



DEPARTMENT OF FOODS AND NUTRITION *report*

imagination
&
collaboration

PURDUE
UNIVERSITY



PURDUE

UNIVERSITY

There is much excitement at Purdue stimulated by President Martin Jischke. Strategic planning has been occurring at all levels to take Purdue to the next level of preeminence. We have been identifying strategies and metrics for evaluating our progress in the areas of learning, discovery, and engagement. Purdue hopes to improve in each of these areas, but four signature areas have been identified for focused development. These areas are being featured in Discovery Park, which will be the home of new buildings with appropriate laboratories for nanotechnology, bioengineering, proteomics, entrepreneurship, and e-commerce. The provost is planning for 300 new faculty positions over the next five years. These ambitious goals of the leadership at Purdue, accompanied by strategies to raise the necessary funds, give us unique opportunities at a time when state budgets are in crisis and the national attention is focused on homeland security. We are in a more competitive position than we ever have been. Expect to see good things happening.

It is a pleasure to share with you our dreams and visions through our "Imagine" stories inside. I am eager for these to unfold.

Connie Weaver

Connie M. Weaver, Ph.D.
Head and Distinguished Professor
Department of Foods and Nutrition

2



Calcium
& Bone

4



Botanicals
Research Center

6



Cancer
Prevention

LEARNING HIGHLIGHTS

After spending several years altering the undergraduate dietetics curriculum to meet the American Dietetics Association competencies, which led to continued approval of our didactic and coordinated programs under the new guidelines, we turned our attention to our graduate curriculum. Faculty from several departments in the Interdepartmental Nutrition Program created and taught for the first time in 2001-2002 an eight-credit graduate core class for 23 new graduate students. The core provides an integrated approach of biochemistry and physiology applied to nutrition science. A matrix of advanced courses was compiled to begin in the fall of 2002. The former individual vitamins, minerals, and macronutrient courses were eliminated. The core course approach creates a bonding environment for each class of graduate students and provides a solid foundation of knowledge for each student. Interdepartmental graduate programs are encouraged at Purdue by providing fellowship opportunities from the graduate school only for these programs.

DISCOVERY HIGHLIGHTS

Faculty in the department have provided leadership for several large research and student training programs. The National Institutes of Health-funded Botanicals Center for Age-Related Diseases housed in Foods and Nutrition studies the efficacy and mechanism of action of botanicals for age-related diseases. This work is gaining more importance with the increasing problems associated with traditional drugs. For example, with the findings that hormone replacement therapy for postmenopausal women has adverse cardiovascular side effects as well as increased breast cancer risk, the evaluation of alternatives to prevent bone loss by the center is timely.

A multi-site trial to develop and test a curriculum for sixth graders to enhance bone mass is in testing for two years with the hope that it will become a national curriculum. The ability for Purdue to coordinate the collection of bone density data from seven geographical sites should pave the way for other future studies. One such study, funded by the National Dairy Council, is a multi-site trial to evaluate the role of dairy products in weight loss.

We are part of a campuswide effort to plan a Life Sciences Mall at Purdue. We are planning a medical sciences building to house clinical research facilities for nutrition, pharmacy, nursing, imaging, and other areas. In addition, we have remodeled a space for a new metabolic kitchen and have also acquired three new large pieces of equipment for campus-wide mineral analysis.

ENGAGEMENT HIGHLIGHTS

Our Corporate Affiliates program now has 25 members. This is one of our most effective outreach activities, in addition to our May conference and American Dietetics Association videoconference in February. Donna Vandergraff's educational video "Safe Food and You" won a Silver Award from Agricultural Communication in Education. Charles Santerre is often in the media, discussing the safety of eating fish. Our faculty plan to strengthen ties with alumni and are creating an alumni awards program.

Energy Balance
& Fitness



10



Food Science
& Toxicology

12-17

Engagement

Undergraduate and
Graduate Education

Corporate Connections

Faculty

Funded Projects

8

CALCIUM & BONE

collaboration

Imagine ...
kids consuming
enough calcium
to optimize peak
bone mass.



Judging from the one-size-fits-all children's multivitamins that have been on the market for years, it's easy for parents to assume that all children's calcium needs are the same. In reality, children at various ages require different amounts of calcium for peak bone mass, and boys' needs differ from girls in their peer groups. Those are the conclusions that Foods and Nutrition researchers have been drawing through their extensive studies into children's calcium intake.

Now that adolescent girls' calcium requirements have been established (see sidebar), researchers are hoping to close the gap between typically low calcium intakes of adolescents and actual calcium requirements. Dennis Savaiano, professor and dean of the School of Consumer and Family Sciences, and Carol Boushey, assistant professor, are leading a two-year, multi-site trial of sixth grade girls, evaluating the effectiveness of a high-tech curriculum designed to increase calcium intakes and thereby increase bone mass. As each of the seven other collaborating universities collects its data, Purdue researchers are analyzing it.

Through Camp Calcium studies, researchers are now working to help establish dietary guidelines for adolescent males. "Males are more efficient at building bones, but they may require more calcium to build their

larger skeletons," explains Connie Weaver, head and Distinguished Professor of Foods and Nutrition. "We don't know to what extent the changing hormones of adolescence play into this. That's one of the things we're working to find out."

Here's a sampling of other calcium research underway:

