Fall 11-14-2018

Does a Vegan Diet Contribute to Prevention or Maintenance of Diseases?

Malia K. Burkholder
Cedarville University, maliaburkholder@cedarville.edu

Danae A. Fields
Cedarville University, danaefields@cedarville.edu

Does a vegan diet contribute to prevention or maintenance of diseases?

Malia Burkholder

Danae Fields

Cedarville University

Does a vegan diet contribute to prevention or maintenance of diseases?

What is the Vegan Diet?

The idea of following a vegan diet for better health has been a debated topic for years. Vegan diets have been rising in popularity the past decade or so. Many movie stars and singers have joined the vegan movement. As a result, more and more research has been conducted on the benefits of a vegan diet. In this article we will look at how a vegan diet may contribute to prevention or maintenance of certain diseases such as cancer, diabetes, weight loss, gastrointestinal issues, and heart disease. We will look at how both athletes and everyday people could benefit from taking on the vegan lifestyle.

Information about veganism is getting out to the public through articles, doctors, the internet and word of mouth. But there are still plenty of people who don't know much about this topic. There are many who are trying to go completely vegan for various health reasons. Other people just do it as a fad or something to try. But, they do this without knowing very much about the lifestyle. There are several things that should be understood before switching from their regular diet.

One thing that people do not know about veganism is the history of the movement. The terms vegan and veganism were coined in the year 1944 (Moran, 2016). Also, in that year Donald and Dorothy Watson along with a small group created "The Vegan Society" in the United Kingdom (Moran, 2016). The way they defined veganism is "a way of living which seeks to exclude, as far as is possible and practical, all forms of exploitation of, and cruelty to animals for food, clothing or any other purpose" (Moran, 2016). Veganism came out of the wood works in the 1960's when it was starting to be acceptable in culture. In 1960, Jay and Freya Dinshah started the American Vegan Society. This time period is known as Generation 1. Generation 2 is

the time period between the 1960's and 1970's. In 1968, a Minnesota chiropractor by the name of Dr. Frank Herd and his wife Rosaline Herd wrote a cook book for vegans called *Ten Talents* (Moran, 2016). In 1971, a hippie by the name of Stephen Gaskin made the United States' first soy dairy. Today the little farm is used as a vegan publishing house (Moran, 2016). This publishing house published a book called *Diet for a Small Planet* (Moran, 2016). This book in part led to the foundation of FARM in 1974. FARM stands for Farm Animal Rights Movement. FARM was established by a Holocaust survivor, Alex Hershaft and The North American Vegetarian Society (Moran, 2016). This society held a conference in Maine in 1975 that brought over two thousand vegans and vegetarians. This was the biggest conference in vegan and vegetarian history. After this event, Peter Singer wrote a book called *Animal Liberation* where he coined the term "animals rights" (Moran, 2016).

Next comes Generation 3, in the 1980's and the 1990's. This generation brought about the organization called People for the Ethical Treatment of Animals; also known as PETA. The book *Fit for Life* was published during this time and it sold more than fifty million copies. The book was about eating fruits, vegetables, and raw foods. Dr. Dean Ornish is the author of this book (Moran, 2016). But, he is well known for another reason as well. At this time in history, it was believed that coronary disease was permanent, and nothing could reverse or change this disease. Dr. Dean Ornish discovered that this was not the case. Coronary disease was indeed reversible (Moran, 2016). This discovery and his book brought thousands of people to veganism. Also, in the 1980's, there was a strong presence of veganism in the punk rock culture and Farm Sanctuary was founded. In the 1990's, there was a big lawsuit against Oprah Winfrey and a cattle farmer named Howard Lyman (Moran, 2016). Lyman was a huge cattle farmer, but eventually turned to veganism. He went on the Oprah Winfrey show and said, "I'll never eat another

burger" (Moran, 2016). Because of this, Texas cattlemen filed a lawsuit against both Winfrey and Lyman. It was a very long lawsuit, but Winfrey and Lyman came out unscathed (Moran, 2016). This whole decade a doctor named Caldwell Esselstyn Jr. was working on the information that Dr. Dean Ornish had been working on. Dr. Esselstyn Jr. took it a lot farther by discovering that heart disease could be reversed merely by diet alone (Moran, 2016). In the last year of the 20th century, a fifteen-year-old boy by the name of Nathan Runkle founded Mercy for Animals (Moran, 2016).

As of 2018, we are in Generation 4. This generation has had the most vegan growth. As of right now in the United States of America about 2.5% of Americans are vegan (Vegan Living, 2018). That is about seven and a half million people that do not use any animal products. Many more vegan books have come about and many vegan cook books have been written. It is now easier to be a vegan than ever before. Since the internet has been invented, the vegan movement has gained a lot of ground. There are many documentaries, blogs, podcasts, and social media posts that have cast light on veganism. Several vegan athletes have become vegan and explained their position on their choice. Many countries are coming together to share evidence and collaborate on scientific studies. Some of the countries include the United Kingdom, India, Canada, Israel, Germany, and Italy (Moran, 2016).

Some people do not know anyone who is completely vegan or any one who has tried the vegan diet. But, there are a lot of famous actors, actresses, and singers who are vegan or have tried to go vegan. One famous singer is Ellie Goulding. She was a vegetarian because she said she loved cheese too much to go full vegan. After a decade of vegetarianism, she gave up her love of cheese and has become a full vegan (Bunny, 2018). Natalie Portman is another big name in the vegan culture. She is a true vegan activist. She regularly talks in interviews about her love

of veganism and her concern for animal welfare (Bunny, 2018). A very well-known actor by the name of Liam Hemsworth is also vegan. The vegan diet makes him "feel nothing but positive, mentally and physically (Bunny, 2018)." One of the most well-known couples of Hollywood are on and off vegans. Jay Z and Beyoncé have tried many times to vegan. Beyoncé has done well with the diet, but Jay Z claims he cannot give up cheese; it is just too much of a struggle for him (Bunny, 2018).

The biggest misunderstanding about the vegan diet is that people think it is just like the vegetarian diet. While the diets are very similar there are major differences in them. Both the vegan diet and the vegetarian diet exclude a lot of normal everyday foods. That is why the diets are often confused or thought of as the same thing. Meat, fish, and poultry are not eaten in either diet. Vegetarians do; however, eat dairy products including eggs. Some vegetarians are vegetarian because of the cruelty of the meat market. Others are vegetarians purely for health reasons. Like vegans there are different types of vegetarians. Vegetarianism is really just a diet not a lifestyle. For some people vegetarianism is just a step on the journey to veganism. By going vegetarian first they can slowly implement changes in their diet instead of going cold turkey overnight.

The big difference between vegans and vegetarians is how far they go to protect animals. The vegan diet takes their animal safety a step farther. They do not eat any animal products such as dairy products, eggs, or honey. They also do not use any animal by products. They do not use fur, leather, silk, wool, soap, or any cosmetics that are derived from animal products (The Vegetarian Resource Group, 2018). They even avoid toothpastes that have calcium that are extracted from animal bones; if they know about it (Vegan Food Guide, 2018).

People do not understand that the vegan "diet" is so much more than just a diet. It is a whole lifestyle and a whole way of thinking. They are against anything that has to do with hurting animals or using animal by products. Veganism is not for someone just to try out. It takes a lot of effort and commitment to be a true vegan.

The vegan diet has many components to it in general. One component is what is eliminated from the diet. Another component is getting all the vitamins and minerals they need because of the elimination of so many foods. Then there are multiple variations of the vegan diet itself. Veganism isn't the easiest diet for going out to eat. They have to constantly be planning ahead and packing vegan friendly food to bring with them. Vegans also have the non-food component which makes veganism more than just a diet; it is a lifestyle.

Although vegans chose to exclude animal-based foods, they still have 3 basic food groups in their diet. They eat grains, fruits, and vegetables. These food groups alone aren't enough for vegans to have get all the nutrition they need, so they have to add in foods and supplements that give them all the nutrients they need.

Why People Choose Veganism

Lots of people have very little knowledge of veganism and just jump right in, learning along the way about the lifestyle. Others, do extensive research before making the commitment to transition to the diet. One of the major reasons why people decide to make the switch from a conventional diet to a vegan diet is because of the perceived health benefits that come along with a plant-based diet. Many people come to veganism because they have heard that it is a way to lose weight, lower their risk of certain diseases, or have more energy in their day to day lives. The health benefits of veganism are a large factor in why people decide to restrict their diet so heavily.

People who choose to eat a vegan diet usually consume a significantly greater amount of fruits and vegetables in their daily routine than the general population. Multiple studies have been done and it is common knowledge that consuming fruits and vegetables is advantageous to a person's health (Aune, 2017). The vegan diet eliminates a number of foods that may be seen as controversially healthy or unhealthy. The debate among nutritionist whether eggs, certain dairy products, and whether red meat are damaging to one's overall health or are beneficial is debate that will certainly not be won soon. However, in recent studies red meats and cured meats have been linked to colorectal cancer (Aykan, 2015). In a review done by Aykan on Red Meat and Colorectal Cancer, Aykan looked at 10 meta-analyses of prospective epidemiological studies. In the conclusions of his review he found that the evidence indicates that processed and red meat may increase one's risk of colorectal cancer by 20-30% (Aykan, 2015). By eating a vegan diet, this risk is cut out completely. Another reason consuming meat may cut down on someone's overall health is that eating meat may lead to microbial resistance. The meat and dairy industry combined use around 100,000 tons of antibiotics each year to treat the animals that are to be consumed as meat or their dairy products are going to be used (Boeckel, 2015). These animals in factory farms are crowded into small enclosures and with the combination of tight corridors and many bodies, disease can take hold quickly. Farmers, to prevent this as much as possible, pump their animals full of antibiotics such as penicillin, a drug the human population heavily relies on as well. When humans consume animals that have been given large doses of these types of drugs, our own resistance to the antibiotics goes up, making them less effective in our own body's. This microbial resistance can be avoided by either not consuming meats that have been pumped with antibiotics or someone can cut out meat to avoid this threat entirely. Another health benefit is that veganism is linked to a lower risk of heart disease and other common killers such as diabetes

(Crowe, 2013). One probable reason as to why people who eat a vegan diet may be less prone to these diseases is because vegans tend to have a leaner body composition and are less disposed to obesity than the general population.

