

HEALTH & NUTRITION

Executive Summary

- ▶ Developing fortified foods targeted to the nutritional needs of women.
- ▶ Iron, calcium, protein and other important nutrients for women.
- ▶ Healthy ingredients that mitigate breast cancer risk.



Nurturing Women's Wellness

BY DONNA BERRY
Contributing Editor

The Institute of Medicine's Dietary Reference Intakes suggest that until age 9 both genders have the same nutritional requirements. But once a woman's hormones kick in, her nutrient requirements begin to change ... and those hormones impact various bodily functions throughout life, influencing the need for increased or decreased levels of many nutrients.

"Nutrition is at the center of healthy aging," says Michelle Braun, Ph.D., nutrition science communications specialist, Solae LLC, St. Louis. "A large body of research supports the role nutrition plays in women's health."

Cathy Arnold, senior formulation scientist supervisor, Fortitech, Inc., Schenectady, NY, adds: "Research indicates the importance of in-utero nutrition as a factor in establishing risk for chronic diseases that may not appear until much later in life. So, women, in particular, must be very

conscious of maintaining good nutrition throughout their lives to foster optimal health in their offspring, as well as in themselves as they grow older.

"Not only do the roots of chronic disease begin early, but life-long nutritional vigilance must be maintained to optimize health," says Arnold. "Although a woman's genetic makeup plays an important role in determining her risk of developing chronic disease as she ages, the good news is that diet can play an important role in modifying the interaction of genetics and some important diet-related diseases, such as iron deficiency, osteoporosis and breast cancer."

When less is better

Understanding the role of specific nutrients in women's health allows for the development of fortified foods that

deliver the nutrition women need to age healthfully. Almost always, calorie control is part of the equation.

This is because, in general, females need fewer calories but more nutrients than males to thrive, as women tend to be smaller and have higher body-fat percentages, both of which are hormone-related features. The extra height and muscle affords men a greater daily calorie intake, suggesting that women should choose lower-calorie, nutrient-dense foods if they want the occasional indulgence without the consequence of weight gain. But sometimes it's hunger that has a woman grabbing for that second slice of pizza. Taming hunger sensations helps women eat less, which becomes increasingly important with age, as metabolism also slows down.

This has led to a search for satiety solutions—ingredients that can enhance the feeling of fullness and help control appetite. One ingredient category increasingly linked to satiety is protein. One study (*British Journal of Nutrition*, 2009; 101(6):798-803) showed that increased protein at breakfast was particularly effective



Photo: iC Performance Products

in promoting satiety, so a high-protein woman's breakfast bar or beverage might be one option formulators can pursue.

But other ingredients can also be effective. For example, "DSM markets a proprietary ingredient that is an emulsion made from two naturally occurring dietary lipids, namely palm and oat oils," says Sarah Sullivan, director, marketing, DSM Nutritional Products, Inc., Parsippany, NJ. "The unique system, which has application in a variety of foods, in particular yogurt—a favorite for many women—delays digestion of the oils in the gastrointestinal tract, triggering appetite-control signals. Additional evidence also shows that when this ingredient is taken with yogurt, it stays in the digestive system for a longer time, which contributes to the feeling of fullness."

When more is a must

Because they require fewer calories than men, coupled with the uniquely female function of menstruation, women are at an increased risk of iron deficiency. The Institute of Medicine (IOM), Washington, recommends a daily allowance of 18 mg of iron for

women ages 19 to 50. This jumps to 27 mg during pregnancy. (Pregnancy creates an increased need for many other nutrients, including choline and folate, which are both associated with fetal development.) Men in that same age range need just 8 mg daily.

The carnivorous tendency of most males makes it easy for them to meet their iron needs. Females, on the other hand, who will likely choose a calorie-conscious salad for lunch in order to dessert on some chocolate, are typically challenged with meeting their iron needs. Iron-fortified foods can help.

According to a paper published in the April 2002 issue of *The Journal of Nutrition* (132(4 Supp):849S-852S), cereal flours (wheat and maize) are the most common vehicles for iron fortification. And these cereals can be readily formulated into breakfast foods and bars designed specifically with women in mind.

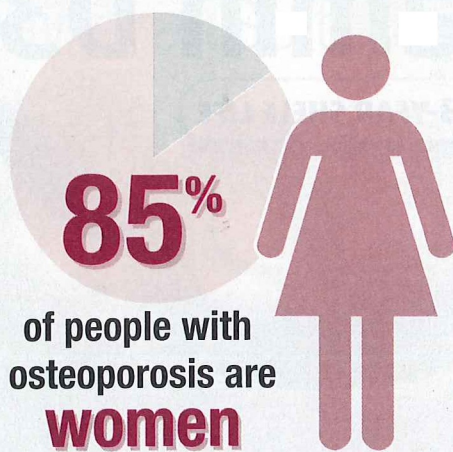
"Critical technical barriers determining potential effectiveness of fortification are the bioavailability of iron, selection of the vehicle (food/matrix), the balance of inhibitors and enhancers, and total iron intake. The most absorbable iron compounds tend to be the most reactive with the food matrix. This limits the amount of iron added to foods and determines in practice their potential biological impact," according to the researchers.

