Chronic Fatigue Syndrome, Fibromyalgia, Scleroderma, Lupus, Rheumatoid Arthritis, MCS: The Mercury Connection

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1.1 Introduction

Chronic fatigue syndrome (CFS) is characterized by fatigue, neurologic symptoms including headaches, brain fog, mood disorders, and motor dysfunction. Millions of people in the U.S. suffer from CFS. An estimated three to six million patients in the US are affected by fibromyalgia (FMS) (581). Spect scans of those with CFS have found that the majority have over 5 times more areas of regional brain damage and reduced blood flow in the cerebral cortex area of the brain (471) than controls. The majority studied were also found to have increased Th2 inflammatory cytokine activity and a blunted DHEA response curve to I.V. ATCH indicative of hypothalamic/adrenal deficiency such as relative glucocorticoid deficiency (472).

CFS and Fibromyalgia patients have also been found to commonly have abnormal enzymatic processes that affect the sodium-potassium ATPase energy channels (473), which appears to be a major factor in the condition and for which mercury is a known cause (43, 288, 498). This also has been found to result in inflammatory processes that cause muscle tissue damage and result in higher levels of urinary excretion of creatine, choline, and glycine in CFS, and higher levels of excretion of choline, taurine, citrate, and trimethyl amine oxide in FM (474, 593, 594). Supplementation of creatine has been found to result in improved muscle mitochondrial function in such patients (502). FM is further characterized by muscle and fibrous tissue pain, and its *prevalence*[1] has been estimated at greater than 7% in women aged 60-79 years and 3.4% for all women (528). A Swedish study found that in one county, 11.6% of women over 35 surveyed had symptoms of Fibromyalgia, while 5.5% of men reported such symptoms (368). A study found that for a group of patients that had both CFS and FM, all had high homocysteine levels, a marker of inflammation (580, Regland et al, 1997). Other factors in CFS and Fibromyalgia include oxidative stress, metal sensitivity, adrenal fatigue, autoimmunity, *leaky gut*[2], organic acid imbalances, food allergies, *IBS*[3], digestive malabsorption of essential nutrients, along with overgrowth of intestinal yeasts, bacteria, or parasites (386a, 580,

[1] **Internet:** "http://www.glycoscience.org/glycoscience/document_viewer.wm?FILENAME=G005&MAIN=glyconutritional
[2] **Internet:** "http://www.flcv.com/leakyghg.html".
[3] **Internet:** "http://www.flcv.com/inflamhg.html".

581, 586). Research suggests that as many as 75% of individuals with fibromyalgia have bacterial overgrowth in the small bowel. Clinical experience has found that the pathogen overgrowths cannot be fully eliminated without detoxification of mercury and toxic metals which facilitate the pathogen overgrowths (581).

Tests also found mercury accumulation in the limbic system and muscle tissues of a sample of fibromyalgia patients tests, and significant improvement after dental revision to replace amalgam fillings and deal with toxic root-canal teeth and cavitations (586).

Factors other than metals that can be involved in chronic fatigue include drug side effects, estrogenic chemicals, chronic stress related adrenal fatigue, hypothyroidism, and poor diet (19), though toxic metals and other toxics can be factors in hypothyroidism and adrenal fatigue. Drugs known to reduce thryroid and adrenal function include birth control pills, hormone replacement drugs, statins, blood pressure medications, anti-histamines, migraine medications, muscle relaxers, pain meds, Evista, tamoxifen, tri-cyclic antidepressants, etc. (19) Birth control pills and HR drugs deplete essential vitamins and minerals including B vitamins, vit C, magnesium, zinc, and tyrosine. Statins and blood pressure medications can damage the liver and deplete the essential enzyme CoQ10 causing cardiovascular problems and fatigue (19). Large numbers have obesity and fatigue related to insufficient exercise and poor diets with too much sweets, sodas, high glycemic starches, low fiber, etc. See the treatment section for more details and options in dealing with such problems.

