



Coimbra Protocol, Stress and its influence on Autoimmune Diseases

Felipe Belanda Trofino *¹

Corresponding Author: Felipe Belanda Trofino, .

Copy Right: © 2023 Felipe Belanda Trofino, This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Received Date: January 18, 2023

Published Date: February 01, 2023

Introduction

For over a decade, countless patients with autoimmune diseases have benefited from the treatment created by neurologist Dr. Cicero Coimbra. The treatment model that bears his surname, unlike conventional pharmacological methods, is based on the regulation of the immune system through supplementation, almost exclusively, of vitamin D. This molecule - now recognized as a hormone - is potentially capable of modifying more than two hundred biological functions and has receptors in almost all cells, which gives it, therefore, a systemic action in the entire organism. Considering the estimate that 1 billion people worldwide are deficient in vitamin D; that it would be the main regulatory agent of the immune system - mainly in autoimmune diseases - and that the current model of life, increasingly frantic and stressful, can be the main triggering factor of these diseases, it is necessary and urgent, therefore, to seek new methods that aim not only to “remedy” the symptoms, but a model that can act on the causes of the problem. In this sense, this article seeks to demonstrate the effectiveness of the Coimbra Protocol, not only as an “alternative” method, but as a treatment option that aims to reconstitute and regulate, in a physiological way, the mechanisms that nature itself has developed, with the objective of avoid not only autoimmune aggression, but also the numerous side effects resulting from the use of conventionally used drugs. In addition, it also proposes to analyze the role of Family Constellations as a psychotherapeutic method of support for the Coimbra Protocol.

Review of Literature

Vitamin D and Heliophobia

We are currently experiencing a veritable pandemic of vitamin D deficiency. For the main scholars on the subject, more than half of the world's population has low levels of this substance, which is produced by the skin after contact with sunlight. Over the last few decades, we have migrated from an outdoor life to increasingly burrowing in confined environments. The current model of life followed by the vast majority of people, almost imperceptibly, made us move further and further away from the sun. We live more and more enclosed in our houses, apartments, offices. The means of locomotion do not allow us contact with sunlight either. Children no longer play outdoors like they used to; they prefer indoor environments such as malls, cinemas and even the comfort of their homes seems more attractive to them. Tablets, TV, video games, cell phones, netflix, and countless other technologies are largely responsible for this migration.

But the problem doesn't stop there. As Ian Wishart tells in his book “Vitamin D - Is this the miracle vitamin?”, “For decades, associations linked to the treatment and prevention of skin cancer have run campaigns demonizing sun exposure and classifying it as solely responsible for this problem. Therefore, a good part of the medical community has adopted, as a standard guideline, completely avoiding the sun and, when this is not possible, abusing the use of sunscreens, which, in turn, completely block the production of vitamin D.”¹As a final product From this set of factors we then have what we call heliophobia (sun phobia), an environment extremely conducive to the installation of various diseases, highlighting among them the autoimmune ones.

Immune System and Autoimmune Diseases

The immune system is made up of an intricate network of organs, cells and molecules, and its purpose is to maintain the body's homeostasis, fighting aggression in general. Innate immunity acts in conjunction with acquired immunity and is characterized by a rapid response to aggression, regardless of prior stimulus, being the body's first line of defense. Its mechanisms comprise physical, chemical and biological barriers, cellular and molecular components.

According to the book “Basic Immunology for Immunization” by WHO (World Health Organization), “Nonspecific defense mechanisms are present in all normal and healthy individuals. They are effective at birth and work without requiring previous exposure to a microorganism or its antigens; These include physical barriers (eg, intact skin and intact mucous membranes), chemical barriers (eg, gastric acid, digestive enzymes, bacteriostatic fatty acids in the skin), phagocytic cells, and the complement system.” [2]

Making a brief analogy, the immune system could be compared - in a didactic way - to a kind of “defense army”. Your front line is composed of a type of non-specific defense (innate), the one that attacks first and which, later, will facilitate the role of the next defense, called specific (acquired). When we talk about autoimmune diseases, the defense that matters most and is most relevant is the nonspecific or innate one. This type of defense, although rudimentary, is extremely efficient and is always alert to any slightest sign of aggression, regardless of its nature. Innate immunity takes its name from the fact that we are born with it and, if we didn't have it, we would probably die as soon as we leave the mother's womb, invaded by countless microorganisms. We can say, in general, that innate immunity is somewhat rudimentary, since it does not, in fact, have a specific action directed against this or that pathogen. However, in individuals considered healthy, even with this lack of selectivity, it proves to be extremely effective, being able to recognize and attack any type of invader.

When we talk about autoimmunity, several dysfunctions make this “defense army” not work fully. Individuals with autoimmune diseases - for reasons that we will see later - have this first line of defense (innate immunity) deregulated, causing this "army", which until then should defend us, starts to recognize the body's own cells and tissues as attack targets.

According to a review article published in the Brazilian Journal of Rheumatology, “evidence is currently accumulating that innate immunity plays an important role in the development of autoimmunity.”³ The recognized link between deficiencies of the complement system and autoimmunity has been explained by impairment in removal of immune complexes and apoptotic cells.

Another important link between innate and acquired immunity is Toll-like receptors, which recognize pathogen-associated molecular patterns (PAMPs). Inflammatory processes triggered by innate immunity can have an immune-stimulating effect, called an adjuvant effect. Inflammatory mediators induce the expression of class I and class II HLA molecules by cells in the injured tissue, allowing these cells to function as antigen presenters. In this situation, the presentation of self-antigens in an unusual context is possible, which may result in autoimmunity.

Following this reasoning, the immune system would then recognize the body's own tissues as “foreign bodies”, turning against them. People with Psoriasis would have their own skin as a target of the immune system; carriers of Hashimoto's Thyroiditis would target the thyroid itself; in Crohn's disease the affected organ would be the colon; and patients with Multiple Sclerosis would have the Nervous System as a target for their immune system - specifically the Myelin Sheath, a fundamental protein in the transmission of nerve impulses. The fact that many of these diseases can coexist in a single individual – which in fact often happens – has drawn the attention of several authors to the hypothesis that, in fact, they would not be different diseases, but rather different manifestations of the same disease; in this case, the deregulation of the immune system.

