HAPS News
May 1996

Human Anatomy & Physiology Society
Established in 1989 by Human Anatomy & Physiology Teachers
HAPS COMMITTEES AND BOARDS

Have you wondered where you could obtain a standardized anatomy and physiology test? Or maybe you are thinking about an educational project and are looking for funding? Do you feel strongly about a particular issue and would appreciate an opportunity to discuss it with other HAPS members? The following committee chairs invite input from HAPS members and willingly provide information on the activities of their committees.

ANIMAL USE COMMITTEE
William (Bill) Perrotti, Chair
Life Science Dept.
Mohawk Valley Community College
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Utica, NY 13501
E-mail: wperrotti@mvcc.edu
Phone: (315) 853-2343
Fax: (315) 792-5666

A policy statement on animal use in human anatomy and physiology courses was developed by the Committee and officially adopted by the HAPS Executive Committee. The Committee is presently researching other issues relating to animal use.

COMPETENCY TESTING COMMITTEE
David S. Smith, Chair
Dept. of Biology
San Antonio College
1300 N. San Pedro
San Antonio, TX 78284
E-mail: dsmitll@accd.edu
Phone: (210) 733-2695

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
Fairleigh Dickinson University
285 Madison Ave.
Madison, NJ 07940
Phone: (201) 993-8748
Fax: 874-8

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
David (Dave) L. Parker, Chair
Dept. of Sciences-Biology
Northern Virginia Community College
3001 N. Beauregard St.
Alexandria, VA 22301
Phone: (703) 845-6004
Fax: (703) 845-6006

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 newsletter before it goes to press.

GRANTS AND SCHOLARSHIPS COMMITTEE
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St. Louis College of Pharmacy
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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 Executive Committee for approval. Completed grant and scholarship applications are due December 31, 1996.

MEMBERSHIP COMMITTEE
Pamela Langley, Chair
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The Committee assists the membership chair in recruiting members and compiling membership information.

NOMINATING COMMITTEE
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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.

HAPS LOCAL CONFERENCE COMMITTEE
Pat Hawker, Co-Chair
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St. Louis, MO 63110-1393
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Joliet Junior College
1216 Humboldt Rd.
Joliet, IL 60436
Phone: (815) 729-9020 X2373
Fax: (815) 773-6670

The Committee provides mentoring assistance to coordinators of regional meetings. Anyone interested in hosting a regional meeting should contact one of the Co-Chairs.

ANNUAL CONFERENCE PLANNING COMMITTEE
Shirley Mulcahy
San Diego Mesa College
Biologv Department
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San Diego, CA 92111
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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.

HAPS INTERNET COMMITTEE
John R. Waters
Penn State University
208 Mueller Laboratory
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The committee has developed a HAPS Home Page on the World Wide Web and is actively involved in updating it with the latest HAPS information. Visit the HAPS web site at: http://www.bio.psu.edu/haps.htm

HAPS News May 1996 page 2
This issue of HAPS News is filled with thought-provoking, brain-tickling and emotionally-rewarding articles. The quality and variety of articles from our members are increasing in quantum leaps with every issue. Note that beginning with the November 1995 issue, HAPS News increased from 16 to 20 pages. I strongly suspect the increase is closely linked to our growth as a Society, to better record keeping and tracking of members by Kevin Patton, our exceptional Secretary-Treasurer and the terrific leadership and futuristic thinking demonstrated by Bob Anthony and the other members of the Board of Directors and Steering Committee.

Henry Ruschin’s Update Symposium article provides an extensive review of receptor dynamics. If you missed his fact-filled symposium or if your mind was on a time-out-break due to sensory overload at the conference, here is your opportunity to discover what you missed.

We have an exciting article in the Teaching Tips section by Dean Johnson. He hopes that some of our terrific HAPS teachers will give it a try and provide feedback to him on how effective it is in helping students with critical thinking. He has even included diagrams for those visual learners.

Millie Galliher continues to send her nifty tips on how to care for your computer. Her latest article discusses care of the keyboard. While I am editing her articles, it is impossible not to look down at my computer and observe that it has greasy, yucky keypads, a dirty monitor screen and a dusty case. When I find some free time from my editing tasks, I plan to give my sadly-neglected com-

puter a spring cleaning. Maybe Spring of 1997!

Have you received a copy of John Martin’s HAPS ’96 conference packet? I decided that I would need at least two extra weeks in the Portland area to see all of the wonderful places shown on the brochure. Forget the symposia, workshops and Board of Directors meetings, you can find me in one of the many gardens! But please, don’t tell my Chair. He’ll think I’m hard at work in the halls of education.

Have a safe journey, and I’ll meet you in Portland.

LETTERS TO THE EDITOR

I have read the HAPS Position Statement on Animal Use and want to express my opposition to the Society’s decision to support the use of animals for dissection in anatomy courses and for demonstrating physiological principles.

The position statement declares that “the use of live animals allows students to pose questions, propose hypotheses, develop technical skills, collect data, analyze results, to focus on procedural and technical details, to resolve unexpected and erroneous results, to improve critical thinking and problem solving skills, and to depict the uniqueness of living organisms.” All of these goals can be reached without the use of animals.

Our ultimate goal is to teach about the human body. At the College of San Mateo we use cadavers that were donated to science through the Curator’s Office at the University of California. We purchase one or two per year for dissection and maintain well-dissected cadavers with Carosafe, gauze wrapping, etc., for future use to demonstrate differences in age, sex, and other human features. In addition to excellent learning experiences, our students learn respect and appreciation for the person who chose to donate their body.

By designing experiments that examine the physiological responses of the student’s own body, each student gains insight into their own health and well being. By comparing experimental findings of classmates, they learn about the uniqueness of human physiology and homeostatic mechanisms. Experiments are frequently expanded to include awareness of family members.

The HAPS position that science educators demonstrate respect and reverence for the natural world is not accomplished by approaching animal experimentation in a careful, responsible way. By the unnecessary use of animals in our classrooms, we make an opposite statement. Student organizations (including medical students) have made position statements whereby they refuse to use live animals. I believe that HAPS should have the same policy.

J.M. Cons, Ph.D.
College of San Mateo
San Mateo, California 94402

Continued next page
TENTH ANNUAL CONFERENCE
HUMAN ANATOMY AND PHYSIOLOGY SOCIETY

SYMPOSIA AND
WORKSHOPS

JUNE 8-13, 1996


Hotel: Red Lion Hotel at the Lloyd Center in Portland, Oregon
Phone: (503) 249-3111 Fax: (503) 284-8553

Travel: Portland (Oregon) International Airport (PDX). McKenzie Travel (800-677-7167) and American Airlines (800-221-2255) have been designated the official travel agents for HAPS '96. The Star File number for HAPS '96 with American Airlines is S0566PA.

