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Let us know if you want to continue your subscription to the "Iowa Biotech Educator." We are in the process of updating the mailing list for the "Iowa Biotech Educator." If you did not complete the special page at the end of October's "Educator," please do so. If you misplaced the October issue, you may respond directly to the Office of Biotechnology, 1210 Molecular Biology Building, Iowa State University, Ames, IA 50011, telephone 515-294-7356 or 1-800-262-0015, ext. 7356 (in Iowa), FAX 515-294-4629, or e-mail x1lacy@exnet.iastate.edu. The next issue will only be sent to those persons who indicated they want to receive it.

National FFA Foundation Helps Students Prepare for a Biotech Future

The National FFA Foundation, through a grant from the U.S. Department of Education and with matching funds from industry, has developed voluntary skill standards to guide students in their educational programs and to assist educators in developing agricultural biotechnology curricula to meet industry needs.

To order a free copy of the "National Voluntary Occupational Skill Standards: Agricultural Biotechnology Technician," send your request to: National FFA Organization, Attn: Distribution Services, PO Box 15160, 5632 Mt. Vernon Memorial Hwy, Alexandria, VA 22309.

Three Iowa Teachers Lead in Access Excellence Program

In the spring of 1994, Kevin Brasscer, South O'Brien School, Paullina, Jeffrey Weld, Pella High School, and Tina Schmitt, Dowling High School, Des Moines, were selected to become part of a group of 100 Access Excellence Fellows from all over the United States. They were selected based on their demonstrated capabilities and interest in advancing the state-of-the-art of secondary school biology education.

Access Excellence is sponsored by Genentech, Inc., a South San Francisco-based biotechnology company. G. Kirk Raab, Genentech President and Chief Executive Officer, explained, "The private sector has a responsibility to support science education in America if we are to maintain the unparalleled scientific strength that brought this country to its leadership position in biomedical research over the past decades. This program reflects our commitment to that goal by facilitating what is one of Genentech's highest priorities, scientific excellence." The program was developed with the assistance of many leading national scientific and educational organizations.

The three Iowa teachers attended an Access Excellence Summit last summer where they received a laptop computer and were given special training on the use of America Online and the Internet. Weld says, "Being part of Access Excellence makes us feel 'connected' to our peers. We worked with regional teachers from the north central area of the U.S. to collect data on leaf color changes and are working to collect data on flu epidemics now. It's fun for our students to get involved in projects. The best ideas from teachers participating in the Access Excellence computer network will be distributed free to biology teachers in the U.S. If you have American Online connections, check out this program under the keyword EXCELLENCE."}