As we saw earlier, the emergence of an autoimmune disease is due to multiple factors, and among them we can highlight the loss of the ability of the individual's immune system to distinguish what is proper (self) from what is not proper (non-self). This ability, called self-tolerance, is maintained in immunocompetent cells by both central and peripheral mechanisms, and its loss may have intrinsic or extrinsic causes. Intrinsic causes, related to characteristics of the individual, are generally associated with genetic polymorphisms; components of innate immunity (complement system and Toll-like receptors) and components of acquired immunity (regulatory T-lymphocytes, cytokines and hormonal factors), which are also under genetic control. Environmental factors such as bacterial and viral

infections, exposure to physical and chemical agents, pesticides and drugs are examples of extrinsic causes.

Currently, within scientific circles, it is becoming increasingly difficult to dissociate vitamin D from autoimmune diseases. Although a large portion of the medical class still neglects the numerous non-calcemic functions performed by vitamin D, the importance of obtaining levels greater than those hitherto called “sufficient” is increasingly evident. For some time now, the scientific community as a whole has been warning health professionals about the importance of seeking, as a daily clinical practice, not just sufficiency, but the optimization of levels of this hormone, called by many “the molecule of the century”.

From this new perspective, vitamin D would then play an increasingly important and crucial role in the prevention and treatment of various diseases. In this sense, not only carriers of autoimmune diseases would benefit, but also those who have acute and mainly chronic diseases, such as Systemic Arterial Hypertension; Diabetes Mellitus Type 2; Metabolic Syndrome and Obesity; Neurodegenerative diseases such as Alzheimer's and Parkinson's; mental illnesses such as Schizophrenia, Depression, Bipolar Disorder and even Cancer, where vitamin D plays a very important role as an adjuvant therapeutic substance to conventional treatments.

To get an idea of the size and importance that this hormone has gained nowadays, just a quick Google Scholar search (search engine for papers and scientific articles). When typing “Vitamin D and autoimmunity” (in English), approximately 121,000 articles on the subject will be found. If we search for “Vitamin D and Immunology” we will find a total of approximately 904,000 articles. If we look for “Vitamin D and Diabetes”, “Vitamin D and pregnancy”, “Vitamin D and Autism” and finally “Vitamin D and Cancer”, we will find, respectively, 1 million and 900 thousand articles for diabetes; 1 million 270 thousand for pregnancy; 2,330 articles for autism (which has recently been considered an autoimmune disease) and more than 2 million articles for vitamin D and cancer, which shows the value of its relevance in different comorbidities, just to name a few of them.

When the subject is Autoimmune Diseases, the main factor associated with the loss of self-tolerance and the consequent emergence or outbreak of the disease is due to the pro-inflammatory response called Th17 (provoked by T-helper cells through interleukin 17). As mentioned in the article “Th17 Response and Autoimmune Inflammatory Diseases”, “The pro-inflammatory activity of T-helper17 (Th17) cells may be beneficial to the host during infection. However, uncontrolled or inappropriate Th17 activation has been associated with several autoimmune and autoinflammatory pathologies.” [4]

In fact, preclinical and clinical data show that Th17 cells are associated with various autoimmune diseases such as Rheumatoid Arthritis, Multiple Sclerosis, Psoriasis and Lupus, and when we Google Scholar again “Vitamin D and Th17”, we will see that the first The article that appears will be “Vitamin D suppresses Th17 cytokine production by inducing C/EBP homologous protein (CHOP) expression”⁵, showing the important role of vitamin D in the suppression of this inflammatory response mediated by Th17 lymphocytes.

The article already mentioned earlier, “Immune system - part III. The delicate balance of the immune system between the poles of tolerance and autoimmunity” reports that “Studies carried out in autoimmune diseases such as rheumatoid arthritis, systemic lupus erythematosus, psoriasis, multiple sclerosis, systemic sclerosis, inflammatory bowel disease, ankylosing spondylitis and juvenile idiopathic arthritis have demonstrated the presence of high levels of inflammatory products related to the Th17 effector pathway or even their direct participation in the physiopathogenic mechanisms”.[6]

Current concepts in immunopathology of chronic inflammatory diseases point to the central role of Th17 cells that would be responsible for mediating early tissue inflammation, producing pro-inflammatory cytokines and chemokines responsible for recruiting Th1 cells to inflammatory sites. Even though T-regulatory lymphocytes (TREGs) also accumulate in these sites, the presence of high levels of inflammatory cytokines makes target cells less susceptible to immunoregulation and decreases the immunosuppressive power of TREGs.

A 2016 paper published in the “JournalofNeuroimmunology” entitled “Vitamin D modulates different subsets of IL-17-secreting T cells in patients with multiple sclerosis” concluded that “Vitamin D deficiency is an environmental risk factor for MS, a disease Th17 cell-mediated autoimmune disease that results in demyelination in the CNS. Taken together, the results indicate that the active form of vitamin D should benefit MS patients by attenuating the percentage of pathogenic T cells. This effect can be direct and/or indirect, improving both classical and non-classical regulatory T cells.[7]

In short, from this perspective, we can therefore conclude that vitamin D plays a central role in the regulation and optimization of the immune system in the most diverse autoimmune manifestations as it modulates and inhibits its main triggering factor, which is the pro-inflammatory response mediated by Th17 cells. Understanding this vitamin D suppressor mechanism on the Th17 inflammatory response is an essential part of understanding the effectiveness of the Coimbra Protocol, a treatment model that we will discuss below.

Coimbra and Epigenetic Protocol

The Institute for Investigation and Treatment of Autoimmunity (Instituto de Autoimunidade) was created in the first half of 2011, in São Paulo (Brazil) based on the initiative of its signatory physician and former patients who had autoimmune manifestations, and who benefited from the treatment offered to them. Currently, these people have a normal level of quality of life, remaining free from the aggressions of the immune system, to the point of considering themselves to be ex-carriers of the disease and participating in the direction of the Institute, idealistically aimed at making the same benefit possible for other patients. , especially the most needy.

The spontaneous reports of the benefited patients generated great repercussions in the communities of the most diverse networks and social media, thus leading to a greater demand for the proposed activities. At that time, the activities of the Autoimmunity Institute were aimed at identifying and correcting metabolic disorders (possible causes of autoimmune diseases), initially with special attention to the correction of vitamin D deficiency, now widely recognized by several members of the international scientific community as a key factor in the emergence and exacerbation of the activity of autoimmune diseases and other serious diseases, such as cancer.

