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**MATRIC NUMBER: 17/MHS01/212 LEVEL: 300LVL**

**BIOCHEMISTRY 313 ASSIGNMENT BY MR. AKAWA**

**ASSIGNMENT TITLE: DIABETES, OBESITY AND CANCER.**

**GROUP 2 CATEGORY ASSIGNMENTS**

1. **DEFINE THE FOLLOWING TERMS**
2. **KETOGENESIS**

Ketogenesis is a metabolic pathway that produces ketone bodies, which produce an alternative form of energy for the body. The body is constantly producing small amounts of ketone bodies that can make 22 ATP each in normal circumstance.

1. **KETONAEMIA**

The presence of an abnormally high concentration of ketone bodies in the blood.

1. **KETONURIA**

**The** excretion of abnormally large amounts of ketone bodies in the urine, characteristics of diabetes mellitus, starvation, or other medical conditions.

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1. **What are the consequences of Ketosis?**

* **Frequent urination**: As your body burns through the stored glucose in your liver and muscles within the first day or two of starting a ketogenic diet, you’ll be releasing a lot of water in the process. Plus, your kidneys will start excreting excess sodium as the levels of your circulating insulin drop.

Basically, you might notice yourself needing to pee more often throughout the day. But no worries; this side effect of ketosis takes care of itself once your body adjusts and is no longer burning through the extra glycogen.

* **Dizziness and drowsiness:** As the body is getting rid of this excess water, it will also be eliminating minerals like potassium, magnesium, and sodium too. This can make you feel dizzy, lightheaded, and fatigued.
* **Low blood sugar:** Also known as hypoglycemia, low blood sugar is another common ketosis side effect when beginning a ketogenic diet, especially for people who were used to eating higher amounts of carbs each day. When your body is used to intaking more carbs, it becomes accustomed to putting a certain amount of insulin out to handle the sugar.

So, when the amount of sugar intake is drastically reduced on a keto diet, it’s possible to experience short-term episodes of low blood sugar. That can make you feel temporarily tired, hungry, or shaky until your body adjusts.

* **Craving for sugar:** A great long-term benefit of the ketogenic diet is reduced cravings for sugar and other unhealthy foods. However, you might initially have stronger cravings for carbs during the transition period. This can last anywhere from one to two days to around three weeks.
* **Constipation:** As your digestive system adapts, you might initially experience some constipation when new to the keto diet. This is often caused by dehydration as you release more fluids.
* **Diarrhea:** On the flip side of the previously mentioned side effect, some people might experience minor issues with diarrhea in the first few days. This can simply be a result of your body adjusting to the macronutrient ratio change. In other cases, some people make the mistake of limiting their fat intake along with their carbs, which makes your intake of protein too high and can lead to diarrhea.

