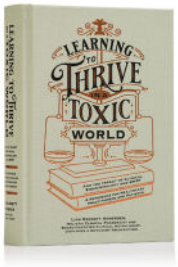
Is Estrone Evil?

Lisa Everett Andersen, *B.SC. Pharm, CCN, FIACP, FACA*
Author, Holistic Clinical Pharmacist and Board Certified Clinical Nutritionist



Hmmm, not likely. If this is true, then the creation of our bodies included a huge mistake. Without estrone, we have no estrogen at all. Estrone is the first estrogen made in the human body. It is made from androstenedione (from either 17-OH progesterone or from DHEA). It can then be metabolized to estradiol, which, in turn, can be metabolized to estriol. In yet another act of contribution to estrogen balance, estrone is the storehouse for estradiol. Estrone is 10 times weaker than 17beta-estradiol. Additionally, testosterone can not be effective, even for boosting libido, without adequate levels of estrone and estradiol to prime the testosterone receptor sites.

Yet, estrone has been falsely blamed and widely represented as a common cause of breast cancer. This belief stems from a lack of knowledge: 1) about the vital physiologic role of estrone in humans, and 2) the confusion of our endogenous estrone with foreign estrone-based metabolites. These metabolites are from the consumption of xenoestrogens in food, water, and air from our environment, as well as inappropriate types and dosage forms of hormone replacement therapy. (Some practitioners and laypersons also perpetuate the inaccurate notion that progesterone has the same activities as medroxyprogesterone acetate because they have been taught that a hormone is a hormone is a hormone, be it endogenous, bio-identical, or synthetic; or cow, cat, or human.) There are also practitioners who view estrone as an obtrusive, dominating hormone during menopause. Dominant? How can this be?

Until recently, pre-menopausal levels of estrone were around 700pg/ml during peak days of the menstrual cycle. Even considering the low reference ranges that reflect the negative influence of xenobiotics on hormone production, the menstrual cycle range of estrone is 50-300pg/ml. But during menopause, estrone levels are only between 10-15pg/ml. Pregnancy levels are around 1600, in keeping with the ultra elevated levels of all steroid hormones. And indeed those levels are protective: the more pregnancies and breastfeeding, ergo the more estrone, the lower the incidence of breast cancer. So if estrone is so bad for us, why would levels be so high during pregnancy? Better yet, why would our bodies make it at all? These climacteric numbers of 10-15pg/ml in menopause can not be dominant! Plus, without labs, menopausal symptoms tell us there is not enough estrone being produced in the body to even maintain healthy physiology. (Note: In Learning to Thrive in a Toxic World, the effects of steroid hormones on healthy physiology are discussed, as well as the effects of chemical and toxic invasion on hormone reference ranges. Also see Count Down by Shanna Swan, PhD.)

Estrone is important, so much so that after it is metabolized to estrone sulfate via sulfotransferase to exit the body, there is a backwards pathway with a separate enzyme (sulftase), which allows conversion back to estrone when the body recognizes it needs more. DHEA is the only other hormone that also has this separate reverse pathway. These pathways are in place to recover estrone and DHEA if levels are getting lower than production can keep up with. For both sexes, estrone is at approximately half of the body's estrogen production, promoting stellar bone density, cardiovascular function, cognition, the immune system, cancer prevention, and much more. A little known result of the workhorse, estrone, is that it modulates glucocorticosteroid production in the adrenal glands, limiting the production of cortisol to prevent cortisol dominance. It is a vital player in neurological health as the most fat soluble estrogen, most easily crossing the blood brain barrier. It so necessary for the function of the brain and central nervous system that brain and nerve cells will make their own estrone, and in greater amounts than the other two estrogens.

Pre-menopause, estrone is produced in the brain, skeletal muscles, liver, adrenals, and ovaries (with the ovaries being the biggest producers) via aromatization with aromatase of androstenedione or from estrone sulfate via sulftase. During menopause, it is produced in the brain, skeletal muscles, liver, adrenals, and adipose tissues. It is obvious that the body's naturally occurring function is to keep some estrone circulating throughout the body, not to eradicate it.

