Plant-Based Nutritional Strategies in Health & Sport: Facts & Fallacies

Webinar Questions Answered by Nanci Guest, PhD, RD, CSCS

1. **What is the most current scientific stance on soy, and soy products, as it relates to overall health?**

- Soy products are used for menopausal symptoms, bone health, improving memory, high blood pressure, and high cholesterol levels.
- Soy was recently victorious with U.S. regulators in maintaining its health claim that, "Soy can lower cholesterol and protect your heat". Researchers continue to recommend soy protein as part of a heart-healthy diet because it helps lower cholesterol, they conclude from an analysis of dozens of studies done in the past two decades. Dozens of studies on soy and heart health. Ramdath et al. Beyond the Cholesterol-Lowering Effect of Soy Protein: A Review of the Effects of Dietary Soy and Its Constituents on Risk Factors for Cardiovascular Disease. *Nutrients*. 2017;9(4):324.
- Breast cancer: Prospective studies show post-diagnosis intake reduces recurrence/mortality. Clinical studies show no effect on breast cell proliferation. Lots of studies support safety.
    - Seema et al. Soy Isoflavone Supplementation for Breast Cancer Risk Reduction: A Randomized Phase II Trial. Cancer Prev Res. 2012;5:309-319.
    - Chi et al. Post-diagnosis Soy Food Intake and Breast Cancer Survival: A Meta-analysis of Cohort Studies. Asian Pacific J Cancer Prev. 2013;14 (4), 2407-2412
- A paper to be published in the next 3-6 months shows soy does not cause adverse endocrine-related effects in men or women. Messina et al.
- Effects on hormones in men: A 2010 Meta-analysis, "Clinical studies show no effects of soy protein or isoflavones on reproductive hormones in men: results of a meta-analysis" (Hamilton-Reeves et al, Fertility and Sterility (94)3; 997-1007, 2010) is currently being updated and shows the same results: no effects of isoflavones on hormones in men.
- Intervention data indicate that isoflavones do not exert feminizing effects on men at intake levels equal to and even considerably higher than are typical for Asian males. Fertil Steril 2010;93:2095–104. 2010 by American Society for Reproductive Medicine.
- One concern with Soy is that most of it is GMO. Organic soy is not GMO, but it is sometimes difficult to find. Most scientists agree that GMO crops are safe, but this is a very controversial topic.

2. **Any scientific evidence that plant-based diets affect testosterone levels in body-building men?**

- No! A study just published last month: The Association Between Plant Based Content in Diet and Testosterone Levels in US Adults. NHANES data. The study found that BMI & age significantly linked to (lower) testosterone levels, but high intakes of plant foods are not. "Our findings suggest that there is no association between plant-based content in diet and serum testosterone levels" The results of this study concur with several prior studies where androgen levels were evaluated in men consuming a variety of diets with different vegetarian-based content. The results suggested that no significant difference in serum free testosterone was present when comparing different types of diets with a vegetarian base. Kuchakulla et al. The association between plant-based content in diet and testosterone levels in US adults [published online ahead of print, 2020 May 28]. World J Urol.

- So specific to bodybuilding men – resistance training may boost hormone levels, although transiently so lifting weights + eating plants is a great approach!

3. What are your thoughts on hormones found in dairy milk?

- While bovine growth hormone is not allowed legally in Canada (where I live), it is clearly labelled in the US. Given the choice we should steer clear of this hormone in my opinion and choose milk without BGH. As far as "naturally occurring" hormones: to increase milk production, cows have been bred to produce higher levels of insulin-like growth factor I (IGF-I), and they are pregnant for most of the time they are milked, which greatly increases levels of progestins, estrogens, and other hormones in milk. Dairy milk tends to be growth-promoting (height/mass), but whether these effects are caused by specific amino acids, anabolic hormones, or other factors is not clear. We do not need to consume milk at all if we'd prefer to have zero exposure to these animal-derived hormones.
- I highly recommend this recent review paper by two Harvard Nutrition Scientists: Willett WC, Ludwig DS. Milk and Health. *N Engl J Med*. 2020;382(7):644-654

4. Do you know if Nick Squires is obtaining 240 grams of protein from protein powder, solely from whole foods or combination?

He's very open, ask him on Twitter! I do know he'll eat 2-3 vegan burgers at once = 45-65 g protein!

