

ILSI North America 2012 Summer Fellowship Program

ILSI North America Technical Committee on Food and Chemical Safety

The ILSI North America Technical Committee on Food and Chemical Safety will consider four subject areas described below for the ILSI North America 2012 summer fellowship program. The four topics are AGE's & ALE's, natural colors, furan and Tox21. The selection of the candidate will depend on the candidate's qualifications and the appropriate fit with the candidate's desired project choice. The fellow will be assigned a project that is agreed upon between the fellow and the Food and Chemical Safety Committee.

Selection Criteria

A strong background in science, chemistry, biostatistics, nutrition, and/or toxicology or environmental health is required. A graduate level student is desired.

Applicants should have good written and oral communication skills and strong computer skills (spreadsheet, graphics, presentation, Internet, and statistical programs), and should also be organized, self-motivated, flexible, and able to work independently and interact with a variety of people. Other selection criteria may be added based on the specifics of the program, such as an interest in food safety.

Program Duration

The estimated time period for the program is 8 to 10 weeks during the summer (May-August) of 2012. Alternative start and end dates are negotiable. Two days of vacation will be permitted.

Stipend

The fellow will be provided with a stipend intended to cover expenses including transportation to/from Washington DC and housing.

Housing

George Washington University (GWU), American University (AU), or other housing alternatives are available during the summer of 2012.

Application Instructions

Candidates should submit a statement about the fellow's specific interests in one or more of the four topics; a resume, including service and volunteer activities; an official transcript; and two letters of recommendation. Materials can be submitted to akretser@ilsi.org. Interviews (via phone) of prospective candidates will be arranged. Deadline for submission is Wednesday April 4, 2012.

For more information, please contact Ms. Alison Kretser at akretser@ilsi.org or at 202-659-0074, ext. 161.



About ILSI, ILSI North America, and the Technical Committee on Food and Chemical Safety

International Life Sciences Institute

Founded in 1978, the International Life Sciences Institute (ILSI) is a nonprofit, worldwide foundation that seeks to improve the well-being of the general public through the advancement of science in the areas of nutrition, food safety, toxicology, risk assessment, and the environment by bringing together scientists from academia, government, and industry.

Headquartered in Washington, DC, ILSI accomplishes this work through its worldwide network of branches, and the ILSI Research Foundation. Branches currently operate within Argentina, Brazil, Europe, India, Japan, Korea, Mexico, North Africa & Gulf Region, North America, North Andean, South Africa, South Andean, Southeast Asia Region, as well as a Focal Point in China. The ILSI Health and Environmental Sciences Institute (ILSI HESI) has a global, rather than regional, focus.

ILSI North America

ILSI North America is a unique nonprofit organization based in Washington, DC, that provides a forum for academic, government, and industry scientists to identify important nutrition, food safety, and personal healthcare issues. Through its programs, ILSI North America contributes to scientific understanding of issues for the benefit of the general public. For more information on ILSI North America's areas of interest, projects, staff, and a copy of the 2011 Annual Report, please visit:

<http://www.ilsi.org/NorthAmerica/Pages/HomePage.aspx>

ILSI North America Technical Committee on Food and Chemical Safety

The Food and Chemical Safety Committee helps to assure the safety of foods by providing a forum to advance scientific issues related to food allergens and chemicals of interest, such as additives, contaminants, and naturally occurring components. To learn more about recent committee projects and activities, please visit

<http://www.ilsi.org/NA/Pages/toxicology.aspx>

Fellowship Opportunity in Food Toxicology

Goals of the Fellowship

ILSI North America Technical Committee on Food and Chemical Safety supports a fellowship program for students interested in pursuing careers in food and chemical safety and food toxicology. Committee members seek to:

- Invest in the training and education of future scientists and leaders,
- Promote the development of a diverse, highly skilled, vital workforce, and
- Help students acquire the technical, professional, and personal skills to become leaders in their chosen careers.



Why Consider a Fellowship with the ILSI North America Food and Chemical Safety Committee?

The purpose of the fellowship program is to provide the student with a multifaceted, interdisciplinary experience that incorporates technical and professional skill building opportunities, hands-on experience in an office, networking, and information gathering. The program will emphasize and provide exposure to areas of contemporary scientific interest, emerging issues, modern scientific concepts, and cutting edge methods and tools for research and discovery in the area of food and chemical safety and food toxicology.

