

THE **GUT-SKIN**



CONNECTION

Exploring the intricate
connection of gut health and the
skin.



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Introduction

1. Introduction

The Growing Interest In Skin Health and Skin Care

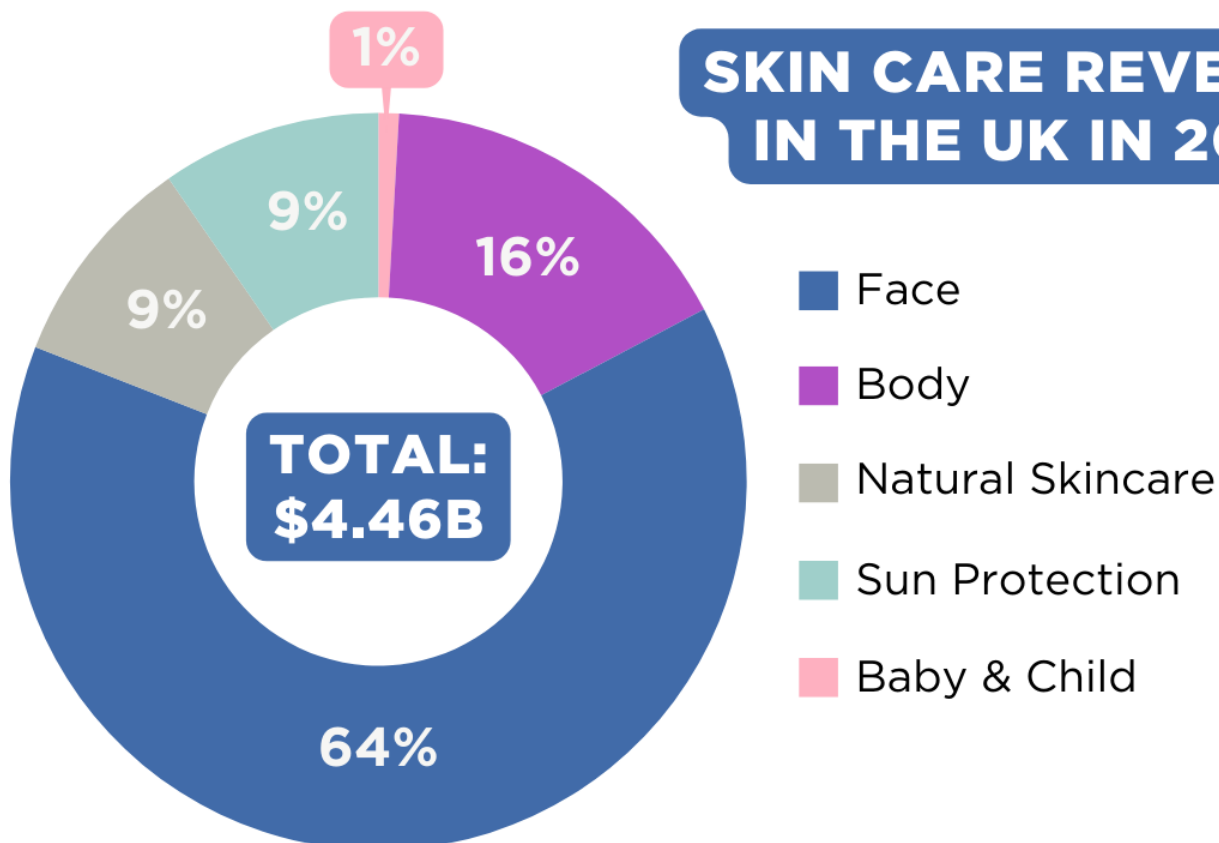
In recent years, awareness of skin health has significantly increased. In 2024, the skincare market in the United Kingdom was projected to generate \$4.46 billion in revenue (1). This is only set to rise year on year, with a 2.17% growth rate expected from 2024 to 2028 (1). This trend highlights a widespread desire to improve skin health, whether due to specific skin conditions or general well-being.

Many individuals actively seek to enhance their skin's general look and feel, and so experiment with products ranging from simple moisturizers to complex multi-step routines involving active ingredients like chemical exfoliants, and retinoids. This commitment to finding effective skincare solutions demonstrates a collective willingness to adapt and refine routines in pursuit of healthier skin. Many people struggle with skin conditions that demand more than a quick solution such as eczema, rosacea, psoriasis, and acne. These people often require specialized treatments and long-term care to manage their skin effectively. diseases are a major

public health concern, affecting between 30% to 70% of the population, and are one of the most common reasons for GP visits (2). Many people experiment with treatments applied directly to the skin, including topical corticosteroids, non-steroid-based ointments, and specific cleansers to alleviate their skin flare-ups. However, our gut health can also play a crucial role in improving our skin health, and appearance.

Gut Health and the Importance of the Gut Barrier in Skin Health

Awareness of the crucial role that gut health plays in our overall well-being has grown significantly. In parallel to this increased awareness, our diets have changed rapidly over the past few decades, with a notable increase in additives, preservatives, and sweeteners. A study in the USA found that from 2001 to 2019, the proportion of food products with additives increased from 49.6% to 59.5% (3). This shift may be affecting our digestion and broader health unpredictably. Data from the UK suggests that despite some positive trends like reduced red meat and sugar consumption, our overall diets are getting worse (4).



For some people, this could be contributing to issues with their skin.

In the gut, food that has been ingested is digested and absorbed into the body. Because of this, the lining of the gut has a barrier function that allows essential nutrients to be absorbed through but keeps unwanted materials out. This gut barrier is essential in maintaining a healthy digestive system and preventing issues like bacterial overgrowth. Interestingly, the skin barrier shares many similarities with the gut barrier, and in many cases, gut issues can manifest as skin problems. For example, acne (5), atopic dermatitis (6), psoriasis (7), and rosacea (8) have all been associated with this gut-skin connection. As we progress through this eBook, we will discuss the mechanisms that are responsible for this connection, and discuss how addressing underlying gut health issues could also improve our skin health.

You may have heard the term 'gut microbiome' — a community of microbes such as bacteria, fungi, and archaea that inhabit our gut. The gut microbiome plays various roles in maintaining overall well-being, and is thought to be particularly important in the connection



between our gut and skin, or, the “gut-skin axis”. One of the major roles of the gut microbiome is that it assists with digesting the food we eat, particularly fibrous material in our diet through a process called fermentation. Many foods we eat contain fibers that our bodies cannot break down on their own. Thanks to helpful gut bacteria, our bodies break down these fibers and produce essential chemicals.

