

Tradename: AC ExoEternal

Code: 60200

CAS #: 7732-18-5 & 68333-16-4 (or) 92128-79-5 & 90082-61-4 (or) 68132-21-8 & 123465-35-0

Test Request Form #: 14436

Lot #: 9420611

Sponsor: *Active Concepts, LLC; 107 Technology Drive Lincolnton, NC 28092*

Study Director: *Daniel Shill*

Principal Investigator: *Kayla Goodson*

Test Performed:

Anti-Erythema Study

Introduction

Skin erythema refers to the redness of skin and is a result of dilation and irritation of superficial capillaries. The appearance of a red hue on the skin is due to the augmented flow of blood through capillaries. Often, hyperpigmentation of the skin is undesirable as it is vibrant in color and can appear visually like a rash. Reducing skin redness and irritation is vital to the appearance of healthy skin.

Accordingly, an Anti-Erythema Study was conducted to evaluate the immediate and short-term redness and irritation reducing properties of **AC ExoEternal**. Additionally, Retinol and a blend of **AC ExoEternal** and Retinol were tested to elucidate any synergistic effects and to demonstrate the superior nature of bioauthentic exosomes as a delivery system.

Study Principle

Surgical tape is applied to the skin to induce irritation and redness on the skin. After tape removal, erythema measurements are made by placing a probe on the skin of preidentified test sites. The control and test material were applied to the skin test sites once skin redness was induced, and after a given amount of time erythema measurements were recorded again. Additionally, participants quantified the perceived redness on their skin.

Materials

- A. Equipment:** DermaLab Skin Combo (Colori Probe)
- B. Products:** Base Lotion (Cetaphil® Moisturizing Cream for All Skin Types); 3M™ Medipore™ H Soft Cloth Surgical Tape; Retinol (Lot #: 25372061)
- C. Software:** Excel Analysis ToolPak (Microsoft)

Methods

Ten volunteers between the ages of 20 and 33, who were known to be free of any skin pathologies with Fitzpatrick skin types I to III, participated in this study (Table 1).

Table 1. The Fitzpatrick Classification of Skin Types Chart¹

Fitzpatrick Skin Type Descriptions*	
Skin Type	Description
I	Always burns, never tans
II	Burns easily, tans minimally
III	Burns moderately, tans to light brown
IV	Burns minimally, tans to moderate brown
V	Rarely burns, tans to dark
VI	Never burns, least sensitive to changes
*Adapted from The Surgeon General's Call to Action to Prevent Skin Cancer	

Four assigned test sites were identified on the volar forearm of participants. The surgical tape was applied to the test sites for two minutes before being removed to induce skin redness. Immediately after the surgical tape removal, erythema measurements were recorded, and the test materials were applied. The skin test site conditions and treatments are described below (Table 2). After 15 minutes of product application, erythema measurements were recorded again, and participants were asked to evaluate the visual reduction in redness for all test sites compared to immediately after tape removal on a scale from 1 (no change in redness) to 10 (no redness present) (Figure 3). The Base Lotion utilized in this study was Cetaphil® Moisturizing Cream for All Skin Types.

Table 2. Descriptions of the Conditions and Treatments for each Skin Test Site

Skin Test Site	Condition	Treatment / Test Article Application Description
1	Base Lotion	Base Lotion
2	0.3% Retinol	0.3% Retinol in Base Lotion
3	2.0% AC ExoEternal	2.0% AC ExoEternal in Base Lotion
4	2.0% AC ExoEternal + 0.1% Retinol	2.0% AC ExoEternal + 0.1% Retinol in Base Lotion

An average of three consecutive erythema measurements per condition at each time point was recorded. Data is displayed as averages from all participants and was analyzed using T-tests with statistical significance accepted at $p \leq 0.05$. The percent change in erythema was calculated for each test site at every timepoint relative to Baseline values, using the following equation:

$$\text{Percent Change (\%)} = \frac{\text{Skin Erythema}_{15 \text{ Minutes After Application}} - \text{Skin Erythema}_{\text{Immediately After Tape Removal}}}{\text{Skin Erythema}_{\text{Immediately After Tape Removal}}} \times 100$$

Results

The data obtained from this study met criteria for a valid study as the Base Lotion, Retinol, and AC ExoEternal performed as anticipated. Application of 2.0% AC ExoEternal + 0.1% Retinol demonstrated effective synergistic short-term redness reducing effects on the skin.

