Nutrition analysis project report samples

Health & Medicine, Body

Introduction

This analysis will focus on the excess intake of saturated fats and cardiovascular disease. The analysis is based on the report detailing my nutrient intake recorded for two days starting from September 4, 2014 to September 6, 2014. According to the analysis, my diet during the two-day period predisposes me to cardiovascular disease since it is high in saturated fats. According to the food guidelines given by USDA, saturated fats should contribute less than 10 percent of the total daily calories. However, my nutrient report indicates that saturated fats contribute 12 percent of my total daily calorie intake. Consequently, if I continue following this diet, I may develop a cardiovascular disease. I also chose to write about the cardiovascular disease because it exhibits a high mortality rate in the United States. Apart from excess intake of saturated fats, lack of physical activity may also contribute to the development of cardiovascular disease. Since I do not do much exercise, I am predisposed to cardiovascular disease. Cardiovascular disease is a group of diseases that lead to a blockage or narrowing of the blood vessels. This narrowing of the blood vessels causes difficulties in the movement of blood to the various tissues and may cause the blood to stop flowing into the tissues together. When this situation occurs, the cells are deprived of the materials needed for growth and normal functioning. Prolonged deprival of the cells of the nutrients needed for growth and other functions leads to their death, thus resulting into heart attack if it occurs in the blood vessels supplying the heart. Cardiovascular disease includes; heart attack, ischemic stroke, heart failure, arrhythmia, and heart valve problems. Cardiovascular disease is usually referred to as a

lifestyle disease because most of its risk factors such as smoking and poor nutrition are related to lifestyle practices.

Mechanisms

Saturated fats carry out most activities that any other fat does in the body. First, saturated fats supply energy needed for the various body functions. The supplying of energy takes place through metabolism of fat molecules in muscle cells and other cells. As a matter fact, fats supply more energy than carbohydrates and proteins: one gram of fat supplies 9 calories while one gram of carbohydrate and one gram of protein can only supply 4 calories. The metabolism of fats to produce energy mainly takes place in the muscle cells mainly at rest or during low physical activity. However, some cells do not rely on fats for energy at all. Such cells include brain cells and red blood cells.

Another function of fats is the provision of support and protection for internal organs. In this case, fats are deposited in certain regions around the various body organs in order to protect the organs from shock and mechanical injury. For instance, fats surround the pericardium membrane of the heart where they offer protection against shock to the heart.

Fats also insulate the body against changes in temperature that may affect the various body tissues and cells. In this case, they are deposited in the adipose tissue under the skin where they form a layer of insulation. The layer protects the body against cold.

Fats also help I absorption of fat-soluble vitamins. Fat-soluble vitamins include vitamins A, D, E, and K. These vitamins are insoluble in water. Consequently, they cannot be absorbed into the body in the absence of fats.

They dissolve in the digested fats in the small intestine. From the small intestine, the fats, alongside the dissolved vitamins, are absorbed into the lymphatic system before returning to the circulatory system.

Digestion of fats begins in the mouth following the ingestion of food into the mouth. However, much of fat digestion process taking place in the mouth entails a mechanical means, which involves the breakdown of food into smaller pieces that can be easily swallowed. Nevertheless, the little chemical digestion that takes place in the mouth is aided by the action of enzyme lingual lipase. The food is then swallowed, and it moves to the stomach once it has been broken down into appropriate size for swallowing. In the stomach, the food is digested slightly by the enzyme gastric lipase before it moves to the duodenum.

The entry of fat into the duodenum triggers the release of the hormone cholecystokinin. The hormone cholecystokinin then stimulates the gall bladder to release bile. The bile in turn suspends the hydrophobic molecules found in the intestinal fluid hence preparing the fat for digestion. The process is referred to as emulsification. Emulsification of fats leads to the formation of enlarged surface areas thus boosting enzyme activity. From the duodenum, the fat moves to the small intestine.

The small intestine is where most fat digestion takes place. In this case, enzyme pancreatic lipase breaks down the each triglyceride molecule into one monoglyceride molecule and two fatty acid molecules. The fatty acid molecules formed are then absorbed directly into the intestinal cells and transported to the liver via hepatic portal vein. However, monoglycerides and long-chain fatty acids first dissolve into micelles before being absorbed

into the intestinal cells. Monoglyceride molecules and long-chain fatty acids bind to form a triglyceride molecule once inside the cell. They are then combined with other molecules and encased in a protein to form chylomicrons. The chylomicrons then transport the absorbed lipids throughout the body first through the lymphatic system and later through the blood system.