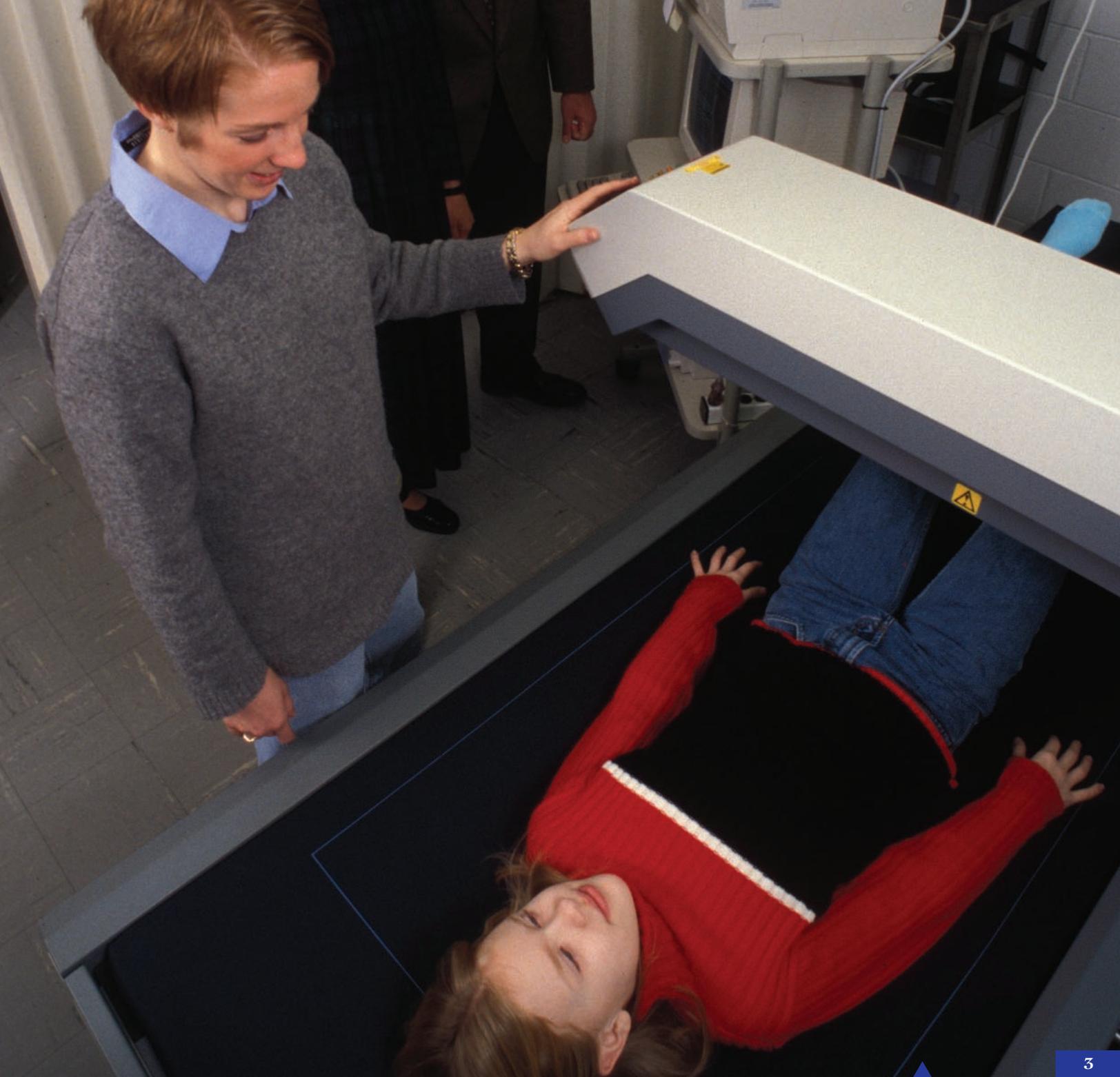
- One of the earliest researchers nationwide to observe a correlation between dairy calcium and body fat, Dorothy Teegarden, associate professor, is collaborating on a multi-site trial that may help turn around young women's reluctance to drink milk. After pioneering a study that indicated higher calcium intakes may reduce overall levels of body fat and slow weight gain, she is now hoping to replicate her findings on a larger scale. If further research bears out, results could significantly impact health behaviors of a population that has largely ignored bone health.
- James Fleet, associate professor, is studying molecular mechanisms of calcium absorption to determine how calcium nutrition and bone health can be improved in ways other than increasing calcium efficiency.
- Researchers are studying the role of exercise in bone health.

A place
in history



Whether it's an honor badge or a championship trophy, most summer camps and school activities offer children ample opportunities for recognition. Youngsters participating in Purdue University's calcium studies, however, earn something even greater – a spot in history.

For more than a decade, adolescents participating in Camp Calcium have assisted Connie Weaver and her team of researchers in studying calcium metabolism during pubertal growth. In between



sports and educational activities, the children have eaten carefully controlled diets.

By monitoring the youngsters' calcium intake and waste and blood samples, the researchers have examined how calcium requirements are affected by race, gender, age, and salt intake. Their work has already paid off; the Institute of Medicine, National Academy of Sciences, has used the research on Caucasian girls' optimal calcium intake for maximum calcium retention in setting calcium requirements

for adolescent girls. More recommendations based on Purdue's research could follow. Now, instead of simply reminiscing on their summer camp fun, youngsters can say they helped shaped the health of future generations.

The dual energy X-ray absorptiometry machine, called DXA, helps investigators measure the effectiveness of a calcium intervention in sixth grade girls. Identical machines on six other campuses in the U.S. allow Purdue to coordinate multi-site research.

imagination

BOTANICALS RESEARCH CENTER

collaboration

Imagine ...
decreasing
the incidence
of age-related
illnesses with
the right dietary
supplements.



While not exactly promising to be the famed Fountain of Youth, many herbal supplements claim to help prolong our lives by preventing and treating age-related diseases. And Americans are buying into the dream, spending more than \$5 billion a year on dietary supplements. Despite their popularity, however, the efficacy and effectiveness of herbal supplements is largely unknown. That's what the Botanicals Center for Age-Related Diseases was developed to address.

Created in collaboration with the University of Alabama-Birmingham through an \$8 million grant (plus supplemental funding) from the National Institutes of Health, the center is one of six of its kind in the nation studying botanical dietary supplements. The Purdue-UAB center specifically studies botanicals claiming to prevent and treat age-related diseases, including cancer, cardiovascular disease, osteoporosis, and dementia. "Our goal is to provide to the consumer information as well as some safe diet alternatives to drugs that they can use in the prevention and treatment of age-related diseases," says C.J. Krueger, administrative assistant to the botanicals center.

The center coordinates 20 Purdue researchers representing consumer and family sciences, general science, pharmacy and pharmaceutical sciences, agriculture, veterinary medicine, physics, and chemistry. Researchers from UAB, Indiana University School of Medicine, University of Illinois-Champaign, and Rutgers also collaborate on the projects. Professor Richard Mattes coordinates the analytical core for the center, which oversees clinical studies and collaborates with Bioanalytical Systems, Inc. in the Purdue Research Park and the Purdue Rare Isotope Measurement Laboratory in the Department of Physics.