Different Types of Veganism

As with any other diet, there is not just one way to eat vegan. Yes, you can only be considered "vegan" if you stay away from meat, eggs, fish, dairy, and all animal products but many vegans choose to live the lifestyle differently. One path that some take is to rid their diet of all cooked foods. Raw veganism excludes any food that is above 46 degrees Celsius or 115 degrees Fahrenheit (Hackett, 2018). One reason some decide to follow this diet is because they believe that once food is cooked above the temperature of 115 F it starts to lose enzymes and nutrients in the cooking process. Thus, they believe that only consuming raw foods leads to higher yields in nutrients gained from the food which leads to better overall health. Proponents of this diet claim that it promotes better digestion, clearer skin, higher amounts of energy, and weight loss (Hackett, 2018). Ariel Belloso has been a raw vegan for ten years and swears by his diet change. He started researching raw food and the vegan diet after his mother was diagnosed with Leukemia and had a 33% chance of surviving the cancer. His mother and himself started following a raw vegan diet ten years ago. They contribute the change in lifestyle to helping cure his mother of cancer and providing himself with better quality of life (Belloso, 2016).

Another type of veganism is following a starch-based diet. The large proponent of this type of veganism is Dr. McDougall. He has authored many books on the diet and claims that when people cut out processed oils and animal products their bodies are able to heal and thrive (Nutritiously, 2017). The diet focuses on consuming starch-based foods such as potatoes, sweet

potatoes, and rice with the addition of fruits and vegetables. The diet avoids oils and other fats along with highly processed foods.

Dr. Caldwell Esselstyn is the originator of the Esselstyn vegan diet. He termed this particular way of eating for those who were trying to prevent or reverse the effects of heart disease. The diet is essentially vegan whole foods based with the avoidance of highly fatty foods such as avocadoes, nuts, and oils. Dr. Esselstyn helped former president Bill Clinton who underwent a quadruple bypass surgery with his diet. So far, the diet has helped him to avoid a potentially lethal heart attack (Nutritiously, 2017).

Some may think it almost impossible to be a low-carb vegan; however, some vegans eat a low-carb vegan diet. Almost all of the staple foods of a vegan are somewhat carb-based. It can be challenging to follow a low-carb diet as a vegan especially if one is looking to go into ketosis. The foods that are emphasized in this diet are beans and legumes even though they are fifty percent carbs, nuts, seeds, oils, soy protein, non-starchy vegetables, and berries (Nutritiously, 2017).

Some vegans decide to base their diet on mainly consuming fruit. In recent years, it has been labeled as the "vegan fruitarian diet." This diet, as you can assume, is very high in sugar content. Most end up eating large smoothies in the morning followed by large quantities of fruit at lunch and as snacks. Some decide to opt for steamed vegetables and potatoes for dinner so as to not have quite as high blood sugar levels before going to sleep. This kind of diet tends to end up being mostly raw because of the shear amount of fruit being consumed. Mono meals, meals consisting of one type of food such as bananas, are a large emphasis in this diet. Oils, salt, caffeine, and alcohol are avoided on the diet and drinking plenty of water is encouraged.

Another way to eat vegan is the high fat raw vegan diet. This diet is another form of raw veganism, however, much of their diet consists of foods that have a high fat content. Many gourmet vegan dishes tend to be higher in fat and may be raw as well. This diet's main food groups are nuts and seeds and fruits. Many raw vegan desserts and dishes have more fat content because of hearty sauces and using cashews and other nuts as bases to desserts. In a high fat raw food diet, appliances like blenders, dehydrators, and juicers are used heavily to create meals.

Some people decide to switch to veganism because of some health reason or to detox their body. With this approach, some decide to try a vegan detox diet. This type of eating plan emphasizes whole and mostly raw foods. One of the concepts in a detox diet is to choose foods that are alkaline. Alkaline is defined by Merriam Webster as having a pH of more than 7 (Merriam Webster, 2018). A detox vegan diet puts a strong emphasis on eating foods that have a pH of 7 or more this helps to prevent the body from becoming too acidic which can have adverse health effects. On a detox diet, leafy greens, high fiber foods, and plant supplements such as spirulina are used frequently. Many decide to go gluten free and stay away from high glycemic index foods as well. Many people who choose to eat this way do so for a short amount of time. Detox diets are not normally a long term diet because of how strict they can be and because detoxing the body is not normally an extended process.

The SOS free vegan diet was popularized by Dr. Alan Goldhamer. The founder of the TrueNorth Health Center, wanted to take the vegan diet a step further by eliminating salt, oil, and sugar. These three foods are considered to be stimulants and when eaten may have an addictive effect in the body. By eliminating these 3 foods, people may have an easier time reaching their health goals. Dr. Goldhamer introduced this diet to his patients and started to see the effects of weight loss and overall better health. Salt, oil, and sugar are discussed in the book, The Pleasure

Trap. In this book it describes how people look for the most amount of pleasure with the least amount of effort. In the book, it describes how these three foods require very little effort to add to meals, but they increase the palatability of the foods substantially without much effort (Lisle, 2003). Once these foods are added to meals, it is much more likely to overeat above the amount someone would if they had not added them. When consuming salt, oil, or sugar it is much more likely to consume large amounts instead of limiting portions. Completely eliminating these foods is one way to not overeat in that area.

Finally, there are many vegans who simply follow a plain vegan diet. Most vegans eat this way, just avoiding animal products and eat whatever they want as long as it falls within those guidelines. There are many meat free substitute foods as well as dairy free options like plant based milks, yogurts, and cheeses. Even though these foods are "processed" many vegans still decide to consume them. There are still foods that are considered junk food when you eat vegan. Most people eat these foods and are not opposed to consuming them unlike some who avoid any and all processed groceries. There is such a thing as the "standard" vegan diet and just like the standard American diet followers eat anything that is vegan, it does not matter if it is considered healthy or unhealthy.

Disadvantages to a Vegan Diet

There are many good aspects to the vegan diet, but it is not all sunshine and roses. There are limitations to this diet that must be overcome to have a healthy lifestyle. This diet takes a lot of planning ahead and being prepared for quick changes. It also takes a lot of commitment by the person to sustain this diet. The normal American diet is everywhere and there are relatively few vegan choices. It also takes a lot of knowledge because this diet is so limited. With the main food groups that are in the vegan diet there are plenty of essential nutrients that need to be added in to

their diet in a different way. The diet itself is not life functioning if it isn't properly supplemented.

The vitamin B12 is something that is really only found in meat, eggs, milk, and cheese. It is essential for the body because it makes red blood cells and maintains normal nerve function (Vegan Food Guide, 2018). Vegans must get this essential vitamin from enriched cereal, nutritional yeast, fortified soy products, or supplements. Supplements are the most common way a vegan usually gets Vitamin B12. Supplements can come from over the counter pills like a multivitamin. They also have a sublingual form of the vitamin. It is placed under the tongue and will dissolve. This could be a good option for children or adults that can't swallow pills. There is a nasal gel that dispenses Vitamin B12 (Vitamin B12, 2011). A person can get a prescription for an administered shot of Vitamin B12 (Vitamin B12, 2011). This is usually only used to treat a deficiency, however. A deficiency of vitamin B12 can cause tiredness, constipation, weakness, loss of appetite, weight loss, megaloblastic anemia, nerve problems, balance problems, depression, confusion, poor memory, and soreness in the tongue or mouth (Vitamin B12, 2011). It is very important for vegan mothers who are pregnant or breastfeeding to get enough B12 in their diet. If they have a deficiency in the vitamin then their child will too. This is a big problem for little babies.

Another big limitation to the diet is calcium. Calcium is important for strong bones and teeth. Without enough calcium bones are weak and brittle. They easily break and can cause major problems when the person is elderly. They do not eat any dairy products which is how most people get their calcium. There is a large amount of calcium in green leafy vegetables like spinach, kale, bok choy, broccoli, and collards which is a good option for vegans. They can also get some calcium from almonds, sesame seeds, blackstrap molasses, dry figs, and soy foods

(Vegan Food Guide, 2018). Vegans, like everyone else, need milk substances in most cases. Milk is a main ingredient in a lot of recipes. Instead of using regular milk they use almond milk, soy milk, rice milk, and fruit juices.

Getting enough calcium is only beneficial if the person also has enough vitamin D. Vitamin D helps calcium absorption in the body. Vitamin D is a fat-soluble vitamin which means it is stored in adipose tissues in the body. This vitamin is hard to get in the diet. Vitamin D comes from the sun. If a person is consistently outside, they will mostly like get enough vitamin D. If a person is inside a lot they will have to their get vitamin D from fortified dairy products like rice milk and almond milk. They can also get some Vitamin D from orange juice. There is not any vitamin D in commonly eaten plant-based foods (Vegan Food Guide, 2018).

Iron is a mineral that is essential to the human body. Its main function is attachment with hemoglobin in the blood stream. Hemoglobin is an important part of red blood cells. Collectively, red blood cells, hemoglobin, and iron function together to carrying oxygen through the bloodstream to all parts of the body. Without enough iron the body can't get the oxygen that it needs. Iron comes from both plant- based foods and animal- based foods, but the body can more easily process the animal-based iron. This is why the recommended amount of iron is higher for vegans than people with a meat-based diet (Vegan Food Guide, 2018). Vitamin C helps iron get absorbed in the body. Vegans can get iron through soybeans, tempeh, tofu, chick peas, lentils and legumes (Vegan Food Guide, 2018).

