



# RESEARCH PORTFOLIO

JIFSAN



COLLEGE OF AGRICULTURE  
& NATURAL RESOURCES

## JIFSAN Research Portfolio



Research has been a major focus of JIFSAN. The JIFSAN research program was established to assist in the generation of new knowledge in the support of the goal to develop a strong scientific base to address ongoing and increasingly complex public health issues. The program includes not only traditional laboratory and field research, but also educational, behavioral and social research.

Since 1998, JIFSAN has funded 54 research projects through its Internal Competitive Research Program (34 projects) and Collaborative/Cooperative Research Program (20 projects). In addition, 12 postdoctoral research projects have been funded. These projects have generated 112 publications as book chapters and research articles in major food safety, applied nutrition, and other public health journals, including the New England Journal of Medicine, Emerging Infectious Diseases, Antimicrobial Agents and Chemotherapy, Applied and Environmental Microbiology, Journal of Food Protection, Journal of Agriculture and Food Chemistry, Journal of Applied Social Psychology, Nutrition and Cancer, NeuroToxicology, and Investigative Ophthalmology & Visual Science. A total of 221 abstracts/presentations have been accepted in numerous national and international meetings, including 23 posters presented by UM undergraduate interns at FDA Science Forum. Many research articles have been repeatedly cited by other investigators and made important contributions to a better understanding of food safety and public health issues. JIFSAN plans to continue building a strong research program with a direct impact on the public health.



# JIFSAN

## Research Portfolio

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## Internal Competitive Research Projects

*Project Ref. U.034*

**Development and validation of nanosensors for detecting and subtyping foodborne pathogens**

**Start and End Dates:** 10/1/2009- 9/30/2011

**Project Objective:** To develop and validate low cost, rapid, sensitive, versatile, and portable biosensors using nanotechnology for detection and molecular subtyping of food borne microbial pathogens. (2) To develop carbon nanotube transistor arrays to electronically detect the binding of microbial DNA to specific DNA probes (3) To optimize procedures of microbial enrichment and DNA release for the nanobiosensor. (3) To validate the nanobiosensor arrays using current standard methods.

**Principal Investigator:** Romel D. Gomez (Electrical and Computer Engineering)

**FDA Collaborators:** Eric Brown (CFSAN) Thomas Hammack (CFSAN)

**UM Collaborator:** Wenxia Song (Cell Biology and Molecular Genetics)

*Project Ref. U.033*

**Development of a Risk Assessment Framework for Folate Metabolism and the Identification of Applicable Risk Assessment Models**

**Start and End Dates:** 10/1/2009- 9/30/2011

**Project Objective:** To develop a risk assessment framework for folate. (2) To explore the data availability and gaps in the construction of risk and benefit curves. (3) To identify an appropriate risk assessment model based on available data that would take into account inadequate and excess folate intake.

**Principal Investigator:** Nadine Sahyoun (Nutrition and Food Science)

**FDA Collaborator:** WenYen Juan (CFSAN)

*Project Ref. U.032*

**Development and Validation of In Vitro Hepatotoxicity Assay(s) for Dietary Supplemental Materials**

**Start and End Dates:** 10/1/2009- 9/30/2011

**Project Objective:** To develop in vitro assay(s) for examining potential hepatotoxicity of supplemental ingredients and other botanical materials; to validate the in vitro assay(s) using in vivo animal study.

**Principal Investigator:** Liangli (Lucy) Yu (Nutrition and Food Science)

**UM Collaborator:** Thomas J. Flynn (Applied Research and Safety Assessment)

*Project Ref. U.031*

**Developing Phyllosphere Metrics in Good Agricultural Practices (GAPs) to reduce the risks of Salmonellosis in Fresh-Market Tomatoes and other Vegetable Crops.**

**Start and End Dates:** 8/1/2009- 7/31/2010

**Project Objective:** To learn more about the effects of agricultural practices on epiphytic populations in the phyllosphere of vegetable crops, and whether surrogate organisms can be identified that are associated with high risk practices, such as using surface water for routine pesticide applications, especially as harvest approaches.

**Principal Investigator:** Christopher S. Walsh (Plant Science and Landscape Architect)

**FDA Collaborator:** Eric Brown (CFSAN)

**UM Collaborators:** Andrea Ottesen (Plant Science and Landscape Architect)

Mihai Pop (Computer Science) James R. Wright (Mathematics)

**Collaborators:** Michael Newell (Wye Research and Education Center)

*Project Ref. U.030*

**Evaluating Public Health Impacts and Cost-Effectiveness of Implementing Good Agricultural Practices (GAPs) in the Tomato Farm Environment**

**Start and End Dates:** 8/1/2008- 7/31/2010

**Project Objective:** To understand the impacts of GAPs implementation on either reducing or eliminating on-farm *Salmonella* spp. and *Enterococcus* spp. contamination of water, soil, plants and tomatoes. (2) To determine the costs to tomato growers of implementing GAPs. (3) To evaluate the degree to which the costs of GAPs presents a significant barrier to implementation and reduction of bacterial contamination.

**Principal Investigator:** Amy R. Sapkota (Epidemiology & Biostatistics)

**FDA Collaborators:** Andrew Estrin (CFSAN) Christina McLaughlin (CFSAN)

Marc Boyer (CFSAN)

**UM Collaborator:** Sam W. Joseph (Cell Biology/ Molecular Genetics)

*Project Ref. U.029*

**Predicting Exposure Estimates: Experimental Food Additive Partitioning Studies and Model Development**

**Start and End Dates:** 7/01/04 – 6/30/07

**Project Objective:** To develop accurate methods for predicting the extent of packaged food contamination, allowing officials to quickly evaluate personal food exposure estimates to chemical agents and/or radioactive contamination from the food supply and implement the necessary safety measures.

**Principal Investigator:** Robert A. Walker (Chemistry and Biochemistry)

**FDA Collaborators:** Timothy Begley (CFSAN) and William Limm (CFSAN)

*Project Ref. U.028*

**The Impact of Risk Messages about Bioterrorism on the U.S. Food Supply on Audience Attitudes and Behaviors**

**Start and End Dates:** 7/01/03 – 6/30/06

**Project Objective:** To test different food bioterrorism scenarios, played out through simulated news stories over a period of days, to evaluate the effects of selected message characteristics on public responses.

**Principal Investigator:** Linda Aldoory (Communication)

**FDA Collaborators:** Marjorie Davidson (CFSAN), Brenda Derby (CFSAN), Laura Fox (CFSAN), and Alan Levy (CFSAN)

*Project Ref. U.027*

**An Integrated Approach for Identifying Phototoxic Cosmetic Ingredients**

**Start and End Dates:** 7/01/03 – 6/30/06

**Project Objective:** Development of non-animal assays or biomarkers that predict the risks associated with the use of cosmetic ingredients on sun-exposed skin.

**Principal Investigator:** Daniel E. Falvey (Chemistry and Biochemistry)

**FDA Collaborators:** Wayne G. Wamer (CFSAN), and Patty K.L. Fu (CFSAN)

*Project Ref. U.026*

**Molecular Mechanism of Fluoroquinolones and Erythromycin Resistance in *Campylobacter jejuni/coli***

**State and End Dates:** 07/01/03 – 06/30/06

**Project Objectives:** To determine the role of point mutations in *gyrA* gene in fluoroquinolones and erythromycin resistance; (2) To identify putative efflux pumps associated with fluoroquinolones and erythromycin resistance; and (3) To identify novel determinants responsible for resistance to fluoroquinolone and erythromycin

**Principal Investigator:** Jianghong Meng (Nutrition and Food Science)

**FDA Collaborators:** Patrick F. McDermott (CVM) and David G. White (CVM)

*Project Ref. U.025*

***Campylobacter jejuni*-host Interaction of the Intestinal Mucosal Surface**

**Start and End Dates:** 7/01/03 - 6/30/06

**Project Objective:** To compare the abilities of different isolates of *C. jejuni* to adhere to, invade into, and migrate across the polarized intestinal epithelial monolayer; (2) To determine the effect of *C. jejuni* on the organization of the cytoskeleton and tight junction of polarized intestinal epithelial cells; (3) To determine the effect of *C. jejuni* on the expression levels of the chemokine and the homing receptor for leukocytes in polarized intestinal epithelial cells.

**Principal Investigator:** Wenxia Song (Cell Biology and Molecular Genetics)

**FDA Collaborators:** Shaohua Zhao (CVM) and Ruby Singh (CVM)

*Project Ref. U.024*

**Facilitating Needed Drug Approvals for Aquaculture: In Vitro Metabolic Profiles to Characterize and Predict Drug Residues in Finfish**

**Start and End Dates:** 07/01/02 – 06/30/05

**Project Objective:** To facilitate needed drug approvals for the expansion of therapeutic drugs used in aquaculture in the United States.

**Principal Investigator:** Andrew S. Kane (Veterinary Medicine, Baltimore Campus)

**FDA Collaborators:** Badar Shaikh (CVM) and Renate Reimschuessel (CVM)

*Project Ref. U.023*

**Moving Whole-Cell Biosensing from a Qualitative to Quantitative Tool:**

**Development of a Dynamic Cell Immobilization Mechanism**

**Start and End Dates:** 07/01/02 – 06/30/05

**Project Objective:** Establishment of the cell immobilization mechanism, verification of sensing capacity and cell viability, and quantitative analysis of sensing signals.

**Principal Investigator:** Y. Martin Lo (Nutrition and Food Science)

**FDA Collaborator:** Mahendra H. Kothary (CFSAN)

*Project Ref. U.022*

**Study of Nisin and Sublancin in a Strategy for Protection of the United States Food Supply from Pathogenic Bacterial Spores Introduced Through Bioterrorism**

**Start and End Dates:** 07/01/02 – 06/30/05

**Project Objective:** Identify and study chemical agents that can kill bacterial spore pathogens, thus destroying their ability to synthesize toxins or cause infections.

**Principal Investigator:** Norman Hansen (Chemistry and Biochemistry)

**FDA Collaborator:** Laila H. Ali (CFSAN)

*Project Ref. U.021*

**Safety Inspection of Fresh-Cut Fruits and Vegetables using Optical Sensing and Imaging Techniques**

**Start and End Dates:** 07/01/02 – 06/30/05

**Project Objectives:** To identify and characterize contaminations and defects on ready-to-eat fresh fruits and vegetables based on spectral sensing; (2) To determine the efficacy of using multispectral imaging techniques on identifying various fecal contaminations on fresh produces; (3) To test and validate multispectral imaging techniques to detect potentially problematic defects that could harbor pathogens, such as cuts or cracks in fruits and vegetables, in which washing water is hard to reach.

**Principal Investigator:** Yang Tao (Biological Resources Engineering)

**FDA Collaborators:** Robert Buchanan (CFSAN), Yoonseok Soon (CFSAN), Yud-Ren Chen (CFSAN), and Moon S. Kim (CFSAN)

**USDA Collaborator:** Yaguang Luo (Produce Quality, and Safety Lab)

*Project Ref. U.020*

**Evaluation of the Potential Toxicity of Soybean Isoflavones in Development and Aging**

**Start and End Dates:** 07/01/02 – 06/30/03 (extended to 6-30-04)

**Project Objective:** To investigate the transfer and accumulation of genistein or genistin administered orally to birds, with resulting accumulation into the eggs.

**Principal Investigator:** Mary Ann Ottinger (Animal and Avian Sciences) (previously, Monica M. Giusti, Nutrition and Food Science)

**FDA Collaborator:** Sherry Ferguson (CFSSAN)

*Project Ref. U.019*

**Influence of Pre-harvest Antibiotic Pesticide Treatment on the Native Microflora of Apple and Pear Blossoms, Leaves, Fruit and Cider, and Its Implications for Food Safety**

**Start and End Dates:** 07/01/02 – 06/30/05

**Project Objective:** To test the hypothesis that the application of antibiotic pesticides alters the native bacterial microflora of pre-harvest orchid fruit, creating ecological niches for human enteric pathogens.

**Principal Investigator:** Christopher Walsh (Natural Resources Sciences and Landscape Architecture)

**FDA Collaborators:** Arthur J. Miller (CFSSAN) and S. Brian Eblen (CFSSAN)

*Project Ref. U.018*

**Monitoring and Compliance under Seafood HACCP: An Economic Investigation**

**Start and End Dates:** 07/01/01 – 06/30/04

**Project Objective:** To conduct an economic investigation of the determinants of seafood processing plant inspection and compliance with HACCP regulations, using data provided by FDA and other sources. The results of the analysis should help improve targeting of inspections and formulation of measures (e.g., injunctions or fines) to promote greater compliance.

**Principal Investigator:** Anna Alberini (Agriculture and Resource Economics)

**FDA Collaborators:** Dominic Mancini (CFSSAN) and Robert Scharff (CFSSAN)

*Project Ref. U.017*

**The Use of Tissue Fluid Correlations in Predict Drug Residue Levels in Edible Tissues**

**Start and End Dates:** 07/01/01 – 06/30/04

**Project Objective:** To provide the initial validation for the use of tissue-fluid correlation data as a tool to be used by food safety personnel to accurately predict whether a particular animal has tissue drug residues, which are in violation of FDA approved tolerances.

**Principal Investigator:** Natalie D. Eddington (Pharmaceutical Sciences, UMB)

**FDA Collaborators:** James O. Peggins (CVM), Keesla Moulton (CVM) Jurgeon van Bredow (CVM), and Pamela Chamberlain (CVM)

*Project Ref. U.016*

**Investigating the Perceived Credibility of FDA's Advisory Committee Meetings as Techniques for Communicating about Food, Drug, Biologics, and Medical Device Issue**

**Start and End Dates:** 07/01/01 – 06/30/04 (Extended to 06/30/05)

**Project Objective:** To investigate the influence of conflict-of-interest considerations on the perceived credibility of FDA advisory committee.

**Principal Investigator:** Leah Waks (originally, Katherine A. McComas)  
(Communications)

**FDA Collaborators:** Linda Sherman (CFSAN) (originally Linda Suydam, OC)

*Project Ref. U.015*

**Comparison of the Effects of Curcumin Supplements in Young and Aged Rats**

**Start and End Dates:** 07/01/01 – 06/30/04

**Project Objective:** To compare the incidence of pathological changes in young and aged rats fed curcumin with rats fed the control diet, to determine the effect of aging on the absorption of metabolism of curcumin added to the diet and to elucidate a potential mechanism for the purported anti-aging effect of curcumin supplements.

**Principal Investigator:** Bernadene Magnuson (Nutrition and Food Science)

**FDA Collaborators:** Fred Hines (CFSAN), Sabine Franke (CFSAN) and Hamida Alam (CFSAN)

*Project Ref. U.014*

**Modeling the Antimicrobial Effect of Lactate on the Growth and Survival of *Listeria Monocytogenes* on Ready to Eat Seafood**

**Start and End Dates:** 07/01/01 – 06/30/04

**Project Objective:** To provide scientific information needed for HACCP analysis and microbial risk assessment of ready-to-eat seafood to diverse interest groups such as FDA, seafood industry, retailers, and consumers.