The main factors determining whether chronic conditions are induced by metals appear to be exposure and genetic *susceptibility*[4], which determines individuals immune sensitivity and ability to detoxify metals (405). Inherited defects in detoxification of environmental chemicals may promote toxicity and fatigue in CFS (386a). Very low levels of exposure have been found to seriously affect relatively large groups of individuals who are immune sensitive to toxic metals, or have an inability to detoxify metals due to such as deficient sulfoxidation or metallothionein function or other inhibited enzymatic processes related to detoxification or excretion of metals. A *study*[5] involving 930 fatigued patients saw more than half (62 percent) test positive for metal allergy. The majority of those who went on to remove the offending metal reported substantial health improvements. When metal particles enter the body (through any number of sources, including dental amalgam fillings) they bind with proteins. This happens to everyone, hypersensitive or not. With hypersensitive people, the new structure is falsely identified by the immune system as a foreign invader. The white blood cells, or lymphocytes, go into attack mode. The activated immune system will up-regulate the activity of certain brain structures (hypothalamus) and adrenal glands (see diagram, right). The brain perceives a warning about danger and prepares for defense against the invader. This stress mode will last as long as the inflammation process is fueled by toxic metals, which have *synergistic effects*[6]. This will result in fatigue while the attack is being carried out by the lymphocytes. When antibodies are produced to attack the protein, the condition becomes far more serious - possibly leading to neuropsychiatric disorders. For those with chronic conditions, fatigue regardless of the underlying disease is primarily associated with hypersensitivity to inorganic and organic mercury, nickel, and gold (118, 313, 342, 382, 456, 590).

1.2 Mercury sources and exposure levels

Amalgam fillings are the largest source of mercury in most people with daily exposures documented to commonly be above government health guidelines (49, 79, 506, 600). This is due to continuous vaporization of mercury from amalgam in the mouth, along with galvanic currents from mixed

[4]**Informativo:** "Susceptibility Factors in Mercury Toxicity: Immune Reactivity, Detoxification System Function, Enzymatic Blockages, Synergistic Exposures".

[5]**Internet:** "http://www.melisa.org/chronic-fatigue-syndrome.php".

[6]**Internet:** "http://www.flcv.com/synergis.html".

metals in the mouth that deposit the mercury in the gums and oral cavity (600). Due to the high daily mercury exposure and excretion into home and business sewers of those with amalgam, dental amalgam is also the largest source of the high levels of mercury found in all sewers and sewer sludge, and thus a significant source of mercury in rivers, lakes, bays, fish, and crops (603). People also get significant exposure from vaccinations, fish, and dental office vapor (600).

When amalgam was placed into teeth of monkeys and rats, within one year mercury was found to have accumulated in the brain, trigeminal ganglia, spinal ganglia, kidneys, liver, lungs, hormone glands, and lymph glands (20). People also commonly get exposures to mercury and other toxic metals such as lead, arsenic, nickel, and aluminum from food, water, and other sources (601). All of these are highly neurotoxic and are documented to cause neurological damage which can result in chronic neurological conditions over time. Mercury induced lipid peroxidation has been found to be a major factor in mercury's neurotoxicity, along with leading to decreased levels of glutathione peroxidation and superoxide dismustase (SOD)(13, 254, 489, 494-496). Antioxidants have been found to protect against such mercury neurotoxicity (494, 572).

Mercury (especially mercury vapor) rapidly crosses the blood brain barrier and is stored preferentially in the pituitary gland, hypothalamus, thyroid gland, adrenal gland, and occipital cortex in direct proportion to the number and extent of amalgam surfaces (20, many studies referenced in (600)) Thus mercury has a greater effect on the functions of these areas. The range in one study was 2.4 to 28.7 parts per billion (ppb), and one study found on average that 77% of the mercury in the occipital cortex was inorganic (600).

1.3 Effects of Mercury (and toxic metal) Exposure

Some of the factors documented to be involved in inflammatory conditions like CFS, FMS, Lupus, Rheumatoid Arthritis, etc and in programmed cell death, apoptosis, of neurons and immune cells in degenerative neurological conditions like ALS, Alzheimer's, MS, Parkinson's, etc. include inducement of the inflammatory cytokine Tumor Necrosis Factor-alpha (TNFa) (126), reactive oxygen species and oxidative stress (13, 43a, 56a, 296b, 386a), reduced glutathione levels (56, 126a, 111a), liver enzyme effects and inhibition of protein kinase C and cytochrome P450 (43, 84, 260), nitric oxide and peroxynitrite toxicity (43a, 521, 524), excitotoxicity and lipid peroxidation (490, 496), excess free cysteine levels (56d, 111a, 33, 330), excess glutamate toxicity (13b, 416), excess dopamine toxicity (56d, 13a), beta-amyloid generation (462, 56a), increased calcium influx toxicity (296b, 333, 416, 432, 462c, 507) and DNA fragmentation (296, 42, 114, 142) and mitochondrial membrane dysfunction (56de, 416), and autoimmunity (313, 342, 382, 405, 513). As will be documented, mercury and toxic metals exposure causes all of these factors.

