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## SUGAR IS SWEET—REFINED VERSUS COMPLETE

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The truth is leaking out: **Refined sugars** are harmful to your health. The biggest defenders of refined sugars have been—you guessed it—the sugar industries. Trustworthy research showing links between sugar and ill health have been thwarted. “For 40 years, the sugar industry’s priority has been to shed doubt on studies suggesting that its product makes people sick.”<sup>1</sup> In 2003 the World Health Organization (WHO) advocated eating **less** refined sugar to fight obesity, to limit daily consumption to 10% of total calories.<sup>2</sup> This quickly provoked the US sugar industry to ask Congress to **cut** all funding to WHO unless it revised their new rules for healthy eating.<sup>3</sup> Sugar, food and beverage industries influence scientific studies to further their commercial agenda. We must ask: who **paid** for the study? Study authors often receive grants from these industries or serve as consultants to them.<sup>4-7</sup> Financial ties exist between the Academy of Nutrition and Dietetics (formerly American Dietetic Association) and major junk food and sweetener purveyors. The Academy represents 74,000 dietitians who are supposed to help people eat well. Their journal, trade organization meetings and some educational webinars have sponsors like the Sugar Association, General Mills, Coca-Cola, PepsiCo, ConAgra, Wrigley, Nestle, Kraft, etc.<sup>8</sup> It’s no wonder the mantra of most dietitians is “No food is a ‘bad’ food,” including those containing refined sugars.<sup>9</sup> A ‘Sugars and Health Workshop’ for health professionals, sponsored by the sugar industry and companies selling sweetened foods, concluded that refined sugars are not risk factors for disease though it “flies in the face of strong evidence to the contrary.”<sup>10</sup> Yet **realities** trickle through. For example, according to a 2009 statement by the American Heart Association, a high intake of refined sugar is associated with overweight, obesity, high blood pressure, high LDL cholesterol and triglyceride levels, inflammation and other risk factors associated with heart disease and stroke. The statement said people consume, on average, about 22.2 teaspoons of added sugars per day and called for setting a “prudent” daily upper limit of just over 6 teaspoons for women and 9 teaspoons for men. Drinking just **one** 12-ounce can of non-diet soda puts a woman over the recommended limit.<sup>11</sup> 75% to 80% of supermarket foods contain added sugars. It is important to read labels and know the various names of refined sugars.

Numerous studies link refined sugars to weight gain, insulin resistance, type 2 diabetes, fatty liver, high blood pressure, heart disease, high triglycerides, gout, chronic inflammation, dental caries and other adverse effects. The efficiency of white blood cells, essential parts of the immune system, can be reduced significantly for several hours after consuming refined sugar. Susceptibility to environmental toxins is increased. A drop in blood sugar after a sugar high can cause muscle spasms, cause or worsen migraines and tension headaches.<sup>12,13</sup> It was thought that obesity, not sugar, was the primary cause of type 2 diabetes. But studies are showing that sugar **does** have a direct, independent link to diabetes.<sup>14</sup> Consuming refined sugars adversely affects hormone levels. It can lower sex-hormone-binding-globulin which plays a key role in controlling the amount of estrogen and testosterone available in the body and can reduce testosterone levels in the blood by up to 25%. The risk of pancreatic cancer may be increased and possibly cancer of the breast, ovaries, prostate, rectum, lung, gallbladder and stomach. Increased risk of preterm delivery is noted in pregnant women. Refined sugars have “adverse effects on diet quality” because nutrient-empty sugar displaces consumption of nutrient-dense foods and depletes or imbalances many nutrients in the body. Children’s reaction times are slower when they eat foods with refined sugars. Refined sugars have deleterious effects on many bodily systems including the cardiovascular, gastrointestinal, immune, nervous and endocrine systems. They cause a surge in blood sugar (glucose) and insulin followed by a plunge, often producing fatigue, irritability and hunger (usually for more sweets). Eventually this can lead to hypoglycemia, insulin resistance, hyperglycemia, and diabetes. The digestive tract lining is irritated or injured, causing inflammation to attempt repair. Indigestion, excess acid, Crohn’s disease, ulcers, diverticulitis, ulcerative colitis, gallstones and pancreatic damage are linked to refined sugars. The adrenal glands are stressed, causing a rapid adrenaline rise which can lead to hyperactivity, crankiness, nervousness and difficulty concentrating. The nervous system can be affected causing lowered cognition, depression and anxiety. Mineral relationships in the body are upset; chromium and copper levels are lowered and there is interference in absorption of calcium and magnesium. Disrupted minerals means loss of tissue elasticity and function; osteoporosis and other structural problems are possible.<sup>15-30</sup>

