Diagnosis and Personalized Acne Therapy

Tech ID: 22464 / UC Case 2012-558-0

SUMMARY

UCLA scientists have discovered novel, bacterial genomic markers that facilitate the personalization of diagnosis and treatment for acne patients.

BACKGROUND

To date, acne and associated morbidity represent an unmet clinical need. While the production of acne products has been prolific, the standard of treating acne with antibiotics and retinoid has not changed. Both antibiotic and retinoid-based treatments have varying efficacy and side effects between acne patients, driving continued research for the $3B acne market. Propionibacterium acnes, the bacterium implicated in causing acne, is the intended target of most antimicrobial-based acne treatments. However, those treatments do not consider the genetic diversity between P. acnes strains nor their distribution within pores of the skin, which undoubtedly differs between individual patients. Thus, employing the principles of personalized medicine to treat acne will potentially improve treatment and diminish the social and psychological impacts of the disease.

INNOVATION

Researchers in the laboratory of Dr. Huiying Li in the department of Molecular & Medical Pharmacology at UCLA have developed a protocol to quickly and efficiently determine the microbiome type of acne subjects. Through quantitative methods, the researchers have identified ten major lineages of P. acnes and five major microbiome types within human subjects. Interestingly, specific strains were highly associated with acne, while others were associated with healthy skin. This technology allows "typing" of individual patients and opens the door to strain-specific drug targeting and vaccines, as well as probiotic treatments to seed healthy bacteria on acne prone skin.

APPLICATIONS

- DIAGNOSIS
  - Kit development to isolate DNA/RNA from patients.
  - Diagnosis for specific bacterial type of acne.
- TREATMENT
  - P. acnes strain-specific drug development.
  - Probiotic treatment through "seeding" of healthy bacterial strains that will re-balance the bacterial population to a healthier phenotype.
  - Phage therapy: The bacterial lineages have different host specificities to phages, allowing therapy through genetic transformation.
- PREVENTION
  - Vaccine development against acne-causing strains of P. acnes.
  - Prophylactic acne treatment through probiotic creams.

ADVANTAGES

The invention embodies a significant advancement in understanding the underlying culprit to acne, *P. acnes*. This approach facilitates the development of therapies tailored to the bacterial makeup of each patient. The invention thus creates new strategies for diagnosis, treatment, and prevention as described above, under potential applications.

STATE OF DEVELOPMENT

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INVENTORS

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OTHER INFORMATION

KEYWORDS

acne, acne prevention, bacterial genomics, acne diagnostics and therapeutics, personalized medicine, probiotics

CATEGORIZED AS

- **Medical**
  - Diagnostics
  - Disease: Dermatology

RELATED CASES

2012-558-0

The investigators have devised the method to isolate DNA/RNA from pores and the protocol to rapidly and accurately identify the microbiome type. The typing protocol is PCR-based and is therefore rapid and cost-effective. The genomic sequences analyzed and corresponding primers have been uniquely defined by the investigators.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,692,229	07/04/2023	2012-558
United States Of America	Issued Patent	10,364,473	07/30/2019	2012-558

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