

This special edition of Spot On summarises the acne research presented within the All About Acne session of the 2021 Australasian College of Dermatologists Annual Scientific Meeting held in April 2021.

## What's in the journals

(Ones you might have missed and latest trends)

Philip Tong, Deputy Director of Research,  
The Skin Hospital, Sydney

Dr Tong is a dermatologist in private practice in Sydney and a visiting specialist at St Vincent's Hospital. He is also the Deputy Director of Research at The Skin Hospital and leads translational research at The Centenary Institute. He speaks widely on skin health and has a special interest in acne and acne scarring.



### A review of transcriptome profiles in acne patients treated with isotretinoin

Yuchen Jiang and colleagues looked at transcriptome profiles in acne patients successfully treated with isotretinoin, compared to those unsuccessfully treated. The study of patients with severe acne found that there was a differential gene profile expression between those that responded to isotretinoin and those that did not respond to isotretinoin. Transcriptome expression is involved in acne pathogenesis, and may indicate a personalised therapeutic approach to acne patients. [isotretinoin](#) <sup>1</sup>

### Can skin and hair changes be mitigated with biotin

A study by Sema Aksac and colleagues looked at biophysical skin parameters and hair changes in patients treated with isotretinoin treatment, and whether side effects can be mitigated with biotin. The study found that supplements with 10mg/day of biotin maintained skin hydration, while decreasing telogen hair ratio and increasing anagen hair ratio. More evidence is needed but the results of this small study are promising. [isotretinoin](#) <sup>2</sup>

### A review of Clascoterone cream, a topical androgen receptor inhibitor

Clascoterone cream, a topical androgen receptor inhibitor, has been reviewed by Michael Gold. The cream blocks testosterone in sebaceous glands and dermal papilla cells, and inhibits synthesis of inflammatory cytokines. This review found there was an abnormal HPA axis response in three patients, but there was no evidence of adrenal suppression. In one double-blinded randomised controlled study, Clascoterone cream was found to be more effective than placebo, but another study did not demonstrate statistical significance when compared with 0.05% tretinoin. [emerging therapeutics](#) <sup>3</sup>



### The role of biofilm formation in noninflammatory comedones & inflammatory lesions

A paper by Manisha Loss and colleagues looked at the role of biofilm formation in noninflammatory comedones and inflammatory lesions in acne vulgaris. This small study of adults found that biofilms were most often found in comedones (55.6%) compared to inflamed or uninvolved skin (22.2%). Comedones were significantly enriched with Staphylococcus compared to unaffected skin. It's not clear whether Staphylococcus contributes to biofilm, or if the biofilm environment allows Staphylococcus to flourish. [biofilm](#) [microbiome](#) <sup>4</sup>

### The role of the gut-skin axis in acne

Britta De Pessemer and colleagues reviewed current knowledge of the gut-skin axis. They found that acne patients have a distinct gut microbiome composition with reduced diversity, but there's still insufficient evidence of any benefits of using probiotics in treating acne. Diet plays some role in acne, particularly saturated fats and foods with a high glycaemic index load, and is thought to cause acne through a disturbed nutrient signalling pathway through SREBP-1, causing increased fatty acids and triglycerides production in sebum, and stimulated C. acnes. [biofilm](#) [microbiome](#) <sup>5</sup>

### How electric fields affect biofilm formation in C. acnes

A paper looking at emerging therapeutics by Asia Poudel and colleagues examined how electric fields affect biofilm formation in C. acnes. Electrical fields are currently being used to inactivate microbes in liquid food and wastewater. Nanosecond pulsed electric fields have been found to affect bacterial cell viability. The researchers found that electric fields affect the viability of C. acnes in biofilms more than those in suspension, possibly by affecting the extracellular matrix and outer membrane, as well as the biological processes crucial for microbial survival. [emerging therapeutics](#) <sup>6</sup>

## Local research studies

Individuals report spending an average of \$850 over a six month period on acne treatments, most of which is spent on over-the-counter products.



### The financial costs of acne: Costs incurred by patients with acne before dermatological consultations

When patients are seeking treatment for acne, they're more likely to consult their friends, family and the internet before doctors.