5453 W. 61st Place • Mission, Kansas 66205 • *(913) 322-0001 • (913) 322-002 fax • (800) 627-4360 • www.lisaeverettandersen.com*

Is Estrone Evil?

Why does any of this matter? First and foremost, women should never be made to believe their own hormones are out to kill them. Not only is it wrong to project fear and distrust in our body's ability to function, it is scientifically inaccurate to tell women our hormone-related issues are because we have "evil" female hormones that are "dominating" our golden years instead of what is actually happening: a deficiency of our life-saving hormones that keep us strong, capable, and steady. This also matters because practitioners who associate estrone with breast cancer will often eliminate it from any bio-identical hormone replacement therapy (BHRT), minimizing its success.

Estrone is useful when combined with estriol and estradiol in BHRT to eliminate the side effects of using estriol and estradiol alone, such as migraine headaches, water retention, and weight gain. It also enters the negative feedback system for the adipose tissue production of estrone in menopause and perimenopause, regulating adipose production of estrone. If estrone were a carcinogenic hormone, it would cause cancer during the child-bearing years, and certainly during pregnancy when levels are so many times higher than they are during menopause. It is not a ligand like estradiol and estriol and does not turn on GPER1 receptor sites, so it cannot regulate functions such as cell growth and apoptosis (programmed cell death) as does estradiol. Estrone is not the problem. Breast cancer is triggered by free radicals and the invasion of fat soluble xenoestrogens resembling estrone and behaving as free radicals, along with a deficiency of anti-oxidants and other nutritional prophylaxis, especially in women with low, protective, endogenous estrogen. Because estrogen production decreases as we age, xenoestrogens take over unoccupied hormone receptor sites, exerting their deleterious signaling on tissues. By changing the way cells multiply and divide, xenoestrogens convert healthy cells into tumor cells. In contrast, our hormones help insure proper cellular division. And when we have enough of our hormones on board, our bodies can attempt to fill those receptor sites properly.

Beyond keeping xenoestrogens from fooling receptor sites, there are salient functions that only take place when estrogens, including estrone, occupy those receptors. Every cell has alpha (ERα) and beta (ERβ) receptor sites for the activity of estrone. These receptors direct gene expression, which in turn determines biological outcomes in reproductive organs and bone development, cardiovascular system functioning, metabolism, and behavior in both females and males. Estrone binds to ERα's 5 times more than it binds to ERα's. However, the binding affinity for ERβ is only 4% of estradiol's affinity. The binding affinity for ERβ is only 3.5% of estradiol's, so it has less capability of turning on cancer. Estrone's half life is 6 to 8 hours and is only 16% bound to SHBG and 80% bound to albumin, as opposed to other sex hormones.

There is absolutely no evidence, no biochemistry or physiology textbook, and no scientifically sound study that states estrone is a dangerous molecule. So who declared it so? This "evil" concept is only found in articles quoting other articles or speakers quoting other speakers who are deficient in the knowledge of estrone physiology. Where is the evidence our Creator did not know what She/He was doing? The fact is, estrone being a hormone to avoid is completely hypothetical and postulated. It is part of our human design, so if anyone has an issue with estrone, they will just have to take that up with The Creator.

