

# Aromatase



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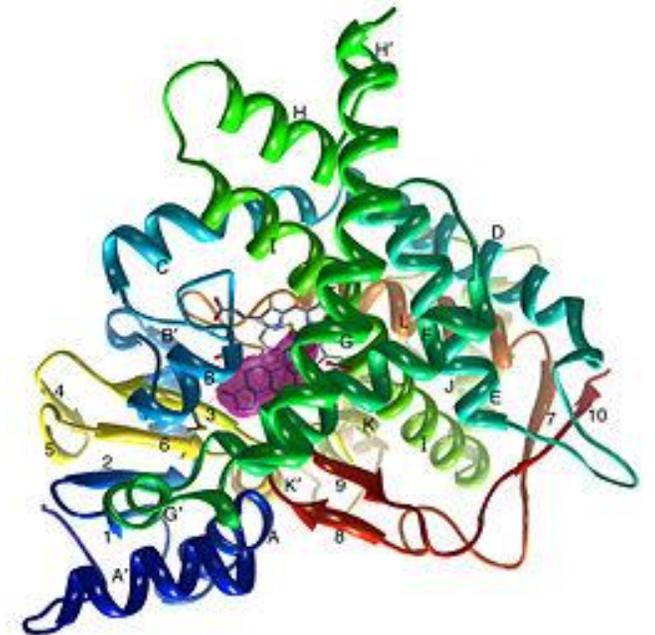
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Aromatase is an enzyme that converts testosterone to estrogen

It can be found in the gonads, brain, fat cells, placenta, blood vessels, skin, and bone, as well as in tissue of endometriosis, uterine fibroids, breast cancer and endometrial cancer

Highest concentration is in the adrenals but the potential for the conversion to estrogen is throughout the body

Circulating inflammatory cytokines increase the activity of aromatase and therefore estrogen – this is in men and women (before, during and after menopause)



# Aromatase Inhibitors

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Refer to drugs or specific elements in food

Aromatase inhibitors interfere with the body's ability to produce estrogen from androgens

They do this by suppressing aromatase enzyme activity

Drugs created for this purpose are prescribed to women and men who have estrogen hormone-related cancers, usually menopausal women

There have been 3 generations of drugs so far as researchers try to limit reactions



# Tamoxifen

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A drug that has been in use the longest and blocks the actions of estrogen (not production)

If taken for 5 years, it reduces the risk of recurrence by 40% and death by 34%

1/3 of all women taking it do have a recurrence

Women who had a metastasis with original cancer will all relapse despite tamoxifen

Side effects include increased risk of blood clots, stroke and heart disease, liver problems, breast lumps, blurred vision, vomiting, unusual vaginal bleeding and discharge, increased risk of ovarian cancer, hot flashes



# Aromatase-Inhibiting Drugs

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Anastrozole, Exemestane, and Letrozole

Side Effects: Hot flashes, joint pain, vaginal dryness, painful intercourse, bone loss, high cholesterol

More effective than tamoxifen

Anastrozole was effective at shrinking some tumors in menopausal women to allow them a surgical option

A study of 9000 women on AIs combined with Tamoxifen or alone – depending on the type of breast cancer – AIs were as effective as tamoxifen or better in some cases by themselves



# Natural AIs

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The problem with drugs is the side effects and long-term damage to the body

Could natural alternatives alone be the answer?

The problem is that a study will not be done – it is considered unethical to deprive a person of a known treatment as part of a test

There are women who opt for natural alternatives over drugs, do so by choice

It is not something we can advocate

Studies on natural AIs are in vitro and/or on animals



# Modulation Of Aromatase Activity By Diet Polyphenolic Compounds

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**Abstract:** Estrogens are involved in physiological actions related to reproduction, body fat distribution, and maintenance of bone mass and are also related to the pathogenesis of estrogen-dependent cancers. The aim of this work was to study the effect of polyphenols on estrogen synthesis. Some of the tested polyphenols inhibited estrogen production, chrysin being the most potent.

