Perimenopausal Nutrition Strategies:

Evidence-Based Approaches to Support Hormones, Metabolism, and Wellbeing

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Disclaimer

This presentation contains educational material only and is not intended to take the place of advice from your own physician(s) or to be a means of diagnosing or treating an illness.

Disclosures

- **Professional disclosure:** Deanna Minich is an educator, speaker, author, and independent contractor in the health industry.
  - Symphony Natural Health, manufacturer of Maca-GO (commercially known as Femmenessence), Chief Science Officer, Independent Contractor/Stock Options
  - Genexa Health, Stock
  - Turner Publishing, Book Royalties
  - Various companies (e.g., Nutrabiotics, Standard Process) Speaker (occasional)
- **Personal disclosure:** I take MHT and supplements designed for menopause, as well as engage in various lifestyle practices.

Learning Objectives

- **Describe** the hormonal and metabolic changes that occur during perimenopause and their implications for nutrition.
- **Identify** evidence-based dietary patterns and specific foods that support hormone balance, cognitive health, and metabolic function.
- **Evaluate** the role of phytoestrogens, phytonutrients, and key micronutrients in perimenopausal health.
- **Discuss** the influence of circadian nutrition, gut microbiome dynamics, and lifestyle factors on perimenopausal outcomes.
- **Apply** personalized nutrition strategies that account for cultural, clinical, and individual differences in supporting women through perimenopause.

Perimenopause

- Defined as the period of time during which a woman's body transitions towards menopause through the decline of the ovarian function and resulting decreased E2 and PRG.
- The beginning phase is marked by the onset of menstrual irregularities.
- Lasts for an average of 4-7 years, although can be up to 14 years for some.

PMID: 40264725

Perimenopause

- Each year, about 2 MM women in the US enter perimenopause.
- Spectrum of symptoms span physical, emotional, and mental domains: longer periods of bleeding, anxiety/depression, weight gain, changes in sexual desire, muscle aches, insomnia, hot flashes/night sweats.
- 20% of women experience debilitating symptoms that affect quality of life.

PMID: 40264725

Severity of perimenopausal symptoms may have deeper reaches into systemic imbalances

- Insulin resistance and incremental blood sugar elevations
- Cortisol dysregulation and sympathetic nervous system overdrive
- Immune imbalances and autoimmune tendencies
- Dysbiosis

Cardiovascular disease is not a statin deficiency.

Menopause is not *just* a hormone deficiency.

Addressing the root causes of menopause through integrative approaches

- Menopause is a natural process.
- The speed at which it takes place is related to a **decline in the function of the endocrine system**.
- The overall “communication” in the body is declining due to specific antecedents, triggers, and mediators.

The HPTAO Axis

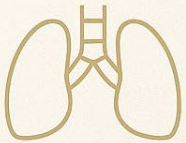
With menopause, there is a decline in communication between these endocrine glands:

- Hypothalamus
- Pituitary
- Thyroid
- Adrenals
- Ovaries

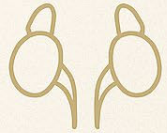
With menopause, there is **a decline in communication** between these endocrine glands:

Hypothalamus

Pituitary



Thyroid



Adrenals

Ovaries

Goal: Restore feedback loop for hormonal resilience

The Hormone Orchestra:

Everything is connected.

- In the 20s and 30s, it might start with the adrenals.
- In the 30s and 40s, there might start to be autoimmune issues, particularly involving the thyroid.
- For decades, there can be issues with the gut.
- Menopause = loss of ovarian signaling, but adrenal, gut & thyroid compensation matter.

ATMs involved in endocrine decline:

Antecedents

Genetics, personal history of diseases (especially autoimmune disease), medication use, prolonged nutrient insufficiencies/deficiencies

Triggers

Acute stressors, disruptive sleep, smoking, alcohol, recreational drugs

Mediators

Endocrine disruptors, total toxic load, chronic stress, nutrient-poor diet, sedentary activity, lacking key nutrients, circadian disruption (e.g., shift work)

Bring in the timeline to understand “how did I get here?”

Timeline Example 1: Early Transitioner

History:

- Menarche at age 11
- High ACE (adverse childhood experiences) score; frequent antibiotics in childhood
- Lifelong low-protein, high-sugar diet; chronic sleep deprivation

Midlife triggers: Caregiving stress in 40s, sedentary lifestyle, nightly alcohol

Perimenopause onset: early 40s.

Symptoms: Severe hot flashes, heavy/erratic cycles, insomnia, mood instability, accelerated bone loss

Underlying biology:

- Low ovarian reserve + chronic cortisol = early onset
- Gut dysbiosis + sluggish detox = estrogen recirculation
- Insulin resistance + inflammaging amplify symptoms

Timeline Example 2: Resilient Transitioner

History:

- Menarche at age 13
- Healthy pregnancies; nutrient-rich diet with protein sufficiency
- Regular activity, strong social ties

Midlife triggers: Manageable work stress, minimal toxic exposures

Perimenopause onset: late 40s

Symptoms: Occasional hot flashes, gradual menstrual tapering, mild sleep changes.

Underlying biology:

- Strong antioxidant/mitochondrial reserves
- Stable insulin sensitivity = higher SHBG = steady hormone bioavailability
- Robust detox pathways → smooth estrogen clearance
- Resilient HPA/circadian rhythm

What is the solution?

- Nutrition and lifestyle changes offer strong, sustainable relief for many menopause symptoms.
- Personalization and consistency are key.
- Not all women respond equally due to genetics, microbiome, and baseline health status.
- ***Moderate to severe symptoms*** may still need targeted therapies like non-hormonal and/or hormonal interventions.
  - 75-80% of women suffer from the symptoms caused by menopause, and they are more severe in 20–30% of women.

PMID: 38201856

What about non-hormonal, natural remedies?

- **Composition:** May involve a variety of different herbs, vitamins, and mineral combinations on the market
- **Availability:** Widely available and accessible
- **Safety:** They “seem” safer than hormones. Provides an option for women who can’t or won’t take MHT.
- **Marketing:** Often recommended by friends, online forums, or influencers

Other aspects to consider

- **Lack of evidence:**
  - Most available supplements have inconsistent or weak clinical evidence and rely on marketing alone.
  - Often rely on anecdotal success stories
  - May work via placebo effects, which are real, but not always reliable
- **Lack of symptom relief:**
  - Can be expensive with little to no symptom relief
- **Quality concerns:**
  - May vary in quality and potency
  - There is a spectrum of poor-quality supplements, where labels may not match contents or may have contaminants.

Integrative Approaches: Nutrition & Lifestyle

Where to start clinically:
General Nutrition Guidelines

- Aim for higher protein, healthy fats, higher fiber and complex carbohydrates; anti-inflammatory/higher antioxidant potential
- Mindful eating with the circadian rhythm
- Less stimulants (caffeine)
- Swapping out alcohol

Where to start clinically:
General Nutrition Guidelines

- 30-40% carbohydrates
- 30–35% fat
- 25–30% protein
- Many women do best when carbohydrates are front-loaded earlier in the day and paired with movement.

*** Always better to personalize to the client when possible.**

Deepening the hormone-related aspects:
Address the foundation of endocrine health through nutrition, nutrients, herbs & lifestyle

- **Synthesis**
- **Transport**
- **Activation**
- **Metabolism**
- **Excretion**

Synthesis:
Optimizing Hormone Production

Synthesis:
Structural building blocks from the diet

- **Cholesterol** → precursor for all steroid hormones (estrogen, progesterone, testosterone, cortisol, aldosterone).
- **Essential fatty acids (omega-3 and omega-6)** → incorporated into cell membranes where hormone synthesis occurs; support eicosanoid hormone synthesis (prostaglandins).
- **Amino acids** → form peptide and protein hormones (insulin, growth hormone, thyroid-stimulating hormone).
  Key ones: tyrosine (thyroid hormones, catecholamines), tryptophan (serotonin, melatonin).

Omega-3 requirement can shift in menopause

ALA conversion drops after menopause

- Premenopause: ~21% → EPA, ~9% → DHA
- Postmenopause: ~0.2–6% → EPA, ~0.1% → DHA

Why it matters

- LC omega-3s may:
  - Support ovarian reserve
  - Delay menopause onset
  - Lower early menopause risk

How

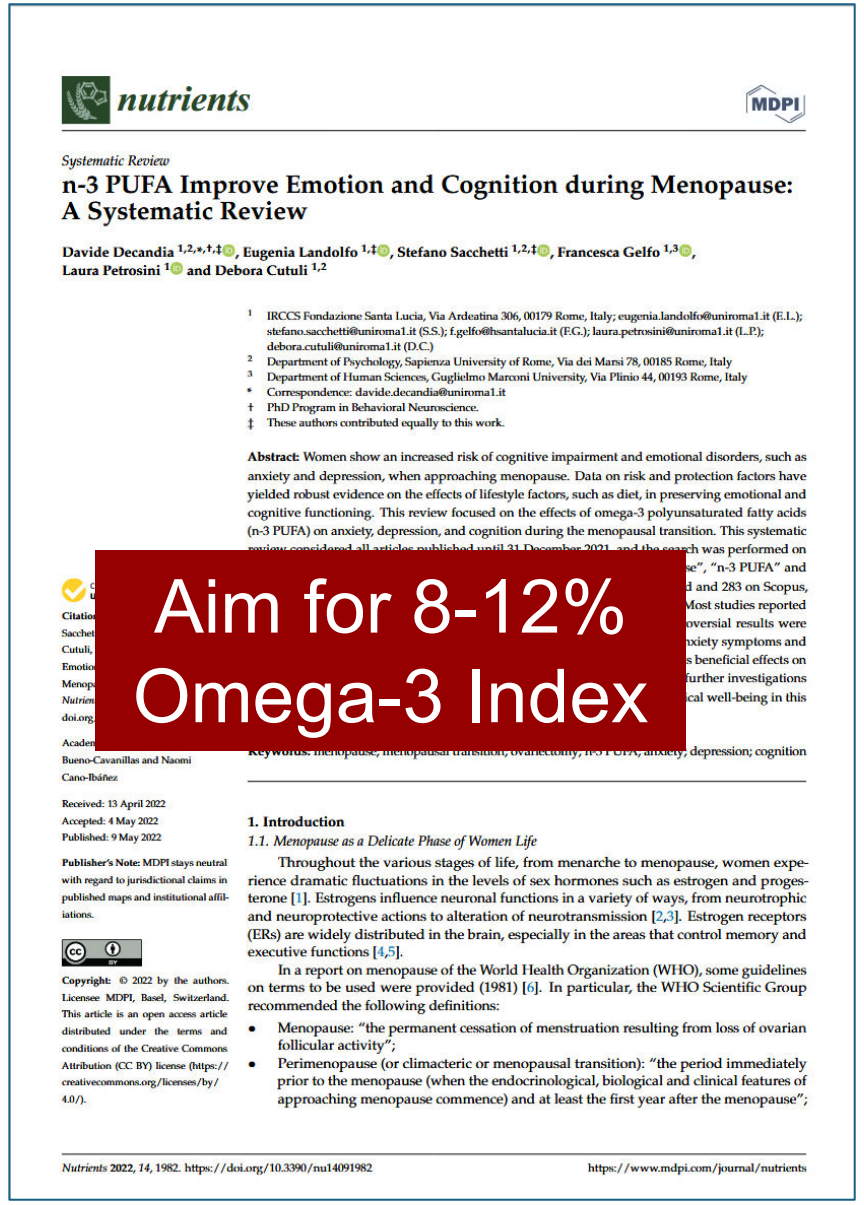
- Reduce inflammation & oxidative stress
- Improve blood flow & mitochondrial function

Minihane AM. Omega-3 fatty acids, brain health and the menopause. Post Reprod Health. 2025 Jun;31(2):97-104. doi: 10.1177/20533691251341701. Epub 2025 May 30. PMID: 40444522; PMCID: PMC12209554.

Omega-3s to support psychoneuroendocrine health

Overall, preclinical and clinical studies suggest that omega-3 PUFA supplementation during menopause supports mood (reducing anxiety and depression), enhances cognition, and that higher RBC EPA + DHA levels correspond with larger total brain and hippocampal volumes.

PMID: 35565948, 24453077



nutrients

MDPI

Systematic Review

n-3 PUFA Improve Emotion and Cognition during Menopause: A Systematic Review

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Abstract: Women show an increased risk of cognitive impairment and emotional disorders, such as anxiety and depression, when approaching menopause. Data on risk and protection factors have yielded robust evidence on the effects of lifestyle factors, such as diet, in preserving emotional and cognitive functioning. This review focused on the effects of omega-3 polyunsaturated fatty acids (n-3 PUFA) on anxiety, depression, and cognition during the menopausal transition. This systematic review considered all articles published until 31 December 2021, and the search was performed on

Aim for 8-12% Omega-3 Index

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1. Introduction

1.1. Menopause as a Delicate Phase of Women Life

Throughout the various stages of life, from menarche to menopause, women experience dramatic fluctuations in the levels of sex hormones such as estrogen and progesterone [1]. Estrogens influence neuronal functions in a variety of ways, from neurotrophic and neuroprotective actions to alteration of neurotransmission [2,3]. Estrogen receptors (ERs) are widely distributed in the brain, especially in the areas that control memory and executive functions [4,5].

In a report on menopause of the World Health Organization (WHO), some guidelines on terms to be used were provided (1981) [6]. In particular, the WHO Scientific Group recommended the following definitions:

- Menopause: "the permanent cessation of menstruation resulting from loss of ovarian follicular activity";
- Perimenopause (or climacteric or menopausal transition): "the period immediately prior to the menopause (when the endocrinological, biological and clinical features of approaching menopause commence) and at least the first year after the menopause";

Dietary protein to support muscle & bone health, metabolic health

- **Target:** 1.0–1.6 g/kg/day protein for most menopausal women, with distribution across meals.
  - **Per-meal dose:** 25–30 g of high-quality protein per meal (including ~2.5 g leucine) is often recommended to stimulate muscle protein synthesis optimally.
- **Sources:** Lean meats, fish, eggs, dairy, legumes, soy, nuts/seeds, and protein-rich grains (quinoa, amaranth).
- **Pair with exercise:** Resistance training enhances the anabolic effect of dietary protein.

