IODINE AND TRACE ELEMENTS IN THE PROMOTION AND MAINTENANCE OF METABOLIC EXCELLENCE

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It is to be noted that the International College of Applied Nutrition in no way endorses or recommends any product. The mention of "Mineral 72" in the Paper was not to lend advertising value to the product. It was the desire of the author only to show that there was available a product of silt from water similar to that discussed in the Paper that hopefully could be tried by physicians and nutritionists to see if it would satisfy some of the needs of the patients in a way similar to the people with great longevity in the three areas of the world discussed in the "National Geographic" magazine of January 1973.

In a Paper published in the Spring 1975 issue of The Journal of Applied Nutrition it was pointed out that ions of specific metals produced remarkable results in supporting good health, as well as alleviating specific symptoms. The complete protocol of the manufacture of these ions was given in the Paper. It is to be understood that any benefit to be obtained from the silted elements of "Mineral 72" is only an added value over the trace elements in ionic form. They are not interchangeable. They supplement each other.

Longevity has long been synonymous with good heredity, as well as good health. When a person has poor health it is often facetiously remarked that he should have selected different grandparents. Both the physician and the lay public will often remark that an individual is more likely to live a long, healthy life if he comes from parents and grandparents who have lived to a ripe old age.

An article in the January 1973 issue of the "National Geographic"¹ points out that there are places in the world where people live much longer and remain more vigorous in old age than in most of our modern societies. Dr. Alexander Leaf, M.D., the Chief of Medical Services at Massachusetts General Hospital, and Professor of Medicine at Harvard University Medical School, visited three of the best known of these regions. They were all remote, mountainous, and over a mile high—the Andean Village of Vilcabamba in Ecuador—the Land of the Hunzas in Kashmir—and Abkhazia in Russia on the border of the Black Sea.

One of the most interesting persons he interviewed was a woman in Abkhazia who

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was more than 130 years old. She had a good memory, good energy, was still able to go on the bus alone to visit her friends in distant villages, had smoked a pack of cigarettes a day for 62 years, and still enjoyed vodka before breakfast. She was a small woman, only 5 feet tall, but the photograph shows her tissues to be remarkably well preserved and not dried up or wrinkled, and no edema of her feet.

In this article Dr. Leaf shows pictures of people 100 years of age and older, who look better than some we see here in their 50's. They all maintained a remarkable sense of humor, good memory, and an interest in life such as horseback riding and dancing. Many over 100 years of age continue working in the fields picking tea-leaves.

It has long been noted that very old individuals had parents who lived to old age. This was strikingly brought out when he talked to centenarians of all three areas. Almost all had at least one parent who had lived for more than 100 years. There is no known gene for longevity; there is only the absence of bad genes. The extreme isolation, due to the inaccessibility of their valleys, gives one the feeling that the Hunzas and the residents of Vilcabamba would be of pure genetic strain. Such isolation might be expected to prevent the introduction of bad genes. However, in the Caucasus area any notion of a pure genetic strain is promptly banished by the fact that one sees centenarians from many different ethnic groups.

Dr. Leaf commented that his confidence in the importance to health and longevity of a low animal fat, low cholesterol, low caloric diet was somewhat shaken by the eating habits of Caucasus. Dietary study of the habits of 1,000 persons above the age of 80, including more than 100 centenarians, showed that the old people consumed about 1,900 calories daily—considerably more than most people of such advanced age. 70 to 90 grams of protein were included in the diet—milk being the main source of protein. The daily fat intake was about 40 to 60 grams. Bread provided the major source of carbohydrates.

An active interest in the opposite sex is popularly regarded as an excellent indication of vigor and vitality. Although the ovaries of women do age and stop producing ova at the menopause (usually in the late 40's or early 50's), this has little effect on sex appetite. In the male, too, aging is associated with a gradual decrease in the number of cells in the testicles. Still, sexual potency in the male may persist to advanced old age. Centenarians in these areas professed continued interest in love and sex.

In an effort to explain the reasons for the people in these three areas living to such an old age, Dr. Leaf discusses the immune system of the body:—antibodies against bacteria or foreign substances, and the type of protein and other food consumed; but nowhere does he suspect the mineral elements supplied by this agricultural existence. He does not discuss the fact that each of these communities is situated in a valley supplied with water which washes silt from a mountain behind them. He does not recognize that they drink the silted water, they fertilize the crops they eat with the silted water, they eat the flesh and drink the milk of the animals that were raised on this silted water, and they have a constant supply of trace elements throughout their lives that is

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as good or better than any other place on earth. It is my opinion that these people maintain their health and longevity from the activation of the enzymes of their cells by these mineral elements supplied to them in a fortuitiously balanced concentration.² Substantiation of this idea can be seen in the answer to a question that Dr. Leaf asked Christine Azuba, age 110 years. When he asked her why she had lived so long in such good health, she answered: "I can't explain in scientific terms, but there just seems to be something special in the life here."