The initial treatment model, which later became a structured and organized service protocol, was not always like this. In an interview given to *Veja* magazine, Dr. Cícero Coimbra, the neurologist responsible for developing the protocol, emphasizes that “There has been research on the effects of vitamin D on the immune system for more than four decades. About 10 years ago, we started using doses of 10,000 units, which we call physiological, for the correction of vitamin D in patients with multiple sclerosis, and we saw a significant improvement. At that time, we also had access to studies that indicated that carriers of autoimmune diseases have varying degrees of resistance to this hormone. With this information in hand, we began to increase doses above 10,000 units, always monitoring patients in the laboratory to avoid the only important side effect of vitamin D, which is the danger of renal calcification due to excess calcium absorption. By doing this we realized that the more we increased the doses, the greater the benefits. Over the past five years, we have managed to develop a technique capable of identifying the dose of vitamin D necessary to leave each patient free of disease activity.” [8]

For many years, the main form of treatment for autoimmune diseases, the one we call conventional, is based mainly on Corticoids and Immunosuppressive drugs, which basically aim at reducing the inflammatory process mediated by cytokines and suppressing the immune system. In a way it makes perfect sense. We return to the analogy: if there is an “army” that is out of order and that is attacking

me, nothing is more obvious than throwing a “bomb” into that army, “destroying” half of it, and that way it will attack me less. The reasoning is logical and even obvious, but in practice there are complications. Patients in chronic use of corticoids have numerous side effects - already exhaustively reported - and, when associated with immunosuppressants, the situation gets even worse. Immunosuppressive drugs, as the name implies, suppress the action of the immune system, which on the one hand is great, as this reduces self-harm. However, on the other hand, patients who use these drugs start to have a greater susceptibility to infectious diseases, as their immune system is working below its optimum capacity. According to Coimbra, “The difference between vitamin D and conventional drugs used in the treatment of autoimmune diseases is that it is an immunoregulator, not an immunosuppressant. While other medications depress the immune system as a whole, leaving the body susceptible to infections, vitamin D is the only substance capable of selectively inhibiting the reaction called “Th17”, which is caused by autoimmune diseases.” [9]

In a summarized way – but not that simple – we can say that the Coimbra Protocol is based on a tripod: high doses of vitamin D; diet free of foods rich in calcium (to avoid the only side effect of vitamin D, nephrocalcinosis) and abundant hydration (at least 2.5 liters of water per day, obligatorily). Over two years, the patient undergoes four consultations. On Wednesday, he is provisionally discharged, but continues with the vitamin and diet. Two years later, he redoes the laboratory tests and undergoes a review appointment to assess the situation of the disease.

As we saw earlier, vitamin D is the main modulating agent of the immune system both in healthy individuals and in patients with autoimmune diseases – who are resistant to its effects. This resistance, which is partial, is one of the reasons that make these individuals susceptible to developing autoimmune diseases. Currently, 95% of the results obtained in the treatment by the Protocol are exclusively due to the effects of vitamin D, and in the vast majority of patients, due to this resistance, higher doses are needed to control the disease.

Although the protocol includes supplements other than vitamin D, achieving the correct level of vitamin D for each patient accounts for 95% of treatment success. Therefore, at the start of treatment, PTH levels are measured and then measured regularly for the remainder of treatment. If PTH is not within the lower normal range (around 7 to 10 pg/ml), daily doses of vitamin D are increased until the desired level is reached. During treatment, PTH levels are expected to drop to their lower normal range and remain there. When this happens, resistance to vitamin D is overcome and the patient begins to benefit from its powerful immuno-accumulative effects. It usually takes two years to adjust vitamin D doses. After this period, treatment consists of maintaining adequate levels of PTH and calcium.

As previously stated, the Coimbra Protocol is not just about Vitamin D. Doctors from all over the world come annually to the Institute of Autoimmunity and are trained by Dr. Cicero to correct any deficiency found through laboratory tests. During the first consultation - which lasts an average of 3 hours - a thorough anamnesis is carried out, where the doctor will investigate several factors, such as: restriction of the mother's sun exposure during the gestational period; traumas of strong emotional impact during pregnancy (we know that this can influence the fetus through the action of cortisol, which in this case is passed to the fetus via the placenta, leading to the demethylation of genes that may be predisposed to an autoimmune disease); type of delivery (normal or cesarean section); aspects related to the patient's childhood, adolescence and adult life (whether or not there was a decrease in sun exposure during these periods, whether there was any trauma with a strong emotional impact during these periods); eating habits; bowel habit; use of licit/illicit medication and/or drugs; stress; sleep; family history of illnesses, etc. After extensive questioning about these and other aspects, we then ask the patient a direct question: do you know what an Autoimmune Disease is and why it happens? Usually patients do very well in the first part, however, the second part almost always leaves something to be desired. Seneca, in his famous phrase already said: "The desire to be healed is part of the cure" [10]. But I go further... Yes, in fact, the desire to be healed is part of healing, but, before that, understanding the disease by its carrier is a fundamental part of the entire healing process. And it is on this premise that all Coimbra Protocol physicians are guided, as we understand that the protocol would be unlikely to be successful if the patient left the consultation without fully understanding the factors that led to his illness.

During the first consultation, right after explaining how the immune system works in autoimmune diseases, we give the patient a brief genetics "lesson" where we explain to them - through concepts of epigenetics (the prefix 'epi' means 'above'; or i.e. above genetics) - that no individual is predestined to have a disease just because their parents or grandparents had it. Although many diseases do have an important genetic factor, we always advise patients that this factor almost always needs an environmental trigger for the disease to manifest itself. According to JIRTLE & SKINNER in their article, "The epigenome is particularly susceptible to dysregulation by environmental factors during pregnancy, neonatal development, puberty and adulthood. Evidence from animal studies indicates that exposure to environmental factors such as radiation and other chemical and physical agents, during the pre- and postnatal periods, may result in altered epigenetic programming and, consequently, in a high risk of developing diseases". [11]

PAULSEN & FERGUNSON-SMITH, in turn, in their article entitled "DNA methylation in genomic imprinting, development and disease"¹² mention the importance of silencing diseases through

methylation. “DNA methylation is the epigenetic modification best characterized and recognized as a silencing mechanism. It consists of the addition of a methyl radical (CH₃) to carbon 5 of cytosine, usually followed by guanine, catalyzed by DNA methyltransferase enzymes (DNMTs)”. Guided by this line of reasoning and bearing in mind that every autoimmune disease has genetic characteristics as its underlying cause; Coimbra Protocol physicians use not only vitamin D to reduce the autoimmune reaction, but also other substances that aim to optimize the effectiveness of the treatment by acting on various metabolic processes related to the disease, such as: correction of possible infections and inflammation (their presence maintains active autoimmune disease); increased methylation capacity through the optimization of nutrients and trophic factors such as neurotransmitters and, finally, modulation and treatment of dysbiosis and intestinal permeability aimed at optimizing its microbiome (closely linked to the nervous and immune system).

