

BCN SHIELD

Prebiotic day cream

BCN SHIELD is a rich, non-greasy emulsion suitable for daily use, formulated with a combination of Prebiotics and 48-hour moisturising ingredients to protect against external attacks and restore the skin's balance and health, building its tolerance threshold.

50ml Airless Tube | 1.69 fl. oz.

BCN PREBIOTICS

Beautiful skin is healthy and protected skin. With this philosophy in mind **Institute BCN has developed BCN Prebiotics, an innovative line of products centred on prebiotic actives that help rebuild the skin's microbiome** while providing a nutritional boost to balance the skin. In addition to this cocktail of prebiotic actives, **BCN Prebiotics** products also contain **powerful anti-ageing non-prebiotic ingredients with antioxidant and highly moisturising properties**.

The new BCN Prebiotics line is suitable for all skin types, and especially recommended for the daily care of:

- sensitive skin and conditions such as acne and rosacea, offering impressive results without damaging the skin barrier.
- skin that has developed sensitivity.
- skin that has undergone aggressive medical-aesthetic treatments, which can affect the skin's microbiome.

INDICATIONS

BCN Prebiotics' ultimate aim is beautiful and luminous skin that helps us feel good about ourselves; skin with minimal signs of ageing. In order to achieve this, the skin needs to be healthy and well-protected.

Institute BCN believes that the best way to tackle ageing is to strengthen the skin with highly effective, skinidentical and biocompatible products.

Our skin's main protective systems compared to the phenomena that can affect these systems are:

BALANCED MICROBIOTA VS DYSBIOSIS

The balance — or eubiosis — between the different groups of bacteria that make up the **microbiota or skin flora** can become unstable due to genetics and exposure to environmental aggressors (pollution, solar radiation and overexposure to electronic devices).

Medical and aesthetic radiofrequency treatments, facial dermabrasion, peels, microneedling and mesotherapy can also alter skin flora.

When the microbiome balance is disturbed, **dysbiosis occurs, which can cause irremediable changes in the skin's natural defences**, causing premature ageing, sunspots and irritations such as redness, inflammation, flaking and itching.





To **remedy this dysbiosis** or imbalance in the cutaneous microbiota, **Institute BCN** has formulated a whole line of **skincare products containing prebiotic actives**, the natural food sources of 'good' bacteria in the saprophytic flora..

The BCN Prebiotics line contains the right combination of nutrients to encourage the growth of 'friendly' bacteria populations, helping to fight harmful bacteria and restoring the skin's microbial balance.

WATER BALANCE VS ALTERATIONS IN THE BARRIER FUNCTION

Hydration is the process of restoring the skin's water balance to protect us from dryness and prevent premature signs of ageing.

As we age, the skin loses its natural humectants and the skin's barrier function is weakened, meaning that we lose more water through diffusion and TEWL (TransEpidermal Water Loss).

The water content of the stratum corneum in well-hydrated skin is about 10 to 20%. When the skin lacks water for whatever reason, the skin's natural hydration levels decrease, causing the skin to become dehydrated. When the water content of the stratum corneum is below 10%, the skin is dehydrated.

All skin types are prone to dehydration, including combination and oily skin. In oily skin-types, the body produces an excess amount of lipids, but this doesn't mean it can't lack water and be dehydrated in certain circumstances or seasons.

The manifestation of this **skin dehydration** is called **xerosis**, which is extremely dull and unhealthy skin. The main tell-tale sign for this is usually a **lack of glow**. Dehydrated skin also has **less elasticity** and a more or less intense and persistent feeling of **tightness** that can lead to **flaking**. This loss of elasticity usually results in physical changes and accelerates the appearance of signs of ageing like wrinkles and bags.



Structural changes derived from the loss of hydration in the skin

CORRECT IMMUNE REACTION

The skin is the largest organ in the human body and is an active element of the immune system. It is our first line of defence against external aggressors to the skin tissue and has its own evolved system to prevent infection and maintain the balance between beneficial and harmful species.

The mechanisms of resistance to infections can be divided into innate and adaptive immune responses.

