

# **EXPERIENCE OF PHOTOPNEUMATIC THERAPY IN TAIWANESE ACNE PATIENTS**

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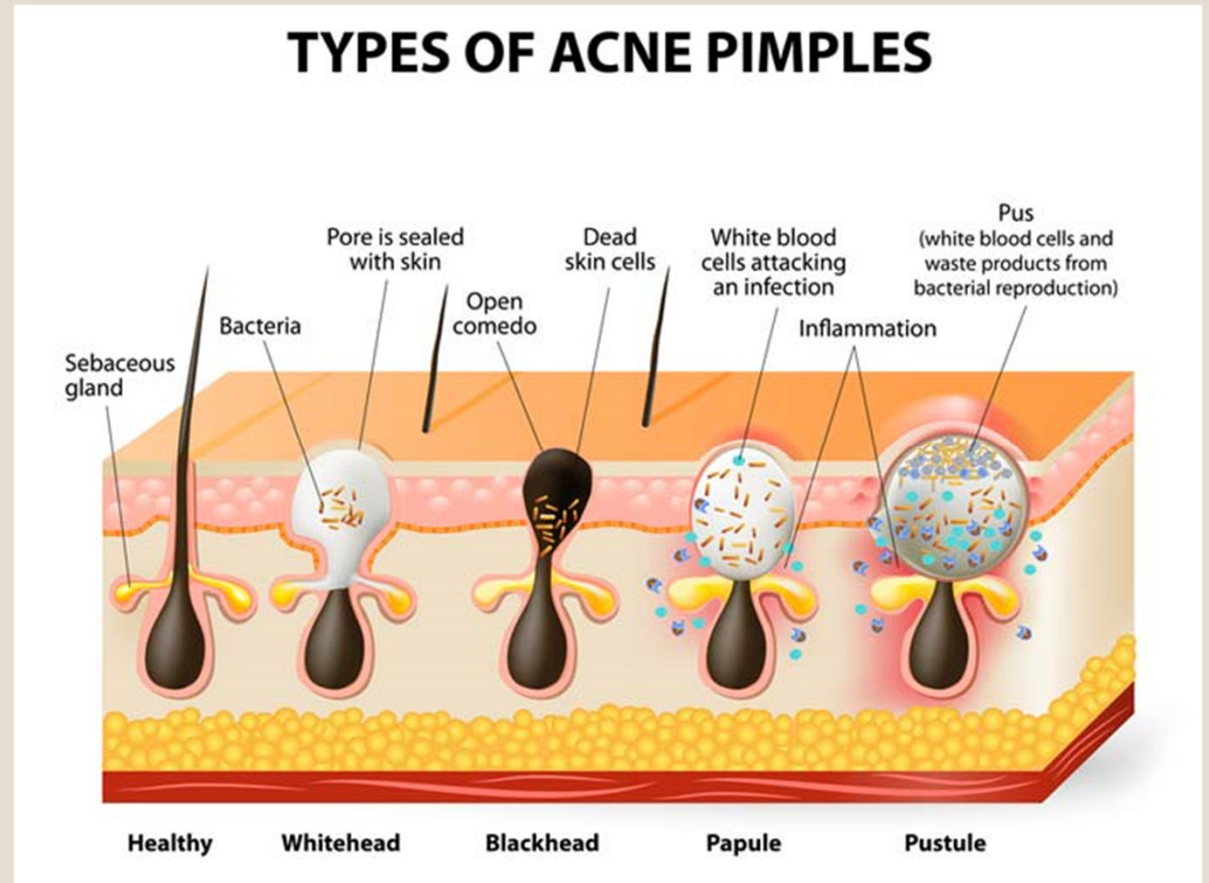




# QUICK REVIEW OF ACNE VULGARIS

# Four primary factors in acne pathogenesis

- Greater sebum production
- Follicular hyperkeratinization /hypercornification
- *P. acnes* colonization
- Perifollicular inflammation



### 【Classification of Acne】

NON-  
INFLAMMATORY



**Closed Comedo whitehead**



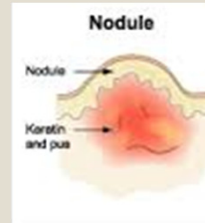
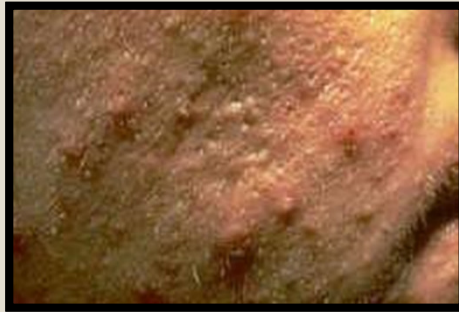
**Open Comedo blackhead**

# 【Acne Classification】

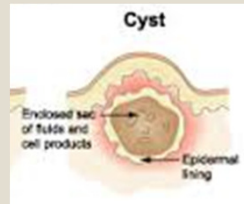
I  
N  
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Pustular Acne



Nodular acne



Cystic acne

# Most difficult cases:

recurrently inflamed, unsightly scarring/pigmentation

- Papulopustular acne



[http://www.wheatgrassprofessional.info/images/acne\\_chin1.jpg](http://www.wheatgrassprofessional.info/images/acne_chin1.jpg)

[http://www.usc.edu/student-affairs/Health\\_Center/adolhealth/images/b4derm1\\_clip\\_image006.jpg](http://www.usc.edu/student-affairs/Health_Center/adolhealth/images/b4derm1_clip_image006.jpg)

<http://img.medscape.com/pi/emed/ckb/dermatology/1048885-1122381-615.jpg>

# Conventional Acne Treatment

- Topical and oral medication
  - Antibacterials or Antimicrobials
  - BPO
  - Retinoids





# Treatment Challenges – Orals & Topicals

Medication	Duration of Impact	Major Challenges
OTCs	6-10 weeks	Mostly Ineffective Irritating to skin Cause excessive dryness of skin
Antibiotics	6-8 weeks	Can promote bacterial resistance Yeast infections and reduction on potency of birth control pills in women 50% of Americans are antibiotic resistant* Growing % of patients oppose systemic tx
Isotretinoin	3-6 months	Negative Media publicity Teratogenic Excessive dry and chapped lips Inflammatory bowel disease etc

\*Skin Therapy Letter. 2012;17(9)

# Challenges in Acne Treatment

Resistant *P. acnes* strains have been shown to emerge **after only 8 weeks** of topical antibiotic monotherapy, with the number of resistant strains increasing progressively over subsequent weeks.

## **Antibiotic Resistance in Acne Treatment:**

- Reduced clinical response to antibiotic therapy
- Potential increase in pathogenicity of *P. acnes*
- Transfer of resistance to more pathogenic organisms

# 120 Patients questionnaire survey in a Taiwan dermatology clinic

- 60 male and 60 female (cross-sectional survey, aged 16-35)
- >70% patients seeking treatment through national health insurance
- >90% currently using topical medications to treat acne
- 50% of patients have received oral antibiotics
- 50% patients have underwent topical/oral antibiotic treatment for >1 year
- 33% of patients were already bothered by acne for > 6 years)

# 120 Patients questionnaire survey in a Taiwan dermatology clinic

- ~10% of male patients thought past treatment is effective, Most female patients considered traditional treatment as ineffective
- > 95% of female patients have willingness to change regimen
- < 20% of patients understand that light base treatment can reduced acne
- 53% of patients are willing to spent ~USD 100 to receive light base anti-acne treatment

The image features a decorative border with a repeating pattern of white leaves and circular motifs on a blue background. The text is centered within a white rectangular frame.

