THE HISTORY OF FOOD and WHY WE NEED TO GET BACK TO A WHOLE FOOD PLANT BASED DIET

In the beginning, food was beautiful. Food grew on bushes, in trees, in the ground and for most of human history, humans understood what food was. It was the source of nourishment. We called food items by their names like nectarines, berries, apples, tomatoes and tubers. Food was colorful and bright and we know from food science that our eyes are attracted to the colors of food, which gave us clues as to the nutrients in them. We had a natural attraction to the vibrant colors of yellow, blue and green as well as foods with powerful aromas, all providing clues as to their nourishing nature.

Food was whole and we understood it in its natural state. It was not reduced to its macro and micronutrients. We didn't talk about proteins, fats, carbohydrates, phytonutrients, minerals, vitamins or fiber. We just understood food in its whole nature and state and we made decisions about what to cook and eat based on whole foods. The whole was powerful.

About 23,000 years ago, we learned how to cultivate the ground and to grow more food. We went from being purely "gatherer-hunters" (we were never "hunter-gatherers" since the estimated rate of successful hunting was only 5%) to farmers. We developed a powerful relationship with the soil. We understood seasons, weather, crop rotation, soil rest... We understood nature. Communities grew around farms and the act of growing food. Food was shared and bought from neighbors forming very integrated societies.

It's only in the last 200-300 years, less than 0.1% of modern man's existence on this planet, that our attitudes about food started to deviate from a more natural state. In the 1700's and 1800's, out of the *Age of Enlightenment* and the *Industrial Revolution*, we started to change how we thought about food. We started to think about it more reductionistically, breaking things down into their component parts. At that time, philosopher Immanuel Kant wrote an essay entitled '*What is Enlightenment?*". For Kant, the Enlightenment was mankind's final coming of age and the emancipation of the human consciousness from an immature state of ignorance and error. This philosophy bred the idea that the ways of the past are old and should be left behind and that through modern science, we can reinvent the way that we eat and live. Reductionism started to replace wholism.

Reductionism is not all bad. It allowed us to identify bacteria and eventually antibiotics and vaccines, eliminating many of the communicable diseases of the world. Reductionism has driven many of the medical and scientific advances of our time but it must always be taken back into the context of the whole and understand the relationships of the parts to the whole. We must be aware of the decisions that we're making to manipulate the parts and understand the impact they have on the entirety of the whole.

During this time, people started to move out of rural communities and into urban environments, losing touch with the Earth. We began to exploit nature, the soil and the animals and we also even began to exploit our own fellow man, especially children. Food production started to become automated. Processing and shipping began.

The railway system provided a mode for people to travel but it also provided a means to transport food. New markets could be exploited and the process of canning, which started in the 1870's, and preservation was developed. We created chemicals, which we added to foods to enhance their transportability. As early as 1899, <u>studies were published</u> showing how boric acid and formalin could be used to preserve milk. This was common practice until we discovered the boric acid was killing babies. Today, formalin is used to preserve bodies after death, so that tells you how well they work!

Refrigeration was a wonderful development but it also changed how we could again manipulate foods. We could transport perishable foods like meat and dairy. Refrigeration and air conditioning is also now one of the largest contributors to global warming, after the agricultural/meat sector and transportation.

We also started to pasteurize food, further extending its shelf life and transportability.

In 1938, the *Agricultural Adjustment Act* was passed in the US, which fixed prices on dairy, pigs, chicken, wheat, corn and cotton. It gave farmers a safety net and the era of monocropping and commercial crops began.

World War 2 brought with it the introduction of the concept of *calories* to the public. During the war, calories started to be listed on menus so that people could save the calorie-dense foods for the soldiers in the field. This also unfortunately fostered the notion that, after we win the war, we can all share in the rich calorie dense foods.

Animal production started to dramatically rise after the war as well. Pre-war, there were 68 million cattle and post war, the number rose to 132 million and today it's about 10 billion animals are slaughtered for food annually.

With greater numbers came greater feeding demands. As we started to move them into large feedlots for greater production, we also moved away from cattle being allowed to graze and feed on grass. We started feeding them corn silage and other grains which were not part of their normal diet. The storage silo also developed at this time.

The "feed lot" phenomenon also changed the microbiome and the livestock became less healthy. Antibiotics were introduced into their feed as a preventative measure, as well as to promote growth. Antibiotics consumed from animal sources, including the farmed fish industry, are the main source of antibiotic resistance worldwide today.

As feedlots and the number of crowded cattle grew, we developed insecticides to kill the insects, which inevitably also multiplied under those conditions. DDT, developed as an insecticide in 1939 for which scientists received the Nobel Prize, started to be widely used. It wasn't until 20 years later that we started to understand the extremely harmful effects of DDT.