Skin Erythema AC ExoEternal

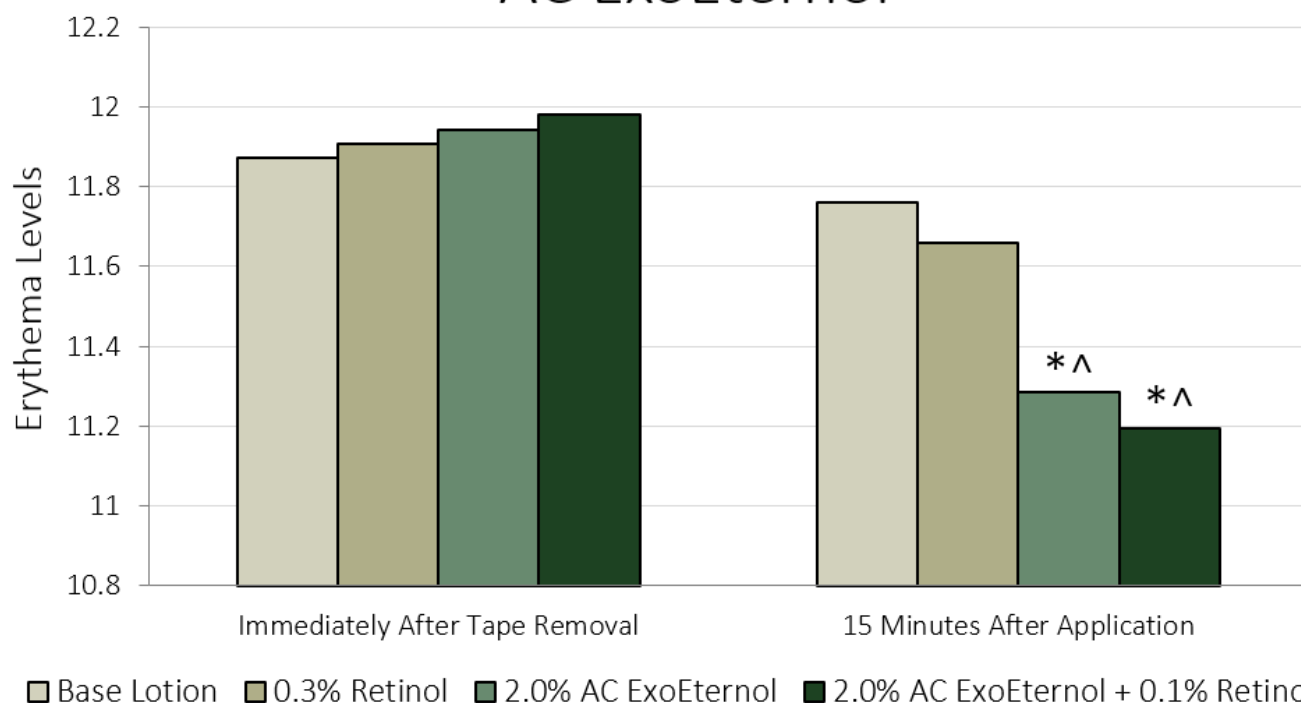


Figure 1. Skin Erythema Before and After Product Application. * indicates significance between timepoints within conditions ($p \leq 0.05$). ^ indicates significance between conditions at given timepoint ($p \leq 0.05$).

Table 3. Results from T-test Analysis of Skin Erythema Levels. * indicates significance between timepoints within conditions ($p \leq 0.05$).

	Base Lotion: Immediately After Tape Removal vs 15 Minutes After Application	0.3% Retinol: Immediately After Tape Removal vs 15 Minutes After Application	2.0% AC ExoEternal: Immediately After Tape Removal vs 15 Minutes After Application	2.0% AC ExoEternal + 0.1% Retinol: Immediately After Tape Removal vs 15 Minutes After Application
P-value	0.752	0.421	0.039*	0.032*

