



Multivitamins: Combinations Vs Single ingredient

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Multivitamin is a nutritional supplement that includes a combination of vitamins, and often minerals. Vitamins are good for health but what about multivitamins?

The hitch is that there is no standard or regulatory definition for multivitamins, meaning that the composition and quality can vary significantly from product to product.

Multivitamin Summary: Key Takeaways

- The long-term health benefits and risks of multivitamins are inconclusive
- If you do not have a balanced diet that includes fruits and vegetables, a multivitamin may be beneficial as nutritional insurance
- While challenging, eating as much as 10 servings of fruits and vegetables a day is ideal

Whole-Food Vitamins Vs Synthetic Vitamins

Multivitamins can be considered into two broad categories: whole-food derived (found in natural, whole foods) and synthetic (created in laboratories). Without getting too technical, it is important to understand that just because something has been synthesized in a laboratory doesn't necessarily mean it is not the same as what is found in nature. However, it is often different – for instance, synthetic Vitamin E is structurally unique from that of natural Vitamin E.

With both types of vitamin on the market, the argument

against using synthetic – which include chemical distillates – is that they are not recognized and used by the body the same way vitamins from whole foods are. In research on scurvy (a disease defined by a Vitamin C deficiency), for example, it was found that whole foods containing Vitamin C quickly eliminated the illness while ascorbic acid (the distillate) supplementation had little effect. Whole food vitamins (in their highest quality form) contain the vitamin complexes as they exist in nature, and are theoretically recognised by the body as whole foods.

Although the FDA has established “current Good Manufacturing Practice” (cGMP) regulations (requiring that vitamin manufacturers evaluate their products by testing purity, strength, and composition), because vitamins are classified by the FDA as general food products under the category of dietary supplements, and no testing is required before the manufacturer brings a product vitamin to market.

The primary safety concern with multivitamins is toxicity from over ingestion of a vitamin, or mineral, leading to increased risk of illness. For example, ingesting too much zinc interferes with copper and iron absorption. Since people do not need to consult a doctor before ingesting vitamins, you can potentially take vitamins that interact with one another in ways that can hurt, rather than help, your health.

Additionally, as with any nutritional supplement, there is a risk of impurities in the product, which can have severe consequences. For example, a contaminated batch of tryptophan from a particular manufacturer in Japan was linked to 37 deaths and 1,500 cases of permanent disability.

Long-term Health Benefits of Multivitamins are Inconclusive

Diets high in fruits and vegetables reduce the risk of diabetes, cancer, heart disease, and a host of other medical conditions. It's hypothesised the high concentrations of anti-oxidants and fibre reduces inflammation and protect against chronic disease. So, the natural progression from this is the belief that supplementing with isolated forms of the anti-oxidants and nutrients found in fruits and vegetables would confer the same benefits.

The research, however, on the benefits (and harms) of vitamin supplementation in the general population is inconsistent. Supplementation of a nutrient confers health benefits if a person is deficient in that nutrient. That should be obvious, but that is not what this article is about. The question we need to know the answer to is: will taking a multivitamin make us live longer or perform better?

The gold standard of research study design is a randomised, placebo controlled trial, in which subjects are divided into experimental and "control" groups, with the experiment group receiving a placebo, or inactive substance, and the experimental group receiving the substance to be studied.

The Journal of the American Medical Association published the results of the first large-scale, placebo controlled trial examining the long-term effects of multivitamin supplementation on cancer. The researchers found an 8% decrease in total cancer incidence in men taking a multivitamin. However, other observational studies find no association between multivitamin use and lower cancer rates, and some even find evidence that supplemental intake of certain vitamins may actually increase risk of certain cancers.

To further complicate matters, the few randomised controlled trials that have been done have produced conflicting results. Some show decreased cancer incidence and others show no effect or elevated risks.

As far as improving performance, the research is also equivocal. For example, a study published in the Journal of the American Society of Clinical Nutrition shows no performance improvement in runners after three months

of multivitamin supplementation. Similarly, a study entitled "Chronic multivitamin-mineral supplementation does not enhance physical performance" concluded just that. A study from 2006 in Research and Sports concluded that a liquid multivitamin supplement had no effect on "Anaerobic Exercise Performance" in people consuming an adequate diet.

Multivitamin Recommendations

The research on multivitamins is lacking overall and even the research that has been done shows conflicting results. So what are we to do?