Vegans have the potential to be deficient on the mineral zinc. It can be found in plenty of plant foods such as nuts, legumes, miso and other soy products, pumpkin and sunflower seeds, tahini, wheat germ, and whole-grain breads and cereals (Vegan Food Guide, 2018). Zinc is important for immune system response. Zinc is found inside cells and helps them fight off

bacteria and viruses. The body needs zinc in order to make DNA and proteins (Zinc, 2016). Although deficiencies in North America are rare the problems that come from it are very serious. They include slow growth in infants and children, delayed sexual development in adolescents, hair loss, diarrhea, eye and skin sores and loss of appetite, weight loss, problems with wound healing, decreased ability to taste food, and lower alertness levels (Zinc, 2016).

Omega 3 fatty-acids are really important to incorporate in any diet. They prevent and manage heart disease. They may help to lower blood pressure. Omega 3's lowers the risk of depression, dementia, and arthritis. They are known as a "good fat." There are three types of Omega 3 fatty acids. One is alpha-linolenic acid. It is an essential fatty acid, meaning the body can't make it. A person must get this from what they eat or drink. A person can get alpha-linolenic acid from plant oils such as flaxseed oil, canola oil, and soybean oil (Omega 3 fatty acids, 2018). Eicosapentaenoic acid is another type of omega 3 fatty acid. It is found in salmon and other seafood. It is usually with the third type of fatty acid which is docosahexaenoic acid. It is found in fish and other seafood as well. The retina, brain, and sperm cells have a high concentration of docosahexaenoic acid in them. The human body is able to take alpha-linolenic acid and turn it into eicosapentaenoic acid and then into docosahexaenoic acid (Omega 3 fatty acids, 2018). It can only convert a very small amount, however, so a vegan may not get all the omega 3's they need. Even the supplements for Omega 3's are limited to vegans as they are mostly fish oil. There is a supplement made from algae (Omega 3 fatty acids, 2018). Deficiency can cause scaly, rough skin or a red, swollen, itchy rash (Omega 3 fatty acids, 2018).

Protein is one of the biggest concerns in the vegan diet. Protein usually comes from meat and animal sources, however, that is not where vegans get their protein. Vegans can get protein from nuts, seeds, legumes, and soy (Vegan Food Guide, 2018). Vegans should use soy products

carefully, however, because they are highly processed. The best way for a vegan to get the protein they need is to mix and match their food. For example, rice and beans. This meal is really good because it is complete in proteins. Other meals that supply a complete protein combination are hummus with pita and spirulina with grains or nuts. Quinoa is rising as a super food. It is loaded with protein, iron, magnesium, and manganese (Vegan Food Group). It is a good replacement for rice. Protein is very important because it is vital in growth. When there is a deficiency in protein, growth is stunted, anemia, edema, vascular dysfunction, physical weakness, and impaired immunity (Wu, 2016). Protein is needed to grow our muscles and is used to gain muscle mass.

If a person is deciding to try a vegan diet, they should consult their doctor and a nutritionist to make sure they are getting the recommended amounts of these vitamins and minerals. Some of the vitamins and minerals have repercussions when they are taken in excess.

We know that vegans have a strict diet where they can't eat a lot of normal foods. However, they are not rabbits; they do not just eat salads. A good replacement for meat is tofu. Vegans can eat tofu and like red meat it is complete with all the proteins (Bunny, 2018). They make tofu dogs as a substitute for hot dogs. There is also a food called tempeh that is less common than tofu, but it is packed with the complete set of proteins. There are more and more meat substitutes. Instead of hamburgers, vegans can eat veggie burgers. There is fake bacon and sausage alternatives (Vegan Food Guide, 2018). Crackers, cookies, and cereals are now being made with no animal products so that vegans can have them. Some random good foods that vegans are allowed to have are Oreos, crescent rolls, spicy-sweet chili flavored Doritos, unfrosted pop tarts, Krispy Kreme glazed apple pies, Fritos, and pretzels. The vegan diet does not have to be boring, and they do not have to eat the same foods repeatedly. There has been a lot

of progress toward more vegan friendly foods, but there are still some challenges that go along with following the vegan diet.

A problem that vegans face in our fast-paced world is going out to eat. Vegans sometimes feel as though they can only order salads when they go out to eat. Fast food restaurants such as McDonalds are not an option unless they get a salad. Sit down restaurants are definitely better than fast food restaurants, but it can still be challenging. It takes a lot of planning and knowledge on behalf of the individual. A vegan must know exactly what they can and cannot eat. They may have to look at the menu online before going to a restaurant to make sure that they have some vegan options. A busy vegan mom might be running her three children to soccer practice, volleyball game, and piano lessons which does not leave her time to eat. There is a concession stand at the volleyball game with hot dogs, hamburgers, pizza and nachos with cheese. All things she, as a vegan, can't eat. It takes dedication to have a strict diet like veganism.

The Advantages to a Vegan Diet

There are advantages to a vegan lifestyle that are not health related. One advantage is to the environment. Factory farming as defined by Merriam Webster as, " a farm on which large numbers of livestock are raised indoors in conditions intended to maximize production at minimal cost (Merriam Webster, 2018)."Factory farming has played a large role in contributing to environmental change and the changes are not of any benefit. Besides having the moral implications, factory farming is effecting not just domesticated animals but other wildlife as well. Because so much land is needed to sustain large farms, there has been major deforestation to be able to make room for cattle and other animals. In about the last forty years or so, since factory farming erupted, the number of mammals, birds, reptiles, amphibians, and fish declined by half internationally (McLellan, 2014). Almost two-thirds of wildlife loss is because of food

production, with factory farming being a major culprit (Global Biodiversity Outlook, 2014). Land is being taken away from all forms of wildlife to make room for crops that are meant to feed livestock for our consumption. An example of this is the large decline in the Jaguar population in Brazil. Brazil houses half of the jaguar population in the world. Within fifty years, 95% of the population has disappeared. A large reason as to why this has occurred is because so far, 13 million hectares of land have been used to grow soya, with its main purpose to feed industrially reared farm animals (Compassion in World Farming, 2018). So much of the jaguar's native land has been destroyed, decreasing the population because they have nowhere to grow and thrive.

Almost half of the world's land that is usable, excluding oceans and other bodies of water, is devoted to agriculture. The land devoted to agriculture does not all go to raising crops that the general population consumes. Most of this agriculture goes toward feed for factory farm animals which will then be slaughtered for the consumption by the general population. Nearly 74 billion farm animals are raised every year for food and that number is rising. The large number of animals raised lends to the 74 billion animals contributing to a seventh (14.5%) of all global greenhouse gas emissions (Compassion in World Farming, 2018). Pollution is not just happening in the air and on land because of factory farming, the oceans are being affected as well. A dead zone is defined as a hypoxic zone of water that does not receive enough oxygen to sustain animal life (National Ocean Service, 2018). One such dead zone appears in the Gulf of Mexico every spring as fertilizers, that farmers use in crop season, make their way into water sources that lead into the ocean (National Ocean Service, 2018). The dead zone in the Gulf of Mexico is the second largest in the world. This especially affects the shrimp population because it disrupts their migratory pattern and increases the death rate. There are now more than 400 coastal dead zones

with the total square mileage equaling 95,000 miles of ocean area. Most of these can be easily remedied by cutting out the harmful fertilizers that are used on crops for factory farming (Compassion in World Farming, 2018).

As of right now, an arable land the size of half the United States is being used as crop land to feed and cultivate the animals in factory farming. This amount of land is likely to grow to meet the demands for more meat, poultry, and dairy in our world. This expansion of crop land will most likely come at the expense of forested land and lead to more extinction of species and natural wildlife habitats. Much of factory farming is condoned because of the forthcoming food crisis. However, the United Nation's statistics say that there is enough food available on the earth today to feed 16 billion people (FAOSTAT, 2018.) More than one-third of the world's cereals and soya crops are fed to animals, which wastes more than two-thirds of the existing calories and protein in conversion to meat, eggs, and milk (Compassion in World Farming, 2018). By not buying from the industries that are causing these environmental changes, vegans may see themselves as helping the environment.

The last potential advantage that could come from consuming a vegan diet is the bacteria and disease prevention. E. coli comes from consuming contaminated red meats and is the leading origin for bloody stool (Nursingdegree, 2018). People such as young children, the elderly, and individuals with a compromised immune system can become particularly ill and possibly die from being exposed to E. coli. Salmonella is another gastrointestinal illness that is closely related to e. coli. Foods that are most prevalent with possible salmonella poisoning come from consuming raw eggs and raw chicken meat (Nursingdegree, 2018). Another disease that is not as wide spread as E. coli or salmonella but is still apparent in parts of the world is Mad Cow disease. The safest way to not contract, Creutzfeldt-Jakob disease, which is a fatal and non-

treatable disease is to not consume animals with such illness (Nursingdegree, 2018). With these three illnesses, going vegan would safely eliminate the possibility of contracting any one of them.

Literature Review

Veganism has been attributed to helping with the prevention and maintenance of certain diseases and medical conditions. Much research has been done on the topic of veganism with regard to its benefits for individuals with certain illnesses and whether or not switching someone's diet can have an effect on their health as a whole. Such research has looked at diseases such as cancer prevention, diabetes, heart disease, gut issues, weight loss, and even the effect of the vegan diet on such things as stress and athletic performance. In this literature review, we will cover research findings on all of these topics to see whether a vegan diet changes the effects of certain medical conditions, if it has no effect, or it has a negative effect.

The Vegan Diet and Cancer

5F. Cancer is the second leading cause of death in the United States. According to the American Cancer Society, about 609,640 Americans will die in 2018 from cancer (American Cancer Society, 2018). They also predict that 1.7 million new cases will be diagnosed in 2018. The statistics show that 87% of cancer cases happen in the people who are fifty years old and older. They say this is mostly because of smoking, eating an unhealthy diet, and/or lack of exercise (American Cancer Society, 2018).