This type of approach is one of the most important characteristics of the first consultation and precisely what differs it from other models, as it is based on it that we will be able to make the patient himself have a different view of his illness, a view that until then has not been achieved. had, more integral. Knowing these mechanisms better would facilitate understanding by patients and enable joint action in the search for better results during treatment.

In order to facilitate the understanding of these processes, many doctors in the Protocol use a scheme (flowchart) where we can clearly demonstrate all the metabolic pathways that lead to both the activation (demethylation) and deactivation (methylation) process of illness. One of the main pathways presented in this scheme contemplates what we call the “Folate Cycle” in scientific circles.

Understanding some specific aspects of the Folate Cycle is a fundamental part of understanding the effectiveness of the Coimbra Protocol. At first, for those who are layman in the subject, it may even seem a bit complex but, as we gradually unravel its metabolic pathways, the understanding of the disease by the patient then starts to make much more sense.

Among the main substances used as an adjunct to Vitamin D in the Coimbra Protocol are: Magnesium (Chloride, Glycinate, Malate, Citrate, etc); B complex vitamins (Methylcobalamin B12, Riboflavin B2 and Methylfolate B9); Omega 3 fatty acids (DHA and EPA); Melatonin; Propolis Extract (green 70); Probiotics (when needed) and a formula with small amounts of Zinc, Chromium Picolinate, Pyridoxal Phosphate, Choline and Selenium.

Despite the title “protocol”, the prescriptions are made in a personalized way, case by case, according to the needs of each patient, so that not all patients undergoing treatment will be using the same supplements. The substances are added or removed according to the evolution and prognosis of the

Citation: Felipe Belanda Trofino, “Coimbra Protocol, Stress and its influence on Autoimmune Diseases”

MAR Neurology and Psychology, Volume 6 Issue 2

www.medicalandresearch.com (pg. 10)

disease and the same also happens with the dosages, which can also be modified. Not every patient needs probiotics; as well as the dosage of vitamin D will not always remain the same throughout the treatment period.

The ideal – and also what is desired – would be that we could increasingly lower the dose of vitamin D until we reach physiological doses without this costing the patient remission or a new outbreak of the disease. However, for this to happen, the patient's commitment to complying with the requirements established by the treatment is essential, especially regarding diet, water restriction and emotional control (we will see their importance in the treatment later).

Another extremely important point - and which should be very clear to every patient - concerns the side effects of high doses of vitamin D. The possible side effects when using high doses of vitamin D for a long time are excess calcium blood (hypercalcemia) and/or urine (hypercalciuria) - which can lead the patient to a condition of nephrocalcinosis - and loss of bone mass. Excess calcium can be easily avoided with a dairy-free, calcium-fortified diet, as well as regular laboratory testing to ensure calcium levels are kept in check (24-hour calciuria).

Dietary restrictions are related exclusively to the amount of calcium that foods contain. Milk and foods rich in calcium should be avoided. Again, every patient is different, so the test results will determine if the diet is being followed correctly or if more restrictions are needed. To avoid loss of bone mass, patients in the protocol are instructed to engage in a daily aerobic exercise routine, such as brisk walking for 30 minutes, for example. Those who cannot do aerobic exercise may need medication over time, such as bisphosphonates, to prevent osteoporosis.

Also, as already mentioned, patients need to drink 2.5 liters of water a day to ensure that the kidneys are able to eliminate excess calcium without difficulty. It is worth noting here that vitamin D toxicity can indeed occur when using doses greater than 50,000iu/day - which is very common in the Coimbra Protocol - however, as previously reported, the doctors who carry out the protocol are trained to prevent and treat poisoning if necessary.

Despite the thousands of works already published that point out and guarantee the innumerable benefits of increasing the doses of vitamin D - mainly in autoimmune patients - many doctors are still resistant to the Coimbra Protocol; perhaps due to the lack of knowledge of the innumerable functions performed by it, or even due to a refinement of deep-rooted egocentrism and loyal to traditional methods - purely medicinal - that does not allow them to open their eyes to the unique possibility of being able, literally, to bring the patient back to a active, disease-free life.

Doctor Cícero Coimbra, in this aspect, is critical and emphatic “It is deeply regrettable that thousands of young people, all over Brazil, with Multiple Sclerosis, are becoming blind and paraplegic just for lack of a substance that could be administered under the form of drops, in a single daily dose, which would give them back the right perspective of a normal life. There is no justification for not correcting any alteration or metabolic deficiency that can be corrected, even in the absence of detectable clinical signs of possible harmful consequences to health. Doing so is mandatory! Failure to do so could be viewed as negligence or the result of misinformation. The doctor cannot leave the health of the patient who seeks him at risk, even for prevention. Prevention is and will always be the best approach, whether on an individual basis or as a government public health policy.”[13]

Stress, Emotions and the Influence of the Environment

The obsolete idea that the immune system would act autonomously and in isolation gave way, especially from the 1980s onwards, to a new conception of integration. In this sense, we began to recognize that the immune system is closely associated with other systems, including the central nervous system. In this way, the role that the different areas of human functioning, recognizably cognitive and emotional, can play on the efficiency of the immune system becomes increasingly evident.

The frenetic and sometimes chaotic context in which we are inserted has given birth to a new demand in society. Psychoneuroimmunology - as it was called - is a specific area of scientific knowledge that exclusively studies psychosocial stressors, emotions and the different neuroimmunological pathways responsible for the body's adaptive response. As we know, the lack of control of the immune system that results in autoimmunity is multifactorial, and numerous factors such as genetic, environmental, hormonal and dietary are considered important in its development. Some older studies report that at least 50% of autoimmune disorders were once attributed to unknown triggers, which at the time naturally served as a motivational spur for future research. We now know that physical and psychological stress can be associated with the development of autoimmune diseases, since numerous studies in animals and humans have already demonstrated its effects on the immune system.

