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Anthony E. Lang, MD
NEW SURGICAL PROCEDURES FOR PARKINSON'S DISEASE

PROMOTING EXCELLENCE IN THE TEACHING OF HUMAN ANATOMY AND PHYSIOLOGY
HAPS-EDucator

MAY 1998

Volume 2, No. 4

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Cover design and graphics by Toby Ke Nelson of Nelson Graphics.
Are Throwing Out The Welcome Mats

Are you likely to be traveling to another city? Do you need lodging while there? If so, then you need to contact a HAPS Host. HAPS Hosts are HAPS members who are volunteering to open up their homes for other HAPS members while they are visiting the Host's area.

This is a new service offered to HAPS members, and more Hosts are needed. If YOU would like to be listed as a HAPS Host, please contact Satish Chandran (information listed below). It is the goal to have an extensive and continent-wide array of HAPS Hosts. The following individuals have graciously offered to be "charter members" in the HAPS Host program. Please keep these names and addresses in a readily accessible location so you can contact them if you should need lodging in the Chicago area.

- **Satish and Judith Chandran**
  1648 Western Ave.
  Flossmoor, IL 60442
  (708) 957-9780 schandran@ccc.edu

- **Bob and Mary Ann Anthony**
  34W103 Wagner Road
  Batavia, IL 60510
  (630) 879-1475

- **Ann and Richard Smith**
  16351 S. Dan O'Connell
  Plainfield, IL 60544
  (815) 436-7970

Visiting the D.C. area this summer? If so, you will certainly not run out of things to do and places to visit. But what about scratching that A & P itch after you have gone to all the more traditional places such as the Smithsonian Institute?

The National Museum of Health and Medicine is certainly worth the short jaunt from the Mall area. Unfortunately, the eclectic clutter created by collections and oddities from the past two centuries, which included Civil War memorabilia, has disappeared; they have been replaced by very professional and streamlined thematic exhibits that are far more austere. Highlights include an exhibit on the Lincoln assassination, a nice embryology exhibit with a few developmental abnormalities, systems of the body and treatment of battle wounds. Every visitor I've talked to was amazed by the human hair ball. The museum also has extensive collections of medical instruments and a nice collection of models depicting field hospital transportation units. The last couple of times I have visited, there have been exhibits on sexually transmitted diseases, one on the World War II campaign against syphilis and a current one on AIDS. While I prefer the old museum, the new museum is certainly well worth visiting.

The museum is on the grounds of the Walter Reed Army Hospital. Within a short walking distance is a cafeteria where you can get an inexpensive (cheap!) lunch. Parking is limited but free with a pass picked up inside the museum entrance. The facility is handicap-accessible and all on one floor. Admission is free and the museum is open 10:00-5:30 daily except December 25. Here's the address:

National Museum of Health and Medicine
Walter Reed Army Hospital
Alaska Avenue and 16th Street NW
Washington, D.C.
Phone: 202-782-2200

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HAPS-EDucator

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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 $30. Annual membership renewals shall be due on January 1, April 1, July 1, or October 1. New members shall renew on whichever date most closely follows the date of their initial membership. HAPS Hotline: (800) 448-HAPS (4277). Information on membership, meetings and more! Send correspondence to: HAPS, 222 S. Meramec, Suite 303, St. Louis, MO 63105. Check out our new webpage at: http://www.bio.psu.edu/haps

SUBMISSIONS TO HAPS-EDucator

Papers for publication, requests for information, positions available and wanted and letters to the editor are welcomed. Articles submitted on 3.5" double density disks are preferred—please include a hard copy as a backup. If references are included, please follow the methods suggested in: Scientific Style and Format: The CBE Manual for Authors, Editors, and Publishers. 6th Edition, Style Manual Committee (Council of Biology Editors) Cambridge. Cambridge University Press. 1994.

It is the policy of the Human Anatomy and Physiology Society (HAPS) that any advertising appearing in its publication must be related to the teaching of anatomy and physiology. The HAPS Editor and Editorial Board jointly determine whether an advertisement meets the criteria of the Human Anatomy and Physiology Society. Any advertisement that is deemed not to meet the needs of the organization will not be printed, and the advertisement plus any monies collected from the advertiser will be returned. The opinions reflected in advertising that appears in its publication do not necessarily represent the opinions of the Human Anatomy and Physiology Society. Advertisement of a product in the HAPS-EDucator does not represent endorsement of that product by the Human Anatomy and Physiology Society. Contact the Editor for information on advertising rates, advertisement size and the procedures for submitting an advertisement to HAPS-EDucator for publication.

DEADLINES FOR SUBMITTING MATERIAL TO HAPS-EDucator: June 1 (August Issue); September 1 (November issue); December 1 (February issue); March 1 (May issue).
Since this is my last issue as Editor, I decided to reveal my identity as the Phantom Reviewer, and provide you with a review of a terrific book, rather than my typical editorial—besides I did not have space for both. Having said that! Let’s get started on an exploration into the realm of psychology and neurobiology. I hope you enjoy the experience.

Books are like the people you meet at church, at work, at the supermarket or at social events. Some make you feel good (or perhaps not so good) for a brief moment and then fade quietly from your consciousness. Others, either positively or negatively, profoundly affect the direction of your life. Such a book is Brainstyles by Marlane Miller (Simon & Schuster, New York, 1997). It successfully bridges the gap between so-called soft science and hard science. As a prelude to the introduction, the author states that, “Deep within, you know already that you are perfect, just as you are right now.” This sets the tone and the premise of the book—in effect, you can’t change other people nor do you need to change yourself. You cannot train yourself to be different from who you naturally are, and to improve yourself, you simply need to be more yourself not less yourself.

Brainstyles, as one would surmise from the title, is based on the idea that humans can be grouped into personality or behavioral categories, brainstyles, based on whether they function from a predominantly right brain or left brain approach. While the brain does function in an integrated and cohesive manner, there are internal, functional differences among different parts. The left brain (left hemisphere) is used when you talk, set goals, plan, count time, measure or differentiate between objects or concepts. The right brain is more active when you feel, speculate, visualize, empathize or sense similarities; it has no sense of time or measures and no speech.

There appear to be four basic brainstyles that the author defines as: the Knower, the Conciliator, the Conceptor and the Deliberator. Knowers process information and make decisions in a rapid left brain and unemotional style. They are impressive in action because they seem to instantly know with absolute certainty the solution for a problem. They are persuasive and can easily convince others to follow them.

The major weakness in this brainstyle lies in the inability to see flaws in their ideas, and they are not at all interested in “feelings.”

The Conciliator makes decisions using the right brain predominantly. This person is imaginative, spontaneous, and takes an unstructured approach to problem-solving. Most decisions are based on emotion. They care deeply how others feel and try to ensure that harmony prevails. Counselors and elementary school teachers are more likely found in this brainstyle.

