RICE

Everyone knows that rice is an ancient food, but only recently have we discovered just how ancient it is. Rice was believed to have been first cultivated in China around 6,000 years ago, but recent archaeological discoveries have found primitive rice seeds and ancient farm tools dating back about 9,000 years.

For the majority of its long history, rice was a staple only in Asia. Not until Arab travelers introduced rice into ancient Greece, and Alexander the Great brought it to India, did rice find its way to other corners of the world. Subsequently, the Moors brought rice to Spain in the 8th century during their conquests, while the Crusaders were responsible for bringing rice to France. Rice was introduced into South America in the 17th century by the Spanish during their colonization of this continent.

The majority of the world's rice is grown in Asia, where it plays an incredibly important role in their food culture. Thailand, Vietnam and China are the three largest exporters of rice.

Rice is one of the most important foods in the world, supplying as much as half of the daily calories for half of the world's population. No wonder that in Asian countries, such as Thailand, rice is so highly valued that the translation of the word "to eat" literally means "to eat rice."

Asked to name the types of rice they are familiar with, people may be able to recall one or two. Yet, in actuality there is an abundance of different types of rice—over 8,000 varieties. Oftentimes, rice is categorized by its size as being either short grain, medium grain or long grain. Short grain, which has the highest starch content, makes the stickiest rice, while long grain is lighter and tends to remain

separate when cooked. The qualities of medium grain fall between the other two types.

The scientific name for rice is *Oryza sativa*.

Another way that rice is classified is according to the degree of milling that it undergoes. This is what makes a brown rice different than white rice. Brown rice, often referred to as whole rice or cargo rice, is the whole grain with only its inedible outer hull removed. Brown rice still retains its nutrient-rich bran and germ. White rice, on the other hand, is both milled and polished, which removes the bran and germ along with all the nutrients that reside within these important layers.

Some of the most popular varieties of rice in this country include:

- **Arborio: A round grain, starchy white rice, traditionally used to make the Italian dish *risotto*.**
- **Basmati: An aromatic rice that has a nutlike fragrance, delicate flavor and light texture.**
- **Sweet rice: Almost translucent when it is cooked, this very sticky rice is traditionally used to make sushi and mochi.**
- **Jasmine: A soft-textured long grain aromatic rice that is available in both brown and white varieties.**
- **Bhutanese red rice: Grown in the Himalayas, this red colored rice has a nutty, earthy taste.**
- **Forbidden rice: A black colored rice that turns purple upon cooking and has a sweet taste and sticky texture.**

Why Brown--But Not White--Rice is One of the World's Healthiest Foods

The difference between brown rice and white rice is not just color! A whole grain of rice has several layers. Only the outermost layer, the *hull*, is removed to produce what we call brown rice. This process is the least damaging to the nutritional value of the rice and avoids the

unnecessary loss of nutrients that occurs with further processing. If brown rice is further milled to remove the bran and most of the germ layer, the result is a whiter rice, but also a rice that has lost many more nutrients. At this point, however, the rice is still unpolished, and it takes polishing to produce the white rice we are used to seeing. Polishing removes the *aleurone layer* of the grain--a layer filled with health-supportive, essential fats. Because these fats, once exposed to air by the refining process, are highly susceptible to oxidation, this layer is removed to extend the shelf life of the product. The resulting white rice is simply a refined starch that is largely bereft of its original nutrients.

Our food ranking system qualified brown rice as an excellent source of manganese, and a good source of selenium, phosphorus, copper, magnesium, and niacin (vitamin B3). The complete milling and polishing that converts brown rice into white rice destroys 67% of the vitamin B3, 80% of the vitamin B1, 90% of the vitamin B6, half of the manganese, half of the phosphorus, 60% of the iron, and all of the dietary fiber and essential fatty acids. By law in the United States, fully milled and polished white rice must be "enriched" with vitamins B1, B3, and iron. But the form of these nutrients when added back into the processed rice is not the same as in the original unprocessed version, and at least 11 lost nutrients are not replaced in any form even with rice "enrichment."

Here are some of the ways in which the nutrients supplied by brown rice can make an important difference in your health:

BENEFITS

- Cancer Prevention

The phenolic compounds that are found in it, particularly in brown or wild rice, have anti-inflammatory properties. It has

natural antioxidants like vitamin C, vitamin-A, phenolic and flavonoid compounds, which also act as or stimulate antioxidants to scour the body for free radicals. Free radicals are byproducts of cellular metabolism that can do serious damage to your organ systems and cause the mutation of healthy cells into cancerous ones.

- Skin care

Rice can be applied topically to cure certain skin ailments. The phenolic compounds that are found in it, particularly in brown or wild rice, have anti-inflammatory properties, so they are also good for soothing irritation and redness. Whether consumed or topically applied, substance derived from rice tends to relieve a number of skin conditions. The antioxidant capacity also helps delay the appearance of wrinkles and other premature signs of aging that can affect the skin. Heated external application is used for severe or minor inflammation and cancer prevention

- Alzheimer's Disease

Brown rice is said to contain high levels of nutrients that stimulate the growth and activity of neurotransmitters, subsequently helping to prevent Alzheimer's disease to a considerable extent. Various species of wild rice have been shown to stimulate neuroprotective enzymes in the brain, which inhibit the effects of free radicals and other dangerous toxins that can cause dementia and Alzheimer's disease.

