

## Toxins, Malnutrition, Stress, Infections and Electromagnetic Pollution: Looking about New Perspectives in Development of Diseases

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### Abstract

This review addresses the effect of ingested toxins, malnutrition, stress, infection, and electromagnetic pollution in development of diseases. Some toxins are transmitted by umbilical cord blood in birth and others are ingested by orally as monosodium glutamate, fructose, soft drinks, gluten, oils, xenoestrogens and heavy metals. Consequently, these toxins if accumulate in the body and overloading the liver, favoring only diseases. Lack of basic nutrients as water, magnesium, iodine, stomach acid, amino acids and fatty acids were strongly linked with achlorhydria, growth of diabetes and cardiovascular disease. Dental infection destroys mitochondria's through of gliotoxins, mercury, thioesters and oral infections can cause many systemic diseases. Root canals contain a significant source of bacteria and fungi in the circulation blood and endodontic treatment can be the cause of anaerobic bacteremia and fungemia predisposing the chronic disease. Sleep deprivation and to sleep with light on, tablets, cell phone next to bed commits the release of melatonin by pineal gland. Electromagnetic pollution contribute for headaches, depression, anxiety, palpitation and these symptoms are linked with electrical hypersensitivity that have been associated with diabetes, multiple sclerosis and attention deficit hyperactivity disorders. Thereby, we believe that is need paradigm change in the medical model for investigate these factors in your patients because currently this is not being done.

**Keywords:** Toxins; Malnutrition; Stress; Infections; Electromagnetic pollution

### Introduction

Nowadays, why do some people get sick and others not? Worldwide, the people live connected the internet, drinking more beer and sugar-sweetened beverage that water, consuming more processed foods compared the ancestors, do not sleep needed and taking drugs for control some diseases. Hippocrates, father of medicine, 431 B.C. said: Let food be thy medicine and medicine be thy food, however, currently we do drugs our food and drugs are foreign substances for human body containing adverse effects. Unfortunately, current medical model is based in suppression of symptoms thereby, are prescribed more drugs for treatment of symptoms. On the other hand, the conceit of prevention of diseases and like having health is little taught in majority medical schools worldwide, and this form, the physicians become experts only in diseases treatment.

When compared Neolithic Era with lifestyle current is noteworthy the differences in the type of food, time of sun exposure, hours of sleep, physical activity (Table 1). We consumed more calories daily compared decade of 1980 modifying the leptin, hormones satiety [1,2].

Therefore, is crucial clarify the factors that impart resilience or contribute development some diseases that may arise through of toxins, malnutrition, infections, stress and electromagnetic pollution (Figure 1). Thereby, is objective this narrative review explain role these factors in diseases source and suggest alternative measures for prevention and illness treatment.

### Toxins

We eat what not should eat and thus overload the liver that is responsible for cleaning of toxins consumed as sugar, some sweeteners and oils for cooking, soft drinks and fructose (Figure 2). Toxins have presents in air, soil, water and some can be in the foods. However, some toxins can be transmitted umbilical cord blood of according with Environmental Working Group (EWG). This study, the researchers

found an average 200 industrial chemicals and pollutants in umbilical cord blood from 10 babies born in August and September 2004. After cord was cut, umbilical cord blood harbored pesticides, gasoline, consumer product ingredients, garbage and waster from burning coal [3]. High intake of sugar in pregnancy is great problem for newborns. Results of study HAPO (Hyperglycemia and Adverse Pregnancy Outcomes); found that of higher levels maternal glucose were associated with birth weight and an increased in the levels C-peptide in the cord-blood [4].

