

WHITE PAPER

# **Clarifying the Mischaracterization of Ultraviolet Radiation as a Carcinogen**



© 2003 International Smart Tan Network. All rights reserved.  
Duplication of this document is not permitted in any circumstance.



## Clarifying the Mischaracterization of Ultraviolet Radiation as a Carcinogen

The relationship between ultraviolet radiation and skin damage is not straightforward and most often is oversimplified to the point of being inaccurate. In fact the relationship between ultraviolet light and skin cancer is not necessarily related to cumulative sun exposure, but is more strongly associated with intermittent sunburns in populations that are genetically susceptible to skin damage.

### PART I: EXECUTIVE SUMMARY

#### ■ UV Light Does Not Deserve the Blanket Label of 'Carcinogen'

The U.S. National Toxicology Program in 2000 placed ultraviolet light on the federal government's list of known human carcinogens.<sup>1</sup> In doing so, ultraviolet light became the first item on that list that humans need to live and would die if they didn't receive. Putting UV light on the list without explanation misrepresents the nature of the relationship between ultraviolet light and cancer for several reasons:

1. The listing does not mean that moderate tanning will cause skin cancer. Here is why: The criteria to be on the list do not take into consideration the dosage required for a substance to be harmful. That is the problem. Here is a portion of the listing criteria: "The Report does not present quantitative assessments of carcinogenic risk. Listing of substances in the Report, therefore, does not establish that such substances present carcinogenic risks to individuals in their daily lives." This exclusion makes this listing meaningless.
2. The lack of exposure criteria in NTP's report downgrades the listing to mean nothing more than overexposure to sunlight may contribute to your risk of skin cancer. Overexposure is exactly what the professional indoor tanning industry is trying to prevent in tanning facilities by controlling your exposure to UV light.
3. The conclusions to support the listing reached by the NTP – which produces the Report on Carcinogens in the Department of Health and Human Services – are divergent from conclusions reached about UV light by the U.S. Food and Drug Administration, which is also an HHS agency. The government is disagreeing with itself.

4. The list does not take into account that there are positive effects to ultraviolet light exposure. Many forms of cancer – including breast, colon, prostate and ovarian tumors – now appear to be retarded or even prevented by regular exposure to ultraviolet light.<sup>2,3,4,5,6,7,8</sup> This omission on the NTP list is conspicuous, given that positive effects are listed for other substances in the government's list of carcinogens that have positive effects.
5. One thing we know for certain: You would be dead today if you did not receive any ultraviolet light.

## PART II: DISCUSSION

### ■ The Fundamental Arguments

The contention that ultraviolet light is carcinogenic and therefore should always be avoided is based on two misconceptions that are the result of oversimplifications:

- 1) The contention that "there is no such thing as a safe tan."
- 2) The contention that any tan is a sign of damage to your skin.

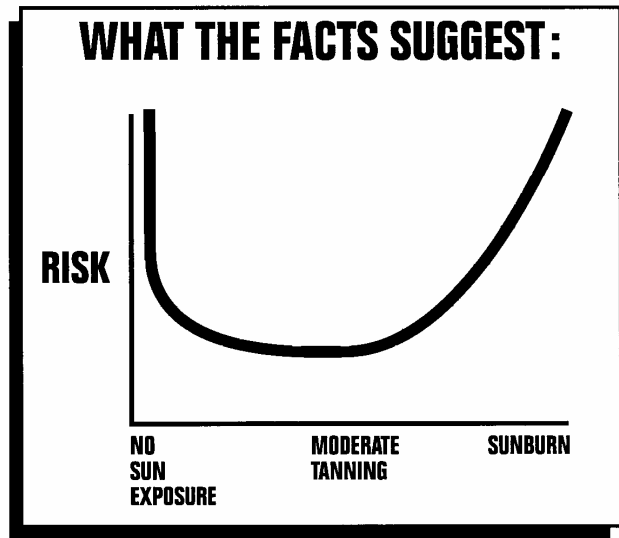
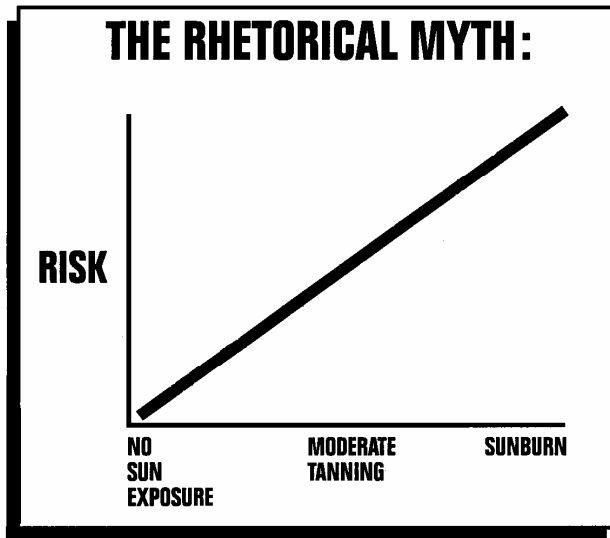
Those two remarks have been the cornerstones of the anti-tanning lobby's objections to the indoor tanning industry for nearly a decade. However, both of these contentions do not paint an accurate portrayal of the big picture about the risks associated with ultraviolet light.

