

Food/Nutrition - Human/Health Interface

Food Choices and Behavior

- Identifying and characterizing the main drivers behind consumption decisions and how that information can be used to increase better decisions.
- Research on determinants of food consumption/purchase behavior
- Research on determinants of adult and childhood obesity
- Social scientists to develop comprehensive randomized controlled trials or creative identification strategies when examining new/existing agri-food related programs/initiatives aimed at improving human health.
- Impact of provision of healthful foods impact on eating behavior with health systems interventions.
- Impact of governmental programs providing food and health systems providing public health interventions targeting physical activity and nutrition behavior change.
- Identifying the causal links from dirt to fork to health outcomes requires expertise in systems implementation science.
- Understanding the perspective of consumers, especially low-income consumers, regarding what is needed to enable them to successfully achieve healthful food choices in light of budgetary demands.
- Food behavior change research
- Policy systems and environment research around food behavior
- Focus on behavioral changes that could deal to improved diets
- We are not currently looking at the interplay of what consumers are actually consuming. What is it that makes a consumer ingest different types of foods?
- Understanding the human genetic variability plays a role in response to foods. What role does genetics play in the response to foods and subsequent health outcomes.
- Increasing consumer acceptability of vegetables and developing great tasting protein alternatives to meat.
- Understanding how healthy diet can be implemented by all people regardless of economic status by making healthy low cost foods
- Research related to getting people to cook real food again.
- Precision Health - Determining the impacts of interactions of nutrition/food intake and physical activity educational interventions on non-communicable disease prevention and treatment.
- Increase the availability of high quality food, healthy food and better formulas; food manufacturers make a lot of great foods but there are a lot of empty calorie foods available as well.
- More focus on diet quality in health rather than individual nutrient or constituent to limit

Metabolism and Genetics

- Establish the biomarkers of phytoactive compound intake (biosignatures) and correlate them with attenuation of disease biomarkers.
- Interaction between the genome/epigenome of food plants, and the genome/epigenome of the human consumer
- Effect of the microbiome on ingested phytoactive compounds
- Scientific basis for the role of bioactive food components and whole food in preventing diseases and promoting health
- Research on the components of foods that influence health positively, e.g., polyphenols, vitamin D and omega-3 fatty acids
- Identify bioavailable compounds in foods that reduce chronic diseases such as heart disease, diabetes, cancer, obesity.

- Determining the long term impacts of GMOs on health status and disease prevention at the genetic level.
- Understanding variability in human responses to diets. All chronic diseases (and food intolerances) are "complex traits" with interacting genetic and environmental risk factors.
- Identification of bioactive compounds that can improve health when incorporated into a normal diet by identifying methods to increase bioavailability, identifying genetic populations that are responsive to the bioactive compounds and developing technologies to stabilize the compound in food.
- Inorganic nitrate (NO₃⁻) supplementation is emerging as a powerful modulator of physiological function (blood flow, oxygen delivery, mitochondrial function, glucose metabolism) with demonstrated efficacy as an ergogenic aid in athletes, sports participants and all who exercise or should exercise more for their health, as well as benefiting heart failure and potentially diabetic and cancer (research necessary) patients. Forward-thinking initiatives that promote these efforts and get NO₃⁻ treatment from "bench-to-counter top and maybe bedside" are needed.
- Emerging area of metabolomics that deals with plants, food, food processing, nutrition and medicine and personalized food and nutrition metabolomics for health.
- Gut microbiome research and trying to identify how that influences nutrition and health as well as how foods are processed in bodies by gut microbiome and how that influences biological activity of certain components /affects our metabolome.
- How we can control and understand inflammatory responses? What do we consume in the diet that influences inflammation? It seems inflammation has a huge impact on the development of disease states.
- The gut- Need to better understand what food does in the gut and the impact the gut has on the body specifically relating to the microbiome piece of it all.
- The brain- need to understand food, food selection and food processing effects on the brain. What role does the brain have on food selection – are there triggers or signals that the brain processes from foods.
- Better biomarkers of exposure of intake and measures that predict health and chronic disease risk
- Need to learn more about the synergies with the gut microbiome – how diet interacts with gut microbiome to improve health and prevent disease.

Policy and Programs

- Research on evaluation of food program and policies
- Community health coalition development
- What role does taxation and subsidization of foods have on altering food purchases and specific health outcomes.
- Bureaucratic regulations inhibit us from either promoting a particular source of nutritious food or making any disparaging remarks about any food product (we must call them "sometimes food").
- Funding process for research too often leaves out promising outreach interventions already in place, but not properly evaluated (using randomized control trials or other similarly rigorous methods).

