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Original research Articles

Finding Appropriate Therapies for Blood Pressure, Diabetes (2), and Related Conditions

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Abstract:- For many people worldwide, diabetes type 2, blood pressure, particularly hypertension, and associated conditions have been the most serious issues in recent decades. Since these illnesses differ from others, a sample from various societies was selected for this study in a tiny city in southern Iraq named "Al-Mejar Al-Kabeer" in order to investigate them accurately. those in this city engage in the same activities as those in other Iraqi cities, and the only change that has occurred in the previous 20 years is the switch from tap water to commercial water, known as R.O. Around 20,000 of the city's 70,000 residents have diabetes, which means that more than 28% of the population as a whole has the condition, and this ratio may be more for hypertension.

The study's findings indicate that civilization is the primary cause of type 2 diabetes, high blood pressure, and related illnesses. Based on solid evidence, it is recommended that people with diabetes, hypertension, and related conditions take 5 grams of potassium ions (K^+) daily and less sodium ions (2:1). Since insulin is actually made from recognized amino acids, the body needs adequate levels of these acids. As a result, the proper therapy for type 2 diabetes involves more than just potassium; it also requires adequate amounts of proteins every day or every three days.

According to the research's references, diabetes and hypertension are widely understood conditions, but a chemist's perspective is necessary to completely comprehend them.

Keywords: Diabetes, Hypertension and potassium.

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Introduction:

Chronic polyuria brought on by a number of metabolic diseases is known as diabetes. The majority of the time, a high glucose level in the renal tubule causes polyuria [1]. The main causes of diabetes mellitus are either insufficient insulin secretion or tissues' incapacity to react to insulin. About 3% of persons with diabetes mellitus have insulin-dependent diabetes mellitus (IDDM), also known as type 1 diabetes mellitus, which is caused by decreased insulin secretion. The incapacity of tissues to react to insulin causes noninsulin-dependent diabetes mellitus (NIDDM), also known as type (2) diabetes mellitus. Although the age of start varies greatly, NIDDM typically occurs in adults over 40 to 45. Although the disease has a significant genetic component, its true cause is recognized. Compared to IDDM, NIDDM is more prevalent. NIDDM is present in about 97% of individuals with diabetes mellitus [(2)].

On the other hand, blood pressure is a measurement of the force that blood applies to the walls of blood vessels [(2)]. There are two pressures noted: (1) The highest arterial blood pressure reached during ventricular systole is known as systolic pressure. (2) The lowest arterial blood pressure in between heartbeats is known as diastolic pressure. Arterial blood pressure in a healthy individual is expressed as 120/75, which is the ratio of systolic to diastolic pressure [(1)].

Global News reports that a large percentage of the aforementioned diseases are prevalent in the southern region of Iraq. Indeed, according to the Iraqi Ministry of Health, 10% of Iraqis have diabetes and 40% have high blood pressure, with these percentages pertaining to individuals aged 25 to 65. Since type 2 diabetes affects millions of people worldwide, this study provides the best explanation for this improbable illness. This presents three methods of scientific experimentation; First, nothing has changed in the lives of about 70 people in a small city over the past 20 years except that they have changed their drinking water, which lacks potassium ions. As a result, the ratio of people with type 2 diabetes increased from roughly 2-3% before 2003 to 28.5% after 2003. Secondly, a chemically specific method demonstrates the relationship between glucose, insulin, and cell membranes in both normal and diabetic cases to better understand this disease and hypertension. Lastly, there are two unusual studies. Studies conducted in the United States and Japan have demonstrated a correlation between potassium and type 2 diabetes; however, they have not provided an explanation for the findings that low serum potassium causes diabetes. In contrast, this study offers a proper explanation for the rationale behind the treatment of type 2 diabetes, and its right treatment. This study aims to eradicate this improbable illness in three ways. Furthermore, it provides the appropriate therapy for hypertension and explains why it occurs.

Experimental part:

People in "Al-Mejar Al-Kabeer" city have been doing the same things as people in other Iraqi cities for the past fifteen years, therefore there are no variations, making it an ideal place to study high-scoring disorders like diabetes mellitus or hypertension. This city has a large hospital, and records show that roughly 70,000 people live there, with 20,000 of them having type 2 diabetes and hypertension. It is a known truth that the city's residents share only two resources: air and water. The majority of people on the planet only share these characteristics with one another.