Your body **can** tell the difference between nutritionally empty refined sugars and naturally occurring sugars in whole foods like fruits, vegetables, grains and milk which come with numerous nutrients and other factors—all working synergistically—that help metabolize their sugars. The effect of a sugar separated out and heavily processed in **no way** resembles the effects of an undivided, unaltered **complete** food. When refined sugars are consumed, especially in large amounts, nutrients needed to metabolize or process the sugars have to be taken from the body's reserves. Eventually the body becomes deficient.<sup>31</sup> Refined sugars are **stripped** of essential food contents. For example, table sugar (sucrose from sugar cane or sugar beets) is, after refining, devoid of the minerals, vitamins, enzymes and other food factors in whole cane or beet juice. The processing it goes through and the chemicals used result in a substance that does **not** qualify as natural or nourishing. Traditionally, stalks of sugar cane were chewed by people in areas where it commonly grows. The stalk juice did **not** cause dental cavities or any other health problem. In areas where modern refined/processed foods took over and traditional diets were discarded, health deteriorated. Restoration of native foods, including whole sugar cane juice, improved people's health. Dr Weston Price documented such occurrences. Besides sucrose, whole sugar cane juice contains chlorophyll, small amounts of minerals (such as chromium, iron, magnesium), vitamins (like B's), enzymes, fiber, etc., all working together as a unit.<sup>32</sup> Besides sucrose, other refined sugars include fructose, some fruit juice concentrates (fructose separated from fruit juice), glucose, dextrose, maltose, dextrin, corn syrup, invert sugar, brown sugar (white sugar with a tiny amount of molasses) and the following:

**High-fructose Corn Syrup** (HFCS). Corn starch is extracted from corn by soaking in sulfur dioxide and using high speed centrifuge. The starch is hydrolyzed by acid, acid-enzyme, or enzyme-enzyme catalyzed processes to convert part of the corn glucose into fructose. The result is 42% fructose, 52% glucose, 6% other sugars—HFCS-42 for use in processed foods. To get more fructose, HFCS-42 is put through liquid chromatography, resulting in 90% fructose—HFCS-90 for use in low-calorie diet products. HFCS-42 and HFCS-90 are blended together to make HFCS-55 for soft drinks.<sup>33</sup> Manufacturers try to get the public to believe HFCS is 'natural' because it comes from corn, but the processing makes it **far from** natural—corn contains only glucose, not fructose which must be constructed; chemical bonds are altered; a synthetic enzyme is used; synthetic fixing agents are employed.<sup>34</sup> Refined cane sugar (sucrose) and HFCS both contain glucose and fructose. But in sucrose the sugars are **connected** in a single molecule and don't separate until broken down in digestion. The bonded sugars are chemically and physiologically different than free, separated forms as in HFCS.<sup>35</sup> The body handles and processes contrived isolated fructose differently. Consumption of HFCS or any other separated fructose has been linked to obesity, insulin resistance, metabolic syndrome, type 2 diabetes, hypertension, elevations in triglycerides and LDL (so-called "bad") cholesterol, decreased HDL (so-called "good") cholesterol, cardiovascular disease, liver disease, kidney disease and systemic inflammation.<sup>36-44</sup> Isolated fructose can cause excess abdominal fat and weight gain. Release of leptin (an appetite-limiting hormone) is reduced, making it harder to become satisfied.<sup>45-47</sup> Separated fructose is mostly broken down in the liver where it can affect production of various fats and related substances. Consuming large amounts may overwhelm the liver's capacity to process it, resulting in transient liver dysfunction.<sup>48</sup> The liver increases production of uric acid which can lead to gout, high blood pressure or kidney disease.<sup>49</sup> Mineral absorption, and thus bone health, may be affected. Increased loss of calcium, magnesium and phosphorus has been shown.<sup>50</sup> After the detriments of HFCS were publicized, consumption waned. But the research on fructose spurred another **fear**:

