JOURNAL OF ORTHOMOLECULAR MEDICINE

OPEN ACCESS

VOLUME 33, NUMBER 1

PUBLISHED: FEBRUARY 2018

SYNTHESES ARTICLE

Metabolic Correction and Physiologic Modulation as the Unifying Theory of the Healthy State: The Orthomolecular, Systemic and Functional Approach to Physiologic Optimization

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Citation: Gonzalez MJ, Olalde J, Rodriguez JR, Rodriguez D, Duconge J (2018) Metabolic Correction and Physiologic Modulation as the Unifying Theory of the Healthy State: The Orthomolecular, Systemic and Functional Approach to Physiologic Optimization, *J Orthomol Med* 33(1)

Abstract

We propose the unification of two medical paradigms: Orthomolecular Medicine and Systemic Medicine with their mechanistic counterparts, Metabolic Correction and Physiological Modulation as tools to achieve the healthy state by attaining physiological optimization.

In Western therapeutics, the use of drugs, which have many side effects and are often inefficient in the treatment of chronic degenerative diseases, is common. Observing the extensive use of traditional healing systems in China, India, Indonesia and Japan, an impartial observer must acknowledge that there is more to these medicines than just wishful thinking. Three billion people are treated with holistic medicines with much success; addressing the root cause of the physiologic disruption is key.

Metabolic correction is a functional biochemical approach to improving cellular biochemistry by means of providing necessary cofactors and coenzymes that favor optimal physiological balance to attain and maintain the healthy state. Metabolic Correction is achieved by judicious hydration, nutritious food intake and scientific supplementation. In addition, identification of contaminants, endocrine disruptions and infections is necessary to properly address the underlying cause of disease.

 ISSN 0317-0209

Physiologic modulation induces functional changes accomplished by the use of nutrition and botanicals that support defence and repair mechanisms to achieve homeostasis. The combined use of metabolic correction and physiological modulation principles may reduce the requirement of medications and their adverse effects, while improving treatment outcomes.

Introduction

Western medical science lacks an all-embracing philosophy and theory to describe the health and disease continuum and its therapeutic approach in a profound, explicative and functional manner. We are proposing the unification of two remarkable medical paradigms: Orthomolecular Medicine and Systemic Medicine with their mechanistic counterparts; Metabolic Correction and Physiological Modulation as tools to achieve the healthy state by attaining physiological optimization.

Modern pharmacological therapeutics is based on a reductionist point of view, which limits the ability to understand the organic wholeness of the person. Rather than seeing body, mind and spirit, as an integrated system, it merely treats and often suppresses an isolated symptom. This may explain why conventional medicine has become increasingly dehumanized. Current allopathic medicine regards traditional forms of healing as unscientific quackery; however, in many ways, several of these practices, based on a comprehensive philosophical approach, are less primitive, more systematic in essence and more humane than orthodox therapeutics (Hankey A., 2005).

The Healthy State

The healthy state is a physiological status of balance in which the cells are functioning with all their physiologic capabilities. For this to happen, the cell needs all the necessary fluids, electrolytes, macromolecules, micronutrients, enzymes and cofactors to allow life-sustaining functions to proceed in a balanced, dynamic fashion. A true healthy state facilitates and promotes energy production, formation of structures, tissue growth and repair, cell differentiation, production of all the necessary chemicals (hormones and neurotransmitters, cytokines, growth factors) in a delicate dynamic balance and proper detoxification. The level of health – excellent, good, average, poor – is determined by the functioning of all cells in the human body. It has been estimated that 37.2 trillion human cells make up the human body (Biaconi et al., 2013). We do not need 100% of them working at 100% capability to have optimal health, but we need most of them working at high levels in order to attain the healthy state. Oxygen, water, amino acids, fatty acids, sugars, vitamins, minerals, and trace elements are needed for the myriad biochemical reactions taking place in each cell. Cellular health is based on a synergistic combination of nutrients in the necessary quantity (dose) and quality (form) received with the necessary frequency needed to help maintain this continuum. Although the precise amount needed by each individual varies, a conscious diet and judicious supplementation are necessary to attain this goal.

