Food Safety, Security Addressed at Iowa State University

Iowa is known for being one of the world’s largest food producers. Meat products and grains for human and animal consumption are grown throughout the state. Iowa State University’s new Institute for Food Safety and Security is researching how to continue to produce safe, high-quality food products.

The institute was developed in the fall of 2002 to discover ways to control food-borne illnesses, prevent contamination of food and water, and protect agriculture from disease outbreaks. The institute’s interim director is Catherine Woteki, dean of the college of agriculture and former under secretary for food safety at the USDA. The search for a permanent director currently is underway.

“The institute will serve the needs of farmers, producers, food preparers, and consumers to control serious food-borne infectious diseases, to prevent contamination of food and water by toxins, and to protect plants and animals from the threat of cataclysmic disease,” Woteki said.

Seven elements of food safety issues are overseen by the Institute: food-borne infectious disease; food and water—harvest; food and water—post-harvest; foodservice and retail; society, communication, and public policy; food-borne disease models and risk analysis; and international food security. Research and training programs have been developed that focus on human health issues related to globalization, food processing, global warning/environmental changes, and agro-terrorism. To meet these multi-disciplinary goals, researchers affiliated with the institute come from the colleges of agriculture, liberal arts and sciences, family and consumer sciences, and veterinary medicine.

“The institute brings together the resources in food safety that are available in Iowa, including those at the federal research laboratories and at Iowa State University. It provides a unifying structure to food safety and security research at our university,” said Jim Dickson, chair of the microbiology department at the university.

Dickson also is the director of the Food Safety Consortium, a three-university, multi-disciplinary organization that has been exploring food safety issues since 1988. The Food Safety Consortium is one of three research efforts at the university that collaborates with the new Institute for Food Safety and Security. Research in the consortium includes the development of methods and technologies to detect, monitor, and prevent microbiological and chemical hazards from entering the food chain.

The Center for Food Security and Public Health, established in July 2002, also collaborates with the institute. The center combines the university’s expertise in veterinary medicine and zoonotic diseases with the activities and needs of the Center for Disease Control and Prevention. Its primary goal is to increase national preparedness for the introduction of disease agents that threaten public health into the food supply.

The third research organization working with the institute is the Biosafety Initiative for Genetically Modified Products (BIGMAP). BIGMAP develops risk/benefit analyses for genetically modified products to develop policies regarding the health, environmental, economic, and social impacts of biotechnology. BIGMAP is part of the colleges of agriculture and veterinary medicine, the Plant Sciences Institute, the Office of the Vice Provost for Research and Advanced Studies, the Office of Biotechnology, and ISU extension.

The institute benefits from strong collaborations with the USDA laboratories located in Ames, including the Agricultural Resource Service’s (ARS) National Animal Disease Center (NADC) and the Animal and Plant Health Inspection Service’s (APHIS) National Veterinary Laboratory Services and the Center for Veterinary Biologics. Many ISU researchers collaborate in research conducted in these facilities.

The Institute for Food Safety and Security is committed to developing new, science-driven meth-
Forum Addresses Field Testing for Pharmaceutical Crops

A public forum on proposed federal rules for testing pharmaceutical crops was held at Iowa State University, in response to a U.S. Department of Agriculture (USDA) draft document. The forum brought more than 40 citizens from the university and surrounding communities to the university on April 7.

Rebecca Bech of the USDA Animal Plant Health Inspection Service (APHIS) was available via telephone for comments and questions about the agency’s proposed guidelines. The guidelines were published in a draft document in the March 10 Federal Register and were available to the public for suggested changes and additions.

The proposed guidelines in the draft document are intended to develop a method of safe and thorough testing of plants genetically altered to contain pharmaceuticals or industrial products. They recommend procedures for confinement of pharmaceutical test crops from non-test crops; a multi-stage inspection process to be conducted by APHIS at critical points in crop development and post-harvest; and required recording by the researcher of all efforts undertaken to meet confinement protocols and other permit conditions. In addition, specific crops, such as corn, have additional requirements.