Dr. David Kakiashvili, a Russian cardiologist who has been studying gerentology in this region for the past 12 years, is convinced that exercise is a major factor in longevity. He poses the question: "Why do people in small mountain villages tolerate myocardial infarctions (heart attacks) much better than their urban relatives?" He then proceeds to answer his own question: "The constant physical activity required of them improves cardiopulmonary function, so that the oxygen supply to the heart muscles is much superior to that in city dwellers." Even though these old people that he studied showed evidence of heart attacks, they apparently were not felt by the victim. Dr. Kakiashvili, like Dr. Leaf, does not recognize the value of the mineral elements in the diet of these people.

It seems rather easy to accept the longevity and good health of these people, both men and women, living in these isolated areas, but how do we explain the longevity of women over men in our modern society throughout the civilized world? I recently visited a Retirement Home in California where there were 350 residents—only 53 of which were men (a ratio of 6 to 1). This pattern exists pretty much everywhere. The cause of the decimation of the male over the female is attributed to atherosclerotic heart disease. Long-term projects designed to study the relationship of dietary fat as the cause of atherosclerotic heart disease have used only males roughly between 35 to 60 years of age. Despite this clear-cut preponderance of the disease in males over females, long-term statistical studies have not been able to show a clear-cut relationship of dietary fat consumption to the occurrence of heart disease.

Joseph Stambul, M.D., Chief Cardiologist, Department of Medicine, Southern Division, Albert Einstein Medical Center, published a Paper³ entitled: "Atherosclerosis: Interpretation Of Its Mechanics And New Approach To Prevention And Treatment." He points out that as early as 1862 Austin Flint discovered that the liver is the organ for the excretion of the excess of cholesterol in the blood plasma. Also, the liver, after a meal high in fat, plays an important role in maintaining the normal level of cholesterol in the blood plasma. If the liver fails to reestablish the normal cholesterol blood level, the cells of the reticulo-endothelial system engulf and store cholesterol in their cytoplasm and are converted into lipoid cells. An accumulation of these lipoid cells in the arterial wall is characteristic of early atherosclerosis. It is generally agreed that atherosclerosis is a sequela of long high blood cholesterol, but the factors causing this sustained elevation of cholesterol are not explained.

It has been demonstrated by a number of investigators that high blood fat is a

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common complication of many bodily disorders associated with the mobilization of fat from fat depots, such as a diet low in carbohydrate, endocrine dysfunction, and ingestion of poisons that destroy the liver. When the high blood fat persists, it is accompanied by high blood cholesterol. It is a fact that high blood fat always preceeds high blood cholesterol.

Since cholesterol is a normal constituent of the blood, the question arises as to why, under certain conditions, the cells of the reticulo-endothelial system respond to an excess of this normal substance as if it were a foreign substance. In the normal man and animal, the cholesterol ingested with the food along with the excess of cholesterol synthesized by the tissues, is rapidly absorbed from the blood stream by the Kupffer cells of the liver and excreted into the bile. The cholesterol level in the circulation remains constant by this regulator action.

It has been demonstrated that cholesterol is synthesized in all the early cells of the fetus. Every organ and tissue of the body is capable of cholesterol synthesis, but the liver is the chief source of plasma cholesterol in the adult. It has been shown in the experimental studies on animals that cholesterol can be synthesized from a simple two-carbon atom such as alcohol, and maintains a constant level according to some internal regulation. When large quantities of cholesterol are ingested in the food, this regulator slows down the production of cholesterol by the body cells. Austin Flint pointed out that the liver bears the same relation to blood cholesterol as the kidney does to blood urea.

In spite of the fact that the liver is actively engaged in the metabolism of fat, the liver is not a depot of fat. The liver cells of the normal animal are free of neutral fat, except during the process of fat digestion. In conditions involved in the active mobilization of fat, the fat is rapidly released from cells of adipose tissue throughout the body in quantities greatly in excess of immediate requirements. Anterior pituitary hormones are the most important agents causing the mobilization of fat and cholesterol in the blood. These factors lead to the development of atherosclerosis. It may be suggested therefore that atherosclerosis in the human is a complication of the disturbed function of the endocrine glands. Based on this assumption, the prevention and treatment of atherosclerosis becomes a problem of the prevention and correction of the endocrine disturbance causing it.

It has been known for many years that the thyroid gland has a regulating influence on the level of cholesterol in the blood. Hyperthyroid animals have low blood cholesterol values. Thyroidectomized animals have high plasma cholesterol values.