If a person eats a nutritionally deficient diet, high in refined carbohydrates, sodium, preservatives and artificial colors and flavors, low in micronutrients and phytonutrients, the cells will not have all the necessary elements to function optimally. Chronic insufficiency of these nutrients is the most frequent cause of cellular dysfunction, thus deviating toward the pathological or disease state. In addition to nutrient insufficiency, commercially processed food, unless organic, may have increased amounts of toxins such as pesticides, heavy metals or oxidized fatty acids, all of which interfere with proper cell functioning that may lead to tissue, organ and systemic dysfunction.

- The gastrointestinal tract, may suffer from insufficient enzyme production, resulting in undigested food leading to dysbiosis and inflammation, and/or food sensitivities leading to allergies and more inflammation.

- Imbalances of fatty acids (omega 3 to omega 6 ratio) and accumulation of metabolic by products (such as homocysteine), decreased NO, elevated glucose, elevated insulin, contribute to systemic inflammation and lead to damage in many systems such as the nervous and cardiovascular systems, which results in increased peripheral resistance, reduced circulation and oxygenation to the cells.

 ISSN 0317-0209

Replenishing cells with the necessary nutrients supports energy production and regenerative processes leading to optimal health, thus attaining the healthy state. It may also be necessary to detect excessive exposure to contaminants, to stop further contamination and eliminate them from the body if necessary through a well-designed detoxification program.

The Healthy State–Pathological State Continuum: Role of Epigenetics

Health as described by the World Health Organization is a state of complete physical, mental and social well-being and not merely the absence of disease (WHO, 1948). There is a continuum that goes from vibrant, energetic and robust to fragile, sick and disabled. This Health–Pathology Gradient Continuum will vary in an individual through time and depend on lifestyle factors and to some extent on genetics. Contrary to what many believe today, for most individuals, environment is a greater determinant of health than genetics. It is gene expression rather than genetic predisposition that determines the fate of the patient. It is therefore necessary to understand the dynamics of the Health–Pathology Gradient Continuum. This concept can be expanded to involve all the dimensions of human existence (physical, mental, emotional, social, ecological, economic and spiritual) and the balance and harmony among all those components within the set of values of the person, its society and its environment.

Epigenetics refers to the study of changes in organisms caused by modification of gene expression rather than alteration of the genetic code itself. An inherited variation of DNA regulates chromosome architecture and modifies gene expression without alterations to the underlying DNA sequence. In addition to this, it involves acetylation and methylation of proteins. Nutrigenomics is the study of the effects of food and food constituents on gene expression. It describes how DNA is transcribed into messenger RNA (mRNA) and then translated into proteins, providing a foundation for the understanding of the biological activity of food components (Kaput,J. & Rodriguez, R.L., 2004). Optimal level of wellness (Healthy State) requires investment of education and effort to acquire nutritionally dense food in adequate quantity and quality, amounts and time, exercise, good hygiene and awareness of the increasingly prevalent environmental toxins.

Metabolic Correction: Addressing the Root Cause of the Pathological State.

Metabolism is the sum of all the enzyme-facilitated biochemical reactions that occur in the body and which are needed to sustain life. Metabolic enzymes are proteins that have functional specificity based on their tri-dimensional conformation. Enzymes require non-protein cofactors and coenzymes, (vitamins, minerals, and other micronutrients) in order to achieve their full activity. When metabolic enzymes lack their required cofactors their activity is greatly diminished, the necessary reactions will not occur and a biochemical derangement arises. If this unbalanced metabolism continues, biochemical-physiological disarray will ensue that will favor the pathological state.

The Metabolic Correction concept provides the biochemical explanation for the utilization of nutrient cofactors for preventive and therapeutic purposes against disease. Metabolic Correction is a biochemical/physiological concept that explains how improvements in cellular biochemistry help the body achieve metabolic or physiological optimization. Impaired or incomplete cellular biochemical reactions are amended with Metabolic Correction (Gonzalez& Miranda-Massari, 2012; Gonzalez, et al., 2015; Miranda-Massari, 2015).