The Internet is crammed with claims that any **food** naturally containing fructose is harmful, especially fruit with high amounts. Should we avoid such foods? Studies that showed deleterious effects of fructose used either HFCS or an isolated fructose.<sup>51-54</sup> Most studies used abnormally high levels that don't occur in natural foods. In real foods, fructose and glucose are combined; glucose acts as a moderator to fructose. Numerous nutrients and phytochemicals (like phenols) in whole foods help metabolize the fructose and glucose. By analyzing fructose independently, the studies don't represent real food.<sup>55</sup> There is a huge difference between the nutritional, balanced value of natural carbohydrates in plant foods like fruit and the empty, disrupting content of isolated fructose used in those studies.<sup>56</sup> When ingested by itself, says Dr George Bray, "fructose is poorly absorbed from the gastrointestinal tract, and it is almost entirely cleared by the liver." Studies using **isolated** fructose are the ones showing weight gain, liver stress, higher cholesterol, smaller LDL particles, increased triglycerides, markers of cardiovascular disease risk, high uric acid, digestive tract irritation, and other problems.<sup>57</sup> One study found that people who regularly consume sweetened drinks containing HFCS, refined

sugars or artificial sweeteners increased the risk of hypertension by 13%. Lead author Dr Lisa Cohen commented, “You would think if fructose were the causative factor, then eating a lot of apples (for example) would also increase your risk of hypertension.” But it doesn’t. People eating real food, like fruit, have less risk and lower blood pressure.<sup>58</sup> Alternative and complementary health therapies for all sorts of health problems (even cancer) often include fresh fruit and fresh vegetable/fruit juices. Patients don’t suffer adverse effects; in fact, spectacular recoveries have occurred. Research shows the body **can** distinguish the difference between refined sugars, like HFCS or isolated fructose, and natural sugars from fruit.<sup>59</sup> A Mediterranean diet including plenty of fresh fruit, for instance, reduces elevated blood levels of uric acid whereas HFCS or other isolated fructose increases uric acid levels.<sup>60</sup> Myriad studies show health **benefits** from consuming real fruits; there is no room here to site even a fraction of them. In one study, when HFCS was given with or without cranberry juice, by itself HFCS decreased antioxidant capacity but the addition of cranberry juice improved antioxidant capacity.<sup>61</sup> So fruit appears to offset some of the adverse effects rather than contribute to them. Real fruit has **no** adverse effects on blood fats, blood pressure, uric acid or insulin resistance and helps people **lose**, not gain, excess weight.<sup>62</sup> Restricting fruit intake doesn’t improve blood sugar control in overweight diabetics, so diabetics don’t need to limit fruit intake.<sup>63</sup> Fructose in fruit is **D**-fructose. The main type in HFCS is **L**-fructose and may be totally artificial. It has a reverse polarity than natural D-fructose in fruit.<sup>64</sup> It does not behave the same in the body. Studies using HFCS or other isolated fructose can’t accurately demonstrate effects that are the same as eating fruit or other foods containing D-fructose. “Fructose intolerance” that causes bloating, gas, abdominal pain and diarrhea is increasingly being diagnosed. Studies use isolated fructose or HFCS to test people; most case studies attribute the problem to consumption of HFCS. Though there is a rare genetic disorder causing fructose intolerance due to lack of an enzyme that breaks down fructose during digestion, the recent more common fructose intolerance is essentially due to HFCS or other isolated fructose.<sup>65-67</sup>