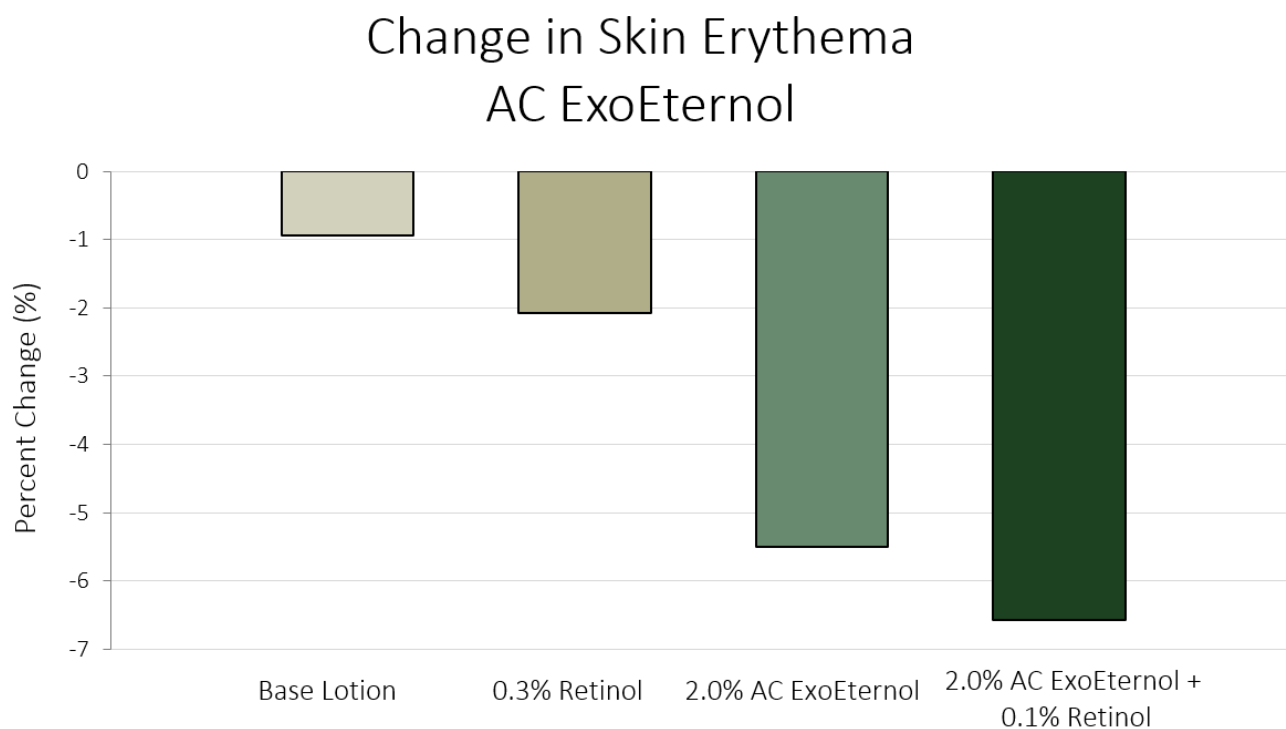


Figure 2. Percent Change in Skin Erythema After Product Application.

