

Part I:

Oh, I love food, it is delicious, and I love it.

My name is Rashid Hamza, a biology teacher in Dhahran national schools, Saudi Arabia.

Yes, I love food, but I will put that aside. Come with me to our lesson for today, follow me, here we are, it's the place where i am going to measure the sugar level in my blood.

Look at what I have prepared. This is a device for measuring sugar level in blood, this is a lancing device, these are the sterile lancets for this lancing device, these are the test strips to test sugar, and these are the disinfectants (medicalwiper), these items must always be handy, and always make sure to have a new sterile lancet each time to prevent infectious diseases.

Here is the sterile lancet ready to work now. I will take a test strip and insert it in the device and wait a little until it is ready. Meanwhile, I'll sterilize the finger, which I am going to take the blood sample from, preferably dry it with a piece of cotton. Now, I'm ready to take the sample.

Look at my blood. It is very familiar to me. I must check the sugar level in my blood every now and then. Let's wait a little while. Look, the reading for the sugar level in my blood should appear now. It is 240, write this value in your notebooks we will use this value and I will ask you later at the end of this lesson whether I have diabetes or not. Diabetes is the disease of the century. It has invaded almost every house, especially the elderly, and knocks on the door of every one's house. Let's learn find out more about diabetes.

Use the KWL table on one of the worksheets that was distributed earlier, to write what you know about diabetes in the first column. In the second column you will write what you want to know about diabetes, and in the third column you will write what you have learned about this disease by the end of this lesson. Now, my dear students fill in the first and second columns in groups and I will come back to you shortly.

Part II:

Hello, again. This is the KWL table, I expect that all of you have filled in the first and the second columns and I expect all the groups know the causes of diabetes, the factors that increase the risk of diabetes, normal or high blood sugar levels, health problems resulting from diabetes, the symptoms associated with the disease, prevention and treatment methods as well.

Now, let's learn more and answer the first question. What are the causes of diabetes? Before I explain the causes of diabetes, I have to remind you of the endocrine glands. You studied it at the beginning of this chapter about the hormone system in the human body. Now look at the figure in the worksheets. I deliberately left blanks for you to write the names of these glands, and now just write their names as previously studied; I will wait for you and make sure that you know them.

You must fill in these boxes with the names of these glands. Now look at the figure shown and compare what you have already written to the names of the glands in front of you. I am completely confident that you have written the correct names for these glands in the worksheets you have. Most importantly of all, look at the pancreas gland and circle it as shown in the figure. Here is the circle I have drawn around the pancreas and this is what I want you to do in the figures you have.

Now, let us learn more about the pancreas, which is ultimately responsible for diabetes. This is a model of the human body. Let's determine the location of this gland, its size and shape in the body. We will see it soon. Here I am removing the lungs. Here is the heart in the chest area and the liver in the abdominal area. Here is the stomach. Look, now at what lies at the bottom of the stomach. It is the pancreas. Here is the pancreas, located below the stomach and at the top of colon. This is the transverse colon and as you can see the pancreas is above the transverse colon and below the stomach. Notice, its size and shape compared to the size of other organs in the human body.

This is the size, shape & location of the pancreatic gland, but what if we take a closer look at a cross-section to show the structure of the pancreas. Let us see what we have here. As you can see from the cross-sectional part of the pancreas, it consists of several cells and microscopic cell populations, a so-called islets of Langerhans, which consists of several types of cells; beta, alpha, and others. Most importantly of all, beta cells are responsible for secretion of insulin hormone, which is the main cause of diabetes.

Now, dear students, it is time for work. You have previously studied the digestive system and you know that the pancreas is a gland that works with the digestive system where its function is to... I do not want to say. I do not want to complete,

I'll leave that to you. Now here you are studying the pancreas as one of the endocrine glands. I want you to work in groups to answer the following question: Why is the pancreas considered an exocrine gland in the digestive system while it is endocrine gland in the hormonal system? Discuss this question in groups, try to find an explanation, and I will come back to you after the break.

Part III:

Hello, again. I am sure you have answered correctly. The pancreas gland is not an endocrine since it secretes digestive juices in the digestive system through a duct, and it is considered an endocrine because it secretes hormones, which are released into blood directly.

It is a dual-function gland (endocrine and exocrine), but now I have an important question for you: How does the insulin reduce blood sugar levels? Let us find out and answer this question.

The insulin hormone performs several tasks to keep normal sugar level in the blood. It activates the body's cells by absorbing glucose. It uses it as a fuel, which lowers sugar level in the blood by converting excess glucose to glycogen and storing it in the liver and muscles. It activates the growth process and cell reproduction in the body and reduces the percentage of glucose in the blood. Now, look at this video clip, which will show you how insulin transfers glucose to the body cells, which decreases glucose level in blood. Look here, as you can see, humans eat carbohydrates. These carbohydrates reach to the gastrointestinal tract where they are digested and converted to glucose. This glucose now begins to move to the blood, which, in turn, takes the glucose into the body's cells. At the same time, notice that the pancreas secretes insulin into the blood and the blood now carries a combination of both. First insulin reaches the receptors to facilitate the entry of glucose into cells and thus reduce the glucose in the blood. Now it is the time for an activity. After you have been introduced to the three main processes carried out by insulin in reducing blood sugar, I want you to think in groups in what would happen if there is a lack of insulin in the human body and what will this shortage lead to, and I will come back to you.