**Agave.** Mexicans use agave sap/juice to make a sweetener by boiling it or to make a mildly alcoholic beverage by fermenting it. But agave nectar in stores is neither of these. Agave juice is filtered and heated to break down its inulin-containing starch. Genetically-modified enzymes and a chemically intensive process including caustic acids, clarifiers and filtration chemicals convert it into a highly refined fructose syrup. Like HFCS, it’s a product of “advanced chemistry and extensive food processing technology.” In fact, agave syrup and HFCS are made pretty much the same way. Agave starches are converted into “highly refined fructose inulin that is even higher in fructose than high-fructose corn syrup.”<sup>68-70</sup> It is **not** healthful and can deplete the body of nutrients. The Glycemic Research Institute placed a ban on agave because diabetic subjects in clinical trials experienced “severe and dangerous side effects” after ingesting it. The warning also applies to those with metabolic syndrome, insulin resistance and pre-diabetic conditions like hypoglycemia.<sup>71</sup> Most agave sold in the US comes from Mexico; some have excessive pesticide residues.<sup>72</sup>

**Sugar alcohols** are used in processed foods labeled ‘sugarless,’ ‘no sugar added’ or ‘sugar-free.’ Some whole foods contain sugar alcohols but to make sweeteners they are extracted and chemically altered. They include sorbitol (from cornstarch), mannitol (from seaweed), erythritol (from cornstarch), lactitol (from lactose), maltitol, isomalt (from sucrose), hydrogenated starch, hydrolysates and xylitol. The body doesn’t fully digest sugar alcohols, so they yield fewer calories (0.2 to 3.0 per gram) than refined sugar (4 per gram). Because they’re slowly and incompletely absorbed, sugar alcohols have less effect on blood sugar, but consuming large amounts can cause gas, bloating, cramping and diarrhea since intestinal bacteria ferment what isn’t absorbed. Since they are in so many products, it’s easy to consume too much.<sup>73,74</sup> **Xylitol** is purported to help prevent cavities. Originally made from birch bark, the source material used now, xylan, is obtained from corn cobs, hardwood, waste from cotton ginning or similar sources. Xylan is either hydrolyzed or fermented (possibly with GMO bacteria). Acetic acid, hydrolyzing acid and organic residues are then removed. Finally, the resulting syrup is crystallized. Many studies claim that xylitol prevents cavities, but not all of them. The claim is based on the theory that bacteria in the mouth cause cavities from acids produced when they’re broken down; it’s difficult for bacteria to break down xylitol. Evidence indicates other causes.<sup>75</sup> Some research found that xylitol can be toxic. Xylitol’s own promotional material says it’s not safe for everyone.<sup>76,77</sup> Any protective effect for children appears to be more for teeth that erupt **after** xylitol-gum chewing has started than for teeth already present.<sup>78,79</sup> Xylitol is a refined carbohydrate and its long-term effects on health are not known.

**Stevia.** A dry leaf of *stevia rebaudiana* is up to 30 times sweeter than sucrose. Stevia as an ingredient in food products or as a packaged sweetener is **not** ground leaves or a liquid concentrate. Instead, it’s a highly refined sweetener made from the plant’s sweetest sugar molecule—Reb A (rebaudioside A)—which is 200-300 times

