5-2019

Improving Sun Protection

Raheel Zubair  
*Henry Ford Health System*, RZubair1@hfhs.org

Indermeet Kohli  
*Henry Ford Health System*, ikohli1@hfhs.org

Alexis B Lyons  
*Henry Ford Health System*, ALyons5@hfhs.org

Amanda F. Nahhas

Taylor L. Braunberger  
*Henry Ford Health System*, TBraunb1@hfhs.org

*See next page for additional authors*

Follow this and additional works at: [https://scholarlycommons.henryford.com/merf2019clinres](https://scholarlycommons.henryford.com/merf2019clinres)

Recommended Citation  
Zubair, Raheel; Kohli, Indermeet; Lyons, Alexis B; Nahhas, Amanda F.; Braunberger, Taylor L.; Moktari, Mohsen; Ruvolo, Eduardo; Lim, Henry W; and Hamzavi, Iltefat H., "Improving Sun Protection" (2019). Clinical Research. 3.  
Authors
Raheel Zubair, Indermeet Kohli, Alexis B Lyons, Amanda F. Nahhas, Taylor L. Braunberger, Mohsen Moktari, Eduardo Ruvolo, Henry W Lim, and Iltefat H. Hamzavi

This poster is available at Henry Ford Health System Scholarly Commons: https://scholarlycommons.henryford.com/merf2019clinres/3
Improving Sun Protection

Raheel Zubair MD, Indermeet Kohli PhD, Alexis Lyons MD, Amanda Nahhas DO, Taylor Braunberger MD, Mohsen Moktari BS, Eduardo Ruvolo MS, Henry Lim MD, Iltefat Hamzavi MD

Department of Dermatology
Henry Ford Hospital, Detroit, MI, USA

Disclosure: This study was sponsored by Bayer
The Problem with Sunscreen

Age-Adjusted Melanoma Incidence and Projection
NIH data
Sunscreens only protect $\lambda < 370\text{nm}$

Image credit: Skin Cancer Foundation
Inadequacy of Sunscreen
(Liebel, Kaur, Ruvolo 2012)

- Sunscreens do not absorb ultraviolet A1 (UVA1) and visible light (VL)
- UVA1 and visible light induce
  - Erythema (redness/burns)
  - Pigmentation (tanning)
  - Reactive oxygen species (ROS)
  - Extracellular Matrix-degrading enzymes
Antioxidants
(Denat, Kadekarro, Marot 2014) (Pelle, Mammone, Marenus 2003)

• UVA1 + VL $\rightarrow$ ROS $\rightarrow$ pigmentation
• Antioxidants quench ROS
• Antioxidants mitigate VL induced ROS and photooxidative damage
• Hypothesis: A topical antioxidant product will mitigate VL-induced pigmentation
Methods

• Antioxidant complex: DESM, tocopherol, ascorbic acid
• 10 subjects of skin phototypes IV-VI
• Subjects’ backs received 320 J/cm² of VL and UVA1
• Sites with 0.5%, 1%, and 2% antioxidant were compared with untreated control
Assessments

• Spectrophotometer measured skin color after irradiation and 7 days later
• Immediate pigment darkening: lasts minutes, caused by melanin oxidation and redistribution
• Delayed tanning: lasts days, caused by new melanin synthesis
Results: Spectrophotometry Data

Day 0

Day 7

Untreated  0.5\%  1\%  2\%

\[\Delta \text{ITA}\]

\[\Delta \text{ITA}\]

\[p=0.07\]
Results

- Every subject developed pigmentation at all irradiated sites.
- Immediately after irradiation, 2% antioxidant sites were significantly less pigmented.
- A week later, 2% antioxidant sites were still less pigmented, but this difference did not reach significance.
Discussion

• Results support hypothesis and further investigation is warranted
• Topical antioxidants can mitigate VL-induced pigmentation
• Future studies
  o Can antioxidants prevent sunburn in lighter-skinned subjects?
  o Molecular assays to quantify ROS generation