PMID: 24522467, 35769543

Synthesis:
Critical Vitamins for Enzymatic Conversion

- **Vitamin B5 (pantothenic acid)** → forms coenzyme A, required for the first step of steroid hormone synthesis from cholesterol.
- **Vitamin B6 (pyridoxal phosphate)** → cofactor in neurotransmitter synthesis, influencing melatonin and steroid hormone regulation.
- **Vitamin C** → concentrated in adrenal glands; essential cofactor for dopamine → norepinephrine conversion and adrenal steroidogenesis.
- **Vitamin D** → itself acts as a hormone; also regulates genes involved in steroid hormone production.

PMID: 40003647, 14284101, 25988614, 21951027

Synthesis:
Essential Minerals as Cofactors

- **Zinc** → required for over 300 enzymes, including those that convert cholesterol into steroid hormones and regulate gene expression of hormone receptors.
- **Magnesium** → cofactor in ATP-dependent reactions in hormone biosynthesis.
- **Iodine** → structural element of thyroid hormones (T3 and T4).
- **Selenium** → necessary for thyroid peroxidase activity and for converting T4 → T3.

PMID: 21051590, 33446948, 33808247, 36902254 https://www.ncbi.nlm.nih.gov/books/NBK222323/

The Phytoneuroendocrine System:

Aligning plants with the dynamic orchestra of the neuroendocrine system

Minich DM. The Phytoneuroendocrine System: Connecting Plants to Human Systems Biology. *Integr Med* (Encinitas). 2024;23(1):28-31. PMID: 38618161

Carotenoids:
The overall biological basics

- Typically found in the layers of the plant underneath the green chlorophyll
- Fat-solubility (varying degrees)
- About 600-700 types of carotenoids in nature
- About 40 in the human diet
- About 20 in the human blood and tissues
- 95% of the total consist of beta-carotene, alpha-carotene, lycopene, lutein, zeaxanthin, beta-cryptoxanthin
- Beta-carotene has the highest conversion to vitamin A
- Absorption of beta-carotene from plant foods 7–65%

Reference: Kim JA, Jang JH, Lee SY. An Updated Comprehensive Review on Vitamin A and Carotenoids in Breast Cancer: Mechanisms, Genetics, Assessment, Current Evidence, and Future Clinical Implications. Nutrients. 2021;13(9):3162. Published 2021 Sep 10. doi:10.3390/nu13093162.

Carotenoids & ovarian health

- It has been hypothesized that dysfunctional retinoid signaling may be implicated in PCOS [1].
- Human ovarian tissue found to contain ~ 13-14 carotenoids [2-3].
  - Carotenoid content highest in the follicular phase
  - Provitamin A carotenoids highest in the luteal phase
  - Different types of carotenoids in cancerous tissue
  - All uterine tissues contain beta-carotene and beta-cryptoxanthin
- Studies with beta-carotene supplementation in cows and goats indicate greater progesterone levels and enhanced ovarian function [4]

Reference: 1. PMID: 28359780. 2. PMID: 16211314. 3. PMID: 19056531. 4. PMID: 19141099.

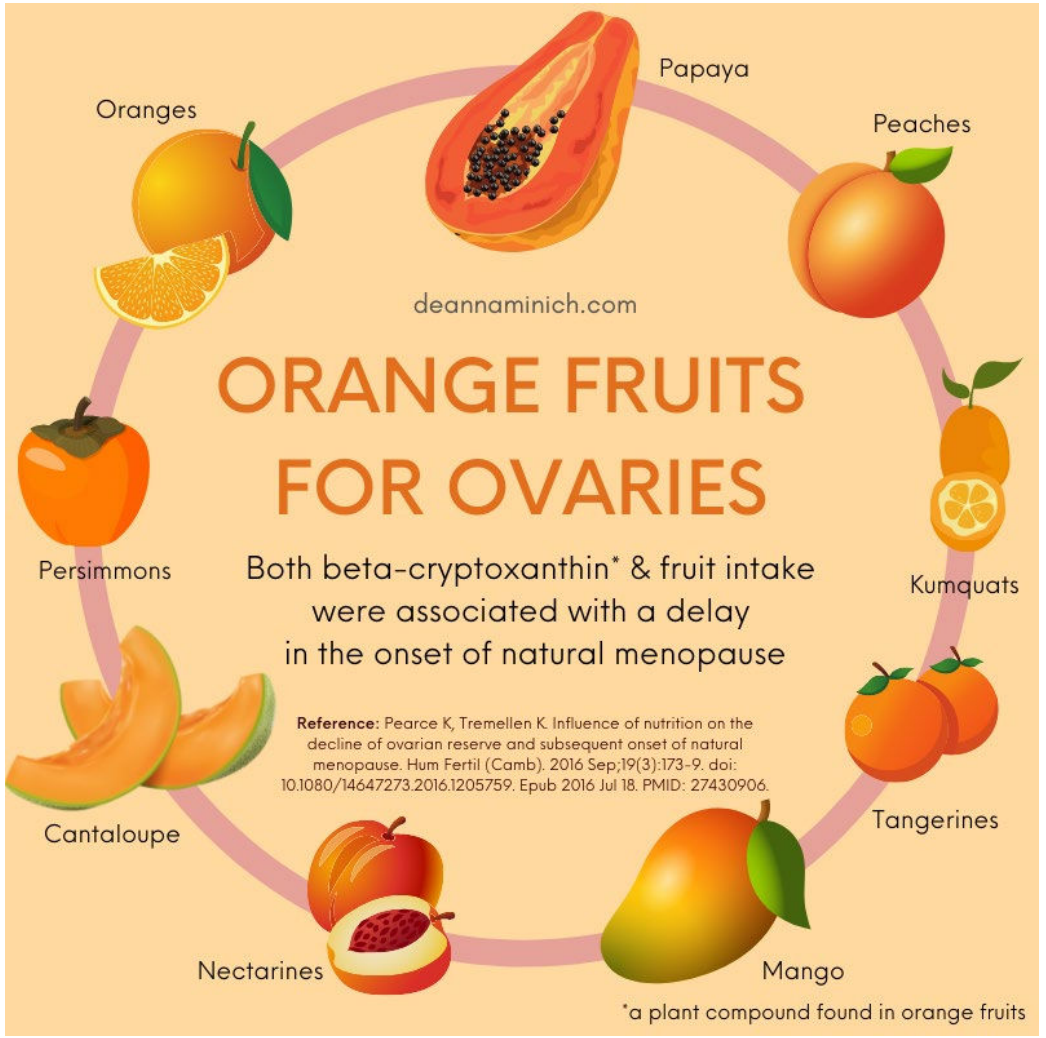
Orange fruits & reproductive health

- In a large study with >70K premenopausal women followed up over time, it was shown the **higher fruit intake** was associated with reduced risk of endometriosis.
- **Citrus fruits** particularly significant with women eating ≥1 servings of citrus fruits/day having a **22% lower endometriosis risk**.
- Of nutrients analyzed, only **beta-cryptoxanthin** was associated with lower risk for endometriosis.

Reference: Harris HR, Eke AC, Chavarro JE, Missmer SA. Fruit and vegetable consumption and risk of endometriosis. Hum Reprod. 2018;33(4):715-727. doi:10.1093/humrep/dey014

Orange fruits and ovarian health

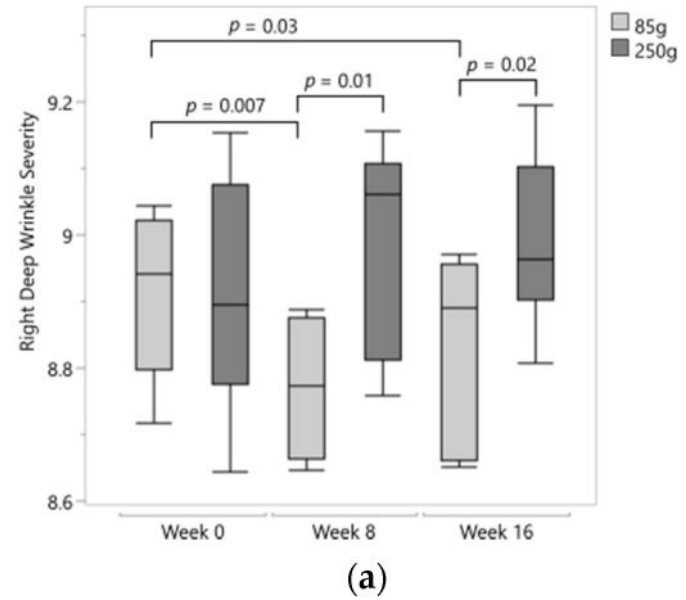
- 1146 pre-menopausal women followed for ~ 12.5 yrs.
- Age at natural menopause was associated with beta-cryptoxanthin and fruit intake, even after adjustment of other factors.
- A diet containing ~400 micrograms of beta-cryptoxanthin per day (mandarins, oranges, and peaches) may help delay ovarian aging by 1.3 years

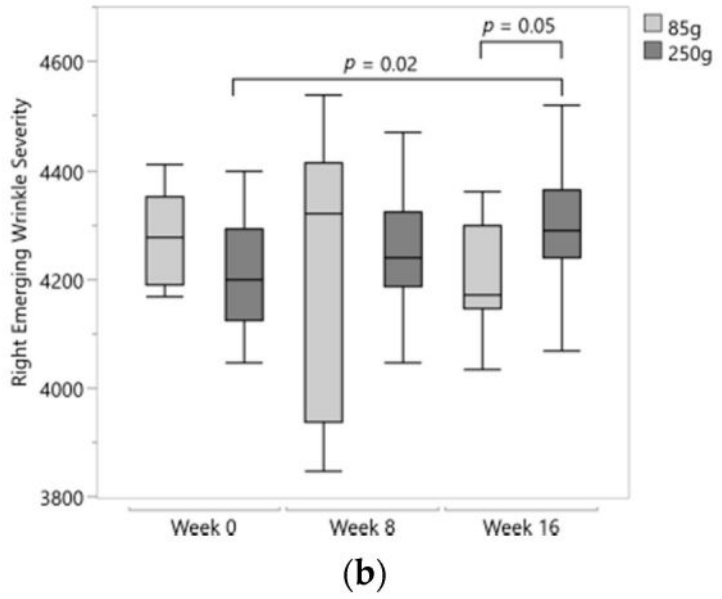


Reference: Pearce K, Tremellen K. Influence of nutrition on the decline of ovarian reserve and subsequent onset of natural menopause. Hum Fertil (Camb). 2016 Sep;19(3):173-9. doi: 10.1080/14647273.2016.1205759. Epub 2016 Jul 18. PMID: 27430906.

Mango & skin health

In this study, eating 85 g of Ataulfo mango daily for 16 weeks reduced facial wrinkles in fair-skinned postmenopausal women, while a higher intake of 250 g increased wrinkle severity—suggesting a moderate amount may offer skin benefits.

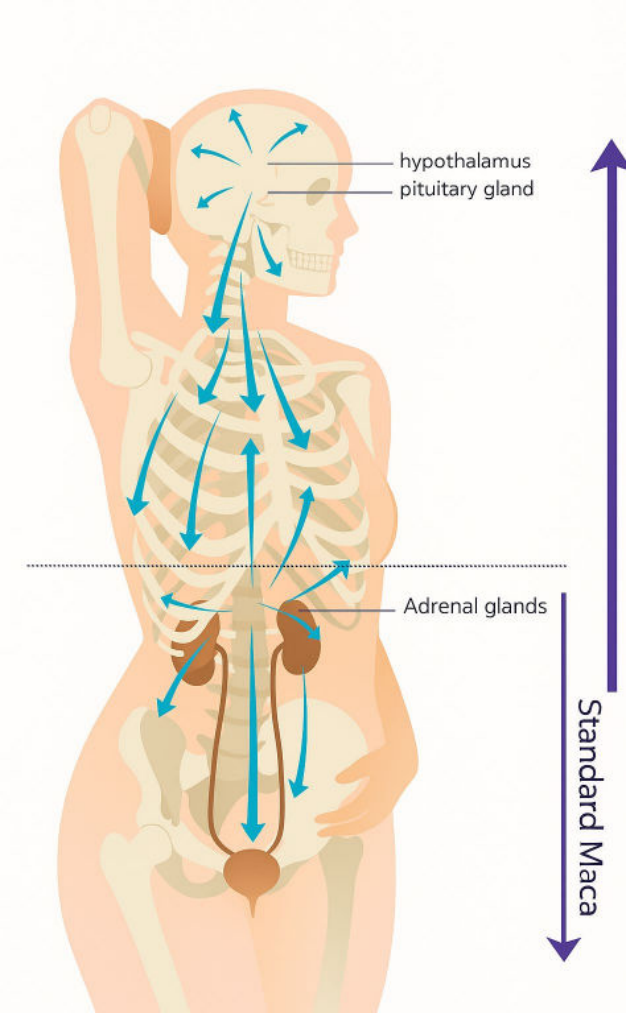




Fam, V.W.; Holt, R.R.; Keen, C.L.; Sivamani, R.K.; Hackman, R.M. Prospective Evaluation of Mango Fruit Intake on Facial Wrinkles and Erythema in Postmenopausal Women: A Randomized Clinical Pilot Study. *Nutrients* **2020**, *12*, 3381. https://doi.org/10.3390/nu12113381. CC-BY.