Inadequate dietary intake of vitamins and minerals is widespread, mostly due to excessive consumption of calorie rich, nutrient poor, refined food. Sub-optimal intake of micronutrients often accompanies caloric excess. These inadequate intakes may result in metabolic disruptions. Episodic shortages of micronutrients were common during evolution. Natural selection favors short-term (emergency) survival at the expense of long-term health. Short-term survival was achieved by allocating scarce micronutrients by triage (Ames, 2006), meaning prioritization of the use of relatively scarce nutrients for the most fundamental life preserving functions. In metabolic reactions, enzymes involved in adenosine triphosphate (ATP) synthesis would be favored over those involved in deoxyribonucleic acid (DNA) repair, as well as favored over those involved in the production of multipart immune system components and complex neurological chemicals. When there is a lack of synergistic components of the metabolic network, an array of negative metabolic

 ISSN 0317-0209

repercussions result, eventually leading to loss of a healthy physiological equilibrium followed concurrently by the emergence of degenerative diseases.

Many types of physiological impairments due to inadequacy of vitamins and minerals can lead to suboptimal organ-system function including poor drug metabolism, insufficient neurotransmitter production and impaired immune defences. Chronic vitamin-mineral under-nutrition reduces immune competency and central nervous system efficiency, while increasing morbidity, which may lead to increases in degenerative diseases perpetuating the pathological state. Optimizing health by improving enzyme efficiency and thereby metabolism and physiology is the basis of metabolic correction.

To summarize, metabolic correction has three important biological actions: First, optimize cellular function by improving enzymatic efficiency; second, produce a pharmacological effect to correct abnormal cell function due to the biochemical disarray produced by the disease process and; third, increase energy production needed to maintain the organization and communication necessary for keeping the physiological balance vital for the healthy state. An optimum intake of micronutrients and metabolites, which varies with age, environmental factors and genetics, should correct metabolism and markedly improve health at a modest cost.

Systemic Medicine: Modifying Physiology Toward The Healthy State

The pathological state results from multiple causes and therefore the health solution needs a synergistic partner in addition to supplying cofactors in the right form and dose that influence cellular biochemistry. This synergistic partner must influence physiology and provide key exogenous, friendly molecules that produce, replicate or enhance a necessary physiological effect that will help restore normal physiology favoring the healthy state. Botanical medicine takes advantage of a wide variety of metabolic friendly molecules that possess the structure and/or chemical properties needed for a specific action. The idea of using tonic remedies to restore balance and health in a person is an ancient idea. The word and concept of an “adaptogen” is a relatively new way of describing a type of remedy commonly found in traditional Chinese (Qi tonic), African (Manyasi), Tibetan, Ayurvedic (Rasayana) and Cherokee medicine.

The term “adaptogen, introduced by Lasarev in 1947, defines “a substance of plant origin that is able to increase a non-specific resistance of the organism to stress factors and thereby promote its adaptation to stressful external conditions” (Antoshechkin, 2001). The idea was to find ways to enhance the productivity and performance of soldiers, athletes and workers without using dangerous stimulants.

The administration of this pharmacological concept results in the stabilization of physiological processes and promotion of homeostasis leading to the healthy state. Adaptogens seem to regulate homeostasis via several mechanisms of action, linked to the hypothalamic pituitary-adrenal axis and the regulation of key mediators of stress response, such as molecular chaperons, cortisol and nitric oxide (Panossian & Wikman, 2010). Most adaptogens also have anxiolytic and antioxidant properties.