**Principal Investigator:** Kisun Yoon (Human Ecology, UMD, Eastern Shore)

**FDA Collaborator:** Richard D. Whiting (CFSAN)

*Project Ref. U.013*

**Using a Probabilistic Risk Assessment Model to Study Risk of *E. coli* contamination in Hard Cheeses**

**Start and End Dates:** 02/01/00 – 01/31/03

**Project Objective:** To develop a probabilistic risk assessment model to study risk of *E.coli* 0157:H7 contamination in rennet-acid-conjugated cheeses and particularly hard cheeses (cheddar)

**Principal Investigator:** Mohammed Modarres (Mechanical Engineering)

**FDA Collaborator:** Joseph Schlessler (NCFST, Argo, IL)

*Project Ref. U.012*

**Antibiotic Resistance Integrons in Shiga Toxin –Producing *Escherichia coli* and *Campylobacter jejuni/coli***

**Start and End Dates:** 02/01/00 - 1/31/03

**Project Objective:** Characterization of antibiotic resistance and antibiotic resistance integron among Shiga toxin-producing *E. coli* isolates, and *Campylobacter* isolates and their antimicrobial susceptibility

**Principal Investigator:** Jianghong Meng (Nutrition and Food Science)

**FDA Collaborators:** David White (CVM), Shaohua Zhao (CVM), and David Wagner (CVM)

*Project Ref. U.011*

**The Evaluation and Removal of Bacterial Biofilms from Food and Food Processing Materials**

**State and End Dates:** 02/01/00 – 01/31/03

**Project Objective:** Development of Methods for the Culture and Analysis of Bacterial Biofilms on Food Processing Materials

**Principal Investigator:** Paul Schreuders (Biological Resources Engineering)

**FDA Collaborator:** Laila H. Ali (CFSAN)

**UM Collaborators:** Sam Joseph (Cell Biology and Molecular Genetics) and Andrea Lomander (Biological Resources Engineering)

*Project Ref. U.010*

**Viral Immunosuppression and the Infection of Shell Eggs by *Salmonella Enteritidis***

**Start and End Dates:** 02/01/00 – 01/31/02

**Project Objective:** Examining the effect of Chicken Anemia Virus infection on salmonella shedding, immunobiology of Salmonella infections in the laying hen

**Principal Investigator:** Robert Heckert (Veterinary Medicine)

**FDA Collaborators:** Richard Raybourne (CFSAN), Uma Babu (CFSAN)

**UM Collaborator:** Wenxia Song (Cell Biology and Molecular Genetics)

*Project Ref. U.009*

**The Detection of Food Borne Pathogens in Biofilms Using Antibodies, Lectins and Fluorescent Dyes**

**Start and End Dates:** 02/01/99 – 01/14/02

**Project Objective:** Examination of the formation of biofilms in model pathogenic food-borne bacteria

**Principal Investigator:** Ronald Weiner (Cell Biology and Molecular Genetics)

**FDA Collaborator:** Ben Tall (CFSAN)

**UM Collaborators:** Sam Joseph (Cell Biology and Molecular Genetics) and Lewis Carr (Biological Resources Engineering)

*Project Ref. U.008*

**Immunologic Sequela Following Oral Exposure to a Foodborne Toxin**

**Start and End Dates:** 02/01/99 – 01/31/02

**Project Objective:** To assess immunologic risk associated with different oral exposure levels of staphylococcal enterotoxins (SE). Provide improved exposure models for transcytosis of SE and potentially other toxins in food across the gut epithelium.

**Principal Investigator:** Carol Pontzer (Cell Biology and Molecular Genetics)

**FDA Collaborators:** Richard Raybourne (CFSAN) and Mary Ann Principato (CFSAN)

*Project Ref. U.007*

**Food Safety Risk Perceptions among Professionals and Consumers**

**Start and End Dates:** 01/01/99 – 12/31/00

**Project Objective:** Investigation of attitudes and perceptions associated with food safety risks to further understand why many individuals fail to adopt safe food handling recommendations.

**Principal Investigator:** Mark A. Kantor (Nutrition and Food Science)

**FDA Collaborators:** Cynthia R. Turtle (CFSAN), Toija A. Riggins (CFSAN), and Alan S. Levy (CFSAN)

**UM Collaborator:** Robert Feldman (Public and Community Health)

*Project Ref. U.006*

**Effect of Moderate Dose Iron Supplementation on Zinc Absorption and Metabolism during Lactation**

**Start and End Dates:** 02/01/99 – 01/31/00

**Project Objective:** To determine whether a single 60-mg dose of ferrous sulfate interferes with fractional zinc absorption at 7-9 weeks of lactation.

**Principal Investigator:** Robert T. Jackson (Nutrition and Food Science)

**FDA Collaborator:** Isaac Rabbani (CFSAN)

**UM Collaborator:** Phylis Moser-Veillon (Nutrition and Food Science)

*Project Ref. U.005*

**The Missing Connection: Isolation and Concentration of Microorganisms on Biocapture Surfaces**

**Start and End Dates:** 11/28/98 – 11/30/00

**Project Objective:** This project seeks to develop methods to capture and concentrate pathogenic microorganisms from relevant biological samples.

**Principal Investigator:** Catherine Fenselau (Chemistry and Biochemistry)

**FDA Collaborators:** Mary Carson (CVM) and David Wagner (CVM)

*Project Ref. U.004*

**Surveillance of Poultry and Other Stock for Carriage of Multiresistant Enterococcus**

**Start and End Dates:** 05/01/98 – 05/30/01 (extended to 12/01)

**Project Objective:** To investigate the biological activities of individual and mixture of dietary carotenoids and their metabolites in several *in vitro* and *in vivo* models of chemoprevention. These are: (a) intercellular gap-junctional communication proteins in an *in vitro* model; (b) the detoxication (phase 2) enzymes in an *in vitro* model; (c) an

*in vivo* anti-inflammatory model. The results from these studies will allow the investigators to determine structural requirement and chemopreventive potency of dietary carotenoids and their metabolites. Based on these findings, a multicarotenoid supplement consisting of a mixture of dietary carotenoids and their metabolites could be developed by scientists for clinical chemoprevention trials of chronic diseases such as cancer and cardiovascular.

**Principal Investigator:** Lewis E. Carr (Biological Resources Engineering)

**FDA Collaborators:** David Wagner (CVM), Linda Tollefson (CVM), and David White (CVM)

*Project Ref. U.003*

**Immunoaffinity Ultrafiltration for High Throughput Screening/Residue Analysis in Food Safety**

**Start and End Dates:** 05/01/98 – 04/20/01

**Project Objective:** Develop immunoaffinity membrane ultrafiltration, which integrates membrane separation with the specificity of antigen-antibody interactions, for multiresidue analysis of veterinary drugs, pesticides, toxicants, and mycotoxins in foods, agricultural commodities, and environmental samples.

**Principal Investigator:** Cheng Lee (Chemistry and Biochemistry)

**FDA Collaborator:** Mary Trucksess (CFSAN)

*Project Ref. U.002*

**Effects of a Variety of Stress Factors on Immune System of Poultry and Subsequent Infection of Shell Eggs by Salmonella**

**Start and End Dates:** 05/01/98 – 04/30/01

**Project Objective:** Examine the immune response of hens orally inoculated with different dosages of *Salmonella enteritidis*. Compare the immune response of hens at a time just after receiving the bacteria versus a designated time long after the inoculation.

**Principal Investigator:** Wenxia Song (Cell Biology and Molecular Genetics)

**FDA Collaborator:** Richard Raybourne (CFSAN)

*Project Ref. U.001*

**Mechanism of Chemoprevention by Dietary Carotenoids and Their Metabolites in the Prevention of Chronic Disease in Humans**

**Start and End Dates:** 05/01/98 – 04/30/01

**Project Objective:** Investigate if carotenoids and their metabolites can cross the brain-blood barriers, and if so how these essential groups of nutrients are distributed throughout the various parts of the human brain

**Principal Investigator:** Frederick Khachik (Chemistry and Biochemistry)

**FDA Collaborators:** Eugene Mazzola (CFSAN), Shirley Blakely (CFSAN), Andrija Kornhauser (CFSAN)



## Cooperative Research Projects

*Project Ref. C.020*

**Plant Responses to the Colonization for Escherichia coli O157:H7 and Salmonella**

**Start and End Date:** November 1, 2008- October 31 2009

**Project Objective:** To develop experimental procedures to analyze the *M. truncatula* enteric bacteria interaction and test the effect of environmental and physiological factors  
(2) To analyze *M. truncatula* gene expression in response to *E. coli* O157:H7 and *Salmonella*

**Principal Investigator:** Jean-Michel Ane, University of Wisconsin-Madison, Department of Agronomy

**Collaborators:** Charles W. Kaspar, University of Wisconsin-Madison, Department of Bacteriology, Eric Brown, Center for Food Safety and Applied Nutrition, FDA

*Project Ref. C.019*

**Enzymatic Degradation of Prion Surrogate Proteins**

**State and End Dates:** 10/1/2004 – 9/30/2007

**Project Objective:** To compare Sup35NM and Sup35NM-His6 and select the better candidate for development of a standard Prion Surrogate Protein (PSP). The PSP will be mixed with normal nervous tissue in a pilot-scale pressure cooker and serve as a marker for prion degradability to enzymatic action under industrial rendering conditions. Brain and spinal cord tissues will be added to mimic the specified risk materials (SRM) for BSE. To improve the specificity and activity of the keratinase, several genetically modified keratinases will be produced and tested for efficacy against the PSP. If proven effective, modified keratinase enzyme species that specifically attack BSE prion may ultimately be developed.

**Principal Investigator:** Jason C.H. Shih, Professor, Department of Poultry Science, North Carolina State University

**Collaborators:** Gerald B. Havenstein, Head, Department of Poultry Science, North Carolina State University, Jeng-Jie Wang, Director, Biotechnology BioResource International, Inc., Raleigh, NC

*Project Ref. C.018*

**Human Infectivity Dose-Response Analysis and Semi-Quantitative Risk Assessments of Hepatitis A Virus (HAV) and Norovirus (Norwalk Virus; NV) in Foods**

**State and End Dates:** 08/01/04 – 09/30/07

**Project Objectives:** (1) Identify and acquire human infectivity dose-response data from HAV and NV from studies done primarily in the USA from the published literature and other available data sources, such as reports and experimental records; (2) Acquire as

many of the HAV and NV inocula as possible that were used in these human volunteer dose response studies. Better quantify the virus titers of as many of the acquired inocula as possible using RT-PCR and possibly other analytical methods; (3) Quantify dose-response relationships of HAV and NV using various estimates of virus titers in the inocula and the health effects responses of human volunteers (infection, illness and if available, mortality). Develop quantitative dose-response relationships using various dose-response models appropriate for human pathogens; (4) Search the published literature, other published reports and other legitimate data sources for the measured concentrations of HAV and NVs in foods, including foods consumed in outbreaks of NV gastroenteritis and of Hepatitis A (infectious hepatitis); (5) Use the dose-response relationships from human volunteer studies with NV and HAV and the data on NV and HAV levels in food to estimate these risks of NV gastroenteritis and infectious hepatitis (Hepatitis A) from ingestion of these foods. Compare the predicted risks of illness of NV gastroenteritis and Hepatitis A obtained by these analyses to the actual risks of NV gastroenteritis and infectious hepatitis observed in food borne and waterborne disease outbreaks. This provides a basis to compare the risks predicted from the quantitative microbial risk assessment analyses to the actual risks observed in outbreaks.

**Principal Investigator:** Mark D. Sobsey, Univ. of North Carolina, Chapel Hill

*Project Ref. C.017*

**Development of Molecularly Imprinted Polymers for the Selective Detection of Marine Biotoxins**

**Start and End Date:** 07/01/04 – 09/30/06

**Project Objective:** To develop molecularly imprinted polymers (synthetic polymer receptors) against the marine biotoxins domoic acid and microcystin-LR. The two water soluble toxins are hazardous substances that are common contaminants in human drinking water and food supplies. The molecules possess chemical structures that present a challenge for developing robust, sensitive and selective materials for their detection. There are two facets of the proposed research. The first consists of the development of optimum conditions for synthesizing molecularly imprinted polymers (MIPs) against the two marine biotoxins, domoic acid and microcystin-LR. We draw upon expertise from our own laboratory and from the molecular imprinting literature to identify the most promising porogins, functional and cross-linking monomers for the MIP formulations. Small combinatorial arrays of functional monomers, cross linkers, will be prepared and evaluated semi quantitatively to identify the best candidates. Larger scale synthesis will provide material for evaluation of affinity and selectively for domoic acid and Microcystin-LR. Analysis will include data from binding isotherms and where available, comparison with commercially available ELISA diagnostic kits. The second phase of this work will involve modifications of the imprinted receptor sites to incorporate a transducer for reporting the binding event. We will draw from our recent imprinting studies of functional, polymerizable monomers containing a florescent group. By analogy, binding of the biotoxins domoic acid and microcystin-LR would produce a detectable change in the fluorescence emission of the MIP. This approach will allow direct verification of the presence of the biotoxins in the field with a minimum requirement for peripheral instrumentation.

**Principal Investigator:** Kenneth J. Shea, University of California, Irvine

*Project Ref. C.016*

**Analyses of Data Collected in Epidemiologic and Microbiologic Field Studies of Domestic and Imported Produce**

**Start and End Date:** 06/01/04 – 09/30/05

**Project Objective:** To investigate the potential sources of microbial contamination of produce in 10 farms and 13 packing sheds in the southern US. This includes produce from groups that are minimally processed and eaten raw (leaf lettuce/spinach, parsley/cilantro/basil, green onions, cabbage, melons/cantaloupe).

**Principal Investigator:** Christine Moe, Associate Professor, Rollins School of Public Health, Emory University, Atlanta, GA

**Collaborator:** Juan Leon, PhD, MPH, Rollins School of Public Health, Emory University, Atlanta, GA

*Project Ref. C.015*

**Acrylamide Content of Home-Prepared, Surface-Browned Foods**

**Start and End Date:** Unknown

**Project Objectives:** To characterize acrylamide content of home prepared/finished foods; (2) examine the impact of formulation and cooking time on acrylamide production; (3) test theoretical strategies for acrylamide reduction, and 4) identify acrylamide reduction strategies available to in-home preparers of food.

**Principal Investigators:** George Sadler<sup>1</sup>, Lauren Jackson<sup>2</sup>

**Collaborators:** Joseph Jablonski<sup>2</sup>, Helen Miller<sup>1</sup>, and Ilona Setikaite<sup>1</sup>; <sup>1</sup>Formerly with Illinois Institute of Technology (IIT), National Center for Food Safety & Technology (NCFST), 6502 S. Archer Rd., Summit-Argo, IL 60501; <sup>2</sup>Food and Drug Administration, NCFST, 6502 S. Archer Rd., Summit-Argo, IL 60501

*Project Ref. C.014*

**Effects of Consumer Food Preparation on Acrylamide Formation**

**Start and End Date:** 10/01/2002 – 09/30/2004

**Project Objective:** (1) Study the effects of cooking conditions (e.g. time/temperature) on acrylamide formation in a variety of consumer-prepared foods; (2) Determine the consumer acceptability of foods cooked under conditions that prevent or reduce acrylamide levels.

**Principal Investigator:** Charles Sizer, Illinois Institute of Technology (IIT), National Center for Food Safety & Technology (NCFST), Lauren Jackson, National Center for Food Safety & Technology (NCFST), Food and Drug Administration

*Project Ref. C.013*

**Human Neurobehavioral Outcomes at 11 Years Following Prenatal and Postnatal Exposure to Methylmercury from a fish diet: A Pilot Study**

**Start and End Date:** 02/01/1998 – 07/31/2000

**Project Objective:** To develop a battery of neurodevelopmental measures capable of detecting subtle CNS dysfunction in children. The battery would then be given to children exposed prenatally and postnatally to methylmercury as a result of fish consumption to determine whether associations occur between exposure and testing outcomes. A battery capable of detecting subtle effects of methylmercury neurotoxicity in children is not currently available. The battery includes measures of cognitive and

sensory functions adversely affected in animals and humans exposed to high dosages of MeHg. These measures have not been used before to study children whose exposure resulted from consumption of a diet high in non-contaminated ocean fish, where effects are expected to be subtle.