Prostate cancer is the second most common type of cancer. It accounts for twenty-seven percent of cancer cases (American Journal of Clinical Nutrition, 2016). In one study, the effects of a vegan diet on prostate cancer was tested on 26,346 male participants. Of the male participants tested, 1,079 were diagnosed with prostate cancer. More African-Americans were

identified with this type of cancer than Caucasians. The men diagnosed with this were slightly more educated and had a higher BMI (American Journal of Clinical Nutrition, 2016). A higher amount of people with diabetes mellitus and prostatic hypertrophy were diagnosed with prostate cancer. People with a vegan diet were diagnosed with prostate cancer in a lower percent than a regular non- vegan diet. This study showed that a vegan diet is a significant protector against prostate cancer. A study done with Dr. Dean Ornish said that poultry and eggs were just as bad as red meat (Natural Health and Vegetarian Life, 2010). The study said that men who had prostate cancer and ate eggs and poultry were twice as likely to have their cancer reoccur after treatment or progress to a more serious form.

Insulin growth factor 1 is a known risk factor for prostate cancer. Animal products have this hormone which puts more men at risk (Natural Health and Vegetarian Life, 2010). It also showed that people with higher cholesterol were more at risk because cholesterol helps cancer cells divide. It is really good for a person to consume plant sterol because plant sterol suppresses prostate cancer cell growth and also makes the cell commit "suicide" (Natural Health and Vegetarian Life, 2010). Fibroblast Growth factor 23 (FGF23) is a hormone that regulates phosphate and vitamin D. It is produced mainly in the osteocytes and mature osteoblasts in bone (Longevity, 2017). It is known to have growth factor activity in prostate cancer. FGF23 is seen to synthesize inside bone and likely promotes the expansion of prostate cancer bone metastases (Longevity, 2017). Dietary intake of bioavailability of phosphate and calcium boosts the bone's production of FGF23 which may induce the cancer or help the cancer spread throughout the body (Longevity, 2017). This evidence indicates that high intake of the bioavailable phosphate or calcium are high risk factors for aggressive prostate cancer. While the natural plant-based diet is not low in phosphate or calcium, it is lower in bioavailability than animal products. These are

expected to lower the production of FGF23. This might play a big role into why vegans and vegetarians have a lower risk of developing prostate cancer.

A study about a low-fat vegan diet was done in 1999. A lot of diseases were examined in this study, but what it had to say about cancers was interesting. The study indicated that the low-fat vegan diet was especially protective against insulin resistant cancers such as prostate cancer, breast cancer, and colon cancer (McCarty, 1999). This study blames the high IGF-I activity that is associated with high intake of animal products; which is thought to be the reason for so many people in wealthy societies getting "Western" cancers (McCarty, 1999).

There was a study done specifically about breast cancer risks in the early 2000's. There were 96,001 females that participated in the study between 2002 and 2007. They broke them up into groups by the type of diet that the participants ate. They had the non- vegetarians, the lacto-ovo-vegetarians, the pesco-vegetarians, the semi-vegetarians, and the vegans. This study showed that non-vegetarians and all three of the vegetarian groups had the same exact risk for breast cancer (Penniecook-Sawyers et al., 2016). The study also showed that the people who ate a vegan diet had a lower risk for breast cancer (Penniecook-Sawyers et al., 2016).

Cancer research has figured out a connection between cancer occurrences and the level of mTORC1. The mTORC1 complex is a heterotrimer comprised of mTOR; a protein. Chronic activation of mTORC1 is often seen in cancer cases (McCarty, 2011). On the flip side, increased plasma levels of adiponectin have been linked to decreased risk of breast cancer, colorectal cancer, prostate cancer, endometrial cancer, pancreatic cancer, gastric cancer, renal cancer, and melanoma (McCarty, 2011). Research has shown that a vegan diet lowers the levels of mTORC1 and increases the plasma levels of adiponectin (McCarty, 2011).

Colorectal cancer is another type of cancer that is very prevalent in the Western society. It is the leading cause of cancer related deaths. The primary prevention of this cancer is diet along with exercise. Just because a person has a good diet and exercises regularly does not mean they cannot or will not get this type of cancer. However, it will reduce the risk of it.

A study started in 2002 and ended in 2014 was done on colorectal cancer. The trail was from 2002-2007. Then the analysis part was from June 2014 to October 2014. The study had 96,354 participants initially. After exclusions, there were 77,659 participants in the study. Both men and woman were in the study. The first thing the participants had to do was fill out an extensive dietary questionnaire (Orlich et al, 2015). Based on their answers, they were split up into five groups; vegan, lacto-ovo-vegetarian, pesco-vegetarian, semi-vegetarian, and nonvegetarian. The goal of the study was to see the relationship between diets and colon and rectal cancer cases. In the follow up phase of the study, there were 380 cases of colon cancer and 110 cases of rectal cancer documented. Pesco-vegetarians had by far the lowest amount of cases; following that was lacto-vegetarians. Vegans were the next lowest in cases. Semi vegetarians followed vegans and then nonvegetarians had the highest amount of cases (Orlich et al, 2015). This study also showed that men and women were similar along with black and nonblack individuals in terms of number of cases (Orlich et al, 2015). Evidence shows that red meat, especially highly processed meat, when consumed puts a person at a significantly higher risk of developing either colon or rectal cancer.

Another research case was conducted in 2014. It showed the risks of getting different cancers according to the diet that people ate. They were broken up in groups of nonvegetarians and vegetarians. The vegetarian group included vegans and all the different types of vegetarians. The results showed that vegetarians experienced an eight percent risk reduction for overall-

cancer. For cancer-specific locations, vegetarians had approximately half the risk of developing colon cancer (PubMed, 2014). Vegetarians had 23% risk reduction for cancer of the gastrointestinal tract (PubMed, 2014). Vegetarians also experienced a 35% risk reduction for prostate cancer compared to non-vegetarians (PubMed, 2014). Similarly, vegetarians tended to have lower risk for cancer of the respiratory tract (PubMed, 2014). No significant differences between the diet groups were found for other site-specific cancers including lung, breast, and uterine (PubMed, 2014). However, there was a 48% risk reduction in breast cancer mortality in vegetarians. Vegans have a 73% higher risk for urinary tract cancer than nonvegetarians (Le & , 2014).

In almost all of the studies done between cancer and the vegan diet, the vegan diet has been a part of a positive change in the cancer patients or have had less cases of cancer in the vegan population. While none of the studies say without a doubt that a vegan diet is the cause of the positive changes we see in the studies, they do suggest that the diet could be the changing factor. More research is needed to fully be able to say that the vegan diet is a way to protect against cancer or a way to have adverse effects of cancer. This diet is something that people should talk to their doctor about if they want to take a more natural approach to cancer.

The Vegan Diet and Diabetes

5G. There are 30.3 million people in the United States that are diagnosed with diabetes. There is another 7.2 million people in the United States that may have undiagnosed diabetes according to the American Diabetes Association (American Diabetes Association, 2018). Every year another 1.5 million people in the United States are diagnosed with diabetes. It is the seventh leading cause of death. In 2015, over 300,000 people died because of diabetes (American Diabetes Association, 2018). It was also recorded in 2015 that 84.1 million Americans age eighteen or

older were diagnosed with prediabetes (American Diabetes Association). Clearly, diabetes is a huge problem in the United States and is growing bigger every year.

A study done in 2014, was conducted on the different types of diets that people in America ate and what the disease rate looked like. The diets were nonvegetarians, semi vegetarians, pescovegetarians, lacto-ovo-vegetarians, and vegans. The study showed that all the forms of vegetarians and vegans had a 25%-49% risk reduction of developing type 2 diabetes compared to nonvegetarians (Olfert & Wattick, 2014).

An academic journal published in September of 2018 wrote that a vegan diet is "the most beneficial for diabetes prevention and management" (Olfert & Wattick, 2018). Countries across the world have seen that has they develop a more "Western" diet, they develop more and more cases of diabetes. A Western diet is full of saturated fats and trans fats whereas a vegan diet is low on these types of fats.

There was a study done in 2018 that examined 8,401 people. They were not diabetic at baseline. The results were concluded seventeen years later. They found that vegans and vegetarians in the study had a 73% reduced risk of getting diabetes in their life time. People who eat meat once a week had a 27% higher chance of developing diabetes and the risk went up to 38% if the meat was processed (Olfert & Wattick, 2018).

Another study that was conducted in 2018 had 2,918 participants. These participants were non-drinkers, non-smokers, and Buddhists. They also had no chronic diseases at base line testing. They did a follow up study 5 years later. Of the participants, 183 of them had diabetes. They found that the participants who adhered to a vegan diet their whole life had 35% reduced risk of diabetes (Olfert & Wattick, 2018). They also discovered that participants who adopted a

vegan diet after not being vegan had a 53% reduced risk of developing diabetes compared to non-vegans (Olfert & Wattick, 2018).

A study conducted in the Netherlands examined different aspects of diabetes including insulin resistance, pre-diabetes, and type 2 diabetes between plant-based diets and animal-based diets. They collected data about dietary, insulin resistance, presence of pre-diabetes, and presence of type 2 diabetes. They measured the adherence to a plant-based diet by assigning them a score based on a plant-based diet index using their responses from a food frequency questionnaire (Olfert & Wattick, 2018). A high score on the questionnaire meant that they followed a strict plant-based diet whereas if they had a lower score it meant that they did not follow a strict plant-based diet. The higher the score the lower insulin resistant they were. Those with a higher score also had a lower risk of pre-diabetes and a lower risk of type 2 diabetes (Olfert & Wattick, 2018). They also adjusted for BMI and the results were still significant for insulin resistance and type 2 diabetes.

A 12-week study that began in 1999, had male participants start a low-fat, vegan diet. The results showed that the people on this diet had a 28% reduced fasting plasma glucose level (Olfert & Wattick, 2018). They also had lost a significantly more amount of weight than people on the tradition diabetes diet.

