

Fertility Nutrition

A. Acetyl-L-carnitine – a derivative of the amino acid L-carnitine that supports mitochondrial energy production. Related terms: L-carnitine, mitochondrial function, oxidative stress. Explanation: Enhances sperm motility and oocyte quality by facilitating fatty-acid transport into mitochondria. Practical application: 500 mg daily for couples undergoing IVF. Challenge: High doses may cause gastrointestinal upset or a fishy odor.

B. Beta-carotene – provitamin A carotenoid found in orange vegetables. Related terms: retinol, antioxidant, lutein. Explanation: Converts to vitamin A, essential for ovarian follicle development and embryo implantation. Practical application: Include carrots, sweet potatoes, and pumpkin in the diet. Challenge: Excess intake can lead to hypercarotenemia, a harmless yellowing of skin.

C. Choline – an essential nutrient involved in cell membrane synthesis and neurotransmission. Related terms: phosphatidylcholine, methylation, fetal brain development. Explanation: Supports embryo implantation and placental growth via methyl-group donation. Practical application: Eggs, liver, and soybeans provide 250–300 mg daily. Challenge: Low intake is common in vegan diets; supplementation may be needed.

D. DNA methylation – epigenetic process regulating gene expression. Related terms: folate cycle, SAMe, epigenetics. Explanation: Proper methylation is crucial for gamete quality and early embryonic development. Practical application: Ensure adequate folate (400-800 µg) and B12 (2.4 µg) intake. Challenge: Environmental toxins can disrupt methylation patterns, affecting fertility.

E. Egg quality – refers to the competence of oocytes to mature, fertilize, and develop. Related terms: mitochondrial DNA, oxidative stress, AMH. Explanation: Influenced by age, diet, and antioxidant status. Practical application: Antioxidant-rich foods (berries, nuts) and omega-3 fatty acids improve quality. Challenge: Decline with age is irreversible; nutrition can only mitigate decline.

F. Folate (vitamin B9) – water-soluble vitamin essential for DNA synthesis. Related terms: folic acid, 5-MTHF, neural tube defects. Explanation: Supports oocyte maturation and reduces miscarriage risk. Practical application: 400-800 µg daily from leafy greens or a prenatal supplement. Challenge: Synthetic folic acid may not be efficiently converted in some individuals; 5-MTHF form may be preferable.

G. Glucose tolerance – ability to regulate blood sugar after carbohydrate intake. Related terms: insulin resistance, PCOS, HbA1c. Explanation: Impaired tolerance can disrupt ovulation and increase miscarriage risk. Practical application: Low-glycemic diet, regular physical activity, and fiber intake (25-30 g/day). Challenge: Hidden sugars in processed foods can undermine control.

H. HCG (human chorionic gonadotropin) – hormone produced after implantation. Related terms: luteinizing hormone (LH), pregnancy test, corpus luteum. Explanation: Supports progesterone production; used

therapeutically to trigger ovulation. Practical application: Monitor levels in early pregnancy to assess viability. Challenge: Elevated HCG can mask ectopic pregnancies; careful interpretation required.

I. Iron – mineral vital for oxygen transport and cellular respiration. Related terms: ferritin, heme iron, anemia. Explanation: Deficiency impairs ovulation and reduces embryo implantation rates. Practical application: Include red meat, lentils, and fortified cereals; aim for 18 mg/day (women of reproductive age). Challenge: Excess iron can cause oxidative stress; balance is essential.

J. Junk food – highly processed foods low in nutrients and high in sugars, fats, and additives. Related terms: ultra-processed foods, glycemic load, inflammation. Explanation: Contributes to hormonal imbalance, oxidative stress, and reduced fertility. Practical application: Limit intake to Ketogenic diet – high-fat, low-carbohydrate eating pattern inducing ketosis. Related terms: keto-adaptation, insulin sensitivity, fatty-acid oxidation. Explanation: May improve ovulatory function in insulin-resistant PCOS but can lower luteal phase progesterone. Practical application: Under professional supervision, limit carbs to Luteinizing hormone (LH) – pituitary hormone that triggers ovulation. Related terms: FSH, LH surge, corpus luteum. Explanation: Adequate LH levels are essential for follicular rupture and progesterone synthesis. Practical application: Dietary omega-3s and zinc support LH production. Challenge: Stress and excessive caffeine can suppress LH release.