Innate immunity, also known as natural immunity, **is the protection we are born with** and is our first line of defence against harmful pathogens. The innate immune response consists of cellular defences that react non-specifically to certain aggressors by secreting **an arsenal of antimicrobial peptides (AMPs)**. This family of molecules is produced at different concentrations and has a wide range of antibacterial activities, thus acting as a primary defence mechanism.

The skin's **adaptive immunity** is composed of a series of antigen-specific mechanisms that are carried out by cellular components of the epidermis and dermis, which are also used by the immune system in other organs and systems, and whose key characteristics are specificity and memory.



In short, there is a crucial collaboration between the cutaneous microbiota and the skin's immune system that helps maintain balanced and healthy skin capable of fighting off infections and inflammation (inflamm-ageing).

PROTECTION AGAINST UV RADIATION AND BLUE LIGHT

The increasing use of electronic devices that emit **blue light** — **or High-Energy Visible Light (HEV)** — overexposes **the skin to types of radiation that the skin cannot combat with its natural protection system**. On top of this, it is already well-established that **solar radiation causes extreme damage to the skin**. This is why it is extremely important to protect the skin with a medium SPF sun cream every day, even in winter.

Exposure to both these types of radiation can cause sunspots, skin inflammation, weakening of the epidermal barrier and premature ageing.

It is especially important to protect the skin from HEV and UV radiation in the case of sensitive and/or skin that has become sensitised by undergoing medical-aesthetic treatments. Sensitive skin is weaker and therefore more susceptible to the harmful effects of blue light and solar radiation.



ACTIVE INGREDIENTS

BCN SHIELD is a complete formula that contains all the active ingredients found in the **BCN Prebiotics** line:

 Broad-spectrum prebiotic complex containing active ingredients that act as superfoods for beneficial bacteria, to the detriment of pathogens.

The combination of Prebiotics designed by **Institute BCN** specifically for the new **BCN Prebiotics** line is made up of:

BIOALGAE: This is the **main prebiotic compound** of the line and is obtained from freshwater microalgae Chlorella Vulgaris. It is considered a **superfood** for the skin Prebiotic active or nutrient that promotes growth of beneficial microbiota & inhibits detrimental



Rebalancing effect of Prebiotics on an altered microbiome

due to its nutritional properties. In addition to its prebiotic action, several studies show that it has even more benefits for the skin:

• Helps stimulate cell regeneration and can even improve the EGF (Epidermal Growth Factor) *



BASAL LEVEL



EGF (100 ng/ml)



WITH PREBIOTIC ACTIVE

The rapid migration and renewal of keratinocytes stimulates the regenerative and reparative properties of the skin barrier.

* An *in vitro* wound-healing test was performed on human keratinocytes demonstrating the enormous potential of Bioalgae to stimulate and promote epidermal regeneration in just 18h.

- Helps calm and prevent inflammation caused by microbiome imbalances to fight conditions like inflamm-ageing (visible or invisible chronic inflammation that accelerates premature ageing of the skin).
- Helps balance oily skin, reducing sebum production and the appearance of comedones, commonly called blackheads.

INULIN AND YOGUR POWDER: This mixture of Prebiotics **combines the skin benefits of yogur with the prebiotic activity of inulin**, a fructose polysaccharide produced by plants.

Most of the Prebiotics used today are short-chain carbohydrates that are naturally found in fruits and vegetables. Within this category, inulin is considered one of the most effective.

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- **Super-hydrating biomimetic complex, Hydraskin24**, combines physiological molecules that are naturally present in the skin with natural hydrating actives.
 - NMS: Natural Moisturising Sugars.
 - Plant-based saccharides trehalose, fructose and maltose are excellent natural moisturisers with low molecular weights that can deeply penetrate the skin.
 - NMF: Natural Moisturising Factors.

NMFs are a collection of free amino acids (serine, glycine, alanine, histidine) and other ingredients such as urea, allantoin, etc. They are low molecular weight filaggrin degradation products located in the stratum corneum. NMFs are water-soluble and have excellent hygroscopic or water-retaining properties. As such, they are highly humectant physio-moisturising molecules that retain moisture in the stratum corneum and help maintain the skin's flexibility. They compose about 20-25% of the dry matter of corneocytes.