Organochlorines and Breast Cancer. (1998). Alternatives for the Health Conscious Individual. 7(13)

Williams RH, Wilson JD, Foster DW. (1992). Williams Textbook of Endocrinology. 8th ed. Saunders

Monteiro R., Teixeira D., Calhau C. (2014, October 23). Estrogen Signaling in Metabolic Inflammation. Mediators Inflamm, 2014, 65917. doi: 10.1155/2014/615917

Martin CR. (1985). Endocrine Physiology. Oxford Medicine Publications. Oxford University Press

Nilsson BO, Olde B, Leeb-Lundberg LM. (2011 Jul). G protein coupled estrogen receptor 1 (GPER1) / GPR30: a new player in cardiovascular and metabolic estrogenic signaling. Br J Pharmacol. 163(6): 1131-39

Morinaga A, Ono K, Takasaki J, Ikeda T, Hirohata M, Yamada M. (2011 Jan 31). Effects of sex hormones on Alzheimer's disease-associated β-amyloid oligomer formation in vitro. Exp Neurol. 228(2): 298-302

Lin J, Kroenke CH, Epel E, Kenna HA, Wolkowitz OM, Blackburn E, Rasgon NL. (2011 Mar 16). Greater endogenous estrogen exposure is associated with longer telomeres in postmenopausal women at risk for cognitive decline. Brain Res. 1379: 224-31

Patch RJ, Searle LL, Kim AJ, De D, Zhu X, Askari HB, O'Neill JC, Abad MC, Rentzeperis D, Liu J, et al. (2011, Feb 10). Identification of diaryl ether-based ligands for estrogen-related receptor α as potential antidiabetic agents. J Med Chem. 54(3): 788-808

Miyagawa K, Rosch J, Stanczyk F, et al. (1997). Medroxyprogesterone interferes with ovarian steroid protection against coronary vasospasm. Nat Med. 3: 324-27

Rosano GM, Webb CM, Chierchia S, et al. (2000). Natural progesterone, but not medroxyprogesterone acetate, enhances the beneficial effect of estrogen on exercise-induced myocardial ischemia in postmenopausal women. J Am Coll Cardiol. 36: 2154-59

Kerdivel G., Habauzit D., Pakdel F. (2013, May 2). Assessment and Molecular Actions of Endocrine-Disrupting Chemicals that Interfere with Estrogen-Receptor Pathways. Int J Endocrinol.

Starek A. (2003). Estrogens and Organochlorine Xenoestrogens and Breast Cancer Risk. Int J Occup Med Environ Health, 16(2), 113-24.

Abdalla M., Gutierrez-Mohamed M., Farah I. (2003). Association of Pesticide Exposure and Risk of Breast Cancer Mortality in Mississippi. Biomed Sci Instrum, 39, 397-401.

Colburn T., vom Saal F., Soto A. (1993, October). Developmental Effects of Endocrine-Disrupting Chemicals in Wildlife and Humans. Environ Health Perspect, 101(5), 378-84.

Hayes T., Haston K., Tsui M., Hoang A., et al. (2003, April). Atrazine-Induced Hermaphroditism at 0.1ppb in American Leopard Frogs (Rana pippins): Laboratory and Field Evidence. Environ Health Perspect, 111(4), 568-75.

Hayes T., Khoury V., Narayan A., Nazir M., et al. (2010, March). Atrazine Induces Complete Feminization and Chemical Castration in Male African Clawed Frogs (Xenopus laves). Proc Natl Acad Sci USA, 107(10), 4612-17.
Vinas R., Jeng Y., Watson C. (2012, August). Non-Genomic Effects of Xenoestrogen Mixtures. Int J Environ Res Public Health, 9(8), 2694-714.

Ott S. (2008, April). Reproductive Hormones and Skeletal Health in Young Women. J Clin Endocrinol Metab, 93(4), 1175-77.

Bretveld R., Thomas C., Scheepers P., Zielhuis G., Roeleveld N. (2006, May 31). Pesticide Exposure: The Hormonal Function of the Female Reproductive System Disrupted? Reprod Biol Endocrinol, 4, 30.

Savolainen-Peltonen H., Rahkola-Soisalo P., Hoti F., Vattulainen P., et al. (2019). Use of Postmenopausal Hormone Therapy and Risk of Alzheimer's Disease in Finland: Nationwide Case-Control Study. BMJ, 364, l665 doi:10.1136/bmj.l665

αβ