FOUNDATION FOCUS



A Look Back at 2021 as We Look Forward to 2022

As the Foundation looks forward to 2022, a brief review of the work of the Foundation shows a commitment to the Foundation's mission to conduct research and disseminate information that drives continuous improvement in the meat and poultry industry. The Foundation continues work that will enable meat and poultry companies to exceed expectations in key areas like food safety, nutrition, animal welfare and sustainability. In 2021, the Foundation undertook an ambitious research agenda implementing nine research projects over the course of three requests for proposals.

Funded by the Beef Checkoff and Foundation

- Effect of clean label antimicrobials on the inhibition of *Clostridium perfringens* and *Bacillus cereus* during extended cooling of uncured beef and poultry products
- Current Knowledge and Gaps on the Mechanistic Development of Cancer in Humans Associated with Processed Meat and Poultry Product Components
- Maximizing the dietary pattern of older adults: the effects of protein intake on protein kinetics

Funded by the Foundation and National Pork Checkoff

- A Cross-Sectional Investigation of *Salmonella* in the Lymph Nodes of Market Hogs

Funded by the Beef Checkoff and Administered by the Foundation

- Effects of deep cleaning sanitation on biofilms and pathogens
- Risk assessment model to assess the impact on public health of ground beef lots based on the contamination level and presence of highly virulent or multidrug resistant strains
- Evidence-based, quantitative risk assessment to control salmonellosis attributable to ground beef: Evaluating and mitigating the contribution of lymph nodes to *Salmonella* contamination
- Using empirical evidence, modeling, and risk assessment methods to estimate the public health impact of incorporating enumeration and virulence as part of the criteria for evaluation of *Salmonella* contamination in ground beef in the US

Funded by the National Pork Checkoff and Administered by the Foundation

- Risk assessment model to assess the impact on public health of pork based on the contamination level and presence of highly virulent or multidrug resistant strains

While the Foundation focuses on disseminating research to meat and poultry industry stakeholders, outreach to audiences beyond the meat and poultry community is also critical. The Beef Checkoff, through its contract with the Foundation, sponsored the Partnership for Food Safety Education's Consumer Food Safety Education Virtual Conference, which supports food safety educators in their work to communicate the science of food safety to consumers. As a sponsor, the Beef Checkoff was provided an opportunity to engage with attendees directly through Community Connectors sessions. These sessions allowed for a video briefing and were followed by a live question and answer session. "Beef Safety and Date Labels: What Does it All Mean?" addressed the confusion behind date labeling on certain types of beef products, including further processed and ready-to-eat products. Nearly 150 attendees participated in the live questions and answers session.

To further advance the scientific knowledge, in July the Foundation issued its three concurrent requests for proposals (RFP) on key topics in food safety, nutritional sciences and product quality. The proposals submitted in response to the RFP were reviewed by the Foundation's Research Advisory Committee. Select projects were recommended for funding and evaluated by the Foundation's Board of Directors in January 2022. Seven projects addressing meat and poultry safety, nutrition sciences and product quality were approved for funding. More detailed information on the projects will be provided in the April 2022 *Foundation Focus*.

FDA Releases Sodium Reduction Targets

The U.S. Food and Drug Administration released its long-awaited Guidance to the Industry: Voluntary Sodium Reduction Goals Target Mean and Upper Bound Concentrations for Sodium in Commercially Processed, Packaged, and Prepared Foods on October 14, 2021. This voluntary guidance aims to reduce sodium in packaged and restaurant foods, and thus sodium intake by about 12 percent, over the next 2.5 years. Americans consume on average 3,400 milligrams (mg) of sodium per day—nearly 50 percent more than the 2,300 mg recommended limit. There are 16 overarching categories, including meat and poultry, with individual sodium targets for 163 subcategories of food. The targets take into consideration the many functions of sodium in food, including taste, texture, microbial safety and stability. The targets do not address naturally occurring sodium or salt that individuals add to their food. FDA intends to monitor the sodium content of the food supply, evaluate progress towards achieving the targets in the final guidance and engage with stakeholders on sodium reduction efforts and the targets. Based on that information, FDA expects to issue revised subsequent targets in the next few years to facilitate a gradual, iterative process to reduce sodium intake. More information on the voluntary guidance can be found here.

2021—2022 RESEARCH ADVISORY COMMITTEE

A special thank you the Foundation's 2021-2022 Research Advisory Committee for their commitment to advancing the science around meat and poultry safety, the role of meat and poultry in healthy dietary patterns, and product quality. Over the nine-month research cycle, committee members have dedicated their time to develop research priorities, reviewed hundreds of pages of proposals, and made funding recommendations based on merit and industry needs. The Foundation's research agenda could not be implemented without your dedication.