**Principal Investigator:** Phillip W. Davidson, Ph.D., University of Rochester

*Project Ref. C.012*

**Evaluation of Food Handling Practices, Awareness of Microbiological Hazards in Foods, and of Agricultural Practices of Fresh Fruit and Vegetable Producers in Costa Rica**

**Start and End Date:** 02/01/2000 – 09/30/2001

**Project Objective:** To evaluate, using survey methodology, the agricultural practices of approximately 100 packing houses and 400 producers involved in the production and export of fresh fruits and vegetables from Costa Rica to the U.S. Emphasis will be on Good Agricultural Practices (GAPs) and Good Manufacturing Practices (GMPs). A manual will be prepared describing the methodology used in the project. A second phase of the project will involve an evaluation, using survey methodology, of the food handling practices and hazard awareness of the Costa Rican population.

**Principal Investigator:** Carmela Vázquez, Ruth De la Asunción, Fernando Aguilar, Carmen Ivankovich, Luís Jiménez, Universidad de Costa Rica, Nacional Center of Food Science and Technology (CITA)

*Project Ref. C.011*

**Prevalence/Quantitation of *L. monocytogenes* in Selected Retail Products**

**Start and End Date:** 10/01/2000 – 09/30/2002

**Project Objective:** To evaluate the types and numbers of *L. monocytogenes* present in retail samples of certain ready to eat foods and then correlate those data with available consumption data to derive an exposure assessment. The exposure data will be compared with illness data collected by CDC concurrently and in the same geographic locations as the sample collection to assess risk of listeriosis from consumption of specific numbers or subtypes of *L. monocytogenes*.

**Principal Investigator:** David E. Gombas, National Food Processors Association Research Foundation

*Project Ref. C.010*

**The kinetics of acrylamide inhibition/destruction/scavenging under various reaction/ process conditions**

**Start and End Date:** 11/1/2003 – 03/31/2004

**Project Objective:** Not available

**Principle Investigator:** Bryan Hanley, Leatherhead Foods International

*Project Ref. C.009*

**IFIC Consumer Attitude Research on Acrylamide**

**Start and End Date:** 02/03/2003 – 04/30/2003

**Project Objective:** To explore the extent to which the issue of “acrylamide in food” has permeated the consciousness of the consumer, and the extent to which it has impacted dietary choices or concerns. In addition, this qualitative research will attempt to identify potential triggers to behavioral change and acceptable messages that explain and provide context to risk information provided to the consumer.

**Principal Investigator:** Dave Schmidt, International Food Information Council (IFIC)  
(Research conducted by Cogent Research – Cambridge, MA)

*Project Ref. C.008*

**Development of a PBPK/PD Model for Acrylamide**

**Start and End Date:** Unknown

**Project Objective:** To develop using toxicokinetic and biomarker data collected in B6C3F1 mice and F344 rats a physiologically based pharmacokinetic-pharmacodynamic (PBPK/PD) model for acrylamide and glycidamide from which tissue levels of parent compound, its genotoxic metabolite, and their disposition can be simulated across species, including the human. Biomarkers of exposure including hemoglobin adducts of acrylamide and glycidamide and glycidamide-derived DNA adducts will provide a pharmacodynamic link with measures of tissue damage. The ultimate goal is to predict concentrations of acrylamide and glycidamide in human tissues along with the resultant DNA damage for use in assessing toxic risks from acrylamide in the diet.

**Principal Investigator:** Daniel R. Doerge, National Center for Toxicological Research, Food and Drug Administration

Collaborator: David R. Lineback, JIFSAN, University of Maryland

*Project Ref. C.007*

**Rapid Assay for Detecting Human Enteric Viruses and Viral Survival Dynamics on Fresh Fruits and Vegetables**

**Start and End Dates:** 10/1/2004 – 09/30/2008

**Principal Objective:** To develop a more accurate indicator of the fecal viral risk associated with fresh fruits and vegetables. The aim of this project is to develop and evaluate a range of rapid assays based on virus-specific RNA to detect enteric viruses in both water supplies for irrigation and on the surface of vegetables. The assays will subsequently be utilized to study the prevalence of enteric viruses and die off of the viruses once they contaminate the surface of vegetables. The project will involve: (a) development of methods for detecting enteric viruses on fresh produce; (b) evaluation of fresh produce safety using *E. coli*, enterococci, and virus testing; (c) survival dynamics of the enteric viruses on fresh produce; and (d) screening and characterization of enteric viruses on retail fresh produce

**Principal Investigator:** Jianghong Meng, DVM, PhD, University of Maryland  
Robert Premier, PhD, Agriculture Victoria

*Project Ref. C.006*

**Conflicting information about safety guidelines for consumption of fish**

**Start and End Dates:** 07/01/2004 – 06/30/2005

**Project Objective:** To analyze National daily newspapers in order to explore how the media has framed the issue of safe fish consumption.

**Principle Investigator:** Linda Aldoory, Communications/CRCR, University of Maryland

*Project Ref. C.005*

**Developing Methodology to Detect Adverse Events**

**Start and End Date:** 07/11/2000 – 06/30/2002

**Project Objective:** To develop an Internet-based reporting system that will collect high quality data that can then be utilized not only by FDA, but also by the public. This will provide access to risk management information to the primary users of this database. The primary public users are hospitals and other facilities that use medical devices.

**Principal Investigator:** Johnny Blair, Timothy Triplett, Henry Wu, Song Zhao UM Survey Research Center, and Marilyn Flack (FDA)

*Project Ref. C.004*

**FT-NIR Rapid Determination of Food Integrity**

**Start and End Date:** 1998 -- 2001

**Project Objective:** To develop a methodology for the rapid detection of contaminants (chemical and microbial) in a wide range of foods by using FT-NIR spectroscopy combined with multivariate data analysis techniques. The data obtained can lead to the development of a database to support studies on the natural variation and variation caused from different processing techniques in foods. The results of this project should provide for cost effective screening techniques that can be used by the food industry, FDA, other food safety agencies, and DOD to increase surveillance of the food supply for contaminants, including potential threat agents. The food industry would have "value added" incentives to apply this technology as part of their HACCP and quality assurance programs.

**Principal Investigator:** Elizabeth Calvey, FDA, Center for Food Safety and Applied Nutrition, Bruce Jarvis, UMD, Chemistry and Biochemistry

**Collaborators:** Fred S. Fry, Farukh M. Khambaty, Magdi M. Mossoba, Michael A. McLaughlin, FDA

*Project Ref. C.003*

**Mechanistic Assays for the Phototoxicity of Cosmetics**

**Start and End Date:**

**Project Objective:** Development of non-animal assays that predict the risks associated with the use of cosmetic ingredients on sun-exposed skin.

**Principal Investigator:** Daniel Falvey UM

**Collaborators:** Peter Vath UM, and Wayne Wamer FDA

*Project Ref. C.002*

**Development and Validation of a New Technology for the Detection of *E. coli* O157:H7 and Other Enterohemorrhagic Serotypes**

**Start and End Date:**

**Project Objective:** Development of a new, simple pathogen detection system that can be used in a variety of public health and food safety settings involving a combination of core technologies licensed by the industrial partner.

**Principal Investigators:** Jianghong Meng UM, Robert Hall FDA

*Project Ref. C.001*

**Animal Health Sciences – related to characterizing the genetic resistance determinants responsible for fluoroquinolone resistance among veterinary isolates of *E. coli* and *Salmonella* spp.**

**Start and End Date:** 09/30/99 – 09/29/2002

**Project Objective:** This research is partially funded through the USDA National Research Initiative Competitive Grants Program (NRICGP) in the Food Safety area. Data from this research investigation has yielded important information leading to better insight into the molecular mechanisms responsible for bacterial resistance to this powerful class of antimicrobials among veterinary *E. coli* and *Salmonella* strains. Provide information to identify whether there are potential public health implications regarding the use of fluoroquinolones in food animals in the U.S.

**Principal Investigators:** Jianghong Meng UM, David White FDA/CVM



## Post-Doctoral Research Program

*Project Ref. P.012*

**Fresh Produce Safety**

**Start and End Dates:** 10/01/07 – 9/30/08

**JIFSAN Post-doctoral Research Associate:** Jie Zhang

**Principal Investigators:** Jianghong Meng, UM and Eric Brown, FDA

**Objective:** (1) Use several molecular subtyping methodologies to source-type a collection of feral Newport strains provided by our collaborators. These strains were isolated from numerous distinct ecological niches on the Eastern Shore of Virginia in conjunction with outbreak strains in order to establish and pinpoint a potential reservoir of infestation for this serovar on tomato plants. This will include determining what potential reservoirs support Newport persistence in this environment. A study of strains from various niches, including those niches associated with vectors and vehicles such as migratory fowl, domestic or wild animal sources, nematodes, soil, pond sediment, and/or well water will all be explored. Fecal strains will be included and subtyped as potential reservoirs of the contamination. An inspection of specific genotypes of Newport will also be investigated in the context of tomato infestation. (2) Use culture and PCR-based methods to ascertain the prevalence by serotype of various serovars of *Salmonella* that are persisting in natural reservoirs (i.e., ponds) on the Eastern Shore. This will aid in determining whether Newports are predominant in the environment or whether they emerge on tomato due to some selective advantage in this particular environment. This objective will also include temporal components whereby seasonal investigations will be performed to determine if Newport maintains a seasonal preference in its persistence. (3) Determine how *S. Newport* persists on or in tomato plants/fruits/seeds. This work will answer the questions as to whether or not the bacteria are internalized by the plant, fruit, roots, or seeds during some period of the tomato growing season and life cycle. Several of the studies to address the question of the local epidemiology/ microecology of Newport in or on tomatoes includes surveys on farm raised Eastern Shore tomato plants and greenhouses using laboratory inocula will be performed to ascertain the incidence of Newport in or on various portions of plant tissues (*e.g.*, blossoms, seeds, roots, leaves, fruits). Exterior portions of tomato organs will be surface sterilized to examine all aspects of the tomato interior (*e.g.*, again including blossoms, seeds, roots, leaves, fruits) for *S. Newport* sequestration. (4) Identify potential antagonists to *S. Newport*. In order to provide information that may lead to a “kill-step” to prevent Newport infestation of Eastern Shore tomatoes, a series of microbiological screenings will be conducted to screen naturally-occurring microflora endemic to the Eastern Shore growing regions, which will be isolated, preliminarily identified, and tested for bactericidal or competitive exclusionary properties against *S. Newport*. Native micro biota that exists epiphytically on the surfaces of both tomato and other indigenous plant species that surround Eastern Shore tomato farms will be targeted. Screenings for antagonistic activity will ensue both *in vitro* and *in vivo* (*e.g.*, on tomato fruits and blossoms in environmentally controlled

studies) in efforts to provide solutions for the control and elimination of S. Newport from Eastern Shore tomato plants.

*Project Ref. P.011*

**Transport of Self-Assembled Nanostructures through Skin**

**Start and End Dates:** 10/01/06 – 9/30/08

**JIFSAN Post-doctoral Research Associate:** Olawatosi Ogunsola

**FDA Principal Investigator:** Robert Bronaugh

**UM Collaborator:** Srinivasa R. Raghavan

**Objective:** To study the ability of nanoscale particles to transport encapsulated ingredients into skin. Such nanoscale structures are beginning to be used in cosmetic and topical consumer products, and the results from these studies could have potential safety implications in the use of these products. Nanoscale structures of particular interest are vesicles and liposomes. These will be synthesized to incorporate markers of skin penetration, either fluorescent molecules or radiolabelled chemicals. The nanostructures will be applied to excised human and animal (either pig or rat) skin and penetration into the skin will be determined using *in vitro* diffusion cell techniques developed at FDA.

*Project Ref. P.010*

**Development of a Real-time PCR assay for the detection and identification of *Shigella* spp. from foods**

**Start and End Dates:** 5/01/06 - 4/30/08

**JIFSAN Post-doctoral Research Associate:** Kwang-Young Song

**FDA Principal Investigator:** Keith Lampel

**Objective:** (1) Exclusion of a false positive strain, *Escherichia vulneris*, from a chormogeinc agar plate for specific detection of *Enterobacter sakazkaii* by supplementing with glucose. (2) Quantitative recovery of *Enterobacter sakazkaii* by using updated one-step enrichment with spin-down method from dried infant formula; (3) Direct applicability of Taqman detection chemistry designed for ABI Prism 7000 SDS to the Cepheid SmartCycler® II platform; (4) Re-Evaluation of a combined culture and Real-Time PCR method for detection of presumptive pathogenic *Enterobacter sakazakii* in milk products; (5) Effect of lactic acid bacteria on *Enterobacter sakazkaii* during short- and long-term storage of dried infant formula; (6) Use of various post-lethality treatments to reduce *Enterobacter sakazkaii* on Ready-to-Eat baby food and dried infant formula; (7) Comparison of detection limit for detecting *Enterobacter sakazkaii* using by Real-Time PCR, Pathatrix, selective media and conventional culture method. (8) Risk assessment of *Enterobacter sakazkaii*; (9) Update BAM method to detect *Enterobacter sakazakii*

*Project Ref. P.009*

**Development of a Specific Monoclonal Antibody for *Enterobacter sakazakii* Identification and an Immunoassay Using Color-Coded Bio-Nanotubes**

**Start and End Dates:** 5/01/04 – 4/30/06

**JIFSAN Post-doctoral Research Associate:** Kwang-Young Song

**FDA Principal Investigator:** Kun-Ho Seo

**Objectives:** (1) To identify specific antigen of *E. Sakazakii*; (2) To develop a specific monoclonal antibody for *E. Sakazaki*; (3) To develop an immuno assay system using the monoclonal antibody and innovative fluorescence bio-nanotubes. (4) Simple and User-Friendly Slide Assay; (5) Automated and Rapid Assay; (6) To evaluate the immuno assay system for rapid, specific detection of *Enterobacter sakazakii* in infant formula and environmental samples

*Project Ref. P.008*

**Aquaculture Drugs: LC/MS protocols for marker determination**

**Start and End Dates:** 3/01/04 – 1/09/06

**JIFSAN Post-doctoral Research Associate:** Ann Abraham

**FDA Principal Investigator:** Robert W. Dickey, Ph.D.

**Objective:** (1) Characterize the absorption, tissue distribution, metabolism, and elimination of unapproved aquaculture drugs in cultured catfish and shrimp; (2) Identify a marker residue (e.g. parent drug or metabolic product) of drug exposure to catfish and shrimp; (3) Develop protocols for the determination of the marker residues in catfish and shrimp using liquid chromatography – mass spectrometry; and (4) Validate or peer verify the performance of the LC/MS method for acceptability in residue monitoring and surveillance programs

*Project Ref. P.007*

**Molecular phylogenetic identification of foodborne bacterial strains**

**Start and End Dates:** 1/12/04 – 1/12/06

**JIFSAN Post-doctoral Research Associate:** Alice Hayford

**FDA Principal Investigator:** Eric W. Brown, Ph.D.

**Objectives:** The project maintains three experimental objectives. Each contributes to the rapid differentiation and identification of foodborne bacterial strains: (1) Cladistic analysis of DNA sequence diversity for the identification of foodborne microbial strains; (2) Identification of specific strains using single-nucleotide signatures; (3) Design and application of PCR-based markers for the differentiation of *E. coli*, *Salmonella*, and *Shigella*

*Project Ref. P.006*

**Rapid Determination of Food Integrity and Identification of Food borne Bacteria using Fourier Transform Near Infrared (FT-NIR) Spectroscopy and Pattern Recognition Techniques**

**Start and End Dates:** 9/01/03 – 1/28/05

**JIFSAN Post-doctoral Research Associate:** Janie DuBois

**FDA Principal Investigator:** Fred S. Fry, Jr., Ph.D.

**Objectives:** To optimize, improve, and make more generally available some of the methodology involving FT-NIR that has been previously developed: (1) Optimize/improve current FT-NIR methodologies on bacterial identification and further validate the models developed. (2) Optimize/improve current FT-NIR methodologies on quantification of added biological or chemical substances through the use of surrogate materials, if necessary. (3) Investigate the portability of the methodology to other laboratories/instruments and the chemometric models by transfer of calibration. (4) Investigate the comparison of the results from FT vs. dispersive instrumentation. (5) Investigate the applicability of FT-NIR for detection of other contaminants or adulterants to food or food products as determined by Center needs.

