Ultraviolet B Light Exposure Associated With Increased Risk Of Skin Cancer

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A decreased ability to repair chromosomal damage caused by exposure to ultraviolet B (UV-B) radiation in test tubes may be associated with an increased risk of the common skin cancers basal cell carcinoma and squamous cell carcinoma, but not of melanoma, according to a study in the December 21 issue of the Journal of the National Cancer Institute.

Exposure to UV radiation from sunlight is a risk factor for the two most common skin
cancers, basal cell carcinoma and squamous cell carcinoma, and for the less common and potentially lethal skin cancer cutaneous malignant melanoma. UV-B radiation can cause strands of DNA to break in sun-exposed skin or skin cells. People with a condition called xeroderma pigmentosum are at a very high risk of sunlight-induced skin cancer because their cells are unable to repair these kinds of DNA and chromosomal damage. However, scientists did not know if the frequency of UV-B induced chromatid breaks, an indirect estimate of DNA repair capacity, is a risk factor for skin cancer in the general population.

Li-E Wang, M.D., and Qingyi Wei, M.D., Ph.D., of the University of Texas M. D. Anderson Cancer Center in Houston, and colleagues set out to answer this question by studying 469 patients with both melanoma or nonmelanoma skin cancers and 329 cancer-free patients. They took blood samples from all of the patients and then measured the number of chromatid breaks in the patients' cells 24 hours after the blood samples were exposed to UV-B radiation.

They found that a high number of chromatid breaks was associated with a nearly threefold increased risk of basal cell and squamous cell carcinomas but was not associated with risk of melanoma. The risk of the nonmelanoma skin cancers associated with chromatid breaks increased with increased experimental exposure to UV-B radiation. They also found that sensitivity to UV-B radiation may interact with other known risk factors, such as hair color, skin color, sunburn history, tanning ability, and freckling, to increase risk of squamous cell and basal cell carcinomas, but they did not find the same relationship between chromatid breaks and risk of melanoma.

"These findings suggest that in vitro UVB-induced mutagen sensitivity reflects susceptibility to [nonmelanoma skin cancer] but not [cutaneous malignant melanoma]," the authors write. They note that their findings should be investigated further in prospective studies.

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