

## Introduction

Acne vulgaris is the most prevalent skin disorder in the US with 40-50 million individuals affected. It affects 85% of adolescents, from ages 12-24, and can continue on into adulthood, with 20% of men and 35% of women still affected into their 30s.[1] Although acne is not life threatening it causes significant psychosocial morbidity and has physical sequelae including lifelong scarring.[2] Acne is a complex interaction of the immune system recognition of *Propionibacterium acnes* based on an individual's genetics played out in the follicular apparatus. *P. acnes* is a key player in the pathogenesis of acne. These Gram-positive, anaerobic/microaerophilic rods are found within sebaceous follicles. They produce porphyrins that fluoresce under Wood's lamps illumination.[1]

Each of the popular acne treatments is a target of attack in the literature and lay press for assorted reasons. Isotretinoin, one of the most effective treatments has been attacked because of side effects, including liver enzyme abnormalities, dyslipidemia and teratogenicity, and its use is limited in many countries.[3] Oral and topical antibiotics, while effective for inflammatory lesions are accused of leading to bacterial resistance.[4] Topical retinoids, the current first-line treatment for acne, cause irritation and burning on initiation.[5] As a result, there exists a need for new drugs with fewer side effects without diminishing efficacy. Green tea polyphenol (GTP) has gained interest in recent years because of its potent antimicrobial and anti-inflammatory activities.[6] Evidence has shown that GTP has antibacterial effects on *P. acnes*, as well as sebostatic, apoptotic, and anti-inflammatory effects on sebocytes.[7] Caffeine is another well-known anti-inflammatory ingredient. Together, GTP and caffeine synergistically protect cells from oxidative challenge.

## Methods

We identified a group of 13 patients from our private practice database from 2008 to 2016 who had the requisite images during 6 months of treatment. We analyzed the images of the patients (ages 18 to 40) with mild to moderate acne vulgaris to evaluate the efficacy of a commercially available topical product containing 90% GTP and caffeine USP. Subjects were photographed under fluorescing conditions using Canfield imaging equipment before treatment and at monthly follow-ups. 13 blinded pairs of pre and post-treatment photographs were shown to 28 dermatology residents who served as evaluators. Evaluators were asked to select which photo in a pair had the fewest number of orange spots. The evaluators were not told the orange spots were of porphyrin fluorescence. Intraclass correlation coefficient (ICC) was used to measure the inter-rater reliability of evaluators of the photograph pairs.

## Results

- The evaluators found a decrease in orange spots corresponding to *P. acnes* fluorescence in 12 out of 13 pairs of images.
- There was a single set of photos in which the majority of evaluators were not able to distinguish the post-treatment image.
- The average measures ICC amongst evaluators was 0.934 (95% CI 0.868 to 0.976)
- The decrease in fluorescence in *P. acnes* was seen as early as 1 month and continued for the 6 months that the patients were followed.
- There was subjective improvement in the appearance of acne and treatment was well tolerated with no adverse outcomes. (Data presented elsewhere)

## Discussion

- The GTP and caffeine topical treatment decreased the porphyrin levels, which indicated a decrease or change in metabolic function of *P. acnes*. We did not evaluate by colony counts that the *P. acnes* was reduced but there was correspondence between the decrease in porphyrin levels and the clinical improvement in acne.
- Our initial use of this commercially available antioxidant in our acne patients was to mitigate the irritant effects of tretinoin. This product contains all of the naturally occurring portions of green tea which includes molecules that historically were known to have antibacterial properties that include *P. acnes*.



## Limitations

- Small sample size
- We did not quantitate bacteriologically a reduction in *P. acnes*.

## Conclusion

GTP and caffeine are a novel treatment that obviates most of the reasons that other standard acne medications are attacked in literature. The formulations either cream or serum does not irritate the skin and may decrease the irritation of retinoids.

Topical GTP and caffeine were found to be a viable non-antibiotic and non-irritating addition to our armamentarium of acne treatments.

## Disclosures

The commercially available product was generously donated by Topix Pharmaceuticals, Inc. It is marketed as Replenix CF and available in cream and serum formulations. Dr. Brody was involved in the conceptualization and design of the product.

## References

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