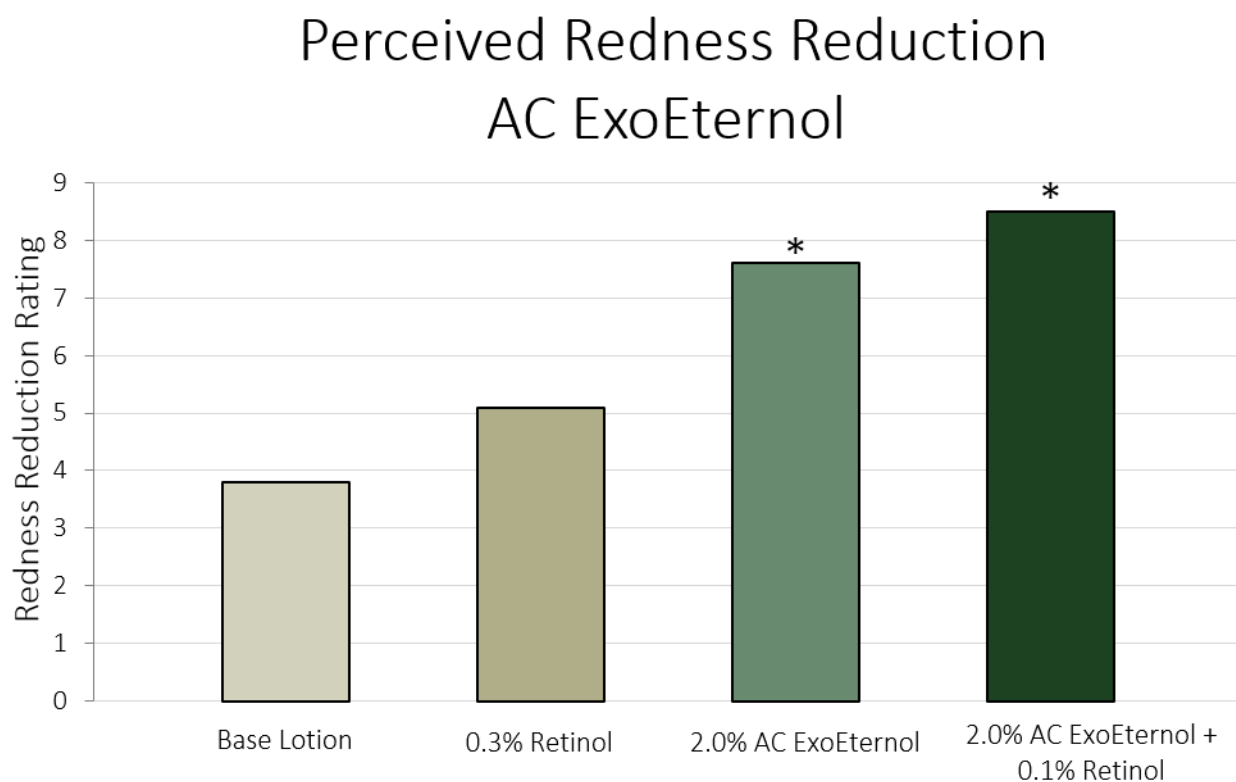


Figure 3. Participant Ratings for Redness Reduction on a Scale of 1 (no change in redness) – 10 (no redness present). * indicates significance between conditions ($p \leq 0.05$).

Table 4. Results from T-test Analysis of Participant Redness Reduction Ratings. * indicates significance between conditions ($p \leq 0.05$).

	Base Lotion vs 0.3% Retinol	Base Lotion vs 2.0% AC ExoEternal	Base Lotion vs 2.0% AC ExoEternal + 0.1% Retinol
P-value	0.256	< 0.001*	< 0.001*