M. Macronutrient balance – proportion of proteins, fats, and carbohydrates in the diet. Related terms: dietary ratio, energy availability, hormone synthesis. Explanation: Balanced intake supports hormone production and gamete health. Practical application: 30% protein, 30% healthy fats, 40% complex carbs. Challenge: Individual metabolic differences may require adjustments.

N. Omega-3 fatty acids – polyunsaturated fats including EPA and DHA. Related terms: fish oil, inflammation, membrane fluidity. Explanation: Reduce ovarian inflammation, improve sperm motility, and enhance embryo quality. Practical application: 2 g EPA/DHA combined daily from fish or algae supplements. Challenge: Risk of oxidation; use stabilized formulations.

O. Oxidative stress – imbalance between free radicals and antioxidants. Related terms: ROS, antioxidant capacity, lipid peroxidation. Explanation: Damages DNA in gametes, leading to reduced fertility. Practical application: Increase intake of vitamins C and E, selenium, and polyphenols. Challenge: Over-supplementation of antioxidants may impair necessary ROS signaling for ovulation.

P. Progesterone – steroid hormone produced by corpus luteum; prepares uterus for implantation. Related terms: luteal phase, progesterone-induced blocking factor (PIBF), hormonal assay. Explanation: Adequate levels are critical for maintaining early pregnancy. Practical application: Foods rich in vitamin B6 (e.g., bananas) support progesterone synthesis. Challenge: Chronic stress and caffeine can lower progesterone.

Q. Quercetin – flavonoid with antioxidant and anti-inflammatory properties. Related terms: polyphenols, mast cell stabilization, insulin sensitizer. Explanation: May improve ovarian blood flow and reduce PCOS symptoms. Practical application: 500 mg daily from onions, apples, or standardized supplement. Challenge: High doses can interfere with certain medications (e.g., antibiotics).

R. Retinol (vitamin A) – fat-soluble vitamin important for reproductive tissue health. Related terms:

beta-carotene, vision, immune function. Explanation: Supports follicular development and embryo implantation. Practical application: 700-900 µg RAE from liver, dairy, or carrots. Challenge: Toxicity risk at >3000 µg daily; supplementation should be monitored.

S. Selenium – trace mineral essential for selenoproteins and antioxidant defense. Related terms: glutathione peroxidase, thyroid hormone conversion, male fertility. Explanation: Improves sperm motility and protects oocytes from oxidative damage. Practical application: 55 µg/day from Brazil nuts (1–2 nuts) or supplements. Challenge: Narrow therapeutic window; excess can cause selenosis.

T. Thyroid-stimulating hormone (TSH) – pituitary hormone regulating thyroid hormone production. Related terms: hypothyroidism, free T4, reproductive axis. Explanation: Elevated TSH (>2.5 mIU/L) can impair ovulation and increase miscarriage risk. Practical application: Ensure iodine intake (150 µg/day) and monitor thyroid function. Challenge: Autoimmune thyroid disease may require medication beyond nutrition.

U. Uterine receptivity – ability of the endometrium to allow embryo implantation. Related terms: window of implantation, LIF, integrins. Explanation: Influenced by progesterone, micronutrient status, and inflammatory balance. Practical application: Adequate omega-3s, zinc, and vitamin E improve receptivity. Challenge: Endometrial factors are multifactorial; nutrition is one component.

V. Vitamin D – fat-soluble secosteroid involved in calcium homeostasis and immune modulation. Related terms: 25-hydroxyvitamin D, VDR, seasonal deficiency. Explanation: Low levels correlate with reduced IVF success and higher miscarriage rates. Practical application: 1000-2000 IU daily, or higher under physician guidance, plus sunlight exposure. Challenge: Toxicity is rare but possible; monitoring serum 25-OH-D is recommended.