Conceptors are a rare breed. They use a rapid right brain-left brain alternating overview when making decisions. They are best at putting together ideas, that may initially appear to be unrelated, in new and novel ways. They combine logic and imagination to create future possibilities. Many inventors and computer nerds fit this category.

The Deliberator brainstyle, the largest group, consists of two subcategories: the Left Brain Deliberator and the Right Brain Deliberator, depending upon whether they take a more or less emotional approach in formulating a decision. As a whole, this group tends to rapidly assess a situation based on memory of prior experiences. They are highly analytical and decisions frequently are delayed until “all the facts are in.” Right Brain Deliberators are “good with people” and are typically outgoing and friendly. Left Brain Deliberators, usually are not as “good with people;” they are far better at expressing emotion through words or deeds. Deliberators as a group are the planners and organizers—the steady ones. This group is best at developing a workable plan for implementing the ideas formulated by the Knowers and Conceptors. Accountants, scientists and engineers are common in this brainstyle.

The ideas presented in Brainstyles appear to be based on solid research in psychology and neurobiology. Obviously, the book is directed toward people who are already fairly successful. But, in the genre of self-help books, Brainstyles is among the best that I have read, and I encourage you to add this to your list of “must read books.”
GREETINGS
FROM YOUR PRESIDENT

Kevin T. Patton, President

Many of you may recall filling out a survey last year. This survey resulted from your Board of Directors' desire to hear what you have to say about some of the important issues facing HAPS. Karen LaFleur, then HAPS President, designed the survey last spring with the help of Board members. Some of you filled it out and returned it at the Annual Conference in Toronto. Many others received theirs with last fall's mailing along with the Annual Membership Directory. We are all grateful to the almost 350 of you who took the time to respond!

The results of the 1997 survey follow. These results were very useful to the Board of Directors at their January 1998 meeting in St. Louis and will continue to be valuable to all of us as we guide our organization toward the next century. Overall, the results indicate that the membership is happy with the organization but also has many ideas for improving it.

The last question of the survey ("What one thing would you do to change or improve HAPS?") has been omitted in this summary, that question produced many, sometimes lengthy, comments. Overall, the comments reflected the satisfaction with HAPS implied by the rest of the survey. Some folks were concerned about our rapid rate of growth and others embraced it. Some members liked HAPS Educator just as it is and some had specific suggestions for improving it. Some liked the informal style of the organization while one or two wanted to see it become more formal in tone and style. A couple of folks didn't like the fact that many of our officers and chairpersons make their living from both teaching and publishing, while others expressed gratitude that so many have volunteered their time and talent to serve the organization. Many offered suggestions for more Local Conferences and ways to improve both Annual and Local Conferences.

Thanks to all who shared their joys, concerns, and wisdom with us!

I would like the HAPS EDUCATOR to be:

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Anecdotal teaching experience articles |

| Descriptions of experiences teaching anatomy and physiology |
| In-depth content of issues devoted to a content theme |
| More technology application descriptions |
| Tips for the novice |
| Profiles of HAPS volunteers |
| Opinion/position of HAPS members |
| Opinion/position of non-HAPS members |

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Do you think HAPS should publish a peer-reviewed journal?

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If yes, how much would you be willing to spend

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<td>60</td>
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Are you doing research that could be published in a HAPS journal?

The HAPS member directory is

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The Annual Conference

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<td>4</td>
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Duration is

| Workshops should be |
| Large group sessions should |
| Unstrutured time should be |
| Registration fees are |

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My institution pays travel expenses
If you have not attended the HAPS Annual Conference, please respond to the following:
I have not attended because (check all that apply):
   I can't get time off
   My institution will not pay expenses
   I am not interested
   I use my funds to go to other conferences
   YES
   NO
   I would attend if my institution would fund it.
   I would attend if the conference fit with my teaching schedule.
   I would be willing to pay for the conference proceedings.
   If yes, how much?
   DAYS
   Local conferences should last
   YES
   NO
   Should involve a banquet/luncheon
   Should occur more frequently
   Local conference content should be summarized in HAPS Educator
   EXPENSIVE
   APPROPRIATE
   INEXPENSIVE
   Local conferences are
   Have you read the HAPS curriculum document?
   Has it influenced the way you teach anatomy and physiology?
   Do you feel that it provides an appropriate content framework for anatomy and physiology?
   If other organizations besides APS endorsed HAPS curriculum, would it strengthen your request for travel funding?
   position regarding course content requests for institutional equipment money?
   Have you read the HAPS exam?
   If yes, Are the questions appropriate for your students?
   Did they sample your students' understandings?
   Would you be willing to pay a fee for grading, scoring summaries, and statistical comparisons?

If yes, how much would you be willing to pay per 25 students?

Where do you think HAPS should be more assertive?
   Adopting positions regarding laboratory safety
   Promoting pedagogical research
   Offering financial support for pedagogical research
   Do you think HAPS should publish and sell conference proceedings?
   How many annual HAPS conferences have you attended?
   How many local conferences have you attended?

Have you served on or chaired a HAPS committee?
Have you held an elected office in HAPS?
To which of the following professional organizations do you belong?
   National Association of Biology Teachers
   American Physiological Society
   National Science Teachers
   Other

In which state or province do you live?

In what type of institution do you teach?
   High school
   2-year college
   4 year college/university
   Other

How many years have you taught?
   Less than 5
   Between 5 and 20
   More than 20

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WANTED!!

HAPS members willing to make at least 50 new friends in six months by hosting a one-day

LOCAL CONFERENCE

*** The Local Conference Committee has *** materials to help you plan and run a conference!

Please contact:
Ann M. Smith
Joliet Junior College
1215 Humboldt Rd.
Joliet, IL 60431
(815) 729-9020 X 2373

CALL FOR PROPOSALS

HAPS GRANTS AND SCHOLARSHIPS PROGRAM

Do you have a Human Anatomy and/or Physiology “project” that has been kept on the back-burner because of lack of financial support? Funding may be on its way! Teachers and students of anatomy and physiology are equally invited to apply for a HAPS grant or scholarship. For application forms contact:

Estry Z. Ang
University of Pittsburgh at Greensburg
1150 Mt. Pleasant Rd.
Greensburg, PA. 15601
Email: Estry@vms.cis.pitt.edu
Fax: (412) 836-7129

ROBERT ANTHONY SCHOLARSHIP FUNDS SOUGHT

On behalf of Bob Anthony, the Board of Directors and the Steering Committee Members invite you to support the anatomy and physiology education of your novice colleagues by making contributions to the Robert Anthony Scholarship Fund. In making a donation, you will honor this special man and help the next generation of anatomy and physiology faculty.

When the scholarship was founded, Bob was given the latitude to determine how contributions would be spent. As is so typical of him, Bob wants to encourage fledgling faculty who teach anatomy or physiology. Thus, these funds will be earmarked to provide scholarships for new HAPS members to encourage participation in the annual conferences. Initially the scholarships will pay for registration, but as the scholarship fund grows it will be used to pay for lodging. Estry Ang, Chair of the HAPS Grants and Scholarship Committee, is assisting Bob in working out the final details.