- Urea is highly moisturising and penetrates deep into the epidermis.
- Allantoin promotes cell proliferation, has a calming effect and increases the skin's hydration levels. It also has keratolytic properties.
- **Glycerin** is an excellent moisturiser that acts on the surface of the skin, providing long-lasting moisture.
- · Sodium lactate / lactic acid is an NMF with rejuvenating properties.
- **Hyaluronic Acid** is a glycoaminoglycan (GAG) distributed widely throughout neural, connective, and epithelial tissues. It is found naturally in the skin and is involved in tissue repair and hydration.
- Aloe Vera concentrated base made from the dehydrated powder of the inner cut of fresh aloe vera leaf contains up to 10 times more active substances than regular aloe vera. The dehydration process is carried out at low temperatures to preserve the maximum concentration of polysaccharide molecular structures.
- Dihydroavenanthramide D (DHAv D): synthetic derivative of avenanthramide D with the same antihistamine activity.

Avenanthramides are a group of phenolic compounds found mainly in oats (mostly avenanthramides A, B and C), very effective at relieving skin conditions such as itching, redness and weals in a dose-dependent manner. In fact, they are the main soothing active component of oats.

However, avenanthramides present a double challenge: there are only very small amounts of avenanthramides in oat extract and synthesising them is expensive. For this reason, and after an exhaustive screening of more than 40 synthetic avenanthramides, **dihydroavenanthramide D** has been selected as the most sustainable, stable, effective and safe alternative.

In addition to the standard actives in the **BCN Prebiotics line**, this formula also contains:



- Chia Oil (Salvia Hispanica), which is obtained by cold pressing chia seeds, a herbaceous plant belonging to the mint family. Chia seeds are one of the best known superfoods: its oil contains essential fatty acids (up to 60% omega-3) as well as polyunsaturated acids, palmitic acid and vitamin E. It is also rich in minerals such as calcium, zinc, iron, phosphorus, magnesium and potassium. As if that weren't enough, it's also rich in phenolic acids and isoflavones, which are powerful antioxidants.
- **Bisabolol**, which is a plant extract widely used in cosmetics for its **regenerative properties**. It's derived from chamomile essential oil and its most bioactive stereoisomer, alpha-bisabolol, is a super versatile active ingredient.



- **Squalane** is the hydrogenated form of squalene and its stable derivative. It is a very refined moisturising oil derived from olives. Squalane is a plant lipid with a **very similar molecular structure to that of skin lipids**, which make up the sebum and the hydrolipidic film.
- **Protection system against blue light (BLP_Blue Light Protection)** or high energy visible light (HEV) emitted by electronic devices.
- Broad-spectrum (IR, UVA and UVB) SPF 15 sun cream, providing medium-level protection according to European recommendations, and ideal for daily use.

RESULTS

The **BCN SHIELD** cream formulation achieves:

- <u>a complete prebiotic action:</u>
 - restores and maintains a healthy microbiome balance.
 - boosts the skin's immune response.
 - facilitates cell renewal, repairs the skin barrier, and diminishes the appearance of scars.
 - revitalises and strengthens the skin
- for its content in hyaluronic acid, sugars and natural moisturising factors:
 - prevents dry skin and provides long-lasting comfort
 - short and long-term double moisturising action that lasts up to 72 hours *.
- <u>due to aloe vera and α-bisabolol:</u>
 - moisturising, calming and antioxidant properties.
- for its content in avenanthramide D:
 - reduces itching, discomfort, and redness in sensitive skin.
- due to chia oil and squalane:
 - repairs the skin barrier, balances the skin's natural water levels, and strengthens the skin's natural defence system.
 - improves skin elasticity, firmness, and texture.
- <u>due to α-bisabolol</u>: in addition to the anti-inflammatory, calming and antioxidant effects described above,
 - treats hyperpigmentation.
 - antimicrobial action
 - better topical absorption of the formulation
- Because of the presence of UVA, UVB and IR sun filters and a blue light protection complex:
 - provides a protective shield against daily external aggressors, preventing the appearance of sunspots, preserving skin integrity and minimising signs of premature ageing.

*results of an *in vivo* test performed on the ingredient with an instrumental analysis by panellists.