LETTERS TO THE EDITOR
Continued from page 3

Having successfully prepared Core Curriculum Guidelines for A & P and a standardized exam based on these guidelines, I would like to propose that HAPS look at guidelines for the use of computer software in the teaching/learning of A & P. There are two aspects to be considered: 1) evaluation of existing software and development of guidelines as to what would constitute good software and 2) the role of computers in the A & P curriculum. This latter question stems from the direction I'm seeing with administrators looking to reduce teaching hours in lieu of students spending more time learning A & P on an "independent learning" mode. I hope to see this issue discussed at this year's conference.

Henry Ruschin Bioscience Coordinator
School of Health Sciences
Humber College
Toronto, Ontario, M9W 5L7 Canada

A Little A & P HUMOR to Brighten Your Life

As part of our exams, we routinely ask case study questions. The skeleton exam included a forensic biology study. We gave the students brief descriptions of three missing people: Nicole Noman, a 5'8" Caucasian prostitute; James Brown, a 5'9" African American boxer; and Harry Kim, a 6'4" Korean-American comedian. We also gave them descriptions of a tibia, os coxa and skull that were found at a crime scene. Students had to calculate the height and gender of the victim based on the descriptions given. The final part of the assignment was to correctly identify the victim.

One student's answer was particularly intriguing. After correctly estimating the height and determining the gender of the victim, she wrote: "Based on the evidence presented, I believe the victim was James Brown. However, before a final identification is made, I would want to do more testes on the skeleton."

Submitted by
Janice Yoder Smith and Freddie Anderson
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Fort Worth, TX 76179

HAPS News May 1996 page 4
Greetings From Our President

ROBERT ANTHONY, TRITON COLLEGE, RIVER GROVE, ILLINOIS 60171

My last column as President is devoted to a review of the issues addressed by the Steering Committee (Executive Board) since the 1995 Conference. Our efforts began with a series of long range planning sessions held during and immediately following the St. Louis Conference. Improving the structural organization of HAPS, increasing the number of professional development opportunities for members and establishing communication with other professional organizations were just a few of the many suggestions arising from those sessions. The Board of Directors (Executive Committee) has proposed several changes to the HAPS Constitution based on those recommendations. Members received a copy of the proposed changes in March, and the membership will vote on those at the 1996 Conference in Portland. President-Elect Karen LaFleur deserves special praise for her work in overseeing the constitutional revisions.

Kevin Patton, HAPS Secretary-Treasurer, has continued the work initiated by John Dustman, and we now have a Membership Confirmation Form in addition to our Membership and Interest Survey Form. Membership renewal forms are sent out quarterly. A member’s renewal date is determined by the initial application date. To improve communication among the members of HAPS, Kevin provided a current membership list with the recent membership mailing to all members. Under his expertise an organizational budget was developed, and with the approval of the Board of Directors, he arranged to have our financial status reviewed by an accounting firm.

The designation of Regional Director (Member-at-Large) regions with specific states assigned to each region was clarified. Each Regional Director will represent a specific region of the United States and/or Canada. The Directors will work with the Membership Committee, under the direction of Pam Langley, along with state or regional coordinators to eventually develop a list of all teachers of anatomy and physiology in their respective regions. A copy of the map depicting the area represented by each Regional Director was included with the membership mailing.

A HAPS Policy Manual is being developed. It will include our mission statement, an organizational calendar, appropriate addresses and phone numbers of the Steering Committee members, job descriptions, each subcommittee’s goals and members and a list of past decisions made by the Board of Directors. It is expected that transition of new members onto the Steering Committee will be much smoother as a result of implementation of the proposed policy manual. The manual will also provide a reliable source of information on past and present decisions made by the organization.

The HAPS Newsletter continues to be a major source of professional development for our members. Our Editor Theresa Page, with input from the Editorial Advisory Board, strives to provide information that is pertinent to those teaching human anatomy and physiology. The organization has purchased a printer to facilitate Theresa’s efforts.

The organization has developed a policy on animal use. The policy, approved by the Executive Committee (Board of Directors) in July, was printed in the November newsletter. Bill Ferro, Chair of the Animal Use Committee, plans to hold informational sessions concerning our policy during the HAPS Annual Conference in Portland.

David Smith, Chair of the Competency Testing Committee, wrote a progress report on the HAPS Standardized Examination for the November issue of our newsletter. He plans to give a further update at the Portland Conference. Margaret Weck, Chair of the Grants and Scholarships Committee, has received several inquiries for possible grants. She also will provide an update at the Portland Conference.

Several regional meetings were held for human anatomy and physiology teachers this year. During the fall of 1995, a meeting was held at Kishwaukee College in Malta, Illinois. Spring meetings were conducted at Collin County Community College in Plano, Texas; at the Community College of Allegheny County-North Campus in Pittsburgh, Pennsylvania; at Hawkeye Community College in Waterloo, Iowa and at Wright College in Chicago, Illinois. A meeting has also been scheduled at Delaware Technical and Community College-Owens Campus for October of 1996. Pat Hawker and Ann Smith are the Co-Chairs for our Local Conference Committee.

Several new committees were developed over the past year. The Annual Conference Committee, chaired by Shirley Mulcahy, has recommended Toronto, Canada as the site of the 1997 Conference and Fort Worth, Texas as the site of the 1998 Conference. Both of these recommendations have been approved by the Board of Directors.

Continued next page
The new Internet Committee is chaired by John Waters, Penn State. To find our new HAPS Home Page on the World Wide Web, point your web browser to (http://www.bio.psu.edu/haps.htm).

The name for the Core Curriculum Committee has been changed to the Curriculum and Assessment Committee. Dan Lemons, City College of CUNY, will conduct a general workshop session on assessment at the beginning of the Portland Conference.

The Steering Committee has identified several areas that the organization may wish to address in the future, and it is seeking input on those from the membership during a portion of the business meeting in Portland. Participants will be divided into small groups and provided an opportunity to share their ideas and concerns with members of the Steering Committee. Membership input is vital to the continued growth and effectiveness of HAPS.

If you cannot attend this meeting, please consider sharing your ideas with a member of the Steering Committee. We appreciate your continued support for the mission of HAPS which is to promote excellence in the teaching of human anatomy and physiology” (proposed mission statement).