Stemming off the last study, a group of twenty men that all had type 2 diabetes enrolled in a 16-day study. This study investigated a low-fat high carbohydrate diet for diabetics. The first seven days they followed a regular diabetic diet. After that they switched to the new diet. The new diet had a lot of carbohydrates from whole grains and plant food for the rest of the study (Olfert & Wattick, 2018). They were tested on each diet. They found that on the traditional diet the participants saw no changes in insulin dosage, fasting plasma glucose, or urine glucose levels

(Olfert & Wattick, 2018). One the high carbohydrate, they saw that nine of the participants that used fifteen to twenty units of insulin a day no longer need it, and they stopped using it all together. The remaining men had a higher dosage of insulin, but even they decreased their use of it by at least half (Olfert & Wattick, 2018). Fasting plasma glucose did not drop significantly, but it did after 26 days of a low-fat, high carbohydrate, high fiber, and low salt diet (Olfert & Wattick, 2018).

It is important for diabetics to try to manage their cardiovascular disease risk. Diabetics are 2-4 times more likely to get cardiovascular disease (Olfert & Wattick, 2018). Those who choose to follow a vegan diet found a significant reduction in blood pressure, serum cholesterol, and blood glucose levels (Olfert & Wattick, 2018). All of which are cardiovascular disease risk factors.

A study examined diabetic patients that had neuropathy and renal failure. The ones that had a vegan lifestyle for one year found a significant improvement in creatine clearance, urine protein levels, cholesterol levels, and blood glucose levels (Olfert & Wattick, 2018).

A vegan diet is an excellent way to prevent diabetes and it is a good way to treat diabetes. That fact is well established. However, a vegan diet can still be unhealthy. It can be full of refined grains, saturated fats, and added sugars. Those three things are associated with getting type 2 diabetes. So just because they say they are on a vegan does not mean they are getting the benefits from it. The foods that diabetics need to be eating in order to get the benefits from a vegan diet is whole grains, vegetables, fruits, nuts, legumes, and unsaturated fats (Olfert & Wattick, 2018). Each one of these foods has different components to them that reduce the symptoms of diabetes. Nutritionists and clinicians should give their diabetic patients their

knowledge on this topic, so that the patients know and understand the benefit of eating these foods.

The Vegan Diet and Weight Loss

The vegan diet and weight loss has been a topic that has been researched thoroughly. Studies have been conducted on whether or not it aids in weight loss more than other diets as well as how it effects mood and activity levels. A study done in 2013 conducted by Gabrielle M. Turner-McGrievy Ph.D., R.D. and others wanted to compare weight loss results from 5 different diets. In the study, Comparative effectiveness of a plant-based diets for weight loss: participants were placed in a 6 month, five-arm, randomized controlled trial in South Carolina (Turner-McGrievy, Davidson, Wingard, Wilcox, & Frongillo, 2013). Fifty participants (79%) fully completed the program which included weekly group meetings between vegan, vegetarian, pesco-vegetarian, and semi-vegetarian group members (Turner-McGrievy et al., 2013). The control group, omnivores, met monthly and had weekly email lessons. All individuals who participated were overweight adults between the ages of 18-65; no gender or race was excluded (Turner-McGrievy et al., 2013). The results showed that the vegan groups weight decreased significantly more than the Omni, pesco, and semi-vegetarian participants at the 6-month mark (Turner-McGrievy et al., 2013). The conclusion to this study suggests that the vegan diet may results in higher weight loss rates than the other 4 diets demonstrated in this controlled trial (Turner-McGrievy et al., 2013).

Turner-McGrievy conducted another study on whether the vegan diet had stronger weight loss effects than other low calorie diets, however he focused on a specialized population. In the 2014 study done by Turner-McGrievy and others, they researched Low glycemic index vegan or low-calorie weight loss diets for women with polycystic ovary syndrome. The aim of the study

was to see the feasibility of a vegan diet compared to a low calorie diet. Women with PCOS who were experiencing infertility and who were overweight or obese were recruited for this trial (Turner-McGrievy, Davidson, Wingard, & Billings, 2014). The study included nutrition counseling, email, and a Facebook group that members had to participate in for 6 months with three check ins throughout the process (Turner-McGrievy et al., 2014). McGrievy has conducted numerous studies with regards to veganism and whether or not the vegan diet is a better option for weight loss. Most of his hypothesis' are that a vegan diet is the quickest and most feasible way to lose weight quickly. In this particular trial, he sticks with his original hypothesis, the low glycemic vegan diet will yield more benefits than the low-calorie diet (Turner-McGrievy et al., 2014). At three months, the vegan group had a significant weight reduction compared to the low-calorie group (Turner-McGrievy et al., 2014). However, at the completion of the study, both groups had around the same weight loss results with the vegan group showing greater signs of decreased energy and fat intake (Turner-McGrievy et al., 2014). In conclusion, this study shows that the vegan diet may lead to greater weight loss more quickly than standard diet regimens as well as showing that special populations may still respond to the vegan diet favorably.

Another similar study conducted by Wendy J. Moore and others wanted to look at the adherence levels between individuals on a plant-based diet in comparison with people who chose diets that adhered to an omnivore way of eating. One of the arguments that has been made in the past is that adhering to a vegan diet is exceptionally hard to do in comparison to not having any restrictions on any certain food groups. The research study Dietary adherence and acceptability of five different diets, including vegan and vegetarian diets, for weight loss: The New DIETs study main goal was to see whether sticking with a plant-based diet would be more difficult to do in comparison to a standard American diet. Overweight individuals were put into 5 different

dietary groups, vegan, vegetarian, pesco-vegetarian, and semi-vegetarian, and omnivore. Participants were allowed to express their preferred diet preference of the five categories, however their preference was not the category they were automatically placed into. The intervention consisted of an intensive two-month dietary intervention with a four-month maintenance phase (Moore, McGrievy, & McGrievy, 2015). Participants completed, at each time point, 24-hour unannounced dietary recall, the Food Acceptability Questionnaire, TFEQ, and PFS (Moore et al., 2015). The adherence to the five diets were measured as the absence of any prescribed foods from the dietary recalls at each time point. For the omnivore group, they were considered to be adherent if their fat intake was equal to or less than 40%. Weight loss was recorded at two months and 6 months with adherent and non-adherent individuals respectively. At 2 and 6 months no difference was found in adherence between all 5 groups (Moore et al., 2015). Between adherent and non-adherent participants of all groups, the non-adherent vegan and vegetarian members experienced a lowered cholesterol level compared to the non-adherent pesco-vegetarian and semi-vegetarian individuals (Moore et al., 2015). In the adherent individuals, all of the groups experienced the same level of lowered cholesterol. Weight loss results went along the same lines as cholesterol. Weight loss was greater among the non-adherent vegans and vegetarians compared to the non-adherent pesco-vegetarians and semi-vegetarians (Moore et al., 2015). Among all adherent groups weight loss results were not significantly different from one another. This study shows that the adherence issue that many people think comes along with the vegan diet does not have to put a damper on weight loss. As a non-adherent vegan, people are more likely to lose more weight than if they are on another diet regimen that they cannot consistently stick to. Some may benefit from having a plant-based approach as opposed to a standard omnivore diet regimen.

There have been many research studies done to see if veganism is an effective way to lose weight. With regards to these studies, it is safe to assume that the vegan diet does have a role in weight loss and people can use it as a way of losing excess body fat. Some studies have focused on weight loss and behavior such as mood and if vegan participants have different characteristics compared to people who use standard low-calorie diet with no restrictions on food groups. There have also been studies that have looked at micro nutrients and whether certain diet programs meet micro nutrient criteria.

There have been some speculations with regards to if the vegan population has different overall lifestyle characteristics. Do individuals who follow this type of diet have different physical activity levels, ways of eating, and are their demographics different than people who follow a standard diet? Once again Turner-McGrievy, performed another research study to see if people's speculations were true. Their study, Does the type of weight loss diet affect who participates in a behavioral weight loss intervention? Examined if there was a difference in the demographics of who chose to participate in weight loss programs (Turner-McGrievy, Davidson, & Wilcox, 2013). Their hypothesis was that people who choose to participate in a diet such as vegan or vegetarian in nature will have different demographics than those who choose a standard omnivore diet. The largest factor that wanted to be known was whether individuals who choose to be vegan have higher physical activity levels than omnivores. The study accomplished this by enrolling two sets of participants in a 6-month long study. The studies were the mobile Pounds Off Digitally study, standard omnivore reduced calorie diet, and the New DIETs study which was plant-based (Turner-McGrievy et al., 2013). There were no differences in baseline demographics between participants except for the New DIETs members being older and having a higher BMI than the Pounds Off members (Turner-McGrievy et al., 2013). The large difference

between the groups dealt with the physical activity level. This could be attributed to the Pounds Off participants being encouraged to perform in greater amounts of physical activity the more that the study progressed. However, the New DIETs participants were encouraged to keep their level of activity as constant as possible throughout the whole trial. This led to the Pounds Off member's activity level being higher than the other group. The conclusion of the study demonstrated that using plant-based dietary approaches to weight loss does not mean that people who choose these approaches to be demographically different than those who choose omnivore diet plans (Turner-McGrievy et al., 2013).