Here's a sampling of the latest research:

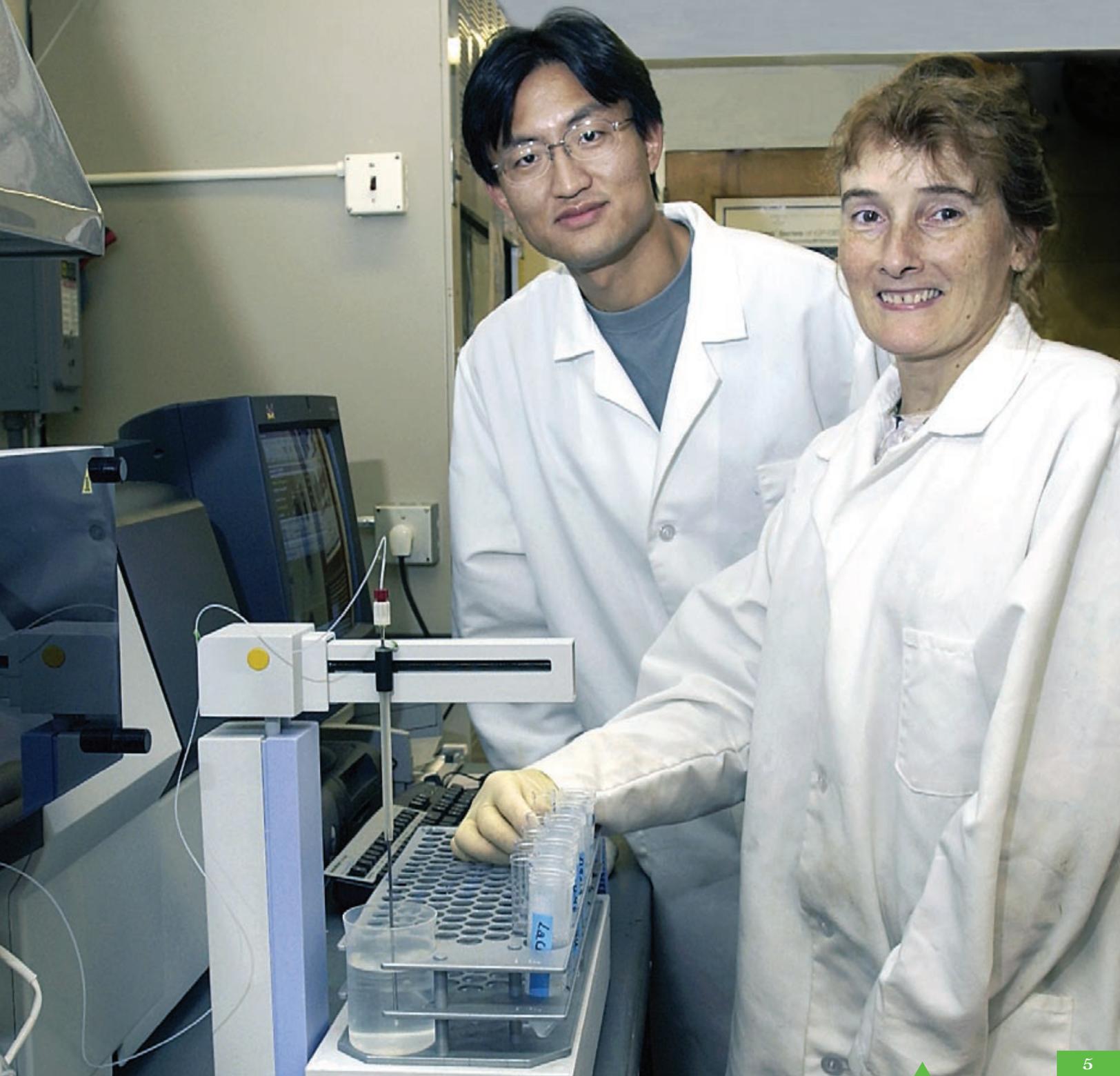
- As supplement use has risen, so has the incidence of adverse effects, fueling a demand for better information. Charles Santerre, associate professor, has created a database to measure usage, knowledge, attitude, and behaviors of healthcare professionals, teachers, and consumers.
- Recent serious concerns raised about the side effects of hormone replacement therapy have amplified the interest in soy and other plant phytoestrogens as possible alternatives. Connie Weaver, director and Project 1 leader, is looking at the efficacy of such treatments (see sidebar).
- The center has awarded pilot grants to several Purdue researchers, along with other medicinal chemistry, UAB, and Bioanalytical Systems, Inc. scientists. Wayne Campbell, associate professor, is investigating the efficacy of a soy constituent in regulating blood glucose. John Burgess, associate professor, is investigating how dietary flavonoids provide antioxidant protection. James Fleet, associate professor, is exploring how enhanced vitamin D signaling can help prevent prostate cancer. Young-Cheul Kim, assistant professor, is studying the role of soy isoflavones in fat cell gene regulation. All the projects will contribute significantly to the center's mission to vigorously evaluate the potential health benefits and risks of botanicals.
- Professor Dorothy Morr  and D. James Morr , Dow Distinguished Professor of Medicinal Chemistry and Molecular Pharmacology at Purdue, are discovering the efficacy of green tea supplements in the inhibition of cancer growth (see sidebar, page 6).

Soy alternatives: fact or fiction?



For years, hormone replacement therapy was a welcome relief to women weary of menopausal symptoms and eager to strengthen bone health. Now that a growing body of evidence is indicating that HRT might increase the risk of heart disease, breast cancer, and other disorders, researchers are seeking viable alternatives.

An answer may lie in a commonly consumed botanical that is marketed to reduce the risk of bone fractures.



Connie Weaver, Head and Distinguished Professor of Foods and Nutrition, is studying if isoflavones in over-the-counter soy products replace estrogen and suppress bone resorption in postmenopausal women. Results will be determined by measuring postmenopausal women's bone loss by following a calcium isotope in urine.

"The participation of the women in this study means more than ever now because

of the need to find safe and effective alternatives that have the same preventive benefits as hormone replacement therapy," Weaver says.

Anecdotal evidence suggests botanical sources may be beneficial. Women in Asian countries have consumed soy with phytoestrogen all their lives and don't seem to have menopausal symptoms. "Scientists need to determine: is that genetic or is that diet," she says.

Dan Zhao, PhD student, and Ania Kempa-Steczko, research technician, are pictured here in the mineral analysis laboratory facility. The lab helps determine the role of phytoestrogens in bone health in postmenopausal women.

imagination

CANCER PREVENTION

collaboration

Imagine ...
reducing
the incidence
of cancer
through
better
nutrition.



While cardiovascular disease is the leading cause of adult deaths in the United States, it's usually the No. 2 killer that strikes fear into most. Many adults know they can help reduce their risk of a heart attack through such measures as diet and exercise, yet they feel helpless to stop the development of cancer. But thanks to a growing body of knowledge that Foods and Nutrition researchers are helping to develop, cancer prevention may not seem so impossible in the future.

In recent years, researchers have discovered that abnormal cell growth and death regulation occurs in a wide variety of disease states, including cancer. "It has been suggested that nutrients play a prominent role in cancer prevention, but how they regulate cells is still unclear," says Dorothy Teegarden, associate professor. Using their own departmental facilities as well as the National Cancer Institute-designated Purdue Cancer Center, Foods and Nutrition and Interdepartmental Nutrition Program researchers are collaborating to investigate this role.

