

Physician's Desk Reference Guide For GBG's 10-in-One Formula

The following is a retrospective analysis of GBG's 10-in-One Formula and it's active ingredients

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I. INTRODUCTION

“GBG “ is a vitamin and mineral preparation with many additional nutritional supplements.

- 1) This vitamin preparation contains many of the essential vitamins which are expressed as percent of Daily Value (DV) per serving based on a 2,000 calorie diet.
- 2) Many of the important minerals are contained in the “GBG” preparation. There are two categories of minerals:
 - a) Bulk or essential minerals called “macrominerals” such as calcium and magnesium.
 - b) “Trace minerals or microminerals” are important. These include boron, chromium, iron, zinc, copper, selenium and many others.

3) Energy Blend

The energy blend portion contains “adaptogens” such as Schizandra seed extract, Eleutherococcus senticosus root extract (Siberian ginseng).

“Adaptogens” are natural substances found in certain plants and herbs. The adaptogens help the body achieve increased mental, physical, and work performance. Dr. Nicholai Lazarev of Russia coined the term “adaptogen” in 1947.

Dr. Lazarev was the mentor and teacher of Dr. I.I. Brekhman. Dr. Brekhman and his group in Russia were responsible for the pioneering work on the various “adaptogens” found in plants.

The adaptogens have three important properties:

- a) They are non-toxic.
- b) They help increase the body’s mental, physical and work performance. The adaptogens help provide resistance to stressful insults to the body’s cells.
- c) They increase the ability of the body to balance and normalize overall health and homeostasis.

In addition, strong antioxidants, such as EGCE (Epigallocatechin Galate) from green tea leaf extract are in The Energy Blend.

- d) Fruit and vegetable blend contains many extracts from fruits and vegetables that contain antioxidants and many healthy ingredients.
- e) Anti-Aging/Antioxidant Blend.
The ingredients have anti-aging properties with antioxidants and nucleotides.
- f) Trace Minerals
The body utilizes over 80 minerals for maximum healthy function.
- g) Miscellaneous Ingredients:
Whole aloe, choline, Inositol, etc.
- h) Toxic Metals
The GBG preparation has been manufactured so the common toxic metals, such as lead, arsenic and mercury are absent or the levels are far below the toxic range. Exposure to “toxic metals” has become an increasingly recognized source of illness. Toxic metals are often called “heavy metals”. These include arsenic, lead, mercury, cadmium, beryllium and chromium in high concentrations. Some of these so-called “toxic metals” in small amounts are necessary to support life. However, in large amounts they become toxic and become a significant health hazard.

II. LABEL AND INGREDIENTS IN GBG 10-in-One Formula.

Suggested use:

| SUPPLEMENT FACTS | | |
|--|--------------------|--------|
| Serving Size 2 Tablespoons (1 oz/29.6 mL) | | |
| Servings per Container 32 | | |
| | Amount per Serving | % DV |
| Calories | 0 | |
| Carbohydrates | 0g | 0%** |
| Sugars | 0g | |
| Vitamin A (from 50% Beta Carotene & 50% Retinol Palmitate) | 10,000IU | 200% |
| Vitamin C (as Ascorbic Acid) | 750 mg | 1,250% |
| Vitamin D (as Cholecalciferol) | 600IU | 150% |
| Vitamin E (as d,l-Tocopheryl Acetate & Mixed Tocopheryls) | 75IU | 250% |
| Vitamin K1 (Phylloquinone) | 80mcg | 100% |
| Thiamin (as Thiamin Mononitrate) (Vitamin B1) | 15mg | 1,000% |
| Riboflavin (Vitamin B2) | 17mg | 1,000% |
| Niacinamide | 30mg | 150% |
| Vitamin B6 (as Pyridoxine HCL) | 10mg | 500% |
| Folic Acid | 600mcg | 150% |
| Vitamin B12 (as Cyanocobalamin) | 100mcg | 1,667% |
| Biotin | 300mcg | 100% |
| Pantothenic Acid | 25mg | 250% |
| Calcium (from Calcium Citrate) | 150mg | 15% |
| Magnesium (from Magnesium Citrate) | 50mg | 25% |
| Zinc (from Zinc Citrate) | 15mg | 100% |
| Selenium (from Sodium Selenite) | 200mcg | 286% |
| Copper (from Copper Citrate) | 1mg | 50% |
| Manganese (from Manganese Sulfate) | 1 mg | 50% |
| Chromium (from Chromium Amino Acid Chelate) | 120mcg | 100% |
| Potassium (as Potassium Citrate) | 99mg | 3% |
| MSM (Methysofonylmethane) | 150 mg | * |
| Energy Blend | 250mg | * |
| L-Carnitine, Epigallocatechin Galate (EGCG) from Green Tea Leaf Extract, Acai Fruit, Clucoranolactone, Schizandra Seed Extract, Eleutherococcus senticosus Root Extract | | |
| Fruit & Vegetable Blend | 250mg | * |
| Wolfberry (Goji Berry), Mangostene, Pomegranate Fruit, HiActives Broccoli, HiActives Broccoli Sprouts Extract, Tomato Powder, HiActives Carrot Powder, HiActives Spinach Powder, HiActives Kale Powder, HiActives Brussel Sprouts Powder, HiActives Onion Extract | | |
| Anti-Aging/Antioxidant Blend | 50mg | * |
| CoQ10, Lutein, Lycopene, Alpha Lipoic Acid, Curcumin, Quercetin, Hesperidin, Nucleotides [DNA (Deoxyribonucleic Acid), RNA (Ribonucleic Acid)], Glucosinolates, Sulphoraphane | | |
| Trace Minerals | 100mg | * |
| Calcium, Antimony, Carbon, Copper, Gadolinium, Indium, Lutetium, Nitrogen, Rhenium, Selenium, Terbium, Tungsten, Magnesium, Barium, Cerium, Dysprosium, Germanium, Iodine, Manganese, Osmium, Rhodium, Silicon, Thallium, Vanadium, Phosphorus, Bismuth, Cesium, Erbium, Gold, Iridium, Molybdenum, Oxygen, Rubidium, Silver, Thorium, Ytterbium, Potassium, Boron, Cerium, Europium, Hafnium, Iron, Nickel, Palladium, Ruthenium, Strontium, Thulium, Yttrium, Sodium, Bromine, Chromium, Fluorine, Holmium, Lanthanum, Niobium, Platinum, Samarium, Tantalum, Tin, Zinc, Sulfur, Beryllium, Cobalt, Gallium, Hydrogen, Lithium, Neodymium, Praseodymium, Scandium, Tellurium, Titanium, Zirconium. | | |
| L-Theanine | 20mg | * |
| Boron (Boron Citrate) | 1mg | * |
| Rhodiola rosea herb (from Rhodiola 4:1 Extract) | 500mg | * |
| Whole Aloe (from Aloe 200:1 Extract) | 600mg | * |
| Choline (from Choline Bitartrate) | 25mg | * |
| Inositol | 25mg | * |
| *%Daily Value (DV) not established | | |
| **Daily Value is based on a 2,000 calorie diet | | |
| Other ingredients: Triple Filtered Purified Water, Glycerine, Citric Acid, Potassium Benzoate, Potassium Sorbate, Natural Flavors, Xanthum Gum, Calcium Propionate | | |

III. VITAMINS AND MACROMINERALS

Vitamins and minerals are vital to life and bodily functions. The best way to get the vitamins and minerals is through food. However, today dietary supplements can be useful as medicines. With proper scientific evidence, vitamins and minerals are being recommended for the prevention and treatment of several illnesses. In such treatment regimens, often higher doses of the dietary supplements are needed.

A) Water-soluble vitamins are vitamin C (ascorbic acid) and eight members of the vitamin B complex: thiamin (vitamin B₁), riboflavin (vitamin B₂), niacin, pyridoxine (vitamin B₆), folic acid, cobalamin (vitamin B₁₂), biotin, and pantothenic acid.

B) Fat-soluble vitamins are retinol (vitamin A), cholecalciferol and ergocalciferol (vitamin D), α -tocopherol (vitamin E), and phylloquinone and menaquinone (vitamin K). Only vitamins A, E, and B₁₂ are stored to any significant extent in the body.

Many Americans are deficient in important vitamins and minerals in their daily diet. The U.S. Department of Agriculture found that a significant percentage of the population receives less than 80% of the Recommended Daily Allowance (RDA) for vitamins A, C, and B complex and the essential minerals, calcium, magnesium and iron.

