Contributed Papers

I.1. Teaching Infectious Disease by the Case Method
Cathy Hunt and Mary Ann McMurray, Dept. of Biology, Henderson Community College, Henderson, KY 42420
Students in allied health care come to medical microbiology with one very usable resource—a very keen interest in the infectious diseases. In an effort to tap this interest early in the semester, use it to teach key microbiology concepts, and avoid the endless teacher-centered presentation, we have developed and implemented a series of 25 case studies. Students “solve” these cases in small groups and present their solution to the class. The cases are written to introduce concepts of pathogenesis, epidemiology and laboratory diagnosis. Critical questions which accompany each case allow students to begin to learn concepts which are usually not dealt with until late in the semester. We will share results of this approach and present sample cases. We welcome others to bring and share their uses of cases or other problem solving techniques in the teaching of biology.

I.2. Developing and Implementing an Inservice Program in Biotechnology for Secondary Science Teachers
Karen Klyczek; Biology Department, University of Wisconsin, River Falls, WI 54022
The results of a three year, National Science Foundation sponsored project to conduct inservice programs in biotechnology for secondary science teachers will be presented. The project involved a three week summer workshop designed to enhance the teachers’ backgrounds in biotechnology and to provide them with the time and resources to develop new classroom activities. We will share tips on planning, including conducting needs assessment and forming alliances between school districts and local colleges, and discuss the impact of such projects on the teachers, their students, and the college faculty involved.

I.3. Organizing a Tropical Ecology Course
David J. Hicks, Biology Department, Manchester College, N. Manchester, IN 46962
Students are strongly interested in the biology and environmental problems of the tropics. This presentation will describe the development and structure of a tropical ecology course taught in Costa Rica, Central America. Tips on getting started in tropical biology, finances, logistics, and course structure and activities will be included.

I.4. How to Win at Science Fairs
Rudolph Prins, Department of Biology, Western Kentucky University, Bowling Green, KY 42101
This is a prototype of a workshop to be presented to precollege teachers of science. All college professors who have judged science fairs realize that most of the entries display very little science. Given the publicity of scientific illiteracy in America and the pressure to affect a change, courses and curricula are being reassessed and changed. College professors can facilitate the process of change by helping precollege teachers become more sensitive to good science. This workshop will be presented as a potential model of the kind of workshop that could be given in local areas. The goal of this presentation is to solicit your input for any modifications that would make this model most effective for precollege science teachers.

II.1. Regional Science Fairs
Ray Reed, Department of Biology, Jefferson Community College, Louisville, KY 40201
Interest in science can be developed in students at an early age. Science teachers in institutions of higher education should maintain a liaison with teachers in the elementary and high schools within the community. Regional science fairs provide a means whereby precollege students, under the guidance of their teachers, can develop science projects during the academic year with an emphasis on scientific methods and principles. Students later exhibit their projects and compete for prizes and scholarships. Much work is involved in developing and conducting science fairs but the benefits can be measured.

II.2. Mountain Ecology: A New Field Course at Loras
Tom Davis, Department of Biology, Loras College Dubuque, IA 52004
A successful field ecology course for upper division students at Loras will be presented.
Logistics, student activities, methods of evaluation, altitudinal adaptations and general discussion of field courses will be included. This course included 10 undergraduates, 1 instructor and several guest lecturers along the way to investigate the effects of altitude, temperature, soil, geology and wind on plants and animals in six different mountain ranges in Wyoming and South Dakota.

II.3. Interaction of Mouse Peritoneal Macrophages with Malignant Tumor Cells

David Thomasson, Biological and Physical Sciences, Fontbonne College, St. Louis, MO 63105