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HAPS News - May 1996 page 6

CORE CURRICULUM COMMITTEE REPORT

The second edition of the HAPS endorsed “Course Guidelines for Undergraduate Instruction of Human Anatomy and Physiology” (September, 1994) is now in print. Copies of the second edition were mailed in late April/early May, 1995, to all HAPS members and were also available at the 1995 HAPS Annual Conference in St. Louis. Members who have not received a copy of the second edition or who need another copy should mail their request to:

Ronald Carlin
Fairleigh Dickinson University
285 Madison Avenue
Madison, NJ 07940

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HAPS News - May 1996 page 6

Please check (✓) one:

☐ New membership
☐ Renewal
☐ Change of information

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Please check (✓) one:

☐ Use of cadesavers
☐ Electronics in the lab
☐ Lecture testing methods
☐ Lab testing methods
☐ Management/administrative
☐ Implementing computers in the classroom
☐ Radiosotope/special chemicals in the lab
☐ Disabled/Learning disabled learners
☐ Physical facilities design
☐ Museum displays
☐ Grants
☐ Leadership skills

☐ Computerized library searches
☐ Computerized data acquisition
☐ Videotape acquisition
☐ Instructor/course evaluation
☐ Gradebook programs
☐ Team teaching
☐ Writing articles/textbooks/manuals
☐ Lab safety
☐ Dissection/animal use

Your membership includes a subscription to HAPS News ($10).
FROM PHARMACOLOGY TO PHYSIOLOGY: RECEPTOR BOUND

Presented by and reported by
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In the last 30-40 years, remarkable advances have more clearly identified the role of receptors in cellular communication. Much of the data has come from a desire to find new and improved therapies for many of the diseases that currently afflict humankind. Since drugs do not produce new effects or actions in the body but only alter existing physiology, pharmacological research has contributed significantly to our knowledge of human biology. The receptor theory, extended to endocrinology, immunology and molecular biology, has proved essential for explaining many aspects of biological regulation.

Paul Ehrlich, a German scientist, and John Langley, a British scientist, are credited with the development of the receptor theory. Ehrlich’s observations on the affinity of dyes for specific tissues and on the mechanism of action of the tetanus toxin led to the concept of a receptor. He postulated that cells contained molecular side-chains on their surface that could bind with a combining group on the toxin molecule, a sort of lock and key combination. The term receptor, as applied to this molecular arrangement, arose in one of his later lectures in which he stated, “for the sake of brevity, that combining group of the protoplasmic molecule to which the introduced group is anchored will hereafter be termed the receptor.”

John Langley studied the effects of various drugs, such as curare and nicotine, on nerve and muscle tissue. He observed that while curare did not prevent electrical stimulation of a muscle it did block a muscle contraction triggered by nicotine. Based on such experiments, Langley developed the idea of a “receptive substance.” In a 1905 paper, he defines the term receptive substance as follows:

I conclude then that in all cells two constituents must be distinguished, (1) substances concerned with carrying out the chief functions of the cells, such as contraction, secretion, the formation of special metabolic products and (2) receptive substances especially liable to change and capable of setting the chief substance in action. Further, that nicotine, curare, atropine, pilocarpine, strychnine and most other alkaloids, as well as the effective material of internal secretions, produce their effects by combining with the receptive substance.

From the 1930’s through the 1960’s, the receptor theory gained much support based largely on bioassay experiments and mathematical interpretation of those experiments. Since drug-receptor complexes obey the law of mass action, it is possible to derive dose-response curves and formulae based on the Michaelis-Menten equation that is used for enzyme-substrate interactions. While it is well known that pharmacological effects of drugs are dependent on the concentration of the drug at receptor sites, less well known is the observation that drugs or other factors may bring about a change in the number of receptors. This seems to be a form of autoregulation. If the number of receptors increases, it is called “up-regulation,” and if the number goes down, it is called “down regulation.”

Increased secretion of thyroxine by the thyroid gland, for example, results in an increase in beta adrenergic receptors and would therefore represent “up regulation.” Consequently, when the thyroid gland is in a hyperactive state, termed thyrotoxicosis, the observed increase in cardiac palpitations are due specifically to the increased binding of catecholamines by the myocardium. Antagonists, such as beta blockers, also cause “up regulation” of receptors. Sudden withdrawal of a beta blocker may under the proper conditions precipitate an anginal attack. Fluoxetine (Prozac) on the other hand causes a “down regulation” of serotonin receptors which accounts for its antidepressant effects.

From the late 1960’s to the present, new experimental approaches have allowed researchers to identify the actual structure of receptors. Techniques such as the labeling of drugs or endogenous substances with radioactive isotopes have led to the identification of over a hundred different receptors. Fortunately, most of these can be grouped into a smaller number of families or categories based on their structures and properties. There are at present four mechanisms that account for activation of cellular processes following binding of a substance at the receptor site; these are: 1) activation of ion channel receptors, 2) activation of G proteins and second messengers, 3) activation of intrinsic protein tyrosine kinases and 4) activation of nuclear or lipid-soluble agents. Each mechanism uses a different strategy to interact with or pass through the barrier posed by the lipid bilayer of the cell membrane.
Ion Channel Receptors

This is the simplest mechanism since no molecules other than the receptor are involved. The protein complex that acts as a receptor forms an ion channel; activation of the receptor by a messenger causes the channel to open. Opening the channel results in an increase in the net diffusion across the plasma membrane of the ion or ions specific to that channel. Since these receptors are found mainly in excitable tissues such as the central nervous system, the autonomic ganglia and the neuromuscular junctions, it is not surprising that movement of ions through the receptor channel results in either depolarization or hyperpolarization of neurons and muscle cells. Such signaling systems operate on a millisecond time scale necessary for the rapid transfer of information throughout the nervous system.

The molecular composition of most of the better understood receptors has been identified. These include nicotinic acetylcholine receptor (nAchR), gamma amino butyric acid receptor (GABAR), glycine receptor (GlyR), glutamate receptor (GluR), and the serotonin receptor (5HT). Using nAchR as a prototype, we can see that it contains 5 polypeptide subunits, designated as two alpha chains plus one beta, one gamma and one delta chain. The composition and arrangement of the subunits vary with the receptor type and also with the animal species. When acetylcholine (Ach) binds to sites on the alpha subunits, conformational changes occur that result in the transient opening of the central receptor channel which then allows sodium ions to diffuse from the extracellular fluid to the intracellular fluid.

These receptors, while important physiologically, have limited pharmacological application. For example, the drug trimethaphan (Arfonad) blocks nicotinic receptors in autonomic ganglia and is used in the short term control of blood pressure in hypertensive emergencies. Drugs such as pancuronium (Pavulon) and succinylcholine (Anectine) block nicotine receptors at the neuromuscular junctions and are used as adjuncts to general anesthesia during surgery or mechanical ventilation.

The GABA (subscriptA) receptor, another member of this class, is the chief inhibitory neurotransmitter in the brain. It is responsible for neuronal hyperpolarization by increasing Cl- or K+ conductance. Baclofen (Lioresal) is an orally-active GABA agonist with muscle relaxant properties (spasmolytic) that is used to treat spasticity associated with multiple sclerosis.

Benzodiazepines (e.g. Diazepam) bind to receptors at sites that are functionally different from the neurotransmit-ter sites, and binding of these drugs results in an increase in the frequency of receptor channel opening. This explains in part their anti-anxiety and antidepressant effects. The existence of specific benzodiazepine receptors strongly suggests the presence of an endogenous ligand whose function is to regulate the inhibitory effect of GABA. Its function is probably analogous to that of the endorphins in relation to the morphine receptor. So far no such substance has been definitively identified although there has been much speculation about its existence.

