Opportunities for Nutrition Research at Penn State

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Department of Nutritional Sciences
The Pennsylvania State University
Overview

- Penn State is a land grant university with top-tier departments studying foods and nutrition in humans
- We have expertise across the lifespan
- The research covers sensory science, ingestive behavior, causes and treatment of obesity, and co-morbidities
- Studies can be conducted at the individual, group, and population level
- The Methodology Center can provide statistical and experimental design advice
General Clinical Research Center (GCRC) at University Park
Jan Ulbrecht, M.D.

- Assist in design of food and nutrition intervention studies
- Prepare and serve food for acute and long-term controlled feeding
- Perform tests: blood draws, IV therapy, anthropometrics, DXA, RMR, etc.
- Provide screening and study coordination
GCRC Nutritional Intervention Services

- **Long-term feeding studies:** Design cycle menus, develop recipes, set kitchen procedures

- **Short-term feeding studies:** Design food vehicle appropriate for test variable

- **Free-living studies:** Provide dietary counseling, conduct dietary recalls by phone, analyze diet records, develop educational materials, provide staff training
1. Prepare food & weigh to the nearest 0.1 gram. Portions may vary with calorie level.

2. Package in appropriate containers for serving and/or carryout. Label.

3. Store refrigerated or at room temperature.

4. Serve at requested time for short-term studies or assemble day’s meals for long-term participants.
Recent Studies

Long-term CONTROLLED FEEDING studies:
- Legume (8-12 weeks) - Terry Hartman, Nutrition
- Pistachio (10 weeks) - Sheila West, Biobehavioral Health
- Leucine (2 weeks) - Doug Cavener, Biology
- Low methionine (6 weeks) - John Ritchie, Hershey

Short-term studies:
- Tomato, Walnut, Mushroom, Peanut - Penny Kris-Etherton
- Flax, Spice - Sheila West, Biobehavioral Health
- Cocoa drink - Nicole McBrier, Kinesiology

Free-living: Counseling & dietary analysis:
- REFUEL - Mary Jane DeSouza, Nancy Williams, Kinesiology
- Whole Grain - Penny Kris-Etherton
- ALS - Zachary Simmons, Hershey Med Center
Sensory Evaluation Center
Dr. John Hayes, Food Science

Meeting Room
- modular space for descriptive panel training and discussion, and reception area for consumer testing

Focus Groups
- observation rooms with one-way mirror, with digital audio and video recording capabilities
Sensory Evaluation Center

Large Preparation Area
- modern fully equipped facility for sample preparation and serving

Testing Booths
- 12 booths with controlled lighting (northern daylight or red monochromatic)
- ballot presentation and data collection using Compusense Five software
Routine Contract Testing

Discrimination Tests
- Are products different in any way?

Descriptive Analysis
- What are the intensities of specific attributes?

Affective / Hedonic Tests
- Are products liked? Which are preferred?

Academic Research

Individual Differences
- Characterizing how people differ in perceptual response to chemosensory stimuli

Translating Sensation to Food Choice & Health
- How do sensory phenotypes predispose or protect individuals from dietary risk

Behavioral Genetics
- Can sensory / reward polymorphisms drive ingestive behavior?
Examples of Recent Research Projects with Potential Health Impact

**Extending banana shelf life through novel storage technology**

**Taste psychophysics of RebA, a natural high intensity sweetener**
Department of Nutritional Sciences

- Research Themes
  - Ingestive behavior / obesity
  - Micronutrients
  - Nutrition across the life cycle
  - Nutrition education / outreach
Facilities

- **Chandlee Lab**
  - 31,799 sq ft over 3 floors
  - Offices, administration suite, 4 conference rooms, 10 bench labs, 3 unfinished labs, Diet Assessment Center, Project PA suite, undergrad advising suite, grad student work areas
  - Functional MRI
  - Animal Facility

- **Henderson Building**
  - Rolls and Kris-Etherton labs
  - Teaching Kitchen
Gordon Jensen, MD, PhD

Research Interests

- Nutrition risk status and health outcomes of older persons – role of inflammation
- Obesity and aging – functional and health outcomes
Penn State Diet Assessment Center (PSDAC)
Director, Terryl Hartman, R.D., Ph.D.
Coordinator, Diane Mitchell, M.S., R.D.

- Provide the highest quality dietary data collection and analysis through collaborative research projects
- Research has spanned 20 years with the collection of over 55,000 dietary recalls
- Specialize in the collection of 24-hour dietary recalls by telephone using the NDSR (Nutrition Data System for Research, Nutrition Coordinating Center, Univ. of Minnesota)
Projects include:

- dietary validation studies
- food frequency analysis
- dietary quality screener development and evaluation
- comparison of different assessment methodologies
- calculation of energy density, dietary quality indices (e.g., Healthy Eating Index) and food group/pattern analysis
Faculty and Staff work with investigators by providing guidance and support for research proposals by:

- Assisting with proposal writing
- Selecting appropriate methodologies and dietary outcome variables
- Collection and calculation of nutrient and food related data
- Guidance on statistical analysis
- Interpretation of diet and related data and assistance with manuscript preparation
Cardiovascular Nutrition Studies

Evaluate the effects of dietary patterns, individual foods, nutrients, and bioactives on risk factors for CVD in various population groups

Penny Kris-Etherton, PhD, RD
Director, Metabolic Diet Study Center

- Controlled feeding study design
- All meals prepared on site
Meal Supervision

- **All** foods are provided to participants throughout study
- Subjects consume 1 meal daily in lab
- Remaining meals (including weekends) are packed for take out
Energy Content Controlled

- Estimate energy needs
- Monitor weight daily and adjust as needed for weight loss or weight maintenance studies
Interdisciplinary Collaborations

- General Clinical Research Center
- Hospitality & Management – Dr. Peter Bordi
- Vascular Health Lab – Dr. Sheila West
- Nutrigenomics – Dr. Jack Vanden Heuvel
- Dairy and Animal Science – Dr. Alex Hristov
- Food Science – Dr. Robert Beelman
- Kinesiology – Dr. Nancy Williams
- Social, Life, & Engineering Sciences Imaging Center
- Hershey Medical Center – Dr. Richard Legro
The Eating Lab at Penn State

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Nutritional Sciences

Formulation, preparation, and testing of foods that affect satiety and weight management
Hotel and Restaurant Management School runs a campus restaurant

Dr. Pete Bordi

Café Laura

• Customers: Faculty, Staff, Visitors, Students
Preschool children’s eating behavior can be studied in campus day-care facilities