Vegetarian Diet Basics

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What follows is some basic information that is needed in order to be healthier on a vegetarian diet. A balanced vegetarian diet involves much more than simply omiting animal foods. When a culture has been vegetarian for generations, food practices are much more likely to be supportive of health. If you were not raised vegetarian, it is much harder to know how to eat. What I want to do is to try and help you to navigate this.

Macronutrients: Carbohydrates

What I would like to look at first is the macronutrient level. By this I mean the relative proportion of protein, carbohydrates, and fats. Most vegetarian diets are considerably lower in fat and protein than an omnivorous diet, often becoming very heavy in carbohydrates - sugars and starches. When eaten in excess, and especially in too refined a form, carbohydrate foods tend to cause a rise in insulin levels, resulting in blood sugar imbalances, chronic inflammation, and weight gain.

It is very helpful to eat low glycemic index foods. Glycemic index refers to how fast a carbohydrate that is eaten shows up in your blood as glucose or blood sugar. In general, the more refined the carbohydrate, the higher the glycemic index. For example, whole oats have a lower glycemic index than steel cut oats, which in turn are lower than rolled oats, which are lower than instant oats. Whole fruit has a lower glycemic index than fruit juice. Canned beans have a higher glycemic index than beans that you have soaked and cooked yourself. In general, you will want to eat foods that are closer to their original, natural form, and prepared in such a way as to make them more digestible.

Carbohydrates eaten alone are much higher in glycemic index than food eaten in the context of a meal with fat and protein. The basic idea here is to eat carbohydrate foods with fat and protein.

One small but important detail. Fructose, the sugar found predominantly in fruit, (but also used in many processed foods), is low in its glycemic index. Fructose in excess is very hard on the liver. It can cause fatty liver and a tendency to obesity.

Macronutrients: Fat

A big issue has to do with the kinds of fats that tend to show up in a vegetarian diet. Until very recently in human history, the types of fats that we have used have tended not to be what we use today. Sunflower, safflower, corn, soy, and cottonseed oils have a very high percentage of their fats as polyunsaturated omega six fats. These fats are very easily damaged in processing. To the detriment of our health, they can be deodorized, fooling our senses into thinking that they are not rancid.

One of the problems with a high omega six diet, especially one with even tiny amounts of hydrogenated oils is that it creates a very strong tendency in the body to have inflammation beyond what is needed for tissue repair and healing.

The best fats for a vegetarian are olive oil, butter, and ghee (for lacto-vegetarians), and coconut oil (non-hydrogenated, raw and organic). Ghee, unrefined sesame oil, or coconut oil can be used for frying. Organic refined coconut oil can be used if you don't care for the coconut flavor in your fried foods. Some flax oil (unheated, as it is a very fragile oil) can be used in salads.

Contrary to what is generally taught, it is by and large not fat *per se* that causes one to gain weight. More often it is carbs in excess, especially where there is insulin resistance and inflammation.

Macronutrients: Protein

As to protein, the main issue is of getting enough, and getting a balance of all the amino acids. It is especially tricky for those who were not raised vegetarian, because, for some reason, those who become vegetarian later in life have a tendency to not absorb the needed amino acids as well. Amino acids are the building blocks of proteins, hormone receptor sites, neurotransmitters, cellular antioxidants such as glutathione, etc. It is very important to eat grains, beans, and dairy products (for lacto-vegetarians), and it is important to eat the protein with some fat as it seems to help in its digestion and assimilation.

Please resist the use of soy to meet protein needs. Unfermented soy products such as tofu are very hard to digest and are loaded with phytoestrogens, which is not so good in an environment already loaded with so-called estrogen mimics. Children should not have this type of soy at all, in my opinion, as it is much too estrogenic and very confusing to the endocrine system. Soymilk has its own additional hazards. It is not a good food. Miso, tempeh, and tamari have been fermented and are much more digestible.