The thyroid hormone, thyroxin, is the only hormone that stimulates the excretory function of the Kupffer cells of the liver. There is a mass of clinical and experimental data which shows that the thyroid is intimately associated with cholesterol metabolism and that it has a controlling influence on the level of the cholesterol in the blood plasma. Although these facts have been known to the medical profession for many

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years, thyroid therapy for prevention and treatment of atherosclerosis is limited because of the toxic effects of the thyroid hormone on the body. Baumann⁴ discovered that the thyroid gland contains iodine in combination with a protein molecule called 'thyroglobulin.' Kendall⁵ in his investigations of the chemical constituents of thyroglobulin found that the iodine was present in two forms of organic combination:—one is thyroxin, and the other is diiodotyrosine. It was found by Stambul that the feeding of diiodotyrosine, free of any fraction of thyroxin, controlled the level of cholesterol in the blood plasma of experimental animals.

Ovarian hormones have been described as being protection against atherosclerosis. They protect a woman during her active sex life, from puberty to menopause, against coronary artery disease. As pointed out previously, the incidence of coronary artery disease is much higher in men under 40 years of age than in women of similar age. After the menopause the resistance of the female to atherosclerosis progressively decreases. It has long been recognized that there is a close relationship between the activity of the thyroid and ovarian glands. Enlargement of the thyroid is frequently observed during puberty and pregnancy. When the ovaries are removed there are functional changes that take place in the thyroid, the submaxillary gland, and the paratid glands; especially in young women.

The presence of iodine in the ovaries was discovered by Scharger⁶ at the same time that Baumann found iodine in the thyroid. With the exception of the thyroid, the ovaries contain the highest concentration of iodine. Carter⁷ has shown that there is a cyclic change of the ovarian iodine content associated with ovarian activity, that is, the iodine concentration is highest at the peak of ovarian activity and becomes lower with the decline of ovarian activity. Carter extracted the iodine component from fresh ovaries. He could not detect thyroxin in this extract, but found that it has a marked stimulating influence on tadpoles. Morse⁸ fed tadpoles with diiodotyrosine and produced a similar accelerating action on the metamorphosis of the frogs' larvae. It was concluded that there is a possibility that the iodine compound stored or manufactured by the ovaries is a diiodotyrosine fraction.

Perkins and Brown⁹ reported that removal of the thyroid in male dogs is followed by a marked drop in the protein-bound iodine of the blood plasma, while in thyroidectomized female dogs the blood iodine remains unchanged. When the ovaries are removed in the thyroidectomized female dogs, the iodine blood level declined to the same level observed in thyroidectomized male dogs. These authors believed that "their findings indicate that the blood iodine level is influenced to the same degree by the ovary as by the thyroid gland." In other words, the ovaries participate directly in iodine metabolism.

It seems, therefore, that the pattern of iodine concentration in the ovaries coincides with the activity of the ovaries and also with the resistance of the female to the development of atherosclerosis. This strongly suggests that the iodine fraction in the ovary is either stored or manufactured by the ovary which acts as an anti-atherogenic agent.

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The thyroid occupies an important position in cholesterol metabolism, as it controls the rate of excretion of cholesterol from the blood by the liver. Therefore, an insufficiency of the thyroid secretion is always associated with high blood cholesterol. The anterior pituitary hormones also exert great influence on the excretory function of the liver. In endocrine insufficiencies the anterior pituitary gland secretes the respective trophic (or stimulating) hormones in order to promote the deficient endocrine glands to greater activity. When the trophic hormones of the pituitary in the circulation are high, they mobilize large quantities of depot fat, causing elevated blood fat. The excess of circulating fat blocks the excretory cells of the liver (Kupffer cells), thus interferring with their excretion of cholesterol and resulting in high blood cholesterol.

Thus we can see that the longevity of the female over the male in our modern society is due to her unique ability to control the level of her blood cholesterol by a special hormone, diiodotyrosine, produced in her ovary. It is completely separate and distinct from estrogen, the hormone which defines her as a female and which controls her specific sex functions. Diiodotyrosine plays a specific role in converting the fat and cholesterol-like secretions of the breasts to milk to feed her baby.

The breast is an organ that is developed from 15 to 20 sweat glands of the skin and grows back toward the chest wall. It converts its secretions of fat and cholesterol into milk under the stimulus of prolan from the anterior pituitary. During lactation when induration appears, it is rapidly softened and brought to a fluid state by the administration of diiodotyrosine. This is helped also by the feeding of extra iodine and trace elements. The trace elements that have the most marked effect on the breast are zinc, manganese, copper, cobalt and silver. When ions of these materials are placed upon the tongue, within ten seconds a softening effect can be felt in the breast, and with proper care early conditions diagnosed as cystic mastitis will disappear in minutes. Cystic fibrosis and cysts of the breast will disappear over a period of time under adequate treatment of iodine with trace elements and estrogen. The breast is protected against the development of cancer by adequate vitamin and mineral supplements.¹⁰ ¹¹

