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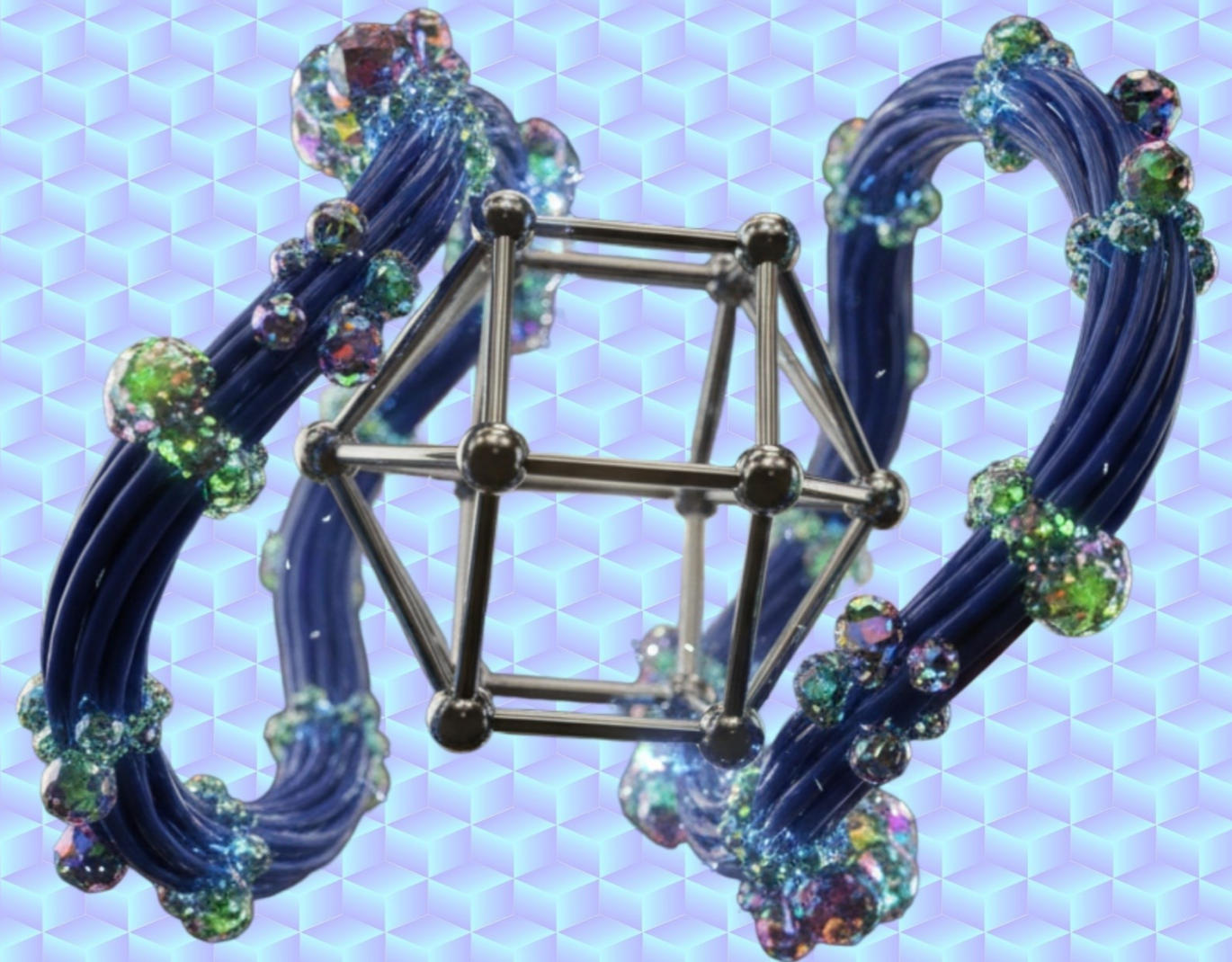


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## Biosemiotics, the New Research Technique from the Cause-Effect Perspective.

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\* **Corresponding Author:** [abuadili@yahoo.com.mx](mailto:abuadili@yahoo.com.mx) Surgeon graduated from the National Autonomous University of Mexico (UNAM), Bachelor of Law from the Mexican University, Master in Health and Business Administration, Honorary Doctorate for his research on the 10 causes of diseases and new techniques for metabolic diagnosis.

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### ABSTRACT

We have focused on paying attention to disease, knowing how to diagnose it, how to treat it, how to "eliminate" or control it. But I assure you that very few people in this world have become aware and consistent, and instead of thinking about eliminating the disease, they think about preventing it from developing. After years of research, this author has concluded that, according to the International Code of Diseases (ICD-11), there are more than 44,000 reported diseases, and more are described each year; however, there are only ten causes for all diseases. Biosemiotics is a new scientific concept that corresponds to the study of causal processes, signs and symptoms that a person may present before the development of the disease, the management of the living systems involved, which includes both a theoretical description of the processes that living nature can affect the development of these conditions, and especially the metabolic processes that occur within the human body; with a vision of life itself, that is, of the natural history of all the acts and events that occur before the clinical diagnosis, according to the allopathic definition. The objective of this study is to interrelate, through biosemiotics, the bridge that exists between biology, semiotics, and Applied Omics Sciences, using Metabolic Assessment under the System for the Application of Techniques for Metabolic Diagnosis (ATDM System). Results: The six components of biosemiotic study have been identified, defining their content and scope. Conclusions: Through this study, we have established the components of Applied Clinical Biosemiotic Research using the ATDM System methodology, and we can now explore their interrelation with different diseases.

### KEYWORDS

*Biosemiotics; ATDM System; Metabolic Assessment; Capillaroscopy; Bioimpedance; Causes of Diseases; Omics Sciences*

## INTRODUCTION

How can we explain pre-effect signs and symptoms? We can say that there are circumstances in modern medicine where people experience symptoms without an apparent cause, or where healthcare professionals cannot determine the cause, but we know the symptom is present. For example, there are cases such as acanthosis nigricans in a person with insulin resistance, but who hasn't yet developed diabetes, or a young woman who experiences dysmenorrhea, which we associate with a normal hormonal imbalance due to menstruation.[32] However, the recurrence of this dysmenorrhea leads to further tests and a diagnosis of Polycystic Ovary Syndrome (PCOS), but we often fail to consider that this might be due to factors such as magnesium deficiency and insulin resistance, and we don't associate it with Metabolic Syndrome.[40]

In addition to the above, science has now demonstrated that many small particles influence this transition from health to disease, and it is crucial to study the behavior of metabolites, since a substance, virus, fungus, or parasite can generate different behaviors depending on the molarity of the environment. Thus, "Applied Omics Sciences" are the sciences that allow us to study a large number of molecules involved in the functioning of an organism. [22,36,38]

In recent decades, technological advancements have enabled the large-scale study of many genes, proteins, and metabolites, leading to the development of genomics, proteomics, metabolomics, and other related fields. Each of these areas has contributed to a better understanding of the causes of certain diseases.[38] The "-omics" sciences exhibit a strong integrative component and have been characterized as a "multilayered, inter- or even transdisciplinary field", which implies that these areas are comprised of a high complexity of concepts, methodologies, and logical frameworks. A distinctive feature of Omics Sciences is that from their inception they have presented explicit intentions to generate knowledge and technologies to intervene in different aspects related to human health, especially regarding the genesis of diseases [33]. Each substance, metabolite, bacterium, or virus can generate another diverse one, and that is why it is necessary to understand the metabolic component and its implications in the health-disease transition. We observe that there is a cellular or metabolic shift, depending on the behavior that these metabolites generate in the body; the molarity of the metabolite will produce a different effect.