Data reported by D. Bergner has shown that since 1948, levels of essential minerals, iron, manganese, and copper have declined significantly in many agricultural crops. Iron and selenium content and levels in the soil and food have dropped dramatically. Residents who live in the Northern part of the U.S. have a lower incidence of stroke, heart disease, and cancer than residents in the southern part of the U.S. Studies have shown that selenium deficiency will lead to increased risk for stroke, heart disease, and cancer.

Today, the vitamins and minerals are often expressed on the basis of DV(daily value) which can be based on a diet, such as a 2000 calorie daily diet. Previously, the RDA (recommended daily allowance) where known, was expressed in cases of Vitamins and minerals.

A number of vitamins and minerals have been associated with preventing age-related chronic disease and also improving pregnancy outcomes. These nutrients include:

- Vitamins C, E, and D.
- Folic acid.
- Vitamin B₁₂ and B₆ vitamins.
- Minerals, include calcium, magnesium, iron, zinc, and selenium.

In cardiovascular disease (CVD) prevention, there is a link between antioxidant nutrients and B vitamins.

Higher intake of folic acid, vitamin B₆ and B₁₂ are required to lower homocysteine levels. Vitamins E and C may help in lowering CV risk factors associated with elevated homocysteine levels.

Examples of Micronutrients and Disease Prevention.

- 1) Calcium and vitamin D intake have been associated with risk of osteoporosis, hypertension, colon cancer, and lead poisoning.
- 2) Dietary antioxidants, including vitamin C, vitamin E, B-carotene have been associated with decreased risk of some cancers, cataract, hypertension, infectious disease, and heart diseases, as well as protection against pro-oxidant environmental pollutants.
- 3) Vitamin B₆, B₁₂ and folic acid are associated with reduced risk of some cancers, cognitive impairment, heart disease, neural tube birth defects.
- 4) Reduction of total and saturated dietary fats is inversely associated with cardiovascular disease, hypertension, gallbladder disease, obesity, and cancer.

IV. ENERGY BLEND

This group consists of two “adaptogens” which has been defined above.

The special biological and physiological properties of the adaptogen herbs are:

- a) Schizandra chinensis (seed extract).
 - 1) Increases physical and mental work capacity.
 - 2) Speeds recovery from fatigue
 - 3) Produces antioxidant activities against oxygen free radicals which are damaging to body cells
 - 4) Increases resistance to stress
- b) Eleutherococcus senticosus (Acantho root)
 - a. Increases physical capacity and endurance
 - b. Increases attention span
 - c. Sustains energy levels during prolonged work periods.
 - d. Provides resistance to stress
 - e. Enhances the immune system
- c) Rhodiola Rosea (Golden root)
added as a miscellaneous ingredient
 - a. increases work ability
 - b. improves quality of sleep and appetite
 - c. possesses anti-stress action
 - d. aids in lowering lipids and triglycerides
- d) EGCG (epigallocatechin gallate)

The catechins from green tea possess potent antioxidant activity and protect the body from the damaging effects of oxidative damage from free radicals. EGCG has antioxidant activity of about 25 to 100 times more potent than Vitamins C and E.

- e) L-carnitine

Is an amino acid synthesized in the liver and kidneys from lysine and methionine. The claims of biological activities of L-carnitine are:

- a. Increases fat metabolism
- b. Lowers cholesterol and triglyceride levels
- c. Is cardioprotective

f) Acai Fruit

Acai berry is harvested from the Brazilian rain forest.

This fruit has many beneficial ingredients but has strong antioxidant properties. Acai has up to 33 times the antioxidant content as red wine grapes.

g) Glucoranolactone is a naturally occurring metabolite, a carbohydrate produced by the human metabolic system, formed when glucose breaks down and is believed to be helpful in ridding the body of harmful substances and providing an instant energy boost.

V. FRUIT AND VEGETABLE BLEND

This blend consists of many vegetable and fruit extract.

Fruits and vegetables are: 1) a rich source of essential nutrients and healthy antioxidants, such as beta carotene, vitamins C and E, bioflavonoid; 2) rich source of fiber. The general amount of fiber recommended is about 35 grams per day. Americans who favor meat, fat, refined sugar and white flour may have only 4-8 grams of fiber in their daily diet.

The fiber is important as it (1) reduces the risk of colorectal cancer, 2) binds heavy metals and other toxins and helps in their elimination, and 3) helps in rapid transit time of waste products. Slower transit time will cause accumulation of toxic waste with inflammation and damage of intestinal tissues.