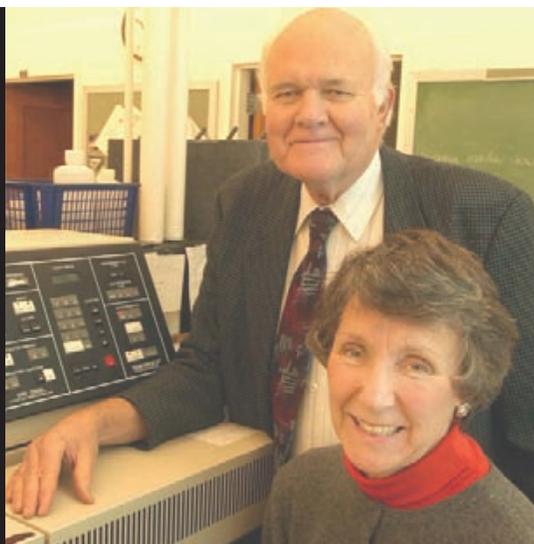
"Since 1990, over 12 million cases of cancer have been diagnosed," says Teegarden. "Any substantive progress in research in these areas will aid in designing preventive strategies and improve the quality of life for those suffering from these diseases as well as reduce the associated health care costs. Understanding the role of nutrients in regulation of cell growth and death decisions will clearly aid in designing recommendations to prevent specific diseases."

Colorectal cancer, for instance, is one of the most common forms of cancer diagnosed each year in the U.S. Among other environmental risk factors, bile acid excretion has been epidemiologically linked to the risk for colorectal cancer, with higher concentrations of fecal bile acids being positively correlated to increased risk. Because dietary fiber and lipids have an impact on bile acid concentrations, researchers are examining the effects of dietary fiber on both total bile acid concentration and the spectrum of bile acids excreted.

Other cancer research is also underway:

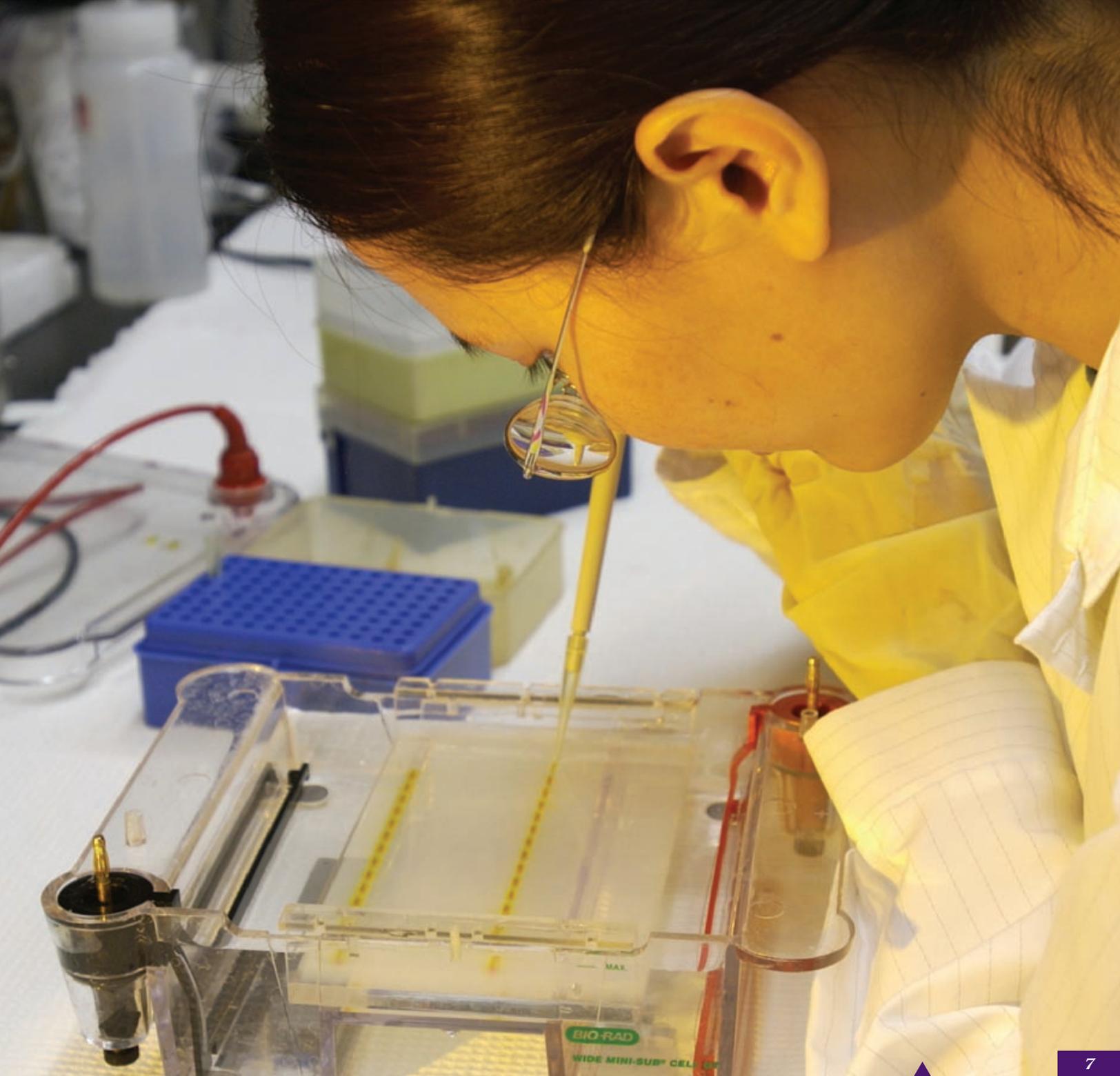
- Dr. Teegarden is investigating the regulation of cancer cell growth, cell death, and blood vessel development by calcitriol, 1,25 dihydroxyvitamin D.
- James Fleet, associate professor, is exploring how calcitriol, a metabolite of vitamin D, works to prevent colon and prostate cancer.
- Researchers are investigating how a specific protein in green tea helps destroy cancerous cells (see sidebar).
- John Burgess, associate professor, is investigating the adaptation to oxidative stress in the regulation of cell growth.

Slowing cancer
cell growth



For more than 5,000 years, humans have drunk green tea for their health. Now there's some contemporary evidence to back up this practice.

Through their research into a specific compound in green tea, Dorothy Morr  and D. James Morr  have discovered that EGCG inhibits an enzyme required for cancer cell growth and can kill cultured cancer cells with no ill effect on noncancer cells.