Secondary metabolites, such as alkaloids, terpenoids, steroids and polyphenols, have a role in other important functions that give plants adaptive advantages in particular environments. Some of these compounds contain information molecules with unique properties that are useful to provide valuable biologic effects across many species. These include therapeutic uses from anti-viral to anti-inflammatory, and an increase ATP production. Flavonoids, typesof polyphenols, act as pigments giving color to flowers and fruits. Their anti-viral and anti-inflammatory properties can benefit humans. The benefits of adaptogens are more encompassing because they exert their effects in additional fundamental biological processes such as oxidative phosphorylation and nitric oxide production. These effects have been demonstrated in adaptogens such as Rhodiola rosea and Eleutherococcus senticosus.

The Systemic Theory of Living Systems originates from the phenomenological idea that physiological health is based on three factors: functional organic energy reserve; active biological intelligence; integrity of its structure or organization. A treatment strategy called Systemic Medicine (SM) is derived from this theory. SM’ main mechanism of action is

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Physiologic Modulation (PM), which involves identifying and prescribing phytomedicines and/or other natural medications that strengthen health by supporting physiological mechanisms.

Systemic Theory postulates that health is directly proportional to the integrity of a living system's energy, bio-intelligence and organization (Olalde, 2005; Olalde & Rangel, 2005). Systemic Theory also establishes a common denominator to all sickness and attributes the cause of disease to be an increase in entropy: disorder augmenting within the biological system, stemming from energo-informational and organizational impacts.

Therefore the basic purpose for including suitable adaptogens in all age-related diseases is to activate or improve deteriorated or diminished neuroendocrine and cellular energy metabolism.

Energy and the Healthy State

The application of Physiologic Modulation consists in classifying and applying herbs according to type: energy stimulators; biological intelligence modulators; and organizational (structural and functional) enhancers. Energy, intelligence and organization are essential to life. A dead organism has no energy beyond the matter that it is composed of, no biologic intelligence and no organizational function. A sick organism has diminished levels of these three elements, while a healthy one has all three in suitable amounts.

The second law of thermodynamics states that a system naturally tends to go from a state of higher energy and order to one of lower energy and disorder. The same occurs in living systems whose internal entropy tends to increase with aging, going from health, energy and physiological order towards sickness, asthenia and physiological disorder. Illness, however, can be countered. According to Erwin Schroedinger, the quantum physicist, the general change of entropy in a living system consists of internal entropy variations and entropy exchange with the environment. Internal entropy in a biological organism, by definition, tends to be greater than zero due to inner irreversible processes.

Therefore, negative entropy provided from the environment may reduce the entropy of a biological system (Von Stockar & Liu, 1999). The decrease of entropy in living systems is provided by free energy, released when nutrients consumed from the outside dissociate, i.e. at the expense of the sun's energy. Thus, the flow of negative entropy is important to compensate for inner destructive processes and the decrease of available free energy dissipated by spontaneous metabolic reactions. Circulation and transformation of free energy drives the functions of living systems (Korotkov, Williams & Wisneski, 2004).

The Living System is a unit comprised of elements that work in a coordinated manner, each in service to the other, to achieve the common goal of survival. Intelligence is the regulating entity that controls and integrates parts of a living system into a functional unit, directed towards survival. Energy is the fuel that causes action or movement. Organization is a group of elements ordered as a functional unit, directed towards goals established by the intelligence that rules them. In a living system, these work synergistically.

All living systems are functional units that seek maximum survival (Hubbard, 1950). The cell is the simplest form of a living system which functions as a basic building block of the living universe, just as the atom does in matter. Chaos occurs in the absence of intelligence. Intelligence is energy dependent. The proof of this is that no living system can exist without intelligence. The intelligence of the system creates and utilizes energy with the prime role of achieving organization and evolving into a higher system (Owens & Van de Castle, 2004).

Intelligence may be defined as an emergent informational entity, capable of learning, exerting control, emitting and receiving communication, handling energy flow, establishing feedback mechanisms and creating organization for survival.

The concept of intelligence becomes more objective and functional when treated as an informational entity, one dependent on information exchange, which has a thermodynamic interpretation. A change of entropy will produce a

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change or variation in information availability and therefore a change in intelligence and order in the biological system. Any entity that can exchange information can also generate changes of entropy.

