Increase Your Stem Cells

37 Supplements

Proven to Help You Grow and Nourish New Stem Cells

Note to the Reader

This guide is specifically written for adults who want to naturally increase your number of stem cells so you live a happier, healthier, longer life.

In this supplement guide you will learn:

• The 4 ways scientifically proven to grow more stem cells, and which supplements will help you do that

• The 3 ways your multivitamin could be preventing you from making new stem cells

• Which supplements are scientifically proven to increase your number of stem cells, and which ones are a waste of money, so you can invest your money in supplements that will get you results

• The 6 enemies of stem cells and how you can protect yourself from them so you can naturally increase the number of healthy stem cells in your body

• Powerful supplements proven to protect your heart, prevent cancer, reduce inflammation, and protect your brain from Alzheimer's disease, so you can live a long, happy, healthy life

• Supplements shown to reduce pain, reduce swelling, and regrow cartilage, so you can enjoy your favorite activities and spend time with your family

• Much much more...

Medical Disclaimer

The information in this guide is for education and entertainment purposes only. This guide does not constitute medical advice in any way. You are responsible for how you use the information in this guide.

The information is this guide is meant to be accurate and authoritative on the topics covered. And the herbs and supplements in this guide can be dangerous to your health if taken improperly or if you have a disease or are currently taking prescription drugs, therefore it is important that you talk to your doctor before taking any of the supplements in this guide.

Do not take any supplement without talking to your doctor or healthcare professional first. Some supplements in this guide may interact with medications and certain conditions, and to help protect against any negative side-effects or dangerous interactions, consult your doctor before starting any new supplements, herbs, dietary supplements, exercise or sleep protocols.

All amounts and dosages are the recommended dosages for healthy adults (not children under 18 years old, pregnant women, or those with a specific disease or condition).

Contents

Section 1:
Information about stem cells

Chapter 1: What Are Stem Cells?

Stem cells are undifferentiated cells that can become specialized cells. And they can replicate rapidly. For example, a stem cell injected into your body could become cartilage, bone, collagen, or some other tissue.[1]

There are two major classes of stem cells, embryonic stem cells and adult stem cells. This guide will focus exclusively on adult stem cells.

Adult stem cells exist throughout the body. They are found inside of different types of tissue. For example, adult stem cells have been found in t the brain, bone marrow, blood, blood vessels, skeletal muscles, skin, and the liver.

Stem cells play a huge part in the body's healing process. Stem cell therapies that introduce new stem cells to a particular site (e.g., injecting your own stem cells into your knee to help regrow cartilage) shows tremendous promise.[2]

Stem cell therapy has great potential because your stem cells can be guided into becoming specific cells that can be used to regenerate and repair diseased or damaged tissues in your body.[3]

Stem cell therapy may benefit those with spinal cord injuries, type 1 diabetes, neurodegenerative diseases like Parkinson's disease or Alzheimer's disease, heart disease, stroke, burns, cancer, osteoarthritis, and other conditions.[4]

Adult stem cells can divide or self-renew indefinitely, which means their is lots of explore regarding the potential of stem cells to treat disease.

Adult stem cells are found in small numbers in most of your tissues, such as your bone marrow or fat. New research suggests that adult stem cells may be able to create unrelated types of cells. For instance, bone marrow stem cells could create bone, cartilage, lung or heart cells. Currently, scientists are investigating using adult stem cells to help people with neurological diseases, heart disease, and other conditions.[5]

1 https://www.medicalnewstoday.com/info/stem_cell
2 https://www.cryo-cell.com/cord-blood/about-stem-cells
3 https://www.mayoclinic.org/tests-procedures/bone-marrow-transplant/in-depth/stem-cells/art-20048117
4 https://www.mayoclinic.org/tests-procedures/bone-marrow-transplant/in-depth/stem-cells/art-20048117
5 https://www.mayoclinic.org/tests-procedures/bone-marrow-transplant/in-depth/stem-cells/art-20048117

Chapter 2: What promotes stem cell growth?

There are four primary ways that you can naturally increase the amount of stem cells in your body:

1. Exercise
2. Fasting
3. Proper supplementation and nutrition
4. Get healthy and stay healthy.

Exercise

Lifting weights and/or engaging in aerobic activity can naturally increase adult stem cells.

Here is what the research shows:[6]

- More active older animals have more stem cells[7,8]
- Exercise increases muscle stem cells in mice
- Weight lifters have better stem cells

How much exercise should you do to maximize your stem cells?

Talk to your doctor before beginning any new exercise regimen. Ask your doctor what level of exercise will be most beneficial for creating stem cell and for your overall health.

Whatever exercise you do, choose something fun that you like to do. When exercise creates positive feeling and emotions that creates a healthier and more vibrant immune system that can support new cells.

The power of positive moods isn't pseudoscience, it is well documented in the scientific literature.

For example, one research study published in Bone Marrow Transplantation in 2012 found that pessimism or optimism before a stem cell transplant predicted the patient's health after the transplant.[9] Those who were

6 https://www.regenexx.com/how-can-i-grow-more-stem-cells-top-10-list-of-things-to-do/
7 https://www.ncbi.nlm.nih.gov/pubmed/22168399
8 Hell, R. C. R., Ocarino, N. M., Boeloni, J. N., Silva, J. F., Goes, A. M., Santos, R. L., & Serakides, R. (2012). Physical activity improves agerelated decline in the osteogenic potential of rats' bone marrow derived mesenchymal stem cells. Acta Physiologica, 205(2), 292-301.
9 https://www.nature.com/articles/1705419

optimistic before receiving stem cells were healthier after receiving stem cells than those who were pessimistic.[10]

Fasting

Scientists have known for years that calorie restriction (i.e., fasting) has increased longevity and reduced signs of aging. But it gets even more promising than that regarding stem cells.

A recent study using rats found that short-term calorie restriction significantly increased the availability of stem cell availability in both young and old animals.[11] Fasting also increased muscle regeneration after stem cell transplant.[12]

How much should you fast to increase your stem cells?

Talk to your doctor before undergoing any fasting protocol.

If it is safe for you to fast, you can start off by doing intermittent fasting. This means not consuming calories for 16 hours a day and only eating during an 8-hour period. (This is the protocol for men. For women the fasting period is 12-16 hours).

For example, you could have breakfast at noon and complete your dinner by 8 p.m. Then you would fast from 8 pm - noon the next day (16 hours).

Another way to get started fasting is to fast for 24 hours. You can drink water, tea, and other calorie-free beverages during that time. And drink lots of water.

There are other health benefits to fasting aside from increasing the number of stem cells. Other potential benefits include:[13]

- Increased Energy
- Improved Cognitive Functioning
- Lose Fat
- Reduce Oxidative Stress
- Increase Longevity

Supplementation and Nutrition

Your body needs certain vitamins and minerals to create, support, and protect new

10 Hoodin, F., Uberti, J. P., Lynch, T. J., Steele, P., & Ratanatharathorn, V. (2006). Do negative or positive emotions differentially impact mortality after adult stem cell transplant?. Bone Marrow Transplantation, 38(4), 255.
11 https://www.cell.com/cell-stem-cell/fulltext/S1934-5909(12)00167-1
12 Cerletti, M., Jang, Y. C., Finley, L. W., Haigis, M. C., & Wagers, A. J. (2012). Short-term calorie restriction enhances skeletal muscle stem cell function. Cell stem cell, 10(5), 515-519.
13 https://www.healthline.com/nutrition/10-health-benefits-of-intermittent-fasting#section9

stem cells.

There are five ways that supplements can assist in increasing your number of stem cells:

- Stimulate the production of new stem cells directly
- Provide the vitamins and minerals and supplements necessary to create and maintain new stem cells
- Protect the existing stem cells with antioxidants
- Support a healthy immune system and high levels of energy so that your body has the energy and resources to create and support new stem cells
- Reduce inflammation in your body

Proper nutrition and eating very specific foods in the right quantity can support the growth of new stem cells as well. And there are some nutrients that are only available as supplements that can dramatically increase your body's ability to grow and support new stem cells.[14]

Get Healthy and Stay Healthy

In order to maximize the amount of new stem cells your body can create and support, your body must be healthy.

That means that your immune system is functioning, that you are getting high quality sleep so you can rebuild and repair your body, and that you have healthy mitochondria so that you have high levels of energy.

If you aren't sleeping well, if you don't have good energy, or if you are sick or your immune system is constantly taxed, your body's ability to support stem cells will be impaired.

Mitochondria are especially important regarding your energy levels. You've heard the phrase, "Mitochondria are the Powerhouse of the cell". They produce the energy utilized throughout your entire body. If your mitochondria aren't healthy, are damaged by oxidation, or are not given the proper nutrients, your body's energy levels will be low. Low energy means fewer resources available to grow new cells.

So to maximize your body's ability to grow and maintain stem cells, you need to be physically healthy with high levels of energy (i.e., effective mitochondria and a strong immune system).

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14 https://www.regenexx.com/how-can-i-grow-more-stem-cells-top-10-list-of-things-to-do/

Chapter 3: What inhibits stem cell growth?

There are six "enemies" of stem cells that will prevent your body from growing and maintaining new stem cells:

- Certain Antibiotics
- Inflammation
- Oxidative Stress
- Low Energy (Low-functioning Mitochondria)
- Impaired Immune Function
- Poor Sleep

Stem Cell Enemy #1: Certain Antibiotics[15,16]

Antibiotics with quinolone, such as Cipro and Levaquin, are given for infections like urinary tract infections. Animal and human research shows a direct negative impact of quinolone antibiotics on stem cells. Researchers investigating stem cells in rats found that there was reduced stem cell mobilization in the presence of quinolone antibiotics.[17]

It gets worse for those with joint and tendon issues. These antibiotics hurt both stem cells and tendon cells. Ligaments have their own stem cells, so when certain antibiotics damage those cells, your ligaments or tendons could weaken and eventually fail. The result could be tendinopathy or tendon rupture.[18]

Talk to your doctor to see if quinolone antibiotics are safe for you, and if there is a safer alternative that won't damage your stem cells.

Stem Cell Enemy #2: Inflammation

Inflammation is the body's natural defense system - the immune system - responding to protect your body from foreign organisms, like viruses and bacteria. When responding to a virus or a wound, your body's inflammatory response is beneficial to your health. But when inflammation becomes chronic it can cause life-threatening diseases.

Inflammation harms and potentially destroys your body's healthy stem cells in three ways.

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15 Velders, G. A., van Os, R., Hagoort, H., Verzaal, P., Guiot, H. F., Lindley, I. J., ... & Fibbe, W. E. (2004). Reduced stem cell mobilization in mice receiving antibiotic modulation of the intestinal flora: involvement of endotoxins as cofactors in mobilization. Blood, 103(1), 340-346.
16 https://www.regenexx.com/how-can-i-grow-more-stem-cells-top-10-list-of-things-to-do/
17 http://www.bloodjournal.org/content/bloodjournal/103/1/340.full.pdf?sso-checked=true
18 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2921747/

The first way inflammation decreases your ability to support stem cells is by stressing your immune system and hurting your overall health and well being.

When inflammation becomes chronic, it can cause serious health problems. One reason for chronic inflammation are autoimmune diseases, such as arthritis. What happens with autoimmune diseases is your body's immune system triggers an inflammatory response when there are no foreign invaders to fight. This can lead to chronic inflammation and all of the negative symptoms that come with it.

Today, because of our modern western diet and sedentary lifestyle, many experience chronic inflammation and suffer because of it.[19] Many researchers now believe that a great number of diseases are at least partly caused by inflammation, like heart disease, Alzheimer's disease, MS, and Crohn's disease.[20]

If you wish to have a long and healthy life free from the challenges associated with inflammatory diseases, reducing the inflammation in your body by eliminating inflammatory toxins and protecting your body from inflammation with proper supplementation might be something for you to discuss with your doctor.

The second way inflammation harms your ability to grow and maintain stem cells is that inflammation harms your body's mitochondria and decreases your energy. And when you are low on energy it is difficult for your body to grow new cells and support healthy cells.

This may also be why inflammation reduces memory and cognitive performance.[21]

The third way inflammation harms stem cells is through oxidative stress.

When your immune system is responding to inflammatory toxins, for example foods that trigger inflammation, your body sends cytokines into your bloodstream. The purpose of cytokines is to find the foreign invader triggering your immune system.

These cytokines travel through your body and cause oxidative stress on your cells. This means that inflammation is causing your body to harm itself by damaging its own cells through oxidation.

Imagine how much harm a person is doing to their health when they are constantly consuming foods and beverages that cause inflammation.

So, by reducing and preventing inflammation in your body, you protect your stem cells and you create an environment that is able to support and maintain stem cells.

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19 Head Strong, by Dave Asprey. Random House, 2017
20 http://www.ppt-health.com/inflammation-relief/diseases-caused-by-chronic-inflammation/
21 Head Strong, by Dave Asprey. Random House, 2017

And the research shows that reducing inflammation is a powerful way to your protect stem cells.[22]

Stem Cell Enemy #3: Oxidative Stress

Oxidative stress is when your body has more free radicals than antioxidants. Free radicals are molecules with an uneven number of electrons. That means they easily react with other molecules. Free radicals can cause chemical reactions in your body because they are so reactive. These reactions are called oxidation.[23]

When there are more free radicals than can be kept in balance by antioxidants, the free radicals can start doing damage to your body. Specifically, free radicals have been known to damage fatty tissue, DNA, and proteins in your body.

