Does Photoprotection Lower the Risk for Skin Cancer?

Henry W. Lim, MD
Chair Emeritus, Department of Dermatology
Senior Vice President for Academic Affairs
Henry Ford Hospital, Detroit, Michigan
Disclosure

• **Investigator:**
  – Estée Lauder
  – Ferndale
  – Allergan
  – Incyte
Photoprotection

- Shade
- Clothing
- Hat
- Sunscreens
- Sunglasses
- ? Non-topical agents

Photoprotection and Skin Cancer

• Effect of Tanning Lamps
• Effect of Sunscreens
Photoprotection and Skin Cancer

- Effect of Tanning Lamps
Sunbeds and Skin Cancers

- Systematic review of literature till 3/06 (case-control, cohort, or cross-sectional studies)
- “Ever-use” of sunbeds: positively associated with melanoma, but no consistent dose-response relationships
- First exposure before 35 years of age: significantly increase the risk
- Increased risk of SCC
- No association with BCC
Sunbeds and Skin Cancers
(Zhang, M, Qureshi, AA…. J Clin Oncol 5/12; 30:1588. Boston)

• 73,494 female nurses, followed for 20 yrs (1989-2009)
• Hazard ratio of skin cancer for an incremental increase in use of tanning beds of 4x/yr:
  – BCC: 1.15 (P <0.001)
  – SCC: 1.15 (P = 0.03)
  – Melanoma: 1.11 (P=0.13)
• Higher risk of BCC for tanning bed use during high school/college, compared with use at ages 25-35 yrs
Sunbeds and Melanoma

• Systematic review of publication done in Aug, 2013
• 31 studies: 14,956 melanoma cases, 233,106 controls
Sunbeds and Melanoma

• Conclusions:
  – Tanning bed use was associated with subsequent diagnosis of melanoma
  – > 10 sessions: most strongly associated
  – No statistically significant difference in the association before and after 2000 → newer tanning technology is NOT safer than older models
Sunbeds and Skin Cancers

- Tanning in tanning salons: increased melanoma and BCC; tanning at home: increased melanoma

- Early-onset BCC was related to indoor tanning, with the strongest association observed for first exposure as an adolescent or young adult.
Compliance of Tanning Salon Operators

(Williams MS, .... Stratman EJ. JAMA Dermatol. 2018 Jan 1;154:67)

• Telephone survey, 2/2015 – 4/2016
  – Posing as minors attempting to schedule a tanning appointment

• Tanning salons in 42 states and the District of Columbia with legislation restricting tanning bed use in minors
Compliance of Tanning Salon Operators

(Williams MS, ..., Stratman EJ. JAMA Dermatol. 2018 Jan 1;154:67)

• 427 Tanning salons surveyed, overall noncompliance with state legislation was 37.2%
• Higher noncompliance was in:
  – Rural locations
  – Southern US
  – Independently owned salons
  – States with younger age groups being regulated
  – States with more than one tanning regulation
Photoprotection and Skin Cancer

• Effect of Tanning Lamps
• Effect of Sunscreens
Sunscreens and NMSC

*Green, A., Lancet 1999; 354:723.*
*van der Pols, JC,…. Green, A.  Cancer Epidemiol Biomarkers Prev 12/2006; 15:2546. Brisbane, Australia*

- A 4.5 yr + 8 yr f/u study of 1621 residents of Nambour, Queensland, randomly assigned to daily SPF16 broad spectrum sunscreen group, vs. control.
- SCC incidence rates: significantly decreased by 38%
- BCC incidence rates: decreased by 25%, but not significantly
Sunscreens and Melanoma
(Green, A., J Clin Oncol. 2011 Jan 20;29(3):257-63. Brisbane, Australia)

• 1992-1996: 1621 residents of Nambour, Queensland, randomly assigned to daily SPF16 broad spectrum sunscreen group + 30 mg beta-carotene daily, vs. control.

• 2006 (10 yrs later):
  – Melanoma: 11 in tx gr; 22 in control
  – Invasive melanoma: 3 in tx gr, 11 in control.

• Melanoma may be prevented by sunscreen use
Sunscreens and Photoaging
(Hughes, MCB.... Green, AC. Ann Intern Med 6/13; 158:781 Brisbane, Australia)

• 903 adults <55 yo
• Daily sunscreen (SPF15+; cinoxate + avobenzone) gr, vs discretionary sunscreen gr
• 1992-1996 (4.5 yrs)
• Photoaging assessed by silicone-based impression material on back of hand.
Sunscreens and Photoaging
(Hughes, MCB, Green, AC. Ann Intern Med 6/13; 158:781 Brisbane, Australia)

- Suncreen group:
  - No detectable increase in skin aging
- Skin aging in daily sunscreen group was 24% less than the discretionary sunscreen group.
Photolyases
Photolyases


• Naturally occurring enzymes
  – Repair UV-induced thymine dimer
  – Absent in placental mammals
  – Isolated from a cyanobacterium *Anacystis nidulans*
    in marine plants

• Incorporated into “film-forming medical device”
  with photolyases encapsulated in liposomes
Photolyases


- Compared to sunscreen alone, sunscreen with photolyases was better at:
  - In XP patients, suppression of development of actinic keratoses, BCC and SCC (Giustini, S et al, Case Rep Dermatol. 2014 Sep-Dec; 6(3): 222)
Photolyases

- Studies were done in Europe and England, with organic UV filters + photolyases
- Product available in the US: zinc oxide + photolyases
Photoprotection and Skin Cancer

- Effect of Tanning Lamps
- Effect of Sunscreens
Does Photoprotection Lower the Risk of Skin Cancer?

Yes!