Additionally, the Chemistry Department of the College of Science used the flammable atomic absorption technique to determine the percentage of potassium ions (K+%) in six distinct water samples. Six samples were gathered from various Missan City water sources. Four of these samples are produced using distinct filtration processes since they come from different filters, such as reverse osmotic (R.O.) waters and deionized waters. The two remaining samples came from tap water that had undergone standard filtration procedures.

Results:

About 20,000 of the approximately 70000 residents of "Al-Mejar Al-Kabeer" city have diabetes mellitus; the diabetes prevalence is 28.57%, which is a high score.

Moreover, the percentage yield of the six samples used in this study is as follows: the tap water contains roughly 3.1–3.2 mg/L of potassium ions (K+), whereas the four samples (filtered water, including R.O. samples and deionized waters) contain zero potassium ions.

Discussion:

The high prevalence of diabetes mellitus in "Al-Mejar Al-Kabeer" city must have a scientific explanation; before many years, the rate was not this high, with 28.57% of persons developing the disease after 2003. There are only two things that the residents of this little city share: air and water. The primary gases found in air are O2, N2, and CO2. There is no proof that these gasses are connected to either hypertension or diabetes mellitus.

Diabetes mellitus should therefore be caused by another source. After 2003, for unknown reasons, Iraqis in the south of the country switched from using tap water to commercial water known as "R.O." reverse osmosis, or deionized water. The study's findings indicate that these fluids lack essential ions like potassium ions. Strong evidence suggests a connection between potassium-sodium ions and both hypertension and diabetes mellitus.

Science determines that glucose and sodium bind to distinct locations on a Na^+-glucose symporter at the apical surface throughout the penetration process into several cells [1-4 and 18]. "Drag" glucose along with Na^+ when it enters the cell along its electrochemical gradient. As a result, more glucose enters when the Na+ gradient is larger, and glucose transport ceases when the Na^+ in the extracellular fluid is low [14]. Na^+ is more crucial for the transfer of glucose into various species' cells in this regard.

The body needs the same amount of sodium ions after every meal, and billions of glucose molecules should be present in the extracellular fluid in the blood. Where does the body obtain this quantity of sodium ions, one wonders? Furthermore, if all of the body's cells absorb these sodium ions, their intracellular concentration must be greater than their external concentration. This is untrue, and the actual state of the body shows that it is the opposite of this [2]. The concentration of sodium ions is larger outside the cell than inside, and the potassium ions have the opposite status.

It is evident that sodium-potassium ions play a key role in the transfer of glucose into various cells. K^+-Na^+ ATP-ase is a well-known transporter that is in charge of delivering all glucose molecules into the various cells of the body. When three Na^+ enter distinct cells, two K^+ exit [1-4 and 18].

In actuality, residents of Al-Mejar Al-Kabeer led normal lifestyles prior to 2003 and up until this point. According to the hospital's specialists, the percentage of persons with diabetes or hypertension was less than 2% prior to 2003, but it is currently at 28.57% for diabetes and roughly the same for hypertension. In just fifteen years, from 2003 to 2018, this gap has gone from an anomalous 2% to 28.57%; there must be a logical explanation for this! The only change that occurred in Al-Mejar Al-Kabeer was that, prior to 2003, residents of this city drank regular tap water; now, they drink R.O. water, or deionized water.

The findings of this study demonstrate that, for scientific reasons, R.O. fluids do not contain potassium ions. Thus, for the past 20 years, this is the only change that has occurred in Al-Mejar Al-Kabeer.

The aforementioned findings suggest that potassium ions are important in the process by which glucose enters the various cells of the human body, which implies that they are important in the development of diabetes and hypertension. In Al-Mejar Al-Kabeer, the prevalence of diabetes is 28.57% for all age groups, from 1 to 65, and may be higher in other southern Iraqi cities. Furthermore, Arab Gulf nations and other nations have comparable rates, if not higher ones. Actually, as the WHO stated, these percentages are alarming for the entire world, and the reason for this is that the majority of people consume commercial water that either contains no potassium ions at all or very little of them.