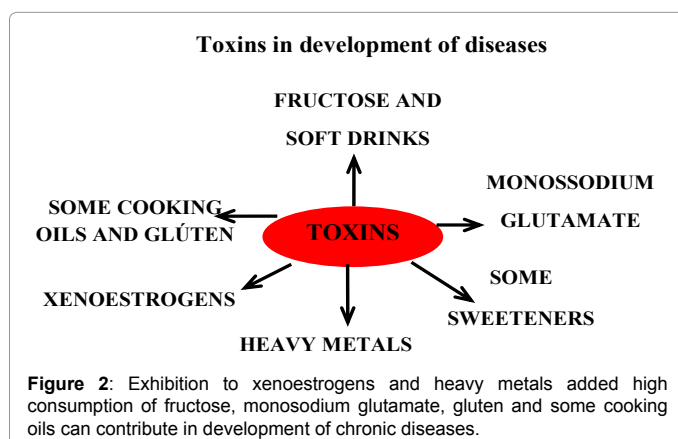
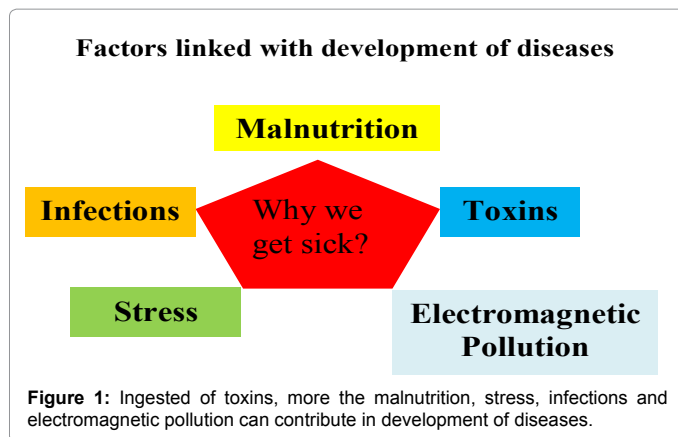
Pesticides are considered essential for development of agriculture in worldwide, moreover the high levels of pesticides accepted for some countries like Brazil, become a great problem of health public [5]. Furthermore, they kill the funds and decreased the production of humic acid and fulvic acid which are crucial in the formation of feedstock for soil. Atrazine is the one of the most widely used herbicides in the Unites State in cultivation and have been associated with complications in female reproduction [6,7] and toxicity on human liver [8]. Heated Foodstuffs are dangerous for health. Besides, is noteworthy that French fries are strongly consumed for children's, teens and adults the entire world, but when the potato is heated, she becomes in acrylamide, a carcinogen compound that may build-up in body human [9]. Thereby, there is a toxic overload in liver, kidneys, gut, pancreas and immune dysregulation contributing for appearance of diseases [10].

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Monosodium glutamate (MSG) is the sodium salt of glutamic acid used in the food industry as flavor enhancer that intensifies for meaty, stews and meat soups that may increase sensibility for the flavor umami. MSG produces a salty flavor when added to food, thus excites your taste buds umami stimulating the release of brain neurotransmitters as glutamate. Glutamate is a neurotransmitter excitatory essential role for learning and memory it being, crucial for body in the produce of GABA (gamma-aminobutyric acid), which is a calming and inhibitory brain chemical. However, high intake of processed foods with MSG may make body lose the ability to convert glutamate into GABA, leading the build-up of glutamate with deficiency of GABA. Therefore, these dates has been linked to serious disorders, like: Obesity and Metabolic Syndrome [11,12], Autism [13] and Alzheimer's disease [14].

Artificial sweeteners are consumed frequently for people trying to lose weight including obese children, patients with Diabetes and some sweeteners can have negative effects. A study done in 2014 found that consumption of artificial sweeteners it is associated with development of glucose intolerance through of induction of compositional and functional alterations to the intestinal microbiota in mice [15]. Aspartame is artificial sweeteners composed of methanol (10%) phenylalanine (50%) and aspartic acid (40%). After, human body convert methanol in formate, it can be excreted or can give rise to formaldehyde and a number of other highly toxic derivatives as the diketopiperazine, a carcinogen [16]. In a review done in 2008 researches reported that aspartame altered amino acid metabolism, integrity of nucleic acids, neuronal function, and balance endocrine and brain concentration catecholamines [17]. Furthermore, previously studies suggested an association between Aspartame consumption and risk of type 2 Diabetes [18] and preterm delivery [19].