Ideally, an individual should strive to eat a variety of fresh fruits and vegetables (10+ servings) every day. Few people would disagree that this is the best way to get nutrients, improve energy and performance, and guard against disease. There is certainly a synergistic health effect from

the contents of fruit and vegetables (both the things we know about and probably things we don't know about), as nature's design is most likely the best. The problem lies in executing this type of plan over the long run.

This is especially true for people who are trying to restrict calories to lose body fat, as 10 pieces of fruit would provide about 1,000 calories per day. The makers of Centrum will say that

taking a Centrum a day is the best alternative. Companies that sell whole food vitamin supplements will tell you that taking Centrum will do more harm than good, as the body doesn't recognise and utilise synthetic vitamins the same way it does natural micronutrients. Unfortunately, there is no clear answer provided by research.

If eating 10+ servings of fruit and vegetables per day is not feasible for you, the next best thing is a product that most closely approximates it, namely, a "super greens and reds powder," which is essentially fruit and vegetables concentrated down into a powder to be taken daily. This bypasses the issue of poor use of isolated nutrients and the idea that nutrients in real food exist in combinations impossible to replicate in a lab.

If using a super foods powder is not feasible, the next best thing is a whole food multivitamin. It is very important



to scrutinise the label of whatever product you're thinking of buying, as often times products label "whole food multivitamins" are actually synthetic compounds combined with yeast (a whole food).

Recommendation against the routine use of traditional multivitamins, unless you are part of a special population that research has shown to benefit from them. Still, if you are a hard training athlete, or are at risk for deficiencies due to restricted nutritional plans, you will likely derive more

benefit from supplementation with traditional products than none at all. It is, however, a much better idea to use a preparation that more closely mimics eating real food.

In conclusion, there are no clear answers, and in the end the decision to supplement with multivitamins needs to be tailored to the situation of each individual. For most of the population, and especially athletes and people looking to improve body composition, a whole food derived nutrition supplement is a solid bet.

Multivitamins and minerals for patients on selected medicines

Patients on selected medications			
Medication	Vitamin Affected	Mechanism	Treatment
Anticonvulsants (phenytoin, phenobarbital, carbamazepine, and primidone)	Vitamin D	These drugs induce CYP enzyme 3A4, which increases the metabolism of vitamin D to inactive compounds, which in turn reduces calcium absorption Hypocalcemia, osteomalacia, and osteoporosis can occur with long-term use, >6 months	Vitamin D levels should be monitored in high-risk patients and supplemented as needed ¹¹⁸
Bisphosphonates (alendronate (Fosamax), ibandronate (Boniva), risedronate (Actonel))	Calcium Vitamin D	Patients should be taking supplemental calcium and vitamin D to facilitate retention of calcium in bone	Elemental calcium, 1500 mg daily Vitamin D, 800-1000 IU daily
Colchicine	Vitamin B ₁₂	Colchicine inhibits the development of vitamin B ₁₂ receptor in the rapidly proliferating ileal mucosal cells ¹¹⁹	Monitor B ₁₂ levels in patients on high doses (>1.9 mg) for long periods
Corticosteroids	Calcium Vitamin D Potassium	Steroids inhibit vitamin D-mediated calcium absorption in the gut and deposition in the bone ⁶² Steroids cause sodium retention, resulting in potassium loss	High dose prednisone 7.5 mg per day and long-term >6 months steroids Supplement with calcium, 1500 mg daily and vitamin D, 800 IU daily Monitor potassium level and supplement as needed
DMPA depot medroxyprogesterone contraceptive (Depo Provera)	Calcium Vitamin D	Women who use DMPA for >2 years have significantly reduced bone mineral density of the lumbar spine and femoral neck	Elemental calcium, 1300 mg daily Vitamin D, 400 IU daily
Metformin (Glucophage)	Vitamin B ₁₂	Metformin competes with calcium in the calcium-dependent intrinsic factor-B ₁₂ receptor of the ileum ^{120,121}	Reduced serum levels occur in up to 30% of patients on chronic dosing ¹²² Supplementation with 1200 mg elemental calcium daily negates this effect, allowing appropriate vitamin B ₁₂ absorption ¹²²

Conclusion

Healthy diet is an adequate source of all vitamins and minerals needed. It is not appropriate to recommend vitamins/minerals to all patients. Vitamins/minerals supplement should be individualised considering the patient's needs/medical or drug history. The growing evidence suggesting that overuse of vitamins/minerals may lead to potential harm. Further studies are needed to establish more reliable evidence for the use/ disuse of vitamins/minerals. **NS**