TNFa (tumor necrosis factor-alpha) is a cytokine that controls a wide range of immune cell response in mammals, including cell death (apoptosis). This process is involved in inflammatory conditions like CFS, FM, RA, Lupus, etc. and in degenerative neurological conditions like ALS, MS, Parkinson's, rheumatoid arthritis, etc. Cell signaling mechanisms like sphingolipids are part of the control mechanism for the TNFa inflammatory and apoptosis mechanism (126a). glutathione is an amino acid that is a normal cellular mechanism for controlling inflamation and apoptosis. When glutathione is depleted in the brain, reactive oxidative species increase, and CNS and cell signaling mechanisms are disrupted by toxic exposures such as mercury, neuronal cell apoptosis results and neurological damage. Mercury has been shown to induce TNFa, deplete glutathione, and increase glutamate, dopamine, and calcium related toxicity, causing inflammatory effects and cellular apoptosis in neuronal and immune cells (126b, 126c). Mercury's biochemical damage at the cellular level include DNA damage, inhibition of DNA and RNA synthesis (42, 114, 142, 197, 296, 392); alteration of protein structure (33, 111, 114, 194, 252, 263, 442); alteration of the transport and signaling mechanisms of calcium (333, 43b, 254, 263, 416d, 462, 507); inhibitation of glucose transport (338,

254), and of enzyme function and transport/absorption of other essential nutrients (96, 198, 254, 263, 264, 33, 330, 331, 338, 339, 347, 441, 442); induction of free radical formation (13a, 43b, 54, 405, 424), depletion of cellular glutathione (necessary for detoxification processes) (56, 111, 126, 424), inhibition of glutathione peroxidase enzyme (13a, 442), inhibits glutamate uptake (119, 416), induces peroxynitrite and lipid peroxidation damage (521b, 56b), causes abnormal migration of neurons in the cerebral cortex (149), immune system damage (111, 126, 181, 194, 226, 252, 272, 316, 355); affects dopamine uptake by neuronal synaptosomes (288), inducement of inflammatory cytokines (126, 152, 181), and induces autoimmunity (181, 313, 342, 382, 405, etc.). Mercury's activation of inflammatory cytokines and Th2 helper immune cells suppresses the cytotoxic response of T-cells and natural killer immune cells that are the body's main defense against viruses and such biological pathogens (181, 472, 580, 581).

A direct mechanism involving mercury's inhibition of cellular enzymatic processes by binding with the hydroxyl radical (SH) in amino acids appears to be a major part of the connection to allergic/immune reactive conditions such as: Lupus (SLE) (331a, 330a, 33, 113, 126, 181, 234, 260d, 288a, 405, 270, 226, 314, 316, 263c, 456) & Scleroderma (330a, 33, 126, 181, 234, 468, 405, 263c) & Rheumatoid Arthritis (287, 288a, 416f, 331b, 330a, 33, 126, 181, 405, 263d, 260d), as well as CFS and FMS that are also related to inflammatory cytokine processes and autoimmunity (181, 118, 313, 314, 342, 382, 405, 126, 330, 33, 263, 582, etc.). One study found that insertion of amalgam fillings or nickel dental materials causes a suppression of the number of T-lympocytes (270), and impairs the T-4/T-8 ratio. Low T4/T8 ratio has been found to be a factor in lupus, anemia, MS, eczema, inflammatory bowel disease, and glomerulonephritis.

Mercury induced autoimmunity in animals and humans has been found to be associated with mercury's expression of major histocompatibility complex (MHC) class II genes (314, 181, 226, 425c). Both mercuric and methyl mercury chlorides caused dose dependent reduction in immune B-cell production (316). B-cell expression of IgE receptors were significantly reduced (316, 165), with a rapid and sustained elevation in intracellular levels of calcium induced (316, 333).