*Project Ref. P.005*

**Profile of gene expression in Hepatitis A virus infected cells**

**Start and End Dates:** 12/12/01 – 11/30/02

**JIFSAN Post-doctoral Research Associate:** Siddhartha Bhattacharya

**FDA Principal Investigator:** Biswendu B. Goswami, Ph.D.

**Objective:** To develop improved detection and sub-typing methods for the detection of viral pathogens (HAV and NLV) in support of the development of food safety guidance and policies, and to contribute to surveillance, outbreak and traceback activities.

*Project Ref. P.004*

**Development of Pathogen Detection Technology for Field Deployment**

**Start and End Dates:** 12/5/01 - 2/01/04

**JIFSAN Post-doctoral Research Associate:** Sanjay Gummalla

**FDA Principal Investigator:** Robert H. Hall, Ph.D.

**Objective:** To transfer a rapid, sensitive and specific, yet complex pathogen detection technology from the bench to the FDA Field Laboratories. The method targets enterohemorrhagic E. coli of O157:H7 through a specific hlyA sequence, generates amplicons using Strand Displacement Amplification (SDA), and visualizes amplicons through Fluorescence Polarization (FP). Objectives include improving the SDA workflow, developing protocols, training field operators, supervising field trials, and experimenting with the detection componentry to accommodate additional pathogens and new technologies. The progress to date was accomplished in collaboration with the University of Maryland and an industrial partner, both of which will provide expertise respectively in molecular biology and fluorescence detection.

*Project Ref. P.003*

**Characterization of pathogenic aquatic eucaryotes and their toxins (P-003)**

**Start and End Dates:** 10/29/01 – 10/03/03

**JIFSAN Post-doctoral Research Associate:** Zhihong Wang

**FDA Principal Investigator:** Steven Plakas, Ph.D.

**Objective:** To characterize the absorption, metabolism, and elimination of marine toxins in finfish and shellfish. Preliminary data suggests 60%-80% of total toxicity present in shellfish is undetectable by the mouse bioassay and the toxic metabolites remain unidentified. For brevetoxins, developments of more definitive and efficient alternatives to the mouse bioassay are being sought through further characterization of toxin disposition in shellfish.

*Project Ref. P.002*

**Determination of Mutagenic Potentials in Milk from Lactating Dairy Cows Fed Aflatoxin-containing, Aflatoxin-decontaminated and Aflatoxin-free feed (P-002)**

**Start and End Dates:** 9/17/01 – 9/16/03

**JIFSAN Post-doctoral Research Associate:** Socrates Trujillo

**FDA Principal Investigator:** Douglas L. Park, Ph.D.

**Objective:** To determine the efficacy of reducing aflatoxin contamination levels in corn and cottonseed using the ammonia atmospheric pressure/ambient temperature zone treatments, and determine relative mutagenic potentials of aflatoxin decontamination by-products in milk from lactating dairy cows fed ammonia and ozone treated aflatoxin-contaminated feed rations.

*Project Ref. P.001*

**Pathogen Concentration from Food and Environmental Samples for “Real Time” Detection**

**Start and End Dates:** 6/09/01 - 10/03/03

**JIFSAN Research Associate:** Michael Vickery

**FDA Principal Investigator:** Angelo DePaola, Ph.D.

**Objective:** To develop simple reliable pathogen concentration procedures for food and environmental samples to allow the application of a variety of pathogen detection and enumeration methods based on: culturing; PCR amplification; flow cytometry; and biosensors/surface-enhancing Raman scatte



## Research Projects Publications

### 2009

Aldoory, L., & Kim, J. N. (submitted 2009). The effect of shared experience: An elaboration of the situational theory of publics. *Public Relations Review*.

Ruzante, J.M., Davidson, V.J., Caswell, J., Fazil, A., Cranfield, J.A.L., Henson, S.J., Anders, S.M., Schmidt, C., and Farber, J.M. (2009). "A Multifactorial Risk Prioritization Framework for Foodborne Pathogens." *Risk Analysis*. Early view at <http://www3.interscience.wiley.com/cgi-bin/fulltext/122542673/PDFSTART>.

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Zheng, J., S. Cui, S. Zhao, J. Meng. (2009). "Effect of transcriptional activators RamA and SoxS on expression of multidrug efflux pumps AcrAB and AcrF in fluoroquinolone-resistant *Salmonella* Typhimurium." *J Antimicrob Chemother*. 63: 95-102

### 2008

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Khachik, F., Chang, A.N., Gana, A. and Mazzola, E. (2007). "Partial Synthesis of (3R,6'R)- $\alpha$ -Cryptoxanthin and (3R)- $\beta$ -Cryptoxanthin from (3R,3'R,6'R)-Lutein." *J. Nat. Prod.* 70 (2): 220-226, 2007. *Project Ref. U.001*

McComas, K.A., Simone, L., Waks, L. and Sherman, L. (2007). "Predicting Satisfaction and Outcome Acceptance with Advisory Committee Meetings: The Role of Procedural Justice." *Journal of Applied Social Psychology.* 37 (5): 905-927. *Project Ref. U.016*

Ottinger, M.A., E. Lavoie, N. Thompson, A. Barton, K. Whitehouse, M. Barton, M. Abdelnabi, M.Quinn, Jr., G. Panzica, C. Viglietti-Panzica (2007). "Neuroendocrine and behavioral effects of embryonic exposure to endocrine disrupting chemicals in birds." *Brain Research Reviews.* Epub Sep 19. 57(2): 376-385. *Project Ref. U.020*

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## Research Projects Presentations

### **2009**

Lubran, M., R. Pouillot, E. Calvey, J. Meng and S. Dennis. (2009). "Observational Study of Food Handling Practices in Retail Deli Departments." Annual Meeting of Society for Risk Analysis, Baltimore, MD

McDermott, P., A. Kelman, S. Ayers, Y. Li, A. Glenn, and J. Meng. (2009). "Antimicrobial resistant Staphylococcus aureus in ground meat products of the Washington DC area. ASM-ESCMID Conference on Methicillin-resistant Staphylococci in Animals." September 22 - 25, 2009, London, UK.

Xia, X., J. Meng, P. McDermott, and S. Zhao. (2009). "Prevalence and Characterization of Shiga Toxin-Producing Escherichia coli in Retail Meats." ASM Annual Meeting, Philadelphia, PA

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### **2008**

Lamm, K.A., A. Rameshan, J. Meng, E. W. Brown. (2008). Distribution and Evolution of the Palatinose (pal) Operon in Enterobacter sakazakii. ASM Annual Meeting, Boston, MA.

Xia, X., A. Smith, S. Zhao J. McEvoy, J. Meng, A. A. Bhagwat. (2008). "Characterization of Salmonella isolates from retail foods for biofilm formation, inducible acid-tolerance and Caco-2 cell infectivity." ASM Annual Meeting, Boston, MA.

Zheng, J., C. E. Keys, A. Ramaseshan, S. Zhao, J. Meng, E. W. Brown. (2008). "Simultaneous Analysis of Multiple Enzymes Sharply Increases the Accuracy of PFGE in Assigning Genetic Relationships among Homogeneous Salmonella Strains." ASM Annual Meeting, Boston, MA.

Zheng, J., F. Tian, S. Cui, J. Song, E. W. Brown and J. Meng. (2008). "Global Regulation of Gene Expression in *Salmonella* Typhimurium by Constitutive Expression of RamA." ASM Annual Meeting, Boston, MA

## **2007**

Aldoory, L., Kim, J. N., & Tindall, N. (2007, August). The effect of shared experience on problem recognition and involvement: An elaboration of the situational theory of publics for risk communication. Paper presented to the Public Relations Division of the Association for Education in Journalism and Mass Communication, Washington, DC.

Keys, C.E., Zheng, J., Zhao, S., Meng, J. and Brown, E.W. (2007). "An Enhanced Discriminatory Scheme for Subtyping *Salmonella* Enteritidis with Macro-restriction of DNA and Pulsed-field Gel Electrophoresis." ASM Annual Meeting, Toronto, Canada. *Project Ref. C.002*

Khachik, F. (2007). "Chronic Supplementation of Lutein and Zeaxanthin in the Female Rhesus Macaque" CARIG Conference on Carotenoids, Washington DC. *Project Ref. U.001*

Lo, Y.M., Vargas, A. and Blersch, D. (2007). "Portable Biodetector Integrating Bioluminescent Sensing Cells with Real-time Signal Acquisition and Processing." CIGR Section VI – 3<sup>rd</sup> International Symposium: Food and Agricultural Products: Processing and Innovations, Naples, Italy. 2007. Proceedings of CIGR Section VI – 3<sup>rd</sup> International Symposium: Food and Agricultural Products: Processing and Innovations, Naples, Italy. *Project Ref. U.023*

Ottinger, M.A. (2007). "What Do EDC Effects in Birds Mean for Biomedicine?" in the Conference on New Chemical Bodies: Biomonitoring, Body Burden, and the Uncertain Threat of Endocrine Disruptors; a Gordon Cain Conference sponsored by the Chemical Heritage Foundation, Philadelphia, PA. *Project Ref. U.020.*

Vardeman, J., & Aldoory, L. (2007, August). How women make meaning of shared involvement in news about bioterrorism. Paper presented to the Public Relations Division of the Association for Education in Journalism and Mass Communication, Washington, DC.

Zheng, J., Meng, J. and Song, W. (2007) "Campylobacter-induced Polarized Secretion of IL-8 in Human Intestinal Epithelial Cells Requires Campylobacter-secreted CDT and TLR-Induced Activation of NF-kB." Intl Asso. Food Prot., Orlando, FL. *Project Ref. U.025 & U.002*

## **2006**

Abou-Zeid, K.A., Yoon, K.S., Oscar, T., Schwarz, J.G., Nassar, K., Hashem, F.M., Whiting, R.C. (2006). "Development and Validation of Tertiary Model for Predicting Growth Kinetics of *Listeria monocytogenes*." Scott A. International Association of Food Protection, Calgary, Canada. *Project Ref. U.014*

Abou-Zeid, K.A., Yoon, K.S., Oscar, T., Schwarz, J.G., Hashem, F.M., and Whiting, R.C. (2006). "Development and Validation of Primary and Secondary Models for Specific Growth Rate and Lag Time of *Listeria Monocytogenes*" 106<sup>th</sup> American Society for Microbiology (ASM) meeting. *Project Ref. U.014*

Alberini, A. (2006). "Was It Something I Ate? Implementation of the FDA Seafood HACCP Program," 3<sup>rd</sup> World Congress of Environmental and Resource Economists, Kyoto. *Project Ref. U.018*

Buchanan, R. (2006). "Spinach outbreak as part of broader concerns about produce safety." International Association of Food Protection Symposium on October 6, 2006, Arlington, Virginia. [www.foodprotection.org/meetingsEducation/Rapid%20Response%20Symposium%20Presentations.asp](http://www.foodprotection.org/meetingsEducation/Rapid%20Response%20Symposium%20Presentations.asp). *Project Ref. U.031*

Ottesen, A., Walsh, C. and Newell, M. (2006) "Health and Food Safety Implications of Organic vs. Conventional Management of Fruit Trees: Impacts on Phyllosphere Bacteria." *Underutilized Plants. Their Role in Preventive Medicine, Nutrition and Sustainability*. (Abstract-Poster). Center for a Livable Future at Johns Hopkins University. *Project Ref. U.019*

Song, K.Y., Seo, K., Lee, S., and Brackett, R. (2006) "Comparison of Ct Value on 10 Different Pre-enrichment Broths to Detect *Enterobacter sakazakii* in Powdered Infant Formula Using by Real-Time PCR – Preliminary Study." *Abstract Published – FDA Science Forum. Project Ref. P.009 & P.010*

Song, K.Y., Seo, K., Lee, S. and Brackett, R. (2006) "Comparison of FDA Method and Real-Time PCR for the Detection of *Enterobacter sakazakii* in Powdered Infant Formula – Preliminary Study." *Abstract Published – FDA Science Forum. Project Ref. P.009 & P.010*

Song, K.Y., Seo, K., Lee, S. and Brackett, R. (2006) "Evaluation of Efficacy of Quaternary Ammonium Compounds as Disinfectant to Inactive *E.sakazakii*." Preliminary Study, Abstract Published – *FDA Science Forum Project Ref. P.009 & P.010*

Song, K.Y., Seo, K., Lee, S. and Brackett, R. (2006) "Inactivation of *Enterobacter sakazakii* Vegetative Cell to Sodium Hypochlorite and Comparison of Biofilm Formation on Various Different Conveyor Belt Chips." *Poster Presentation – FDA Science Forum Project Ref. P.009 & P.010*

Song, K.Y., Seo, K., Lee, S. and Brackett, R. (2006) "Inactivation and Removal of *Bacillus anthracis* Spores by Commercial Disinfectants." Poster Presentation – IAFP Meeting. *Project Ref. P.009 & P.010*

Song, K.Y., Seo, K., Lee, S. and Brackett, R. (2006) "Multi-detection System for *E. coli* O157:H7 and *Salmonella* Enteritidis Using Quantum Dots as Nontechnology." Preliminary Study, Abstract Published – *FDA Science Forum. Project Ref. P.009 & P.010*

Song, K.Y., Seo, K., Lee, S. and Brackett, R. (2006) "Quantum Dots as a Novel Immunofluorescent Detection System for *E. coli* O157:H7 and *Salmonella* Enteritidis" Preliminary Study. *Poster Presentation – IAFP Meeting. Project Ref. P.009 & P.010*

Song, K.Y., Seo, K., Lee, S., and Brackett, R. (2006) "Removal and Inactivation of Bacillus Anthracis Spores Using by Various Commercial Disinfectants." *Poster Presentation – FDA Science Forum. Project Ref. P.009 & P.010*

Song, K.Y., Seo, K., Lee, S. and Brackett, R. (2006) "Resistance of *E.sazakazakii* Vegetable Cell to Chlorine and Comparison of Biofilm Formation on Two Different Conveyor Belts." *Poster Presentation – IAFP Meeting. Project Ref. P009 & P.010*

Tao, Y. (2006) "Quality Assurance Imaging." National Food Processor Association Annual Conference, Washington DC. (2006) *Project Ref. U.021*

Walker, R.A. (2006) "Migration and Two-Dimensional Phase Behavior of Common Polymer Antioxidant Additives." Mid-Atlantic Regional Meeting (MARM) of the American Chemical Society, Hershey, PA. *Project Ref. U.029*

Walsh, C. (2006) *Sustainable* Orchardring. "Future Harvest Conference; Farming for Profit and Stewardship" Hagerstown, MD. (2006) *Project Ref. U.019*

Zheng, J., Meng, J. and Song, W. (2006) "IL-8 secretion of Human Intestinal Epithelial Cells Induced by *Campylobacter jejuni/coli*." ASM Annual Meeting, Orlando, FL. *Project Ref. U.025 & U.002*

