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A bi-annual review digest of research associated with psoriasis and psoriatic arthritis

Welcome to this issue of *Pso Pscience* from PAPAA!

Over the past two-decades there has been a revolution in our understanding of psoriasis and psoriatic arthritis, both in terms of basic immunology, disease mechanisms and therapeutics.

This newsletter is designed to provide a summary of recently published research.

Of course, it's never a good time to have psoriasis or psoriatic arthritis, but if you have to have it, has never been a better time!

Dr David Ashton MD PhD

Why don't (non-human) animals get psoriasis?

Although researchers have documented occasional, spontaneous cases of psoriatic lesions in animals like chimpanzees and rhesus macaques, overall, it would seem that psoriasis is an almost uniquely human condition.[1]

As to some veterinary reports suggesting its presence in dogs and cats, most scaly skin conditions in these two groups turn out to be dermatitis or allergies rather than true human-equivalent, i.e. autoimmune - psoriasis. Why should that be? There are several reasons:

- Psoriasis is fundamentally an auto-immune system disease which is driven by specialised inflammatory cells and molecules, which behave differently in animals.
- Human skin has a particular thickness and blood vessel network, which makes it especially prone to exhibiting an inflammatory response.
- The precise genetic markers which trigger surface human skin cells to overproduce and produce the scaling and itchiness which are the hallmark of psoriasis, do not exist in animals.

Reference: Schön MP, Manzke V, Luise Erpenbeck L. Animal models of psoriasis—highlights and drawbacks. Journal of Allergy and Clinical Immunology 2021; 439-455

Impaired taste and smell linked to psoriasis

It is well known that an individual's sense of smell and taste can be impaired in chronic inflammatory bowel diseases, which may alter the patient's food preferences. In general, the diet returns to normal once the disease has been treated. Given that psoriasis is also an immune-mediated inflammatory disease, scientists at Erlangen University in Germany decided to investigate whether the sense of tase and smell, were similarly affected in psoriasis.[1]

For the study, 50 patients were recruited and asked to complete taste and olfactory (smell) tests to identify sweet, salty, sour, bitter and unami (savouriness) in the form of solutions sprayed onto the back of the tongue and sniffing sticks. Results were compared with a group of healthy (non-psoriatic) volunteers. The patients had a mean age of 50.7 and the control group 62.8 years.

The results suggested a distinct impairment of taste and smell in patients with psoriasis when compared with healthy controls. While all psoriasis patients could detect sweet taste, bitter could not be detected by 33 (66%) and unami by 15 (30%). There was also a significant deficit for the psoriasis patients for the sniffer sticks.

According to the researchers, these findings suggest that inflammation may impair the sense of smell and taste, which may influence food choices in patients with psoriasis, leading to higher rates of obesity and metabolic diseases, such as diabetes.

Comment: The problem with this study is that there is a strong possibility of confounding – i.e. there are many other potential causes of changes in smell and taste which might account for these findings. For example, some forms of medication used to treat psoriasis may cause changes in taste – methotrexate being a prime example. Furthermore, although the researchers say that inflammation may cause changes in taste and smell, they do not say anything about the mechanism involved. So at present, this study amounts to an interesting observation, but not very much more.

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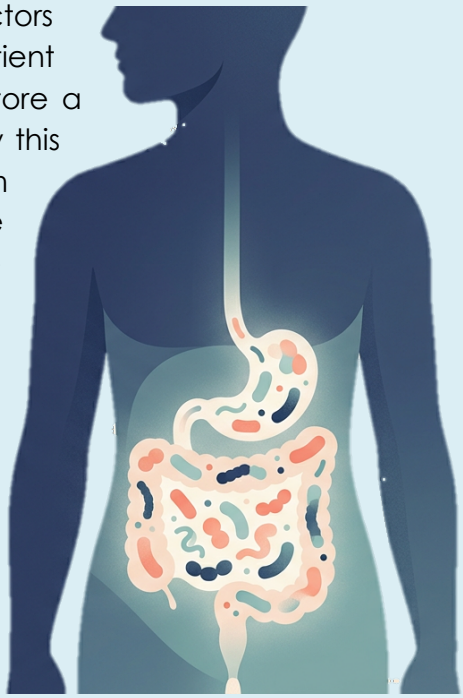
1.Rüter, P. Grünthaler V, Zopf Y, Sticherling M. Impairment of gustatory and olfactory senses in plaque psoriasis. Psoriasis: From Gene to Clinic International Congress, London 30th November - 2nd December 2017.

Faecal transplantation for psoriasis



Faecal microbiota transplantation (FMT) is a process where doctors transfer stool from a healthy person into the digestive tract of a patient with infectious or inflammatory bowel disease. The goal is to restore a healthy balance of gut bacteria (microbiome). Researchers study this because a lack of good gut bacteria may affect the immune system in people with psoriasis.1 The ways in which faecal material can be transferred from donor to recipient range from colonoscopy, where the material is inserted directly into the rectum, via an enema into the colon, by means of oral capsules or via a tube inserted into the stomach. FMT has been shown to work for certain gut infections and is currently being investigated as a treatment for certain inflammatory bowel disease and irritable bowel syndrome.