#### 1) The "Safe" Dilemma

Anti-tanning lobbyists have made the statements that "There is no such thing as a safe tan" and that "Any tan is a sign of damage." Unfortunately, both of these statements, without further qualification, are terribly misleading.

In fact, the statement that "There is no such thing as a safe tan" is a semantic deception because the antithesis of that statement is also not true. Avoiding sunlight completely isn't safe either. In fact — because avoiding sunlight carries risks, as does getting too much sunlight — there is no such concept as "safe" when it comes to sunlight. The best we can possibly do is minimize the risks inherent with either too much or *too little* exposure.

The graphs on the next page illustrate our point. The left graph shows the conventional thinking about sunlight, what "sun-scare" lobbyists have drilled into our heads for more than a decade: that totally eliminating sun exposure eliminates risks. That is why "sun scare" lobbyists tell us to wear sunscreen 365 days a year, no matter where we live. But the right graph is a more accurate, albeit more complicated, description of the risk function. The one thing we do know for certain about sunlight is that zero exposure does NOT equal zero risk; in fact, the risks of zero exposure would be deadly. So the risk function must be curved. The vertex of that curve — where risk is minimized — is different for every person and cannot be randomly defined. Anti-tanning lobbyists want to define it for you anyway.



Therein lies the essence of our objection to the “sun scare” campaign: Human life is totally reliant on sun exposure, and the life-giving effects of ultraviolet light. The question for each of us — a question that nobody knows the exact answer to — is how much sun exposure is appropriate, and how much is too much. Basing the answer to that question on the belief that any exposure increases one’s risk of skin damage — a belief that is not categorically supported in the medical literature — is naive and fails to recognize the positive influence ultraviolet light and sunlight have on our lives.

That is exactly why the International Smart Tan Network and its member facilities use the word “smart” to describe moderate tanning today. The word “safe” implies that one can recklessly abuse something without any fear of causing harm. And that certainly is not what we are trying to say. In fact, we are playing a key part in preventing that kind of reckless abuse.

For example, previous generations believed that sunburn was an inconvenient but necessary precursor to developing a tan. Today we know better, and are teaching a new generation of tanners how to avoid sunburn at all costs.

### **Why the Oversimplification?**

The truth about sun exposure is abstract and complicated — it is a lot easier just to tell people to avoid sunshine than teach them how to enjoy it responsibly. Instead of teaching you how to maximize the benefits and minimize the risks, anti-tanning lobbyists would rather oversimplify the scenario and mislead you into believing that any exposure is bad for you. Instead of teaching people how to live practical lives and avoid sunburn by using sunscreen products intelligently, anti-tanning lobbyists are preaching total sun avoidance and what we believe is most likely a total misuse of sunscreens.

For instance, many leaders in the dermatology community are encouraging everyone to wear sunscreen lotion 365 days a year — no matter where they live. This radical message — which conveniently benefits the \$5 billion sunscreen industry, members of which are among the largest

supporters of dermatology industry programs — is not supported by any actual data to suggest that daily sunscreen usage offers any advantages. It is only reflective of the belief that any UV exposure is bad for you.

## **2) Any Tan is Not "Damage"**

Tanning is your body's natural protection against sunburn — it is what your body is designed to do. Calling a tan damage to your skin is like calling exercise damage to your muscles. Consider, when one exercises you are actually tearing tiny muscle fibers in your body. On the surface, that is damage. But that damage is your body's natural way of building stronger muscle tissue. So to call exercise "damaging" to muscles would be terribly deceiving. The same can be said of sun exposure. Your body is designed to repair damage to the skin caused by ultraviolet light exposure; developing a tan is its natural way to protect against the dangers of sunburn and further exposure.