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DETAILED INFORMATION

EPIDERMIS AND SKIN MICROBIOTA

The **epidermis** or external part of the skin is the body's most important protective barrier against the environment, on which **more than 1000 different species of microorganisms** (bacteria, fungi and viruses) coexist. This huge, invisible and complex community is called the **cutaneous microbiota**. The cutaneous microbiota forms an ecosystem whose balance is essential for the proper functioning of our skin and our body.



Stratum corneum Melanocytes

Basal layer

Stratum microbium, the very thin outer layer of the stratum corneum.

MICROBIOME AND MICROBIOTA

Although the terms are often used interchangeably, there is a slight difference between microbiome and microbiota: while the term **microbiota only refers to microbes**, the term **microbiome** encompasses **microorganisms and their genes**.

The skin microbiome is made up of limited number of microbial а types, mainly resident microbial species such as Staphylococci (Staphylococcus epidermidis...) and Propionibacteria (P. acnes, P. avidum and P. granulosum). There are beneficial or neutral species such as S. epidermidis and other species that can become harmful in certain conditions such as P. acnes and malassezia sp. Beneficial species prevent the proliferation of harmful ones by occupying physical space and chemically inhibiting the growth of competing species. In other words, the resident microbiota is symbiotic with our skin and occupies space that could otherwise be colonised by aggressive pathogenic microorganisms that cause infections.

The **functions of the microbiota** are very varied and range from synthesising vitamins to producing antimicrobial peptides and antiinflammatory molecules that help **fight biological imbalances.**



Study of bacterial communities in the skin: reveals several different skin microbiomes with fairly consistent patterns of microbial composition *E Grice et al, Topographical and temporal diversity of the human skin microbiome, Science 324 (5931) 1190-1192 (2009).*

EUBIOSIS AND DYSBIOSIS

The skin barrier's condition is key to preventing the proliferation of harmful species, which thrive when the skin barrier is damaged and can cause different skin problems. The most common non-pathological consequence of an **imbalanced microbiota** or **dysbiosis** is referred to as inflamm-ageing (ageing due to chronic inflammation).



The outside environment can be hostile and throw the delicate epidermal ecosystem out of balance. Solar radiation, air pollution, harsh climates, irritating chemicals and aggressive medical-aesthetic treatments are some of the factors that can weaken our skin.



Ultimately, these epidermal depletion factors lead to damaged and aged skin with sunspots, redness, flaking and/or itching.

THE ACTION OF BCN SHIELD

- 1. **The prebiotic complex** used in the **BCN Prebiotics** line is a naturally-occurring, sustainable compound with broad-spectrum prebiotic properties that **provide a number of skin benefits:**
 - Direct prebiotic effect: reduces pathogenic microbial species and protects beneficial ones.
 - Indirect prebiotic effect: promotes the synthesis of antimicrobial peptides.
 - · Powerful EGF-like properties: stimulates cell renewal.
- The powerful combination of HA + NMF + NMS with biomimetic mechanisms of action and excellent biocompatibility with the epidermis, provides complete hydration to the skin through different mechanisms of act:
 - Small hygroscopic molecules (NMF and NMS) penetrate the epidermis to provide instant hydration that immediately relieves the skin. Thanks to their hygroscopic nature and ability to attract and retain water, they are also a continuous source of bioavailable hydration, helping to restore the skin's water reserves.
 - Hyaluronic Acid (HA), known for its abilities to hold impressive amounts of water, is that of high molecular weight in this formulation which means that forms a film on the surface of the skin that prevents transepidermal water loss (TEWL) and improves the skin's barrier function.

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Thus, with this effective combination of moisturising actives and their different mechanisms of action, a **double moisturising effect** is achieved that restores the skin's water, prevents dryness and slows signs of ageing.

- 1. SHORT-TERM EFFECTS-RAPID HYDRATION prevents skin dryness and provides immediate comfort.
- 2. LONG-TERM EFFECTS LONG-LASTING HYDRATION (48–72 hours*): improves the skin's own internal hydration management and prevents water loss.

* results of an *in vivo* test performed on the ingredient with an instrumental analysis by panellists.



