

Hormones and Cancer



Healthy
Hormones

Cancer

- It is not a hormone condition as people might think
- All conditions have a hormone component but no one gets cancer because of hormones
- Hormones can play a role as to which cancer someone gets
- The truth is cancer is a failure of the immune system



Cancer

- Cancer evolves because the immune system can't prevent it from growing
- The theory is that we may have cancerous cells many times throughout our lives
- The immune system takes care of them so they do not grow
- The big questions with cancer is why did these cells escape the immune system – allowing them to grow to become the tumours we know as cancer



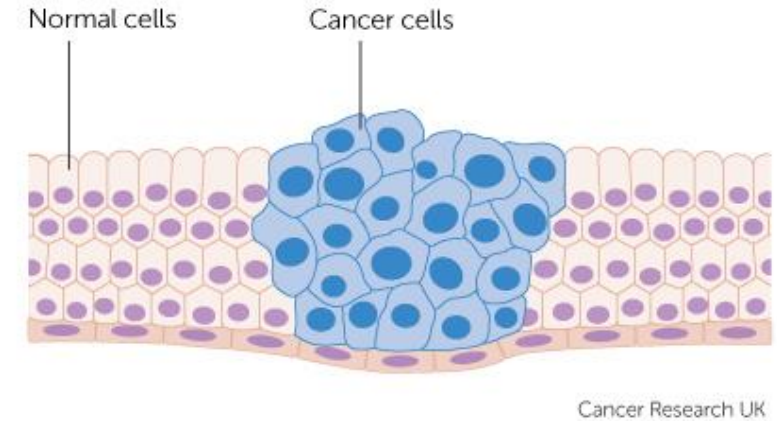
The Players

- All the same players are involved
- There cannot be a healthy immune system without good liver function, healthy adrenals and thyroid glands, good gut health and stable blood sugar and insulin levels
- Other factors such as nutrition, sleep, exercise, stress reduction are also important
- Reproductive hormones and other hormones have a connection to cancer