5. Could you recommend vegan-friendly vit D source?

- It is difficult to obtain adequate vita min D through foods. Mushrooms are one of the only plant sources that contain a significant amount of vitamin D. Some mushrooms are grown using ultraviolet light and may contain up to 500 IU Vitamin D2 per cup or 6 medium-size mushrooms. Mushrooms grown in the dark may not contain a significant amount of vitamin D. Mushrooms contain vitamin D2, while animal products (such as salmon) contain vitamin D3. Vitamin D2 might not be as bioavailable as vitamin D3 but can still raise vitamin D levels.
- Most plant milks (soy, oat, almond, coconut) are fortified with Vit D2 (~100 IU per cup) but you must read labels to be sure. Orange juice and breakfast cereals are often fortified as well.
- Supplements: There are many brands of vitamin D2 but vegans can also get their vitamin D3 that has been extracted from lichen (vegan-friendly source), it provides natural vitamin D in its most bioactive form, cholecalciferol (vitamin D3). To enhance absorption, it's best to take vitamin D supplements (whether vitamin D2 or D3) with a meal. Foods that are high in fats, like olive oil, avocados, nuts, and seeds, will help to increase the absorption of vitamin D into your bloodstream.

- Exposing your skin to sunlight can also increase your body's natural vitamin D production, but we do not want to be in the sun for too long without sunscreen. For most people, 15 minutes three to four times a week is sufficient. Exposed arms and legs should do the trick. And the good news is, research shows that you can still make vitamin D in your skin even if you are wearing sunscreen.

- For more information on vitamin D check out the National Institutes of Health (NIH) vitamin D fact sheet: https://ods.od.nih.gov/factsheets/VitaminD-Consumer/

6. **Is it possible to get adequate B-12 from nutritional yeast?**

   Yes. Nutritional yeast is grown specifically to be used as a food product. The yeast cells are killed during manufacturing. It is used in cooking and has a cheesy, nutty or savory flavor. Most yeast is fortified, and contains synthetic vitamins added during the manufacturing process to boost nutrient content. If vitamins have been added to the yeast, they will be included in the ingredients list. Although nutritional yeast is a great source of vitamin B12, if this is your only source you may also be getting too much of other vitamins such as folate. It's best to mix up your sources of B12 from supplements, and fortified foods such plant-based meats and other proteins and plant milks.

7. **How long can we take Zinc supplement before it hinders copper absorption?**

- Zinc is an important nutrient, especially for immunity. Those following plant based diets should be mindful of this nutrient since many concentrated forms are found in animal products. However, many beans, seeds, whole grains and fortified breakfast cereals contain plenty of zinc. I do still recommend that my plant based / vegan clients take a multi-vitamin 3-4 times per week (not daily) to top up any possible dietary gaps for micronutrients such as vitamin B12, zinc, iron, calcium and vitamin D and others.
- Males require 11 mg and females 9 mg per day of zinc. Most multivitamins contain 5 to 10 mg of zinc. Supplements contain several forms of zinc, including zinc gluconate (14% elemental), zinc sulfate (23% elemental), and zinc acetate (30% elemental). The percentage of elemental zinc varies by form. For example, approximately 23% of zinc sulfate consists of elemental zinc; thus, 220 mg of zinc sulfate contains 50 mg of elemental zinc. The elemental zinc content in milligrams will appear in the Supplement Facts panel on the container.
- Research has shown that intakes of 150–450 mg of zinc per day (20 to150 mg elemental) have been associated with such chronic effects as low copper status, altered iron function, reduced immune function, and reduced levels of high-density lipoproteins (HDL; good cholesterol). The upper limit for ages 19+ years in both males and females is 40 mg of elemental zinc per day.

8. **Are there any leucine supplements you would recommend?**

   I think there are many options online. I look for brans made in the US or Canada. Look for a brand that provides 2 to 5 grams per serving and aim for 2 grams after exercise and before bed -- added to food or plant protein powder.

9. **Regarding vitamins specially for athletes, I've heard that omega 3's are also essential along with iodine.**

   Can one meet the omega 3 target with only nuts and chia seeds? Yes, you can get plenty of omega-3s with walnuts, nuts, seeds and omega-3 fortified foods. You can also opt for vegan-friendly algae omega-3. Although vegans have lower DHA/EPA levels in their blood we don't seem to detect adverse health effects. Omega-3 fat deficiency is virtually non-existent in the medical literature. Iodine can be ingested as seaweed: as a snack or as sushi, or fresh as seaweed salad. It is also contained in iodized salt from the shaker, not the salt in processed foods. Look for a multi-vitamin that contains iodine.

