

Vitamin Supplements

People spend billions of dollars every year on vitamin and mineral supplements, though up until recently there has not been much evidence that they are necessary for the average person. With only a few exceptions, people who eat a well-balanced diet do get adequate amounts of the vitamins and minerals they need. In other words, they are not deficient in any. However, according to dietary surveys, most people do not eat a balanced diet and may be low or deficient in a variety of vitamins and minerals. In addition, though you may not be deficient in any vitamins or minerals, there is some evidence that supplementary vitamins may truly improve your health. There is a lot of hype and misinformation in this field and you really do need to be careful and suspicious about what you read - especially when it comes to advertisements.

Reading studies on vitamin use is very complicated and many studies are hard to interpret. This is because it is very hard to design and implement studies that control for the many variables that affect people's intake of vitamins. Many of the studies on "vitamin" intake is extrapolated from dietary studies. For example, one recent study showed that people who eat large amounts of spinach have a lower risk of an eye disease called macular degeneration. The correct way to interpret this study is to say that those who are at risk for this eye disease should consider eating spinach. Some may decide that beta-carotene, a vitamin which is present in large amounts in spinach, can be taken in lieu of eating spinach. You need to be aware that this study does not support the latter conclusion because the protective property of spinach may be something other than beta-

carotene. On the other hand, it still is possible that beta-carotene might be helpful. Since there are hundreds of studies like this in the medical literature, I am sure you can see just how difficult it is to sort through this kind of information.

For reasons that are unclear to me, many people are quick to take vitamins and supplements, though they can be very reluctant at times to take medications. I frequently get calls from patients who have read the information sheet that comes with their prescription, become worried about taking their medication and then decide against taking it. There is nothing wrong with reading the labels on your medications, and in fact, it is quite a good idea. Any time you take a medication, you need to consider the risks and benefits involved and if you have any questions, be sure to call me. You should know that medications have all been studied to at least a reasonable extent, and while scientific study is not foolproof, any medication you purchase has at least a reasonable guarantee that what you are taking is both safe and effective. On the other hand, you need to realize that vitamins are considered to be food supplements and are not actively regulated by any of the agencies that control prescription medications. The Dietary Supplement and Health Education Act of 1994 created a loophole whereby most vitamins and supplements are totally immune to any rules or regulations of the FDA. What this means is the following:

Pharmaceutical companies must prove that their products are both safe and effective. In other words, the company must prove that the product is safe through scientific research

and, in addition, that there is evidence that the medication provides a documented benefit. The burden of proof rests with the company. This must be proved before the medication can be marketed. In the case of supplements, the company need not provide any data or scientific evidence that the product is safe or useful in treating or preventing any illness. What this means is that the product is presumed safe unless somebody has proven otherwise. The burden of proof rests with the FDA to show that a given product is not safe and the FDA is simply too busy to investigate most supplements. The buyer must beware: just because the product you purchase is in a nicely sealed, professional appearing bottle next to "over-the-counter" medications (the latter is subject to FDA regulations) does not mean that the product has been reviewed in any way by the FDA or any other regulatory agency, and there is absolutely no guarantee of safety.

Supplement manufacturers may make claims on their packages as long as they are not strictly making medical claims. They do not need to prove that the supplement has ever been shown through scientific study to have any beneficial effects. They can state that the supplement promotes better prostate function or promotes better heart function or improves energy even though it is not proven. However, they cannot state that the supplement is useful in treating any disease or medical condition since this would cause the product to be considered a medication and not a supplement. This represents quite a fine line between true and false advertising.

You must always remember that vitamin and supplement manufacturers often make all kinds of claims for their products that are simply not proven. However, no pharmaceutical company could make claims of health benefits unless there is medical evidence to back up the claim. I think it is important to be skeptical of any product that has claims that are "too good to be true".