sweeter than sucrose. In 2008 the FDA classified Reb A as ‘Generally Recognized as Safe’ **after** stevia manufacturers Wisdom Natural Brands (maker of SweetLeaf), Cargill and Coca-Cola (makers of Truvia), and PepsiCo and Merisant (makers of PureVia) released results of their scientific reviews. There are still concerns about stevia sweeteners mainly because they’re highly purified extracts. The FDA has not approved other sugars derived from stevia, such as stevioside, which continue to be sold only as supplements.<sup>80-82</sup> Stevioside is sometimes linked to health benefits. One study found stevioside reduced food consumption in healthy and obese people; it also reduced blood sugar and insulin levels after eating. In hypertensive people, both systolic and diastolic blood pressure decreased after 3 months. Other studies showed **no** effects on blood pressure or glucose. As for Reb A, a study found **no** reduction in either glucose or blood pressure levels in diabetics. Due to concerns over safety, stevia is restricted or banned in some countries. Long-term effects are not known though so far only minor side-effects such as dizziness and nausea have been reported.<sup>83-85</sup>

**Tagatose**, made from lactose, has minimal impacts on blood sugar and insulin due to low intestinal absorption. It is mostly fermented in the intestines and can have a laxative effect.<sup>86</sup> **Whey Low**, a blend of fructose, lactose and sucrose—3 refined sugars—is claimed to have only 4 calories per teaspoon because “the sugars interfere with each other’s absorption” in the small intestine. No studies back up this assertion (the manufacturer admits it’s theoretical) or that it prevents osteoporosis or boosts immunity or any other claims.<sup>87</sup> **Turbinado** sugar, formed after the first crystallization of sugar-cane juice, is refined, though not quite as much as table sugar.<sup>87</sup> **Molasses** (from either sugar cane or sugar beet) is boiled three times, each time extracting more sugar than the last, making it less sweet. After the third boil, the result is blackstrap molasses which contains small amounts of some minerals. Sulfur dioxide may be added as a preservative and it can be blended with a refined sugar solution for uniform quality. **Brown rice syrup** is cooked rice starch that is malted or converted to syrup by using enzymes and evaporation. It’s refined and contains only a few minerals but at least it’s all natural.<sup>88</sup>

**UNREFINED SWEETENERS.** **Date sugar** is ground-up dates containing all the nutrients and fiber.<sup>86</sup> **Palm sugar** comes from the sap of unopened coconut blossoms. The sap is boiled to condense it into a dark brown crystallized sugar. If it’s unrefined organic sap, no additives are used, no bleaching, and no stripping of minerals takes place; it’s higher in antioxidants than refined cane sugars, indicating some nutrients are intact.<sup>89</sup> **Barley malt** is made from fermented barley whose starches have become sweet.<sup>86</sup> **Monk fruit** is a sweet dark-green melon that is crushed, mixed with hot water, filtered and spray-dried to form a sweet powder. But a product composed of monk fruit extract plus refined erythritol, sucrose and molasses should be avoided.<sup>90</sup> **Maple syrup** (sap from maple trees that is boiled and concentrated) contains at least 20 compounds that may be healthful including polyphenols. Use pure maple syrup, **not** products using maple flavoring or other sugars. Pure maple syrup contains nutrients (like manganese and zinc) and food factors that may be supportive to the immune, nervous and musculoskeletal systems. Maple sugar is maple syrup that’s boiled until the liquid has almost entirely evaporated.<sup>91,92</sup> **Evaporated cane juice** may be unrefined **or** refined. It used to be (as Sucanat, then Rapadura) simply the dehydrated (at low heat) juice of whole cane juice. But the original company didn’t patent the term ‘evaporated cane juice’ so it’s no longer a dependable indication that the product is unrefined. Most producers separate the sugar stream from the molasses stream, blends them back together and crystallizes the result. **But** the original unfiltered, unrefined, unbleached organic whole cane sugar—the only one in which the sugar stream is not separated from the molasses—(it’s “squeezed, dried and ground—that’s it”) is available as “Rapunzel Organic Whole Cane Sugar.” It contains substantial flavonoids and phenols.<sup>93-95</sup>

