

MICRONUTRIENT	WHAT IS IT?	WHAT DOES IT DO? (AND OTHER FUN FACTS)	FERTILITY FOCUS	SUPPLEMENTATION	SPECIAL CONSIDERATIONS	REFERENCES
ZINC	Essential Mineral	<p><i>Why would I be deficient?</i> Lack in diet, impaired absorption (leaky gut, inflammation), MTHFR (see special considerations), previous use of oral contraceptives, PCOS (see special considerations), too many phytates (compound found in whole grains and legumes. Can decrease absorption of zinc. One reason I recommend limiting grains and legumes, especially if not properly prepared with soaking, fermenting etc.)</p> <p>BONUSES of correcting levels/supplementing – Skin health (acne, rashes) Immune System Strength Decrease size of fibroids Balance Hormones (estrogen and progesterone) Increase testosterone production Antioxidant Increased energy Hormone balance Improved nutrient absorption Improved cognition/memory</p>	<p>Essential when it comes to your body's ability to absorb other nutrients --> deficiency in zinc could mean a deficiency in other nutrients. helps body detox metals (which can impair fertility). Helps the body make amino acids for fertility. Improves sperm count and motility. Essential for the egg to mature before ovulation (deficiency could keep you from ovulating). Supplementing could improve egg quality in those undergoing ART. Zinc deficiency can reduce LH and testosterone.</p>	<p>The DRI for adults is between 8 and 12 mg May be better off at 30-40 mg a day (depending on gut health, copper status, and specific fertility issues) If you are in overall good health, without signs of gut inflammation, you may get adequate amounts in diet (otherwise 15-20 mg daily) Xymogen Prenatal vitamin has 20 mg zinc glycinate and 2 mg copper Look for supplement with zinc glycinate for max absorption Zinc and copper are like yin and yang, must be balanced Zinc depletes much quicker than copper Excess copper will deplete zinc Mother nature knows more than we give her credit for: most food with high zinc naturally has copper Special Circumstances (based on scientific studies) 66 milligrams of zinc sulfate daily for 26 weeks in fertile and subfertile males to increase sperm count. Fertl 30 mg a day for fibroids People with inflammatory bowel disease such as Crohn's or Ulcerative Colitis may need a lot more Xymogen Zinc Glycinate 20 mg per capsule</p>	<p>MTHFR & PCOS - both can have excess/elevated copper levels, which can deplete zinc</p>	<p>Wong WY, Merkus HM, Thomas CM, Menkveld R, Zielhuis GA, Steegers-Theunissen RP. Effects of folic acid and zinc sulfate on male factor subfertility: a double-blind, randomized, placebo-controlled trial. Fertil Steril. 2002 Mar;77(3):491-8/Steril. 2002 Mar;77(3):491-8. Effects of folic acid and zinc sulfate on male factor subfertility: a double-blind, randomized, placebo-controlled trial.</p>
SELENIUM	Essential trace mineral found in the soil	<p>What is it involved in? Immunity Antioxidant Manages inflammation Metabolism Essential for fertility and reproduction</p>	<p>Deficiency linked to miscarriage/RPL 10% improvement in pregnancy rate in combination with vitamin E Required for proper sperm motility Supplementation in men with low selenium status improved motility Necessary for proper thyroid function Required for the body to make glutathione PCOS ALERT</p>	<p>Look for L-selenomethionine Total of 200 mcg per day for PCOS, impaired sperm motility and pregnancy loss XYMOGEN Prenatal Essentials: 100 mcg per serving XYMOGEN LIVER PROTECT: 100 mcg per capsule (1-2 capsules a day)</p>	<p>PCOS ALERT: Studies have shown that women with PCOS have lower levels of selenium, selenium deficiency could be involved in the pathogenesis of PCOS https://www.ncbi.nlm.nih.gov/pubmed/23490536 Supplementation has been shown to: Improve insulin metabolism Protect against oxidative stress Improve endometrial/uterine function in presence of insulin resistance Recommended dose 200 mcg daily</p>	<p>http://www.tandfonline.com/doi/abs/10.1080/01443610120113373 Moslemi MK, Tavanbakhsh S. Selenium-vitamin E supplementation in infertile men: effects on semen parameters and pregnancy rate. Int J Gen Med. 2011;4:99-104</p>