Many patients with acne try over-the-counter remedies before seeing a doctor, but few of these OTC therapies are evidence-based. Population-based studies have shown that many patients don't seek medical advice, even if their acne is significantly impacting their quality of life.

Few studies into acne treatment consider the financial cost to patients, and few have examined those costs in relation to patient income. This study sets out to determine the financial costs of managing acne before patients saw a dermatologist, and whether that spending correlated with income. The hypothesis was that patients would prioritise spending on acne treatments, regardless of their level of income.

Patients at a Melbourne clinic were asked about their spending on any kind of acne treatment over the previous six months. For those patients, 74% said the impact of their acne on their quality of life was moderate-severe or severe. In the previous six months, they had spent an average of \$850 on acne treatments, including OTC treatments, GP consultations, alternative medicines, prescriptions and tools, with OTC products making up the greatest cost overall.

Interestingly, there was no statistically significant difference in spending between income brackets.



#### takeaway

While many patients delay seeing a dermatologist, an earlier consultation could save them unnecessary acne treatment costs.

Dr Claire Felmingham, Dermatology Registrar,  
The Skin Health Institute, Melbourne

Claire is a dermatology registrar at the Skin Health Institute in Melbourne. She's also undertaking a Master of Philosophy researching Artificial Intelligence in dermatology. She's previously worked at the Occupational Dermatology Research & Education Centre at the Royal Women's Hospital, and in the Victorian Melanoma Service at the Alfred Hospital.



### Word on the street

by Philip Tong

Many healthcare professionals are seeing individuals with "maskne", where face masks are triggering outbreaks of acne.



### How to treat "maskne"

You might have patients who experienced "maskne" during the pandemic, where face masks trigger acne outbreaks.

It's a variant of acne mechanica and the triggers include follicular occlusion and mechanical stress – pressure, occlusion and friction – as well as dysbiosis in the skin caused by heat, pH and moisture. It can also cause rosacea and perioral dermatitis.

Patients are recommended to use gentle cleansers, light moisturisers, and potentially consider using niacinamide, azelaic acid, or topical retinoids and have makeup free days.

Disposable masks might cause more aggravation to the skin than reusable masks, according to an editorial by Wan-Lin Teo.<sup>7</sup>



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## Local research studies

A local study has found that 100% of young people with acne had altered their social media use in some way.

### How acne affects relationships and social media use: The impact of acne on interpersonal relationships and social media use

Acne is highly prevalent among young Australians, affecting 90% of adolescents, and there's a link between the severity of acne and low self-esteem, body image, depression and suicide. This research assessed the psychological impact of acne on body image and self-esteem, interpersonal relationships and social media use. The survey of patients aged 18-26 found that the more severe the acne, the more it impacted on interpersonal relationships.

Having acne also affected their social media behaviour:

- Young people often edited or cropped photos of themselves, avoided having photos taken with people with clear skin, or avoided social media altogether.
- 51% of all participants had deleted or untagged a photo of themselves on social media
- 100% of people with severe acne had deleted a photo of themselves
- 100% of young people with acne had altered their social media use in some way



#### takeaway

These changes in behaviour among young Australians show the impact that perfectionism and unrealistic images have on adolescents' psychological wellbeing. While acne can be physically treated, it's important for clinicians to talk to patients about whether acne is affecting their quality of life and psychological wellbeing.

Dr Rhiannon Russell, Resident Medical Officer  
at The Wollongong Hospital

Dr Rhiannon Russell is a resident medical officer at the Wollongong Hospital. She is also a member of the Australian Indigenous Doctors Association. Rhiannon developed a special interest in dermatology during medical school and completed her research component investigating the effects of acne on young Australians.



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## Word on the street

by Philip Tong

*Bakuchiol may have a role to play in the treatment of mild to moderate acne and in skin of colour.*



### Is there a role for a plant-based retinol alternative in treating acne?

**Bakuchiol** is a plant-based retinol alternative that has been found to improve wrinkles, skin firmness and pores.

It may play a role in treating acne and acne in patients with skin of colour as investigated by **Lidia Bownell and colleagues**.<sup>8</sup>



*Ask your patient about their skin care routine, as alternative treatments may be affecting their response to current treatment.*

### Talk to patients about use of alternative treatments

There could be a reason why your patients aren't improving on isotretinoin.