**Raw honey** contains carbohydrates (fructose, glucose, oligosaccharides), minerals, vitamins, small amounts of amino acids, enzymes and polyphenols. Levels vary slightly, depending on the source. Honey inhibits the growth of ‘sick’ bacteria and fungi plus **increases** blood concentrations of vitamin C, carotenes, uric acid, and glutathione reductase. It supports the immune system and may inhibit tumor growth and metastasis. Honey can help resolve inflammation by its healing effects; increase blood levels of monocytes (white blood cells), hemoglobin, iron, magnesium, copper, zinc, packed cell volume; slightly increase lymphocytes and eosinophils (white blood cells). **Reduced** are elevations in liver enzymes, immunoglobulin E (linked to allergic reactions), lactate dehydrogenase (various illnesses), creatine kinase (tissue damage, underactive thyroid) and fasting blood sugar. Manuka honey lessens development of dental plaque and gingivitis. Use of honey to prevent and treat gastrointestinal disorders (peptic ulcers, gastritis, gastroenteritis) is well documented. Oligosaccharides in honey have prebiotic effects; they ‘feed’ healthy intestinal bacteria. Honey can help reduce total cholesterol, LDL (so-called “bad”) cholesterol and triglycerides plus slightly increase HDL (so-called “good”) cholesterol. It

increases nitric acid which relaxes and opens blood vessels. In athletics, honey improves performance, heart frequency and blood glucose without promoting low blood sugar. In hepatitis-A patients, bilirubin production and alanine amino-transferase activity are decreased. When undergoing radiation or chemotherapy, cancer patients experience less mucositis (painful inflammation and ulceration of mucous membranes of the mouth, sometimes digestive tract). People with cancer also don't lose as much weight as controls and may gain some—a positive effect. Chemotherapy patients with neutropenia (reduced neutrophils) when given honey, have less need for stimulating medication. Honey allergies are relatively uncommon; even people allergic to pollen are rarely allergic to honey.<sup>96-101</sup> Honey may lower insulin spikes in people who don't have diabetes and stabilize blood sugar in people who have diabetes. In diabetics, reduction in C-reactive protein (inflammation indicator) and HbA1c (average blood sugar level over a period of time) can occur. Tupelo honey is often tolerated by diabetics.<sup>102,103</sup> As blood sugar spikes are blunted and an appetite hormone (ghrelin) response is delayed, honey may help prevent obesity in some people.<sup>104</sup> Honey soothes coughs and cold symptoms.<sup>105,106</sup> It has the ability to lower levels of inflammation markers, improve immune function, reduce pain, and stimulate the healing process.<sup>107</sup> With honey treatment, adults with recurrent lip or genital herpes have shorter attack and pain durations, reduced occurrence of crusting and improved healing time.<sup>108</sup> Use of local honey to relieve allergy symptoms has mixed study results; a recent study showed a 60% reduction in symptoms.<sup>109</sup> As 'sick' bacteria cannot thrive in the presence of honey, it is used **topically** to help heal various types of wounds, including burns. The effects of raw honey were compared to 11 antibiotics on 28 different strains of 'sick,' multi-drug-resistant bacteria associated with burns. Only 3 of the strains were inhibited by the 11 antibiotics; every single one of the 28 strains was inhibited by the honey. Honey is used to treat bed sores, leg ulcers, malignant ulcers, fistulas, cracked nipples, surgical wounds, gunshot and trauma-induced wounds, cuts, abrasions and puncture wounds. Honey is not antagonistic to all bacteria; it enhances healthy bacteria like bifidobacteria in fermented dairy products and is believed to help sustain a healthy gastrointestinal tract.<sup>99,110-112</sup> **Heating** honey decreases its antimicrobial activity. In addition to its antibacterial effect, topically applied honey creates a moist environment and helps to debride wounds, promote healing by stimulating tissue regeneration and inhibit scar formation.<sup>113-118</sup> Botulism spores are found in some honey and other raw foods. A healthy immune system can deal with these spores but it is thought that it takes at least the first 12 months of life to do so. So giving honey to infants less than a year old is not recommended. Using honey topically is fine at any age. Get unprocessed, **raw** honey, not the ultra-filtered, refined and heated types. Honey from China (commonly used in US) can be diluted with sugar or corn syrup and contaminated with pesticides and/or antibiotics.<sup>119</sup> Know your source.