Publications Free to Educators for the Asking

If your students are interested in biotechnology throughout the world, you may wish to subscribe to "Biotechnology and Development Monitor." The Monitor is produced in cooperation with the African Center for Technology Studies, the Research and Information System for the non-
aligned and other developing countries (India), and the Instituto Interamericano de Cooperacion para la Agricultura (Costa Rica). Its focus is on applications of biotechnology in developing countries and economic and social issues. It includes editorials, articles on policies, problems, research, new technology developments, and book reviews. The editor is Professor Gerd Junne, Dept. of International Relations and Public International Law, University of Amsterdam, Oudezijds Achterburgwal 237, 1012 DL Amsterdam, The Netherlands. It is a quarterly publication. Another publication, you may wish to order is "Biotechnology Notes." This is a United States Department of Agriculture publication. It includes brief descriptions of current biotechnology research, policy issues, and trends in agricultural biotechnology. This monthly publication is edited by Marti Asner, United States Department of Agriculture, Office of Agricultural Biotechnology, Rosslyn Plaza East, Rm. 1001, 14th and Independence Ave., S.W., Washington, DC 20250-2200. A free electronic newsletter, "Bio/Technology/Diversity News Bulletin," includes items related to biotechnology and biodiversity. Topics include patenting, regulation, legislation and finance. Both domestic and international news are covered. Its editor is Michelle Thom, Institute for Agriculture and Trade Policy, 1313 5th St. S.E., Suite 303, Minneapolis, MN 55414 (e-mail: mthom@igc.org). Ethical and policy issues related to both agricultural and medical biotechnology are the focus of the "Center for Biotechnology Policy and Ethics Newsletter." Each issue features one or more pieces or recent discussion papers available from the Center and other items relating to biotechnology, genetics and bioethics coverage in the media. This bimonthly publication’s editor is Susanna Hornig, Institute of Biosciences and Technology, Texas A&M University, 329 Dulie Bell Building, College Station, TX 77843-4355. Biotechnology in Europe is covered in the "European Biotechnology Information Service Newsletter." The newsletter provides coverage of biotechnology policies, legislation, activities and research developments throughout the European Communities. Each issue features an editorial and news items. Its editors are M.F. Cantley and M. Lex, European Biotechnology Information Service Newsletter, Commission of the European Communities, CUBE, DGXII/F-1, Rue de la Loi, 200, B-1049, Brussels, Belgium. "NABC News," is published by the National Agricultural Biotechnology Council, a consortium of not-for-profit research and extension organizations whose main purpose is to serve as an open forum where all viewpoints are considered. Its editor is June Fessenden MacDonald, National Biotechnology Council, 159 Biotechnology, Cornell University, Ithaca, NY 14853-2703. The Saskatchewan Department of Agriculture and the Canadian Institute of Biotechnology publish "Agbiotechnology Information Bulletins for Schools." These non-technical features are directed towards students. To be put on the mailing list for these bulletins, contact Dr. Murray McLaughlin, President, Ag-West Biotech Inc., 222 - 111 Research Drive, Saskatoon, Saskatchewan, Canada 57N 3R2. A pamphlet is available to let the public know more about the advances in food production that modern biotechnology will make possible, as well as how these advances will be regulated to ensure safety. The brochure emphasizes the roots of agricultural biotechnology in traditional farming and food production and highlights the value and benefits of future product applications. It provides a brief summary of regulatory policy and issues. To order a complimentary copy of the 12-page educational brochure, "Food Biotechnology - Health and Harvests for Our Times from the International Food Information Council (IFIC)
Foundation," send a self-addressed stamped envelope to: Food Biotechnology, PO Box 1144, Rockville, MD 20850.

Information on these free publications came from the Biotechnology Information Center, an information center of the USDA National Agricultural Library, 4th Floor, 10301 Baltimore Blvd., Beltsville, MD 20705-2351. Telephone 301-504-5947 or 301-504-6875. FAX: 301-504-7098. Internet: biotech@nal.usda.gov. You may ask the Information Center for its list of miscellaneous publications, many of them free to educators for the asking, other newsletters, bibliographies, and audio-visuals that can be used in the classroom. To access the Biotechnology Information Center's gopher, gopher to: gopher.nalusda.gov select Information Centers --> Biotech Info Center Or alternatively gopher to: inform.umd.edu select Education Resources --> Resources by Topic --> Ag and Environ --> Biotech Info Center

IOWA SCIENCE TEACHERS ATTEND LEADERSHIP INSTITUTE

Iowa high school biology teachers, Douglas Herman, East High School, Sioux City, and Lee Killpack, Tri-Center Community Schools, Neola, attended a Leadership Institute at Cold Spring Harbor Laboratory in Cold Spring Harbor, NY, last summer. The institute, sponsored by a National Science Foundation grant, drew together innovative teachers from 18 states, Sweden, and Australia. Teachers were chosen to participate based on their experience in molecular genetics and curriculum development. They are expected to function as regional genetics resource persons and to conduct a minimum of 30 hours in-service instruction for elementary and secondary teachers in their regions.

According to Herman, "The Leadership Institute encompassed 160 hours of advanced laboratory experiments, scientist seminars, computer explorations, leadership training, classroom observation, and independent projects. We participated in an interesting informal question-and-answer period with the Laboratory’s Director, James D. Watson, who shared the Nobel Prize for the discovery of the structure of DNA." Herman stated, "Most of the lab work we did at the Institute will not be easy to duplicate in the high school setting given the time, money, and materials available. I do have some ideas that I will try though and, if they work, I will share them with other teachers through the Iowa Biotech Educator." For further information, you may contact Herman at East High School, 5011 Mayhew Ave., Sioux City, IA 51106, phone 712-274-4000, fax 712-274-4002.