**Fad treatments** such as vitamin C, niacinamide, witch hazel and tea tree oil might cause skin irritation, so ask your patients if they're using any alternative treatments.

### Do acne patches work?

**Acne patches** are another over the counter treatment, but do they work? The short answer is: possibly.

They stop picking and promote wound healing, and some contain tea tree oil and salicylic acid. Let's watch this space for further research.

## Local research studies



A study has found that 32% of people self treat their acne for more than two years before seeing a dermatologist and, for most people, the first product they use is from a supermarket.

### Patients trust dermatologists the most, but delay making that first appointment: Patient perspectives on acne management

In our media-driven society, patients are exposed to an unprecedented amount of information about acne management and treatments. Even though dermatologists are highly trusted, they aren't the first port of call for patients with acne: laser clinics, beauticians, naturopaths and Instagram influencers are competing with dermatologists for the attention of patients.

This survey of patients at Woden Dermatology Clinic found that:

- 32% of patients had self-treated their acne for more than 24 months before seeing a dermatologist.
- Most patients had treated their acne for at least 6 months before seeing a dermatologist.
- All patients had used some form of acne treatment before seeing a dermatologist.
- The most commonly used treatments were antibiotic tablets, prescription creams, and chemist and supermarket products.
- For most patients, the first product they used was from a supermarket.
- Once patients had a referral to a dermatologist, most had to wait 1-3 months to see a specialist.
- 87% said their number one trusted source of information about acne management were dermatologists.
- Topical treatments considered first line for acne such as Benzyl peroxide aren't available in supermarkets, but only in chemists. This shows there's a need to educate patients about over the counter acne management.
- For patients who saw a GP, 65% were prescribed oral antibiotics.
- GPs commonly view topical treatments as ineffective for acne.



#### takeaway

Educating GPs and patients is essential to maintain medical presence and compete with information from beauticians and influencers. Health professionals need to ensure that patients receive high quality evidence-based medical information about acne management.

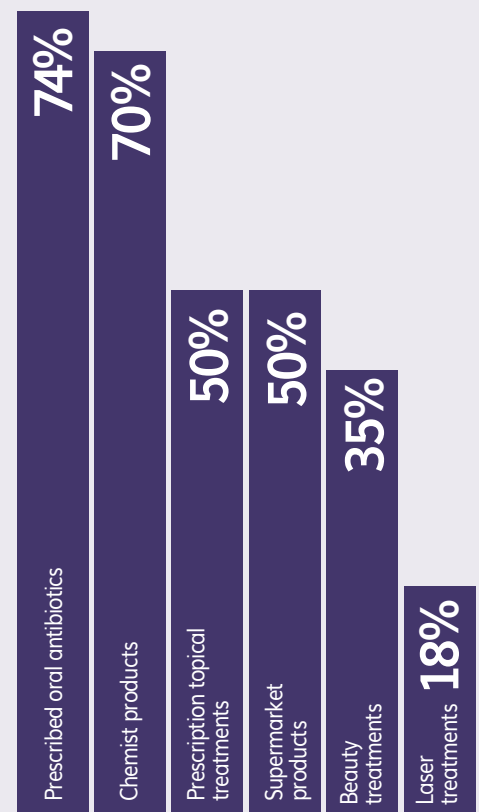
Dr Subashini Gnanendran, General Practice Registrar, South Australia Training Network

Dr Gnanendran is a General Practice registrar based in Adelaide who is currently completing a Masters in Clinical Epidemiology. She has worked as an Honorary Dermatology Registrar at The Canberra Hospital as well as a Dermatology Research registrar in clinical trials. Dr Gnanendran has a wide range of interests including acne management and dermato-oncology.



74% of people who participated in the Woden Dermatology Clinic survey (refer left) had been using oral antibiotics prescribed by their GP before seeing a dermatologist.