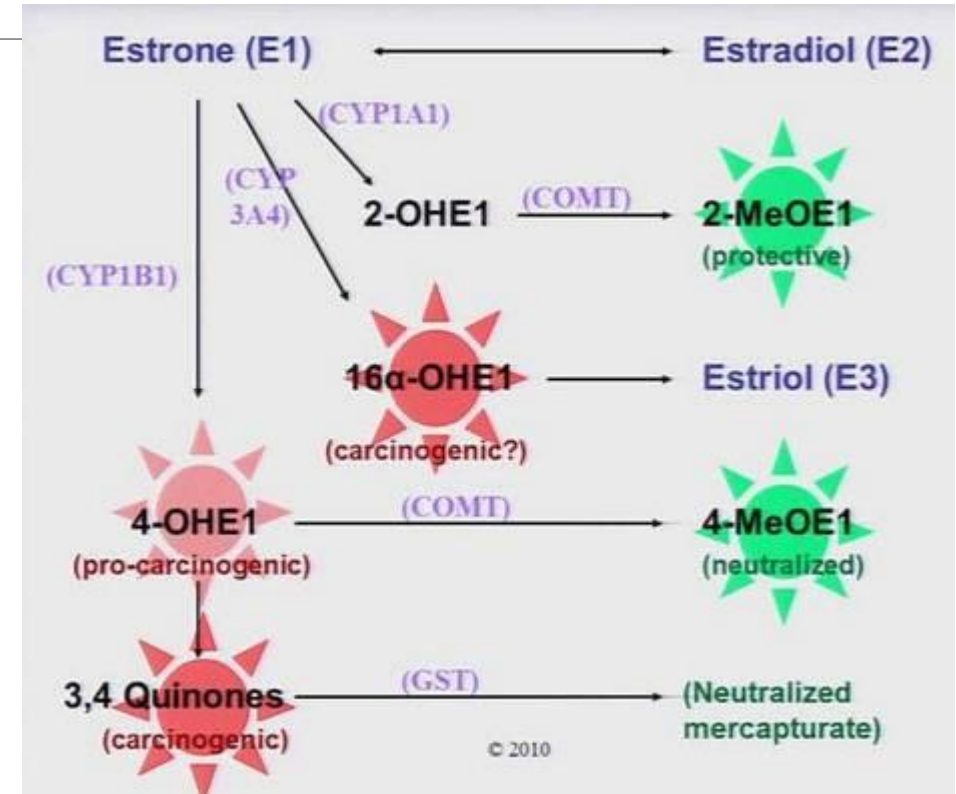
Breast Cancer

- Cancer begin in the in the DNA of breast cells
- Usually it is a damaged cell that has mutated and replicated
- It happens because of a number of factors including genetic, environmental, hormonal and physiological factors
- Genes linked to breast cancer only make up 5% of the all breast cancers
- The biggest factor is an excess of pro-cancer estrogen metabolites and a failure for successful detoxification of the excess



Estrogen Metabolites

- Estradiol can convert to estrone and visa versa
- There are three forms of estrone metabolites
- 2-hydroxyestrone (with 2 carbon molecules) considered innocuous and anti-cancer
- 4-hydroxyestrone (with 4 carbon molecules) more dangerous form of estrogen
- 16-hydroxyestrone (with 16 carbon molecules) – considered a pro-cancer form of estrogen



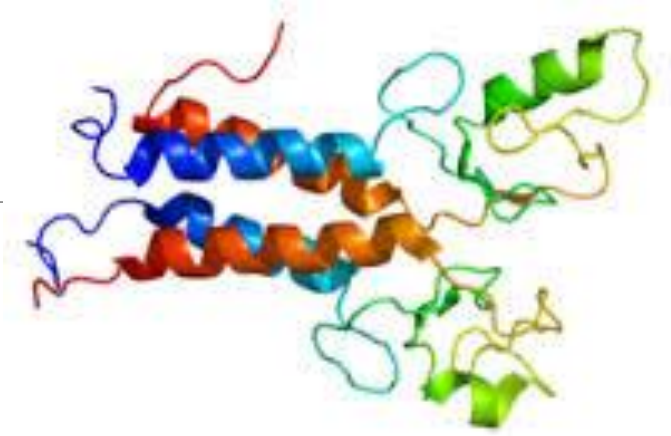
Estrogen Metabolites

- The ratio of 2 -16 hydroxyestrone is critical as 2 is cancer-protective and 16 is pro-cancer
- Most cells have a programmed death – they are born, live and die
- For abnormal cells, the immune systems will destroy them but cancer cells have found a way to avoid being deactivated and can continue to grow
- Cancer cells do not have a programmed death so there is nothing to stop them



BRCA-1 and BRCA-2

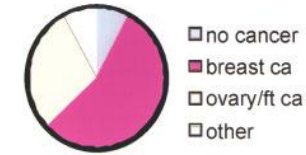
- Tumour-suppressing proteins (genes)
- Help repair damaged
- Play a role in ensuring the stability and health of the cell
- If they become damaged, and mutated, they can increase risk of cancer
- The mutated genes can be passed from parent to child, increasing the risk



BRCA-1 or BRCA-2

- Only 12 percent of women will develop breast cancer in their lifetime
- 55-65% women who inherited the mutated BRCA-1 gene and 45% of women who inherited the BRCA-2 mutated gene will develop the breast cancer by age 70
- Men with BRCA-2 mutations, and BRCA1 mutations, are also at increased risk of breast cancer and have a higher risk of prostate cancer