# ADJUNCTIVE LIGHT BASED TREATMENT

# Process of treating Acne

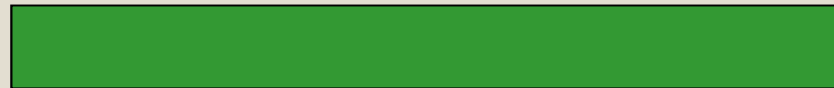
Peeling

Medicine

UVA/UVB  
Blue light  
IPL  
PDL  
LP-KTP  
PDT

IPL  
Infrared laser (1320, 1450, 1540nm)  
RF

RF  
Ablative laser  
Dermabrasion



Kill P. Acnes

Reduce size of Sebaceous glands  
Reduce sebum production

Acne Scar repair

Short term

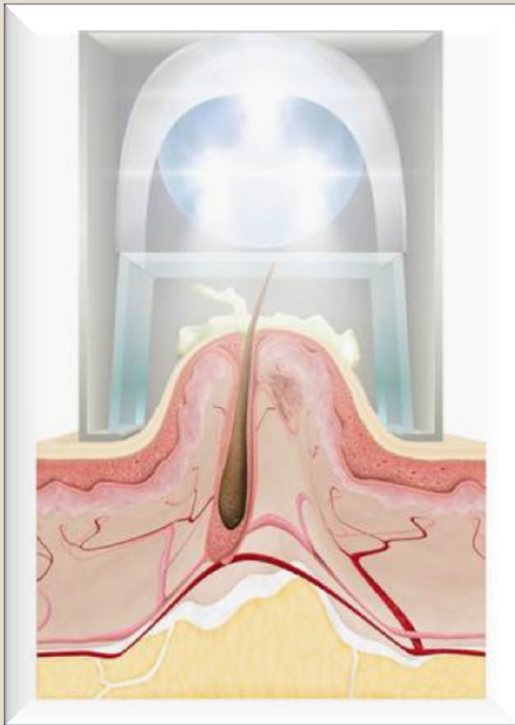
Long term

PhotoPneumatic Treatment:

= A Combination of **Light** and **Vacuum**  
Treatment

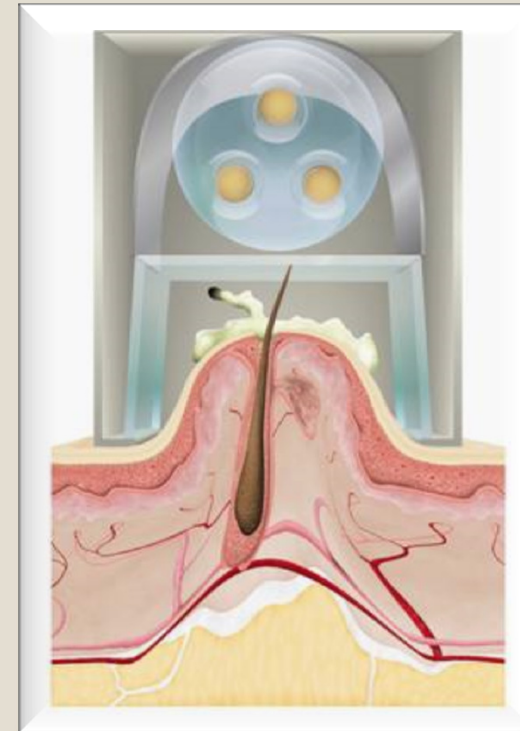
as an alternative treatment for acne

# Combines Therapeutic Advantages of Light & Vacuum



## Light

- Heat injury to bacteria → Destroys p.acnes
- Heat shock to sebaceous glands → Makes sebaceous gland less active reducing skin oils
- Reduces erythema → Immediate reduction in redness



## Vacuum

- Elevating and Opening Sebaceous Gland
- Dislodging of follicular ostia



# Targeting to P.acnes

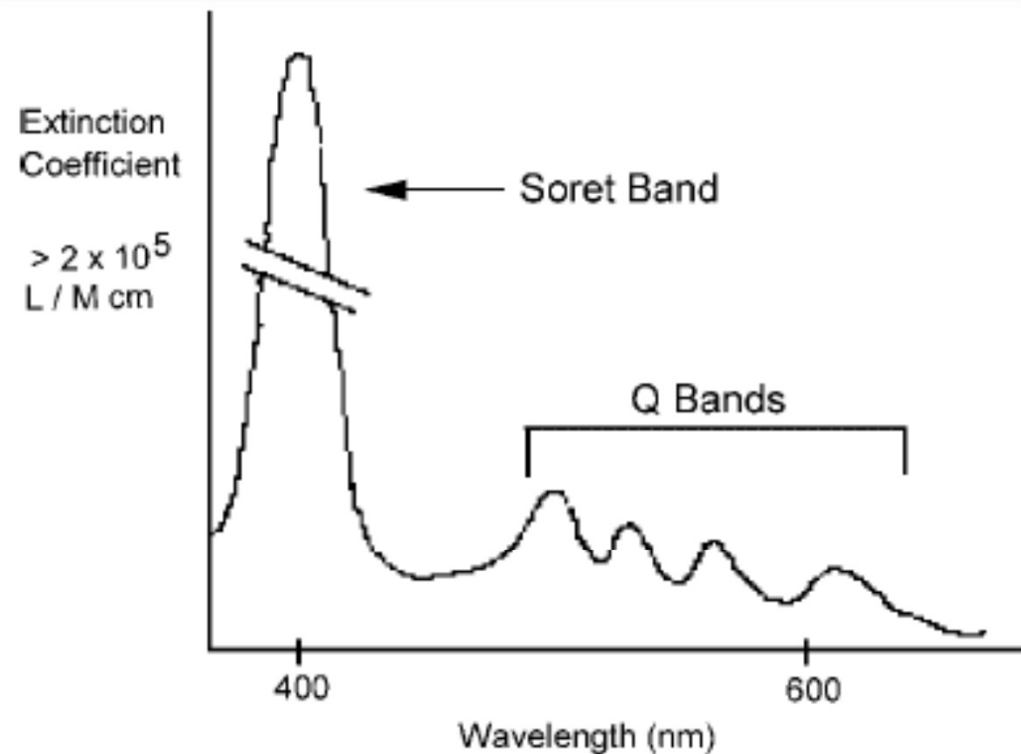


Fig. 1. Excitation spectrum of protoporphyrins. The Soret Band represents the highest peak of light absorption and thus sensitizer activation while the Q Bands represent the several weaker absorptions at longer wavelengths. Because the highest peak of absorption of porphyrins is at blue light (415 nm), this wavelength is used by several light source systems for acne treatment.