Mercury and other toxic metals also form inorganic compounds with OH, NH2, CL, in addition to the SH radical and thus inhibits many cellular enzyme processes, coenzymes, hormones, and blood cells (405, 600). Mercury has been found to impair conversion of thyroid T4 hormone to the active T3 form as well as causing autoimmune thyroiditis common to such patients (342, 382). In general, immune activation from toxic metals such as mercury resulting in cytokine release and abnormalities of the hypothalamus-pituitary-adrenal (*HPA*[7]) axis can cause changes in the brain, hypocortisolism, fatigue, and severe psychological symptoms (348, 342, 375, 379-382, 385, 386a, 405, 118) such as profound fatigue, muscoskeletal pain, sleep disturbances, gastrointestinal and neurological problems as are seen in CFS, Fibromyalgia, and autoimmune thyroiditis. Such hypersensitivity has been found most common in those with genetic predisposition to heavy metal sensitivity (60, 313, 342, 405), such as found more frequently in patients with human lymphocyte antigens (HLA-DRA) (381-383). A significant portions of the population appear to fall in this category.

Mercury exposure through dental fillings appears to be a major factor in chronic fatigue syndrome (CFS) and Fibromyalgia through its effects on ATP and immune system (lymphocyte reactivity, neutraphil activity, effects on T-cells and B-cells) as well as its promotion of growth of Candida albicans in the body and the methylation of inorganic mercury by candida and intestional bacteria to the extremely toxic methyl mercury form, which like mercury vapor crosses the blood-brain barrier, and also damages and weakens the immune system (222, 225, 226, 234, 235, 265, 293, 60, 313, 314, 342, 404, 581, 590). Mercury vapor or Inorganic mercury have been shown in animal studies to induce autoimmune reactions and disease through effects on immune system T cells (226, 268, 269, 270, 314). Chronic immune activation is common in CFS, with increase in activated CD8+ cytotoxic T-cells and decreased NK cells (518). Numbers of suppressor-inducer T cells and NK cells have been

[7]**Internet:** "http://www.flcv.com/endohg.html".

found to be inversely correlated with urine mercury levels (270ad). CFS and FMS patients usually improve and immune reactivity is reduced when amalgam fillings are replaced (342, 383, 405, 581, 590, 293).

Heavy metal toxicity has been found to be a common co-factor in FMS, as well as root canaled teeth and jawbone cavitations (582). Nickel has been often found to be a factor in chronic autoimmune conditions like CFS and Lupus (342, 456, etc.)

Chronic neurological conditions appear to be primarily caused by chronic or acute brain inflammation. The brain is very sensitive to inflammation. Disturbances in metabolic networks: e.g., immuno-inflammatory processes, insulin-glucose homeostasis, adipokine synthesis and secretion, intra-cellular signaling cascades, and mitochondrial respiration have been shown to be major factors in chronic neurological conditions (592, 593, 598, etc.). Inflammatory chemicals such as mercury, aluminum, and other toxic metals as well as other excitotoxins including MSG and aspartame cause high levels of free radicals, lipid peroxidation, inflammatory cytokines, and oxidative stress in the brain and cardiovascular systems (13, 595-598, 386a, etc.) Exposures to heavy metal toxins can impair energy production and burden the detoxification system (386a). Oxidative stress caused by unstable free radical molecules can damage the energy-producing mechanisms inside the body's cells. Fatigue and/or muscle pain can develop from toxic stress when the body is unable to detoxify harmful waste products or toxins from the environment (386a).

Mercury and other toxic metals inhibit astrocyte function in the brain and CNS (119), causing increased glutamate and calcium related neurotoxicity (119, 333, 416, 496). Mercury and increased glutamate activate free radical forming processes like xanthine oxidase which produce oxygen radicals and oxidative neurological damage (142, 13). Nitric oxide related toxicty caused by peroxynitrite formed by the reaction of NO with superoxide anions, which results in nitration of tyrosine residues in neurofilaments and manganese Superoxide Dimustase (SOD) has been found to cause inhibition of the mitochondrial respiratory chain, inhibition of the glutamate transporter, and glutamate-induced neurotoxicity involved in ALS (524, 521).

These inflammatory processes damage cell structures including DNA, mitochondria, and cell membranes. They also activate microglia cells in the brain, which control brain inflammation and immunity. Once activated, the microglia secrete large amounts of neurotoxic substances such as glutamate, an excitotoxin, which adds to inflammation and stimulates the area of the brain associated with *anxiety*[8] (598). Inflammation also disrupts brain neurotransmitters resulting in reduced levels of serotonin, dopamine, and norepinephrine which can lead to *depression*[9]. (593) Some of the main causes of such disturbances that have been documented include vaccines, mercury, aluminum, other toxic metals, MSG, aspartame, etc. (593, 598, 600, etc.)