Learn to make quinoa. It is a high protein grain that is easy to cook. There are a number of varieties available, each delicious in its own way. Learn to cook millet. It is another higher protein grain. A healthy combo for balance in amino acids is rice and beans, or rice and lentils.

It is very important for adults to have adequate protein at each meal. With children, they need good quality protein as well, but their system is so geared to growth that they will take every scrap of protein and build a good body out of it. With adults, the growth drive is much lessened. It is the protein intake that actually triggers repair and maintenance of muscle and bone. There needs to be adequate protein for this repair to be triggered. For the average person this works out to be about 25-30 grams of mixed animal and vegetable protein at at least two meals per day. For lacto-ovo vegetarians, having some level of dairy or whey protein in a meal will give the right amino acids to trigger repair and maintenance.

A small detail here - the protein needs to be eaten as a meal rather than spread out over an hour or two. (Sorry to those that like to make a protein shake and drink it

slowly.) If you have gotten into the habit of multiple small meals each day, you will not trigger the repair and maintenance mode in your metabolism.

Getting adequate protein and fat in the first meal of the day is important. This promotes a feeling of satisfaction. During the nighttime fast, we are breaking down our body tissues. It is the protein intake in the first meal of the day that shifts the body into repair and maintenance mode. If you do not eat adequate protein until dinner, you are spending the entire day breaking down your muscles and your bone.

Children

One of the big issues that I see a bit too often is where a younger child, usually a girl around age ten or eleven, decides to become a vegetarian. If the diet is a standard American one, and the child doesn't have the help to eat well, the results will not be at all good. It is a recipe for rapid malnutrition. You must help a child in this situation to learn how to eat well. You will need to learn all the ins and outs of cooking. The junk will have to go because there just isn't any margin. As mentioned above, an adequate vegetarian diet is not simply the standard American diet without the animal food.

Specific Nutrients

This section is a bit difficult for me to write. It is not at all my intention to make being a vegetarian some big, special process. That being said, there are some specific nutrients that are harder to get on a vegetarian diet. These will need to be watched closely and supplemented if needed.

In traditional vegetarian cultures, these issues have mostly been worked out over time, with specific food combinations and special nutrient rich foods being part of the standard vegetarian diet. The specific needs are typically addressed in this way. Because there are no traditionally vegan cultures, this has never been worked out.

Vitamin A

Vitamin A is only found in animal foods. It functions in the area of vision, growth, reproduction, cellular maturation, immune function, bone growth, prevention of kidney stones, and as an antioxidant in cellular membranes. It is necessary for puberty and has some relationship to infertility issues.

It is needed for bone mineralization because of its effect on osteocalcin, which is a protein made exclusively by our bone building cells, the osteoblasts. Osteocalcin is responsible for taking calcium and laying it down in the bone matrix. Giving Vitamin A alone or Vitamin D alone results in only a low level of increase in osteocalcin. A larger amount of each alone with a small amount of the other had a somewhat similar result. Adequate amounts of both result in a very large increase in osteocalcin.

Low osteocalcin levels result in insulin resistance and weight gain.

You may see a bottle that says "Vitamin A", when in fact, it contains beta carotene. A single molecule of beta carotene can be split to form two molecules of vitamin A. This

conversion is difficult in some people for a number of reasons, including a sluggish thyroid.

Retinyl palmitate and retinyl acetate are two sources of preformed vitamin A. It would be helpful to take 10,000 iu of retinyl palmitate or retinyl acetate daily.

Vitamin D

Vitamin D3, the best form for our body, is found only in animal foods, especially seafood. Vitamin D can also be had from the sun, but only from about May to September. After September, the sun is too low in the sky to result in Vitamin D synthesis in the skin. To get vitamin D from the sun, you will need exposure to the sun at more or less mid-day without sunscreen. Sunscreen blocks vitamin D production.

The recent research on Vitamin D has been nothing short of incredible, showing it to have effects not only on bone density, but also on prevention of cancer of the breast, prostate, and colon, on preventing diabetes, preventing autoimmune disorders, even chronic lower back pain - the list goes on and on. With the paranoia in recent years about the sun, more and more people are showing up Vitamin D deficient.