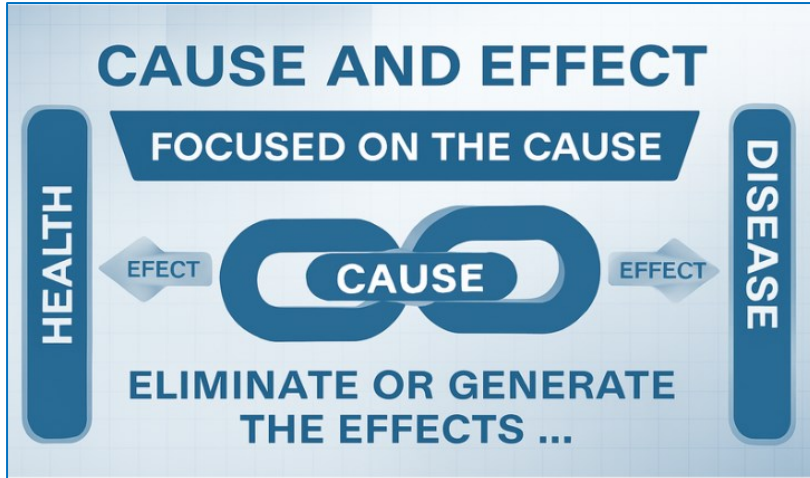
Today, it is crucial to understand and address human health from a new perspective, integrating the physical, mental, emotional, and energetic aspects that comprise human health, including the principles of quantum physics, which studies the behavior of subatomic particles and their interaction with the environment. Considering that the human body is a complex and dynamic system, ranging from the organs and systems that compose it, to each tissue, each cell, and ultimately understanding that it is composed of atoms and molecules that vibrate at different frequencies, generating electromagnetic fields that, in turn, influence the functioning of the cells, tissues, organs, and systems that make up the human body. Thus, health is understood as a state of balance and harmony among the different frequencies of the body, while illness arises from an alteration or imbalance of these frequencies.

The study of biological and medical sciences comprises dynamic and collaborative human activities that consist primarily of controlled experiments and their critical interpretations. However, this does not constitute an exhaustive catalog of the components of the life sciences. The cost of modern living has had profound and disruptive implications in the field of research, causing changes in the study of disease etiology, as well as in disease treatment and prevention. To the point, if we review medical literature using a metasearch engine like PubMed, the study of glycation, oxidative stress, mitochondrial dysfunction, and microbiota accounts for 80% of recent publications in the last 10 years. [5] Medical textbooks talk about diseases whose specific cause is perfectly known: bacteria, viruses, fungi, genetics, etc. But they also talk about idiopathic diseases, where the exact cause of the disease is unknown. This generated a major hypothesis: "If all diseases are the effect of a cause, then there must always be a cause or combination of causes. Therefore, we must change the paradigm of medical care and now ask ourselves: What are the causes of diseases?" [3.4]

The Law of Cause and Effect is a law of life that many people don't take into account, and it is truly important to achieve good results in all aspects of our lives. It is a law that works perfectly on all levels and brings to fruition everything we sow, whether in thought, word, or action. This means that everything we do sets a cause in motion, and this brings a positive or negative consequence, which will depend on the cause set in motion. There is no idiopathic, good luck or bad luck, only results. The law of cause and effect is omnipresent. It's everywhere, so you can't get rid of it. [7,8] In Figure 1, we represent this Law of Cause and Effect, where we know that if we focus on the cause, we will generate or eliminate an effect; that is, if the person has a disease, but we focus on the cause, we eliminate the disease,

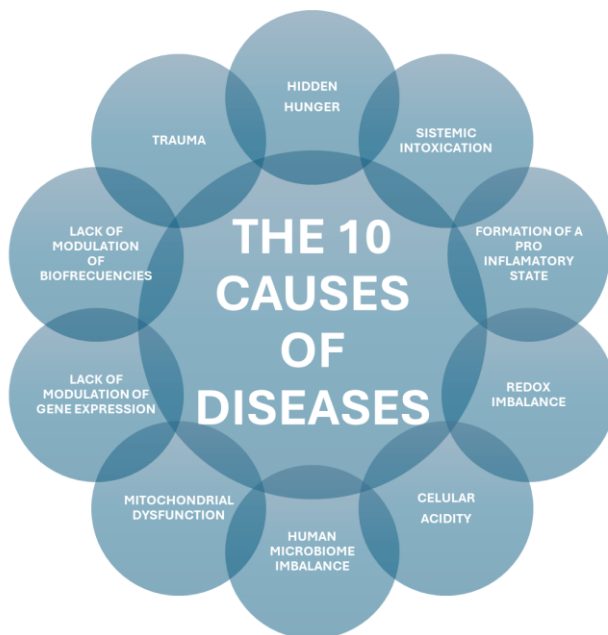
or if the person does not have a disease, and we focus on the causes that originate it, then we prevent the disease from developing.

**Figure 1.**  
*Cause and Effect Law in relation to the Health-Disease Transition.*



The boundary between the microscopic, quantum world and the macroscopic, classical world remains enigmatic; therefore, this author has dedicated himself to studying this boundary and is developing new concepts under the ideology of "The New Perspective on Health: Eliminating the 10 Causes of All Diseases." After years of research, this author has concluded that, according to the International Classification of Diseases (ICD-11), more than 44,000 diseases have been reported, and more diseases are described every year; however, there are only ten underlying causes for all diseases. Give a disease any name you want, but it will have one or more of these ten causes. [1, 7, 8]

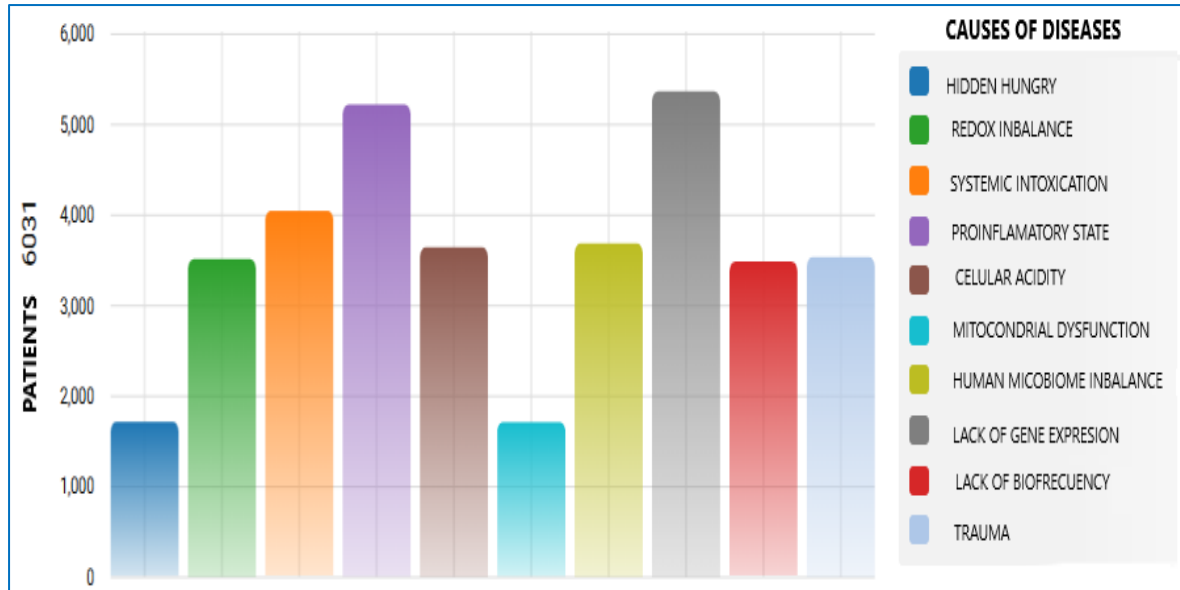
**Figure 2.**  
*The 10 Causes of Diseases*



