LIPINUTRAGEN
CELL MEMBRANE BALANCE

THE SKIN-INTESTINE RELATIONSHIP

The concept of barrier

In a previous article we analyzed the concept of barrier as an essential component to protect the organism against external environment.

The physiological barriers of our organism are:

- the epidermis
- the intestinal mucosa
- the genital mucosa
- the oral and nasal mucosa

These structures, formed by one or more layers of cells side by side as if they were bricks held together by the mortar, represent the first line of defense against harmful or

pathogenic environmental agents. The defense function at the points of interface with the external environment is so important that most of the immune cells of the whole organism reside in the mucous membranes.

All barriers consist of:

- a cellular component (mono or multilayered)
- a bacterial component
- an immunological component

The spatial organization and biochemical interaction of these elements ensures correct separation from the external environment and, therefore, protection from it.

Skin and gut health are linked

Although the skin and intestinal mucosa are made up of different cells (keratinocytes and enterocytes, respectively), in reality they have many similarities regarding physiological aspects. In fact, both must hinder the passage of pathogens, environmental toxicants and chemical-physical agents such as UV rays, in the case of the skin, or prevent the passage of food contaminants, metals, bacteria, without prejudice to the exchange of water and nutrients, in the case of the intestine.

These functions are guaranteed by two fundamental aspects:

- the cohesion of the **epithelial layer**
- the balance of the **commensal microbial population**

As an example we can cite **leaky gut syndrome**, which we often hear about. This term refers to a condition of increased permeability of the epithelium (or a “detachment” of some parts of the membrane of the enterocytes, closely connected to each other, the so-called “tight junctions”) and consequently the passage of substances occurs harmful

and bacteria through the epithelium with activation of a defensive response, which is inflammation in the intestine. The inflammatory process due to permeability does not resolve itself, as long as this problem remains, and this determines the consequent loss of balance in the commensal microbial populations, which can no longer carry out their balanced activities and lose their protective capacity. The perpetuation of this state of imbalance can establish an immune hyper-reactivity which, together with inflammation, can have repercussions on a systemic level.

Given that the causes of impaired permeability due to loss of "adhesion" in the epithelial tissue and consequent inflammation are common to all barriers, often the intestine is associated with a similar situation also for the epidermis. That is, **dermatological problems** (acne, rosacea, dermatitis, eczema, psoriasis) **coexist with intestinal problems**. Sometimes, moreover, respiratory problems such as asthma, rhinitis or bronchitis can be found in association.

Dysbiosis and **the altered permeability of the epithelial layer** go hand in hand: while in physiological conditions there is a synergy of protection, in pathological conditions the alteration of one affects the functioning of the other. The common denominator is the **inflammatory process** that fuels the functional deterioration of the barrier.

The good news is that if purposefully action is taken on the cellular component, it is possible to restore the functioning of the barriers. In the case of the intestine, the integrity of the enterocyte layer and the arrest of the inflammatory process are two priorities, and targeted and synergistic interventions both to balance the microbiota and to abolish the inflammatory state can lead to the true solution of the disorders.

Lipidomics in intestinal and dermatological problems: not just omega-3s!

The lipidomic study of the mature red blood cell membrane in persons who report intestinal and dermatological problems often disclose one or more of the following characteristics:

- excess of **arachidonic acid** (omega-6): as we have previously commented, the inflammation represented by this fatty acid is the common denominator of the functional alterations of the barriers;
- alteration of normal levels of **EPA and/or DHA** (omega-3): these fatty acids are precursors of lipid mediators of inflammatory resolution. If they are deficient, the inflammation persists and can become a chronic state, both local and systemic.

It must also be underline that, with the habit of "do it yourself" for the choice of the supplement, we are observing more and more cases of excess omega-3 in the membranes, such as result of **excessive or unnecessary doses**. The excess of omega-3 alters the structure of the membrane, unsettle the anchor points of the cell-cell junctions and consequently the permeability of cell membranes. At the same time, omega-3 fatty acids, being easily peroxidable molecules, increase the reactivity of the tissue to oxidative stress, perpetuating the inflammatory and immunological stress of the barrier. In the case of the skin, this factor plays a crucial role due to direct contact with atmospheric agents with an oxidizing action.

- Eicosatrienoic acid deficiency (**DGLA**, omega-6): this omega-6 fatty acid can perform an anti-inflammatory control function, acting in the balance between the omega-3 and omega-6 components in cell membranes. In fact, it plays a central role especially in dermatological problems in which a poor functioning of the delta-6 desaturase enzyme is known, with a consequent decrease in the level of DGLA.
- excess of **saturated fats**: an inflammatory condition, is also favored by the increase in the level of saturated fatty acids which increase the production of inflammatory cytokines.

As evident, the intervention scheme in case of intestinal and dermatological problems is not unique, but depends on the lipidomic profile of the cell membranes, performed on the mature red blood cell, and on which imbalance has been observed in the subject: therefore the approach is personalized and the supplementation intervention is "precision".

Article by the editorial team of Lipinutragen

The information provided must in no way replace the direct relationship between health professional and patient.
The food recommendations in the article are not intended as a substitute for a personalized meal plan and are to be adapted to specific cases.

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