



# CarciKnow News

*the voice of Carcinogenesis Foundation*

<http://www.carciknowgenesis.org>

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## To expose or not expose to Sun is the question

### Editorial Thoughts

With the onset of summer around many parts of the world, the focus turns on sun burns and on a more serious disease, skin cancer. Epidemiological research has shown that both melanomas and basal cell carcinomas seem to be sensitive to the regularity of sun exposure. This is not the case for squamous cell carcinoma.

There are provocative observations that suggest the beneficial effects of exposure to sun.

Professor Bruce Armstrong from University of Sydney seems to think that how often one is exposed to sun matters more than how much one gets exposed to sun. He points out that anyone who is regularly engaged in sun-related recreation is at a lower risk of contracting skin cancer than a person who gets their whole week's sun in one hit, if they have equal amounts of sun exposure overall.

Going a step further, Professor Marianne Berwick concludes in the research article published in 2005 in the Journal of the National Cancer Institute that Sun exposure is associated with increased survival from melanoma. They suggest

a role for vitamin D or sun induced DNA repair capacity as a mechanism involved in this process.

A team of international researchers led by Karin Ekström Smedby, from Karolinska Institute, Sweden, also published an observation in 2005 in the Journal of the National Cancer Institute suggesting that sunlight reduces the risk of developing tumours in the lymph glands. These researchers observed that frequent exposure to ultraviolet rays seems to reduce the chance of developing lymphoma by 30 to 40%. They also speculate a role for vitamin D in this process. Regardless of the discordant nature of the observations, the researchers seem to suggest a role for vitamin D in preventing skin cancers. It is important for us to know that we all have different genetic make-up including differences in Vitamin D receptors that responds to exposure to sun rays differently.

Skin cancer remains a major public health issue and there is a need for authentic information on the causes and prevention of skin cancers.

### Special points of interest:

MAY - MELANOMA AWARENESS MONTH

TAKE VITAMIN-RICH DIET

GIVE UP TANNING—ARTIFICIAL OR NATURAL



## Virtues of vitamin D

Vitamin D<sub>3</sub> is produced photochemically in the skin from 7-dehydrocholesterol. Synthesis in the skin involves UV-B radiation which effectively penetrates only the epidermal layers of skin. The amount of time an individual requires to produce a given amount of Vitamin D may also depend on season, geographic latitude, time of day,

cloud cover and smog. For individuals with limited sun exposure to sun, it is important to include good sources of vitamin D in their diet. Several foods are now being fortified with vitamin D.

The active form of vitamin D has significant, protective effects against the development of cancer. Low levels of vitamin D in

serum have also been correlated with breast cancer disease progression and bone metastases and studies suggest that increased intake of vitamin D reduces the risk of breast cancer in premenopausal women. Polymorphisms of the vitamin D receptor vitamin D receptor gene have been associated with an increased risk of breast cancer.

### Inside this issue:

WHAT IS MELANOMA	2
CAUSES OF SKIN CANCER	2
VITAMIN C AGAINST CANCER	2
HAROLD PAUL RUSCH	3
SKIN CANCER FACTS TO REMEMBER	3
UV AND SKIN CANCER	3
TYPES OF SKIN CANCER	4

### Vitamin Shield Against UV Radiation

A research team led by Diona L. Damian from the University of Sydney at Royal Prince Alfred Hospital, New South Wales has shown that nicotinamide (vitamin B3) has immune-protective and cancer-preventive effects against UV radiation in mice. In a previous research, the same researchers have shown previously that topical nicotinamide is immune protective in humans.

Small doses of UV radiation suppresses cutaneous immunity, a key defense against the development of skin cancers. Oral nicotinamide, at doses of either 1500 or 500 mg daily, was well tolerated and significantly reduced UV immunosuppression with no immune effects in unirradiated skin. The study published in a recent issue of *Carcinogenesis* proves that oral nicotinamide is safe and inexpensive and looks promising as a chemopreventive supplement for reducing the immunosuppressive effects of sunlight.

### What is Melanoma

May is the melanoma month. Melanoma is the deadliest of skin cancers. It increases by about 4 percent each year. By 2010, it is estimated to affect 1 in 50 U. S. citizens.

Melanoma develops from cells in the skin called melanocytes. Melanocytes function to produce melanin, which protects humans from the damaging effects of the sun's UV rays.

The melanocytes are the ones that become cancerous thereby causing melanoma. A single sunburn can trigger biochemical

changes in melanocytes culminating in melanoma, so it is important to prevent sunburns by applying sunscreen when outside.

Melanoma is a serious and potentially deadly disease. If it is left undetected and untreated at its earliest states, it penetrates deeper in the skin and migrates to various parts of the body forming new tumors. This spread is called metastasis.

One needs to keep an eye on apparently innocuous moles as these could develop into melanoma. Adults should check their

skin every month.