Eubiosis



VS

Dysbiosis



Our gut microbiome can also directly influence our physiology by contributing to metabolic functions, protecting against pathogens, and regulating the immune system. Additionally, the gut microbiome regulates metabolism, affecting body weight and energy balance, and is linked to mental health through the [gut-brain axis](#), affecting mood and cognitive functions. Fiber, found in vegetables, whole grains, legumes, and nuts, promotes the growth of beneficial gut bacteria. However, average fiber intake in the UK remains below the recommended daily amount, and most people do not consume the recommended five portions of fresh fruit and vegetables daily.

overgrowth (SIBO). This is when an abnormal microbial community, or excessive bacteria, begin to colonize in the upper gastrointestinal tract causing bloating, diarrhea, and nutrient malabsorption. You can [learn more about SIBO in our readily available eBook](#). In summary, the gut microbiome is vital for digestion, immunity, metabolism, and mental health. Maintaining a balanced gut microbiome is key to preventing and managing various health issues and ensuring overall well-being. The extent to which our dietary choices, gut microbiome, and gut health have an impact on our skin appearance is still not yet fully appreciated, and will be explored in this eBook.

An illustration featuring a female doctor on the left and a female patient on the right. The doctor is wearing a white lab coat and has a stethoscope around her neck. The patient is wearing a yellow sweater. Several small milk cartons are scattered around them. A large white speech bubble is positioned between them, containing text.

Will my acne clear up if I stop drinking milk?

Although correlated, scientists have not yet proven that dairy directly causes acne!

We have discussed how the gut microbiome is the key player in a lot of the processes within our body and helps in overall well-being. However, our health can suffer when the gut microbiome becomes unbalanced, a state known as dysbiosis.

Dysbiosis can result from a variety of things, including poor diet, excessive antibiotic use, stress, illness, and lack of physical activity. One example of gut dysbiosis is small intestinal bacterial

The Skin Barrier: A Critical Defense

You may have heard about the skin barrier before, especially as many products on the shelves promise to "restore" it. But what exactly is the skin barrier, and why is it so important? Similar to the gut barrier, the skin barrier plays a vital role as a defense mechanism. The skin is made up of multiple layers, each contributing to its ability to shield against environmental pollutants, harmful microorganisms, and

allergens, while also maintaining hydration and preventing the entry of harmful substances. When compromised, the skin barrier can lead to issues like dryness, irritation, and heightened sensitivity. Understanding the function and significance of the skin barrier is crucial for addressing skin health concerns.

Skin issues and dermatological conditions not only strain healthcare systems like the NHS, with 15% to 20% of GP's workload being in dermatology (9), but also impact individuals significantly. People prioritize their appearance and skin health, as conditions such as psoriasis, eczema, and rosacea can have psychosocial effects, causing embarrassment, social anxiety, and physical discomfort (10). Recognizing the parallels between skin and gut barriers underscores the importance of giving equal attention to gut health. By acknowledging the interconnectedness of these systems, we can adopt a more holistic approach to enhancing both gut and skin health.

This eBook has been developed and researched using the latest data and insights on the connection between the gut and the skin, known as the gut-skin axis. Its goal is to deepen your understanding of how the gut can influence skin conditions such as rosacea, psoriasis, eczema, and acne, and how poor gut health can exacerbate the symptoms of these conditions. Additionally, we will

discuss the connection between our diet and our skin, and how you support your gut health for better skin.



REMEMBER:

This is **NOT** medical advice. Everyone's microbiomes and skin issues are different, so please visit a GP if you need a doctor's advice.

A photograph of a woman with dark hair, eyes closed, and a slight smile. She is touching her cheeks with her hands. Her other hands are resting on her abdomen. The image has a light teal overlay.

The Gut-Skin Axis

2. The Gut-Skin Axis

The Similarities between the Gut and the Skin

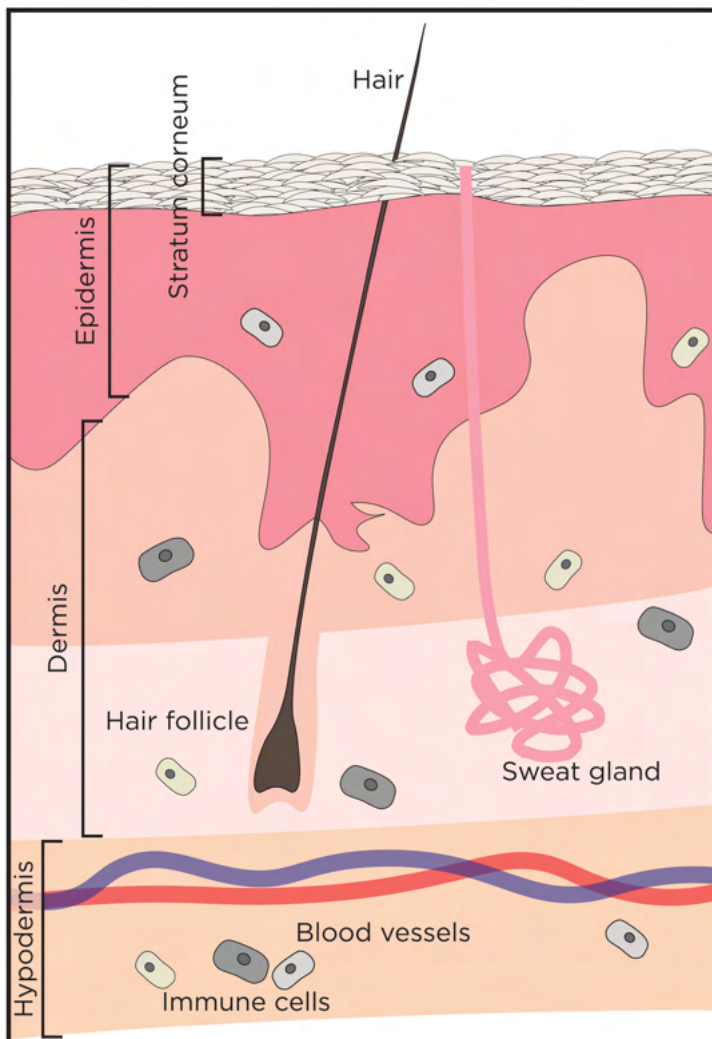
It might seem like the gut and the skin are far away from each other, too far to have an impact on each other, but in reality, the two systems are closely related. This is called the gut-skin axis, and means that what is happening in our gut can impact the health and appearance of our skin. To understand the connection between the gut and the skin, let's first walk through the anatomy of what our gut and skin look like.