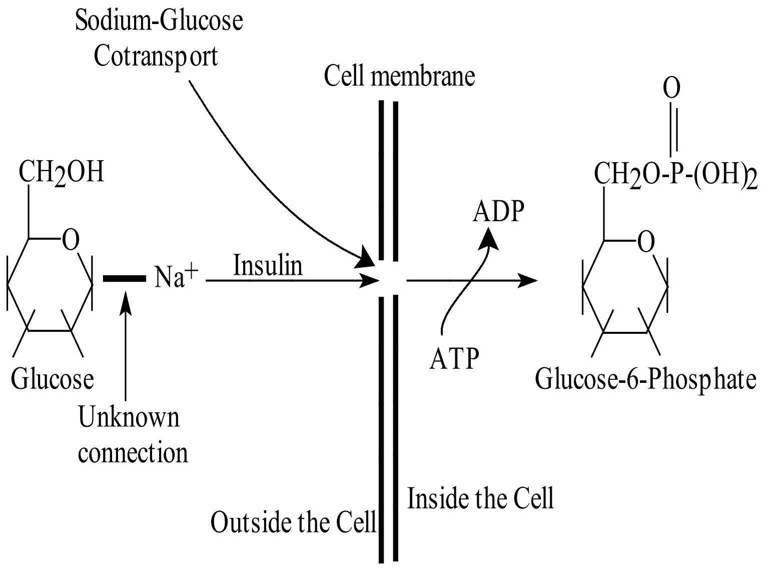
The sole change that has occurred in the lives of the approximately 70000 residents of Al-Mejar Al-Kabeer since 2000 is the substitution of deionized water (R.O. water) for tap water throughout the last 15 years, from 2003 to 2018. As previously said, this type of water lacks potassium ions, and it is a known truth that diabetes and hypertension are caused by low potassium ion levels in the body. Due to a decrease in potassium ions, the prevalence of diabetic disease increased from roughly 2-3% to 28.57 percent between 2000 and 2018.
About 20,000 of the 70000 samples collected over the course of 15 years had diabetes, and almost the same

number had hypertension. Based on these findings, it is more than sufficient to ensure that the proper medication for both conditions—roughly 5 g/day potassium ions—is administered.

But since there is no obvious explanation for how glucose binds to sodium ions, chemistry cannot accept this! There are numerous types of bonds in chemistry, including covalent, ionic, hydrogen, and others. When glucose enters several cells through their membranes, which one of them binds to sodium? Additionally, why does glucose bind to sodium but not to potassium? Does the glucose-Na link have an ionic nature, as sodium prefers ionic bonds? Chemistry should provide answers to these additional questions in order to better ensure that type 2 diabetes and hypertension are treated appropriately. Answering these questions provides more proof that the treatment of diabetes and hypertension is more effective than the previous one.

According to the research's findings, tap water contains roughly 3.1–3.2 mg/L of potassium ions, whereas filtered water samples—such as R.O. samples and deionized waters—that are created using various filtering techniques do not. The most vital ion for the human body is potassium (1-4). Diabetes and illnesses associated with potassium ions have a positive relationship (1–18). As previously stated, the information and explanations above are more than sufficient to determine the best course of action for type 2 diabetes and hypertension; nonetheless, the following additional data should be included:

A healthy person's blood has a specific amount of glucose, approximately 100 mg/100 ml [2]. References [1-6] state that insulin helps glucose molecules pass through certain channels in plasma membranes where they connect with sodium. Once within human cells, the glucose is then transformed to glucose-6-phosphate. Knowing how this mechanism works should help you understand what causes diabetes and related conditions. This explanation should be made clear using the following scheme:



Scheme (1): Explain the process by which blood glucose enters bodily cells and the outcomes of this entry.

The above scheme explains chemically how insulin helps the body's cells absorb salt and blood glucose (3). The above scheme (1) explains how insulin and salt work together to allow glucose to penetrate cell membranes and what happens inside body cells. It is clear that insulin is what allows glucose to enter the body's cells and that the chemical structure of the entering glucose molecules does not change during the entering process. In other words, with the help of the hormone insulin, glucose molecules remain unchanged when they reach bodily cells. Thus, how does insulin enable glucose molecules to get through cell membranes for the glycolysis process?

And why does insulin have to help glucose pass through the cell membrane? Lastly, what kinds of modifications must glucose molecules undergo in order for them to enter human cells? Understanding the causes of diabetes, hypertension, and related conditions will be possible thanks to these inquiries.