Bone and muscle breakdown

In addition to a female's tendency to be iron deficient, women have an increased propensity to develop significant bone loss and osteoporosis as they age as a result of decreasing estrogen levels. "Eighty-five percent of people with osteoporosis are women, and 1 in 3 women over age 50 will experience an osteoporotic fracture," says Arnold.

Barbara Heidolph, principal, applications research and technical support, ICL Performance Products, St. Louis, says: "With luck, women will have consumed sufficient calcium during their young lives to build a solid bone structure. However, ongoing calcium consumption is important to maintain bone quality. In fact, women over age 51 should increase their calcium intake from 1,000 mg to 1,200 mg per day.

"For the calcium to be effective, both magnesium and phosphorus must be present. An ideal ratio of calcium to phosphorus is 3:1," Heidolph says. She suggests an



ingredient “that delivers both calcium and phosphorus in this precise targeted ratio. It can be used with our magnesium ingredients to formulate a food or beverage specifically for women’s bone health.”

In addition to bone loss, muscle tends to be replaced with fatty tissue as one ages. “After your mid-60s, body weight starts to decrease, with much of the weight loss coming from lean or muscle tissue with a corresponding gain in fat mass,” says Braun. “Increased dietary protein, combined with exercise, can help reduce the risk of age-related loss of muscle, also known as sarcopenia.”

Keigan Park, director, nutrition research, Dairy Research Institute, Rosemont, IL, adds: “Muscle declines with age, but including whey protein at each meal may be a good way to help reduce this loss, which may help women remain active longer in life. Whey protein works well in a variety of applications that women enjoy and find convenient, such as smoothies, isotonic and snack bars. Its neutral flavor and clarity make it ideal for beverages.”

Menopausal madness

Changing female hormones are also a contributing factor to why about 1 in 8 U.S. women (just under 12%) will develop invasive breast cancer over the course of her lifetime, according to statistics from the Centers for Disease Control and Prevention (CDC), Atlanta. A man’s lifetime risk of breast cancer is about 1 in 1,000.

The most significant risk factors for breast cancer are gender (being a woman) and age (growing older). In fact, about 77% of breast cancer cases occur in women over 50 years old, according to the American Cancer Society, Atlanta, and almost 50% are age 65 and older. In other words, among women 40 to 49 years of age, there is a 1 in 68 risk of developing breast cancer. In the 50 to 59 age group, that risk increases to 1 in 37.

The breast cancer incidence rate in women began to decline at the turn of the century, with a dramatic decrease of almost 7% from 2002 to 2003. This was attributed to a reduction in hormone replacement therapy (HRT) for the treatment of menopausal symptoms. Women started



shying away from HRT after the Women's Health Initiative in 2002 showed an association between HRT and an increased risk of breast cancer and coronary heart disease.

Scientists also have a better understanding of the relationship between a woman's diet and breast-cancer prevention. "In general, most studies support the conclusion that weight management, healthy diet, moderate alcohol consumption, and high fruit and vegetable intakes reduce breast cancer risk," says Arnold. "The role of specific nutrients or bioactive food components on breast-cancer risk remains more obscure; however, studies suggest that several dietary compounds may have chemopreventive effects on breast cancer. For example, vitamin D has been gaining in attention as a potentially important modifiable risk factor for breast cancer. Also, women with a lower omega-6 to omega-3 fatty acid intake have been found to have a lower risk of breast cancer, supporting the potential anticancer role of higher omega-3 fatty-acid intake.

"Another interesting line of research on food components and breast cancer risk involves dietary lignans, which are composed of a large family of fiber-associated phenolic compounds that are widely distributed in edible plants,"

says Arnold. "Some of the lignans are converted in the large intestine to biologically active compounds by intestinal microbes. One of these compounds is enterolactone, which is believed to be the major biologically active lignan and associated with breast cancer risk potentially by modifying estrogen signaling in the breast.

"Soy, specifically soy isoflavones, also can influence breast cancer risk," Arnold says. Soy isoflavones are classified as phytoestrogens, meaning they are estrogen-like substances. Studies have also linked soy isoflavones with a decrease in the occurrence of hot flashes and mood swings. This makes soy isoflavone-fortified foods attractive to women who no longer consider HRT an option to alleviate menopausal discomforts.

"Accompanying the transition into menopause are changes in blood levels of low-density lipoprotein (LDL), also known as 'bad' cholesterol," says Braun. "Total and LDL cholesterol and triglycerides have been shown to peak during late peri- and early postmenopause. Further, research suggests that cholesterol in the blood tends to increase with age. Multiple meta-analyses have been published confirming the cholesterol-lowering efficacy of soy protein in humans, which is yet another reason to include soy in women's foods and beverages."

Along with fortified foods designed to provide benefits for a multitude of health conditions, more foods designed to address the health concerns specific to women are beginning to appear on grocers' shelves. "There are many considerations for food designers looking to incorporate specific nutrients into products that address women's health," Arnold says. "These include responsible examination of interactions, as well as synergies, between various ingredients. It is also important to remember that nutrients perform and interact differently depending on how they are integrated and in what application."

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