



*Synergistic blend of green tea and lotus protects  
against blue-light induced free radicals*

Hemali Gunt, PhD<sup>1</sup>, Stanley B. Levy, MD<sup>2</sup>

<sup>1</sup>*Burt's Bees, Durham, NC*; <sup>2</sup>*Chapel Hill Dermatology PA, Chapel Hill, NC*

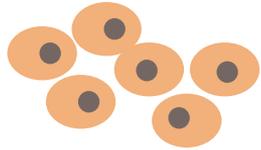
# Background

- Blue light (400-495nm), also referred to as high-energy visible light (HEV), is emitted naturally from the sun, as well as artificially from electronics (cell phones, computer screens, etc.), fluorescent bulbs, and LED lights.
- Skin is a major target of oxidative stress. The link between aging and oxidative stress is well-documented.
- Concerns about the negative effects of blue light on the skin have rapidly increased over the past decade. Recent studies show that reactive oxygen species (ROS) are generated in the human skin subsequent to irradiation with blue-violet light *in vivo* and may cause apoptosis and necrosis.
- Thus, future protection strategies based on quenching and scavenging free radicals can help mitigate and prevent signs of skin damage.
- We developed a patent-pending, nature-based complex of green tea and lotus that has demonstrated synergistic antioxidant activity in prior investigations. (Data on file)

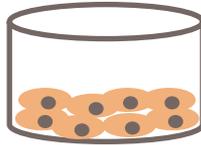
# Objective

- To evaluate the ability of a proprietary nature-based complex of green tea and lotus to protect against blue light damage to the skin, using an *in vitro* model.

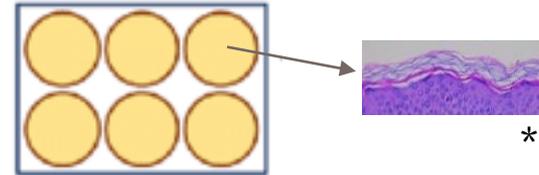
# Methods



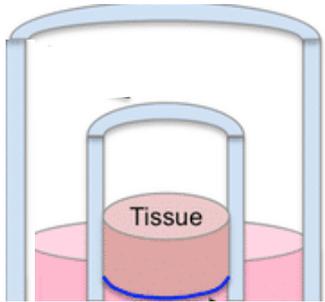
*Isolated keratinocytes*



*Cultured at  
air-liquid interface*

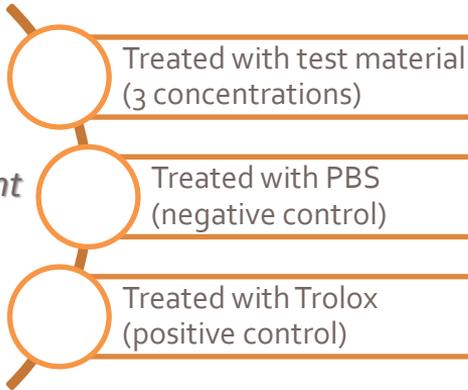


*Fully-differentiated Epidermis  
(MatTek Epiderm™)*

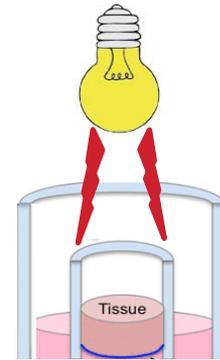


*Tissue loaded with ROS  
sensitive dye*

*Treatment  
Arms*



*Fluorescent Measurements  
(baseline)*

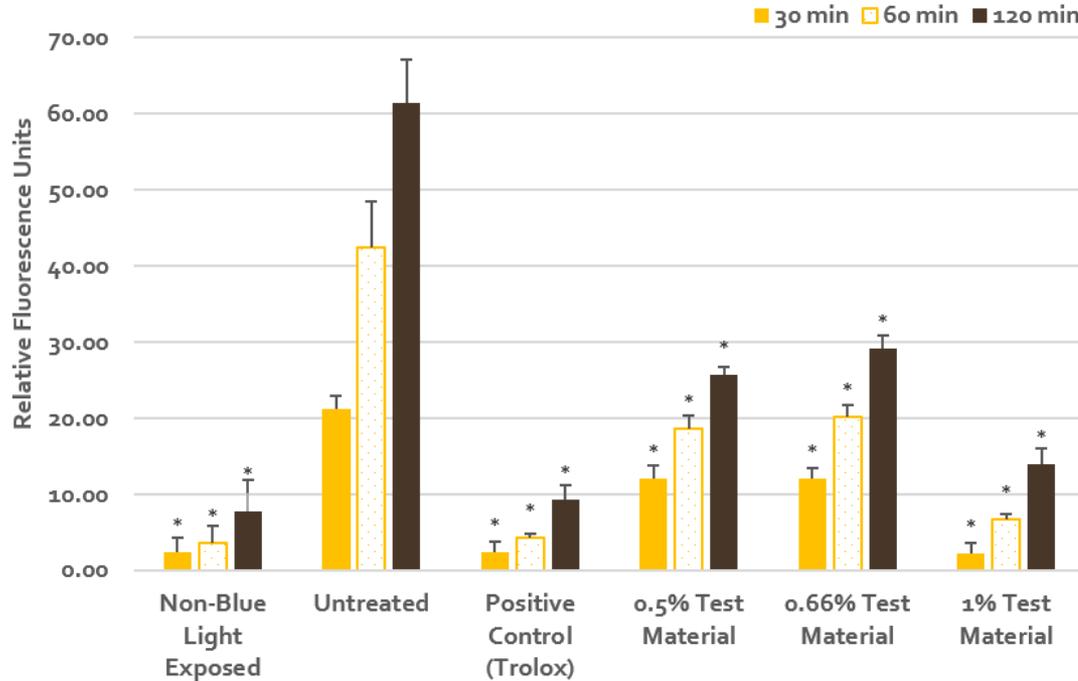


*Blue light exposure (450 nm) and  
fluorescence measurement at 30, 60  
and 120 minutes*

\* For demonstration purposes only

# Results

## Reactive Oxygen Species Formation



\* $p \leq 0.05$

Test material = Green tea & Lotus complex

- All 3 concentrations of the nature-based complex significantly reduced the formation of ROS resulting from blue light exposure.
- There was no statistically significant decrease in tissue viability. Tissue viability assessed by MTT assay ranged from 90-100+%. The test materials were determined not to be toxic. (Data on file)

## Conclusions

- Exposure of the untreated EpiDerm™ tissues to 450nm blue light resulted in a significant increase in formation of ROS.
- The nature-based complex of green tea and lotus demonstrated reduced formation of ROS generated with blue light exposure, establishing its potential as an effective treatment for prevention of blue light-induced premature photoaging.