Since diabetes mellitus has been recognized for almost 3,000 years, its name is derived from the Greek term

siphon, which means secretion of large amounts of urine, and mellitus, which means sweet flavor. Therefore, diabetes mellitus in Greek refers to the production of urine containing sugar.
Although glucose serves as the primary energy source for the human body, different bodies rely more on the metabolism of carbohydrates than on other metabolisms, such as those of fatty acids or amino acids, in their everyday activities. For this reason, during the past 200 years, numerous scientists and researchers have thoroughly examined the metabolism of carbohydrates. The following are some of the numerous facts on the metabolism of carbohydrates and other related processes on which this research is based:

1. The blood of a typical person mostly contains specific amounts of insulin and glucose [1-4].
2. The pancreas secretes large amounts of insulin in response to the presence of high levels of glucose in the human blood, which occurs after every meal and causes the insulin level to rise as well [1-4].
3. Humans will lose the majority of their energy after going five to seven hours without eating, as evidenced by life.
4. For glucose to enter human cells through the cell membrane, both the sodium and glucose molecules are necessary [1-6].
5. Diabetic ketoacidosis, or diabetes, can be effectively treated with potassium chloride [8].
6.Various cell membrane chemicals have been thoroughly explored [1-6].
7.The structure and characteristics of glucose have been thoroughly examined [1-4].
8.The molecular structure and action of insulin have been thoroughly examined [1-4].
9. After entering human cells, glucose molecules transform into glucose-6-phosphate [1-4].
10. As previously mentioned, insulin is the hormone that causes glucose to enter the cell through a protein channel.
11. Glucose is transformed into CO2, H2O, and ATP molecules inside various cells, which are the body's energy sources.
12. Compared to other bivalent ions, molecules, or chemicals, univalent positive ions like Na+ and K+ are absorbed by the human gut comparatively more quickly [1-6].
13. Three sodium ions leave human cells for every two potassium ions that enter them [1-6].
14. According to the references, diabetes and low serum potassium levels are related [7, 15–17].

As a result, many scientists have been thoroughly studying the pathways of glucose inside human cells for a long time. This is because, as was previously explained, glucose is the primary molecule that the human body uses for bioenergy through the metabolism of carbohydrates. It is true, nonetheless, that the above (14) points provide a treatment for diabetes in addition to the previously mentioned ones; however, this solution requires more than just the aforementioned points; a chemist's touch is required.
Scheme (1) demonstrated how the insulin hormone converts glucose to glucose-6-phosphate after it has passed through the cell membrane. Chemistry states that when glucose is transformed into glucose-6-phosphate, it interacts with the ATP molecule within human cells. This is a straightforward reaction that will be explained later. With the aid of insulin molecules, glucose enters human cells from the outside (blood). As a result, insulin and cell membranes are two crucial components for the entry of glucose into various human cells. Actually, the following explanations of these elements may be found in references [1-4] and chemistry science:

1. Cell's membrane:

The plasma membrane, as defined by references [1-4], is a lipid bilayer made up of cholesterol and phospholipids with proteins embedded in or extending over both surfaces. Marker molecules, on the other hand, allow cells to recognize one another, receptor molecules aid in intercellular communication, and it regulates the entry and departure of substances [2]. According to chemical principles, blood is actually a polar liquid that cannot interact with lipid bilayer membranes.

Two distinct compounds pass through the plasma membrane: lipid-soluble molecules (non-polar molecules) diffuse directly through the membrane, whereas certain non-lipid-soluble molecules (polar molecules), like glucose or various ions (sodium), diffuse through membrane channels [(2)]. Thus, glucose and salt enter human cells by a mechanism known as "facilitated diffusion," which is a carrier-mediated or channel-mediated process that transfers substances from a higher to a lower concentration into or out of cells. Transporting molecules across the plasma membrane does not require metabolic energy [(2)]. Through the channel protein, potassium ions enter the cell while three sodium ions escape. These ions then return to the cell with glucose molecules via the carrier protein. Stated differently, potassium ions offer.

According to reference [(2)], the plasma membrane is composed of 4%–8% carbohydrates, 45%–50% proteins, and 45%–50% lipids. As previously stated, polar molecules enter body cells through membrane channels (channel proteins and carrier proteins), whereas non-polar molecules enter body cells through their membrane [(1-4)].

The number of channels in a cell's membrane varies according to its location inside the body [(1-4)]. Additionally, according to the same texts, membrane channels can be classified as either channel proteins or carrier proteins. When all carrier proteins or channels are occupied, the first one (carrier protein) does not require energy and the rate at which molecules or ions are transported is directly proportional to their concentration gradient up to the point of saturation.