Here's how we see it: Saying that any ultraviolet light exposure causes skin damage is a dangerous oversimplification. It would be like saying that water causes drowning. Yes, water can cause drowning. But our bodies also need water; we would die without it. Similarly, we need ultraviolet light exposure; we would die without it. It is the professional indoor tanning industry's position that sunburn prevention is a more effective message than total abstinence, which ultimately encourages abuse. It is a responsible, honest approach to the issue.

### **■ The Realities About Skin Cancer**

You must realize that skin cancer has a 20-30 year latency period; the rates of skin cancer we are seeing today are a function of the ignorant misbehavior of the 1960s, 1970s and 1980s. Recall, society used to view sunburns as an inconvenient right of spring — a precursor to developing a summer tan. Society felt that sunburns would "fade" into tans, and so tanners hit the beaches and blacktops with baby oil and reflectors. Severe burns were commonplace. Today we know how reckless that approach was, and the rates of skin cancer we are seeing today reflect that ignorance. But here's something encouraging: the trend seems to be reversing. Death rates for non-melanoma skin cancer have been declining significantly in the past 10 years. Estimates range from 1,200 to 1,500 people — down significantly from years past.

And you must remember that melanoma skin cancer does not fit the mold of other skin cancers. Melanoma is more common in people who work indoors than in those who work outdoors and most commonly appears on parts of the body that do not receive regular exposure to sunlight. Heredity, fair skin, an abnormally high number of moles on one's body (above 40) and a history of repeated childhood sunburns have all been implicated as potential risk factors for this disease.

Because people who receive regular exposure to sunlight get fewer melanomas, blanket statements that ultraviolet light causes melanoma cannot be made. Indeed, some studies have found that an individual's *genetic susceptibility to sunburn*, and not the actual sunburn incidence itself, is the risk factor. Further, the majority of studies on indoor tanning have not shown a statistically significant connection between commercial use of tanning equipment and an increased risk of melanoma. That is important, considering that most of the studies did not

account for confounding variables such as outdoor exposure to sunlight, childhood sunburns, type of tanning equipment utilized and duration and quantity of exposures. So the professional indoor tanning industry is doing its part to help individuals of all skin types minimize their risks by teaching them how to avoid sunburn at all costs.

### ■ **The Big Contradiction: The Berwick Bombshell**

In 1998, Dr. Marianne Berwick, an epidemiologist at the Memorial Sloan-Kettering Cancer Center in New York, released a study on the most deadly form of skin cancer that made two major points, shattered some old myths and bolstered the tanning industry's position on moderate tanning.

Speaking at the annual meeting of the American Association for the Advancement of Science in Philadelphia, Berwick created the stir by providing epidemiological data to support two important concepts:

- 1) Contrary to what has been promoted by most sunscreen manufacturers, using sunscreen does not protect a person from melanoma and in fact may elevate an individual's risk of contracting the most deadly form of skin cancer.
- 2) Regular sun exposure, for individuals who can develop a tan, does appear to protect a person from contracting melanoma, whereas intermittent sun exposure appears to increase an individual's risk for getting the deadly disease.

Both points coincide with the tanning industry's argument that sunburn prevention and moderate tanning, for individuals who can tan, are the keys to maximizing the benefits and minimizing the risks associated with ultraviolet light exposure. And since the tanning industry did not fund Berwick's work, the findings are that much more credible.

"After examining the epidemiological data and conducting our own large case-control population-based study, we have found no relationship between sunscreen use at any age and the development of melanoma skin cancer," said Berwick, who, in addition to her research, reviewed nine other studies on this topic to reach that opinion.

### **The Truth About Sunscreen**

Berwick's study showed no link between sunscreen usage and melanoma incidence, as did two other studies on the topic. Five other studies actually showed that using sunscreens increased an individual's risk of contracting melanoma, while only two papers of the 10 published to date show a risk reduction for those who use sunscreen.

"Given the data, blanket advice to the public to wear sunscreens as protection against melanoma skin cancer at any time outdoors is not warranted," Berwick said. That statement, as you might expect, came as a huge shock to the mass media — even though previous studies have supported that position. Berwick was the first epidemiologist to make the statement loud and clear in front

of the international media. CBS News, the Associated Press, Reuters and other international news agencies covered Berwick's presentation, giving the story coverage worldwide.

Equally as shocking to the media was Berwick's assertion that regular sun exposure might actually help an individual reduce their risk of melanoma. "Epidemiologic studies show that...people are spending less constant time outdoors and thus engaging in more intermittent sun exposure, which may explain the increase in melanoma rates," Berwick said. "The evidence indicates that chronic sun exposure may be protective for the development of melanoma because the skin has adapted to the sun, having become thicker as it has tanned. On the other hand, intermittent sun exposure appears to increase risk, making it much less protective."