Having moved the animals into these feedlots, they no longer nourished the soil with their waste products. Soon, large cesspools of waste storage started to develop. These bred even more disease and contaminated the surrounding waters and even the air affecting the health of local communities.

The 1940s also ushered in the fast food generation when the first McDonald's was born. In 1948, automatic milking systems were developed increasing milk production by massive amounts.

Food processing through chemistry started to evolve more rapidly during this time as well. Kikunae Ikeda, a chemistry professor at Imperial University of Tokyo and founder of Ajinomoto, discovered the flavor-enhancing property of MSG in 1908. He isolated the substance from seaweed that for centuries Japanese cooks had been using to make food taste better. This compound was later found to be I-glutamate, a neurotoxin. MSGs addition to processed foods came out of the WW2 discovery that captured Japanese soldiers used seaweed to help preserve their food rations.

After the end of the war, all the TNT plants needed to find something to do with all the nitrogen, previously used to make bombs. They quickly found a market in the fertilizer industry. NPK, Nitrogen, Phosphorus and Potassium (K), was massed produced and used to grow crops larger and more quickly. The plants were green, but they are not strong. Mother nature has an amazing way of "weeding" out the weaker plants by having them secrete pheromones, which attract insects to intentionally kill them. Well humans didn't like losing crops so more pesticides and herbicides were used to protect the crops. We forced the weaker crops to continue to grow.

Between the use of more chemicals along with more destructive farming practices, plants slowly became weaker and weaker and more and more chemicals needed to be used. To tolerate the potency and volume of chemicals used, the era of genetic modification came to be. As the plants became weaker, they also became less nutritious.

Also out of WW2, the war funding gave 11 pharmaceuticals the funding to develop drugs and we quickly started producing 50% of the world's drugs.

Another WW2 legacy is our school lunch program. The US government started to provide food at schools mainly because many of the military recruits for the war effort were malnourished and could not enlist. Meat and dairy were encouraged at school because of how much of animal products we were producing and this trend still continues. In fact, in many states, it is illegal NOT to provide milk and a parent needs to provide a doctor's note in order or the school to provide a non-dairy alternative. It was during the Regan era however that our school food programs really took a nosedive. With massive government cutbacks, including the school breakfast and lunch programs, the schools turned to the food manufacturers for help. They were more than happy to provide discounted, processed foods and this legacy persists today with almost all schools having soda and junk-food vending machines on site and some even contract with fast food establishments to provide lunches! Our kids get hooked early.

In 1977, The McGovern report recommended that, for health reasons and to reduce healthcare spending, Americans should "cut down on meat and dairy." Large meat and dairy advocacy groups protested and lobbied to change the language and "reduce" was changed to "choose", a value-less and more nebulous term. The specific concepts like "meat and dairy" were changed to "nutrients", again, a more confusing and non-specific term. The only word that was not changed was the word "sugar". The maximum allowable calorie consumption was set to 25% of daily calories, significantly higher than the World Health Organization's suggested limit of 10%.

In 1982, the National Academy of Sciences codified a new official language of "nutrients" rather than "foods". This initiated the whole movement of scientific reductionism, reducing foods to individual nutrients like proteins, fats, carbohydrates, minerals, vitamins... This also led to food-confusion and ambiguity in the public.

How we grow and obtain food along with the type and quality of food we eat has changed dramatically over the last 100 years. Although consumption of sugars, oils and fats have increased directly, much of the increase is also attributed to their incorporation into processed foods. From 1900 to 2000, the following changes in consumption and patterns occurred:

- Sugar 5 lbs/yr increased to 141 lbs/yr
- Oils/fat 4 lbs/yr increased to 74 lbs/yr
- Cheese 2 lbs/yr increased to 30 lbs/yr
- Meat 140 lbs/yr increased to 210 lbs/yr
- Fruit/Veg 131 lbs/yr <u>decreased</u> to 11 lbs/yr
 Calories 2100/day increased to 2757/day
- Calories 2100/day increased to 2757/day
 Nutrient density decreased by 40-60%
- Numeric density <u>decreased</u> by 40-007
- Soft drinks 0 reached 53 gallons/year
- TV 0 4 hours/day

We stopped growing food at home in gardens and started to buy food in grocery stores where now on average, there are 46,000 products. Unfortunately, grocery stores are no longer the sole source of food. You can buy all kinds of edible products at the hardware store, electronics stores, museums, public transportation stations and the gas station! Nutrient density has decreased because of deteriorating soil quality but also because of how food has been bred. Wheat, for example, has been hybridized to withstand more processing so the wheat stalks are shorter and the wheat heads are stronger. But in doing so, we have changed the nature of the wheat itself. Apples are another example of nutrient deficiency. In order to get the same amount of iron that an apple from 1950, one would have to eat 26 of today's apples.