Starting with the skin, our skin is made up of multiple layers, each playing a crucial role in forming a barrier between dirt, harmful toxins, and pathogens from the environment, and your body. These layers are the epidermis, the dermis, and the hypodermis, with the epidermis on the outside, and the hypodermis on the inside. The outermost layer of the epidermis that

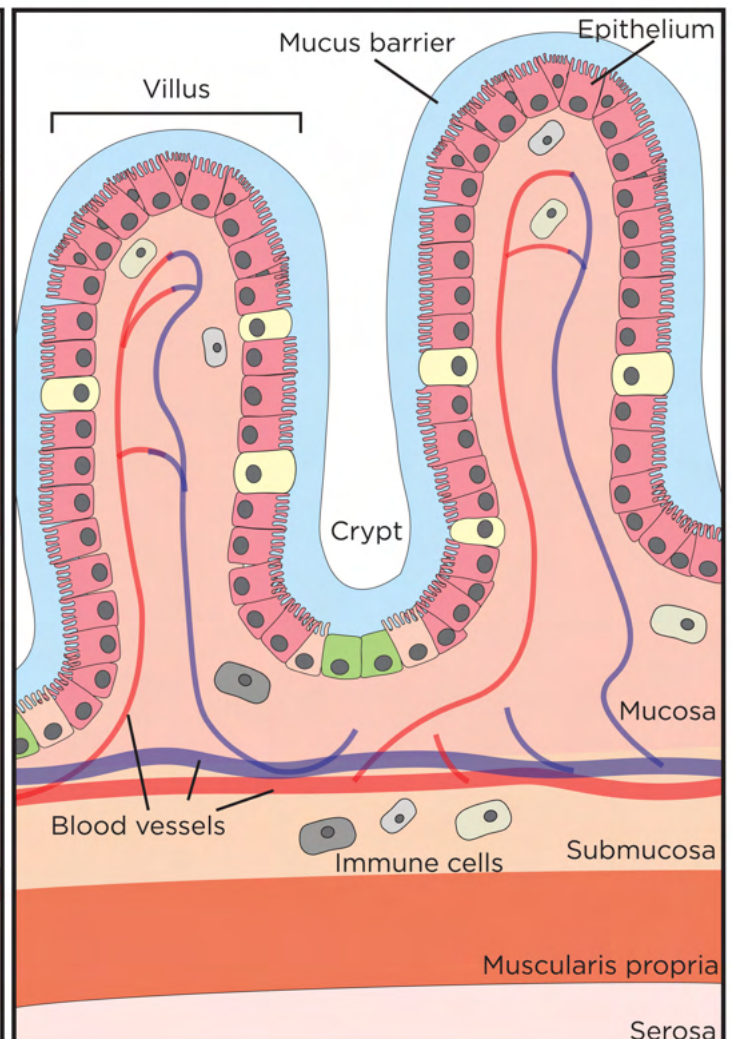
is directly in contact with the outside world is known as the stratum corneum, and is often compared to a "brick wall" (3) This layer consists of cells called corneocytes, which are held together by lipids. These lipids include cholesterol, fatty acids, and ceramides—names you might recognize from skincare products or even from your knowledge of the gut microbiome. Interestingly, your skin is slightly acidic. This acidic nature, known as the acid mantle, acts as a defense mechanism against harmful bacteria, viruses, and fungi that could damage your skin or cause infections (4).

Next, the gut wall. The wall of the intestines is made up of four main layers, the mucosa: the innermost layer that is in direct contact with the inside of the intestines (lumen), and the food we eat, the submucosa, the muscularis propria (muscle layer), and the serosa, which is the outermost layer. Unlike the skin, the innermost layer of the gut isn't smooth, it

Skin



Gut Wall



has a bumpy appearance with many folds in its surface known as villi (plural), or villus (singular). In between the villi are crypts. This bumpy appearance is crucial for the absorption of nutrients. The gut has an “epithelium” (the technical term for a thin layer of cells on the outside of tissues and organs), and a mucus barrier as its innermost layer, that is secreted by the gut wall itself.

The skin and the lining of the gut share a surprising number of similarities when it comes to their structure and function. In the skin, the outermost layer (stratum corneum) is composed of dead cells that eventually flake off. Newer cells are created from stem cells in the deepest layer of the skin (basal layer) and move upwards as they mature, in a process called “cell turnover”. Did you know that the cells of the gut do this too? The gut lining (intestinal epithelium) has a rapid cell turnover. Stem cells located in the crypts of the gut continuously produce new cells that move towards the surface, where older cells are shed. The rate of this cell turnover is high in both the skin and the gut and is important to enable rapid wound healing if damage occurs. In the gut, this epithelium is made up of a single layer of live cells,

whereas in the skin, it is made up of multiple layers of cells.

The cells of the outer layer of the skin and the intestinal lining maintain an important barrier that protects us from the external environment. The skin keeps dirt and pathogens from the outside from entering our body, and the lining of the gut also keeps unwanted pathogens, and other substances such as waste products from entering deeper into the body. There are noticeable signs of a broken skin barrier, including dry, scaly skin that is more sensitive than usual.

Knowing these signs can help you take better care of your skin and maintain its essential protective functions.

Crucially, both the gut and the skin are major sites that host a community of microorganisms (known as the microbiome) that live in and on our bodies to help maintain our health and wellness. The way that our body interacts with these microorganisms can regulate our immune system, and in certain scenarios this community can become “unbalanced” (known as dysbiosis), contributing to the development of disease. The skin and the intestinal lining both secrete substances

(mucus from the gut, sebum from the skin) that helps to maintain a balanced microbiome and keep harmful pathogens and substances out.