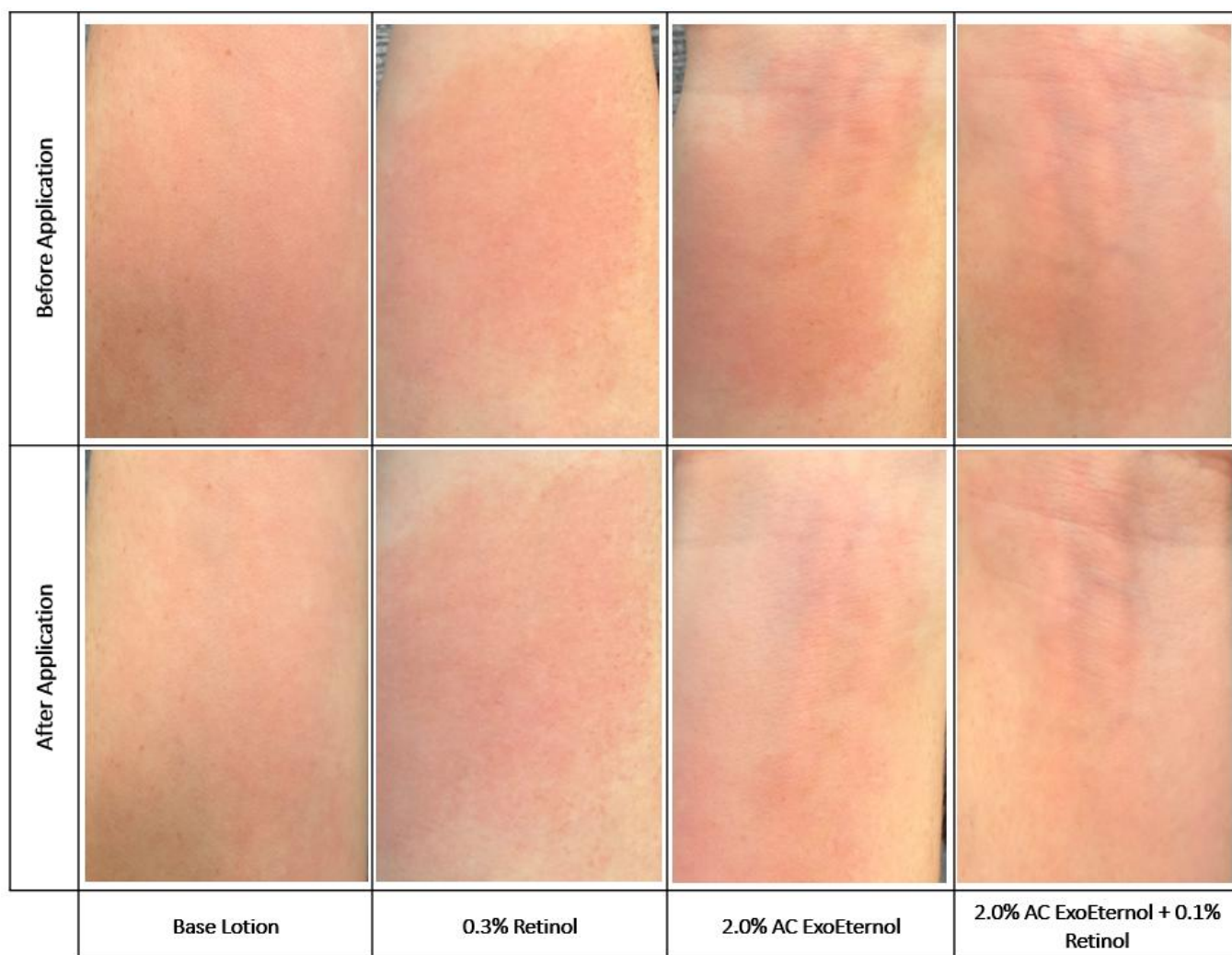


Image 1. Participant Image Before and After Application of Test Materials.

Discussion

The ability of AC ExoEternal + 0.1% Retinol to reduce redness and irritation on the skin was assessed via erythema measurements and perceived redness reduction after tape stripping. As shown in Figures 1 and 2, Base Lotion and 0.3% Retinol did not significantly alter erythema levels, indicating consistent skin redness and irritation 15 minutes after application (Table 3). Conversely, applying 2.0% AC ExoEternal and 2.0% AC ExoEternal + 0.1% Retinol immediately after tape removal significantly reduced skin redness by 6% and 7%, 15 minutes after application, respectively (Figures 1, 2; Table 3). This data indicates Base Lotion and Retinol alone does not reduce skin redness, whereas 2.0 AC ExoEternal and 2.0% AC ExoEternal + 0.1% Retinol exerts significant redness and irritation reducing properties. Furthermore, these results demonstrate the synergistic effect of AC ExoEternal + 0.1% Retinol to reduce skin redness.

Additionally, participants rated the perceived redness of their skin 15 minutes after product application compared to immediately after tape removal. Participants did not perceive a significant reduction in skin redness with Base Lotion and 0.3% Retinol application, indicating the Base Lotion and Retinol alone does not exert redness reducing properties on the skin (Figure 3; Table 4). Conversely, participants perceived a significant reduction in redness following the application of 2.0% **AC ExoEternal** and 2.0% **AC ExoEternal** + 0.1% Retinol (Figure 3; Table 4). Examining images of the skin test sites at Baseline and 15 minutes after application, 2.0% **AC ExoEternal** and 2.0% **AC ExoEternal** + 0.1% Retinol visually outperformed the Base Lotion and Retinol test sites in terms of reducing skin redness (Image 1).

Taken together, these results indicate **AC ExoEternal** reduces erythema levels in addition to improving the visual and perceived redness on skin when added to personal care applications at recommended use levels. Collectively, **AC ExoEternal** + 0.1% Retinol demonstrates significant synergistic anti-redness and anti-irritation effects which improves the skin's protective barrier function and contributes to the appearance of healthier looking skin.

References

1. Sharma AN, Patel BC. Laser Fitzpatrick Skin Type Recommendations. [Updated 2022 Mar 9]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK557626/>