Dorothy Morr , professor, and her husband, who is the Dow Distinguished Professor of Medicinal Chemistry and Molecular Pharmacology at Purdue, showed in an independent study how green tea interacts with a form of quinol oxidase called tNOX (tumor-associated NOX), on the surface of many types of cancer cells including breast, prostate, colon, and neuroblastoma.

tNOX is required for uncontrolled growth of cancerous cells. When EGCg inhibits

tNOX cell activity, the cancerous cells eventually die, leaving non-cancer cells intact.

Further research is needed to understand how tNOX works in cancer cell growth. But their findings suggest that drinking more than four cups of green tea a day could provide enough of the active compound to slow the growth of cancer cells and reduce cancer risk.

Examining the effect of vitamin D on the expression of genes will help explain how vitamin D protects cells from cancer.

imagination

ENERGY BALANCE & FITNESS

collaboration

Imagine ...
adults
effectively
using nutrition
and exercise
to maintain a
healthy body
weight and
composition.



It's common knowledge that when energy intake is not in balance with energy expenditure, humans become either overweight or underweight. While this relationship may seem simple, various forces modulating diet and lifestyle are incomplete. To gain needed insights, researchers have established the Purdue Resource for Integrative Dietetics and Exercise.

The PRIDE effort draws on the University's expertise in the control of food intake, nutrient metabolism, and energy expenditure in order to better meet the health-care needs of individuals and populations. Says Professor Richard Mattes, "A better understanding of how balance can be achieved is essential because unhealthy body weight – both high and low – results in an array of adverse health consequences for the individual, as well as daunting public health challenges at the regional, national, and global levels."

Mattes is researching the influence of oral fat exposure on lipid metabolism, effects of foods varying in texture (for example, beverages versus solid foods) on appetite and energy balance, the role of bitter taste in modulation of food choice, and the health effects of peanut consumption (see below).

Other studies underway are outlined below:

- Wayne Campbell, associate professor, is focusing on the influences of protein intake on body composition changes in older women during weight loss and in older men and women during resistive exercise training. He's also researching the effects of the compound pinitol (found in whole soybeans) on whole body and muscle glucose metabolism in overweight older adults with an increased risk of developing diabetes mellitus.
- Young-Cheul Kim, assistant professor, is seeking to understand how molecular and genetic factors influence fat cell development. His research also focuses on identifying dietary bioactive molecules, such as phytochemicals, that influence fat cell differentiation and function. Such molecules might be targets for treating obesity, diabetes, and other diseases.

PRIDE researchers hope to translate the knowledge they acquire to the teaching and training of undergraduate and graduate students. "The nutrition, fitness, and health major is the second largest major in our department and includes didactic and experiential training provided by numerous faculty," says Mattes. "Findings from our discovery efforts through PRIDE will also be effectively disseminated by one of the strongest teams of extension educators in the nation."

Putting
peanut remorse
to rest



Given all the news media reports about the dangers of high-fat diets, many dieters may feel a twinge of guilt when they grab a bag of peanuts from a vending machine. New research by Professor Richard Mattes has shown, however, that peanut snackers can put some of that remorse to rest.

In an international study conducted in the United States and Ghana, Mattes and his research team discovered that subjects who consumed peanuts daily experienced little change in body weight.



“Peanuts have a great mix of features, such as high protein, high fiber, and a crunchy texture, which enhance satiety,” says Mattes. When the research participants ate peanuts, they felt satisfied and naturally decreased food consumption at other times of the day, offsetting the peanuts’ high calorie content.

Mattes’ findings are consistent with larger population studies indicating that people who frequently eat about an ounce of peanuts, nuts, and peanut butter have lower body mass index scores. The

importance of an international study is that “it allows you to tease out the independent contributions of culture and biology,” Mattes explains.

More importantly, studying peanuts globally shows the useful role this widely accepted commodity can play in less privileged countries. In the United States, peanuts can help curb the urge to snack. In places where food shortages are common, they can reduce hunger pangs.

Wayne Campbell uses an indirect calorimeter to measure resting energy expenditure, the largest contributor to a person’s need for dietary energy.

This measurement is used to help document changes in the energy expenditure as part of weight loss and exercise intervention studies.

imagination

FOOD SCIENCE & TOXICOLOGY

collaboration

Imagine ...
foods that
are low in
contaminants,
palatable, and
affordable.

In affluent nations, flavor preference largely influences which foods consumers choose in grocery store aisles. Now that shoppers are recognizing the central role of diet in health, they are increasingly concerned that foods contain adequate levels of defined nutrients and provide specific health benefits. To help consumers make wise food choices, Foods and Nutrition professors are engaged in food science and toxicology research.

For much of the past decade, Charles Santerre, associate professor, has been measuring chemical contaminants in fish, such as polychlorinated biphenyls and mercury, and exploring ways to remove these contaminants from our tables. His research has demonstrated the safety of farm-raised fish, helping encourage the growth of the aquaculture industry. For the past three years, the research has also yielded awards or finalist positions for his graduate students in national graduate student paper competitions.

Management to maintain an AnglingIndiana™ Web site. Logging on to the site, pregnant and nursing women can make informed decisions about the consumption of commercial and sport fish.

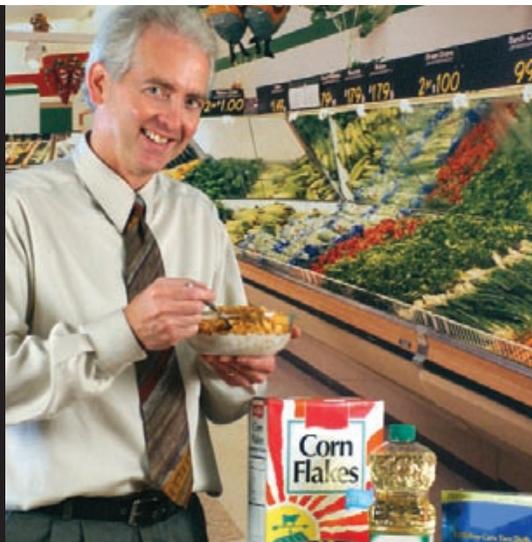
Santerre is also collaborating with Donna Vandergraff, Expanded Food and Nutrition Education Program coordinator, and Angie Abbott, Family Nutrition Program coordinator, to deliver this message to women of limited resource households.

Because consumers still want palatable as well as wholesome foods, the department's food scientists are also examining their sensory appeal. In addition to providing training in sensory evaluation techniques to students, Professor Richard Mattes and fellow researchers are exploring issues in sensory testing methodology; the associations between food attributes, hunger, and food preference; and the influence of sensory stimulation on digestion, nutrient metabolism, and health indices.

In one pioneering study, Mattes discovered that fat does indeed have a taste, contrary to prevailing scientific opinion. If further studies confirm his findings, it could not only explain why many consumers bypass fat-free products but also lead to more palatable fat-free options in the future.