Failure in cellular energy metabolism is a common denominator in chronic degenerative diseases. This is where energy plants and energoceuticals (Gupta, 2005) acquire importance. Adaptogens support the activation and synchronization of both neuroendocrine systems and cellular energy metabolism, that have been reduced by illness, physical/mental fatigue and aging. Scientific literature abounds with descriptions of specific biochemical mechanisms of adaptogenic action: (Antoshechkin, 2001; Wu, Wang, & Li, 1998; Gaffney, Hugel, & Rich, 2001; Kim et al., 2004; Zhang, Wang, Wang, & Gao, 2004; Gorgen, 2005; Lopez-Fando, Gomez-Serranillos, Iglesias, Lock, Upamayta, & Carretero, 2004; Agrawal, Rai, & Singh, 1996; Ramachandran, Divekar, Grover, & Srivastava, 1990; Yang, Wang, & Jin,1990; Wang, Yang, & Jin, 1990; Wang, Zhou, & Yang, 2003; Kotsiuruba, Bukhanevych, Tarakanov, & Kholodova, 1993; Tashmukhamedova, Almatov, Syrov, Sultanov, & Abidov,, 1986; Kutuzova, Filippovich, Kholodova, & Miladera, 1991; Bucci, 2000; Siquerira, 2003; Maslova, Kondrat'ev, Maslov, & Lishmanov, IuB., 1994; Spasov, Wikman, & Mandrikov, 2000; Darbinyan et al., 2000; Shevtsov, Zholus, & Shervarly, 2003; Abidov, Crendal, & Grachev, 2003).

Our hypothesis proposes that the survival potential (health) of every human being could be improved by a synergetic increase of any or all of the three interdependent factors a energy, intelligence and organization (Haken, 2000). Olalde (2005) compiled a group of systemic treatments by combining superior plants, adaptogens and tonics, i.e. phytomedicines that could modulate all three axes of the health (or survival triangle) and complement Metabolic Correction.

According to this hypothesis the triangle's integrity reflects an organism's entropic status, which can be enhanced by providing energy and information to cells. Moreover this furnishes negative entropy from herbs, to create an endogenous healing tendency within the body called syntropy. The results obtained using this method by 150 MDs in 300,000 patients reveal an improvement in their clinical condition and quality of life, without significant adverse effects. In other words, when all three factors were enhanced, patients' began to recovernormal health. This experience has demonstrated the functionality of the hypothesis. This highly successful healthcare methodology became known as Systemic Medicine (SM) because it provided "a solid systematic foundation in disease cognition" based on a healing philosophy (Olalde, 2003; Ames, 2003). The main mechanism of this therapeutic avenue is Physiological Modulation. This methodology differs significantly from orthodox systemic medicine concepts, which categorize as "systemic" a reduced number of pathologies considered to affect the whole body, as well as the synthetics used in their treatment. The divergence between these medical systems lies in the fundamental postulate that all chronic degenerative diseases should be treated as "systemic" with a whole body therapy using nutraceuticals that provide negative entropy.

Health Entropy

How does life defy entropy? In physics, entropy is defined as the measure of disorder in a system. Disorder, in turn, can be expressed mathematically by probability of random occurrence. All pathologies, by definition, result from a higher than normal organic entropy; thus, to induce health, entropy must first be reduced. Contemporary thermodynamics defines entropy (or chaos) in an intelligent system as a deficiency in energy and/or information. Therefore, entropy is inversely related to information and energy availability.

Recognizing entropy as a deficiency in energy and/or information in intelligent systems gives the opportunity to amplify this concept. We must recognize that entropy (chaos) is constitutive of life.

A basic common premise in this new thinking proposes that information and energy have an inverse correlation with entropy. In other words, evidence suggests that no suitable organization can be attained in living systems that possess reduced levels of information or energy. Disease, therefore, may be defined as a state of disorganization, i.e. higher organic entropy, corresponding with a low energy/informational status of the system. All diseases originate from lack of energy.