SIGNS OF A DISRUPTED SKIN BARRIER:



Dry, scaly skin



Acne



Itchiness



Sensitive skin



Skin infections



Discolored/ red skin



Rough skin texture

These similarities at the cellular level also reflect the similar functions that the gut and skin have in our health and underpin the reason that the gut and the skin have a close relationship with each other:

Attribute	Gut	Skin
Impacted by stress		
Acts as a barrier		
Has a microbiome		
High cell turnover		
Can rapidly repair itself		
Dense network of supporting blood vessels and nerves		
Semi-permeable barrier		
Produces a protective fluid layer		
Site of important vitamin synthesis		

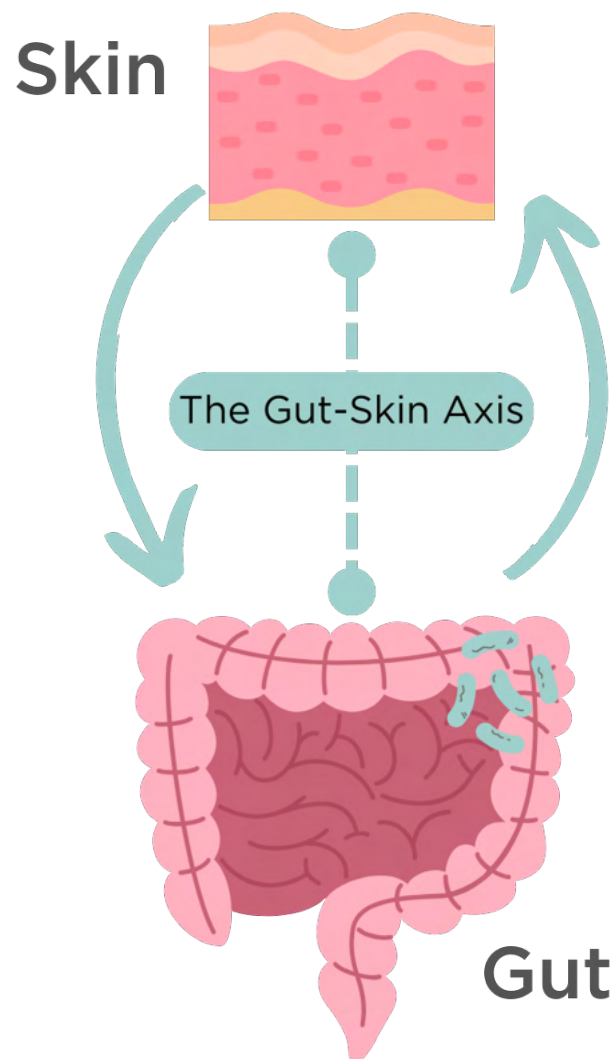
There are a few key differences in the anatomy and physiology of the gut and the skin that reflect their different roles within the body. The gut wall has an epithelium as it's innermost, a wall that is a single cell thick, however, the outer layer of the skin is the stratum corneum which is made up of many skin cells together like a brick wall. The gut has finger-like protrusions known as villi on its surface to maximize absorption of certain substances, whereas the skin surface is smooth. The skin also has a network of hair follicles which have roles in temperature regulation, skin healing, and protection..

How do the gut and skin interact and impact each other?

Both the gut and the skin are supported by a dense network of blood vessels, nerves, and immune cells to allow communication and coordination with the rest of the body and support a dynamic community of microorganisms. The gut and the skin are physically connected through blood and lymph vessels despite being far away from each other, and the similarities in their cellular composition and function mean that there is thought to be cross-reactivity between them. This means that due to their similarities, signals that are produced or detected by either the gut or the skin can often be detected by the other, effectively allowing their crosstalk. The main mediators that relay communication in the gut-skin axis are the immune system and metabolites produced by the gut microbiome. Gut microbiome metabolism produces at least 30 hormone-like compounds, including short-chain fatty acids (SCFAs), cortisol, and neurotransmitters (11). These can travel through the blood and exert their effects on the skin.

The similar makeup of the immune system in the two systems can cause them both to react to the same signals - for example, an inflammatory process occurring in the gut releasing pro-inflammatory compounds could circulate through the blood to the skin, and cause an inflammatory process in the skin also. This is thought to be why gastrointestinal conditions with an

inflammatory basis that involve a breakdown of the intestinal barrier, such as inflammatory bowel disease (IBD) and celiac disease can show specific signs on the skin. The weakening of the gut barrier can allow for pro-inflammatory compounds to "leak" through the impaired lining through the blood and the rest of the body, including the skin. The common skin manifestations of IBD are known as erythema nodosum and pyoderma gangrenosum, and involve the development of red tender bumps, or



singular bumps that develop into ulcers respectively (12). These are most common on the skin of the legs, particularly the shins. For celiac disease the most common skin manifestation is called dermatitis herpetiformis, an itchy red rash that mostly appears on the elbows, knees, and/or the buttocks (13,14). This gut-skin axis also plays a key role in the development of common skin conditions such as acne (15), atopic dermatitis (16), psoriasis (17), and rosacea (18). In particular, the gut-skin axis



MYTH

Make up causes acne because it clogs your pores

is thought to be underpinned by the microbiome. The exact mechanism behind this connection is not yet clear, however, it is thought that the gut microorganisms can produce certain compounds that can interact with the immune system across the body. This could be due to the microorganisms being able to produce factors that can either interact with immune cells directly in the gut that could have wider effects, or that these factors can be absorbed from the gut into the bloodstream or lymph system, and travel to the skin (11,19,20).

It is also possible that certain people are more prone to these cross-reactions between the gut and the skin, either due to predisposing factors in the skin, or in the gut. You may have come across the term “leaky gut” or even “leaky gut syndrome” around the internet, which is used to describe a state in which the gut lining is somehow compromised, and unwanted



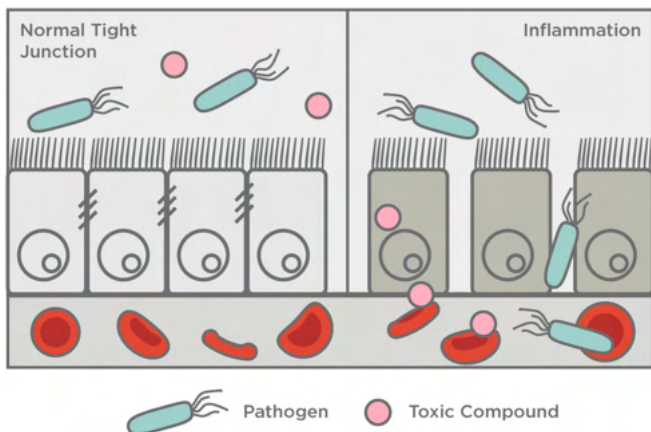
TRUTH

You can wear makeup whenever you like but make sure to thoroughly remove it to help prevent acne

molecules and potentially even microorganisms can “leak” through the gut barrier and enter deeper into our body.