While research by several laboratories has examined various lymphokine-mediated macrophage functions, little is known about the interaction between these lymphocyte-derived products and their macrophage targets. We have explored the interaction between one of these products, macrophage activating factor (MAF), and murine peritoneal macrophages. Results from our laboratory, and previously shown by others, indicated that non-tumoricidal macrophages obtained from thioglycollate-injected mice can be activated to a tumoricidal function by pulse-incubation in lymphokine-enriched medium. However, we have shown that its activation mechanism is inhibited by 0.1 M concentrations of the amino sugar, N-acetyl-D-galactosamine. No decrease in viability was noted among macrophages which were pulse-activated in the presence of the inhibitory sugar. Further, long-term cultivation of macrophage colonies was not affected by N-acetyl-D-galactosamine. The addition of N-acetyl-D-galactosamine to cultures of previously activated macrophages and tumor cells had no effect on macrophage-induced tumoricidal actions. A 0.1 M solution of the structurally-related saccharide, N-acetyl-D-glucosamine, did not prevent activation of these cells. Also not inhibitory were L-fucose and L-rhamnose, previously shown to inhibit guinea pig and human migration inhibition factor (MIF) which several believe to be identical with MAF.

III.2. Comparing the Scopes Trial of 1925 with the Little Rock “Balanced Treatment” Trial of 1981

Neil M. Baird, Department of Biology, Millikin University, Decatur, IL 62522

The Scopes trial, held in the little town of Dayton, TN, brought world-wide attention to the issue of creationism/evolution. Discussion of scientific and constitutional issues was not allowed at Dayton. It seemed to be a matter of science on one side and religion on the other side of the issue. Years later at Little Rock, a thorough analysis of the interacting scientific, religious, constitutional, and educational issues was permitted. Although most laypersons (and science teachers) are not aware of the expert testimony presented at the trial, knowledge of these arguments provides an excellent opportunity to better understand the issue today.

III.3. Hypermedia in Biology Education

Mark Bergland, Department of Biology, UW-River Falls, River Falls, WI 54022

Information will be provided on how to develop hypermedia software for use both inside and outside the classroom, with emphasis on biological examples. Hypermedia computer simulations
give students instant access to a variety of electronic information including computer animation, written text, and video, all accessed by "clicking" or "dragging" screen icons with the computer's mouse.

A hypermedia simulation of plant cell division was developed at UW-River Falls and evaluated by Introductory Biology students and Cell Biology students. This highly interactive program, developed using Macromind Director authoring software, enables students to guide a plant cell through the stages of cell division. Corresponding video footage of division in an actual plant cell is available at any time via a laserdisc player interfaced with the computer. Student reaction has been very favorable, and a proposal to develop experimental simulations for use in cell biology and biotechnology courses has been funded by the National Science Foundation. Some of these new simulations, including patch-clamp studies of ion channel function, will also be demonstrated. These programs develop critical thinking skills by enabling students to collect data and test hypotheses.

Video compression/playback software (such as QuickTime) will also be discussed, along with a comparison of the CAV and less expensive CLV videodisc formats. For example, Voyager Videostack software has been used to easily incorporate CLV laserdisc control into Hypercard stacks for use in ornithology lectures and quizzes.

III.4. The Teaching of Reading and Studying Biology Textbooks

Rodney Foth, Department of Biology, University of Dubuque, Dubuque, IA 52001

College biology students require special skills to acquire and retain information presented to them through textbooks; unfortunately, many students to not adequately possess these skills. Instructors of college biology courses may be frustrated with students lacking these skills and uncertain as how to remedy this. They may also assume incorrectly that including information for assisting students in correcting this problem will decrease time for traditional course content. This presentation demonstrates how to teach students to read and study biology textbooks while not losing content presentation time for the instructor.

IV.1. "Pass the Videocam, Please"

Ethel Stanley, Department of Biology, Millikin University, Decatur, IL 62522.

Extending video technology to students in the classroom, lab and field has some surprising results. From video specimen collection in field biology to student generated "commercials" during lecture, there are a 1001 uses for this remarkable tool. Share ideas with us as we offer samples of our favorite video projects!

IV.2. Methods of developing student awareness of ethics and their role in decision-making biology

Terry L. Derting, Department of Biology, Murray State University, Murray, KY 42071

Students are well aware of a multitude of controversial biological issues in today's society. Students are also well aware that they have a personal view with respect to most of these issues. However, a surprisingly small number of students can identify the fundamental ethics upon which their views and actions are based. Most frequently, the concept of an ethic is confused with opinions that vary from situation to situation. I will discuss methods of assisting students in developing an awareness of their fundamental ethics, which are non-situational, and how these ethics relate to an individual's situational opinions and actions. Specifically, I will present the various "stages of ethical development" that most students progress through as they consider bioethical issues and their personal views and ethics. Knowledge and recognition of these stages can enhance a teacher's ability to assist each other in a manner that is best suited to that stage of a student's ethical development. Methods whereby specific bioethical issues can be examined by students will also be discussed.

