OBESITY, FROM THREE NATUROPATHS' PERSPECTIVES
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A panel discussion at the Southwest Conference on Herbal Medicine of March 26-28, 2021, by three Naturopathic Doctors, presented major factors contributing to obesity and how to treat them. Here I summarize their contributions.

Dr. Marianne Marchese practices in Phoenix AZ, and is on the adjunct faculty at the Southwest College of Naturopathic Medicine in Tempe AZ. She also wrote an article on this same topic in the journal, Townsend Letter For Doctors, May, 2021. She pointed out several contributing factors. Sleep is a primary one. For example, children who slept less than 10 hours a night had a 45% higher risk of developing obesity, in one study. Prescription drugs are known to cause weight gain, including antihistamines, beta blockers, SSRI antidepressants, prednisone, the higher dose oral contraceptives, anti-psychotic drugs, and anti-seizure and nerve pain drugs, such as gabapentin, and opioids.

Environmental pollution is a major source of obesogens, chemicals that affect metabolism of fat cells and cell signaling, cause adipose tissue inflammation, alter insulin metabolism, cholesterol and glucose dysregulation, and promote adipogenesis, the growth of fat cells. They can have anti-thyroid effects and affect sex steroid hormones, leptin, ghrelin, and other fat metabolism hormones. These effects can occur in the uterus, during lactation, in childhood, and through adulthood, at any time, and they are cumulative.

The main culprits are Bisphenols (BPA, BPS, BPF, etc.), phthalates, polybrominated dephenyl ethers, (PBDE's), Polyfluoroalkyl chemicals (PFC's), organocholorine (OC) pesticides, and polychlorinated biphenyls (PCB's).

BPA is clearly linked with increased risk for obesity, promotes adipogenesis, cholesterol and glucose dysregulation, and adipose tissue inflammation. The textbook, Clinical and Environmental Medicine, reports increasing general and truncal obesity with every increase in urinary BPA levels. This chemical is found in canned food, food packaging, plastic dishes and utensils and other plastics and thermal paper receipts.

Phthalates also appear to have effects on lipophilic hormones, fatty acids, and fatty acid metabolites, which affect adipocyte (fat cell) proliferation, especially prenatally, at very low doses. The environmental textbook also confirms increasing waist circumference and insulin resistance associated with phthalates. These are present in many consumer products, including vinyl flooring and shower curtains, plastic food wrap and containers, water bottles, and a plethora of personal care products.

PBDE's contribute to adipogenesis and altered insulin metabolism. They are in flame retardants, wire insulation, and computers, are in air, water, and soil, and they accumulate in the food chain.

PFC's (polyfluoroalkyl chemicals) are associated with gain in waist and hip girth over time, the higher the blood levels of PFC's. They are called "forever" chemicals because they never break down in the environment, and they accumulate in the food chain. They have been used in non-stick cookware, stain resistant and water repellent fabrics, and cosmetics.

Organochlorine pesticides, DDT, lindane, chlordane, etc., are stored in body fat for decades. They were banned in 1979, but they persist in soil and water and accumulate up the food chain. We are

exposed through food, water, and air. They are linked with metabolic syndrome, insulin resistance, lipid abnormalities, and excess body fat.

Dr. Marchese's recommendations are to use cosmetics that are free of parabens and phthalates, no solvents or fragrances, store food in glass, no non-stick frying pans, no plastic water bottles, reverse osmosis drinking water filter, buy in bulk to reduce packaging, organic vegetables, HEPA room air filter, avoid farmed fish, avoid canned foods and foods wrapped in plastic. For detoxing, support liver with foods, herbs, vitamins, and minerals, and antioxidants. Eat 2 tablespoons of ground flax meal, 2 teaspoons psyllium per day, 3-4 cups of green or roibos tea, 3-4 servings of organic cruciferous vegetables (cabbage, broccoli, etc.), increase organic legumes and vegetables, and avoid refined carbohydrates, white flour, and sugar.

The aforementioned textbook also gives evidence that air pollution, especially vehicular exhaust and second hand smoke are closely linked with obesity, insulin resistance, and diabetes.