<p>FOLATE</p>	<p>An essential vitamin (vitamin B9)</p>	<p>Why would someone be deficient? MTHFR mutation Bowel health impacts absorption Inadequate folate intake High intake of processed food</p>	<p>Folate is essential for human growth and development Helps the body make new cells (copying and making DNA) Which makes sense when we are talking about growing babies that are comprised entirely of these types of cells Crucial for development of baby's neural tube Needed for RBC production (oxygen delivery) Needed for adequate birth weight of baby Higher intake of folate associated with a reduced rate of spontaneous abortion (miscarriage) Low folate (due to MTHFR mutations) associated with RPL</p>	<p>One of the first things any provider will tell you, and what many women know, is that you should take folic acid if you are pregnant or trying to get pregnant. HOLD UP. Let's all avoid folic acid. That is SO 1990s. Folic acid and folate are NOT the same thing. Folic acid is made in a lab and must be converted by the body into the active form of folate (5 MTHF). This is where things get complicated. (MTHFR). Add insult to injury, not only is it challenging to convert FA to 5 MTHF, but if consuming folic acid, may have build up Folate losses during harvesting, storage, distribution, and cooking (heat) can be considerable. Frozen berries seem to maintain folate levels well I recommend getting plenty of folate from fresh, organic, raw produce (one of the reasons I praise a daily salad and smoothies). At least 3-4 servings a day! In addition to a folate-rich diet, if you do not have a MTHFR mutation or condition (such as bowel inflammation) that would put you at risk from folate deficiency, I recommend 800-1000 mcg of methylated folate daily (5-MTHFR) Always keeping B12 in mind If you do have an MTHFR mutation, supplementing can be a bit challenging May be dependent on heterozygous vs homozygous as well as homocysteine score and nutrient status Titrate carefully XYMOGEN PRENATAL ESSENTIALS: Contains 400 mcg 5 MTHF and 400 mcg calcium folinate (50 mcg B12) XYMOGEN METHYL PROTECT: 1000 mcg 5 MTHF, 1000 mcg calcium folinate, 1000 mcg B12 (methylcobalamin) XYMOGEN 5 MTHF: 1000 mcg 5 MTHF per capsule</p>	<p>MTHFR ALERT - unable to process synthetic folic acid, must ingest folate in the methylated form (through food or supplements). See notes in Supplementation.</p>	<p>https://www.ncbi.nlm.nih.gov/pubmed/24901281 Obstet Gynecol. 2014 Jul;124(1):23-31. doi: 10.1097/AOG.0000000000000343. Maternal prepregnancy folate intake and risk of spontaneous abortion and stillbirth. Gaskins AJ1, Rich-Edwards JW, Hauser R, Williams PL, Gillman MW, Ginsburg ES, Missmer SA, Chavarro JE. https://www.ncbi.nlm.nih.gov/pubmed/26530235 Arch Gynecol Obstet. 2016 Jun;293(6):1197-211. doi: 10.1007/s00404-015-3944-2. Epub 2015 Nov 3. Association between maternal, fetal and paternal MTHFR gene C677T and A1298C polymorphisms and risk of recurrent pregnancy loss: a comprehensive evaluation. Yang Y1, Luo Y2, Yuan J2, Tang Y2, Xiong L2, Xu M1, Rao X3, Liu H4.</p>
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<p>VITAMIN C</p>	<p>An essential vitamin AND an antioxidant</p>	<p>A Few Facts: The body can't make it, and stores deplete rapidly = must ALWAYS be replenishing Vitamin C is one the of most unstable vitamins. It is quite sensitive to heat. Therefore, obtaining it from raw, organic produce (or supplements if needed) is best.</p>	<p>Aids in iron absorption Important role in <i>regulation of the menstrual cycle</i> Plays an <i>essential role in ovulation</i>: Concentration of ascorbic acid is much higher in the developing egg than in the body in general (indicating that there is likely an active transport of vitamin C into the follicle) Facilitates proper ovulation, which may play a role in repairing the ovary after ovulation (reducing the formation of ovarian cysts) Supplementation <i>improved serum progesterone levels</i> - resolution of luteal phase defect. This study also demonstrated a statistically significant increase in pregnancy rate. (These were all in the patients that showed resolution of luteal phase defect.) Some studies have shown that vitamin C supplementation <i>may positively impact the endometrium (increased thickness)</i> <i>Improved sperm count, motility and structure</i> (in combination