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### Type 2 Diabetes and a Plant Based Diet

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# Type 2 Diabetes and a Plant Based Diet

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## Diabetes Mellitus 2

- Reduced insulin-stimulated mitochondrial activity and insulin resistance caused by oxidative phosphorylation in cellular mitochondria has been noted.

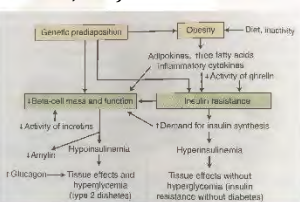
Insulin resistance is another factor in the development in DM2. The liver, muscles and adipose tissue has a subpar response to insulin because they are sensitive to insulin and affects obesity (McCance & Huether, 2019). How does this happen? Some mechanisms include high amounts of insulin antagonists, changes in glucose transporter proteins, and defects of the insulin molecule itself.

If you take a look at glucagon, you will see that the numbers of glucagon increase because pancreatic cells don't react normally to glucose inhibition (McCance & Huether, 2019). Normally when levels of glucose are low, the pancreas secretes glucagon. The glucagon increases the blood sugar levels and then gets broken down into glycogen which the body then uses as energy. However, since the pancreatic alpha cells are less responsive and know when to stop producing glucagon, it keeps producing it creating a high sugar level.

Amylin is an interesting hormone. First, it is a beta-cell hormone. Second, it decreases in BOTH type 1 and type 2 diabetes (McCance & Huether, 2019). Third, it increases satiety and suppresses glucagon release from the pancreatic alpha cells (McCance & Huether, 2019). So, in other words, with the decrease in amylin, it takes you longer to get full when you eat, and it doesn't work well to stop glucagon production. So, you overeat, and you have no protection to stop your blood sugar from going to high levels.

Your Gastrointestinal (GI) tract also comes into play when it comes to Type 2 diabetes.

Figure 1. Pathophysiology of Type 2 Diabetes Mellitus (McCance & Huether, 2019)



A peptide the is produced in the stomach and in the pancreatic islets called ghrelin, help to regulate the secretion of hormones, the intake of food and energy balance (McCance & Huether, 2019). It's been shown that decreased levels in this particular hormone has caused fasting insulin levels to be higher and also insulin resistance to increase as well. (McCance & Huether, 2019).

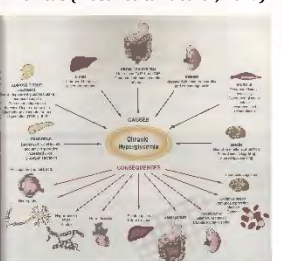
There are also peptides called incretins. Incretins come about as a response to the intake of food and work to increase the production and secretion of insulin. Lastly, incretins can also protect the body against beta-cell damage and help with the regeneration and growth of beta-cells. (McCance & Huether, 2019).

## Manifestations and Treatment

The manifestations of DM2 are broad. The person who has DM2 is usually overweight, has high cholesterol, high blood sugar glucose and hypertensive. The three classic symptoms are excessive urination, thirst and hunger. You don't have to have all three symptoms together to have diabetes either. Other manifestations include frequent infections, visual changes (diabetic retinopathy), peripheral neuropathy and hypoglycemia.

Treatment for DM2 include exercise, pharmaceutical interventions (metformin, insulin, glipizide and others). However, one of the single most effective treatments one can do is to change one's diet. There are many diets out in the world, but for this poster, I am going to focus on a whole-food, plant-based diet.

Figure 2. Multiorgan Causes and Common Consequences of Chronic Hyperglycemia in Type 2 Diabetes Mellitus (McCance & Huether, 2019)



## Whole Food Plant Based Diet (WFPB)

"Let food be thy medicine, and let medicine be thy food."  
- Hippocrates

It's the kind of mantra or way of life that I would like to live by. I did for awhile a few years after my diabetes diagnosis. For eleven months in 2018, I went totally vegan...cold turkey. I started on New Year's Day and lasted all the way to...Thanksgiving. I'm sorry, roast chicken (my parents do not like turkey, so I grew up in a Thanksgiving chicken household), mashed potatoes, sweet potatoes, corn, collard greens, pumpkin pie and football was just too much to overcome. I'm just being honest.

When I was vegan, my blood pressure dropped by 30 points systolic, blood sugars were under control, H1AC was in the 7's, cholesterol was good, and I lost 25 pounds.

And since those times, I have not been back all the way fully since then. I have done the VB6 diet popularized by the food writer Mark Bittman. It is where you are a strict vegan all day until dinner when you can eat what you want but just in moderation. On my last checkup, all my numbers were back up.

And let me tell you, I think about this literally every day. I want to change, but I know what I will be missing out on then. But I need to change. And I know that I will.

## What is a WFPB Diet?

The goal of a whole-foods, plant-based diet is to consume as much nutrient dense foods and at the same time, try to avoid meat and poultry,

seafood, eggs, dairy, oils and highly processed foods (Ha, 2019).

So what foods are acceptable or desired in a whole-foods, plant-based diet? The WFPB diet encourages people to consume raw or cooked vegetables, fruits, beans, lentils, peas, seeds, soybeans, nuts (in smaller amounts however) and try consume as low amount of fat as possible (Ha, 2019).