Some of the fruit and vegetable ingredients will be discussed.

a. Fruits

- 1) Wolfberry or Goji berry. This is a popular food and drink in China and known medicinally for 2000 years. There are a number of compounds including flavinoids and pyrole derivatives. The fruit has been used to treat a number of chronic health conditions, including diabetes and cancer.
- 2) Mangostene
Mangostene is predominantly grown in Southeast Asia. It contains a lot of xanthones and many other ingredients beneficial to good health. It has been used to treat many health conditions such as rheumatoid arthritis and fibromyalgia.
- 3) Pomegranate
It is widely cultivated over the whole Mediterranean region. It is now grown in the drier parts of California and Arizona. Pomegranates are rich in Vitamin C and polyphenols (antioxidant). It has been helpful in reducing heart disease risk factors.

b. Vegetables

a. Brussel Sprouts

This vegetable contains many important vitamins, minerals and amino acids.

b. Kale

It is a leafy green vegetable related to the cabbage family. It is very nutritious with powerful antioxidant properties.

VI. ANTI-AGING/ANTIOXIDANT BLEND

Many of the ingredients in this blend are biologically and physiologically active with beneficial effects, due to the antioxidant properties. Before the specific ingredients will be discussed, we will discuss antioxidants in general and the problem of “free radicals”.

The antioxidants in general demonstrate anti-aging properties by preventing cellular damage and damage to DNA and RNA constituents.

a). What are Antioxidants?

Antioxidants are molecules which can interact with “free radicals” and terminate the reaction before cellular damage occurs. Within the body there are several enzyme systems that scavenge free radicals:

- 1) The principal vitamin anti-oxidants are vitamin E, beta-carotene and vitamin C.
- 2) Selenium is a trace metal that is required for one of the body’s antioxidant enzyme systems.

b). What are “Free Radicals?”.

Free radicals are atoms or a group of atoms with an odd unpaired number of electrons which can be formed when oxygen interacts with certain molecules. The free radicals can cause damage to cellular components, such as DNA and the cell membrane.

c) Thus, one can see antioxidants are intimately involved in the prevention of cellular damage which is common in cancer, aging and a variety of chronic diseases.

Antioxidants are present in foods, as vitamins, minerals, carotenoids and polyphenols. Many of the antioxidants are often identified by their distinctive colors:

- 3) The deep red of cherries and tomatoes
- 4) Orange of carrots
- 5) Yellow of corn, mangoes, saffron
- 6) Blue-purple of blueberries, blackberries and grapes.

d). Phytochemicals

Phytochemicals are plant chemicals that are neither vitamins or minerals and yet may have health enhancing effects.

Many of the phytochemicals are antioxidants and include carotenoids and flavinoids.

- 1) Carotenoids – are the fat soluble colors in fruits and vegetables and are a family of more than 600 antioxidants. Beta-carotene, which is found in carrots and other yellow/orange vegetables and fruits, converts to vitamin A.
 - a) Alpha carotene is high in carrots and green beans,
 - b) Lycopene – high in tomatoes
 - c) Leutin and zeaxanthin – is high in spinach and dark green vegetables.
- 2) Lycopene – is a strong antioxidant and affords strong protection against certain types of free radicals.
- 3) Co-Q10
Co-Q10 or ubiquinone is found in the mitochondria of the cells and has two functions.
 - a) Co-Q10 transports electrons in energy production
 - b) Is also an antioxidant that protects against “free radicals”

The heart, brain and muscles which have high levels of mitochondria may be most affected by decreased levels of Co-Q10.

E) Alpha-lipoic acid

Lipoic acid is a strong antioxidant and needed for mitochondrial function. Lipoic acid is both water and fat soluble and protects lipids and nerve fiber lining against oxidation. Lipoic acid has the remarkable ability to recycle several other important antioxidants, including Vitamin C and E, glutathione and Co-Q10, as well as itself. Lipoic acid is often called the “universal antioxidant”. Lipoic acid is the only antioxidant that can boost the level of intracellular glutathione, an important antioxidant in the cells.

F) Polyphenols

Polyphenols are a broad family of antioxidants and can be divided into four subgroups.