Two small studies have looked into the efficacy of this approach, in the context of psoriatic arthritis and the other in plaque psoriasis.

The trial in psoriatic arthritis recruited 31 patients,15 of whom were randomised to FMT while the remainder were treated with methotrexate. Overall, 30 (97%) completed the 26-week clinical evaluation. No serious adverse events were observed. Treatment failure occurred more frequently in the FMT group than in the control group (9 (60%) vs 3 (19%). This small study suggests that FMT is not effective in psoriatic arthritis.[2]

The second report (it was not actually a trial) had a single male patient, aged 36 years, with severe plaque psoriasis for 10 years and irritable bowel syndrome (IBS) for 15 years. He was administrated FMT twice, via both upper endoscopy and colonoscopy with a 5-week interval. Overall, the severity of his psoriasis symptoms was greatly improved, as were objective measure such as the psoriasis area and severity index (PASI) and dermatology life quality index (DLQI), Moreover, his IBS was completely relieved and no adverse reactions were observed during the treatment and follow-up. The researchers conclude that FMT could be a novel therapy for psoriasis.[3]

Comment: There is currently no evidence whatever that FMT has any role to play in the management of psoriasis. Moreover, on the basis of what is known at the moment, there would seem to be little justification for mounting large-scale trials to investigate this any further.

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1. Zhao N, Wang K, Jiang Y, Huang R. Clinical Treatment and Clinical Application Research Progress of Psoriasis and Intestinal Microbiota Dysbiosis. Clin Cosmet Investig Dermatol; 2025:18:3155-3164.

2.Kragsnaes MS, Kjeldsen J, Horn HC, et al. Safety and efficacy of faecal microbiota transplantation for active peripheral psoriatic arthritis: an exploratory randomised placebo-controlled trial. Ann Rheum Dis:2021, 80:1158-1167.

3.Yin G, Li JF, Sun YF, et al. Fecal microbiota transplantation as a novel therapy for severe psoriasis. Zhonghua Nei Ke Za Zhi (Chinese Journal of Internal Medicine) 2019; 58:782-785.

Climate change and childhood psoriasis

When we talk about psoriasis, we invariably tend to have a middle-aged adult with scaly, red skin patches in mind. However, recent evidence suggests that an increasing number of children are being diagnosed with the condition. And this trend appears to be worldwide.[1] At this point, it affects approximately 1% of children. What might explain this worrying increase?

There are a number of possibilities, but one which is attracting a lot of attention is the impact of climate change on the gut microbiome. The microbiome, is the collection of trillions of microorganisms – including bacteria and fungi – living in the digestive tract. Over the last decade there has been a wealth of evidence to suggest that the microbiome plays an essential part in regulating the immune system, especially its anti-inflammatory functions. This may promote the development and progression of a variety of inflammatory diseases, including psoriasis.

But what does this have to do with climate change? The theory is that rising CO2 levels on Earth degrade air quality and, by increasing plant starches at the expense of essential proteins and minerals such as zinc and iron, reduce the nutritional value of food. This degrades the gut microbiome, moving it into a more pro-inflammatory state and it is this which initiates the development or progression of psoriasis, especially in children who may be genetically susceptibe.[2,3]

Comment: While the link between climate change and childhood psoriasis seems compelling, a causal association with inflammatory and autoimmune diseases has yet to be established. Nevertheless, the increase in childhood disease underscores the need for increased awareness, early diagnosis, and active management.

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1. Zhang H, Song X, Xiang W. Global burden of psoriasis in children and adolescents, 1990–2021: a population-based study. Archives of Medical Science. 2025;21:1091–1094.

2. Maciel-Fiuza, MF, Muller GC, Campos DMS et al. Role of gut microbiota in infectious and inflammatory disease. Front Microbiol. 202314:1098386.

3. Ray C, Ming X. Climate change and human health: a review of allergies, autoimmunity and the microbiome. Int J Environ Res Public Health. 2020;17:4814.

Skin cancer and psoriasis

Psoriasis is a chronic inflammatory skin disease, and the risk of developing cancer has been postulated due to a number of underlying mechanisms. A recent large-scale report, involving >700,000 individuals from population studies conducted in Denmark, England, Israel and Taiwan, looked at the association between psoriasis and the risk of 26 cancers. Overall, the researchers found a small (8%) increase in cancer risk across all studies. For skin cancer specifically, there was an increased risk of 37% in the risk of keratinocyte – or non-melanoma – cancers, such as basal cell carcinoma (BCC) and squamous cell carcinoma (SCC).[1] This may seem alarming, but neither of these cancers especially dangerous if treated early.

But why should psoriasis increase the risk of skin cancer? There are a number of potential mechanisms:

Lifestyle factors: There is an association between psoriasis, smoking, obesity and heavy alcohol intake, all of which independently increase the risk of cancer in general.

Inflammation: Psoriasis is a chronic inflammatory condition and this forces rapid skin turnover. This, in turn, produces free radicals that can damage DNA and trigger cancerous mutations. This causes damage to cellular DNA, which in turn increases the risk of malignancy.