One comment that I frequently hear regarding vitamin/supplement use is that "it couldn't hurt". Unfortunately this simply is not true and there are many examples of people being seriously injured or even dying from side effects from supplements. Also, most manufacturers do not list what is a safe amount to take. I've seen many people fall into the dangerous trap that if one pill is good, two is better and ten may be fantastic. The problem is that 2 may be safe but 10 may be toxic. Before you panic, I would like to reassure you that most vitamins are safe, especially when you stick to doses close to the RDA or recommended daily allowances. These are the amounts of a vitamin that has been reviewed by a scientific panel and has been recommended for the general public. Although these recommendations are widely available for many commonly used vitamins such as vitamin A and C, levels have not been established for many others (such as minerals like selenium). In addition, I feel that the RDA is quite inadequate in several instances (particularly with vitamin D) and should be changed. I will try to give you advice in this handout about keeping your intake of vitamins within safe levels. I think it is also important to remember that vitamins are different from many of the other "supplements" that are readily available. There are many different herbal preparations and supplements that may have complex biochemical effects in the body and simply are not adequately studied to allow us to give any scientific guidelines on their use. This is not to say that they are necessarily toxic or without benefit. I simply want you to consider the basic concepts of safety and efficacy before you take any supplements.

I would tend to ask you to avoid vitamins that have many unusual compounds listed on them. I have looked at many labels in the vitamin section of the grocery store and in some health food stores. You would be surprised what ingredients are listed. I read on a "Men's Vitamin" label in a health food

store that it contains, among many unusual ingredients "glandulars" . These are ground up endocrine organs of a variety of animals. Certainly this is not something one would probably choose to take. I must admit, the packaging was very attractive and I was certainly drawn to the product because it "looked" good. This serves as just another reminder to read the label.

I am not generally a big fan of large doses of any vitamins. In large doses, many vitamins (such as vitamin C) are just passed out in the urine, though in some cases, vitamins can accumulate and cause damage (vitamins A and D). In my opinion, there is really is no substitute for eating a healthy, well-balanced diet. Please understand that this handout is not meant to discourage you from taking vitamins. In fact, now, for the first time in my medical career, I generally do recommend vitamins for many if not most of my patients. I simply want to emphasize caution in choosing what you will take. Lastly, remember, this is only some brief general information. If you have more specific concerns, I would be happy to discuss them with you or recommend other references where you can get more information.

Multivitamins: For those who truly do not seem able to eat a balanced diet with adequate amounts of fruits and vegetables, a standard multivitamin taken on a daily basis is fine. However, I still would recommend that you work harder on your diet. For safety, read the label to make sure that most of the components have no more than 100% of the RDA, or recommended daily allowance. As I will discuss later, there are some circumstances where I do recommend doses higher than the RDA and this will be discussed in the individual sections. There are many brand names that are probably just fine: Centrum, One-A-Day, and many of the store brands - Giant, CVS, etc. all seem perfectly reasonable. Multivitamins contain a number of vitamins that are mentioned later in this handout and may be a good way to take

supplements of these vitamins without having to take too many pills. A number of recent articles in very reputable medical journals now do recommend that everybody strongly consider taking such a vitamin. All things considered, given a strong safety record and studies now advocating their general use, taking a daily multivitamin seems reasonable for virtually everybody.

Vitamin C There has been a lot written about vitamin C - perhaps more than any other vitamin. Some feel that high doses protect against everything from the common cold to cancer. I have to say that I have been generally unimpressed with these conclusions. However, at least taking extra vitamin C appears to be safe. Doses from 500 mg to 2000 mg, which are much higher than the RDA are not generally associated with any adverse side effects. Though I can't say that you need to go out and take extra vitamin C, if you do wish to, it is fine with me.

Vitamin A/Beta-Carotene: Vitamin A is a compound known as retinol. It is found in many foods derived from animal sources such as eggs, dairy products and meat. We get our vitamin A by directly eating foods high in this vitamin or by eating foods high in beta carotene which is metabolized into vitamin A. Unlike preformed vitamin A, beta-carotene is found in many healthy foods such as fruits and vegetables. If you eat a balanced diet, you probably do not need supplemental vitamin A or beta-carotene. Excess vitamin A can be associated with nausea, vomiting, skin rash and liver damage. There have been recent studies linking even mildly increased intake of vitamin A with birth defects in pregnant women. (If you are pregnant, do not take excess vitamin A.) There are additional new studies with strong evidence to suggest that even moderately increased intake of vitamin A lowers bone density and can cause osteoporosis. It should be noted that when one consumes beta-carotene, it is converted in the body to vitamin A. You cannot develop vitamin A toxicity from taking

in too much beta-carotene because the body has a regulatory mechanism that prevents this from happening. That is why most of the vitamin A supplements usually indicate what percentage is in the form of vitamin A and what percent is in the form of beta-carotene. In general, for the sake of safety, I prefer that the supplements you might take have the majority of the vitamin A as beta-carotene.