Learn what your moles, freckles or other birthmarks look like so that you can notice any new moles or changes in existing ones.

### Causes of Skin Cancer

Skin cancer is the most common form of cancer in the United States. The incidence of malignant melanoma has more than doubled between 1973 and 1996. The chief miscreant to cause skin cancer is exposure to the sun's ultraviolet rays.

In addition to sun's ultraviolet rays, UV rays from artificial sources of light may initiate skin cancer. Artificial sources like tanning beds and sun lamps are just as dangerous as those from the sun and should also be

avoided. There are certain factors that increase the risks of skin cancer among people.

People with light skin color or eye color, family history of skin cancer run the greater risks of skin cancer. There are also other risk factors like certain types and a large number of moles, freckles, which indicate sun sensitivity and sun damage.

In addition to these factors, chronic exposure to the sun and history of sunburns early in life

poses threat of skin cancer.

Unfortunately, despite the fact that both tanning and burning can increase one's risk of skin cancer, most Americans do not protect themselves from UV rays.

To increase awareness to minimize UV exposure, U. S. Centers for Disease Control and Prevention has developed Guidelines for School Programs to Prevent Skin Cancer to help state and local education agencies and schools.

### Can Vitamin C Prevent Cancer?

Vitamin C also known as ascorbic acid is a water soluble vitamin. Unlike most mammals, humans can not make their own vitamin C. So, the only source of vitamin C is diet. It is long known to fight common colds.

It is a versatile vitamin and plays role in the synthesis of collagen, an important structural component of blood vessels, tendons, ligaments, and bone. Its anti-cancer effects first came to light in the 1970s and 1980s when chemistry Nobel Laureate Linus Pauling and colleagues at Stan-

ford University suggested that very large doses of vitamin C (10 grams/day intravenously for 10 days followed by at least 10 grams/day orally indefinitely) were helpful in increasing the survival time and improving the quality of life of terminal cancer patients.

Since then a number of case-control studies have investigated the role of vitamin C in cancer prevention. Most have shown that higher intakes of vitamin C are associated with decreased incidence of cancers of the mouth, throat and vocal chords,

esophagus, stomach, colon-rectum, and lung.

A number of observational studies have found increased dietary vitamin C intake to be associated with decreased risk of stomach cancer. Intravenous (IV) administration can result in much higher blood levels of vitamin C than oral administration, and levels that are toxic to certain types of cancer cells in culture can be achieved with intravenous but not oral administration of vitamin C. It appears reasonable to reevaluate the use of high-dose vitamin C as cancer therapy.

## Harold Paul Rusch

Harold Paul Rusch and his colleagues at the McArdle Laboratory for Cancer Research, Medical School of University of Wisconsin, Madison were the first to shed light on the cause of skin cancer. Rusch and his teammates identified the range of wavelengths of ultraviolet light that produces cancer of the skin in mice.

He made important contributions to the knowledge of how cells differentiate and grow using a model system like slime molds, especially *Physarum polycephalum*. Before founding McArdle

Laboratory in 1940, he studied at the University of Wisconsin in Madison, where he received the B.A. and M.D. degrees.

During his stint at McArdle, he inspired his co-researchers to embark on cancer research. Teaming up with R. K. Boutwell he showed that a high-fat or high-calorie diet accelerated the production of cancer in mice.

Ironically, cancer took revenge on this prominent researcher. He died of prostate cancer on May 26, 1988.

Before death, he chronicled the history of cancer research at the University of Wisconsin in "Something Attempted, Something Done", an autobiographical sketch.

This modest title, taken from a line in Longfellow's poem about a village blacksmith, is followed by another line in the original poem, "Has earned a night's repose." This phrase aptly depicts the life of Harold Paul Rusch.

## Preventive Tips Against Skin Cancer

Because the sun's UV rays are strong and do the most damage during midday, outdoor activities should be avoided at this time. If this is not possible, then finding the shade of a tree, beach umbrella, or tent is a practical way to protect the skin.

A shirt, beach cover-up, or pants are all good choices. However, a typical shirt actually has a sun protection factor (SPF) rating substantially lower than the recommended SPF 15, so it is wise to double up on protection by using sunscreen with at least sun protection factor SPF 15 and a shade.

The head and neck are common sites for skin cancers to occur, so a wide-brimmed hat should be worn to shade the face, ears, scalp, and neck from the sun's UV rays.

## Skin Cancer: Some Important Facts

Cases of both non-melanoma and melanoma skin cancers has risen over the past few decades. Currently, between 2 and 3 million non-melanoma skin cancers and 132,000 melanoma skin cancers occur globally each year.

One in every three cancers diagnosed is a skin cancer and, according to Skin Cancer Foundation Statistics, one in every five Americans will develop skin cancer in their lifetime.