In this context, this author published in the year 2025, in the American Journal of Medical Science and Innovation,[5] an article describing the prevalence and incidence of the causes of diseases, and Graph 1 and Table 1 describe this

prevalence and incidence from the information obtained from the patient sample (n=6031), we observed the following results, according to the following graph and table:

**Figure 3.**  
*Prevalence of the Causes of Diseases.*



**Table 1.**  
*Prevalence of the Causes of Diseases.*

CAUSES OF DISEASES			
CAUSE OF DISEASE	PATIENTS	CASES	AVERAGE
HIDDEN HUNGRY	6031	1718	28
REDOX INBALANCE	6031	3514	58
SYSTEMIC INTOXICATION	6031	4048	67
PROINFLAMATORY STATE	6031	5221	86
CELULAR ACIDITY	6031	3647	60
MITOCHONDRIAL DYSFUNCTION	6031	1714	28
HUMAN MICROBIOME INBALANCE	6031	3689	61
LACK OF GENE EXPRESION MODULATION	6031	5368	89
LACK OF BIOFREQUENCY MODULATION	6031	3488	57
TRAUMA	6031	3539	58

Now, looking at the cause and correlating the data provided by this study with statistics viewed from an effect-based paradigm, we can see that diseases are underestimated, as ordinary statistics determine values below the possible reality of what is being experienced every day.

If we analyze the data from a preventive-predictive perspective, the data obtained are alarming, as they not only have value in terms of prevalence (the cases present in a population group), but this study also allows us to see incidence statistics (the new cases that are occurring), and therefore, a future trend is observed, which, according to this author, is alarming.

Analyzing that the prevalence of certain causes of disease is as high as 6 to 9 out of 10 people already have them, then the alarming thing about these data is that the incidence maintains the same trend and, therefore, will increase to the total number of cases in the coming years; that is, in addition to the current cases, new cases will be added and multiplying. Therefore, the trend over the next 5 to 10 years will be completely exponential, which will mean that no health system will have the capacity to address the effects generated by not addressing the causes now.

It is alarming to see that the data indicates that this impact on health is derived from the toll modern life is taking. Poor eating habits, environmental pollution, exposure to chemicals of all kinds, ionizing radiation, and the stress of modern life are causing us to collapse. If we do nothing to reverse this trend, the incidence and prevalence of chronic degenerative diseases will overwhelm any health system, and no medical innovation will be able to address this catastrophic condition for humanity.

## DEVELOPMENT

As described by the Argentine Mexican researcher and philosopher Enrique Dussel, who says: "It's not enough to discover something new; we must discover why we are discovering it," and indeed, for decades, the same preventive schemes have been applied in primary healthcare without any impact or direct results in preventing the development of diseases. This is due to a form of "scientificide" [34], in that prevention is approached from a focus on the effect, that is, preventing the diseases themselves; however, the knowledge of scientific developments focused on addressing the root causes of diseases is blocked by these "scientificidal" actions.[35]

Therefore, it is necessary to integrate into clinical research on diseases other elements that, within the context, should be incorporated into scientific studies, such as Kuhnian paradigms (Kuhn's paradigms are the sets of theories, values, and practices accepted by a scientific community during a specific period, which define normal science by guiding research, establishing which problems are relevant, how questions should be formulated, and how results should be interpreted) and heuristic constructions (heuristic constructions are algorithms or methods that build a solution to a problem iteratively, adding elements at each step according to a specific selection criterion; "iteratively" means that something is performed repeatedly, executing a set of steps or instructions over and over again to reach a goal, often to refine or improve a result with each repetition), and which, by themselves, rarely suggest new research. (Scott F. Gilbert, 1982) This is why it is necessary to implement and apply new sciences such as Biosemiotics, which derives from the conjunction and combination of Biosemiotics with Applied Omics Sciences, and metabolic assessment using the System of Application of Techniques for Metabolic Diagnosis (ATDM System) methodology, which allows us to delve deeper into the study of the transition between health and disease.

Biosemiotics (from the Greek βίος bios, "life" and σημειωτικός *sēmeiōtikos*, "observer of signs") is a science that studies life as a symbolic phenomenon. Biosemiotics utilizes both the scientific method and the dialectical method, overlapping biology with phenomenology, to conceptualize the meanings and senses, as well as the signs and codes, inherent in the biological domain.[36] Biosemiotics integrates the findings of biology and the definitions of semiotics, proposing a paradigmatic shift in the scientific view of life, in which semiosis (the process of signs, including meaning and interpretation) is considered immanent and intrinsic to living things.[22] The term biosemiotics was perhaps first used by Friedrich S. Rothschild in 1962.[51] Subsequently, Thomas Sebeok, Thure von Uexküll, Jesper Hoffmeyer, and many others have made significant contributions, establishing biosemiotics as a new science.

"Omics" are the sciences that allow the study of many molecules involved in the functioning of an organism. In recent decades, technological advances have enabled the large-scale study of many genes, proteins, and metabolites, leading to the creation of genomics, proteomics, metabolomics, and others. Each of these areas has contributed to a better understanding of the causes of certain diseases.[38] Omics sciences have a strong integrative component and have been characterized as a "multi-layered, inter- or even trans-disciplinary field", which implies that they are areas comprised of a high complexity of concepts, methodologies, and logics. A distinctive feature of omics sciences is that from their inception they have had explicit intentions of generating knowledge and technologies to intervene in different aspects related to human health, especially regarding the genesis of diseases.[33]

The development of non-invasive methods for determining metabolic conditions is a topic that will revolutionize the field of diagnostics [7, 8]. Given the circumstances mentioned above, it is necessary to establish a non-invasive test that is easy to implement, low-cost, and high-impact, one that detects the causes of diseases, shifting paradigms from subjective to objective approaches, and establishing patterns, processes, procedures, and systems that allow for its continuous improvement.

Metabolic assessment using the Application of Techniques for Metabolic Diagnosis System (ATDM System) methodology employs statistical modeling that generally refers to the analysis of the human body, its chemical, physical, and biological reactions, and its interaction with the environment, to determine any given situation and

identify trends.[9] This determination is based on data and facts collected and organized systematically and iteratively [10], allowing for a better understanding of what is happening, based on components, patterns, and indicators, through bioimpedance and capillaroscopy testing.

#### Bioimpedance Test:

Bioelectrical impedance analysis (BIA) is a non-invasive and easily applicable method for all types of populations. Understanding its operation, as well as its physical principles, allows for a better understanding of its use and, therefore, the strict application of the measurement conditions to ensure the reliability of the results obtained. BIA is a good method for determining body water and fat-free mass in individuals without alterations in body fluids and electrolytes. Prediction equations adjusted for age and sex, appropriate for the population, should be used and must have been validated against reference methods.[24]

Bioelectrical impedance analysis (BIA) studies are based on the close relationship between the electrical properties of the human body, the body composition of different tissues, and the total water content in the body. Like all indirect methods of estimating body composition, BIA depends on certain assumptions regarding the electrical properties of the body [44], its composition and maturational state, its hydration level [44, 73], age, sex, race, and physical condition [44,73].