Berwick continued, "People need to focus on their individual risk characteristics, such as their pigmentary phenotype, their family history, and the type and number of moles they have. I recommend that people avoid the sun when they are clearly at high risk and that they should enjoy a reasonable amount of outdoor activities with less anxiety when they are clearly at reduced risk."

### **Who's At Risk?**

Who is at risk for melanoma? Berwick stated it isn't those who sunburn, but those who genetically are susceptible to sunburn. "Based on the evidence, we conclude that sunburn itself probably does not cause melanoma," she says. "But it is an important sign of excessive sun exposure, particularly among those who are genetically susceptible because of their skin type."

Berwick isn't the first to make that point. Dr. Richard Gallagher, of the Cancer Control Agency of British Columbia, reached the same conclusion in his 1987 "Western Canada Melanoma Study." In that work, Gallagher found that those who had no tan summer or winter had twice the risk of melanoma. What's more, he wrote, "The propensity of the skin to sunburn appears to be more important than actual sunburn history in the development of elevated risk of melanoma."

But Gallagher's study, which also showed no link between indoor tanning and melanoma, didn't receive press coverage, unlike Berwick's report. Perhaps that's because Berwick's findings more dramatically state the importance of genetics in melanoma risk.

Bolstering Gallagher's assertion, Berwick's study found that an individual with numerous moles was six times more likely to contract melanoma than someone with only a few moles. Red- or blond-haired people with light eyes also have six times greater risk than people with dark skin and dark hair, regardless of their sun habits.

### **The Sun Scare Coalition Reacts**

Perhaps more interesting than the Berwick study itself is the manner in which those who have drilled an anti-sun message into the public's heads for the past decade reacted to the study. The Berwick study prompted the American Academy of Dermatology, The Canadian Dermatology Association and those who manufacture sunscreens to put their media relations departments into

high gear, churning out press releases to control the damage. Within 24 hours of Berwick's paper being published, all of these agencies had issued their own analysis of Berwick's study.

Ironically, it is their damage-control efforts that may ultimately prove to be most damaging to the sun scare campaign. The American Academy of Dermatology, for example, concluded that Berwick's assessment is flawed because only 10 years of data have been collected on the use of broad-spectrum sunscreens that block UVA and UVB rays. "The study asked only about sunscreen use in the prior 10 years, whereas skin cancer typically occurs many decades after the damaging sun exposures," Dr. Roger Ceilley, president of the American Academy of Dermatology, said in a statement released at 8:50 p.m. Eastern Standard Time February 17 — only hours after Berwick presented her study.

The problem is, Ceilley's statement directly contradicted the logic the AAD used to promote its debunked theory that indoor tanning causes melanoma. In 1995, the Academy tried unsuccessfully to ban indoor tanning in the United States — even though the commercial tanning industry had only been regulated in the United States for nine years and the oldest salons had only been in business for 16 years. If melanomas become apparent only after decades of sun exposure — a point the Academy was making to defend daily usage of sunscreen — how could the Academy make up its mind about indoor tanning after scarcely a decade?

What's more, in 1995, the AAD used the results of a survey conducted in Sweden to make the case that indoor tanning was a significant risk factor for melanoma, despite the fact that most research showed no such connection. The 1994 Swedish study, a mail-in survey conducted by Dr. Johan Westerdahl, alleged that individuals who visited tanning salons 10 times a year had seven times the risk of melanoma as non-tanners. Other researchers shot down that connection, however, because the statistic was derived from just eight individuals out of the study of more than 800. The overall study showed no statistically significant increase in risk for tanners.

But more telling was the fact that Westerdahl's data also concluded that individuals who used sunscreens had an 80 percent greater risk of melanoma compared to people who did not use sunscreen — the same conclusion reached by Berwick that the Academy now refutes. "The use of sunscreens was not found to protect against developing malignant melanoma," Westerdahl wrote.

Why didn't the Academy promote that part of Westerdahl's study — when it obviously believed the rest of his work was valid. And why did the Academy form an opinion on indoor tanning and melanoma with only nine years of data on the regulated commercial tanning industry when later, in the context of sunscreen research, it claimed the latency period for melanoma is a matter of decades?

What's more, the Academy's reaction to Berwick's study, which ran under the headline "Use Sunscreens As Part of Sun Safety Program, Says American Academy of Dermatology," presumed that Berwick was encouraging people to stop using sunscreens, which wasn't the case. She merely pointed out that claims about melanoma prevention aren't valid.

