



## Dreamfields Pasta—For a Healthy Heart and Cardiovascular System

Bryan Tunglund



One of the main health concerns of the U.S. Department of Health and Human Services and the consumer is the increasing risk of cardiovascular diseases (CVD)<sup>22</sup>. Coronary heart disease remains the number one cause of untimely death for both men and women in the U.S., accounting for nearly 40% of all annual deaths<sup>22</sup>. Heart disease is not only attributed to the elderly—it is the leading cause of death for all Americans age 35 and older. Heart disease accounts for over 1 million deaths each year, about 1 death every 35 seconds. In addition, 1 in 4 American or more than 70 million people currently live with a cardiovascular disease<sup>22</sup>, and more than 6 million hospitalizations occur each year because of cardiovascular disease<sup>22</sup>.

The economic impact of cardiovascular disease on our nation's health care system continues to grow as the population ages, about every 7 seconds another person reaches 55 years in the U.S. The cost of heart disease and stroke in the U.S. is projected to be \$403 billion in 2006, including health care expenditures and lost productivity from death and disability<sup>22</sup>.

Two key etiologies of the disease, excess weight and high cholesterol, have risen dramatically since the 1970s in adults and recently in children less than 19 years. It is estimated that 119 million, or 64.5%, of American adults are overweight or obese<sup>18</sup>. According to projections, 73 percent of American adults could be overweight (34 percent) or obese (39 percent) by 2008<sup>39</sup>. Since the 1970s, the prevalence of overweight among children has more than doubled for preschoolers ages 2-5 and adolescents ages 12-19, and it has tripled for children 6-11 years<sup>33</sup>. Thirty-one percent of boys and girls alike, aged 6-12 years are considered to be either at risk for overweight or overweight, defined as at or above the 85<sup>th</sup> percentile of the sex-specific BMI-for-age growth chart, and 16% or more than 9 million children are overweight or at or above the 95<sup>th</sup> percentile of the sex-specific BMI-for-age growth chart<sup>19</sup>. In addition to being overweight, an estimated 27 million children under the age 19 have high cholesterol (>200 mg/dL) and over 2 million have high blood pressure. Further, according to the American Obesity Association, over 75 percent of hypertension cases are reported to be directly attributed to obesity<sup>17</sup>. The CDC estimate 101 million Americans have cholesterol levels over 200 mg/dL<sup>22</sup>. Due to continuing education, nearly two-thirds (64%) of all adults in the U.S. are now aware that some of the cholesterol in their body is good and some is bad. Furthermore, twenty-five percent of those having their cholesterol checked are aware of their HDL/LDL ratio<sup>16</sup>. It is therefore not surprising that the possibility of exploiting the diet with healthy multi-fiber containing foods, like Dreamfields pasta, to reduce the risk of CVD is gaining ever-increasing interest.

On one hand, many dietary risk factors have been identified (e.g. high intake of saturated fat) as well as lifestyle risk factors (smoking, lack of physical exercise) increasing this risk. On the other, dietary factors lowering the risk become more and more apparent (see section on dietary considerations and nutrition supplements). Among these are (poly)unsaturated fatty acids, antioxidants such as vitamins A, C, & E and some types of dietary fiber. A fairly recent development is the use of soluble fibers, including prebiotic fibers like inulin, found in

Dreamfields pasta, as possible dietary factors for lowering serum blood lipids relevant for CVD.

## **What the science says about fiber and its influence on cardiovascular disease**

### ▪ **Fiber and cholesterol**

The earliest and most widely researched topic related to dietary fiber is reducing the risk factors for coronary heart disease. Total blood cholesterol and low-density-lipoprotein (LDL) cholesterol levels are generally accepted as being indicators of potential risk for developing the disease. Because of this, research has primarily focused on their reduction as a means to reduce the risk of developing CVD. Substantial experimental data support that blood cholesterol can be lowered using soluble, well fermented fiber types that produce thickening effects in the gastrointestinal tract,<sup>2,33,36</sup> and epidemiological evidence supports the relationship between higher dietary fiber intake and reducing the risk of cardiovascular disease<sup>6,25,42</sup>.

The cholesterol lowering effect of water-soluble fiber is suggested to be related to the specific properties of the fiber being consumed. Scientific studies indicate effects on cholesterol formation are, in part, due to specific well fermented fibers that have the ability to bind with certain digestive enzymes (bile acids) made in the liver, and promote their removal as waste. As the liver uses cholesterol to make bile acids, the liver draws additional cholesterol from the blood to make more, resulting in a lower blood cholesterol level. Examples of fibers of this type include pectin, psyllium, and oat fiber<sup>3,15,24,25,30,37,38</sup>. In addition to bile acid binding, many of these fibers also having high water binding capacity and generate thickening, such as pectin and xanthan gum (found in Dreamfields), and guar gum. These fibers have their influence on small intestine absorption of nutrients and help reduce the overall amount of cholesterol in the blood. Clinical research also indicates that the cholesterol lowering effect of certain highly fermentable dietary fibers, like inulin found in Dreamfields, might also be influenced by the short chain fatty acids (SCFA) produced from the fiber fermentation in the colon. These SCFA are absorbed from the colon and move to the liver where they have influence on the synthesis of cholesterol and triglycerides within the liver, and subsequent lowering effect on blood lipid content<sup>12,13,26,27,31,43</sup>.