## **2005**

Abou-Zeid, K.A., Yoon, K.S., Oscar, T.P. and Whiting, R.C. (2005). "Response Surface Model for Effects of Temperature, pH, and Lactate-Diacetate Concentrations on Growth Kinetics of *Listeria monocytogenes* in Brain Heart Infusion Broth." International Association of Food Protection, Baltimore, MD. *Project Ref. U.014*

Dubois, J., Lewis, E. N., Fry, F. S., and Calvey, E. M. (2005). "High-Throughput Identification of Bacteria – The Use of Near-Infrared Chemical Imaging (NIR-CI) for the Identification of Micro-Organisms of Concern in Food." FDA Science Forum, Washington, D.C. *Project Ref. C.004*

Ferri, M., Francke-Carroll, S., and Magnuson, B. (2005). "Development of Immunohistochemical Staining Techniques for PCNA and Apoptosis Tissue Markers on Rat tissues in the CFSAN Pathology Laboratory." FDA Science Forum, April, Washington, DC. *Project Ref. U.015*

Jeong, D., Cui, S. and Meng, J. (2005). "The Role of Efflux Pumps and Outer Membrane Protein in the Susceptibility of *Escherichia coli* and *Salmonella* Typhimurium to Biocides". Annu. Meet. Intl. Asso. Food Prot., Baltimore, MD. *Project Ref. C.001*

Khachik, F. (2005). "Distribution and Metabolism of Dietary carotenoids in Humans as a Criterion for Development of Nutritional Supplements. Plannary Lecture" 14<sup>th</sup> International Carotenoid Symposium Edinburgh, Scotland. *Project Ref. U.001*

- Khachik, F. (2005). "Distribution, Metabolism, and the Role of Tomato Carotenoids in Disease Prevention", Symposium entitled "Lycopene and Other Carotenoids" 229th American Chemical Society National Meeting, San Diego, California. *Project Ref. U.001*
- Khachik, F., de Moura, F.F., Chew, E., Douglass, L.W., Csaky, K., Ferris III, F., Dabas, K. and Sran, P. (2005). "Dose ranging study of lutein supplementation in elderly with and without age related macular degeneration" 14<sup>th</sup> International Carotenoid Symposium Edinburgh, Scotland. *Project Ref. U.001*
- Khachik, F. and Liu, Y. (2005). "Showalter, H. Industrial Processes for Partial Synthesis of (3R)- $\beta$ -cryptoxanthin and (3R, 6'R)- $\alpha$ -cryptoxanthin from (3R, 3'R, 6'R)-lutein" 14th International Carotenoid Symposium Edinburgh, Scotland. *Project Ref. U.001*
- Khachik, F., London, E., de Moura, F.F., Johnson, M., Steidl, S., Detolla, L., Shipley, S., Sanchez, B.; Chen, X.Q.; Flaws, J.; Fowler, B.; Luty, G. and McLeod, S. (2005). "Chronic Ingestion of (3R, 3'R, 6'R)-lutein and (3R, 3'R)-zeaxanthin in Female Rhesus Macaque Primates" 14<sup>th</sup> International Carotenoid Symposium Edinburgh, Scotland. *Project Ref. U.001*
- Kwon, Y.J. and Magnuson, B.A. (2005). Expression of Cyclooxygenase-1 is Inhibited by Azoxymethane and Restored by Dietary Curcumin in the Colon of Rats. *Frontiers in Cancer Prevention*, October, Baltimore, MD. *Project Ref. U.015*
- Kwon, Y.J., Francke-Carroll, S. and Magnuson, B.A. (2005). Effect of Age on Azoxymethane-Induced Colonic Apoptosis in Rats. *FDA Science Forum*, April, Washington, DC. *Project Ref. U.015*
- Ottinger, M.A. (2005). "The Japanese Quail Model: Neuroendocrine and Behavioral Responses to Environmental Contaminants." Symposium on Reproductive Behavior and Environmental Pollutants, Centre for Reproductive Biology in Uppsala, Stockholm, Sweden. September 15-16, *Project Ref. U.020*.
- Sadler, G. (2005) "Acrylamide Levels and Mitigations in Home Prepared Foods" JIFSAN Research Grant Symposium, College Park, MD. *Project Ref. C.015*
- Tracy, A., Francke-Carroll, S. and Magnuson, B.A. (2005) "Age-Related Changes in Intestinal Crypt Density may Contribute to Increased Sensitivity of Soy-Fed Female Rats to Acute Toxicity of Azoxymethane." *FDA Science Forum*, Washington, DC. *Project Ref. U.015*
- Walker, R.A. (2005) "Predicting Exposure Estimates: Experimental Food Additive Partitioning Studies and Model Development." JIFSAN Research Grant Symposium, College Park, MD. *Project Ref. U.029*
- Walker, R.A. (2005) "Properties and 2-Dimensional Organization of Common Polymer Antioxidant Additives." 230th National Meeting of the American Chemical Society, Washington, DC. *Project Ref. U.029*

Walker, R.A. (2005) "Surface Activity of Common Antioxidant Additives in Polymers." Bioscience Day, University of Maryland, College Park, MD. *Project Ref. U.029*

Walsh, C. (2005) "A Progress Report from the Organic Orchard at WyeREC." Ag Agent In-Service Training and Crops Tour, Upper Marlboro, MD. *Project Ref. U.019*

Wang, J., Hahm, T.S., Stoecker, D.K. and Lo, Y.M. (2005) "Quantitative Analysis of Bioluminescent Signals Emitted by lux-fused Biosensing Cells for the Detection of Harmful Algae." IFT Annual Meeting, New Orleans, LA. *Project Ref. U.023*

Williams, K., and Meng, J. (2005). "RT-PCR for the Detecting Norovirus." Annu. Meet. Intl. Asso. Food Prot., Baltimore, MD. *Project Ref. C.007*

Zhan, G., Khachik, F., Sulaiman, P. and Camras, C.B. (2005) "Effect of Lutein, Zeaxanthin,  $\alpha$ - and  $\beta$ -cryptoxanthin, Lycopene, and Their Mixture on Oxidative Stress in Cultures of Normal and Glaucoma Human Ciliary Muscle Cells and Rat Retinal Ganglion Cells." 14<sup>th</sup> International Carotenoid Symposium Edinburgh, Scotland. *Project Ref. U.001*

Zheng, J., Meng, J. and Song, W. (2005) "*Campylobacter* Induces a Polarized Secretion of IL-8 Human Intestinal Epithelial Cells." Microbial Pathogenesis and Host Response. Cold Spring Harbor Laboratory, New York, NY. *Project Ref. U.025 & U.002*

## **2004**

Abou-Zeid, K.A. and Yoon, K.S. (2004). "Modeling the Antimicrobial Effect of Lactate on the Growth and Survival of *Listeria monocytogenes* on Ready to Eat Seafood." JIFSAN Research Presentation Symposium. *Project Ref. U.014*

Aldoory, L., Davidson, M., Derby, B. and Levy, A. (2004/2005). "The Impact of Risk Messages about Bioterrorism on the U.S. Food Supply on Audience Attitudes and Behaviors." JIFSAN Research Grant Symposium, College Park, MD. *Project Ref. U.028*

Aldoory, L., & Van Dyke, M. A. (2004, August). Shared involvement and risk perceptions in responding to bioterrorism: An extension of the situational theory of publics. Presented to the Public Relations Division of the Association for Education in Journalism and Mass Communication, Toronto, Canada

Chen, S., Zhao, S., McDermott, P.F., White, D.G., Cui, S. and Meng, J. (2004). "The Roles of Target Mutation and Efflux in Fluoroquinolone Resistant *Salmonella*." Annu. Meet. Am. Soc. Microbiol., New Orleans, LA. *Project Ref. U.026*

Cui, S., McDermott, P.F. and Meng, J. (2004). "Prevalence and Characterization of *Salmonella* Serovars from Retail Organic Chicken." Annu. Meet. Am. Soc. Microbiol., New Orleans, LA. *Project Ref. C.001*

Dubois, J., Fry, F. S., Calvey, E. M., and Lewis E.N., (2004). "Near-Infrared Imaging in Food Safety" FACSS, Portland, OR. *Project Ref. C.004*

Dubois, J., Keys, C., Calvey, E.M. and Fry, F.S. (2004). "Rapid Bacterial Identification Using Infrared Spectroscopy: Meeting Real World Challenges Using a Dedicated Expert System." FDA Science Forum. Washington, D.C. *Project Ref. C.004*

Dubois, J., Lewis, E.N., Calvey, E.M., Al Khaldi, S.F., Mossoba, M.M., and Fry, F.S. (2004). "An Array-Based Approach for Bacterial Identification by Infrared Spectroscopy." *Microscopy and Microanalysis*, Savannah, GA. *Project Ref. C.004*

Falvey, D.E. (2004/2005). "An Integrated Approach for Identifying Phototoxic Cosmetic Ingredients." JIFSAN Research Grant Symposium, College Park, MD *Project Ref. U.027*

Francke-Carroll, S., Daly, K., Wang, T. and Magnuson, B. (2004). "Underlying Age-Related Liver Pathology Increases Azoxymethane Toxicity in Female F344 Rats in an Aging Study on Colon Cancer Chemoprevention." Society of Toxicology Annual Meeting, March, Baltimore. *Project Ref. U.015*

Ge, B., McDermott, P.F., White, D. and Meng, J. (2004). "The Role of Efflux Pumps and Target Gene Alteration in Antimicrobial Resistance of *Campylobacter jejuni/coli*." The 44<sup>th</sup> Interscience Conference on Antimicrobial Agents and Chemotherapy, Washington, DC. *Project Ref. U.012*

Ge, B., Zheng, J. and Meng, J. (2004). "Antimicrobial susceptibility of *Campylobacter* spp. and *Salmonella* serovars Isolated from Retail Organic Chickens." The 44<sup>th</sup> Interscience Conference on Antimicrobial Agents and Chemotherapy, Washington, DC. *Project Ref. U.012*

Hansen, N. (2004/2005). "Study of Nisin and Sublancin in a Strategy for Protection of the United States Food Supply from Pathogenic Bacterial Spores Introduced through Bioterrorism." JIFSAN Research Grant Symposium, College Park, MD. *Project Ref. U.022*

Kane, A, Shaikh, B. and Reimschuessel, R. (2004/2005). "Facilitating Needed Drug Approvals for Aquaculture *in vitro* Metabolic Profiles to Characterize and Predict Drug Residues in Finfish." JIFSAN Research Grant Symposium, College Park, MD. *Project Ref. U.024*

Khachik, F. (2004). "Chemical and Metabolic Oxidation of Carotenoids" The XI Oxygen Club of California, 2004 Congress, Santa Barbara, California. *Project Ref. U.001*

Khurana, M. and Eddington, N.D. (2004). A Simple HPLC Assay for Determination of Gentamicin in Rat Urine and Its Application to Urinary Excretion Study. University of Maryland School of Pharmacy, Research Day Celebration, Baltimore, MD. *Project Ref. U.017*

Khurana, M. and Eddington, N.D. (2004). A Simple and Sensitive HPLC Assay for Determination of Gentamicin Components C1, C2a and C2 in Rat Urine, Plasma and Tissues: Application to Urinary Excretion and Tissue Uptake Study. AAPS, Baltimore, MD. *Project Ref. U.017*

Khurana, M. and Eddington, N.D. (2004). Physiological Based Pharmacokinetic Model for Gentamicin in Rats. AAPS, Baltimore, MD. *Project Ref. U.017*

Lo, Y.M. (2004/2005). "Moving Whole-Cell Biosensing from a Qualitative to Quantitative Tool: Development of a Dynamic Cell Immobilization Mechanism." JIFSAN Research Grant Symposium, College Park, MD. *Project Ref. U.023*

Magnuson, B. (2004). "Comparison of the Effects of Curcumin Supplements in Young and Aged Rats." JIFSAN Research Grant Symposium, College Park, MD. *Project Ref. U.015*

McComas, K. and Tuite, L. (2004). "Conflicted Scientists: The "Shared Pool" Dilemma of Scientific Advisory Committees." Paper presented at the Association for Education in Journalism and Mass Communication Annual Convention, Toronto, ON. *Project Ref. U.016*

McComas, K., Waks, L., Simone, L., and Sherman, L. (2004). "Predicting Satisfaction and Outcome Acceptance with Decision-Making Processes: The Role of Procedural Justice." Paper presented at the International Communication Association Annual Meeting, New Orleans, LA. *Project Ref. U.016*

Meng, J., Ge, B., McDermott, P., White, D. and Zhao, S. (2004). "The Role of Efflux Pumps in Antimicrobial Resistance in *Campylobacter jejuni/coli*." The 5<sup>th</sup> World Congress Foodborne Infections & Intoxications, Berlin, Germany. *Project Ref. U.026*

Meng, J., McDermott, P.F., & White, D.G. (2004/2005) "Molecular Mechanisms on Fluoroquinolone and Erythromycin Resistance in *Campylobacter jejuni/coli*." JIFSAN Research Grant Symposium, College Park, MD. *Project Ref. U.026*

Ottinger, M.A. (2004). "The Actions of Endocrine Disrupting Chemicals in Poultry." Invited Keynote Speaker, 5th International Congress on Food Animal Endocrinology, Budapest, Hungary, *Project Ref. U.020*.