with vitamin E - to come) 1,000 mg/day</p>	<p>The fabulous thing about vitamin C is that you can get quite a bit of it from diet alone. See smoothies and salads in the Recipe Roundup Remember: Vitamin C is like your super-sensitive best girlfriend. Levels can be decreased significantly by heat. Raw choices can be some of your best. Vitamin C content also starts to decrease from the moment that the food is picked. Again, this is a great reason to either find local, trusted organic produce suppliers or to grow your own food. Keeping food that is high in vitamin C in a cool place (refrigerator) will also slow this process. Even if you are able to commit to eating a good amount of vitamin C in your diet, you may also consider supplementing, particularly if you have a history of a luteal phase defect, your partner has abnormal semen parameters, you've struggled with anovulation or you have PCOs. So...pretty much most of us! Consider 500-2000 mg Xymogen XcellentC - 2 capsules = 1500 mg</p>	<p>Irregular menses, anovulation, progesterone deficiency/luteal phase deficiency, abnormal semen parameters</p>	<p>- Ascorbic acid positively affects the synthesis of collagen (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC319462/) Henmi, H., Endo, T., Kitajima, Y., Manase, K., Hata, H., & Kudo, R. (2003). Effects of ascorbic acid supplementation on serum progesterone levels in patients with a luteal phase defect. <i>Fertility and sterility</i>, 80(2), 459-461. Effects of Vitamin C on the Endometrial Thickness and Ovarian Hormones of Progesterone and Estrogen in Married and Unmarried Women Sami R. Al-Katib*, Meissam MH. Al-Kaabi* and Karim A. Al-Jashamy (http://www.usa-journals.com/wp-content/uploads/2013/07/AL-Katib_Vol18.pdf)</p>
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<p>VITAMIN E</p>	<p>An essential vitamin that loves fat (fat-soluble) AND an antioxidant</p>		<p>Shown to improve blood flow to the uterus and endometrium, which may increase endometrial thickness (600 mg a day - increased uterine blood flow in 72% of women and increased endometrial thickness in 52% of patients)</p> <p>Regulates reproductive hormones - Vitamin E possesses estrogenic, androgenic and progesterone-like properties. It also acts synergistically with ovarian hormones and testosterone. Can protect and improve mitochondrial energy production</p> <p>Improve the uterine environment when combined with folate in diabetes</p> <p>Improves semen quality and sperm motility (in conjunction with selenium) as well as spontaneous pregnancy</p> <p>Improves semen quality (concentration, motility and morphology) alone (200 mcg) and when combined with N-Acetyl-Cysteine (600 mg)</p>	<p><i>Recommended daily intake is 15 mg</i></p> <p>Vitamin E is one of the MOST COMMON vitamin deficiencies in the US! Hmmm...fertility issues anyone?</p> <p>You can easily get adequate amounts of vitamin E if you make good dietary choices like the ones that are included in this program. One of the BEST ways to get adequate amounts of vitamin E is by eating <i>nuts and seeds, but especially sunflower seeds. This is just ONE reason that sunflower seeds are a Fertility Superfood.</i></p> <p>Other great sources include leafy greens like spinach and chard. I'm thinking a nice salad with sunflower seeds for added crunch! (Don't worry, I've got you covered in the recipes section.</p> <p>Additional supplementation may be needed in specific groups such as men with low sperm concentration and motility as well as morphology.</p> <p>Please Note: Vitamin E and Vitamin C are best friends. They need each other to allow them to be recycled.</p>	<p>Abnormal semen parameters</p>	<p>Takasaki A, Tamura H, Miwa I, Taketani T, Shimamura K, Sugino N (April 2010). "Endometrial growth and uterine blood flow: a pilot study for improving endometrial thickness in the patients with a thin endometrium". <i>Fertil. Steril.</i> 93 (6): 1851-8. doi:10.1016/j.fertnstert.2008.12.062. PMID 19200982.</p> <p>(Kikuchi, et al., 1991; Donchenko, et al., 1990, 1983; Guarnieri, et al., 1981, 1982.)</p> <p>Combination of Vitamin E and Folic Acid Ameliorate Oxidative Stress and Apoptosis in Diabetic Rat Uterus Article in International Journal for Vitamin and Nutrition Research 84(1-2):55-64 · April 2014 with 13 Reads DOI: 10.1024/0300-9831/a000193 · Source: PubMed https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4229790/ (J Hum Reprod Sci. 2014 Jul-Sep; 7(3): 159-169. doi: 10.4103/0974-1208.142475)</p>