Because DNA, proteins, and lipids (a fancy word for fats) make up a large part of your body, oxidative stress caused by free radicals can cause tremendous damage.

Some diseases associated with oxidative stress are diabetes, heart disease, Parkinson's disease, Alzheimer's disease, and cancer.[24]

Free radicals can also do damage at the cellular level. Meaning if your body has too many free radicals and not enough antioxidants, those free radicals can do damage to your stem cells. Those free radicals can also do damage to tissues and systems that support healthy stem cells, like your mitochondria.

For example, a study in humans found that even low doses of oxidative stress damaged stem cells in the brain.[25,26]

Stem Cell Enemy #4: Low Energy

If you have low levels of energy you won't have enough resources to grow and maintain new stem cells.

Your mitochondria are the source of energy in your body. If you mitochondria aren't functioning properly because of oxidative damage, or they don't have the appropriate nutrients to operate well, your energy levels will suffer.

Not only will you feel tired and have poor cognitive performance when your

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22 https://www.elsevier.com/about/press-releases/research-and-journals/reducing-inflammation-protects-stem-cells-during-wound-repair
23 https://www.healthline.com/health/oxidative-stress#effects
24 https://www.healthline.com/health/oxidative-stress#effects
25 https://www.sciencedirect.com/science/article/pii/S2213231715000270
26 Baulch, J. E., Craver, B. M., Tran, K. K., Yu, L., Chmielewski, N., Allen, B. D., & Limoli, C. L. (2015). Persistent oxidative stress in human neural stem cells exposed to low fluences of charged particles. Redox biology, 5, 24-32.

mitochondria are impaired, but your ability to grow and maintain stem cells will be greatly reduce.

Stem Cell Enemy #5: Poor Sleep

Your ability to grow and maintain new stem cells is directly linked to your ability to get consistent, quality sleep.

Sleep is intimately involved with stem cells in three ways.

The first way sleep impacts stem cell growth and development is sleep's essential role in repairing and maintaining healthy cells and tissues in your body.

Your body is repairing itself all the time, and the vast majority of repairs occur when you are asleep. This is when your body is relatively motionless and can devote its energy to finding and repairing damaged cells and tissues.

When you are not getting high-quality sleep, then your body has less time to repair your cells. In fact, research now shows that a lack of sleep can actually cause brain damage.[27]

Mice who were deprived of sleep showed a 25-30% loss of a specific type of neuron. And, not surprisingly, mice deprived of sleep showed higher signs of *oxidative stress* than mice who got healthy sleep.[28]

The second way poor sleep harms your stem cell production and maintenance is that it impairs your immune system. And when your immune system is weak your are more likely to get sick, which means your body has to spend its energy fighting disease instead of building new stem cells.

A compromised immune system can also contribute to inflammation, which we know is bad for stem cells.

The third way poor sleep harms your body's ability to grow and maintain new stem cells is that it depletes your energy levels.

Question: Have you ever had trouble sleeping?

After a night of tossing and turning in bed, how much energy did you have?

If you are like most people, you felt tired, grumpy, maybe even a little groggy.

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27 https://www.thoughtco.com/can-lack-of-sleep-really-damage-your-brain-2795013
28 https://www.thoughtco.com/can-lack-of-sleep-really-damage-your-brain-2795013

When you are sleep deprived your body goes into "survival mode." This means you are functioning on a more primal, instinctual level. Your brain has less energy, so you don't think as well, and your body is craving energy. This usually means you are craving junk food that promising quick energy through sugar and high-calorie and fatty foods.[29]

Imagine how much less energy is available for growing and repairing stem cells when you don't even have enough energy to think properly!

So getting good sleep is critical to your ability to grow and maintain new stem cells.

Stem Cell Enemy #6: Impaired Immune System

If your immune system is impaired or overtaxed, it is unlikely you will have the resources available to grow and maintain new stem cells.

And an impaired immune system can directly cause damage to your stem cells through chronic inflammation.

As you already know, your immune system becomes compromised when you don't get enough sleep, consume inflammatory substances or toxins (like alcohol), or have low energy levels from poor diet or poorly-functioning mitochondria.

Whatever your health goals are, a healthy immune system is critical to growing and protecting new stem cells AND your overall health and well being.

Section Summary

The 4 ways to grow and support new stem cells

1. Exercise.
2. Fasting.
3. Proper Supplementation and Nutrition.
4. Get Healthy and Stay Healthy.

The 6 "enemies" of stem cells

- Antibiotics with Quinolone
- Inflammation
- Oxidative Stress
- Low Energy (Low-functioning Mitochondria)

29 https://thedolcediet.com/things-you-never-knew-about-sleep-deprivation

- Poor Sleep
- Impaired Immune System

Ideal Supplements for Stem Cells

In the next section you will learn the exact supplements you can take to promote and support new stem cells in your body. Of course, talk to your doctor before beginning any new supplement, diet, or exercise protocol, especially if you are taking any medication or have a disease or chronic condition.

As you have probably figured out, the supplements that are going to help you increase your number of healthy stem cells the most will have one or more of the following properties:

- Stimulate the creation of new stem cells
- Provide necessary nutrients to your stem cells
- Antioxidant properties
- Anti-inflammatory properties
- Increase your energy and improve your mitochondrial function
- Boost your immune system
- Assist your body in recovering from exercise
- Improve your sleep

Section 2: Supplements

From Section 1 you now know that you can increase the number of stem cells by exercising, boosting your immune system, improving your mitochondrial efficiency and energy levels, getting great sleep, and protecting your body from the damages of oxidative stress and inflammation.

You can also increase your stem cells by taking supplements that directly stimulate the creation of new stem cells.

How to use this guide

- Detailed science is in the back, along with a list of citations. There are two types of citations: citations that detail the name and authors of particular study and citations that are links that will take you directly to the cited material. Don't let the number of citations overwhelm you or distract you, they are there only for those who are curious where the information in this guide comes from

- The supplements are organized by the benefits they provide to your stem cells and your overall health

- Each supplement details its specific benefits, dosage information where appropriate, foods that contain the supplement, and potential risk factors. Supplement are concentrated nutrition in pill form, and every supplement carries risks, from allergic reactions to interacting with medications to potential for overdosing if you take more than the recommended dose. This information is provided for you so that you and your doctor can make the best decisions for your health

Generally speaking, the supplements listed in this guide are considered safely for most healthy adults.

- The purpose is to give you the information you need to get the proper nutrition and supplementation you need to grow and maintain new stem cells. Whether you choose to do that entirely through supplements or a combination of diet and supplements, the information is here for you to choose

- Information is provided specifically regarding supplements because many people find it easier to consistently get the nutrition they need by taking supplements and not relying entirely on their diet

• If a supplement is helpful for a specific disease or condition, e.g., heart disease or Alzheimer's disease, that information would be listed under benefits

• This guide contains a lot of information but does not contain all the information about a supplement. If you have any questions do your own research and talk to your doctor

• Check with your doctor before beginning any new supplement, diet, or exercise protocol, especially if you are taking medication or have a pre-existing condition

Attention: All recommendations and dosages are for healthy adults, not children or pregnant women or adults with a disease, condition, or taking medication.

Why multivitamins are dangerous!

Three ways multivitamins are hurting your health.[30]

1. Multivitamins are a one-size fits all approach to supplements. As a result, the amounts and doses of various supplements are unlikely to meet your specific needs.

Furthermore, there is no way to fit "a complete spectrum" of nutrients into a single pill. Most multivitamins contain too much of some nutrients (e.g., vitamin A or vitamin B6) and not enough of others (e.g., zinc and magnesium). The result is an imbalance of nutrition that was designed to reduce manufacturing costs and not designed to promote your optimal health. makes more sense for the manufacturer's bottom line and less sense for your body.

2. Many multivitamins have very low bioavailability.[31] That means that the vitamins and minerals in the pill you swallow are not absorbed by your body, and therefore give you no benefit.

For example, folate is an essential B vitamin, but folic acid, the kind found in many multivitamins, is not easily absorbed by many people. Even worse, this form of folate can be carcinogenic in high doses.

3. By taking a multivitamin, many people believe that they don't need any other supplements. As a result they don't seek out higher-quality, bioavailable supplements that could make a huge difference in their health. They think, "I

30 https://www.furtherfood.com/supplements-essential-ones-take-not-take-david-asprey-weighs/
31 https://www.everydayhealth.com/columns/jackie-arnett-green-plate-special/are-vitamin-supplements-really-bioavailable/

am taking a multivitamin, that's good enough," and they miss out on all of the amazing supplements available that could better meet their specific needs.

Supplements that Directly Support Stem Cells

Quercetin[32]

Benefits:

- New research suggests it supports stem cell growth and differentiation
- Antioxidant
- Supports mitochondria
- Safe alternative to painkillers for pain relief from joint pain and arthritis
- Protects your body by reducing stress
- Natural antihistamine and alleviates allergy symptoms
- Can prevent cell death[33]

*Note: earlier research suggested quercetin might inhibit stem cell growth. The current research suggests it supports stem cell growth.

Food Sources:

- Apples
- Olive Oil
- Peppers
- Red Wine
- Leafy Greens
- Cruciferous Vegetables

Recommended Dosage:

- Ideal amounts have not yet been established by the scientific community. Talk to your doctor to find the right dosage for you.
- Most supplements are 500 mg taken twice daily. And you can likely get benefits from taking even less than that, especially with a diet rich in Quercetin.

32 https://www.naturalfoodseries.com/11-proven-benefits-quercetin/
33 https://www.sciencedirect.com/science/article/pii/S0085253815471996

Astragalus membranaceus (root) or Astragalus-mongholicus (root)

Benefits:[34]

- Prevents collagen degradation
- Helps heal lung tissue
- Immune booster
- Anti-inflammatory
- May slow the growth of tumors
- Protects the cardiovascular system
- Regulates and prevents diabetes
- Can help treat tumors when combined with chemotherapy[35]
- Antiviral and antibacterial properties
- Has more than 63 differently flavonoids[36]

Protects healthy stem cells by improved apoptosis, (regulated cell death)[37]

Controversial Research:

The following study has been retracted, even though it is groundbreaking research that could revolutionize cancer therapy. A study of 1,815 patients[38] with advanced lung cancer found that an Astragalus-based Chinese medicine increased the effectiveness and reduced the toxicity of standard chemotherapy.[39]

Were the authors were pressured to retract their study by an outside force, business conglomeration, or institution that gives research grants? We don't know. All we know is authors chose to retract this important cancer study 4 years after its publication.

To read more about the mystery of why this important research paper, which proved that this root is an effective cancer treatment, was redacted, go the Appendix B.

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34 https://draxe.com/astragalus/
35 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5758356/
36 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5758356/
37 https://www.selfhacked.com/blog/astragalus/
38 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3818446/
39 Wang T, Xuan X, Li M, Gao P, Zheng Y, Zang W, et al. (2013). Astragalus saponins affect proliferation, invasion and apoptosis of gastric cancer BGC-823 cells. Diagn Pathol, 8: 179.

Forms:

- Astragalus root is available in most Chinese markets and health-food stores in a variety of forms:
- Tincture (liquid alcohol extract)
- Capsules and tablets
- Topically for the skin
- Dried and used in tea

Dosage:

- Supplements generally contain 500 mg and two to three tablets or capsules are usually the recommended daily dosage. Take only as directed

What Else to Know:

- Too much can inhibit the immune system[40]

40 https://www.herbal-supplement-resource.com/astragalus-herbs.html

Spirulina

Benefits:[41]

- Can trigger the production of new stem cells
- Antioxidant
- Anti-inflammatory
- Rich in protein
- May have anti-cancer, anti-viral, and anti-aging effects
- Ideal source of protein and vitamins for vegetarians and those trying to reduce their consumption of animal protein

Food Sources:

- Powders
- Capsules

Recommended Dosage:

- No universally accepted dosage
- Use as directed
- Supplement capsules can range from 300 mg up to 1,000 mg per serving
- Powder supplement doses range from ½ teaspoon to 1 tablespoon

41 https://theshawnstevensonmodel.com/5-benefits-of-spirulina/

Chlorella

Benefits:[42]

- Activates stem cell production[43]
- Antioxidant
- Cleanses your body of heavy metals[44]
- Immune system booster
- Rich in omega-3s
- May enhance aerobic endurance
- May activate stem cell production

Food Sources:

- Supplements

Forms:

- Powders
- Capsules
- Pressed tabs

Dosage:[45]

- Like spirulina, chlorella can come in pills or powder form
- The ideal daily amount of chlorella for healthy adults is unknown
- Some research has seen benefits of 1.2 grams per day, other research uses doses of 5-10 grams per day

General dosage information:

- Some supplements recommend 2-3 grams per day
- Pills can be 500-1,000 mg per serving
- Powders can range from 1 teaspoon up to 1 tablespoon per day

42 https://www.healthline.com/nutrition/benefits-of-chlorella
43 https://www.ebay.com/itm/Chlorella-Supplement-Stem-Cell-Activator-500mg-Help-Hot-Flashes-Caps-3B-/112150664805
44 https://www.sciencedirect.com/science/article/pii/S0278691511003000
45 https://www.healthline.com/nutrition/benefits-of-chlorella#section13

Glucosamine[46]

Benefits:

- Assists in stem cell attachment and differentiation[47]
- Protect cartilage and prevent cartilage loss
- Stimulate cartilage metabolism
- Helps with osteoarthritis
- Anti-inflammatory
- May help reduce pain and increase joint mobility
- Reduces lung inflammation caused by cigarette smoking[48,49]