Another fascinating study that does have some pertinence to average individuals and whether or not the vegan diet is suitable for them, deals with a plant-based diet and mood. There are usually concerns with whether weight loss programs give someone adequate energy or not. It is often a trend to hear of individuals on diet's struggling with low energy levels and having some sense of fatigue or tiredness. Reduced calorie eating habits usually do have an effect on someone's energy throughout the day because their body is in caloric deficit. Behavioral characteristics such as anger and irritability usually accompany feelings of fatigue. A study done by A. Olabi focused on food and mood. In his study, Food and mood: A nutritional and mood assessment of a 30-day vegan space diet, him and others looked at the effect of veganism and mood. The aim of the study was to see if a "space diet" an eating regimen that could be done in space had an effect on weight and mood in individuals (Olabi et al., 2015). At the completion of the study, they were hoping to see whether or not a vegan pattern of eating could be used on astronauts as their form of nutrient intake while in space. There were concerns because prior studies show that vegans and vegetarians have a lower BMI and accepting a vegan diet usually leads to some amount of weight loss. This would not be ideal for astronauts in space. The vegan

diet and its effect on mood was a significant factor in the study because astronauts cannot have the added stress of their diet taking a toll on them physically as well as mentally. The study included 16 subjects with about half being both male and female who had not reported having mood disorders in the past such as depression, anxiety, etc. as well as 15 control subjects (Olabi et al., 2015). The subjects were omnivore adults who had been consuming meat regularly and had kept their weight within the same range for at least a year prior (Olabi et al., 2015). During the 30-day trial, participants were told that there would be no calorie restrictions and that they could consume as much food that fit the criteria as they wanted. Within the 30-day period, three 10-day cycles were completed (Olabi et al., 2015). 95 different foods were included in the 10-day cycle menu and these meals were either prepared beforehand or at the time of consumption (Olabi et al., 2015). Participants came to the lab for breakfast and before eating completed a general health questionnaire. Participants were given 2 different snacks to consume between meal sessions and were expected back for lunch and a prepackaged dinner was sent home with them (Olabi et al., 2015). Subjects were weighed twice a week with light clothing for the duration of the study. A mood questionnaire was completed for 9 weeks prior to the experiment as well as 5 times during the study and 2 times after it ended (Olabi et al., 2015). A dietary analysis was the last component that was measured during the study. This was to see if participants were getting the adequate nutrients and if any gaps occurred throughout the trial. The results showed the participants lost an average of 1.7 kg by the end of the study (Olabi et al., 2015). With regards to mood, the study showed a decrease in energy and increase in fatigue, this continued from pre-study to the post-study (Olabi et al., 2015). There was no increase in depression of negative moods; other studies have shown an improvement in mood scores because of dieting, this may be due to individuals losing weight (Olabi et al., 2015). The nutrient

intake was lower than what astronauts would need to function in space, however this is obvious because participants were not consuming as much food as they would. Their intake of calcium and vitamin D was lower than an omnivore diet, but subjects were supplemented (Olabi et al., 2015). This study shows that making a change from an omnivore diet to a vegan diet has no real mood effects other than a decrease in vigor. This may be remedied by consuming more calories while on a vegan diet.

One of the significant reasons that people are drawn away from a vegan diet is because of the perceived threats to macronutrient and micronutrient gaps. This perceived threat to macronutrient gaps can be fairly easily remedied by diversifying one's diet and getting enough calories. The micronutrient gap is slightly tougher to fix. People have speculated about whether or not regular diet plans have micronutrient gaps as well, however. It is not just a common trend only within vegan diet plans. A study done by Matthew Engel and others wanted to know just this, are there micronutrient gaps within three different commercial weight loss plans (Engel, Kern, Brenna, & Mitmesser, 2018)? They went about discovering if their hypothesis was correct or not by analyzing three different diet plans. The study was done on a hypocaloric vegan diet, (the Eat to Live-Vegan) high-animal-protein low-carbohydrate, (fast metabolism diet) and the weight maintenance (Eat, Drink and Be Healthy) diet (Engel et al.,2018). The three different diets were selected based on Amazon.com's top five best reviewed diet plans. Diets were excluded based on whether or not they fit the criteria of accurately being represented within a seven-day sample and on whether the diets were for rapid weight loss (Engel et al.,2018). These three diets were sampled on seven-day menus from the diet plans and then analyzed. The study analyzed for 20 different micronutrients with the online calorie and nutrient tracker CRON-O-Meter (Engel et al.,2018). The results from the three diets differed greatly. The number of

calories ranged from 1137 to 2015 within the diets (Engel et al.,2018). The Eat to Live diet was lower in protein than the other two diets which average protein coming to 51g vs. 85-90g (Engel et al.,2018). Without accounting for adjustment to energy intake the Eat to Live diet failed to provide 90% of the recommended amounts for seven different micronutrients (Engel et al.,2018). These seven nutrients were vitamin B_3, B_{12}, D, E, calcium, selenium and zinc (Engel et al.,2018). The other two diets failed to hit some micronutrient levels as well, however the Eat to Live diet had a higher percentage than the other two by a stretch. After the diets were adjusted for a standard 2000-kcal diet, all three failed to provide adequate amounts of all 20 micronutrients being tracked (Engel et al.,2018).

In conclusion to this study, Engel noted that for all diet plans where people are trying to lose a certain amount of weight, it is almost impossible to meet micronutrient requirements. As an example, another study done on four different diet plans showed how many calories would need to be consumed to reach 100% micronutrient levels. Without changing the macronutrient composition, in order to receive all 21 essential micronutrients, the calories consumed would have to be 2425 kcal, 3175 kcal, 3300 kcal, and 5000 kcal (Calton, 2010). It almost seems impossible that on a diet plan someone can reach 100% for each micronutrient. This being said, it is not only prevalent in the vegan diet that micronutrients cannot always be met. It is prevalent in other diets as well. Supplementing diet plans with vitamins may be a way to help override this issue.

The Vegan Diet and Gut Issues

70 million people in the United States are affected by gastrointestinal issues. About 246,000 people die every year from gastrointestinal issues each year (Digestive Diseases Statistics for the United States, 2014). There has been some research done on gastrointestinal

issues, but not a lot of research has been focused on the vegan diet. We still do not know a lot about it and it is still unclear whether a vegan diet can be used to help different gastrointestinal issues long term. There are some studies that do show that it can be helpful and beneficial.

According to the US National Library of Medicine, the vegan diet has gained acceptance as a dietary strategy for maintaining good health and for managing disease conditions all the way from cardiovascular disease to cancer (US National Library of Medicine, 2014). The vegan diet may be a useful tool in fighting against metabolic syndrome including obesity, diabetes, and cardiovascular risk. It may also protect from inflammatory responses such as rheumatoid arthritis.

Gut microbiota is a topic that is gaining more popularity in research. Not a ton of information is known about it at this point. We do know that microbiota is important for the health of the host, but recent studies have shown that it is also an important factor in the pathogenesis of many diseases. The composition of the microbiota can be influenced by a number of different factors; age, host environment, genetics, and diet (GD, 2014). There is evidence suggesting that diet can influence the form and function of the microbiome. There is also epidemiologic data that associates diet with the development of irritable bowel syndrome (GD, 2014). Because of this evidence, studies are being conducted to determine the effect of defined formula diets as a therapeutic modality in Chron's disease (GD, 2014). It is being tested for both the microbiome efficiency and the metabolome. Small molecule production may influence the production of immune-mediated and metabolic diseases. Diet has an impact on both the function and composition of the microbiota which helps make up the small molecule production. This is why the microbiota have such an impact on the gastrointestinal system. The microbiota in the intestines was compared between vegans and omnivores. It showed that the

production of certain bacterial metabolites is constrained by the composition of the intestinal microbiota (GD, 2014). This means that the link between diet manipulation and composition of the intestinal microbiota and its metabolome can be used as a method to obtain health and prevent diseases (GD, 2014).

In most research, the effects of a vegan diet and a vegetarian's diet are mostly the same in all categories. However, that is not true for the gut's microflora. Because the microflora is so different between vegans and vegetarians' scientists who study this subject think that vegan diets should be exclusively studied. The vegan diet could be the new way of treating these gastrointestinal issues that so many people have. There were two distinctions found between the vegans and the other vegetarians examined. Vegans had a higher ratio of an anti-inflammatory bacterium and abundant butyrate producer that play a protective role for colonocytes (Glick-Bauer, 2014).

Researchers are beginning to think that the vegan gut microbiota can help protect against metabolic syndrome. Obesity is associated with an altered gut profile. The resident bacteria may be responsible for an increased capacity for energy harvest and a state of chronic, low-grade inflammation (Glick-Bauer, 2014). This inflammation, in turn, can interfere with insulin signaling. When insulin signaling is blocked it results in metabolic dysfunction. This dysfunction is found in people who struggle with obesity and type 2 diabetes (Glick-Bauer, 2014). When an obese person starts on a reduced calorie diet, the microflora starts to change. The harmful microflora starts to diminish, and the good microflora start to flourish while body fat starts to diminish. A balanced diet that is full of fruits and vegetables and a low consumption of meat makes a good habitat for highly diverse intestinal microflora (Glick-Bauer, 2014). Intestinal microbiotas are able to produce short chain fatty acids, acetate, propionate, and butyrate through

metabolism of dietary fiber. Butyrate production in the gastrointestinal tract suggests that this species may be associated with higher fiber intake and reduced risk for cardiovascular disease, colon cancer, diabetes, and obesity (Glick-Bauer, 2014). Inflammation may be the critical component linking gut microbiota with obesity, metabolic dysfunction, and chronic disease. The microbiota of obese people, unlike that of the non-obese people, was characterized by a reduced bacterial diversity and an increased abundance of potentially inflammatory causing bacteria (Glick-Bauer, 2014).

The role of a vegan diet in influencing obesity and inflammation was tested in a study of 6 obese subjects with diabetes and/or hypertension. The results showed that the people who followed a vegan diet for one month were found to have improved blood glucose levels, reduced body weight, a reduction in triglycerides, total cholesterol, LDL-cholesterol and Hemoglobin A1c (Glick-Bauer, 2014). The vegan diet therapy stimulated an altered gut microbiota by reducing the abundance of dangerous microbiota and increasing the abundance of healthy microbiota, significantly. Regardless of alterations these changes did not result in a switch of the host's enterotype. The vegan diet is associated with a decrease in pathobionts, a family of bacteria implicated in triggering low-grade inflammation, which was found majorly reduced in the vegan participants. The study measured decreasing concentrations of the inflammation markers, as the participants progressed on their vegan diets. It was concluded that the vegan diet directly reduced the population of pathobionts, reduced inflammation, and contributed to the improved glucose tolerance and lipid metabolism of the vegan participants (Glick-Bauer, 2014). The fiber content of the vegan diet could definitely play a significant role in regulating the inflammatory response. Short chain fatty acids generated by gut microbiota can act as signaling molecules by activating G protein-coupled receptors and controlling the host's inflammatory

response (Glick-Bauer, 2014). Dietary fiber could be the major variable in any evaluation of vegan diets and inflammatory disease.

