

CALCUN D'glucurato.
A NEW BREAKTHROUGH IN CANCER RESEARCH

THE GLUCARATE REPORT

D-Glucarate Helps Remove Toxins and Carcinogens From the Body

Cancers develop gradually as a result of a complex interaction of factors related to heredity, environment, lifestyle and diet (NAS, 1982; Slaga, 1980 a and b). Based on sound scientific estimates, it can be stated that greater than 80 percent of all cancer deaths are related to the use of tobacco products, to what we eat and drink, to exposure to sunlight and ionizing radiation and to exposure to cancer-causing chemicals found in the environment and the workplace (Doll and Peto, 1981). No doubt, some people are more sensitive than others to factors that cause cancer; however, personally controlled lifestyle factors account for the major cancer risk experienced by mankind.

More than 200 epidemiological studies show that a diet high in fruits and vegetables leads to a decrease in cancer as well as other degenerative diseases (Steinmetz and Potter, 1991 a and b). In addition, thousands of human and experimental animal studies show the protective effects of vitamins, minerals, antioxidants and other beneficial phytochemicals against cancer and other degenerative diseases.

D-glucarate is a nontoxic, natural substance found in both fruits and vegetables, and many studies have shown it to be highly protective against cancer. The health benefits of D-glucarate were discovered by researchers at the M.D. Anderson Cancer Center, the No. 2 cancer center in the United States. They have developed a patented form of glucarate for use in dietary supplements.

In experimental animal studies, D-glucarate has been shown to decrease lung, skin, liver, breast and colon cancers by 60 percent or more (Walaszek, 1990). In addition, D-glucarate has been found to have an inhibitor effect on cancers of the bladder and the prostate.

In the breast, D-glucarate has been shown in more than 20 experimental animal and *in vitro* studies to significantly inhibit cancer. D-glucarate inhibits the induction of breast cancer by a variety of chemical carcinogens and tumor promoters including estrogens. D-glucarate has been found to work synergistically with both retinoids and tamoxifen to prevent the induction of breast cancer. The primary mechanism of action of D-glucarate is through its ability to enhance detoxification of both chemical carcinogens from the environment and estrogenic tumor promoters produced by the body. Women who are at a higher risk for breast cancer have a lower detoxification capacity for carcinogens and estrogens. Several human trials are currently underway with D-glucarate to determine its capability to decrease the breast cancer risk in women at a high risk for breast cancer.

Likewise, D-glucarate has been found to effectively prevent the induction of prostate cancer in men. An enhancement of the detoxification of carcinogens and androgens appears to be the mechanism by which D-glucarate inhibits prostate cancer. Several experimental animal studies have likewise shown the protective effect of calcium D-glucarate against colon cancer induced by various potent carcinogens. Once again, the mechanism by which calcium D-glucarate inhibits colon cancer appears to be related to the enhancement of the detoxification of both carcinogens and sterol tumor promoters.

In studies of lung cancer, a leading cause of death in this country, D-glucarate has been shown to effectively inhibit the induction of this form of cancer in experimental animal studies using different types of carcinogens found in cigarette smoke. Detoxification of these carcinogens appears to be the major mechanism of action.

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In addition, several experimental animal studies have shown the protective effect of calcium D-glucarate against colon cancer. Once again, the mechanism by which calcium D-glucarate inhibits colon cancer appears to be related to the enhancement of the detoxification of both carcinogens and sterol tumor promoters.

In studies of lung cancer, a leading cause of death in this country, D-glucarate has been shown to effectively inhibit the induction of this form of cancer in experimental animals using different types of carcinogens found in cigarette smoke. Currently there are ongoing studies of the effect of calcium D-glucarate on individuals determined to be at high risk for the development of lung cancer.



At this time, limited data in experimental animal models are available on the effect of D-glucarate on cancers of the liver, the bladder and the skin. However, there appears to be beneficial application.

Why is calcium D-glucarate being targeted to people at risk for breast cancer?