- The dehydrated Aloe Vera powder from which the Aloe Vera concentrate is reconstituted is a rich source of the pattern recognition molecule mannose. Mannose-binding proteins, also known as Mannan-Binding Proteins (MBP), play an important role in the first wave of the body's immune response to external pathogens (bacteria, viruses, etc.).
- 4. Laboratory studies have shown that DHAv D (dihydroadvenamin D), as well as being a powerful antioxidant, is a histamine inhibitor. Histamine is a hormone produced in the cells of our immune system specifically mast cells and basophils (among others) that acts as an inflammatory mediator in allergic reactions. Histamine is involved in the regulation of the immune system.

DHAv D, as well as **reducing ROS-induced damage**, can also: **minimise inflammation, reduce itching** and possible **irritation** from applying AHA peels or other medical-aesthetic treatments. Also alleviates extreme dryness, all thanks to its **antihistamine** properties.

5. Chia Oil (Salvia Hispanica), acts as a powerful anti-ageing agent fighting wrinkles, acne, blemishes and helping the skin appear smooth and supple, thanks to its high omega 3 content. It is also ideal for sensitive, dry and irritated skin since it is rich in minerals and vitamins that help to hydrate the skin and retain the skin's hydration levels. The vitamin E found in this product has rejuvenating and antioxidant benefits, which help fight the harmful effects of free radicals. In addition, tocopherols, phytosterols and essential fatty acids found in this powerful oil help reduce inflammation and soothe the skin.



- 6. **Squalane, a skin-identical moisturiser**, is absorbed easily by the skin without making it feel greasy. It is a brilliant emollient that works to:
 - protect the skin barrier.
 - retain hydration and natural oils in the skin.
 - improve skin elasticity, firmness and texture.

Squalane also has anti-inflammatory properties, relieving itching, redness, and swelling.

On top of that, it is a powerful **antioxidant** that helps protect the skin from UV damage and sunspots and visibly reduces fine lines and wrinkles.

- α-Bisabolol is a very versatile active ingredient known for its calming and anti-inflammatory properties. It also
 protects the skin from free radicals and keeps the skin feeling healthy. Therefore, it has different mechanisms
 of action within the cell, depending on the biological function it's carrying out.
 - Anti-inflammatory activity: α-Bisabolol is involved, initially, in the release of certain inflammatory mediators such as cytokine IL-1α and leukotriene B4^[1]. These two molecules are involved in reactions associated with skin hypersensitivity. α-Bisabolol acts at the source of inflammation by limiting the release of these proinflammatory mediators, which is why it has the ability to effectively soothe skin irritations ^[2].
 - Antioxidant activity: scientific studies show that bisabolol is an excellent biological antioxidant because it reduces the production of free radicals inside the cell, restoring the redox balance and preventing oxidative stress. It also interferes in the production of ROS (Reactive Oxygen Species), which disturb the chain of reactions that cause free radicals^[3]. It decreases redness and helps soothe irritated skin (redness, itching, tightness, stinging)^[4]. α-Bisabolol can thus also relieve UV- or temperature-induced erythema.
 - **Reduces hyperpigmentation:** bisabolol **inhibits melanin synthesis**. The mechanism of action works to inhibit cAMP response elements (CRE: Cyclic AMP Response) involved in the production of melanocyte-stimulating hormones (MSH). Bisabolol blocks the transcription of these genes and prevents melanin synthesis.
 - Antimicrobial: bisabolol also has powerful fungicidal and bactericidal properties against certain strains of fungi and bacteria. Bisabolol induces apoptosis (programmed cell death) by reducing oxygen consumption in cells by altering the structure and function of the mitochondrial permeability transition pore (mPTP), a structure formed in the mitochondria that communicates the mitochondrial matrix directly with the cytoplasm. Similarly, bisabolol also induces apoptosis in fungi and bacteria by interacting with cell membranes and fungal hyphae.

As if all this were not enough, one of bisabolol's lesser known properties is its ability to **increase and improve the topical absorption** of other beneficial ingredients in the cosmetic formulation.

8. The **blue light (HEV) and broad-spectrum (IR, UVA, UVB) sun protection** is achieved with innovative microfine organic particles that combine the best of organic and inorganic filters in one: the high UV absorption of organic filters and the increased dispersion levels of inorganic filters due to their insolubility.