Synthesis:
Lepidium peruvianum (Maca-GO)

- *Lepidium peruvianum* → unique phenotype effects (Maca-GO).
- Mechanism: modulates HPATO, supports endogenous hormone production
- RCTs: 84% success rate in reducing menopausal symptoms; improvements in lipid and bone density markers



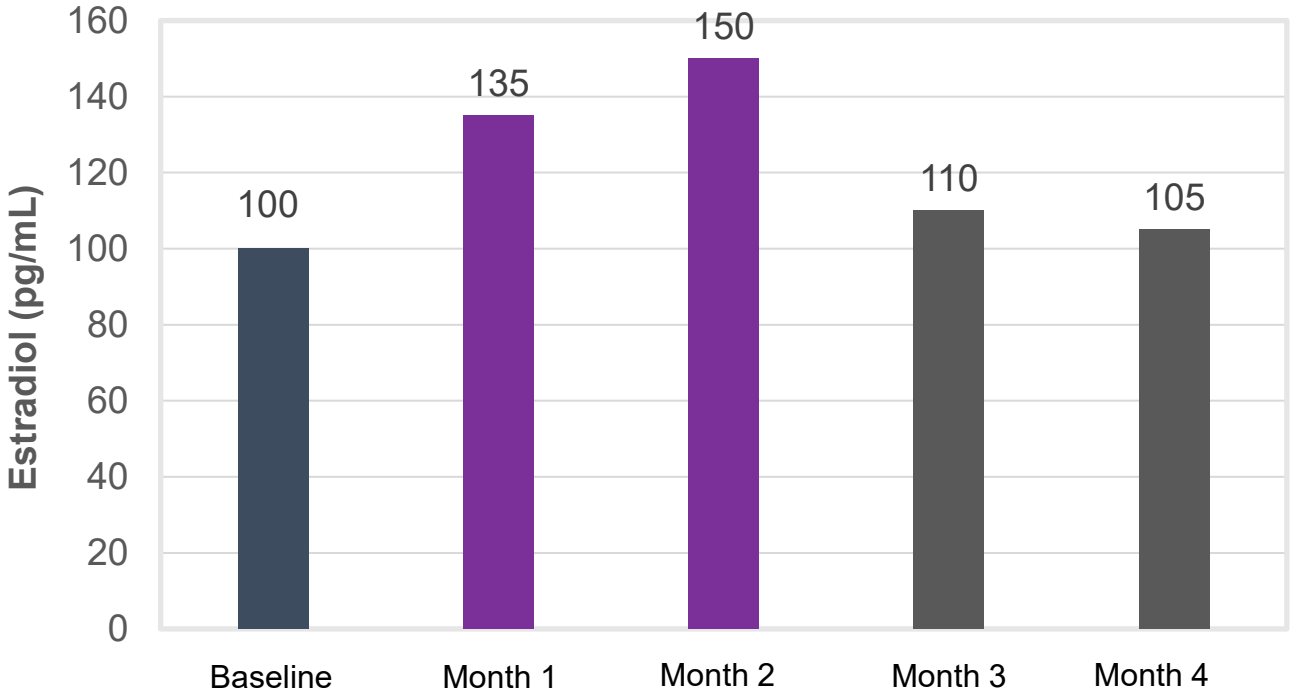
PMID: 38398854, 23675005, 23674952, 23674976, 23675006

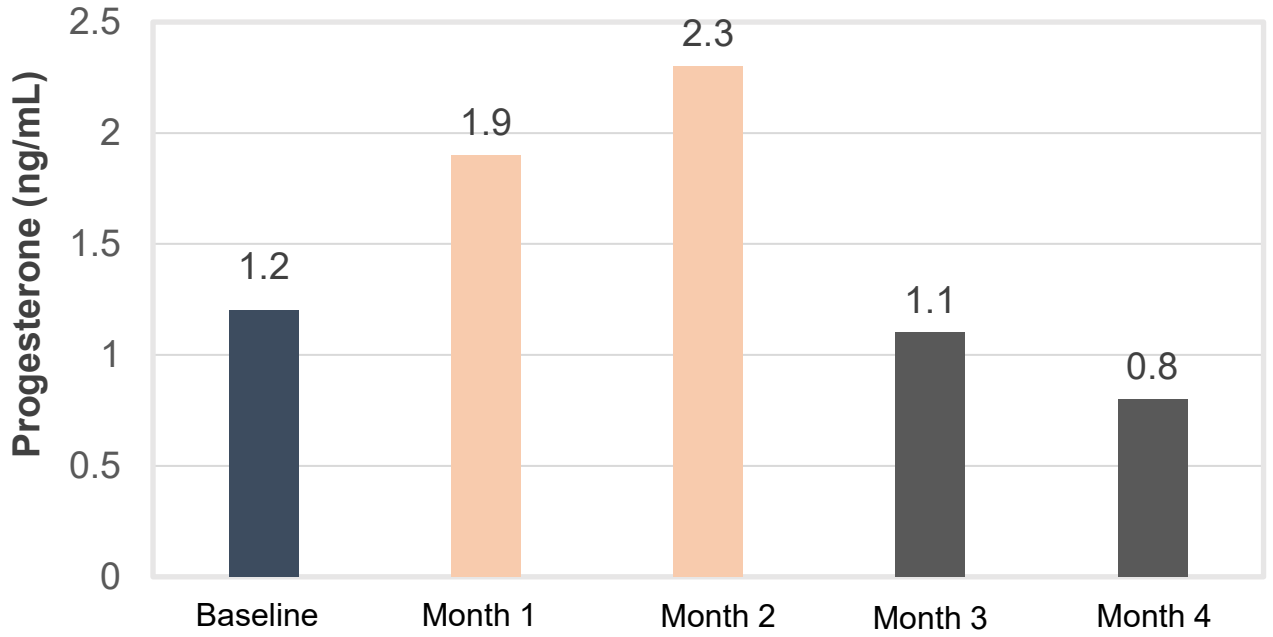
Perimenopausal women: Hormonal effects of Maca-GO

52% of perimenopausal women taking Maca-GO saw estradiol levels rise by more than 50% on average.

92% of perimenopausal women taking Maca-GO experienced nearly doubled levels of progesterone.

Meissner HO, Reich-Bilinska H, Mscisz A, Kedzia B. Therapeutic Effects of Pre-Gelatinized Maca (Lepidium Peruvianum Chacon) used as a Non-Hormonal Alternative to HRT in Perimenopausal Women - Clinical Pilot Study. Int J Biomed Sci. 2006 Jun;2(2):143-59. PMID: 23674976; PMCID: PMC3614596.





Synthesis:
Supportive Lifestyle Inputs

- **Sleep** → Growth hormone and melatonin are synthesized during deep sleep; poor sleep disrupts synthesis of adrenal and reproductive hormones.
- **Stress regulation** → Chronic stress depletes vitamin C, B5, and cholesterol reserves in the adrenal glands, impairing cortisol and sex hormone synthesis.
- **Circadian rhythm alignment** → Morning light exposure helps regulate synthesis of melatonin at night and cortisol at dawn.

Synthesis:
Replenishing melatonin loss with age

- Melatonin declines after menopause and contributes to sleep, mood, and bone changes.
- Clinical trials show **2–3 mg nightly** improves sleep, quality of life, and bone density, with additional evidence for mood benefits.
- 1-yr treatment with 1 mg melatonin increased BMD at the femoral neck in a dose-dependent manner, while high-dose (3 mg) melatonin increased volumetric BMD in the spine.
- Safe and well tolerated, with plant-based melatonin emerging as an alternative to synthetic forms due to the presence of other phytonutrients which may amplify its antioxidant, anti-inflammatory and mitochondrial effects.

PMID: 26036434, 33969545

Transport:
Moving Hormones to Where They Act

Transport:
Moving Hormones to Where They Act

- Making hormones is only step one — they must travel through the bloodstream to reach target tissues.
- Most hormones don’t float freely; they hitch a ride on **carrier proteins** (e.g., albumin, sex hormone-binding globulin [SHBG], thyroid-binding globulin).
- Healthy transport ensures hormones arrive where they’re needed and in the right amounts.

Clinical Aspects of SHBG

Context	Key Finding	Clinical Relevance
Menopause transition	↑ SHBG → ↓ risk of T2 diabetes	Monitor SHBG trends as metabolic risk guidance
Metabolic syndrome risk	SHBG < ~76.6 nmol/L → increased MetS	Potential threshold for metabolic screening
Cardiovascular and lipid risk	↑ SHBG causally linked to ↓ CHD risk via better lipid profile	Supports SHBG as a metabolic resilience marker
Nutrition & SHBG expression	Diet components (fiber, olive oil, caffeine, red wine) modulate SHBG	Encourages dietary strategies to optimize SHBG

PMID: 38934352, 38320264, 39026336

Transport:
Minerals

- **Magnesium** – helps regulate SHBG production.
- **Vitamin D** – low levels can alter SHBG and free hormone levels.
- **Zinc** – important for the structure of transport proteins and SHBG regulation.
- **Selenium** – aids thyroid hormone transport by supporting proteins that bind and convert them.

More likely to be low after menopause: Calcium, magnesium, zinc, selenium, copper, manganese.
More likely to be high: Iron (due to loss of menstruation).

PMID: 32850896, 24011991, 33535639

Transport:

Mineral adequacy = natural chelation + competition

- Adequate essential minerals “occupy” transporters, binding sites, and enzyme cofactors that toxic metals would otherwise hijack.
- In menopause, where mineral deficiencies are common (Ca, Mg, Zn, Se), women may have **higher susceptibility to toxic metal burden** from both environmental exposures and internal release (lead from bone).

PMID: 36979042

Transport:
Importance of hydration & salts

- Estrogen and progesterone influence fluid regulation
  - Estrogen typically helps the body retain water, while progesterone promotes fluid elimination.
- In a 60-kg healthy menopausal woman, lean mass is reduced, and about 55% of body mass is water (lower than the average of 60-70%).

PMID: 24492487

Transport:
Importance of hydration & salts

- Symptoms like **hot flashes and night sweats** increase fluid loss, raising risks of dehydration. Fluid loss combined with hormonal shifts further compromises hydration.
- Dehydration may **exacerbate symptoms** such as fatigue, headaches, dizziness, dry skin, and brain fog
    - Even mild dehydration (just 1–2%) can impair cognitive function, worsen fatigue, and intensify hot flashes.

PMID: 24492487

Transport:
Importance of hydration & salts

- Aim for **~2–3 liters/day** from beverages and high-water foods (fruits, vegetables, soups).
- Include **electrolyte-rich foods** (leafy greens, citrus, coconut water) to support fluid balance.
- Sole as a super-saturated, quality salt (Original Himalayan Crystal Salt) solution

Activation:
Modulating cellular receptors

Activation:

Modulating cellular receptors

- Phytoestrogens
- Phytoprogestins
- Selective Estrogen Receptor Modulators (SERMs)
- Serotonergic modulation
- Adaptogens

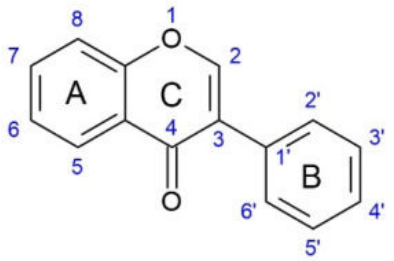
Hormone activation through receptors:

- **Receptor Sensitivity** – how responsive the cell is to the hormone.
- **Receptor Number** – more receptors = stronger response.
- **Interference** – toxins, inflammation, or competing molecules can block binding.

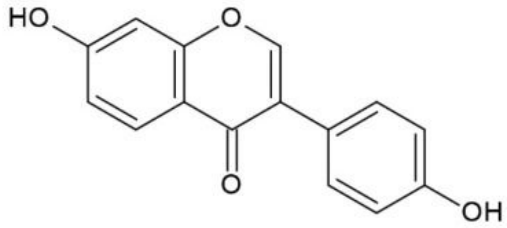
Phytoestrogens: Soy

- Isoflavones, particularly daidzein and genistein, are among the most studied phytoestrogens
- High-affinity binding to estrogen receptors, particularly ERβ, resulting in pronounced estrogen-like effects and diverse biological activities
  - Selective estrogen response modulators (SERMs)

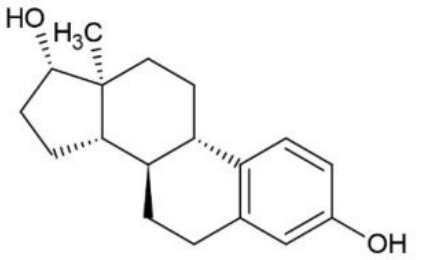
A. Isoflavone



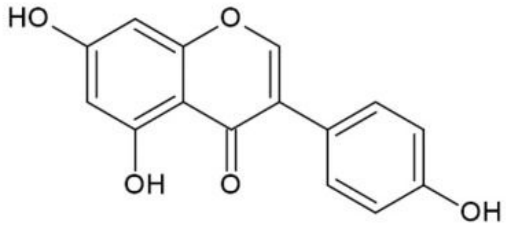
B. Daidzein



C. 17β-estradiol



D. Genistein



PMID: 40725220

Modest benefit in symptoms with soy

- **Isoflavones show modest benefit overall:** Most trials with genistein and daidzein report only small reductions in vasomotor symptoms compared to conventional HRT.
- **Genistein-enriched supplements look stronger:** RCTs (n = 90–200+) using **30–54 mg/day genistein** have shown up to **50% reductions** in hot flash frequency and severity versus placebo.
- **Individual variability matters:** Benefits appear greater in **equol producers**, but not all trials show significant results, underscoring the need for larger, well-controlled studies.
  - About 30–50% of Western women are equol producers, vs 50–70% in Asian populations.

PMID: 40725220

The gut microbiome changes postmenopause

- Menopause spans ~30 years, influencing long-term microbiota shifts
- Post-menopausal gut microbiomes show lower diversity and diminished estrobolome function.
- Menopause often comes with reduced microbial diversity, which may lower equol conversion potential.
- Animal studies: estrogen treatment reverses menopause-like microbiome changes.

PMID: 29033921, 30791484

Guidance for soy intake

- Moderate soy intake (1–2 servings/day, equivalent to 40–50 mg isoflavones)
- Caution when using high-dose isoflavone supplements, especially for an extended period or if they have hormone-related health problems, since the exact effects are unknown.
- Personalized approaches that account for genetic differences in isoflavone metabolism, gut microbiota composition, and overall health status could help optimize the therapeutic benefits of these compounds.

PMID: 40725220

Phytoestrogens: Flaxseed lignans

Outcome	Results
Hot flash reduction	Daily flaxseed bar delivering 410 mg lignans vs placebo bar in 6-week, randomized, placebo-controlled, double-blind trial; Modest or non-significant in large RCT (~33% flax vs ~29% placebo);
Symptom reduction	Some smaller studies show benefit in frequency/duration and severity
Biomarkers & hormone metabolism	Flaxseed (~ 2 tablespoons) improves lignan levels and favorable estrogen metabolite ratios (increased serum 2-hydroxyestrone and 2:16α-hydroxyestrone ratio)
Safety	No adverse effects on endometrial thickness or vaginal cytology observed

PMID: 21900849, 39364521, 36766971, 30375890

Guidance for flaxseed intake

- Ground (milled) flaxseed is preferred
- ~25 g ground flaxseed/day (~2–3 tablespoons, ~50 mg lignans).
- Practical, everyday intake: 1–2 tablespoons (10–20 g) ground flaxseed daily provides ~30–60 mg lignans, 2–4 g ALA, and ~3–5 g fiber.
- Higher doses may cause abdominal distension, flatulence, diarrhea, and nausea.
- Best stored in the refrigerator/freezer after grinding to prevent rancidity
- Adequate hydration is helpful.