Dr. Slaga: Research suggests that women at risk for the development of breast cancer may excrete estrogen less effectively than women at lesser risk. The same reactions that promote the excretion of carcinogens promote the excretion of estrogen metabolites.

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D-gluconate also appears to have beneficial applications with cancers of the liver, bladder and skin; although, more research is needed. In all reviewed cases, the mechanism of action of D-gluconate appears, once again, to be related to the enhanced detoxification and inhibition of cell proliferation.

Of particular importance, the protective effect observed in experimental animal studies of D-gluconate and its derivatives against cancers of the breast, prostate, colon, lung, liver, bladder and skin appears associated with a considerable inhibition of both the initiation and promotion stages of carcinogenesis. Similar amounts of a calcium control — calcium gluconate — did not provide protection. In a review of all studies performed to date, D-gluconate and its derivatives appear promising as chemopreventive agents against several different cancers.

The mechanism by which D-gluconate enhances the detoxification of carcinogens, steroids and sterols seems to be associated with its ability to inhibit the enzyme β -glucuronidase. The major mechanism by which carcinogens, steroids, hormones and sterols are detoxified through a process called conjugation by glucuronidation, β -glucuronidase effectively reverses this reaction, allowing activity of the carcinogen tumor promoters to occur.

It is important to note that D-gluconate is a natural compound produced in small amounts by mammals, including humans, and by some plants. Studies of D-gluconate and its derivatives reveal no toxicity when consumed in large amounts, making it a safe substance to ingest. If gluconate were not produced in small amounts by the human body, it would more than likely be classified as a vitamin because of its beneficial role in protecting against cancer. Dietary sources of D-gluconate include different fruits and vegetables. The highest amounts of D-gluconate are found in fruits, especially apples, grapes, pears, cherries and apricots. Significant amounts are also found in vegetables including broccoli, brussels sprouts and alfalfa sprouts.

An Interview With Dr. Thomas Slaga

Dr. Thomas Slaga is the Executive Vice President for Research and the Chair of the Center for Cancer Causation and Prevention at the AMC Cancer Research Center in Denver, Colo. He oversees the development of research programs that focus on major cancer target sites, including the breast, colon, prostate gland and skin. He also directs activities in other areas of cancer study including molecular epidemiology, genetic monitoring and cancer interventions. Recently, we sat down with Dr. Slaga to gather his insights on calcium D-gluconate.

What is calcium D-gluconate?

Dr. Slaga: Calcium D-gluconate is a patented form of gluconic acid. Gluconic acid is already present in small amounts in our bodies and is found in certain fruits and vegetables.

The process of glucuronidation, a natural process in the body, is essentially a conjugation of carcinogens and hormones and sterols by which carcinogens, steroids, hormones and sterols are detoxified through a process called conjugation by glucuronidation. β -glucuronidase effectively reverses this reaction, allowing activity of the carcinogen tumor promoters to occur.

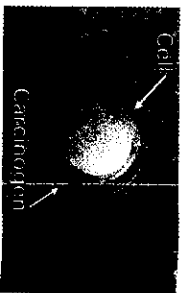
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I recommend that individuals eat a healthy diet such as five servings of fruits and vegetables per day plus take calcium D-gluconate supplementation in order to get sufficient protection against carcinogens and toxic agents.

GLUCURONIDATION



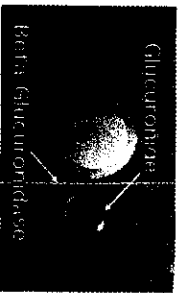
1. Gluconate enters cells.



2. Carcinogens attack cells.



3. Through glucuronidation, harmful substances are removed from cells, made water soluble and eliminated from body.



4. A harmful enzyme often reverses glucuronidation, releasing carcinogens back into the body.



5. Gluconate from cells binds with the enzyme, preventing its harmful actions.

produced in our bodies naturally in fruits and vegetables. Additional amounts of gluconate are especially important for individuals who are exposed to more harmful chemicals, such as cigarette smoke and individuals who have a high risk for certain cancers, like breast, lung and prostate cancer. The typical American diet does not include enough fruits and vegetables to maintain an effective level of gluconate; therefore, additional amounts can only help the body fight the harmful chemicals.