As announced at the 1997 Annual Conference, the Robert Anthony Scholarship Fund was established to honor the contributions of our “founding father,” Bob Anthony, a man whose leadership resulted in this organization. Bob provided the original spark for formal organization of HAPS, gave steady encouragement and guidance to the fledgling group, nurtured members and officers and served as President (1995-1996). Bob and his wife, Mary Ann, even opened their home for mid-year board meetings, graciously housing, feeding and hosting some two dozen officers for several days.

Please join us in making a contribution to this scholarship fund. Your donations will be fully tax-deductible since HAPS is a non profit organization. Please write a generous check to the HAPS Robert Anthony Scholarship and mail it to:

John Martin
HAPS Treasurer
Clark Community College
1800 E. McLoughlin Blvd.
Vancouver, WA 98663
(360) 992-2282
jmartin@edu.com

THANK YOU!
For honoring Bob and helping future instructors.
ABOUT HAPS MEMBERS

By Craig Clifford
Northeastern State University
Tahlequah, OK 74464

Welcome to a new feature in HAPS-EDucator. In Toronto, during an Editorial Advisory Board meeting, the idea of a feature on our members was suggested. I volunteered to collect this information and compile it for our publication. I was then faced with the dilemma of how to collect the information. I decided to e-mail all members who attended the Toronto meeting. I soon found it to be a daunting task but found a student who could help with it. Many transmissions came back with error messages either due to bad addresses, errors in addresses or changes in employment. If you attended the HAPS Conference in Toronto, and you have not received an e-mail requesting information, then please e-mail me at: clifford@cherokee.nsuok.edu

The response has been great. One member sent interesting information and suggested that I should request “juicy tidbits” rather than just the “meat and potatoes” stuff. Another member wanted to know something about the officers. As the response was so good and space will be limited, I have decided to go with whatever each member sent. Some officers did respond and they will be included. Hopefully, these short biographies will provide a view of our membership in all its diversity and uniqueness. So here it goes!

Teresa Forsyth, Ph.D. has been teaching full-time at Indiana University-Southeast (New Albany) since 1984. She taught part-time from 1968-1984. Her training in biology and genetics was at the University of Arkansas and the University of Louisville. Teresa currently teaches basic human anatomy, developmental biology and histology to allied health, nursing, pre-med and other pre-professional health students as well as biology majors. Teresa is actively carrying out research on the phylogenetic relationships of southern Indiana salamander species using PCR-RAPD (polymerase chain reaction-randomly amplified polymorphic DNA) analysis. Teresa’s husband, Bill, is an ecologist. They met in graduate school and have been married for 33 years. Teresa and Bill have two daughters. They also raise American Water Spaniels.

Elizabeth Becker of Elgin Community College in Elgin, IL, earned her BA at Cornell, her MS in Physiology at University of Minnesota-Twin Cities and her MS in Zoology at University of Wisconsin. Her research areas were animal behavior and ecology as well as cardiovascular and behavioral physiology. Elizabeth began her teaching at Cottey College in Nevada, MO. She has taught for 6.5 years. Her students come from several different disciplines and include: nursing, physical therapy assistants, surgical technicians, medical technicians, physical therapy and occupational therapy.

Nisha S. Bryska has taught at the University of North Carolina-Charlotte for 8 years. She obtained her MS in Physiology from Western Michigan University. She has also taught at Broward Community College. Nisha is currently occupied with teaching human anatomy and physiology, team teaching anatomy and training to be an Assistant to the Chair of her department. Her students are mostly in allied health.

Donald J. Alsum teaches at the University of Minnesota-St. Mary’s. He attended Purdue University for his MS, and he earned his Ph.D. in physiology from the University of Minnesota. His degree includes minors in anatomy and biochemistry. He is presently teaching Human Anatomy and Introductory Biology labs. Donald spends most of his time with students who are interested in anatomy, allied health and biology. He is currently involved in the incorporation of ADInstruments MacLab system into the physiology labs at the University of Minnesota. He has already implemented Interactive ADAM software and Interactive Physiology software. He enjoys attending the HAPS conference and appreciates the many opportunities to interact with colleagues, attend workshops and meet with the exhibitors.

NEW ANATOMY & PHYSIOLOGY LISTSERV

A mailing list has been started for individuals interested in Human Anatomy and Physiology, especially concerning but not limited to education. The list was started on March 16, 1998, and currently has 130 subscribers in 11 countries. To subscribe send an email to: HAPP-L-request@scimath.imperial.cc.ca.us

Place the word SUBSCRIBE by itself in the body of the message. The “HAPP-L” part must be uppercase. If you have any difficulty subscribing or unsubscribing, please contact Jim Pendley, list manager, by e-mail at: pendley@imperial.cc.ca.us

If you are new to the subject of mailing lists, email Jim Pendley and he will send you information.
LABORATORY HAZARDS

In the modern classroom and laboratory there are common situations that could pose potential danger. Here are some ideas to help prevent accidents.

1) **FREE WALK WAYS**— Walk ways should be free of obstacles. While moving around your lecture hall and laboratory, look for purses, coats, bookbags, knapsacks or other items that might impede the flow of traffic. Microscope and other instrument covers as well as plastic transparency film (used with an overhead projector) are slick and if they are on the floor they could cause a fall.

2) **WATER ON FLOOR**—Preserved specimens are usually soaked in a water-based solution before lab examinations. Water spilled on the floor creates a slippery surface that could cause an accident. Any spills should be blotted up immediately.

3) **LATEX GLOVES FOR BODY FLUIDS**—When examining body fluids such as human blood, saliva or urine, all students should wear latex gloves and OSHA-approved safety glasses, but be aware of latex allergies and warn students about this possibility. One cannot assume that everyone else is healthy. Failure to protect others against these potential hazards could lead to a lawsuit.

4) **ELECTRICAL SAFETY**—All electrical instruments should be grounded and with no frayed or loose wires. Microscope electrical plugs should be checked frequently. Wires lying along walkways should be taped down with brightly-colored tape.

5) **DISSECTION INSTRUMENTS**— All dissecting tools with sharp edges should have protective covers. Scissors and scalpel points should be covered with tape, cork or styrofoam. Instruments should be returned to their box.

**THE COW EYE—A Lesson in Reality**

I use computers in my class and think they are great. However, I am concerned that we don’t throw out the baby with the bath water. For example, how many human anatomy and physiology teachers today have their students dissect a fresh cow eye, pig stomach or cow heart? Even though students are learning anatomy from computer software programs, they should still dissect fresh tissue such as the cow eye or pig stomach.