This is technically known as intestinal hyperpermeability and is known to play a role in gastrointestinal disorders such as celiac disease and IBD. However, outside of certain conditions, all of us have a slightly permeable gut! This is because our gut lining allows us to absorb water and essential nutrients from the food we eat through the intestine, and into our bodies to energize us. However, the gut lining also serves as a barrier to prevent larger unwanted molecules, and microbes from leaving the gut and entering deeper into the body. This sort of barrier is known as “semipermeable”, as it can let certain materials in, and keep others out. It is hypothesized that in certain people, immunogenic compounds entering the blood and lymphatic system from the gut can have a negative impact on the skin. The extent to which this occurs in the population and the extent to which a “leaky gut” (or, intestinal hyperpermeability) outside of well-established conditions such as IBD or celiac could play a role in this is not yet known.

In our next section, we will discuss the skin conditions acne, atopic dermatitis, rosacea, and psoriasis, and the evidence that links the gut microbiome to their development.



A detailed 3D illustration of skin cells, showing their characteristic bumpy, overlapping structure. Interspersed among the cells are various colorful microorganisms, including green spheres, purple rod-like shapes, and blue and green structures, representing the skin's microbiome. A large, soft-edged pink shape is centered on the page, containing the title text.

Skin Conditions and Gut Health

3. Skin Conditions and Gut Health

Studies estimate that our microbiome may be home to 300-500 different bacterial species (1,2). Not only do they affect how we digest our food, but the microorganisms that live in our gut can also have profound effects on our health. As previously mentioned, dysbiosis can contribute to the development of an extensive array of conditions, such as obesity, autism, cancer, and diabetes. Due to their cross-reactivity, the gut microbiome can also have significant effects on the skin, especially in inflammatory conditions. This chapter describes our current understanding of the links between the gut microbiome and various skin conditions, highlighting the key role of our resident gut bacteria.

Acne

Acne Vulgaris is a common disease caused by a variety of factors, such as hormones, increased sebum production, and even the skin microbiome. However, research has begun to highlight the role of our gut microbiome in the development of acne. Studies have shown that acne patients have a lower gut microbiota diversity, a higher Bacteroidetes to firmicutes ratio, and a decrease in several other species, including Lactobacillus and Bifidobacterium (3-5). These species are proposed to normally strengthen the intestinal barrier and encourage the production of anti-inflammatory immune cells (6). Butyricococcus, which produces butyrate to prevent mucosal barrier damage and inflammation, is also decreased in acne patients (5,6). Although our current understanding of the exact

involvement of gut microbiota in acne is limited, studies suggest that the intestinal dysbiosis documented in acne patients can be linked to acne due to its pro-inflammatory effects.



Acne

Keep in mind that acne can vary in appearance from person to person.



Atopic dermatitis (eczema)

Keep in mind that conditions can appear differently on various individuals.

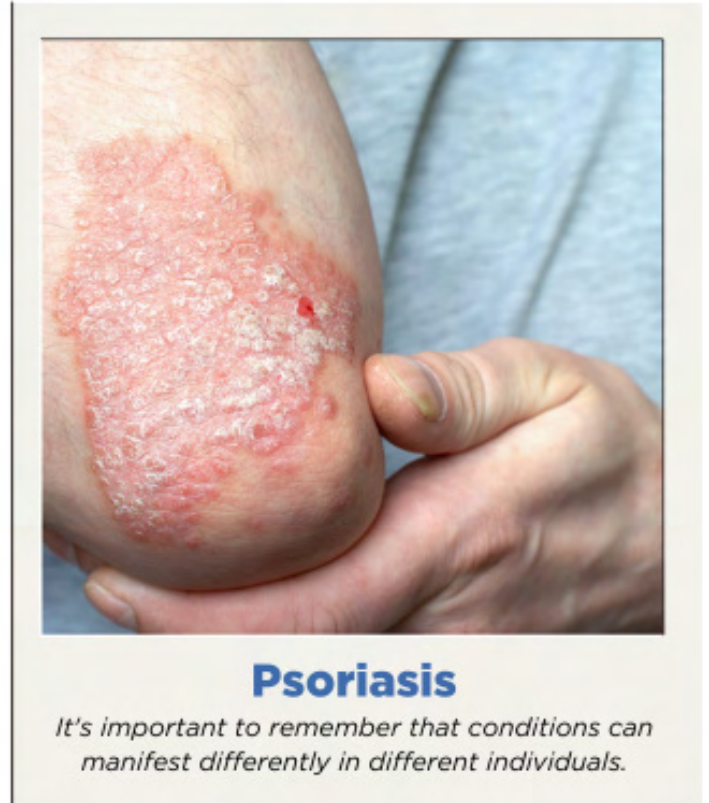
Atopic dermatitis

Atopic dermatitis is a common form of Eczema, an inflammatory skin condition that, like acne, is caused by many factors including our genes, immune system, and the environment. Studies looking at the gut microbiota reveal different changes but generally agree on an increase in the proportion of bacteria such as Clostridium difficile, Escherichia coli, and Staphylococcus aureus and a decrease in Bifidobacteria, Bacteroidetes, and Bacteroides (7). Similarly, it is not fully understood how the microbiome could lead to eczema, but there are several proposed mechanisms. Firstly, bacteria such as Clostridium difficile and Escherichia coli can interact with immune cells to affect the production of

inflammatory molecules (7,8). Next, metabolites produced by the gut microbiota have been shown to play important roles in inflammatory conditions, with oral administration of metabolites reducing eczema symptoms in mice (9,10). Additionally, butyrate-producing bacteria were less abundant in infants with severe eczema (11). Lastly, the gut microbiome can produce hormone-like substances that directly cause eczema symptoms. For example, tryptophan and gamma-aminobutyric acid (GABA) can be produced, which promote and inhibit itching respectively, and serotonin is involved in skin pigmentation (7). In conclusion, current research has highlighted the likely link between the microbiome and eczema, but its direct effects are not yet fully understood.