Beta-carotene has often been recommended as useful in preventing heart disease and cancer. However, there is very little available data to indicate that it is useful for this purpose. Two recent studies demonstrated an actually higher incidence of lung cancer in smokers who took supplemental beta-carotene!! So, if you currently smoke, taking beta carotene would be inadvisable. Two other recent well designed studies demonstrated that beta carotene supplements did not reduce the risk of developing heart disease. Although there is little evidence to suggest that beta-carotene is helpful in preventing heart disease or cancer, several studies do suggest that it may be useful in preventing macular degeneration (these are in addition to the questionable study quoted earlier in this article.) Many ophthalmologists are now recommending that people with a family history of macular degeneration take 5,000 - 7,500 units of supplemental beta-carotene. There are a number of "eye" vitamins on the market with varying combinations of beta-carotene, zinc, copper and other supplements that have been implicated as reducing your risk of macular degeneration. From my research, including reading the labels, I don't think that these special formulations offer much more (other than extra cost and extra pills) than the standard multivitamins described above.

Vitamin E: Vitamin E is considered to be an "antioxidant" vitamin. Many processes in the body which are associated with aging are felt to be due to oxidation of various proteins. (Oxidation of proteins can literally be compared to the "rusting" that occurs in iron

when it is oxidized.) Antioxidants are felt to possibly protect the body from this process. Vitamin E deficiency is very rare since the body maintains a large reserve of this vitamin in the tissues. It is readily found in many healthy food sources such as leafy green vegetables and whole grains but the amounts are overall low. It is found in higher quantities in many fatty foods such as vegetable oils, margarine and dairy products but obviously, taking these in large amounts would not be beneficial. The RDA for this vitamin is 30 international units (IU) per day. There have been several studies in recent years which suggest that high doses of Vitamin E may be protective in patients who have heart disease. In addition, some studies suggest reduced rates of cancers of the lung, breast and cervix in those that have higher blood levels of vitamin E. There have also been studies that suggest that Vitamin E may be helpful in reducing fibrocystic disease in women and in reducing cataracts and delaying the onset of Alzheimer's disease. However, another more recent study indicated that patients who take higher doses of vitamin E (400-800) units daily have an overall increased mortality risk!!! Another recent study published in a very highly regarded medical journal indicated that vitamin E combined with other antioxidant vitamins may decrease the effectiveness of statin medications (statins are medications used to reduce cholesterol). So if you are on a statin, you may not wish to take extra vitamin E. Hopefully, further studies will shed more light on this issue. At the present time, I do not feel that current evidence indicates that taking high doses of vitamin E are appropriate for most patients. If you are taking it for a more specific reason, we should discuss your options.

Iron : Iron is an important component of the diet and is used by the body in making red blood cells. People who are deficient in iron often become anemic. Iron deficiency can cause anything from mild symptoms of fatigue and loss of concentration, to very significant symptoms of severe shortness of breath when

a severe iron deficiency anemia is present. Recent studies done on teenage girls showed that even very mild iron deficiency was associated with decreased school performance and lower scores on mental aptitude tests. Iron deficiency is much more common in women than in men primarily because women lose iron in the blood lost during menstrual periods. Many otherwise healthy women become iron deficient just from a diet that has insufficient iron to keep up with menstrual blood loss. When men become iron deficient, it may be due to significant medical problems that cause blood loss such as a bleeding ulcer or intestinal bleeding. In general, most men do not need much iron supplementation while many women do. It must be kept in mind that too much iron intake can be harmful particularly if you have a not uncommon genetic condition called hemochromatosis. Excess iron intake under these circumstances can cause diabetes, liver problems, arthritis and heart disease. If you need extra iron, the best dietary sources are in foods that are not particularly healthy - such as red meats, organs such as liver, and egg yolks. However, there are a number of other sources of iron including green vegetables, wheat germ and cereals, chicken and fish, as well as beans and some fruits. There are many over the counter iron supplements that can be used if needed. Most multivitamins have about 15-20 mg of iron which is the RDA. Women who have heavier than normal menstrual periods can safely take iron supplementation with 30 to 75 mg of iron daily. People who are truly deficient in iron and significantly anemic may need 200 to 900 mg of iron daily until the problem is corrected. After the anemia is corrected, usually 3-4 months, one can resume normal levels of iron intake. Please check with me to see if iron supplements would be appropriate for your needs.

