"Supernutrition" as a Strategy for the Control of Disease

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Introduction

Aside from the frank starvation there are three levels of nutrition that human beings have experienced: poor, fair and good. "Supernutrition" (total nutrition in the most sophisticated sense) is above and beyond all these. It is concerned with the *quality* of nutrition, and is antithetical to calorie overnutrition.

Poor nutrition brings about in human populations severe underdevelopment of the young as well as deficiency diseases: beriberi, scurvy, pellagra, rickets, kwashiorkor and all the ill-defined combinations and variations of these afflictions.

Fair nutrition is good enough to prevent the well-recognized deficiency diseases but is not good enough to promote positive good health and excellent development. Certainly our present nutrition is not above suspicion when an official government report indicates "one of every two selective service registrants called for preinduction examination is now found unqualified," (One-Third of a Nation[1]). Mediocre nutrition is unfortunately the kind which medical practitioners have generally been taught to regard as satisfactory. Many nutritionists have tended to accept the same doctrine, namely, if everyone gets the minimum daily requirements of certain specified nutrients ("recognized by the U.S. government!")

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and are free from overt deficiency diseases, the major aims of nutrition have been achieved.

Good nutrition is best exemplified by what we often give our cats and dogs, as well as chickens and pigs being raised for the market. Such nutrition provides the animals not only with energy but with an abundance of protein of high quality, as well as a good assortment of minerals and vitamins far above the danger line. In accordance with extensive evidence presented in a current book (Williams[2]), good nutrition is probably experienced by no more than a minority of the population such as ours in the United States; for many are satisfied if their nutrition is fair and the physicians, who are typically ill-trained in this area (Williams[3]), often concur.

Supernutrition

Supernutrition exists at present only as an idea—a potential strategy for promoting health and preventing disease. It is a valid concept because there are many loopholes even in good nutrition. If all individuals had perfect digestive systems and about average needs in every respect, then the loopholes would be minimal; but such individuals are probably so rare that they need not be considered, Burton.[4] If medical education had not been remiss in its attention to nutrition during the past six or eight decades, supernutrition would not by now be a strange idea, nor would seeking to attain it be an unusual goal.

The idea of supernutrition is based on two biological observations which can hardly be challenged: First, living cells, in our bodies and everywhere, practically never encounter perfect optimal environmental conditions; second, living cells when furnished with wholly satisfactory environments, including the absence of pathogenic organisms, will respond with health and vigor.

An ideal optimal environment for the cells in our bodies would include not only water and oxygen and a suitable ambient temperature but also an impressive team of about 40 nutrients all blended in about the right proportions and working together. It is no wonder that cells usually have to put up with environments which fall short of ideal.

Optimal Environments

If living cells commonly lived under optimal conditions, with no room for substantial improvement, then there would be no room for supernutrition. As it is, there is vast room for a serious attempt (which has never been made) to provide the cells and tissues comprising our bodies with highly favorable environmental conditions.

One of the crucial factors involved in any attempt to give our cells and tissues something like optimal environments is the teamwork which has so often been neglected, Williams.[2] If any link in the environmental chain is weak or missing, then the cells cannot remain healthy. The weak link may be something well-recognized like oxygen, tryptophan, thiamin or iron or it may be something more obscure like molybdenum, folic acid or selenium. The result is the same: an impoverished environment which leads to functional impairment.

At one time nutritionists used to speak of major and minor nutrients and of the major and "lesser" vitamins. It is true that some nutrients and some vitamins were discovered before others but once a nutrient is found to be indispensable, it can no longer be regarded as minor or "lesser." Any nutrient which is absolutely indispensable is a link in a chain and is a *major* nutrient regardless of quantitative relationships.

Another factor which may be crucial in attempting to give every cell and tissue what it needs is the existence of many barriers within our bodies. It cannot safely be assumed that the mere presence of a nutrient in our food insures its delivery to the cells and tissues that need it.

Digestion, absorption and transportation are not automatic processes that always take place with perfection. Even if certain nutrients get into the blood, this does not mean that all cells and tissues automatically receive an adequate supply. As Pauling[5] has pointed out, the "blood-brain barrier," for example, not only may protect the brain cells against unwanted metabolites, but it may also act imperfectly in the direction of excluding needed nutrients. For all we know, there may be in our bodies other barriers comparable to the "blood-brain barrier."