In consequence, if a reduction in illness is to be achieved, entropy must be reduced. A comprehensive way of accomplishing this is administering negative entropy, or order, through adaptogens and tonic plants which stimulate the

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production of energy and provide survival information to the immune, neuroendocrine and cellular systems. For a more complete result or system optimization, this must be accompanied by Metabolic Correction that complements the action of Physiologic Modulation via the provision of necessary cofactors and coenzymes that guide cellular metabolism.

These two therapeutic physiologic balancing actions, together with active biological intelligence, create the necessary environment to favor the Healthy state. As explained by Ames, enzymes catalyze the majority of chemical reactions that take place in living organisms. The mechanisms of enzyme-catalyzed reactions in general involve two aspects: first, the formation of a complex between the enzyme and a substrate, and second, the breakdown of this complex to form the products of the reaction. The rate-determining step is usually the breakdown of the complex to form the products. Under conditions such that the concentration of the complex corresponds to equilibrium with the enzyme and the substrate, the rate of the reaction is given by the Michaelis-Menten equation (Ames, Elson-Schwab, & Silver, 2002).

The rate of an enzyme-catalyzed reaction is approximately proportional to the concentration of the reactant, until concentrations that largely saturate the enzyme are reached. The saturation concentration is higher for a defective enzyme with decreased affinity for the substrate than the normal enzyme. For such a defective enzyme the catalyzed reaction could be made to take place at or near its normal rate by an increase in the substrate concentration. The mechanism of action of gene mutation is only one of several that lead to disadvantageous manifestations that could be overcome by an increase in the concentration of enzymatic cofactors. These binding problems may result in metabolic inefficiency with the accumulation of metabolic by-products. In general, this is the Law of Mass Action: as the vitamin and mineral concentration increases, enzyme efficiency increases. These considerations suggest a rationale for Metabolic Correction where one provides the needed cofactors in the amount needed to improve function. This increased enzyme efficiency may allow a genetic defect to be overcome. This biochemical activity follows the chemical principle of Le Chatlier, which states that when stress is applied in an equilibrium situation, it will move in the direction to minimize stress. In this case there is an unfavorable equilibrium of active enzyme that with the addition of necessary nutrients will be moved toward a more physiologically favorable metabolic state (Bland, 1981).

Many human genetic diseases due to defective enzymes can be remedied or ameliorated by the administration of high doses of the vitamin component of the corresponding coenzyme, which can partially restore the enzymatic activity (Ames, Elson-Schwab, & Silver, 2002). Several single nucleotide polymorphisms, in which the variant amino acid reduces coenzyme binding and thus enzymatic activity, can be remedied by raising cellular concentrations of the cofactor through high dose nutrient therapy.

Inadequate intake of vitamins and minerals from food can lead to DNA damage, mitochondrial decay, and other pathologies (Ames, 2006). Ames (2006) suggests that evolutionary allocation of scarce micronutrients by enzyme triage is an explanation of why DNA damage is commonly found during micronutrient deficiency states. Also, Motulsky (1987; 1992) has argued that many common degenerative diseases are the result of an imbalanced nutritional intake with genetically determined needs.

Synergy is a quality of informational systems. It can be understood as the resulting effect that is greater than the algebraic sum of the parts. Synergy is an important characteristic of third-stage systems. The increase of energy availability within a third-stage, living, system also decreases its entropy, potentially generating an endogenous tendency for informational flow and a heightened intelligence; this in turn generates organization. By analogy, an increase of information will, on its own, raise intelligence, which will positively influence energy and organization.

If there is communication, intelligence exists. Communication is a manifestation of intelligence. The existence of biochemical and biophotonic communication in cells has been corroborated: biochemical communication, for example, between the neurological and immune systems, has been examined, among others, by Blalock (1989), Cavagnaro and Lewis (1989), and more recently Takeda and Okomura (2004) and Cooper (2004).