Body impedance (Z) is a function of two components or vectors: resistance (R) and reactance (Xc). These two vectors are related by the equation  $Z^2 = R^2 + Xc^2$ . R represents the resistance of the tissues to the passage of an electric current, and Xc is the additional opposition due to the capacitance of these tissues and cell membranes (the so-called dielectric component) [58]. These values depend on the frequency of the electric current. Reactance is due to the electrical effect of the charge offered over short periods by the lipid component of the cell membranes. [52, 58, 70, 75]

#### Capillaroscopy Test:

Capillaroscopy is a non-invasive, simple, high-impact, and low-cost method that was initially used in rheumatology to examine only the microcirculation. This author has discovered that this technique can be used to perform a comprehensive assessment of metabolism and other abnormal conditions, and therefore should be included in the diagnostic protocol of every patient in real time, as it can be performed in the doctor's office, during medical outreach programs, and in any location.

Thanks to the need for a clinical application different from that of rheumatology and the study of microcirculation, this author, Víctor Alfonso Abuadili Garza, disruptively decided in 2011 to begin the systematic study of metabolic diagnosis through capillaroscopy, establishing the treatment and research protocols of the System for the Application of Techniques for Metabolic Diagnosis (ATDM System) [1, 5, 6], to achieve this, lighting, digital photography, and electronics experts from various parts of the world were consulted to modify the conventional optical capillaroscope, under a utility model, into one where the cold light source is externalized from the capillaroscope body. This allows the light beam to be directed at various angles: approximately 30° to obtain a lateral view, approximately 45° to obtain a sagittal view, and 90° to obtain a frontal view of the area of the periungual bed to be visualized. This design reduces reflections that frequently hinder visualization with epi-illumination and enhances the intensity of the visible wavelength through a combination of lenses and bioresonance, resulting in a magnification capacity exceeding 800X and continuing to improve.

Using the Application of Techniques for Metabolic Diagnosis System (ATDM System) methodology, we utilize Capillaroscopy Test as a diagnostic tool that allows us to observe multiple conditions, such as the identification of metabolic reactions like the Maillard reaction [13], pyrolysis reactions [14]), redox imbalance processes caused by free radical species [12], non-enzymatic de novo lipogenesis and the corresponding lipid deposition in tissues [15, 16, 17, 18], and microbiome alterations [19], thus providing an unlimited diagnostic scope.

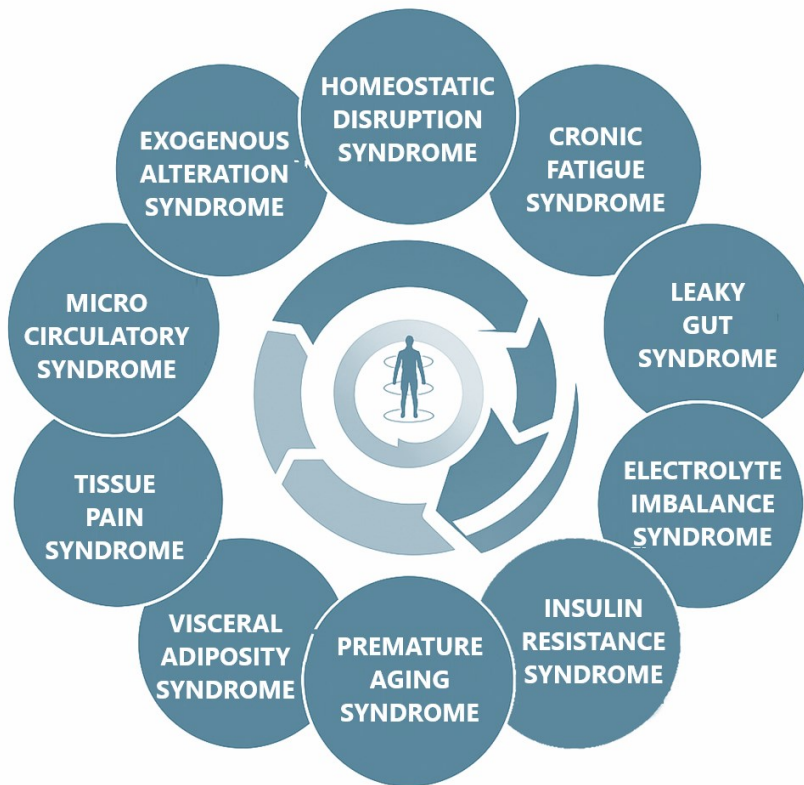
In short, biosemiomics bridges the gap between the quantum world and the world of classical physics, biology, and medicine. Therefore, it is essential that we understand the basic concepts, which are quite different from the concepts we commonly learn, but which science and technology have now verified, thus establishing the operational definition for the biosemiomic diagnosis of any disease, and specifically, in the case at hand, for the transition between health and disease. This approach integrates the analysis of external risk factors, the metabolic processes that occur in the body, a preclinical description of the signs and symptoms that individuals present before the onset of symptoms

meeting conventional clinical criteria, a description of the natural history of the disease, a clinical description, and confirmatory paraclinical laboratory and imaging studies. These elements, along with case-based, statistical, and epidemiological data, are used to measure the degree of metabolic risk presented by individuals.

A "syndrome" is comprised of the conjunction, and in some cases, the concatenation of various patterns that appear in the biochemistry of metabolism and the affected tissue or microcirculation, which will eventually lead to a disease. Generally, a syndrome is the sum of all the signs that compose it; therefore, it can also be assessed both qualitatively and quantitatively. This is why, based on research conducted through metabolic assessment using the System for the Application of Techniques for Metabolic Diagnosis (ATDM System)

Using the Metabolic Diagnostic Techniques Application System methodology, it has been possible to identify a directly proportional relationship between the metabolic components detected in the tissues, microcirculation, or metabolism of a person—who was unaware of these metabolic alterations—and the pre-effect components, where there are clinical manifestations of bodily alterations that even lead to certain symptoms that are not yet medically detected but are already present in the individual. In Figure 3, under the ATDM System methodology, the study of Metabolic Assessment Patterns (MAPs) [7] has been used. These patterns are interrelated and interconnected to form Metabolic Assessment Syndromes (MASs) [6] that subclinically affect individuals, and which are described below:

**Figure 4.**  
*Metabolic Assessment Syndromes*



Therefore, it can be inferred that the bridge between the transition from cause to effect, that is, between health and disease, may lie at that specific point where there are symptoms without the characteristic manifestations of the disease, in other words, when metabolic assessment syndromes are expressed.

## GENERAL OBJECTIVE AND SPECIFIC OBJECTIVES

The main objective of this study is to establish, from a biosemiotic perspective, the cause-and-effect relationship in the transition between health and disease, and a secondary objective is to verify, using the ATDM System methodology,

whether there is an interrelationship between the Metabolic Assessment Syndromes, acting as a bridge in the health-disease transition.

## OBJECT OF STUDY

The purpose of this study is to establish the link that originates the transition from health to disease.

## METHODOLOGY

This article employs a quantitative, documentary, and propositional research approach, conducting an exploratory, descriptive, explanatory, propositional, and predictive study. To this end, the author first conducted a literature review using PubMed, Google Scholar, LatinIndex, and other metasearch engines to determine the methodology applied for the real-time performance of metabolic assessment under the System for the Application of Techniques for Metabolic Diagnosis (ATDM System).