Fructose is a kenotic monosaccharide sweeter that glucose or sucrose. Your absorption, digestion, metabolism differs from those of glucose. Unlike glucose, she does not stimulate insulin secretion or enhance leptin productions that control the food intake and body weight. Thus the high fructose consumption may contribute to increase energy intake and obesity [20]. There was an increase significantly of intake fructose of 1970 to 2000 and a 25% increase in added sugars this period [21]. In the pre-industrialization, the average consumption was day 15 g/fructose day and we obtained fructose through fresh fruits, vegetables and honey. However, with the inclusion of high-fructose corn syrup (HFCS), a sweetener made from corn starch more cheap that white sugar and done for replacing table sugar in food, made with that fructose intake increased 37 g/day and currently average consumed is 72.8/day [22]. Consequently, there was an increase of diseases as metabolic syndrome [23], diabetes [24], hypertriglyceridemia [25], nonalcoholic fatty liver disease [26] and cardio metabolic diseases due to high intake of HFCS. We increased sugar and fructose intake in the foods producing a new disease for society, the diabetes [27].

The soft drinks intake has been linked the type 2 diabetes [28,29], risk of gout [30], obesity and metabolic syndrome [31], deleterious effects on bone health [32] and coronary artery calcification [33]. Beyond sodium, some soft drinks containing caffeine which has diuretic effect, this form, how much more caffeine and sodium have in soft drink, more thirst the people will have, consuming more. A can of soda contains an average 150 cal, multiplied by 365 days (1 year) and divided by 3500 cal equivalent to about 500 g of weight, because for every 3,500 eaten and unburned calories, you gain about 500 g of weight [34]. Thereby, is noteworthy that over time the size of can of soda increased, thus there was an increasing in amount of calories, linked with weight gain of according to the Table 2. Interestingly, controlled trial done in schools with obese children found that the obesity decreases when the withdrew soda vending machine. In contrast, the obesity continues the increased in the schools with the soda vending machine [35].

Xenoestrogens are a sub-category of the endocrine disruptor group that imitates the actions of estrogens such Polychlorinated biphenyls

Neolithic period	Worldwide
Organic foods	Processed foods
Good sleep quality	Poor sleep quality
High sunlight's (more vitamin D)	Low Sunlight's (less vitamin D)
Low sanitation	High sanitation
High physical activity	Low physical activity
Higher breastfeeding	Lower breastfeeding
Normal Birth	Cesarean
Without artificial lights and telephone	With artificial lights and telephone
Active lifestyle	Sedentary lifestyle
High intake of fruits and vegetables	Low intake of fruits and vegetables
Absence of fast food consumption	Increase of fast food consumption
Low sugar intake	High sugar intake
Little consumption of antibiotics	Indiscriminate use of antibiotics
Low sodium diet	High sodium diet
Soil rich in minerals (potassium and magnesium)	Soil poor in minerals
Low consumption of alcoholic beverage	High consumption of alcoholic beverage
Low consumption cigarette smoking	High consumption cigarette smoking
Low gluten diet	High gluten diet
Absence dairy, sausages and juices	High dairy consumption, sausages and juices
High water intake	Low water intake

**Table 1:** Differences of food between Neolithic period and worldwide.

Year/Amount	Calories	Days	Calor X Days	Overall/3500 Cal	Weight/Year
1915...192 mL	82,28	365	30032	8,58	4,29
1955...300 mL	128	365	46720	13,35	6,67
1960...350 mL	150	365	54750	15,64	7,82
1990...590 mL	252,85	365	92290	26,37	13,18
1991...1000 mL	428,57	365	156428	44,69	22,35
1992...2000 mL	857,14	365	312856	89,39	44,69

**Table 2:** Amount of soda and weight gain.

(PCBs), bisphenol A (BPA), phthalates and are widely used industrial compounds producing adverse effects in human body. Bisphenol A is food contaminant utilized in fabrication of plastics, internal coating cans and it is found in bottles of plastic, plastic containers to store food, drinks and canned foods and children's glass. However, human exposure to BPA could favor obesity [36], metabolic disorders such as hepatic steatosis [37], insulin resistance in childhood obesity [38], and autism spectrum disorder [39]. Recently, phthalates were associated with birth size and gestational that varied by sex and timing of exposure [40], and yet may affect serum thyroid hormones activity in newborns in period neurodevelopment [41].