Sources:

- Not available in food in substantial amounts
- Primarily available in supplements

Forms:

- Tablet
- Gel
- Powder
- Liquid

Recommended Dosage:[50]

- Liquid form is most quickly absorbed
- Take powder with fruit juice
- 1,500 mg per day (500 mg taken 3x per day)

What Else to Know:

- High doses can inhibit stem cells
- May take 4-8 weeks to experience benefit
- Talk to your doctor or stop taking the supplement if you do not experience any improvement after 8 weeks

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46 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3150191/
47 https://www.ncbi.nlm.nih.gov/pubmed/28481047
48 https://www.sciencedirect.com/science/article/pii/S0891584914000392
49 Wu, Y. L., Lin, A. H., Chen, C. H., Huang, W. C., Wang, H. Y., Liu, M. H., ... & Kou, Y. R. (2014). Glucosamine attenuates cigarette smoke-induced lung inflammation by inhibiting ROS-sensitive inflammatory signaling. Free radical biology and medicine, 69, 208-218.
50 https://www.jointhealthmagazine.com/whats-the-best-glucosamine-dont-take-the-wrong-kind.html

Chondroitin

Benefits:

- Important structural part of cartilage
- Helps treat joint pain from osteoarthritis
- Assists with recovery from injury and exercise
- May help protect and stimulate the regeneration of cartilage

What else to know:

- Results are mixed, some research shows some benefit, other shows no benefit[51]
- No research shows any danger in chondroitin supplementation

Food Sources:

- Available in supplements only

Forms:

- Chondroitin sulfate

Recommended Dosage:

- Often taken in combination with glucosamine
- 1,200 mg per day (400 mg 3x per day)

What Else to Know:

- Do not combine with Tylenol (Acetaminophen). They can interact with each other and may reduce the effectiveness of each other. If you are currently prescribed or are taking Acetaminophen, consult your doctor first before taking Chondroitin

51 https://www.arthritis.org/living-with-arthritis/treatments/natural/supplements-herbs/guide/chondroitin-sulfate.php

Vitamin A[52]

Benefits:

- Ensures proper cell growth
- Supports healthy cell replication (aka cell differentiation)
- Promotes healing and repair of cells
- More is needed for women during pregnancy to support healthy fetal development

Food Sources:

- Dark leafy greens
- Carrots
- Eggs

Recommended Dosage:

- Men: 900 IU a day
- Women who aren't pregnant: 700 IU a day
- Max daily recommended dose is 3,000 IU a day
- Use as directed

52 https://www.livestrong.com/article/527768-nutrients-needed-for-cell-growth-and-repair/

Phosphorous[53]

Benefits:[54]

- Required for cell growth, repair, and maintenance
- Essential mineral involved in hundreds of cellular activities
- Important part of healthy teeth and bones
- Balances the levels of other nutrients inside cells (e.g., Zinc and vitamin D)
- Detoxes the body through urination and excretion
- The second most abundant element in the human body

Food Sources:

- Meat
- Fish
- Nuts

Forms:

- Phosphates (salts)

Recommended Dosage:[55]

- 700 - 1,200 mg per day

What Else to Know:

- Overdosing on Phosphorus may inhibit vitamin D production and disrupt calcium absorption.[56,57] High doses can also cause problems with your heart and kidneys.[58]

53 https://www.livestrong.com/article/527768-nutrients-needed-for-cell-growth-and-repair/
54 https://draxe.com/foods-high-in-phosphorus/
55 https://www.mayoclinic.org/drugs-supplements/phosphate-supplement-oral-route-parenteral-route/description/drg-20070193
56 https://www.ncbi.nlm.nih.gov/pubmed/8642452
57 Calvo, M. S., & Park, Y. K. (1996). Changing phosphorus content of the US diet: potential for adverse effects on bone. The Journal of nutrition, 126(suppl_4), 1168S-1180S.
58 https://draxe.com/foods-high-in-phosphorus/

Zinc[59]

Benefits:

- Present in every cell in your body
- Plays an important role in cell growth and cell division
- Involved in cell repair and healing
- Supports a healthy immune system
- Important in the production of Testosterone in men
- Involved in apoptosis, a process that can destroy or preserve your stem cells

Food Sources:

- Beef
- Pork
- Lamb
- Legumes
- Nuts

Forms:[60]

- There are 7 different forms of zinc in supplements
- The most bioavailable form is zinc orotate

Recommended Dosage:

- Males: 11 mg per day
- Females: 8 mg per day
- 40 mg per day is the max dose recommended[61]

What Else to Know:

- Ingesting 250 mg of zinc is ingested, or about 25 times the recommended dosage, can result in zinc toxicity

59 https://www.livestrong.com/article/527768-nutrients-needed-for-cell-growth-and-repair/
60 https://www.globalhealingcenter.com/natural-health/types-of-zinc/
61 https://www.mayoclinic.org/drugs-supplements-zinc/art-20366112

Vitamin C[62]

Benefits:

- Synthesizes collagen, the main structural protein found in your skin and connective tissue
- Powerful antioxidant
- Increases the effectiveness of other antioxidants

Food Sources:

- Broccoli
- Strawberries
- Spinach
- Brussel sprouts
- Melons
- Citrus fruits

Forms:[63]

- 5 different types of vitamin C supplements
- Ascorbic acid is the form found in food and is the recommended form for supplements

Recommended Dosage:[64]

- Males: 90 mg per day
- Females: 70 mg per day

What Else to Know:

- Avoid supplementing with vitamin C if you have kidney problems[65]

- Studies have shown that more than 2,000 mg/day of vitamin C can lead to nausea and diarrhea[66]

62 http://healthyeating.sfgate.com/list-antioxidants-9645.html
63 https://www.swansonvitamins.com/blog/lindsey/benefits-of-vitamin-c-and-vitamin-c-types
64 https://www.swansonvitamins.com/blog/lindsey/benefits-of-vitamin-c-and-vitamin-c-types
65 https://www.everydayhealth.com/drugs/ascorbic-acid
66 https://www.everydayhealth.com/drugs/ascorbic-acid

Resveratrol

Benefits:

- Enhances the proliferation of stem cells[67]
- Anti-inflammatory[68]
- Antioxidant
- May prevent tumors

Sources:

- Red wine (though getting a substantial amount of Resveratrol by drinking red wine would be very dangerous to your health)
- Blueberries
- Dark chocolate

Dosage:

- Talk to you doctor to find the ideal amount for you. Most supplements are between 20 mg - 500 mg. The amounts of resveratrol used in research studies are sometimes as high as 2,000 mg

Stay away from:

- Thus far there have been no negative side-effects of taking resveratrol or taking large amounts of resveratrol[69]

67 https://www.sciencedirect.com/science/article/pii/S094471130700061X
68 https://www.ncbi.nlm.nih.gov/pubmed/15832402
69 https://www.webmd.com/heart-disease/resveratrol-supplements#1

Anti-Oxidants

Curcumin[70]

Benefits:

- Anti-inflammatory
- May help prevent Alzheimers and other neurodegenerative diseases (by preventing inflammation. Scientists believe chronic inflammation may cause neurodegenerative diseases)[71]
- Potent antioxidant[72]
- Boosts the activity of other antioxidants in your body
- May help reduce depressive symptoms[73]

Food Sources:

- Turmeric

Forms:

- Powder
- Capsule

Recommended Dosage:

- There is no accepted recommended dosage
- Use as directed. Consult your doctor

What Else to Know:

- Take curcumin supplements with black pepper. Black pepper has shown to increase the bioavailability of curcumin in the body, such that black pepper may increase the effect by 2,000%[74]
- But too much and it can inhibit stem cell growth and survival[75]

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70 https://www.healthline.com/nutrition/top-10-evidence-based-health-benefits-of-turmeric#section1
71 https://www.healthline.com/nutrition/top-10-evidence-based-health-benefits-of-turmeric#section1
72 https://www.ncbi.nlm.nih.gov/pubmed/17569207
73 https://www.sciencedirect.com/science/article/pii/S009130570800350X
74 https://pdfs.semanticscholar.org/2c1d/b67216db08e105d6fb1f7ec30e7275c681f1.pdf
75 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4466857/

Piperine[76]

Benefits:

- Antioxidant
- Improves absorption of other nutrients
- Enhances the bioavailability of other antioxidants
- Improves memory
- Supports a healthy immune system
- Can help reduce depression
- Enhances cognitive performance

Food Sources:

- Black Pepper

Forms:

- Capsules
- Concentrated oils

Dosage:

- Standard amount usually found in food is safe
- Consult your doctor before taking a piperine or black pepper supplement or oil, as it can increase the bioavailability and potency of certain drugs and medications

What Else to Know:

- Always take curcumin with black pepper for maximum absorption and benefit

76 https://neurohacker.com/bioperine-piperine-benefits

Vitamin D

Deficiency:

- Over 1 billion people in the world are deficient in Vitamin D[77]
- 45% of Americans are estimated to be deficient in Vitamin D[78]

Benefits:

- Antioxidant
- Increases the number of blood stem-cells during embryonic development[79]
- Essential for the growth and maintenance of healthy teeth and bones
- Regulates calcium in the body
- Supports a healthy immune system
- Vitamin D supplementation has shown to significantly reduce mortality[80,81]

Food Sources:[82]

- Fatty fish
- Egg yolk
- Dairy (caution, may be inflammatory)
- Grass fed beef liver
- *Sunlight

Forms:

- Vitamin D2 (ergocalciferol)
- Vitamin D3 (cholecalciferol)
- You want D3 for maximum benefit

Dosage:

- 600 IU per day

77 https://www.eurekalert.org/pub_releases/2016-10/cp-vdi100316.php
78 https://www.scientificamerican.com/article/vitamin-d-deficiency-united-states/
79 https://www.eurekalert.org/pub_releases/2016-10/cp-vdi100316.php
80 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3356951/
81 Nair, R., & Maseeh, A. (2012). Vitamin D: The "sunshine" vitamin. Journal of pharmacology & pharmacotherapeutics, 3(2), 118.
82 https://www.webmd.com/food-recipes/guide/calcium-vitamin-d-foods

Beta carotene

Benefits:

- Antioxidant
- Body converts it into retinol, a form of Vitamin A
- May protect against cognitive decline

Food Sources:[83]

- Sweet potatoes
- Carrots
- Onions
- Peas
- Spinach

Forms:

- Food
- Supplement (not recommended)

Recommended Dosage:

- 6-15 mg a day in a supplement

What Else to Know:

- Supplements of beta carotene have mixed results. Best to get this nutrient through food
- Vitamin A is toxic at high levels. High doses of beta carotene (180 mg a day) have been used without toxic side-effects.[84] So a daily dose of 10x the recommended dosage did not produce toxic effects.[85]

83 https://www.medicalnewstoday.com/articles/252758.php
84 https://www.nutri-facts.org/en_US/nutrients/carotenoids/beta-carotene/safety.html
85 Copper, I. O. M. (2001). Dietary reference intakes for vitamin A vitamin K, arsenic, boron, chromium, copper, iodine, iron, manganese, molybdenum, nickel, silicon, vanadium, and zinc(pp. 224-57). Washington, DC: The National Academies Press.

Lycopene[86]

Benefits:

- Protects stem cells[87]
- Antioxidant
- Boosts immune system
- Strengthens bones and can help prevent osteoporosis
- Research suggests it can delay the onset of Alzheimers and Parkinsons
- May help prevent strokes
- Prevents heart attacks in mice[88,89]

Food Sources:

- Tomatoes
- Watermelon
- Pink grapefruit
- Papaya

Dosage:[90,91]

- Talk to your doctor. Recommendations vary from 9 mg per day up to 120 mg per day
- Daily doses of 120 mg of lycopene per day have proven safe for up to 1 year[92]

What Else to Know:

- Prostate cancer - Some research suggests that lycopene may enhance the spreading of prostate cancer.[93] Though other research shows men who eat foods rich in lycopene are less likely to contract prostate cancer.[94,95]

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86 https://www.naturalfoodseries.com/15-benefits-lycopene/
87 http://www.europeanreview.org/wp/wp-content/uploads/1625-1631.pdf
88 http://www.mdpi.com/2072-6643/8/3/138/htm
89 Tong, C., Peng, C., Wang, L., Zhang, L., Yang, X., Xu, P., ... & Qi, H. (2016). Intravenous administration of lycopene, a tomato extract, protects against myocardial ischemia-reperfusion injury. Nutrients, 8(3), 138.
90 https://www.drweil.com/vitamins-supplements-herbs/supplements-remedies/lycopene/
91 https://www.webmd.com/vitamins/ai/ingredientmono-554/lycopene
92 https://www.webmd.com/vitamins/ai/ingredientmono-554/lycopene
93 https://www.webmd.com/vitamins/ai/ingredientmono-554/lycopene
94 http://journals.sagepub.com/doi/abs/10.1177/153537020222701003
95 Giovannucci, E. (2002). A review of epidemiologic studies of tomatoes, lycopene, and prostate cancer. Experimental biology and medicine, 227(10), 852-859.