- c) Bioflavonoids.
- d) Anthocyanins
- e) Proanthocyanidins
- f) Xanthones

These phytochemicals are found in everyday fruits and vegetables. Eating spinach, kale and green leafy vegetables along with a cup or more of blueberries everyday will double the antioxidant intake from foods.

G) Turmeric Seed and Curcumin

Turmeric seed, the basis for yellow mustard, is a powerful anti-inflammatory and antioxidant. The turmeric seeds contain the polyphenol “curcumin”.

H) Flavinoids

Flavinoids are phenolic compounds in vegetables, fruits, leaves, flowers and bark and give these ingredients their color.

The names of some of the most important bioflavonoids are baicalin and quercetin which provides many healthful benefits.

Their bioflavonoids are important substances in cancer prevention. They have been shown to inhibit the growth of cancer cells in the breast, colon, prostate, and lungs.

The bioflavonoids are helpful in preventing oxidative damage to the cardiovascular system by their antioxidant and anti-inflammatory properties.

I) Glucosinolates

Glucosinolates are a class of secondary metabolites found in 15 plant families. The skeleton of glucosinolates consists of a thioglucosidic link to the carbon of a sulfonated oxime.

Some glucosinolates especially those in broccoli, have anticarcinogenic properties and are being studied for their therapeutic potential and use.

J) Sulphoraphane

Sulphoraphane is a naturally occurring isothiocyanate and is a potent anticarcinogen in animal experiments.

Sulphoraphane is a sulfur compound present in broccoli, broccoli sprouts, collard greens, kale, cabbage, brussels sprouts, cauliflower, and a red and black radishes.

VII. TRACE MINERALS

Essential trace minerals include iron, iodine, zinc, chromium, selenium, manganese, molybdenum, and copper. Except for chromium, each of these is incorporated into enzymes or hormones required in metabolism. Except for deficiencies of iron and zinc, micromineral deficiencies are uncommon in industrialized countries (see Vitamin Deficiency, Dependency, and Toxicity: see Mineral Deficiency and Toxicity).

Other minerals (e.g. aluminum, arsenic, boron, cobalt, fluoride, nickel, silicon, vanadium) have not been proved essential for people. Fluoride, although not essential, helps prevent tooth decay by forming a compound with Ca (CaF_2), which stabilizes the mineral matrix in teeth.

All trace minerals are toxic at high levels, and some (arsenic, nickel, and chromium) may cause cancer.

Minerals are important for basic health. The minerals are needed for the formation of bone and blood, proper composition of body fluids, healthy nerve function, and cardiovascular function, etc.

a) There are three basic classifications of minerals

- 1) Metallic minerals – are found in elemented form, such as sodium chloride and zinc sulfate.
- 2) Chelated minerals – a metallic mineral is usually “chelated” with an amino acid. The amino acid surrounds the metal like a “claw” and helps solubilize the metal and make the mineral chelate more bioavailable or useful to the body.

Examples are magnesium aspartate and chromium picnolate. The chelated minerals are about 40% more efficient in regards to absorption and assimilation into the body metabolism.

- 3) Colloidal minerals – these are minerals that occur in nature in a colloid state as minute particles. There is a major increase in surface area. This results in increased solubility and bioavailability. Plant derived colloidal minerals are very useful with increased solubility.

b) Boron

Boron is a trace mineral needed for healthy bones and teeth and the proper metabolism of essential minerals, such as calcium, magnesium, and phosphorus.

Boron deficiency also accentuates Vitamin D deficiency. It is required to convert Vitamin D to the most active form in the kidneys.

Most people are not deficient in boron; however, the elderly often benefit with boron in 2 ng to 3 ng daily dose supplementation in their diet.

c) Chromium

Chromium is an important constituent of a natural substance called glucose tolerance factor (GTF). The GTF is important in glucose metabolism, and low levels can result in elevated blood sugar levels.

Chromium is not absorbed well in the diet and most people may benefit from a multivitamin supplement. Chromium as Cr +3 is an important trace mineral. However, the Cr+6 ion is very toxic.

d) Cobalt

Cobalt is a mineral constituent of colalamin which is recognized as Vitamin B12. Cobalt helps red blood cells and maintain nerve tissue. To be biologically useful, cobalt should be obtained from foods, such as liver, clams, sea vegetables, etc. It is also can be obtained from Vitamin B12 supplements.

e) Copper

Copper is very important in its many functions which are:

- 5) Help to form hemoglobin in blood.
- 6) Facilitate absorption of iron
- 7) Help regulate blood pressure and heart rate
- 8) Strengthen blood vessels, bone, tendons and nerves.

