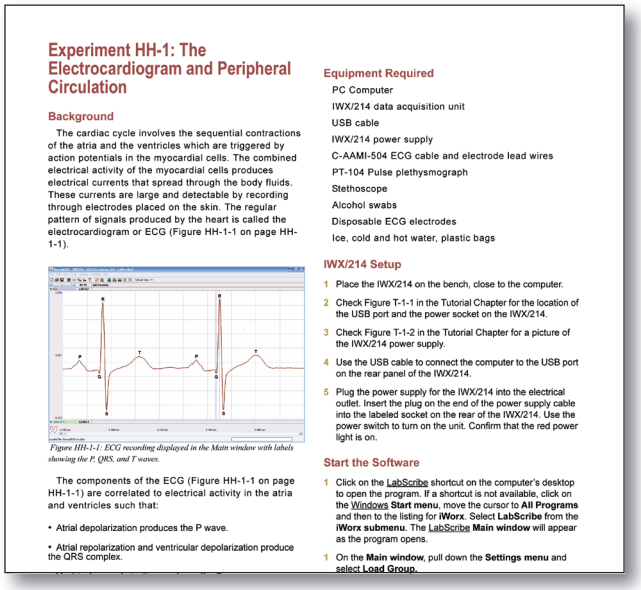

Experiment HH-1: The Electrocardiogram and Peripheral Circulation

Background

The cardiac cycle involves the sequential contractions of the atria and the ventricles which are triggered by action potentials in the myocardial cells. The combined electrical activity of the myocardial cells produces electrical currents that spread through the body fluids. These currents are large and detectable by recording through electrodes placed on the skin. The regular pattern of signals produced by the heart is called the electrocardiogram or ECG (Figure HH-1-1 on page HH-1-1).

Figure HH-1-1: ECG recording displayed in the Main window with labels showing the P, QRS, and T waves.

The components of the ECG (Figure HH-1-1 on page HH-1-1) are correlated to electrical activity in the atria and ventricles such that:

- Atrial depolarization produces the P wave.
- Atrial repolarization and ventricular depolarization produce the QRS complex.

Equipment Required

PC Computer
IWX/214 data acquisition unit
USB cable
IWX/214 power supply
C-AAMI-504 ECG cable and electrode lead wires
PT-104 Pulse plethysmograph
Stethoscope
Alcohol swabs
Disposable ECG electrodes
Ice, cold and hot water, plastic bags

IWX/214 Setup

1. Place the IWX/214 on the bench, close to the computer.
2. Check Figure T-1-1 in the Tutorial Chapter for the location of the USB port and the power socket on the IWX/214.
3. Check Figure T-1-2 in the Tutorial Chapter for a picture of the IWX/214 power supply.
4. Use the USB cable to connect the computer to the USB port on the rear panel of the IWX/214.
5. Plug the power supply for the IWX/214 into the electrical outlet. Insert the plug on the end of the power supply cable into the labeled socket on the rear of the IWX/214. Use the power switch to turn on the unit. Confirm that the red power light is on.

Start the Software

1. Click on the LabScribe shortcut on the computer's desktop to open the program. If a shortcut is not available, click on the Windows **Start menu**, move the cursor to **All Programs** and then to the listing for **iWorx**. Select **LabScribe** from the **iWorx submenu**. The LabScribe **Main window** will appear as the program opens.
1. On the **Main window**, pull down the **Settings menu** and select **Load Group.**

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