

## Cancer: Forbidden cures?

Cancer is the leading cause of death in the world. Despite the estimated high death rates as a result of cancer, it is mostly a preventable disease. Due to their safety, low toxicity, antioxidant properties, and general acceptance as dietary supplements, fruits, vegetables, and other dietary elements (phytochemicals and minerals) are being investigated for the prevention of cancer. Extensive research over the past several decades has identified numerous dietary and botanical natural compounds that have chemopreventive potential. Researchers have successfully identified a small molecule that resets the “biological clock” of cancer cells and can play an important role in shrinking tumor growth and pave the way for a new therapy to treat cancer.

Botanical and nutritional compounds have been used for the treatment of cancer throughout history. These compounds also may be useful in the prevention of cancer. Population studies suggest that a reduced risk of cancer is associated with high consumption of vegetables and fruits. Thus, in the treatment modality of cancer the chemopreventive potential of naturally occurring phytochemicals is of great interest. There are numerous reports of cancer chemopreventive activity of dietary botanicals, including cruciferous vegetables such as cabbage and broccoli, *Alliums* vegetables such as garlic and onion, green tea, *Citrus* fruits, soybeans, tomatoes, berries, and ginger, as well as medicinal plants. Several lead compounds, such as genistein (from soybeans), lycopene (from tomatoes), brassinin (from cruciferous vegetables), sulforaphane (from asparagus), indole-3-carbinol (from broccoli), and resveratrol (from grapes and peanuts) are in preclinical or clinical trials for cancer chemoprevention. Phytochemicals have great potential in cancer prevention because of their safety, low cost, and oral bioavailability.

Another interesting findings, it has been reported that the scientists are targeting cell’s “biological clock” in order to find a way to get rid of cancer cells.

UT Southwestern Medical Center researchers found that a small molecule 6-thio-2'-deoxyguanosine (6-thiodG) could




stop the growth of cancer cells in culture and decrease the growth of tumors in mice, and have targeted telomeres with 6-thiodG, which takes advantage of the cell’s “biological clock” to kill cancer cells and shrink tumor growth.

Dr. Jerry W Shay, Professor and Vice Chairman of Cell Biology at UT Southwestern, said that they observed broad efficacy against a range of cancer cell lines with very low concentrations of 6-thiodG, as well as tumor burden shrinkage in mice.

6-thio-2'-deoxyguanosine acts by targeting a unique mechanism that is thought to regulate how long cells can stay alive, a type of the aging clock. This biological clock is defined by DNA structures known as telomeres, which cap the ends of the cell’s chromosomes to protect them from damage, and which become shorter every time the cell divides. Once telomeres have shortened to a critical length, the cell can no longer divide and dies through a process known as apoptosis.

Cancer cells are protected from this death by an RNA-protein complex called telomerase, which ensures that telomeres do not shorten with every division. Telomerase has, therefore, been the subject of intense research as a target for cancer therapy. Drugs, that successfully block its action, have been developed, but these drugs have to be administered for long periods of time to successfully trigger cell death and shrink tumors, leading to considerable toxicities. This outcome is partially because cells in any one tumor have chromosomes with different telomere lengths and anyone cell’s telomeres must be critically shortened to induce death.

6-thio-2'-deoxyguanosine is preferentially used as a substrate by telomerase and disrupts the normal way cells maintain telomere length. Because 6-thiodG is not normally used in telomeres, the presence of the compound acts as an “alarm” signal that is recognized by the cell as damage. As a result, the cell stops dividing and dies.

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Telomerase is an almost universal oncology target, yet there are few telomerase-directed therapies in human clinical trials, researchers noted.

Importantly, unlike many other telomerase-inhibiting compounds, the researchers did not observe serious side effects in the blood, liver, and kidneys of the mice that were treated with 6-thiodG.

In another interesting finding in the nature cure. The incredible story behind the Graviola, a clustered fruits comes from a tree in the rain forests of Africa, South America, and Southeast Asia. Its scientific name is *Annona muricata*. It is also known as custard apple, cherimoya, guanabana, soursop and Brazilian paw. The active ingredient is thought to be a type of plant compound (phytochemical) called annonaceous acetogenins. This tree is low and is called Graviola/guyabano! In Brazi, guanabana in Spanish and has the uninspiring name "soursop" in English. The fruit is very large, and the subacid sweet white pulp is eaten out of hand or, more commonly, used to make fruit drinks, sherbets.

The principal interest in this plant is because of its strong anticancer effects. Although it is effective for a number of medical conditions, it is its anti-tumor effect that is of the most interest. This plant is a proven cancer remedy for cancers of all types.

Besides being a cancer remedy, Graviola is a broad spectrum antimicrobial agent for both bacterial and fungal infections, is effective against internal parasites and worms, lowers high blood pressure and is used for depression, stress and nervous disorders.

Overall, there is no full proof evidence to show that Graviola works as a cure for cancer. In laboratory studies, Graviola extracts can kill some types of liver and breast cancer cells that are resistant to particular chemotherapy drugs. Hence, we don't know yet whether it can work as a cancer treatment or not.

The extract is basically used to treat infections with viruses or parasites, rheumatism, arthritis, depression, and sickness.

It is confirmed from research that some Graviola extracts can help to treat these conditions. In many countries, people use the bark, leaves, root, and fruits of this tree for traditional remedies.

The truth is stunningly simple: Deep within the Amazon Rainforest grows a tree that could literally revolutionize what we and the rest of the world think about cancer treatment and chances of survival. Or it's an herbal natural way or by targeting cell's "biological clock" in order to find a way to get rid of cancer cells. It is important to realize that the future has never looked more promising.



S. G. DAMLE  
Editor-In-Chief,  
Contemporary Clinical Dentistry  
E-mail: journalccd@gmail.com

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