Reduced levels of magnesium and zinc are related to metabolic syndrome, insulin resistance, and brain inflammation and are protective against these conditions (595, 43). Mercury and cadmium inhibiting magnesium and zinc levels as well as inhibiting glucose transfer are other mechanisms by which mercury and toxic metals are factors in metabolic syndrome and insulin resistance/diabetes (43, 196, 338, 597).

Fatigue is a hallmark symptom of thyroid or adrenal hormone imbalances (386a, 581). Mercury lymphocyte reactivity, effects on glutamate in the CNS, and mercury induced hypothyroidism induce CFS type symptoms including profound tiredness, musculoskeletal pain, sleep disturbances, gastrointestinal and neurological problems along with other CFS symptoms and Fibromyalgia (342, 346, 405, 293). Mercury has been found to be a common cause of Fibromyalgia (293, 346, 342, 523, 527, 581). Glutamate is the most abundant amino acid in the body and in the CNS acts as excitory neurotransmitter (346, 386), which also causes inflow of calcium. Astrocytes, a type of cell in the brain and

[8]**Informativo:** "Depression and other Neurotransmitter Related Conditions - The Mercury Connection".
[9]**Informativo:** "Depression and other Neurotransmitter Related Conditions - The Mercury Connection".

CNS with the task of keeping clean the area around nerve cells and facilitating neurotransmission, have a function of neutralizing excess glutamate by transforming it to glutamic acid. If astrocytes are not able to rapidly neutralize excess glutamate, then a buildup of glutamate and calcium occurs, causing swelling and neurotoxic effects (119, 333). Mercury and other toxic metals inhibit astrocyte function in the brain and CNS (119), causing increased glutamate and calcium related neurotoxicity (119, 333, 226) which are responsible for much of the Fibromyalgia symptoms. This is also a factor in conditions such as CFS, Parkinson's, and ALS (346, 416). Animal studies have confirmed that increased levels of glutamate (or aspartate, another amino acid excitory neurotransmitter) cause increased sensitivity to pain, as well as higher body temperature-both found in CFS/Fibromyalgia. Mercury and increased glutamate activate free radical forming processes like xanthine oxidase which produce oxygen radicals and oxidative neurological damage (142, 346, 13). Medical studies and doctors treating Fibromyalgia have found that supplements which cause a decrease in glutamate or protect against its effects have a positive effect on Fibromyalgia. Some that have been found to be effective include Vit B6, methyl cobalamine (B12), L-carnitine, choline, ginseng, Ginkgo biloba, vitamins C and E, nicotine, and omega 3 fatty acids (fish and flaxseed oil-GLA, EPA, DHA) (417, 229). Other supplements that also have been found to help are magnesium and malic acid (488, 489). Avoidance of exictotoxins like MSG and aspartame have been found to eliminate symptoms in some with Fibromyalgia (490).

Clinical tests of patients with chronic neurological conditions, Lupus (SLE), and rheumatoid arthritis have found that the patients generally have elevated plasma cysteine to sulphate ratios, with the average being 500% higher than controls (330, 331, 600, 33e), and in general being poor sulphur oxidizers. This means that these patients have insufficient sulfates available to carry out necessary bodily processes. Mercury has been shown to diminish and block sulphur oxidation and thus reducing glutathione levels which is the part of this process involved in detoxifying and excretion of toxics like mercury (33). Glutathione is produced through the sulphur oxidation side of this process. Low levels of available glutathione have been shown to increase mercury retention and increase toxic effects (111), while high levels of free cysteine have been demonstrated to make toxicity due to inorganic mercury more severe (333, 194, 33e). Mercury has also been found to play a part in inducing intolerance and neuronal problems through blockage of the P-450 liver enzymatic process (84, 33e).