Katie Stage, ND, RH, AHG, presents the influence of the colonic microbiome and obesity. This microbiome has metabolic activity that produces SCFA's (short chained fatty acids), vitamins, and TMA (trimethylamine). Several factors can disrupt the composition and activity of the gut microbiome. The main culprits are antibiotics.

Most children in this country have had 3 antibiotic prescriptions by the age of 3, and 10 by the age of 10, 17 by the age of 20. Antibiotics are put into animal feed, not just to treat infections, but because they cause them to gain weight faster to bring a better price. They can make us gain weight also but not to fetch a better price. Farmed fish likewise are fed antibiotics. Eating the animals and fish gives us the antibiotics too.

A mouse study showed antibiotics in early life had the most impact on obesity and diabetes, long after the antibiotics were discontinued. Germ free mice receiving fecal microbiota transplant (FMT) from an obese mouse, became obese. FMT from a genetically obese mouse to a lean mouse resulted in the lean mouse becoming obese. FMT from an obese human to a mouse resulted in the mouse becoming obese.

Humans with metabolic syndrome had improved insulin sensitivity after FMT from a lean donor. A map of various states in the US showed that the states with the highest antibiotic use had the highest rates of obesity. Infants who had antibiotics in the first year of life had a greater chance of the overweight condition at age 9 and 12, regardless of diet and activity level.

The way the condition of the microbiome affects body composition may be by changing the predominance of firmicutes over bacteroidites, 2 major groups of bacteria. This can change the SCFA's (short chained fatty acids) to promote lipogenesis (building fat), and by causing inflammation.

So the best interventions for better body composition may be doing things to promote a healthier, more diverse microbiota. The main actions Dr. Stage recommends are 1. decreasing sugar in the diet, 2. increasing fiber to 40gms/day, 3. decreasing meat, or at least restricting meat to organic grass fed meat, 4. decreasing saturated fat, and 5. increasing fish oil. Intermittent fasting, limiting eating within an 8-10 hr window during the day, or 2 days a week of calorie restriction, supports the circadian rhythm of the microbiome.

Some supportive nutrients and foods are probiotics and fermented foods, prebiotics such as dandelion root, burdock root, chicory, slippery elm, licorice, triphala (Emblica officionalis, Terminalia bellerica, and Terminalia chebula). Polyphenols also help to favor a more healthy microbiome, in green tea, cacao, berries, black currants, grapes, onions, and hibiscus. NAC (n-acetyl cysteine), and PPAR-γ agonists such as turmeric, isoflavones, resveratrol, and cannabis are also helpful.

Lise Alschuler, ND, FABNO, addressed the issue of obesity as *adipose tissue dysfunction*, having adverse metabolic effects on the body. Not all increase in body fat is harmful if it is not causing these adverse metabolic effects. Fatty tissue secretes adipokines, cytokines, chemokines, hormones such as leptin, adiponectin, and resistin. These affect vascular function, immunity, bone metabolism, and neurological function. When these are out of balance, they lead to a pro-inflammatory state that promotes insulin resistance, type 2 diabetes, and cardiovascular disease.

Insulin resistance promotes the release of free fatty acids from adipose tissue, increase in production of VLDL cholesterol by the liver, and decreased HDL, all not such a good lipid profile. (In my opinion, these lipid parameters are more important than LDL, which get so much attention, since it is "druggable" and lucrative for "statin" manufacturers). The free fatty acids and inflammatory cytokines, adipokines, and mitochondrial dysfunction, all impair insulin signaling. This decreases glucose uptake in the muscles, where it is needed for energy, it increases glucose release from the liver, and causes β-cell dysfuntion (the cells that produce insulin).

Some people are genetically programmed for more insulin resistance, and this can block muscle cells to uptake glucose, making resistance to exercise, and favors release of glucose from the liver, then this promotes obesity. Then the converse also happens. The dysfunctional fat of obesity then causes insulin resistance and diabetes, and this can go round and round.

