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## ***Highlights of NABC 14: Foods for Health***

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More than 340 experts in agriculture, medicine, biotechnology, business, consumer health and policy from thirty-seven states and five countries convened at the *Foods for Health* conference in Minneapolis May 19–21, 2002. This annual conference marked a significant effort to expand the circle of discussion on agricultural biotechnology to include nutrition and healthcare professions. Participants explored the implications of better integrating medicine and food production to increase the health value of foods and the potential of therapeutics using plant-derived and technology-based enhancements.

The conference was hosted by the University of Minnesota's College of Agricultural, Food and Environmental Sciences and its Academic Health Center. Co-hosts Charles C. Muscoplat, Vice President and Dean of the College of Agricultural, Food and Environmental Sciences, and Frank Cerra, Senior Vice President for Health Sciences, highlighted integrated efforts at the University of Minnesota, including their partnership in the university's interdisciplinary Center for Plants and Human Health.

### **DIET AND HEALTH: CHALLENGES AND POTENTIALS**

Dual keynote addresses that described the challenges presented by diet-related disease and the opportunities at the intersection of agriculture and medicine set the stage for discussion at the conference. Shiriki Kumanyika, Center for Clinical Epidemiology and Biostatistics at the University of Pennsylvania School of Medicine, cited the increasing incidence of diet-related chronic diseases in the United States and worldwide, and provided data on direct costs to society. Charles Arntzen, founding director of the Arizona Biomedical Institute at Arizona State University, described the potential for addressing diet-related chronic disease through improvements in foods and in new therapeutics derived from agricultural and horticultural crop plants.

Kumanyika summarized the magnitude of the diet-related chronic disease problem as it affects the global population as well as individuals and their families. She noted that obesity and type-2 diabetes costs society in the United States \$50 billion per year (in 1995 dollars) in health services, loss of work, and other factors. Coronary heart disease carries a \$40 billion cost, with hypertension and osteoarthritis at about \$18 billion. In 1995, 13.9 million people in the United States had diabetes. Trends suggest that the number will increase to 21.9 million by 2025. India, the country with the highest rate of diabetes, will increase from 19.4 million affected in 1995 to 57.2 million by 2025.

Arntzen summarized the human timeline of crop improvement and applications of technology from the beginnings of crop domestication about 10,000 years ago to the present. He noted that early populations selected traits to reduce toxicity, reducing or removing glycoalkaloids in potatoes, for example. Over time, breeders selected traits that enhanced taste, nutritional quality, color, and storage. Recent technologies, including plant-tissue cultures and DNA transfer, allow more-specific improvement in traits. He emphasized that the “transition point” from agriculture to medicine has been reached. Researchers now are evaluating selection processes that could restore natural, beneficial, chemicals in plants such as cancer-preventing antioxidants, that have been lost through breeding over time. Arntzen concluded with a glimpse of the future of plant-based vaccines, referencing his own work in potato, that has resulted in three vaccines in stage-1 clinical trials: a hepatitis-B vaccine and two diarrhea vaccines. He emphasized that the production of plant-based vaccines will likely be more efficient and less expensive, and could be set up anywhere in the world—meeting critical disease-prevention needs in developing countries.

Kumanyika and Arntzen were followed by thirty-eight speakers and panelists who addressed the regulatory process, ethics and consumer demand, choice, and health and wellness trends. Other speakers more specifically detailed historical linkages between agriculture and medicine, botanicals as therapeutics, plant-produced antibodies, edible vaccines, functional foods and allergenicity. An additional fifty-two individuals served as facilitators and recorders for conference participants as they discussed key issues in fifteen concurrent workshop sessions<sup>1</sup>.

