



## **Barley Foods Health Benefits Research Project**

In 2000, the National Barley Foods Council, in cooperation with the Barley Foods Research Steering Committee and the National Barley Improvement Committee, recommended that permanent funding be approved in the USDA ARS program budget to initiate clinical trials to investigate the human health benefits of barley.

Thanks to funding approved by Congress, the Barley Foods Health Benefits Research Project was established in 2001. Congress initially appropriated \$200,000 for the program. Since that time, the annual funding has been increased to a current level of \$477,000. To date, the monies have been used to fund the following clinical trials at the Beltsville Human Nutrition Research Center, Beltsville, MD:

### **FY2001 – Lipids Studies**

The ARS Diet and Human Performance Laboratory at the Beltsville Human Nutrition Research Center, Beltsville, MD, conducted a small clinical trial designed to examine the lipidemic response of 18 hypercholesterolemic men while consuming two levels of barley (pearled barley products made from standard varieties). Final data from the trial indicated that diets containing 3 grams barley soluble fiber reduced total cholesterol 10% and LDL cholesterol 14%. The data also showed that diets containing 6 grams barley soluble fiber reduced total cholesterol 16% and LDL cholesterol 23%.

Final data from this trial regarding cholesterol reduction was published in the February 2004 issue of the *Journal of the American College of Nutrition*. ARS scientists published a second paper in *Nutrition Research* in 2003 on additional data from the trial showing that consumption of pearl barley lowered systolic, diastolic and mean arterial blood pressure in men that had elevated levels of cholesterol. The paper concluded that barley's effect on lowering blood pressure may also help to reduce risk of coronary heart disease.

### **FY2002 – Lipids Studies**

The ARS Diet and Human Performance Laboratory at the Beltsville Human Nutrition Research Center, Beltsville, MD, conducted a second clinical trial to confirm findings in the 2001 study. This trial investigated the lipidemic response of 18 pre- and post-menopausal hypercholesterolemic women and 9 hypercholesterolemic men. Final data from the trial indicated that diets containing 3 grams barley soluble fiber reduced total cholesterol 8% and LDL cholesterol 9%. The data also showed that diets containing 6 grams barley soluble fiber reduced total cholesterol 9% and LDL cholesterol 11%. Final data from this trial was published in the November 2004 issue of the *American Journal of Clinical Nutrition*.

**FY2004-2005 – Glucose and Insulin Response Studies**

Studies of low levels of barley consumption (1 to 2 grams) found that acute reduction of the glycemic response and hunger ratings in overweight women required consumption of at least 2 grams and 1 gram of beta-glucan per meal, respectively. However, in overweight men greater amounts of beta-glucan per meal is likely to be required for substantial glucose and satiety rating effects. This study further suggests the beneficial effects of beta-glucan on glucose metabolism and, possibly, satiety. This work was published in *Cereal Foods World*. 51:29-33.

**FY2005 - 2006 Acute Intake and Satiety Studies**

A dose response study of glucose, insulin, and satiety hormones to beta-glucan has been completed that examined high levels of barley consumption (2.5 to 10 grams beta-glucan). Preliminary data analyses found significant reduction in insulin response in the participants that were insulin resistant suggesting that the soluble fiber improved the ability of insulin to function in processing of glucose. Complete analysis of satiety hormones and further data is underway.