Psoriasis

Psoriasis is another inflammatory disease that is one of the most prevalent chronic skin diseases in the world (8). Scientists have shown significant differences in bacterial composition between psoriasis patients and healthy people (12). Notably, there was an increase in the Firmicutes to Bacteroidetes ratio, which has been associated with psoriasis comorbidities such as cardiovascular disease and obesity (12). *Farcalibacterium prausnitzii* produces compounds that protect the gut barrier and reduces the pro-inflammatory response, and is also decreased in psoriasis patients (12). The gut microbiome of psoriasis patients is also proposed to interact and alter the immune cells to lead to skin inflammation (13). However, changes in other families of bacteria are not very well understood, and it is still unclear whether psoriasis is a cause or effect of the intestinal dysbiosis observed.



Rosacea

Lastly, Rosacea is another chronic inflammatory skin condition which is linked to the gut microbiome. Rosacea patients were found to have an altered firmicutes to Bacteroidetes ratio, a reduction in microbiome diversity, and a decrease in *F. prausnitzii* abundance as compared to healthy people (14). Families including Lactobacillales were also significantly increased, while others such as Peptococcaceae were significantly decreased (14). Interestingly, rosacea patients tend to be associated with gastrointestinal disorders such as celiac disease, Crohn's disease, *Helicobacter pylori* (*H.pylori*) infection, and small intestine bacterial overgrowth (SIBO) (15). It is suggested that *H.pylori* infections can trigger the release of inflammatory molecules to aggravate rosacea (16).



Additionally, a separate study showed that treating SIBO using the antibiotic rifaximin led to an improvement in symptoms in a significant number of rosacea patients (17). A hypothesized explanation is that the bacterial overgrowth in SIBO can damage the walls of the intestine directly or indirectly via toxins, making the wall more permeable to inflammatory compounds. You can read more about this study in our blog. These examples highlight the close link between the gut microbiome and rosacea, providing a strong argument for the role of the microbiome in the development of rosacea symptoms.

With so much evidence associating dysbiosis with inflammatory skin conditions, are there any benefits of restoring the microbiome balance for our skin?

Although limited, some studies have shown beneficial effects of oral probiotics on some skin conditions. One study showed that a greater proportion of acne patients taking probiotics containing *Lactobacillus rhamnosus* and *Arthrospira platensis* had decreased acne severity compared to controls (18). Another study showed that a probiotic mix of *Lactobacillus* and *Bifidobacterium* resulted in a greater reduction in acne severity when used in combination with antibiotics, as compared to the group treated with antibiotics only (19). Similar results were seen in eczema patients, with many trials showing that probiotic supplementation, specifically those containing *Lactobacillus* spp. strains, effectively decreased eczema symptoms (20). Several studies have shown the benefits of probiotics in the treatment of psoriasis (21,22), but there is a lack of clinical evidence supporting the use of probiotics for rosacea (16). It is important to remember that these conditions are caused by many factors.

Although the use of probiotics can result in improvements, there have been no studies showing that they are a complete cure for these conditions.

Another important consideration is that while our gut can affect our skin, this relationship is bi-directional, with evidence showing that the skin is able to alter our gut microbiome. Firstly, increased vitamin D levels in our skin upon UV exposure have been shown to increase the diversity of the gut microbiome, specifically levels of *Lachnospiraceae* and *Fusicatenibacter* (8,23). A study has also suggested that eczema can contribute to the development of peanut allergies by exposing the skin to peanut protein in dust (24).

In conclusion, our gut and skin have a complex relationship. Current research has begun to uncover the important role of the gut microbiome in inflammatory skin conditions, but due to our limited understanding of the gut-skin axis and the complex nature of these conditions, the exact mechanisms are still unknown. However, keeping a healthy gut microbiome is likely going to be beneficial not only for inflammatory skin conditions, but also for our overall health.

MYTH:

The caffeine in coffee aggravates rosacea



FACT:

The heat in hot coffee could cause rosacea flare ups, but caffeine can actually improve symptoms





Diet and Skin Health

4. Diet and Skin Health

With the prevalence of dermatological diseases today, there has been an extensive amount of research surrounding what factors can be beneficial or detrimental to skin conditions. One such factor is our diet. Unlike other factors like our genes, our diet is easily modifiable, and there is significant interest in identifying what foods can help our skin. Consequently, the internet is brimming with blogs, news reports, and content highlighting what foods can help with our skin appearance, and skin conditions. However, sensational headlines connecting the diet and our skin sometimes take research findings out of context. But what is the evidence behind these claims?

This chapter discusses some of the popular claims made about certain food groups, focusing on popular skin conditions. We aim to identify which claims are sufficiently backed up by research, and which ones have only shown tentative links and should be taken with a pinch of salt. It is important to remember that many of skin conditions are caused by multiple factors and although a change in diet may be helpful, it will unlikely be a complete cure.

Antioxidants

Recently, there has been great interest in antioxidants, they include carotenoids, polyphenols (from teas and fruits), vitamins A, C, and E, and others. In our diet, antioxidants are found in fruits (especially berries), dark leafy greens, and beans. Antioxidants have been shown to be beneficial in slowing down skin aging. One of the reasons our skin appears to age is due to the inability to repair damage,

leading to a loss of physiological integrity and result in the 'sagging' associated with aging (1). This damage can be caused by ultraviolet (UV) radiation exposure, which can produce reactive oxygen species (ROS). These ROS molecules are highly reactive, therefore causing ageing by damaging skin cells in a process known as photo-ageing. Because antioxidants effectively neutralizes ROS, antioxidants in our diet like polyphenols are strongly supported by research to combat the buildup of ROS that significantly contributes to skin aging (1). In addition to dietary antioxidants, this effect is also seen in the use of topical antioxidants to combat UV-induced damage (2). This is also why wearing a sunscreen daily is so important! In psoriasis patients, ROS can also damage blood vessel walls to allow inflammatory cells to leak out and worsen inflammation in the skin to worsen the lesions (3,4). Some research suggests that supplementing the diet with antioxidants are beneficial for psoriasis (3), while others question the feasibility of the doses required to cause a beneficial effect (5). Overall, while an antioxidant-rich diet has shown beneficial effects on psoriasis lesions, it is unlikely to be a complete cure.

Collagen

Dietary collagen is often touted as an anti-aging supplement. Found in foods like chicken, fish, and bone broth, there is huge demand for collagen supplements, such as in collagen drinks, pills, and powder. Collagen makes up about 30% of the body's total protein and is the primary component of the skin (6). However, dietary collagen cannot be directly absorbed and is broken down into smaller



collagen peptides. In addition to being an antioxidant, the collagen peptides may slow down the visible signs of aging by acting as precursors for the structural collagen in skin and prevent skin collagen breakdown (1). Currently, research suggests that collagen supplements do have a beneficial effect on the structural integrity of the skin, and could slow down the signs of aging without side effects (7).