Fresh specimens can be easily obtained from a meat-packing plant and are usually free. The eye can only be realistically studied by dissecting a large fresh specimen. The cow eye is a good choice because it is readily available. The following observations can only be seen with fresh specimens:

1) The eye is surrounded by lots of connective tissue, especially adipose. This is obvious only if one removes it from the orbit.
2) There are six large meaty muscles attached to the eyeball.
3) When trying to puncture and cut through the covering of the eyeball, one notes a tough, leathery sclera.
4) Upon opening the eye, a gooey, clear gel (vitreous humor) oozes out from the vitreous body.
5) One observes a beautiful purple-blue-green tapetum lucidum (light reflector, not found in humans) attached to the choroid layer.
6) A rounded, crystalline lens is attached to the stringy suspensory ligaments. Cutting the ligaments frees the lens.
7) The lens magnifies newsprint. Holding the lens by its ligaments and looking through it allows one to see his or her lab partner upside down. The lens is fragile and can tear easily.
8) The cornea can be felt as a tough, transparent tissue.
9) The iris is blue on the outside but black on the inside.
10) The retina is a thin, vascular tissue attached to the optic disk.
11) The diameter of the optic disk which forms our visual blind spot can be measured internally and externally. One can see that the optic nerve is white and flexible.
12) The ridged ciliary body (black) can be observed.
13) Seen through the pupil, the choroid tunic, which consists of the tapetum lucidum, appears black.
14) One observes the 3D nature of the eye, the roundness of the eyeball and how the parts fit together.
15) One can find the eyelids, eyelashes and conjunctiva.
16) One can see the hole (the pupil) in the center of the iris. Moving the iris changes the shape of the pupil.

During the dissection process, students can learn to work together, share the moments of exciting discovery and have a psychomotor learning experience.
POSITION AVAILABLE

A full time non-tenure track position is available at the University of Alabama at Birmingham. Duties include teaching human anatomy, human physiology, pathophysiology, and supervision of associated laboratories. Candidates should have experience in human anatomy, preferably a doctorate, but applicants with a Master’s and appropriate training and experience will be considered. Review of applications will begin May 1, 1998 and continue until the position is filled. Desired starting date is September 1, 1998. Applicants should submit a curriculum vita, three references, and a brief statement of teaching philosophy. Please forward application materials to: Dr. Daniel D. Jones, Chair, Department of Biology, University of Alabama at Birmingham; 1300 University Boulevard; Birmingham, AL 35294-1170. The University of Alabama at Birmingham is an Equal Opportunity/Affirmative Action Employer.

INFORMATION SOUGHT ON HONORS PROGRAMS

Our campus is initiating honors programs for students in various subjects. I am interested in offering contracts to students in my anatomy & physiology classes, and I need some direction. Is anyone currently offering contracts or stand-alone classes? If so, can you offer some suggestions for curriculum expectations? What do you expect of the honors student that you don’t expect of the other students? What do you delete from your regular curriculum for them?

I will be attending the HAPS Conference in May. Will any of you be interested in having a brainstorming session on honors programs? Let me know or let the program planners know. If you couldn’t attend the conference but would like to share information, please contact:

Mary Bracken
Trinity Valley Comm College
PO Box 668
Terrell TX 75160
972-563-9573

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Presented by:
Sam Drogo and Bill Perrotti
Life Science Department
Mohawk Valley Community College
Utica, New York 13501

In the Human Anatomy and Physiology sequence at Mohawk Valley Community College, an exercise physiology laboratory experience serves as the capstone hands-on activity of a two semester course. It occurs late in the second semester, by which time students have covered the anatomy and physiology of most body systems. In lab, students have previously been exposed to cardiovascular monitoring, pulmonary function testing, muscle physiology and determination of basal metabolic rate. The presenters feel that students are by this time well positioned for an integrative experience that brings together elements of cardiovascular, respiratory, nervous, musculoskeletal and metabolic physiology. In order to demonstrate the exercise activity provided at MVCC, Professors Drogo and Perrotti utilized a multimedia format which included computer generated text and graphic images interspersed with video footage of an actual graded exercise session.

In addition to the content-related benefits afforded by a graded exercise activity, this experience provides a number of other advantages. It uses a team approach to collect real data from a volunteer student subject. Data collection by a group of students requires cooperation and develops a sense of ownership of the data. Also, the data collection in this activity parallels similar activities many students see and practice in clinical settings (e.g. cardiopulmonary stress testing and/or rehabilitation).

The presenters summarized the history of the exercise physiology lab experience at their institution. Initial efforts over 10 years ago involved taking pre-exercise vital signs from a student volunteer, sending the student on a 15 minute jog, determining post-exercise vitals, and discussing the results. However, they were inspired to greater efforts through their participation in the 1991 HAPS conference in Greenville, South Carolina which included an exercise physiology workshop on the determination of maximum oxygen consumption (VO2max) in a well conditioned athlete. Although the sophistication and the expense of the Greenville experience was clearly out of reach, they set about designing a lab experience that would approach what they had observed.

Since Greenville, progress has been incremental but steady. The current exercise activity is an aerobic graded exercise test. A student volunteer walks for 18 minutes on a treadmill set at a constant speed, usually between 2 and 4 miles per hour. During this time, the grade is changed in 3° increments to a maximum of 15°. A one-way breathing system which uses a low resistance Hans Rudolph valve and large bore tubing is employed. The valve is kept in position by a light weight, plastic head harness. The subject breathes in fresh air from the room and exhales through a long tube to the room. This system allows for measurement of minute volume and for the determination of the oxygen percent in exhaled air. The minute volume and breathing rate are determined using a mechanical Wright-type respirometer. Cardiovascular measurements include pulse, blood pressure, and sometimes, oxyhemoglobin saturation and exhaled carbon dioxide percentage. At MVCC, access to a respirometer, a pulse oximeter (for measuring SaO2) and a CO2 analyzer (for measuring exhaled CO2 percent) all derive from the close working relationship which exists with faculty in the college’s Respiratory Care Program. Modification of the basic set-up (shown in Figure 1) is certainly possible depending on the availability of equipment and budgetary considerations.

The instructor is responsible for recruiting a student volunteer for this graded treadmill activity. This is done well in advance discreetly and privately, and standard fitness criteria are employed in making the selection. Whenever pos-
sible, varsity student athletes are sought for the activity. To better insure against inappropriate subjects, no bonus points are offered. During the presentation there were questions regarding the need for informed consent/release forms for the students selected as subjects. While the presenters admitted not formalizing the selection process to that degree, all agreed that such forms are at least desirable and probably should be incorporated into exercise protocols in the future.

Although the instructor assigns students to specific tasks and closely monitors and supervises the entire session, the responsibility for completing assigned tasks rests with the students. When the lab group is large, it is essential that everyone be involved. Students are assigned not only to data collection, but to data reporting and input. Often different students may be involved in obtaining additional replicates of the same data just as a back-up. Data are collected prior to exercise and during the final 30 seconds of each 3 minute interval. Data collection continues according to the same schedule during recovery until measured parameters return to their pre-exercise levels. All data are collected and input to a spreadsheet using a computer that remains in the lab.