The researchers' findings benefit Indiana residents in practical ways. Santerre, for example, cooperates with the State Department of Health and Department of Environmental



Charles Santerre knows scientifically that biotechnology can be a safe alternative to current food production methods. But the difficulty lies in communicating this technology to a population increasingly separated from food production, processing, handling, and preparation. To help educate the 98 percent of Americans that don't live on farms, Santerre has developed a training program on the basics of food biotechnology.



Along with Purdue Extension staff, the program has now been delivered to more than 8,700 people in three countries with promising results. Before the training, only 31 percent of the participants believed that bioengineered crops were properly regulated by federal agencies, and only 25 percent were confident that bioengineering was unlikely to make an existing food allergenic. Afterward, 83 percent believed that such crops were properly regulated, and 63 percent believed that biotechnology was unlikely to add new allergens to the food supply.

Most astonishingly, 90 percent of those trained also noted they would eat or serve genetically-modified foods to their family, and 90 percent believed that they or their family would benefit from genetically-modified foods within the next five years.

“It is apparent from these results that when provided sound, science-based information, participants are more accepting of this technology and the regulatory process,” says Santerre.

The flavor of a food is determined by the combined contribution of all its sensory properties (taste, odor, texture, appearance, sound, and temperature). In the laboratory for sensory and ingestive studies, researchers characterize the sensory systems involved and evaluate their contributions to food choice and nutrition.

imagination



FOODS AND NUTRITION ENGAGEMENT

Purdue University's recent name change of its off-campus and partnership programs from "outreach" to "engagement" has caused a few matrimonial chuckles among Foods and Nutrition staff and faculty. "We used to extend a hand in outreach," jokes April Mason, associate dean for discovery and engagement. "Now we are actually engaged."

All kidding aside, Mason and her colleagues believe the analogy is fitting. As the University pursues engagement with people, organizations, and communities throughout the state of Indiana, tentative partnerships will mature into enduring relationships. Foods and Nutrition is embracing the new philosophy by forming very intentional, strong relationships with people, organizations, and communities around the state. Here are some examples:

- Purdue Extension serves individuals of all ages with research-based food safety and nutrition curricula and programs. Current topics include a newly revised Professor Popcorn food pyramid program for third through sixth graders, food biotechnology, the importance of folic acid in women's diets, the role of functional foods in diets, diabetes prevention, prevention of overweight and obesity, and fish contaminants and their effect on health. "The department's extension engagement is wide and reaches target audiences using a diverse array of methods, from the high tech to the high touch: Web, CD-ROMs, video, DVD, groups, and one-on-one instruction," says Mason.
- Registered dietitians can now gain required continuing education credits through virtual attendance at American Dietetics Association annual meetings. By making a short drive to Indiana Higher Education Telecommunications sites, RDs can hear overviews given by Foods and Nutrition faculty and staff at annual meeting sessions – information that previously was available only by traveling to West Lafayette.
- Extension specialist William Evers is working on "Feeding Young Children," three programs that teach parents and caregivers to provide appropriate serving sizes for preschool children, identify the child's and parent's responsibilities for feeding, find alternatives for coping with changes in a child's eating behavior, and help children develop positive attitudes toward food and physical activity. Evers has also developed an educational CD-ROM on overweight and obesity, emphasizing the importance of physical activity as a partner with nutrition.



UNDERGRADUATE EDUCATION

From top positions in research and development companies to dietetics management in health organizations to editorial leadership for popular consumer magazines, the stellar careers of Foods and Nutrition graduates have given faculty and staff much to brag about. And it's no wonder. Over the years, the department's reputation has been growing.

The dietetics program, for instance, is currently ranked No. 4 by the *Gourman Report of Undergraduate Programs*. "With only .08 of a point between the top ranked program and Purdue, we are poised to move up," enthuses Olivia Wood, associate professor, who administers the program.

Of the current roll of dietetics students, more than half are also majoring in nutrition, fitness, and health. "More students transfer into these curricula than transfer out, an indication of the strong recruitment and retention for the majors," says Wood. Graduation statistics are also strong. In recent years, 100 percent of Purdue's graduates have passed their registered dietitian examinations, and 80 percent to 95 percent have found jobs in their field, well above the national-reported average. Graduates work in a wide variety of settings, including traditional health care, food and nutrition industry, wellness programs, and the armed services.

Other majors within the Foods and Nutrition department also provide a myriad of career options for graduates:

- The nutrition science major at Purdue offers a rich integrated science background for students going on to medical school, dental school, or graduate nutrition work. Other students learning nutrition science wind up working in industry, academia, or food product, nutrition product, and pharmaceutical sales.
- Those studying foods and nutrition in business, a major suited for students with a mind for science and a flair for creativity, often land in editorial positions for top publishing companies.
- A number of Purdue's food science majors have gone on to work in research and development or quality assurance positions throughout the world. The major offers a strong food science curriculum with additional emphasis on nutrition and sensory evaluation.



GRADUATE EDUCATION

The role that diet plays in the health and well being of humans and animals is a complex interaction of biochemical, physiological, psychological, genetic, cellular, and food science forces. To help students prepare for academic and industrial careers that integrate these disciplines, the department has created a multidisciplinary training ground.

INTERDEPARTMENTAL NUTRITION PROGRAM

Purdue offers an Interdepartmental Nutrition Program, featuring faculty from 10 departments at Purdue University in West Lafayette, the Indiana University School of Medicine at Indianapolis, and Indiana University-Purdue University in Fort Wayne.

Master's level and Ph.D. students can choose from one of four emphasis areas in INP:

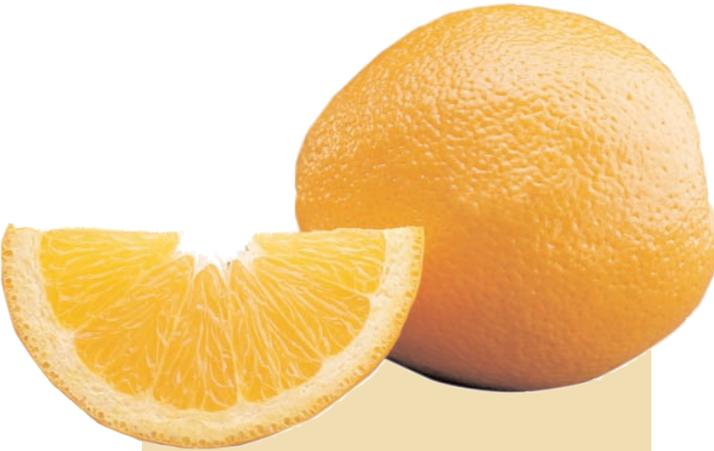
- biochemical and molecular nutrition,
- animal health, growth, and development,
- human and clinical nutrition, and
- public health and education.