Adding to the AAD's efforts, the Canadian Dermatology Association the next day issued a similar press release, "Sunscreens Important Part of Sun Protection Regimen," which also refuted Berwick's study.

"Canadians should continue to use sunscreen as part of an overall sun protection regimen and a report this week, which questioned the protective ability of sunscreens was misleading," the press release read, reiterating the AAD's assertion that melanomas take 10 to 15 years to develop in humans.

### **Selling Sunscreens**

Also jumping in with their own spin on the issue were two pharmaceutical interests that manufacture sunscreens. Ironically, both were companies marketing new products that offer protection against the entire UVA spectrum, which they claim most products don't offer.

SunSmart, (no relation to Smart Tan) which manufactures a transparent zinc oxide physical sunblock used in hundreds of cosmetics and sunscreen formulas, seems to have a transparent motivation to question Berwick's study. The company claims Berwick's study shows "Sunscreens of the past did not adequately block UVA, specifically the long UVA rays...Fortunately, new sunscreens are now incorporating an ingredient that does block the long UVA rays. This ingredient is a transparent form of zinc oxide called Z-Cote (R)."

Paula Morrow, publicist for SunSmart, told Smart Tan that the company's goal "is to make using sunscreens as automatic as brushing your teeth." Roche Vitamins Inc., which manufactures the chemical sunscreen agent Parsol 1789, also issued a press release, agreeing with SunSmart's assessment. Parsol 1789 is used in sunscreens and cosmetics produced by companies such as Coppertone, Avon and Lancome.

### **What Does It Mean?**

Berwick's study is an important piece of the puzzle — showing that moderate tanning, for people who can develop a tan, may have its place in melanoma prevention. What's more, the results should put the media on call that claims made by sunscreen companies should be more closely scrutinized in the future.

Naturally, Smart Tan emphasizes that sunscreens are still an important product in the battle against sunburn, and should be used appropriately outdoors. But Berwick's report should quiet those issuing blanket statements that sunscreens should be used 365 days a year, even in winter climates. "I personally think (sunscreen) very likely reduces the risk of melanoma," AAD's Ceilly, a University of Iowa professor, says. "I use it every day and recommend it to patients."

But as Ceilly slops on sunscreen in February in Iowa, the sun appears to be setting on the idea that any sun exposure is bad for us. Instead, it's rising on a new era in skin cancer prevention — the era of intelligent moderation.

## PART III: CONCLUSIONS

### ■ Don't Oversimplify the Arguments

Saying that ultraviolet light causes skin cancer and therefore should be avoided is just like saying water causes drowning and therefore should be avoided. You need water in order to live and survive – just as you need ultraviolet light in order to live and survive. By including UV light in the government's list of known human carcinogens without making the statement clear that overexposure, and not mere exposure, is the danger, the makers of this list have made a glaring omission.

## PART IV: REFERENCES

---

<sup>1</sup> Ninth Report on Carcinogens. U.S. Department of Health and Human Services, Public Health Service, National Toxicology Program. 2000.

<sup>2</sup> Garland CF, Garland FC, Gorham ED: Can colon cancer incidence and death rates be reduced with calcium and vitamin D? *Am J Clin Nutr* 1991, 54:193S-201S

<sup>3</sup> Garland CF, Garland FC, Shaw EK et al: Serum 25-hydroxyvitamin D and colon cancer: Eight-year prospective study. *Lancet* 1989, 18:1176-1178

<sup>4</sup> Garland CF, Garland FC, Gorham ED, et al.: Sunlight, vitamin D and mortality from breast and colorectal cancer in Italy. *Biologic Effects of Light* 1992; 39-43

<sup>5</sup> Garland FC, Garland CF, Gorham ED, et al: Geographic variation in breast cancer mortality in the United States: A hypothesis involving exposure to solar radiation. *Prev Med* 1990, 19:614-622

<sup>6</sup> Hanchette CL, Schwartz GC; Geographic patterns of prostate cancer mortality. *Cancer* 1992, 70, 2861-2869.

<sup>7</sup> Ahonen MH, Tenkanen L, Teppo L, et al.: *Cancer Causes Control* 2000, 11:847-852

<sup>8</sup> John EM, Schwartz GC, Dreon DM, Koo J: Vitamin D and Breast Cancer Risk: The NHANES I Epidemiologic Follow-up Study, 1971-75 to 1992. *Cancer Epid, Biomarkers & Prev* 1999, 8: 399-406