Mercury from amalgam interferes with production of cytokines that activate macrophage and neutrophils, disabling early control of viruses and leading to enhanced infection (131, 251). Mercury's activation of inflammatory cytokines and Th2 helper immune cells suppresses the cytotoxic response of T-cells and natural killer immune cells that are the body's main defense against viruses and such biological pathogens (181, 472, 580). Animal studies have confirmed that mercury increases effects of the herpes simplex virus type 2 for example (131). Mercury damages the immune system and in those with chronic conditions has been found to commonly facilitate infestation by pathogens such as viruses, harmful bacteria, candida, mycoplasma, and parasites (131, 251, 386a, 404, 460, 470, 473, 485). The majority of those tested who have CFS or FMS have been found to have infections of mycoplasma, Human Herpes Virus-6, XMRV, Cytomeglivirus, or bacterial infections such as intracellular chlamydia (470, 575, 580). Clinics treating these conditions commonly find such pathogens to be a factor in the condition (470, 473, 485, 487, 488, 580). Mercury detoxification and treatment of these pathogens results in significant improvement in the majority of those treated (470, 485, 488, 489, 230, 581, 600). Studies have also found bilberry extract, curcumin, carotenoids, and chlorophyll supplements to be effective in suppressing effects of viruses such as Epstein-Barr (580) or XMRV (575). Supplementation with chlorella has been found to result in beneficial effects when used in patients chronic conditions such as ulcerative colitis, hypertention, or Fibromyalgia (304). Doctors such as D. Klinghardt (581) have suggested that the mechanism by which chlorella improves treatment of such conditions is metals detoxification, which is the main mechanism of action of chlorella and has been found to greatly improve intestinal function.

Mercury exposure causes high levels of oxidative stress/reactive oxygen species (ROS)(13, 386a),

which has been found to be a major factor in apoptosis and neurological disease (56, 250, 441, 442, 443, 13) including dopamine or glutamate related apoptosis (288c). Mercury and quinones form conjugates with thiol compounds such as glutathione and cysteine and cause depletion of glutathione, which is necessary to mitigate reactive damage. Such congugates are found to be highest in the brain substantia nigra with similar congugates formed with L-Dopa and dopamine in Parkinson's disease (56). Mercury depletion of GSH and damage to cellular mitochondria and the increased lipid peroxidation in protein and DNA oxidation in the brain appear to be a major factor in *Parkinson's disease*[10] (33, 56, 442)

1.4 Multiple Chemical Sensitivity

Many cases of Multiple Chemical Sensitivity (MCS) develop following exposures to heavy metal toxins such as mercury (386a). Mercury exposure results in oxidative stress, reduced glutathione, increased peroxynitrite, found in virtually all with MCS or CFS or FM, which have overlapping symptoms and factors. Oxidative stress from reactive free radicals or deficient glutathione and the resulting increased peroxynitrite can inactivate important mitochondrial enzymes and interfere with energy production in MCS or CFS (386a, 580). *Inherited impairments*[11] in detoxification function can also interact with environmental factors to promote MCS. Defects in the body's ability to neutralize environmental chemicals lead directly to the accumulation of toxins. The body's ability to neutralize and excrete environmental toxins depends on the availability of key nutrients. Some cases of MCS may be secondary to *'leaky gut'*[12] and the passage of toxins or food particles into the system. Maldigestion of critical nutrients, as well as intestinal infection (bacteria, yeast, or parasites) may aggravate MCS. Intestinal overgrowth of yeast and the passage of Candida toxins into the system or parasites may further chemical sensitivities in MCS or CFS (386a, 580).

1.5 Treatment of CFS, Fibromyalgia, Multiple Chemical Sensitivity, etc.

It has been well documented by hundreds of medical studies including thousands of tested subjects and by scientific panels that "amalgam fillings" are the *largest source of mercury*[13] in people and that those with several amalgam fillings often have daily exposures exceeding the Government Health Standards for mercury (600). Thus among those most susceptible, significant neurological and immune effects related to amalgam fillings are common. Symptoms of those with CFS, Fibromyalgia, or thyroid related conditions usually improve significantly after proper amalgam replacement. In thousands of cases undergoing amalgam replacement, the majority recovered or had significant improvement in symptoms for muscular/joint pain/Fibromyalgia (222, 293, 317, 322, 342, 440, 469, 470, 523, 527, 94), Chronic Fatigue Syndrome (CFS) (8, 27, 60, 212, 230, 293, 229, 222, 232, 233, 271, 293, 313, 317, 320, 342, 375, 376, 382, 440, 469, 470, 485, 590, 35), lupus (342, 113, 222, 229, 233, 323, 35), autoimmune thyroiditis (342, 382), multiple chemical sensitivities (26, 27, 35, 60, 62, 95, 222, 229, 232, 233, 115, 313, 321, 342, 537, 583), as well as many other conditions (600). Of one group of 86 patients with CFS symptoms, 78% reported *significant health improvements after replacement of amalgam fillings*[14] within a relatively short period, and the MELISA immune reactivity test found significant reduction in lymphocyte reactivity compared to pre removal tests (342, 375). The improvement in symptoms and lymphocyte reactivity imply that most of the Hg-induced lymphocyte reactivity is allergenic in nature. Although patch tests for mercury allergy are often