PMID: 16317125

Activation:

Modulating neurotransmitter pathways with black cohosh

- Black cohosh appears to act on the **serotonin and dopamine pathways** in the hypothalamus, influencing **thermoregulation**
- **Mixed results overall.** The large, high-quality HALT RCT (n=351) found **no benefit** of black cohosh (alone or in a botanical mix) over placebo for hot flashes.
- Studies tend to be small with older publication dates (~10 years)

PMID: 17179056, 22972105

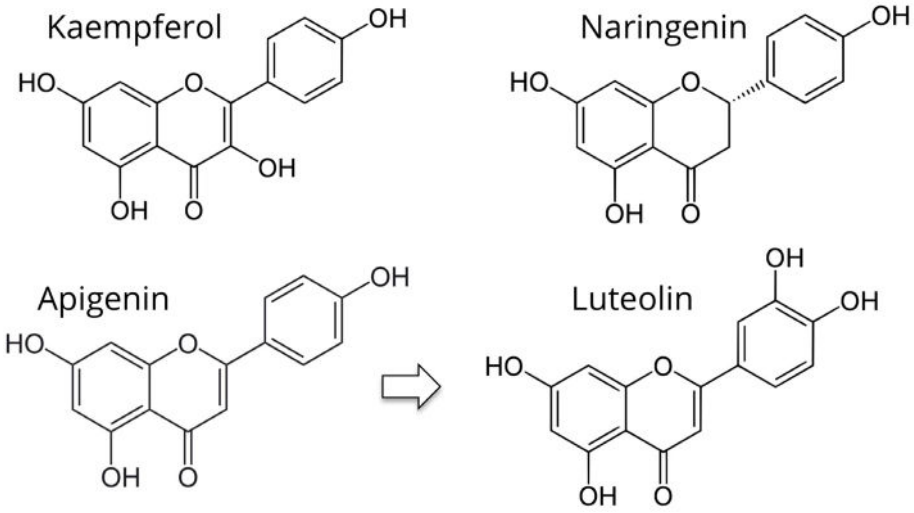
Activation:

Modulating cellular receptors with phytoprogestins

Phytoprogestins

- Dioscorea villosa, Vitex agnus-castus, and Turnera diffusa have some 'progesterone-like' properties.
- Dietary phytoprogestins
  - Kaempferol, naringenin, apigenin, luteolin
- More studies required: clinical trials in menopausal women lacking.

PMID: 37494965



Greco, S.; Pellegrino, P.; Zannotti, A.; Delli Carpini, G.; Ciavattini, A.; Reis, F.M.; Ciarmela, P. Phytoprogestins: Unexplored Food Compounds with Potential Preventive and Therapeutic Effects in Female Diseases. *Nutrients* **2021**, *13*, 4326. https://doi.org/10.3390/nu13124326

Activation:

HPA axis

Some limited clinical trial data support the use of adaptogens for stress resilience and menopausal symptoms:

- **Ashwagandha (Withania somnifera)** — 91 perimenopausal women, 300 mg BID for 8 weeks: significantly improved total MRS and MENQOL scores vs placebo; E2 ↑, FSH/LH ↓ (between-group), suggesting symptom and hormonal effects.
  - Influences GABAergic and serotonergic signaling
  - May increase thyroid activity
  - Mild GI upset is the main side effect

PMID: 34553463

Activation:
HPA axis

Other Adaptogens

- **Schisandra chinensis** — 36 women, BMO-30 extract for 6 weeks: greater reduction in Kupperman Index vs placebo; benefit most notable for hot flushes, sweating, palpitations.
- **Rhodiola rosea** - Evidence mainly from combination therapy (with black cohosh): RCT showed greater Kupperman/MRS improvements than black cohosh alone; robust trials of rhodiola monotherapy for VMS are lacking.
- **Panax ginseng -** Evidence on ginseng as an effective treatment for managing menopause symptoms is limited. Most of the RCTs are burdened with a high risk of bias.

PMID: 27763802, 32455817, 23717154

Comparison of plant actives for menopause

	Maca-GO®* (*Lepidium peruvianum*)	Maca (*Lepidium meyenii*)	Black Cohosh (*Cimicifuga racemosa*)	Chaste Tree (*Vitex agnus-castus*)	Dong Quai^{v} (*Angelica sinensis*)	ERr 731® (*Siberian rhubarb*)	Red Clover (*Trifolium pratense*)	Soy isoflavones	Wild Yam (*Dioscorea villosa*)
Symptoms	Hot flashes, night sweats, libido, energy, mood swings, PMS, fertility, menstrual disorders (PCOS, endometriosis, dysmenorrhea, amenorrhea)	Hot flashes, night sweats, energy, libido [1,2]	Hot flashes, night sweats, mood [3-6]	PMS [3,7]	Hot flashes, night sweats, PMS [3-5,8]	Hot flashes. night sweats, moods	Hot flashes, night sweats [3-5]	Hot flashes, night sweats [3-5]	Hot flashes, night sweats, PMS [3,4,9]
Efficacy	74-87% reduction in menopausal symptoms, as measured by KMI, in human clinical trials.[10-13] 100% resolution of hot flashes, night sweat and anxiety in 1 published case.[14]	30%-60% reduction in menopausal symptoms.[1] Efficacy for symptoms varies based on the color of maca used[2]	Up to 60%. Shows promise but insufficient/ inconsistent evidence for menopausal symptoms$^{\wedge}$, some reports are similar to placebo.[4-6]	14-80% improvements in symptoms.[7]	Up to 25%. No effects or similar to placebo for menopausal symptoms.[3-5,8] No RCT's for PMS.***[3,15]	67-83% reduction in hot flashes, with significant changes in MRS scores.[16-18] 84% reported decreased anxiety.[19]	Up to 25%. Similar to placebo or slight improvements.[3-5]	Up to 40%. Insufficient/ inconsistent evidence for menopausal symptoms; similar to placebo or modest improvements.[3-5]	Up to 25% reduction in PMS and menstrual pain (limited evidence)[9]; Similar to placebo[3,4] or ineffective for menopause when used as cream.[3]
Effect on Hormones	Significant improvements in estradiol, progesterone, FSH, LH, T3, cortisol, ACTH.[10-13]	Preclinical trials show slight increase in E2 with ethanol extract.[20] Otherwise, no effect on hormone levels.[21]	Animal studies suggest it may suppress LH.[6]	Preclinical evidence suggests higher LH, FSH, estrogen and progesterone.[23] Decreased FSH and increased LH (in vitro studies).[3]	Not studied.	Not studied.	Statistically significant change in FSH and SHBG, no impact on estrogens.[24] Preclinical trials on estradiol and progesterone.[25]	Conflicting data: No effects to reduction in estradiol, progesterone, DHEA-S.[26] Moderate increase in SHBG, decrease in free estradiol and estrone.[27]	No effect.[28]

Abbreviations: KMI=Kupperman's Menopausal Index; MRS= Menopause Rating Scale II; TCM= Traditional Chinese Medicine

*FemmenessencePRO® can be used in combination with other botanicals or bio-identical hormone therapy, when indicated.
^Highest and most consistent efficacy is based on the use for a specific commercial product of black cohosh.
ᵛDong Quai is primarily used in a combination herbal therapy product.
#Study group variability included peri-menopausal women, post-menopausal women, and women with a history of breast cancer (hot flashes resulted from cancer treatment)

Other nutrients to consider for receptor function and activity

Omega-3 Fatty Acids – Improve Receptor Fluidity

- Cell membranes need healthy fats for optimal receptor structure and hormone binding.
- **Sources:** salmon, sardines, flax, chia, walnuts

Antioxidant-Rich Foods – Protect Receptor Integrity

- Oxidative stress can damage receptors or alter their shape.
- **Sources:** berries, green tea, dark leafy greens, cacao, colorful vegetables

The Photometabolome:
It’s not just vitamin D…

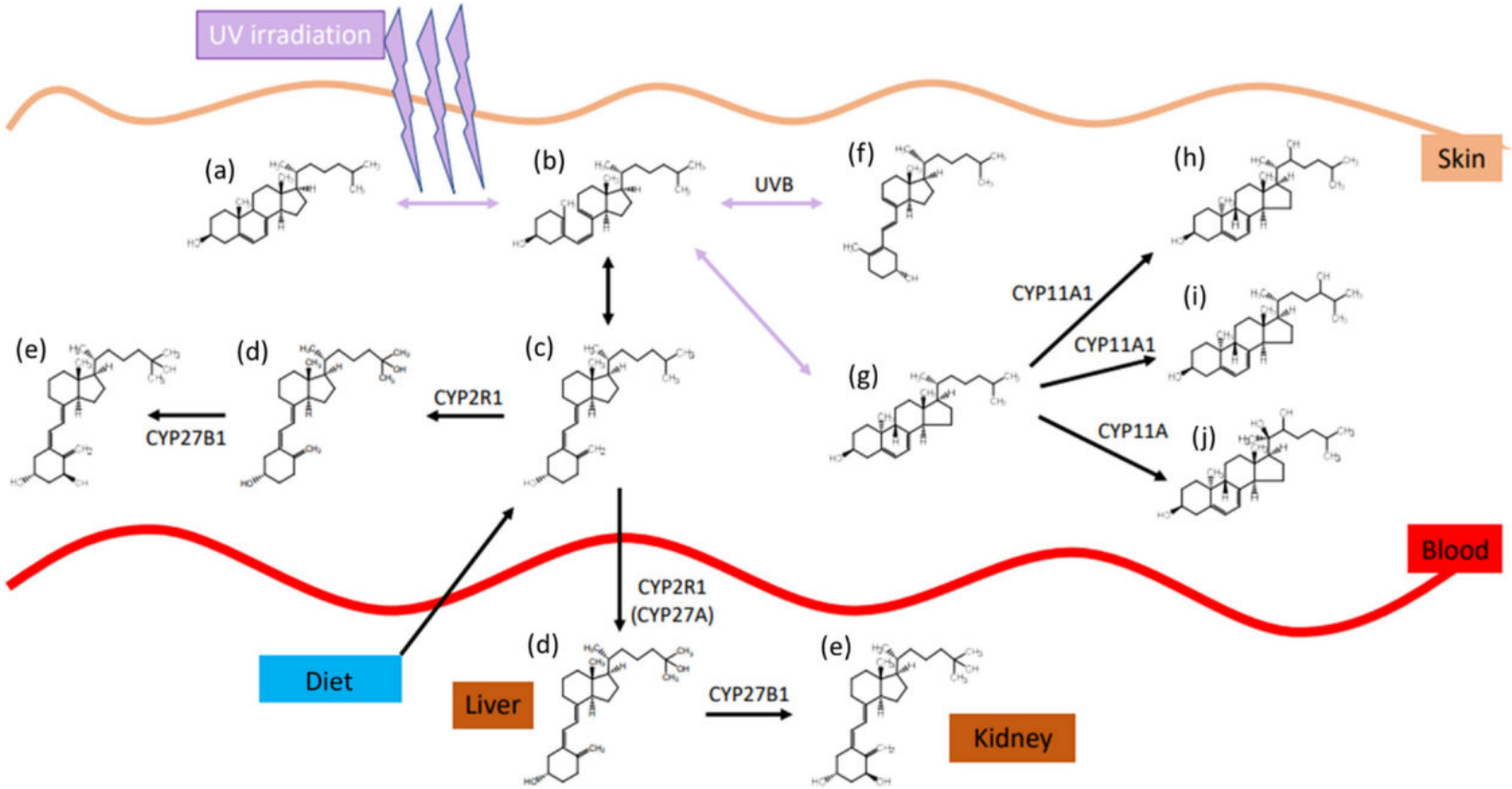
- The overall “**photometabolome**” of the skin is broader than just cholecalciferol, including molecules that may act as local hormones or modulators of skin immunity.
- Postmenopausal women are often vitamin D deficient, but they may also benefit from non-classical vitamin D metabolites, which support skin health, local immune balance, and anti-inflammatory pathways.

PMID: 40077673

Vitamin D photometabolites in skin

With full-spectrum light, the skin forms not only vitamin D_3 but also multiple vitamin D–like photoproducts (tachysterol, lumisterol, hydroxylated derivatives such as 20(OH)D_3).

These compounds have emerging roles in immune regulation, photoprotection, and inflammation control.



Schümmer, T.; Stangl, G.I.; Wätjen, W. Safety Assessment of Vitamin D and Its Photo-Isomers in UV-Irradiated Baker's Yeast. *Foods* **2021**, *10*, 3142. https://doi.org/10.3390/foods10123142

Menopausal women may need more than just vitamin D

- **Participants:** 70 postmenopausal women (<20 ng/mL vitamin D, osteopenia).
  - **Group A:** Narrowband UVB therapy (3x/week) **plus** high-dose vitamin D_3 loading (100,000 IU weekly for 8 weeks) followed by daily maintenance (3,000 IU for 16 weeks).
  - **Group B (control):** Vitamin D_3 supplementation alone.
- **Results:** After 6 months, both groups improved, but **UVB + vitamin D was significantly superior**, showing greater increases in: vitamin D levels, lumbar spine and femur bone density (T-scores), knee extensor muscle strength
- **Conclusion:** Combining **narrowband UVB irradiation with vitamin D_3 supplementation** is more effective for improving bone and muscle health in vitamin D–deficient postmenopausal women than supplementation alone.