THE MODERN AMERICAN DIET:



- Processed foods (added fats and oils, sugars, hyper refined grains) today represent 63% of the American diet. This figure was 0% 100 years ago.
- Animal foods represent 25% of our diet. Cholesterol is ONLY found in animal products (meat, fish, dairy and eggs), which are also the primary source of saturated fat. In addition, the animals eaten today are significantly different than the animals eaten 100 years ago with more fat, fewer nutrients because of what they are fed, and they are loaded with antibiotics and other added and environmental chemicals.
- Plant Food (fruit, vegetables, nuts, seeds, whole grains and legumes) represent only 12% of our diet, but the majority of that are processed foods like juices, French fries and ketchup. The more accurate and important number is that for most Americans, <5% of their diet is coming from whole, unprocessed fruits and vegetables. Plants are our ONLY source of fiber.

Not only is there a physiologic reaction to food, there is an emotional one as well. When you look at a plate of bland, uncolorful brown and tan French fries, meat and processed grains like bread and dough and contrast the emotional response you have when you look at a bright plate of brightly colored fruits and vegetables, there is no comparison.

WE MUST RETURN TO THE EATING PATTERNS WE ABANDONED A MERE 200 YEARS AGO. WE ATE AND EVOLVED THROUGH NATURAL WHOLE FOODS FOR MILLENIA.

For humans to thrive, and for our planet to survive, a huge positive and undeniable step is to return to a more natural way to eat focusing on a whole-food, plant-based diet. Whole plant foods have a positive impact from the atomic to the planetary level.

MOLECULAR LEVEL:

- A) Inflammation/Tissue injury. The unhealthy food we are eating including processed foods, animal products, toxins, dyes, endotoxins from even dead bacteria, stress... cause free radical formation and initiates an inflammatory cascade. The endotoxins from bacteria cause a spike in TNF Alpha and IL-6, both inflammatory mediators, about 3-4 hours later. At that same time, there is a noted depressed mood and feeling social disconnect related to brain inflammation. Not only do the foods we eat affect us, they affect all those around us. Phytochemicals from plants, on the other hand, reduce inflammation and those same markers. The antioxidant amount in foods is related to the quality of the foods we eat. An unhealthy plant based diet (lots of processed plant-based foods) has as much heart disease risk as an omnivorous, standard American diet does.
- B) Telomeres, the "end-caps" on our DNA, are impacted by diet. Those following a whole foods, plant-based diet have a 30% increases in telomerase, the enzyme responsible for healthy telomeres. This lifestyle, which also includes stress reduction, exercise along with social support also impacts on genetic switches, turning off the ones causing damage and turning on the ones which are helpful.

CELLULAR LEVEL:

- A) Plant-based diets improve the efficiency of and the number of mitochondria, the powerhouses and dna-protectors of the cells. This is shown clinically in athletes who perform better, exercise longer and recover better on plant-based diets.
- B) The phytochemicals in broccoli improve the function of and protect mesenchymal stem cells, which are responsible for repair of the musculoskeletal system.
- C) These phytochemicals also enhance DNA repair, inhibit the formation of cross-linking agents and AGE's, assist in cellular detoxification, act as cell signaling molecules and bind to nuclear receptors and inhibit aromatase, found in mushrooms, just as effectively as drugs used to treat breast cancer.

SYSTEMIC LEVEL:

A) Angiogenesis. Growth and suppression/reversal of new blood vessel growth it impacted by what we eat. Too much growth supports the growth of cancers and stimulates excessive inflammation. It also contributes to obesity by allowing fat cells to grow. Too little leads to poor

wound healing and oxygenation of tissues.

- B) Microbiome. Plants and the various forms of fiber contained only in plant foods, feed the healthy bacteria. The best predictor of a healthy microbiome is the variety of fruits and vegetables we eat. 75% of a healthy immune system comes from the microbiome and when it's dysfunctional, our whole immune system is dysfunctional. Apples and onions help to heal a leaky gut. A plant-centered diet reduces production of TMAO, a very pro-inflammatory molecule, which comes only from meat. Fiber from plants feed the beneficial bacteria in the gut. Healthy bacteria increase production of serotonin, the neurotransmitter responsible for feeling good, 80% of which is made in the gut. In fact, 80-90% of ALL neurotransmitters are made in the gut. Blood sugar control is improved with a healthy gut. And lastly, colon cancer risk is reduced with a healthy gut.
- C) Endothelium (lining of our blood vessels). A plant diet protects against oxidation of LDL, downregulates inflammatory pathways which damage the walls of blood vessels, increases NO (Nitric Oxide) which relaxes arterial walls, reduces smooth muscle proliferation and reduces overall cardiovascular disease risk.

