

Phytoalexins, Epigenetic, Nutrigenomics, Are We in the Right Track..?

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The arsenal of the surgeon and the clinician must cover a further and deeper perimeter. We are evolutionary beings, and therefore, we have in our DNA the traces of evolution imprinted in genomic expressions based on epigenetics and nutrigenomics [1,2].

We seek the solution of diseases, sometimes attacking the effect rather than the cause.

If we could understand the powerful weapon of nutrition, we would be better armed to combat many scenarios or improve them [3].

Our western diet is full of ingredients that generate silent inflammation and increase obesity rates [4].

The inflammation that does not lead to a straightforward repair process causes a hostile response in the joint environment, and we are obliged to reduce this inflammation from its origin by changing what is called lifestyle, which not only refers to a diet, it is a much broader concept that includes exercise, intermittent fasting and evolutionary diet such as Paleolithic.

Exercise epigenetically induces the reduction of inflammation, that is, we can have controlled much beyond treating the effect with the conventional anti-inflammatories cox1 and Cox2, much more on the origin of the pathology than on the effect [5,6].

Autophagy is a mechanism by which proteins that can create problems are self-regulating; it is a protein cleaning mechanism that has a profound effect on the health of the cell. It is a lysosomal defense process that controls xenobiotics and defective cell organelles. This is a regulating mechanism of inflammation in addition [7].

A paleolithic-style diet has an intense influence on the immune system since the consumption of grains causes the so-called leaky gut that causes serious problems with the passage of proteins into the bloodstream and dysbiosis of the intestinal flora with the consequent problem caused by an exaggerated inflammation of the gut line with immunological consequences [3,8-10].

If only we could convince our patients with osteoarthritis to change their lifestyle aided by certain phytoalexin compounds, we would save serious problems, or their evolutions would be better. For example, it is a fact that many diabetic patients do not follow the recommendations because, deep down, they wait for the magic pill that will allow them to take sugary soft drinks, cakes, flours, and all kinds of pro-inflammatory drugs with impunity.

The fact is that deep down, and in reality, every year, a pill, injection, treatment will be added to the patient in the same condition to attack the effect and not the cause [11].

The treating doctors are obliged to explore the essence of the simple but impressive, of the evolutionary because our genes do not forget, and of the approach from another point of view that is generally dismissed or ignored by the community, the return to the origin [12].

Other interesting factors to explore are substances called phytoalexins. These compounds come from the plant kingdom and are capable of interacting with species such as humans. They are composed of low molecular weight and have antibiotic and xenobiotic properties against fungi, viruses, bacteria. They regulate the growth of plants and regulate the Quorum sensing of bacteria. They are chemical signals of defense and alarm. They protect from UV radiation and are pro-oxidant elements that awaken a genomic anti-oxidant response in humans [13].

Perhaps the most studied compound is curcumin, the phenolic extract of *Curcuma longa* that has originally been used for thousands of years, yet its intriguing mechanisms of action it is still not thoroughly understood [14].

Curcumin has a very important role in arthrosis conditions as an adjunct in pain caused by rheumatoid arthritis. This study of 45 people with rheumatoid arthritis was divided into three groups, diclofenac sodium, diclofenac and curcumin, and curcumin alone. The results were very encouraging for the curcumin groups, despite the fact that all groups improved the active disease score DAS scores and the points considered by the American College of Rheumatology related to the phlogosis or tenderness of the joints and their inflammation. Curcumin was non-toxic and free of side effects [15]. Osteoarthritis is a degenerative joint problem and the most common that affects 27 million Americans. In this study comparing curcumin with ibuprofen, it is concluded that curcumin is as good in reducing pain with fewer side effects as ibuprofen, without the toxic effects of cox inhibitors such as gastritis and numerous other negative effects [16].

There is definitely a strong global trend in the use of herbal extracts that represent a good option to help and that characteristically when they are used well represent clear advantages in efficacy and above all in safety [17,18].

Boswellia serrata is another derivative in this case from the bark of the tree of the same name, originating in India, whose resin has modulating effects on inflammation. Considered a disease-modifying agent, it demonstrates in this study its efficacy and safety in 256 individuals where parameters such as the use of anti-inflammatory drugs, pain, joint inflammation, and erythrocyte sedimentation were observed compared to a standard placebo [19].

Boswellia serrata attenuates oxidative stress and thus secondary inflammation signaling agents without side effects [20].

In addition to this, it has matrix metalloproteinase inhibition effects in cartilage, making this a good option as an adjuvant [21].

The flavonoid quercetin found in onion and curcumin exert a powerful joint anti-inflammatory effect measured by assays, chondrocyte culture, and its expression in metalloproteinases, crystal-activated neutrophil, synoviocyte proliferation, and angiogenesis [22,23].

Resveratrol, a stilbene in wine and *macrocarpum* bark, is an inhibitor of the pivotal transcription factor Kappa B (NF- κ B) related to the activation of TN alpha and IL-1B genes [24].

The universe of phytoalexins, nutrigenomics, and epigenetics, is of enormous therapeutic possibilities, it is to make use of the atavic mechanisms where the evolution comes from, is to make use of the great information contained in our genes that we are yet to discover in our favor, we only need our mind to function as a parachute, as Einstein said, being open.

Wonder, are we on the right track...?

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