Ottinger, M.A. (2004). "Transfer of Soy Isoflavones into the Eggs of Japanese Quail (*coturnix japonica*)." Invited Keynote Speaker, The 3rd International Symposium on Egg Nutrition for Health Promotion, Banff, Alberta, Canada. *Project Ref. U.020*

Ottinger, M. A., Lin, F., Wu, J.M., Quinn, M.J., Jr., Abdelnabi, M.A., Lavoie, E.T. and Giusti M.M. (2004) "Isoflavones-enriched eggs: Transfer of Isoflavones into Eggs and Health Benefits." In *The Amazing Egg: Nature's Perfect Functional Food for Health. The Post-Symposium Proceeding Book. The 3<sup>rd</sup> International Symposium on Egg Nutrition for Health.* Banff, Alberta, Canada. *Project Ref. U.020*

Sahin, K., Ozercan, R., Onderci, M., Sahin, N., Gursu, M., Khachik, F., Sarkar, F.H., Munkarah, A., Ali-Fehmi, R., Kmak, D. and Kucuk, O. (2004) "Lycopene Supplementation Prevents the Development of Spontaneous Smooth Muscle Tumors of the Oviduct in Japanese Quail." FASEB, Washington, DC. *Project Ref. U.001*

Song, W. (2004) "Campylobacter jejuni-host Interaction on the Intestinal Mucosal Surface." JIFSAN Research Grant Symposium, College Park, MD. *Project Ref. U.025 & U.002*

Tao, Y. (2004) “Advanced Detection Technology for Food Processing Lines.” National Food Processor Association (NFPA) Annual Conference, Washington DC. *Project Ref. U.021*

Tao, Y. (2004) “Bio-Imaging and Machine Vision.” Zhejiang University, China. *Project Ref. U.021*

Tao, Y. (2004) “Imaging Modalities for Quality & Safety Inspections.” CIGR International Annual Conference. Beijing, China. (2004) *Project Ref. U.021*

Tao, Y. (2004) “Machine Vision & Imaging for Automated Detection of Hazardous Materials.” National Food Processor Association (NFPA) Annual Conference, Washington, DC. *Project Ref. U.021*

Tao, Y. (2004) “Machine Vision Intelligence, Process Automation, and Productivity. Invited lecture to Chinese Governmental Official Training Class.” (Invited by the Institute of Global Chinese Affairs of UMD). *Project Ref. U.021*

Tao, Y. and Lefcourt, A. (2004/2005) “Safety Inspection of Fresh-Cut Fruits and Vegetables Using Spectral Sensing and Imaging Techniques.” JIFSAN Research Grant Symposium, College Park, MD. *Project Ref. U.021*

Tao, Y., Vargas, A., Kim, M., Lefcourt, A.M., Chen, Y.M., Luo, Y., Buchanan, R.L. and Song, Y. (2004) “Safety Inspection of Fruit and Vegetables Using Optical Sensing and Imaging Techniques - Hyperspectral Fluorescence Imaging System for Food Safety. JIFSAN Annual Conference, College Park, MD. *Project Ref. U.021*

Vargas, A.M., Tao, Y., Kim, M., Lefcourt, A.M., Luo, Y. and Chen, Y.R. (2004) “Safety Inspection of Fruit and Vegetables Using Optical Sensing and Imaging Techniques.” written for presentation at the 2004 ASAE Annual International Meeting Sponsored Ottawa, Ontario, Canada. *Project Ref. U.021*

Walsh, C. and Ottesen, A. (2004/2005) “Influence of Pre-Harvest Antibiotic Pesticide Treatment on the Microflora of Apple and Pear Blossoms, Leaves, Fruit, and Cider and its Implications for Food Safety.” JIFSAN Research Grant Symposium, College Park, MD. *Project Ref. U.019*

Wang, J. and Lo, Y.M. (2004) “Characterization of Stress-Responsive Bioluminescence Induced by Toxic Harmful Algae.” ASABE/CSABE Annual Meeting, Ottawa, Canada. *Project Ref. U.023*

Wang, J. and Lo, Y.M. (2004) “Detection and Identification of Toxic Harmful Algae Using Bioluminescent Stress Fingerprinting.” IFT Annual Meeting, Las Vegas, NV. *Project Ref. U.023*

Yeh, E. and Meng, J. (2004) “Isolation of *Listeria Monocytogenes* from Retail Organic Chickens.” Annu. Meet. Am. Soc. Microbiol., New Orleans, LA. *Project Ref. C.001*

## **2003**

Abou-Zeid, K.A. and Yoon, K.S. (2003). "Fate of *Listeria monocytogenes* in Brain Heart Infusion Broth Containing Combined Potassium Lactate and Sodium Diacetate at Various Temperatures." IFT Annual Meeting, Chicago, IL. *Project Ref. U.014*

Cheng, M. Y., Tao, Y., Chen, R. and Chan, D. (2003). "Hyperspectral Imaging and Feature Extraction Methods in Fruit and Vegetable Defect Inspection." ASAE International Annual Meeting, Las Vegas, NV. 2003. ASAE Paper No. 033119. The American Society of Agricultural Engineering, St. Joseph, MI. *Project Ref. U.021*

Chew, E. Y., Ferris III, F.L., deMonasterio, F. M., Thompson, D. J., Kim, J., Csaky, C.G., Woods, M., Khachik, F., Bone, R. and Landrum, J. (2003). "Dose Ranging Study of Lutein Supplementation in Persons over Age 60, Association for Research in Vision and Ophthalmology (ARVO)" Fort Lauderdale, Florida. *Project Ref. U.001*

Foley, S. L., Simjee, S., Meng, J., White, D.G., McDermott, P.F., Friedman, Qaiyumi, S. and Zhao, S. (2003). "Evaluation of Molecular Typing Methods for Escherichia coli O157:H7 Isolated from Cattle, Food, and Human." 7<sup>th</sup> PulseNet Annual Update Meeting, San Antonio, Texas. *Project Ref. C.002*

Khachik, F. (2003). "Distribution, Metabolism, and Physiological Functions of Lutein and Zeaxanthin in Disease Prevention" A Conference on the Role of Lutein and Zeaxanthin in the Prevention of Macular Degeneration, Organized by Agencia Nacional de Vigilancia Sanitaria (ANVISA), Government of Brazil, Brasilia, Brazil. *Project Ref. U.001*

Khachik, F. (2003). "Distribution, Metabolism, and the Role of Carotenoids in Disease Prevention." An International Ceres® Forum, Examining the Health Benefits of Lycopene from Tomatoes" Organized by Center for Food and Nutrition Policy at Virginia Tech, Washington DC. *Project Ref. U.001*

Khurana, M., Moulton, K., Chiesa, O.A., von Bredow, J.D. and Eddington, N.D. (2003). Pharmacokinetics of Gentamicin after Single and Multiple Doses in Holstein Steers. American Association of Pharmaceutical Sciences, Salt Lake City, UT. *Project Ref. U.017*

Lin, F., Giusti, M.M., J. Wu, J. and M. A. Ottinger, M.A. (2003). "Effects of Dose and Glycosylation on the Transfer of Genistin into the Eggs of the Japanese Quail (*Coturnix japonica*)." IFT annual Meeting, Anaheim, California. 2002. Biosciences Research & Technology Review Day, College Park, MD. 2002. IFT Maryland Section Supplier's Night, Timonium, MD. *Project Ref. U.020*

Magnuson, B. and Francke-Carroll, S. (2003). "Comparison of the Growth and Pathology of Colonic Preneoplastic Lesions in Young and Adult F344 Rats Fed Various Diets." Proceedings of the Frontiers in Cancer Prevention Research Conference A121, Phoenix, AZ. *Project Ref. U.015*

Magnuson, B. (2003). "Aging Affects Response to Dietary Curcumin Supplements." Food and Drug Administration seminar. CFSAN, College Park, MD. *Project Ref. U.015*

McComas, K. (2003). "Investigating the Perceived Credibility of FDA Advisory Committee Meetings." Invited presentation at the JIFSAN Research Grant Symposium, College Park, MD. *Project Ref. U.016*

Meng, J. (2003). "Emerging antimicrobial resistance in foodborne pathogens." Keynote lecture, 5<sup>th</sup> International Symposium on the Epidemiology and Control of Foodborne Pathogens in Pork, Greece. *Project Ref. U.012*

Moulton, K.E., Peggins, J.O., Chiesa, O.A., Chamberlain, P.L., von Bredow, J., Thomas, M.H., Eddington, N.D. and Khurana, M. (2003) "Antibiotic Gentamicin: A Long Depletion Time in Holstein Steers." 9<sup>th</sup> Annual FDA Sciences Forum, Washington Convention Center, Washington, DC. *Project Ref. U.017*

Rodriguez-Saona, L.E., Fry, F.S., Khambaty, F.M. and Calvey, E.M. (2003) "Application of Aluminum Oxide Membranes for the Rapid Classification of Bacterial Strains Using Fourier Transform Near-Infrared Spectroscopy and Multivariate Analysis." FDA Science Forum. Washington, D.C. *Project Ref. C.004*

Schroeder, C. M., Meng, J., White, D.G., Walker, R.D., Singh, R., McDermott, P.F., Wagner, D.D., DebRoy, C. and Zhao, S. (2003) "Characterization of Antimicrobial-Resistance Integrons Among Shiga Toxin-Producing *Escherichia coli*" The 5<sup>th</sup> International Symposium on "Shiga Toxin (Verocytotoxin)-Producing *Escherichia coli* Infections. Scotland, UK. *Project Ref. U.012*

Simjee, S, Zhang, Y.Y., McDermott, P.F., Donabedian, S.M., Zervos, M.J. and Meng, J. (2003) "Heterogeneity of *vatE* Carrying Plasmids in *E. faecium* recovered from Human and Animal Sources." 43<sup>rd</sup> Interscience Conference on Antimicrobial Agents and Chemotherapy, Chicago, IL. *Project Ref. C.001*

Simone, L. and McComas, K.A. (2003) "Perceptions of Media Coverage of Conflicts of Interest within the U.S. Food and Drug Administration's Advisory Committees." Paper presented at the Association for Education in Journalism and Mass Communication Annual Convention, Kansas City, MO. August. *Project Ref. U.016*

Tao, Y., Vargas, A.M., Kim, M., Lefcourt, A.M., Chen, Y.R., Luo, Y., Kelly, J., Chan, D., Buchanan, R.L., Song, Y. (2003) "Safety Inspection of Fruit and Vegetables Using Optical Sensing and Imaging Techniques." Annual Symposium of JIFSAN Food Safety Research. University of Maryland. *Project Ref. U.021*

Vargas, A.M., Tao, Y., Kim, M., Lefcourt, A.M., Chen, Y.R., Kelly, J. (2003) "Safety Inspection of Fruit and Vegetables Using Optical Sensing and Imaging Techniques." Poster at Bioscience Day, University of Maryland, College Park, MD. *Project Ref. U.021*

Wang, J. and Lo, Y.M. (2003) "Enabling Whole-Cell Biosensing: Quantification of Stress-Responsive Bioluminescence from a Five-Gene *luxCDABE* Reporter System." IFT Annual Meeting, Chicago, IL. *Project Ref. U.023*

Yoon, K.S. (2003) “Antimicrobial Effect of the Combination of Potassium Lactate and Sodium Diacetate on Growth and Survival of *Listeria monocytogenes*.” Joint Institute of Food Safety and Applied Nutrition (JIFSAN), College Park, MD. (2003) *Project Ref. U.014*

## **2002**

Barratt, R.A., Yoon, K.S. and Whiting, R.C. (2002). “The Effect of pH and Agitation on the Growth of *Listeria monocytogenes* in Brain Heart Infusion (BHI) Broth Containing Combined Potassium Lactate and Sodium Diacetate Stored at 4°C and 10°C.” International Association of Food Protection, 89<sup>th</sup> Annual Meeting. Technical program abstract pp:54. San Diego, CA. *Project Ref. U.014*

Bernstein, P. S., Zhao, D.-Y., de Moura, F. F., Aebischer, C. and Khachik, F. (2002). “Metabolic Transformations of Carotenoids in Ocular Tissues of Humans and Non-Primate Animal Models” Association for Research in Vision and Ophthalmology (ARVO), Fort Lauderdale, Florida. *Project Ref. U.001*

Calvey, E.M., Rodriguez-Saona, L.E., Fry, F.S. and Khambaty, F.M. (2002). “FT-NIR Rapid Determination of Food Integrity.” JIFSAN Advisory Council Meeting. (invited). *Project Ref. C.004*

Calvey, E.M., Rodriguez-Saona, L.E., Fry, F.S., Khambaty, F.M. and Mossoba, M.M. (2002). “Applications of FT-NIR and FT-IR for Rapid Testing of Food Contaminants.” Third Joint CSL/JIFSAN Symposium on Food Safety and Nutrition. (invited) *Project Ref. C.004*

Chen, S., Zhao, S., White, G., McDermott, P.F. and Meng, J. (2002). “Characterization of Antimicrobial Resistant Salmonella.” (2002) 102nd Annu. Meet. Am. Soc. Microbiol., Salt Lake City, UT. *Project Ref. C.001*

De Villena, Meng, J. and White, D.G. (2002). “Fluoroquinolone Resistance of Avian *E. coli*.” Annu. Meet. Intl. Asso. Food Prot., San Diego, CA. *Project Ref. C.001*

Francke-Carroll, S., Montgomery, J.E., Hines, F.A. and Magnuson, B.A. (2002). “The Effect of a Dietary Curcumin Supplement on the Development of Histopathological Age-Associated Changes in Male Azoxymethane-Treated F344 Rats.” Society of Toxicologic Pathology. Denver, Colorado. *Project Ref. U.015*

Ge, B., White, D.G., Zhao, S., McDermott, P.F., Walker, R.D. and Meng, J. (2002). “Antimicrobial-Resistant *Campylobacter* Isolated from Retail Raw Meats.” 102nd Annu. Meet. Am. Soc. Microbiol., Salt Lake City, UT. *Project Ref. U.012*

González, J.F., Reimschuessel, R., Shaikh, B. and Kane, A.S. (2002). “*In vitro* Metabolic Profiles to Characterize and Predict Drug Residues in Aquacultured Finfish.” (Abstract) Presented at the Fourth International Symposium on Aquatic Animal Health, New Orleans, LA. *Project Ref. U.024*

Khachik, F. (2002). "Development of Industrial Processes for Production of 3'-Epilutein, (3R, 3'R)-Zeaxanthin, (3R, 6'R)- $\alpha$ -Cryptoxanthin, and (3R)- $\beta$ -Cryptoxanthin from Technical Grade (3R, 3'R, 6'R)-Lutein" 13<sup>th</sup> International Symposium on Carotenoids, Honolulu, HI. *Project Ref. U.001*

Khachik, F., de Moura, F.F., Bernstein, P.S., Zhao, D.Y. and Aebischer, J.C. (2002). "Distribution and Metabolism of Ocular Carotenoids in Humans and Non-Primate Animal Models" 13<sup>th</sup> International Symposium on Carotenoids, Honolulu, HI. *Project Ref. U.001*

Khachik, F., Telang, N., T., Enjo, F. and Lipkin, M. (2002). "Bioavailability of Major Dietary Carotenoids in C57BL/6J Mice Administered a Formulated Multicarotenoid Mixture" 13<sup>th</sup> International Symposium on Carotenoids, Honolulu, HI. *Project Ref. U.001*

Khachik, F., Telang, N. and Lipkin, M. (2002). "Development of a Mixture of Dietary Carotenoids as Cancer Chemopreventive Agents: C57BL/6J Mice as a Useful Animal Model for Efficacy Studies with Carotenoids. "Phytochemicals: Mechanisms of Action", College of Agriculture, California State Polytechnic University, Pomona, California. *Project Ref. U.001*

Kucuk, O., Sakr, W., Djuric, Z., Pollak, M., Khachik, F., Parchment, R., Belinsky, S., Banerjee, M., Bertram, J. and Wood, D. (2002). "Lycopene and Prostate Cancer" 13<sup>th</sup> International Symposium on Carotenoids, Honolulu, HI. *Project Ref. U.001*

Kwon, Y., Montgomery, J.E., Hines, F.A. and Magnuson, B.A. (2002). Aging Alters the Inhibition of Colonic Aberrant Crypt Foci by Curcumin. American Institute for Cancer Research Annual Research Conference, Washington, DC. *Project Ref. U.015*

Lee, H.S., Khachik, F. and Park, J. H.Y. (2002). "Lycopene Reduces Levels of Insulin-Like Growth Factor-I Receptor (IGF-1R), Insulin Receptor Substrate (IRS-1), Akt, and Mitogen-Activated Protein Kinase (MAPK) in Human Colon Cancer HT-29 Cells" FASEB, New Orleans. *Project Ref. U.001*

Lo, Y.M. (2002). "Moving Whole-Cell Biosensing from a Qualitative to Quantitative Tool." Institute of Biological Engineering Meeting, Baton Rouge, LA. *Project Ref. U.023*

Malik, M. and Magnuson, B. (2002) "Semi-Quantitative Multiplex PCR Using LabChip Technology. CE in Biotechnology and Pharmaceutical Industries." Practical Applications for Analysis of Proteins, Nucleotides and Small Molecules. Washington, DC. *Project Ref. U.015*

McComas, K.A. (2002). "Credibility, Conflict of Interest, and Satisfaction with Advisory Committees: Report on Research In-Progress." Invited presentation to the Center for Food Safety and Applied Nutrition Staff College at the U.S. Food and Drug Administration, College Park, MD. *Project Ref. U.016*