- Participate in design of a project of mutual interest to the fellow and the Food and Chemical Safety Committee
- Generate literature reviews
- Develop a report and/or formal presentation related to the specific project
- Attend ILSI North America committee meetings
- Attend public scientific and policy meetings. Interact with numerous organizations and agencies in the Washington, DC area. Write summaries of the key scientific points emerging from meetings attended.
- Potential visit with universities with whom ILSI North America collaborates or receives ILSI North America funding
- Potential visit to a food company including a tour of the facility, and/or meet with food industry scientists to discuss key scientific issues and career paths.
- Potential travel with ILSI North America staff to meetings of professional societies (*e.g.*, the ILSI Annual Meeting, ADA, IAFP, IFT, SOT)

The four subject areas are listed below:

A. Evaluation of the human health implication of AGEs and ALEs

Background:

Advanced glycation endproducts (AGEs) and lipoxidation end products (ALEs) are compounds that can be formed in the body when proteins are structurally modified by sugars and lipids, respectively. They are also formed by cooking when foods are prepared under high temperature. Whether formed internally or ingested in the foods that we eat, AGEs/ALEs are increasingly being implicated in the pathogenesis of various disease conditions including diabetes, atherosclerosis, Alzheimer's disease, and in the process of normal aging. Until about 1980, little was known about AGEs and ALEs, or their potential to producing tissue inflammation and damage. Since the early 80s, many (>100) papers have described the patho-physiological implications of these reactive compounds. A number of these papers have suggested that ingestion of AGEs/ALEs is actually more detrimental to health than internal production. Despite the growing number of studies suggesting negative health implications of AGEs/ALEs, there is no scientific consensus as to whether healthy people are at increased risk from food sources containing AGEs/ALEs.



Purpose:

ILSI held a symposium on heat-formed compounds in 2004 in which a leading researcher in this field presented a paper on AGEs. In the intervening years, this area of research has blossomed leading to a greater recognition of the role of AGEs in human health. Moreover, this area of research has expanded to include the study of the effect of protein modification by lipids (ALEs). This project would involve the fellow's conducting a review of the existing literature on the human health effects attributable to AGEs and the ALEs. Importantly, the fellow would need to understand the relative contribution and importance of exogenous intake of AGEs and ALEs versus their internal metabolic production. The relative strength of their relationship to the pathogenesis of various chronic diseases conditions including diabetes, atherosclerosis, Alzheimer's disease, and normal aging should also be assessed. Evaluation of epidemiological and clinical studies will need to consider the confounding effect of smoking since it is a highly significant source of exogenous AGEs. Areas of future research should be highlighted, included suggested research approaches and methods.

Deliverables:

Provide periodic written updates during the fellowship to the Committee

Create a document/written report on his/her evaluation of the human health implication of AGEs & ALEs

Make a presentation at the fall Food and Chemical Safety Committee business meeting in 2012

Milestones:

Meet with one or more key researchers in the field to obtain most current information on emerging research

Attend a professional society meeting to learn more on AGEs and ALEs (IFT?)

B. Natural Colors

Background:

Since the publication of the 2007 "Southampton Study" in the *Lancet* and the recent hearing on the safety of food colors in March 2011 at the FDA, the use of artificial food colors has come under heavy scrutiny.

Despite the many statistical and scientific flaws identified within the article and the fact that approved artificial colors have undergone extensive safety evaluations, there is a growing population (NGOs and concerned consumers) that are in favor of manufacturing foods that contain natural, rather than artificial, colors. To that end, many food manufacturers are seeking alternatives. However, natural colors, as well as any novel food additive, must undergo extensive safety and regulatory evaluations in order to be approved for use in food.

Purpose and Deliverables:

1. Understand the differences between natural and artificial food colors: how are they manufactured, current use within the food industry, etc.



2. Understand the literature (both toxicologically and nutritionally speaking) behind exposure to artificial and natural colors
 - a. Gain a broad perspective of use, not only in foods, but all CPG companies that may use colors
 - i. ADME/Tox data?
 - ii. Epi studies?
 - iii. Nutritional studies?
3. What natural color alternatives are available?
 - a. Where are they derived?
 - b. Have they undergone safety evaluations?
 - c. What's the regulatory status?
 - d. In what matrix may they be used?
 - i. Sensitive to photosensitization?
 - ii. Heat labile?
 - iii. Etc.?
 - e. Etc.
4. Global landscape
 - a. Current use globally?
 - b. Different regulatory requirements globally?

