Nutrient Bioavailaility

W-2002 (2008-2013)

Diet and Disease

The food you eat can improve your health and reduce your risk for many diseases and disorders—like cancer, heart disease, obesity, poor bone health, birth defects, and neurological diseases. Although these diseases can often be treated with drugs and surgical procedures, harnessing the preventative effects of nutrients naturally found in food is a desirable alternative. Scientists, health officials, food and drug manufacturers, and consumers need to pinpoint which nutrients prevent diseases and just how much of these nutrients should be consumed. This is especially important information to have as more and more Americans take dietary supplements and eat foods fortified with nutrients. In order to maximize the health benefits of nutrients, researchers also need to determine factors that affect how nutrients are absorbed and metabolized in the body—in other words, their bioavailability.

Multistate Research Feeds Changes that Benefit Health & Economy

Since 2008, Multistate Research Project W-2002 has helped scientists coordinate pioneering research about nutrients that affect human wellbeing. Participating scientists have developed new techniques and tools that have advanced research capabilities. Their discoveries have inspired new, nutrition-based approaches to preventing diseases. These approaches are easy, low-cost alternatives to drug therapies and surgery. W-2002 researchers have also made it possible to develop health screenings that identify nutrient-deficient and at-risk individuals. Screenings enable individuals to take preventative action sooner, which can stave off serious illness and reduce future health care costs.

Farmers are using W-2002 research findings to grow more nutritious crops, and food manufacturers are developing new health food products. These actions ensure a supply of desirable, healthy food for consumers and give producers new opportunities for income.

Research insights have led to daily intake recommendations and have encouraged more detailed food labels and accurate health statements. As a result, Americans have better access to the information they need to make healthy diet choices. W-2002 research has even influenced legislation, including mandates for iodized salt in Ethiopia that will improve the health of rural women and infants.

Researchers Discover Dietary Interventions for Diseases

Over the last five years, W-2002 researchers have engaged in a wide range of groundbreaking studies. These studies identified specific vitamins, minerals, and enzymes from food that can assist or prevent chemical reactions in the body, bind to toxins and prevent them from being absorbed in the body, reduce inflammation, enhance digestion, and protect against infection. Here is a breakdown of W-2002 studies and findings:

HEART DISEASE

Heart disease is the leading cause of death worldwide.

Washington State University: flavonoids in ginkgo leaves and extracts can reduce the risk of cardiovascular disease.

University of Connecticut: compounds in green tea and berries can regulate the removal of bad cholesterol from the body and enhance the body's defense against inflammation.

University of Arizona & Kansas State University: copper deficiency can enlarge the heart and deteriorate heart muscle function.

The Ohio State University: vitamin E protected against blood vessel dysfunction that is caused by high blood sugar.

Oregon State University: vegetable sources of nitrate and nitrite are associated with lower mortality and sickness due to heart diseases.

CANCER

Cancer is the 2nd leading cause of death in the U.S. with 1 in 2 Americans diagnosed in their lifetime.

University of Arizona & Oregon State University: sulforaphane, a chemical found in cruciferous vegetables, leads to prostate cancer cell death.

Washington State University: flavonoids in ginkgo leaves and extracts can reduce the risk of cancer.

Colorado State University: purple potatoes have greater anti-cancer properties than white/yellow potatoes. Baking retained more anti-cancer properties than chipping.

University of Illinois: compounds in legumes, oilseeds, and vegetables can prevent genetic mutations and reduce cancer risk.

University of Nebraska, Lincoln: biotin decreases breast cancer risk and spread of tumors.

University of California, Berkeley: folate may exacerbate vitamin B12 deficiency.

Michigan State University: low doses of nitrite can inhibit early stage colon cancer cell progression, but higher doses may promote cancer cell progression in later stages.

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OBESITY

>66% of Americans are overweight or obese. Biological changes associated with obesity, such as inflammation, further impair health.

University of Arizona: daily doses of vegetables modulated inflammation and other health problems in overweight women.

Oklahoma State University: bitter melon can regulate fatness, cholesterol, and glucose in mice.

Oklahoma State University: compounds in mango can reduce body fat accumulation in mice fed high-fat diets.

Montana State University: a new variety of pea can be used for low-starch flour and food products. (High intake of starches is a leading cause of obesity and heart disease.)

The Ohio State University: green tea extract prevented nonalcoholic fatty liver disease when included in the diets of obese rats and mice.

University of Arizona: Insufficient sleep altered nutrient metabolism in rats, increasing risk for bacterial infection and promoting weight gain. Obese rodents were more sensitive to the effects of insufficient sleep than leaner rats.

COGNITIVE DISEASES

Oklahoma State University: primary school children in Ethiopia who consumed meat, poultry, fish, and/or eggs got higher scores on cognitive tests.

Oklahoma State University: women in rural communities of southern Ethiopia do not consume iodized salt, and iodine concentrations are low enough to be a public health problem. (Iodine is important for brain development during pregnancy and infancy.)

Oklahoma State University: zinc deficiency is linked to impaired cognition in women and infants.

BONE DISEASE

Bone diseases are estimated to affect ~14 million people >50 years old in the U.S by 2020.

Purdue University: out of several botanical supplements, only soy suppressed bone breakdown.

Purdue University: amount of calcium consumed can be as important of a factor for skeletal growth as genetics.

Oklahoma State University: chemicals in green tea suppress bone erosion, enhance bone formation, and increase bone volume in female rats.

Oklahoma State University: dried plum can mitigate bone damage.

University of Nebraska, Lincoln: humans absorb microRNAs from milk in large quantities, some of which promote bone formation.

Purdue University: different sources of calcium affect bone health differently. Bones of rats fed non-fat dry milk solids were longer, wider, and denser than rats fed calcium carbonate.

Oklahoma State University: rural women in Ethiopia do not consume vitamin D-rich foods, and 15% of women were at risk of deficiency.

AGE-RELATED DISEASES

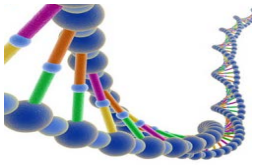
University of California, Davis: lutein and zeaxanthin found in green leafy vegetables and eggs reduce risk of age-related macular degeneration, the most common cause of irreversible blindness in elderly Americans.

University of Connecticut: quantity and quality of dietary fat affects the absorption and metabolism of nutrients that can reduce risk of age-related chronic diseases.

Oregon State University: zinc supplementation in older animals inhibits age-related immune defects and inflammation.

BIRTH DEFECTS

Birth defects are diagnosed in 30 per 100,000 live births in the U.S.



University of Nebraska, Lincoln: dietary biotin and folate can decrease risk for birth defects.

University of California, Berkeley: common variants in human genes related to folate metabolism can influence the risk of birth defects.

Oregon State University: low dietary zinc causes developmental abnormalities and increases susceptibility to environmental agents that can cause birth defects.

NANOTECHNOLOGY

University of Massachusetts: a wide variety of foods can be turned into nanoemulsions, microemulsions, and nanolaminated droplets that can be used to control the delivery and release of nutrients in the body.

CONSUMER BEHAVIOR

Colorado State University: consumers are more willing to pay higher premium for purple potato products if they are educated on the health benefits.

University of Illinois: knowledge alone is not effective in changing eating behavior; interactive education is important.

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Administrative Advisor:
Tammy M. Bray (tammy.bray@oregonstate.edu)

This Impact Summary was compiled by Sara Delheimer.