The exercise activity as presented affords considerable flexibility in terms of emphasis. Depending on the focus of the course and the preferences of the instructor, emphasis can be on data collection, manual data manipulation and calculation of derived values, graphing of results, analyzing results or some combination of these. Faculty at MVCC generally prefer the automatic calculation and graphing of data via spreadsheet, with emphasis on analysis and application of this information. Other approaches are certainly appropriate and easily implemented.

The analysis, application, and critical thinking components of the lab experience involve students working with numerous graphs of interval changes in measured and derived cardiovascular and respiratory values. Careful grouping of data plots on a single set of axes often allows students to see trend similarities and therefore to better recognize interrelationships of physiologic importance. Consider the cardiovascular plot depicted in Figure 2 as just one such example. In this instance, students are likely to recognize that heart rate (or more generally, cardiac output) exerts a major influence on systolic blood pressure. A further examination of the same plot seems to indicate that the major determinant of diastolic pressure is something other than cardiac activity. And so the discussion develops and proceeds.

Students are also assigned questions which normally take the following or similar forms. What is the trend observed? Is the observed change what you expected? What is the likely trigger or stimulus for the observed change? Describe a

Figure 1. Graded Exercise Monitoring Set-up.
physiologic mechanism/regulatory process that can account for the observed change. Would the response observed be significantly different in aerobically trained and untrained individuals and, if so, how and why? The answers to these questions and others serve as the basis for discussion during the following week's lab and reinforce concepts that have been discussed in the lecture portion of the course.

In similar fashion, a plot of respiratory activity as shown below can serve as a useful tool for developing insights into the relative influence exerted by the components of minute ventilation.

If the capabilities exist, a plot of oxyhemoglobin saturation (as an indicator of oxygen supply) contrasts nicely when plotted on the same set of axes with exhaled oxygen percentage (an indicator of oxygen utilization). Students can see that while the loading of blood with oxygen seems unaffected by increasing activity, oxygen extraction increases steadily until activity decreases or ceases.

Some technical problems exist in the system currently being used and the presenters admit to constantly experimenting to minimize their impact and improve the general design of the experience. There is considerable flow restriction associated with the use of the Wright-type respirometer, much fluctuation in exhaled oxygen percent readings using many of the available monitors, and considerable skill and care required for accurate blood pressure determination in a moving subject. Plans are afoot to more completely computerize the system. Some consideration has been given to the collection of a large volume of exhaled air in a Douglas bag in order to provide more accurate and less variable average gas percentages. The presenters are also experimenting with a pneumotachometer as a means to continuously monitor exhaled gas volumes and flows without any flow restriction problems. The most important point to remember is that physical exercise with its associated physiologic changes is an excellent topic to use for integrating much that is covered in A&P. Even the very basic exercise activity described from 10 years ago can provide a very useful and effective learning opportunity for students.

Figure 2. Cardiovascular Changes During Graded Exercise.
Figure 3. Respiratory Changes During Graded Exercise.

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ANATOMY, PHYSIOLOGY AND BIOCHEMISTRY OF THE BASAL GANGLIA

New Surgical Procedures In The Treatment Of Parkinson's Disease

Anthony E. Lang, MD
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The field of movement disorders encompasses diseases which present with hypokinesia (loss of movement) or hyperkinesia (excessive movement). Parkinson's disease is the prototype for hypokinetic disorders, whereas Huntington's disease is the prototype for hyperkinetic disorders. Dr. Lang focused on basal ganglia dysfunction, especially Parkinson's disease, and new surgical treatments that have been developed for this disease.

The basal ganglia include the striatum, made up of the caudate nucleus plus putamen, globus pallidus, substantia nigra and the subthalamic nucleus. It has long been known that the basal ganglia are involved in movement, but just how they are involved has been a mystery. Since these nuclei do not project directly to motor neurons of the anterior horn, it is thought that they influence movement by indirect methods. Movement disorders have classically been divided into two groups: 1) those which influence lower motor neurons and typically produce weakness and 2) those which influence upper motor neurons and produce disturbances of motor control. The basal ganglia, cerebellum, cortex and thalamus appear to be involved more directly in control of upper motor neurons.

The striatum (caudate and putamen) is the input nucleus to the basal ganglia. It receives projections from all parts of the cortex, and from the dopaminergic, serotonergic and noradrenergic nuclei of the brain stem. Pathways connect the striatum to the output nuclei of the basal ganglia, the internal segment of the globus pallidus (GPI) and the substantia nigra pars reticulata (SNr). GPI and SNr are anatomically and physiologically similar, as if they are parts of a single structure divided by the internal capsule. GPI is involved in control of limb movements and SNr is in control of eye movements. These output nuclei do not project down the cord to motor neurons, rather they project up to the cortex by way of the ventral anterior (VA) and ventrolateral (VL) nuclei of the thalamus. The basal ganglia therefore lie in a central position between the association cortices and the motor cortex, final motor output for descending pathways. The basal ganglia receive information about the intention to move, the subsequent movement and the motivation to move, then drive the motor cortex via the supplementary motor cortex (SMA) to produce movement.

Disorders of the basal ganglia result in either too much movement or too little movement. Chorea is an example of too much movement, whereas Parkinson's disease an example of too little movement.

Early anatomists believed that cortical input was funneled through the basal ganglia. More recent work by DeLong suggests multiple segregated loops (1). Four such loops can be traced from their origin in the cortex to the striatum and GPI/SNr and then to the thalamus and SMA. The motor loop, the limbic loop, the oculomotor loop and the prefrontal loop make up the four loops hypothesized in this model. Not only do the basal ganglia influence movement, they appear to be involved in many other functions as well. Each loop in the model displays a somatotopic organization with separate functions. An alternate hypothesis for this model is the concept of split loops in which the striatum and somatotopic cortex of individual loops have cross projections that account for the overlap of function within separate loops.

INFLUENCE OF BASAL GANGLIA ON MOVEMENT

Major regions of the cortex remain separate from each other as they project into the basal ganglia. The sensorimotor cor-
tex projects to the putamen, the association cortices project mainly to the caudate and the limbic cortex projects to the ventral striatum, including the nucleus accumbens. Since projections from the putamen are directed to the ventrolateral parts of GPe and GPI, new surgical treatments for movement disorders are directed to this anatomical area (2).

Two separate pathways are contained within the motor loop. The direct pathway is from the striatum to the GPI (the output nucleus); the indirect pathway is through the external segment of the globus pallidus (GPI) and the subthalamic nucleus (STN) to GPe. (See Figure 1 for an illustration of these pathways, their transmitters and their inhibitory or excitatory actions.) The pathways have opposite effects on GPe. The direct pathway inhibits GPe which in turn reduces inhibition of the thalamus. When the thalamus is disinhibited, the cortex is stimulated to produce movement. Activation of the direct pathway (decreasing the drive to GPe) leads to movement. The indirect pathway stimulates GPE, thereby inhibiting the thalamus and decreasing activity to the motor cortex. Inhibition of the motor cortex inhibits movement. Activation of the indirect pathway (driving GPe) inhibits movement. The action of dopamine (DA) is different for each of these pathways. Striatal neurons in the direct pathway have a predominance of D1 receptors. Since dopamine is excitatory for D1 receptors, the direct pathway is activated which leads to movement. In the indirect pathway, striatal neurons have a predominance of D2 receptors. Dopamine inhibits these receptors which leads to inactivation of the indirect pathway and therefore to movement.