Milestones:

End of summer summary, identifying and clearly communicating the key deliverables

Meet/speak with experts in the field of colors: epidemiologist, behavioral toxicologist, neurotoxicologist

Attend IFT to learn more about food colors – general background, safety evaluations

Attend International Association of Color Manufacturers Global Conference—September 2012

C. Furan: Estimate the risk from different points of view of heat formed compounds with an emphasis on Furan formation during the heat processing of foods.

Background:

Some unwanted compounds occur in foods when prepared using traditional cooking methods (frying, roasting, baking, and toasting). Examples of such “process-generated” or “process-formed” compounds include acrylamide and nitrosamines. There is an increasing body of literature that suggests a potential for process-generated compounds to produce adverse health effects, resulting in a call for industry testing and labeling.



Purpose:

The Food and Chemical Safety Committee has supported work to assess the potential human health effects of acrylamide in food in the past. Currently the committee is considering a new project to address the safety of other heat-formed compounds in foods in particular Furans. The fellow needs to summarize the current work being done to discover Furans from heating food and identify the several compounds forming and involved. It would be prudent for the fellow to educate the committee on the current state of furan science and any recent findings in the area of heat formation in food. The fellow will be asked to explore Furan formation in heat processing in food and gather the most current scientific information on the potential risks. Regarding risk the fellow would be asked to compare the risk of furans to the currently discussed heat formed compound, Acrylamide. Possibly investigate any epidemiology studies that might be available with Furan human risk and typical levels of Furan that may form in several foods. The fellow is also asked to consider what other areas may need to be explored. A secondary objective could be to explore the nutrition/health benefits of any data on Furan heat-formed compounds, and to contrast these benefits with the risks.

Deliverables:

Provide periodic written updates during the fellowship to the Committee
Create a document/written report on his/her risk assessment of Furan product formation
Make a presentation at the fall Food and Chemical Safety Committee business meeting in 2012

Milestones:

Meet with Dr. David Lineback to obtain background on EU heat-tox project, and/or meet with food industry scientists to discuss key scientific issues on this topic
Review previous work done at ILSI on Acrylamide
Attend a professional society meeting to learn more on process-formed compounds

D. Tox21

For selection of the Tox21 topic, the university which the candidate attends must be working currently in Tox21.

Background:

Tox21 is an interagency collaborative research program between the EPA, the NIEHS/NTP, NIH Chemical Genomics Center (NCGC), and most recently the FDA. The goals of Tox21 are identifying patterns of compound-induced biological response (“toxicity pathway”), prioritizing compounds for more extensive toxicological evaluation, and developing predictive models that can be used to more effectively predict how chemicals will affect biological responses in humans (<http://ntp.niehs.nih.gov/go/28213>; <http://www.epa.gov/ncct/Tox21/>). Chemical toxicity has traditionally been determined through relatively slow and resource intensive animal studies. The new tools of Tox21 could fundamentally change the way chemically-induced biological change is evaluated. Currently the NCGC is constructing a library of more than



10,000 chemicals for quantitative high throughput screening (qHTS) and this 10K Library is expected to be released in December 2011 with qHTS testing to begin shortly thereafter. New data rapidly emerging from Tox21 over the next few years, public and policymakers' perceptions of those data could impact the food and consumer products industry by affecting the public's confidence in the safety of these products.

Purpose:

To understand the potential impact of Tox21 on food industry, the fellow will be asked to explore the 10K Library to identify chemicals of interest to food industry and to evaluate the qHTS results of the identified chemicals. The scope of the project could be limited to potential endocrine disruptors, food additives or chemical contaminants. Comparing qHTS data to relevant *in vivo* data if available and translating *in vitro* effect concentrations into relevant *in vivo* doses would be encouraged. Collaboration with Dr. Raymond Tice at NIEHS and/or Dr. Rusty Thomas at Hamner can be a possibility. Depending on the timing of the qHTS data availability, this could be a multi-year project.

Deliverables:

Provide periodic written updates during the fellowship to the Committee

Create a document/written report on his/her evaluation of chemicals of interest identified from the 10K Library and the qHTS results if available

Make a presentation at the fall Food and Chemical Safety Committee business meeting in 2012.

Milestones:

Meet with key researchers in the field to obtain background on Tox21/10K Library and/or to understand how to translate *in vitro* concentrations to *in vivo* doses (Dr. Raymond Tice and/or Dr. Rusty Thomas)

Attend a professional society meeting to learn more about Tox21.