**Are refined sugars addictive?** Some doctors say no, but many say either yes or, as it may not entirely fit the official definition of addiction (craving, tolerance and withdrawal), there **is** dependency in some people. Refined sweeteners cause a sharp rise in blood sugar which quickly plummets, leading to lowered energy and mood with a **craving** for sweets to bring the blood sugar back up. When some neurotransmitters (like serotonin) are low, there may be depression and decreased impulse control, making it more difficult to avoid sugar. Like heroin, alcohol, and morphine, refined sugars activate beta-endorphin to give a euphoric feeling. Dr Kathleen Des Maison explains that some people are more sensitive to refined sugars and feel more euphoria than others because their levels of endorphins are already lower.<sup>120</sup> Refined sugars cause release of opioids and dopamine; so they may be expected to have addictive potential.<sup>121</sup> Bartley Hoebel, PhD, (Princeton University) conducted a study with rats which showed **dependency** within a month and **withdrawal** signs when opiate receptors were blocked by a drug. Sugar caused their brains to release opioids that acted on the same receptors as addictive drugs. Hoebel says "some people can become overly dependent on sweet food."<sup>122,123</sup> Addictions expert Janice K Phelps refers to the sugar-addictive person who eats a "reasonable portion of sugar food, but immediately wants more." Such people end up gorging on sugar or other refined carbohydrates "even when they know it is going to make them feel terrible." And one addiction can easily substitute for another. It's not unusual for a person who stops drinking excess alcohol to become a sugarholic. Heroin addicts consume enormous amounts of sugary nonfoods while undergoing treatment; it seems to alleviate some withdrawal symptoms. Dopamine released after eating refined sugars triggers a pleasurable sensation that soon shifts to fatigue, irritability, and depression. The body then craves more sugary foods to restore mood.<sup>124</sup> PLoSOne reported findings that "clearly demonstrate that intense sweetness can surpass cocaine reward, even in drug-sensitized and –addicted individuals." Excessive stimulation of sweet receptors by refined-sugar foods "would generate a supranormal reward signal in the brain, with the potential to override self-control mechanisms and thus to lead to addiction."<sup>125</sup> Nutrient deficiencies have been noted to contribute to sugar dependency. Among

them are B vitamins, numerous minerals, trace elements, amino acids, and fatty acids. People on low-fat diets frequently crave sweets. Improving nutritional levels help sugar cravings and its detrimental effects.

Although many dieticians assert that **all** sweeteners are the same and don't provide significant nutrition, the objective in using natural, unrefined sweeteners is **not** for their nutritional content. Rather, it's because they contain factors needed to process their sugars and they don't cause the biochemical disturbances, nutritional depletions or toxic reactions that refined, over-processed, chemicalized sweeteners do. For a person with refined-sugar dependency, weaning off refined sugars while consuming a whole-foods diet (including fruit to satisfy desire for sweet tastes) may be aided by the following: (The herb gymnema neutralizes the taste for sweet foods for up to 2 hours, making sweets less tempting without affecting other flavors.)

Just Before Two Meals:

- 1 Paraplex
- 2 Cataplex B – chew or break in mouth
- 1 Cataplex G – chew of break in mouth
- 1 Cellular Vitality

Midway Through Two Meals:

- 1 Hepatrophin PMG – chew or break in mouth
- 1 Cholacol OR 2 Cholacol II
- 1 Cod Liver Oil

Once or twice per day with sugar craving: 1 Gymnema 4 gm (MediHerb)

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