[10] **Informativo:** "Toxic Exposures and Parkinsons: the Mercury Connection".

[11] **Informativo:** "Susceptibility Factors in Mercury Toxicity: Immune Reactivity, Detoxification System Function, Enzymatic Blockages, Synergistic Exposures".

[12] **Internet:** "http://www.flcv.com/leakyghg.html".

[13] **Informativo:** "Dental Amalgam Mercury Solutions".

[14] **Internet:** "http://www.melisa.org/chronic-fatigue-syndrome.php".

given for unresolved oral symptoms, this is not generally recommended as a high percentage of such problems are resolved irrespective of the outcome of a patch test (60, 87, 90, etc.)

Exposure to *organochlorine*[15] compounds such as DDT/DDE and hexachlorobenzene have also been found to be highly correlated with chronic fatigue. Sick building syndrome (SBS) related to toxic exposures is usually characterized by upper respiratory complaints, headache, and mild fatigue, but the more serious CFS is often also associated with SBS (588).

Other Treatments for CFS and FM

Nutrition and nutritional support have been found to play significant roles in CFS/FM alleviation (580, 386a, 19, etc.). Adrenal fatigue related to long term stress and hypothyroidism are common factors in chronic fatigue (19). An adequate supply of vitamins and essential minerals as well as antioxidants have been found to benefit such conditions to counteract free radicals and oxidative stress caused by the conditions. Avoidance of too much sweets, sodas, high glycemic starches, etc. and more exercise such as walking, yoga, pilates, etc. can make major improvement in chronic fatigue (19). Adding more raw, steamed, and sauted greens, seafood, fruit, and other vegetables can also make a large difference. Glyconutrients such as Mannatech Ambrotose and Immunostart have also been found to be effective in reducing the effects of CFS and FM (528). Immunostart has been documented to be effective in detoxing toxic metals. Adrenal and/or thyroid fatigue can be reversed over time through such means along with adaptagenic herbs such as Cordyceps senensis, Rhodiola rosea, Aswagandha, Panax giseng, licorice root and supplementing Pantethine (B5), magnesium, vit C, DHEA, R-lipoic acis, and EFAs (19). Hormone testing such as Genova and ZRT lab tests along with morning temperature monitoring can help in assessing needs. Minerals often deficient related to thyroid fatigue include iodine, sea salt, selenium, magnesium, and zinc, along with the amino acid tyrosine and B vitamins. (19)

Some of the conditions found in people with CFS or FM or MCS include immune effects, energy metabolism problems, inflammation, adrenal fatigue, homocystein metabolism, fatigue, stress, brain neurotransmitter imbalances, leaky gut. (580, 386a, etc.) In addition to metals detox, supplementation has been found clinically effective to deal with these conditions. Immune (ginseng, echineacea, EFAs, curcumin); energy metabolism (CoQ10, NADH, L-carnatine, magnesium); Adrenal fatigue (DHEA, licorice, sodium); Stress (glutamine, Adapton); neurotransmitters (tyrosine); homocysteine (B6, B12, folic acid, SAMe); inflammation (antioxidants: N-acetyl-cysteine, alpha lipoic acid), fatigue (ginseng, Mate), digestive support (digestive enzymes, probiotics) (580). Tests are readily available to check for hormone levels often out of imbalance in these conditions such as DHEA, cortisol, thyroid, and testosterone in older men (386a, 580, etc.).

B.E. Vickery's testing showed all Fibromyalgia patients to have five common conditions, regardless of their symptoms: 1) protein deficiency 2) degenerating spinal disks 3) sulfur deficiency 4) heavy metal toxicity, and 5) viral infection. (585) It is claimed that if they follow the Vickory Protocol their bodies are able to heal.

1.6 References

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[15] **Internet:** "http://www.flcv.com/pesticid.html".

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