W. Vitamin E – lipid-soluble antioxidant protecting cell membranes. Related terms: tocopherol, oxidative stress, sperm membrane integrity. Explanation: Improves sperm function and protects oocytes from lipid peroxidation. Practical application: 15 mg (22 IU) from almonds, sunflower seeds, or supplement. Challenge: High doses (>400 IU) may increase bleeding risk.

X. Xanthine oxidase – enzyme involved in purine metabolism producing uric acid. Related terms: gout, oxidative stress, allopurinol. Explanation: Elevated activity can increase oxidative stress, negatively affecting gamete quality. Practical application: Diet low in purine-rich foods (organ meats, anchovies) and high in antioxidants. Challenge: Genetic variations affect enzyme activity; dietary control may be insufficient alone.

Y. Yeast infections – overgrowth of Candida species in the genital tract. Related terms: dysbiosis, probiotic, antifungal diet. Explanation: Can cause inflammation and impair sperm motility or embryo implantation. Practical application: Reduce refined carbs and sugars; incorporate probiotic-rich foods (yogurt, kefir). Challenge: Recurrent infections may require medical treatment.

Z. Zinc – essential trace mineral involved in DNA synthesis and hormone regulation. Related terms: metallothionein, immune function, sperm quality. Explanation: Critical for oocyte maturation and testosterone production. Practical application: 8-11 mg daily from meat, pumpkin seeds, or supplement. Challenge: Phytate-rich diets inhibit absorption; pairing with vitamin C enhances uptake.

- A. Adiponectin – hormone secreted by adipose tissue influencing insulin sensitivity. Related terms: leptin, metabolic syndrome, PCOS. Explanation: Low adiponectin is linked to ovulatory dysfunction. Practical application: Weight-loss diets rich in monounsaturated fats raise adiponectin levels. Challenge: Genetic factors may limit responsiveness.
- B. Allicin – sulfur compound formed when garlic is crushed. Related terms: alliin, antimicrobial, cardiovascular health. Explanation: May improve uterine blood flow and reduce oxidative stress. Practical application: Include 2–3 cloves of fresh garlic daily. Challenge: Strong odor and gastrointestinal irritation for some individuals.
- C. Coenzyme Q10 (CoQ10) – mitochondrial electron-carrier and antioxidant. Related terms: ubiquinone, oxidative phosphorylation, sperm motility. Explanation: Enhances oocyte mitochondrial function and embryo quality. Practical application: 200–600 mg daily in soft-gel form. Challenge: Bioavailability varies; fat-containing meals improve absorption.
- D. Dietary fiber – indigestible carbohydrate component that promotes gut health. Related terms: prebiotic, SCFA, glycemic control. Explanation: Improves hormone balance by modulating estrogen re-circulation via the enterohepatic pathway. Practical application: 25–30 g/day from whole grains, legumes, fruits, and vegetables. Challenge: Sudden increase may cause bloating; gradual incorporation is advised.
- E. Eicosapentaenoic acid (EPA) – omega-3 fatty acid with anti-inflammatory effects. Related terms: DHA, fish oil, prostaglandin synthesis. Explanation: Lowers prostaglandin-mediated uterine contractions, supporting implantation. Practical application: 1 g EPA daily from wild-caught salmon or algae oil. Challenge: High EPA without DHA may affect membrane stability; balanced EPA/DHA ratio is preferred.
- F. Fertility-friendly diet – dietary pattern designed to optimize reproductive health. Related terms: Mediterranean diet, anti-inflammatory foods, nutrient density. Explanation: Emphasizes whole foods, healthy fats, and limited processed sugars to support hormone production. Practical application: Follow Mediterranean guidelines: 2 servings of fatty fish, 3 servings of nuts, and abundant vegetables. Challenge: Cultural food preferences may require adaptation.
- G. Glutathione – tripeptide antioxidant critical for detoxification. Related terms: N-acetylcysteine (NAC), oxidative stress, sperm DNA integrity. Explanation: Low levels impair oocyte maturation and increase miscarriage risk. Practical application: Supplement 600 mg NAC daily to boost endogenous glutathione. Challenge: Direct glutathione supplementation has poor bioavailability.
- H. Hyaluronic acid – glycosaminoglycan present in cervical mucus. Related terms: IVF embryo transfer medium, lubrication, extracellular matrix. Explanation: Adequate levels improve sperm penetration and embryo implantation. Practical application: Foods rich in magnesium (leafy greens) support synthesis. Challenge: Direct supplementation is limited; topical applications are used clinically.
- I. Insulin-like growth factor 1 (IGF-1) – peptide hormone promoting cell growth. Related terms: GH axis, ovarian follicle development, protein intake. Explanation: Adequate IGF-1 supports folliculogenesis; low levels may hinder ovulation. Practical application: Ensure sufficient high-quality protein (1.2–1.5 g/kg body weight). Challenge: Excess IGF-1 can increase cancer risk; balance is essential.