Young women in puberty and adolescence are many times stunted in their development by a lack of these basic nutritional elements in their diet. This is particularly true in our modern civilized society, where softened, distilled and purified water is used in place of deep well water, spring water, or silted river water. But iodine is even more difficult to obtain in our modern diet. Iodine will sublime and disappear from stored, sterilized and cooked food. It is present only in deep well water. Its presence in fish eggs, such as roe and caviar, is practically distained in most of our culture. Men of the Andes would catch fish and sun-dry the roe and feed it to their pregnant women and young girls, to prevent what they called 'big throat,' and which we call goitre. With our high carbohydrate diet even sufficient tyrosine is frequently unavailable to manufacture diiodotyrosine, and subsequently the thyroid hormone.

Iodine, when it is prescribed at all, is considered to be necessary only for making the thyroid hormone. It has been my experience in feeding iodine in its natural form as

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iodized lime, that it has a marked effect on muscle contraction directly. It relieves cramps of the leg muscles known as 'charley horses.' It also relieves pain in the precordium, which I am sure is a similar contraction of the heart muscles, and it has a remarkable effect on muscle energy and contraction of all muscles of the body. Several female patients following severe debilitation with violent cramps in the intestinal tract were subjected to repeated laporotomy for obstruction, but nothing was found. Later, under treatment with iodine, metallic elements and minerals, these cramps were greatly relieved.

Iodine plays a decisive and critical role in the lymph system and in the lymph glands. Swollen submaxillary glands known as 'waxen kernels' to our parents and grandparents, will soften and regress within minutes after allowing iodized lime to dissolve in the mouth. It is my experience that it is the need for iodine in puberty that is the prime cause for the development of infectious mononucleosis. This is a disease completely misnamed:—it is neither infectious, nor is it mononucleosis—it is a lymph adenitis. It is a swelling of the lymph nodes throughout the body and a severe debilitation in strength and energy. Response of the disease to iodine is remarkable. It is interesting, however, that Dr. Frederick R. Klenner reports remarkable results in this disease with fantastic doses (30 grams intravenously) of Vitamin C.¹²

Iodine plays a very important role in the mucous of the body, and modifications of this mucous can be seen in the mouth and vagina. Sticky, thick and odorous mucous is both areas can be changed to a clear, flowing limpid fluid without odor and with a high degree of lubrication. When a woman has a sufficient amount of iodine in her body from the intake of either iodized lime or diiodotyrosine, it is impossible for her to become infected with trichomonas. Applications of "Roma-Nol," an aqueous solution of iodine, is the best protection and aid in treating this disease. Iodine sprayed on the mucous lining of her vagina will be absorbed and will soften her breasts in a matter of 5 minutes, while at the same time it relieves the tension and irritability of her intestinal musculature. The staining of the cervix and vaginal lining a deep brown color is known as Schiller's test for cancer of the cervix. Areas that do not stain should be biopsied and examined for cancer.

In early embryonic life a deficiency of iodine invariably leads to some degree of mental retardation. The degree of retardation varies from severe mongolism to subclinical patterns of deficiency that are difficult to diagnose and are frequently called 'neuroses.' Often the children are labelled as some behavioral pattern. Seldom is the condition recognized as a deficiency of iodine, even though the medical literature contains much information about clinical pictures of this specific iodine deficiency pattern.

Emotional disturbances are frequently seen at adolescent transition. I have seen two young girls develop severe depression and anxiety states beginning at 12 years of age. Careful and detailed examination by physician, psychiatrist and psychologist failed to give any reason for the emotional disturbance, and it was called a 'transitional phase.' I recommended the ingestion of potassium chloride one gram a day, which relieved the

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condition completely in both patients. As the condition cleared up so quickly (within a month), the patients and their parents felt that the supplement could be discontinued and the potassium supplied by the diet. In time both patients found it was again necessary to supplement their diet, because the symptoms repeatedly returned insidiously and completely after variable lengths of time.

Emotional outbursts of reformed alcoholics can often be relieved by a high intake of potassium chloride. In one case this was accomplished entirely by adding McCormick's salt substitute in the preparation of their food. In other patients the addition of potassium chloride directly as "Slow-K" as necessary to give a sufficient amount to control the symptoms.

Copper has long been known to be important in brain function. When copper is deficient in the diet of the mother during gestation, the offspring may be born with an undeveloped and a completely disabled brain. This has been shown by experiments on sheep—and the following slides showing work done by Dr. J.R.M. Innes indicates the severity of this illness and disease. Copper added to the mother's diet in subsequent pregnancies produce normal offspring.