INTERDEPARTMENTAL FOOD SCIENCE GRADUATE PROGRAM

Students interested in graduate training in food science can work with faculty in the Department of Foods and Nutrition or from other departments on campus through the Interdepartmental Food Science Graduate Program.



<http://www.cfs.purdue.edu/f&n/graduate>



CORPORATE CONNECTIONS

In the mid-1990s, Foods and Nutrition faculty had a vision for forging a stronger connection between academia and the corporations that benefit from research findings and talent cultivated by the department. Their dream led to the creation of two different programs that today offer boundless opportunities for collaboration.

Each spring and fall, Corporate Affiliates representatives and guests visit the department to hear faculty symposiums on topics such as macronutrients, functional foods, nutrient-gene interaction, botanicals, lipids, biotechnology and dietary guidelines, and nutrition and aging. From an initial meeting of 6 members, the program has grown to 27 affiliates (list at left).

Each fall, eight to ten industry representatives also share their business perspectives through the department's undergraduate course, Executive in the Classroom. Executives discuss their education and job paths, profile their companies, and outline issues such as production, regulation, research and development, food safety, nutrition, and consumer health-care. Through the program, many foods and nutrition undergraduates make connections for internships and jobs. A few find their career goals reshaped. Executives also network with Purdue faculty, and some become Corporate Affiliates.

"The vitality and relevancy that the corporate connection adds to the academic climate would be hard to overstate," says Marleen Troyer, assistant to the head of Foods and Nutrition. In addition to job and internship opportunities, corporations provide ongoing financial support to the department. Over the past two years, corporate underwriting has allowed the department to:

- hire competitive, National Institutes of Health-funded faculty who build on departmental strengths,
- partner with the University on a new transgenic mouse facility, and
- provide updated computers and technology for graduate students, faculty, and staff in a period of diminishing state funds for higher education.

Plus, as faculty had envisioned when they created the programs, a synergy has resulted. Corporate visitors provide a real-world viewpoint for both students and faculty. In return, they form friendships with faculty and revisit their academic roots. Corporate Affiliates also enjoy previewing the most recent research findings. "Since many companies have cut funding and infrastructure for internal research, the opportunity to have corporate-funded research projects in the academic setting is a boon for both parties," says Troyer.

corporate affiliates

Almond Board
Cargill
Coca-Cola
EAS
Frito-Lay
Gerber
Hill's Pet Nutrition
IFIC*
Kellogg
Kraft
Loders Croklaan
McNeil Health
Mead Johnson
Monsanto
National Dairy Council
Nestlé
ORAFTi
Procter & Gamble
Quaker Oats
Ross Labs
Schwan Food Company
Solae Company
Sugar Association
Tate & Lyle
Tropicana
United Soybean Board
Wyeth Consumer Healthcare

*Courtesy Member



DEPARTMENT OF FOODS AND NUTRITION FACULTY

BOUSHEY, Carol, MPH, PhD, RD
Dietitian and Director,

Coordinated Program in Dietetics
Research: Nutritional epidemiology, dietary and behavior assessment methods, folate and homocysteine, public health

BURGESS, John R., PhD
Nutritional Biochemist

Research: Polyunsaturated fatty acid metabolism: vitamin E, selenium, and phospholipases

CAMPBELL, Wayne W., PhD

Human Nutritionist and Exercise Physiologist
Research: Basic and clinical human nutrition and exercise studies of macronutrient metabolism, protein and energy requirements, body composition, muscle strength, and muscle function, with special emphasis on aging

DANIEL, James R., PhD
Food Chemist

Research: Carbohydrates, non-cariogenic sweeteners, food gums, and fat substitutes

EVERS, William D., PhD, RD
Extension Specialist - Nutrition

Research: Computers in nutrition education

FLEET, James C., PhD, RD
Human Nutritionist

Research: Molecular mechanisms of transepithelial mineral transport using cell culture and animal models; vitamin D mediated gene expression, nutrition and osteoporosis

JAMESEN, Karen S., MS, RD
Nutritionist and Food Scientist

Research: Nutrition and food science education

KIM, Young-Cheul, PhD
Human Nutritionist

Research: Molecular mechanisms of fat cell differentiation in obesity and diabetes, dietary regulation of gene expression in lipid metabolism

MASON, April C., PhD
Nutritionist

Research: Trace mineral metabolism in plants and animals, food safety education, food security issues

MATTES, Richard D., MPH, PhD, RD
Human and Clinical Nutritionist,
Sensory Physiologist

Research: Regulation of food intake in humans, dietary preferences and compliance, taste and smell function, human cephalic phase responses

MORRÉ, Dorothy M., PhD
Nutritionist

Research: Chemoprevention of tumorigenesis by nutrients: vitamin A, membranes

SANTERRE, Charles R., PhD
Extension Specialist - Food Safety

Research: Food safety/toxicology

SAVAIANO, Dennis A., PhD
Human Nutritionist

Research: Lactose digestion and intolerance, carbohydrate maldigestion

STORY, Jon A., PhD
Nutritional Physiologist

Research: Nutritional regulation of cholesterol metabolism

TEEGARDEN, Dorothy, PhD
Nutritional Biochemist

Research: Nutrition and cancer, vitamin D and signal transduction, molecular mechanisms in the progression of cancer, exercise, nutrition and bone health

WEAVER, Connie M., PhD
Human Nutritionist, Food Chemist

Research: Bioavailability of minerals; calcium metabolism, exercise, nutrition and bone health, and iron status

WOOD, Olivia B., MPH, RD
Dietitian and Director, Didactic Program
in Dietetics

Research: Nutrition education

COURTESY FACULTY

BLACK, Randy D., PhD
Health Promotion

Research: Obesity/weight management and eating disorders among people with anorexia

HYNER, Gerald C., PhD
Health Promotion

Research: Risk reduction education using computer-assisted instruction

LYLE, Roseann M., PhD
Health Promotion

Research: Nutrition, fitness, and health

SEDLOCK, Darlene A., PhD
Exercise Physiology

Research: Energy expenditure, physiology of upper body exercise

SEEHAFER, Roger W., PhD
Health Promotion Specialist

Research: International student health, culture shock and adaptive strategies

WATKINS, Bruce A., PhD
Nutritionist and Lipid Biochemist

Research: Biochemistry of polyunsaturated fatty acids, antioxidant nutrients, physiological and molecular aspects of bone modeling

ADJUNCT FACULTY

BELURY, Martha, PhD
Nutritionist

Research: Dietary fat and cancer, fatty acid and phospholipid metabolism, signal transduction

