

## Background

Osteoporosis, Multiple Sclerosis, and Hyperlipidemia are medical conditions that are becoming more prevalent today. Osteoporosis is a bone degenerating disease that affects the porosity of bones. It is mainly caused by genetic and ethnic predispositions. Multiple Sclerosis (MS) is an auto-immune disease that leads to neural degeneration. The cause of MS is not clearly defined and is being investigated. Hyperlipidemia is the effect of prolonged elevation of cholesterol in the blood stream. This condition is mainly a result of poor nutrition and has some genetic background. Studies conducted have shown the benefit of nutrition in relation to the condition described previously have been compiled in a comprehensive poster presentation. One main aspect of the presentation focuses on the inhibitory effect on symptoms provided by nutritional changes in a diet. Calcium has been found to reduce the risk of osteoporosis and is the main supplement recommend for osteoporosis patients. Additionally, Vitamin D also has a positive effect on osteoporosis and those with Multiple Sclerosis. One nutritional benefit found with Omega 3s in treating hyperlipidemia is controlling elevated cholesterol levels. Specific foods have been listed as reference for additions of beneficial vitamins and minerals for these specific conditions. The results of the information collected in this presentation shows the potential for advancement in the nutritional field of research. Future research could lead to the decrease of excessive prescriptions, reduce risk for developing these degenerative diseases and slowing or halting the progression of the diseases.

## Introduction

### Osteoporosis

Osteoporosis is a disease that targets the strength and density of bones and is often called the “silent disease” because symptoms are so few and hard to distinguish. There are many common causes for osteoporosis, some of them being poor nutrition or malnutrition, age, race (greater risk if you are White or of Asian descent), sex (females have a greater risk), and a lifestyle with little to no activity. While some of these factors are unable to be changed, such as age or sex, you can still reduce the risk of getting osteoporosis by increasing your physical activity levels and getting proper nutrition (Mayo Clinic, n.d.).

#### Most common symptoms:

- Hunched posture
- Higher risk of bone fractures
- Joint pain

#### Most common treatments are:

- Calcium supplements
- Light exercise
- Prescription strength bone stimulators

### Hyperlipidemia

Hyperlipidemia is the medical term used to talk about high levels of fats found in the bloodstream. There are many forms of hyperlipidemia; however, this specific type is high cholesterol (or hypercholesterolemia). Hyperlipidemia is a common disease in most modern countries due to the excess of fried and processed foods available to the general public (Healthline, 2021).

#### Two Types of Cholesterol:

- (High-density lipoprotein) HDL- the “healthy” cholesterol
- (Low-density lipoprotein) LDL- the “lousy” cholesterol

### Multiple Sclerosis

“Multiple sclerosis (MS) is an immune-mediated disease. This means that an abnormal response of the body’s immune system causes the disease. In this case, the immune system attacks the central nervous system (CNS) by mistake. The CNS is made up of the brain, spinal cord and optic nerves. The immune system attack damages the myelin — the fatty substance that surrounds and insulates the nerve fibers — and the cells that make it. This damage to the myelin and the failure to replace it is called demyelination. Without myelin to protect the nerve fibers, they are also damaged.” (Healthline, 2021). Vitamin D is one of the most important vitamins because it helps to build the layers on nerves that get degraded from MS.

#### Common symptoms:

- Fatigue
- Difficulty walking (impaired balance)
- Vision changes
- Chronic pain
- Slurred speech

#### Types of MS:

- Clinically Isolated Syndrome (CIS) (1 symptomatic episode in 24 hours)
- Relapsing-remitting MS (RRMS) (symptoms clear and then relapse)
- Primary Progressive MS (PPMS) (becomes progressively worse)
- Secondary Progressive MS (SPMS) (transitions into progressive symptoms)