G Proteins and Second Messengers

This category represents by far the largest number of receptors for both exogenous and endogenous ligands. These receptors are part of a signaling system which involves three separate components. First, the extracellular ligand is specifically detected by a cell-surface receptor. The binding of the receptor in turn activates a G protein located on the cytoplasmic side of the plasma membrane. G proteins are proteins that bind guanine nucleotides with high affinity. Activated G proteins activate other plasma membrane proteins called effector proteins which act as enzymes or ion channels. The effector protein brings about a change in the concentration of an intracellular second messenger such as cyclic adenosine monophosphate (cAMP), calcium or phosphoinositides. These second messenger molecules mediate many biological processes and exert their effects by stimulating cAMP-dependent protein kinases which in turn phosphorylate other cellular elements to bring about the biological effect.

The time scale for these events is in seconds to minutes. G proteins can initiate many complex cellular responses. There are at least 16 distinct plasma-membrane G proteins and a single receptor type may be associated with more than one type of G protein. Also, each G protein may couple with more than one type of plasma mem-

Continued next page
brane effector proteins.

The receptors coupled to the G proteins are structurally related to one another and comprise a family of "serpentine receptors", so called because the receptor polypeptide chain crosses the plasma membrane seven times. Receptors for adrenergic amines such as serotonin, acetylcholine (muscarinic but not nicotinic), many peptide hormones and even visual receptors all belong to the serpentine family.

Another complicated set of second messengers involves the phospholipids called phosphoinositides. When certain G proteins are activated, they initiate the production of a membrane enzyme called phospholipase C (PLC). This enzyme hydrolyzes phosphatidylinositol-4,5-bisphosphate (PIP2) into two second messengers, diacylglycerol (DAG) and inositol-1,4,5-trisphosphate (IP3). DAG remains in the membrane where it activates cellular kinases which eventually leads to a biological response. Since inositol-1,4,5-trisphosphate is water-soluble, it diffuses through the cytoplasm and triggers the release of calcium from internal storage vesicles such as the sarcoplasmic reticulum. The increased calcium binds with calmodulin, a calcium binding protein, that regulates the activities of a number of enzymes including calcium dependent-protein kinases.

The calcium-phosphoinositide and cAMP signalling pathways oppose one another in some cells, and are complementary in others. For example, vasopressor agents that contract smooth muscle act by IP3-mediated mobilization of Ca2+, whereas agents that relax smooth muscle often act by elevation of cAMP. In contrast, cAMP and phosphoinositide second messengers act together to stimulate glucose release from the liver. It is also thought that the therapeutic effects of lithium, used in the treatment of manic-depressive illness, may be mediated by effects on the metabolism of phosphoinositides.

Much of our understanding of the biologic roles of these second messengers comes from the use of pharmacologic agents. For example, in the treatment of asthma, there are three distinct groups of bronchodilators: beta agonists, anticholinergics and xanthine derivatives such as theophylline. How do they work? Beta agonists cause increased levels of cAMP by stimulating adenyly cyclase activity; theophylline, on the other hand, increases cAMP by blocking its breakdown by phosphodiesterase. Anticholinergics cause bronchodilation by inhibiting the breakdown of cAMP.

Another second messenger, cGMP is produced in two ways, either by a membrane-bound guanylyl cyclase or by a cytoplasmic guanylyl cyclase. Increased cGMP causes relaxation of vascular smooth muscle by dephosphorylation of myosin light chains. Nitric oxide (NO), also called endothelium-derived relaxing factor (EDRF), is produced in vascular endothelial cells. It readily enters cells and brings about activation of cytoplasmic guanylyl cyclase. A number of useful vasodilating drugs act by generating or mimicking nitric oxide (e.g. nitroglycerin).

Intrinsic Protein (Tyrosine) Kinase

These receptors play a dual role in the cell by functioning as both an enzyme and a receptor. They mediate the first steps in cell signaling modulated by insulin, epidermal growth factor (EGF), platelet-derived growth factor (PDGF), atrial natriuretic factor (ANF), transforming growth factor-beta (TGF) or other trophic hormones. Intrinsic protein kinase receptors are polypeptides consisting of an extracellular hormone-binding domain and a cytoplasmic enzyme domain that may be a protein tyrosine kinase, a serine kinase, or a guanylyl cyclase. The two domains are connected by a hydrophobic segment that crosses the lipid bilayer of the plasma membrane.

When an appropriate hormone binds to the receptor, two receptor molecules undergo a conformational change and bind to one another. This brings about activation of protein kinase which in turn phosphorylates other proteins found in either the membrane or the cytoplasm. Activation of these proteins leads to the biological effect of the hormone such as a change in metabolism, growth, increased uptake of molecules such as glucose and amino acids or changes in glycogen and lipid metabolism in the cell. Because of their involvement in growth, tyrosine kinases provide an attractive target for drug development. Some compounds have been shown to be inhibitors of tyrosine kinase activity and could have therapeutic use in the treatment of neoplastic disorders (e.g. quercetin).

Nuclear or Lipid-Soluble Agents

A number of pharmacologically important hormones and drugs are sufficiently lipid-soluble to cross the plasma membrane and act on intracellular receptors that are attached to DNA segments within the cell nucleus. These include glucocorticoids, mineralocorticoids, gonadocorticoids, vitamin D and thyroid hormones. In order to perform their roles in the regulation of various homeostatic processes, these hormones act within the cell by increasing or decreasing gene transcription and protein synthesis that are on a time scale of hours to days.

This means that the gene-activating hormones cannot be expected to alter a pathologic state within minutes. For example, glucocorticoids will not immediately relieve the symptoms of acute bronchial asthma. It also means that the effects of these agents can persist for hours or even days after the agonist concentration has been reduced to zero, due to relatively slow turnover of most enzymes and proteins. Therefore, both beneficial and toxic effects will decrease slowly after the hormone administration is stopped, and there is no simple time correlation between plasma concentration of the hormone and its effects.

In summary, receptors and their signaling pathways are essential for con-
REPORT FROM THE ANNUAL CONFERENCE COMMITTEE

Shirley Mulcahy
San Diego Mesa College
San Diego, CA 92111

Following the HAPS Executive Board meeting in Chicago(January 5-7), I traveled to Toronto, Canada to meet with Henry Ruschin, a faculty member at Humber College, who is hosting the 1997 HAPS Conference. Assisting Henry with the Conference will be the Canadian Colleges Biosciences Association (CBA) and Helen Colman, a former CBA President. Henry is the current CBA Newsletter Editor.

My primary purpose in traveling to Toronto was to help Henry and Helen select the hotel for the 1997 conference. We chose the Toronto Colony Hotel which is located in downtown Toronto. Nearby are access points for the Toronto subway system and two large malls with extensive food courts. The hotel is within walking distance of the theatre district, the third largest in the world (New York and London hold the honors for the largest and second largest). In addition, the Toronto Colony Hotel is near the Skydome, home to the world champion Blue Jays. Henry and Helen have promised to make every effort to assure that the Blue Jays will play at home while we are there.