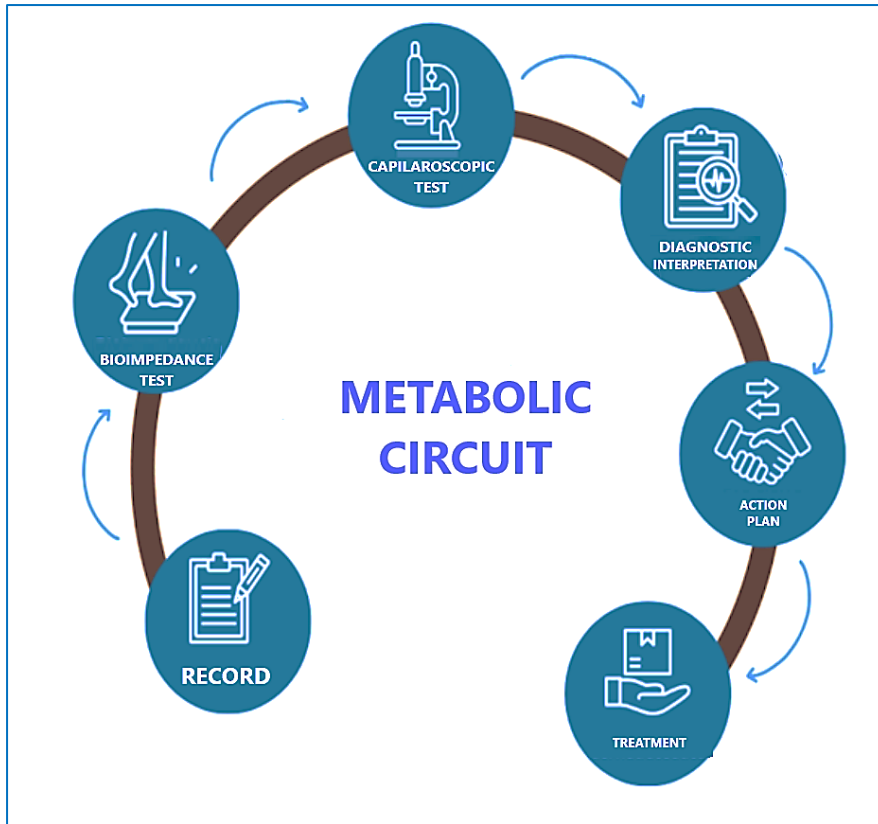
## PHASES OF DEVELOPMENT

Applying the methodology called "Metabolic Assessment," established within the System for the Application of Techniques for Metabolic Diagnosis (ATDM System), a clinical investigation was conducted involving bioimpedance and capillaroscopy tests on more than 6,000 individuals ( $n = 6031$ ) of both sexes, ranging in age from 2 to 90 years, without specific reference to their health status, in Mexico, the United States, the Dominican Republic, Guatemala, Puerto Rico, and Colombia. A general medical history was compiled for each patient, and a database was created to report the corresponding statistics, which are available on the ATDM System website.

Metabolic assessments were conducted during various health events, using a methodology called the "Metabolic Circuit." A simple medical history was taken first to gather information about the participants' backgrounds, and then two tests were administered: bioimpedance and capillaroscopy, the latter being the relevant test for this article.

### Figure 5.

*Methodology of the Metabolic Circuit for conducting metabolic assessment according to the Methodology of the System for the Application of Techniques for Metabolic Diagnosis (ATDM System)*



A methodology for evaluating individuals, which we call the "Metabolic Circuit," was used to conduct the assessments. The metabolic circuit refers to a process where the patient attends the health screening without prior preparation and moves through different stations where each evaluator performs a different test, thus minimizing any potential bias in the information obtained. The tests have an average duration of 20 to 30 minutes. First, the patient goes to a registration desk, where an identification form is completed, an identification number is assigned, and the information is entered into the ATDM System database. Subsequently, the patient undergoes a bioimpedance test, followed by a capillaroscopy test. Finally, the patient proceeds to a diagnostic integration station where a Level 5 or higher evaluator, certified by the ATDM Educational System, provides the final interpretation.

As the patient moves from station to station to undergo the tests, they are unaware of the parameters being evaluated, nor are they given any prior instructions such as fasting or a specific time for the test, thus avoiding alterations to the patient's real-time basal metabolism. Similarly, the certified evaluators in the ATDM System Educational Model, level 2 or higher, who perform the capillaroscopy tests, are not given any specific instructions or indications of what to look for, or whether they should find a particular image; the evaluator is simply required to perform the patient's somatometry by measuring bioimpedance parameters using an Omron HBF-516B device. The capillaroscopy test was conducted using CMOS XW880, X crista, and Digilenz bioresonance capillaroscopes with different magnifications, modified under a utility model where the cold light source is externalized from the capillaroscope body, This allows the light beam to be directed at various angles, approximately 30° to obtain a lateral view, approximately 45° to obtain a sagittal view, and 90° to obtain a frontal view, of the area of the periungual bed to be visualized. This reduces reflections that frequently hinder visualization with epi-illumination.

By combining lenses and using bioresonance, the intensity of the visible wavelength is enhanced, resulting in a magnification capacity exceeding 800X. The capillaroscopy images are photographed directly from the device's screen. The test is performed on the fourth digit of the right hand as the sole standardization pattern. A zigzag observation and visual field movement technique is employed, allowing the light to penetrate the different tissues without the evaluators being able to identify anatomical and histological differences within their field of view. Evaluators are instructed to take three photographs: one of the tissue in general, without specifying a particular position; one of the

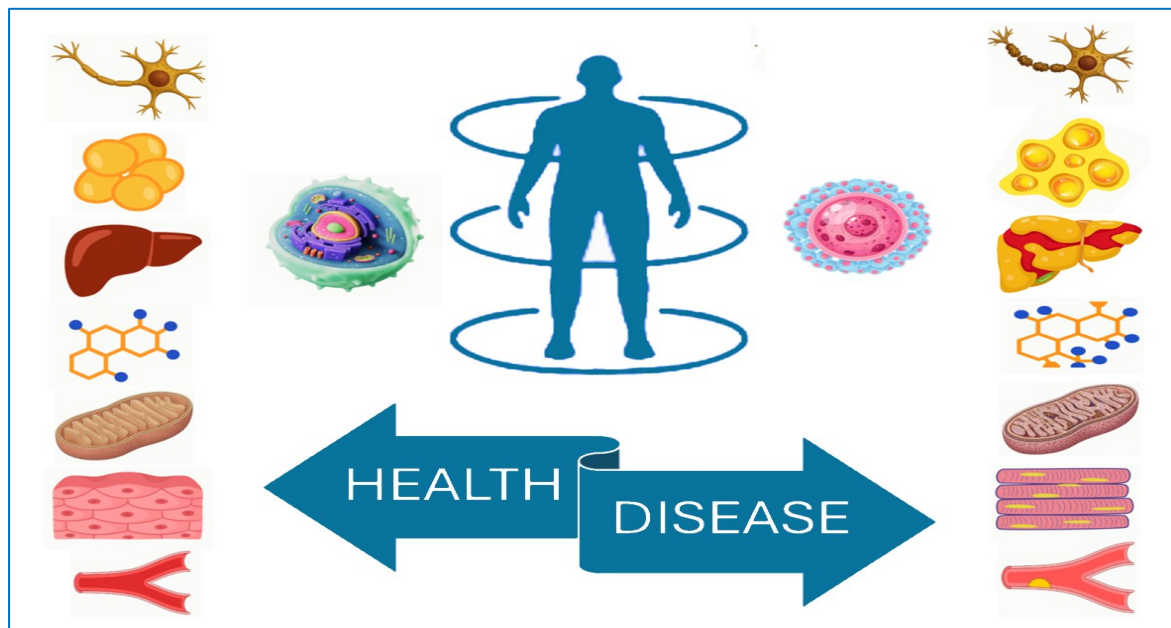
microcirculation; and one, if present, of any unusual or different findings they observe. These images are then uploaded electronically to our database, and using the Metabolic Valuation Patterns (PVM) that this author has identified in various publications in the Journal “Ciencia Latina”[7] are selected, the positive patterns are chosen, and the data is introduced into our big data platform, which uses Kuhnian paradigms and heuristic constructs, our digital platform provides specific data, so we can diagnose and measure Metabolic Assessment Syndromes and then interrelate them with both the causes and effects of various groups of diseases.