It has been stated that calcium D-gluconate helps prevent cancer. Is this true? If so, how does it do that?

Dr. Slaga: As I mentioned before, calcium D-gluconate is a substance that aids in glucuronidation, which is one of the body's major detoxification systems for eliminating both foreign chemicals and endogenous chemicals, such as steroids and sterols. Glucuronidation is a reaction where a toxin is made water-soluble so that it can be more easily excreted in the urine or the bile. Calcium D-gluconate inhibits an enzyme, present in many tissues of the body and in the microflora of the intestines, which reverses detoxification. Calcium D-gluconate inhibits the detoxification-reversing enzyme β -glucuronidase.

What are the research findings about calcium D-gluconate and its role against cancer?

Dr. Slaga: In experimental animal studies, D-gluconate has been shown to decrease lung, skin, liver, breast and colon cancers by 60 percent or more. In addition, D-gluconate has been found to have an inhibitor effect on cancers of the bladder and the prostate.

In the breast, D-gluconate has been shown in more than 20 experimental animal and *in vitro* studies to significantly inhibit cancer. Several human trials are currently underway with D-gluconate to determine its capability to decrease the breast cancer risk in women at a high risk for breast cancer.

If you will, calcium D-gluconate inhibits the "bad enzyme" in the detoxification process. In a general sense, calcium D-gluconate helps the body's process for eliminating harmful toxins and carcinogens that occur naturally or come from things like tobacco smoke, pesticides and other foreign substances. In addition, calcium D-gluconate helps eliminate excess amounts of chemicals produced in the body that promote cancer, such as estrogens and androgens. With more of these substances eliminated, an individual may rid his or her body of some of the things that lead to cancer. So, yes, it may be a promising tool against cancer.

How exactly does calcium D-gluconate help with the glucuronidation process?

Dr. Slaga: As we discussed, the body gets rid of harmful substances by making them more water soluble and more excretable. In individuals at risk for cancer, gluconic acid levels are low and are excreted quickly from the body. With low levels of the inhibitor gluconic acid, β -glucuronidase activity is high and there is less excretion of carcinogens and toxins. If an individual were to have higher levels of gluconic acid, he or she may be able to slow down the work of the "bad enzyme," β -glucuronidase, and rid his or her body of dangerous toxins and carcinogens. Calcium D-gluconate first associates into calcium and gluconic acid in the body, and then gluconic acid spontaneously converts to a lactone that inhibits the bad enzyme.

What are the research findings about calcium D-gluconate and its role against cancer?

Dr. Slaga: In experimental animal studies, D-gluconate has been shown to decrease lung, skin, liver, breast and colon cancers by 60 percent or more. In addition, D-gluconate has been found to have an inhibitor effect on cancers of the bladder and the prostate. In the breast, D-gluconate has been shown in more than 20 experimental animal and *in vitro* studies to significantly inhibit cancer. Several human trials are currently underway with D-gluconate to determine its capability to decrease the breast cancer risk in women at a high risk for breast cancer.

GLUCARATE ... IN BRIEF

- Glucarate is a component of fruits and vegetables and is present in the human body.
- Glucarate is safe; no toxicity has been detected.
- Glucarate is a pure compound that's molecular structure and mechanism of action is well defined.
- Glucarate supports the major detoxification pathway in the body: glucuronidation. This is the body's primary defense against cancer-causing agents.
- Shown to inhibit the development of cancers in laboratory animals in more than 30 studies published in cancer research journals.
- Glucarate in lab animals has been shown to be effective in preventing breast, lung, prostate, skin, colon, bladder and liver cancers.
- Clinical trials are underway by the National Cancer Institute and the AMC Cancer Research Center on glucarate as a cancer-preventative agent.
- Epidemiological evidence shows a positive correlation between higher glucarate levels and reduced cancer risk.
- Researchers at M.D. Anderson Cancer Center, the No. 2 cancer center in the United States, developed a patented form of glucarate used in dietary supplements.
- Recommended daily supplement dosage is 200 to 400 mg.