1. **WRITE CONCISELY ON THE MANANGEMENT OF KETOSIS**

* **Minimize Your Carb Consumption:** Eating a very low-carb diet is by far the most important factor in achieving ketosis. Normally, your cells use glucose, or sugar, as their main source of fuel. However, most of your cells can also use other fuel sources. This includes fatty acids, as well as ketones, which are also known as ketone bodies. Your body stores glucose in your liver and muscles in the form of glycogen. When carb intake is very low, glycogen stores are reduced and levels of the hormone insulin decline. This allows fatty acids to be released from fat stores in your body. Your liver converts some of these fatty acids into the ketone bodies acetone, acetoacetate and beta-hydroxybutyrate. These ketones can be used as fuel by portions of the brain. The level of carb restriction needed to induce ketosis is somewhat individualized. Some people need to limit net carbs (total carbs minus fiber) to 20 grams per day, while others can achieve ketosis while eating twice this amount or more. For this reason, the Atkins diet specifies that carbs be restricted to 20 or fewer grams per day for two weeks to guarantee that ketosis is achieved. After this point, small amounts of carbs can be added back to your diet very gradually, as long as ketosis is maintained.:
* **Include Coconut Oil in Your Diet:** Eating coconut oil can help you get into ketosis. It contains fats called medium-chain triglycerides (MCTs). Unlike most fats, MCTs are rapidly absorbed and taken directly to the liver, where they can be used immediately for energy or converted into ketones. In fact, it's been suggested that consuming coconut oil may be one of the best ways to increase ketone levels in people with Alzheimer's disease and other nervous system disorders. Although coconut oil contains four types of MCTs, 50% of its fat comes from the kind known as lauric acid. Some research suggests that fat sources with a higher percentage of lauric acid may produce a more sustained level of ketosis. This is because it's metabolized more gradually than other MCTs. MCTs have been used to induce ketosis in epileptic children without restricting carbs as drastically as the classic ketogenic diet. In fact, several studies have found that a high-MCT diet containing 20% of calories from carbs produces effects similar to the classic ketogenic diet, which provides fewer than 5% of calories from carbs. When adding coconut oil to your diet, it's a good idea to do so slowly to minimize digestive side effects like stomach cramping or diarrhea. Start with one teaspoon per day and work up to two to three tablespoons daily over the course of a week
* **Ramp up Your Physical Activity:** A growing number of studies have found that being in ketosis may be beneficial for some types of athletic performance, including endurance exercise. In addition, being more active can help you get into ketosis. When you exercise, you deplete your body of its glycogen stores. Normally, these are replenished when you eat carbs, which are broken down into glucose and then converted to glycogen. However, if carb intake is minimized, glycogen stores remain low. In response, your liver increases its production of ketones, which can be used as an alternate fuel source for your muscles. One study found that at low blood ketone concentrations, exercise increases the rate at which ketones are produced. However, when blood ketones are already elevated, they do not rise with exercise and may actually decrease for a short period. In addition, working out in a fasted state has been shown to drive up ketone levels in a small study, nine older women exercised either before or after a meal. Their blood ketone levels were 137–314% higher when they exercised before a meal than when they exercised after a meal. Keep in mind that although exercise increases ketone production, it may take one to four weeks for your body to adapt to using ketones and fatty acids as primary fuels. During this time, physical performance may be reduced temporarily.
* **Increase Your Healthy Fat Intake**: Consuming plenty of healthy fat can boost your ketone levels and help you reach ketosis. Indeed, a very low-carb ketogenic diet not only minimizes carbs, but is also high in fat. Ketogenic diets for weight loss, metabolic health and exercise performance usually provide between 60–80% of calories from fat. The classic ketogenic diet used for epilepsy is even higher in fat, with typically 85–90% of calories from fat. However, extremely high fat intake doesn't necessarily translate into higher ketone levels. A three-week study of 11 healthy people compared the effects of fasting with different amounts of fat intake on breath ketone levels. Overall, ketone levels were found to be similar in people consuming 79% or 90% of calories from fat. Furthermore, because fat makes up such a large percentage of a ketogenic diet, it's important to choose high-quality sources. Good fats include olive oil, avocado oil, coconut oil, butter, lard and tallow. In addition, there are many healthy, high-fat foods that are also very low in carbs. However, if your goal is weight loss, it's important to make sure you're not consuming too many calories in total, as this can cause your weight loss to stall.
* **Try a Short Fast or a Fat Fast:** Another way to get into ketosis is to go without eating for several hours. In fact, many people go into mild ketosis between dinner and breakfast. Children with epilepsy are sometimes fasted for 24–48 hours before they start a ketogenic diet. This is done to get into ketosis quickly so that seizures can be reduced sooner. Intermittent fasting, a dietary approach that involves regular short-term fasts, may also induce ketosis. Moreover, "fat fasting" is another ketone-boosting approach that mimics the effects of fasting. It involves consuming about 1,000 calories per day, 85–90% of which come from fat. This combination of low calorie and very high fat intake may help you achieve ketosis quickly. A 1965 study reported significant fat loss in overweight patients who followed a fat fast. However, other researchers have pointed out that these results appear to have been highly exaggerated. Because a fat fast is so low in protein and calories, it should be followed for a maximum of three to five days to prevent an excessive loss of muscle mass. It may also be difficult to adhere to for more than a couple of days.
* **Maintain Adequate Protein Intake:** Achieving ketosis requires a protein intake that is adequate but not excessive. The classic ketogenic diet used in epilepsy patients is restricted in both carbs and protein to maximize ketone levels. The same diet may also be beneficial for cancer patients, as it may limit tumor growth. However, for most people, cutting back on protein to increase ketone production isn't a healthy practice. First, it's important to consume enough protein to supply the liver with amino acids that can be used for gluconeogenesis, which translates to "making new glucose. "In this process, your liver provides glucose for the few cells and organs in your body that can't use ketones as fuel, such as your red blood cells and portions of the kidneys and brain .Second, protein intake should be high enough to maintain muscle mass when carb intake is low, especially during weight loss. Although losing weight typically results in the loss of both muscle and fat, consuming sufficient amounts of protein on a very low-carb ketogenic diet can help preserve muscle mass. Several studies have shown that the preservation of muscle mass and physical performance is maximized when protein intake is in the range of 0.55–0.77 grams per pound (1.2–1.7 grams per kilogram) of lean mass. In weight loss studies, very low-carb diets with protein intake within this range have been found to induce and maintain ketosis.
* **Test Ketone Levels and Adjust Your Diet as Needed:**  like many things in nutrition, achieving and maintaining a state of ketosis is highly individualized. Therefore, it can be helpful to test your ketone levels to ensure you're achieving your goals. The three types of ketones — acetone, beta-hydroxybutyrate and acetoacetate — can be measured in your breath, blood or urine. Acetone is found in your breath, and studies have confirmed testing acetone breath levels is a reliable way to monitor ketosis in people following ketogenic diets. The Ketonic meter measures acetone in breath. After breathing into the meter, a color flashes to indicate whether you are in ketosis and how high your levels are. Ketones can also be measured with a blood ketone meter. Similar to the way a glucose meter works, a small drop of blood is placed on a strip that's inserted into the meter. It measures the amount of beta-hydroxybutyrate in your blood, and it has also been found to be a valid indicator of ketosis levels. The disadvantage of measuring blood ketones is that the strips are very expensive. Lastly, the ketone measured in urine is acetoacetate. Ketone urine strips are dipped into urine and turn various shades of pink or purple depending on the level of ketones present. A darker color reflects higher ketone levels. Ketone urine strips are easy to use and fairly inexpensive. Although their accuracy in long-term use has been questioned, they should initially provide confirmation that you are in ketosis. A recent study found that urinary ketones tend to be highest in the early morning and after dinner on a ketogenic diet. Using one or more of these methods to test ketones can help you determine whether you need to make any adjustments to get into ketosis.

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