This was my first trip to Toronto, and I wanted to share some of my excitement with the rest of you. In brochures advertising the city, one can find the following adjectives being used: "sophisticated and safe," "clean and green," and "magnetic and multicultural." Toronto lies along Lake Ontario and has beaches, 100,000 acres of parkland and 20 kilometers of trails that follow the waterfront. Within a two hour drive are 108 golf courses. The city is the home of the Royal Ontario Museum and the Art Gallery of Toronto. Niagara Falls is only 90 minutes away, and Henry is planning an excursion there.

For theatre enthusiasts, like me, there is the Shaw Festival at Niagara-on-the-Lake and the Shakespeare Festival at Stratford. I am so enthralled by the prospect of attending both of the theatre festivals that I plan to spend an extra week in Ontario after the Conference. The current money exchange rate makes this doubly attractive. In January, the Canadian dollar was valued at 73% of the American dollar, meaning that American dollars buy more, and this deficit is not predicted to change before the Conference. Even better, the Canadians refund sales taxes to visitors.

Henry and his Conference Planning Committee are preparing a superb demonstration of Canadian hospitality. So begin planning now to meet us in Toronto, Ontario May 31-June 5, 1997.

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Eleventh ANNUAL CONFERENCE

MAY 31-JUNE 5, 1997
at the TORONTO COLONY HOTEL
hosted by HUMBER COLLEGE

Conference Coordinator:
Henry Ruschin
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HAPS '97
TORONTO, CANADA

The Colleges of Biosciences Association (CBA), an association in Ontario similar to HAPS, will incorporate its annual conference (also the 11th) into the 1997 HAPS Conference.

HAPS News May 1996 page 10
AN ADJUNCT: TO BE OR NOT TO BE?

Part-time teaching in colleges and universities is considered by many as a prestigious type of academic affiliation. These part-time teachers who are often referred to as part-timers, taxi cab professors or by the glorified appellation of "adjuncts" are the mainstay of many universities and colleges throughout the world. In Mexico, for example, more than three fourths of the faculty hold outside and part time appointments, and in Brazil more than one-half do. In fact most South American universities depend on part-time faculty. In Europe and the United States, the employment of part-time faculty is steadily increasing. Governments, unions, media and the research community, among others, are taking notice of the growing trend.

Gappa and Leslie (1993) in their publication The Invisible Faculty note that nationally there are 311,000 adjuncts that comprise a "shocking 38 percent of all faculty." This figure compares unfavorably to the 16.9 percent of part-timers in the general work force. The American Council of Education (Robinson, 1994) found that 53% of institutions of higher education have increased their number of adjuncts and that in 52% of those institutions, part-timers teach more than one-fourth of all courses offered. The American Federation of Teachers (AFT) has been active in organizing and representing part-time teachers. It recognizes the growing trend of hiring part-timers and deplores their "abuse" and exploitation. To remedy the problem, they have called for a strategy to organize and represent the needs of these part-time faculty.

How did this trend of hiring part-time faculty come about? Maybe it is a carryover from the financially depressed 1950's. Bowen and Schuster, in their book American Professors (1986), identify five factors that contributed to this trend during the 1970's and 1980's. They are: 1) declining prosperity of higher education, 2) staffing in a time of uncertain and rapidly shifting enrollments, 3) a glut of higher degree candidates, 4) growth of community colleges which have become heavy users of part-timers and 5) expansion of life-long learning programs. The desire on the part of administrators to manipulate the situation and to induce flexibility are major factors in this abundance of non-tenure track temporary faculty.

What are the advantages that administrators see in employing adjuncts? They do not need offices, laboratories or libraries; they only need classrooms with desks to grade papers. No insurance of any sort is offered to adjuncts, and of course, they can be dismissed without probable cause and without providing personal files in nebulous situations.

What most full-time faculty find irksome about adjuncts is that they are not part of the culture of the college community, and they have no particular commitment either to the college or to their students. They are paid to teach, not to be involved in student advising, committee work or in the multidimensional activities that make colleges and universities function. They do not function in any decision-making role on admissions and records, course syllabi and the like. On many campuses, they do not even generate the syllabi or tests administered in their classes.

What about students who are the recipients of the services provided by adjuncts? Those students cannot rely on their professors for guidance outside of the classrooms because adjuncts do not maintain office hours. Students taught by adjuncts do not have a role model since their instructors disappear immediately after class to go to their next part-time job.

Are the apparent advantages of flexibility in scheduling, low-cost instruction and scrapping on insurance costs worth the potential loss of full-timers who have a lifelong dedication to the college, its programs and its students? A whole other issue is the exploitation and abuse of hard-working part-time instructors who want to earn a decent living via college and university affiliations.

References:


Talking To Your Mitochondria Lately?

Did you bring your mitochondria to work with you today? Lewis Thomas might argue that in reality they brought you.

Have you considered that your body could be taken for nothing more than "a very large, motile colony of respiring bacteria, operating a complex system of nuclei, microtubules, and neurons for the pleasure and sustenance of their families?" Lewis Thomas has.

Have you ever tried to get in closer touch with your mitochondria? Lewis Thomas maintains that if he concentrates he can imagine that he feels them; "they do not quite squirm, but there is, from time to time, a kind of tingle."

Thoughts about mitochondria are included in a series of twenty-nine mini-essays presented by Lewis Thomas in his book "The Lives of a Cell." He suggests that "a good case can be made for our non-existence as entities. We are not made up, as we had always supposed, of successively enriched packets of our own parts. Instead we are shared, rented, occupied."

"Mitochondria are stable and responsible lodgers, and I choose to trust them. But what of the other little animals, similarly established in my cells, who are involved in sorting and balancing me, clustering me together? I like to think that they work in my interest, that each breath they draw for me, but perhaps it is they who walk through the local park in the early morning, sensing my senses, listening to my music, thinking my thoughts."

Thomas won the National Book Award in 1974 for "The Lives of a Cell." Sequels include "The Medusa and the Snail," "The Youngest Science," and "Late Night Thoughts on Listening to Mahler's Ninth Symphony." The series of books are published by The Viking Press at 625 Madison Avenue, New York, New York. I believe the above titles are all out of print, so you may have to do your shopping in used book stores. Personally, I have found them relatively easy to track down.

The Lives of a Cell addresses a wide ranging array of topics, including our attitude towards life, our obsession with disease and death, our human chauvinism, societies and organs viewed as organisms, computers, pheromones, the universal need of animals to make music and listen to it, the technology of medicine, extraterrestrial life and what we are going to talk about, human speech and the gift of language, biomythology, the social sciences, our autonomic nervous system and how helpless we would be if we were given the task of running it, the Marine Biological Laboratory at Woods Hole, and the world's largest membrane.

I would describe Lives of a Cell as a delightful blend of the biological sciences and philosophy from the perspective of a poet. Totaling 148 pages, it is ideally read one small bite at a time, followed by ample time to savour the taste and digest what you have read in a leisurely fashion. Perfect for the nightstand, a few pages of reading each night will leave you both intrigued and satisfied as you drift away into your dreams.

Vic Johnson
Madison Area Technical College
Madison, WI 53704

("The Phantom Reviewer" is on sabbatical, and Vic graciously volunteered to write the column for this issue.)