This whole thing starts with processed carbohydrates, sugar, starches, etc. causing increased blood glucose spikes, leading to increased insulin, which causes increased triglycerides, that causes fat storage, leading to insulin resistance, which makes inflammation, cytokines, leptin resistance, causing fatigue and hunger, and then increased appetite for carbohydrates follows. I would add that intake of processed carbohydrates feeds the yeast (candida) in the gut, which make cravings for carbohydrates. Just another complicating factor that feeds the vicious cycles.

She points out that lean fat cells have high adiponectin (which reduce fat building), and their macrophages secrete anti-inflammatory cytokines and promote insulin sensitivity. Obese fat cells have low adiponectin, release free fatty acids, and their macrophages secrete inflammatory cytokines. How do you know what kind you have, I ask? Well, a moderate amount of subcutaneous fat is usually the lean kind, and the intra-abdominal fat and the excessive subcutaneous fat are the obese ones. Well, how much subcutaneous fat is too much? I don't think we have an easy answer. I think it's just better to stay on the lean side mostly. These changes happen over years and promotes oxidative stress, liver fat, systemic inflammation, and cancer.

Various tests can assess whether the fat is inflammatory or not. Blood glucose over 100, Hemoglobin A_1C more than 5.6, visceral adiposity (waist circumference over 40 inches for males, 35 inches for females), and triglycerides over 150 denote the inflammatory kind, and insulin resistance. A more sensitive test is the HOMA-IR, (Homeostatic Model Assessment of Insulin Resistance), using fasting insulin X fasting glucose X a constant (depending on what units of measure the lab uses). The total should be less than 2.0. This can only be used if the person does not already have diabetes.

Dr. Alschuler recommends as the most effective diet to overcome the metabolic syndrome as low calorie, low carhohydrate, and intermittent fasting. The latter is either overnight fasting greater than 13 hours, or 2 days/week of less than 500 calories per day.

Botanical and nutritional supplements for support to help insulin sensitivity include magnesium, berberine, cinnamon, bueberries, green tea, Fenugreek, and Gymnema sylvestre.

Magnesium is needed for insulin receptors, 360mg elemental Mg for 4 months.

Berberine reduces liver production of glucose, fatty acid synthesis, and adipose tissue fibrosis and inflammation.

Cinnamon increases insulin sensitivity, activates the PPAR's, and decreases inflammation, reducing the inflammatory cytokines IL-1β, IL-6, and TNF-α. One teaspoon per day recommended.

For green tea, 3-5 cups per day, some trials show decreased glucose and insulin and HbA_1C.

Fenugreek, 10 grams of powder per day showed significant improvement, in randomized trials, for glucose, insulin, HOMA-IR, HbA_1C, tryglycerides, and cholesterol.

Gymnema syslvestre at 300mg/day decreased body weight, glucose, VLDL cholesterol, and HbA_1C.

Exercise improved leptin function.

In summary, these 3 presentations show that obesity is a multifactoral condition, with several causes, and with many probable outcomes. It is the dysfunctional fat that causes inflammation, insulin resistance, metabolic syndrome, and many chronic health conditions. So we are not so much concerned with body fat as such, but its effects and how it functions. The abnormal metabolism and chronic inflammation from dysfunctional fat are what drive most chronic diseases, in my perspective. The aforementioned tests such as fasting glucose and insulin, Hemoblobin A_1C, triglycerides, and waist circumference are valuable measures for screening to detect early problems with this, and for monitoring progress in reversing these conditions. Tests are available for measuring chemical toxicants in the body, usually through urine tests. See my previous article in the archives about <u>Clean, Green, and Lean</u>. Stool tests that measure amounts of various categories of organisms in the gut microbiome can assess predominance of firmicutes or bacteroidites.

This area is huge in terms of the enormous burden of chronic disease which inhibits human potential in a major way, and threatens to bankrupt the health care systems of the world. Next month, I plan to review Dr. Lustig's book <u>Metabolical</u>, a description of the 8 areas of metabolic dysfuntion that mediate nearly all of our chronic disease. Much of it is related to obesity, but not all. The main culprit is *processed food*. You can't compensate for bad food and sedentary life with supplements. If our food is our medicine, then we are in trouble, and tackling sugar and processed food addiction and the *Big Food and Big Agriculture industries* is an enormous task. Stay tuned. We'll take it on!