ORGAN LEVEL:

- A) Cardiovascular: Blood pressure normalizes and atherosclerotic plaques are prevented, progression is suspended or is actually reversed.
 - a. Dr. Dean Ornish shwed in his heart trials that:
 - i. At 1 year, there was a 91% regression of angina vs 165% increase in controls who were on the American Heart Association "Healthy Heart" diet.
 - ii. Arterial narrowing on angiography regressed by 82% vs progression in the control group.
 - iii. Cardiac reperfusion seen in just 3 weeks of dietary changes.
 - iv. These findings continued to be observed at 5 years assuming the lifestyle changes were continued.
 - v. Patients on cardiac transplant lists improved enough to no longer require transplants after they went through his program.
 - b. Dr. Calwell Esselstyn at the Cleveland Clinic showed reversal of plaques in arteries after patients switched to plant-based diets.
 - c. Although all lesions do not regress, plant based diets do promote healthy angiogenesis with collateral blood vessel formation, bypassing the narrowed areas.
- B) Gastrointestinal: Improvements in constipation, diverticulosis, reflux, IBS/IBD, gastroparesis (slow moving gut), reduced colon cancer risk.
- C) Nervous system: Improved ADD, MS, mood, prevents dementia, stabilizes neurotransmitters.
- D) Musculoskeletal System: improved bone density, increases muscle mass, mobilizes stem cells and improves cartilage health.

- E) Liver & Kidney: repairs liver cells, resolves NAFLD (Non-Alcoholic Fatty Liver Disease, now the #1 cause of liver transplants), normalizes fatty acid metabolism and improves kidney function.
- F) Diabetes: Compared with the American Diabetes Association diet, a whole foods plant based diet improves a variety of systemic markers to a much greater degree. It doesn't just enhance insulin sensitivity.
 - a. In one large meta-analysis, the following was found:
 - i. 44% of type 2 diabetics on insulin were able to stop their insulin within 4 weeks.
 - ii. 74% of type 2 diabetics were able to stop their oral medications within 4 weeks.
 - iii. Their beta cell function, responsible for insulin production, improved.
 - iv. Reduced fat in the beta cells was seen.
 - b. Another study found the following:
 - i. Reduced diabetic neuropathy scores by 81% in as little as 4 days.
 - ii. Improved pain and quality of life scores.
 - iii. 50% reduction in insulin requirements within 2 weeks.
 - iv. Fasting glucose dropped by 35% in 2 weeks.
 - v. 4 year follow up showed that 71% maintained the diet and that 94% had no return of symptoms at all.
- G) A systematic review of 86 observational trials and 10 cohort trials looking at the benefits of switching from an omnivorous diet to a whole foods, plant based diet revealed the following benefits and improvements:
 - a. BMI significantly improved.
 - b. Total cholesterol and LDL cholesterol levels decreased significantly.
 - c. Blood sugar parameters improved.
 - d. Mortality from heart decreased by 25%.
 - e. Total cancer mortality decreased by 8% and overall incidence of cancer decreased by 15%

GLOBAL LEVEL:

- A) Our present rate of population growth combined with the vast majority eating an omnivorous diet along with the rate of soil, ocean and rainforest destruction is not sustainable. For us to be able to feed an animal based diet to the predicted 10 billion who will populate the planet by 2050, we would need the land mass of 2 entire Earths.
- B) If everyone ate a plant-based diet, we would restore 5 billion football fields to re-forest, which would help with CO2 sequestration and reverse climate change.
- C) A family of 4 uses about 12,000 gallons of water, the same amount that it takes to produce only 10 lbs. of beef.
- D) According to the UN, we are losing 1% of our topsoil annually, starting 40 years ago, and that it is estimated that we have only 40 harvests left if we don't change the way we are farming (tilling and monocropping along with the use of chemicals). A dump truck load of topsoil is

washing away into the Gulf of Mexico every minute. Only regenerative agriculture methods can rebuild the soil. Some of these techniques include: no tilling, cover crops, allowing trees to grow acting as wind breakers, allowing animals to graze using their excrement as fertilizer, no chemicals...

- E) Switching to a plant-based diet would show compassion for the billions of animals slaughtered every year for meat.
- F) More than 80% of farmland is used for livestock but it only produces 18% of food calories and 37% of protein. It also accounts for 58% of greenhouse gas emissions, 57% of the water pollution, 56% of the air pollution and 33% of freshwater withdrawals.