Most adults get enough copper from a normal diet, although a high quality nutritional supplement may insure adequate intake. Excess calcium and zinc will interfere with copper absorption.

f) Flouride

Fluoride is required for healthy teeth and bones. It helps form tough enamel that protects teeth from decay and cavities.

g) Germanium

This is a metallic trace mineral which is known to improve cellular oxygenation and thus is an antioxidant. Germanium has many other uses in the human body and primarily increases tissue oxygenation as it acts as a carrier of oxygen to the cells.

Most people are not deficient in germanium; however, the elderly usually benefit by supplementation with germanium. Germanium is best found in garlic, shitake mushrooms, onions, and aloe vera.

h) Iodine, iron, magnesiums, phosphorus, potassium, sodium

These are key macro-minerals essential to normal body function and are well known mineral supplements.

Iron is very important for the production of red blood cells and an important mineral for premenopausal women.

i) Manganese

This mineral is essential for proper development and function of bone, cartilage, and connective tissue. Manganese is an important co-factor in the key enzymes of glucose metabolism. A deficiency of manganese in guinea pigs results in diabetes and pancreatic abnormalities or no pancreas in the offsprings.

j) Molybdenum

Molybdenum is an essential trace mineral which is a component of the enzyme "Xanthine Oxidase". Molybdenum is important for normal growth and development, particularly of the nervous system.

Molybdenum deficiency is very rare and has been seen in people who have been on long term tube or intravenous feeding or who have a rare genetic defect in the use of molybdenum.

k) Selenium

Selenium is an essential trace metal which is an antioxidant. It supports the immune function and helps in diseases, such as arthritis, heart disease, and cancer. In high doses, selenium is very toxic and can be carcinogenic.

l) Vanadium

Vanadium is a trace metal mineral which is probably important in many bodily functions. Limited evidence suggests vanadium lowers blood sugar levels and helps protect against diabetes and some forms of cancer.

m) Zinc

Zinc is an important mineral and is integral to the synthesis of RNA and DNA. Zinc is an important ingredient and nutrient involved in the immune system. Zinc also possesses direct antiviral activity including viruses that can cause the common cold.

VIII. MISCELLANEOUS ITEMS

a) L-Thianine

Thianine is an unique amino acid found in the leaves of green tea. The beneficial effects of thiamine are:

- 9) Improved mental focus
- 10) Good for anti-stress and cortisol controlling effects.
- 11) Reduces blood pressure.

b) Boron

An important trace mineral important in bone and muscle metabolism discussed above.

c) Родиола – an adaptogen discussed above.

d) Whole Aloe

The gel from aloe vera leaf has been used for centuries as a topical remedy for skin cuts, bruises, burns, and minor irritations. Taken internally, aloe juice is used as a laxative and the active constituents are anthroquinone and glycosides. Aloe is helpful in lowering the blood sugar level and supporting the immune system.

e) Choline is an essential B-vitamin nutrient. Choline is an amino precursor for the neurotransmitter acetyl choline and important for brain development.

Choline is also an important constituent of cell membranes and is important in every bodily system.

- f) Inositol – plays an important role in the health of cell membranes and especially of the cells in the brain.
If there is a deficiency of inositol, there may be eczema, hair loss, constipation, and elevated cholesterol levels. The compound inositol is available from plant and animal sources. Inositol can be manufactured in the body.

IX. TOXIC METALS

- a) What are Toxic metals?

Many metals have no known biological function and certain ones are capable of disrupting important and essential physiological processes and can be called “toxic metals”. Examples of “toxic” metals are cadmium, lead, mercury and arsenic. In very small amounts, some of these metals are important to support life. However, in larger amounts, the same metals may become “toxic”.

For example, chromium as Cr +3 ion is an essential trace element important for maintaining correct blood sugar levels. However as Cr+6 ion is “toxic” and a known human lung carcinogen.

- b) Are heavy metals the same as toxic metals?

The short answer is “no” as “heavy” refers to atomic weight. The heavy metals cadmium, lead and mercury are certainly “toxic”. However, molybdenum is a heavy metal but an essential metal. In contrast, beryllium is a light metal but very toxic.

- c) Testing for “toxic metal”.