Selenium[96]

Benefits:[97]

- Antioxidant
- Assists in the production of other antioxidants
- Supports the production of proteins which prevent cell damage
- Boosts the immune system
- May protect against Alzheimer's disease[98]

Food Sources:[99]

- Brazil nuts
- Eggs
- Mushrooms
- Meat
- Salmon
- Brown rice

Forms:

- Liquid drops (most bioavailable)
- Pill form or multi-vitamin

Dosage:

- Use as directed
- 55 micrograms a day

What Else to Know:

- Selenium only mineral that the National Institute of Health lists as an antioxidant

96 http://healthyeating.sfgate.com/list-antioxidants-9645.html
97 https://www.healthline.com/nutrition/selenium-benefits#section4
98 https://www.sciencedirect.com/science/article/pii/S2352873717300409
99 https://www.healthbeckon.com/selenium-rich-foods/

Lutein[100]

Benefits:

- Antioxidant
- Protects your eyes and skin
- Reduces the two leading causes of age-related blindness, macular degeneration and cataracts
- Protects your eyes from oxidative damage
- Is anti-inflammatory
- Reduces the risk of heart disease and stroke

Food Sources:

- Spinach
- Kale
- Collards
- Broccoli
- Swiss chard
- Green peas
- Arugula

Forms:

- Lutein can be found in multivitamins and lutein supplements, and it is often paired with Zeaxanthin, another supplement that is beneficial to eyesight.
- Lutein supplements can be starch-based or alginate based; choose *starch-based lutein* because it is more bioavailable.[101,102]

Dosage:

- Recommended dose is between 6 mg - 30 mg per day for adults[103]

100 http://www.lifeextension.com/Magazine/2016/8/Newly-Discovered-Benefits-of-Lutein/Page-01
101 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3663991/
102 Evans, M., Beck, M., Elliott, J., Etheve, S., Roberts, R., & Schalch, W. (2013). Effects of formulation on the bioavailability of lutein and zeaxanthin: a randomized, double-blind, cross-over, comparative, single-dose study in healthy subjects. European journal of nutrition, 52(4), 1381-1391.
103 https://draxe.com/lutein/

Vitamin E[104]

Benefits:

- Powerful antioxidant
- Helps maintain the integrity of cell membranes[105]
- Benefits your circulation and keeps your blood healthy
- Supports the creation of new red blood cells, which transport oxygen all over your body
- Helps your body utilize Vitamin K, which is essential to healthy blood clotting
- May protect from developing Alzheimer's Disease

Food Sources:

- Almonds
- Wheat germ
- Spinach
- Avocado
- Pine nuts
- Sweet potato
- Olive oil

Forms:[106]

- There are 8 forms of vitamin E
- Only 1 form of vitamin E, alpha-tocopherol, is available in supplements
- Best to get most of your vitamin E from food

Dosage:[107]

- 15 mg (22.4 IU) per day in supplements
- Many supplements have higher doses than this, check with your doctor to determine what dose is safe for you

What Else to Know:

- If you have a condition such as heart disease or diabetes, do not take doses of 400 IU/day or more[108]

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104 http://healthyeating.sfgate.com/list-antioxidants-9645.html
105 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2040110/
106 https://products.mercola.com/vitamine/
107 https://ods.od.nih.gov/factsheets/VitaminE-HealthProfessional/
108 https://www.webmd.com/vitamins/ai/ingredientmono-954/vitamin-e

Choline

Benefits:

- Antioxidant
- May protect against Alzheimer's disease
- Important in fetal brain growth and development[109]

Food Sources:

- Eggs
- Salmon
- Liver
- Peanuts
- Poultry
- Brussel Sprouts

Forms:

- Multiple forms available in supplements
- Choose CDP choline, also called Citicoline, or Alpha GPC choline for maximum benefit[110]

Dosage:

- Males: 550 mg per day
- Females: 450-550 mg per day

What Else to Know:

- Choline and folate rely on each other in the body, so a deficiency in one can cause a deficiency in the other.[111] Make sure you are getting the proper amounts of both folate and choline.

109 https://www.seattletimes.com/seattle-news/health/all-about-choline-a-lesser-known-vitamin/
110 https://draxe.com/what-is-choline/
111 https://www.seattletimes.com/seattle-news/health/all-about-choline-a-lesser-known-vitamin/

B12

Deficiency:

- Currently there is a worldwide epidemic of b12 deficiency[112]
- Estimates are that 40% of the us population is deficient in vitamin b12[113]
- Deficiency risk increases as you age[114,115]

Benefits:[116]

- Plays an important role in many bodily functions, including your psychological mood, energy, memory, hair, skin, and your digestion and metabolism
- Maintains healthy nerve cells
- Necessary for a healthy immune system
- A deficiency can lead to joint pain, muscle pain, fatigue, and many other problems
- Plays an essential role in rapidly replicating tissues[117,118]

Food Sources:

- Sardines
- Grass-fed beef
- Salmon and other fish
- Eggs

Forms:[119]

- 4 types in supplements
- Choose Methylcobalamin for best results

Dosage:[120]

- 2.4 micrograms per day

112 https://draxe.com/vitamin-b12-benefits/
113 https://www.emaxhealth.com/13955/vitamin-d-deficiency-and-genetic-link
114 https://academic.oup.com/ajcn/article/89/2/693S/4596795
115 Allen, L. H. (2008). How common is vitamin B12 deficiency?–. The American journal of clinical nutrition, 89(2), 693S-696S.
116 https://draxe.com/vitamin-b12-benefits/
117 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1538177/
118 Hitzig, W. H., & Kenny, A. B. (1975). The role of vitamin B 12 and its transport globulins in the production of antibodies. Clinical and experimental immunology, 20(1), 105.
119 https://www.globalhealingcenter.com/natural-health/four-types-vitamin-b12/
120 https://draxe.com/vitamin-b12-benefits/

What Else to Know:

- Avoid using a combination of vitamin B12, folate, and vitamin B6 after receiving a coronary stent. This combination may increase the risk of blood vessel narrowing.[121]
- Do not take B12 if you have Leber's Disease, a hereditary eye disease[122]

121 https://www.webmd.com/vitamins/ai/ingredientmono-926/vitamin-b12
122 https://www.webmd.com/vitamins/ai/ingredientmono-926/vitamin-b12

Fish Oil

Benefits:

- Contains two omega-3 fatty acids (DHA and EPA)
- Anti-inflammatory
- Lower bad cholesterol (LDL)
- Increase good cholesterol (HDL)
- Deficiency of omega-3s causes 96,000 deaths in the US every year[123]
- May reduce risk of mortality
- Protects against heart disease
- A safe alternative to Advil, Tylenol, and over-the-counter painkillers[124]

Food Sources:

- Salmon
- Tuna
- Sardines

Forms:

- Liquid (keep refrigerated)
- Capsules

Dosage:[125,126]

- 300 -500 mg per day
- Some supplements are much higher; there is not a great risk of overdose when used as directed

What Else to Know:

- If you are concerned about mercury levels in fish, the following fish have low mercury levels and high levels of Omega-3 fatty acids: sardines, sockeye salmon, anchovies, mackerel, wild trout.[127]

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123 https://www.nutraingredients-usa.com/Article/2009/06/26/Omega-3-deficiency-causes-96-000-US-deaths-per-year-say-researchers
124 https://www.ncbi.nlm.nih.gov/pubmed/16531187
125 https://www.webmd.com/hypertension-high-blood-pressure/guide/omega-3-fish-oil-supplements-for-high-blood-pressure
126 https://www.livestrong.com/article/248909-can-you-overdose-on-fish-oil/
127 Head Strong, by Dave Asprey. Random House, 201

Krill Oil

Benefits:

- Contains omega-3 fatty acids (DHA and EPA)
- Anti-inflammatory, especially intestinal inflammation[128]
- Similar benefit as fish oil
- Krill oil contains a pink-orange[129] pigment called astaxanthin, which has anti-inflammatory and antioxidant effects[130]
- May be more bioavailable than fish oil[131]

Food Sources:

- Only available in supplement form

Forms:

- Capsules

Recommended Dosage:

- The FDA recommends a combined maximum intake of EPA and DHA below 3 grams day[132]
- You can safely combine with fish oil. Check with your doctor to determine the best dosage for you. Use as directed

128 https://www.ncbi.nlm.nih.gov/pubmed/26493628
129 https://www.healthline.com/nutrition/krill-oil-benefits#section2
130 Costanzo, M., Cesi, V., Prete, E., Negroni, A., Palone, F., Cucchiara, S., ... & Stronati, L. (2016). Krill oil reduces intestinal inflammation by improving epithelial integrity and impairing adherent-invasive Escherichia coli pathogenicity. Digestive and Liver Disease, 48(1), 34-42.
131 https://www.ncbi.nlm.nih.gov/pubmed/26357480
132 https://ods.od.nih.gov/factsheets/Omega3FattyAcids-HealthProfessional/

Flaxseed oil

Benefits:[133]

- Antioxidant
- Anti-inflammatory
- Rich in omega-3 fatty acids
- Contains ALA, a different omega-3s than fish oil and krill oil

Sources:

- Flaxseeds

Form:

- Liquid (keep refrigerated)

Dosage:[134]

- Best when you consume with food
- Start with a small dose and gradually increase as desired
- Max recommended dosage is 4 grams taken twice per day

What Else to Know:

- Not every study has found an anti-inflammatory effect with flaxseed oil. For example, one meta-analysis found that flaxseed oil did not significantly reduce inflammation in the general population.[135] Interestingly, this same meta-analysis found that flaxseed oil did reduce inflammation in those with obesity.[136]

133 https://www.healthline.com/nutrition/flaxseed-oil-benefits#section6
134 https://superfoodprofiles.com/flaxseed-oil-side-effects-dosage
135 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4808865/
136 Ren, G. Y., Chen, C. Y., Chen, G. C., Chen, W. G., Pan, A., Pan, C. W., ... & Chen, L. H. (2016). Effect of flaxseed intervention on inflammatory marker c-reactive protein: a systematic review and meta-analysis of randomized controlled trials. Nutrients, 8(3), 136.

Alpha Lipoic Acid (ALA)

Benefits:[137]

- Antioxidant
- Anti-inflammatory
- Plays a key role in metabolism and energy
- Increases the expression of antioxidant enzymes[138]
- Its anti-inflammatory action in independent of its antioxidant activity[139]
- In animals ALA has neuroprotective effects and may prolong life[140]
- May be effective in preventing or combating Alzheimer's Disease[141]
- Helps protect DNA in rats from oxidation[142]

Food Sources:

- Spinach
- Broccoli
- Tomato
- Brussel sprouts

Forms:

- Capsules

Recommended Dosage:[143]

- There is no definitive dosage for LA. Talk to your doctor first to make sure LA is safe for you and that you are taking the right amount for you
- In research studies for diabetes y, the dosage of ALA varied from 600-1,200 mg daily
- Most supplements range from 250-600 mg a day. Use only as directed

137 https://www.healthline.com/nutrition/6-anti-inflammatory-supplements#section1
138 https://www.ncbi.nlm.nih.gov/pubmed/25620240
139 Andrea Moura, F., Queiroz de Andrade, K., Celia Farias dos Santos, J., & Oliveira Fonseca Goulart, M. (2015). Lipoic acid: its antioxidant and anti-inflammatory role and clinical applications. Current topics in medicinal chemistry, 15(5), 458-483.
140 Andrea Moura, F., Queiroz de Andrade, K., Celia Farias dos Santos, J., & Oliveira Fonseca Goulart, M. (2015). Lipoic acid: its antioxidant and anti-inflammatory role and clinical applications. Current topics in medicinal chemistry, 15(5), 458-483.
141 https://www.sciencedirect.com/science/article/pii/S0167494301001042
142 http://www.pnas.org/content/99/4/2356.short
143 https://www.webmd.com/diet/supplement-guide-alpha-lipoic-acid#1

Ginger

Benefits:[144]

- Anti-inflammatory
- Antioxidant
- Effective treatment for nausea and indigestion
- Can reduce muscle pain and soreness after exercising (stem cells require exercise)
- Can reduce pain associated with osteoarthritis
- May lower cholesterol levels
- May protect against Alzheimer's Disease

Food Sources:

- Fresh ginger root
- Powdered ginger
- Ginger extract supplements
- Ginger tinctures

Recommended Dosage:[145]

- Only get supplements that are 100% ginger
- Do not exceed 4 grams per day. More than that may cause heartburn and interfere with blood-thinning medications

What else should you know:

- Ginger may act as a blood-thinner. Stop using ginger supplements two weeks before surgery.[146]

144 https://www.healthline.com/nutrition/11-proven-benefits-of-ginger#section9
145 https://www.drweil.com/vitamins-supplements-herbs/herbs/ginger/
146 https://www.drweil.com/vitamins-supplements-herbs/herbs/ginger/

Blueberries

Benefits:

- Antioxidant
- Protects stem cells with other antioxidants
- Prevents bone loss
- Blueberry extract stimulates bone formation

Food Sources:

- Organic blueberries
- Blueberry supplements

Recommended Dosage:[147]

- Surprisingly, you can eat too many blueberries
- The recommended serving size of blueberries for adults is ½ cup, or 74 grams
- Approximately 1 cup of blueberries will meet your recommended daily dosage of antioxidants[148]
- The optimal dose for blueberry extract in supplements is unknown. Talk to your doctor before taking blueberry supplements concentrated in pill form

147 https://healthyeating.sfgate.com/serving-sizes-nutritional-information-blueberries-2095.html
148 https://www.quora.com/How-many-cups-of-blueberries-should-you-eat-per-day-to-maximize-their-health-benefits

Vaccinium uliginosum (fruit)

(questionable value)

Benefits:

- Antioxidant
- Included in many "stem cell supplements"

Food Sources:

- Alpine blueberries (fruit)
- Similar nutrients are available in blueberries

Recommended Dosage:

- There is no accepted dosage for Vaccinium uliginosum (fruit)
- Eating the whole fruit of Alpine blueberries is less likely to have potentially unpleasant side-effects than a Vaccinium uliginosum supplement

What Else to Know:

- Vaccinium uliginosum (fruit) is included in "stem cell" supplements and is likely not significantly better than blueberries for supporting stem cell growth
- Supplements containing Vaccinium uliginosum can be quite expensive, and your supplement budget may be better invested in other supplements

Organic Coffee

Benefits:[149]

- Antioxidant
- Rich in polyphenols
- Contains over 1,000 compounds that improve function in your cells
- The #1 source of antioxidants for Americans
- Can reduce chronic inflammation
- Linked to improved longevity

Food Sources:

- Regular organic coffee
- Decaf organic coffee

Recommended Dosage:

- 1-5 cups per day[150]
- Switch to decaf coffee after 2 pm to prevent from interfering with your sleep
- The suggested maximum daily dosage of caffeine is 400 mg per day, about 200 mg at one time. This is equivalent to about 3 8-oz cups of brewed coffee.
- DO NOT mix milk, cream, or any dairy products into your coffee. Dairy can prevent your body from absorbing the beneficial polyphenols in coffee.[151]
- Safest to consume coffee as a beverage, not as a supplement

What Else to Know:

- WARNING: Coffee is grown with lots of pesticides. To protect yourself from consuming pesticides, only consume organic coffee.[152]

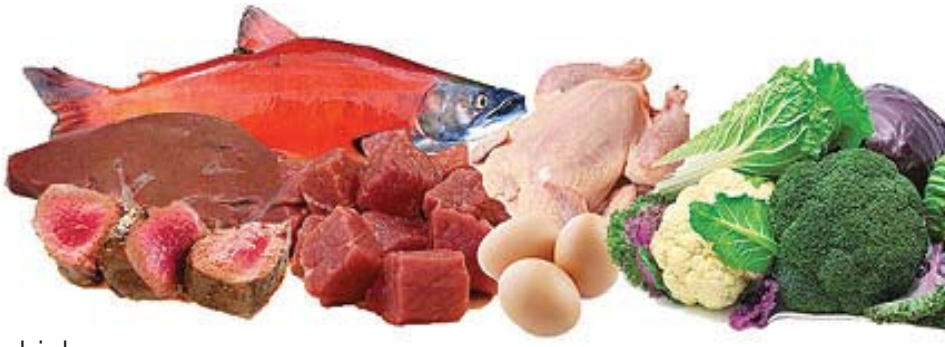
149 https://www.tandfonline.com/doi/full/10.1080/10408390500400009
150 Head Strong, by Dave Asprey. Random House, 2017
151 Head Strong, by Dave Asprey. Random House, 2017
152 http://blog.equalexchange.coop/organic-vs-conventional-coffee/

Coenzyme Q10 (CoQ10)

Benefits:[153]

- Antioxidant produced in your mitochondrial membranes[154]
- Helps your mitochondria produce energy
- Protects your mitochondria from oxidative stress
- Reduces symptoms of Parkinson's disease[155]
- Beneficial to your brain
- Amount in your body decreases as you age

Food Sources:[156]



- Broccoli
- Sweet potato
- Egg yolks
- Avocado
- Strawberries
- Grapefruit
- Heart and liver of cows and chickens

Forms:[157]

- There are two forms, Ubiquinone and *Ubiquinol*
- Ubiquinone is more common in supplements, Ubiquinol is easier for people over 30 to process
- Choose *Ubiquinol* for maximum benefit

Dosage:[158]

- There is no established dose. Research studies have utilized doses of ranging from 50 mg to 1,200 mg. Sometime these doses are spread throughout the day
- A typical daily dose is 100 milligrams to 200 milligrams

153 https://www.healthline.com/nutrition/coenzyme-q10#section9
154 Head Strong, by Dave Asprey. Random House, 2017.
155 https://www.sciencedirect.com/science/article/abs/pii/S030439400300185X
156 https://www.superfoodly.com/coq10-foods-the-50-highest-natural-dietary-sources/
157 https://ubiquinol.org/ubiquinol-vs-coq10
158 https://www.webmd.com/diet/supplement-guide-coenzymeq10-coq10#1

Folinic acid (the bioavailable form of Folate)

Benefits:[159]

- Folinic acid is the metabolically active form of folate/folic acid
- Required for healthy mental functioning
- Improves mood and cognition
- Antioxidant properties
- Increases energy levels
- Natural antidepressant
- Vitamin B-12 requires folate to work effectively in the brain
- Anti-aging qualities
- Promotes healthy immune system

Food Sources:[160]

- Liver
- Spinach
- Asparagus
- Avocado
- Beets
- Broccoli

Forms:

- Folate, folinic acid, and folic acid
- You want *folinic acid*

Dosage:

- The ideal dosage of folinic acid is unknown
- Common supplement doses are 400-800 mcg per day for adults[161]

What else should you know:

- Maximize the benefits of Folinic acid supplementation by combining with appropriate amounts of vitamin B12.
- Folic acid, the incorrect supplement not recommended, can be dangerous if taken in excess.[162] So make sure you get *folinic acid.*

159 https://www.selfhacked.com/blog/16-proven-benefits-vitamin-b9-folate-folic-acid/
160 https://draxe.com/top-10-vitamin-b9-folate-foods/
161 http://www.integratedhealth.com/hpdspec/folinic.html
162 http://www.goodwholefood.com/folinic-acid-with-vitamin-b12/

Sleep And Immune Boosters

Gaba

Benefits:

- Reduces anxiety
- Promotes relaxation for healthy sl

Food Sources:[163]

- Bananas
- Almonds
- Beef liver
- Walnuts
- Halibut
- Spinach

Forms:

- Capsules

Dosage:[164]

- 800 mg per day as a maximum daily dose
- Some supplements recommend 1,000 to 1,500 mg per day
- Talk to your doctor before taking more than 800 mg per day

What else should you know:

- Gaba isn't for everyone. Make sure you are getting adequate amounts of magnesium, which improves relaxation and sleep, before supplementing with GABA

163 https://www.sheknows.com/health-and-wellness/articles/816088/eat-your-way-to-less-anxiety-1
164 https://www.livestrong.com/article/548115-the-maximum-dosage-of-gaba/

Ashwagandha

Benefits:[165]

- Reduces stress levels and information by reducing cortisol
- Promotes relaxation and supports healthy sleep
- Anti-cancer properties
- Can reduce anxiety and depression
- May assist in recovery from exercise (remember, exercise increases stem cells)
- May improve cognitive functioning

Forms:[166]

- Capsules
- Teas
- Powders

Recommended Dosage:[167]

- The supplement container will say what percentage anolides, which is a way of measuring potency
- The a good daily dosage is 500 mg of extract, standardized to 2.5-5% withanolides
- Follow the directions on the supplement

165 https://www.healthline.com/nutrition/12-proven-ashwagandha-benefits#section8
166 https://www.drweil.com/vitamins-supplements-herbs/herbs/ashwagandha/
167 https://www.drweil.com/vitamins-supplements-herbs/herbs/ashwagandha/

Vitamin K2[168]

Deficiency:

- 80% of Americans are deficient in vitamin K2

Benefits:

- Essential for immune system and blood clotting
- Reduces risk of heart disease
- Protects your arteries
- Needed for proper calcium usage, similar to magnesium
- Can reduce varicose veins

Food Sources:

- We get vitamin K1 from kale and leafy greens
- We get vitamin K2 from grassfed beef and raw milk

Forms:

- Vitamin K2 is different from Vitamin K1
- 90% of the vitamin K we get from foods is K1[169]
- There are 2 forms of vitamin K2, MK-4 and MK-7
- You want to get both forms

Recommended Dosage:

- According to government recommendations, the appropriate daily dose is 90mcg for women and 120 mcg for men.[170]
- Considering that 80% of adults may be deficient in vitamin K2, other experts recommend as much as 2,000 mcg per day, of that at least 100 mcg in MK-7 form.[171]
- Take with vitamin D supplement
- Vitamin K is a fat-soluble vitamin, and it is possible to take too much, so talk with your doctor to find the right daily dosage for you.

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168 https://www.healthline.com/nutrition/vitamin-k2
169 https://www.drweil.com/vitamins-supplements-herbs/vitamins/how-much-vitamin-k-for-strong-bones/
170 https://www.drweil.com/vitamins-supplements-herbs/vitamins/how-much-vitamin-k-for-strong-bones/
171 https://www.furtherfood.com/supplements-essential-ones-take-not-take-david-asprey-weighs/

Copper

Deficiency:[172]

- Estimates are 75% of Americans are deficient in copper

Benefits:[173]

- Supports healthy immune system
- Trace mineral found in every tissue in the body
- Helps the body form collagen, which can support stem cells

Food Sources:

- Seafood
- Kale
- Mushrooms
- Cashews
- Avocados

Forms:

- Copper in supplements comes in a variety of forms
- Choose copper gluconate, copper acetate, or copper sulfate, because they are the most easily absorbed[174]

Recommended Dosage:

- 900 mcg per day[175]

What Else to Know:[176]

- Too much zinc supplementation can impair absorption of copper. Make sure you are getting the correct amounts of both copper and zinc, because too much of either can be harmful
- The upper limit of daily copper intake considered safe for adults is 10 mg a

172 https://www.globalhealingcenter.com/natural-health/copper-deficient/
173 https://www.medicalnewstoday.com/articles/288165.php
174 https://www.selfhacked.com/blog/copper/
175 https://draxe.com/copper-deficiency/
176 https://www.supplementhq.com/copper-supplementation/

day, about 10x the recommended dose.[177][178]

- Too much copper is associated with impaired health, neurodegenerative diseases like Alzheimer's disease, and inflammation. Talk to you doctor to ensure you are getting the correct amount of copper.[179]

177 https://www.ncbi.nlm.nih.gov/books/NBK222312/#ddd00333
178 Copper, I. O. M. (2001). Dietary reference intakes for vitamin A vitamin K, arsenic, boron, chromium, copper, iodine, iron, manganese, molybdenum, nickel, silicon, vanadium, and zinc(pp. 224-57). Washington, DC: The National Academies Press.

179 https://www.selfhacked.com/blog/copper/

Iodine

Deficiency:

- 40-74% of adults are deficient in iodine

Benefits:[180]

- Enhances immune function
- Antioxidant
- Prevents brain damage
- Maintains strong teeth and bones
- Natural mood-stabilizer
- Beneficial for proper thyroid function
- Plays an important role in cognitive development[181]

Food Sources:

- Iodized salt
- Seaweed
- Shrimp
- Eggs
- Prunes

Forms:

- Kelp powder or potassium iodide capsules

Recommended Dosage:

- 150 mcg - 1,000 mcg per day
- Talk to your doctor if you have a thyroid condition before taking iodine supplements

What Else to Know:

- Unless you eat seafood at every meal, getting your daily recommended dose of iodine through food alone is challenging. Supplementation of iodine may be beneficial, even with a healthy diet.

180 https://organixx.com/iodine-benefits/
181 http://www.mdpi.com/2072-6643/5/4/1384/htm

Glutamine

Benefits:[182]

- Important energy source for intestinal and immune cells
- Amino acid that serves as a building block for proteins
- Helps recovery from exercise
- Boosts brain health

Food Sources:

- Bone broth
- Eggs
- Grass-fed beef
- Asparagus
- Venison
- Turkey

Forms:

- L-Glutamine

Recommended Dosage:

- There is no accepted dosage for supplementing glutamine
- Doses of 2-5 grams per day have shown to be safe
- Do not exceed 10 grams/day
- Use only as directed

182 https://www.healthline.com/nutrition/glutamine#section4

Bonus Supplement

Magnesium

80% of Americans may be deficient in magnesium

Benefits[183]

- Involved in over 300 processes in the body
- Reduces anxiety and stress
- Essential for bone health
- Improves heart health
- Increases energy levels
- Helps produce collagen (which can support stem cells)
- Decreases inflammation[184]

Food Sources:[185]

- Spinach
- Broccoli
- Kale
- Salmon
- Figs
- Avocado
- Dark chocolate

Forms:[186]

- There are 7 different forms of magnesium in supplements
- Supplements can be in pressed pills, capsules, or liquids
- Liquid drops that can be put in water are likely the most bioavailable
- Magnesium Orotate is the best form for supplements because it is easily absorbed and readily available in the body

Recommended Dosage:

- Males: 400 mg per day
- Females: 320 mg per day

What Else to Know:

- High doses of magnesium can have laxative effects

183 https://www.naturalfoodseries.com/15-benefits-magnesium/
184 http://www.lifeextension.com/newsletter/2014/2/Greater-magnesium-intake-associated-with-decreased-inflammation/page-01
185 https://www.healthline.com/nutrition/10-foods-high-in-magnesium
186 https://www.globalhealingcenter.com/natural-health/types-of-magnesium/

Condensed Summary: Top 10 Supplements to Promote Stem Cell Growth:

If you could only take 10 supplements to promote stem cell growth, these 10 are the best place to start:

- Spirulina
- Chlorella
- Alpha Lipoic Acid (ALA)
- Magnesium
- Iodine
- Quercetin
- Astragalus membranaceus
- B-12
- Krill oil
- Coffee