A lot is still to be learned about gastrointestinal issues and how to prevent and/or treat them. The research is slowly coming along to shed light on the subject. This is a complex issue because it considers so many other variables. Food being a major contributor. One scientist even said that once more in known about fiber then they will be able to figure more about the microflora and how fiber affects it.

The Vegan Diet and Heart Disease

The evidence for adopting a vegan diet to treat the effects of heart disease has been growing in recent years. There have been studies done recently showing if a plant-based diet can beneficially impact individuals with ischemic heart disease. There have also been recent studies to promote eating a plant-based diet to prevent heart disease later in life. Why is a plant-based diet a good way to combat the effects of heart disease or prevent them? Does eating meat, specifically red meat, and dairy products contribute to a higher risk of heart disease? Moreover, if these two factors are true, is this why adopting a vegan diet is a healthier option for people with a high risk for heart disease?

The first aspect to look at is whether or not animal products lead to a higher risk of coronary heart disease. It has been known for quite some time that heavy consumption of meats, especially red meat is linked to a higher risk of heart disease and heart problems. However, a study done by Wagemakers and others says slightly differently. The study Consumption of red or processed meat does not predict risk factors for coronary heart disease, looked at this notion further. The cohort study investigated this assumption in British adults from 1989 to 1999 (Wagemakers, Prynne, Stephen, & Wadsworth, 1999). The participants were 517 men and 635

women, and the assessment was carried out at two time points mentioned above (Wagemakers et al.,1999). The food consumed on a daily basis was recorded in 5-day food dairies and meat consumption was estimated by adding individual meat portions to the meat fractions of composite dishes (Wagemakers et al.,1999). The results at the end of the study indicated that there were no significant relations between the major risk factors of heart disease and the consumption of processed and red meat (Wagemakers et al.,1999). There were limitations to this study in that members recorded their own amounts of meat consumed, they could have tampered with this and given false information. Most of the individuals who participated in the study came from middleclass socio-economic households which may have led them to be more health aware.

How do milk and other dairy products effect the risk of heart disease? Milk and other dairy products have been considered a health risk because of their content in cholesterol, saturated fatty acids, and lactose. One study done in Scotland in the 1970's found a small correlation between heart disease risk and the consumption of full fat milk drunk daily (Ness, Smith, & Hart, 2001). Another study done by Mann looked at the Dietary determinants of ischemic heart disease in health conscious individuals. The conclusions of this study determined that by decreasing the amount of milk or dairy that one consumes this usually leads to weight loss (Mann, Appleby, Key, & Thorogood, 1997). Obesity is a risk factor for CHD and a higher BMI is associated with a higher risk for CHD. There have only been about five research studies done on this topic and two have been listed above already. Seeing that there is scant evidence surrounding the topic at large, there is no definite answer to this question. One study considered the other studies that had already been completed. They analyzed the effect of milk consumption on non-fatal AMI risk in patients located in Italy, this study was based on a detailed and validated food frequency questionnaire (Tavani, Gallus, Negri, & Vecchia, 2002). Data was

taken from a case-control study of non-fatal AMI patients conducted between 1995-1999 in Milan, Italy (Tavani et al., 2002). There were 507 patients in total with 378 men and 129 women (Tavani et al., 2002). A food frequency questionnaire was administered, and patients recorded their consumption of milk and cheese products respectively. Conclusions to the study resulted in that the intake of milk and cheese and therefore calcium did not increase the risk of non-fatal AMI in that population (Tavani et al., 2002).

With the evidence indicating that there are no significant differences if individuals consume dairy and such, is there still a benefit to consuming a vegan diet in preventing the onset of heart disease? There is according to quite a few studies. A nutrient found in red meat and added to some energy drinks has been tied to increasing people's risk for heart disease. The nutrient L-Carnitine is digested by gut bacteria and is turned into an artery-hardening chemical, this reaction is especially prevalent in meat eaters (Rosen, 2013). The interesting thing is that the intestinal microbes of vegetarians and vegans did not make much of the chemical. Even when they ate sirloin steak and L-Carnitine capsules vegans and vegetarians did not make much of the bacterial by product of L-Carnitine, trimethylamine N-oxide or TMAO (Rosen, 2013). Only meat eaters could make TMAO from L-carnitine and they needed their gut bacteria to do it (Rosen, 2013). This may shed some light on why a vegan diet and vegetarian diets are healthier and are better at preventing heart disease.

One study done on the Risk of hospitalization or death from ischemic heart disease among British vegetarians and nonvegetarians showed that consuming a vegetarian diet was associated with lower IHD risk (Crowe, Appleby, Travis, & Key, 2013). They concluded that this outcome was mediated by the differences in non-HDL cholesterol and systolic blood pressure (Crowe et al., 2013). The study was performed on a total of 44,561 males and females

who were enrolled in the European Prospective Investigation into Cancer and Nutrition (EPIC). 34% of the individuals enrolled were vegetarians at baseline (Crowe et al., 2013). Incidences of IHD were found through hospital records and death certificates (Crowe et al., 2013). There have been other studies similar to the one by Crowe and others that have looked at the same effect that a vegan and vegetarian diet can have on heart disease. They show that consuming a diet low in meat and fat and that is high in whole fruits and vegetables leads to a lesser risk in developing heart disease.

Choosing the right plant-based diet is essential. Not all vegan and vegetarian diet plans are right for preventing and lowering the risk of heart disease. You may not need to completely cut out all animal products from your diet as well. The American Journal of Clinical Nutrition found that consuming 3 ounces of unprocessed red meat three times per week did not worsen blood pressure or cholesterol levels (Men's Health, 2018). All in all, consuming a diet that is heavily plant-based is the best way to prevent heart disease the most. A study was done in 2017 on the Healthful and Unhealthful Plant-Based Diets and the Risk of Coronary Heart Disease in the U.S. This study looked at how different plant-based foods increased or decreased the risk of CHD. The procedures included 73,710 women in NHS study from 1984 to 2012, 92,329 women in the NHS2 study from 1991 to 2013, and 43,259 men in the Health Professionals Follow-up study from 1986 to 2012 (Satija et al., 2017). They gathered the data by creating a PDI from questionnaire data that would be categorized into healthful plant-based foods and unhealthful (Satija et al., 2017). Healthy plant foods included whole grains, fruits, vegetables, nuts, legumes, oils, tea, and coffee. Unhealthful plant foods included juices, sweetened beverages, refined grains, potatoes and fries, and sweets. Healthy foods were given a positive score and unhealthy foods were given a negative score. Results showed that a higher intake of the healthy plant foods

lead to a lesser risk of CHD while diets that emphasized higher intake of unhealthy foods were associate with a higher CHD risk (Satija et al., 2017). Just eating a vegan diet does not necessarily mean that one is free to consume whatever he wants. Another study done by the Cleveland Clinic reaffirms that simply following a plant-based diet is not enough to lower CHD. There must be reduced sugar intake and reduced refined grain intake (Cleveland, 2017). The food still must be nutritious and based on whole foods.

There is a recommended diet for patients with heart disease which has been developed by the American Heart Association. How does this diet stand up against a vegan diet in preventing heart disease? A recent study done in June of 2018 looked at the anti-inflammatory effect of a vegan diet vs the American Heart Association's diet for patients with CHD (Shah et al., 2018). They were looking for differences in inflammatory, lipid, and glucometabolic profiles in the patients (Shah et al., 2018). It was a prospective blinded end-point, randomized trial with 100 patients with invasive angiographically-defined coronary artery disease (Shah et al., 2018). Patients were given groceries for their assigned diets and the other necessary tools to measure their diets. They had ongoing consultation with a study dietitian and adherence was measured with two weekly 24-hour dietary recalls, plasma and urine trimethylamine-N-oxide levels (Shah et al., 2018). In conclusion, a vegan diet reduced systemic inflammation, evidenced by hsCRP, in patients with CAD. The American Heart Association diet did not lower inflammation in patients with CAD (Shah et al., 2018).

In conclusion, should a vegan diet be adopted as a way to prevent and aid individuals who have diseases and by individuals who merely want to lower their chances of disease? From the evidence discussed above, the answer would be yes. A vegan diet has been shown to be beneficial in reducing weight, aiding the risk of cancer, lowering the risk of diabetes, it has a

beneficial impact on heart disease patients, and it may help with gut issues. Veganism is a trend that has come about in the past 50 years, but from its short history thus far, it seems like it will be sticking around for quite some time. It would not be that improbably to see doctors in the near future recommending a vegan diet to their patients who have various medical complications. Veganism has been shown to be of benefit. This diet does not have extensive research into all of its aspects so far because of its short life span. As more research is done and more evidence is compiled we will more certainly be able to distinguish f the vegan diet is truly a way of eating that should be implanted in individuals' daily routines.