Heavy metals chemical are elements constituents of the earth crust, however, high levels these compounds can lead the bioaccumulation in the human body and poisoning. These toxins can be introduced into the human body through beverages, foods, skin exposure and the inhaled air it is impossible to live in an environment free of heavy metals. That way, they change the function in glands and organs as enzymes, liver, bone, kidney, brain and heart. Lead can inactive the action of calcium, zinc, iron and when added to arsenic, cadmus and mercury produce synergism, increasing your toxicity. Besides that, they displace the vital nutritional minerals from their original place changing your biological function. On the other hand, as trace elements some metals as zinc, iron, cobalt, copper, selenium, and manganese are essentials for human body [42].

Lard or butter pig is composed of triglycerides obtained from any part of the pig where there is a high proportion of adipose tissue and was used in the past for people to cook. However, she was replaced by vegetables shortening (Crisco) from of 1911, with the strong advertising of be better than butter for you cooking and healthier. Vegetables oils are formed through an industrial process that adds hydrogen to vegetable shortening (partially hydrogenated), that it is cheaper to produce and required no refrigeration. So, the oil is solid at room temperature but melts at cooking temperature increasing shelf life of foods, thereby, there was the costs reduction and in a time when refrigerators were rare [43,44]. Interestingly, after of introduction vegetables oils, the consumption of soybean oil increased more a thousand fold and now supplies about 7% of calories in the U.S diet [45], besides of excess of Omega-6 that is harmful for health. Essential fatty acids as Omega-3 and Omega-6 are crucial for body because he can't produce, must be obtained starting from the diet, but it must get them in a certain balance. In the past, the Omega-6: Omega-3 ratio was in around 4:1-1:2 and currently, the ratio is 16:1 on average with variation between individuals [46]. Added to this, vegetables oils contain large amount Omega-6 that have linked with inflammation [47], cardiovascular diseases [48], diabetes and obesity [49-51], asthma and eczema young children [52], cancer[53,54], homicides rate [55] and depression [56].

Gluten is a compound protein of gliadin and glutenin found in wheat, rye and barley. Gluten is found in biscuits, cakes, pasta, bread,

breakfast cereals, flour, pizza bases, soups, sauces and sausages. He helps dough rise providing elasticity, strength and ability to hold food products together while maintaining a palatable texture [57]. In the past, the native diet of humans consisted of meats, fishes, vegetables and fruits with little exposure to grain, however, in the past 500 years the gluten content of foods increased significantly [58,59]. The gluten proteins may have a unique toxicity profile and distinct T-cell stimulatory sequences, as the gliadin, which cannot be degraded by intestinal enzymes and trigger an immune reaction in predisposed individuals. Therefore, the consumption elevated of gluten in modern diet have been linked the gluten-related-disorders as celiac disease and non-celiac gluten sensibility [60], wheat allergy [61], dermatitis herpetiformis [62], gluten ataxia [63], autism [64] and helicobacter pylori infection [65].

## Malnutrition

Malnutrition occurs when there a reduction of basic nutrients for human body as the water, vitamins, minerals, amino acids and fatty acids. Nowadays, our food is poor in vitamins and minerals because the famers plan only one type of vegetal or fruit in soil (monoculture) and fertilize the land with little nutrients, thus occur a soil nutrients depletion causing a deficiency these nutrients for the fruits or vegetables. The reduction these nutrients in diet represents the largest public health concern contributor for diseases development affecting quality of life of people in developing and developed countries [66]. Currently, more 805 million people worldwide are undernourished and so, the malnutrition leads to deficiencies of micronutrients as the iron, vitamin A, vitamin B12, folate and riboflavin that are linked the anaemia [67].

Some diseases have been associated with reduction of vitamins, minerals, amino acids and fatty acids. Vitamin D deficiency in general population is associated with increased cardiovascular risk [68], allergic diseases [69], death in the intensive care unit [70], musculoskeletal and autoimmune diseases [71,72] type 2 diabetes [73], obesity and cancer [74,75]. On the other hand, a systematic review found that supplementation with vitamin D<sub>3</sub> decreased cancer mortality by 12% and vitamin D decreased all-cause mortality by 7% among adults [76].