At its greatest rate, the transfer rate then stays constant. Furthermore, the number of carrier proteins and the rate at which each one can transport solutes limit the transport rate; if there are so many molecules outside the cell that all of the carrier proteins are occupied, the system is saturated and the transport rate is unable to rise [(2)]. Channel proteins, which consist of one or more integral proteins organized to create a small channel through the plasma membrane, are the second class of membrane channels. According to the references, the hydrophilic portions of the proteins face inward and line the channel, while the hydrophobic portions of the proteins face outward toward the hydrophobic portion of the plasma membrane [(1-3)]. Actually, according to references, this indication applies to all of the plasma membrane's channels.

In other words, membrane channels are found in membrane protein areas of the plasma membrane. These regions are made up of membrane proteins known as integral proteins, which are composed of both hydrophilic (R) and hydrophobic (R) amino acid regions. The hydrophilic portions are found at the membrane's inner or outer surface or in line channels through the membrane, whereas the hydrophobic regions are found within the hydrophobic portion of the membrane [(2)]. This indicates that the two channels (carrier proteins and channel proteins) mentioned above are positioned in the plasma membrane, with their hydrophobic parts found within the membrane's hydrophobic portion and their hydrophilic regions found at the membrane's inner or outer surface or in line channels.

Based on the aforementioned information, there is no connection between diabetes or hypertension and the cell membrane, also known as the plasma membrane. This membrane allows for the easy entry of various ions and glucose without any problems or energy expenditure. Consequently, insulin plays a crucial function in the following ways when glucose passes through a cell without the membrane of the cell.

2. Insulin:

Many scientists have been studying this molecule for a long time. It is a protein hormone that is generated as an inactive precursor, and proteolysis is used to produce the active molecule. For example, the proteolytic removal of a particular peptide from proinsulin results in the production of insulin, a crucial metabolic regulator (4). Proinsulin is made up of 86 known amino acids, whereas insulin is made up of 51 known amino acids (4). Human insulin's chemical structure revealed that it contains 51 distinct amino acids, which are further classified into three groups: hydrophilic, hydrophobic, and intermediate amino acids (4). The following table serves as an illustration of this:

Table (1): shown the names and numbers of the 51 amino acids that make up human insulin.

Hydrophilic amino acids		**Hydrophobic amino acids**		**In between amino acids**	
Name	Number	Name	Number	Name	Number
Cysteine	6	Leucine	6	Tyrosine	2
Glutamic acid	4	Valine	4	Lysine	1
Glutamine	3	Phenylalanine	3		
Threonine	3	Glycine	4		
Serine	3	Isoleucine	2		
Asparagine	3	Tryptophan	2		
Histidine	2	Alanine	1		
Arginine	1	Proline	1		
Total amino acids= 25 a.a.		Total amino acids= 23 a.a.		Total amino acids= 3 a.a.	

It is a scientific fact that if a small amount of phospholipid or fatty acid is dropped into a 250 ml beaker of water while being stirred, the drops will clump together to form micelles or larger drops (emulsion). The content of phospholipid molecules or fatty acid determines this. On the other hand, because they are soluble in water, fatty acids, phospholipids, and other chemicals are clumping together to form micelles or emulsions. Lipid molecules are forced to form a single, large drop by water molecules.

But since insulin includes hydrophobic moieties and human blood is an aquatic solvent, as table (1) above illustrates, the aforementioned fact should apply to insulin molecules in human blood for two reasons: first, human blood is a stirring or moving solvent. Second, there are two distinct types of amino acids found in human insulin: hydrophilic and hydrophobic. Insulin molecules should then be forced to form micelles by the blood; the inner micelles will contain hydrophobic amino acids, while the outside ones would have hydrophilic amino acids. Furthermore, as insulin is a tiny molecule [(2)], it should form micelles rather than emulsions in the moving blood, which is why this might occur.

As a result, in the circulation, (23) insulin's amino acids will be inward insulin micelles, and (25) amino acids will be outward insulin micelles. The three extra amino acids "in between amino acids" listed in table (1) above will either be inward or outward insulin micelles; they have no effect on the hydrophilic amino acid (25) that is an outward insulin micelle. It should be noted that in the structure of insulin, cysteine will form three disulfide bridges [(1-4)].