- Tune Down and Bone Up

Magnesium, another nutrient for which brown rice is a good source, has been shown in studies to be helpful for reducing the severity of asthma, lowering high blood pressure, reducing the frequency of migraine headaches, and reducing the risk of heart attack and stroke.

How does magnesium accomplish all this? Magnesium helps regulate nerve and muscle tone by balancing the action of calcium. In many nerve cells, magnesium serves as Nature's own calcium channel blocker, preventing calcium from rushing into the nerve cell and activating the nerve. By blocking calcium's entry, magnesium keeps our nerves (and the blood vessels and muscles they ennervate) relaxed. If our diet provides us with too little magnesium, however, calcium can gain free entry, and nerve cells can become overactivated, sending too many messages and causing excessive contraction. Insufficient magnesium can thus contribute to high blood pressure, muscle spasms (including spasms of the heart muscle or the spasms of the airways symptomatic of asthma), and migraine headaches, as well as muscle cramps, tension, soreness and fatigue.

But that's far from all magnesium does for you. Magnesium, as well as calcium, is necessary for healthy bones. About two-thirds of the magnesium in the human body is found in our bones. Some helps give bones their physical structure, while the rest is found on the surface of the bone where it is stored for the body to draw upon as needed. Brown rice can help you keep those storage sites replenished and ready to meet your body's needs.

In addition to the niacin it supplies, brown rice may also help raise blood levels of nitric oxide, a small molecule known to improve blood vessel dilation and to inhibit oxidative (free radical) damage of cholesterol and the adhesion of white cells to the vascular wall (two important steps in the development of atherosclerotic plaques). A study published in the *British Journal of Nutrition* suggests that diets high in rice protein can help protect against atherosclerosis by increasing blood levels of nitric oxide.

In this study, when researchers gave mice bred to be apoliprotein-E deficient a purified diet containing either casein, the principal protein in dairy products, rice protein or soy protein, the mice given casein

developed the largest atherosclerotic lesions. (In humans as well as animals, apolipoprotein E plays an important role in cholesterol transport, so a deficiency of this protein increases risk for the development of atherosclerosis.) Mice given rice or soy protein fared much better. In trying to understand why, the researchers evaluated blood levels of nitric oxide. Mice fed either rice or soy protein diets were found to have increased blood levels of L-arginine (the amino acid that the body uses to produce nitric oxide) and nitric oxide metabolites when compared to those given casein-based feed. However, the L-arginine content of the rice and soy diets was not high enough to explain the amount of protective benefit they conferred, so the researchers concluded that these foods must also contain other cardioprotective compounds.

Brown rice is also extremely beneficial for normal functioning of the nervous system and the production of sex hormones.

- Rich in Fiber and Selenium

For people worried about colon cancer risk, brown rice packs a double punch by being a concentrated source of the fiber needed to minimize the amount of time cancer-causing substances spend in contact with colon cells, and being a good source of selenium, a trace mineral that has been shown to substantially reduce the risk of colon cancer.

Selenium deficiency is known as the main factor causing depression and other mental disruptions

Selenium is an essential component of several major metabolic pathways, including thyroid hormone metabolism, antioxidant defense systems, and immune function. Accumulated evidence from prospective studies, intervention trials and studies on animal models of cancer has suggested a strong inverse correlation between selenium intake and cancer incidence. Several mechanisms have been suggested to explain the cancer-preventive activities of selenium.

Selenium has been shown to induce DNA repair and synthesis in damaged cells, to inhibit the proliferation of cancer cells, and to induce their *apoptosis*, the self-destruct sequence the body uses to eliminate worn out or abnormal cells.

In addition, selenium is incorporated at the active site of many proteins, including *glutathione peroxidase*, which is particularly important for cancer protection. One of the body's most powerful antioxidant enzymes, *glutathione peroxidase* is used in the liver to detoxify a wide range of potentially harmful molecules. When levels of *glutathione peroxidase* are too low, these toxic molecules are not disarmed and wreak havoc on any cells with which they come in contact, damaging their cellular DNA and promoting the development of cancer cells.

Not only does selenium play a critical role in cancer prevention as a cofactor of *glutathione peroxidase*, selenium also works with vitamin E in numerous other vital antioxidant systems throughout the body. These powerful antioxidant actions make selenium helpful in the prevention not only of cancer, but also of heart disease, and for decreasing the symptoms of asthma and the pain and inflammation of rheumatoid arthritis.

- Manganese—Energy Production & Antioxidant Protection

Manganese helps produce energy from protein and carbohydrates and is involved in the synthesis of fatty acids, which are important for a healthy nervous system, and in the production of cholesterol, which is used by the body to produce sex hormones. Manganese is also a critical component of a very important antioxidant enzyme called *superoxide dismutase*. *Superoxide dismutase* (SOD) is found inside the body's *mitochondria* (the oxygen-based energy factories inside most of

our cells) where it provides protection against damage from the free radicals produced during energy production.