References

15 different types of vegan diets: Which is right for you? (2018, October 24). Retrieved from https://nutriciously.com/different-vegan-diets/

57 health benefits of going vegan | nursingdegree.net. (2018). Retrieved from http://www.nursingdegree.net/blog/19/57-health-benefits-of-going-vegan/

Aleksandrowicz, L., Green, R., Joy, E. J., Smith, P., & Haines, A. (2016). The Impacts of Dietary Change on Greenhouse Gas Emissions, Land Use, Water Use, and Health: A Systematic Review. PLOS ONE, 11(11), e0165797. doi:10.1371/journal.pone.0165797

American Cancer Society. (2018). Cancer Facts & Figures 2018. Retrieved from https://www.cancer.org/research/cancer-facts-statistics/all-cancer-facts-figures/cancer-facts-figures-2018.html

American Diabetes Association. (2018). Statistics About Diabetes. Retrieved from http://www.diabetes.org/diabetes-basics/statistics/?loc=superfooter

American Journal of Clinical Nutrition. (2016, January 1). Are Strict Vegetarians Protected Against Prostate Cancer? Retrieved from http://eds.a.ebscohost.com/eds/pdfviewer/pdfviewer?vid=2&sid=3c1e4e05-57d6-4f6c-84e7-14a6d9cafb1c%40sessionmgr4006

Aune, D., Giovannucci, E., Boffetta, P., Fadnes, L. T., Keum, N., Norat, T., … Tonstad, S. (2017). Fruit and vegetable intake and the risk of cardiovascular disease, total cancer and all-cause mortality—a systematic review and dose-response meta-analysis of prospective studies. International Journal of Epidemiology, 46(3), 1029-1056. doi:10.1093/ije/dyw319

Aykan, N. F. (2015). Red meat and colorectal cancer. Oncology Reviews, 9(1). doi:10.4081/oncol.2015.288

Belloso, A. (2016). What i've learned after 10 years on a raw vegan diet (part 1). Retrieved from https://nutritionraw.com/what-ive-learned-after-10-years-on-a-raw-vegan-diet/

Binita Shah, Lisa Ganguzza, James Slater, Jonathan D. Newman, Nicole Allen, Edward Fisher, … Kathleen Woolf. (2017). The effect of a vegan versus AHA DiEt in coronary artery disease (EVADE CAD) trial: Study design and rationale. Contemporary Clinical Trials Communications, Vol 8, Iss C, Pp 90-98 (2017), (C), 90. https://doi.org/10.1016/j.conctc.2017.09.00

Bunny, Sara. (2018, June). Plant Power. Good Health, 5. Retrieved from http://eds.b.ebscohost.com/eds/detail/detail?vid=1&sid=cfe254cd-f763-4368-b7f5-555d4cf31200%40pdc-v-sessmgr04&bdata=JnNpdGU9ZWRzLWxpdmU%3d#db=c9h&AN=129434776

Calton, J.B. Prevalence of micronutrient deficiency in popular diet plans. J. Int. Soc. Sports Nutr. 2010, 7, 24.

Crowe, F. L., Appleby, P. N., Travis, R. C., & Key, T. J. (2013). Risk of hospitalization or death from ischemic heart disease among British vegetarians and nonvegetarians: results from the EPIC-Oxford cohort study. The American Journal of Clinical Nutrition, 97(3), 597-603. doi:10.3945/ajcn.112.044073

definition of alkaline. (2018). In Dictionary by merriam-webster: America's most-trusted online dictionary. Retrieved from https://www.merriam-webster.com/dictionary/alkaline

Definition of factory farming. (n.d.). In Dictionary by merriam-webster: America's most-trusted online dictionary. Retrieved from https://www.merriam-webster.com/dictionary/factory%20farming

Digestive Diseases Statistics for the United States. (2014, November). Retrieved from https://www.niddk.nih.gov/health-information/health-statistics/digestive-diseases

G. Engel, M., J. Kern, H., Brenna, J. T., & H. Mitmesser, S. (2018). Micronutrient Gaps in Three Commercial Weight-Loss Diet Plans. Nutrients, 10(1), 1–N.PAG. https://doi-org.cedarville.ohionet.org/10.3390/nu10010108

GD, Wu. (2016, January 14). The Gut Microbiome, Its Metabolome, and Their Relationship to Health and Disease, 84, 103-10. doi: 10.1159/000436993

Glick-Bauer, M & Ming-Chin, Yeh. (2014, October 14). The Health Advantage of a Vegan Diet: Exploring the Gut Microbiota Connection, 6(11), 4822-4838. doi: 10.3390/nu6114822

Hackett, J. (2007, January 7). Is the raw food diet right for you? Retrieved from https://www.thespruceeats.com/what-is-the-raw-vegan-diet-3378514

Longevity, C. (2017, February).

Omega 3 fatty acids. (2018, June 8). National Institute of Health. Retrieved from https://ods.od.nih.gov/factsheets/Omega3FattyAcids-Consumer/

Mann JI, Appleby PN, Key TJ, et al Dietary determinants of ischaemic heart disease in health conscious individuals Heart 1997;78:450-455.

McCarty, MF. (2011, October). mTORC1 activity as a determinant of cancer risk –Rationalizing the cancer-preventive effects of adiponectin, metformin, rapamycin, and low-protein vegan diets. Science Direct, 77, 642-48. doi:10.1016/j.mehy.2011.07.004

McCarty, MF. (1999, December). Vegan Proteins May Reduce Risk of Cancer, Obesity, and Cardiovascular Disease by Promoting Increased Glucagon Activity. National Institute of Health, 6, 459-85. doi: 10.1054/mehy.1999.0784

Moore, W., McGrievy, M., & Turner-McGrievy, G. (2015). Dietary adherence and acceptability of five different diets, including vegan and vegetarian diets, for weight loss: The New DIETs study. Eating Behaviors, 19, 33-38. doi:10.1016/J.EATBEH.2015.06.011

Moran, V. (2016, November 1). A Brief History of Veganism. Retrieved from https://mainstreetvegan.net/a-brief-history-of-veganism-by-victoria-moran/

Natural Health and Vegetarian Life. (2010, June 1). Early Stage Prostate Cancer. Retrieved from http://eds.a.ebscohost.com/eds/pdfviewer/pdfviewer?vid=6&sid=3c1e4e05-57d6-4f6c-84e7-14a6d9cafb1c%40sessionmgr4006

Ness AR, Smith GD, Hart C Milk, coronary heart disease and mortality Journal of Epidemiology & Community Health 2001;55:379-382.

NOAA. (2018). What is a dead zone? Retrieved from https://oceanservice.noaa.gov/facts/deadzone.html

Not All Plant-Based Diets the Same When it Comes to Lowering Heart Risks. (2017). Heart Advisor, 20(9), 2. Retrieved from https://cedarville.ohionet.org/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=c9h&AN=124641524&site=eds-live

Olabi, A., Levitsky, D., Hunter, J., Spies, R., Rovers, A., & Abdouni, L. (2015). Food and mood: A nutritional and mood assessment of a 30-day vegan space diet. Food Quality and Preference, 40, 110-115. doi:10.1016/J.FOODQUAL.2014.09.003

Olfert, Melissa D., & Wattick, Rachel A., (2018). Vegetarian Diets and the Risk of Diabetes. 18(11) 101. doi: 10.1007/s11892-018-1070-9

Penniecook-Sawyers, Jason A.; Jaceldo-Siegl, Karen; Fan, Jing; Beeson, Larry; Knutsen, Synnove; Herring, Patti; Fraser, Gary E. (2016, May 28). Vegetarian dietary patterns and the risk of breast cancer in a low-risk population. Cambridge University Press. 15, 1790-1797.10.3390/nu6114822

Satija, A., Bhupathiraju, S. N., Spiegelman, D., Chiuve, S. E., Manson, J. E., Willett, W., . . . Hu, F. B. (2017). Healthful and Unhealthful Plant-Based Diets and the Risk of Coronary Heart Disease in U.S. Adults. Journal of the American College of Cardiology, 70(4), 411-422. doi:10.1016/J.JACC.2017.05.047

Tavani A, Gallus S, Negri E, et al Milk, dairy products, and coronary heart disease Journal of Epidemiology & Community Health 2002;56:471-472.

“The Right Plant-Based Diet for You: Plant-Based Diets Can Help Reduce Your Risk of Heart Disease, but They’re Not All Created Equal.” 2018. Harvard Men’s Health Watch 22 (6): 6–7.

Turner-McGrievy, G. M., Davidson, C. R., Wingard, E. E., Wilcox, S., & Frongillo, E. A. (2015). Comparative effectiveness of plant-based diets for weight loss: A randomized controlled trial of five different diets. Nutrition, 31(2), 350–358. https://doi-org.cedarville.ohionet.org/10.1016/j.nut.2014.09.002

Turner-McGrievy, G., Davidson, C., Wingard, E., & Billings, D. (2014). Low glycemic index vegan or low-calorie weight loss diets for women with polycystic ovary syndrome: a randomized controlled feasibility study. Nutrition Research, 34(6), 552-558. doi:10.1016/J.NUTRES.2014.04.011

Turner-McGrievy, G. M., Davidson, C. R., & Wilcox, S. (2014). Does the type of weight loss diet affect who participates in a behavioral weight loss intervention? A comparison of participants for a plant-based diet versus a standard diet trial. Appetite, 73, 156-162. doi:10.1016/J.APPET.2013.11.008

Vegan Food Guide. (2018). Retrieved from https://kidshealth.org/en/teens/vegan.html

Vegan Living. (2018). Retrieved from https://www.dosomething.org/facts/11-facts-about-vegan-living

Vitamin B12. (2011, June 24). National Institute of Health. Retrieved from https://ods.od.nih.gov/factsheets/VitaminB12-Consumer/

Wagemakers, J. J. M. F., Prynne, C. J., Stephen, A. M., & Wadsworth, M. E. J. (2009). Consumption of red or processed meat does not predict risk factors for coronary heart disease; results from a cohort of British adults in 1989 and 1999. European Journal of Clinical Nutrition, 63(3), 303–311. https://doi-org.cedarville.ohionet.org/10.1038/sj.ejcn.1602954

Wu, G. (2016, March). Dietary Protein Intake and Human Health. 7(3): 1251-65. doi: 10.1039/c5fo01530h

Working together to end factory farming worldwide. (2018). Retrieved from https://assets.ciwf.org/media/7432824/ciwf_strategic-plan-revise18-lr2.pdf

Zinc. (2016, February 17). National Institute of Health. Retrieved from https://ods.od.nih.gov/factsheets/Zinc-Consumer/