## Methods

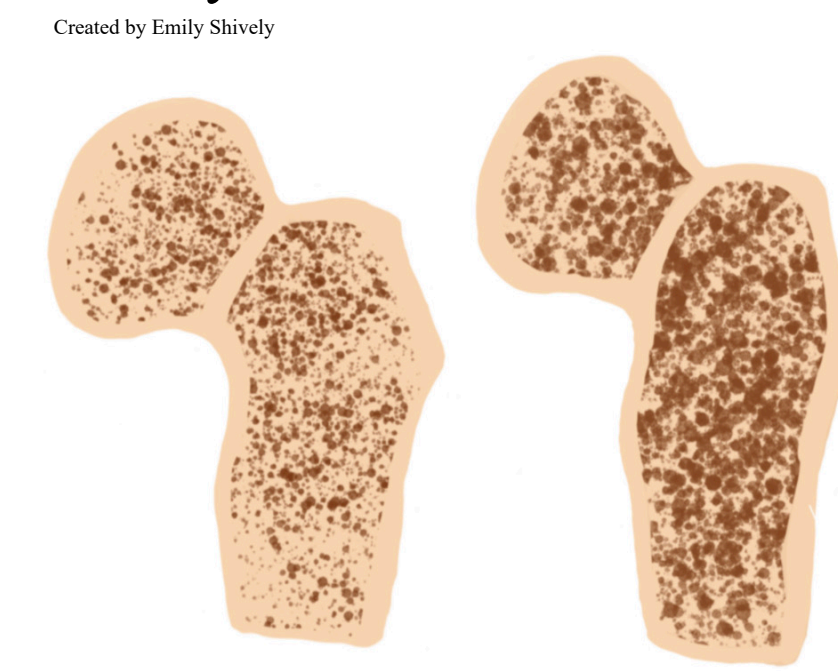
This literature review follows a qualitative research approach compiled in a comprehensive poster. The information collected from various medical resources includes a summary of the disease processes, risk factors for the general public, causes and symptoms of the diseases, and basic treatments that are sometimes used. Graphics were provided as another visual aid of the affects these diseases have on the body. We collected diet studies that were conducted in different time frames, to test the benefits of certain diets for Multiple Sclerosis with the recorded results. Lists of foods were compiled that have been proven to benefit patients suffering from debilitating symptoms as well as foods that seem to exacerbate these symptoms.

## Osteoporosis

### Higher risk for broken bones



### Healthy VS. Porous bones



## FOODS

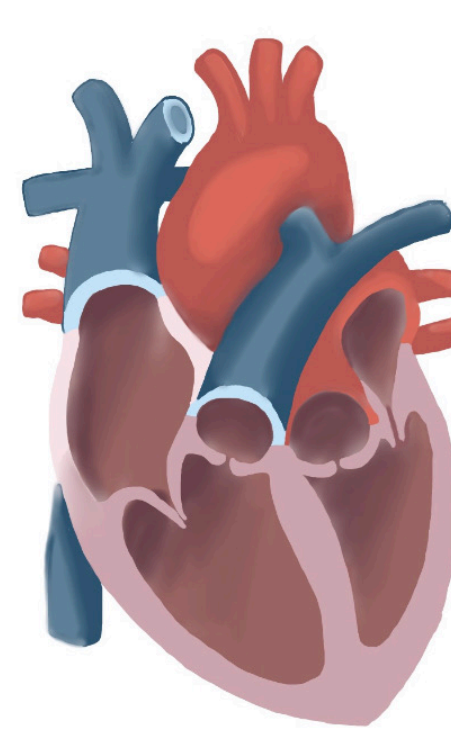


- Kale
- Collared Greens
- Bok Choy
- Broccoli
- Kelp
- Strawberries
- Blueberries
- Salmon
- Milk
- Cheese
- Yogurt



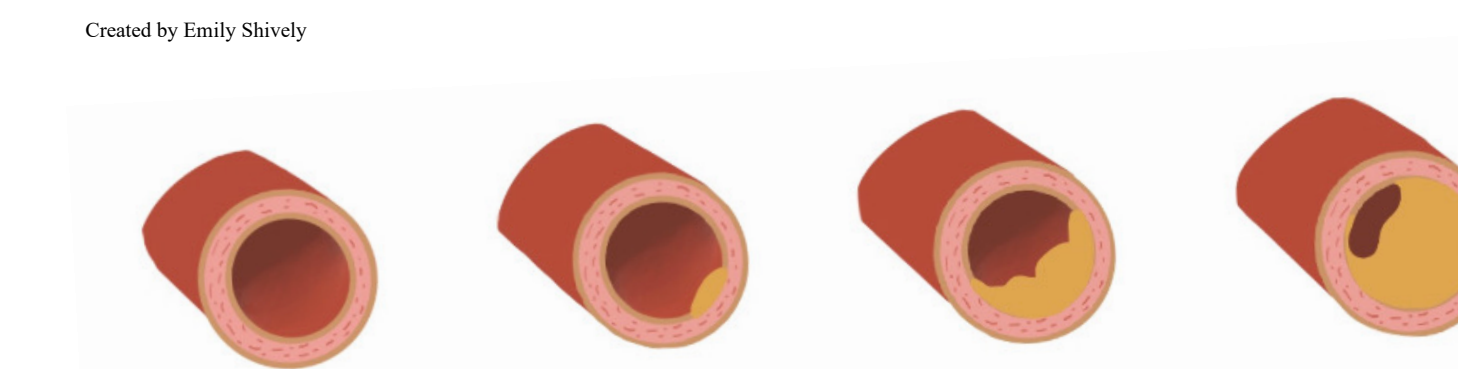
- Baked goods
- Deli meats
- Pizza
- Tacos
- Fries
- Caffeine
- Soda
- Red Meats
- Wheat Bran