In addition to blood lipid content, some scientific evidence also suggests that higher dietary fiber consumption can have a positive influence on high blood pressure, another known risk factor for CVD<sup>4,5,8,9,11,23,42,45</sup>.

Moreover, fermentable fiber, particularly like the inulin found in Dreamfields pasta, also contributes to greater absorption of calcium and magnesium, which are key minerals for healthy heart and cardiovascular systems<sup>1,20,20,21</sup>. Of further notable health significance is that fibers, like inulin selectively nourish the growth of health-promoting bifidobacteria that produce B-complex vitamins (B1, B2, B6, nicotinic acid, B12, folic acid). These vitamins are necessary to help metabolize homocysteine, a molecule produced by the breakdown of the amino acid methionine. Reduction in homocysteine levels is vital to a healthy cardiovascular system, as levels rise homocysteine damages cells and tissues of the arteries, interferes with the constriction and dilation of blood vessels, promotes blood clotting, and stimulates growth of arteriosclerotic plaques, which lead to heart disease<sup>29</sup>. Homocysteine is abundant in animal protein and dairy products, and can rise when there is a deficiency of the B vitamins—B6, B12 and folic acid. In addition, normal aging and female hormones following menopause also increase homocysteine levels<sup>35</sup>.

## ▪ **Fiber and energy and hunger suppression**

Dietary fiber plays a key role in caloric intake control and reduced risk for development of obesity<sup>7,14,28,40</sup>. Fiber's role in caloric intake control is related to its unique physical and chemical properties that aid the body's early signals of feeling full and its prolonged signals of hunger suppression. The feeling of being full is mainly as a result of a particular fiber binding water and swelling to occupy more space, such as the insoluble, bran-type fibers and the soluble, thickening fruit and vegetable fibers, such as pectin. Signals of hunger suppression that act for prolonged periods are generally the outcome of certain soluble fibers, most notably the thickening-type dietary fibers and certain highly fermentable fibers, like those in Dreamfields, to enhance hunger suppression through their influence on the small intestine contents. These fibers slow a particular meal's movement and delay absorption of sugar and fat from the diet, and are later fermented in the large intestine and provide effects on liver metabolism for longer term hunger suppression (see following section on fat metabolism and cholesterol).

Certain soluble fiber-types--like those found in some fruits and vegetables and Dreamfields pasta--that gel can also absorb fat in the intestine, helping to prevent it from being transported to the body for storage in fat cells.

Many weight control diets also promote high protein and low carbohydrates. High protein, low carbohydrate diets require a high water intake compared to a normal diet, often resulting in constipation. Fiber, particularly the soluble type types in Dreamfields pasta, help promote laxation (stool softening), relieving constipation. Another benefit of higher fiber intake in high protein diets relates to fiber's ability to help manage the increased nitrogen from the digestion of a higher protein diet. Soluble fiber, particularly the highly fermentable type, helps promote proper protein digestion, and reduces the risk of potential harmful effects on kidneys that must clear excess nitrogen.

## **Heartwise Dietary Recommendations**

1. Reduce total fat intake and favor vegetable oils over animal fats.
2. Reduce or eliminate caffeine. In general, caffeine consumers have higher blood pressure than those not consuming.
3. Reduce or eliminate alcohol consumption. High consumption correlates with elevated blood pressure. Alcohol consumption further reduces the efficiency of fat metabolism by the liver resulting in elevated cholesterol levels.
4. Reduce salt intakes to 1 to 2 grams/day as it decreases the kidney's ability to regulate blood pressure.
5. Increase soluble fiber intakes, both viscous soluble fiber, such as from oat bran and native fruit pectins and non-viscous soluble fibers (inulin), as they have been shown to help normalize blood glucose and reduce serum lipid levels.
6. Reduce intake of animal protein, which are known to provide undesirable fat types and raise LDL-cholesterol levels. These protein sources also are high in methionine, which can lead to high homocysteine levels in certain situations.
7. Dairy products should be limited as they have been linked to increased risk of CVD via several mechanisms, namely reduced Mg<sup>+2</sup> absorption, calcification within arteries, and potential for increased levels of homocysteine.

## **Recommended heartwise supplements**

1. **B vitamins** (B6, folate, and B12) help remove homocysteine. B6 helps lower cholesterol and triglycerides.
2. **Selenium** reduces platelet aggregation, like vitamin E helps reduce oxidizing substances.
3. **Vitamin antioxidants C and E** reduce oxidative damage and improve blood lipids and help protect blood vessels from free radical damage.
4. **Co-Q<sub>10</sub>** appears important by improving energy production within the heart.
5. **L-carnitine** (a non-essential amino acid) helps transform long-chain fatty acids for energy, improving fatty metabolism.
6. Like L-carnitine, **L-arginine** may offer help to angina sufferers by the body producing nitric oxide, helping to relax arterial blood vessels, permitting improved blood flow to the heart.
7. **Magnesium** is known to relieve vascular spasms and may reduce angina.
8. **Hawthorn berry** flavonoids taken in dose of 150 to 300 mg per day stabilize capillaries. Hawthorn is standardized to 10% proanthocyanidins and 18% procyanidolic oligomers.
9. **Ginkgo bilboa** is useful in cases of arterial insufficiency, intermittent claudication, ischemic heart disease and other cases of tissue oxygen deficiency.
10. **Garlic** in doses of 900 mg dry powder standardized to 1.3% allicin is shown to reduce cholesterol and blood pressure and is able to break down fibrous materials and improve elasticity of blood vessel walls.

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