Activation of the direct pathway can be considered a positive feedback system that facilitates voluntary movement, whereas activation of the indirect pathway can be considered a negative feedback system that suppresses unwanted movement (3). The direct pathway therefore brings about disinhibition of the thalamus, stimulation of motor cortex and movement. The activated indirect pathway produces diminished activity in GPe and increased activity in STN which then drives GPe to inhibit thalamus thereby prohibiting movement. Likewise:

- an overactive direct pathway leads to hyperkinesia
- an underactive direct pathway leads to bradykinesia or akinesia
- an overactive indirect pathway leads to akinesia and rigidity
- an underactive indirect pathway leads to hyperkinesia

**USING THE MODEL TO UNDERSTAND MOVEMENT DISORDERS**

Damage to the subthalamic nucleus, either by infarct as seen in patients or by lesions produced in laboratory animals, produces contralateral hemiballismus with large involuntary flailing movements (4). STN normally excites GPe which

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inhibits the thalamus. When the influence of the STN is removed, the drive to GPi is lost, the motor thalamus is disinhibited and the cortex is driven to produce excessive movement. This clinical syndrome fits the model nicely.

The model may also be used successfully to describe Huntington’s disease. Patients with this disease may have either the choreiform variety in which there is excessive movement or another variant which produces akinesia and rigidity. Using substance P and enkephalin as markers, one can distinguish between direct and indirect pathways. In the choreiform variant, the enkephalin pathway (indirect) is depressed while the substance P pathway (direct) is preserved. The decreased drive to GPi which results from damage to the indirect pathway leads to abnormal, involuntary choreiform movements. The Huntington’s variant presents with akinesia and rigidity, and both the enkephalin pathway and the substance P pathway are depressed. If the depression of the direct pathway predominates, GPi becomes overactive and thereby inhibits the thalamus and cortex, which leads to loss of movement (5).

**PARKINSON’S DISEASE**

The clinical symptoms of Parkinson’s disease include: 1) tremor, 2) rigidity or the resistance to passive movement, 3) akinesia, which encompasses both slow movement and absence of movement, and 4) postural disturbances. The pathology associated with the disease reveals a loss of dopaminergic (DA) cells in the substantia nigra pars reticulata (SNr). Since these cells contain neuromelanin (a pigment), they appear black in fresh tissue which gives the nucleus its name. Dopaminergic neurons of the nigra project to the striatum in a particular pattern (6). In Parkinson’s disease, there is not just a loss of DA, but rather a very specific pattern of loss. More DA is lost from the putamen, especially the ventrolateral portions related to motor control, than the caudate nucleus, which is thought to have more associative functions. Dopamine deficiency produces the akinesia of Parkinson’s in two ways: 1) the action of the direct pathway is lost since it is no longer stimulated by DA and 2) the indirect pathway becomes overactive since it is no longer inhibited by DA. The resulting overactivity of GPi inhibits the thalamus and the cortex and thereby inhibits movement.

A new treatment for Parkinson’s disease, based on these models and recent experience, is to surgically lesion, and thereby remove, the influence of the GPi. Beginning in the early 20th century, Parkinson’s disease was treated by making lesions in various parts of the central nervous system, but with little success until recently. These surgical approaches fell into disuse after introduction of L-DOPA. Today, treatment incorporates surgical as well as medicinal techniques. Success of the surgical treatment comes from carefully placing lesions in GPi. This lesion is called a medial pallidotomy. It removes the overactive pallidum and allows the thalamus to activate the cortex more normally.

The first 39 patients to undergo this surgery have been followed for 6 months. They have been evaluated in the OFF state and the ON state. The OFF state is without medications. Patients withhold medications overnight and are tested first thing in the morning. They then take medication and are evaluated again, this time under the influence of the drugs, or in the ON state. These first 39 patients show a significant improvement in all signs of Parkinson’s disease, amounting to an approximate 30% reduction of symptoms in the OFF state. The ON state remains much the same. Changes observed in the OFF state are predominantly contralateral, although there can be some ipsilateral changes. This is consistent with BG anatomy where most of the projections are within a hemisphere and only approximately 20% of the outflow of GPi are crossed pathways.

The reasons for selecting a surgical approach have to do with the difficulties in using L-DOPA therapies long term. L-DOPA has many unpleasant side effects including 1) dyskinesias much like the involuntary movements observed in Huntington’s disease, 2) mental state changes such as psychosis and paranoia, and 3) motor fluctuations. These complications of drug treatment are the opposite of the motor abnormalities seen in Parkinson’s patients. The dyskinesias can be very nicely explained by the model—in effect that dopamine therapy overdrives the direct pathway and inhibits the indirect pathway, thereby producing excessive activation of the cortex and excessive movement. These are opposite of the motor abnormalities seen in Parkinson’s disease. However, the model goes on to predict that a lesion of GPi would worsen the Parkinson’s symptoms, but this is NOT what is seen clinically. Pallidotomy decreases dyskinesias better than any other form of treatment, and alleviates dyskinesias to a much greater extent than it alleviates bradykinesia and rigidity. After pallidotomy, dyskinesias on the contralateral side are absent, though they creep back over a period of 2 years.

Another neurosurgical treatment, currently being investigated, involves implanting electrodes into various basal ganglia nuclei. The theory proposes that by stimulating a particular nucleus at high frequencies, the activities of that nucleus can be reversibly blocked or jammed, thereby normalizing the outflow of the region. This treatment has the advantage of not being a permanent ablation. The stimulating electrodes are attached to a programmable unit, much like a cardiac pacemaker, that is implanted under the collar bone. This unit can be turned on and off at will. Electrodes may be placed either in GPi or the subthalamic nucleus. Bilateral stimulation of the subthalamic nucleus in Parkinson’s patients during the OFF state results in an improvement in patient scores on both motor functions and activities of daily living. Caution must be exercised, however, as the procedure has many side effects and complications.