- J. Jojoba oil – plant oil rich in monounsaturated fatty acids. Related terms: topical emollient, skin barrier, hormone-free lubricant. Explanation: Used as a sperm-friendly lubricant that does not impair motility. Practical application: Apply a few drops before intercourse. Challenge: Some individuals may experience contact dermatitis; patch test recommended.
- K. Kynurenine pathway – metabolic route of tryptophan catabolism. Related terms: serotonin, NAD⁺, inflammation. Explanation: Overactivation can lead to reduced serotonin and impaired luteal function. Practical application: Limit excessive tryptophan-rich processed foods; increase anti-inflammatory nutrients. Challenge: Complex biochemistry; dietary impact is modest.
- L. Lactoferrin – iron-binding glycoprotein in milk. Related terms: antimicrobial, immune modulation, gut health. Explanation: Supports uterine immunity and may improve embryo implantation rates. Practical application: Consume 200 mg of lactoferrin supplement or fortified dairy. Challenge: Lactose intolerance may limit intake; alternative sources exist.
- M. Melatonin – hormone regulating circadian rhythm and antioxidant defense. Related terms: sleep quality, oxidative stress, IVF outcomes. Explanation: Improves oocyte quality when taken at night. Practical application: 3 mg melatonin 30 minutes before bedtime during IVF cycles. Challenge: Excess can suppress reproductive hormones; use under supervision.
- N. Neuroendocrine axis – interaction between nervous and endocrine systems influencing reproduction. Related terms: hypothalamic-pituitary-gonadal (HPG) axis, stress hormones, GnRH. Explanation: Nutrition impacts neurotransmitter synthesis, affecting GnRH release. Practical application: Adequate omega-3s and B-vitamins support neurotransmission. Challenge: Chronic stress overrides nutritional benefits.
- O. Omega-6 fatty acids – polyunsaturated fats found in vegetable oils. Related terms: linoleic acid, arachidonic acid, inflammatory eicosanoids. Explanation: Excessive omega-6 relative to omega-3 can promote inflammation, impairing fertility. Practical application: Aim for omega-6:omega-3 ratio of $\leq 4:1$ by limiting processed seed oils. Challenge: Modern diets often exceed ratio dramatically.
- P. Phytoestrogens – plant compounds that can bind estrogen receptors. Related terms: isoflavones, lignans, soy. Explanation: Moderate intake may balance estrogen levels in perimenopausal women; high intake may disrupt hormone signaling. Practical application: 1-2 servings of soy (tofu, tempeh) per week. Challenge: Individual sensitivity varies; monitor menstrual changes.
- Q. Quinoa – gluten-free pseudo-cereal rich in protein and micronutrients. Related terms: complete protein, magnesium, fiber. Explanation: Provides balanced amino acids and minerals supportive of hormone synthesis. Practical application: Replace refined grains with quinoa 3-4 times weekly. Challenge: Saponins may cause gastrointestinal irritation; rinse thoroughly before cooking.
- R. Resveratrol – polyphenol found in grapes and berries. Related terms: SIRT1 activation, anti-aging, insulin sensitivity. Explanation: May improve ovarian reserve markers by activating SIRT pathways. Practical application: 200 mg daily from standardized supplement. Challenge: Bioavailability is low; formulation matters.