- McComas, K.A. and Simone, L.S. (2002). "Conflict of Interest, Credibility, and Advisory Committee Meetings: A Pilot Study." Paper presented at the 2002 Society for Risk Analysis Annual Meeting, New Orleans, LA. *Project Ref. U.016*
- McComas, K.A. and Simone, L. (2002). "Media Coverage of Conflicts of Interest in Science." Paper presented at the 2002 Association for Education in Journalism and Mass Communication Annual Convention, Miami, FL. (2002) *Project Ref. U.016*
- Moulton, K.E., Peggins, J.O., Chiesa, O.A., Chamberlain, P.L., von Bredow, J. Thomas, M.H., Eddington, N.D., and Khurana, M. (2002) "Relationship of Drug Levels in Biological Fluids to Tissue Concentrations in Bovine Steers 224." American Chemical Society National Meeting, Boston, MA. *Project Ref. U.017*
- Rodriguez-Saona, L.E., Khambaty, F.M., Mossoba, M.M., Fry, F.S., Calvey, E.M. (2002) "Detection and Classification of Bacterial Strains by FT-NIR" Poster presented at the FDA Forum. Washington, DC. *Project Ref. C.004*
- Rodriguez-Saona, L.E., Fry, F.S., Khambaty, F.M. and Calvey, E.M. (2002) "Application of Aluminum Oxide Membranes for the Rapid Classification of Bacterial Strains Using Fourier Transform Near-Infrared Spectroscopy and Multivariate Analysis." Ann. Mtg., Inst. Food Technol., Anaheim, CA, (2002) *Project Ref. C.004*
- Rodriguez-Saona, L.E., Fry, F.S., Khambaty, F.M., and Calvey, E.M. (2002) "Use of Fourier-Transform Near Infrared (FT-NIR) for Differentiating Among *Bacillus* Species." FDA Science Forum. Washington, DC. *Project Ref. C.004*
- Schroeder, M. C., White, D.G., Ge, B., Zhang, Y., McDermott, P.F., Ayers, S., Zhao, S. and Meng, J. (2002) "Isolation of Antimicrobial-Resistant *Escherichia coli* from Retail Meats Purchased in Greater Washington, DC." Conference on Antimicrobial Resistance. Bethesda, MD. *Project Ref. U.012*
- Schroeder, C.M., Zhao, C., DebRoy, C., Torcolini, J., Zhao, S., White, D.G., Wagner, D.D., Walker, R.D. and Meng, J. (2002) "Antimicrobial resistance among *Escherichia coli* O157 Isolated From Humans, Cattle, Swine, and Food" 102nd Annual. Meet. Am. Soc. Microbiol. Salt Lake City, UT. *Project Ref. U.012*
- Simjee, S, White, D.G., Carter, P.J., Zervos, M.J., Donabedian, S.M. Qaiyumi, S., Zhao S., Wagner, D.D., Meng, J. and McDermott, P.F. (2002) "Prevalence of Enterococcal Virulence Genes in Streptogramin-Resistant *E. faecium* Isolated from Retail Poultry and Humans and *gelE* Expression in a Streptogramin Resistant *E. faecium* Isolate." 42<sup>nd</sup> Interscience Conference on Antimicrobial Agents and Chemotherapy, San Diego, CA. *Project Ref. C.001*
- Tao, Y. (2002) "Machine Vision and Imaging for Inspection of Agricultural Materials." Zhejiang University, Hangzhou, China. Invited by Zhejiang University, China. *Project Ref. U.021*

Tao, Y. (2002) "Machine Vision and Productivity: Techniques and Collaborations in Fruit/Food Quality Sorting, X-ray Detection of Hazardous Materials in Foods, and Other High-speed Machine Vision On-line Inspections." Forum on Ag & Bio System Engineering Development Strategy, Yangling, China. Invited by the Minister of Agriculture of China and Chinese Society of Agricultural Engineers. *Project Ref. U.021*

Zhao, S., Ge, B., White, D. G., McDermott, P. F., Walker, R. D. and Meng, J. (2002) "Characterization of Antimicrobial Resistance of *Campylobacter* Isolated from Retail Raw Meats." Western Poultry Disease Conference, Mexico. *Project Ref. U.012*

## **2001**

Ge, B., Bodeis, S., Walker, R.D., White, D.G., Zhao, S., McDermott, P.F. and Meng, J. (2001). "Comparison of Etest and Agar Dilution Methods for Antibiotic Susceptibility Testing of *Campylobacter* Isolated from Retail Meats." Annual Meeting of National Antimicrobial Resistance Monitoring Program, Rockville, MD. *Project Ref. U.012*

Ge, B., White, D.G., Zhao, S., McDermott, P.F., Walker, R.D. and Meng, J. (2001). "Antimicrobial-Resistant *Campylobacter* Isolated from Retail Raw Meats in Greater Washington Area." The 11<sup>th</sup> Intl. Workshop on *Campylobacter*, *Helicobacter* and related organisms. Freiburg, Germany. *Project Ref. U.012*

Ge, B., Zhao, S., Gaines, S.A., Friedman, S. and Meng, J. (2001). "Genomic DNA Fingerprinting of *Campylobacter* Isolated from Retail Poultry Meats by Ribotyping and Pulsed-Field Gel Electrophoresis." 101st Annu. Meet. Am. Soc. Microbiol., Orlando, FL. *Project Ref. U.012*

Khachik, F. (2001). "Development of a Multicarotenoid Dietary Supplement for Chemoprevention of Cancer and Age-related Macular Degeneration" International Food Ingredients & Additives Exhibition and Conference, Tokyo, Japan. *Project Ref. U.001*

Khachik, F., Carvalho, L., Bernstein, P.S., Muir, G.J., Zhao, D.Y. and Katz, N.B. (2001). "Chemistry, Distribution, and Metabolism of Tomato Carotenoids and Their Impact on Human Health" International Symposium on the Role of Tomato Products and Carotenoids in Disease Prevention, New York, NY. *Project Ref. U.001*

Khachik, F., Carvalho, L., Bernstein, P.S., Muir, G.J., Zhao, D.Y. and Katz, N.B. (2001). "Distribution of Carotenoids and Their Metabolites in the Ocular Tissues of Humans, Quails, and Frogs: Useful Non-primate Animal Models for Investigating the Metabolic Transformation of Macular Carotenoids" Gordon Research Conference on Carotenoids, Ventura, California. *Project Ref. U.001*

Khachik, F., Carvalho, L., Telang N., Fumio, E. and Lipkin, M. (2001). "Bioavailability and Tissue Disposition of Major Dietary Carotenoids in C57BL/6J Mice Administered a Formulated Multicarotenoid Mixture" Gordon Research Conference on Carotenoids, Ventura, California. *Project Ref. U.001*

Rodriguez, L.E., Khambaty, F.M., Fry, F.S., Calvey, E.M. (2001) "Discrimination of Bacterial Strains by Fourier-Transform Near-Infrared Spectroscopy Using an Aluminum Oxide Membrane." Conference on "Spectroscopic Properties of Biological Materials". Environmental and Industrial Sensing Symposium, SPIE-International Society for Optical Engineering, Newton, MA. *Project Ref. C.004*

Simjee, S., White, D.G., McDermott, P.F., Wagner, D.D., Hayes, J. and Meng, J. (2001) "Prevalence of Streptogramin Resistance Genes Among *Enterococcus faecium* Isolates Recovered from Retail Meats in the Greater Washington DC Area." 101st Annu. Meet. Am. Soc. Microbiol., Orlando, FL. *Project Ref. C.001*

Tao, Y. (2001) "Machine Vision for Food Quality and Safety." Invited by National Food Processor Association (NFPA). Audiences were Food Industry, FBI, FDA, and USDA. Washington, DC. *Project Ref. U.021*

Wagner, D.D., Hayes, J.R. and Meng, J. (2001) "Antibiotic Resistance Profiles of *Enterococcus* spp. Isolated from Retail Meat." 101st Annu. Meet. Am. Soc. Microbiol., Orlando, FL. *Project Ref. C.001*

Yang, H., Chen, S., White, D.G., Zhao, S., De Villena, F. and Meng, J. (2001) "Multiple Antimicrobial Resistance in Porcine *Escherichia coli* Isolated in China." 101st Annu. Meet. Am. Soc. Microbiol., Orlando, FL. *Project Ref. C.001*

Zhao, S., White, D.G., Walker, R.D., McDermott, P.F., Friedman, S., English, L., Ayers, S., Meng, J., Maurer, J. and Holland, R. (2001) "Identification and Expression of the Cephamycinase Bla-cmy gene of *Escherichia coli* and *Salmonella* Isolated from Animals and Food." 101st Annu. Meet. Am. Soc. Microbiol., Orlando, FL. (2001) *Project Ref. C.001*

## **2000**

Calvey, E.M. (2000). "Analysis of the Volatile Sulfur-Containing Constituents of Garlic." American Herbal Product Association, International Garlic Symposium (invited). *Project Ref. C.004*

Ge, B., Larkin, C., Ahn, S., Jolley, M., Nasir, M., Hall, R. and Meng, J. (2000). "Identification of *Escherichia coli* O157:H7 and Other Enterohemorrhagic Serotypes by EHEC-hlyA Targeting, Strand Displacement Amplification and Fluorescent Polarization Readout." Abstr. 100th Annu. Meet. Am. Soc. Microbiol., Los Angeles, CA. *Project Ref. C.002*

Humphries, J., Graham, R., McIntosh, G., Worsley, T. and Khachik, F. (2000). "The Role of Carotenoids in Human Health" First South East Asia and Pacific Regional Meeting on Carotenoids, Bangkok, Thailand. *Project Ref. U.001*

Khachik, F. (2000). "Bioavailability and Metabolism of Dietary Carotenoids" International Conference and Exhibition on Nutraceuticals and Functional Foods, Houston, Texas. *Project Ref. U.001*

Khachik, F. (2000). "Distribution, Bioavailability, and Metabolism of Lycopene in Humans" Prostate Cancer Prevention 2000: The Role of Nutrition, Organized by Faculty of Medicine, University of Toronto, Toronto, Canada. *Project Ref. U.001*

Khachik, F. (2000). "Distribution of Carotenoids in Human Serum and Tissues" First South East Asia and Pacific Regional Meeting on Carotenoids, Bangkok, Thailand. *Project Ref. U.001*

Khachik, F. (2000). "Mechanistic Studies on Carotenoids and Their Metabolites in the Prevention of Chronic Diseases" International Conference and Exhibition on Nutraceuticals and Functional Foods, Houston, Texas. *Project Ref. U.001*

Khachik, F. (2000). "Update on Carotenoid Analysis" First South East Asia and Pacific Regional Meeting on Carotenoids, Bangkok, Thailand. *Project Ref. U.001*

Lomander, A., Schreuders, P.D. and Ali, L.H. (2000). "Analytical Techniques for the Evaluation of Biofilms on Food Processing Materials." Northeast Agricultural/Biological Engineering Conference, Ithaca, NY. *Project Ref. U.011*

Rodriguez-Saona, L.E., Fry, F.S., Calvey, E.M. (2000) "Rapid analysis of sugars in fruit juices by FT-NIR: Comparison of sampling devices." Ann. Mtg., Inst. Food Technol., Dallas, TX. *Project Ref. C.004*

Rodriguez-Saona, L.E., Khambaty, F.M., Fry, F.S., Calvey, E.M. (2000). "A Novel Approach for the Rapid Discrimination of Bacterial Strains by FT-NIR Spectroscopy" Conference on "Photonic Detection and Intervention Techniques for Safe Plant, Animal and Food", SPIE-International Society for Optical Engineering. Boston, MA. *Project Ref. C.004*

Simjee, S., White, D.G., McDermott, P.F., Wagner, D.D., Hayes, J. and Meng, J. (2000) "Prevalence of Streptogramin Resistance Genes Among *Enterococcus faecium* Isolates Recovered from Retail Meats in the Greater Washington DC Area." Abstr. 1st Intl Sym. Resistant Gram-Positive Infections. San Antonio, TX. *Project Ref. C.001*

Sudler, R., White, D.G., Ayers, S., Zhao, S., Friedman, S., Wagner, D. and Meng, J. (2000) "Antimicrobial Resistance of *Salmonella* and *Escherichia coli* Isolated from Retail Meat Products." Abstr. 100th Annu. Meet. Am. Soc. Microbiol., Los Angeles, CA. *Project Ref. C.001*

Tao, Y. (2000) "Increase Values of Food and Agricultural Products." Invited by US-China Science, Technology, and Business. McLean, VA. *Project Ref. U.021*

Tao, Y. (2000) "Imaging Analyses of Biological Materials for Food Safety." Invited by American Institute for Medical and Biological Engineering (AIMBE). Washington DC. *Project Ref. U.021*

Tao, Y. (2000) "Critical Review: Photonics in Fruit and Vegetable Quality Assessment." Invited by The International Society for Optical Engineering. Boston, MA. In book: Optics in Agriculture 1990-2000. Vol. CR80. pp.65-100. ISBN: 0-8194-3884-7. *Project Ref. U.021*

White, D.G., Zhao, S., Ayers, S., Gaines, S., Friedman, S., Wagner, D., Debroy, C., Needle, D., Davis, M. and Meng, J. (2000) "Characterization of Antimicrobial Resistance Among Shiga-Toxin Producing *Escherichia coli* O111 Isolates." Abstr. 100th Annu. Meet. Am. Soc. Microbiol., Los Angeles, CA. *Project Ref. C.001*

Zhao, S., White, D., Ayers, S., Friedman, S., Ge, B., Meng, J., English, L., Wagner, D. and Gains, S. (2000) "Antibiotic Resistance Integrons in Shiga Toxin-producing *E. coli*." FDA Science Forum, Washington, DC. *Project Ref. C.001*

## **1999**

Blakely, S.R., Khachik, F., Grundel, E., Collins, M.L., Wahi, M.B. and Kornhauser, A. (1999). "Bioavailability of  $\alpha$ -tocopherol and Lutein in Obese and Lean Female Zucker Rats" 12<sup>th</sup> International Symposium on Carotenoids, Cairns, Australia. *Project Ref. U.001*

Khachik, F. (1999). "Development of a Multicarotenoid Dietary Supplement for Chemoprevention of Cancer and Macular Degeneration" 2<sup>nd</sup> International Conference on Food Factors, Chemistry and Health Promotion, Kyoto, Japan. *Project Ref. U.001*

Khachik, F. (1999). "Nutritional Benefits of Dietary Carotenoids and Their Metabolites in Disease Prevention" 8<sup>th</sup> Asian Congress of Nutrition, Seoul, Korea. *Project Ref. U.001*

Khachik, F., Mazzola, E. and Wahi, M. (1999). "Total Synthesis of 2, 6-Cyclolycopene-1, 5-diol: An Oxidative Metabolite of Lycopene in Tomatoes, Tomato-Based Food Products, and Human Serum" 12<sup>th</sup> International Symposium on Carotenoids, Cairns, Australia. *Project Ref. U.001*

Khachik, F., Bernstein, P.S., Squires, A. and Rosser, J.M. (1999). "Identification of Carotenoids and Related Metabolites in Frog Retina and Liver: A Useful Non-Primate Model for Studying the Physiological Role of Macular Carotenoids" 12<sup>th</sup> International Symposium on Carotenoids, Cairns, Australia. *Project Ref. U.001*

Khachik, F., Scholz, T., Hata, T., Askin, A., and Lai, K. (1999). "Distribution of Carotenoids in Human Organs and Tissues" 12<sup>th</sup> International Symposium on Carotenoids, Cairns, Australia. *Project Ref. U.001*

Kucuk, O., Sakr, W., Sarkar, F., Djuric, Z., Li, Y.W., Khachik, F., Velazquez, F., Heilbrun, L., Bertram, J.S., Crissman, J.D., Pontes, E. and Wood, D.P. (1999). "Lycopene Supplementation in Men with Prostate Cancer (PCa) Reduces Grade and Volume of Preneoplasia (PIN) and Tumor, Decreases Serum Prostate Specific Antigen (PSA) and Modulates Biomarkers of Growth and Differentiation" 12<sup>th</sup> International Symposium on Carotenoids, Cairns, Australia. *Project Ref. U.001*