The toxic effects of most metals is due to their ability to disrupt the function of essential biological molecules, such as proteins, enzymes and DNA.

The listed common so-called toxic metals are:

Arsenic, beryllium, cadmium, hexavalent chromium, lead and mercury.

The GBG preparations are tested for many toxic metals to make sure the preparations are safe.

X. RECOMMENDATIONS FOR PREVENTIVE NUTRITION STRATEGIES

- a) Several recommendations have been made for optimal health by Walter C. Willet (28).
- 1) Stay lean and active throughout life. (body weight should not increase by more than 10 pounds after age 21). Regular exercise is very important.
 - 2) Eat abundant amounts of fruits and vegetables, at least 5 servings/day. Include green leafy and orange colored vegetables daily.
 - 3) Unrefined whole grains should be consumed.
The intake of refined simple sugars and refined flour and carbohydrates should be very low and minimal.
 - 4) Red meat should be eaten only occasionally.
 - 5) Fish and poultry should be eaten in moderation as an alternative to red meat.

- 6) Animal fats and trans fatty acids from partially hydrogenated vegetable oils should be avoided and not eaten.
 - a) Olive oil and other mono-unsaturated fats are healthy alternatives for fat.
 - b) Highly polyunsaturated fats, such as corn or soy-bean oil may also be healthy alternatives
- 7) Deep fried fast foods and most commercially prepared foods contain trans-fatty acids and should be avoided.
- 8) Adequate calcium intake is important for growing children, adolescents, and lactating women. If dietary sources are low, supplements of calcium should be considered. High consumption of milk or dairy products is not likely to be necessary or beneficial for middle aged and older adults.
- 9) Consumption of daily values of a multiple vitamin preparation containing folic acid may provide a sensible nutritional safety net.
 - a) Definite evidence has shown that folic acid containing multivitamin supplements during early weeks of pregnancy will prevent a large fraction of neural tube defects in infants.
 - b) Women should also consider a multivitamin supplement containing folic acid and iron.
 - c) Vitamin C and Vitamin E may help reduce the risk of cardiovascular diseases, cataracts, and other diseases, such as cancer.
- 10) Eating different types of cultural foods based around minimally processed foods from plant sources will provide a healthy and interesting experience.

b) Fruits and Vegetable Rich Diet

U.S. Department of Health and Human Services, the U.S. Department of Agriculture, and the National Academy of Sciences has implemented the “Five a Day” campaign. They recommend that each person eat at least 5 servings each of fruits and vegetables every day along with a variety of foods. However, eight to ten servings per day is best for cancer prevention. Fruits and vegetables are rich sources of fiber, vitamins, minerals, and phytochemicals. One should eat a variety of fruits and vegetables. A serving of fruit or vegetable is equal to ½ cup of fruit, ¼ cup of dried fruit, ½ cup of cooked vegetables, 1 cup of raw vegetables or ¾ cup of fruit or vegetable juice.

One should eat a variety and quantity of vegetables and fruits in the daily diet. It is wise to choose dark green, and deep yellow vegetables, as well as citrus fruits.

c) Other Dietary Substances

The daily human diet typically contains as many as 100,000 chemicals (e.g., coffee contains 1000). Of these, only 300 are nutrients, only some of which are essential. However, many nonnutrients in foods are useful. For example, food additives (e.g., preservatives, emulsifiers, antioxidants, stabilizers) improve the production and stability of foods. Trace components (e.g., spices, flavors, odors, colors, phytochemicals, many other natural products) improve appearance and taste.

Fiber, which occurs in various forms (e.g., cellulose, hemicellulose, pectin, gums) increases GI motility, prevents constipation, and helps control diverticular disease. Fiber is thought to accelerate the elimination of cancer-causing substances produced by bacteria in the large intestine. Epidemiologic evidence strongly supports an association between colon cancer and low fiber intake and a beneficial effect of fiber in functional bowel disorders, Crohn’s disease, obesity, and hemorrhoids. Soluble fiber (present in

fruits, vegetables, oats, barley, and legumes) reduces the postprandial increase in blood glucose and insulin and can reduce cholesterol levels.

The typical Western diet is low in fiber (about 12 g/day) because of a high intake of highly refined wheat flour and a low intake of fruits and vegetables. Increasing fiber intake to about 30 g/day by consuming more vegetables, fruits, and high-fiber cereals is generally recommended.

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