BRCA1 - female



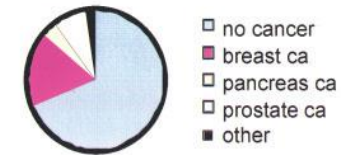
BRCA1 - male



BRCA2 - female

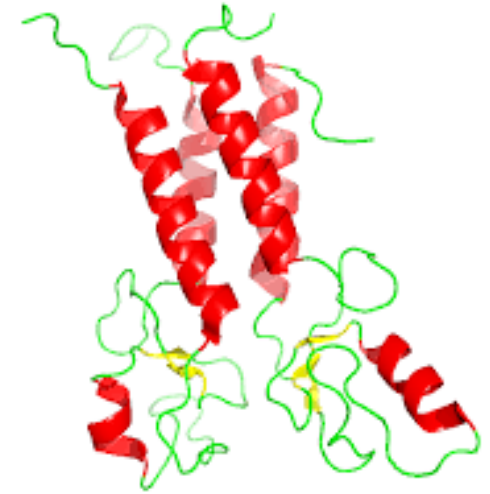


BRCA2 - male



Other Cancers

- Ovarian cancer has similar relation with the BRCA-1 and BRCA-2
- 1.3% of women will get ovarian cancer in their lifetime
- 39% of women with BRCA-1 and 11-17% of women with BRCA-2 will get ovarian cancer by the time they are 70
- BRCA-1 may increase a woman's chances of fallopian tube cancer and peritoneal cancer
- Men and women with either are at higher risk of pancreatic cancer
- Children who inherit BRCA-2 from both parents are at higher risk for leukemia

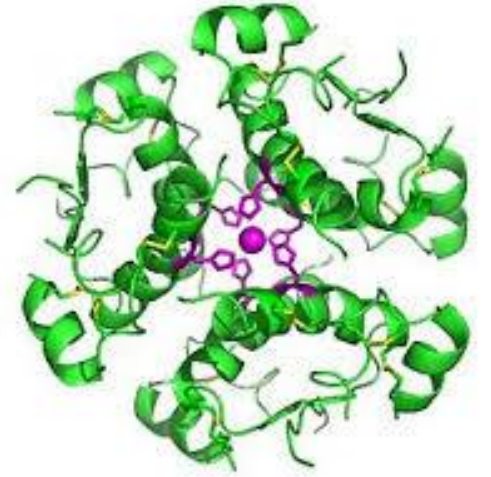


Cancer

- These are just statistics
- They are based on what has occurred with people to date
- Since a significant number of people with the mutated genes do not develop cancer – there are modifying factors why some get cancers related to these genes
- This is true of all other factors for cancers
- Cancer has to be seen as a failure of systems – even hormone-related cancers



Insulin



- Obesity and metabolic syndrome both statistically put someone at a higher risk for cancer
- It is not sugar that supports the growth of cancer – it is the insulin
- High insulin may support the growth of tumours
- IGF-1 (insulin-like growth factor 1) is a hormone that supports growth in children and support the anabolic process in adults
- All factors that are linked to high insulin have to be considered

Liver

- Detoxification is a key process in cancer prevention
- Carcinogens must be removed from the body in order for them to not play a role in developing cancer
- Excess estrogen must be removed and the liver is critical to this process
- Excess cortisol must also be removed by the liver
- Any of these factors can play a role in developing cancer
- Plays a role with healthy 2:16 hydroxyestrone ratio



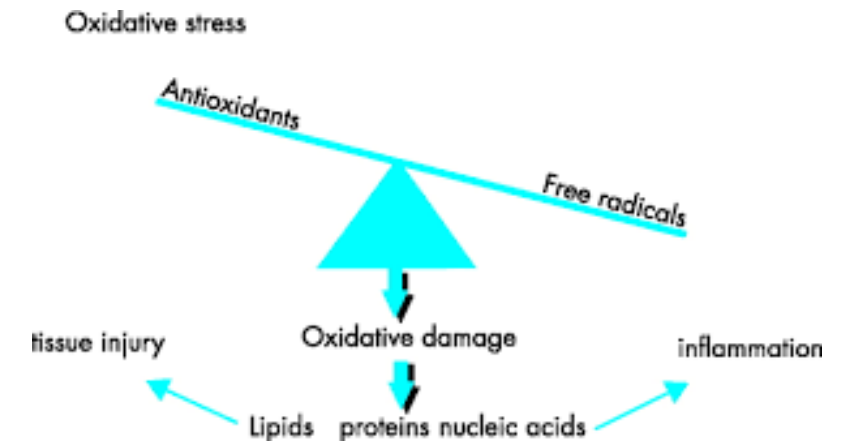
Adrenals



- Stress has two major relationships with cancer
- Chronic stress results in the activation of specific signaling pathways in cancer cells and affects tumour growth and metastasis
- Chronic stress depresses immune function and increases oxidative stress
- Research shows that sustained stress can cause a reduction of natural killer cells by up to 50%
- ATF3 is a gene that is activated by all cells when stress affects their ability to adapt to the stress so they do not die if damaged
- It also allows cancer cells to avoid the immune system by preventing them from dying