10. **I am a flexitarian, and I consume tofu only twice a week since I have GI issues (specifically bloating) after eating consuming and avoid beans for similar reasons. Is there research regarding GI issues when transitioning to predominantly soy for the protein source in your diet?**

    It is best to sit down with a registered dietitian or other similar health care professional who can develop a meal plan to meet your personal needs. There are several options for protein if soy is not suitable for you. You can also try soy in many forms – edamame to tempeh to roasted soy beans, soy beverage etc.

11. **Many of my athlete patients would like to go more plant based or totally vegan, but they have IBS -C and often don't tolerate the vegan protein powders, shakes and increased high fiber foods, especially higher protein foods like beans. Any suggestions for this? They don't tolerate a lot of dairy and milk protein either, basically the FODMAPS.**

    I understand the challenges when food options are further dwindled. However, there are so many options for powders, sprouted grains, tofu, nuts/seeds, heathier meat substitutes I have not found it difficult to design a personalized diet for any of my vegan athletes' clients. It may take some trial and error, and patience but it can be done! This may be best answered on an individual case-by-case basis.

12. **Can you please touch on some of the risks of creatine supplementation as well?**

    Creatine monohydrate supplements have been around since the early 1990s, so we have both short term as well as long term data on it's effectiveness and safety. Well over 500 studies have been conducted on creatine and the only consistently reported side effect from creatine supplementation described in the literature has been weight gain. There are a few cases of cramping and dehydration, but it has been difficult to pinpoint this to creatine ingestion specifically. Weight gain can be detrimental to many sports where you are "carrying your own body weight" such as running as well as fast paced racquet or team sports such as tennis, basketball and soccer. I recommend reading this comprehensive paper: International Society of Sports Nutrition position stand: safety and efficacy of creatine supplementation in exercise, sport, and medicine. https://jissn.biomedcentral.com/articles/10.1186/s12970-017-0173-z

13. **How much B12 do you recommend to vegans?**

    Those who are mostly plant-based, or vegan are at greater risk than lacto-ovo vegetarians and nonvegetarians of developing vitamin B12 deficiency because natural food sources of vitamin B12 are limited to animal foods. Fortified breakfast cereals and nutritional yeast, and plant-based milks are good sources of vitamin B12 from plants. Fortified foods vary in formulation, so it is important to read the Nutrition Facts labels on food products to determine the types and amounts of added nutrients they contain. The RDA for vitamin B12 in adults is 2.4 mcg. Because only about 10 mcg of a 500 mcg oral supplement is actually absorbed in healthy people, I recommend a combination of fortified foods/beverages and a supplement of 1000 mcg of vitamin B12 three times per week. Learn more about vitamin B12 here: https://ods.od.nih.gov/factsheets/VitaminB12-Consumer/

14. **Considering eggs contain a lot of nutrients, what reasoning would a vegan/plant-based person have against consuming eggs from a local farmer where they knew the chickens were raised in a**

responsible caring manner? Especially since the environmental impact of chickens is much lower than that of cows or pigs and the chicken is not being harmed from lying an egg?

This is one of the better animal protein choices as for as ethics, however in the vegan community chickens will have their eggs fed back to them to replace the nutrients lost in making the egg. For each egg a hen produces, they excrete 10% of the calcium needed for the shell that from their bones. Therefore, you'll often see egg-laying hens with weak or broken bones, osteoporosis or even paralysis. Hens have a natural tendency to eat their own eggs to replenish the nutrients that are lost during the egg-laying process. If you feed hens a nutrient-rich diet then eating their eggs is one of the least harmful practices you could carry out, however this would not be considered vegan! I had to face this dilemma myself when I recently purchased a hobby-farm with the intention of livestock rescue – I thought if I rescued the hens, I could ethically consume the eggs. But no, I will feed them back to my hens 😊

15. **I have found that sources of plant proteins also contain high carbohydrate content and is this a disadvantage to these proteins? Especially when trying to maintain or grow muscle which requires higher protein intake that carbs.**

    When athletes are training hard, they do need the extra energy, so I have not found this to be an issue with energy balance. Whole foods are unlikely to cause intakes of carbs to be too high, it is more likely refined grains or sweets or too much fruit.

16. **What if the vegan athlete is allergic to soy and has celiac disease? How can she get enough protein?**

    There many gluten-free and non-soy plant foods that can make up an athlete's performance diet. Check for online "vegan athlete" resources or contact a plant-based or vegan dietitian to discuss the athlete's goals and to get a personalized sports nutrition plan.