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EXTENSION YOUTH SPECIALISTS BRAINSTORM POSSIBILITIES FOR BIOTECHNOLOGY PROGRAMMING Youth Field Specialists, Sheila Manley, Lori Grimoskas, Barb Sauser, and David Seilstad, County Extension Educators Dennis Johnson, Cheryl Heronemus, and Sue Delaney, and Livestock Specialist Dennis DeWitt are developing extension programs for junior high/middle school students with Chuck Morris, Associate Director to Youth and 4-H Programs. These individuals have attended biotechnology workshops at Iowa State University to familiarize themselves with biotechnology products and various laboratory exercises. According to Morris, "They see biotechnology as becoming a cutting edge opportunity for young people and their possible future career choices. They know it is already impacting everyday life and feel it is important to start informing youth early in their lives about the important subject." The group met on campus in September and November and decided they want to work on a notebook filled with biotechnology projects. They want to work with other extension specialists trained in biotechnology, teachers, and volunteers to get the word on biotechnology out to junior high/middle school students. They will look at how biotechnology careers,
bioethics and current developments in biotechnology can be introduced most effectively to these students. They want to be as adept at doing the experiments with students as they are with explaining the significance of the procedures. The group plans to include bioethics in their program. They have asked Gary Comstock, Director of Bioethics at Iowa State University, to write some biotechnology case studies to help students discuss the ethical aspects of biotechnology. This group of enthusiastic youth leaders will meet again at Iowa State University on February 8th and 9th to discuss their progress and make further plans.

COMMUNITY COLLEGE TEACHERS DISCUSS STRATEGY TO INCLUDE BIOTECH IN THEIR COURSES

In October, a group of biology teachers from community colleges throughout Iowa met at the Des Moines Area Community College in Ankeny to discuss changes in curricula that are needed to prepare students for careers related to biotechnology. Beryl Packer, a DMACC biology instructor was the organizer of the meeting. Packer told the group how she has her students prepare a poster session on biotechnology so they are exposed to some of the possibilities of modern science. Mike Zeller, a biology teacher at Woodward-Granger High School, told the instructors that high school teachers are making sure their students are introduced to molecular biology and microbiology before going on to higher education. "We do DNA isolation, transformation, and fingerprinting with our students," Zeller said. He gave the group copies of his recombinant DNA microbiology labs, as well as the laboratories he and the other master teachers in the Iowa State University Public Education Program provide to schools in Iowa.

Bob Young, Associate Dean of Mathematics and Science at Kirkwood Community College, told the group of the process his community college is going through to develop a biotechnology curriculum and to integrate biotechnology into biology classes. Kirkwood met with industry in the Cedar Rapids area to receive input about the skills students need to compete for jobs in biotechnology companies. It also contacted several universities to learn what they are teaching in their biology courses so that Kirkwood students can be prepared for further education after they complete their two-year degrees.

Other speakers included Walter Fehr, ISU Director of Biotechnology, David Grothaus, Coordinator, Protein Biochemistry and Analysis at Pioneer Hi-Bred, International, Ken Culver, Executive Director, Human Gene Therapy Research Institute, and W. Tony Heiting, Science Consultant, Iowa Department of Education.

ISU EXTENSION FIELD SPECIALISTS GET THE WORD OUT ON BIOTECHNOLOGY

Saqib Mukhtar's efforts to bring biotechnology to his colleagues in central Iowa extension and to the public are commendable. Mukhtar, a field specialist in ag. engineering, explained, "I wanted individuals to understand biotechnology and its promises for agriculture and livestock. I wanted them to realize its effect on our lives, especially our health. So I developed presentations to educate and inform central Iowans about biotechnology. I explain terms like biogenetic engineering, molecular biology, DNA, genes, and genomes. I introduce my audiences or have other extension specialists introduce them to current applications of biotechnology such as gene therapy, transgenic plants and animals, food products, bioethics and DNA fingerprinting. In order for the public to understand these products better, I do some laboratory exercises with my audiences too." Mukhtar's audiences have included service clubs, the central Iowa extension staff, extension councils and high school students. Now Mukhtar and horticulture field specialist Mohamad Khan have worked biotechnology into the master gardener training program.
Roger Brummett, field specialist in livestock and swine, took the lead in bringing biotechnology to the southwest area extension personnel. "We took a day in September for biotechnology programming. We held everyone's attention while southwest area extension specialists spoke on biotechnology applications and had the staff attending the workshop do laboratory exercises. All disciplines in extension were represented at this workshop, including youth specialists, families specialists, ag specialists, and county extension education directors. Nearly all the staff in SW Iowa have had biotechnology training," Brummett said.