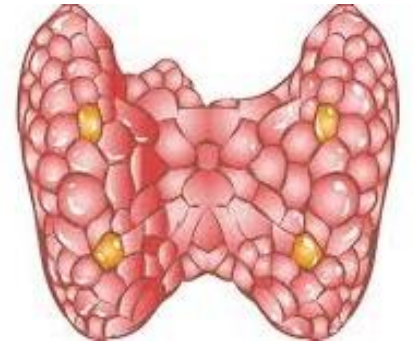
Thyroid

- One role of the thyroid is metabolism which has a direct connection to oxidative stress
- Oxidative stress is linked to inflammation and the process that turns a normal cell into a cancer cell
- Hypothyroidism and hyperthyroidism are both linked to increased oxidative stress
- Increased antioxidants are critical



Thyroid

- A recent study looked at 61,873 women diagnosed with hypothyroidism and 80,343 women with hyperthyroidism
- Looked for incidence of cancer in this population in comparison to incidence of breast cancer in the general population
- Found an increased risk in women with hyperthyroidism and slight decreased risk in women with hypothyroidism
- Theory is that thyroid hormones have an estrogen-like behavior in excess



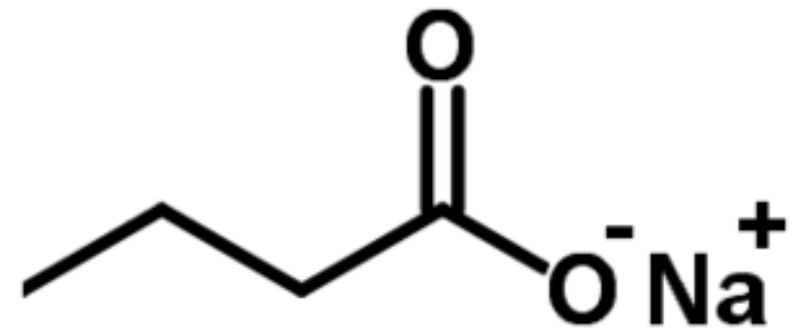
Gut Health

- Probiotics and good gut bacteria boost immune system function
- Even dead bacteria found in sourdough has been found to simulate a positive immune response
- Fermented milks can inhibit tumor growth by reducing the inflammation in hormone-dependent breast cancer models and induced-colon cancer
- *L. helveticus* showed the ability to delay the growth of breast tumours in one study



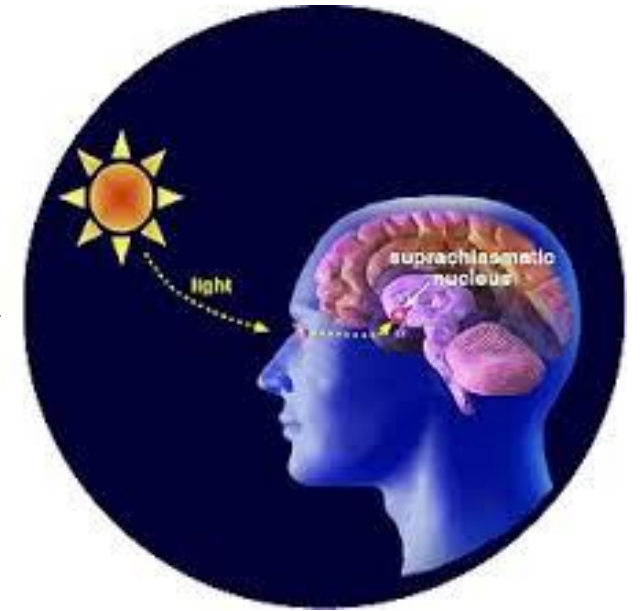
Gut Health

- Short-Chain Fatty Acids (SCFA) are produced by bifidus bacteria in the colon
- Bifidus bacteria eat resistant starch (found in wheat, grains, potatoes, corn, dairy legumes, nut and seeds) to produce various SCFA which have benefits
- Butyrate helps regulate immune tolerance, control inflammation in the body and support immune function
- Studies have found it aids apoptosis of cancer cells in colon cancer and may play a similar role in other cancers