To recap, the tendency to reach order depends on available energy and information within the system, which determines the level of stable organization. The quantity of true information (conceptual data, not noise) transferred to the system's modulating intelligence allows for chaos and/or confusion management and, enhances the system's ability to attain a higher level of organization. Moreover, only an intelligent system can process information and energy to

reduce entropy. Intelligence is the way in which life counters entropy. Also, effective communication is necessary to maintain organization.

Detox and the Healthy State

Detoxification is the process of changing molecules with harmful potential in the body to a form that is less damaging, and moving them out of the body. The three phases of detoxification require substantial energy, multiple enzymes, and other cofactors. When applying Metabolic Correction and Physiologic Modulation in an individual, it is important to consider not only the biochemical disruption directly associated with the pathology of concern, but also the whole system. For example, a patient might have cancer secondary to a metabolic energy problem that limits the capacity of certain cells and tissues to sustain differentiation. To help this patient, improving mitochondrial energy production is essential. However, this is not achieved solely by providing the cofactors necessary for aerobic respiration. We also need to eliminate toxic compounds that interfere with mitochondrial function. Toxins enter the body through the lungs, intestine and skin, and once they are circulating in blood enter the liver, the main detoxification organ of the body. Supplying a number of nutrients and botanical compounds is useful to deal with an excess toxin load. Medications, air pollutants and heavy metals are examples of toxic compounds. The more of these we are exposed to and the less efficient our detoxification system, the more toxins will accumulate, becoming increasingly harmful to the individual. Reducing exposure and helping the liver detoxify with micronutrients and botanical compounds is important. Micronutrients well known to support the detoxification processes in the liver include B vitamins, glutathione, NAC, vitamin C and others (Pizorno & Murray, 1999, pp. 689-693; Anderson & Kappas, 1991; De Vries & De Flora, 1993). Botanical compounds useful in detoxification include iurmeric, ginger, green tea, milk thistle (Pizorno & Murray, 1999, pp. 689-693; Dalvi, 1992; Percival, 1997; Crinnion, 2000; Blumenthal, Goldberg, & Brinkmann, 2000).

Once this process is optimized, toxins can be rendered less harmful and removed through the skin, kidney, lungs and colon. Nevertheless, when the amount of toxins exceeds the detoxification capability, the toxins will be stored in the body. Each toxin will be stored preferentially in certain tissues depending on its chemical characteristics. Therefore if toxins are more lipophilic, they will be stored in adipose tissue, bone marrow, liver, nervous tissue and brain. If toxins are hydrophilic they will accumulate in muscle, tissues, joints and blood. Metabolic correction and physiologic modulation will help the liver achieve its maximum detoxification capacity. Other methods like chelation (to trap and eliminate toxins) and energy emission (infrared sauna) to increase elimination processes may be considered. In addition, the altered microbiota (Astafurov, 2014) and the presence of chronic, subclinical infections (Müller, 2003; Wald, Zeh, Selke, Ashley, & Corey, 1995) must be determined, as these are sometimes causes of additional physiological stress, biochemical derangements and health complications. In this case, metabolic correction and physiologic modulation might not be enough to efficiently improve the condition and additional therapeutic measures must be considered to further improve results. Patients may become more ill when quiescent deposits of toxins are stirred up by efforts to remove chemicals or metals.

Conclusion

There are more than 100,000 deaths annually in the US due to medication properly prescribed and taken as directed (Leape, 2000; Lazarou, Pomeranz, & Corey, 1998). Fatal adverse side effects appear to be the fourth leading cause of death in the US. Although the use of medication is necessary, excess medication produces excessive toxicity and expense. The use of metabolic correction (scientific supplementation, Orthomolecular therapy) and physiological modulation (phytomedicine, systemic therapy) may reduce medication requirements, reduce adverse side effects and improve treatment outcomes (Miranda-Massari, Gonzalez, Jimenez, Allende-Vigo & Duconge J., 2011).

Competing Interests

The authors declare that they have no competing interests.

 ISSN 0317-0209

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 ISSN 0317-0209