Vitamin D3 is the best form to get. It is what the sun makes in the skin. Vitamin D2 is a another form that isn't as biologically active. Biotics makes Vitamin D3 from lanolin, a byproduct of the wool industry. Another option is to get a sun lamp that will raise Vitamin D in the winter months. A good brand is Sperti.

In terms of testing, the proper test is *25 (OH) vitamin D3.* A blood level of 32ng/ml is necessary for good bone development and 46 ng/ml is necessary for controlling blood sugar.

If properly absorbed, taking 1000iu a day can result in a blood level of 30ng/ml, where 5000iu a day can result in a blood level of 60 ng/ml. Optimal is 50-60.

Vitamin K

Vitamin K is a vitamin that not much is known about by the general public. Vitamin K1 is found in abundance in green leafy foods and is mostly involved with regulating the clotting of blood.

Vitamin K2 has a very different function in the body. Vitamin K2 is necessary to activate the proteins needed for the mineralization of bone, to protect the soft tissues from mineralization (think heart disease), to help with myelination of the nervous system, and plays an unknown role in the salivary glands (perhaps helping to prevent tooth decay).

It helps prevent osteoporosis, protects bones and teeth, protects against heart disease, supports the nervous system, and supports the digestive system.

Vitamin K2 is found in eggs (specifically in the yolk), cheese, butter, and the cream part of milk. It is especially high in butter from cows grazing on spring and fall grasses. Natto, a sticky, gooey version of miso has large quantities of K2, though in a slightly different form than what is usually found in animals. K2 is also found in raw sauerkraut. Our bodies will make K2 if our gut is healthy.

Vitamin B12

Vitamin B12 is one of the most critical nutrients that is often missing from the diets of vegetarians, especially vegans. By some studies, 64% of vegans and 43% of lacto-ovo vegetarians and 16% of the elderly have B12 deficiency. In one study, amongst the raw foods vegans and vegetarians, most were B12 deficient.

Vitamin B12 is needed for production of red blood cells, bone growth, immune function, formation of neurotransmitters including melatonin, serotonin, dopamine, and nor-epinephirine, synthesis of myelin, energy production in the cells, and for turning our genes on and off, etc.

There are no vegan sources of B12. There are some B12 look-alikes found in spirulina, but they are not biologically active in the body.

For vegetarians, B12 is found in dairy products. If you are a vegan, you must supplement with B12, though I would recommend that all vegetarians (and many non-vegetarians) supplement with B12. The best forms are hydroxycobalamin and methylcobalamin. You can get this in a vegi-cap, drops, or sublingual tablets.

Vitamin B6

Vitamin B6 has three different forms, two of which are found in animal foods (pyridoxyl and pyridoxamine) and one in plant foods and many supplements (pyridoxine). B6 is involved in many hundreds of reactions in the body. B6 is needed for the production of neurotransmitters. It is needed to make heme, which is the iron-carrying center of our red blood cells. It is needed to transfer nitrogen between amino acids, to make carnitine, histamine and dopamine, to make niacin, glycine, cysteine, and taurine, and for the metabolism of fatty acids.

Much of the B6 found in plant foods is bound to another substance that is somewhat hard to remove, leaving a net of between 0% and 50% actually available for use. The net result is that the intake of B6 in the pyridoxine form may be high, but the active B6 in the body may actually be low.

B6 requirement increases with the use of oral contraceptives, stress, and trauma. The need for B6 also increases with a high protein diet, which is generally not an issue in a vegetarian diet. P5P, a type of B6 found in the body, is a good supplement.

ZInc

Zinc is an essential cofactor in hundreds of enzyme reactions. It is a structural component in cell hormone receptors. It is a structural component of some hormones such as insulin. It is an antioxidant in cell membranes. It can displace mercury and iron in cell membranes, freeing it up to be removed from the body. It is essential to the integrity of cell structures.