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<p>COQ10 (UBIQUINOL)</p>	<p>A vitamin-like substance</p>	<p>Actually, it's a coenzyme. A co-what?! These little guys help enzymes do their thing. Enzymes are what cause reactions in your body to occur. I kind of think of them like little fairy Godmothers flitting about with a wand, singing bippity-boppity-boop! Enzymes do so many things, just one of which is helping you digest and breakdown food.</p> <p>Your body and cells make AND recycle coQ10. Well, then why do I need it?</p> <p>Production correlates greatly with age</p> <p>Peaks in late teens and early 20s and then declines</p> <p>CoQ10 is a special enzyme, because it is involved in creating energy. Hm, I wonder what else is involved in energy creation? If you're thinking mitochondria, you're correct!</p>	<p>This is it. This is one of those times that we really come full circle on everything we have learned. Because, just as CoQ10 levels decline with age, so do mitochondria and mitochondrial function. And we know what happens then: poor egg quality, chromosomal errors and so much more. THIS is where you realize that you don't just have to sit back and accept that you have less CoQ10 and fewer mitochondria and, in turn, poorer egg quality.</p> <p>BONUS: CoQ10 helps protect the mitochondria from oxidative stress and damage by free radicals!</p> <p>Research shows that supplementing CoQ10 can improve egg quality, and better egg quality means greater likelihood of ovulation, fertilization, implantation and maintenance and normal chromosomes. All this from a "coenzyme."</p> <p>In fact, in a study of older women given 600 mg a day of CoQ10, both egg quality and fertilization rates improved.</p> <p>Other studies have shown similar improvements in older mice. Finally, a study of mice at the Samuel Lunenfeld Research Institute, showed that CoQ10 supplementation on mid-aged female mice resulted in more pregnancies and more babies per litter. "They found that when CoQ10 was given to 52-week-old mice – about mid-age for a mouse – their eggs appeared to rejuvenate. There were significantly more egg follicles in the old mice treated with the CoQ10."</p> <p>CoQ10 treatment can improve fertility and oocyte quality in old mice. Another bonus is that this coenzyme also improves sperm parameters. Supplementation has been shown to improving sperm density, sperm motility and sperm morphology. Most of the mitochondria in sperm are found in the tail so that sperm can be robust swimmers. It's not surprising then to see studies that show a correlation between blood levels of CoQ10 and sperm motility. Studies have also shown that supplementing coq10 in men with low motility restored it. Supplementation of even 60 mg a day in men was associated with significant improvements in fertilization rates</p> <p>I know I'm throwing a lot of statistic and studies at you, but I want you to feel as pumped up and empowered as I do about the possibilities of supplementing coq10! You HAVE to know that my husband and I were taking this supplement when we were preparing to and DID conceive our second child.</p>	<p>It is virtually impossible to get the amount of CoQ10 necessary for the processes we discuss in this course through diet alone. This is one of just a few times that I recommend taking a supplement as opposed to obtaining the nutrient from food.</p> <p>Even the richest sources of CoQ10 (organ meats) do not make the cut.</p> <p>I am INSISTING that you take a CoQ10 supplement in the form of UBIQUINOL. This is a situation where you get what you pay for. Many CoQ10 supplements come in the form of ubiquinone. When you take ubiquinone, your body must convert it to ubiquinol. Not surprisingly, your body gets worse at this with age as well.</p> <p>You need to take this supplement with or before a meal with fat</p> <p>Xymogen CoQMax Ubiquinol - 2 softgels = 200 mg (please see the Essential and Comprehensive Fertility Supplements Charts).</p>	<p>AMA, poor egg quality, diminished ovarian reserve, poor semen parameters</p>	<p>Fertility and Sterility Vol. 96, Issue 3. A. Ben-Meir, J. Chong, A. Borrego-Alvarez, K.H. Moley, et al.</p> <p>Mohammad Reza Safarinejad et al. Effects of Reduced Form of Coenzyme Q10 (Ubiquinol) on Semen Parameters in Men with Idiopathic Infertility: a Double-Blind, Placebo Controlled, Randomized Study</p>