Magnesium is the most common element in the crust of earth and is essential for human health, because it is involved in the homeostasis, protein synthesis and DNA stability [77]. However, there a deficiency of magnesium in general population in worldwide, that contributing for a number of chronic diseases such the migraine [78], epilepsy [79], depression [80], Alzheimer's [81], cardiovascular diseases [82], hypertension [83] type 2 diabetes and insulin resistance [84,85], attention deficit hyperactivity syndrome [86-87] asthma [88] and pre-eclampsia [89].

Hydrochloridric acid (HCl) is produced by parietal cells of stomach in response to ingested protein or fat, however, when eats more than required by body and with the aging, acid production begins to decrease. In the body human, stomach pH is 1.5-3.0 and parietal cells need of iodine, zinc, water and thiamine for produce HCl, thereby, when taking H<sub>2</sub> blockers or proton-pump inhibitors there an increase of pH stomach (>4.0) modifying the function of the digestives enzymes and pyloric valve that are pH dependent. Consequently, the low production of HCl decreased digesting food, amino acids, minerals and vitamins principally the vitamin B12 and folic acid, contributing for abnormal growth bacterial, intestinal dysbiose and immune system deficiency. Thus, favor the appearance of diseases like atrophic gastritis [90], gastro esophageal reflux [91], asthma [92] esophagus Barrett



[93], achlorhydria [94] and increased intestinal permeability that can predispose the autoimmune diseases [95,96].

Iodine is an element crucial for all cell and glands of human body especially for the thyroid in production of hormones thyroid and the iodine deficiency is a global health issue, because the amount of iodine in soil is low and intake dietary in adults is <150 µg/day of according World Health Organization [97,98]. Low intake iodine, selenium, zinc and iron have been linked with type 2 hypothyroidism because the deiodinase enzyme no converted T4 to T3 [99,100]. Iodine deficiency in pregnancy have been associated with cretinism [101], impact neuropsychological development in school aged children [102], in adults iodine deficiency is linked with intestinal failure [103] increase cardiovascular disease risk in overweigh people [104], goiter with complications and impaired mental function [105].

## Infections

Nowadays, people in worldwide are dying due to the antibiotic-resistant-bacteria (superbugs) and by infection diseases. Dental infections destroy mitochondria's through of thioesters, gliotoxins and mercury and are the most common diseases in the oral and maxillofacial region. However, majority of chronic systemic disease are due to infection in the tonsils or teeth that are symptom-less and very difficult to detect. Oral infections as the periodontitis can cause the course number of systemic diseases such as cardiovascular disease, cerebrovascular disease, bacterial pneumonia, diabetes mellitus, osteoporosis and adverse pregnancy outcome [106-108]. Cells human body become oxidized by toxins that are pro-oxidant causing damage and altering their normal function and in advanced cancer patients, between two and ten dead teeth, always included root canal teeth. Various study found that all root canal teeth with symptomatic apical periodontitis contain anaerobic bacteria and are a significant source of bacteria and fungi in the circulation blood and endodontic treatment can be the cause of anaerobic bacteremia and fungemia and thereby predispose the various chronic diseases [109-112].

## Stress

Currently, all living organism are challenged by internal or external adverse effects that change the homeostasis human body, defined like stress. Noteworthy that worldwide the stress in the people increased and no decreased because work, sedentary, food, sleep loss, socioeconomics and ideological factors, contributing by diseases as hypertension [113], diabetes [114], depression [115], some type of cancers [116], autoimmune diseases [117,118] and autism [119].

Sleep deprivation has been liked with various diseases in worldwide because nothing is healthier by human body that a good sleep night. In the past, we ancestral slept much earlier and totally in the dark, thus there was no failure in production of melatonin by pineal gland. In contrast, the current society sleeps with the light on, television on, tablets and cell phone next to bed. So there a failure of pineal gland in release of melatonin because the lighting of these devices stimulates serotonin production, tricking the pineal gland into thinking it's daytime, confusing the wake/sleep cycle.