David Seilstad, a youth field specialist, handled the laboratories for the southwest area extension training. "Although I'm far from a rocket scientist, I've grown to be quite confident in the laboratory setting," said Seilstad, "but this confidence came with practice. After I attended a workshop at ISU to learn how to conduct the laboratories, I used the laboratory at Southwestern Community College in Creston to practice. Since Tom Brotherton, Department Chair of Health, Math, and Natural Science, attended the same workshop and had more biotechnology experience than I did, I called on him to help me when I had problems," says Seilstad.

Paul Kassel, Field Specialist, Crops, planned a successful biotechnology program for northwest and north central extension area staff. The two-day program was held at Okoboji in November. "We included an overview of biotechnology and explored biotechnology applications such as BST, pST, tomatoes, soybeans and other biotechnology products. The local chief of police from Storm Lake, Mark Prosser, explained biotechnology developments in relationship to criminology." TIPS FOR TEACHERS Our tip for this issue comes from Susan Siedschlag, a home economics educator at Russell High School. Siedschlag has excellent suggestions for introducing biotechnology into food-related courses, including a delicious ice cream recipe. 

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UPCOMING PUBLIC EDUCATION PROGRAMS

DATE: January 6, 1995 LOCATION: Kirkwood Community College TARGET AUDIENCE: Eastern Iowa Intertergrated Crop Management

CONTACT PERSON: Jim Fawcett, ISU Extension Crops Specialist, Linn County Extension Office, 655 12th St., Marion, IA 52302 Phone: 319-377-9839; FAX: 319-377-0475

DATE: January 14, 1995 LOCATION: City High School, Iowa City, Iowa TARGET AUDIENCE: Ag, home economics or science educators CONTACT PERSON: Gary Garton, City High School, 1900 Morningside Drive, Iowa City, IA 52245 Phone: 319-339-6811; FAX: 319-339-5705 CONTACT PERSON: Dean Hartman, Grant Wood Area Education Agency, 4401 6th St. S.W., Cedar Rapids, IA 52404-4499 Phone: 319-399-6700 or 1-800-332-8488; FAX: 319-399-6457

DATE: February 8 – 9, 1995 LOCATION: Iowa State University, Ames, IA TARGET AUDIENCE: Extension Youth Specialists CONTACT PERSON: Debbie Curry, Director of ESET, 33 Curtiss Hall, Iowa State University, Ames, IA 50011 Phone: 515-294-8417 or 1-800-262-0015, ext. 1017; FAX: 515-294-4715 CONTACT PERSON: Lori Miller, Program Assistant, Office of Biotechnology, 1210 Molecular Biology Building, Iowa State University, Ames, IA 50011 Phone: 515-294-9818 or 1-800-262-0015, ext. 9818 FAX: 515-294-4629

OUTREACH CONSORTIUM The Public Education Program in Biotechnology is supported by the Iowa Soybean Promotion Board, Monsanto Company, Penford Products Company, Pioneer Hi-Bred International, Inc., Roy J. Carver Charitable Trust, West Central Cooperative, and the Iowa Farm Bureau Agricultural
Leadership and Promotion Foundation. The program is available to all without regard to race, national origin, religion, sex, age or disability. Sheila Lacy, Editor Walter R. Fehr, Director of Biotechnology Thomas Ingebritsen, Biotechnology Instructor Lori Miller, Program Assistant