- S. Satiety hormones – hormones that signal fullness, such as leptin and peptide YY. Related terms: appetite regulation, energy balance, weight management. Explanation: Proper satiety signaling helps maintain healthy body weight, crucial for fertility. Practical application: High-protein meals and fiber promote satiety. Challenge: Leptin resistance in obesity can blunt response.
- T. Trans-fatty acids – artificially hydrogenated fats that raise LDL cholesterol. Related terms: inflammation, cardiovascular risk, reproductive toxicity. Explanation: Associated with lower sperm count and disrupted ovulation. Practical application: Avoid margarine, fried foods, and baked goods containing “partially hydrogenated oil.” Challenge: Hidden in many processed snacks; label reading is essential.
- U. Ubiquinol – reduced, active form of CoQ10. Related terms: antioxidant, mitochondrial energy, bioavailability. Explanation: More readily absorbed than ubiquinone, supporting gamete energy metabolism. Practical application: 100-200 mg daily in soft-gel capsules. Challenge: Cost may be higher than ubiquinone; efficacy depends on formulation.
- V. Vitamin B12 (cobalamin) – water-soluble vitamin essential for DNA synthesis and methylation. Related terms: homocysteine, neurological health, anemia. Explanation: Deficiency can lead to elevated homocysteine, impairing implantation. Practical application: 2.4 µg daily from animal products or fortified foods; vegans may need 25 µg supplement. Challenge: Absorption decreases with age; intrinsic factor deficiency requires injections.
- W. Water intake – essential for cellular function and nutrient transport. Related terms: hydration status, urine specific gravity, amniotic fluid. Explanation: Adequate fluid supports cervical mucus quality and follicular fluid composition. Practical application: Aim for 2.5-3 L of total water (including foods) per day. Challenge: Over-hydration can dilute electrolytes; balance with activity level.
- X. Xylitol – sugar alcohol used as a sweetener. Related terms: low-glycemic sweetener, dental health, gastrointestinal tolerance. Explanation: Provides sweetness without spiking insulin, useful for PCOS diets. Practical application: Use xylitol-based products in moderation. Challenge: Excess can cause laxative effect; not suitable for all individuals.
- Y. Yogurt – fermented dairy product containing probiotics. Related terms: Lactobacillus, calcium, gut microbiome. Explanation: Supports vaginal microbiota balance and provides calcium for hormone synthesis. Practical application: 1 cup of plain, low-sugar yogurt daily. Challenge: Lactose intolerance may limit consumption; lactose-free probiotic alternatives exist.
- Z. Zyflamend – herbal blend containing turmeric, ginger, and other anti-inflammatory botanicals. Related terms: natural NSAID, cytokine modulation, fertility supplement. Explanation: May reduce pelvic inflammatory disease risk and improve uterine environment. Practical application: Follow manufacturer dosage (often 1-2 capsules daily). Challenge: Limited clinical data; potential herb-drug interactions require caution.
- A. Acne and fertility – skin condition often linked with hormonal imbalance. Related terms: androgen excess, insulin resistance, dietary glycemic load. Explanation: High-glycemic diets can exacerbate acne and disrupt ovulation. Practical application: Adopt low-glycemic, anti-inflammatory diet to improve both skin and

reproductive outcomes. Challenge: Genetics also play a role; diet alone may not resolve severe acne.

B. Betaine – methyl donor derived from choline. Related terms: homocysteine reduction, liver function, osmoregulation. Explanation: Supports methylation cycles important for embryo development. Practical application: 2–3 g daily from beetroot or supplement. Challenge: Excess may increase cholesterol; monitor lipid profile.

C. Calcium – mineral essential for cellular signaling. Related terms: bone health, calcium-sensing receptor, uterine contractions. Explanation: Adequate intake reduces risk of pre-eclampsia and supports egg activation. Practical application: 1000-1300 mg/day from dairy, fortified plant milks, and leafy greens. Challenge: High sodium intake can increase calcium excretion.

D. Dehydroepiandrosterone (DHEA) – adrenal steroid precursor. Related terms: ovarian reserve, androgenic activity, supplementation. Explanation: Low DHEA levels correlate with diminished ovarian reserve; supplementation may improve IVF outcomes. Practical application: 25-75 mg daily under medical supervision. Challenge: Hormonal side effects and contraindications in hormone-sensitive cancers.