## Electromagnetic Pollution

Electromagnetic pollution or electromagnetic radiation consists of the waves of energy combining electrical and magnetic fields classified in ionizing radiation and non-ionizing radiation based on its capability of ionizing atoms. Electromagnetic energy that flow along a conductor is a quality power poor also known as dirty energy. Dirty energy is

ubiquitous and is generated by electronic equipment as computers, plasma television, energy efficient appliances, dimmer switches, cell phones and broadcast antennas. In buildings, the neighbors who share the same transformer produce dirty energy that contribute by symptoms of radio wave sickness as headaches, dizziness, memory loss, depression, anxiety, palpitations, arrhythmias, pain or pressure in the chest, low or high blood pressure and these symptoms are linked with electrical hypersensitivity [120,121]. Electrical hypersensitivity affect 3% of the population and 35% have your symptoms. Increase of diseases as diabetes, multiple sclerosis, attention deficit hyperactivity disorders, fibromyalgia and asthma chronic fatigue may be linked with electrical hypersensitivity, but reasons still are poorly understood [122]. A study done in laboratory found that insulin release and insulin binding capacity to receptors cell were reduced by electromagnetic fields [123,124]. Besides, it is know that blood sugar levels are increased by stress in diabetics that are exposed the electromagnetic energy induced the stress proteins at various frequencies [125,126]. More investigation this area are need for discovery the mechanisms involved and percentage of population affected.

## Conclusion

Malfunction of pancreas, adrenals glands and thyroid that are organs unison is gateway by diseases. In the chronic diseases, the patients have type II hypothyroidism, deficiency of vitamins, minerals, fatty acids, low intake of fruits and vegetables, low physical activity and an excess of fat trans and sugar principally because industrialized food that make part diet in population worldwide. Besides, the toxins, heavy metals dental infection and electromagnetic pollution can contribute for complications in chronic diseases, thus all these factors are crucial for epidemics of chronic and Western diseases, which are currently the biggest health problems in the world. However, the health of patients with chronic diseases is not duty of physicians or health professional since each people will also is responsible by your health.

On the other hand, for help chronic diseases patients, we encourage the physicians and health professional look for these factors in your patients because a disease no appear alone and can be starting point for others. Diseases no remains in healthy body, thereby we suggested that the chronic patients substitute the soft drinks by water with pH alkaline, coconut water and pink salt Himalayan, as these nutrients are crucial for human body. Replace processed food rich in fat Trans by foods made by nature. For removed the pesticides used in plantation, placed foods in one liter of water with 5 mL tincture of iodine 2% by an hour preferably covered and without any contact with light (in the oven) due to the oxidation iodine. Replace vegetables shortening (Crisco) by coconut oil or butter pig for cooking, because excess of Omega-6 is harmful for your health and have been linked inflammation, cardiovascular diseases and diabetes. No have afraid eat fatty, but the good fatty like avocado, linseed, coconut oil and olive oil. Remove or decrease gluten intake can fight and treat gluten-related-disorders, wheat allergy, autism and helicobacter pylori infection.

A seasonal detoxification is crucial for clear your body of toxins speeding up your metabolism for enhance health. Taking one cup of water with one lemon in the morning rehydrates body promotes digestion and help in flow of waste of your body. Protocols of validated detoxification as garlic extract, glutathione, magnesium sulfate and saunas can help in various chronic diseases.

Plantation in monoculture and few fertilizers applied in land were crucial for decrease the vitamins, minerals of grains, fruits and vegetables. Foods are born poor and not replenish all that the body

needs, however, the supplementation of micronutrients, vitamins and minerals offer potential to improve health of patients with deficiency nutritional. Sun exposure between 15-20 min/day at midday (heliotherapy) increase levels vitamin D preventing and treating various diseases, besides of be a way cheap for care of health.

Dental infections have been strongly linked with auto-immune diseases. In doubt, is crucial the physician refer the patient for dentist for check the teeth, fact that is have been common in Germany. Electromagnetic pollution can be reduced through Grahan/Stetzer (GS) filters installed in schools with sick building syndrome. Interestingly, the symptoms of asthma in the students were reduced, student behavior with ADHD improved and students with type 1 and 2 Diabetes control glycemic improved, on the other hand, Grahan/Stetzer (GS) filters installed in house of patients with multiple sclerosis demonstrated better balance and fewer tremor.

### Author Contributors

H.A.P performed literature search, analyzed data, wrote manuscript and had final responsibility for final content. M.C.F.F, L.R.L analyzed data, and assisted with writing the manuscript.

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