The known connections of the basal ganglia are far more complex than those presented in the simple model (7).
Lang presented video tapes of individual patients and illustrated some of the complex results of the new treatments. One patient who had extreme slowness of movement, poor postural stability and episodes of freezing prior to surgery received a left pallidotomy. After the surgery the patient could make much more rapid movements, and could easily rise from a chair and walk. All tests were performed in the OFF state. In another patient bilateral pallidotomy was shown to eliminate the abnormal movements induced by L-DOPA therapy. Thalamic stimulation, while not appropriate for treatment of Parkinson’s patients, is an excellent way to alleviate resting tremor. A patient with resting tremor which was resistant to medical treatment had bilateral thalamic electrodes implanted. Turning on the stimulator immediately quelled the tremor. When the stimulator was turned off, the tremor returned after several seconds. Stimulating electrodes implanted into GPi of an akinetic, rigid patient with gait disturbances improved the symptoms, but also induced dyskinesias. It takes careful titrating of the stimulating device to provide relief of symptoms without dyskinesias. A patient with severe bilateral tremor had electrodes implanted bilaterally into the subthalamic nucleus. Activating the stimulator prevented the tremor but only after a delay of several minutes. This effect was quite different from the effect observed with thalamic stimulation.

References

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Figure 1. Simplified schematic diagram of the anatomical connections, transmitters, and functional signs of pathways in the basal ganglia.
WHAT SECRETS LIE WITHIN THE VAULTS OF THE CELL?

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Unbelievable, you would say, if you were told that thousands of electron microscopists, studying eukaryotic cells for several decades, would fail to notice organelles that are roughly three times larger than ribosomes. That’s precisely what happened between 1945, when Porter, Claude and Fullam first used an electron microscope to examine cells, and 1986, when Kedersha and Rome made the serendipitous discovery of a new class of organelles. These ellipsoidal barrel-shaped organelles were named vaults because they contain numerous arches that reminded the discoverers of the vaulted ceilings of medieval cathedrals.

Vaults are ribonucleoproteins having dimensions of about 55 x 30 nm, making them the largest cytoplasmic ribonucleoproteins ever discovered. Why would such large particles not be noticed by electron microscopists for several decades? The answer lies in the staining techniques that were being used prior to the discovery of vaults; traditional stains just did not bind to these organelles. Research during the past decade has revealed the following structural details about vaults:

— a typical eukaryotic cell may contain thousands of vaults in its cytoplasm
— each vault contains 96 copies of the major vault protein (MVP) as well as several minor proteins
— each vault contains 16 short vault RNA (vRNA) molecules inside the barrel
— each vault appears to consist of two halves with each half resembling a symmetrical 8-petaled flower, i.e., an octagonal dome; some biologists believe that vaults can change from an open configuration (flower-like halves) to a closed configuration (hollow barrel).

The function(s) of vaults are not yet understood. However, there are tantalizing clues which indicate that they may play an important role in the transport of certain molecules within the cytoplasm of cells. The major pieces of evidence include the following:

a) Vaults have the same size and shape as the central plugs that fit into the pores and nuclear pore complexes of the nuclear envelope. These pores are the gateways for molecular traffic between the interior of the nucleus and the surrounding cytoplasm. This fact has caused some researchers to suggest that vaults may play a role in transporting substances such as messenger RNA or ribosomal subunits from the nucleus into the cytoplasm. Vaults might act as containers that park at a nuclear pore to pick up cargo from the nucleus, transport the cargo to a specific site in the cytoplasm and release it upon reaching their destination.

b) Tumor cells that are resistant to chemotherapy contain many times more vaults than other tumor cells. Some vaults are found associated with vesicles. These facts suggest to some biologists that vaults might play a role in the development of multidrug-resistance in cancer cells. Vaults might shuttle the chemotherapeutic toxins from the nucleus to vesicles for subsequent disposal, thereby allowing cancer cells to continue thriving despite being flooded with foreign toxins. If this is confirmed, it might be possible to design therapies that would interfere with this action of vaults, and therefore, make cancer cells more susceptible to the effects of chemotherapeutic drugs.

It is interesting to note that most physiology textbooks make no mention of vaults. A quick scan through all the major Human Physiology textbooks reveals that only one of them describes vaults and their characteristics. Many questions remain to be answered about vaults and, as more research into vaults continues, the existence and significance of these intriguing organelles will no doubt be described in all physiology textbooks.

References:
DIGITAL CAMERAS AND PHOTOGRAPHY

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OK! Is everyone ready? Throw away those old film cameras. Instead, focus on the continuing development of digital video!

Digital cameras first appeared approximately two years ago and are now becoming popular as prices for these cameras and video camcorders continue to fall. Digital imaging involves translating light images into digital data that can be translated by a computer into points of light or pixels, viewable on a monitor. Prior to this, the only way one could get photographs into the computer was either by scanning a printed photograph with a flatbed scanner or passing a TV signal (NTSC) into a computer through a digitizing card. Both methods result in digitized images, but costs and convenience were important factors to consider. For example, flatbed scanner costs ranged between $600 and $1200 for scanners of sufficient quality for photographs. Hidden are the costs of owning a traditional film camera and concomitant expenses for processing and printing. The digitization of 35mm slides carried more hidden costs as this required higher quality scanners and scanner accessories. Although costly and time consuming to yield an end product, these methods still work to transform photographs into digitized data that can be imported into presentation software such as PowerPoint in support of lectures in anatomy and physiology.

As the first digital camera technology was being developed, an interesting little camera called the ZAPSHOT was marketed. A key advantage of this camera was its use of a tiny 2 x 2 inch floppy disk for storage of images. The capacity of each disk was approximately 50 images at a cost of $10 per disk. The camera literally fit into a hand and had expanded capabilities with a wide angle or zoom lens. However, stored images were analog and could only be played back onto a TV or video recorder for presentation. The ZAPSHOT also lacked provisions for recording from other video sources or connectivity to an adapter for the microscope. A desk model was available that potentially allowed inputs from other sources such as VCR’s and videocameras (i.e. recorded micrographs). Unfortunately, the price of this unit was over $1000. If one was lucky enough to have both, there was the possibility of recording all the visuals for a lecture onto the floppy disks and then going to lecture or laboratory with the small portable camera unit and playing back images as needed. The images did have to be accessed in linear order since random access was cumbersome at best. The system allowed 10 question video quizzes to be recorded for use as laboratory quizzes.

What about images from other video sources including videotapes and videomicroscopy? For these one had to use camcorders or VCRs to record material and then pass the information through a digital converter to the computer. Given the less than spectacular performance of VHS sources, the newer Hi-8 video or S-video cameras were the best, but obviously carried a higher price.

The typical resolution of these video images in the computer was 640 x 480 which is adequate for most lecture uses. The cost of a good digitizing board could easily exceed $600, and some systems were above the $4000 range. Once images were digitized either by scanner or by digitizing boards, the image could be manipulated. Image quality allowed changes in content such as eliminating or adding labels, correcting errors that might have been in the original, changing backgrounds to eliminate unwanted clutter, and creative cutting and pasting to render clever composites. I remember generating an electron micrograph of a cell that had all the organelles where I wanted them. It looked like a real cell but never really existed. Never again will I believe photo-evidence!