### Healthy Heart



## Hyperlipidemia

### Effects of Cholesterol in blood vessels



## FOODS



- Oats
- Whole grains
- Beans
- Nuts
- Almonds
- Walnuts
- Peanuts
- Salmon
- Flaxseeds
- Avocados
- Spinach



- Red meat
- Fats food
- Pork
- Whole fat dairy products
- Fried foods
- Eggs
- Shellfish
- Shrimp
- Clams
- Crabs
- Processed meats
- Hot dogs
- Processed foods

## Multiple Sclerosis

### Modified Mediterranean Diet Study

Duration: 6 Months

Modified to focus on:

- Olive oil
- Fish
- Nuts
- Fruits
- Vegetables
- Eliminate meat and dairy
- Limit processed food and salt

Results:

- Reduced fatigue and disability
- Lost more weight
- Improved quality of life

(Long term safety is not completely established)

### Paleolithic Diet (Wahls Protocol) Study

Duration: 3 Months

Modified diet encouraged consumption of:

- Fruits
- Vegetables
- Meats

Prohibited the consumption of:

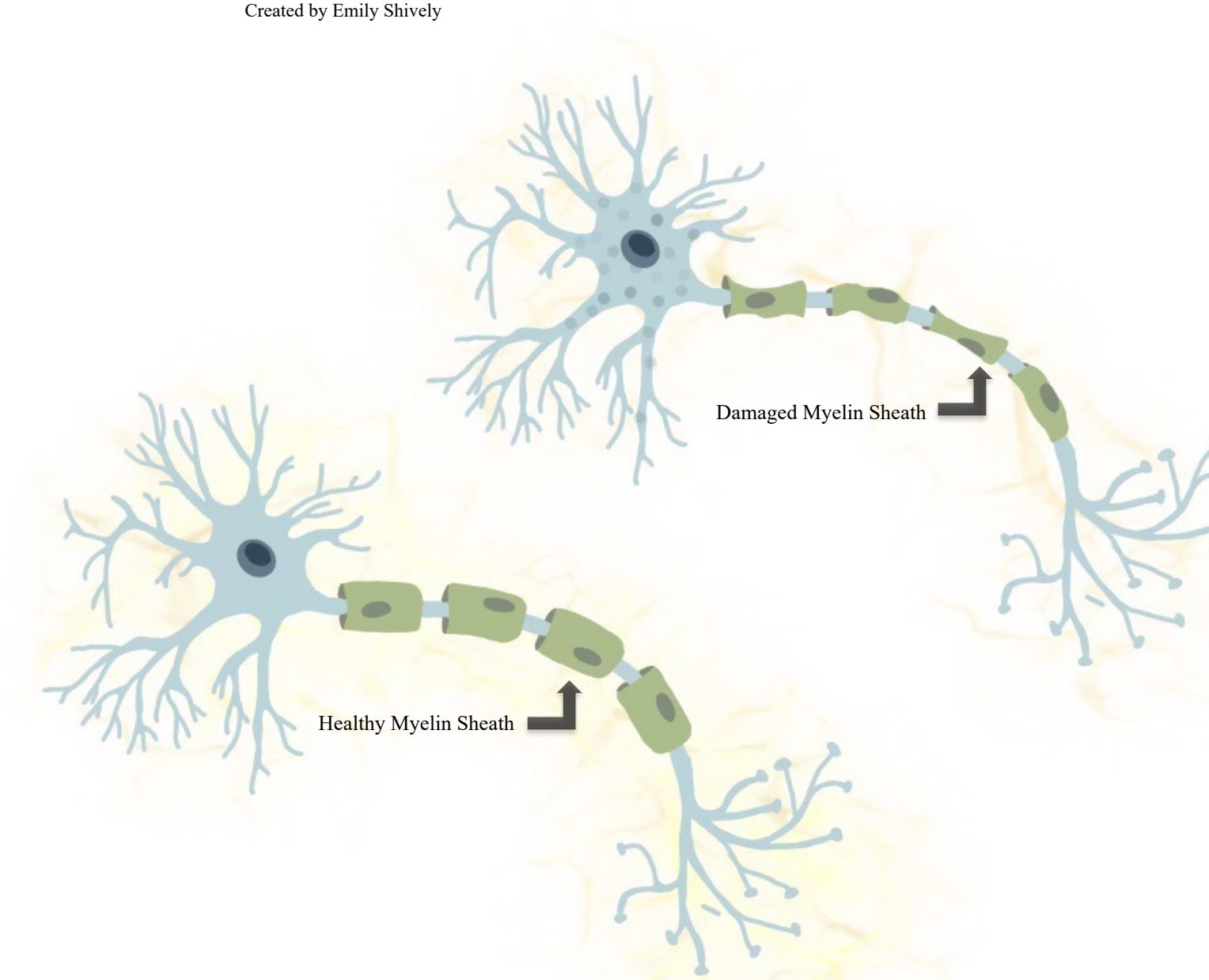
- Dairy
- Eggs
- Gluten

Results:

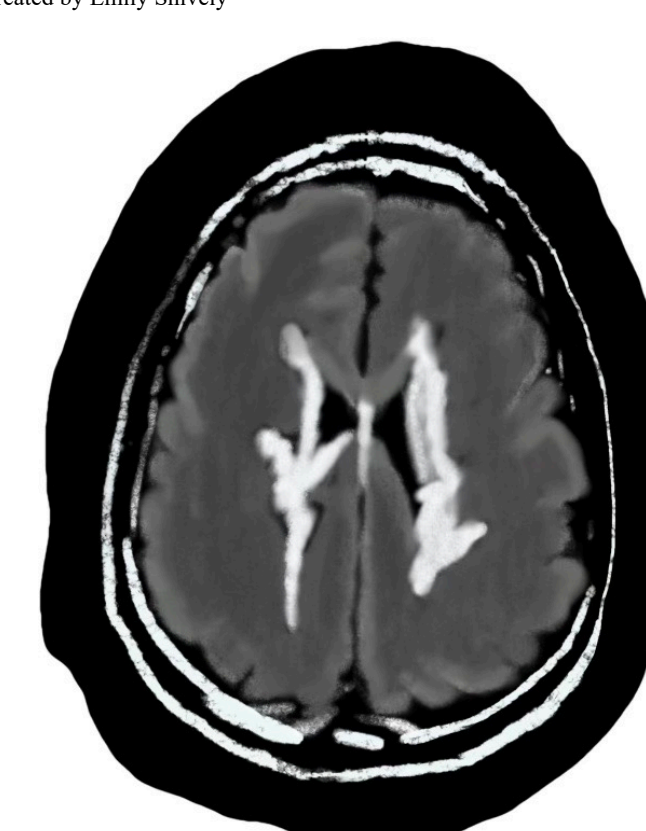
- Reduced fatigue
- Lessened MS symptoms

(Results were better with exercise included in the regimen)

### Normal VS. Demyelinated Neurons



### Brain lesions on an MRI



## FOODS



- Oats
- Rice
- Fish
- Chicken
- Beef liver
- Eggs
- Milk
- Yogurt
- Fruits
- Veggies



- Frozen foods
- Canned meats
- Bacon
- Fires
- Doughnuts
- White bread
- Wheat bread
- Pasta
- Biscuits
- Energy drinks

## Conclusion

Overall, These three diseases are becoming more common. The symptoms may start off intermittently or may not be as severe but given time they can become debilitating. The risk factors have a strong correlation between diet and other demographic predispositions. Research has found that for Osteoporosis fruits and vegetables packed with valuable minerals and calcium are essential in building strong bones. Dairy products are one of the highest sources of calcium. High caffeine consumption can decrease absorption of calcium. For Hyperlipidemia it was found that whole grains and oats were high in fiber and helped lower cholesterol in the bloodstream. Fish, like salmon, are high in omega 3s were found to help reduce high cholesterol levels. Spinach helps prevent cholesterol from building up on the walls of vessels and is also a source of vitamin D. Foods like fruits and veggies contain multiple antioxidants that can help reduce inflammation from MS. For all three diseases avoiding highly processed foods was the biggest area for change in people’s diets. Processed meats, fried foods, boxed goods were all recommended to avoid to decrease the excess ingredients that contribute to inflammation in the body. Foods high in sugar such as: soda, energy drinks, desserts, increase inflammatory markers and raise cholesterol levels in the blood. Carbohydrates like white bread, and pasta are broken down into sugar in the blood stream.

## Future Work

These advances in studying nutrition could contribute greatly to:

- Decreasing these three diseases’ symptoms
- Decreasing the symptoms of many other chronic and acute illnesses
- Allowing a treatment to be more specific and target the disease instead of having to place the participant on more medication.
- Wider range of education to the general public about the affects food has on the body

Future research could be done by:

- Drawing lab values and having the participants fill out a quick survey about their illness and its symptoms before
- Then put the participants on a specific diet
- After the allotted time to be on the diet has passed, the participants would then be tested again and fill out the survey again.

## References

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