In addition, retrospective studies found that most patients (80%) reported unusual emotional stress before the onset of the disease, which shows its important role as a triggering factor. In addition, we also have the disease itself as a significant source of chronic stress, which then creates a vicious feedback loop that keeps the disease active. Recent reviews have discussed the possible role of psychological stress in the pathogenesis of autoimmune diseases and concluded that several

neuroendocrine hormones could be involved. These hormones, released in response to stress, could lead to immune dysregulation by altering or amplifying the production of pro-inflammatory cytokines - such as Th17, for example -, resulting in an autoimmune manifestation.

In addition to the already recognized role of stress, new studies in the field of nutrigenomics have shown that what we eat also plays an important role in the etiology and development of numerous diseases. Individuals who have a diet based on industrialized, processed, and processed foods, and who are not in the habit of eating a diet rich in raw green leaves (sources of methylfolate, vit. B9), may naturally have intestinal inflammation as a result. Chronic inflammation in turn activates the immune system which, once deregulated by vitamin D deficiency, then passes to attack the body's own cells and tissues. Methylfolate deficiency is also associated with other problems such as constipation and increased intestinal permeability, which can intensify the inflammatory process, worsening any autoimmune disease. For this reason, the habit of eating raw green leaves rich in methylfolate becomes even more important, since it actively participates in the treatment, being an important donor of methyl (Ch3) for the process of “silencing” defective genes. In addition to its role in the methylation process, vitamin B9 is also a raw material for the synthesis of serotonin, an important neurotransmitter responsible for modulating and counterbalancing cortisol action.

Dubbed the “stress hormone” and produced by the adrenal gland, cortisol played and still plays a very important role in human survival. Associated with other hormones such as adrenaline, cortisol is exceptionally important for processes of energy production and recruitment in situations of danger or threat. It turns out that, the current model of life; the way we choose - voluntarily or involuntarily - to live;

the cumulative stress of each day; poor management of time and daily tasks; the scarcity of pleasurable activities; the offense to our circadian cycles; as well as a series of other associated factors, make the cortisol levels we have today progressively higher than those our ancestors had thousands of years ago. Once aware of this information, Coimbra Protocol physicians are instructed to investigate different moments in the lives of patients (from the intrauterine period to adulthood) in an attempt to discover which emotional factors could have influenced the onset of the disease.

Normally – and not coincidentally – we encounter many situations related to the loss of family members or loved ones; major conflict situations; traumas; as well as other issues involving a strong associated emotional impact. From the perspective of the “New Germanic Medicine”, based on the discoveries of the German physician Ryck Geerd Hamer, every disease or symptom would be originated by a shock or trauma that suddenly affects us. By the time the unexpected conflict occurs,

the shock would impact a specific area of the brain, causing a lesion in the form of clusters of concentric rings that could easily be visualized through a brain scanner. The brain cells that receive the impact would send a biochemical signal to the corresponding body cells, causing the growth of a tumor, the necrosis of a tissue or even its functional loss, depending on the layer of the brain that receives the shock.” [14]

In this sense, the reason why specific conflicts would be linked to specific areas of the brain is due to the fact that, through our historical evolution, each area of the brain would have been programmed to respond instantly to conflicts that could threaten our survival. While core areas such as the brainstem - the oldest part - it is programmed with basic questions of survival such as breathing, reproduction and feeding; cortical areas - the youngest part - are related to themes of the social and territorial type.

Furthermore, the theory suggests that every disease progresses through two stages. The first would be the so-called “Conflict Active Phase”, characterized by emotional stress, cold extremities, lack of appetite, lack of sleep. Later, in case of resolution of the conflict, we would then have a second phase, called the “Healing Phase”, a period in which the psyche, the brain and the corresponding organ would enter a process of recovery, often difficult, marked by fatigue, fever, inflammation, infection and pain.

Identifying these psychosocial entanglements and clarifying their visualization by patients is a fundamental part of understanding and “disconnecting” the disease. Carl Jung, Swiss psychiatrist and psychotherapist, considered the inventor of Analytical Psychotherapy said that “Until we become aware of our conflicts, the unconscious will direct our lives and we will call it fate.”[15] Patients who follow their lives - consciously or unconsciously - without looking at their conflicts, they will naturally be fated to encounter them later on and, not coincidentally, they will be the ones who will have the most difficulties with the treatment. The truth is that running away from the problem or postponing facing it doesn't make it go away. Quite the contrary, it will always make you present. After all, as Jung would say again, “What you resist, persists.” [16]

The Autism Boom

Thirty years ago, the chance of giving birth to an autistic child was around 1:1800. Today, those numbers have dropped dramatically, reaching a ratio of 1:60. More recent studies in Australia have already reported 1:49. they could not find a conclusive link to the vaccine. Something, however, must have happened to generate such a rapidly increasing rate of Autism over that time, and this something must be common to our civilization, such as vaccination. Or perhaps like the campaigns to protect against the sun's rays.

According to Cannell, "the apparent increase in the prevalence of autism in the last 20 years corresponds to the increase in medical advice to avoid the sun"[17]. Although correlation does not automatically prove causality, it is undeniable that the rapid acceptance of sun avoidance advice, especially by pregnant women, coincides with the rapid rise of autism. If it occurred in the winter months, they had a greater risk of having an autistic child, further strengthening the hypothesis.

Still according to Cannell, "Vitamin D deficiency - during pregnancy or childhood - may be an environmental trigger for ASD (autistic spectrum disorder) in genetically predisposed individuals." [18] According to the same author, vitamin D deficiency is a factor of primary risk for neurodevelopmental disorders as it works as a neurosteroid; it is a potent positive regulator of neural growth factor; it offers neuroprotection and immunomodulation, and is found in a wide variety of brain tissues very early in embryogenesis. For Coimbra, "Recent epidemiological evidence indicates that autism is probably caused or at least greatly facilitated by severe vitamin D deficiency during the pregnancy of the affected child". [19]

The correlation between the disorder and vitamin D started to be suggested when researchers observed that children with rickets, caused by vitamin D deficiency, had several indicators of autism that apparently disappeared with proper supplementation. Cannell went further, he found two old scientific works, prior to 1943, where they showed that children diagnosed with rickets had symptoms similar to those we can see today in autistic people. According to Cannell, "Both documents describe 'inattention,' 'feeble mind,' 'mental sluggishness,' 'lack of response,' and 'developmental delays. Even more intriguing, both papers report that mental status in rickets improved with vitamin D.'" [20]

Currently, many researchers defend the theory that the deficiency or even insufficiency of vitamin D in the mother during the gestational period, associated with the mistaken prescription of folic acid by the vast majority of physicians, would be, together, the main cause of the increase in cases autism in recent years. According to this theory, most humans are almost unable to metabolize folic acid. Experiments on laboratory rats show that they have a biological apparatus that allows them to metabolize efficiently, in such a way that almost all of the folic acid given to them is transformed into methylfolate, its active form.