# Targeting to *P. acnes*

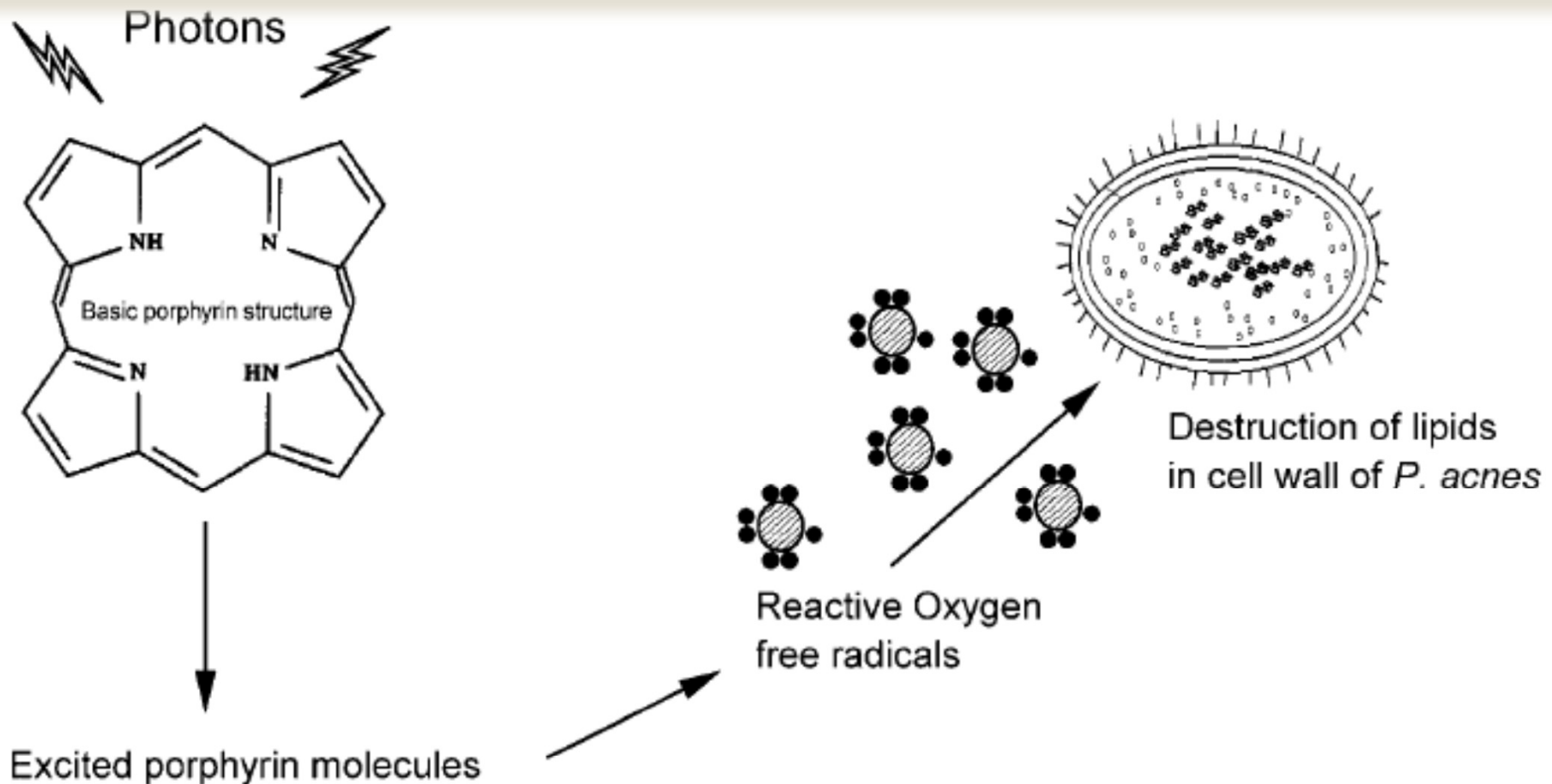
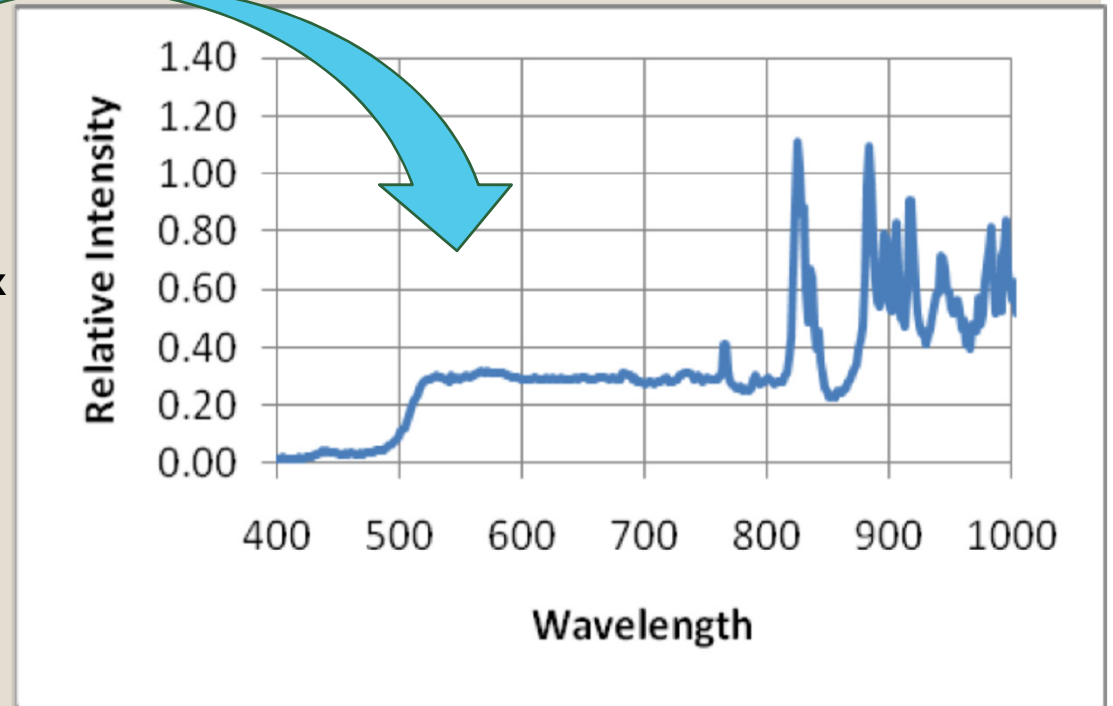
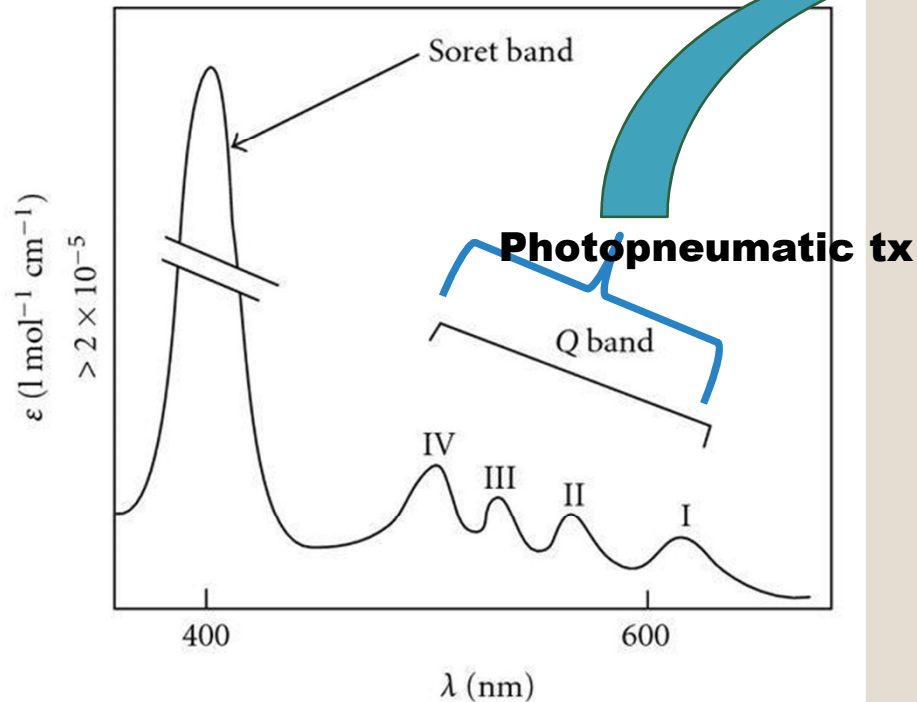


Fig. 2. Mechanism of *P. acnes* destruction by visible light interaction with porphyrins. When exposed to absorbed light wavelengths, porphyrins act as photosensitizers and generate highly reactive free radical species, one of which is singlet oxygen. These radicals are potent oxidizers and destroy the lipids in the cell wall of the *P. acnes*.