In addition to providing insulin with its structure and stability, these bridges and the forces of blood (aquatic solution) will make insulin a micelle, which resembles a tiny drop in the blood. Again, amino acids (25) and (23) are inward and outward of this drop, respectively. The remaining three amino acids (between) will be the outer insulin micelle because their (R) groups are hydrophilic ($-NH3+$ and $-OH$), but since they are fewer in number (3) than in number (25) they have no effect on insulin activity.

Therefore, total outward amino acids are 25 amino acids, there are (6 Cys) in disulfide bridges, resulting (19) free (R) groups of insulin outward amino acids.

These amino acids by dismissing them number in insulin are; Glu., Gln., Thr., Ser., Asn., His. and Arg. therefore, insulin molecules in blood should be as drops approximately such as following figure by neglecting numbers of amino acid in these drops (micelles of insulin):

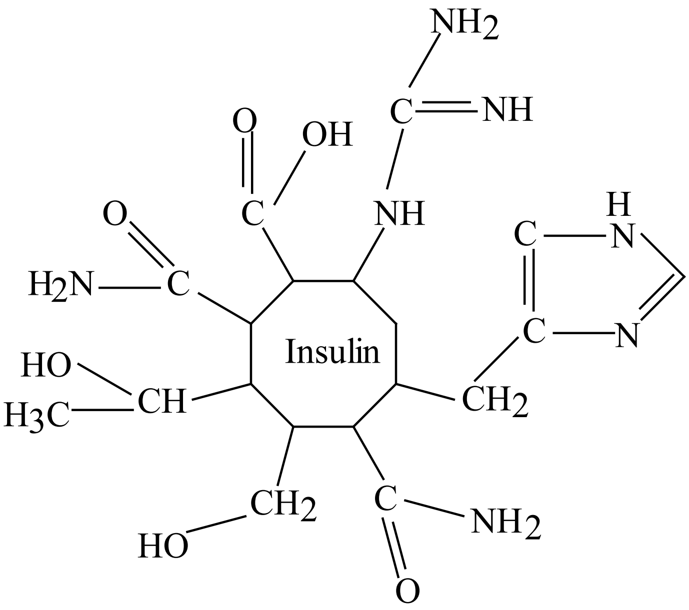


Figure (1): Estimation of the blood's insulin molecule's micelle structure.

About 13 carbon atoms, which should have partial positive charges, are joined to withdrawing atoms, such as oxygen or nitrogen, in the full above figure. This indicates that insulin has 13 electrophile or positive centers that are readily attached to any nucleophile, including oxygen, nitrogen, etc. Furthermore, insulin is an amphipathic molecule because, as previously shown, it is composed of hydrophilic and hydrophobic amino acids. As a result, it should form a micelle in a flowing aquatic solvent, such as blood.

In addition to arginine, the insulin molecule contains two distinct groups of hydrophilic amino acids, as shown in figure (1): amino acids with a carbonyl group connected to either a hydroxyl group (-OH) or an amine group (-NH2). Thr. and Ser. make up the second group. Due to disulfide bridges, the hydrophilic group of the insulin micelle has 25 amino acids less 6 amino acids of Cys. The remaining hydrophilic amino acids are 19 amino acids. The first group of carbonyl groups with other molecules plus arg will make up 13 of these 19 amino acids, while the second group, as shown above, consists of 6 amino acids of Thr and Ser.

According to figure (1), both serine and threonine, which make up the second group of the three amino acids mentioned above, are alcohol-type compounds, as is glucose. These compounds do not interact with one another. Therefore, insulin in human blood will be represented by a drop having thirteen amino acids that have carbonyl groups with amine or hydroxyl moieties or carbon connected to nitrogen by double bonds as carbonyl, based on the chemical structure and characteristics of the amino acids that make up insulin. Furthermore, glucose and insulin can react in a single way based on their chemical structures, or the insulin micelle drops in the blood can react with glucose in a single way based on their chemical makeup.

Knowing the chemical structure of insulin in the blood and that the cell membrane (plasma membrane) should have a different way of allowing glucose molecules to enter, insulin micelles that display various (13) amino acids are released. The process by which glucose enters human cells should then be clear.

<u>How glucose enter human cells</u>:

For normal person, glucose enter its different cells by three steps as follow:

1. How insulin and glucose interact:

This phase will demonstrate how insulin and glucose interact. This occurred as a result of both of the aforementioned substances' elevated blood concentrations following meals or other circumstances, such as after consuming sugary syrups or fast food (such as various sandwiches), etc.