However, a large portion of human beings (up to 60%) have genetic defects (polymorphisms) in the MTHFR enzyme (methylene-tetrahydro-folate reductase), called by Ben Lynch as the "mother of all enzymes" [21], responsible for this conversion. In these individuals, only 2% of the folic acid (which comes from fortified foods or supplementation) turns into methylfolate. Furthermore, when that little bit of methylfolate we have – which is supposed to come from the diet rich in raw leafy greens – "runs"

to dock with the receptor on the cell, the receptor is already occupied by the folic acid that is the majority. If this is proven, later, definitively, through new works, this problem could be considered one of the greatest examples of medical iatrogenics ever reported.

Attachment, Trauma and the Family Constellations Method

Autoimmune diseases have a close relationship with emotional aspects. In this sense, this article proposes, as one of its objectives, an invitation to reflect on the importance of introducing psychotherapeutic practices - here specifically represented by Family Constellations - as a way of helping not only in the treatment of these comorbidities but also in their prevention. We need, first of all, to understand that it is a psychotherapeutic method capable of identifying situations hitherto unconscious to the person, linked to their family of origin. In addition, the method allows the constellator to have access to traumas that were suffered by ancient ancestors, transmitted from generation to generation, through a family unconscious.

In the Houaiss dictionary, the word “constellation”, in Portuguese, can mean a group of close stars or, even, “a set of elements that form a coherent whole, linked by something in common” (Houaiss, 2009, p. 531). The first recorded use of the term in the scientific literature in Portuguese is by Antonios I. Tekzis, in the article “Family Constellation and Schizophrenia”[22], from 1987. It is a study that establishes a relationship between family dynamics and schizophrenia in patients admitted to psychiatric hospitals.

Bert Hellinger, the German who is credited with creating the method, always makes it clear that he is not the creator of the Constellations, but the one who developed them. To develop the method we know today, Bert “drank” from various sources, from Psychoanalysis, Gestalt, Transactional Analysis, extending to Family Therapies. We can say that the combination of these and other areas of knowledge - in addition to those acquired through his personal experiences - resulted in what we now call Family Constellations. ”[23]. They would be: Belonging; the Order (Hierarchy) and the Equilibrium. According to the method, every action carried out in consonance with these laws favors that life flows in a balanced and harmonious way and, when transgressed, cause loss of health, vitality, achievement, good relationships, with resulting failure in life goals.

stillborn, miscarried or prematurely deceased; people who somehow were embraced by the “family soul” (employees who took care of someone in the family, for example); previous partners of parents or grandparents, uncles, cousins, step-siblings, etc. Also included are those who have done something very good or caused serious damage to someone in the family.

The assumption of Order or Hierarchy indicates that the first to arrive in a family have preference over those who came later: the oldest in relation to the youngest, the first wife in relation to the second - in case of separation -, the children of the first marriage in relation to the children of the second, and so on. It is therefore a chronological hierarchy. Without this recognition and respect, there is an imbalance in the system.

Equilibrium is another important principle and says that the family system will impel people, consciously or unconsciously, to act in such a way as to rebalance the system - which will not always be something good or pleasant, since the consciousness of the system only aims at the search for the balance and is exempt from valuation. This balance is maintained through the give and take that must exist in all relationships. It works as follows: while one gives, the other receives and, preferably, takes, as taking something is more proactive than simply receiving. When someone gives and does not receive in return, an imbalance is created; the same happens when someone, in a certain way, is incapable of receiving what is offered to him (because he does not feel worthy, for example). Both situations would affect the balance of the system.

The problems experienced by a person, according to the Family Constellation, are called “entanglements”, and indicate that there is interference in some of these orders (belonging, order and balance). These entanglements can be related to some type of exclusion, injustice, mourning, serious illness, breaking ties, adoption, suicide and even fights over inheritance. The role of the constellator will be to identify the entanglement and restore the flow of love orders in the constellate's family system. Making a Family Constellation means, in a simple way, finding solutions to specific problems, whatever they may be. From emotional issues to tragic events within the family, the Constellations reveal and seek practical and simple solutions, bringing to light what is essential at that moment and which has often been forgotten or denied.

As we know, the onset of autoimmune diseases is commonly associated with episodes that involve a strong emotional impact. For physicians who have been working with autoimmune diseases for some time and have a broader view of the disease, it is very common to find that the vast majority of these patients report having acquired the disease after some specific traumatic event, such as an accident. severe (with a feeling of near death) or the sudden loss of a family member. Taking into account the psychological and emotional character, very present and common in almost all autoimmune diseases, it is clear, therefore, the need to adopt measures that aim to treat the disease not only in its organic, genetic and biochemical scope, but also at a psychic level, in an integral way, thus contemplating its totality.

The Family Constellation is characterized as a systemic method. This means that the therapist sees in the client, from the beginning, not only the family system in which he is inserted, but also countless other factors that surround his entire context and that may influence the process of the onset of the disease. During the entire constellation process, the therapist considers the problems and solutions that relate to the client's family system in their entirety and starts from the assumption that the individual solution, sought by the client, must be obtained through the solution of what remained to be clarified or resolve in its broad system of relationships.