# Photopneumatic Device's Unique Spectral Output – 500 nm – 1200 nm

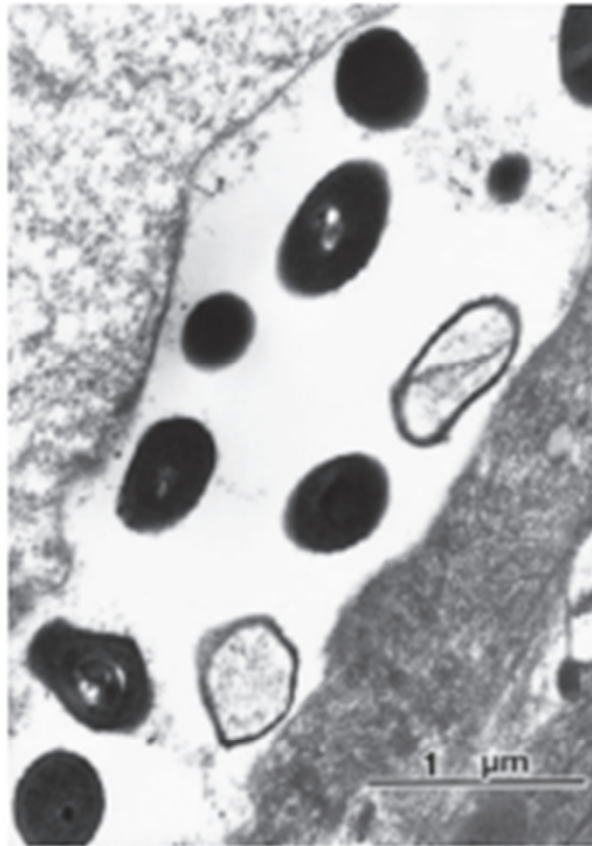


## Typical Absorption Spectrum of a Porphyrin

- Peaks at 400 nm
- 4 peaks between 500 – 600 nm

## Spectral Output : 500 – 1200 nm

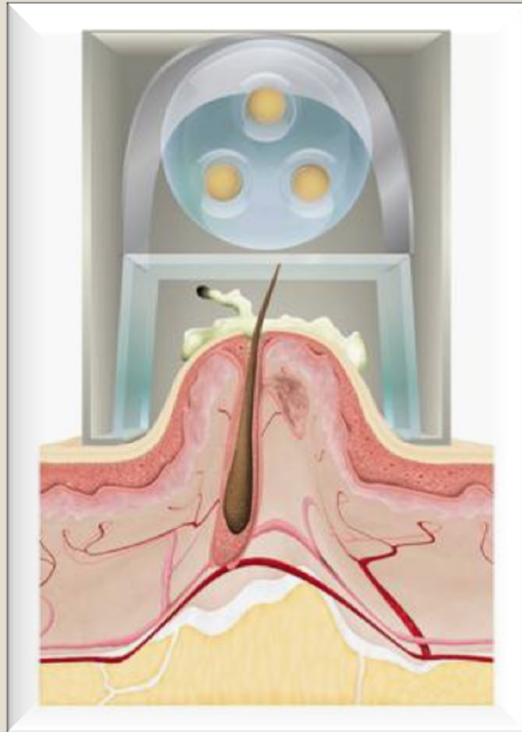
- Captures 4 peaks of Soret Band between 500 – 600 nm
- Depth of Penetration of 500 – 600 nm peaks align with depth of sebaceous gland
- Safer on darker skin typed patients



**Fig. 6:** Injured bacteria after the photopneumatic technique.

These bacteria were considered to be bacilli (most probably *Propionibacterium acnes*) because of their shape. Their morphological structure was almost normal immediately following the first session of treatment. However, 1 week after the second treatment session, injured bacteria can be observed in this specimen, together with necrotic stratified cells.