E. Eicosanoids – signaling molecules derived from fatty acids. Related terms: prostaglandins, leukotrienes, inflammation. Explanation: Balance of eicosanoids influences uterine receptivity and menstrual pain. Practical application: Omega-3 intake shifts eicosanoid production toward less inflammatory forms. Challenge: Genetic variations affect enzyme activity (COX-2), altering response.

F. Fermented foods – foods produced through microbial action. Related terms: kimchi, sauerkraut, gut microbiota, lactic acid bacteria. Explanation: Enhance gut barrier function and may improve estrogen metabolism. Practical application: Include 1-2 servings of fermented vegetables daily. Challenge: Salt content in some fermented foods may be high; choose low-salt options.

G. Glycemic index (GI) – ranking of carbohydrates based on post-prandial blood glucose impact. Related terms: low-GI foods, insulin response, carbohydrate quality. Explanation: Low-GI diets stabilize insulin, benefiting ovulation and reducing miscarriage risk. Practical application: Prioritize legumes, whole grains, and non-starchy vegetables. Challenge: Portion size still matters; high-GI foods can be included in moderation.

H. Heme iron – iron from animal sources, more bioavailable than non-heme. Related terms: ferric, iron deficiency anemia, absorption enhancers. Explanation: Improves iron status, supporting energy for gamete production. Practical application: Include lean red meat or poultry 2-3 times per week. Challenge: Excess intake may increase oxidative stress; balance with antioxidant intake.

I. Inositol – carbohydrate involved in cell signaling. Related terms: myo-inositol, D-chiro-inositol, PCOS. Explanation: Improves insulin sensitivity and restores ovulatory cycles in PCOS. Practical application: 2 g myo-inositol + 0.5 g D-chiro-inositol twice daily. Challenge: Gastrointestinal upset at high doses; split dosing helps.

J. Jujube fruit – traditional Chinese fruit with antioxidant properties. Related terms: vitamin C, flavonoids, stress reduction. Explanation: May lower cortisol, indirectly supporting reproductive hormone balance.

Practical application: 5–10g dried jujube as a snack or tea additive. Challenge: Limited research; use as complementary rather than primary intervention.

K. Kefir – fermented milk drink rich in probiotics. Related terms: Lactobacillus kefir, gut health, calcium. Explanation: Supports vaginal microbiome equilibrium and provides calcium for hormone synthesis. Practical application: 1 cup daily, plain or lightly sweetened. Challenge: Lactose intolerance; choose dairy-free kefir made from coconut or almond milk.

L. Leptin resistance – condition where elevated leptin fails to suppress appetite. Related terms: obesity, hypothalamic inflammation, fertility decline. Explanation: High leptin can inhibit GnRH, reducing LH/FSH secretion. Practical application: Weight loss and anti-inflammatory diet improve leptin sensitivity. Challenge: Genetic predisposition may limit responsiveness.

M. Magnesium – mineral cofactor in over 300 enzymatic reactions. Related terms: ATP synthesis, NMDA receptor, menstrual cramps. Explanation: Supports progesterone synthesis and relaxes uterine smooth muscle. Practical application: 310–320 mg/day from nuts, seeds, and leafy greens. Challenge: High calcium intake can compete for absorption; timing supplements apart is advisable.

N. Niacin (vitamin B3) – water-soluble vitamin involved in NAD⁺/NADH cycles. Related terms: pellagra, vasodilation, lipid metabolism. Explanation: Adequate niacin improves blood flow to reproductive organs. Practical application: 14–16 mg daily from poultry, fish, and peanuts. Challenge: Large doses cause flushing; extended-release forms mitigate this.

O. Omega-9 fatty acids – monounsaturated fats such as oleic acid. Related terms: olive oil, HDL cholesterol, anti-inflammatory. Explanation: Promote favorable lipid profile, supporting hormone transport. Practical application: Use extra-virgin olive oil for cooking and dressings. Challenge: Over-reliance may reduce intake of essential omega-3s; maintain balance.