Cartilage:

If you want more stem cells specifically because of joint pain and cartilage issues, consider including these supplements:

- Curcumin (include piperine/black pepper)
- Chondroitin
- Glucosamine

Brain Health and Neurodegenerative Diseases:

If you are concerned about your brain health or neurodegenerative diseases like Alzheimer's disease or Parkinson's disease, consider including these supplements:

- Coenzyme Q10 (CoQ10)
- Selenium
- Ashwagandha

Appendix A: Detailed Scientific Research on Supplements

Quercetin

Early in-vitro research found that Quercetin in high concentrations (10μM) had adverse impacts on stem cells and inhibited cell differentiation.[187]

It has been linked to an increase in cancer in research in rats, and reduced lifespan in rats when included in their diet on a regular basis.[188]

A very well-received review paper from 2005 (it has been cited by over 2,000 other papers), \shows a wide variety of benefits of Quercetin, including protection against oxidation, heart disease, lung cancer, and may even be helpful in the treatment of some cancers.[189]

In animal studies it has promoted the rejuvenation of bone density after the removal of ovaries in mice. And the majority of research in rodents has found Quercetin to have anticarcinogenic properties, meaning it is helpful in treating cancer.[190]

The most up-to-date research says otherwise. A 2018 study in BioMed Research International researched the impact of Quercetin on stem cells in mice. The study concluded that Quercetin supports stem cell growth and differentiation.[191]

Curcumin[192]

Promotes stem-cell proliferation at the right dose, and has potentially harmful effects on stem cells at higher doses.[193]

Specifically, doses of 10 μM/L were shown to be toxic in the stem cell environment and prevented stem cell proliferation. Lower doses of 0.1, 0.5, 1, and 5μM/L were found to have beneficial effects on stem cell growth.[194]

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187 https://www.ncbi.nlm.nih.gov/pubmed/27142748
188 https://www.ncbi.nlm.nih.gov/pubmed/27142748
189 Scalbert, A., Manach, C., Morand, C., Rémésy, C., & Jiménez, L. (2005). Dietary polyphenols and the prevention of diseases. Critical reviews in food science and nutrition, 45(4), 287-306.
190 https://www.ncbi.nlm.nih.gov/pubmed/2714274
191 https://www.hindawi.com/journals/bmri/2018/4178021/
192 https://www.healthline.com/nutrition/top-10-evidence-based-health-benefits-of-turmeric#section1
193 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4466857/
194 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4466857/

Vitamin D

Researchers from Harvard found that Vitamin D was very important to fetal development, specifically blood stem cells in the fetus. They concluded, "We clearly showed that not getting enough vitamin D can alter how blood stem cells are formed. Vitamin D was having a direct response on the blood stem cells and it changed what those cells did in terms of multiplying and staying alive."[195]

Despite it's vitamin importance in the body, and its association with reduced mortality, Vitamin D deficiency is very common in the United States and other developed countries. A study in Archives of Internal Medicine found that Vitamin D levels were lower in Americans than samples from 1988-1994 than in 2001-2004. The researchers were very concerned and concluded, "Current recommendations for vitamin D supplementation are inadequate to address the growing epidemic of vitamin D insufficiency."[196,197]

Vitamin D has the ability to protect stem cells from damage, especially when combined with other antioxidants. Researchers found that the ability of spirulina to protect stem cells from damage in rats was increased when the rats were given vitamin D in addition to spirulina.[198]

Glucosamine[199]

ew research of the impact of glucosamine on stem cells is very exciting. A study published in 2017 found that glucosamine promotes stem cell attachment and proliferation. It also assisted in growing new cartilage.[200]

And in 2006 researchers tested the impact of growing stem cells grown in the presence of glucosamine. They found that glucosamine was" beneficial for directing the differentiation and tissue formation."[201]

Phosphorus

Phosphorus is essential to many processes in the body, and overdosing on

195 https://www.eurekalert.org/pub_releases/2016-10/cp-vdi100316.php
196 https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/414878
197 Ginde, A. A., Liu, M. C., & Camargo, C. A. (2009). Demographic differences and trends of vitamin D insufficiency in the US population, 1988-2004. Archives of internal medicine, 169(6), 626-632.
198 Bachstetter, A. D., Jernberg, J., Schlunk, A., Vila, J. L., Hudson, C., Cole, M. J., ... & Borlongan, C. (2010). Spirulina promotes stem cell genesis and protects against LPS induced declines in neural stem cell proliferation. PLoS One, 5(5), e10496
199 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3150191/
200 Mirzaei, S., Karkhaneh, A., Soleimani, M., Ardeshirylajimi, A., Seyyed Zonouzi, H., & HanaeeAhvaz, H. (2017). Enhanced chondrogenic differentiation of stem cells using an optimized electrospun nanofibrous PLLA/PEG scaffolds loaded with glucosamine. Journal of Biomedical Materials Research Part A, 105(9), 2461-2474.
201 Hwang, N. S., Varghese, S., Theprungsirikul, P., Canver, A., & Elisseeff, J. (2006). Enhanced chondrogenic differentiation of murine embryonic stem cells in hydrogels with glucosamine. Biomaterials, 27(36), 6015-6023.

phosphorus is unlikely to happen by eating food alone. But, taking large amount of phosphorus supplements has shown to contribute to a variety of health problems.

For example, a 2009 study investigated the link between high levels of phosphorus and coronary artery calcification, a condition associated with heart disease and poor heart health.[202] The study looked at 900 healthy adults and found that those with high phosphorus levels in their blood were more likely to have coronary artery calcification, and therefore a risk of heart disease.[203]

Zinc[204]

A review of the research on zinc had some important findings. Zinc deficiencies are found with a variety of diseases, and supplementing with zinc has quick and dramatic positive benefits.[205] Data from mouse studies shows that a deficiency in zinc can cause a 30-80% decrease in immune functioning.[206]

Zinc plays an important role in Testosterone (T) production in men. In this study men were fed a diet low in zinc.[207] After 20 weeks of a low zinc diet, the men had a 75% decrease in their T levels.[208]

This same study investigated zinc and T in older men. They found that giving zinc supplements to older men doubled their levels to T.[209]

Vitamin C[210]

Vitamin C supports stem cell proliferation by promoting healthy collagen in your body. And the research shows that collagen supports the survival and proliferation of stem cells.[211]

According to the authors of one study, *"Our study shows that collagen will be a suitable matrix for large scale production of MSC (i.e., stem cells) with high survival rate and to obtain high osteogenic differentiation for therapy."*

Specifically, researchers found stems cells had significantly higher cohesion in

202 http://jasn.asnjournals.org/content/20/2/397.short
203 Foley, R. N., Collins, A. J., Herzog, C. A., Ishani, A., & Kalra, P. A. (2009). Serum phosphorus levels associate with coronary atherosclerosis in young adults. Journal of the American Society of Nephrology, 20(2), 397-404.
204 https://www.livestrong.com/article/527768-nutrients-needed-for-cell-growth-and-repair/
205 https://academic.oup.com/jn/article/130/5/1399S/4686392
206 Fraker, P. J., King, L. E., Laakko, T., & Vollmer, T. L. (2000). The dynamic link between the integrity of the immune system and zinc status. The Journal of nutrition, 130(5), 1399S-1406S.
207 https://www.ncbi.nlm.nih.gov/pubmed/8875519
208 Prasad, A. S., Mantzoros, C. S., Beck, F. W., Hess, J. W., & Brewer, G. J. (1996). Zinc status and serum testosterone levels of healthy adults. Nutrition, 12(5), 344-348.
209 https://www.healthline.com/health/erectile-dysfunction/zinc#zinc-deficiency-and-erectile-dysfunction
210 http://healthyeating.sfgate.com/list-antioxidants-9645.html
211 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4678765/

collagen compared to other environments and mediums, called "matrices."

Researchers then exposed the stem cells to oxidative stress and found that cell death was significantly lower in collagen than other matrices.

Lastly, the collagen matrix had a lower amount of "inflammatory cytokines" than another medium.

Vitamin C may also be protective with regards to Alzheimer's Disease.[212] A meta-analysis reviewed over 160 papers related to Alzheimer's Disease to explore the impact of **vitamin C** on the brain. What they found is very encouraging...those with Alzheimer's Disease had significantly lower levels of vitamin C in their blood than those without Alzheimer's Disease.[213]

Beta carotene

A study from 2007 in *Archives of Internal Medicine* had some important findings regarding beta carotene and its role in health. The study looked at 4,052 men over a period of 15-18 years. Men who took a beta carotene supplement showed significantly less cognitive decline at the end of the study than did men who did not take beta carotene supplements.[214]

Resveratrol

In vitro research found that Resveratrol was beneficial to stem cells. Specifically, resveratrol stimulated proliferation and differentiation of stem cells.[215,216]

According to research published by the Department of Pharmacology at the University of Seville in Spain, "One of the most striking biological activities of resveratrol soundly investigated during the late years has been its cancer-chemopreventive potential. In fact, recently it has been demonstrated that it *blocks the multistep process of carcinogenesis at various stages*: tumor initiation, promotion, and progression."[217]

Its ability to prevent cancer may come from its anti-inflammatory properties.[218]

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212 https://www.sciencedirect.com/science/article/pii/S2352873717300409
213 de Wilde, M. C., Vellas, B., Girault, E., Yavuz, A. C., & Sijben, J. W. (2017). Lower brain and blood nutrient status in Alzheimer's disease: Results from meta-analyses. Alzheimer's & Dementia: Translational Research & Clinical Interventions, 3(3), 416-431.
214 https://www.medicalnewstoday.com/articles/252758.php
215 https://www.sciencedirect.com/science/article/pii/S094471130700061X
216 Dai, Z., Li, Y., Quarles, L. D., Song, T., Pan, W., Zhou, H., & Xiao, Z. (2007). Resveratrol enhances proliferation and osteoblastic differentiation in human mesenchymal stem cells via ER-dependent ERK1/2 activation. Phytomedicine, 14(12), 806-814.
217 https://draxe.com/all-about-resveratrol/
218 Alarcon De La Lastra, C., & Villegas, I. (2005). Resveratrol as an antiinflammatory and antiaging agent: Mechanisms and clinical implications. Molecular nutrition & food research, 49(5), 405-430.

Though other research[219] has found no significant positive impact of Resveratrol.[220]

Lycopene[221]

One recent study from China shows the potential for lycopene to assist with stem cell treatments. In this study, bone marrow stem cells from mice were isolated. They were then exposed to lycopene. Those cells exposed to lycopene were protected; they had a significant reduction in apoptosis, which is planned cell death.[222]

A 2015 study using humans stem cells found the same effect.[223] Stem cells exposed to Lycopene were protected from apoptosis, possibly due to lycopene's antioxidant effects.[224]

Lutein[225]

A meta-analysis of the health benefits of Lutein looked 71 articles, that included 387,569 participants. They found Lutein has a variety of beneficial effects in the body:

Those who ate more Lutein had:

- A **12%** *reduction* in the risk of heart disease
- An **18%** *reduction* in the risk of a **stroke**
- A **25%** *reduction* in the risk of having elevated blood pressure, obesity, and elevated triglycerides (unhealthy fats) in the blood

Those who consumed more Lutein also had significantly higher levels of good cholesterol (HDL) and lower levels of bad cholesterol (LDL).

The authors of the study said, "Our findings suggest that higher dietary intake and higher blood concentrations of lutein are generally associated with better cardiometabolic health"[226]

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219 Semba, R. D., Ferrucci, L., Bartali, B., Urpí-Sarda, M., Zamora-Ros, R., Sun, K., ... & Andres-Lacueva, C. (2014). Resveratrol levels and all-cause mortality in older community-dwelling adults. JAMA internal medicine, 174(7), 1077-1084.
220 https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/1868537
221 https://www.naturalfoodseries.com/15-benefits-lycopene/
222 Li, Y., Xue, F., Xu, S. Z., Wang, X. W., Tong, X., & Lin, X. J. (2014). Lycopene protects bone marrow mesenchymal stem cells against ischemia-induced apoptosis in vitro. Eur Rev Med Pharmaco, 18(11), 1625-1631.
223 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4624067/
224 Kim, J. Y., Lee, J. S., Han, Y. S., Lee, J. H., Bae, I., Yoon, Y. M., ... & Lee, S. H. (2015). Pretreatment with lycopene attenuates oxidative stress-induced apoptosis in human mesenchymal stem cells. Biomolecules & therapeutics, 23(6), 517
225 http://www.lifeextension.com/Magazine/2016/8/Newly-Discovered-Benefits-of-Lutein/Page-01
226 Leermakers, E. T., Darweesh, S. K., Baena, C. P., Moreira, E. M., Melo van Lent, D., Tielemans, M. J., ... & Kiefte-de Jong, J. C. (2016). The effects of lutein on cardiometabolic health across the life course: a systematic review and meta-analysis, 2. The American journal of clinical nutrition, 103(2), 481-494

Selenium[227]

A team in France did some excellent research with selenium.[228] In this double-blind, placebo-controlled, randomized trial of 4,447 subjects, those subjects given a blend of antioxidants, which included selenium, showed better cognitive performance and memory.[229]

A powerful meta-analysis reviewed 166 research papers on selenium and Alzheimer's Disease.[230] Here is what they found; those with Alzheimer's Disease had significantly lower levels of selenium in their blood.[231]

Vitamin E[232]