# Combines Therapeutic Advantages of Vacuum & Light



## Vacuum

Elevating and Opening Sebaceous Gland

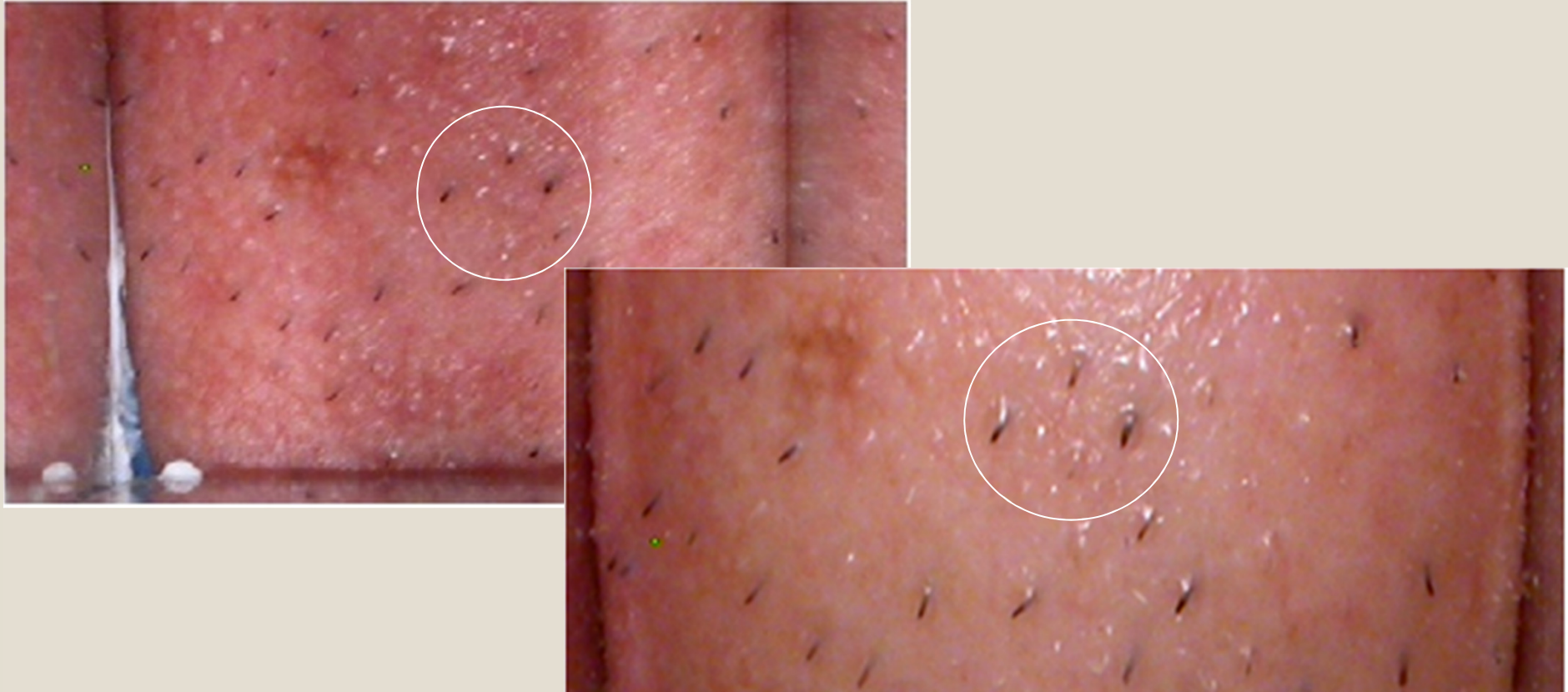
Dislodging of follicular ostia



## Light

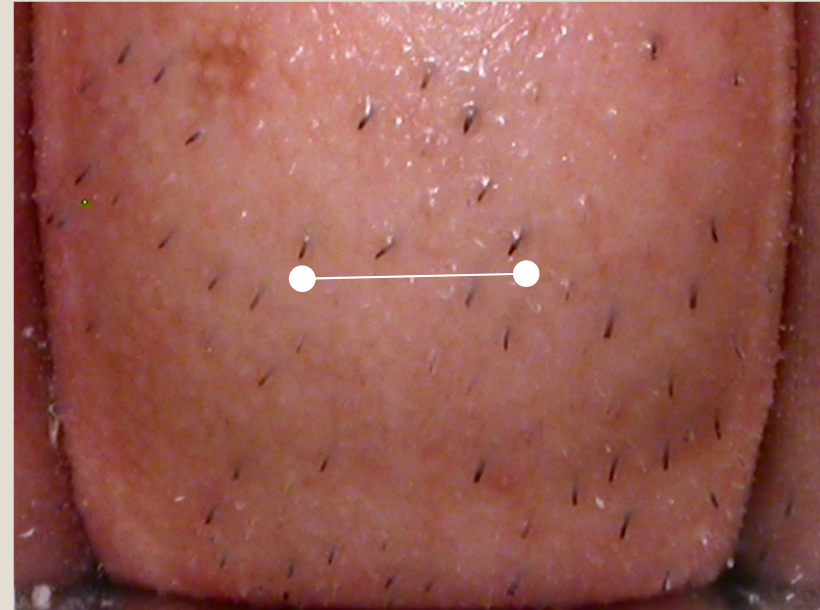
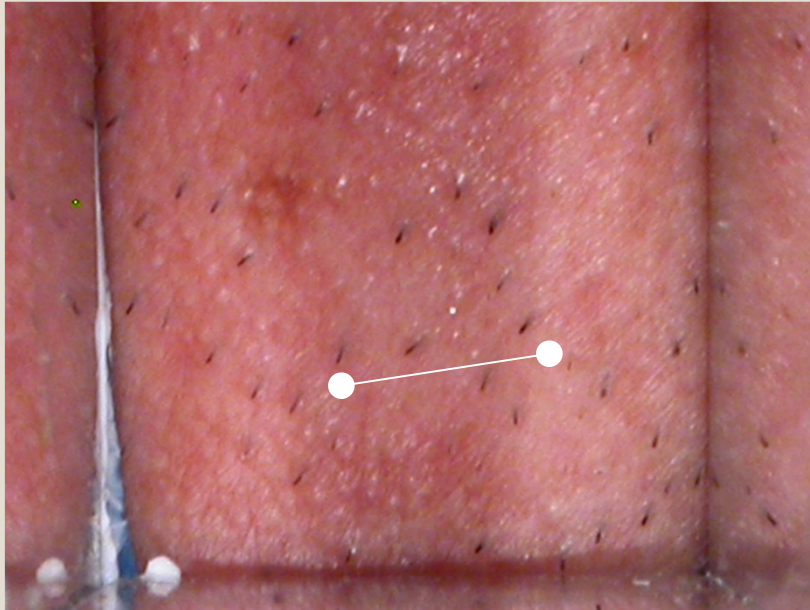
- Heat injury to bacteria → Destroys p.acnes
- Heat shock to sebaceous glands → Makes sebaceous gland less active reducing skin oils
- Reduces erythema → Immediate reduction in redness

# Pneumatics Elevates Targets 500 -700 microns

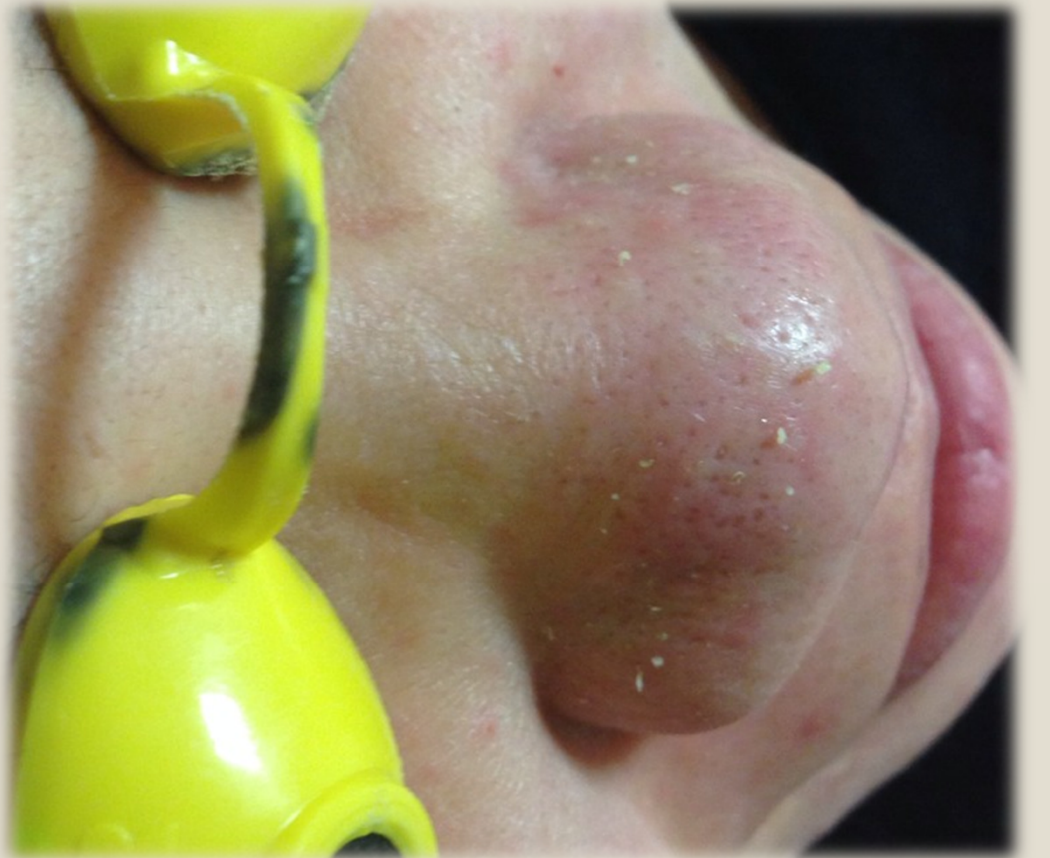


**Targets are brought closer to skin's surface  
increasing the efficiency of light delivered**

# Pneumatics Stretches the Skin



reduce the concentration of competing chromophores  
(**Melanin & blood concentration are reduced by  
25 – 35%**) that is thought to be a factor limiting the effectiveness  
of traditional intense pulsed light treatment

