

# Chapter 2

## Cereal Grass for People Fifty Years of Research

*“I have come to believe that the true medicine is young green barley and wheat leaves which are eaten by human beings as staple food. . . . Such grasses as barley, wheat, rye, and rice too are as indispensable as the elements are.”*

—Y. Hagiwara<sup>108</sup>

Grass is the primary food for many species of animals. Some types of grasses make excellent foods for people as well. Ancient Oriental and Middle Eastern people are said to have eaten the young grass plants of wheat and barley. “*The Book of Daniel*” in *The Old Testament* says that King Nebuchadnezzar (630-562 B.C.) ate only grasses for seven years. He claimed that his mental clarity, perhaps his sanity, was restored during this period, allowing him to again rule his kingdom.

The greatest ancient civilizations grew up in areas suitable for the production of cereal crops. In most parts of the world today, cereal grains such as rice, wheat and corn are the primary staple foods. Research on the use of the young green leaves of cereal plants has been carried out in the United States since the late 1920s. Dehydrated cereal grass became available as a human food supplement in the 1930s.

### THE EARLY YEARS

#### Animal Health Dramatically Improved With Cereal Grass Feed

In 1928, the concept of vitamins as essential nutrients was just gaining acceptance among health researchers. Vitamins A, C, E, and some of the B complex vitamins had been identified. Charles Schnabel, a Kansas City food chemist, was looking for a “blood-building material” which could be added to poultry feeds to enhance egg production and reduce chicken mortality.

It was known at the time that chlorophyll, the green substance in plants, had some structural similarities to hemoglobin, the oxygen-carrying factor in animal blood. Reasoning that “green leaves should be the best source of blood,”<sup>123</sup> he began a search for blood-building factors in green leaves.

Dr. Schnabel first tried increasing the amount of alfalfa fed to chickens, but found that diets consisting of more than 10% alfalfa were harmful to hens. He then tried supplementing the chicken feed with various combinations of twenty vegetables, primarily green vegetables. All were “found wanting” and did not achieve the blood-building effects sought by Dr. Schnabel. In 1931, feeling frustrated and about to give up his search, he gave the experimental hens a “greens mixture,” which “just happened to contain a large amount of immature wheat and oats.” Chickens given a ration containing only 10% of this cereal grass responded dramatically. Winter egg production rose from the average 38% to an astonishing 94%! Not only were more eggs produced, but those eggs had stronger shells and were more likely to hatch healthy chicks. The chickens were free of the usual degenerative diseases associated with poultry production. Their combs were bright scarlet red, and their legs never lost their pigment. He reported that “even a child can see the bloom of health in the grass-fed hens, as compared to the alfalfa-fed hens, though science, as yet, cannot explain it.”<sup>123</sup>

Dr. Schnabel studied many aspects of growth and nutrition associated with cereal grasses. He found that some soils were not suitable for providing high quality cereal grasses, and that the nutrients provided by these green plants varied with the stage of growth of the grasses. He gave the dehydrated grasses, an economical and practical food supplement, to his family of seven. As reported in the *Buffalo Courier Express*,<sup>14</sup> none of his children ever had a serious illness or a decayed tooth. He devised a plan to provide the hungry nations of the world with a high quality protein supplement derived from cereal grasses.