CORRECTION
HAPS ballots are due June 5, 1996—NOT June 12, 1996 as listed on the ballot.
UPDATE
WORKSHOPS

FROM THE 1995 HAPS CONFERENCE IN ST. LOUIS, MISSOURI

INTERPRETING THE LAB SKELETON

Presented by
Robert Smoes
Towson State University
Dept. of Biology
Towson, Maryland 21204

If your students are like mine, you are probably asked repeatedly: “What is the sex of this skeleton?” Like me, you may have examined the bones of the pelvis to answer that question. This workshop took an alternative approach by emphasizing gender differences in the skull. We learned that the male skull is usually larger, heavier boned and more rugged. The female forehead is more rounded, and the supraorbital ridges are medium to small. The male orbits are squared with blunt edges; the palate of the male is broad, tending toward a “U” shape. The female mandible is small with a pointed chin. Racial differences in skull anatomy were discussed as well. Following the thorough explanation, workshop participants moved around the lab sexing the various skulls on display.

As a mystery and detective story fan, I really enjoyed dabbling in forensics. Watch out “Quincy” and Kay Scarpetta (Patricia D. Cornwell’s medical examiner), I know just enough to be dangerous! And I can’t wait for the next student to ask: “What is the sex of this skeleton?”.

UNIVERSITY OF WASHINGTON MEDICAL ANATOMY MUSEUM AND IMAGING CENTER TOUR

6101 Grayson Drive
Denison, Texas 75020

Our tour group was met by Dr. Richard Brand, Assistant Dean of Medicine, who served as our guide. In the pathology and human anatomy laboratory, there were several cadavers designated specifically for medical student independent studies. For instance, a future ophthalmologist would zoom in on the eyes whereas a future neurosurgeon might dissect the brain and spinal cord in great detail.

It is indeed a museum as well as a lab; encased skulls varied from microcephalic to macrocephalic. In addition there were lungs, reproductive organs, fetuses, an Egyptian mummy and a preserved 1901 cadaver whose viscera were reversed. Key concepts such as endochondral versus intramembranous ossification could be taught using the encased feet. There were also examples of polycystic kidneys.

Dr. Stephen Petersen guided us through the imaging center and explained the functioning of the positron emission scan (PET) system. At the University of Washington (known affectionately as Wash U) the PET scanner is 100% dedicated to research. It is set up specifically to examine the head. I jokingly asked Dr. Petersen if having a PET scan might help me think straight, and he commented that the research is not that far along yet! Randy Buchner, a graduate student in the Physics laboratory, explained some of his ongoing research and procedures. He also commented that it was always nice to have a “normal brain” for reference.

The tour was educational and interesting. I am sure I speak for the dozen or so other participants when I say how much I appreciated the knowledge of our tour guides as well as their patience in answering our many questions.

Reported by
Peggy Lurie Goldman
Richfield Springs, New York 13439

SEMINAR FOR NEW A&P TEACHERS

Presented by
Bob Anthony
Triton College
River Grove, Illinois 60171

New teachers benefit from having a mentor, someone with whom they can discuss problems and solutions. As a beginning teacher, do not be afraid to say “I don’t know.” but one should add “Let’s look it up.” The importance of a proper introduction to the A & P course during the first meetings with the class was emphasized. When writing a course syllabus, be specific. Include the attendance policy, drop dates and how the grade will be determined.

Reported by
Jackie Butler
Grayson County College
Require the purchase of a textbook, list the chapters to be covered and state that assigned chapters must be read before coming to class. Besides providing detailed copies of the rules of the course, one should provide tips for success in the course. These may include ways of listening to lectures, reading the text and note-taking.

A teacher should know the student’s background. A visit to the Registrar’s Office to survey the academic background of each student can provide a useful profile for designing a successful presentation of the subject matter. Some students are parents who have been out of school for several years. Other students are training for a new career. Some students may only hold a general equivalency degree (GED) and have never taken any type of biology course. These students must be taught how to study and how to get organized for the class.

The panel discussed the extent to which teachers should become “emotionally involved” with the personal problems of students. While some underscored the importance of acknowledging the sacrifices students make to further their education, others cautioned against any inclination to alter the course standards in light of these hard luck stories. It was suggested that a teacher be aware of social and psychological problems as well as learning disabilities. Students may want to record lectures because they are auditory learners. Other students perform poorly on exams due to test anxiety. Students may not realize they have a learning disability, they just think they are “slow.”

A member of the audience brought up the problem of attendance at lab and lecture sessions. The general approach recommended by the panel was to make these sessions fully relevant to examinations and quizzes, without however, “teaching to the test.” To encourage attendance at the lecture sessions, panelists suggested that the instructor should make these sessions as attractive as possible through adoption of a reasonable but challenging pace while engaging those present in dialogue on the subject at hand. Starting each lab session with a quiz over the previous week’s work and requiring students to remain throughout the session in order to get credit for the quiz were some of the suggestions provided by panelists. Others recommended telling students that “if they leave the class early, don’t come back.” An instructor might also give bonus points for attendance.

The order in which organs systems are taught in an anatomy and physiology course was discussed. During the discussion it became obvious that some of the participants were addressing problems involved in a two-semester course while others were considering a semester of anatomy followed by one of physiology and that the two courses called for quite different arrangements. The consensus was that unless the instructor has received specific directions from the administration, one should more or less stick to the order adopted by the author of the text with the list of subjects divided in equal halves. In addition it was noted that an instructor should not slavishly attempt to cover everything in the text.

There was a lively debate on the advisability of returning course examinations to the students after the examinations have been corrected and the grades recorded. We even had two members from the same household holding opposite positions on this issue. The strongest argument in favor of returning them lay in the hope that the student, if provided with the annotated copy of the test, would take the time to go back and fill in the gaps in knowledge demonstrated by the test score. The strongest arguments in favor of the teacher retaining the tests came from a consideration of the time and effort required to prepare a comprehensive, fair and confidential examination—not only for make up examinations, but for subsequent semesters as well. If none of the students have a copy of the old tests, it is a leveling factor.

Reported by
Gregory Gillis

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Bunker Hill Community College
Boston, Massachusetts 02129
Mary Lou Percy
Navarro College
Corsicana, Texas 75110

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CORE CURRICULUM AND ASSESSMENT COMMITTEE REQUESTS MEMBERSHIP INPUT

The Core Curriculum Committee requests input from the Society members in order to accurately define the current status of the student laboratory component of an anatomy and physiology course. HAPS members who are willing to invest about twenty minutes of their time in filling out a questionnaire, are asked to participate by writing, calling or faxing the Chair of the Core Curriculum Committee for a copy of the questionnaire. Please contact:

Ronald Carlin
Dept. of Biological and Allied Health Sciences
Fairleigh Dickinson University
285 Madison Avenue
Madison, NJ 07940
Phone: (201) 443-8748
Fax: (201) 443-8766

YOUR INPUT IS ABSOLUTELY ESSENTIAL TO THIS WORTHWHILE UNDERTAKING!

