Omega-3 Fatty Acids & Human Health

This project has fostered research that has determined what forms and amounts of omega-3 fatty acids are beneficial to human health, thereby improving quality of life and reducing health care costs.

Who cares and why?

Chronic diseases like cancer, cardiovascular disease, type 2 diabetes, degenerative diseases, and others often lead to poor quality of life and high health care costs. Adequate amounts of omega-3 fatty acids—found in plant, algal, fungal, and fish oils—as part of a nutritious diet could help prevent or treat these diseases and reduce their economic impacts. However, the different forms of omega-3 fatty acids have distinct effects on human health, and some health benefits—and the recommended daily intake to achieve these benefits—are controversial. Current recommendations made by medical professionals and public health authorities are not always consistent or up-to-date, leading many consumers to be confused about how much or what kinds of omega-3 fatty acids to include in their diets. Furthermore, concerns regarding the sustainability of fish stocks and the contamination of fish by mercury and pesticides are rising, making consumers unsure whether fish is a healthy source for omega-3 fatty acids. Appropriate dietary recommendations for omega-3 fatty acids are also needed to reduce the potential for negative health and economic consequences of excessive and unsafe omega-3 fatty acid supplementation practices.

What has the project done so far?

Over the past five years, the NC-1039 project has coordinated research among multiple institutions and scientists from diverse disciplines. Participating scientists have advanced research methods and confirmed that experiments using cell cultures and rodents can be used to accurately determine the dose of omega-3 fatty acids needed to achieve health benefits in humans. Using these methods, scientists have provided evidence supporting the health benefits and disease prevention effects of omega-3 fatty acids, including newly identified effects that advance the potential to prevent or treat problems with reproductive performance, inflammation, type 2 diabetes, cancer, and obesity. In particular, NC-1039 scientists have studied health benefits and proper doses for special populations, such as Hispanic women and pregnant women and Women, Infants, and Children (WIC) program participants. NC-1039 studies have shown that there is increased need for the omega-3 fatty acid DHA in pregnant and lactating women

Salmon, walnuts, and flax seeds are high in omega-3 fatty acids. NC-1039 researchers have evaluated these and other sources of omega-3 fatty acids to determine how much of these foods people should consume in order to get the associated health benefits. Top photo by Dennis Sylvester Hurd. Middle photo by Eliza Adam. Bottom photo by veganbaking.net.

to promote healthy cognitive development in infants. Another study has provided evidence that pregnant women receiving WIC support in Larimer County, Colorado, do not consume enough DHA from food sources to meet the daily recommended intake. This has highlighted an important economic disparity between lower income individuals and omega-3 fatty acid intake. The collective data gathered from NC-1039 studies have been used to modify daily recommended intakes for omega-3 fatty acids. Scientists have also explored ways to share data and recommendations. For example, NC-1039 researchers have initiated an omega-3 Community of Practice eXtension website through the USDA. Scientists have also worked with the National Healthy Mothers Healthy Babies coalition to educate the public of the benefits of seafood consumption and help them make informed, healthy food choices. Research findings have also been disseminated to research communities and the general public via seminars, publications, and websites.

Impact Statements

Raised awareness among the medical community and nutrition professionals of the specific benefits of omega-3 fatty acids, leading to improved nutritional counseling and increased consumption of food-based sources of omega-3 fatty acids.

Determined specific benefits of certain forms and amounts of omega-3 fatty acids, advancing the potential to prevent or treat many diseases and reduce health care costs.

Made suggestions for setting daily recommended intakes of omega-3 fatty acids, including special advice that helps minority groups like Hispanic women increase omega-3 fatty acid consumption.

Educated House Representatives and Senators on the issue of fish intake and omega-3 benefits to pregnant and breastfeeding women and their infants, helping Congress make more informed policy decisions.

Provided valuable data for WIC to revise their current pregnancy package to include fish, thus addressing economic disparities in omega-3 fatty acid intake and promoting healthy mothers and infants.

Fish oil capsules are often taken as dietary supplements. NC-1039 research has provided information on the health benefits of consuming different sources of omega-3 fatty acids and provided recommendations for safe amounts to consume. Photo by Stephen Cummings.

What research is needed?

Scientists are continuing to evaluate the minimum daily amount of the omega-3 fatty acid DHA to promote health and investigate sustainable algae, fungi and plant sources. More research is needed to address the hypothesis that omega-3 fatty acids can help prevent inflammation and enhance immune response. Scientists are taking steps toward identifying genes that mediate the effects of omega-3 fatty acids, opening the door for individualized dietary recommendations.

Want to know more?

Administrative Advisor:
David Jackson (david.s.jackson@unl.edu)

This project was supported, in part, through USDA's National Institute of Food and Agriculture by the Multistate Research Fund (MRF) established in 1998 by the Agricultural Research, Extension, and Education Reform Act (an amendment to the Hatch Act of 1888) to encourage and enhance multistate, multidisciplinary research on critical issues that have a national or regional priority. Additional funds were provided by contracts and grants to participating scientists. For more information, visit *http://ncra.info/*.

Compiled and designed by Sara Delheimer