### Most commonly used treatments for acne prior to seeing a dermatologist



Results of survey (refer left) conducted by Dr Subashini Gnanendran at Woden Dermatology Clinic, ACT.

### We're changing the face of acne treatment<sup>1-5</sup>

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**References:** 1. Acnatat® Product Information. 2. Dreno B *et al.* *Eur J Dermatol* 2014; 24(2):201-9. 3. Ochsendorf F. *J EADV* 2015;29(Suppl.5):8-13 4. Leyden JJ, Wortzman M. *Cutis* 2008;82:151-6. 5. Yentzer BA *et al.* *Cutis* 2010;86:103-8.

Viatrix Pty Ltd. Millers Point, NSW. ACN-2021-0113. July 2021. **BPO**, benzoyl peroxide.



# Biofilms and the microbiome

The cells within the biofilm produce the EPS components, which are typically a mixture of extracellular polysaccharides, proteins, lipids and DNA.



## Biofilms: what they are and what we need to know

**What are they?** A biofilm is a community of micro-organisms in which cells stick to each other and to a surface. These cells become embedded within a slimy extracellular matrix that gives them better resistance to attacks from the host – whether through cellular or chemical responses. These complex communities can be found in a range of weird and wonderful places: from hot springs and glaciers, to poultry processing plants and our own teeth!

**Biofilms build complex 3D cities:** Biofilms aren't just layers of bacterial slime, but are complex biological systems that organize themselves into a functional community, like three-dimensional cities for microbes. They share nutrients with each other, can spread and colonise new surfaces, and as a community have protection from things that can harm them such as drying out, antibiotics, and the body's immune system.

**Biofilms are acne enablers:** Biofilms are hard to eradicate: mature biofilms show antimicrobial tolerance and evade the immune response. Biofilm protects bacteria from antibiotics treatment by acting as a physical barrier, as well as sharing antibiotic-resistant genes with the bacteria. Future acne treatment could rely on disrupting the biofilm.

**The microbiome that lives inside and on us:** Billions of microbes live on our skin, forming a complex ecosystem that interacts with the immune system. This ecosystem is seeded at birth and increases into adulthood, decreasing after age 50. Our skin is a dry and nutrient-poor environment, but some microbes such as *Staphylococcus epidermidis* and *Cutibacterium acnes* are able to survive.

**Not all *C. acnes* are the same:** We used to think that *C. acnes* caused acne, but we now understand that there are different strains of *C. acnes*. The *C. acnes* related to acne have extra virulence genes, are resistant to antibiotics, and they induce an inflammatory response.

**The gut-brain-skin axis and acne:** There's growing evidence that the gut microbiome can influence the skin. Research is now showing that stress and diet affect the gut microbiome, which in turn affects the blood and nervous system, which then affects the skin. In that way, stress such as depression and anxiety might aggravate acne from the inside out, by changing the gut microbiota and contributing to skin problems. The typical Western diet that's low in fibre and high in fat may cause fundamental changes in the intestinal microbiota, producing metabolic and inflammatory skin disease. biofilm microbiome



### takeaway

**The future:** Potential therapies could target the biofilm and we could individualise treatments that target specific *C. acnes* strains. Another treatment or treatments for the future change be alteration of the microbiome in the skin and gut.

### JoAnn See, Dermatologist at Central Sydney Dermatology

Dr See is a dermatologist in private practice in Sydney. She lectures internationally on the topic of acne and skin care. She is a member of the International Global Alliance to Improve Outcomes in Acne; a body dedicated to evaluating the "best treatment" of acne and advancing the understanding of acne science.



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## All About Acne

This special edition of Spot On was brought to you by All About Acne.

All About Acne is a not for profit organisation run by a clinical advisory board of leading Australian dermatologists that publishes the number one website in Australia on acne ([www.acne.org.au](http://www.acne.org.au)). It provides independent, evidence-based research, news and information on the management of acne for healthcare professionals and people living with, or interested in, acne.

Our objective is to inform, educate and empower people living with acne, and to share the latest evidence based research and updates with the healthcare professionals and clinicians working in the field.

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