The building blocks of fats are assimilated into the various body metabolic processes once they are transported to the various body tissues. Molecules of glycerol and fatty acids enter the tricarboxylic acid cycle (TCA) as acetyl coenzyme A in order to produce energy. However, the glycerol and fatty acid molecules take different routes in this case. For glycerol to be catabolized to produce energy, it is first converted to pyruvate. The pyruvate then continues through the TCA pathway to form acetyl Co-A and generate energy in the form of ATP eventually. On the other hand, for fatty acid to take part in energy synthesis, the fatty acid undergoes beta-oxidation to form acetyl Co-A. Acetyl Co-A continues through the energy synthesis pathway to produce energy. Beta oxidation results into the formation of ketone bodies. The ketone bodies formed are then broken down into acetyl Co-A, that then enters the TCA cycle to produce energy. During starvation, the body does not break down fatty acids completely. Consequently, the level of ketone bodies in the blood increases.

The body can also synthesize and store triglycerides from excess calories. In order to convert the excess glucose into triglycerides, the body first converts glucose into pyruvate. Pyruvate is the converted into acetyl coenzyme A. Several molecules of co-A molecules are then combined to form triglyceride

molecule. Synthesis of triglycerides from glucose molecules is more difficult than the synthesis of triglyceride from glycerol and fatty acid molecules. The triglyceride molecules synthesized in the body are then deposited in the adipose tissue and other organs to perform various functions.

The link between saturated fats and cardiovascular disease is controversial. However, some studies have confirmed that there is a positive correlation between the intake of saturated fats and the incidence of cardiovascular disease. For instance, the symposium held at the Department of Human Nutrition, University of Copenhagen, resolved that replacement of 1 percent of energy from saturated fatty acid with polyunsaturated fatty acid lowers the level of low density lipoprotein. Therefore, this substitution is likely to reduce the incidence of cardiovascular disease by less than approximately 2 percent (Astrup et al., 2011).

Saturated fats lead to the development of cardiovascular disease in the sense that they promote the increase in the level of LDL in the blood. High levels of oxidized LDL in blood triggers certain physical and chemical processes that eventually lead to the formation of plaques along the lumen of the cardiovascular vessels. The plaque may facilitate the formation of a clot along the lumen. The clot then causes the narrowing of the blood vessels. The formation of the clots along the blood vessels may also lead to interference with blood flow that may lead to limited supply of blood to certain tissues. Prolonged deprivation of the tissues of oxygen and other nutrients then results into the death of the tissues. This results into heart attack or stroke if the tissue involved is a heart tissue. Some of the conditions caused by this process include chronic heart failure, stroke, heart

attack, high blood pressure, and pulmonary thrombosis among others. Cardiovascular disease has a deep negative impact on people's lives. For instance, the disease results into deterioration of health. The disease also results into high spending on medical bills due to frequent hospitalization. It can also lead to amputation of one's limbs when tissues in the peripheral parts of the body die.

Solutions and recommendations

The DRI for saturated fats is less than 10 percent of the total calories. Since the amount of calories recommended for me is 200 calories, my recommended intake of saturated fats should be at most 20 calories. This amount is equivalent to approximately 2 grams of saturated fat. Some of the rich sources of saturated fatty acids are the following: pork, butter, cheese, lamb, cream, lad, fatty beef, and poultry with skin. Such foods should be avoided. They should be replaced with fruits, vegetables, whole grains, and nuts.

In order to fix my excess intake of saturated fats, the following strategies can help: limiting my consumption of the rich sources of saturated fats such as pork; using polyunsaturated oil for cooking; avoiding eating out; lowering my daily consumption while raising the level of my consumption of fruits and vegetables; increasing my daily consumption of fiber. Increasing the consumption of fiber is possible through increasing the consumption of fruits and vegetables. In my efforts to change my dietary habit, I will start by reducing the number of meals I consume out. I will then limit the consumption of foods rich in saturated fats gradually.

Conclusion

My proposed plan on diet change will be helpful to me. In addition, the plan is manageable since the sources of saturated fats are well known to me. The plans also focus on the actual causes of my high intake of saturated fats.

Works cited

Astrup, A., Dyerberg, J., Elwood, P., Hermansen, K., Hu, F. B., Jakobsen, M. U., & Willett, W. C. (2011). The role of reducing intakes of saturated fat in the prevention of cardiovascular disease: where does the evidence stand in 2010?. The American journal of clinical nutrition, 93(4), 684-688.