## RESULTS AND DISCUSSION

Currently, diseases have been described from an effect-based paradigm, that is, they are defined according to their allopathic definitions, and there is no precedent for defining and describing them from the perspective of the cause of the disease. Furthermore, individuals exhibit biochemical and tissue manifestations, and even signs and symptoms, before the allopathic criteria that currently govern the definition of these diseases are met. Therefore, it is necessary to delve deeper into research on diseases from a new perspective using a cause-and-effect approach, incorporating Kuhnian paradigms and heuristic complexities into the scientific and dialectical method. This would establish a methodology that allows for the transformation of subjective observations into objective data, and qualitative aspects into quantitative values, enabling not only diagnosis but also preventive and predictive measurement.

When studying biosemiotics we observe that there is a bridge with a line, sometimes very thin, between health and disease, and that is where current medicine has not focused its efforts to prevent the human body from crossing that bridge. In Figure 5, we represent that bridge between health and disease, where we can see a human body in a whirlpool of processes that are involved in this transition, where the cell as a functional unit ceases to have the ability to self-regenerate, and therefore, begins to deteriorate.

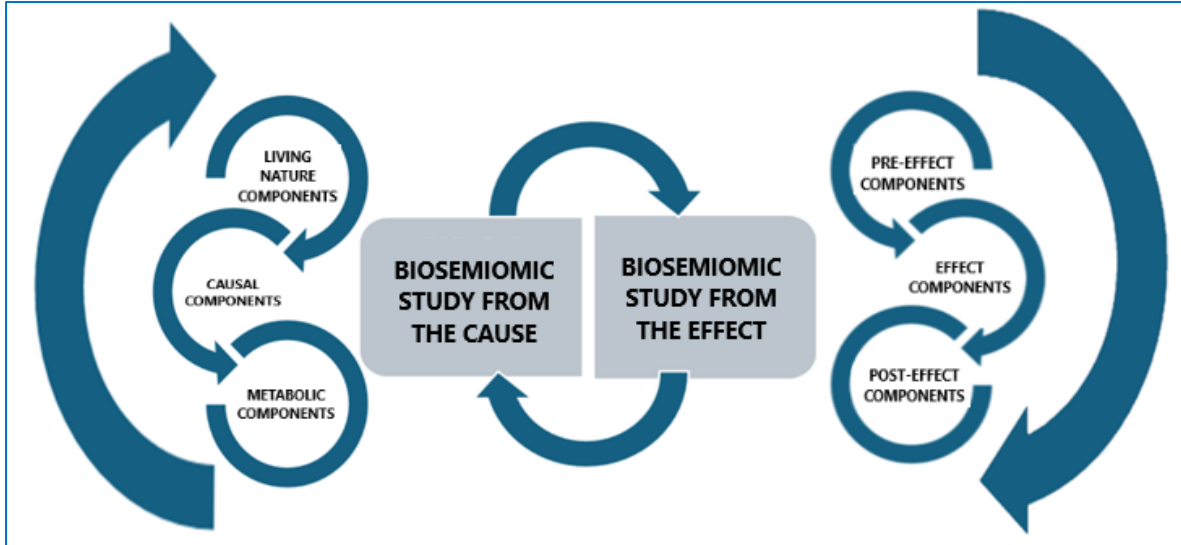
**Figure 6.**  
*Representation of the Health-Disease Transition Bridge.*



Given the multiple Patho physiologies involved in the transition processes between health and disease, we first selected the main processes that affect metabolism and which, according to medical literature, are considered the latest advances in research on the pathophysiology of diseases. These include glycation, redox imbalance caused by free radicals, silent inflammation processes, de novo lipogenesis, and cellular acidity, among many others. These technically correspond to the components of Applied Clinical Biosemiotics, which in turn are identifiable through Metabolic Assessment using the methodology of the System for the Application of Techniques for Metabolic Diagnosis (ATDM System).

Now, from a cause-and-effect perspective, as this author described in an article published in the Journal of Multidisciplinary Novel Journeys & Explorations[6], as we see in Figure 6, the biosemiotic study of the health-disease transition must be done by studying 6 components, namely, three of which are studied from the cause and three from the effect, and for the case that concerns us in this article, we want to study the bridge between Cause and Effect, so we will relate these results in the following way:

**Figure 7.**  
*Method for studying the Health-Illness Transition.*



Based on the results presented in Table 1 and Graph 1, as mentioned previously, we can see that the prevalence and incidence of the causes of these diseases are very high, and therefore, they will have a significant impact on the prevalence and incidence of the diseases themselves.

In this sense, under the hypothesis that if we begin this study with each cause of the disease (Causal component of Applied Clinical Biosemiotics), and relate it to the associated metabolic assessment syndrome (Pre-Effect component), in order to correlate it with the disease itself (Effect component), we will establish the relationship of this cause-and-effect bridge.

It is completely impossible to analyze the transition from health to illness for each of the diseases listed in the International Classification of Diseases (ICD-11); however, we can do so thanks to the methodology of the System for the Application of Techniques for Metabolic Diagnosis (ATDM System), we have been able to break down the interconnectedness between the causes of diseases[5], metabolic assessment syndromes[6], and the different "disease groups," which we describe in Table 2 as examples and not as an exhaustive list:

**Figure 8.**  
*The transition from health to illness from a cause-and-effect perspective.*

THE TRANSITION FROM HEALTH TO ILLNESS FROM A CAUSE-AND-EFFECT PERSPECTIVE			
No	CAUSE OF DISEASE	METABOLIC ASSESMENT SYNDROME	KIND OF DISEASE
1	HIDDEN HUNGRY	CHRONIC FATIGUE SYNDROME	NUTRITIONAL DISEASES
2	SISTEMIC INTOXICATION	EXOGENOUS ALTERATION SYNDROME	ENVIROMENTAL DISEASES
3	PRO INFLAMATORY STATE	INSULIN RESISTANCE SYNDROME	METABOLIC DISEASES
4	REDOX INBALANCE	PREMATURE AGING SYNDROME	INMUNE DISEASES
5	CELULAR ACIDITY	TISSUE PAIN SYNDROME	NEOPLASTIC DISEASES
6	HUMAN MICROBIOME INBALANCE	LEAKY GUT SYNDROME	INFECTIOUS DISEASES
7	MITOCHONDRIAL DYSFUNCTION	MICROCIRCULATORY SYNDROME	ORGAN FAILURE DISEASES
8	LACK OF GENE MODULATION	VISCERAL ADIPOSITY SYNDROME	GENETIC DISEASES
9	LACK OF BIOFREQUENCY MODULATION	HOMEOSTATIC DISRUPTION SYNDROME	NEURODEGENERATIVE DISEASES
10	TRAUMA	ELECTROLYTE IMBALANCE SYNDROME	TRAUMA / SURGERY