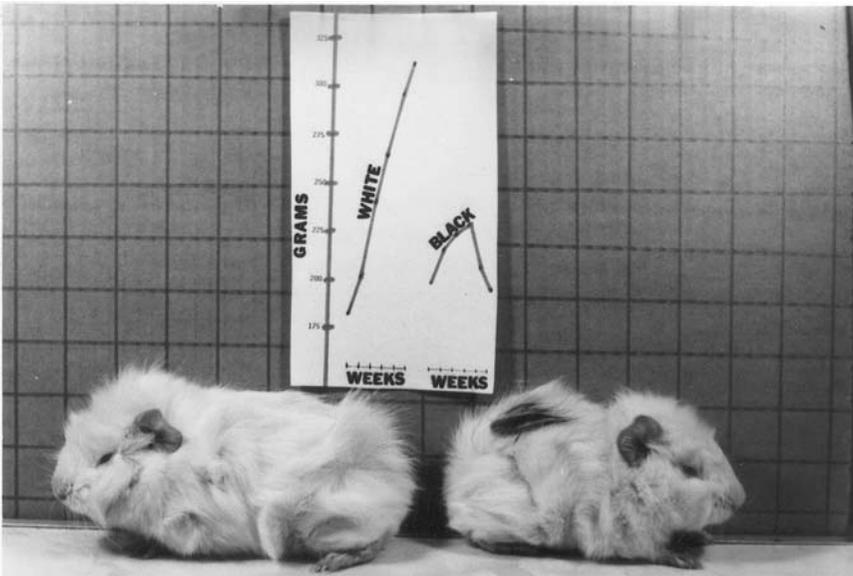
## **The “Grass Juice Factor”**

In the mid 1930s, at the University of Wisconsin, Dr. George Kohler and his colleagues were studying the differences in the nutritional value of cow’s milk produced at different seasons of the year. Although they thrived on summer milk, experimental rats and guinea pigs failed to grow and eventually became sick and died when fed winter milk. The higher nutritional value of the summer milk was found to be due to the grasses eaten by the cows in the

spring and summer. Thus began research on the “Grass Juice Factor”, a water soluble extract of grass juice which was responsible for this growth effect.<sup>67</sup>

Most of the individual vitamins were isolated and identified during the 1930s by scientists working to identify all the nutritional factors necessary for growth and reproduction in humans and domestic animals. Because the addition of green foods to the diets of test animals often produced dramatic growth and health effects, cereal grass and the Grass Juice Factor were intensely investigated. By the late 1930s, dehydrated cereal grasses were available in several forms for use as a human food supplement. They have remained on the market under a variety of trade names ever since.

At the University of California at Berkeley, Dr. Mott Cannon and his colleagues found that guinea pigs failed rapidly when fed a stock ration plus high levels of all the then-known nutrients.<sup>18</sup> When the researchers added standard food supplements such as liver extracts, wheat germ, and brewer’s yeast to the animals’ diets, the guinea pigs remained sick and often died. Addition of dehydrated grass or grass juice brought about dramatic recovery and restimulated growth in these animals.



*Results of Commercial Feed plus Wheat Grass vs Commercial Feed Alone*

*Typical of early studies, the guinea pig on the left was born smaller than his litter mate on the right. After five weeks with wheat grass added to its diet, the left animal shows rapid growth while the right animal (who ate only commercial guinea pig food) shows no net weight gain.*

A large number of foods were tested at the University of Wisconsin to determine which of them contained the highest levels of the Grass Juice Factor.<sup>113</sup> The best sources were found to be dehydrated cereal grass, young white clover, peas, and cabbage.

In 1935, Danish researchers discovered vitamin K, the “koagulation vitamin.” Because this nutrient was difficult to isolate in large quantities, cereal grasses were used in lieu of purified vitamin K—both for research and for medical therapy.<sup>59</sup> Folic acid was identified in 1938, and named for the green leaves, or foliage, which are its richest source. Food scientists were beginning to see that some of the health and growth benefits provided by the cereal grasses were due to essential vitamins and minerals which they contained. Other benefits, however, could not be attributed to known nutrients.

## Cereal Grasses and Fertility

Research continued on previously unidentified factors contained in grasses. Earlier studies had indicated that cereal grasses enhanced the fertility of laying hens. In the 1940s, researchers in several laboratories discovered a substance in green plant foods which affected the fertility of several species of mammals. When injected into rabbits, this water-soluble factor actually induced ovulation! The factor was isolated from a number of sources, most notably frozen and powdered cereal grass juice.

The factor appeared to be most potent when supplied to animals in the spring and summer months.<sup>11,39</sup> It worked like a hormone by stimulating the pituitary gland to release another hormone which caused ovulation in rabbits, cats, and ferrets.<sup>12</sup> Spitzer and Phillips<sup>134</sup> then showed that a factor in green feed supplements improved reproductive ability and lactation when added to rat chow which contained all known required nutrients. When not given this green food factor, rats were less able to nurse their young, a characteristic passed to their daughters, even if the daughters had been fed the green food factor!

A significant number of reports show positive reproduction-related effects of feeding young grasses to mammals. Von Wendt<sup>140</sup> found that when human mothers drank the milk of grass-fed cows, their children developed more rapidly than children nursed by mothers who drank the milk of cows fed winter rations. This information supports Kohler’s earlier work which showed that the Grass Juice Factor had a measurable impact on the nutritive value of cow’s milk. And when fed to dairy cattle, young grasses produced noticeable

increases in milk production.<sup>11</sup> A medical doctor in Kansas City<sup>130</sup> reported “gratifying results” using dehydrated cereal grass for pregnant patients who were at high risk for miscarriage.

