

Self-destroying cancer cells: a major breakthrough for medical research

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By Brenda Townsend Hall

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Although cancer treatments have improved significantly over recent years, the search for the holy grail —a really effective cure — remains elusive. Even the much improved treatments in common use today carry risks. As Dr Claus Jacob of the University of Exeter explains, 'cancer therapy has long been based on highly toxic substances that randomly kill healthy and sick cells alike.'

Now, however, Dr Jacob and Dr Gutowski of the Royal Devon and Exeter Hospital, with support from the Peninsula Medical School, are working on a new approach that causes cancer cells to self-destroy: effectively to commit suicide. In a project that started in 2000 (first with funding from the UK Research Council funding, then from the Leverhulme Trust and involvement of Exeter Antioxidant Therapeutics Ltd) the research has led to the discovery of catalysts that mimic the activity of a certain human enzyme (glutathione peroxidase). They work by setting off reactions in the cancer cells causing them to kill themselves. A crucial benefit of this approach is that the drugs target only diseased cells, leaving healthy ones intact. This means that any therapy based on this approach should avoid many of the risks and side effects associated with chemotherapy and radiotherapy. The treatment is also highly efficient because, as Dr Jacob says, 'catalysts are not consumed during their activity but are recycled over and over again. This means that only minute quantities of biocatalyst are needed to kill cancer cells.'

Dr Jacob goes on to explain that the principle to make cancer cells kill themselves 'is based on the fact that catalysts are not only effective, but also highly selective:

'We knew from previous research (by us and others) that cancer cells have their own "biochemical signature" and that we could design catalysts that recognise this signature and use it to kill cells. We have also looked at natural human defence systems – and they use a similar catalytic chemistry.'

Of course many different types of cancers exist and the crucial question many will ask is what kinds of cancers could be treated by this method in the future? At this stage in the research the catalysts have been shown to work with cancer cells containing elevated concentrations of so-called 'reactive

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species'. Cancers that are known to have these species are human prostate and kidney cancer and certain lung carcinomas. The content of reactive species in several other kinds of cancer cells is still not fully determined.

As existing cancer treatments are associated with risks to healthy cells as well as the cancerous ones, recent research worldwide has been concentrating on the design of drugs that specifically target cancer cells and leave healthy cells alone. Such treatments lower the side effects of the drugs significantly, but unfortunately not completely. 'Our approach,' says Dr Jacob, 'uses catalysts to achieve this goal. Catalysts are very different from "one shot" conventional drugs since they facilitate reactions of species already present within the cancer cell and themselves are therefore recycled. This means they are active in very small concentrations. Since they "need" the cancer cell's reactive species for activity, they are only active in cancer cells but not in normal cells.'

The compounds have been developed and synthesised at Exeter University's School of Biological and Chemical Sciences and tested in cancer cells at the Royal Devon and Exeter Hospital and the research is now entering its critical phase. The team has just started with animal tests and hopes to proceed to clinical trials once the compounds have shown activity in the animal models. They have teamed up with Exeter Antioxidant Therapeutics Ltd. and this company is providing patent protection and is negotiating with larger pharmaceutical companies to develop and test these catalysts further. Since this approach is based on a new method rather than a single new compound, it has considerable potential for the development of a range of new catalysts with anticancer potential.

Although the research team stresses that treatment based on this approach is still many years off, their findings open up valuable new directions in the field of anti-cancer research.

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Note about Dr Jacob:

Dr Claus Jacob moved to Exeter from Harvard Medical School in 1999 and has worked for several years at the Chemistry/Medicine interface. He has published numerous research papers on the importance of oxidative stress in health and disease.

Brenda is a British writer and editor living in France. Find out more about her work at her web site: www.worldsapartreview.com.

The Benefits of Green Tea

By Granny's Mettle

The Benefits of Green Tea by Granny's Mettle

Green tea's popularity in the United States continues to grow as the number of new medical studies increase, showing that green tea is a rich and natural source of antioxidants. These antioxidants help protect the body from accelerated ageing and increased risk of major diseases.

Medical Benefits:

Among the many medical benefits of green tea, here are a few diseases that green tea is reputedly able to prevent from occurring: (1) cancer, (2) rheumatoid arthritis, (3) high cholesterol, (4) cardiovascular disease, (5) infection, and (6) impaired immune function.

The last ten years have seen the wide support of green tea's cancer-preventive effects from various medical studies and research. Many studies have shown that green tea possesses antioxidant properties. In a study published in November 2004, in an issue of Mutation Research, it was found out that the leaves' effects are 120% stronger than those of vitamin C. In addition, it helps starve cancer by inhibiting the development of new blood vessels. The blood vessels are known to supply the cancer cells with nutrients. Without them, cancer cells would not be able to increase its strength, thus, reducing its effect on the body.

In 1994, the Journal of the National Cancer Institute published results of a study indicating that drinking green tea reduced the risk of esophageal cancer in Chinese men and women by nearly 60%. On the other hand, researchers from the University of Purdue made conclusions from their study that a compound in green tea reduces the growth of cancer cells. In addition, another research indicated its effects of lowering total cholesterol levels, as well as improve the growth of good cholesterol in the body.

Green tea is also known to lower blood pressure and helps prevent hypertension. In a study published in an issue of the Archives of Internal Medicine, it was found out that among persons consuming tea regularly for at least one year, the risk of developing high blood pressure was 46% lower among those who drank ½ cup to 2 ½ cups per day. And for those consuming more than 2 ½ cups per day, there is 65% less risk.

Other Benefits:

·Promotes weight loss– There are new evidence that green tea can help dieters. The leaves of green tea plants help raise metabolism in the body. Researchers found during a study that men who were given green tea extract with caffeine burned more calories than those given only caffeine. By increasing the amount of calories burned in a 24 hour period, green tea promotes weight loss.

·Prevent tooth decay and bad breath– Green tea can help prevent tooth decay by destroying bacteria that causes dental plaque. Meanwhile, in a recent study in the University of Illinois, researchers have discovered that an element found in green tea decreases the growth of odor-causing bacteria by 30%.

They say that drinking a cup or two of green tea may help maintain fresh breath.

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- Reduce smoking risks– Studies have shown that cigarette smokers who drink up to six cups of green tea daily reduces their susceptibility to risks caused by the toxins emitted in cigarette smoke. In a 1997 study in the University of Kansas, they were able to conclude that green tea may be the reason why the rate of heart disease among Japanese men is quite low, despite 75% of them are smokers.
- Beauty remedy– Green tea may be used to freshen up the face and sooth tired or strained eyes. It can be applied to spots and blemishes to lessen their visibility. Meanwhile, beauty remedies containing green tea (such as deodorants and creams) are finding their way in the market.
- Antiseptic properties– Green tea is also known to treat minor cuts and rashes, and is an effective treatment for sunburn.

Granny's Mettle is a 30-something, professional web content writer. She has created various web content on a diverse range of topics, which includes digital printing topics, medical news, as well as legal issues. Her articles are composed of reviews, suggestions, tips and more for the printing and designing industry. For inquiries visit <http://www.onlinehomemedicalsupply.com>



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