There is much work being reported in the lay press concerning the possible improvement of memory in older people in the future. This subject is brought into the fore by the sad picture of our senior citizens gathered in nursing homes and retirement areas—many in a state of senility and with great loss of memory and comprehension. This is in marked contrast to the fantastic memory and mental acuity of the people in the three areas visited by Dr. Leaf, mentioned in the first part of this paper. Again, the strange part about the present research in improving memory for future generations, does not in any way consider the supplementation of mineral elements in the diet of the patient. In my own experience I have a number of patients who have reached 90 years of age with good memory, good hearing, good vision without cataracts or glaucoma, good disposition and a good sense of humor. I feel certain this was accomplished by the addition of the trace elements to their metabolic function. In my experience zinc, copper, manganese, magnesium, silver and iodine play outstanding roles in memory and brain function. As all of these materials are in some way interdependent, it is impossible to say which is the most important.

Dr. Roger J. Williams is one of the great chemists of our time. He devoted much of his research to the biological chemistry of nutrition and discovered pantothenic acid. This is one of the most important metabolites in the Krebs' cycle of energy in the cell. In a Paper entitled: "Nutrition For Chemists"¹³ he states: "The list of raw materials we need from our environment is a long one, and the list is largely what nutrition is all about. We need calcium ions, phosphate ions, sodium ions, potassium ions, chloride ions, magnesium ions, ferric or ferrous ions, zinc ions, manganese ions, copper ions, cobalt ions, molybdenum ions, iodine ions, leucine, isoleucine, valine, methionine, phenylalanine, threonine, tryptophane, choline, some form of Vitamin A, some form of Vitamin D, some form of Vitamin E, some form of Vitamin K, ascorbic acid, thiamine, riboflavin, pantothenate, niacinamide, biotin, folic acid, pyridoxine and

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cobalamin.

"Unbelievable as it may seem, we need all of these items in about the right amounts every day (or every few days) or we suffer. Furthermore, there is excellent evidence that most of the items listed constitute absolute needs. If we fail to get them and run out of our own reserves, we will surely die. It is an odd sensation to have your very existence depend, every day, on the practical solution of an equation with 40 or more variables."

As long as this list may seem to you, it is still incomplete and we are continuing to discover new elements to add to the list such as selenium, tin, silver—and so the list grows as time passes and our research improves.

In the past 30 years Dr. Irwin Stone¹⁴ has changed our perspective on nutrition with respect to Vitamin C. Scurvy is a disease produced by the absence of Vitamin C. It is a disease that was recognized the the early Egyptians; it was mentioned in the writings of Hippocrates, and was a disease recognized in the soldiers of the Roman legions. It is a disease that has existed throughout man's entire history. It has killed more individuals, caused more human misery, and changed the course of history more than any other single factor.

Until 1907 scurvy was regarded as a disease peculiar to humans only, because no other animal was known to develop it. It was in 1907 that guinea pigs were accidentally found to be susceptible to scurvy.¹⁵ Eventually it came to be realized that guinea pigs, some monkeys and some birds, along with man, suffered a biochemical lesion of the liver that prevents them from synthesizing ascorbic acid from glucose. This missing enzyme in the liver is due to a defective gene in the DNA molecule that would govern its synthesis. This makes it necessary for the human, as well as the guinea pigs, the monkeys, and some birds to have a continuous outside source of ascorbate throughout life in order to survive. Because of this defective gene, scurvy is not a simple dietary disturbance, but a serious inborn error of carbohydrate metabolism. It is a genetic liver enzyme disease. It exists 100% in all humans. According to Irwin Stone, this mutation occurred in a primate ancestor about 60 million years ago.

We have come to understand Vitamin C, or ascorbate as it is used in the body as a sodium salt, as a specific for scurvy and that extremely small amounts, in the order of a few milligrams a day, are adequate to prevent the appearance of the classical signs of frank, clinical scurvy. This has led to a widespread impression in medicine that ascorbate is only useful in the prevention and treatment of frank, classical scurvy and that these daily small milligram amounts offer complete protection. Nothing could be farther from the truth. The few milligrams used to treat the dietary disturbance are adequate only to prevent the classical signs of impending death from scurvy, but are grossly inadequate to fully correct our genetic liver enzyme disease in order for us to maintain full, vibrant, lifelong health. The living process at the sub-molecular level is essentially an enzymatically controlled, orderly transfer of electrons. The presence of a high concentration of this reversible oxidation-reduction system in all of life,

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vegetable or animal, would act as an electronic intermediary facilitating electron transfer and would be essentially 'an oil to the machinery of life.'

It is this uncorrected, chronic subclinical scurvy that is basically responsible for the high incidence and morbidity of heart disease, cancer, the collagen diseases and many others. It is a necessary metabolite that must be supplied daily and distributed throughout the day—not just given in one slug for convenience. Linus Pauling¹⁶ in studying this defect has shown that animals manufacture ascorbate in their liver to the extent of 5 to 13 grams a day. The goat produces 13 grams, as indicated in the following Table. Irwin Stone¹⁴ has collected the following figures from the literature, indicating the daily ascorbate synthesis in mammalian livers.

