Marine Organism Discovered That May Fight Cancer

An unexpected discovery in marine biomedical laboratories at the University of California in San Diego may lead to new information about a marine organism that creates a natural product currently being tested to treat cancer in humans. The finding could lead to new applications of the natural product in treating disease in humans.

Scientists discovered an enzyme called SaLL inside Salinispora tropica, a marine bacterium identified in 1991. The researchers also identified a novel process—a “pathway”—for the way the marine bacterium incorporates a chlorine atom, the key ingredient for triggering its potent cancer-fighting natural product. Previously known methods of activating chlorine were processed with the use of oxygen.

Pharmaceutical companies might be able to make this type of drug in greater quantities, now that scientists know how nature makes it. It is still unclear how pervasively SaLL and its unique biological activation pathway exist in the ocean environment. Chlorine is a major component of seawater, and a fundamental component of Salinispora’s disease-inhibiting abilities. Salinosporamide A, for example, is 500 times more potent than its chlorine-free analogue, salinosporamide B.

The chlorine atom in salinosporamide A is key to the drug’s irreversible binding to its biological target and one of the reasons the drug is so effective against cancer. According to one of the authors, finding the SaLL enzyme and its new pathway may also enhance their understanding of how related enzymes are activated in different ways.

(Source: Nature Chemical Biology, 2008; 4:69-74.)

In our next issue ...

The MYSTERY OF HORMONES

Hormones travel to different sites in the body and have various effects. The endocrine system comprises a complex group of glands that control reproduction, metabolism, growth, and development through many hormones. This system includes the pituitary glands, the hypothalamus, testes (in males) and ovaries (in females), the thyroid and adrenal glands, and the pancreas. Sometimes the endocrine glands are impaired and can cause a hormonal imbalance, which can affect health in many ways.

In the upcoming issue of Nutrition Health Review, we will examine some endocrine disorders, such as osteoporosis, infertility, menopause, erectile dysfunction, diabetes, metabolic syndrome, hyperthyroidism, and hypothyroidism. We will also explore how abusing steroid hormones to build muscle may trigger serious health risks.

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Green Tea Extract Helps Remove Genital Warts

The human papillomavirus (HPV) comprises a group of difficult-to-treat viruses that can produce warts on the skin and on the membranes that line body passages. Genital warts are spread by sexual contact. Approximately 40 types of HPV can infect the anogenital tract. Infection caused by HPV may result in local infections and may appear as warts, growths of the vulva, or glans penis. Genital warts develop in approximately two thirds of individuals who have sexual contact with an infected partner. Most health professionals estimate the incubation period to be three months. Most newly infected patients tend to seek medical care when they notice bumps on the vulva, perianal area, or pericentral area.

No one curative treatment exists for condyoma acuminata. Simple topical therapies are the initial treatments of choice for most patients. They are cost effective and result in minimal toxicity. Most therapies result in a 30 to 90 percent success rate in eliminating visible condyoma. The lesions are easily spread from person to person by contact with the wart. These skin-colored or brown cauliflower-like bumps in the genital areas of men and women can be small or large. Genital warts are common and difficult to treat.

A subgroup of HPV that infects the genital tract and anus can lead to precancerous changes in the uterine cervix. External anogenital warts are frustrating for patients, who find them to be agonizing and repugnant in appearance. Usually multiple treatments are needed. Current treatment options are quite discouraging because of their low efficacy, high recurrence rate, or unfavorable side effects.

In a study published in 2008, green tea extract was mentioned in the list of treatments. An extract of the green leaves of Camellia sinensis is comprised mainly of tea polyphenols. Green tea catechins can exert antiviral, antioxidants, antiproliferative, and immunostimulatory activity.

A team of international researchers led by Silvio Tatti, M.D., from Bogota, Colombia, evaluated the possible benefits of sienatechins for treating anogenital warts. The investigators randomly assigned 502 men and women to one of two sienatechin ointment strengths (10 or 15 percent) or placebo ointment. Patients applied the topical ointment three times daily until the warts cleared or for a maximum of 16 weeks.

Patients were seen during follow-up visits at four and 12 weeks. Both baseline and newly emerging external genital and perianal warts were completely cleared in 53.6 percent of all patients studied who received sienatechins. Among patients receiving placebo, the warts were cleared in 35.3 percent of patients.

During these trials, recurrence rates were also low in patients receiving sienatechins (only 6.8 percent). Sienatechins were observed to be superior as early as four weeks, with better clearance of warts than had been present at the beginning of the study as well as those that recurred during treatment. Rates of complete clearance were somewhat higher in women than in men, but this difference was not statistically significant. Most patients experienced local reactions at application sites, consisting predominantly of mild-to-moderate itching. The overall rate of adherence to therapy was more than 90 percent.

(Source: Obstetrics and Gynecology, 2008; 111:1371-1379.)

Natural Chemical Combats Skin Blistering Disorder

The compound sulforaphane, whose natural precursors occur at high levels in broccoli, was originally identified as the chemical responsible for its anti-cancer properties. Now sulforaphane may be able to be used to treat a genetic skin blistering disorder called epidermolysis bullosa simplex (EBS). In patients with this rare but devastating inherited condition, fluid-filled lesions appear at sites of frictional trauma to the skin. The bottom layer of the epidermis is uncommonly fragile and ruptures readily. Unfortunately, therapy options for EBS are limited.

The desire to learn more about sulforaphane led Pierre Coulombe, Ph.D., Professor of Biological Chemistry at Johns Hopkins University School of Medicine in Baltimore, to his colleague, Paul Talalay, M.D., Professor of Pharmacology at the university, who had previously identified sulforaphane as a cancer-preventive agent. Their research so far suggests that EBS might be treatable. Considering that the only available option for patients with EBS is to wrap gauze around trauma-prone areas to minimize breakage, even a modest improvement would be beneficial.

Dr. Coulombe notes that extracts from broccoli sprouts rich in sulforaphane have already been shown to be safe for use in human skin. However, much work remains to be done before sulforaphane can be tested in patients. Because sulforaphane is naturally available in our diet, there is no need to invent, test, or evaluate a new drug.

(Source: Proceedings of the National Academy of Sciences, 2007; 104:14460-14465.)