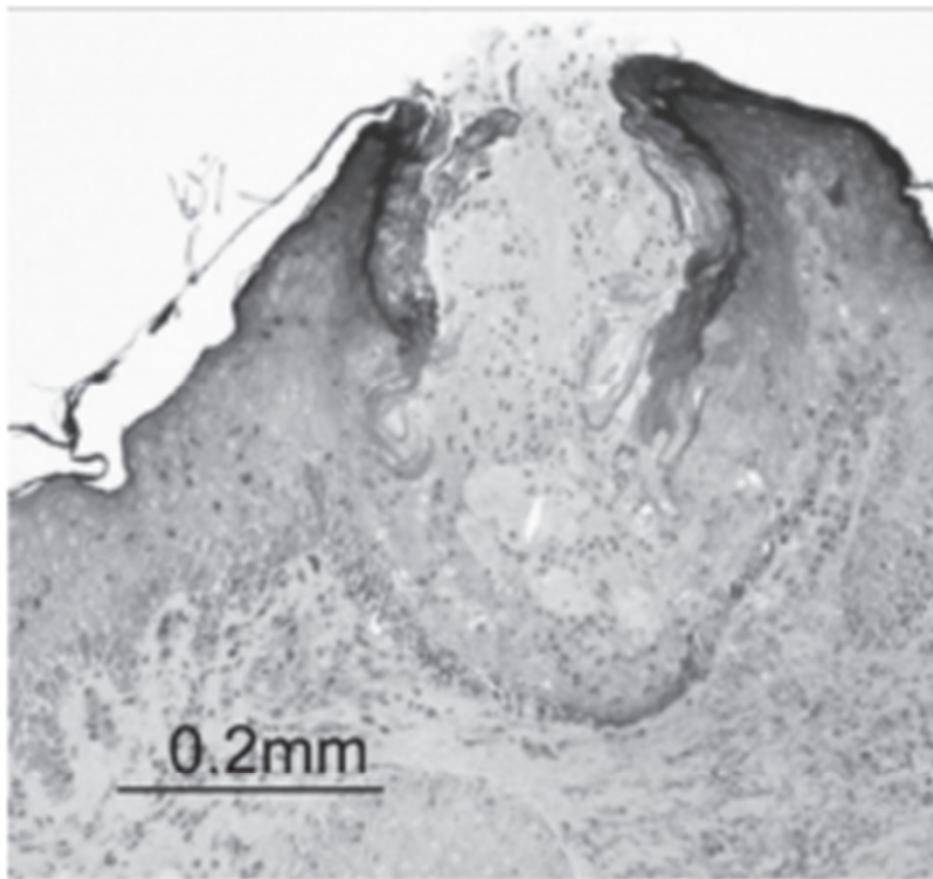




# Photopneumatic Device Mechanically Clears Sebaceous Gland Before Light Application



Allowing deep extraction and cleansing of the sebaceous glands bringing debris onto the skin surface.



**Fig. 5:** Comedonal opening with the photopneumatic technique.

Dilatation of the epidermal openings and enlarged pilosebaceous ducts are observed in comedones in the biopsy tissues sampled immediately following the first treatment session. Inspissated material can be found within the comedones that were extruded through the epidermal openings on to the skin surface.

# VIDEO



# TheraClear is FDA Cleared for Most Types of Acne

Mild to Moderate Inflammatory Acne \* Comedonal and Pustular Acne \* Acne Vulgaris

BURTON GRADE	MEDICAL TERMINOLOGY	DESCRIPTION
<b>0</b>		Absence of acne lesions
<b>1</b>	<b>Sub clinical acne</b>	Few comedones visible (only in close examination).
<b>2</b>	<b>Comedonal acne</b>	Comedones with slight inflammation
<b>3</b>	<b>Mild acne</b>	Inflamed papules with erythema
<b>4</b>	<b>Moderate acne</b>	Many inflamed papules and pustules
<b>5</b>	<b>Severe nodular acne</b>	Severe nodular acne
<b>6</b>	<b>Severe cystic acne</b>	Many nodular cystic lesions with scarring

Excellent Outcomes  
TheraClear's Broadest FDA Clearance

# US Study

- Patient unresponsive to traditional therapies are enrolled
- multicenter study evaluating photopneumatic device (Isolaz, Aesthera)
- 15 patients who were treated once weekly for up to four sessions.
- All patients continued on existing traditional acne treatment during the study, although patients on retinoids were excluded.
- stereotactic photographs that were obtained immediately pre- and post-treatment at each session, and again at one month following the last treatment.
- >70% achieved 50~100% clearance in comedones and inflammatory papules & nodules

# GENERAL TREATMENT REGIMEN & CLINICAL IMPROVEMENT

- WEEKLY treatment with excellent patient tolerance
- The most dramatic visual improvement was showing an improvement in inflammation & erythema post 2nd treatment.
- a reduction in oiliness of the skin and an improvement in overall skin texture.
- a very dramatic reduction in blackheads and whiteheads



# TREATMENT EFFICACY

Before & After Photos

## 【Before &amp; After】



Before



Post 2 Txs

Photo Courtesy: Steven Bloch, MD, Highland Park, IL. Do not distribute without permission



## 【Before &amp; After】



Before



Post 5 Txs

Photo Courtesy: James Fulton, MD, PhD, Miami, FL; Do not distribute without permission



## 【Before &amp; After】



Before

Post 1<sup>st</sup> TxPost 2<sup>nd</sup> TxPost 3<sup>rd</sup> TxPost 4<sup>th</sup> TxPost 5<sup>th</sup> Tx

Photo Courtesy: Joel Cohen, MD, Denver, CO; Do not distribute without permission





# TAIWAN STUDY

**Journal of Cosmetics, Dermatological Sciences and Applications, 2014, 4,  
332-338**

# Study Design & Patient Demographic

- Dermatologic clinic in Taipei City, Taiwan
- Healthy non-pregnant individuals with mild to moderate acne, who have received oral/topical antibiotics and/or topical retinoid acid treatment but with unsatisfactory results
- **Twenty** Taiwanese subjects (9 F, 11M)
- mean age **23** years (male subjects, range 19 - 35 years old)  
mean age **26** years (female subjects, range 22 - 31 years old).
- Fitzpatrick skin type **III**
- **moderate acne**
- Exclude :
  - tattoos, scars, dermatitis, or open wounds and patients with a history of major diseases, diabetes mellitus, HIV infection, connective tissue disease, and malignant diseases.
  - Recent (within 3 months) or aesthetic laser/chemical peeling treatment
  - Meds e.g., aspirin, NSAIDs, warfarin

# Treatment Design

- **6 sequential treatments q 1-2 weeks**
- The patients were allowed to use topical clindamycin gel/ topical adapalene on a short-term basis (3 - 5 days) and on focal areas should they experience severe flare-ups of the inflammation
- A 4 × 4 cm<sup>2</sup> area on cheek was chosen as a **control** area which will not be treated during the trial period.
- VISIA Complexion Analysis System (Canfield Scientific Inc., New Jersey).