PMID: 40534210

Endocrine Disruptor Interference

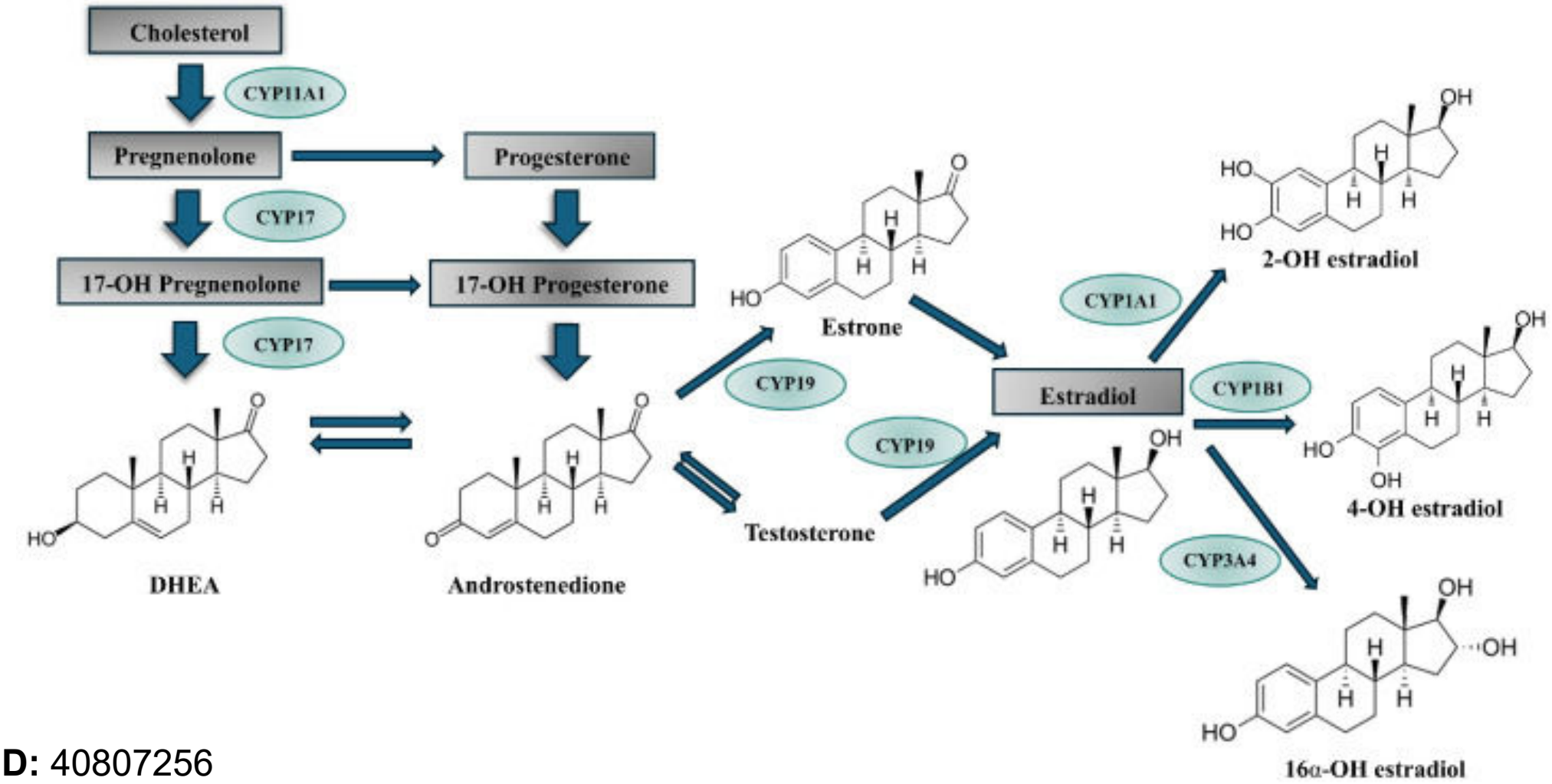
Endocrine disruptors interfere with estrogen signaling by:

- **Mimicking/blocking ER binding** (e.g., BPA, nonylphenol).
- **Altering co-regulator recruitment**, changing gene transcription.
- **Triggering rapid non-genomic signaling** via membrane ERs/GPER.
- **Inducing epigenetic changes** in estrogen-responsive genes.
- **Disrupting receptor cross-talk** with other endocrine systems.

PMID: 19502515

Metabolism:
Ensuring healthy quantities & ratios of hormone metabolites

Metabolism:
Estrogen metabolites

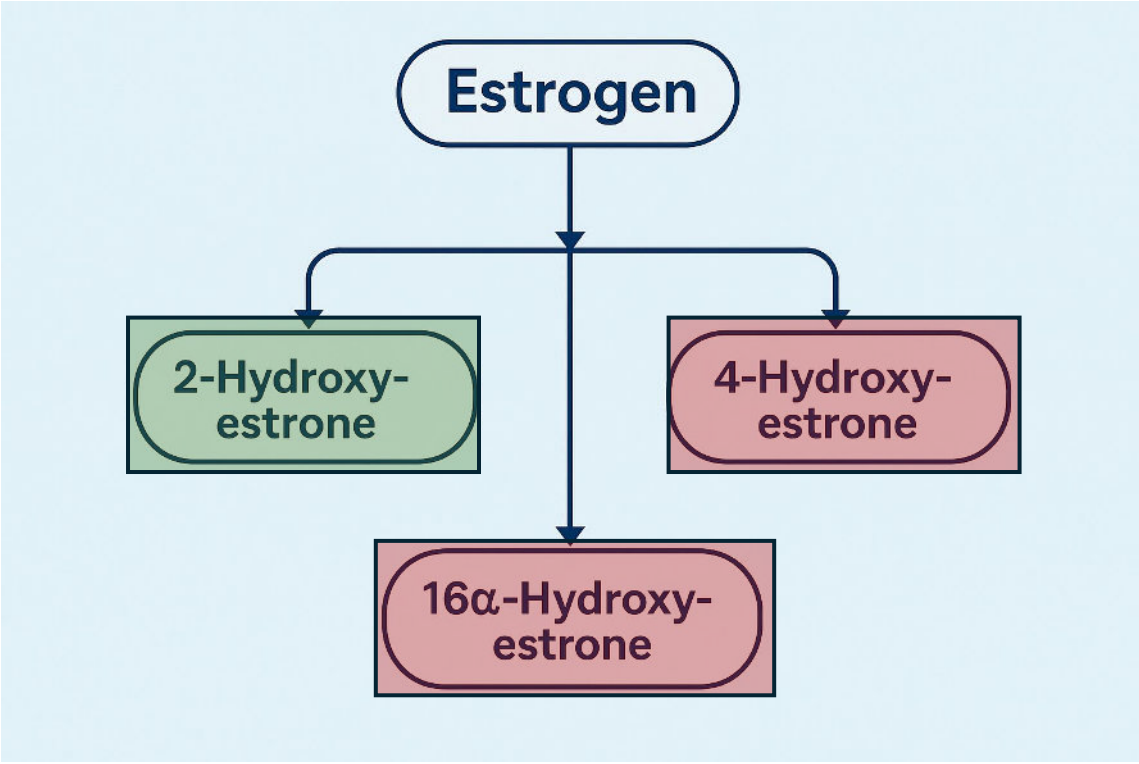


PMID: 40807256

Supporting Detoxification Pathways in Menopause

Menopausal health risk:

- Imbalances in Phase I estrogen metabolism (favoring 4- or 16-hydroxy metabolites) are associated with higher risks of breast/endometrial cancer.
- Aging/menopause alter CYP activity and estrogen availability, influencing metabolite balance.



PMID: 16102930

Supporting Detoxification Pathways in Menopause

Modifiable factors:

- Increase cruciferous vegetables (I3C, DIM → induce CYP1A1, shift toward 2-hydroxylation).
- Add flaxseed lignans (support 2-hydroxylation; effects modified by COMT/CYP1B1 genotype).
- Limit alcohol (reduces 2-hydroxy metabolites).
- Support Phase II detox (methylation, glucuronidation, sulfation) to neutralize Phase I intermediates.

PMID: 16102930, 17301257, 11694156

Nutrition for Hormone Metabolism

Phase 1 – Modification (Liver)

- Enzymes modify hormones (e.g., hydroxylation, oxidation) to prepare them for excretion.
- **Nutrients Needed:**
  - **B Vitamins** (B2, B3, B6, B12, folate) – co-factors for cytochrome P450 enzymes.
    - Sources: leafy greens, eggs, legumes, poultry, whole grains
  - **Antioxidants** (vitamins C & E, carotenoids) – protect liver cells from oxidative stress during metabolism.
    - Sources: citrus, berries, nuts, colorful vegetables

Nutrition for Hormone Metabolism

Phase 2 – Conjugation (Liver)

- Hormones are bound to another compound to make them water-soluble for elimination.
- **Nutrients Needed:**
  - **Amino Acids** (glycine, taurine, cysteine, glutamine) – for sulfation, glucuronidation, and amino acid conjugation pathways.
  - **B vitamins** – for methylation support (especially in MTHFR)
  - **Sulfur Compounds** – support sulfation pathways.
    - Sources: cruciferous vegetables (broccoli, kale, Brussels sprouts), garlic, onions
  - **Magnesium** – cofactor for many conjugation reactions.

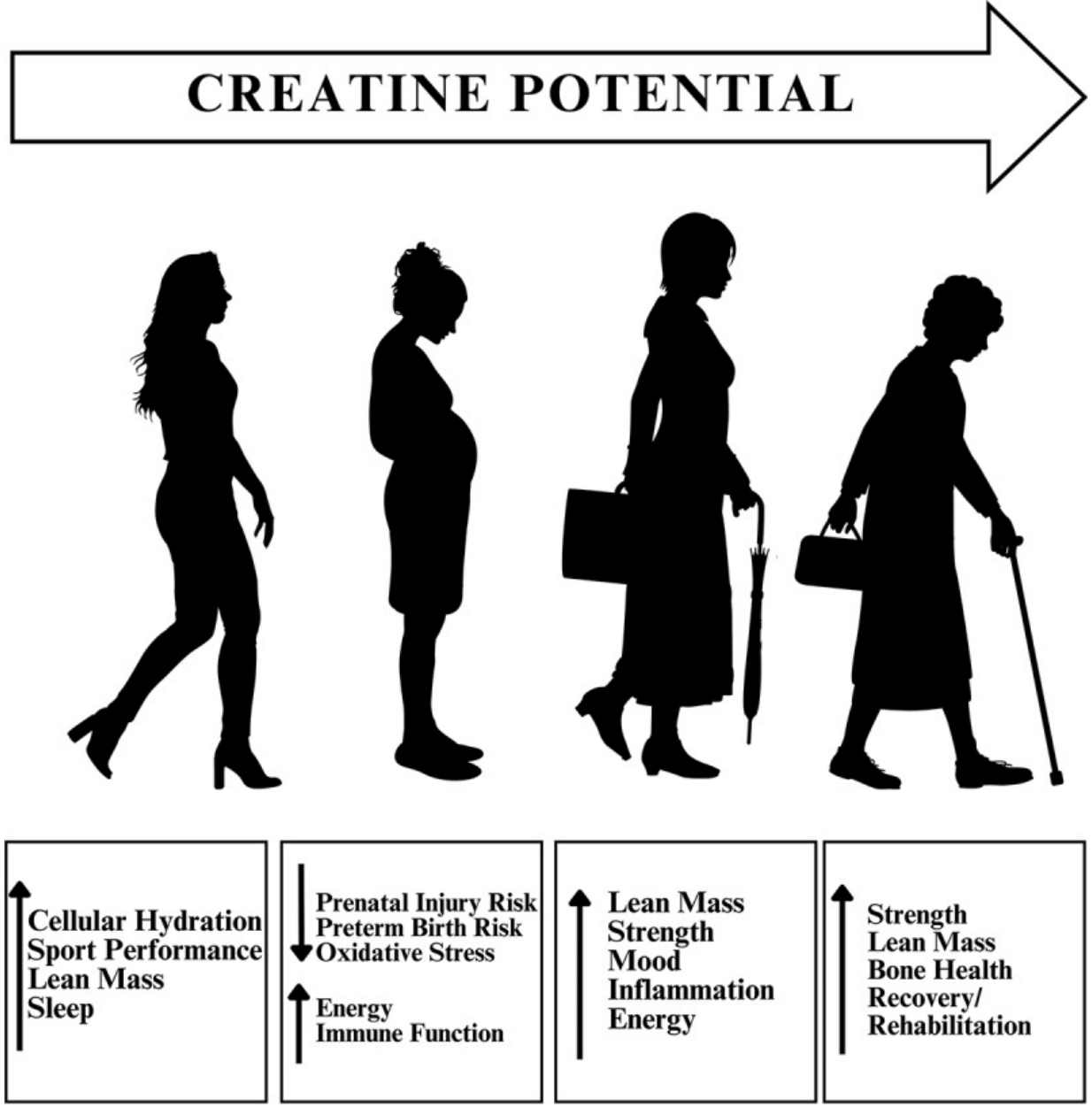
Flaxseed, Estrogen Metabolites, and Genotype in Postmenopausal Women

- 132 healthy postmenopausal women (ages 46–75) with an intervention of 10 g ground flaxseed daily for 7 days.
- Flaxseed significantly ↑ **2OHE1** and ↑ **2OHE1:16OHE1 ratio** after 7 days (both $P < 0.01$).
- Genetic differences in COMT and CYP1B1 modify the degree of this effect, suggesting that diet–gene interactions influence estrogen metabolism and potentially disease risk.
  - **COMT Met/Met** carriers had the largest ratio increase (not statistically significant).
  - **CYP1B1 Val/Val** carriers had significantly greater increases than Leu/Leu ($P = 0.04$).

PMID: 17301257

Metabolism:
Support muscle through creatine supplementation

PMID: 40371844



Excretion:
Eliminating hormone metabolites efficiently

Excretion:
Eliminating from the body

- **First-pass metabolism:** In the liver, endogenous estrogens undergo conjugation with glucuronide or sulfate groups → enables biliary excretion.
- **Gut fate of conjugated estrogens:**
  - Excreted directly in feces, **or**
  - **Deconjugated by gut microbiota** (β-glucuronidase, sulfatase activity) — collectively termed the **"estrobolome."**
  - **Enterohepatic recirculation:** Deconjugated estrogens are reabsorbed, re-enter systemic circulation, and can act on tissues again.

PMID: 35983178

Hormone Elimination:
The role of β-glucuronidase

Menopause-specific effects & interventions

- Deconjugating functions of the gut microbiome (estrobolome) declined in postmenopausal vs. premenopausal women.
- Women with higher β-glucuronidase activity may have *greater estrogen recycling* → potentially protective for bones/brain, but also possibly higher risk for breast or endometrial cancer.
- Elevated activity may increase **toxin reabsorption**, which could be more problematic postmenopause, when liver detox efficiency and antioxidant defenses decline.