Some of the fertility effects of cereal grasses may be attributed to their vitamin K content. However, the isolated factor used in the experiments mentioned above was taken from the water soluble portion of the grass extract, and so is clearly not associated with vitamin K, which is a fat-soluble vitamin.

## **Other Unidentified Health Factors in Cereal Grasses**

Through the 1940s and 1950s, cereal grasses were found to contain a number of “factors” which had different health-related effects on animals. In addition to the growth and fertility factors, grass was shown to contain factors which support the growth of lactobacilli<sup>25</sup> and other beneficial intestinal bacteria.

Cereal grasses contain a factor which blocks the development of scurvy (vitamin C deficiency) which follows the feeding of glucoascorbic acid. This effect could not be duplicated by the feeding of vitamin C (ascorbic acid).<sup>150</sup> Other reports describe a cereal grass factor which blocks the formation of histamine-induced ulcers in guinea pigs.<sup>64</sup> Clinical studies conducted by Dr. Cheney at Stanford in 1950 demonstrated that green vegetables contain a factor which promotes the healing of peptic ulcers.<sup>20</sup>

By 1950, all the nutrients now considered essential to the human diet (with the exception of selenium) had been identified. But researchers continued to describe green food “factors” which could not be correlated with any known nutrient. In 1957, Erschoff again demonstrated the growth-stimulating effect of a green food factor for guinea pigs.<sup>33</sup> All cereal grasses produced similar results. Dehydration and pelleting of the green foods did not diminish the effects.

In 1960, the same laboratory described a water-soluble factor in alfalfa which improved utilization of vitamin A in rats.<sup>34</sup> This factor was shown to be distinct from known nutrients, including the carotenes. In 1966, Dr. George Briggs and others identified a “plant factor” in grasses, alfalfa and broccoli, which was isolated using the methods used earlier by Kohler.<sup>82</sup> This factor provided significant growth stimulation when fed to guinea pigs. Dr. Briggs’ study is especially useful. It provides controls for nutrients (folic acid, vitamin B-12, zinc) which had not yet been identified when Dr. Kohler did

his original work. To this day the “Grass Juice Factor” in young green plants, required for life and health in guinea pigs, has still not been identified as any of the known nutrients.

## **Cereal Grass as a Multi-Nutrient Supplement For Humans**

Dehydrated cereal grass has been available as a food supplement for humans and animals since the 1930s. Before synthetic vitamin supplements were available, people took grass tablets to supplement diets which they considered to be inadequate. Doctors gave grass tablets to patients with nutrient deficiencies, or for specific health conditions.<sup>22</sup>

In 1940, Drs. Kohler, Schnabel, and Graham presented information about the nutritional properties of cereal grasses to the annual meeting of the American Chemical Society.<sup>47</sup> They reported that cereal grasses contain high levels of a variety of important nutrients—vitamins, minerals, and protein. These nutrients were found to be in highest concentrations just as the grasses approached the jointing stage of growth. In several thousand analyses of cereal grasses harvested at this stage, no consistent differences could be found between wheat, barley, rye and oat grasses. The Grass Juice Factor was said to be essential for the health of test animals given stock rations containing whole milk, iron, copper, manganese and vitamin C. Supplements of vitamins A, D, B1, B2, and B6 could not be substituted successfully for the Grass Juice Factor, nor could these supplements duplicate the growth effects provided by the factor.

The researchers went on to make certain observations which are still relevant today. They pointed out that about one third of the people in the United States at that time (1940) were unable to buy nutritionally adequate foods because of the high cost of foods such as milk and vegetables. Even those who could afford to buy adequate foods frequently did not choose foods which provided adequate nutrients. As a result, the researchers felt that a high proportion of the population was in a state of vitamin deficiency. Because the vitamin content of cereal grass was so much higher than that of vegetables commonly consumed, they suggested that the use of cereal grass as a human food supplement would be an economical way to provide those nutrients which were commonly lacking in the American diet.<sup>47</sup>

The dehydrated cereal grass food most commonly used was called Cerophyl (from the Latin *cerealis*, “of grain” and the Greek *phyllon*, “leaf”). Cerophyl was, in fact, approved as an “accepted food” by the Council on

Foods of the American Medical Association in 1939.<sup>10</sup> The acceptance notice recognizes the value of cereal grass not only as a rich source of carotene, vitamin K and the grass juice factor, but also as a good source of vitamin C and the B vitamins.