APHIS requested suggestions for training standards, the use of third-party auditors, and other quality control mechanisms to monitor and ensure compliance. The agency asked for recommendations on how it can enhance communication between it and the public.

This is the third public forum hosted at Iowa State University by the Office of Biotechnology. The other forums discussed field-test requirements and food-safety requirements for biotechnology-derived plants and their products, from a draft document by the Office of Science and Technology Policy; and industry guidance for drugs, biologics, and medical devices derived from bioengineered plants for animal and human use, from a draft document by the FDA in collaboration with the USDA.

“Their forums allow the public to be active participants in the policies that shape agriculture. As growers, producers, and consumers of the products of agriculture, it is vital that citizens voice their opinions about the future production of organisms with genetically engineered traits,” said Walter Fehr, director of the Office of Biotechnology.

The current forum was co-sponsored by the colleges of agriculture, engineering, family and consumer sciences, liberal arts and sciences, and veterinary medicine.

Summer of Bioethics

This summer, the Office of Biotechnology is offering university faculty, extension personnel, and K-12 educators multiple opportunities to learn about bioethics and bioethics education.

Online course

“Biotechnology Ethics” is Iowa’s first online bioethics course designed for K-12 life sciences teachers and extension personnel. The eight-week course gives participants the background, resources, and confidence they need to lead ethics discussions with their classes or extension audiences. All coursework can be completed on the participant’s home computer and is taught entirely on the Internet. Participants can earn one graduate credit from Iowa State University; one staff development credit is an option for participants from Iowa. Since it first was offered in January 2002, more than 40 educators and extension personnel have taken the course.

Bioethics workshop

Educators and extension personnel can learn about bioethics in a new bioethics workshop, sponsored by the Office of Biotechnology. The workshop focuses on basic ethical theory as well as the science and ethics behind specific issues of bioethical interest. Specific topics to be covered include the ethics of plant biotechnology, transgenic animals, and human stem cell research. The three-day June workshop will be held in the Biotechnology Outreach Education Center in the Molecular Biology Building on the Iowa State University campus.

Bioethics Institute

The Bioethics Institute is a week-long seminar for life science faculty and extension personnel who teach students or the public about issues related to bioethics. The Institute teaches participants about ethical theory, including environmental ethics, animal rights and animal welfare, the ethics of biotechnology, research ethics, and bioethics policy. In addition to lectures and
large-group activities, participants develop case studies and other activities that can be used in classrooms and at community events. The Institute will be held this summer at the University of Minnesota. It is funded by a USDA grant to address social, economic, and ethical aspects of biotechnology and by the National Agricultural Biotechnology Council.

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**Faces and Places**

**New Biotechnology Faculty**

Every year, the Office of Biotechnology provides start-up funds to new faculty members involved in biotechnology research. Below are two recently hired faculty who are recipients of these funds.

**Heather Greenlee**, assistant professor of biomedical sciences, received her Ph.D. in neuroscience and zoology & genetics from Iowa State University. Before becoming an assistant professor in fall 2002, Greenlee was an adjunct assistant professor in the biomedical sciences department, teaching veterinary students.

In her research, Greenlee studies the molecular basis for how the photoreceptor, a type of retinal neuron, specializes to perform its specific function during development. She also is investigating the role of the Alzheimer's protein, beta-amyloid, and the effects it has on neural stem cells, namely their development into neurons. The goal of her research projects is to improve the success of neural stem cell transplantation therapy to treat diseases such as Alzheimer's and retinal degeneration.

Greenlee can be contacted by phone at 515-294-9251, by e-mail at mheather@iastate.edu, or at her office in 2008 Veterinary Medicine, Ames, IA 50011.

**Chad Stahl**, assistant professor of animal science, earned his M.S. and Ph.D. in animal science from Cornell University. After completing his education, Stahl was a biologist with the U.S. Food and Drug Administration's Center for Veterinary Medicine, where he served as the biotechnology consultant for the review of transgenic products for food or feed.