PMID: 35675542

Fortify the gut with SCFA-producing fibers

- **Microbiome changes linked to menopause**
  Postmenopausal women exhibit gut dysbiosis, characterized by reduced microbial diversity, lower SCFA (e.g., butyrate)-producing bacteria such as *Roseburia*, shifts in dominant taxa (e.g., increased *Bacteroidetes* and *Tolumonas*), and elevated species, including *Alistipes*.

Butyrate changes linked to skeletal muscle

- Higher gut microbial capacity to produce butyrate correlated with elevated serum butyrate levels and higher skeletal muscle index in postmenopausal women.
- This underscores the potential for **microbiome-targeted interventions** (e.g., dietary fiber, probiotics) aimed at increasing butyrate production to support musculoskeletal health during menopause.

PMID: 38170622, 34472211

The Sequence of the Hormone Symphony through Nutrition

Synthesis

- **Goal:** Provide raw materials to make hormones.
- **Macronutrients:**
  - Fats → steroid hormones (estrogen, progesterone, testosterone, cortisol)
  - Protein → peptide hormones (insulin, growth hormone, thyroid hormones)
  - Complex carbs/fiber → stabilize insulin & cortisol
- **Micronutrients & Co-factors:**
  - B vitamins, vitamin C
  - Magnesium, zinc, selenium, iodine

Transport

- **Goal:** Deliver hormones to target cells efficiently.
- **Protein:** amino acids for carrier proteins (albumin, SHBG)
- **Healthy Fats:** maintain cell and lipoprotein function
- **Minerals:** zinc, selenium, magnesium, for proper carrier protein synthesis
- **Hydration:** ensures blood volume and flow

Activation

- **Goal:** Make sure hormones can "unlock" receptors on cells.
- **Phytoestrogens:** gentle estrogen receptor modulators (flax, soy, legumes)
- **Omega-3s:** improve cell membrane fluidity for receptor function
- **Antioxidants:** protect receptor integrity (berries, dark leafy greens, green tea)
- **Minerals for signaling:** magnesium, zinc, chromium
- **Vitamin D:** modulates receptor expression

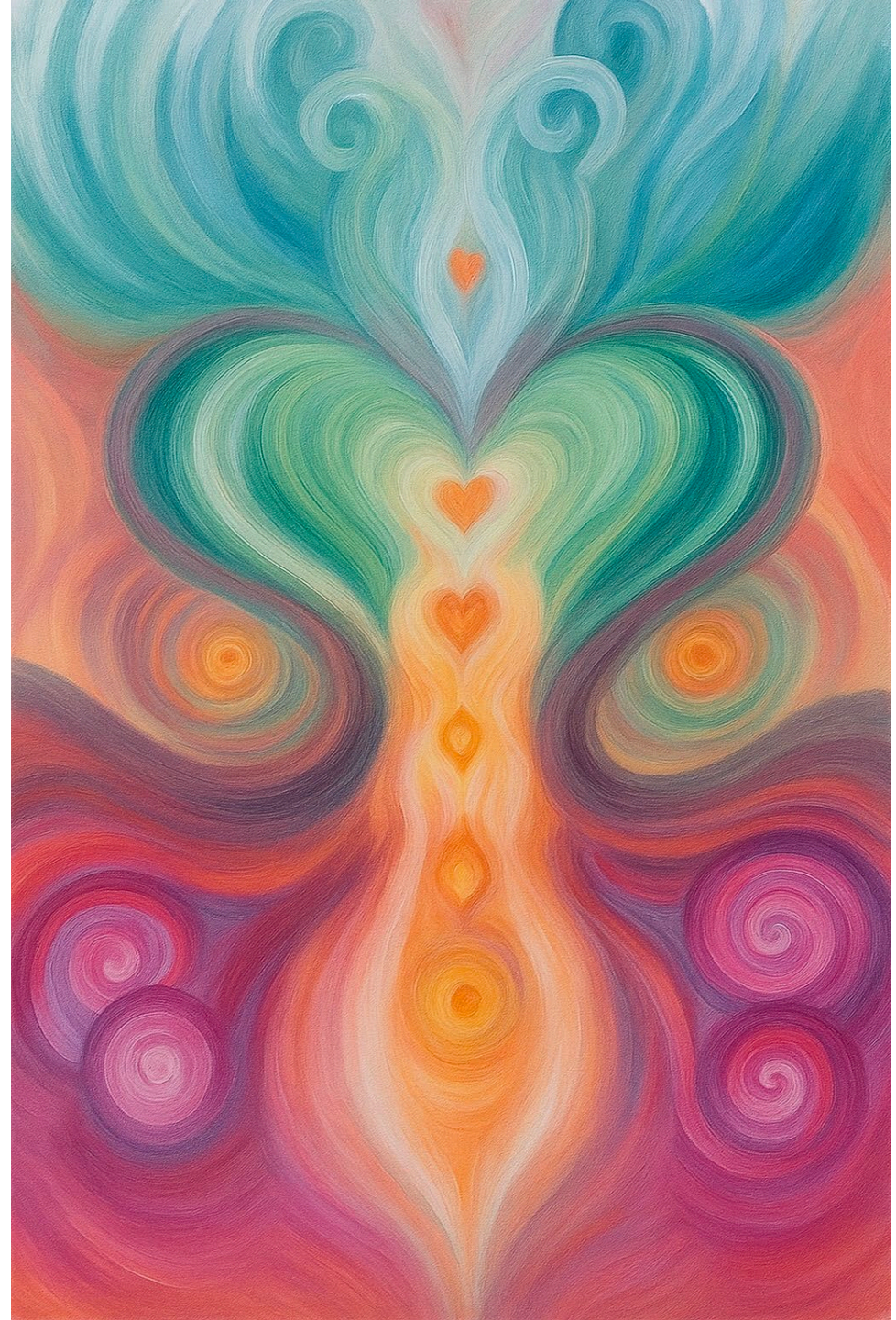
Metabolism

- **Goal:** Modify hormones so they can be safely excreted.
- **Phase 1 (liver modification):** B vitamins, antioxidants
- **Phase 2 (conjugation):** amino acids (glycine, taurine, cysteine), sulfur compounds, magnesium
- **Phase 3 (gut/kidney elimination):** fiber, probiotics/prebiotics, hydration
- **Supportive foods:** cruciferous vegetables, citrus, green tea

Elimination

- **Goal:** Remove used hormones efficiently to prevent imbalance.
- **Bowel support:** fiber, hydration, magnesium, probiotics/prebiotics
- **Kidney support:** adequate fluids, electrolytes, kidney-friendly foods (cranberries, parsley)
- **Minor pathway – sweat:** hydration, phytonutrient-rich foods, exercise/sauna
- **Avoid:** low-fiber diet, alcohol excess, processed foods, chronic constipation

Lifestyle Therapies:
Foundational practices for everyday support



Reframing Menopause

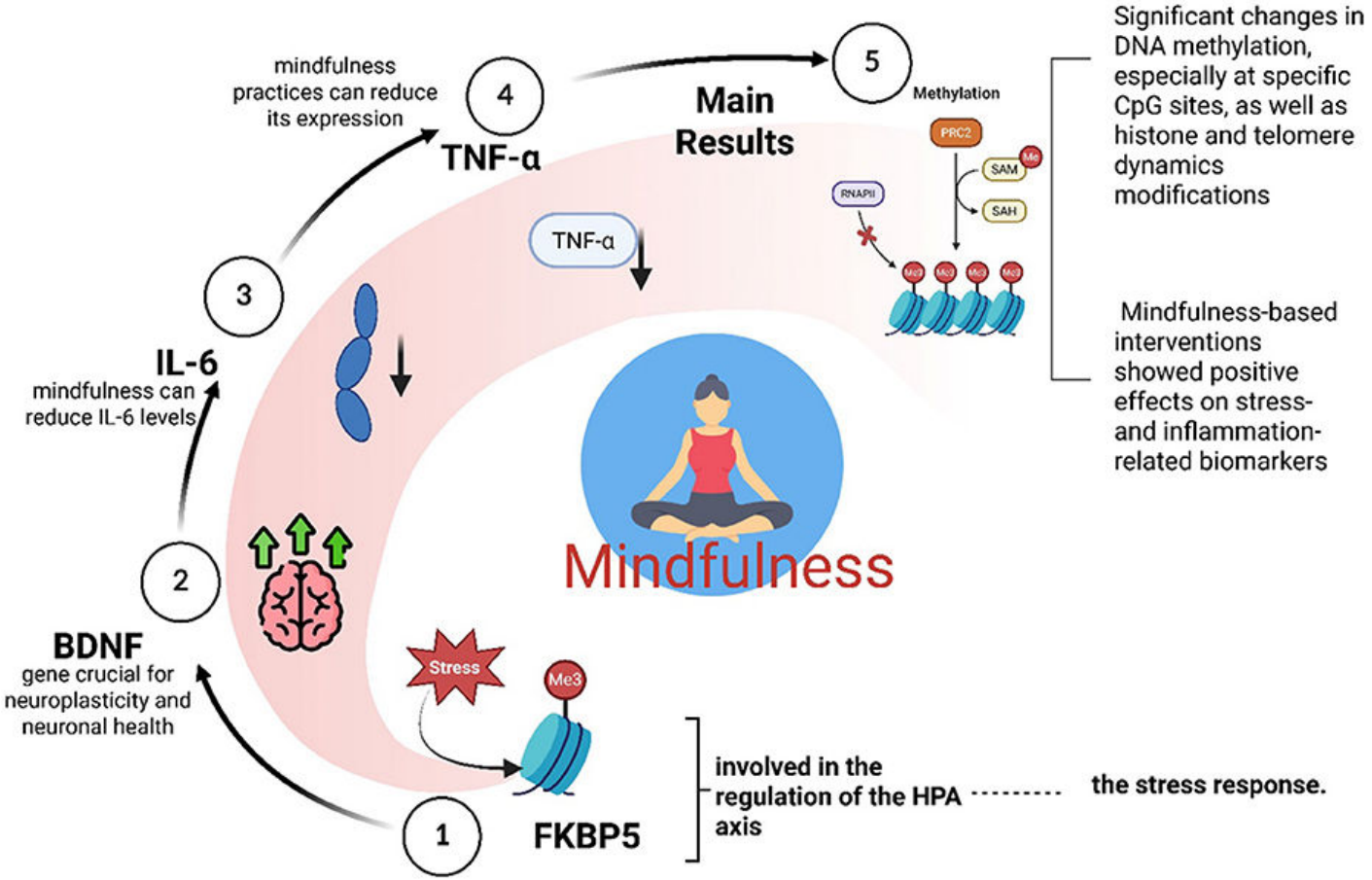
Menopause as a Rite of Passage

Females who dismiss menopause and ageing usually have unfavorable menopausal signs and experiences.

PMID: 9710286, https://www.ncbi.nlm.nih.gov/books/NBK601354/

Evidence-Based Lifestyle Therapies

Stress/Emotional regulation



Ostaiza-Cardenas J, Tobar AC, Costa SC, Calero DS, López-Carrera A, Bermúdez FG and Orellana-Manzano A (2025) Epigenetic modulation by life–style: advances in diet, exercise, and mindfulness for disease prevention and health optimization. *Front. Nutr.* 12:1632999. doi: 10.3389/fnut.2025.1632999

Evidence-Based Lifestyle Therapies
Modalities for Menopause

Mind-body exercise has been shown to improve bone mineral density, sleep quality, mood (anxiety and depression), and fatigue in perimenopausal and postmenopausal women.

- **Mindfulness meditation**: Improves mood, decreases hot flash bother, and alters stress-related gene expression.
- **Breathwork**: Slow diaphragmatic breathing activates the vagus nerve, lowering cortisol and anxiety.
- **Yoga / Tai Chi / Qigong**: Enhance GABAergic tone, improve sleep, reduce perceived stress.

PMID: 38669625

Peri/Menopause & Circadian Dysregulation

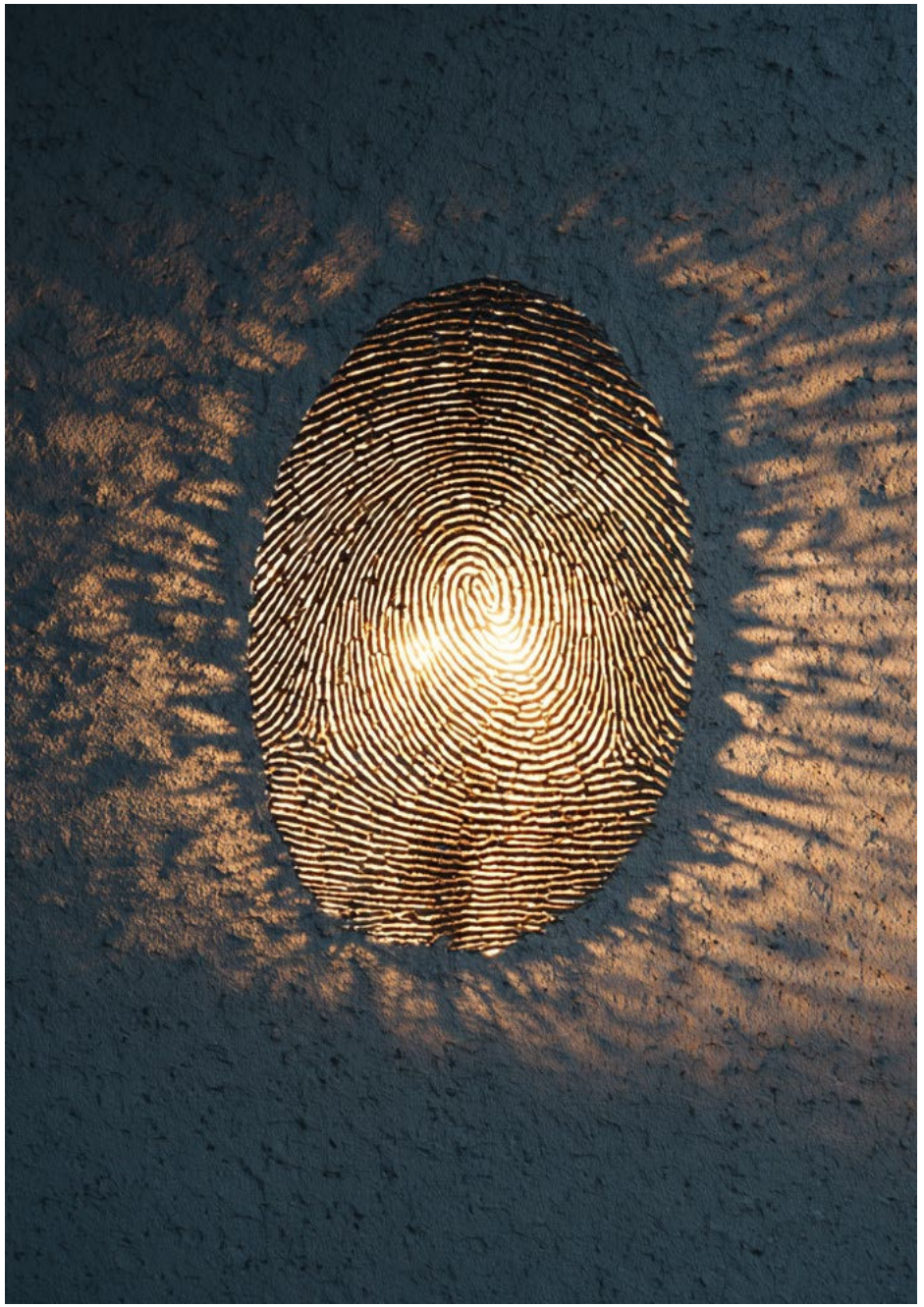
Sleep disruption & hot flashes → circadian misalignment

- **Nocturnal vasomotor symptoms** are frequent in postmenopause and often coincide with awakenings.
- **Melatonin amplitude and circadian rhythm strength decline** after menopause, increasing vulnerability to circadian misalignment.
- **Sleep fragmentation** is the hallmark of menopause-related insomnia, manifesting as more nighttime awakenings.