During the 1950s, chemical and pharmaceutical industries began to play a bigger role in the production and delivery of American foods. It was the beginning of the promotional idea of “better living through chemistry” with a fertilized, crop-sprayed “green revolution.” Agrochemicals began accumulating in our soils and on our food crops. Synthetic nutrients were added to foods and pressed into vitamin pills. As multi-vitamin pills became more commonplace, food-based nutrient supplements such as Cerophyl became less popular.

## CONTEMPORARY APPROACHES

### Cereal Grass Research and Consumption

The 1960s and 70s were times of social change and increased environmental awareness around the world. Growing understanding of our place in our environment and of our responsibility for the health of the planet, as well as our own bodies, spawned a revived interest in “natural” foods and therapies. In Boston, Dr. Ann Wigmore researched and rediscovered the value of cereal grass as a human food and therapeutic agent.

Dr. Wigmore, now over eighty, is an energetic and engaging woman whose vitality is in sharp contrast to her state of health forty years ago. As a child, she had seen her grandmother use grasses to heal wounded soldiers during the First World War. Thirty-five years later, when her own health began to deteriorate, she remembered her grandmother’s remedies, and experimented with various grasses to improve her own health.

She began growing and chewing young blades of “wheatgrass” which she grew in her home. She soon recovered from a longstanding problem with colitis, which had been medically untreatable. She also fed the green plants to her pets, and wrote that “it worked miracles for their well-being.” Her own energy level was vastly improved, and she began giving wheatgrass juice to her elderly and sick neighbors. “In a matter of weeks,” she reports, “all of them were able to get out of bed, and they became more active than they had been in years.”<sup>145</sup>

In 1968, Dr. Wigmore founded Hippocrates Health Institute, a treatment and educational center in Boston. To treat people with chronic

degenerative diseases, she used wheatgrass and wheatgrass juice therapies, along with a diet emphasizing the use of green and raw foods. Many people who were “guests” at Hippocrates claim to have found, in the simple wheatgrass-centered therapy, cures for diseases considered by their physicians to be incurable. An account of one such cure is described by Eydie Mae Hunsberger in her book *How I Conquered Cancer Naturally*.

Dr. Wigmore reports that the “wheatgrass” used in her program contains abscisic acid and laetrile, both of which may have anti-cancer activity. She feels that young grasses and other chlorophyll-rich plants are a safe and effective treatment for ailments such as high blood pressure, some cancers, obesity, diabetes, gastritis, ulcers, pancreas and liver problems, fatigue, anemia, asthma, eczema, hemorrhoids, skin problems, halitosis, body odor and constipation.<sup>145</sup> Dr. Wigmore’s opinions are based on her experiences with her guests at Hippocrates. We have searched through the scientific and medical literature for information which might validate or repudiate her claims. Remarkably, a relatively large number of studies indicate that food factors and nutrients found in wheat grass may provide relief from many of the conditions she alludes to. No clinical studies have verified that such conditions can be cured by the use of wheat grass or “wheatgrass” alone.

Perhaps the most famous of Dr. Wigmore’s “guests” is Viktoras Kulvinskas. He came to Hippocrates in 1969 at the age of 29, suffering from ulcers, arthritis, and migraine headaches.<sup>117</sup> Previously a computer scientist, Mr. Kulvinskas became co-director of the Institute after his own remarkable recovery. There he worked with the guests, and researched the health advantages of wheat grass and a raw foods diet. His book, *Survival Into the 21st Century*, has become a classic in the natural foods field.<sup>75</sup> He continues to work, write and speak out as an advocate of green foods and health awareness.

At about the same time that Dr. Wigmore began her work in Boston, a research pharmacist in Japan, Yoshihide Hagiwara, began to study the dietary benefits of cereal grasses. Like Dr. Wigmore, Hagiwara had developed a number of health problems over the years. After trying medicines and vitamins to no avail, he was able to improve his health with the help of Chinese herbs and a complete change of diet. Believing that his health problems were typical of many modern Japanese people, he began a search for the most health-promoting natural foods.<sup>55</sup>

Like Charles Schnabel fifty years earlier, Hagiwara found that “the leaves of the cereal grasses provide the nearest thing to the perfect food that this

planet offers.”<sup>55</sup> He also found, as had the American researchers in the 1930s, that the grasses of wheat, oats, rye and barley were extremely high in a wide variety of nutrients—much higher than the cereal grains produced by these plants. With colleagues in America and Japan, he carried out a number of animal and clinical experiments to determine the health benefits of cereal grass juices.