17. **What does the literature suggest for following a vegan diet for adolescent and younger athletes?**

    A well-balance plant-based diet can fit all ages and levels of athletes. I find that many young athletes are very motivated because they care deeply about animals and protecting their Earth and their future.

18. **Is improved performance in vegans due to the antioxidant qualities of a plant-based diet?**

    Often, we see a boost in performance when an athlete incorporates more plants in their diet due to an increase in fuel-generating carbohydrates. Certainly, phytochemicals and antioxidants can aid in muscle recovery due to anti-inflammatory effects. However, a plant-based diet will not guarantee an improvement in performance – it's all about overall diet quality!

19. **What is the difference between soy, whey, and milk protein (whey and casein) absorption? Does the speed of absorption have any effect?**

    Researchers measure blood amino acids to figure out rate of protein absorption. Drinking whey protein or skim milk (the liquid whey tends to bypass casein that stays in stomach longer) causes increases in blood amino acids levels in under an hour. This means your muscles are prompted to start muscle protein syntheses (growth and repair) more quickly. Casein takes longer to increase

blood amino acids, but lasts longer, with elevated levels lasting over about 5 hours. This is beneficial overnight when you desire repair all night long (or most the night!). However, in the big picture we eat foods/meals and by far the predominant factor in muscle gain is resistance training with protein types/habits a distant second. Soy and pea protein have been shown to be very effective for muscle gain, so if your goal is to be plant-based these are better options.

20. **What do you think about the Impossible Burger?**

    Plant-based meats have great potential to address factory farming, sustainability, address global warming, and a way to feed 10s of millions without destroying the planet along the way. As the technology improves, this industry can keep evolving to offer foods that are cheaper, healthier, and more varied, too. Nutrition-wise, I think it is a great alternative to a beef burger, but for both types of burgers I would say that this is a 2-3 times a month food, not 3 times a week food! It's also what you eat with it? A whole grain bun, veggies on top and a side salad? The total diet should always be considered. Although it is criticized for being highly processed, many "healthy" foods like yogurt are highly processed food. Moderation is key.

21. **Given all the recent info coming out on phytoestrogens and their impact on cancer-risks, are you at all concerned about how much soy athletes are consuming, both in natural food form and protein powders?**

    See my above answer to question 1.

22. **Do you discuss complimentary protein pairing when trying to reach a well-balanced amino acid profile with your clients?**

    No, this was a concern a couple of decades ago when vegetarians or those from poorer countries may just be eating rice and vegetables which would not be a meal containing adequate levels of all essential amino acids. We have so much variety now and we tend to eat mixed and balanced meals more often. It's also what you eat over the course of the day or days, not in a single meal. But for those who want to be extra diligent here are some "complete protein" combinations: Nuts or seeds with whole grains (peanut butter on whole wheat toast), whole grains with beans (beans and rice; hummus and pita bread; bean-based chili and crackers; refried beans and tortillas), beans with nuts or seeds (salad with chickpeas and sunflower seeds). Soy (tofu, soy milk, soy-based plant meat substitutes) is a complete protein on its own.

23. **What do you think about dietary acid load? About research that suggest taking both vegetable and animal proteins for a buffering effect?**

    This is only really a concern for those with kidney diseases. Diet can influence acid-base balance by providing acid or base precursors. In general, foods rich in protein, such as meat, cheese, eggs, and others, increase the production of acid in the body, whereas fruit and vegetables increase alkalis. However, the body is very quick to balance acidity in the blood/tissues and its urine that can end up more acidic. Because we excrete urine as a waste product this is not harming our organs or body tissues. Measuring urine acidity does not tell us the acidity of the body – a key difference which makes most of the commercial alkalizing fad diets ineffective.

24. For those of us who are everyday meat eaters, how do you suggest we safely move towards a (more) plant-based diet? What are the key first steps to consider?

Great question and I am very happy you are asking it! Change your mindset – we have over 10,000 edible plants yet we only commonly eat 5 animal products – dairy, eggs, beef, chicken, pork. You have an infinite variety of plant combinations that are fabulous without being topped by animal flesh or animal products. Make a commitment to cooking more for a healthier whole foods plant-based approach. There are several dozen FREE resources online to help you get started with idea and recipes. If you google “go vegan” or “vegan start-up package” there are many resources. You can also contact a plant-based or vegan dietitian (I know many and I am one 😊) to help you get set up by considering your personal lifestyle, goals, cooking skills and budget etc.