Additionally, we observed that red wine, alcohol-free red wine, green tea, and black tea (200 microL/mL) significantly decreased aromatase activity. No effect on aromatase expression, has been detected after 24 h of treatment with any of the flavonoids under study. **In conclusion, polyphenols are able to modulate aromatase activity and, consequently, estrogen synthesis. The knowledge of such interference may help to clarify some of the biological properties attributed to polyphenols and may be useful in prevention/treatment of estrogen-dependent disorders.**



# Flavonoid Inhibition Of Aromatase Enzyme Activity In Human Preadipocytes

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Eleven flavonoid compounds were compared with aminoglutethimide (AG), a pharmaceutical aromatase inhibitor, for their abilities to inhibit aromatase enzyme activity in a human preadipocyte cell culture system. Flavonoids exerting no effect on aromatase activity were catechin, daidzein, equol, genistein,  $\beta$ -naphthoflavone (BNF), quercetin and rutin. The synthetic flavonoid,  $\alpha$ -naphthoflavone (ANF), was the most potent aromatase inhibitor, with an  $IC_{50}$  value of 0.5  $\mu$ M. Three naturally-occurring flavonoids, chrysin, flavone, and genistein 4'-methyl ether (Biochanin A) showed  $IC_{50}$  values of 4.6, 68, and 113  $\mu$ M, respectively, while AG showed an  $IC_{50}$  value of 7.4  $\mu$ M.

**Chrysin, the most potent of the naturally-occurring flavonoids**, was similar in potency and effectiveness to AG, a pharmaceutical aromatase inhibitor used clinically in cases of estrogen-dependent carcinoma.

**This data suggest that flavonoid inhibition of peripheral aromatase activity may contribute to the observed cancer-preventive hormonal effects of plant-based diets**



# Study

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## **Effect of soy isoflavones on breast cancer recurrence and death for patients receiving adjuvant endocrine therapy - Xinmei Kang et al 2010**

524 women who had had breast cancer

Results: High dietary intake of soy isoflavones was associated with lower risk of recurrence among post-menopausal women with breast cancer positive for estrogen and progesterone receptors and those who were receiving anastrozole (aromatase inhibitor) as endocrine therapy



# Supporting A Client On Als

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Some doctors will warn client away from phytoestrogens

Look at the list of side effects and try to counter them naturally

Supporting all the players will be helpful

Phytoestrogens such as flax would be helpful

Maca and milk thistle would be helpful

Plus blood sugar support, adrenal support and probiotics



# Two AI Supplements

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- Damiana: A well known plant – aphrodisiac, supports nervous system, helps with headaches, depression and lowers blood sugar
- A study showed that damiana extract could significantly suppress aromatase activity
- Myomin: Combination of ingredients such as white turmeric and cyperus rotundus (also known as java grass), sarsparilla, Aralia dasyphylla – produced by one company
- One study in animals showed that myomin significantly reduced the population of aromatase in the liver in 30 days



# AI Foods

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- Chrysin – Honey, propolis and passionflower, considered one of the most effective
- Quercetin – Apples, peppers, red wine, dark cherries and berries (blueberries, bilberries, blackberries and others) tomatoes, cruciferous vegetables (including broccoli, cabbage and sprouts), leafy green veggies (including spinach, kale), citrus fruits, apricots
- Naringenin – Grapefruit and other citrus fruits



# AI Foods

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- Resveratrol: Grapes, wine, peanuts, pistachios, cranberries, blackberries, blueberries – even chocolate and cocoa have a little
- Apigenin: Parsley, celery, rosemary, oregano, thyme, basil, coriander, chamomile, cloves, lemon balm, artichokes, spinach, peppermint, red wine, licorice
- Genistein: Soy and other legumes, some fruits and nuts have small amount with raisins and currants being the highest (still low compared to soy)
- Oleuropein: Olives, olive oil



# AI Foods

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- Other aromatase-inhibiting foods, including beer, green tea, coffee, black tea, mushrooms, oysters, flax, mangosteen
- Studies only study the chemical in the food, not the food
- Several foods have more than 1 type
- A whole food diet could contain a number of these foods



# AI Foods

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Over 300 foods have been tested for aromatase inhibiting activity

The levels of activity vary

The potential of a diet with a number of them consumed daily offers a lot of potential

Whole foods have other anti-cancer compounds or immune support or liver support (salvestrols)

A man or woman consuming these foods in conjunction with the drug will see more benefit



# Cancer

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Cancer protocols are difficult – even after remission

Aromatase-inhibiting foods are an important part but not the only part

But with all the foods and strategies discussed, the body is receiving so much to fight with

Along with lifestyle suggestions and psycho-spiritual considerations, there is a lot we can offer clients