Although no nutrient differences have ever been found between the cereal grasses, the Japanese research has centered on barley grass leaves, which are readily available in Japanese barley fields. This research suggests a number of therapeutic uses for barley grass juice, including treatment for skin diseases<sup>93</sup> and ulcers, corroborating the research done decades earlier on the therapeutic value of chlorophyll and green vegetables. The Japanese research also demonstrated that mice, when fed juice extracts of barley grass, grew faster and had more energy than mice fed standard rations.<sup>74</sup> This research duplicates and corroborates a portion of the early work done by Dr. Kohler and others on the Grass Juice Factor.

Japanese research goes further to suggest additional, previously unstudied benefits of cereal grasses. Barley grass juice is said to lower serum cholesterol, perhaps by blocking intestinal absorption of cholesterol.<sup>72</sup> Two interesting proteins, P4-D1 and D1-G1, have been isolated from barley grass juice. These proteins may be connected to the previously unidentified factors in cereal grasses.

P4-D1 was shown to protect cells from ultraviolet radiation and a specific carcinogen. This was said to be a result of the stimulation of DNA repair by this protein. These results are preliminary, and have not yet been replicated. P4-D1 and D1-G1 have both been demonstrated to have anti-inflammatory activity<sup>73</sup> when injected, but not when ingested. As with all cereal grass and chlorophyll therapies, these compounds are remarkably free from side effects.

Back in America, a limited amount of research has been reported concerning the potential anti-cancer effects of cereal grass. In a letter to *Barron's Magazine*, Dr. Arthur Robinson describes experiments carried out over a three-year period at the Pauling Institute. The effects of diet and vitamin C on skin cancer in mice were investigated. One diet, consisting solely of wheat grass, carrots, several fruits, and sunflower seeds, “caused a remarkable 35-fold decrease in cancer incidence”<sup>116</sup> when combined with high doses of vitamin C. Vitamin C, when given in high doses without the special diet, produced a five-fold decrease in skin cancer.

In 1979, Dr. Chiu Nan Lai, of the University of Texas Health Sciences Center in Houston, presented information at a meeting of the American Chemical Society<sup>124</sup> which suggested that wheat grass may have cancer-preventive properties. Using the standard Ames Test, she showed that an extract of wheat grass, when applied to known chemical mutagens (which cause cells to become cancerous), decreased their cancer-causing ability by up to 99 percent.<sup>81</sup> Later studies showed that several green vegetables provide anti-mutagenic protection from a number of cancer causing chemicals.<sup>80</sup> This activity was found to be proportional to the amount of chlorophyll in the vegetables.<sup>79</sup>

As we will see in Chapter 7, population studies indicate that the consumption of green vegetables may protect us from a number of diseases, including some types of cancer.

The idea of grasses as foods with specific health benefits is really nothing new. For generations, farmers have let their animals graze on the tender green cereal grass plants before those plants joint in the spring. We also see many of our pets eating only grass plants when they are sick.

Science is sometimes slow in catching up with conventional wisdom. Our mothers and grandmothers knew that to be healthy we needed to eat green vegetables. Their intuitive sense of the strength and health-giving properties of green foods has now been scientifically studied. A large body of scientific research now specifies which nutrients are abundant in green vegetable foods and how these nutrients can contribute to good health and disease prevention. Given the current status of our health, this information could not be more timely.

## **CEREAL GRASS FOR PEOPLE**

### **Fifty Years of Research: A Summary**

The cereal grasses (wheat grass, barley grass, rye grass, oat grass) have been used as human food supplements since the 1930s. Scientists originally studied these plants as sources of blood-building factors. When, in 1931, it was observed that the nutritional level of milk fell when cows did not consume young green leaves, systematic research began on the health benefits of cereal grasses.

As essential nutrients were isolated and identified, the cereal grasses were found to be excellent sources of beta-carotene, vitamin K, folic acid, calcium, iron, protein and fiber, as well as good sources of vitamin C and many of the

B vitamins. In addition, the cereal grasses were shown to contain unidentified factors which provide a variety of health, growth and fertility benefits to animals and to humans.

Laboratory research on the health benefits of cereal grasses increased over the past two decades in the United States and Japan. At the same time, the use of wheat grass as an “alternative” therapy for chronic diseases became popular. These two movements, together with the increased availability of suitably prepared American-grown cereal grass, have been responsible for a renaissance in the use of cereal grasses as human foods.