MAMMAL

ASCORBATE PRODUCED

Rat, unstressed 1.800-4,900 mgms. Rat, stressed 15, 200 mgms. Mouse 19,250 mgms. Rabbit 15,820 mgms. Goat 13,300 mgms. Dog 2,800 mgms. Cat 2,800 mgms. Human 0 mgms.

TABLE 1.

Irwin Stone made the first calculation of the need for Vitamin C in 1966, based on rat liver synthesis. When he extropolated his measurements to a 70 kilogram adult human, it indicated the need for 4,900 milligrams of ascorbate daily in the unstressed condition, and 15,000 milligrams daily under stress. It may be difficult for some of you to believe these figures when the minimum daily allowance of ascorbic acid recommended by the Food And Nutrition Board of the National Academy of Sciences and the F.D.A. is only 60 milligrams a day. Those of us who have been in clinical medicine for the past 40 years or more, have come to realize the need for ascorbic acid in amounts of about 3,000 milligrams a day—and this increased by three or four times in the states of infection, healing and surgery. Dr. Frederick Klenner uses sodium ascorbate intravenously in amounts of 30 to 150 grams a day. He takes orally 20 grams daily himself.¹²

The important thing to realize in this new perspective on Vitamin C is that we can no longer consider it a dietary deficiency. We must realize that we all suffer subclinical scurvy and our entire state of metabolic excellence depends upon an adequate intake of Vitamin C every day. Without this base, all forms of subclinical illnesses appear, even the development of severe mental symptoms, including a constant anxiety state and a persistent desire to commit suicide in chronic states of insufficiency. Having been a victim of acute scurvy in my second year of Medical School, precipitated by a dietary experiment to measure the respiratory quotient of carbohydrates, I would say that no doctor can fully appreciate the subclinical aspects of the symptoms presented

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to him by a patient unless he has experienced the remarkable train of symptoms the patient passes through in recovering from acute scurvy. It is a disease from which we can guarantee recovery with our present knowledge and availability of ascorbic acid. A doctor would never tell a patient his symptoms were bizarre and incomprehensible and pass him off as a neurotic if he has once traversed this path of recovery from acute scurvy. We do great honor to the laboratory method of learning, but this one in clinical medicine is worth all of the others put together. I recommend that all young doctors experience the state of acute scurvy and recovery at least once. I guarantee they would be much more compassionate physicians.

In the course of his long-term study of Vitamin C metabolism Emil Ginter¹⁷ discovered a remarkable relationship of Vitamin C and cholesterol. He shows that within the liver cell, in the presence of adequate ascorbate, cholesterol is modified by the incorporation of an OH group into the cholesterol nucleus. This reaction initiates the transformation of water insoluble cholesterol into bile acids, which are readily soluble in water. His experiments showed also that this solubility action prevents the formation of gallstones. It also caused recently formed gallstones to disintegrate. Vitamin C proved effective beyond all expectations in depressing the levels of plasma triglycerides. As was indicated earlier, high plasma triglycerides, which is high blood fat, play a significant and basic role in the pathogenesis of high blood cholesterol, and eventually atherosclerosis.

We must now ask how these people in the three areas of the world studied by Dr. Leaf, managed to get their supply of Vitamin C which was absolutely essential to their well-being and longevity. Here again, by fortuitous circumstances they consumed large quantities of fresh fruits, peppers, vegetables and grasses. Fresh growing shoots of all vegetables are loaded with Vitamin C. The simple procedure of sprouting beans and peas produces fantastic amounts of Vitamin C. Ascorbic acid is one of the most important protective biochemical substances in all living processes. All multi-cellular organisms, both plant and animal, either make it within their bodies or get it in their food, or they perish. As we progress into civilized living with great concentration of people in cities and away from the simple life on the farm, we decrease our intake of fresh fruits and vegetables and the associated Vitamin C. Staleness, sterilization by cooking, and oxidation by exposure to air and metals again greatly reduce the intake of Vitamin C. It is completely by accident that these people obtained an adequate supply of Vitamin C in their primitive living and agricultural existence. When any of them moved to urbanized areas they reduced both their supply of trace elements and iodine, as well as their supply of Vitamin C and they lost their high degree of metabolic excellence.

In the past much criticism has been leveled at Medical Schools for not teaching courses in nutrition. Recently, Jefferson Medical School in Philadelphia has introduced a Course in Nutrition. The accumulation of knowledge about the need for and the metabolism of nutritional elements is a slow and arduous effort. It is only within the last few years that we have appreciated the role of Vitamin C as a liver

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enzyme metabolite, rather than a simple dietary deficiency. This new perspective changes our entire approach to the understanding of clinical medicine. We are now in a position to understand that we are not using a vitamin, but a mammalian liver metabolite in a manner duplicating that which the mammals have found so successful throughout eons of evolution. We also are now in a position, by chemical technology, to synthesize and to supply this ascorbate in quantity sufficient to protect us from the debilitation produced by our defective gene.