A complicating factor, which makes it not a simple matter to provide human tissues with optimal environmental conditions, is the consistent presence of microorganisms in intestinal tracts which may help (or hinder) the attainment of the goal.

Biochemical Individuality

Another complication is the high probability that human needs are distinctive and appreciably different from those of other animals. The detailed needs of different species are not well-enough known to yield a definitive and adequate answer to this question.

Still another complication is the undeniable fact that each individual human being has nutritional needs which, from the quantitative standpoint, are distinctive, Williams.[6] The facts of biochemical individuality point to the possibility that computerized techniques will have to be employed before refined supernutrition can be

applied to individual human beings, Williams and Siegel.[7]

It becomes obvious in the light of these observations that scientific expertise has not arrived at the point where we know definitely how to provide any human being (or animal) with supernutrition. This is clearly no playground for amateurs. If supernutrition is to be used to combat disease, experts must be engaged in the undertaking.

Raise the Quality of Nutrition

Despite the inherent difficulties which make attainment of the goal difficult or impossible, there are many measures which can be taken to help raise the quality of nutrition up toward the "super" *level*. First, we can be as sure as possible that every recognized essential nutrient is supplied in something like suitable amounts. This can be accomplished with a measure of success by consuming milk, eggs and the cells and tissues of other organisms. The same building blocks—the amino acids, minerals (including trace minerals), and many of the vitamins—are universal and present in the metabolic machinery of living cells regardless of their origin. The energy storehouses (e.g., degerminated grains, fats, oils, sugar) of plants and animals are different; they do not contain all the nutritional essentials, and if we depend largely upon them for nutrition, the result will be an impoverishment of the environment of our cells and tissues.

We cannot safely assume that furnishing high-quality nutrition to an individual will inevitably provide adequate amounts of all the essential amino acids. There are numerous enzymes in our digestive juices, and strong evidence indicates that the patterns possessed by different individuals are distinctive, Williams.[2] Feeding amino acids as such would be a reasonable move in specific cases to help insure the adequacy of the amino acid environment of the cells and tissues.

Providing suitable minerals is difficult, partly because, as was shown in the investigations of Shideler[8], mineral balances are highly distinctive for different healthy young men. As shown by the research of Schroeder and others (Schroeder[9], Schroeder et al.[10]), the trace element situation is complicated in that the amounts needed are imperfectly known and the supplies are uncertain.

Consider All Known Vitamins

One relatively easy step which may be taken to move in the direction of supernutrition is to provide generous amounts of all the vitamins, especially those which have been demonstrated to be harmless at higher than usual levels. This is relatively safe because in general vitamins which are provided in moderate excess are physiologically inactive. This is less true in the case of amino acids and minerals. Trace minerals in general cannot be tolerated at high levels. Supernutrition assuredly involves not only supplying enough of every nutrient but also avoiding excesses and imbalance, Williams.[2]

Several years ago in a different context we carried out an experiment (Pelton and Williams[11]) related to "supernutrition." A group of mice already receiving a commercial stock diet (supposedly well-supplied with all nutrients, including pantothenic acid) were given an extra supply of calcium pantothenate in their drinking water. The result was an increased longevity of about 19 percent. If this result is achieved by strengthening only one link in the chain, one can legitimately expect the result to be even more striking if one attempted to strengthen all the links.

Every Link In Environment Essential

Secondly, in addition to furnishing all the known nutrients, we must have concern for those nutrients which are presently unknown. That such exist is evidenced by the hard fact that cells in tissue culture cannot in general be cultivated in "synthetic" media. The presence of significant unknown nutrients in uncooked food has long been

suspected, and Schneider[1]- has partially isolated an unusual unknown nutrient for mice.

An attempt to supply supernutrition would involve a deep concern for all unknowns. Scientists whose work impinges on medicine need to identify these unknowns because they may constitute indispensable links in the nutritional chain. If so, their inclusion in attempts to supply supernutrition will spell the difference between success and failure. *Every link in the environment is essential.*

A third step in the direction of supernutrition is to supply nutrients which ordinarily are of endogenous origin but which, under some circumstances, are produced endogenously in Suboptimal amounts. The list of such substances may be long. Certainly to be considered are inositol, gluta-mine, lecithin, lipoic acid and coenzyme Q.