## **BIOTECHNOLOGY AS A TOOL**

This conference discussion positioned biotechnology squarely as a tool, not as a focal point or goal. Technology also featured in current and historical examples of food as a vehicle to deliver essential nutrition to consumers—from the emergence of nutrient-fortified breads of the mid-1900s to calcium-fortified orange juice. With land grant university agronomists seated amid dieticians and

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<sup>1</sup>See workshop summary article, page 26.

public health service epidemiologists, the goal was articulated as: achieving high-quality, enhanced foods and increased consumer understanding to help improve nutrition. Further, enhancements could contribute to a reduced incidence of diet-related chronic disease—with the long-term goal of disease prevention. The tools of biotechnology could lead to cheaper, more-effective and plentiful vaccines. They could support the development of medicinal components in food to simultaneously treat symptoms and provide nutrition. Biotechnology is already being used to generate pharmaceutical components in commodity and horticultural crops, such as corn and tomatoes.

The potential of the tools of biotech were discussed throughout the conference in terms of what ethicist Jeffrey Burkhardt, University of Florida, described as “the promise of biotechnology.” He said that biotechnology will provide benefits in the future only if scientific and legal successes are achieved, if consumers accept new developments, and if benefits are actually conferred. These developments cannot merely be a prediction; they must be a promise. This promise must be an ethical obligation to act and achieve benefits in the future.

Speakers collectively emphasized that the “promise of biotechnology” must be realistically extended to all concerned: the public, growers, food companies and health sector professionals. They also highlighted a shared responsibility for keeping such promises— throughout the food system and including regulators.

## FOCUS ON CONSUMERS

Speakers addressing consumer interests and demands emphasized that there is, in fact, no average consumer. Tastes, preferences, and cultural bases for food choices vary widely. In sum, although consumers are somewhat confused by the barrage of conflicting messages in the market place, they maintain interest in nutrition, food, and health, and desire understandable, useable, and credible information. In addition, it will be important for agricultural science to reorient its traditional view of the farmer as its client. Many voiced the need to direct research that is in step with the real client, the consumer. Specifically, Laurie Demeritt, the Hartman Group, discussed five factors driving the trend toward wellness among consumers:

- a generalized loss of control,
- transformative life experience,
- compressed sense of time,
- growing frustration with healthcare, and
- the aging population.

She noted that wellness lifestyle trends in the near term will include more emphasis on the economy than on the environment, and an increased focus on prevention as people continue to turn more to food as medicine and therapy.

## REGULATORY ASPECTS

Numerous speakers addressed the current regulatory framework, reflecting on examples from the first generation of biotech crops—and speculating on new guidelines that were published for public comment in September 2002 jointly from the Food and Drug Administration (FDA) and the United States Department of Agriculture (USDA). Gregory Jaffe, Center for Science in the Public Interest, noted that, to date, almost all commercialized genetically engineered crops have gone through the FDA's voluntary consultation process, in which safety data provided by companies are reviewed to ensure compliance with existing laws. He advocated a mandatory FDA process for the second generation of biotech foods (golden rice and high-lycopene tomato, for example) as well as a revamping of USDA's current system. Others noted that many companies will not move aggressively in development of new vaccines or enhanced foods until regulatory processes under discussion are clear. Speakers underscored the important relationship of consumer choice to confidence in the regulatory process and the validation of safety and efficacy of new products.

## EMPHASIS ON STUDENTS

NABC 14 placed a renewed emphasis on engaging students in shaping conference discussions and the future. The conference hosts awarded scholarships to eight students from the fields of medicine, public policy, and nutrition as well as from agricultural disciplines.

## INNOVATIONS IN MINNESOTA

At the close of the conference, local hosts sponsored a special session that highlighted innovation in agriculture, food and medicine in Minnesota. A panel discussion on safe and healthy foods included Kati Fritz-Jung of Schwan's Sales Enterprises, Inc., Hershell Ball of Michael Foods, Inc., Susan Crockett of the General Mills, Inc., Bell Institute of Health and Nutrition, and Steve Snyder of Cargill Health and Food Technologies. A panel on developments in medicine and health included Clarence Johnson of Bioenergy, Inc., Mark Bolander of the Mayo Clinic, and Gregory Plotnikoff and Gary Gardner of the University of Minnesota. Plotnikoff, associate professor of medicine, and Gardner, professor of horticultural science, are part of the university's interdisciplinary Center for Plants and Human Health.