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<p>VITAMIN B6</p>	<p>Water-soluble nutrient</p>	<p>Vitamin B6 helps the body to maintain a healthy nervous system, to make hemoglobin that carries oxygen in red blood cells, to provide energy from food, to balance blood sugar levels, to act as a natural pain treatment, to boost mood, and also to create antibodies that our immune system uses to protect us.</p>	<p>May improve luteal length in women with luteal phase insufficiency Involved in hormonal balance Plays a role in cell division, making it essential for a fertilized egg or developing embryo</p>	<p>Tuna, turkey, beef, chicken, salmon, sweet potatoes, sunflower seeds, bananas and spinach are all great sources and are all in the FFM If you need to supplement consider the following Xymogen products (They are also great supplements to support detoxification processes.) also, stay below 50 mg a day. Xymogen Methyl Protect Xymogen B Activ</p>	<p>Luteal Phase Insufficiency</p>	
<p>VITAMIN B12</p>	<p>Water-soluble nutrient</p>	<p>Required for many reactions in your body as well as for the health of your nerves, red blood cells, and DNA. B12 also does something called methyl group donation, making it crucial for detoxification. Why are many people are deficient? GI Issues that can impact B12 absorption: Low levels of gastric acid (could be from acid reducing drugs) H.Pylori infection SIBO Insufficient pancreatic enzymes Folate deficiency or folate excess Pernicious anemia Intestinal inflammation from Crohn's or Celiac disease Leaky gut Bariatric surgeries Other chronic issues that can cause B12 deficiency: Autoimmune diseases such as Grave's or SLE MTHFR mutations</p>	<p>Very important, particularly: Improved semen parameters in and decreased homocysteine levels in men with MTHFR mutations when given B9 and B12 Deficiency associated with decreased sperm count and motility Oral and injectable B12 supplementation has shown to improve sperm counts Severe deficiencies have been associated with irregular or loss of ovulation</p>	<p>Make sure to work with a knowledgeable provider if you have an MTHFR mutation. Xymogen Methyl Protect Xymogen B Activ Xymogen methylcobalamin</p>	<p>MTHFR Mutations</p>	<p>https://www.ncbi.nlm.nih.gov/pubmed/28440964</p>

<p>MAGNESIUM</p>	<p>A mineral</p>	<p>What does it do? Everything! Involved in over 300 biochemical processes in the body! Regulate calcium, potassium and sodium magnesium plays a role in your body's detoxification processes and therefore is important for minimizing damage from environmental chemicals, heavy metals, and other toxins. Required for glutathione synthesis, which a powerful antioxidant Required by more than 300 enzymes that are involved in energy production, relaxation of blood vessels, bone and teeth formation, proper bowel function, regulation of blood sugar Required for ATP synthesis by mitochondria (think threonate)</p>	<p>It is estimated that up to 80% of the population may be deficient in magnesium. Relax spasms of the fallopian tubes that can inhibit the sperm and egg from reaching each other Other than this example. Magnesium's impact on fertility is a bit more discrete and behind the scenes, which is why many people overlook this mineral when addressing fertility. Most of its influence on fertility is indirect Deficiency may impair the body's energy production, which we have discussed in great detail is quite necessary for proper egg and sperm development as well as fertilization, development and implantation. Deficiency may also impair detox pathways as well as antioxidant capabilities (which could lead to DNA damage and chromosome abnormalities) A deficiency in magnesium can cause cortisol levels to elevate. And like we talked about in Module 3, this can drastically impact many things including hormone balance. Supplementation in deficient individuals may improve insulin resistance such as that in PCOS.</p>	<p>The thing about supplementing magnesium is that it is unique to every individual. There are many options for delivery based on your needs Start low a slow and increase until loose stool. Consider transdermal options such as magnesium lotion or oil (Ancient Minerals) for best absorption.</p>	<p>May improve insulin resistance in diabetes and PCOS</p>	