While it is true that we can statistically measure the prevalence and incidence of the Causes of Diseases, this is not the focus of this study, and this author commits to conducting a comprehensive study of these statistics in a subsequent article. Therefore, in accordance with our research objective, this study aims to determine the link between the cause of the disease and the disease itself, and its interrelationship with Metabolic Assesment Syndromes.[6] However, to better illustrate the connection established in Table 2, we will now proceed to make a more specific correlation between each cause and its corresponding effect, based on the following considerations:

Regarding Hidden Hunger:

According to the World Health Organization (WHO) [62], hidden hunger is defined as the non-explicit need for one or more nutrients that are essential for the proper functioning of the body. This health problem is estimated to affect two billion people worldwide. [56, 78]

We know that hidden hunger is a process in which we are eating but not receiving adequate nutrition, due to problems with the intake, absorption, transport, or assimilation of nutrients.[62] The consequence of this lack of nutrients is Chronic Fatigue Syndrome, which manifests subclinical or even clinical symptoms such as chronic fatigue, leading to daytime sleepiness or nighttime insomnia, hair loss, nonspecific body aches, among other symptoms.[69] The consequence of this lack of nutrient intake is the loss of cellular energy, but in the long run it will manifest as nutritional diseases such as malnutrition, anemia, nutrient deficiencies, and even contribute to Metabolic Syndrome.

Regarding Systemic Intoxication:

Systemic intoxication is caused by processes that our own body develop and that affect our health in different ways. [3, 4] These processes can be exogenous when they are due to an impact on the body, metabolism, or cellular function, derived from a physical, chemical, or biological agent acquired from the environment, such as toxicology or exposure to allergens; while endogenous intoxication is caused by physical, chemical, or biological processes that occur within our own body.[26] Of the latter, we can see cross-fermentation (aerobic with anaerobic) caused by bacteria in the intestine when eating certain combinations of foods, partial oxidation of methane, and Leaky Gut Syndrome.[21] Leaky Gut Syndrome causes an impairment in the intestine's ability to act as a defensive barrier, and as a result, parasites, fungi, gluten, and allergens can enter the bloodstream and the body[41], which in turn can trigger various environmentally-induced diseases such as allergies, food intolerances, eczema, and many others.

Regarding the formation of a pro-inflammatory state:

Silent system inflammation is characterized by elevated circulating levels of inflammatory cytokines, as well as increased infiltration of macrophages in peripheral tissues. This inflammatory scenario does not induce injury or loss of functionality in the infiltrated tissue, a distinctive feature of a state of low-grade systemic inflammation [49] Low-grade systemic inflammation is closely related to the development of chronic degenerative diseases, which is why this state of immune alteration has also been called meta inflammation.[54]

There are many causes for the formation of a proinflammatory state. However, the main one is the presence of glycation in the tissues. This biochemical process that makes up the Maillard Reaction, causes the formation of Glycation End Agents (AGEs) that generate an inflammatory immunological reaction.[20] Today we know that these AGEs are related to diet and especially to the complications of Diabetes; but recently Dr. Victor Abuadili, thanks to his discovery

by Capillaroscopy, published that the Maillard Reaction is a concatenation of biochemical reactions that occur over a period of 72 hours[13], generating insulin resistance and that after this period of time, a process of NON-enzymatic Condensation begins for the conversion of Carbohydrates into LDL Cholesterol that adheres to the tissues[15], initiating a De Novo Lipogenesis[16], which in the long run triggers obesity, thus closing the vicious circle of inflammation.[18]

These processes are associated with Insulin Resistance Syndrome, which presents with multiple pre-clinical and clinical manifestations, such as Polycystic Ovary Syndrome in young women [41], but will also manifest as acanthosis nigricans, and will eventually develop Metabolic Diseases such as Metabolic Syndrome and its progression to complications, which are widely discussed in the medical literature.

### Regarding Redox Imbalance:

Redox imbalance reactions are those caused by changes in the redox chemical reactions caused by free radicals that affect our bodies. REDOX is the name given to a chemical reaction that involves the transfer of electrons between different reactants, leading to a change in the state of oxidation. In these reactions, one element loses electrons, and another receives them.

A free radical is an atom, molecule, or compound that is highly unstable due to its atomic or molecular structure (i.e., the distribution of electrons within the molecule). As a result, free radicals are highly reactive, attempting to pair with other molecules, atoms, or even individual electrons to create a stable compound. Upon achieving a more stable state, free radicals can "steal" electrons from another molecule, bind to another molecule, or interact in various ways with other free radicals.[27]

Due to the inevitable formation of these free radicals, living beings have had to find a way to survive in this oxidizing environment created by their own functioning, and the appropriate evolutionary response to counteract the damage that these reactive species could cause has been the development of antioxidant systems. This implies that, to consider the situation occurring in an organism, it is necessary to assess the balance between the production of reactive species and their elimination capacity, known as redox balance.[40]

From the moment a human being is conceived, oxidation and reduction begin. The increase in free radicals generates cellular aging that is associated with a chronic inflammatory process, as an overexpression of REDOX-sensitive transcription factors is observed, which activate the transcription of pro-oxidant enzymes in cellular aging. This causes the balance between pro-inflammatory and anti-inflammatory cytokines to be lost in favor of the former. However, due to the cost of modern living, there are various causes that accelerate this imbalance, such as air pollution, saturated fats, heavy metals, smoking, insecticides and pesticides, and stress. [27,40]

Today, the role of redox imbalance in the pathogenesis of various diseases is well known, including cancer, diabetes mellitus, cardiovascular diseases, neurodegenerative diseases, and more than 300 chronic degenerative diseases, which remain the main health problems worldwide.[23]

Because of the importance of these REDOX reactions, and for our readers' better understanding, we divide cellular reactions into five groups of cellular stress:[25]

- a) Oxidative Stress.
- b) Nitrostatic Stress.
- c) Hydrostatic Stress.
- d) Alkoxylic Stress.
- e) Carbonylic Stress.

Redox imbalance is associated with progressive cellular deterioration that results in Premature Aging Syndrome.

### Regarding Cellular Acidity:

The human body is in constant balance (homeostasis), and this balance encompasses several factors, such as fluids, electrolytes, temperature, hormones, etc. However, one of these factors is the tight pH balance. The primary function of this balance is to maintain a wide variety of bonds found in the organic components of living beings, such as proteins, lipids, and carbohydrates, as well as other substances essential to their functioning, such as enzymes. When altered by pH, these substances can be implicated in the mechanism of cellular injury. [80]

Cellular acidity is a process that occurs in the body's cells when glucose metabolism, rather than through aerobic channels, shifts to anaerobic metabolism. Normally, when glucose is oxidized, it is metabolized into carbon dioxide, water, and energy. However, when this does not happen, either because the cell is lacking oxygen or because it is displaced by carbon monoxide, the cell is unable to produce energy.