P. Polyphenols – plant compounds with antioxidant activity. Related terms: flavonoids, resveratrol, catechins. Explanation: Reduce oxidative stress in follicular fluid, enhancing oocyte quality. Practical application: Green tea (2 cups), berries, and dark chocolate (70% cocoa) daily. Challenge: High doses can interfere with iron absorption; separate from iron-rich meals.

Q. Quinoa protein – complete plant protein containing all essential amino acids. Related terms: lysine, methionine, gluten-free. Explanation: Provides necessary building blocks for hormone synthesis without triggering gluten-related autoimmunity. Practical application: Incorporate quinoa salads or side dishes 2–3 times weekly. Challenge: Slightly higher carbohydrate content; monitor total intake for insulin-sensitive individuals.

R. Riboflavin (vitamin B2) – cofactor for redox reactions. Related terms: FAD, energy metabolism, migraine. Explanation: Supports FSH and LH secretion; deficiency linked to menstrual irregularities. Practical application: 1.1 mg daily from dairy, eggs, and almonds. Challenge: Light exposure degrades riboflavin in foods; store in opaque containers.

S. Selenium-rich Brazil nuts – potent source of this trace mineral. Related terms: selenoprotein, antioxidant,

thyroid function. Explanation: One to two nuts supply daily requirement, enhancing sperm motility and oocyte protection. Practical application: Consume 1–2 nuts per day, preferably with a meal to improve absorption. Challenge: Overconsumption can cause selenosis; limit intake.

T. Thymidine – nucleoside component of DNA. Related terms: pyrimidine, DNA replication, folate cycle. Explanation: Adequate thymidine availability is essential for rapid cell division in early embryos. Practical application: Folate-rich diet ensures sufficient thymidine synthesis. Challenge: Direct supplementation is uncommon; focus on upstream nutrients.

U. Urea cycle – metabolic pathway converting ammonia to urea. Related terms: arginine, citrulline, nitrogen balance. Explanation: Efficient urea cycle prevents toxic ammonia buildup that can impair gamete viability. Practical application: Adequate protein distribution throughout the day supports cycle function. Challenge: Inherited urea cycle disorders require medical management beyond nutrition.

V. Vitamin K2 (menaquinone) – fat-soluble vitamin involved in calcium metabolism. Related terms: osteocalcin, vascular health, fermented foods. Explanation: Promotes proper calcium deposition in bone rather than arteries, supporting overall reproductive health. Practical application: Natto or high-dose supplement (45 µg) weekly. Challenge: Limited dietary sources in Western diets; supplementation may be necessary.

W. Water-soluble vitamins – vitamins that dissolve in water and are not stored long-term. Related terms: B-complex, vitamin C, daily intake. Explanation: Require consistent consumption to maintain fertility-related functions such as collagen synthesis and antioxidant defense. Practical application: Consume a variety of fruits and vegetables each day. Challenge: Cooking losses; use raw or lightly steamed preparations when possible.

X. Xanthophylls – carotenoid pigments with antioxidant properties. Related terms: lutein, zeaxanthin, eye health. Explanation: Protect reproductive cells from lipid peroxidation. Practical application: Include corn, kale, and egg yolks in the diet. Challenge: Absorption depends on dietary fat; pair with healthy oils.

Y. Yohimbine – alkaloid derived from *Pausinystalia yohimbe* bark. Related terms: alpha-2 adrenergic antagonist, blood flow, erectile function. Explanation: May improve penile blood flow and sperm quality, but evidence is limited. Practical application: Use only under physician guidance, typically 5-10 mg before sexual activity. Challenge: Can cause anxiety, hypertension, and interact with antidepressants.

Z. Zinc-cysteine complexes – formulation enhancing zinc absorption. Related terms: chelated minerals, bioavailability, antioxidant synergy. Explanation: Improves zinc status for hormone synthesis and immune function. Practical application: Choose supplements labeled “zinc-cysteine” for better uptake. Challenge: Cost may be higher than standard zinc salts; assess necessity based on laboratory results.