Calcium: Calcium is primarily important in building and maintaining strong bones and teeth. Most of us know that calcium is important in growing children and we

encourage them to drink milk so that they will develop better bones. You might not be aware though that your bones are continuously being remodeled, or rebuilt, throughout life and ongoing calcium intake is extremely important to insure that your bones and teeth are strong. For reasons that are unclear, our attitudes about calcium intake change as we become adults and as a result, most adults do not get enough calcium in their diets. As a result, I am seeing more and more patients with osteoporosis. There is enough in the press and on the television these days to alert many of us about this problem, but still, very few adults really do get enough calcium. It is also important to realize that this is not a problem limited to women as they go through menopause, since I have found a number of men suffering from osteoporosis as a result of years of calcium deficiency. Of all the vitamins and minerals discussed in this handout, calcium is the one nutrient where the vast majority of people are truly deficient. The recommended calcium intake largely depends upon your age and sex. Men need about 800 mg daily, while women need 800-1500 mg daily depending upon age. Women under age 40 need about 800 mg daily, age 40-50 need 1000-1200 mg daily, and above age 50, women need 1200-1500 mg daily. The major source of calcium in our diets is dairy products. A glass of milk and a cup of yogurt each contain about 300 mg of calcium. Calcium fortified orange juice (read the label to find the amount of calcium) also has about 300 mg of calcium per 8 ounce glass. Calcium is also found in smaller amounts in a variety of vegetables. I think that from looking at these numbers, you can see that if you do not eat dairy products, you are probably not getting enough calcium and should consider taking a supplement. Since the average calcium intake in adults who do not regularly eat dairy products is only about 300-400 mg per day, you will probably need to take 400-1000 mg of calcium supplements daily. Read the labels of your supplements to determine how many you will need to take. Recent studies do suggest that most all of the

supplements are about the same - you just have to take them regularly! A newer form of calcium is becoming popular — chewable calcium candies. The brand name Vivactiv is a chocolate candy with only 10 calories that has 500 mg of calcium. If that sounds more palatable, look for that in the pharmacy or grocery store. Also, if you need to take more than 600-750 mg in supplements, it is probably best to take them in split doses, i.e. at different times of the day. Most multivitamins typically only have 100-200 mg of calcium and therefore do not have sufficient amounts of calcium to get you up to your desired goal - be sure you read the label. Lastly, as long as you have normal kidney function, are not predisposed to kidney stones and drink adequate amounts of fluid, most people will not have any problems unless they take in more than 2000 mg of calcium a day.

Vitamin D: No discussion about calcium, bone structure and osteoporosis is complete without considering the body's need for vitamin D. This vitamin (actually it is a class of vitamins called calciferols) is important in helping the body regulate the absorption of calcium and phosphorus from the diet. If you are exposed to a lot of ultraviolet light (such as sunlight) you manufacture your own Vitamin D and do not need supplements. However, most people are not exposed to enough sunlight and since overexposure to the sun is dramatically related to the development of skin cancer, I don't recommend getting your vitamin D solely in this way. In addition, in winter months, and in colder climates, it is not possible to make enough vitamin D on your own. Department of Agriculture surveys show that the majority of Americans do not get enough vitamin D through their diets. Although some foods are fortified (such as milk), it is very hard to get enough vitamin D through diet alone. The current RDA for vitamin D is 400 IU per day and the average adult consumes less than half that amount. A recent study published in a major medical journal was even more disconcerting. In that article, more than 50%