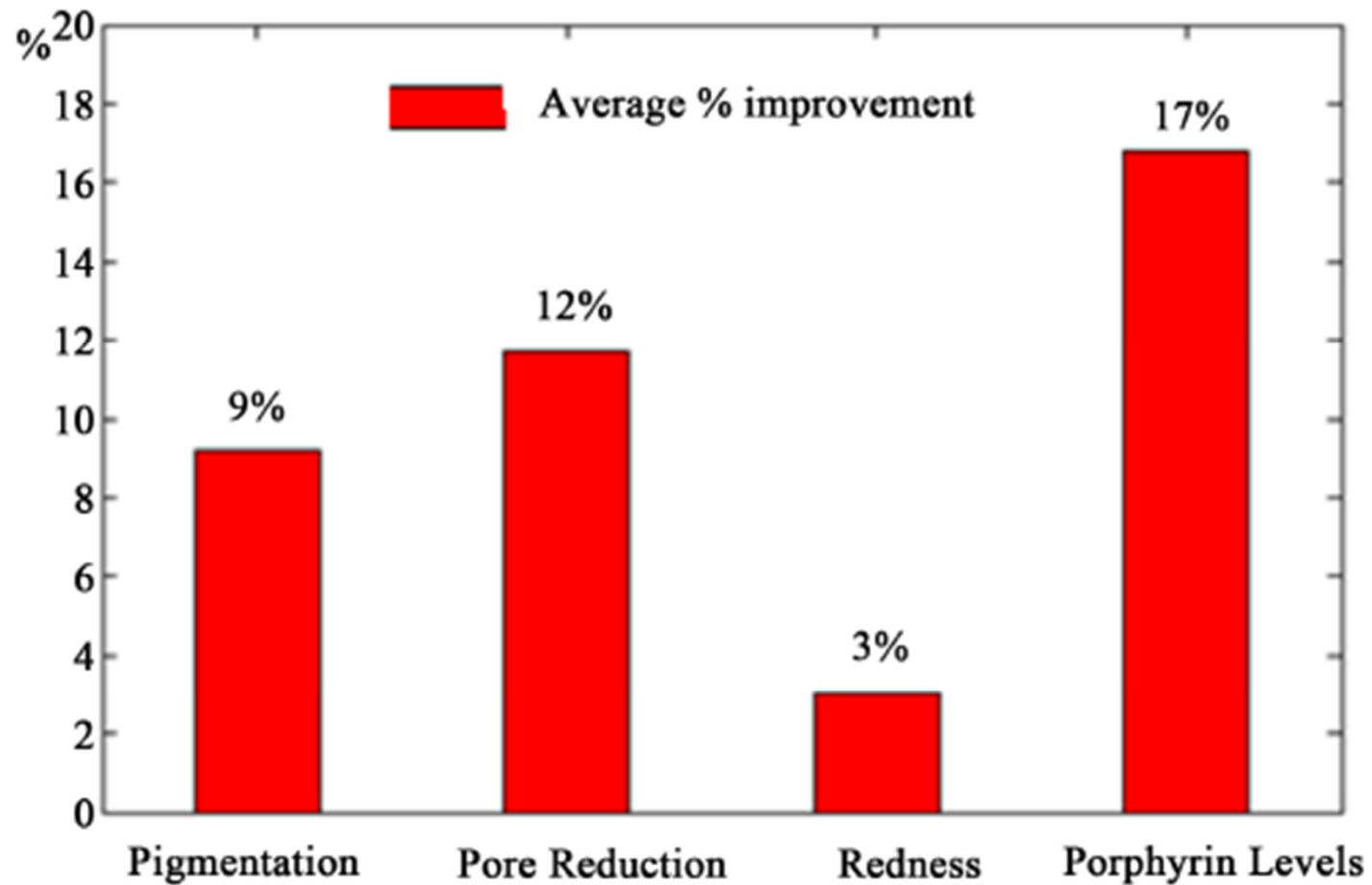
# Treatment Protocol

- Mean energy setting is at an energy setting of **6 J/cm<sup>2</sup>, vacuum at level 2, and double pulse at 750 ms**
- Vacuum settings were set to low (S1-2) on delicate areas such as the forehead and temples.
- Sparing the 4 × 4 cm<sup>2</sup> control area.
- Patients were treated at **every one-to-two weeks for six treatments** based on the severity of acne and level of tolerability.
- **No external cool sprays, gels or anesthetics were used or required.**

# Results

- Improve oiliness of the skin and an improvement in overall skin texture
- dramatic reduction in blackheads and whiteheads.
- most patients were satisfied with treatment outcomes.
- **Side effects:**
  - **mild bruising which typically resolved within 48 - 72 hours post treatment**
    - **Once vacuum settings were adjusted and sensitive settings were used on areas such as the temples and forehead, no bruising occurred.**
  - **Erythema typically resolved within 1 day of treatment**
  - **No severe flare up of acne following treatment**
  - **No excessive dryness and irritation**
  - **No postinflammatory hyperpigmentation**

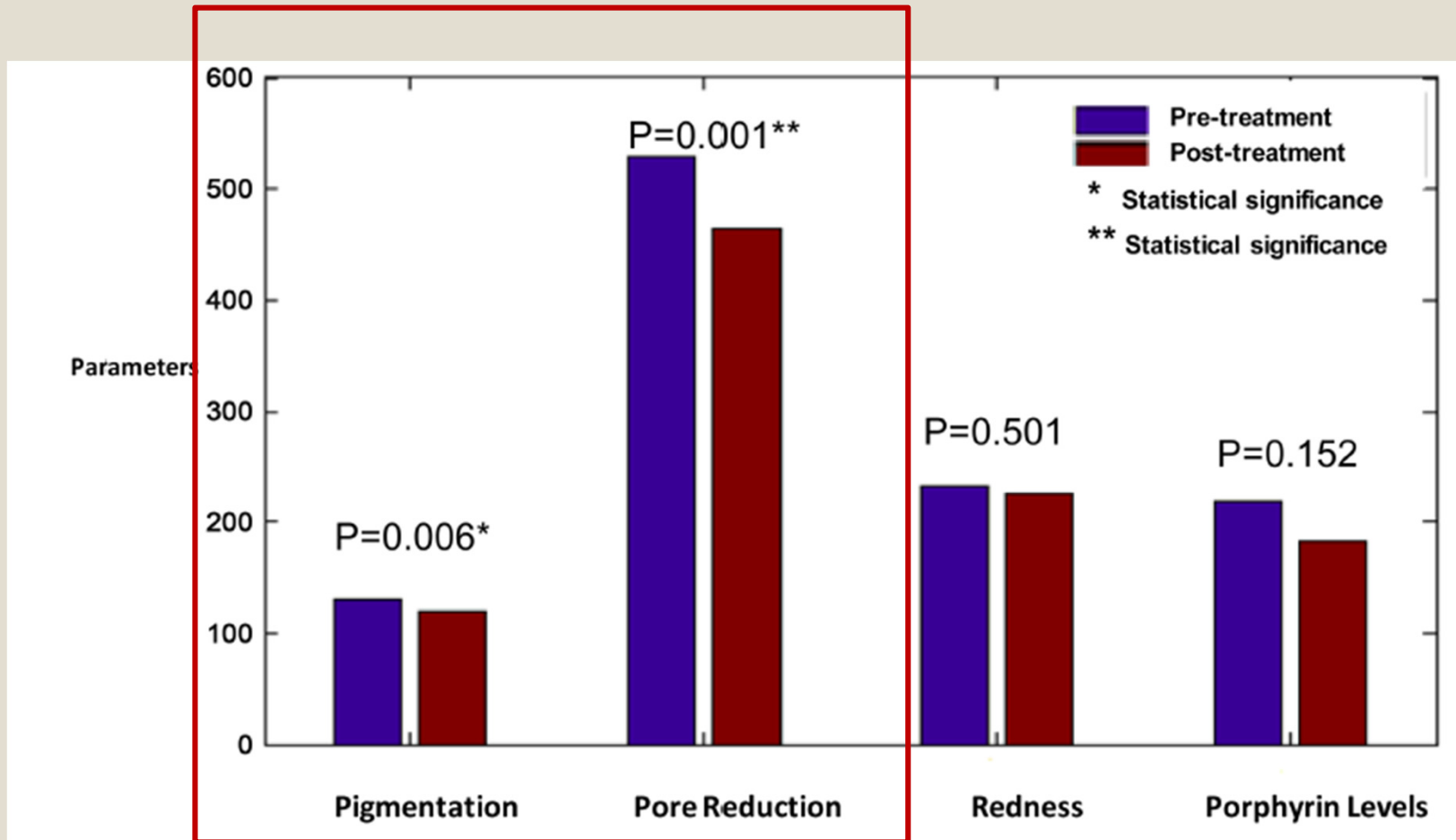
# Average Improvement



**Figure 3.** Average improvement of parameters recorded by VISIA after 6 treatments in all subjects.



# Statistical Analysis



**Figure 2.** Before and after comparison of the improvement in parameters recorded by VISIA complexion analysis system (n = 20, paired samples T-test was used for statistical analysis as shown in Table 1).