A 2007 review of the research on vitamin E found that vitamin E serves a very important purpose in the body, protecting cell membranes from damage so they can remain bioactive.[233]

The research on vitamin E and its link with Alzheimer's Disease is interesting. Researchers reviewed over 150 papers on Alzheimer's Disease and found that those with Alzheimer's Disease had significantly lower less vitamin E in their blood.[234,235]

Piperine[236]

A 2008 research study administered piperine to rats every day for 4 weeks. There were three different dosages given to the rats (5, 10 and 20 mg/kg). At the end of 4 weeks, "The results showed that piperine at all dosage range used in this study possessed anti-depressive like activity and cognitive enhancing effect at all treatment duration."[237]

This research study has been well-received and has over

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227 http://healthyeating.sfgate.com/list-antioxidants-9645.html
228 https://www.ncbi.nlm.nih.gov/pubmed/21775560
229 Kesse-Guyot, E., Fezeu, L., Jeandel, C., Ferry, M., Andreeva, V., Amieva, H., ... & Galan, P. (2011). French adults' cognitive performance after daily supplementation with antioxidant vitamins and minerals at nutritional doses: a post hoc analysis of the Supplementation in Vitamins and Mineral Antioxidants (SU. VI. MAX) trial–. The American journal of clinical nutrition, 94(3), 892-899.
230 https://www.sciencedirect.com/science/article/pii/S2352873717300409
231 de Wilde, M. C., Vellas, B., Girault, E., Yavuz, A. C., & Sijben, J. W. (2017). Lower brain and blood nutrient status in Alzheimer's disease: Results from meta-analyses. Alzheimer's & Dementia: Translational Research & Clinical Interventions, 3(3), 416-431
232 http://healthyeating.sfgate.com/list-antioxidants-9645.html
233 Traber, M. G., & Atkinson, J. (2007). Vitamin E, antioxidant and nothing more. Free Radical Biology and Medicine, 43(1), 4-15.
234 https://www.sciencedirect.com/science/article/pii/S2352873717300409
235 de Wilde, M. C., Vellas, B., Girault, E., Yavuz, A. C., & Sijben, J. W. (2017). Lower brain and blood nutrient status in Alzheimer's disease: Results from meta-analyses. Alzheimer's & Dementia: Translational Research & Clinical Interventions, 3(3), 416-431.
236 https://neurohacker.com/bioperine-piperine-benefits
237 https://www.sciencedirect.com/science/article/pii/S0278691508003049

The beneficial effects of Piperine have been well-documented in the research literature. A review of the literature, which has been cited by over 400 other research papers, details the many benefits of piperine, specifically its antioxidant properties and its ability to improve bioavailability of other antioxidants.[238]

Choline[239]

A team of researchers investigated the impact of choline in fish. They fed fish a diet of varying levels of choline for 65 days. They found that choline decreased oxidative damage in the fish.[240]

There is also research to suggest that choline is involved in neurodegeneration, specifically Alzheimer's disease.[241] In a review of over 100 papers on Alzheimer's Disease, it was found that those who had Alzheimer's disease had significantly lower levels of choline-containing lipids in the brain/cerebrospinal fluid, and they also had lower levels of choline in their blood.[242]

Why would choline be related to Alzheimer's Disease? Researchers believe it is because choline is important in the production of acetyl-choline, and essential transmitter in the brain. With less choline around, Brain cells may instead break down cell membranes to produce acetyl-choline.

Other studies have confirmed the association between Alzheimer's Disease, cognitive performance, and choline.[243] A team looked at data from over 10,000 adults aged 36 to 83. They answered dietary questionnaires between 1991 and 1995, then came back from an MRI brain scan and memory tests between 1998 and 2001.

They found that, in both men and women, those in the top 25% of choline intake performed better on memory and cognitive tests than those who had the least amount of choline in their diet.[244]

Also, those with higher choline intake were less likely to show areas of "white-matter hyperintensity" in their MRI brain scans. Research suggests that "white-matter hyperintensity" is an indicator of blood vessel disease in the brain, which could increase the risk of stroke or dementia.

238 https://www.tandfonline.com/doi/abs/10.1080/10408390601062054
239 https://www.ncbi.nlm.nih.gov/pubmed/24751923
240 Wu, P., Jiang, W. D., Liu, Y., Chen, G. F., Jiang, J., Li, S. H., ... & Zhou, X. Q. (2014). Effect of choline on antioxidant defenses and gene expressions of Nrf2 signaling molecule in the spleen and head kidney of juvenile Jian carp (Cyprinus carpio var. Jian). Fish & shellfish immunology, 38(2), 374-382.
241 https://www.sciencedirect.com/science/article/pii/S2352873717300409
242 de Wilde, M. C., Vellas, B., Girault, E., Yavuz, A. C., & Sijben, J. W. (2017). Lower brain and blood nutrient status in Alzheimer's disease: Results from meta-analyses. Alzheimer's & Dementia: Translational Research & Clinical Interventions, 3(3), 416-431.
243 https://academic.oup.com/ajcn/article/94/6/1584/4598197
244 Knott, V., de la Salle, S., Choueiry, J., Impey, D., Smith, D., Smith, M., ... & Labelle, A. (2015). Neurocognitive effects of acute choline supplementation in low, medium and high performer healthy volunteers. Pharmacology Biochemistry and Behavior, 131, 119-129.

B12

Research shows that B12 becomes increasingly important as a person ages, especially with regard to their immune system and brain health. A study in the *Annals of Internal Medicine* investigated how B12 levels affected the immune response in an elderly community. In this study elderly patients were given a vaccine, half had low B12 in their blood, the other half had healthy levels of B12.[245]

Those with low levels of B12 in their blood had an impaired immune response to the vaccine.[246]

The association between B12 and Alzheimer's Disease is interesting. A group of researchers recently reviewed the Alzheimer's literature and found that those with Alzheimer's Disease had significantly less B12 in their brain/cerebrospinal fluid.[247,248]

Fish Oil

Fish oil has shown to be a safe alternative to painkillers. One study compared fish oil with over-the-counter painkillers. In this study 250 patients were instructed to take 1.2 grams per day omega-3s found in fish oil. During the 75 days of the study, 59% had a substantial reduction in their pain and decided to discontinue their prescription medication.[249]

It is thought that fish oil reduces joint pain by reducing inflammation

A Harvard study looked at omega-3 levels in an older population. They found that omega-3s found in fish oil may reduce the likelihood of heart disease by 35%.[250] The study also found those with the highest levels of omega-3s lived 2.2 years longer, on average, than those with the lowest levels of omega-3s.[251,252]

A meta-analysis of studies looked at the impact of fish consumption on health.[253] The analysis included 11 studies and 222,364 participants. Those who ate fish frequently

245 http://annals.org/aim/article-abstract/709421/impaired-antibody-responses-pneumococcal-polysaccharide-elderly-patients-low-serum-vitamin
246 Fata, F. T., Herzlich, B. C., Schiffman, G., & Ast, A. L. (1996). Impaired antibody responses to pneumococcal polysaccharide in elderly patients with low serum vitamin B12 levels. Annals of internal medicine, 124(3), 299-304.
247 https://www.sciencedirect.com/science/article/pii/S2352873717300409
248 de Wilde, M. C., Vellas, B., Girault, E., Yavuz, A. C., & Sijben, J. W. (2017). Lower brain and blood nutrient status in Alzheimer's disease: Results from meta-analyses. Alzheimer's & Dementia: Translational Research & Clinical Interventions, 3(3), 416-431.
249 Maroon, J. C., & Bost, J. W. (2006). -3 Fatty acids (fish oil) as an anti-inflammatory: an alternative to nonsteroidal anti-inflammatory drugs for discogenic pain. Surgical neurology, 65(4), 326-331.
250 https://www.hsph.harvard.edu/news/press-releases/higher-blood-omega-3s-associated-with-lower-risk-of-dying-among-older-adults/
251 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3698844/
252 Mozaffarian, D., Lemaitre, R. N., King, I. B., Song, X., Huang, H., Sacks, F. M., ... & Siscovick, D. S. (2013). Plasma phospholipid long-chain -3 fatty acids and total and cause-specific mortality in older adults: a cohort study. Annals of internal medicine, 158(7), 515-525.
253 http://circ.ahajournals.org/content/circulationaha/109/22/2705.full.pdf

were significantly less likely to develop heart disease than those who rarely or never ate fish.[254]

Krill Oil

One study recruited 24 healthy volunteers for a double blinded, randomized, placebo-controlled, crossover trial. That means that neither the volunteer nor the researcher knew whether the participant was taking krill oil, fish oil, or placebo. And the "crossover" means that all 24 participants took each of the three different pills throughout the trial. So each participant was involved in three treatment phases, and each phase lasted four weeks.[255]

At the end of the study, after each participant had taken fish oil and krill oil for for weeks, there were so big differences. Consumption of Krill oil increased the amount of omega-3 fatty acids in the blood (DHA and EPA) significantly more than fish oil.[256]

Research also shows that krill oil is more bioavailable than fish oil.[257] This was true for both EPA and DHA.[258]

Flaxseed Oil

One research study found flaxseed oil to be as effective as over-the-counter drugs in reducing inflammation.[259,260] And a meta-analysis of other research studies found that flaxseed oil significantly reduced inflammation in those with obesity.[261]

Alpha Lipoic Acid (ALA)

600 mg of ALA was given to 9 patients with Alzheimer's for about one year (337±80 days).[262] Patients were given cognitive tests before begin treatment and at the end of the study. After 1 year of taking ALA the researchers found that the cognitive abilities of these patients had stabilized.[263]

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254 He, K., Song, Y., Daviglus, M. L., Liu, K., Van Horn, L., Dyer, A. R., & Greenland, P. (2004). Accumulated evidence on fish consumption and coronary heart disease mortality: a meta-analysis of cohort studies. Circulation, 109(22), 2705-2711.
255 Ramprasath, V. R., Eyal, I., Zchut, S., & Jones, P. J. (2013). Enhanced increase of omega-3 index in healthy individuals with response to 4-week n-3 fatty acid supplementation from krill oil versus fish oil. Lipids in health and disease, 12(1), 178.
256 Ramprasath, V. R., Eyal, I., Zchut, S., & Jones, P. J. (2013). Enhanced increase of omega-3 index in healthy individuals with response to 4-week n-3 fatty acid supplementation from krill oil versus fish oil. Lipids in health and disease, 12(1), 178.
257 https://www.ncbi.nlm.nih.gov/pubmed/26357480
258 Ulven, S. M., & Holven, K. B. (2015). Comparison of bioavailability of krill oil versus fish oil and health effect. Vascular health and risk management, 11, 511.
259 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3767321/
260 Kaithwas, G., & Majumdar, D. K. (2013). Effect of L. usitatissimum (flaxseed/linseed) fixed oil against distinct phases of inflammation. ISRN inflammation, 2013.
261 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4808865/
262 https://www.sciencedirect.com/science/article/pii/S0167494301001042
263 Hager, K., Marahrens, A., Kenklies, M., Riederer, P., & Münch, G. (2001). Alpha-lipoic acid as a new treatment option for Azheimer type dementia. Archives of gerontology and geriatrics, 32(3), 275-282.

In other words, taking 600 mg of ALA every day may have prevented Alzheimer's patients from continuing to lose their cognitive capabilities.[264]

And several studies have shown LA can help reduce inflammation linked to insulin resistance, heart disease, cancer, and liver disease.[265]

Ginger

Ginger reduces inflammation by suppresses leukotrienes (inflammatory molecules). Ginger also switches off some inflammatory genes. This combination could make ginger a more effective pain reliever than over-the-counter painkillers.[266]

There is a plethora of research on the beneficial effects of ginger. One of the most impressive is a 12-month double blind, placebo controlled, cross-over study published in Osteoarthritis Cartilage. In this study 29 patients had painful arthritis in their knees. Pain and impaired mobility (called "handicap" in this study) were rated on a 0-100 scale.[267]

Those in the ginger treatment showed a significant improvement in both their pain and mobility, compared to the placebo group. For the ginger group, their pain scores went from 76 down to 41. And their handicap score dropped from 73 to 46.[268]

At the same time the placebo group showed none of these benefits. By the end of six months the placebo treatment was experiencing more pain, increasing from 76 to 82. Their handicap also increased, rising from 73 up to 80.[269]

Another study found ginger extract superior to placebo in reducing pain associated with osteoarthritis of the knee.[270]

Spirulina[271]

Spirulina contains phycocyanin, a powerful antioxidant that has anti-cancer properties and can trigger the production of new stem cells.[272]

A 2010 study investigated the impact of spirulina on stem cells in the brains of rats.

264 Hager, K., Marahrens, A., Kenklies, M., Riederer, P., & Münch, G. (2001). Alpha-lipoic acid as a new treatment option for Azheimer type dementia. Archives of gerontology and geriatrics, 32(3), 275-282.
265 https://www.healthline.com/nutrition/6-anti-inflammatory-supplements
266 https://www.arthritis.org/living-with-arthritis/treatments/natural/supplements-herbs/guide/ginger.php
267 http://www.whfoods.com/genpage.php?tname=foodspice&dbid=72
268 https://www.sciencedirect.com/science/article/pii/S1063458403001699
269 Altman, R. D., & Marcussen, K. C. (2001). Effects of a ginger extract on knee pain in patients with osteoarthritis. Arthritis & Rheumatism, 44(11), 2531-2538.
270 https://onlinelibrary.wiley.com/doi/abs/10.1002/1529-0131(200111)44:11%3C2531::AID-ART433%3E3.0.CO;2-J
271 https://theshawnstevensonmodel.com/5-benefits-of-spirulina/
272 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2864748/

For 30 days rats were fed a control diet or a diet enriched with spirulina. On day 28 the animals were injected with a chemical (LPS) designed to attack, damage, or destroy stem cells. Animals were sacrificed and their brains were inspected.[273]

What the researchers found is pretty amazing. The control group showed damage in the brain due to the chemical injection, but the spirulina diet "was able to negate the LPS induced decrease in stem/progenitor cell proliferation." Meaning the spirulina protected the stem cells in the brain from the damaging chemical.