Now there are digital cameras that are capable of storing images as electronic signals that can pass images to a computer through a serial port without degradation and the added expense of specialized digitizing boards. The majority of these digital cameras capture images to “Flash
Memory" cards and can store images up to 640 x 480 resolution. The prices range from $200 to $700 depending on the capability to capture images at higher resolutions. The lower priced cameras capture images with 320 x 240 pixels with a capacity of 16 images per card. At higher resolution only 8 photographs can be captured per card. These cheaper models really limit what one can do as extra memory cards are expensive, costing as much as $150 each. Higher cost models are actually more economical in that higher resolution photographs (640 x 480 and higher) can be captured with up to 40 images recorded per card. These cameras sometimes have an LCD viewfinder that allows viewing of captured images. These can be reviewed, retaken, and deleted at any time. One needs to remember, however, that an image displayed on a 2 inch LCD screen can look significantly better than the same image on a full screen computer monitor or printed with a color laserjet printer. Other digital camera features of use are integral flash units and an expanded focal range. To date, none allow easy access to adapters for use on microscopes. The major advantage of these cameras is that they allow extremely easy capture, editing, storage, and playback. With respect to playback, the best digital cameras possess additional provisions for playing images directly to the TV. With a video output cable, an instructor can take photos with the camera, edit and rearrange their order in the computer, download them back to the camera and then use the camera in lecture to display desired images. This allows some inclusions from other sources, but the memory cards once again limit the number of items.

The two newest advances in digital imaging involve the Sony Mavica digital camera and the new digital camcorders. The Mavica is unique in that it eliminates the "Flash Memory" cards, which are expensive and limited, and replaces them with a simple 1.44 Mb floppy disk. By using a standard computer floppy disk formatted with DOS one can record 20 high resolution images in a standard JPEG (Joint Photographers Experts Group) format. When the disk is placed into either a Windows or Mac OS PowerMac system, the JPEG images can be input into programs such as Photoshop, Claris Works, etc. for manipulation and storage. A standard high resolution or "fine" image will print easily as an 8 x 10" photograph. Although the camera has a built in automatic flash, most circumstances do not require its use. There are two models, one with a zoom lens ($500) and one with a zoom lens ($700).

The newest cameras with the highest potential for impact on instruction are the digital camcorders. They possess many sophisticated features for recording, editing, and playback. As always, the prices, ranging from $1150 to $3500, determine the capabilities. Most have a fairly large LCD display for editing, various special effects such as fade-in or fade-out, and image-stabilization. With lenses that zoom to 120X magnification or focus within 1/8 of an inch from objects for macro capability, there are few subjects beyond the reach of these lenses. These cameras use a new, tiny DVD (digital video device) type videotape. DVD is the new standard being pushed both as a tape format and disk format. With a single tape, these cameras can record up to 90 minutes of full-motion video or approximately 900 still photographs. The advantage of DVD is that the photographic quality is so good that still shots and stop action have resolutions higher than most television monitors can show. Once recorded, video and still images can be played to a TV or passed through a digitizing board for display and editing on a computer. Look for FireWire connectors on these cameras to allow a direct digital input to computers via dedicated capture cards.

One potential use of a system like this is that one can record intermixed still and motion video for playback during lecture. One attractive feature of some of these cameras is their size; they literally fit into a pocket. The Sony Mini DV recorder is not only small but has remote playback capabilities. Unfortunately it can only play back video the camera has recorded. Recently, a Sony desktop Digital Video Tapedeck has been marketed which allows for mixing inputs from other video sources onto tapes that play in the camera. Unfortunately the recorded deck retails at over $4000. Using this or similar DVD cameras for recording images allows the rendering of cadaver detail not available by other means. These high quality images can then be used for projection either in the lecture or laboratory. The sensitivity of the lens system is such that no additional light is necessary indoors for quality video and stills. VIDEOS and stills taken outdoors and at night are possible, but one can expect a loss of image quality with low light levels. The close-up imaging capability of these cameras for detailed views of bone, muscle preps, models, etc. is impressive and highly useful.

The development of DVD is just beginning and should revolutionize how imaging is used in the classroom. With much higher memory capacity (2.5 hrs), computer DVD disks provide great potential for A&P instruction. At the current time, use in anatomy and physiology is limited since there are no DVD disks available in this content area. With DVD technology it will be possible to put the contents of several laser disks onto one DVD disk the size of a standard CD-ROM.

One last word about the use of digital images. If individual instructors have not yet done so, the preparation of lecture material on a computer for display or presentation by TV (via projection or simple monitors) is not really difficult and does not require expensive equipment. Using a standard 27 inch television to view materials, the conversion device that attaches to the SCSI port of a Mac or Windows machine costs less than $300 and is completely portable.
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Fax: (918) 458-2325
A three-year plan includes widely distributing the HAPS policy statement, developing animal use internet links on the HAPS Home Page, addressing laboratory safety issues, monitoring relevant legislation, developing a dialogue with specimen suppliers and creating a resource packet for HAPS members. Suggestions and questions from members are welcome.

COMPETENCY TESTING COMMITTEE
John Dustman, Chair
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Phone: (219) 980-7106
This committee recently completed and tested an approved HAPS Standardized Test for Human Anatomy and Physiology. Any HAPS member may obtain a copy of the test by writing to the Chair.

CORE CURRICULUM AND ASSESSMENT COMMITTEE
Ronald Carlin, Chair
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285 Madison Ave.
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Phone: (201) 593-8748
This committee has developed a second, revised edition of the HAPS “Human Anatomy and Physiology Course Guidelines.” The second edition includes new guidelines relating specifically to the laboratory component of the course.

EDITORIAL ADVISORY BOARD
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Members of the Editorial Advisory Board provide advisory and support services to the HAPS Editor such as writing articles and proofreading the final draft of the HAPS-EDucator before it goes to press.

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The Grants and Scholarships Committee is responsible for reviewing all grant and scholarship proposals, selecting proposals to receive funding, and submitting its recommendations to the Board of Directors for approval.

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Committee members assist the Chair with recruiting members and compiling membership information.

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The committee chair is always the current President-Elect. The responsibility of the committee is to recruit nominees for the elected offices and appointed positions of the HAPS organization.

LOCAL CONFERENCE COMMITTEE
Ann Smith, Chair
Joliet Junior College
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Phone: (815) 729-9020 X2373
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The committee provides mentoring assistance to coordinators of local conferences. Anyone interested in hosting a local conference should contact the Chair.

ANNUAL CONFERENCE COMMITTEE
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San Diego, CA 92111
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Phone: (619) 627-2787 Fax: (619) 297-5668
Development of a standardized fees structure for the annual conference, formulation of guidelines and assistance for the conference coordinator and generation of a calendar of conference sites are the primary responsibilities of the committee.

TECHNOLOGY COMMITTEE
Martha DePecol Sanner, Co-Chair
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John Waters, Co-Chair (Internet-related Issues)
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The committee monitors and reports on technological changes influencing anatomy and physiology teaching such as advances in instructional software and data acquisition equipment.

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