Melatonin

- A new player in the regulation of cell proliferation
- It inhibits cancer cell proliferation, decreases oxidative stress, increases apoptosis, regulate metastasis
- Melatonin is also essential for healthy immune function including supporting the production of natural killer cells
- EMPs disrupt the pineal gland function and melatonin production
- Melatonin production generally occurs between 12-2 am and is produced in darkness (but it is not for sleeping)



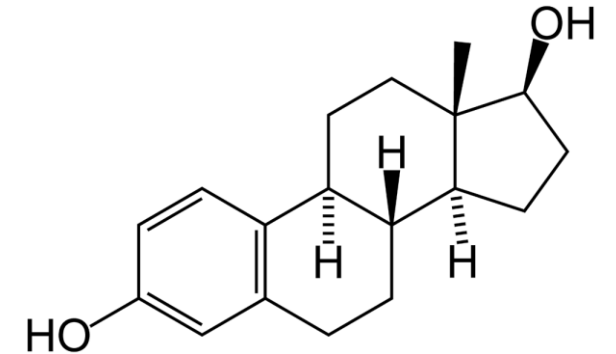
Supplementing With Melatonin

- Melatonin inhibits dopamine production
- Since dopamine is connected to the proper production of several hormones including the production of pituitary hormones
- Melatonin supplementation should be avoided unless someone has cancer (3 mg) Studies trying to modify cancer with melatonin alone use 20 mg
- Stimulate melatonin naturally – sleep in a dark room, be asleep during the ideal melatonin cycle, balance blood sugar and support adrenals, almonds, walnuts, lettuce, corn, rice, barley, cherries (cherry juice), tuna, pineapples, bananas, oranges, tomatoes all either have melatonin or stimulate melatonin



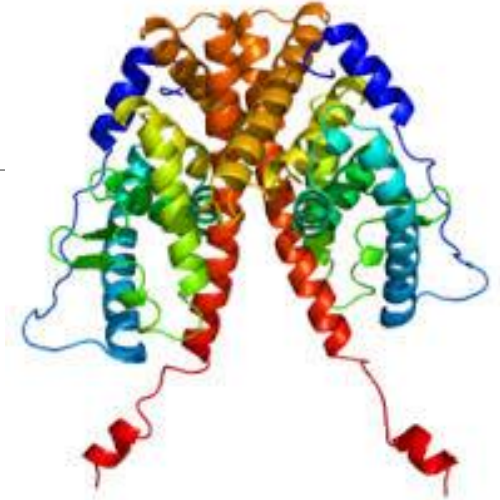
Estrogen

- Estrogen has been officially added to the list of “carcinogens” for hormone-based cancers
- Somewhat like throwing out the baby with the bath water
- Several steps have to occur before estrogen plays a role in cancer
- Estradiol can play a role when combined with oxidative products (produced by oxygen)
- Liver metabolism is essential and encouraging the right form of metabolism of estradiol



Estrogen Receptors

- Estrogen Receptor Alpha (ER-Alpha) regulates gene expression and affects cellular proliferation
- ER-Alpha is found in much higher amounts in breast cancer and other hormone-related cancers
- Also excess found in endometriosis and cysts
- Estrogen Receptor Beta (ER-Beta) counters the effects of ER-Alpha and inhibits cancer cell proliferation and regulates other tissue activities – turned off in breast cancer
- Increasing ER-Beta: Vitamin E, sulforaphanes in cruciferous vegetables, phytoestrogens, estriol, healthy levels of testosterone and progesterone, aromatase-inhibiting foods



Improvement of 2:16 Ratio

- Estrogens are metabolized by cytochrome P-450 (CYP450) enzymes that are induced by compounds found in cabbage, Brussels sprouts, and broccoli (cruciferous vegetables)
- I3C and DIM, are found in these foods
- Other constituents in the cruciferous family are also speculated to aid in estrogen metabolism.
- Glutathione S transferase is also produced by the sulfur components in cruciferous vegetables.
- Brassica vegetables also improve glucuronidation with elimination of estrogen metabolites.
- These compounds that aid estrogen metabolism were also found to decrease DNA damage



Improvement of 2:16 Ratio

- Lifestyle factors such as exercise and a high protein diet were found to improve ratios.
- Indole-3 carbinole (I3C) significantly improves a 2:16 ratio.
- Flaxseed supplementation at 10 g/d significantly increases the urinary 2/16 hydroxy-estrone ratio.
- Dietary intake of soy products and flax have been shown to favorably modulate the rates of 2-16-hydroxyestrone production.