High glycemic index foods

A food group that is closely linked to skin health concerns like acne is high glycemic index (GI) foods. These include processed foods like sodas, fast foods, white breads, or any foods that quickly raise your blood sugar (see the next page for a list of foods with their GI index). A proposed mechanism that links high GI foods to acne development is that the increase in blood sugar causes a spike in insulin and

diet of low glycemic index foods such as fish, wild game, and tubers (10). Similarly, an increase in acne prevalence in the Okinawans and Inuit people was observed after the adoption of a western lifestyle (8). As of now, although current research suggests a link between high glycemic index foods with worsened acne, there is still conflicting evidence, and further research is needed to determine the true effects of high glycemic index foods on acne (8).

Dairy

You may have seen recommendations to reduce your dairy intake to improve acne. This popular claim is not baseless, with several studies supporting the relationship between diets high in dairy and acne. Theories explaining these observations includes the presence of hormones in dairy, and the increase in IGF-1 synthesis stimulated by components of the milk (21).

MYTH

Eating a very restrictive, clean diet of one food type (e.g. vegetables) will clear your skin

FACT

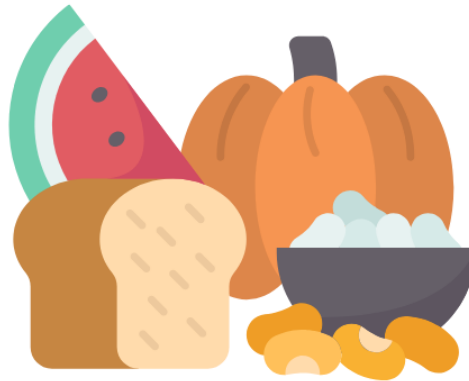
Eating a balanced diet containing all food groups provides all the necessary nutrients for good health, which can be beneficial for acne

insulin-like growth factor (IGF)-1 which promotes sebum (skin oil) production that can worsen acne. High glycemic diets are well documented to be associated with worsened acne in observational studies (8), and lowering the glycemic load has been shown to improve acne symptoms (9). Interestingly, a study of the Kitavans of Papua New Guinea and the Aché of Paraguay found no cases of acne throughout several months of observation. A proposed reason is their adherence to a

However, these findings are not consistent, with other studies showing conflicting evidence on the effects of dairy. The difficulties in coming to a definitive conclusion lies in the challenges faced in conducting studies investigating the effects of dairy. Many of the studies that have identified links relied on subjects answering questionnaires and self-reporting their diet and acne severity, which are subject to substantial biases (8,22). In order to come up with more

Glycemic Index

Chart



LOW GI FOODS

FRUITS

- Apple
- Apricot
- Blueberry
- Blackberry
- Cranberry
- Grapefruit
- Peach
- Pear
- Plum
- Prunes
- Raspberry
- Strawberry
- Tangerine

MEAT/FISH

- Lean red meat
- Fish
- Skinless chicken
- Skinless turkey
- Shellfish

GRAINS

- Barley
- Bulgur
- Oats
- Rye
- Wild rice
- Wheat tortilla
- Wheat pasta

VEGETABLES

- Asparagus
- Artichoke
- Avocado
- Aubergine
- Broccoli
- Cabbage
- Cauliflower
- Celery
- Cucumber
- Courgette
- Lettuce
- Mushroom
- Pepper
- Tomato
- Onion
- Spinach
- Turnip

NUTS & OILS

- Almonds
- Hazelnuts
- Peanuts
- Pecans
- Sunflower seeds
- Olives
- Walnuts
- Room temp oils

BEANS & LEGUMES

- Black eyed beans
- Butter beans
- Chickpeas
- Green beans
- Haricot beans
- Kidney beans
- Lentils
- Mangetout
- Pinto beans

MODERATE GI FOODS

FRUITS

- Banana
- Figs
- Grapes
- Kiwi
- Mango
- Orange
- Raisins
- Cranberry juice
- Orange juice
- Melon
- Pineapple
- Papaya

VEGETABLES

- Beetroot
- Corn on the cob
- Carrots
- Sweet potato
- Pumpkin

GRAINS

- Brown rice
- Couscous
- Jasmine rice
- Long grain rice
- Polenta

NUTS

- Cashews
- Macadamia

HIGH GI FOODS

FRUITS

- Dried dates
- Over-ripe banana
- Watermelon

VEGETABLES

- Baked potato
- Brailed potato
- Fried potato
- Mashed potato
- French fries
- Tinned sweetcorn
- Butternut squash
- Celery (boiled)

BREADS

- baguettes
- Bagels
- Breadsticks
- Breadrolls
- White breads
- Wholegrain bread
- Brioche
- Crackers
- Flatbreads
- Pita bread
- Rye bread
- Gluten free bread

SNACKS

- Cakes
- Sweets
- Crisps
- Biscuits
- Donuts
- Jelly
- Jam
- Nutgrain bars
- Pastries
- Syrups
- White chocolate
- Milk chocolate

robust claims, studies that supplement the diet with dairy in a controlled environment and use objective measures to quantify acne in response are needed. In conclusion, the design of studies showing the link between dairy and acne has made it difficult to draw definitive conclusions on the effects of dairy on acne.

Caffeine

Caffeine is commonly found in many skincare products. In addition to being a potent antioxidant, topical caffeine has demonstrated UV-protective properties, and is therefore touted to protect the skin from photoaging (23). Topical caffeine is also an anti-cellulite product, and stimulates hair growth in male androgenic alopecia patients (23,24). The effects of dietary caffeine have also been explored. There have previously been reports that the caffeine from coffee can aggravate rosacea to worsen its symptoms. Instead, later research found out that the high temperatures of caffeinated drinks was the more likely culprit (25). Furthermore, the caffeine in coffee has been proposed to reduce the risk of rosacea by promoting vascular tone (26). Caffeine has also shown anti-inflammatory properties, with one study showing that drinking 3 cups of coffee a day can reduce psoriasis symptoms. However, the same study showed that more than 4 cups of coffee per day can make symptoms worse (27). While the benefits of topical caffeine is fairly well supported, our current

understanding of dietary caffeine is limited. Current research only correlates moderate caffeine intake with improvements in some skin conditions.