Currently in Brazil, the Family Constellation has great repercussion in private therapeutic contexts; institutions/organizations/companies; and more recently it was integrated into the Unified Health System (SUS) and into the Judiciary System. The SUS, in March 2018, through Ordinance No. 702 of the Ministry of Health, incorporated Constellations into the national program “Integrative and Complementary Health Practices” (PICS) [24]. According to the Brazilian Association of Systemic Constellations, therapy is not intended to replace other therapies or place itself above conventional medicine, but rather to serve as a complement and enable the individual to have greater knowledge of his family system and its entanglements. In addition to the SUS, the National Council of Justice (CNJ) also authorized the use of the Family Constellation as a means of mediating conflicts and promoting judicial agreements; use is justified by CNJ Resolution 125/2010. The truth is that, whether in health or in other areas, more and more authors from different areas have been looking at this new method developed by Hellinger. Franz Ruppert, author of “Multigenerational Systemic Psychotraumatology”[25], fellow countryman and an admirer of Hellinger, defends the idea that psychic traumas can be transmitted from generation to generation through a bonding process existing between members of the same family. According to him, in addition to accessing the trauma, the Constellation would allow the patient to return to the exact moment in which it happened, “reconfiguring” that moment, now in the light of a new understanding, a new look, much broader, making conscious everything that until then it was in the “shadow”. It's as if the constellation brought a new meaning to the trauma, re-signifying that moment. Obviously, it is not an easy and pleasant movement, after all, bringing trauma to light is, above all, reliving it. As Jung would say, “What one does not want to have in one's consciousness and, ignoring it, leaves it aside, actually lands beside it, and is called a shadow. The shadow therefore consists of everything that is not perceived and accepted. In this sense, there is no ego, no human being who is happy to find the themes accumulated in the shadows”[26].

A Family Constellation session consists of setting up the client's family system - where representatives will play the role of their family members - and allowing them to let themselves be carried away, feel

and move in a natural and spontaneous way, through the field that surrounds them. This contact between the representatives, their movements during the practice and their body sensations (heat, cold, desire to walk, run, lie down, cry, scream, feel pain, happiness, etc.) is what will allow the therapist - and the client - identify the reasons that may have caused the imbalance in this system. According to Ruppert, "Constellations are representations of psychic realities interpreted by representatives". [27]

A group session is like a play. The role of the constellator is to observe, conduct, facilitate and subsequently interpret the movements performed by the representatives, movements that are governed by what the biologist Rupert Sheldrake called the "Morphogenetic Field" [28]. The most intriguing thing about a Constellation is the fact that the representatives - who do not know the constellate (client) or their history - are able to faithfully represent the same behaviors and habits of their family members, including reprising relevant events that occurred within that system. familiar. What makes these representatives, during a session, able to feel and express behaviors similar to those performed by the client's own ancestors in the past? What moves the "field"? How does he act in the representatives? Where does this sudden urge to move, body sensations and even the symptoms that affect representatives during the session come from?

All mysticism created about practices in Constellations is due, in large part, to the lack of knowledge and lack of understanding of the "Morphogenetic Fields" [29]. For him, "The key word here is "habit". This is the factor that originates the morphogenetic fields. Through habits, the morphogenetic fields vary their structure, thus causing the structural changes of the systems in which they are associated. For example, in a coniferous forest, a habit is generated to extend the roots deeper to absorb more (and/or better) nutrients. The morphogenetic field of the conifer assimilates and stores this information, which is inherited not only by specimens in its surroundings, but in coniferous forests all over the planet due to the effects of morphic resonance" [30].

Still according to Scheldrake, "Morphic resonance tends to reinforce any repetitive pattern, be it good or bad. Therefore, each of us is more responsible than we imagine. Because our actions can influence others and be repeated" [31].

Finally, when we consider the importance of emotions as a triggering factor for autoimmune diseases and associate this with the contributions of Franz Ruppert (Transgenerational Systemic Psychotraumatology and Attachment Theory) and Ruppert Scheldrake (Morphogenetic Fields Theory), it is easy to understand why , even patients who have not experienced traumatic personal experiences may still have outbreaks of the disease when exposed to a new stressful situation.

From this point of view, recognizing that traumatic events can be transmitted through generations through the bonding process is, above all, realizing that numerous relevant factors have been, until then, neglected. The application of Family Constellations – discussed here in the context of autoimmune diseases – makes it possible to visualize that several of these bonds are seriously disturbed and that, for this reason, entire families live in emotional chaos. These attachment disorders stem from the fact that certain events in these family systems have not been properly overcome and therefore are not psychically at peace.

Results and Final Considerations

Starting from a reality where the immune system is part of a system integrated with other systems such as the endocrine and nervous, and for this reason sensitive to emotions, in this article we seek to synthesize a little better how this relationship takes place and how it can affect in an extremely relevant to the lives of patients with autoimmune diseases. By analyzing some conditions that are related to immunocompetence or lack thereof, we were able to conclude that vitamin D plays a central role in the mechanism of regulation and control of the Immune System, since it acts as an immunoregulatory hormone, suppressing the cell-mediated inflammatory response Th17, which leads to autoimmunity.

Given all the above, and taking into account important factors such as: the exponential increase in autoimmune diseases in recent decades, the inefficiency and high cost of traditionally used drugs and their enormity of important side effects, it is evident, therefore, the need to seek new treatment options that are not only more financially accessible, but also that can provide better results without as many deleterious effects. In this sense, aiming to meet this and other demands, the Coimbra Protocol emerges as a viable option, not only because it is a cheaper treatment when compared to conventional drugs, but also because it is a treatment that does not have side effects and does not pose any risk - as long as the two basic and non-negotiable rules are followed: a calcium-restricted diet and abundant hydration (2.5 liters of water/day).

With regard to the role of emotions and especially stress as a triggering factor for autoimmune diseases, the results of numerous investigations carried out over the last twenty years allow us to conclude that yes, indeed our immune system can be affected by stress. Therefore, if stress is related to immunological problems, and therefore can significantly affect people with autoimmune diseases, it seems obvious to infer that strategies aimed at reducing stress will have a positive effect on their functioning. In this case, if psychotherapy, represented here by the Family Constellations method, is understood as a support and as an opportunity to accelerate the process of understanding and awareness

Citation: Felipe Belanda Trofino, "Coimbra Protocol, Stress and its influence on Autoimmune Diseases"

MAR Neurology and Psychology, Volume 6 Issue 2

www.medicalandresearch.com (pg. 20)

of the disease and its emotions, it will certainly have a positive effect on the immune functioning of these patients.

Relevance

Social impact

Taking all of the above into account, and bearing in mind the fact that conventional medicine – purely medicinal – does little to silence autoimmune diseases and to patients' quality of life, it is then necessary to open our eyes to other treatment methods that aim not only to “remedy” the symptoms, but to act on the causes of the problem.

The human body has an unparalleled capacity for self-regulation and self-repair, as long as it is given the raw materials it needs, as well as we start to stop disturbing it with our countless bad life habits. It is noteworthy that in recent years the number of autoimmune diseases has been growing exponentially and that billions of dollars are spent annually on drugs that promise to improve the quality of life of these patients.