Rodriguez-Saona, L.E., Khambaty, F.M., Fry, F.S., and Calvey, E.M. (1999) "FT-NIR Rapid Determination of Food Contaminants" Eastern Analytical Symposium and Exposition. *Project Ref. C.004*

Rosser, J.M., Khachik, F. and Graham, R.D. (1999) "Distribution of Lutein and Zeaxanthin and Related Geometrical Isomers in Fruits, Vegetables, Wheat, and Pasta Products" 12<sup>th</sup> International Symposium on Carotenoids, Cairns, Australia. *Project Ref. U.001*

Sperrazzo, P., Gellenbeck, K., Khachik, F. and Bubrick, P. (1999) "Differential Cellular Distribution of Carotenoid Pigments in Three Strains of the Alga *Dunaliella Salina*." 12<sup>th</sup> International Symposium on Carotenoids, Cairns, Australia. *Project Ref. U.001*

Squires, A., Katz, N.B, Khachik, F. and Bernstein, P.S. (1999) "Analysis of Xanthophylls and Carotenol Esters in the Frog Retina" Association of Research in Vision and Ophthalmology (ARVO), Fort Lauderdale, FL. *Project Ref. U.001*

Tao, Y. (1999) "Technology and Application of Large-scale Machine Vision Sorting Lines for Fruits and Vegetables." Beijing, China. Invited by the Ministries of Agriculture, Science and Technology, Education, and Foreign Expert Bureau. (Among the 40 been selected from 175 scientists recommended in a worldwide selection). *Project Ref. U.021*

## **1998**

Khachik, F. (1998). "Bioavailability, Metabolism, and Safety of Lutein and Zeaxanthin Supplementation" National Eye Institute Work-Shop, Bethesda, Maryland. *Project Ref. U.001*

Khachik, F. (1998). "Dietary Carotenoids and Their Oxidation Products in Humans," CARIG Conference on Carotenoids, San Francisco. *Project Ref. U.001*

## **1997**

Khachik, F. (1997). "Carotenoids in Fruits, Vegetables, and Human Plasma and Their Role in Nutritional Prevention of Cancer, Heart Disease and Macular Degeneration" conference entitled "Dietary Supplements, Functional & Medical Foods for Chronic Disease of Aging," sponsored by Global Business Research, LTD., Hyatt Regency Alicante, Anaheim, CA. *Project Ref. U.001*

Khachik, F. (1997). "Dietary Carotenoids and Their Antioxidant Mechanism of Action in Prevention of Cancer and Macular Degeneration", conference entitled "Natural Anti-Oxidants and Phytochemicals" sponsored by International Business Communications, Montreal, Quebec, Canada. *Project Ref. U.001*

Khachik, F. (1997). "Dietary Carotenoids in Prevention of Cancer and Macular Degeneration" International Symposium on "Antioxidant Food Supplements in Human Health", Kaminoyama-City, Japan *Project Ref. U.001*

Khachik, F. (1997). "Metabolism of Dietary Carotenoids and Their Possible Role in Prevention of Cancer and Macular Degeneration" Symposium entitled "Functional Foods", 213th American Chemical Society National Meeting, San Francisco, California. *Project Ref. U.001*

Khachik, F. (1997). “Nutritional Significance of Food Carotenoids in Prevention of Chronic Diseases”, Second Annual National Wellness Forum on Complimentary Therapies: Role in Wellness & Health Care, organized by the Institute for Sports Medicine and Health Promotion, Southwest Texas State University, Austin, Texas. *Project Ref. U.001*

Zhao, Z., Khachik, F., Richie, J. and Cohen, L. (1997) “Uptake and Tissue Disposition of Dietary Lycopene in F-344 Rats.” 88th Annual Meeting of the American Association for Cancer Research, San Diego, CA. *Project Ref. U.001*



## **Student Interns**

### **Abstracts, Posters, Presentations and Publications**

2009

#### **U.S. Food and Drug Administration Center for Food Safety and Applied Nutrition-Risk Assessment Coordination.**

Stephanie Briguglio\*, and Marianna Miliotis

#### **Detection and Quantification of Fungi and Aerobic Mesophilic Bacteria in Milk Thistle and Cayenne Pepper Supplements.**

Chelsea Sapp\*, Valerie Tournas, and J. Rivera Calo

#### **Detection of *Yersinia enterocolitica* in Alfalfa, Mung Bean, Cilantro, and Mamey sapote (*Pouteria Sapota*) Food Matrices Using DNA Microarray Chip Hybridization.**

Nusrat Siddique\*, D. Sharma, and Sufian Al Khaldi

#### **Analysis of Uncertainty in Risk Assessment.** JIFSAN Newsletter. Volume 2, Issue 1.

Samantha Watters\*, and Steven Gendel

#### **Overview of Pesticide Analytical Work at the FDA**

Jon Wong, Douglas Hayward, Kai Zhang, Katherine Tech\*, and Alexander Krynitsky

#### **Multiresidue Analysis of Pesticides in Fresh Fruits and Vegetables by a Modified QuEChERS Approach and Capillary Gas Chromatography with Mass Spectrometry-selective Ion Monitoring.**

Jon Wong, Katherine Tech\*, Piyush Sheladia\*, Douglas Hayward, M. Hennessey, Alexander Krynitsky, and Frank Schenck

#### **Salt-out Extraction, Solid-phase Dispersive Cleanup, and GC-MS/SIM Analysis of Pesticides in Wines and Fruit Juices.**

Jon Wong, Katherine Tech\*, Piyush Sheladia\*, Douglas Hayward, Kai Zhang, Alexander Krynitsky, Frank Schenck, Michael Webster, and Susan Ebler

#### **Multiresidue Pesticide Analysis of Botanical Dietary Supplements**

Jon Wong, Katherine Tech\*, Kai Zhang, Douglas Hayward, and Alexander Krynitsky

**Multiresidue Pesticide Analysis of Wines by Dispersive Solid-phase Extraction and Ultra-High Performance Liquid Chromatography-Tandem Mass Spectrometry.**

Jon Wong, Kai Zhang, Douglas Hayward, Alexander Krynitsky, Piyush Sheladia\*, Frank Schenck, Michael Webster, Jeffrey Ammann, and Susan Ebeler

**2008**

**Method to Isolate and Detect Shigella species from Produce Commodities**

Alexander Enurah\*, Ashlee Tipton\*, and Keith Lampel

**Evaluation of Two Immunological Assays and a PCR Assay for Detection of Soy Allergen.**

Nishant Kumar\*, and Eric Garber

**An Overview of 2008 Reported Cases of Botulism**

Aashka Patel\*, Stephanie L.H. Defibaugh-Chavez, and Shashi Sharma.

**Internal Contamination and Spoilage of Harvested Apples by Microfungi.**

Valerie Tournas, and Sarah Uppal\*

**Internal Contamination and Spoilage of Harvested Apples by Patulin-producing and Other Potentially-Toxigenic Fungi**

Valerie Tournas and Sarah Uppal\*

**Challenges in the Analysis of Pesticide Residues in Foods and Botanical Dietary Supplements.**

Jon Wong, Douglas Hayward, Kai Zhang, Katherine Tech\*, and Frank Schenck

**(Posters and abstracts presented at the 2006 and 2005 FDA Science Forum)**

**2006**

**Increasing Confidence Level in DNA Microarray Chip Hybridization Data of 71 Genes with PCR Amplification of 10 Genes in Salmonella Typhimurium (Poster and Abstract)**

S. F. Al-Khaldi<sup>1</sup>, S. Courtney\*<sup>2</sup>, M. E. Mossoba<sup>1</sup>, T. S. Hammack<sup>1</sup>, C. E. Keys<sup>1</sup>,  
<sup>1</sup>CFSAN, FDA, College Park, MD, <sup>2</sup>JIFSAN, FDA, College Park, MD

**The Creation of Consolidated FDA Databases and the Development of Real-Time Data Entry to Support Structure Activity Relationship Approaches in Hazard Identification and Risk Assessment (Poster and Abstract)**

K. B. Arvidson<sup>1</sup>, R. D. Benz\*<sup>2</sup>, E. J. Matthews<sup>3</sup>, J. Mayer<sup>1</sup>, E. Lee<sup>2</sup>, M. L. Twaroski<sup>1</sup>,  
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<sup>4</sup>Leadscope, Inc.

**Automation for Isomer Specific Determination of Polychlorinated Dibenzo-p-dioxins/furans, Polychlorinated Biphenyls and Polybrominated Diphenyl Ethers in Foods and Feeds** (Poster and Abstract)

D. G. Hayward<sup>1</sup>, T. S. Pisano\*<sup>2</sup>, <sup>1</sup>CFSAN, FDA, College Park, MD, <sup>2</sup>JIFSAN, University of Maryland, College Park, MD (Poster and Abstract)

**Distribution Coefficients for Alpha-Amanitin, Ricin and T-2 toxin in Milk and Salad Dressings** (Poster and Abstract)

H. Njapau<sup>1</sup>, F. S. Thomas<sup>1</sup>, A. Chowdhury<sup>2</sup>, S. Trujillo<sup>1</sup>, B. J. Cañas<sup>1</sup>, D. L. Park<sup>1</sup>, <sup>1</sup>CFSAN, FDA, College Park, MD, <sup>2</sup>JIFSAN/University of Maryland, College Park, MD

**Effects of Food Preparation and Lactose on the Detection and Lectin Binding Ability of Ricin B-Chain** (Poster and Abstract)

G. M. Orłowski\*<sup>1</sup>, G. C. Ziobro<sup>2</sup>, E. A. Garber<sup>2</sup>, <sup>1</sup>JIFSAN, University of Maryland, College Park, MD, <sup>2</sup>CFSAN, FDA, College Park, MD

**Contributing Factors (CFs) Identified in Produce-Associated Outbreaks from CDC's National Electronic Foodborne Outbreak Reporting System (eFORS), FoodNet Sites, 1999-2002** (Poster and Abstract)

F. K. Shakir<sup>2</sup>, P. V. McCarthy<sup>1</sup>, J. J. Guzewich<sup>1</sup>, C. R. Braden\*<sup>3</sup>, K. C. Klontz<sup>1</sup>, C. W. Hedberg<sup>4</sup>, K. E. Fullerton<sup>5</sup>, A. Bogard<sup>6</sup>, M. Dreyfuss<sup>7</sup>, K. Larson<sup>8</sup>, D. Vugia<sup>9</sup>, D. C. Nichols<sup>10</sup>, V. J. Radke<sup>2</sup>, T. F. Jones<sup>11</sup>, <sup>1</sup>FDA, Center for Food Safety and Applied Nutrition, Washington, DC, <sup>2</sup>CDC, Atlanta, GA, <sup>3</sup>JIFSAN, University of Maryland, College Park, MD <sup>4</sup>University of Minnesota, Minneapolis, MN, <sup>5</sup>CDC, Atlanta, GA, Atlanta Research and Education Foundation, Atlanta, GA, <sup>6</sup>Minnesota Department of Health, Minneapolis, MN, <sup>7</sup>USDA, Food Safety and Inspection Service, Washington, DC, <sup>8</sup>Maryland Department of Health and Mental Hygiene, Baltimore, MD, <sup>9</sup>California Emerging Infections Program, Oakland, CA, <sup>10</sup>New York State Department of Health, Albany, NY, <sup>11</sup>Tennessee Department of Health, Nashville, TN

**Single Laboratory Validation of Commercially Available Kits for the Detection of Aflatoxin M1** (Poster and Abstract)

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**CFSAN Outbreak Surveillance Database: Outbreaks and Illnesses Reported for 2004 and 2005** (Poster and Abstract)

K. Vierk<sup>1</sup>, E. Elliot<sup>1</sup>, J. J. Guzewich<sup>1</sup>, G. Henderson<sup>1</sup>, T. Hill<sup>1</sup>, K. C. Klontz<sup>1</sup>, P. McCarthy<sup>1</sup>, S. McGarry<sup>1</sup>, C. Purdy<sup>3</sup>, M. Ross<sup>1</sup>, J. Sanders<sup>1</sup>, F. K. Shakir\*<sup>2</sup>, D. Street<sup>1</sup>, B. Timbo<sup>1</sup>, <sup>1</sup>CFSAN, FDA, College Park, MD, <sup>2</sup>JIFSAN, University of Maryland, <sup>3</sup>CFSAN, FDA, Atlanta, GA

**Investigation of Flour Tortillas Implicated in Episodes of Illnesses Associated with School Lunches** (Poster and Abstract)

C. R. Warner<sup>1</sup>, G. O. Noonan<sup>1</sup>, N. Sugimoto<sup>2</sup>, A. Beisaw\*<sup>3</sup>, W. Hsu<sup>3</sup>, G. A. Perfetti<sup>1</sup>, T. H. Begley<sup>1</sup>, G. W. Diachenko<sup>1</sup>, <sup>1</sup>FDA, College Park, MD, <sup>2</sup>National Institutes of Health Sciences, Tokyo, <sup>3</sup>JIFSAN, University of Maryland, College Park, MD

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**Evaluation of Commercial ELISA Kits for Wheat Allergens**

Samantha Amato\*, Greg Orłowski\*, and Eric Garber

**The Teratogen, Valproic Acid, Alters Homeobox Gene Expression during Retinoic Acid-Induced Nerve Cell Differentiation**

Joyce Breger\* and David Reese

**CFSAN Outbreak Surveillance Database**

Christina Coptý\* and Patrick McCarthy

**JIFSAN Student Project: Development of Immunohistochemical Staining Techniques for PCNA and Apoptosis Tissue Markers on Rat Tissue in the CFSAN Pathology Laboratory.**

Michael Ferri\* and Sabine Francke-Carroll

**Determination of Unknown Toxicants in Flour Tortilla by Sequential Extraction: Preliminary Report**

Nick Fico\* and Henry Njapau

**Effect of Ambient Temperature/Atmospheric Pressure Ammoniation of Aflatoxin-Contaminated Dairy Ration Cottonseed on the Levels of Aflatoxin M1 in Milk**

Nick Fico\* and Henry Njapau

**The Effects of Agricultural Pesticide and Antibiotic Applications on Apples and Apple Juice Microflora**

Emily Hawkins\* and Shawn Eblen

**The Determination of Semicarbazide (N-aminourea) in Commercial Bread Products**

Vicky Hsu\* and Charles Warner

**Development of a Structurally Searchable Subchronic Studies Database for Use in Predictive Toxicology Modeling**

Eugene Lee\* and Michelle Twaroski

**Prior Exposure to an Acidic Environment Increases the Acid Resistance of *Enterobacter sakazakii***

Shruti Naik\* and Sharon Edelson Mammel

**Effects of Food Matrices and Processing on Detection of the B Subunit of Ricin Using Enzyme-Linked Immunosorbent Assays**

Greg Orłowski \* and Eric Garber

**Characterization of Virulence Factors Expressed by *Vibrio alginolyticus* Isolates Obtained from Teleosts and Elasmobranchs Housed in a Public Aquarium and Aquaculture Facility**

Matthew Singleton\*, Samya Mohammad\*, Nancy Flores\*, Amit Kalaria\*, and Ben Tall

**An Experimental Model Assessing Chemical-Microbial Interactive Neurobehavioral Toxicity**

Jessica Suagee\* and Larry Garthoff

**Bile Salts Tolerance of Clinical and Food Isolates of *Listeria monocytogenes***

Dawn Winkler\* and Anthony Hitchins

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