TIPS FOR TEACHERS by Sue Siedschlag I want teachers to realize it’s easy to incorporate biotechnology into appropriate parts of their curricula. After I attended a workshop for home economics teachers in the summer of 1993 at Iowa State University, I began to incorporate it into my foods classes. Since then, I have given presentations on how to do this at various meetings for home ec teachers and at the Home Economics Educator’s Conference last summer. I use the following resources for my class, "Food Irradiation: What Is It?" (Extension Publication #437), "Food Additives: How Safe are They?" (Extension Publication #PM 14111) as well as the 11-part Biotechnology Information Series that are available from Extension Distribution, 119 Printing and Publications Building, Iowa State University, Ames, IA 50011-3171. The DNA sections of the "Abundant Food and Fiber Notebook" that was distributed to all Iowa middle schools by Agri-Education, Inc., is also quite helpful. If schools are unable to locate this notebook that comes with videos and classroom activities, they may contact Collette Johnston, Agri-Education, Inc., 801 Shakespeare, PO Box 497, Stratford, Iowa 50249 (phone 515-838-2758) to find out who received it for their district schools. The distribution of this resource to Iowa Schools was funded by the Agribusiness Association of Iowa. Additional copies may be purchased for $119.00 each. The notebook clearly explains what DNA is and has an excellent glossary of terms. It gives teachers ideas to strengthen their students' critical thinking skills so they are able to ask appropriate questions when dealing with biotech processes and products. My Area Education Agency, Southern Prairie in Ottumwa, ordered the laser disk video, "Biotechnology: The Manipulation of Life," published by Lawrence Educational Media Productions, 502 NW 7th St., Suite 387, Gainesville, Florida 32807. This is a good video to use with talented and gifted students if you have the appropriate computer equipment. It requires a DOS computer with CD-ROM capabilities. I programmed a HyperCard Macintosh disk and sent a copy of it to all AEA offices. The AEA’s should be able to make copies of the disk and my other handouts from the summer program for teachers who request the information. The disk includes DNA experiments prepared by the Office of Biotechnology at Iowa State, overheads I use with my classes on the principles of biotechnology and biotechnology products. I include a special lesson I developed called "It's Your Decision" that has students focus on starvation in other countries, discuss basic nutrition, food choices, healthy eating patterns, and the role of technology in food and nutrition. The lesson stresses how important food alternatives will be for the future of humanity. I lead a discussion about microorganisms that have been used for hundreds of years to make breads, wines, and cheeses and then go on to discuss new discoveries about DNA and genetic engineering that enable scientists to rearrange genes very precisely to create and alter food products. My students love hands-on activities. We isolate DNA from vegetables to reinforce the idea that all living cells contain DNA. We make home made ice cream with genetically engineered chymosin, using a recipe I developed.

HOME MADE ICE CREAM (makes three quarts) Mix the following in a saucepan: 4 tablespoons flour, 2 cups sugar, 1/4 teaspoon salt. Add 4 cups milk to mixture and heat for 10 minutes. (I use 2% milk). Add 4 beaten egg yolks. Cook 2 minutes. Cool. When warm to
touch, add 8 - 12 drops of chymosin to mixture.* Add 2 quarts Half & Half and 1 teaspoon vanilla. Pour into ice cream freezer or coffee cans. Fill 1/2 to 3/4 full to allow for expansion. This recipe will fill 4 to 5 one pound coffee cans. I used 1 lb. coffee cans for the ice cream and 3 lb. cans to set the ice and salt in. After filling the 1 pound can, set it in the 3 lb. can, add crushed ice and salt alternately, and be sure lids are securely sealed. Two or three students then roll the can for 15 to 20 minutes. It is important to keep the cans constantly rolling during that time. More ice may be added if needed. When hard, wipe the one lb. can lid dry before opening. Enjoy with your favorite toppings. * Iowa teachers may order chymosin from the ISU Office of Biotechnology, telephone 1-800-262-0015, ext. 9818 or 515-294-9818. If you have questions, please contact Siedschlag at Russell High School, 410 East Smith Street, Russell, Iowa 50238, phone 515-535-6105, fax 515-535-4181. Office of Biotechnology 1210 Molecular Biology Building Iowa State University Ames, IA 50011 xllacy@exnet.iastate.edu