# Taiwan Study

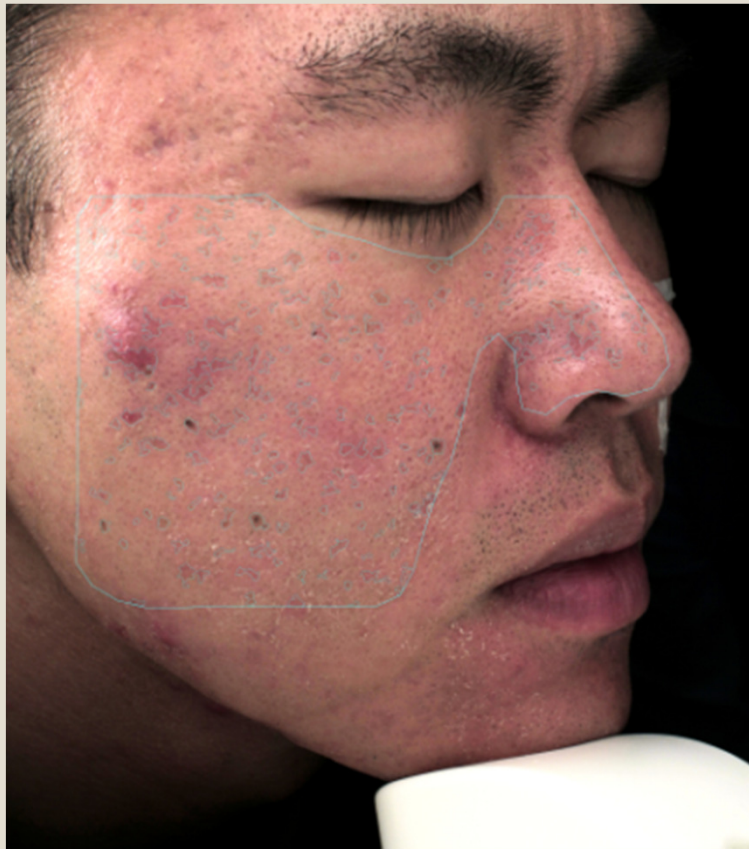
*Photo courtesy Dr. Kelly Haw-Yueh Thong, Dermatologist, M.D., M.S., NTUH*



after **3** treatments

# Taiwan Study

*Photo courtesy Dr. Kelly Haw-Yueh Thong, Dermatologist, M.D., M.S., NTUH*



*after 3 treatments*

# Taiwan Study

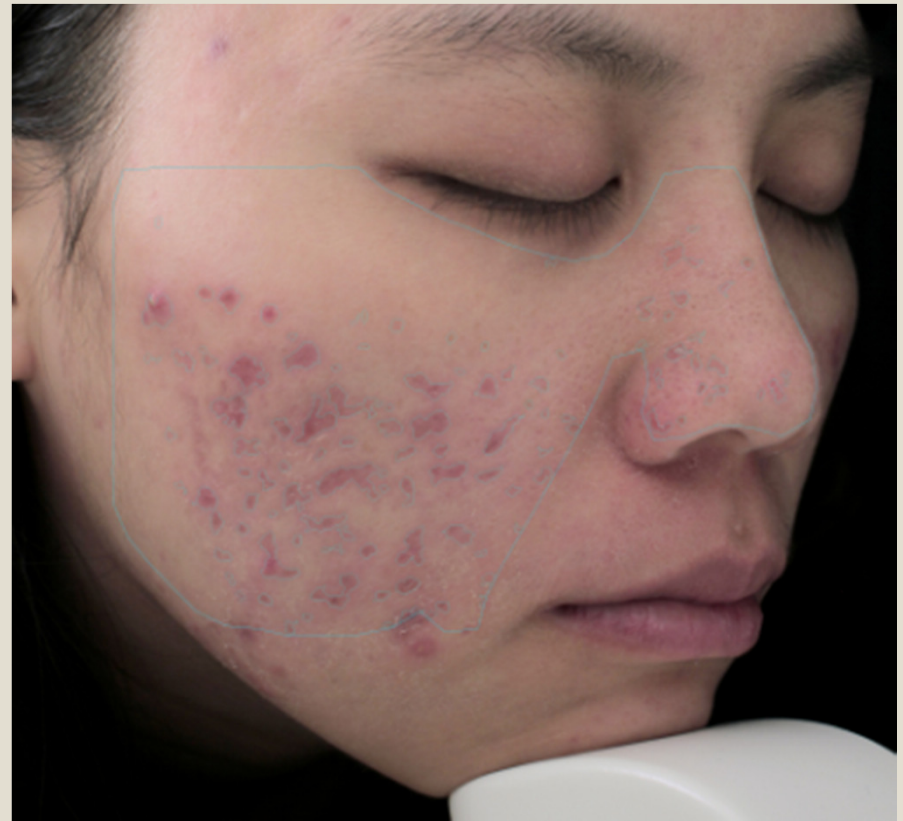
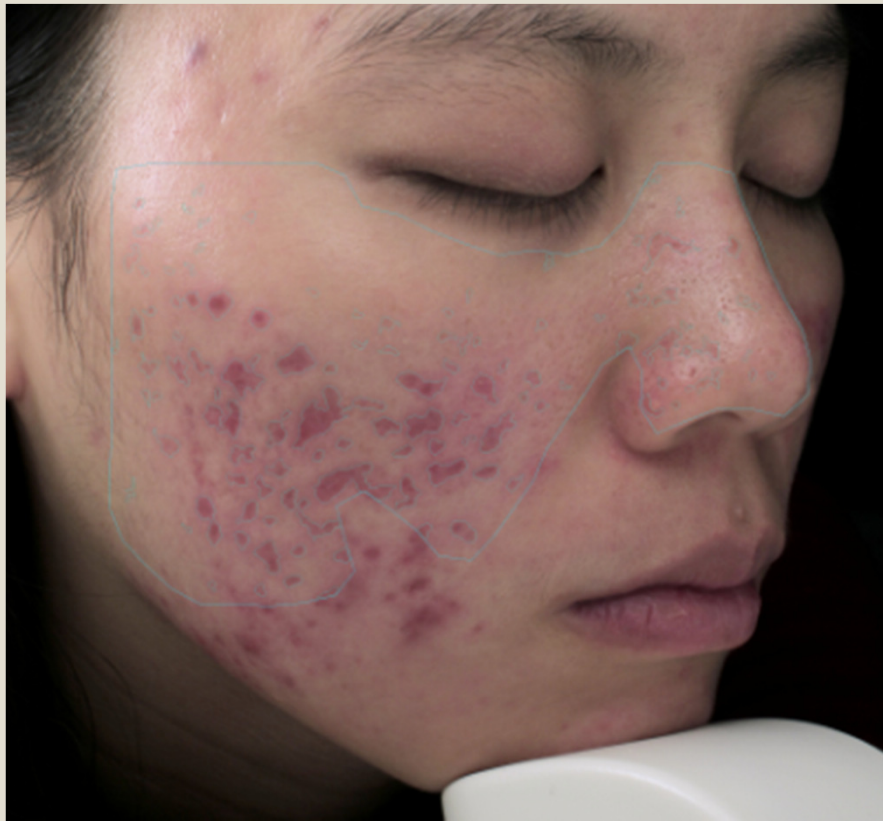
*Photo courtesy Dr. Kelly Haw-Yueh Thong, Dermatologist, M.D., M.S., NTUH*



*after 3 treatments*

# Taiwan Study

*Photo courtesy Dr. Kelly Haw-Yueh Thong, Dermatologist, M.D., M.S., NTUH*



after **3** treatments

# Taiwan Study

*Photo courtesy Dr. Kelly Haw-Yueh Thong, Dermatologist, M.D., M.S., NTUH*



*after 3 treatments*

# CONCLUSION

- Photopneumatic therapy = Light + Vacuum
- Light
  - Captures 4 peaks of Q Band between 500 – 600 nm (destroys P. acnes)
  - Depth of Penetration of 500 – 600 nm peaks align with depth of sebaceous gland
  - Safer on darker skin typed patients
- Vacuum
  - Elevating and Opening Sebaceous Gland
  - Dislodging of follicular ostia
- Relatively painless, well-tolerated with high patient satisfaction
- Significant reduction of pore size and pigmentation
- An excellent adjuvant therapy for mild to moderate acne patients



THANK YOU