PMID: 38916279, 36420995, 7629229

Variables in circadian tone

1. **Antecedents:**
   - Gene variants like MTNR1B, CLOCK
   - Physical features like eye color and sensitivity, skin color
   - Age and sex
2. **Triggers:**
   - Psychological and stress factors
3. **Mediators:**
   - Gut microbiome
   - Hormonal cycles
   - Sleep architecture
   - Toxic load

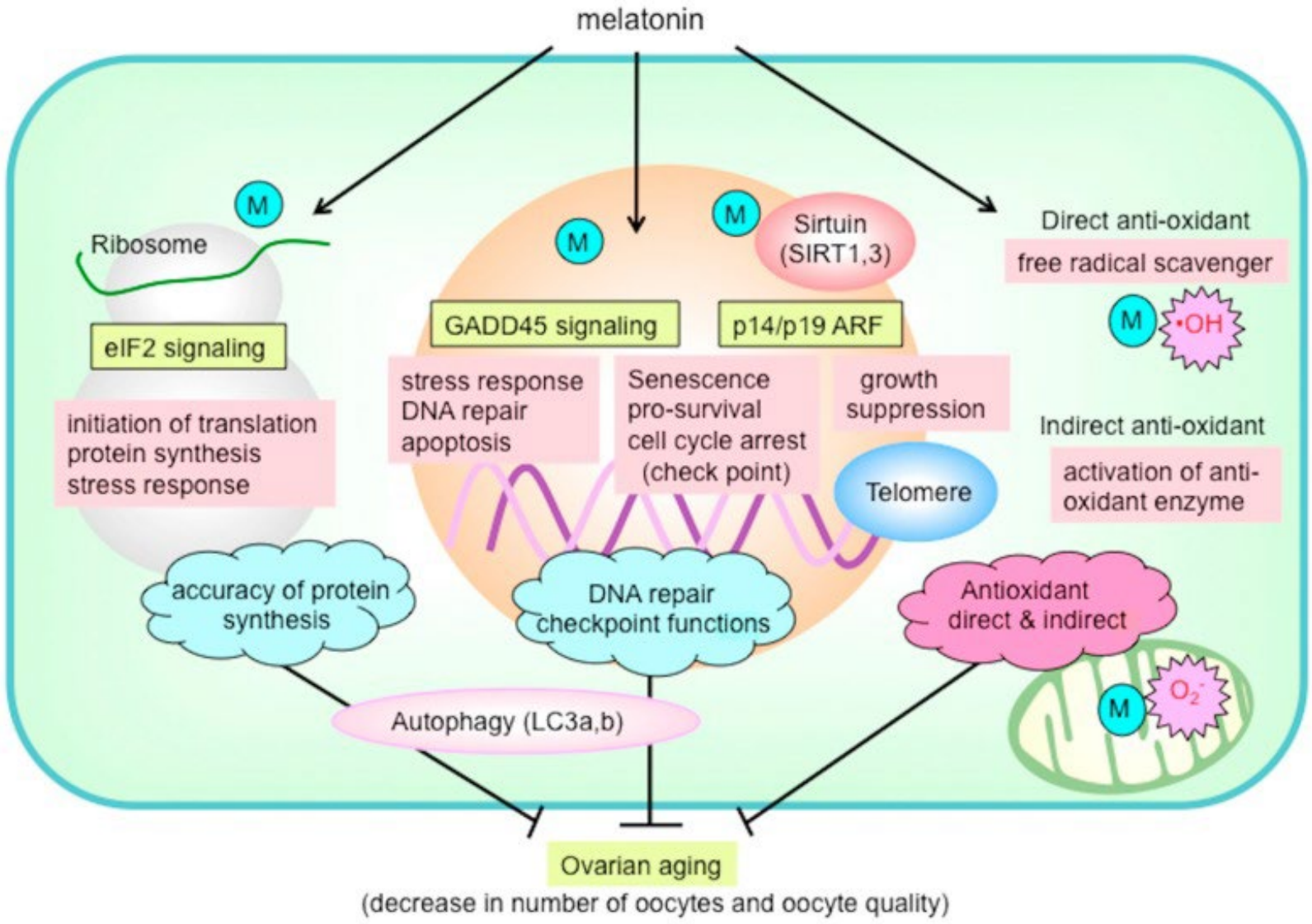


Evidence-Based Lifestyle Therapies
Sleep Hygiene

- Address dysregulated diurnal cortisol and blood glucose relating to 2-3 AM wake-ups
- Supplement with plant melatonin to help with reduced levels with age and for promoting brain, antioxidant, anti-inflammatory and glymphatic support
  - Melatonin has a favorable effect on bone density and BMI.
  - It improves EEG patterns and subjective sleep quality in postmenopausal women with preexisting sleep impairment.
  - With doses of 3 mg or above, melatonin improves climacteric symptoms in one or more domains.
- Tighten the circadian rhythm activities with bright morning light, less artificial light at night, less eating close to bedtime, especially for those with gene variants for MTNR1B

PMID: 29569793, 37529598, 33969545

Mechanisms by which melatonin may help prevent accelerated ovarian aging

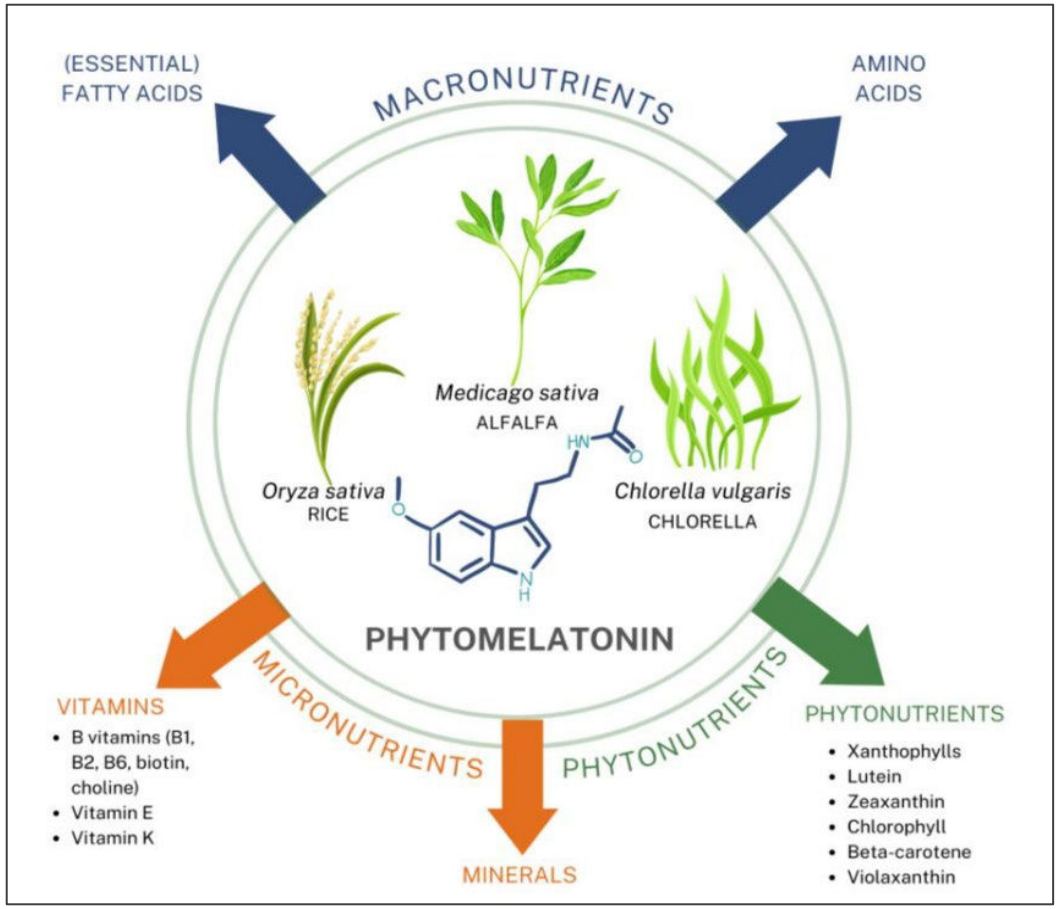


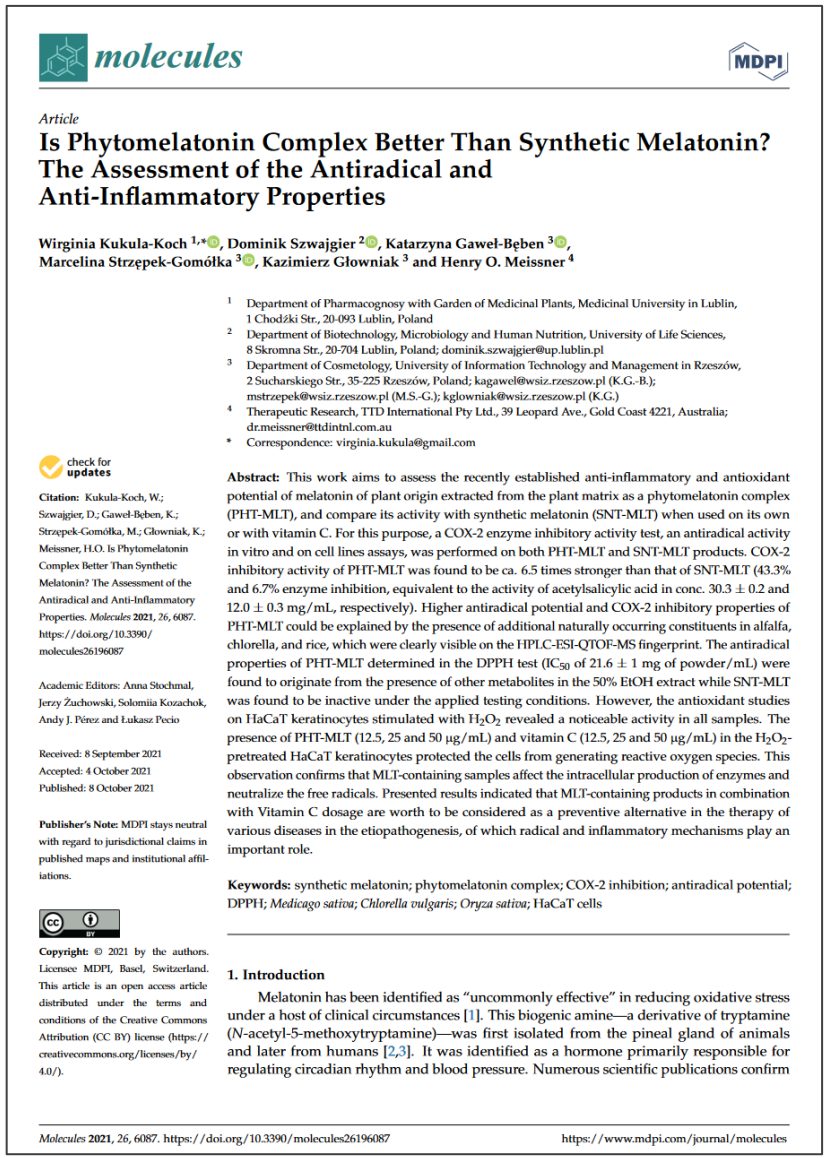
Tamura H, Jozaki M, Tanabe M, et al. Importance of Melatonin in Assisted Reproductive Technology and Ovarian Aging. *Int J Mol Sci*. 2020;21(3):1135. Published 2020 Feb 8. doi:10.3390/ijms21031135.