Medical Professionals' Education

- Educating the medical professionals about nutrition - there is still a wide disconnect.
- To what extent are healthcare professionals trained in preventive medicine and dietary/lifestyle strategies to lower the risk of chronic disease?
- Qualitative work with healthcare workers and administrators to determine their perceptions of the importance of healthy food systems to healthy people. This work could also determine what some of the barriers are to connecting the two (food systems and healthcare) and how to overcome them.

Public Education

- Research information dissemination is critical to educating rural citizens to adopt healthy living styles to reduce the occurrence rate of chronic diseases such as heart problems and diabetes.
- Novel approaches to prevent childhood obesity, increase nutrition knowledge and practices for children and adults (at home at schools) as well as practitioners knowledge about nutrition.
- How can academic experts learn to communicate more effectively with the public?
- Determining the impacts of educational interactions of nutrition/food intake and physical activity educational interventions on non-communicable disease prevention and treatment and the economic impacts on health care costs of the interventions.

Systems Approach

- Greater understanding of the differences and challenges that have kept these systems separate would be a good place to start.
- To what extent can “systems thinking” be translated into health of a single individual?
- Systems research that investigates the impact of the food system on health
- Support for creative interdisciplinary research involving plant scientists, nutritionists, food scientists, engineers and other disciplines to address the complex problem of obesity, enhance food quality and safety.
- How do we break down information silos so that both academics and the public have access to data and can also add to data?
- How can academics from different disciplines and other ag/food/nutrition/health professionals work more closely together?
- How can agriculture/food/nutrition systems and healthcare systems better interact to address food insecurity, particularly in relation to health outcomes.
- Decrease the caloric density of foods/diets through food system approaches.
- Investigate what the relationship between the health of food systems in a region compared to the health of the population in the region.
- Focus on collaboration among granting agencies at a federal level, (i.e. USDA & NIFA together with NIH) so that initiatives could be explored on a multidisciplinary level that would connect ag to nutrition and medicine.
- Investigate the utility of using the Health Impact Assessment technique for exploring potential relationships and impact of ag/food/nutrition systems on specific health outcomes.
- Using a Dissemination and Implementation Research model for addressing high burden health conditions through ag/food/nutrition systems approaches.
- Patients who would benefit from group nutrition programs or physical activity events often are not referred to programs in their communities. Perhaps we might assess our individual systems to identify ways to connect: to bring us all to the table together.
- Focus on formal systems and informal networks in communities, but most particularly their intersections and capacity for social action and change to empirically establish how these processes occur, in this case, to address food systems and health systems; moreover, to include in this mix how informal networks in communities function with support from these systems

Health and Cognition

- Linking child health with academic achievement.
- The relationship between diet and cognition
- Investigate further the connection between mental health and participating in the food system by gardening, farming, canning, or just shopping at farmer's markets.

Agricultural Systems - Food/Nutrition Interface

Health Promoting Food

- Major obstacles in producing healthier and low cost foods.
- Extend shelf life of fresh produce (fruit and vegetables) so people can enjoy it for longer time.
- Study effect of minimal processing on nutritional loss of fruits
- Does access to healthy locally grown food result in improved dietary intake and enhanced health outcomes.
- Develop breeding and genetic programs that enhance bioavailability and concentrations of nutrient rich compounds.
- Engineering the food system to promote human health. We have the unprecedented ability to engineer the nutrient composition of the food system to produce high quality food using new, innovative and sustainable approaches through plant breeding, food processing, fermentation, etc.
- Effects of altering foods. What is the overall nutritional benefits and/or loss thereof nutrition as we take food from the ground to the plant to the shelf to the consumer.
- Optimizing food production for nutrition, not just calories.

Detection Techniques

- Assessment of chemical contaminants on produce
- Develop sensor technologies to determine the presence of microorganisms in foods that could compromise food safety.
- Development of new biomarkers of chronic disease prevention are need to align the food system to healthy aging.

Sustainable Agricultural Systems

- Understanding how sustainable agricultural production can improve human health by reducing natural resources use and protecting the environment.
- Improve farming technologies in many areas such as water and energy uses, fertilizer application, greenhouse gas emissions reductions, air quality improvements, waste reduction and reuse, etc., so farmers will have better tools in dealing with these issues in order to improve the overall health of the rural residents.
- Sustainable business models that increase healthy food access for all but also give a fair return to farmers
- test effective aggregation and distribution systems

Policy

- To what extent have governmental and/or agricultural policies and practices influenced the U.S. food supply in positive and negative ways? Research could focus on changes that have occurred in the nutrient profile of the food supply; how farm subsidies and practices have altered the food supply; etc.
- Leveraging federal food program dollars to benefit the agricultural sector as well as nutrition/health
- approaches to scaling up farmer's market EBT-type models that can reach a larger number of people and have a bigger impact on agriculture
- Policy solutions that are necessary to bring the food system into alignment with healthful food choices
- Impact of subsidies on choice of foods that align with current recommendations for health