Zinc is found in grains and legumes. It is found in eggs and dairy. The problem with grains and beans is that they contain substances that inhibit digestion and absorption of

zinc. What is needed here is to learn to cook grains and beans such that the zinc is available. How to do this will be covered later. Please note that zinc deficiency is extremely common even with an omnivorous diet.

Essential fatty acids

The essential fatty acids that we need are arachidonic acid, DHA, EPA, and DGLA. These are found in a preformed state in animal products. They are all polyunsaturated. They are critical for brain function, healthy arteries, etc. They are a part of virtually every cell membrane in the body. To a lesser extent, we also need alpha linolenic acid and linoleic acid. These are more abundant in a vegetarian diet.

Vegetarians have a lower level of EPA and DHA than omnivores, sometimes markedly lower. Vegans, even more so. Body stores in women who are pregnant tend to go down quite a bit because the babies will tend to take what they need. The vegetable source essential fatty acids can be converted in the body to EPA, DHA, arachidonic acid, and DGLA. The conversion rate is often very poor. Linoleic acid, which is very high in the common vegetable oils such as soy, corn, cottonseed, safflower, etc., inhibits the conversion of alpha linolenic acid to EPA and DHA. You can get a vegetarian DHA online.

Calcium and Iron

Calcium and iron can be found in many vegetarian foods. The main issue is one of being able to actually pull it out of the food.

In grains, much of the mineral content is bound to what are called phytates. It is very hard, without some attention, to free up these minerals. Most traditional diets involved soaking grains for a period of time, often with something acidic such as vinegar, before cooking them. This inactivates the phytates and the enzyme inhibitors naturally present in the grain. Fermentation will do something similar. Sourdough breads are much easier to digest, as are sprouted breads. Beans that have been soaked are also much easier to digest.

If you become iron deficient, the main symptom that you will notice is fatigue, especially fatigue that is worse in the afternoon and evening. Another symptom that you might notice is a diffuse hair loss. Iron is easier to extract from foods in the presence of vitamin C.

Iodine

Iodine is commonly deficient in both vegetarian and non-vegetarian diets. Iodine used to be added to breads as a dough conditioner. For some reason, iodine has been replaced by bromine, an element that blocks iodine use in the body. Couple this with the emphasis recently on lowering iodized salt intake and the use of sea salt (which has little iodine), and we are now seeing an increase in iodine deficiency. You can get iodine from seaweed, though this would need to be a very regular part of your diet to be significant. Sea salt is best to use, but get some iodine in other forms.

Testing

Tests I would recommend: 25 (OH) Vitamin D, Vitamin B12, Zinc, Vitamin A, ferritin (iron) and a blood count (CBC).

I would say that testing is very important in women who want to become pregnant. When B12, Vitamin A or folate are deficient, the risk for birth defects becomes much higher.

Supplements that I would recommend:

- For adults and young people over 100 pounds, vitamin D3, 3000-5000iu a day in the September to May time period, and 2000-3000iu per day in the summer is a reasonable amount.
- B12 as hydroxycobalamin or methylcobalamin, 1000 mcg a day.
- Vitamin A as retinyl acetate or retinyl palmitate, 10,000iu a day.
- Zinc 25-30mg a day.
- Copper 1-2mg a day to balance the zinc.
- Vitamin B6 as P5P or pyridoxyl-5-phosphate, 50mg a day.
- Iron (If anemic or if ferritin levels are below 70-80).
- Vegetarian DHA 4 caps per day (800-1000mg a day).
- Possibly l-taurine, NAC (n-acetyl-cysteine) and L-Carnitine
- Iodine. You can get a liquid iodine called Lugol's solution in a 2% or 5% strength on Amazon. I have Iosol at the office. Supplement with 1-2 drops of the Iosol or 2% Lugol's, or 1 drop of the 5% daily. Take more only with supervision. Put it in a bit of water. Alternately, you can rub the iodine into your skin. Put the iodine and a bit of oil on your skin and rub in well. Your fingers will be orange. You can wash it off your fingers, or just let it absorb.
- Eat some brazil nuts or take selenium 100mcg sometime daily whenever you are taking supplemental iodine.