Part IV:

I welcome you once again. I am sure you have got the correct answer; these are my expectations of my student's, well done. Let us find out now what will the lack

of insulin in the blood lead to. The hormone shortage slows the glucose consumption in the cells causing a rise in blood glucose level, a decrease in the conversion of excess glucose into glycogen. This leads to high glucose level in the blood. This inhibits and reduces the growth and reproduction of body cells, which leads to the accumulation of glucose in the blood. As a result of these effects due to insulin shortage, the blood sugar level increases and consequently leads to diabetes.

For your information there are two kinds of diabetes: Diabetes Type 1 and Type 2. Let's learn more about these two types. We will start with Type I diabetes.

This type results from damage to the beta cells in the islets of Langerhans, which as we studied earlier, is responsible for the secretion of the hormone insulin. If damage occurs to these cells, the secretion of this hormone stops or decreases sharply. This causes blood sugar to rise sharply. Are you wondering about the treatment methods for this type? Patients with this type are often given injections of insulin with continuous monitoring of their blood sugar levels to prevent the risk of high sugar levels.

Let us talk about type II diabetes, which is less dangerous than the previous one. The shortage in secretion of insulin from beta cells in the islets of Langerhans leads to high blood sugar level. This rise often does not cause a threat. Sometimes there is a lack of response from insulin receptors in the membranes of the body's cells to insulin. Although there is enough insulin from the pancreas, these receptors do not function properly, which affects their function and prevents glucose entry into cells.

You must be wondering now about what treatment methods are used to treat type II diabetes. Let us introduce them to you. First an increase in physical activity and regular exercise including walking and jogging are important. Reducing carbohydrate and fatty food consumption of all kinds along with weight loss has a major role in getting rid of type II diabetes. Often using pills to reduce sugar levels such as metformin helps regulate blood sugar levels.

For people with Type II diabetes, statistics indicate that more than 60% of people with diabetes suffer from obesity; this disease did not come from outer space; we must track their life habits: What do they eat? What types of food are in their

diet? What are the quantities? What are their eating habits? There must be many wrong eating habits in their daily life.

Look at these meals now. Look at how much fat and how many carbohydrates there are in one meal that is always followed by desserts. This will lead in the end to diabetes.

Now, it is time for an activity. I wonder, is there a relation between the excessive food consumption or bad eating habits and diabetes? I'll leave you to discuss this question and I will hear your opinions after I return shortly.

Part V:

Hello, again. This is not new for you; you surely agree with me that obesity has a major impact on the human body by increasing insulin level. The accumulation of fats in the abdominal area of the human body hinders the function of the pancreas and also hinders the hormone insulin from polarizing glucose to the cells.

It is fat! It is obesity! It is excessive food! We must be careful of them.

Now, I am wondering what is the normal sugar level in human blood. Let me inform you about these ratios:

- A blood sugar test for person fasting for about 10 hours should be from 70 to 110 mg per deciliter of blood.

- A blood sugar test for person two hours after breakfast should reach 126 mg per deciliter of blood.

- If we take a random test of blood sugar, the result should not exceed the percentage of 140 milligrams per deciliter of blood.

But, what percentage indicates a case of diabetes? When can we say that a person is a diabetic?

- If we test a fasting person and the percentage was from 110 to 126 mg per deciliter.

- If we test a person's blood after two hours from having 75 g of and the percentage was 200 mg or

- If we take a random test of blood sugar, and the result reached a percentage of 200 milligrams per deciliter of blood.

Now, try to remember. What is the percentage of blood sugar that I had when we started this lesson together? You must remember it very well. Go back to your notes from the beginning and now after you look at this number. Tell me: Am I diabetic or what? Do I belong to type I or type II? I want an answer from you; I am waiting to hear your answer. There are many health problems associated with diabetic patients.

To identify the most important of these problems:

Diabetes reduces the energy needed for cells, hence decreases activity of the patient who always feel a lack of energy and laziness. Severe damage to the nerves and blood vessels can sometimes lead to serious complications such as heart disease and stroke in some cases. When a person is wounded or bleeding, his blood clots slowly, causing blood loss. Inflammation in organs, hands or feet may result in their extraction or amputation.

These are the most important of the many problems associated with a diabetic patient, diabetes is accompanied by many symptoms and I will mention only some of them:

An increase in urination for the patient, extreme fatigue, and increased feeling of thirst are common. Other symptoms include the need to drink water constantly, a strong appetite despite eating normal daily meals, slow healing of wounds, and lack of clarity in vision. Do not forget that these are some of the symptoms and not all.

We have reached the last activity; it is now time to go back to the KWL table we started with at the beginning of the lesson. We have left the third column blank and we said that we would come back again to fill it.

Now, in groups, complete the third column in the KWL table. (What have we learned about diabetes in today's lesson).

Part VI:

Welcome to our last station in our lesson for today. I will summarize what we have learned today about diabetes as follows:

- We learned about the causes of diabetes
- We identified the factors that lead to diabetes
- We learned about normal and high percentage of sugar in blood.
- We learned about health problems associated with diabetes.
- We identified the symptoms associated with a diabetic patient.
- And we learned about methods of prevention and treatment for diabetes.

If anyone wants to give advice about diabetes, they must know this information and now, my students, you are informed enough to do so. Always remember, and remind others, that prevention is better than cure. I want you to start, whether now or in other period, to design a slogan, message, card, poster, postcard or a drawing, as appropriate, to be a true logo and a message from you advising all people to protect themselves from diabetes. Do not forget that we will post the best ones and print and distribute them to the public. So try to be one of the winners.

Now, I'm going back to what I love. Goodbye, goodbye, and goodbye. Starting from today, this is going to be my diet. This is my healthy diet.

So do not forget that. See you in another lesson.