of all patients admitted to the hospital were found to be vitamin D deficient based upon blood tests. This included patients that were taking a standard multivitamin. You need to understand that this study was done in Boston during the winter, and included a large number of elderly patients. Even so, it may well be that most all of us are somewhat deficient in vitamin D and that the RDA of 400 IU should be increased to 600-800 IU. Most standard multivitamins contain 400 IU of vitamin D, and that in addition to your diet and sun exposure probably is adequate for most. If you have osteoporosis or are at risk for osteoporosis, or tend not to be outside much you might consider taking as much as 800 IU of vitamin D daily. It is also reassuring to know that as long as you don't overdo the vitamin D supplements, overdose or toxicity is not likely unless you get above 20,000 units a day.

Folic Acid (Folate): Folic acid is a vitamin that normally is needed in the bone marrow for making new blood cells but is also necessary in tissues throughout the body in many different biochemical processes. In general, folic acid deficiency is uncommon unless you have a problem with intestinal absorption of nutrients or you have a diet largely without any fruits or vegetables. Folic acid deficiency is also common in those that drink too much alcohol. Though most of us are not deficient in folic acid, there have been a number of recent reports which indicate that extra folic acid may be beneficial in several circumstances. There are several well done scientific studies which demonstrate that extra intake of folic acid at or around the time a woman becomes pregnant significantly reduces the chances that the baby will have some types of neurologic birth defects. The evidence in these studies is so compelling that most obstetricians now routinely recommend folic acid supplements during the time that women are trying to conceive. In addition to preventing birth defects, extra folic acid may also decrease your risk for heart disease. Here again, this information comes from several

well done studies on the development of heart disease in relationship to dietary intake of folic acid as well as other B vitamins (The same information applies to vitamins B6 and B12). It appears that higher levels of dietary folic acid reduce your risk of heart disease. There has been a lot of speculation as to why folic acid and other B-vitamins have this beneficial effect. Most of the evidence centers around the chemical compound known as homocysteine. Homocysteine is an amino acid that occurs as a byproduct in many biochemical processes. It has long been known that high blood levels of homocysteine promote the formation of cholesterol plaques, which narrow the arteries in the heart and lead to coronary heart disease. The blood level of homocysteine is affected by many factors such as your genetic tendency as well as many environmental factors like diet. In a rare genetic disease, very high levels of homocysteine have been associated with severe heart disease at a very early age. More recent evidence shows that even mildly elevated levels of homocysteine can significantly raise your risk for heart disease. It now appears that increasing dietary folic acid, B6 and B12 all may decrease your blood level of homocysteine. I am beginning to be much more aggressive in recommending that we all be sure to get adequate intake of folic acid and vitamins B6 and B12. Although the optimal intake of folic acid is not clear, it should be at least above .4 mg per day and may be even more beneficial at .8mg per day or higher. If you are known to have heart disease, I would probably recommend that you take at least 1 mg of folic acid daily. Some studies also indicate that taking 250-500 micrograms of B12, and 10-25 mg of B6 may be beneficial under these circumstances as well. In the absence of heart disease, if you do not eat 4 or 5 servings of fruits or vegetables daily, you might consider taking supplements of these vitamins. This can be done by taking an adequate multivitamin or by taking the vitamins separately or in a B complex. In order to take the higher doses of these vitamins, you will probably need to take

individual supplements. Nation-wide plans are underway to supplement and fortify many food products with folic acid so that most people will get a higher intake through their diets. This has already happened in many breakfast cereals and will likely soon take place with many processed foods such as breads. It is also highly likely that the RDA for folic acid will be increased.

Summary: I hope this information is helpful to you in deciding if you should take vitamin or mineral supplements and which ones to take. Most of my patients look over my handouts but then simply ask me what should they do or what do I do for myself? As for myself, I do take vitamin supplements on a regular basis based upon my lifestyle and needs, which may be different from yours. I eat a diet high in fruits and vegetables, as well as complex carbohydrates, and am one of the rare people who actually does get enough calcium through my diet alone without supplements. Although I am not completely satisfied with any of the available multivitamins, I do take a standard multivitamin daily. Your needs may be very different and I would be happy to discuss them with you during your physical.

Dr. Dunn
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