Weston Price, DDS spent many years travelling the world in the 1930's studying the diets of traditional people eating the way their ancestors ate for many generations. He specifically looked for groups with diets that entirely excluded all animal foods. He could not find any groups that ate this way and were healthy

He says, "I have found in many parts of the world most devout representatives of modern ethical systems advocating the restrictions of foods to the vegetable products." In all of these groups he found evidence of degeneration, specifically of the dental arches and teeth.

What this means to me is that if we wish to be vegetarian, it is very important to learn to prepare and eat nutrient dense foods that are more likely to provide us with the nutrition we need to grow and maintain healthy bodies and minds. It is more possible to eat a relatively decent vegetarian diet in modern times because of the remarkable variety of food we have available from all over the world.

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If you are a vegetarian it is not enough to just simply stop the animal foods. It is very important to get educated, to avoid the junk foods, including the health food junk foods from the co-op or natural foods store (of which there are plenty) and take a few supplements to help compensate.

If you are a vegan, you will need to be especially diligent. I honestly cannot recommend this diet as it is extremely difficult to maintain your health over time eating this way. There are no traditional people who have eaten a vegan diet as a culture over a long period of time. The people who write the books on this subject seem to be the people who can maintain their health with this diet. Very few people can. You will need to supplement very carefully.

A lacto and especially a lacto-ovo vegetarian will have a much easier time of it. Eat plenty of organic, full-fat dairy products, especially butter, cream, full fat cheese, whole milk yogurt, and whole, unhomogenized milk. It is the fat that carries the vital fat-soluble vitamins and other factors that we need most. What you want are dairy products from cows that are fed as much as possible on grass.

Eat eggs that are from chickens that are pastured, if possible. Please eat the yolk. Don't overcook them. This is where the fat, and therefore the fat-soluble nutrients, are. "Free range" is meaningless unless you know the conditions at the farm. Pastured means that the chickens are moved from one new grassy location to another every few days.

Eat whole grains, especially rice, quinoa, and millet, as well as lentils and beans that are prepared properly. Prepared properly means soaked overnight with a tablespoon or so of vinegar, then rinsed well and cooked. Avoid the flaked and puffed cereals. These are essentially dead foods that have been quite damaged in their preparation.

Eat nuts and seeds that are made more digestible by proper preparation. Nuts soaked in salted water overnight, then dried (not roasted) at 150 degrees are easier to digest. Roasting damages the fats. You can get delicious soaked and dried organic nuts from wildernessfamilynaturals.com.

Eat a wide variety of vegetables and fruits in their natural, whole state rather than as juices or dried extracts. Learn to like kale. It is packed with nutrients.

If weight is an issue, it would be best to completely avoid fruit juices. Starchy vegetables like potatoes, sweet potatoes and yams are somewhat strong in their glycemic effect. If you cook them, put them in the fridge, then reheat them once cooled, they have much less of this effect. This seems to change the starch to what is called a "resistant starch"

which doesn't affect your blood sugar as much. Always add fat to these kinds of starches.

Eating more fat will communicate to your body that times are good. Metabolism will ramp up and weight will tend to moderate. Breads, bagels, pasta, and the like are best kept to a minimum. If you are overweight, it is especially important to eat adequate protein.

Learn to like natto, raw sauerkraut, and other live, fermented products. It would be good to develop a taste for brewers yeast. Lewis Labs makes a good one available at one of the co-ops. Sea vegetables such as kelp, Irish moss, and dulse are loaded with minerals but do not contain adequate iodine for most people. The preparation process washes much of the iodine out.

*I am indebted to Chris Masterjohn for much of the information on specific nutrients. He recorded a two CD set at the Weston A. Price Foundation 2006 annual seminar titled "Vegetarianism and Nutrient Deficiencies", available from the Weston A. Price Foundation at www.westonaprice.org. A printed version of this talk is also available.