Treatments and Therapies: Various treatments routinely used in the management of psoriasis, may also increase the risk of skin cancer.[2,3]

They include:

- Phototherapy: Ultraviolet (UV) light treatments used to clear skin plaques can induce cumulative DNA changes in skin cells.
- PUVA Therapy: Combining psoralen medication with UVA light, significantly raises the risk for non-melanoma skin cancers like squamous cell carcinoma.

- Immunosuppressants: Strong systemic drugs or biologics can alter immune surveillance, reducing the body's ability to suppress early cancer cell development.

Comment: Patients with psoriasis have an increased risk for skin cancer, though fortunately of the non-melanoma variety. Warning signs include any unusual appearance in psoriatic patches, especially persistent bumps, discolouration or bleeding. Early diagnosis is the key to prompt treatment and cure.

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2. Chiesa Fuxench ZC, Shin DB, Ogdie Beatty A, Gelfand JM. The Risk of Cancer in Patients with Psoriasis: A Population-Based Cohort Study in the Health Improvement Network. JAMA Dermatol. 2016 Mar;152:282-90.

3.Balda A, Wani I, Roohi TF, et al. Psoriasis and skin cancer – Is there a link? International Immunopharmacology. Volume 121, August 2023, 110464

AI and Psoriasis – a revolution in care

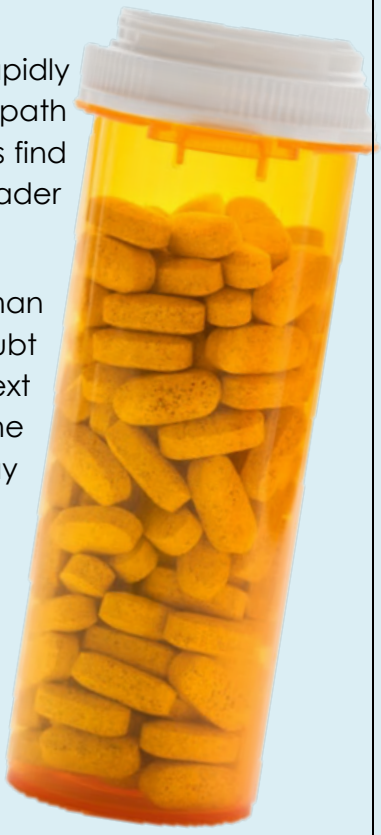
AI is here and already beginning to transform the diagnosis, monitoring and treatment of psoriasis. In the next decade the management of psoriasis will be unrecognisable from where it is now. Here are just a few areas where this revolution will be felt most:

Quicker and more accurate diagnosis: The hugely augmented intelligence of AI will facilitate more rapid diagnosis of psoriasis and of its severity, matching or exceeding that of the general practitioner. AI models can analyse skin photographs to outline lesion borders, distinguish psoriasis from other skin conditions and calculate Psoriasis Area and Severity Index (PASI) scores. Innovative AI tools like EfficientNet-B4 achieve up to 92.3% accuracy in diagnosing skin conditions compared to 86.7% by traditional – and slower - visual assessments.[1]

Intelligent nursing devices facilitate patient self-management: Mobile apps and wearable devices enable real-time tracking of symptoms, helping forecast flares and improve treatment adherence. A study involving 321 participants indicated the Smart Skin Monitor – an AI driven analyser –

achieved 90.2% agreement with clinician PASI scores, whilst reducing assessment time from 15 to 4 min per patient. These devices generate objective condition data, reducing the subjectivity of traditional assessment methods. Smart pill boxes and treatment adherence management systems are combined with disease management applications (APPs), including medication reminders, which increase medication adherence by 41%. Evidence also suggests that the correct use of these APPS can optimize the mental health of patients managing their disease.[2]

Personalised treatments: Machine learning models analyse genetic data, RNA sequencing, and biomarkers to predict which biologic therapies or systemic drugs will work best for individual patients, improving symptoms and clearance rates.[3]



Drug discovery : Scientists are beginning to use AI-guided platforms to rapidly prioritize therapeutic targets and test drug repurposing, accelerating the path to new topical treatments. In addition, AI-guided screening helps scientists find new topical drug targets that reduce skin inflammation without broader immune suppression.[4]

Comment : Whether or not AI will prove to be a great advance in human civilisation or the beginning of its end, we have yet to see. But there is no doubt that in medicine, it will have a hugely beneficial effect. Over the next decade, patients with psoriasis can expect to see a step-change in the monitoring and the treatment of their condition, moving towards the day when it will genuinely be possible to speak of a cure.

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2.Gong Z, Chen Y, Wei X, Zhang Y, et al. Digital technologies in psoriasis management: from precision diagnosis to therapeutic innovation and holistic care. Front Digit Health: 2025 Nov 10;7:1656585.

3.Smith P, Johnson CE, Haran K, et al. Advancing Psoriasis Care through Artificial Intelligence: A Comprehensive Review. Curr Dermatol Rep. 2024; 13:141-147.

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