What can we hope to accomplish by attempting to supply supernutrition? The results will obviously depend on how successful we are in reaching for the goal. It is equally obvious, if we assume that healthy cells and tissues spell healthy bodies, that the potentialities are vast.

Genetic Factors

Critics may immediately point out that there are genetic as well as environmental (including nutritional) factors to be thought of. This limitation becomes less severe when we realize, for example, that PKU babies have a genetic defect which, however, can be corrected at least to a considerable degree by *special* nutritional measures. Rats may have a genetic defect (it causes severe inner ear difficulties) which involves defective manganese utilization. The symptoms can be duplicated in other rats by depriving them of manganese, and can be eliminated from the afflicted rats if the animals having the genetic defect are given an *abundant* supply of this element, Daniels and Everson[13], Hurley and Everson[14], Hurley.[15] These observations exemplify the genetotrophic concept which was set forth in 1950 (Williams et al.[16]) and in more detail in 1956, Williams.[17] The possibility that genetic defects may be involved does not cancel out the potentialities of supernutrition.

It seems unthinkable that medical science will be inclined to reject, without trial, the hypothesis that promoting the health of all body cells and tissues will result in general health and that the total environment of these cells and tissues is of far-reaching significance in connection with maintaining their health. There may be cells and tissues that are so defective genetically that they cannot be reached by environmental (nutritional) means but this should not be assumed to be true until serious attempts have been made to reach them by this means.

A Preventative Approach

I have presented elsewhere evidence, hitherto unassembled, which supports the conclusion that supernutrition, or something approaching it, has the capability, if expertly applied, of preventing, (Williams[2]):

1. The birth of defective, deformed and mentally retarded babies.
2. The development of cardiovascular disease and premature aging.
3. The high incidence of dental disease.
4. Metabolic disorders, obesity, arthritis, etc.
5. Mental disease with all its accompanying ramifications.

A Challenge to Medical Science

All of the stresses to which we as human beings are subject can be withstood with far greater ease if all our cells and tissues, including those in the brain, are provided with excellent environments. This is a hypothesis eminently worth extensive trials.

It seems probable that even "incurable" diseases such as muscular dystrophy and multiple sclerosis can be prevented by expert application of supernutrition, especially

if it could be started with vulnerable individuals at an early age.

An Unparalleled Opportunity

This evidence offers an unparalleled opportunity to the medical profession. To the comment "it is all untried," my retort is a legitimate one: "Why hasn't it been tried?" I believe it will be and that the result will be even more impressive than that suggested by the physician, Frank G. Boudreau[18], who said in 1959, "If all we know about nutrition were applied to modern society, the result would be an enormous improvement in public health, at least equal to that which resulted when the germ theory of infectious disease was made the basis of public health and medical work."

It is my considered belief that medical science has taken an extremely important and unfortunate wrong turn in its neglect of nutrition and that this wrong turn is evident in connection with the thinking about all diseases, including cancer.

Cancer is very much in the public mind these days and in the area of medical science treatments and cures are of the utmost concern. Prevention draws little attention and is thought of in a very restricted way.

Here again supernutrition merits serious consideration. There is certainly room for the hypothesis that cells will not go wild (become cancerous) if they are continuously supported by strong environmental conditions. Several studies have shown that cancer incidence in animals is decreased when their nutrition is improved in specific ways, Engel et al.[19]; Antopol and Unna[20]; Sugiura[21]; Kensler et al.[22] No one has taken the trouble to see whether attempts to strengthen every link in the nutritional chain will result in the decreased incidence or disappearance of cancer. This seems a lot to hope for, but available evidence points to the conclusion that if supernutrition can be successfully furnished, cancer initiation may be stopped. Friction, light, carcinogens and viruses are all environmental agents which cause cells to become cancerous. There is an excellent possibility that cells which are provided excellent environments will increase their resistance to all these outside influences, Williams.[2]

If we spend money on cancer research wisely, we will certainly not forget about the ounce of prevention.

CONCLUSION

I most respectfully urge that every section of the National Research Council which has to do with human health join with the leaders and investigators in the National Institute of Health and the National Cancer Institute in giving more than cursory study to "supernutrition" and its possibilities. The biological principles on which it is based are, I submit, irrefutable.

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