His current research interests include the development of microbial protein expression systems, the development of new antibiotic alternatives, and examining nutrient and gene interactions pertaining to bone metabolism.

Stahl can be contacted by phone at 515-294-5990, by e-mail at cstahl@iastate.edu, or at his office in 201 Kildee Hall, Ames, IA 50011.

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**Hybridoma Facility Adds Fluorescence and Luminescence Capabilities**

The Hybridoma Facility of the Office of Biotechnology recently added state-of-the-art technology that integrates computer efficiency with precision scientific accuracy.

The new equipment allows researchers to use fluorescence and luminescence measurements, both of which study the structure of various molecules using light. These technologies allow researchers to understand protein-protein interactions, protein binding, and enzyme kinetics, as well as a number of other molecular behaviors.

The facility’s new Mithras plate reader measures fluorescence and/or luminescence. It allows researchers to inject additional materials into wells while the plate is in the reader, so any changes in the sample can be seen instantaneously. The Elisa plate reader measures light absorbance. The reader's software imports data into a spreadsheet and analyzes it according to researcher specifications. Both plate readers are connected to a computer that allows for fast data acquisition and analysis. They use similar filter sets, and are located in the same facility for combined use by researchers.

A new Leica microscope in the facility allows researchers to examine cells on an individual basis using fluorescence and luminescence technology. While the plate readers produce quantitative analysis, the Leica microscope provides a visual analysis. The microscope allows researchers to observe energy transfer in a cell and the location of specific proteins within a cell. The microscope uses similar filters and probes as the plate readers. A digital camera is attached to the microscope for image acquisition.

The Hybridoma Facility’s equipment and services are available to on- and off-campus researchers, and training is available. For more information, contact Paul Kapke, 515-294-9837, pakapke@iastate.edu, or at his office in 1104 Molecular Biology Building, Ames, IA 50011.

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**Upcoming Events**

**August 7—Biotech Mixer IV.** This meeting series gives biotechnology industry personnel a chance to meet others and to learn more about the industries that call Iowa home. The fourth mixer will be held at Kemin Industries in Des Moines (www.kemin.com). For more information, contact Lisa Lorenzen at 515-294-0926 or llorenze@iastate.edu.

**October 15—Biotechnology Career Day.** The fifth annual career day will provide an opportunity for biotechnology companies in Iowa to meet with Iowa State’s life science students and discuss job and internship opportunities. Companies that are members of the Iowa Biotechnology Association participate for free; non-member companies pay a small fee. To sign up for Biotechnology Career Day, go to www.biotech.iastate.edu/Industry_resources/career_day2003/industry_app.html, or contact Lisa Lorenzen at 515-294-0926 or llorenze@iastate.edu.
Available Technologies

Iowa State University is seeking industrial partners to develop and/or commercialize the following technologies. For more information and for a complete listing of all available technologies, contact the Office of Intellectual Property and Technology Transfer at 515-294-3893 or www.iastate.edu/~isurf.

Sucrose Derivatives for Food and Commercial Uses
Iowa State University researchers have developed simple, one-step methods to prepare a new group of ester and ether derivatives of sucrose for food and commercial use. Potential applications of the new derivatives include food or beverage bulking agents, reduced-calorie sweeteners, adhesives, biodegradable plastics and films, new fibers, and pharmaceuticals. The derivatives are non-caloric, soluble, and non-carcinogenic. ISURF# 01873

Tobacco Plants for Protein Expression in Plant Nectar
A tobacco plant that naturally produces very high levels of nectar per flower has been developed at Iowa State University. These plants can be used for protein expression systems where the desired product will be expressed in plant nectar, including therapeutic proteins, enzymes, monoclonal antibodies, and vaccines. ISURF# 02924

Research Update

The following are a subset of the grants recently awarded for biotechnology-related research at ISU. For more information about establishing research relationships with ISU biotechnology researchers, contact Lisa Lorenzen at llorenze@iastate.edu.