One of life's most delicate balancing acts is found in the ebb and flow of *hormones* that is constantly taking place in the human body. These messenger chemicals are fundamental to the process of life. Produced by endocrine glands, hormones travel throughout the body, communicating with each other as they direct cellular activity. For example, the hypothalamus gland monitors hormone levels in the body. It signals the pituitary gland, advising it to send messages to the ovaries to either produce or stop producing *estrogen*.

Estrogen is an extremely powerful hormone whose activity can be measured in parts per trillion. Therefore, it doesn't take much to create an imbalance. Like all hormones, estrogen communicates with a cell by docking to a particular receptor site on that cell's membrane. If there is an excess of these estrogen-sensitive receptors, or an excess of circulating estrogen in the bloodstream, normal cellular metabolism can be altered. Another problem is that estrogen receptors are not very particular; they will accept many chemicals – both natural and synthetic – other than estrogen.

How the body removes excess estrogen

One of the processes by which estrogen and estrogenic compounds are metabolized and broken down is through *glucuronidation*. In the liver, they're bound to glucuronic acid and then excreted in the urine or feces. This process can be disrupted by an enzyme called *beta-glucuronidase*, which is found in the gastro-intestinal tract. It frees the bound-up estrogen or estrogenic compound, releasing it to be reabsorbed back into the bloodstream – to again affect cells.

Obviously estrogen is needed by the body; however, too much can lead to cellular disruption. Since it can be very difficult to avoid the estrogenic chemicals rampant in our environment, another strategy is needed, and that is to reduce their negative effects by supporting the body's natural ability to remove excess estrogen and other hormones and toxins.

Calcium D-glucarate and hormone metabolism

The removal of excess estrogen can be increased by a natural substance called *Calcium D-glucarate (CDG)*, because it inhibits beta-glucuronidase activity in the body. This means that estrogen bound for excretion stays bound, and the total estrogen load on the body is reduced.

In clinical trials, tissues that are sensitive to excess hormones – such as breast, liver, and lung – have been shown to respond favorably to CDG. In addition to estrogen and estrogenic compounds, CDG helps promote excretion of other hormone metabolites as well as cellular toxins and steroids.

CDG is made naturally in small quantities in the body; it is also found in a variety of fruits and vegetables: oranges, broccoli, carrots, spinach, and apples. Vitamin A has been shown to have a synergistic effect with CDG. One 500 mg tablet of Source Naturals CALCIUM D-GLUCARATE is equivalent to the phytonutrient activity found in 82 pounds of fresh fruits and vegetables. The suggested use for preventative health maintenance is 3 to 4.5 grams per day. No toxicity has been found with its usage.

Phytonutrients also help reduce estrogen exposure

Another strategy to reduce the effects of excess estrogen is to increase the intake of plant estrogens. This helps for two reasons. First, by occupying estrogen receptor sites, these natural estrogenic compounds block synthetic estrogens from attaching to these sites. Second, phytoestrogens only mildly activate receptors.

One of the best phytoestrogens is *genistein*, the isoflavone in soybeans responsible for soy's beneficial influence on the human body. Increased intake of genistein and/or soy is being recommended by many health professionals, especially for post-menopausal women. Please see Source Naturals product literature on GENISTEIN as well as MENO BALANCE, our nutritional menopause formula with genistein and black cohosh. Both are part of our advanced line of nutritional support for women.

As new research sheds light on the importance of proper hormone balance to our health, it's vital to protect ourselves from the increased burden of estrogen that we are encountering today. Source Naturals CALCIUM D-GLUCARATE is a timely nutrient that can make a real difference in our lives.

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