## Culture of Nutrition in medicine

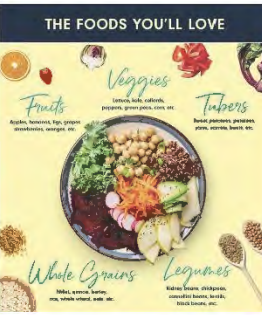
Something that I have seen in documentaries and according to Ha, is that nutrition is not taught to medical students at all during med school (Ha, 2019).

While in the past, it has been hard to find materials and resources in a WFPB diet, times are changing.

There are conferences that you can attend. There is an online nutrition program where you can even get a plant-based nutrition certificate. It is taught at Cornell university e-campus. ([www.ecornell.com/certificates/nutrition/plant-based-nutrition](http://www.ecornell.com/certificates/nutrition/plant-based-nutrition)). Lastly, there is also for the medical profession an opportunity to become board certified in this area. It is by the American College of Lifestyle Medicine ([www.lifestylemedicine.org/Board-Certification](http://www.lifestylemedicine.org/Board-Certification)) ((Ha, 2019).

Figure 3, below and to the left (Forks Over Knives, 2021).  
Figure 4, below (Forks Over Knives, 2021)

PLANT-BASED vs. VEGAN			
	HEALTHY DIET	HEALTHY DIET	HEALTHY DIET
MEAT & POULTRY	×	×	×
SEAFOOD	×	×	×
EGGS & DAIRY PRODUCTS	×	×	×
OILS	×	×	×
HIGHLY PROCESSED FOODS	×	×	×
WHOLE GRAINS	✓	✓	✓
FRUITS, VEGGIES, & STARCHY VEGGIES	✓	✓	✓
LEGUMES	✓	✓	✓



## Benefits of Eating a WFPB Diet

When looking at a WFPB diet, you really have to ask yourself, "What is the benefit of doing something like this?" "Is this worth the huge lifestyle change?"

I believe that the answer is yes. For one thing, adopting a WFPB diet can decrease insulin resistance and lower the risk of developing pre-diabetes and DM2 (Chen, et al., 2018).

According to (Chen, et al., 2018), through eating more fruits and vegetables, you are getting more fiber, anti-oxidants and chlorogenic acids which can lower gastric emptying and glycemic responsiveness, improve inflammation and obesity. Also, the beans and soy are the source of protein which have high amounts of arginine and glycine. Those are known to decrease cholesterol levels (Chen, et al., 2018). The unsaturated fats from nuts are linked to lower obesity and inflammation (Chen, et al., 2018).

## Fasting Blood Glucose and HA1C, Weight and BMI

Along with the nutritional changes that happen with a WFPB diet, there are also bodily change that happen as well.

According to (Sa'ad-Aldin & Altamimi, 2019), in their study, they showed that their participant's fasting blood glucose at baseline at the start of their study to be 189.2 ± 77.1 mg/dL. At the end of just 12 weeks of a WFPB diet, the participant's fasting blood glucose dropped to 102.6 ± 19.8 mg/dL which is a drop of 45%!

Along with that, the participant's Hb1Ac went from 9.4 ± 2.5% to 6.2 ± 0.8%. This correlates to a drop of 35% (Sa'ad-Aldin & Altamimi, 2019).

Next, with body weight (which is what I struggle with and really want to work on). According to (Sa'ad-Aldin & Altamimi, 2019), participants lost between 1-14 kg, with an average of 4.6 ± 3.9 kg. For us American that equates to 2.2-30.8 lbs or an average of 10.12 ± 8.58 lbs.

And like I said earlier, this is in just 12 weeks of starting a WFPB diet.

Lastly with BMI (Body Mass Index), the participants dropped and average of 1.5 points (Sa'ad-Aldin & Altamimi, 2019).

## Are All Plant-Based Foods Good For You?

No. Not all plant-based foods are good for you. Here's an example, according to (Kim, Lee, Rebholz, & Kim, 2020), eating or consuming less healthy plant food sources such as salty foods, sweet foods, sugary foods, and refined grains can actually increase you chances of developing metabolic syndrome (MetS) (If you don't remember, I wrote about metabolic syndrome in the first column) increase by 50%.

So you must remember, that even though something might be plant-based, that doesn't necessarily mean that it's the right type of food for you to eat. While I love Lay's potato chips, it's not necessarily the best thing to eat.

## Implications For Nursing Care

How do we incorporate this type of program in our nursing care? I will admit, that in my 6 years of being a nurse, I have not seen any doctors at the hospital that I work at suggest anything like this for any of the patients that I have taken care of who has DM2.

I have however, talked about DM2 with my patients many, many times and spoke about my experiences with being on a WFPB diet for the short time that I was on it and the many benefits that I received.

So, what else can we do? We can talk to the epidemiology department of our hospitals, ask to see if we are currently looking into this form of treatment. If we are not currently do so, what can we do to see if this is a viable treatment option for our patients.

If this is a viable treatment, we need to make sure that our patients have to know what to eat and what not to eat, learn how to read food labels properly, make sure to make lifestyle changes like exercising and getting adequate sources of vitamin B-12, vitamin D, and calcium (Utami & Findyartini, 2018).

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