HAPS News May 1996 page 14
In the first two installments, I discussed putting together a maintenance kit and preventative maintenance of the monitor. This article will cover preventative maintenance of the keyboard. *I feel it necessary to remind you that these articles are aimed at the novice.* None of the steps will involve actually opening the case or doing anything with the internal parts. That would be at least “intermediate level” maintenance, which may be covered in a future series.

A keyboard quickly becomes grimy through daily use. Dust falls on it and oils from fingers collect and combine with the dust. Dust also slips through the spaces between the keys and the keyboard case and will eventually cause problems such as sticking keys, bouncing keys or keys not making contact.

You can delay the onset of keyboard problems by simply keeping the keyboard covered when it is not in use. You may purchase a commercial keyboard cover, but a clean, lint free cloth will work just as effectively. Keeping the keyboard covered will not fully protect it since dirt, dust and body oils accumulate with use. Therefore, it should receive occasional cleaning. How often? That depends on how quickly it becomes dirty! I vacuum my keyboard every other month and thoroughly clean it about 3 times a year.

**CLEANING THE KEYBOARD**

*First turn off the computer; I cannot say this often enough.* Use a vacuum cleaner with a narrow nozzle or the soda straw trick that I discussed in my first article (November, 1995) to vacuum carefully between the keys as well as between the keys and the keyboard case. You are trying to suck out all the dust and dirt that has fallen into the case, so move the nozzle slowly to pull as much out as you can.

Moisten a soft, lint-free cloth with liquid cleaning solution (90% isopropyl alcohol) and wipe down the keyboard case. Turn the cloth often to ensure that clean areas of the cloth are being employed. The liquid cleaning solution is very effective at removing body oils plus anything adhering to the oils. Make sure the cloth is only moistened, not dripping, as you do not want liquid dribbling down between the keys and into the keyboard case.

Dip a foam swab into the cleaning solution; *squeeze the foam until it is almost dry;* and use it to clean the surfaces of the keys where dirt and oils have accumulated. Dry the keyboard case and keys

*Continued on page 18*

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**Human Anatomy and Physiology Regional Conference**

*Saturday, October 19, 1996*

**Delaware Technical and Community College**

*at the Jack F. Owens Campus*

*Georgetown, Delaware*

Some of the topics being planned include identification of human remains by way of mitochondrial DNA. Lots more.

We are located about 20 minutes from the ocean and fall is a great time to visit the area. Plan to stay for the weekend and enjoy a jazz festival, many new factory outlets, a ferry ride to Cape May or just a quiet walk on the beach. It’s a chance for some great family time or a chance to get away from it all — and attend a HAPS conference!

More information to come, but fall will be here before you know it and you might want to make plans now. Additional information:

**Coordinator:** Barbara Wiggins

*Delaware Technical and Community College*

*P.O. Box 610 Route 18*  
*Georgetown DE 19947*

**Phone:** (302) 856-5400 x 217  
**Fax:** (302) 856-5758

**Email:** bwiggins@outland.dtcc.edu
Teaching Tips

THE SELECT REFERENCE POINT MODEL: An Interface Between Physiology and Problem-Based Learning

Submitted by
C. Dean Johnson, Jr.
Houston ISD
3519 Stanford
Houston, TX 77006

I developed a visual model for learning physiology that has been effective in my classes, and I would like for HAPS members to try it in their classes and provide feedback. My interest in developing the model was aroused about six years ago by a comment from a premed student who said that he learned junior-level college physiology by comparing normal physiology with pathophysiological conditions. Later another premed student told me that visual diagrams of concepts gave him an overall view of the knowledge to be learned. Consequently, I began drawing graphic designs that related disease signs and symptoms to underlying physiological mechanisms.

I have since come to understand that many times scientific knowledge begins with specific cases and that scientific principles are derived from repeated observations (Campbell, 1993). Students learn general principles in the classroom. In the real world, they often have difficulty applying such broad concepts to specific situations because the conditions under which the laws were derived are not necessarily the same. It is no wonder that medical schools are using problem-based learning approaches to teach medical principles!

Problem-Based Learning and The Selected Reference Point Model

Problem-based learning (PBL) is one attempt to provide students with opportunities to relate specific examples found in the real world to general principles in textbooks. Barrows (1980) describes PBL as learning that occurs in the process of seeking problem solutions. However, a systematic approach to case study analysis may be needed in effective PBL approaches.

A systematic approach to PBL should be rooted in anatomical and physiological concepts. In physiology, for example, the nervous and endocrine systems maintain homeostasis through positive and negative feedback loops (Tortora & Grabowski, 1993). Feedback loops may be illustrated in the following general feedback mechanism pathway:

Stimulus→Receptor Afferent Pathway→Control Center→Efferent Pathway→Effector→Response→Feedback→

Many individual feedback systems operating together maintain the complex phenomenon of life. Complex phenomenon may be understood using models. The Select Reference Point Model (SRPM) (Johnson, 1994) is one attempt to relate signs and symptoms (SS) to pathophysiological processes using the general feedback system pathway. The textbook name of the disease (or syndrome) lies at level one. A homeostatic control center (nervous or endocrine system) related to the disease is included in a level two target. The disease-related local target (effector producing a local response) is also identified at level two. The body usually responds both locally and systematically to the stress of a disease state. Therefore, local and systemic pathophysiologies related to a local target and control center are included at level three. At level four local and systemic SS may be sorted into local outcome and systemic outcome categories. It is likely that distinguishing between local and systemic SS reduces confusion and allows comparisons to understand background pathology. When local and systemic signs and symptoms are categorized, inferential thinking may identify a common factor, level five, to understand feedback dysfunctions that underly expressed signs.

![Figure 1. The Select Reference Point Model Pattern.](Continued next page)
and symptoms. The common factor lies at the "crossroads" of systemic and local stress responses and may balance both mechanisms under normal conditions. At level six a therapy to reduce the effects of defective feedback mechanisms may be identified. The notion is that a particular therapy should reduce local and/or systemic signs and symptoms and provide support for a sound hypothesis. Figure 1 shows the pattern of the SRPM:

Double arrows in the SRPM design signify that "top-down" or "bottom-up" information processing approaches are possible. Top-down approaches may require deductive thinking and bottom-up approaches may trigger inductive thinking.

Teaching/Learning Applications

Concepts from SRPM may be used by physiology teachers to write case studies. Last year I wrote three case studies involving unconscious patients which were used in biology I and anatomy and physiology I classes. My students were instructed to read the case studies, write concepts in nodes of an uncompleted SRPM, compare their graphic designs to teacher-made designs, and identify the cause for the patient being unconscious. Most students performed this assignment successfully. One licensed vocational nurse correctly noted that the SRPM should not be used to diagnose diseases. Indeed, a SRPM for any disease should not be mechanically applied to real people. Rather the purpose of an SRPM is to expose students to visual patterns as an aid in differentiating among similar diseases. Ideally, students should make their own SRPMs from case studies. I feel students' efforts to extract clinical cues and relate them together through a common factor will pay off later in the clinic.