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Sharon Beals, CTI Foods
Chris Bodendorfer, Johnsonville Sausage
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Sally Staben, Hormel Foods Corporation
Ben Stellmacher, Johnsonville Sausage, LLC
Tommy Wheeler, USDA, ARS, U.S. Meat Animal Research Center
Barry Wiseman, Triumph Foods

Appendices A&B

On December 14, 2021 the Food Safety and Inspection Service updated two guidelines on cooking and stabilization in meat and poultry products, often called Appendix A and B. The two updated guidelines for meat and poultry establishments concern the destruction of *Salmonella* and other pathogens during the cooking of ready-to-eat (RTE) meat and poultry products and the control of the growth of spore-forming pathogens in heat-treated RTE and not-ready-to-eat (NRTE) meat and poultry products during cooling and hot-holding. The updated guidelines reflect changes made in response to comments received on the 2017 versions of these guidelines. Because of the changes made in the 2017 guidelines the Foundation funded three research projects targeting the identified gaps. The results will help establishments address lethality and stabilization challenges. One year from the release, FSIS will verify that establishments using the 1999 and 2017 versions of Appendix A and B are instead using the 2021 updated versions of the guidance or have identified alternative scientific support for their cooking and stabilization processes, changing their HACCP systems as needed.

2022 BOARD OF DIRECTORS

The Foundation for Meat and Poultry Research and Education is governed by a Board of Directors, which provides scientific leadership and financial oversight, and acts upon recommendations from the Foundation's Research Advisory Committee. The North American Meat Institute's Executive Board is afforded the opportunity to serve on the Foundation's Board of Directors or appoint a designee to serve on their behalf. To broaden the scope of influence and direction, representatives from the livestock (beef, pork, poultry and egg), retail, academic, government agency and consumer sectors, among others, are invited to serve on the Board of Directors. Terms are for one year.

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Russell Yearwood, Indiana Packers Corporation

FOUNDATION EDUCATION SCHEDULE

Workers Safety, Labor & Employment, and Environmental Conferences

March 29-30, 2022
San Antonio, TX

Advanced *Listeria monocytogenes* Intervention and Control Workshop

April 27-28, 2022
Kansas City, MO

THANK YOU TO THE FOUNDATION'S 2021 CONTRIBUTORS

The Foundation is supported through generous contribution of companies and individuals. Company names with an asterisks (*) indicate NAMI Board of Directors companies.

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Tyson Foods, Inc.*
Unibright Foods, Inc.
West Michigan Beef Co. LLC
William Westman
Yosemite Foods, Inc.
Eric Zito

CURRENT FOUNDATION RESEARCH PROJECTS

Current Knowledge and Gaps on the Mechanistic Development of Cancer in Humans Associated with Processed Meat and Poultry Product Components, University of Wisconsin -Madison

The overall goal of this proposed project is to deliver a comprehensive, current, and objective review of the mechanisms by which components found specifically in processed meat and poultry products have been proposed to influence the development of human cancers. A key supporting objective is to identify potential gaps in mechanistic knowledge to inform future research in this area.

Research funded in part by the Beef Checkoff.

Effect of clean label antimicrobials on the inhibition of *Clostridium perfringens* and *Bacillus cereus* during extended cooling of uncured beef and poultry products, University of Wisconsin-Madison, Cargill

This study will compare the effect of clean label antimicrobial ingredients on the inhibition of *Clostridium perfringens* and *Bacillus cereus* in model uncured beef and poultry products, having different moisture, pH, and salt contents, with a primary focus on extending Phase 1 cooling from 120 to 80°F.

Research funded in part by the Beef Checkoff.

Maximizing the dietary pattern of older adults: the effects of protein intake on protein kinetics, University of Arkansas for Medical Sciences

The overall project goal is to demonstrate how easily prepared animal-based protein-rich food sources can be used by older adults to increase protein intake within pre-existing dietary patterns. The current dietary pattern of older Americans will be augmented by readily available quality protein sources and the effects of recommended and common protein intakes on the maintenance of whole-body protein balance and potential for muscle protein anabolism will be assessed.

Research funded in part by the Beef Checkoff.

A Cross-Sectional Investigation of Salmonella in Market Hog Lymph Nodes, Kansas State University, Texas Tech University, Triumph Foods, LLC, Smithfield Foods, Inc., JBS Foods, Clemens Food Group

A cross-sectional study design will be employed to investigate the prevalence and concentration of *Salmonella* in up to 6 lymph nodes and tonsils of market hogs. Prevalence and concentration data will be subsequently used to design a risk-assessment mapping of the carcass for prioritization of node-removal for pathogen control. The study also intends to address knowledge gaps regarding *Salmonella* prevalence by region and/or season in the United States.

Research funded in part by the National Pork Checkoff.

Improving Validation Methods of *Salmonella* Lethality on the Surface of Multiple Impingement - Cooked Meat and Poultry Products, Michigan State University, University of Wisconsin

The study will identify critical limits (i.e., humidity, air velocity, surface time-temperature), relative to achieving target *Salmonella* lethality on the surface of impingement-cooked products. A spreadsheet-based solution for calculating surface lethality of *Salmonella* on multiple products will be developed and cross-validated. Findings are intended to improve the ability of the meat and poultry industry to comply with Appendix A requirements.