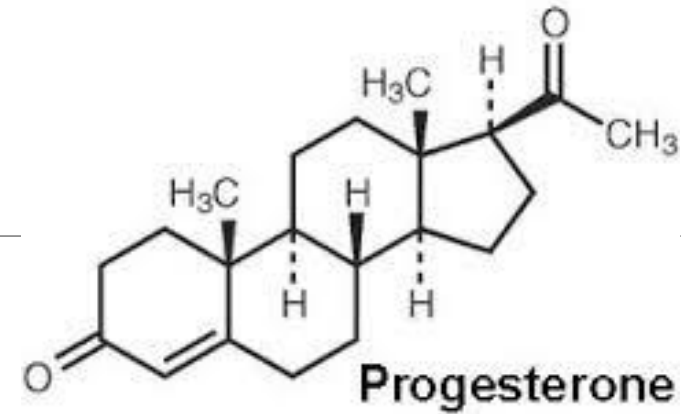
I3C VS DIM



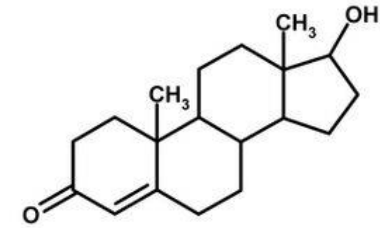
- Both help to modulate estrogen metabolism.
- Even though a larger body of research exists demonstrating safety with I3C, more recent studies are beginning to favor DIM
- I3C may increase 4-hydroxylation of estrone and estradiol - DIM may not.
- 4-hydroxylation has been demonstrated to promote breast and prostate cancer tissue via estrogen receptor stimulation as well as DNA damage.
- Additionally, 4OHE is elevated in breast cancer patients
- But it is a minor player – less than 1% of estrogen metabolites
- I3C is converted to DIM by gut bacteria

Progesterone

- Is known as anti-cancer
- Help lower activity of estrogen receptors
- Inhibition of estrogen transcription (the first step in the process of making of copy of DNA)
- Helps limit cellular adhesion (cells sticking together)
- Cellular Differentiation (the change of one cell to another)
- Promotes apoptosis (cell death)
- PR-Alpha and PR-Beta involved - in some cancers low PR-Beta occurs



Testosterone



- High testosterone (including free testosterone) and other androgens (PCOS and adrenal malfunction) are associated with breast cancer in women – both menopausal and peri-menopausal women
- Low testosterone in men is associated with higher levels of aggressive prostate cancer – corresponds with high estrogen and low progesterone
- 16-hydroxyestrone is considered more significant for the development of prostate cancer than testosterone
- Low T in women may also correlate with high estrogen and cancer
- I3C, EPA/DHA (fish oil, flax, chia), aromatase-inhibiting foods helps men and women with low T

Major Detoxification Systems

- Liver/GI: Almost all chemicals and fat- soluble toxins, food-borne bacteria & toxins from intestines
- Intestines (by itself) some toxins removed before they enter the bloodstream
- Skin: Fat-soluble toxins such as DDT, heavy metals such as lead
- Kidneys: Water-soluble toxins
- Lungs: Gas wastes and mucous
- Lymphatic System: Tissue-generated toxins, viruses



Strategy For Cancer

- Support the detoxification process of estrogen – I3C, calcium d'glucurate, garlic, onions, NAC, milk thistle,
- Support the adrenals: Ashwagandha supports the adrenals and immune system
- Support the gut: Probiotics support the immune system and help recovery from chemo and radiation
- Support the immune system: Plant sterols and lots of antioxidants
- Stabilize blood sugar and keep insulin levels normal
- Good quality sleep and exercise



Cancer

- It is multi-factorial so this is just an overview of a program
- There are many supplements that can help as well as diet and lifestyle choices
- But understanding the hormone relationship is important because they help regulate the body and fight the cancer
- The same players are needed to allow other cancer strategies to work