I have also used the SRPM to help students prepare for examinations in medical/surgical nursing. One student told me after the test that the SRPM helped her categorize parts of a whole and understand the function of each part. Recently two colleagues and I used the SRPM in a study technique seminar to help dental students studying for board examinations. We presented case studies accompanied by SRPMs. Students reacted favorably at the end! I also recall one premed student saying that graphic designs such as the SRPM were particularly useful in understanding complex material. Students usually do not need help with simple concepts.

Summary

In brief, I'm convinced that the SRPM helps beginning physiology students learn complex material and upper-level students connect physiological concepts to real-life cues. I sometimes imagine students pursuing knowledge down an "information highway" in need of a rest stop to enjoy the scenery. Perhaps case studies and visual graphic designs would give them a chance to digest the material. My mind returns to the statement "perception is thinking, and thinking is perception." Why not develop thinking along with perceptions using the SRPM?

SRPM Design: The Stress Response

Selye's (1956) stress model includes both General Adaption Syndrome (G.A.S.) and Local Adaption Syndrome (L.A.S.) components. The G.A.S. corresponds to the control center in the SRPM and the L.A.S. relates to the local target in the SRPM.

When a common factor is identified, a therapy for the pathology may be prescribed. Figure 2 illustrates a stress response using the SRPM.

References


Johnson, C.D. Examining students' beliefs and critical thinking in food choices using planned behavior and prospect theories. Unpublished doctoral dissertation. The University of Texas At Austin, Austin; TX; 1994.


Figure 2. SRPM: Stress Response. *Note that nervous system invoked histamine release in the stomach overrides a negative feedback mechanism that attenuates HCL secretion with decreasing acidity.
The Internet provides excellent resources. Medical school home pages often contain outstanding teaching modules directed toward students or toward patients. Some support organizations, focused on a particular disorder or disease, maintain web sites. Other sites relate art and history to anatomy and physiology.

Several search engines are available to locate topics of interest. Netscape® offers Netsearch® and several others. A customized search page can be created with Search.com®; it contains an assortment of search engines. Yahoo® and its link to OpenText® are particularly useful tools. In most cases, typing a few key words into the search box will return a list of topics related to the search query. Some search engines rank the returned topics by probable relevance to the initial query.

Want to know more? Try some of the following addresses. But be careful! Many addresses are case sensitive, and spelling and punctuation are critical. If the first attempt to access a site is unsuccessful, check for typographical errors and try again. Alternatively, try searching with a keyword. Have fun, but beware. Time disappears as interest builds. Another link to a related site appears. Addiction occurs quickly. Making just one query and staying at just one site is more difficult than eating just one potato chip.

Search Engines:

Search.com®
http://www.searchcom.com/
Yahoo®
http://www.yahoo.com/
Lycos®
http://www.lycos.com

History and Art:
Vesalius: This site includes illustrations from Fabrica, and provides a brief biography of Vesalius.
http://weichlengkapenschulewien.at/homepages/warren.html

DaVinci: Some of DaVinci’s anatomical illustrations are found here:
http://cellini.leonardo.net/museum/north.html#start

Physiology in Space:
NASA: NASA provides brief descriptions of the effect of space travel on several body systems and their functions. Effects on the musculoskeletal, respiratory, immune, neurovestibular, cardiovascular and fluid recycling systems are described on separate pages.
http://medlib.jsc.nasa.gov/intro/humans.html

Medical Imaging:
Mallinckrodt Institute of Radiology, Washington University Medical Center: Bone scans, thyroid scans and other medical images can be seen on this site. Medical school level descriptions of the test procedures, cases with diagnoses and cases as unknowns are available.
http://gamma.wustl.edu/home.html

Beth Israel Hospital, Harvard Medical School: Patient teaching level descriptions of common medical imaging techniques are provided.
http://www.bih.harvard.edu/80/radiology/Modalities/Nucmed/nucmedSubdivs1/

Teaching Modules:
Stanford University Medical School: Stanford University and the University of California at San Francisco, Divisions of General Internal Medicine cooperate to maintain this site. The pages of the site provide teaching modules for medical students. Each module is detailed and includes case studies, lab tests and references. Among the topics are chronic obstructive lung disease, hypertension, hyperthyroidism and lipid disorders.
http://www-med.stanford.edu/MedSchool/DCIM/Teaching

Forensic Anthropology:
University of Montana, Missoula: Dr. Randy Skelton’s (no kidding!) notes and detailed information related to determination of age, gender and race based on skeletal remains are found at this site. Good descriptions of bone histology, bone growth and bone chemistry are also included.
http://grizzly.umt.edu/anthro/class/anth464.html

Skeletal Explorer System: Dr. John Blank and others developed a computerized system to teach important aspects of skeletal anatomy. Sample images are included.
http://bones.asic.csbio.io/sem/skel.htm

Disorders:
Arthritis: The structure of a synovial joint is described here, and an excellent review of the types of arthritis and their treatments is provided.
http://www.fda.gov/bbs/topics/CONSUMER/consumer0099.html

Epilepsy: Extensive information about all aspects of epilepsy and links to other sites are located at this site.
http://www.swcp.com/~dif/epilepsy/index.html

Input/Output
continued from page 15

with a clean, dry and lint-free cloth. Make sure the keyboard is completely dry before you plug in the computer and turn on the power.

Even with preventative care, the keyboard may develop sticky keys, bouncy keys or keys not making contact. At that point, the keyboard case will have to be opened for a deeper cleaning. However, that is beyond the scope of this article. Use of the above procedures will greatly extend the time before this deep cleaning is required.

Well, this article is short in words, but the work it details will take a little time to carry out. Lots of keys to clean. In the next installment we will take a look at the computer “box.” Until then, pamper your keyboard, and it will repay your attention with extended service.
HAPS News is the official newsletter 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 $20. 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!

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DEADLINES FOR SUBMITTING MATERIAL TO HAPS News: June 1 (August issue); September 1, (November issue); December 1 (February issue); March 1 (May issue).

Cover design by Tobye Rae Nelson of Nelson Graphics.
A NEW ERA IN THE STUDY OF HUMAN ANATOMY HAS ARRIVED.

THE DISSECTABLE HUMAN CD-ROM
Engineering Animation, Inc.
April 1996 (Macintosh 0-8151-3057-0; Windows 0-8151-8658-4)

For the first time, a non-destructive, infinitely reusable human cadaver dissection program is available for students of anatomy and physiology. THE DISSECTABLE HUMAN CD-ROM uses three-dimensional visuals to interactively illustrate the complex relationships between anatomical structures and their functions in the human body. Be sure to attend EAI's multimedia session at the June HAPS meeting in Portland. You'll see the unveiling of THE DISSECTABLE HUMAN CD-ROM -- the first systems-based presentation of digital photographic human anatomy. For more information on this innovative software, contact your local Mosby or Wm. C. Brown representative.

CMA111

Mosby