The same researchers found that spirulina has greater protective capabilities regarding stem cells when combined with other antioxidants.[274]

Folinic Acid

Folic acid is the synthetic form of folate found in supplements.

Folinic acid is the natural form of folate that is highly bioavailable and easily processed in your body.

Folate is involved in the synthesis of serotonin and dopamine, two very important neurotransmitters.

A review of the research[275] found that low-doses of folinic acid was highly beneficial for patients suffering from rheumatoid arthritis.[276]

Regarding brain health, an article published in *JAMA* investigated the relationship between folate and Alzheimer's Disease in 164 subjects.[277] Researchers compared the folate levels in blood levels of folate in patients with Alzheimer's and compared them to the blood of subjects of the same age without Alzheimer's. Those with Alzheimer's Disease had significantly less folate in their blood than healthy controls.[278]

Iodine

A meta-analysis estimated that having an iodine deficiency as a child translates into

273 Bachstetter, A. D., Jernberg, J., Schlunk, A., Vila, J. L., Hudson, C., Cole, M. J., ... & Borlongan, C. (2010). Spirulina promotes stem cell genesis and protects against LPS induced declines in neural stem cell proliferation. PLoS One, 5(5), e10496.
274 Bachstetter, A. D., Jernberg, J., Schlunk, A., Vila, J. L., Hudson, C., Cole, M. J., ... & Borlongan, C. (2010). Spirulina promotes stem cell genesis and protects against LPS induced declines in neural stem cell proliferation. PLoS One, 5(5), e10496.
275 https://europepmc.org/abstract/med/23728635
276 Shea, B., Swinden, M. V., Tanjong, E. G., Ortiz, Z., Katchamart, W., Rader, T., ... & Tugwell, P. (2013). Folic acid and folinic acid for reducing side effects in patients receiving methotrexate for rheumatoid arthritis. The Cochrane database of systematic reviews, (5), CD000951-CD000951.
277 https://jamanetwork.com/journals/jamaneurology/fullarticle/774437
278 Clarke, R., Smith, A. D., Jobst, K. A., Refsum, H., Sutton, L., & Ueland, P. M. (1998). Folate, vitamin B12, and serum total homocysteine levels in confirmed Alzheimer disease. Archives of neurology, 55(11), 1449-1455.

a loss of 6.9 to 10.2 IQ points.[279]

As an antioxidant, iodine may be as powerful as vitamin C.[280]

Considering how many people are deficient in iodine, and that iodine has so many benefits and plays such an important role in so many bodily processes, supplementation is likely to be beneficial.

Glutamine

Research shows that those who have low glutamine levels are more susceptible to infections.[281] Glutamine was also able to reduce intestinal inflammation[282] and may help people recover from food sensitivities.[283]

Glutamine is a precursor to the neurotransmitter glutamate. Disruption of the glutamine-glutamate cycle can result in a variety of brain problems, including bipolar disorder, anxiety, and depression.[284]

279 Bougma, K., Aboud, F. E., Harding, K. B., & Marquis, G. S. (2013). Iodine and mental development of children 5 years old and under: a systematic review and meta-analysis. Nutrients, 5(4), 1384-1416.
280 https://organixx.com/iodine-benefits/
281 https://www.ncbi.nlm.nih.gov/pubmed/10600341
282 Chang, W. K., Yang, K. D., & Shaio, M. F. (1999). Effect of glutamine on Th1 and Th2 cytokine responses of human peripheral blood mononuclear cells. Clinical Immunology, 93(3), 294-301.
283 https://draxe.com/l-glutamine-benefits-side-effects-dosage/
284 https://draxe.com/l-glutamine-benefits-side-effects-dosage/

Appendix B: The Mystery of the Redacted Cancer Research

Source:

Wang, T., Xuan, X., Li, M., Gao, P., Zheng, Y., Zang, W., & Zhao, G. (2013). RETRACTED ARTICLE: Astragalus saponins affect proliferation, invasion and apoptosis of gastric cancer BGC-823 cells. *Diagnostic pathology*, 8(1), 179.

History:

It was published in the peer-reviewed scientific journal in 2013. It showed a root could be a safe and effective alternative to chemotherapy. The study was redacted 4 years later.

Though this study is highly controversial and may be dangerous to talk about, we have included a copy of the abstract and a link to the paper in the back of this guide so you can read the study and evaluate it for yourself.

Within just 4 years, 32 different research papers cited this paper before it was retracted. That is a lot of attention for a paper to get in such a short amount of time. This is especially impressive since most research papers go unnoticed and average fewer than 10 citations. And between 27% and 50% of natural science research papers are never cited.[285,286,287]

So the question is, "Why was it retracted?"

Let's look at the study's conclusions to see if that provides any clues.

The study found multiple benefits of Astragalus, with benefits increasing at higher doses.

For example, 24 hours after Astragalus administration, there was a significant reduction in the proliferation of cancer cells. The smallest dose, 20 µg/ml, had a signifcant positive effect, and the largest dose, 80 µg/ml, had an even greater beneficial effect.

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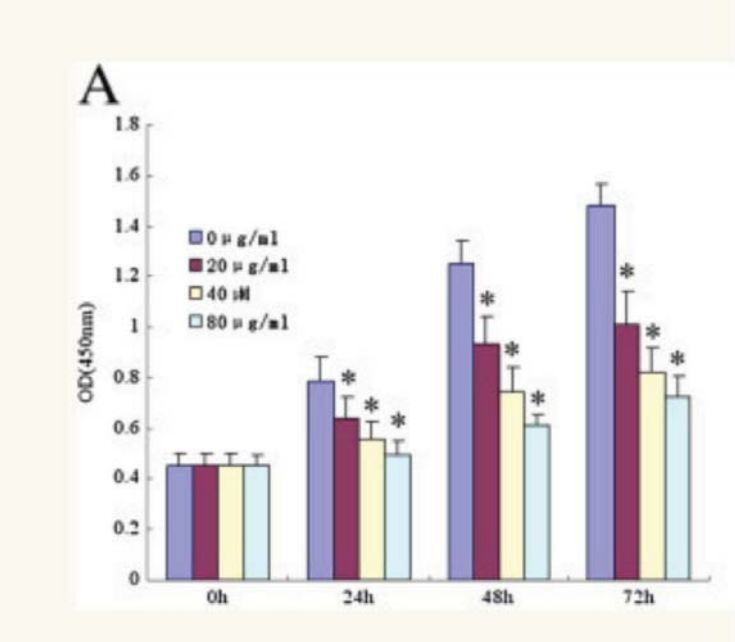
285 http://blogs.lse.ac.uk/impactofsocialsciences/2014/04/23/academic-papers-citation-rates-remler/
286 Heneberg, P. (2013). Supposedly uncited articles of Nobel laureates and Fields medalists can be prevalently attributed to the errors of omission and commission. Journal of the American Society for Information Science and Technology, 64(3), 448-454.
287 https://www.nature.com/articles/d41586-017-08404-0#ref-CR2

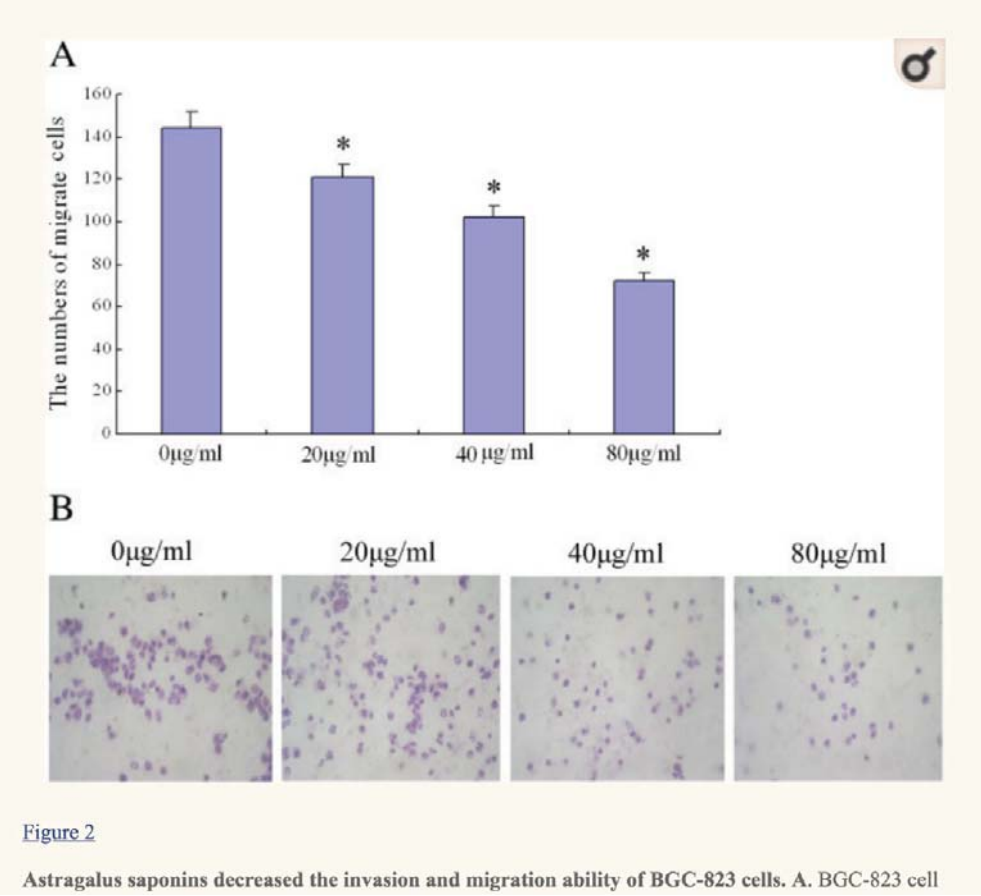


Source: Wang, T., Xuan, X., Li, M., Gao, P., Zheng, Y., Zang, W., & Zhao, G. (2013). RETRACTED ARTICLE: Astragalus saponins affect proliferation, invasion and apoptosis of gastric cancer BGC-823 cells. *Diagnostic pathology*, 8(1), 179.

See chart below. Blue is the control (no Astralagu), and light aqua is the highest dose of Astralgus. The * on the graph indicates that the difference is statistically significant.

The study also found that Astragalus administration increased the relative amount of cells that were non-cancerous.

The third beneficial effect of Astragalus was that it significantly reduced the "invasion and migration" of cancer cells. This was true for all dosages of Astralagus, the higher doses having a greater effect. (see graph below).



Source: Wang, T., Xuan, X., Li, M., Gao, P., Zheng, Y., Zang, W., & Zhao, G. (2013). RETRACTED ARTICLE: Astragalus saponins affect proliferation, invasion and apoptosis of gastric cancer BGC-823 cells. *Diagnostic pathology*, 8(1), 179.

Their conclusions were quite bold: "In the present study, we have shown that the total saponins obtained from radix Astragalus membranaceus could be established as effective chemotherapeutic agent to suppress gastric cancer cell growth through promotion of apoptosis and inhibition of cell proliferation. This is the first report that clearly characterizes the anti-tumor properties of Astragalus saponins in gastric cancer cells and tumor xenograft."

Why was did the authors choose to retract this study? They claim it was for academic reasons, saying parts of the text are published elsewhere.[288,289]

The data in the other articles they claim is a duplication is different from the data published in their retracted study.[290,291] But something doesn't add up here.

An easy way to tell that the data is different is that none of the other studies they claim they duplicated have data on the beneficial effect of a dose of 20 µg/ml Astragalus.

So if their study provided new data, and was "the first report that clearly characterizes the anti-tumor properties of Astragalus saponins in gastric cancer cells," why would the authors choose to voluntarily retract their study?[292]

You are free to draw your own conclusions.

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288 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5590152/
289 Wang, T., Xuan, X., Li, M., Gao, P., Zheng, Y., Zang, W., & Zhao, G. (2017). Retraction Note: Astragalus saponins affect proliferation, invasion and apoptosis of gastric cancer BGC-823 cells. Diagnostic pathology, 12(1), 67.
290 Tin MM, Cho CH, Chan K, James AE, Ko JK. Astragalus saponins induce growth inhibition and apoptosis in human colon cancer cells and tumor xenograft. Carcinogenesis. 2007;28(6):1347–1355. doi: 10.1093/carcin/bgl238.
291 Auyeung KK, Cho CH, Ko JK. A novel anticancer effect of Astragalus saponins: transcriptional activation of NSAID-activated gene. Int J Cancer. 2009;125(5):1082–1091.
292 Wang, T., Xuan, X., Li, M., Gao, P., Zheng, Y., Zang, W., & Zhao, G. (2017). Retraction Note: Astragalus saponins affect proliferation, invasion and apoptosis of gastric cancer BGC-823 cells. Diagnostic pathology, 12(1), 67.


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