Otto Heinrich Warburg, Nobel Prize winner in Physiology or Medicine in 1931, discovered that "Lack of oxygen and cellular acidity are two sides of the same coin: acidic substances repel oxygen; alkaline substances attract oxygen." In other words, instead of dying, as cells normally do, in an acidic environment, these cells survive by becoming abnormal cells. These cells are known as malignant cells, which do not respond to messages sent by the brain or those produced by the genetic code, DNA. Consequently, malignant cells grow indefinitely and without any order. This is cancer." [76]

In addition to the above, Herman Aihara, in his book Acid and Alkaline, tells us: if the condition of extracellular fluids, especially the blood, is acidic, the result will be fatigue, a tendency to catch colds, etc. When these fluids become even more acidic, our condition worsens with aches and suffering such as pain. Pain occurs in acidic environments... There is no pain in an alkaline environment...

Following the previous chronology and what was mentioned earlier, we know that cellular acidity is associated with several metabolic assessment syndromes, since on the one hand hypoxia is related to the microcirculatory syndrome, the production of acids by an alternative metabolism generates pain and therefore association with the Tissue Pain Syndrome, and alters homeostasis related to the Homeostatic Alteration Syndrome.

#### Regarding Human Microbiome Imbalance:

The Human Microbiome Project is the scientific project that is most effectively transforming human health. A small revolution in microbiology has discovered that many modern diseases are indeed related to the human microbiome ("microbiota" is the term used to refer to the collective of microorganisms that exist in the human body; "microbiome" is the genes that code for these microorganisms).[61]

Recent advances in the study of microbiology and clinical medicine have demonstrated the importance of human microbiome in health. Many studies have demonstrated the cross-interaction of the microbiome with the intestinal nervous system and the consequent modulation of brain activity.[74]

It has also been shown that the metabolites produced by the gut microbiota modulate energy metabolism in all mitochondria in the body, since the levels of hydrogen sulfide (H<sub>2</sub>S), produced by enteric bacteria, inhibit or activate cytochrome oxidase in the mitochondrial respiratory chain. This is also true of the interaction between the microbiome and mitochondria in the epigenetic expression of the cell nucleus in different tissue cells.[39]

The human microbiome is composed of all the microorganisms, actions, and interactions of these microorganisms, which we acquire at practically two crucial moments in our lives: at birth and during breastfeeding during the first 48 hours of life. Therefore, we now know that our mothers inherit our bacteria, parasites, or fungi.[46]

This microbiome is composed of several types of microorganisms that make up the human microbiome. However, our readers may come into contact with some terms, and therefore I think it is important for you to coin the following concepts: [21, 39]

Microbiota = bacteria.

Macrobiota = parasites.

Mycobiota = fungi.

We see the imbalance in the human microbiome indirectly related to Leaky Gut Syndrome, where a pore opens, allowing microorganisms to pass into the bloodstream, which will be deposited in different tissues, and therefore, by identifying any of these microorganisms through Capillaroscopy, we can identify that the person has Leaky Gut Syndrome.[19]

#### Regarding Mitochondrial Dysfunction:

Mitochondria are cellular organelles derived from an ancestral symbiosis between prokaryotic bacteria that were phagocytosed by eukaryotic bacteria. During evolution, they became cellular mitochondria.

These mitochondria lost many of the genes of prokaryotic bacteria and retained only a small genetic fraction that controls the synthesis of 67 proteins, including the genes that express 13 proteins in the respiratory chain. They are not only the source of energy for cells, but also actively participate in muscle function, cell proliferation, the secretion of hormones and antioxidant enzymes (SOD, GpX, and catalase), and in anabolic and apoptotic processes.[79]

The term mitochondrial disease encompasses a broad and heterogeneous set of diseases due to a primary mitochondrial defect, characterized in most cases by impaired oxidative phosphorylation and a consequent alteration in energy production.

Mitochondrial dysfunction arises in response to severe stress caused by tissue hypoxia, which activates an inflammatory cascade of cytokines, interleukins, and tumor necrosis factor (TNF $\alpha$ ), inhibiting aconitase in the Krebs cycle, thereby disrupting energy production at the cellular level, causing mitochondrial dysfunction and even cell death.[45]

Mitochondrial dysfunction is related to microcirculatory syndrome, since the alteration in energy production is due to a deficiency in oxygen supply, which in turn generates chronic fatigue syndrome, because the energy necessary for cell function is not produced and which in the long run will lead to diseases such as kidney, liver or heart failure.

#### Regarding Lack of Gene Expression Modulation:

Today, it is no longer considered valid to assume that if a person's grandfather or father has a certain disease, that person will inherently have it. The Human Genome Project was one of the most expensive and celebrated scientific initiatives in history. When this project concluded, the idea was that with the discovery of the genome, certain "letters" of the human genome—individual genes—could be changed and diseases easily corrected.[48]

Genetic expression is determined by many factors. Generally speaking, all somatic cells in the body have the same genetic makeup. However, different cell types express different proteins and have different phenotypes. In other words, the same DNA can be used differently in different cell types, which is known as genetic expression.[59]

#### Regarding Lack of Biofrequency Modulation:

Human beings are matter and energy, and as this universal law states, "Energy is neither created nor destroyed, it only transforms." Our body emits more than a trillion different frequencies that correspond to the working frequency of our organs and even parts of them. Any alteration in the function of an organ or bodily system leads to an alteration of its frequency.[63]

Many diseases are due to biofrequency disturbances; diseases are due to the confusion of bioenergy due to a disruptive connection. When diseases are caused by biofrequency disturbances, they affect the muscular system, the digestive system, and every other bodily system.[71]

Today we know that cells communicate with each other, using various biofrequencies such as Larmor frequencies, Klark frequencies, among others, but everything is intimately linked to the nervous system, so the syndrome of lack of modulation of biofrequencies is related to the alteration in the neurological control functions and therefore, in neurodegenerative diseases.

#### Regarding Trauma:

Trauma not only includes injuries from accidents, but also all conditions that cause trauma to the body's structure, including surgeries. They generally follow the Law of Causality. There will always be a cause that originates an incident that causes harm. Trauma and surgery are generally closely linked to the Hydroelectrolytic Imbalance Syndrome.

Therefore, there is a significant relationship between the various components that make up Applied Clinical Biosemiotics research, establishing a bidirectional bridge between the health-disease transition.[6] In this sense, it

allows for the integration of new approaches to disease care, whether by addressing the causes of diseases[5] or by resolving metabolic assessment syndromes as part of the biosemiomic component of the pre-effect.[5, 6] This is where we establish the benefit of this evidence-based medicine research. These results allow us to establish new paradigms in healthcare, under a preventive-predictive model.

In other words, we now have the methodology for the Metabolic Diagnostic Application System (ATDM System), which combines disease prevention with real-time diagnosis, [1,2,3,4] eliminating delays in care. It features a big data digital platform that generates the necessary algorithms to establish metabolic assessment patterns, metabolic assessment syndromes, and highly specialized medical diagnostic indicators, making this diagnostic tool indispensable for all healthcare professionals. [7,8,9,10] This is true innovation in value.

## CONCLUSION

With this study, we have been able to establish the bridge that exists in the transition between health and disease, from a cause-and-effect perspective. This lays the foundation for the study and research of health through the field of Applied Clinical Biosemiomics. Thanks to the System for the Application of Techniques for Metabolic Diagnosis (ATDM System), we have been able to understand this relationship. We know that further research is needed, but we have established the basis for a new, evidence-based medicine.

It is promising that this new research technique, which integrates Kuhnian paradigms and complex humanistic models, will be applied to health systems worldwide. With a vision of expanding "Applied Clinical Biosemiomics" among health professionals, we will better understand the processes involved in the health-disease transition and be able to establish the necessary public policies to prevent humanity from becoming ill.

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