We must view all new patients as in a state of subclinical scurvy and correct this need before instituting any other therapy. This I have attempted to do for the past 40 years with magnificent results.² ¹¹ ¹⁷ The addition of the mineral elements to activate the various tissue enzymes adds another fantastic improvement to the degree of metabolic excellence that we can now obtain in clinical medicine.

And, finally, one of the most difficult elements to obtain is iodine. The female can metabolize it as iodine extremely well. The male does better, particularly in later life, by the supplementation of iodine as diiodotyrosine. But in any case, both sexes require more iodine than is usually supplied by our diet. Ascorbic acid, trace elements and iodine are necessary in the promotion and maintenance of metabolic excellence.

In a previous paper² I pointed out the remarkable effects of metallic ions in the rehabilitation of patients in various states of debilitation. As part of this clinical research I used ion exchange resins to be able to be sure of the exact ion that was being used. I have passed this information along to the members of our Academy and to others to whom I have given seminar lectures. I found, however, that the preparation of the ions and their application was more of a research project than most of them were interested in pursuing. Also, it required very careful regulation and study, and most of them were interested in treating the patient, rather than carrying on an investigative project. And so I am sorry to say few of them pursued the application of these ions in their practice. They would like to have a product that can be turned over to the patient for long-time use without much direction from them.

In the first part of this paper I discussed the health and longevity of groups of people in three isolated areas of the world. They had one thing in common—they lived in valleys a mile high, with a river at their back that washed silted water into their water supply. I believe it was this silted mineral material that was the reason for their good health. Recently it has come to my attention that there is a supply of this silted material available from an ancient sea-bed near Las Vegas, Nevada. It is being marketed in tablet and powder form under the name of "Mineral 72." As its name implies, it has 72 minerals, which are recognized and measured by spectographic analysis. I have used the material on a wide range of patients: babies; children of 2, 8 and 13, and on up to patients in their 80's. I have also used it on dogs and cats and have had sufficient experience to be able to say at this time that the product is very effective in supporting the sympathetic nervous system in all of its functions. A remarkable improvement in hair, nails and skin is one of the first things that the patients notice. In the dogs, weakness in their hind legs that made them limp and even prevented them from

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standing up, was completely relieved. Also, a tendency of dandruff to form on their skin was reduced. All of my patients have said that they felt more calm and generally had an easier disposition. Many of them commented that they were improved in their bowel action, and all of them felt that they were less tired, more peppy and wide-awake, and were more rested after sleep at night.

It is my feeling that if this material were given to children in the first grade of school, as little as one tablet a day, that within a year the improvement of all of them would be remarkable. In some of my young patients these improvements could be seen within two weeks on this small amount of natural material.

I would like to recommend to you a basic course of supplements that you could give to your patients: "Mineral 72" two tablets three times a day after meals; Kelp for iodine one tablet three times a day; and Vitamin C 1,000 milligrams in a time-released form three times a day. This general support would lay a foundation of metabolic excellence on which you could supplement other vitamins, minerals and hormones as they were indicated, expecially thyroid and estrogen. It is important to remember that this silted trace element material does not replace the materials in ion form: they supplement each other.

Dr. Albert Szent Gyorgyi received the Nobel Prize for his discovery of Vitamin C in 1937, three years after its synthesis. At that time he said: "Vitamins, if properly understood and applied, will help reduce human suffering to an extent which the most fantastic mind would fail to imagine." My efforts to apply this therapy to metabolic disease over the past 40 years has met with magnificent response and satisfaction from the patients, and with a constant demand for which I am unable to meet. I am sorry to say it has met mostly with distain and suspicion from members of the medical profession, the F.D.A. and the Blue Cross.

Professor Linus Pauling, the recipient of two Nobel Prizes, and a possible candidate for a third, has added some basic knowledge that has given the subject a new sense of respectability. His recent book¹⁶ entitled: "Vitamin C The Common Cold And The Flu" is a magnificent compilation of information on the metabolic function and activity of this remarkable metabolite. He coined the phrase 'Orthomolecular Medicine,' which he describes as the preservation of good health and treatment of disease by varying the concentrations in the human body of substances that are normally present in the body and are required for health. I feel certain that we have now reached a time of acceptance where the application of the principles of Orthomolecular Medicine will produce the results expressed in the prophesy of Szent Gyorgyi, which I state again:—"Vitamins, if properly understood and applied, will help reduce human suffering to an extent which the most fantastic mind would fail to imagine."