Plant-based melatonin:

Bioidentical melatonin in the plant cell matrices from rice, alfalfa, chlorella

Green in color; whole plant material





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Article

Is Phytomelatonin Complex Better Than Synthetic Melatonin? The Assessment of the Antiradical and Anti-Inflammatory Properties

Wirginia Kukula-Koch [1,*], Dominik Szwajgier [2], Katarzyna Gaweł-Bęben [3], Marcelina Strzępek-Gomółka [3], Kazimierz Głowniak [3] and Henry O. Meissner [4]

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Citation: Kukula-Koch, W.; Szwajgier, D.; Gaweł-Bęben, K.; Strzępek-Gomółka, M.; Głowniak, K.; Meissner, H.O. Is Phytomelatonin Complex Better Than Synthetic Melatonin? The Assessment of the Antiradical and Anti-Inflammatory Properties. *Molecules* **2021**, *26*, 6087. https://doi.org/10.3390/molecules26196087

Academic Editors: Anna Stochmal, Jerzy Żuchowski, Solomiia Kozachok, Andy J. Pérez and Łukasz Pecio

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Abstract: This work aims to assess the recently established anti-inflammatory and antioxidant potential of melatonin of plant origin extracted from the plant matrix as a phytomelatonin complex (PHT-MLT), and compare its activity with synthetic melatonin (SNT-MLT) when used on its own or with vitamin C. For this purpose, a COX-2 enzyme inhibitory activity test, an antiradical activity in vitro and on cell lines assays, was performed on both PHT-MLT and SNT-MLT products. COX-2 inhibitory activity of PHT-MLT was found to be ca. 6.5 times stronger than that of SNT-MLT (43.3% and 6.7% enzyme inhibition, equivalent to the activity of acetylsalicylic acid in conc. 30.3 ± 0.2 and 12.0 ± 0.3 mg/mL, respectively). Higher antiradical potential and COX-2 inhibitory properties of PHT-MLT could be explained by the presence of additional naturally occurring constituents in alfalfa, chlorella, and rice, which were clearly visible on the HPLC-ESI-QTOF-MS fingerprint. The antiradical properties of PHT-MLT determined in the DPPH test (IC_{50} of 21.6 ± 1 mg of powder/mL) were found to originate from the presence of other metabolites in the 50% EtOH extract while SNT-MLT was found to be inactive under the applied testing conditions. However, the antioxidant studies on HaCaT keratinocytes stimulated with H_2O_2 revealed a noticeable activity in all samples. The presence of PHT-MLT (12.5, 25 and 50 µg/mL) and vitamin C (12.5, 25 and 50 µg/mL) in the H_2O_2-pretreated HaCaT keratinocytes protected the cells from generating reactive oxygen species. This observation confirms that MLT-containing samples affect the intracellular production of enzymes and neutralize the free radicals. Presented results indicated that MLT-containing products in combination with Vitamin C dosage are worth to be considered as a preventive alternative in the therapy of various diseases in the etiopathogenesis, of which radical and inflammatory mechanisms play an important role.

Keywords: synthetic melatonin; phytomelatonin complex; COX-2 inhibition; antiradical potential; DPPH; *Medicago sativa*; *Chlorella vulgaris*; *Oryza sativa*; HaCaT cells

1. Introduction

Melatonin has been identified as "uncommonly effective" in reducing oxidative stress under a host of clinical circumstances [1]. This biogenic amine—a derivative of tryptamine (*N*-acetyl-5-methoxytryptamine)—was first isolated from the pineal gland of animals and later from humans [2,3]. It was identified as a hormone primarily responsible for regulating circadian rhythm and blood pressure. Numerous scientific publications confirm

Kukula-Koch W, Szwajgier D, Gaweł-Bęben K, Strzępek-Gomółka M, Głowniak K, Meissner HO. Is Phytomelatonin Complex Better Than Synthetic Melatonin? The Assessment of the Antiradical and Anti-Inflammatory Properties. Molecules. 2021 Oct 8;26(19):6087. doi: 10.3390/molecules26196087. PMID: 34641628; PMCID: PMC8512846.

Better reduction of inflammation by plant melatonin compared with synthetic melatonin

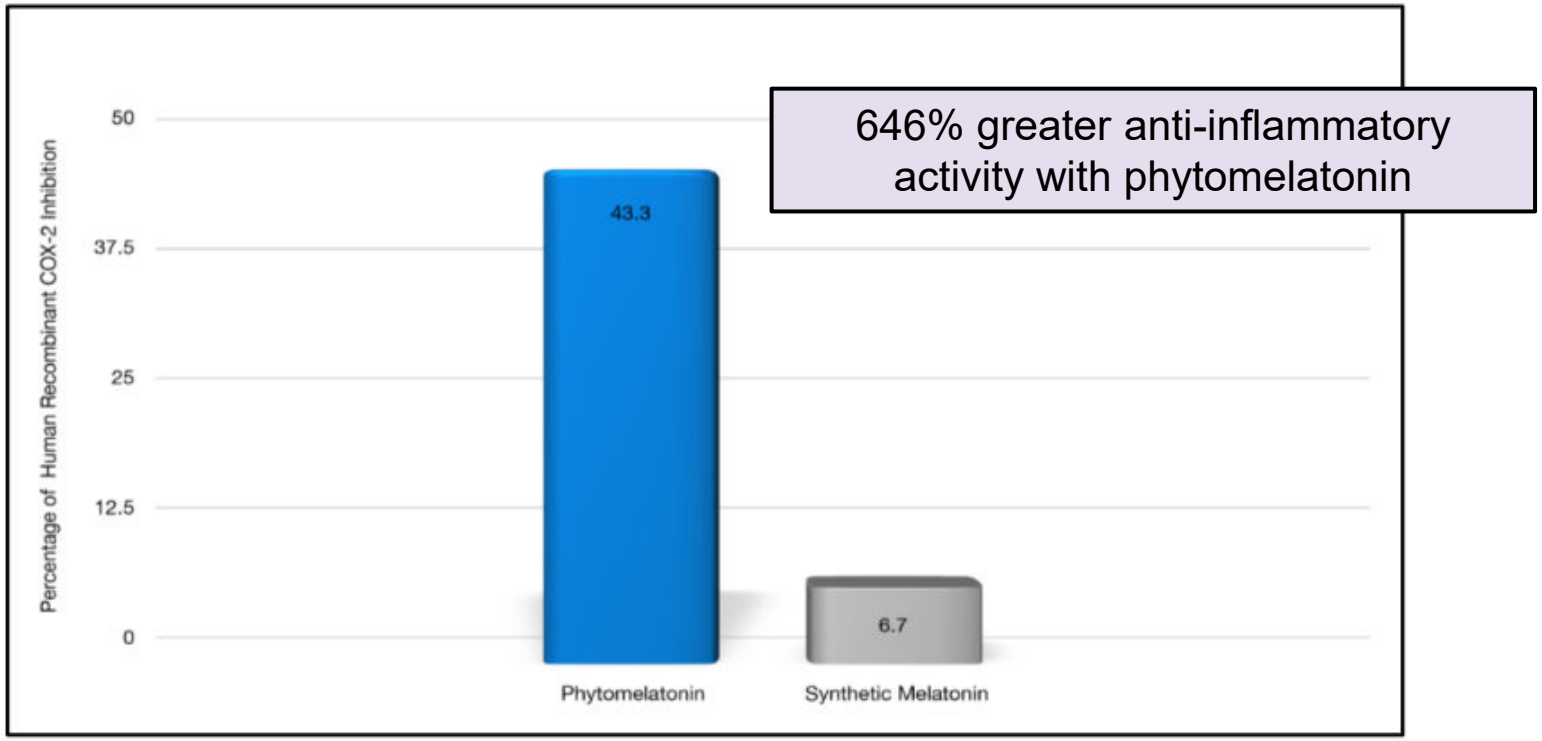

Figure 4. Inhibition of inflammation by phytomelatonin (blue bar) and synthetic melatonin (gray bar). Data are expressed as a percentage of human recombinant COX-2 inhibition. Amounts used for each were 0.030 mL (5 mg/mL). Values are derived from the original data presented in [34].

Kukula-Koch W, Szwajgier D, Gaweł-Bęben K, Strzępek-Gomółka M, Głowniak K, Meissner HO. Is Phytomelatonin Complex Better Than Synthetic Melatonin? The Assessment of the Antiradical and Anti-Inflammatory Properties. Molecules. 2021 Oct 8;26(19):6087. doi: 10.3390/molecules26196087. PMID: 34641628; PMCID: PMC8512846.

Evidence-Based Lifestyle Therapies
Physical Activity

- Regular exercise ensures metabolic health and reduces the number and intensity of hot flashes
- A blended program of **aerobic + resistance + flexibility/balance + lifestyle movement**, personalized to health status and preferences, provides the most benefit for postmenopausal women.

PMID: 20625026, 38201856

Summary:
Integrating into the Whole

Framework for Individualized Protocols
Stepwise Intervention Model

- Nutrition as foundation
- Lifestyle + stress regulation
- Targeted botanicals/adaptogens
- Micronutrient optimization
- Adjunctive hormone therapy if needed

Nutrition Essentials:
General Summary for Women's Health

Dietary Pattern

- Anti-inflammatory, high-antioxidant, phytonutrient/phytoestrogen-dense, fiber- and crucifer-rich diet with diversity (30-50 unique foods weekly); aim for orange foods
- Adequate hydration throughout the day

Macronutrients

- Dietary fat: Aim for 8-12% omega-3 index
- Dietary protein: ~1-1.6 g protein/kg body weight
- Dietary carbohydrate: Reduce simple sugars, increase fiber (especially ground flax)

Micronutrients (testing encouraged)

- Water-soluble & fat-soluble vitamins (MVMM)
- Minerals

Dietary Supplement Considerations:
General Summary for Women's Health

Synthesis
- Assist with endocrine support and hormone optimization with clinically-tested Maca-GO

Transport
- Assist with meeting elevated protein requirements using a protein powder supplement

Activation
- Ensure healthy cell membranes with essential fats
- Increase energy with creatine
- Support sleep, glymphatic fluid flux, antioxidant, anti-inflammatory, and mitochondrial activity with plant melatonin

Metabolism
- Depending on gene variants, may need additional support for metabolic detoxification pathways such as DIM/I3C, amino acids

Excretion
- Modulate beta-glucuronidase with probiotic support
- Nourish a healthy gut microbiome with supplemental (rotational) fiber

Case Study:
Putting it all together

Case Study:

48-yo perimenopausal woman

Overview

- 48-year-old Caucasian/Asian woman, hot flashes (7–8/day), fatigue, weight gain, 3 BMs/week, brain fog
- **ATMs:** early menarche, high stress, nightly wine, low fiber/protein
- **Matrix:** gut dysbiosis, HPA dysregulation, mitochondrial strain, endothelial risk

Case Study:

48-yo perimenopausal woman

General Nutrition Principles:

- Eat the **Rainbow**
- Aim for dietary diversity (30-50 unique foods weekly)
- Time eating with circadian and seasonal rhythms

Case Study:

48-yo perimenopausal woman

Targeted Nutrition Intervention (STAME):

S: 30 g protein breakfast; orange foods daily; Maca-GO
T: Fiber 35 g/day; fish 2–3 x/wk; vitamin D
A: Crucifers daily; selenium, magnesium
M: Methyl donors, sulfur foods, polyphenols, omega-3
E: Flax, hydration, probiotics

Case Study:

48-yo perimenopausal woman

Lifestyle:

Sleep: Sleep hygiene, morning light, cool/dark room
Exercise: Resistance training 3 times/wk + brisk walking
Stress: Daily breathwork
Relationships: Join a women's circle

Case Study

Full-spectrum support during perimenopause

Maria, age 45, perimenopausal

- **Symptoms:** Hot flashes, disrupted sleep, mood swings, joint stiffness, and weight gain (especially abdominal).
- **Medical history:** No history of breast cancer, cardiovascular disease, or osteoporosis, but family history of type 2 diabetes.
- **Labs:** Mildly elevated fasting glucose (96 mg/dL), vitamin D insufficiency (22 ng/mL), normal thyroid, omega-3 index low (4.9%), hsCRP 2.5

Case Study
Nutrition

- **Focus:** Balanced, anti-inflammatory, phytonutrient-rich diet.
- **Strategies:**
  - **Rainbow Diet approach:** Colorful fruits and vegetables daily for antioxidants and polyphenols (e.g., berries, leafy greens, cruciferous vegetables, citrus).
  - **Protein optimization:** 1.2–1.5 g/kg/day for muscle and bone support (fish, legumes, eggs, clean protein powders).
  - **Omega-3 rich foods:** Fatty fish (2–3x/week), chia, flax, walnuts to support brain, mood, and metabolic health.
  - **Calcium and magnesium foods:** Leafy greens, sesame/tahini, almonds, beans
  - **Gut health:** Fiber-rich foods (beans, oats, vegetables) and fermented foods (yogurt, kefir, sauerkraut).
  - **Limit:** Ultra-processed foods, alcohol, and added sugars.

Case Study

Dietary Supplements*

*Always tailored to labs, diet, and tolerance.

- **Vitamin D3 + K2:** Vitamin D at 2000 IU
- **Magnesium glycinate:** 200 mg twice daily
- **Omega-3 (EPA/DHA):** 2000 mg to start, re-evaluate in 3 months
- **Maca-GO:** 2 capsules twice daily to support HPTAO axis and hormone levels, along with symptom relief
- **Melatonin (low-dose, plant-based):** 0.3 mg to start to improve sleep quality, circadian rhythm, glymphatic fluid flux, mitochondrial health, and antioxidant/anti-inflammatory activity

Case Study

Full-spectrum support during perimenopause

Lifestyle & Mind-Body

- **Movement:**
  - Resistance training 2–3x/week.
  - Weight-bearing aerobic activity (walking, hiking, dancing).
  - Yoga/Tai Chi for balance, flexibility, and stress reduction.
- **Sleep hygiene:** Consistent bedtime, dark cool room, evening wind-down rituals.
- **Stress reduction:** Mindfulness, meditation, breathwork, journaling.
- **Social connection:** Community engagement for mental health and resilience.
- **Circadian support:** Morning light exposure; limit screens at night.

Case Study

Full-spectrum support during perimenopause

Outcome Goals

- **3 months:** Improve sleep, reduced hot flashes, better mood stability; improve vitamin D and omega-3 levels, reducing hsCRP, increasing estradiol naturally
- **6 months:** Improve glucose regulation, reduced abdominal weight, greater muscle tone.
- **12 months:** Sustained symptom relief, improved bone health, enhanced vitality and wellbeing.

Take-Home Message:

Perimenopause is universal, but unique.

- Life history shapes the trajectory.
- Functional Medicine Matrix maps root causes.
- **Nutrition via STAME anchors transformation.**
- Lifestyle pillars restore balance.
- Opportunity: help women reframe perimenopause as a **portal to renewal and wisdom**.

Summary
Clinical Takeaways

- Menopause reflects broader **endocrine decline** impacting brain, bone, cardiovascular, gut, and metabolism.
- **Gut microbiome, detoxification, and nutrients** (minerals, EFAs, amino acids, vitamin D) shape hormone balance and long-term health.
- **Environmental exposures** (PFAS, phthalates, air pollution) and genetics influence estrogen metabolism and risk.
- **MHT/HRT** can be effective but is not universally chosen or tolerated.
- Lifestyle, diet, botanicals, and adaptogens show promise for symptom relief, resilience, and healthy aging.
- **Bottom line:** Menopause care requires a whole-person, integrative approach that bridges science, nutrition, and personalized care.

Final thoughts

Menopause is not an ending.

It’s a transition best supported by science, nature, and personalized care.

Thank you!

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