KRITCHEVSKY, David, PhD
Wistar Scholar

Research: Lipid biochemistry, atherosclerosis, nutrition, aging, nutrition in cancer

NAVAS, Placido, PhD
Cell Biologist

Research: Vitamin C, antioxidants, regulation of the redox system at the plasma membrane

WASTNEY, Meryl E., PhD
Bio-mathematician

Research: Kinetic modeling

faculty



FUNDED PROJECTS

CAROL J. BOUSHEY

- Calibration and Validation of a Semiquantitative Food Frequency Among Adults
- Improving Bone Health in Adolescence through Targeted Behavioral Intervention
- Parent and Household Influences on Calcium Intake among Preadolescents
- Safe Food for the Hungry 2003/2005

JOHN R. BURGESS

- 21st Century Fund – In Vivo Antioxidant Activity of Phytochemicals in Foods
- Effect of Flavonoids on Coenzyme Q Metabolism and Function
- Effect of Grapefruit Consumption on Disease Risk
- Role of LC-PUFA Metabolism in ADHD

WAYNE W. CAMPBELL

- Aging, Physical Activity, and Toll-Like Receptor-4
- Dietary Protein Requirements of Elderly Men and Women
- Do Elderly Women Have a Higher Protein Requirement than Young Women?
- Effect of Dietary Beef on Weight Loss-Induced Changes in Immune Function, Indicators of Zinc and Iron Status, and Body Composition in Older Women
- Egg Protein Intake, Resistive Exercise Training, and Muscle Size in Older Men and Women
- Pinitol Supplementation in Humans: Effects on Blood and Urine Inositol Concentrations and Whole Body and Muscle Glucose Metabolism

JAMES R. DANIEL

- Alternative Sweeteners, Fat Mimetics, Anti-Staling Agents, and Novel Food Gums

WILLIAM D. EVERS

- Can Computer-Assisted Instruction Enhance Communication Skills of Nutrition Professionals Who Educate Consumers about Healthy Food Choices?
- Do Interactive, Multimedia Simulations Enhance Clinical Reasoning Skills?
- Raising Awareness about Nutrition and Health Issues by Increasing Critical Thinking Skills Using Computer-Assisted Instruction

JAMES C. FLEET

- Calbindin D9k in Calcium Transport
- Diet, Vitamin D Status, and Prostate Cancer Prevention
- Dietary Protein and Muscle Gene Expression
- Genestein and Vitamin D Synergism on Prostate Cells
- Intestinal Calcium Absorption: Molecular Mechanisms
- Intestinal Cell Differentiation Mechanisms

YOUNG-CHEUL KIM

- Role of Stearoyl-CoA Desaturase Gene Expression in Adipocyte Biology
- Soy Isoflavones and Fat Cell Gene Regulation

APRIL C. MASON

- Family Nutrition Program
- Food Irradiation Education
- Food Safety Education for Delivered Meals Programs

RICHARD D. MATTES

- Appetitive Effects of the Macronutrients in Fluids and Solid Foods
- Effects of a Novel Viscosity System on Appetite
- Effects of Almonds on Appetite and Energy Balance
- Effects of Glycemic Index and Variety on Appetite and Energy Balance in Humans
- Effects of Mastication on Appetite
- Effects of Peanut Use Patterns on Satiety Mechanisms
- Effects of Peanuts and Peanut Oil on Food Intake, Energy Balance, and Cardiovascular Risk
- Effects of Portion Size and Energy Density on Appetite and Energy Balance in Humans
- The Energetics of Peanut Consumption
- Fat Taste, Preference, and Intake; and Readiness for Dietary Modification among PROP Taster Groups
- Oral Fat Exposure and Lipid Metabolism in Humans
- PROP Taster Status and Resistance to Oxidative Stress in Humans
- Psychophysical Assessment of Fat Taste Perception
- Range Bias and the General Labeled Magnitude Scale
- Touch Sensitivity on the Tongue

DOROTHY M. MORRÉ

- Application of Novel Multiphase Separations
- Cancer and Polyphenols
- Evaluation of Phenoxodiol Therapy
- Grape Extract and Cancer
- Mammalian Cellular Response
- Natural Extracts on Cancer Cells
- Polyphenol Synergies in Cancer Prevention and Treatment
- Testing of Antiaging Products

CHARLES R. SANTERRE

- Assessment of Contaminant Levels in Fish
- Educating Professionals about Food Biotechnology
- Ergogenic Supplement Usage by Adolescent Athletes
- Influence of Preparation on Contaminant Residues
- Protecting Sensitive Populations from Contaminants in Fish
- Rapid Methods for Contaminants in Fish and Fish Oil

DENNIS A. SAVAIANO

- Improving Bone Health in Adolescence through Targeted Behavioral Intervention
- Reversing Milk Aversion
- Soy Oligosaccharides and Intestinal Health – a New Project in Process with Central Soya

JON A. STORY

- CLA/Cholesterol Metabolism
- Dietary Fiber/Cholesterol Metabolism

DOROTHY TEEGARDEN

- Effect of Dietary Calcium Education Intervention on Body Fat Mass in Adolescents
- Role of Dairy Products in Weight Loss: a Multi-Center Trial
- Mechanism of Resistance to 1,25 Dihydroxyvitamin D Inhibition of Apoptosis during Carcinogenesis
- Regulation of Angiogenesis by 1,25 Dihydroxyvitamin D
- Regulation of Lipid Oxidation by 1,25 Dihydroxyvitamin D and Parathyroid Hormone
- Role of Ceramide Metabolism in Cellular Resistance to Apoptosis

DONNA J. VANDERGRAFF

- Exploring the Food Pyramid with Professor Popcorn
- Folic Acid Education – Indiana Folic Acid Council
- Have a Healthy Baby – Allen and St. Joseph Counties
- Have a Healthy Baby Video Lessons for Physician's Offices – English
- Have a Healthy Baby Video Lessons for Physician's Offices – Spanish

CONNIE M. WEAVER

- Botanicals Center for Age-Related Diseases
- Calcium and Exercise Interactions on Bone
- Calcium Metabolism in Adolescent Boys
- Component Interactions for Efficacy of Functional Foods
- Effect of Indigestible Carbohydrates on Bone
- Effect of Microgravity on Bone Resorption
- Effects of Milk Components on Calcium Absorption
- Metabolism of Plant Bioactives
- Sodium Intake and Calcium Retention in Adolescent Girls



PURDUE
UNIVERSITY

www.cfs.purdue.edu/f&n

Department of Foods and Nutrition
Stone Hall, Room 210
700 W. State Street
West Lafayette, IN 47907-2059

Phone: (765) 494-8228
E-mail: f&n@cfs.purdue.edu