It should also be noted that this increase is directly associated with the current lifestyle in which we live, which are increasingly confined – far from the sun – and exposed to numerous stressors.

In view of this whole context and for all that vitamin D represents in the academic scenario, we can conclude that we are currently living in the midst of a vitamin D deficiency pandemic, and that this can be considered - without a doubt - the main cause of preventable deaths in everyone. Its conscious and appropriate use cannot be neglected. The fact is that this substance – considered by many to be the molecule of the century – could and should be being used on a large scale, not only as a preventive agent, but also as a therapeutic agent in a multitude of diseases.

Likewise, this article also has the bias of demonstrating the need to treat the patient as a whole, not just the essential paradigm shift in the approach to autoimmune diseases from the perspective of conventional medicine. It was clear during this explanation that the role of stress and personal and transpersonal trauma directly influences the onset of diseases. For this reason, the role of family constellations in the current scenario was argued.

As already mentioned, this psychotherapy developed by a German named Bert Hellinger, is a philosophy of life, governed by systemic laws that guide and unveil human relationships. Through the application of this vision through a therapeutic method, the facilitator brings to light what may be

consciously and unconsciously influencing the trauma, disease, symptom, or illness pattern. At this point, the method acts by offering light on these difficulties that are not consciously shown, providing us with an opportunity for change. Knowing our history and family ties shows us how our ancestors influence us on a daily basis. Which can easily be demonstrated through epigenetics.

The systemic view states that we are all connected through morphogenetic fields, and that is why we can unconsciously relive difficulties, losses, failures, traumas and hidden dynamics that we cannot even imagine. Those who manage to consciously bring out their way of acting and, at the same time, respect the precedence that exists in family relationships, will be able to bring answers to a very common question: the emptiness of something that cannot be explained, or be one of the great causes of emotional problems, which consequently trigger diseases.

It is concluded, therefore, that the present work aims to propose a change in the professional's approach to the treatment of autoimmune diseases, clarifying through the above that it is not generated only by biological factors, but by contexts that need to be observed and treated in a timely manner, which is only possible through an integrative vision capable of unifying the patient's body and mind.

References

1. CANNELL, John. Autism and Vitamin D. Disponível em: <https://www.sciencedirect.com/science/article/abs/pii/S0306987707005373>
2. COIMBRA, Cícero. Cícero Galli Coimbra, o médico que trata Esclerose Múltipla sem remédio. Disponível em: [https://veja.abril.com.br/saude/cicero-galli-coimbra-o-medico-que-trata-a-esclerose- multipla-sem-remedio/](https://veja.abril.com.br/saude/cicero-galli-coimbra-o-medico-que-trata-a-esclerose-multipla-sem-remedio/).
3. COIMBRA, Cícero. Um outro caminho para o tratamento de doenças autoimunes. Disponível em: <https://jornalconceitosade.com.br/protocolo-coimbra-um-outro-caminho-para-o-tratamento-de- doencas-autoimunes+326875>
4. HELLINGER, Bert. As ordens do amor. Cultrix, 2003.
5. ORGANIZAÇÃO MUNDIAL DA SAÚDE. Imunologia Básica para Imunização. Disponível em: <http://livros01.livrosgratis.com.br/ms000065.pdf>.
6. JIRTLE, Randy. Environmental epigenomics and disease susceptibility. Disponível em: <https://www.nature.com/articles/nrg2045>
7. JOSÉ, Maria. RATIONALITY MEDICAL: New Germanic Medicine in the Prevention and Cure of Diseases. <http://www3.ufrb.edu.br/seer/index.php/revise/article/view/1525>
8. SÊNECA, Lucio. Sobre a tranqüilidade da alma / Sobre o ócio. Nova Alexandria, 1994.

9. SHANG, Seon. Vitamin D suppresses Th17 cytokine production by inducing C/EBP homologous protein (CHOP) expression. Disponível em: <https://www.jbc.org/content/285/50/38751.short>
10. PAULSEN, Martina. DNA methylation in genomic printing, development and disease. Disponível em: <https://onlinelibrary.wiley.com/doi/full/10.1002/path.890>
11. RUPPERT, Franz. Reunir as componentes divididas da Alma. Disponível em: http://www.ibssistemicas.com.br/arquivos/downloads/01-reunir_portugues_50714.pdf
12. RUPPERT, Franz. Psicotraumatologia Plurigeracional. Disponível em: http://www.ibssistemicas.com.br/arquivos/downloads/03-folien_portugues_03964.pdf
13. SHELDRAKE, Ruppert. Uma nova ciência da vida. Disponível em: <https://books.google.com.br/books?hl=ptBR&lr=&id=1e50BQAAQBAJ&oi=fnd&pg=PT7&dq=uma+nova+ci%C3%A4ncia+da+vida+&ots=wxSiMvHpVh&sig=9N1ymLTGw9gWZxwYRMXBqkSYIDo#v=onepage&q=uma%20nova%20ci%C3%A4ncia%20da%20vida&f=false>
14. SCHELDRAKE, Rupert. Instituto de Constelação Integral. Disponível em: <https://www.constelacaoinstitucional.com.br/ruppert-sheldrake>
15. SACCOL, Marilda. Saúde e Doença: o novo despertar a partir das Constelações Familiares. Disponível em: https://portalperiodicos.unoesc.edu.br/pp_ae/article/view/17602
16. TEKZIS, Antônio. Family constellation and schizophrenia. Disponível em: https://www.scielo.br/scielo.php?pid=S0004-282X1987000300007&script=sci_arttext
17. The Collected Works about C.G. Jung; https://www.jungiananalysts.org.uk/wp-content/uploads/2018/07/C.-G.-Jung-Collected-Works-Volume-9i_-The-Archetypes-of-the-Collective-Unconscious.pdf
18. WAGNER, Alexandre. “Immune System – Part III The delicate balance of the immune system between tolerance and autoimmunity”. Disponível em: http://www.scielo.br/scielo.php?pid=S0482-50042010000600007&script=sci_arttext.
19. WAITE, Janelle. Resposta Th17 e Doenças Auto-Imunes Inflamatórias. Disponível em: <https://www.hindawi.com/journals/iji/2012/819467/>
20. WISHART, Ian. Vitamina D - Seria esta a vitamina milagrosa? Citadel, 2016 Instituto de Investigação e Tratamento de Autoimunidade. Disponível em: <https://www.institutodeautoimunidade.org.br/novo-paradigma.html>