The first of glucose's six carbon atoms, according to chemistry science, is the aldehyde moiety. However, some facts suggest that the aldehyde moiety in glucose is inert and does not react with other compounds, such as other aldehydes. For this reason, scientists [4] proposed that glucose has a circular structure, as previously shown in scheme (1). Glucose contains five hydroxyl groups, with the sixth carbon serving as the main alcohol-free group to which another molecule can be attached. In terms of chemistry, glucose has two distinct groups: carbonyl groups (-(CO)-) and hydroxyl groups (-OH). While carbonyl groups are accepted attacks by other moieties, hydroxyl groups are aggressive.

In addition to the data mentioned above, scientists have proposed that the glucose molecules in human blood have a circular shape [4]. The hydroxyl moiety, carbon number 6, is where glucose and ATP react after they have passed through the cell membrane, despite the fact that ATP contains several oxygen atoms. As previously mentioned, phosphor ester formation for glucose and fructose inside or outside of cells is crucial for human bioenergy. This fact further demonstrates that carbon six of glucose is more active than other carbons, especially carbon 1. For example, in the glycoside or acetyl formation reaction, this reaction does not occur unless carbon six is deactivated by an acidic catalyst. It is evident from these data that the linked moieties.

However, insulin has several groups that accept the assault of the hydroxyl group, including the previously stated carbonyl groups with amine and hydroxyl moieties in addition to Arg, whereas glucose has active primary alcohol (-OH). Actually, only one type of reaction—13 electrophiles joined by 13 nucleophiles of glucose—can occur between the various groups of insulin and glucose. The structure of each reactant (glucose and insulin) determines the outcome of this reaction, which is similar to an esterification process. The carbon number six in glucose is depicted in the structure of glucose as shown in the following figure:

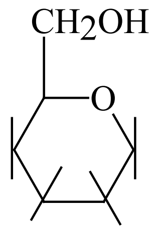


Figure (2): Glucose Chemical Structure.

The carbon number six primary alcohol's oxygen atom is more active than the other oxygen atoms in the glucose molecule, as the above figure demonstrated. Because oxygen has a higher electronegativity than carbon, the hydroxyl groups that are connected to each of the carbon atoms in glucose molecules 1 through 4 have less activity than hydroxyl number six. The electron density of glucose molecules with four oxygen atoms (carbons 1-4) is lower than that of hydroxyl number six, which is free and joined to carbon without an oxygen atom (carbon number 5). In addition to the previously mentioned factors, the oxygen group of the hydroxyl moiety of carbon six is located outside the glucose plane.

As a result, the hydroxyl moiety's oxygen has a high electron density and is more active than the other oxygen atoms in the glucose molecule, reacting with insulin in the manner described below:
As previously seen, there are 13 amino acids for the five different types of amino acids: Glu, Gln, Asn, His, and Arg. These amino acids are hydrophilic and found on the outside of insulin. With the exception of His, which has a distinct structure, the amino acids in the above structure can be shown as follows because they include various

groups:

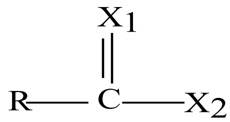


Figure (3): chemical makeup of each of the insulin molecule's twelve amino acid component.

Where;

R= -(R-OC), (R-NH)-CH-$(CH_2)_n$-; n=1, 2 or 4

X_1= O or NH.

X_2= O^- or NH_2

The processes or mechanisms of the overall reactions will then be:

Step 1: As shown in the following image, 13 glucose molecules should bind to 13 positive centers in the insulin molecule, or 13 glucose molecules that are good nucleophiles should bind to 13 electrophile centers of the insulin moiety:

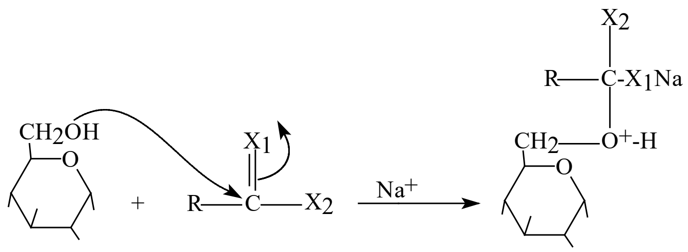


Figure (4): In the first stage, glucose molecules bind to the insulin center.