There is no doubt that our diet plays a major role in affecting various skin conditions. Although significant headway is being made to unravel this complex relationship, there are few foods that have been confirmed to have a direct effect on our skin conditions. So, the next time you read an article announcing a 'miracle cure' for acne or similar claims, be careful to read between the lines and uncover what the research is really suggesting before you make a change in your diet. It should be noted that the consumption of some of the beneficial food groups discussed in this chapter (antioxidants, Omega-3 fatty acids, etc.) have additional benefits on our general health in addition to those discussed on the skin. It could therefore be worth trying to increase their consumption as negative side effects are unlikely. However, dramatic diet changes can easily lead to nutrient deficiencies. For example, cutting all dairy can remove a substantial portion of your daily protein and mineral intake. It is therefore strongly recommended to consult a doctor if you have skin concerns and before attempting a dramatic diet change.



Drinking lots of water keeps my skin hydrated and will fix my skin problems



Water can improve skin hydration, but many factors affect conditions like acne, with no evidence proving that water alone fixes it



How can
OMED Health
help?

OMED
HEALTH

5. About us - OMED Health

OMED Health® is a dedicated, patient-centric brand developed by Owlstone Medical, the global leader in Breath Biopsy® Technology. With a deep commitment to empowering individuals, OMED Health leverages Owlstone's expertise in analyzing exhaled breath to provide innovative, breath-based diagnostic tests, point-of-care (PoC) devices, and comprehensive resources for patients and clinicians alike. We aim to revolutionize the understanding and management of gut health, including those suffering from digestive issues and related skin conditions, offering them a clearer path to improved well-being.

“People living with digestive health issues currently feel let down. They’re waiting years to get a diagnosis and have little choice but to live their daily lives in discomfort, with many turning to fad diets, supplements, apps and devices that have little or no scientific basis. Through **OMED Health**, we are deploying our breath analysis technology, developed with the support of gut health experts, to provide people with a solution they can trust. Our aim is simple – **helping the billion people globally with digestive health issues live normal lives.**”

**Billy Boyle - CEO of
OMED Health and
Owlstone Medical**



Taking a Stance on Gut Health: A Deeper Exploration

For millions of people globally, unresolved gut and skin issues are not just a discomfort but a barrier to living a full life. The ripple effects of digestive health problems often extend beyond the gut, manifesting in skin conditions like acne, eczema, and rosacea, which can significantly impact one's quality of life. OMED Health is dedicated to changing this narrative by providing tools and insights that enable individuals to take control of their gut health, ultimately leading to better skin health and overall wellness.

Digestive health issues are often misunderstood and mismanaged, leaving many to endure years of discomfort before receiving a proper diagnosis. Patients frequently turn to fad diets, unproven supplements, and other ineffective solutions in a desperate attempt to manage their symptoms. It's the same with skin health, many individuals end up spending hundreds, if not thousands, on new products claiming to solve all their concerns. OMED Health is here to provide a scientifically-backed alternative.

Understanding Your Gut: The Power of Breath Testing

We provide hydrogen and methane breath kits, to several NHS hospitals in the UK, which can indicate the presence of gut health issues. These 'gold standard' breath tests can be conveniently conducted at home or in a clinical setting to help identify the presence of conditions such as Small Intestinal Bacterial Overgrowth (SIBO) and food intolerances. As we have discussed, these conditions not only affect digestive health but can also have a profound impact on skin health. You can self-refer yourself on our website if you suspect you could have SIBO or a food intolerance.



Personalized Insights for Long-Term Gut Health Management

The OMED Health Breath Analyzer allows for continuous monitoring of gut health by measuring hydrogen and methane levels over time. This represents a significant leap forward in personalized healthcare. Coupled with our mobile app, users will be able to track not only their hydrogen and methane levels but also correlate them with lifestyle factors such as diet, exercise, and sleep.

Although the device is not currently intended for diagnostic purposes, it provides valuable data that can be used in conjunction with professional medical advice to create personalized healthcare plans for ongoing gut health management. By combining our breath test data with expert support, we aim to help you make meaningful changes that not only alleviate digestive discomfort but you can also monitor improvements to your skin health and overall quality of life.

A Trusted Resource for Gut Health Exploration

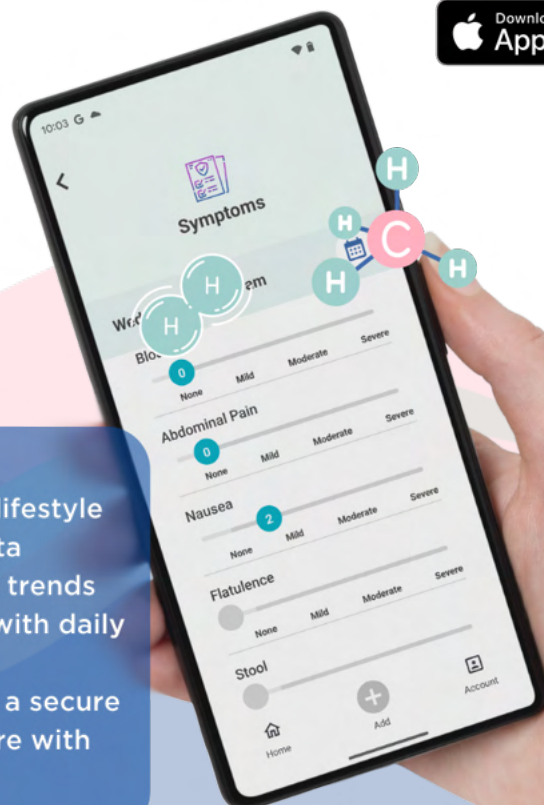
OMED Health is more than just a provider of tools to measure gut health; we are a partner in your health journey. We provide a comprehensive platform offering educational resources and community support. Whether you're just beginning to explore the connection between your gut and your skin or are seeking advanced tools to manage a diagnosed condition, OMED Health is here to support you every step of the way.

For more information about OMED Health and the digestive health breath tests we offer, visit our website at <https://omedhealth.com>.



- Low-cost, real-time analysis of hydrogen & methane
- Testing multiple substrates and longitudinal treatment monitoring
- Quick, convenient data collection

- Log food/drink, symptoms, and lifestyle factors, view data overlays to spot trends
- Track progress with daily data collection
- Store records in a secure database to share with clinicians



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