

## **Oestrogen dependent cancer, an evolutionary perspective, possible treatment and simple prevention**

### **Why are our own hormones killing us? (Draft summary)**

Do we have an evolutionary predisposition to cancer?

Consciousness researcher Tony Wright has proposed a radical new theory to explain the evolution development and function of the human brain. It centres around the ecological factors in our evolutionary environment and their influence on foetal brain development, specifically the unique plant chemicals (flavonoids) very abundant in our ancestral diet for tens of millions of years.

The flavonoid based theory can simultaneously explain several aspects of human physiology from rapid brain expansion and cerebral dominance to some of the oddities in human reproduction.

In addition to the evolution and development of the brain he claims the same hormonal mechanism can shed light on the increasing prevalence of oestrogen dependent cancers and how they are a symptom of a recent and preventable increase in the activity of our own oestrogenic hormones.

It is increasingly accepted that oestrogens produced in our own body can initiate cancer and fuel its proliferation.

Wright's theory proposes that the loss of oestrogen inhibiting plant chemicals once abundant in our evolutionary ecology or ancestral diet have exposed us to increasingly toxic levels of oestrogen activity. By restoring these plant chemicals to the levels they were in our recent past a whole class of cancers would become virtually extinct.

The plant chemicals in question are flavonoids, they are especially rich in fruit and in fact give fruit its colour. Anthropologists generally agree that the early evolution of the human lineage occurred in tropical forests in Africa. The kinds of environment that several great apes species still inhabit today eating a diet extremely rich in flavonoids.

Contrary to accepted wisdom Wright's theory puts the brain expansion phase of human evolution in the tropical forest till a much more recent date than generally presumed, around 200,000 years ago.

This would have significant implications for our hormone system, it would have been flooded 24/7 for tens of millions of years with a powerful cocktail of flavonoids that had a massive impact of the activity of our own hormones particularly steroids such as testosterone and oestrogens. Then in the blink of any eye the complex chemical cocktail that had effectively become part of our normal hormone regime was drastically reduced and continues to decline.

The activity of flavonoids significantly impacts the way our own sex hormones such as oestrogen work. For example many flavonoids are oestrogenic in their action though typically less so than our own oestrogens, they can reduce the effects of our oestrogens by out competing them at the site of action by attaching to oestrogen receptors. This effectively dilutes the overall oestrogenic effect, the quantity of flavonoids is proportional to the diluting effect, the more flavonoids competing for receptors the less impact our own oestrogens can have.

Flavonoids also inhibit the activity of a key enzyme that converts androgens such as testosterone to oestrogen thus further reducing the influence of our own oestrogen by reducing its availability.

Adding weight to these proposals are the pharmaceutical drugs used to treat oestrogen dependent cancers. Two breast cancer drugs, (tamoxifen and exemestane) are close to synthetic equivalents of flavonoids. Exemestane works by blocking the action of the enzyme aromatase, which as already mentioned converts androgens into oestrogens. Tamoxifen directly inhibits the activity of oestrogen. As most breast cancers cells need oestrogens to divide and grow, these actions can stop cancer growth and even cause tumours to shrink. Intriguingly in the development of these drugs it was found that some naturally occurring flavonoids could powerfully inhibit the

action of aromatase too. It seems bizarre that a synthetic equivalent of flavonoids has been developed to treat a disease that may never have emerged if the ancestral levels of flavonoids had been maintained.

Accumulating evidence for the protective effects of flavonoids has led to government advice on increasing the intake of fruit and vegetables including mixing the range of colours thereby improving the range of flavonoids consumed. However a typical western diet may have at best less than 5% of the flavonoid quantity and a fraction of the complexity once present in our ancestral forest diet.

Flavonoids may have been responsible for a further layer of protection against oestrogen dependent cancer. Aside from the oestrogenic activity of flavonoids many are also neuro-active (MAO inhibitors) in just the right way to enhance the activity of our pineal gland so it produced more melatonin and pinoline. Both these hormones add to the oestrogen inhibition cocktail by the very same mechanisms that flavonoids work.

A final thought, why would a species evolve a hormone regime so potentially self-destructive? If our hormone system had evolved in a flavonoid rich environment then it is not surprising that it might be causing us serious problems if the complex flavonoid cocktail it co-evolved with had gone AWOL.

Flavonoids are extremely potent modulators of our own hormones (often classed as endocrine disrupters) and they would have been, in effect, an integral part of our ancestors' endocrine system for millions of years.

Flavonoids powerfully inhibit both the activity of steroids and the conversion of androgens to oestrogens.

This is relevant to all stages of growth and development and function from conception to death as these hormones are an integral part of the DNA transcription/reading mechanism.

Flavonoids also inhibit the action of the enzyme monoamine oxidase (which could have taken the brakes off the pineal glands production of melatonin.)

Anyway that's the basic plot and has huge implications, we were (and should still be) flooded with protective flavonoids from conception to death for millions of years, now we are not and our own very powerful hormones are seriously damaging us!

Intriguingly the thymus gland (the engine driving our immune system) is very sensitive to steroids it tends to physically shrink and its activity declines as steroid activity increases for example at puberty. If our thymus gland and therefore our immune function evolved to operate in a very low level of steroid activity (courtesy of the steroid modifying properties of flavonoids), the huge reduction in flavonoids will have severely compromised our immune system greatly increasing our susceptibility to all kinds of disease and degeneration.

The principle is employed in reverse to reduce the chance of organ rejection after transplant by administering steroids to inhibit immune response. Experiments blocking the effects of steroids have been shown to restore the thymus and its function to juvenile levels.

Perhaps we enjoyed the benefits of a youthful vigorous immune system all our lives.