<p>CALCIUM</p>	<p>A mineral</p>		<p>Calcium plays an important role in triggering growth in embryos Involved in creating an alkaline environment in the reproductive tract, which signals to sperm that they need to change their tail whips to one that will allow them to thrust their tails to reach and penetrate the egg</p>	<p>Food: Green leafy veggies such as spinach, chard, bok choy and collard greens/ chia seeds/sunflower seeds/sardines (bones)/raw or fermented dairy (rare exceptions) Supplements - usually don't need (other than small amounts in a good whole food or prenatal supplement) Vitamin K2 - helps direct calcium where it needs to go and keep it away from places like your blood vessels. Vitamin K2 is in Xymogen Prenatal Essentials but also found in grassfed and pastured beef and eggs as well as butter and ghee.</p>		

IRON	A mineral		<p>Studies have shown that low iron levels or anemia may lead to anovulation (or lack of ovulation) and possibly poor egg quality, which could greatly decrease their ability to conceive.</p> <p>Iron is needed for proper placental development and iron deficiency has been linked to increased risk of miscarriage.</p> <p>Adequate iron stores are necessary for proper thyroid function (ferritin)</p> <p>When anemia was corrected in men, reproductive hormone levels increased or were stabilized and semen parameters were improved.</p>	<p>Whole food: eating beets, spinach, beans, animal meats, pumpkin seeds, molasses, asparagus</p> <p>An iron supplement may be needed if blood work indicates iron deficiency (This is why it can be important to check ferritin levels for a close look at iron status.)</p>		<p>S.Sasikumar, J.Shyam, Sundar, D.Dakshayani, R.Prabavathy, and M.Karthikalnt. J. Curr. Res. Aca. Rev. (2014); 2(2): g6-115. A study on significant biochemical changes in the serum of infertile women. Retrieved from: http://www.ijcrar.com/vol-2-2/S.Sasikumar,%20et%20al.pdf http://www.endocrine-abstracts.org/ea/0032/ea0032p643.htm</p>
SPECIAL CONSIDERATIONS						
CHOLINE	A vitamin-like nutrient	Involved in nervous system development and function, protects the liver and support liver detox	<p>Choline is especially important for those with MTHFR mutations and PCOS as it helps keep homocysteine levels in check. Elevated homocysteine levels are very detrimental to reproductive health (poor egg quality and miscarriage).</p>	Whole Foods such as eggs, Xymogen prenatal essentials contains 200 mg	MTHFR and PCOS	
ALA (ALPHA LIPOIC ACID)	An antioxidant	Helps to neutralize free radicals, involved in blood sugar regulation	Helps protect female reproductive organs. Supplementation has been associated with improved sperm quality and motility, and it helps recycle other antioxidants. It also improves insulin sensitivity.	Xymogen ALAMax	Abnormal semen parameters, PCOS	
N-ACETYLCYSTEINE (NAC) & GLUTATHIONE	An antioxidant	I mentioned these in Module 3 for their detox prowess, and those same properties make them fertility superstars. One of the best ways to improve glutathione levels is to supplement NAC or to raise it naturally. ALA as well as many of the micronutrients we have discussed also increase glutathione levels.	NAC has been shown to be especially promising with regards to PCOS, helping to lower fasting insulin, enhance insulin sensitivity, lower free testosterone and improve egg and embryo quality in IVF.	Xymogen NAC	PCOS	
MYO-INOSITOL	Part of the B complex group	Involved in insulin sensitivity and glucose metabolism	Shown to increase ovulation and pregnancy rates in women with PCOS (safe alternative treatment option), improves androgen/testosterone levels in PCOS	Xymogen RelaxMax (other manufacturers offer this alone or in conjunction with folate)	PCOS!!!!	
	* ESSENTIAL means that you must eat or supplement this as the body cannot make it on its own					