Hindawi Publishing Corporation
Journal of Skin Cancer
Volume 2012, Article ID 480985, 4 pages
doi:10.1155/2012/480985

Review Article

Is There Truly No Benefit with Sunscreen Use and Basal Cell Carcinoma? A Critical Review of the Literature and the Application of New Sunscreen Labeling Rules to Real-World Sunscreen Practices

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Received 14 February 2012; Accepted 29 February 2012

Academic Editor: Arash Kimyai-Asadi

Basal cell carcinoma (BCC) is the most common human malignancy. Both epidemiological and direct evidence have established ultraviolet (UV) exposure from the sun as the most important risk factor for BCC development. There has only been one randomized and controlled study to examine sunscreen's role in the prevention of BCC, and no significant protective benefit was found. This study did not address four important concepts: sunscreen abuse, sunscreen misuse, sunscreen formulation, and cumulative UV exposure. Thus, the results of this study are difficult to interpret and extrapolate with real-world sunscreen practices.

1. Introduction

Basal cell carcinoma (BCC) is the most common cutaneous malignancy, the most common human malignancy overall, and its incidence is increasing [1]. For more than 80 years, convincing epidemiological evidence has linked sun exposure with skin cancer. BCC is more frequent in patients with higher cumulative sun exposure, with more sun-sensitive skin types, from areas of high ambient solar irradiance, and on sun-exposed body sites [1, 2].

Both the quality and quantity of such epidemiological evidence have improved over those 80 years, and more recent data have given us direct evidence of ultraviolet- (UV-) induced mutations in genes important to BCC development. UV-induced mutations in the p53 tumor-suppressor gene have been found in more than half of BCC cases [3]. Mutations that activate the Hedgehog intercellular signaling pathway genes, including PTCH, Sonic hedgehog, and Smoothened, play a significant role in the development of BCC, and these mutations have also been shown to be UV induced [4].

UVB exposure seems to be the most important risk factor in developing BCC [2, 4–7]. Rats exposed to UVB develop BCC as well [8]. UVA has also been implicated as a risk factor for BCC, including exposure during the use of tanning beds [9, 10].

2. Evidence of Sunscreen and BCC

With the propensity of both epidemiologic and direct evidence indicating the chief role of UV in the development of BCC, one may expect a similar propensity of evidence indicating that UV blockade by sunscreen protects against BCC. To date, there has only been one randomized controlled trial examining sunscreen's role in the prevention of skin cancer, and it showed no significant protective benefit of sunscreen with relation to BCC [11].