

Estrogens are a family of hormones which include Estrone (E1), Estradiol (E2), and Estriol (E3). There are also other forms of estrogen, often referred to as “estrogen metabolites” which are primarily metabolized in the liver and excreted from the body through the digestive and urinary tracts.¹

Estrogen metabolism is a term that describes the production, use, and elimination of estrogens through various pathways in the body. The metabolism of estrogens is impacted by a number of factors including: nutrition, stress, toxin exposure, genetics, and health conditions (e.g., metabolic syndrome, anorexia nervosa, hypothyroidism, autoimmunity).^{2,10} When estrogen metabolism is out of balance, estrogens are not properly metabolized and eliminated. Disruptions in estrogen metabolism can damage DNA, and in some cases, predispose individuals to cancer. Some estrogen metabolites have been associated with a higher risk of cancers, including breast, ovarian, and prostate.²

When there is too much estrogen in the body, a condition called “Estrogen Dominance” may be present. Estrogen Dominance can exacerbate endometriosis, premenstrual syndrome (PMS), polycystic ovarian syndrome (PCOS), premenstrual dysphoric disorder (PMDD), and, as stated, put women and men at higher risk for certain cancers. Below is a diagram and a summary of factors which can promote or disrupt estrogen metabolism.

PROMOTES HEALTHY ESTROGEN METABOLISM

- **Fiber** binds harmful estrogen metabolites and other toxins in the digestive tract, which can be eliminated by the body. Multiple studies have shown a decreased risk of breast cancer with higher amounts of fiber in the diet.³ Most individuals should aim for a minimum of 25 grams of fiber per day. Fiber, coupled with hydration and other strategies for healthy elimination ensure that estrogen metabolites are not reabsorbed and recirculated in the body.
- **Cruciferous vegetables** are those in the broccoli family, also called brassica vegetables. This family of vegetables has been shown in many studies to positively influence estrogen metabolism and reduce overall cancer risk.⁴ Cruciferous vegetables contain an important phytonutrient called sulforaphane. Sulforaphane supports the body in producing glutathione, a key antioxidant, and also upregulates another important detoxification pathway called Nrf2. Ask your healthcare practitioner about IFM’s Food Sources of Cruciferous Vegetables resource for more information.
- **Antioxidants** are associated with lower risk of all cancers, including breast cancer.^{2,4} Antioxidant rich foods like those found in IFM’s Phytonutrient Spectrum, or IFM’s Food Sources of Antioxidants, are brightly colored fruits and vegetables, green tea, dark chocolate, herbs, and spices. These foods have been shown to neutralize cancer-inducing free radicals and support detoxification pathways in the body. Eat a “rainbow of colors” to include antioxidant rich foods in your daily diet.
- **Omega 3 fats** from fish, fish oil, and flax have been shown to reduce levels of inflammation in the body, which may indirectly support healthy estrogen metabolism.⁷ Fish choices that are good sources of omega-3’s include wild caught salmon, sardines, herring, mackerel, and anchovies. Farm-raised fish contain PCB’s and other chemicals which should be avoided because of their ability to disrupt estrogen metabolism.
- Certain **supplements** may be supportive for individuals with symptoms related to disruptions in estrogen metabolism. Interestingly, two commonly recommended supplements, diindolylmethane (DIM), and Indole-3-carbinol (I3C), are extracted from cruciferous vegetables.⁶ There is also some evidence that melatonin, N-acetyl-cystine, and methylated B vitamins may support healthy estrogen metabolism as well.² Supplement recommendations should always be tailored for each person’s unique physiology and health goals. Talk to your Functional Medicine provider for tailored supplement recommendations, including type, brand, and dosing.

DISRUPTS HEALTHY ESTROGEN METABOLISM

- **Xenoestrogens** are chemicals that mimic estrogen in the body. Many personal care and home products contain chemicals that can disrupt healthy estrogen metabolism.⁵ For more information on choosing body and home care products, visit the Environmental Working Group website at ewg.org. Ask your healthcare practitioner about IFM's resources for more information on limiting toxin exposure.
- Several **genetic variants** related to detoxification may impact estrogen metabolism, including COMT, CYP1A1, CYP1B1, and GST. Research shows that diet and lifestyle modifications can be supportive for individuals with some of these genetic variants.¹ Talk to your Functional Medicine provider or a genetic counselor if you are interested in understanding how genetics may be impacting your hormonal and overall health.
- **Alcohol** is metabolized in the liver, as is estrogen. Higher levels of alcohol consumption may disrupt estrogen metabolism, and increase breast and overall cancer risk.⁸ Alcohol intake should be taken into account with each individual's other risk factors. Generally, men are advised to have 1 to 2 servings per day and women are advised to have just 1 serving of alcohol no more than four times a week.
- **Insulin Resistance and obesity impair estrogen metabolism.** Estrogen is believed to positively influence insulin sensitivity and weight, but conversely, insulin resistance and obesity are thought to negatively influence estrogen metabolism.⁹ Sustainable healthy habits which address insulin resistance and healthy weight can support estrogen metabolism and may reduce estrogen-related cancer risk. Some of these habits include: cardio and resistance activity, low-glycemic food selection, mindful eating, community support, and stress management.
- Certain **medications**, including oral birth control, and hormone replacement therapy (HRT) influence normal estrogen metabolism in the body and may increase the risk of hormone-related cancers.¹ Discuss the benefits and risks of oral birth control, or HRT with your Functional Medicine provider.

ESTROGEN METABOLISM RECOMMENDATIONS	SUPPLEMENT DOSING/ OTHER NOTES
<ul style="list-style-type: none"> <input type="checkbox"/> Increase fiber <input type="checkbox"/> Cruciferous vegetables <input type="checkbox"/> Increase dietary antioxidants <input type="checkbox"/> Increase Omega 3's <input type="checkbox"/> Supplement(s) _____ _____ 	<ul style="list-style-type: none"> <input type="checkbox"/> Check body care/home products for xenoestrogens <input type="checkbox"/> Reduce alcohol <input type="checkbox"/> Cardio/resistance activity <input type="checkbox"/> Stress management <input type="checkbox"/> Nutrition (IFM food plan, other) _____

