



ADVANCING HUMAN NUTRITION RESEARCH

The ARS human nutrition research program enhances the quality of the American diet and improves health through research. Obesity is estimated to cost \$190 billion annually, and as its prevalence has increased over recent decades, ARS scientists have researched innovative ways of reversing that trend. Since agriculture primarily produces food for human consumption, integrating human nutrition research into ARS is critical for solving the biggest problems facing producers and consumers. The following accomplishments highlight ARS advances human nutrition research in FY 2020.

Dietary carbohydrate intake contributes to reduced stress.

ARS scientists in Davis, California, found that the Dietary Guidelines for Americans (DGA)-based diet reduced concentrations of a key stress response hormone, cortisol, and dampened stress-induced cortisol reactions. The DGA diet includes more dietary carbohydrates than the less healthy typical American diet. These findings suggest that, in the context of a healthy diet, carbohydrate consumption may provide some protection from stress-related disease risk. This stress and cortisol dampening effect associated with the DGA could reduce stress-related eating and make it easier to sustain a healthier diet.



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Breastfeeding alters gut bacteria, impacts immune health in infants. ARS-supported scientists in Little Rock, Arkansas, found that breastfeeding resulted in greater amounts of bacteria that produce compounds that serve as signals in development of the gut and other organs. Additionally, bacterial metabolites that optimize immune response and inhibit allergy were higher in breastfed infants. This new information adds to the scientific basis for the recommendation by the Centers for Disease Control and Prevention to breastfeed infants when possible.

First ever expert advice to parents and caregivers on healthy eating behaviors in young children.

The first 5 years of life are a critical period for helping children learn how to regulate their food intake to match their energy needs. ARS-supported researchers in Houston, Texas, led a partnership with other scientific experts and the American Heart Association to release their first scientific statement giving advice on how to foster healthy eating behaviors in children under 5 years of age. This guidance will broadly reach parents and caregivers across the country and provide strategies for healthy eating behaviors with the goal of reducing childhood obesity.

Obesity dampens immune responses in young women to levels similar to those of elderly. Both obesity and aging are associated with muted immune and inflammatory responses. In a study of 44 women, ARS-supported scientists in Boston, Massachusetts, found that older women with obesity (age 60-83) had significantly fewer circulating immune cells of four specific types than young women with obesity (age 23-43). With few exceptions, however, there was no significant difference in inflammation markers in two types of immune cells. These findings call for further investigation into the impact of obesity on premature aging of the immune system.