It accounts for nearly half of all cancers in the United States. More than 1 million cases of non-melanoma skin cancer are found in this country each year. Of these, about 60,000 are diagnosed with melanoma, the most serious of the common types of skin cancer.

A cure is highly likely, however, if detected and treated early. Malignant melanoma causes more than 75 percent of all

deaths from skin cancer. For localized melanoma, the 5-year relative survival rate is 96 percent; survival rates for regional and distant stage diseases are 61 percent and 12 percent, respectively.

The 5-year relative survival rate for patients with melanoma is 91 percent. About 80 percent of melanomas are diagnosed at a localized stage.

## How does UV Radiation Damages Skin ?

Ultraviolet (UV) rays are a form of invisible energy given off by the sun. Ultraviolet radiation is divided into 3 wavelength ranges: UVA, UVB and UVC rays.

UVA rays cause skin cells to age and can cause some damage to cells' DNA but after a long exposure. UVB rays, on the other hand, directly damage DNA and are thought to initiate most of the

skin cancers. UVC rays don't penetrate our atmosphere and poses no risk of cancer.

Although UVA and UVB rays make up only a very small portion of the sun's wavelengths, they are mainly responsible for the harmful effects of the sun on the skin. UVB radiation can damage the DNA of skin cells. If this damage affects the DNA of genes

that control skin cell growth, skin cancer may be the result.

Recent research has found that UVA also contributes to skin cancer formation. Scientists now believe that both UVA and UVB rays damage skin and cause skin cancer. There are no safe UV rays.

## Risk of Tan Without UV

Tanning pills promise to give tan without exposure to UV radiation. Tanning pills contain color additives similar to beta-carotene, the substance that gives carrots their orange color. With no approval from the Food and Drug Administration (FDA) they are harmful. The main ingredient in tanning pills, canthaxanthin, can show up in the eyes as yellow crystals leading to impaired vision.



## Research-Awareness-Care-Education

CARCINOGENESIS FOUNDATION

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## Mission of the Carcinogenesis Foundation

The mission and activities of Carcinogenesis Foundation can be summarized by an acronym PRIME (Prevention-Research-Innovation-Medicine-Education). Prevention is the best medicine for any disease, especially cancer. CF (Carcinogenesis Foundation) believes that innovative research and development of medicinal agents coupled with education will be the key to the global vision of eradicating cancer incidence. The Foundation will catalyze and support innovations in carcinogenesis research and education.

Please contact us for further details and opportunities to get involved.

## Publish your research in the Journal of Carcinogenesis

Journal of Carcinogenesis is a peer-reviewed, online journal designed to bring together many aspects of research to develop the understanding of carcinogenesis.

Edited by Dr. Gopala Kovvali, Journal of Carcinogenesis is supported by an international Editorial Board.

Journal of Carcinogenesis considers manuscripts in many areas of carcinogenesis and Chemoprevention. Primary areas of interest to the journal include: physical and chemical carcinogenesis and mutagenesis; processes influencing or modulating carcinogenesis, such as DNA repair; genetics, nutrition, and metabolism of carcinogens; the mechanism of action of carcinogens and modulating agents; epidemiological studies; and, the formation, detection, identification, and quantification of environmental carcinogens. Manuscripts that contribute to the understanding of cancer prevention are especially encouraged for submission.

Please contact us at [editor@carcinogenesis.com](mailto:editor@carcinogenesis.com) for further details.

## Types of Skin Cancers

There are two main types of skin cancers – keratinocyte cancers (basal and squamous cell skin cancers) and melanomas. Basal and squamous cell skin cancers are the most common cancers of the skin. They develop from cells called keratinocytes, major constituent of the outermost layer of skin and the most common cells in the skin.

Melanomas are cancers that develop from melanocytes, the cells that make the brown pigment that gives skin its color. Melanocytes can also form benign growths called moles.

### Basal and squamous cell cancers (keratinocyte cancers)

Basal cell cancers and squamous cell cancers are the most com-

mon cancers of the skin. They develop from skin cells called keratinocytes. Both basal cell and squamous cell cancers are found mainly on parts of the body exposed to the sun, such as the head and neck.

These cancers (especially basal cell cancers) rarely spread elsewhere in the body. Still, they are important to recognize. If left untreated, they can grow quite large and invade into nearby tissues, causing scarring, disfigurement, or even loss of function in some parts of the body.

### Melanomas

Melanomas can occur anywhere on the body, but are more likely to develop in certain locations like trunk in men and legs in

women. The incidence of malignant melanoma in white populations generally increases with decreasing latitude, with the highest recorded incidence occurring in Australia, where the annual rates are 10 and over 20 times the rates in Europe for women and men respectively.

Like basal cell and squamous cell cancers, melanoma is almost always curable in its early stages. But if left untreated, melanoma can spread to other parts of the body, where it can be very hard to treat.