WORKSHOPS

W.1. Fast Plants for Slow Biologists

Timothy Mulkey, Department of Life Sciences, Indiana State University, Terre Haute, IN 47809

During the past seven years, rapid cycling Brassica plants (RCB) have been introduced as a model plant in botany teaching laboratories. RCB seed to
seed generation time is 28 days. Thus this plant provides an ideal tool for the study of plant growth, development, anatomy, genetics, and embryology. Hands-on use of fast plants in the teaching laboratory will be explored. Participants will perform a series of experiments to explore the range of laboratory experiences available with RCB. Sample laboratory exercises, hand-outs, and a variety of take-home materials will be provided.

W.2. Using HUMAN to Teach Human Physiology
Pat Bowne, Department of Biology, Alverno College, Milwaukee, WI 53215
HUMAN is a computer program (Coleman and Randall) which simulates changes in over 200 physiological variables when the human's system is perturbed by exercise or disease. With this program, students can perform experiments ranging from exercise physiology to long-term renal or cardiac disease, observing compensatory changes and administering treatment. I will present several laboratories and an assessment based on this program.

W.3. So You Want to Use Multimedia?
Hands-on Workshop
Claire A. Rinchart, Department of Biology, Western Kentucky University, Bowling Green, KY 42101
A demonstration of the various sources that can be included in a multimedia presentation will be followed by hands on development and presentation of multimedia projects by small groups of participants. Sources of material will be drawn from video, laserdisc, CD-ROM, sound, animations, and QuickTime movies.

W.4. Digital Video Microscopy
Robert Blystone, Department of Biology, Trinity University, San Antonio, TX 78212
At Trinity University students are employing digital video microscopy in what were traditional microscopy courses: Developmental Biology and Microanatomy. This technique allows students to turn descriptive microscope laboratory exercises into interactive inquiry-based investigations. The workshop will demonstrate examples of student activities involving low-cost digital video microscopy. Activities include image capture, image enhancement, image quantification, statistical evaluation, and question development. A hands-on, three-dimensional reconstruction will be performed using public domain software. The goal of the workshop is to provide the attendees with applications for their own instructional environment.

POSTER SESSION

P1. Problem Solving Sets and Clinical Case Studies: A Nontraditional Approach to the Undergraduate Biochemistry Experience
Kaela, Rose Thomasin, Vought, Walker and Wilson, Biological and Chemistry Section, Purdue University North Central, Westville IN 46391
A nontraditional education approach to an undergraduate biochemistry course has been initiated on an experimental basis at PU/NC. This approach utilizes problem solving sets and clinical case studies as the central learning tool for evaluating biochemical phenomena, as opposed to the traditional pursuit of memorizing biochemical structures and pathways for purpose of examination. Under the direction of and with assistance from the instructor, students work on and discuss the problem sets and case studies, enhancing their understanding of biochemical concepts and applications, while fostering problem solving and critical thinking skills. The process and outcome assessment of this educational endeavor are presented by the undergraduates involved.

P2. Using "On-Hand" Transducers with the Macscope Analog-to-Digital Microcomputer Interface for Physiological Exercises
Steven H. Mills, Department of Biology, Central Missouri State University, Warrensburg, MO 64093
Chart recorders are rapidly becoming obsolete in the physiology laboratory due to the limited graphical and analysis possibilities with chart recorder output. A multi-channel analog-to-digital converter used with a microcomputer permits data to be transferred directly to the computer. Undergraduates using the "Macscope system" during physiological exercises found it to be easier to use, more precise for measurements and review of specific portions of the waveform, able to print out sections of the waveform, better able to eliminate noise in signals, and able to transfer data to graphical and analysis software.