In conclusion, I would agree with Irwin Stone, Szent Gyorgyi and Linus Pauling that vitamins are imperative to the life processes, but are limited or useless without iodine and trace elements for metabolic excellence. Remember, Ladies and

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Gentlemen, health through applied nutrition had its inspiration and beginnings in the minds of men, some of whom composed the seminars that preceded and eventually became the International Academy of Applied Nutrition.

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SUMMARY

The biological chemistry of life exists today as the result of billions of years of evolution. The DNA molecule—the genetic code of *all life*, is the most durable item on earth. Mutations have occurred—some good, some bad, and some even lethal. The loss of a gene responsible for production of L-Culo olactone oxidase makes the human dependent on dietary ascorbate, without which death could result. Endocrine regulators and the sympathetic nervous system have been developed to function automatically to produce a high degree of excellence in the physical and mental state. The endocrine regulation of cholesterol, along with its metabolic modification by Vitamin C, protects the individual against atherosclerotic heart disease and coronary artery disease. The use of vitamins and minerals and iodine in the intricate functioning of these systems accounts for the metabolic excellence that leads to longevity.

REFERENCES

1. Leaf Alexander. "Every Day Is A Gift When You Are Over 100." National Geographic Vol. 143, No. 1, Jan. 1973 pp. 93-118.

2. Myers, John A. "Biological Tranmutation of Cobalt and Magnesium in the Support of Good Teeth And Good Health" J. of Applied Nutrition, Vol. 27, No. 1, Spring 1975 pp.28-50.

3. Stambul, Joseph "Atherosclerosis" Journal of the Albert Einstein Medical Center, Philadelphia, Penna. 19141. Aug. 1955 pp.131-181.

4. Baumann, E. Munchen Med. Wchnschr. 43:309, 1896.

5. Kendall, E.C. Proc. Soc. Exper. Biol. & Med. 10:165. 1911.

6. Scharger, 1895 Quoted by Elmer, A.W. "Iodine Metabolism in Thyroid Function" Oxford Univ. Press, London. 1938.

7. Carter, G.S. J. Exper. Biol. 9:253. 1932.

8. Morse, M. J. Viol. Chem. 19:421. 1914.

9. Perkins, A.J. and Brown, B.R., Endocrinology 22:537. 1938.

10. Myers, John A. "Metabolic Aspects of Cancer" J. of Applied Nutrition, Vol. 28, No. 1, Spring 1976. pp. 50-64.

11. Myers, John A. "The Role of Some Nutritional Elements in the Health of the Teeth And Their Supporting Structures" Annals of Denistry, Vol. XVII, No. 2, June 1958. pp. 35-49.

12. Klenner, Frederick R. "Observations on the Dose And Administration of Ascorbic Acid When Employed Beyond the Range of a Vitamin in Human Pathology" J. of Applied Nutrition, Vol. 23, No. 3 & 4, Winter 1971. pp. 61-88.

13. Williams, Roger J. "Nutrition For Chemists" American Laboratory, April 1974. pp. 29-30.

Stone, Irwin "Humans, The Mammalian Mutants." American Laboratory, April 1974. pp. 32-39.
Holst, A. and Frohlich, T. "Experimental Studies Relating To Ship Beri-beri And Scurvy" J. Hyg. 7,

 Holst, A. and Floinich, T. Experimental studies Relating 10 Sinp bereden And Scalify S. Alg. 7, 634-671, 1907.
Pauling, Linus "Vitamin C The Common Cold And The Flu" W.H. Freeman & Co., San Francisco,

16. Pauling, Linus "Vitamin C The Common Cold And The Flu" W.H. Freeman & Co., San Francisco, California. 1976.

17. Ginter, Emil "Vitamin C, Blood Cholesterol And Atherosclerosis" American Laboratory, June 1976, pp. 21-29.

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BIOGRAPHY

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The undergraduate education of Dr. Myers was in Electrical Engineering at Johns Hopkins University where he graduated in 1927 with the degree of B.E.E. He continued his education in the graduate school of J.H.U. with the intention of earning a doctrate in engineering. This plan was delayed when he became involved in helping develop a Primary Frequency Standard at the Westinghouse Co. under Dr. Conrad. This frequency measuring equipment was installed at Grand Island, Neb. for the U.S. Government. It is still used to police measure, and adjust the broadcast frequencies of radio transmitting stations in the United States. He was awarded his M.D. degree from John Hopkins School of Medicine. His training in measurements and control devices in electrical engineering made him acutely aware of functional control in metabolic disease. As a branch of Internal Medicine he is particularly interested in the interrelationships of the biochemistry of cellular function and the application of nutritional elements to improve the metabolism of the body systems. He uses teeth, a highly differentiated structure, as a measuring instrument to evaluate conditions in the body. He is a founding member of I.C.A.N.



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