Research funded in part by the Beef Checkoff and the Pork Checkoff.

Effects of proportioning meat and plant-based protein-rich foods within the U.S. Healthy Eating Pattern on cardiovascular disease risk factors, Purdue University
This project will assess the effects of consuming different proportions of red meat and plant-based protein-rich foods incorporated into a U.S. Healthy Eating Pattern on cardiovascular disease risk factors in adults at high risk of developing a heart-related disease.
Research funded in part by the Beef Checkoff.

Meat as a First Solid Food on Risk of Overweight and Neurodevelopment in Infants, University of Colorado Anschutz Medical Campus, University of Colorado Denver
Early complementary feeding is a unique and malleable period to prevent rapid weight gain and later obesity, and is also a critical phase for neurodevelopment. Meat is an excellent source of high-quality protein and micronutrients, which are critical for the normal development of older infants. This research will conduct a randomized controlled trial to comprehensively evaluate the effect of meat on growth, body composition, risk of overweight and neurodevelopment, with a protein intake at the reported population median. Findings from this study will be generalizable and help inform future dietary guidance.
Research funded in part by the Beef Checkoff.

Pathogen Growth in Alternatively Cured Ham and Bacon during Cooking, Cooling, and Process Deviations, Iowa State University and Smithfield Foods
The overall goal of the project is to determine the inhibitory effect of nitrite from a natural source (i.e., pre-converted celery juice powder) in processed meat products with a natural label during "real world" cooking and chilling procedures, which often include instances of process deviation, as well as non-continuous cooling.

Tests of *Salmonella* Sub-unit Proteins as Vaccines for Broiler Chickens, USDA-ARS U.S. National Poultry Research Center
This project will identify the *Salmonella* protein antigens that are able to induce humoral immune response in broilers, and consequently these antibodies can prevent *Salmonella* colonization in the broiler gastrointestinal tracts.

Detection of African swine fever virus (ASFV) in pork meat products by PCR assay, Iowa State University
The study is intended to validate PCR assay tests for ASFV in various pig offal and pork products, including blood, and meat to determine the best sample(s) for testing and monitoring.

Funded by the National Pork Checkoff and Administered by the Foundation

Risk assessment model to assess the impact on public health of pork based on the contamination level and presence of highly virulent or multidrug resistant strains, University of Minnesota
This project will build upon a risk assessment model developed using existing FSIS prevalence and enumeration data to assess the impact of raw pork characterized by contamination level and presence of highly virulent or multidrug resistant strains on public health. Results of this model could evaluate potential impact on public health of model performance standards based on *Salmonella* spp. enumeration level and strain characteristics to reduce the number of human cases due to pork consumption.

Evidence-based, quantitative risk assessment to control salmonellosis attributable to ground beef: Evaluating and mitigating the contribution of lymph nodes to *Salmonella* contamination, University of Nebraska-Lincoln, U.S. Meat Animal Research Center, USDA ARS, Michigan State University, The University of Vermont, University of California
This project will characterize the distribution of both prevalence and concentration of *Salmonella enterica* in bovine deep tissue lymph nodes (DTLNs) by lymph node type, production source, region and season using systematic review and meta-analysis approaches. The relative contributions of DTLNs and the efficacy of their removal at processing on salmonellosis risk associated with ground beef consumption will be evaluated using a quantitative microbial risk assessment approach.

Using empirical evidence, modeling, and risk assessment methods to estimate the public health impact of incorporating enumeration and virulence as part of the criteria for evaluation of *Salmonella* contamination in ground beef in the US, EpiX Analytics, Colorado State University
This project will develop a quantitative microbial risk assessment of the potential public health impact of incorporating enumeration and virulence evaluation strategies as part of the criteria for evaluation of *Salmonella* contamination in ground beef in the U.S. Additionally, using existing surveillance data the effect of season and regional sources of the live cattle on changes in *Salmonella* prevalence, virulence, and enumeration in ground beef and trim will be estimated.

Effects of deep cleaning sanitation on biofilms and pathogens, USDA-ARS-Meat Animal Research Center
The overall goal of this project is to examine the disruption and reformation of natural biofilm communities present in processing plants and attempt to correlate biofilm phenotypes, such as mass, sanitizer resistance, and pathogen protection with their microbial community structures.

Effect of Minimally Processed Meat and Further Processed Meat on Biomarkers and Risk Factors for Cancer and Cardiovascular Disease—Phase I, USDA-ARS-Beltsville Human Nutrition Research Center
A randomized diet controlled crossover study will be conducted with diets containing either minimally processed or further processed meat to assess how the diet effects biomarkers associated with cardiovascular disease. This study will also examine the effect of the background diet on health outcomes.
Funded by the Foundation for Meat and Poultry Research and Education and the National Cattlemen's Beef Association (NCBA) on behalf of the Beef Checkoff. NCBA has primary oversight responsibility for this project.

FOUNDATION FOR MEAT & POULTRY RESEARCH & EDUCATION