Step 2: Since an unstable molecule is indicated by a positive charge on oxygen, proton transfer should occur as follows:

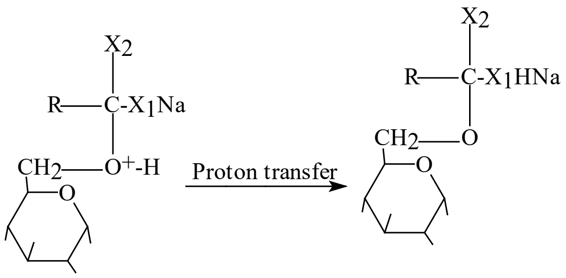


Figure (5): Proton transfer in intermediate phase in step two.

Figure (3) and the one below is only intermediary steps once the glucose is attached because the molecules are extremely unstable and produce the products quickly.

Step 3: The following is an example of a rearrangement step for the intermediate molecules mentioned above:

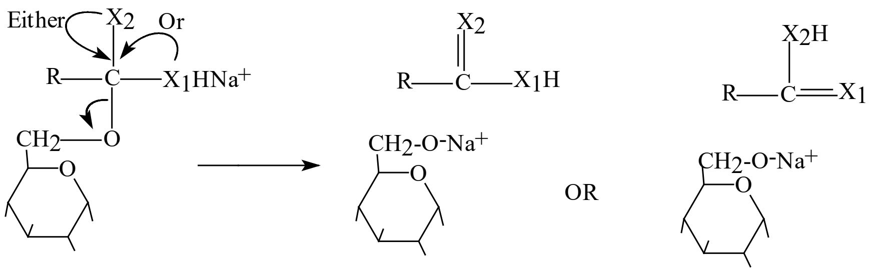


Figure (6): Step three: intermediate molecule rearrangement.

As a review of the previous processes, the body releases insulin from β-cells after every meal or when the blood glucose level reaches its maximum. As previously indicated, glucose is an excellent nucleophile that attaches to insulin, which contains 13 electrophile centers. This interaction has been thoroughly investigated. Furthermore, this interaction creates extremely unstable molecules that result in the products as quickly as possible. Proton transfer should occur to make the oxygen atom of the glucose molecule more stable since, as a result of the interaction product of step (1), it should have a positive charge and be unstable. Otherwise, it would be difficult for oxygen to join with three atoms.

However, the reason all products are intermediate is because the glucose product still has another unstable status tied to it. The numerals 10 and 3 indicate the amount of amino acids in insulin, which are Glu=4, Gln=3, Asn=3, His, and Arg=3. This status indicates that the (-X1HNa^{+}) moiety is equal to 10 (–OHNa^{+}) and 3 (–NH2Na^{+}). Since both atoms O and N bind to more than they can, they lower this by creating double bonds, as seen in figure (5). This is why both (-OHNa+ or -NH2Na+) moieties are extremely unstable and should have positive charges like (-O^{+}HNa^{+} or -N^{+}H2Na^{+}).

The final stage involves rearranging all of the intermediates to produce sodium gluconate as the final product. Observing that each of the 13 amino acids has a carbon center with a partial positive charge, which makes them strong electrophiles, 10 of them have carbonyl moieties with the same R groups binding to oxygen in carboxylate groups in Glu=4, while the remaining 6 amino acids have carbonyl moieties binding to amine moieties (-NH2). Although His and Arg have separate R groups, they bond with two amine groups, which are more electrophile than the ten amino acids above because nitrogen has a higher electronegativity than oxygen.
Sodium gluconate is the correct outcome in both of the final step's products shown in figure (6). So, when glucose binds to insulin, everything works together to make insulin again, and sodium gluconate is the result of glucose binding to sodium through an ionic interaction. many research references [1–5] and others demonstrate that glucose binds to sodium ions to enter many cells, but they do not provide an explanation for this binding.

In this study, the type of bind known as an "ionic bond" was discovered, as was previously reported. Another piece of evidence that needs to be explained is as follows:

1. The reaction between glucose and insulin resembles an esterification reaction, which indicates that it is reversible. As a result, when it occurs in an aquatic liquid (blood), water molecules attach to its ester bond to produce reactants (sodium gluconate and insulin) again, preventing the production of the glucose-insulin complex. As is the case with all esters in aquatic liquid, this indicates that there are no byproducts of the esterification reaction for the glucose-insulin connection.
2. Because both insulin and glucose are rather large molecules, this component increases the hydrolysis of the glucose-insulin complex, generating reactants once more without creating a new product.

   The glucose-insulin response can be expressed using the following equation:

$$\textbf{Glucose-insulin intermediates} \longrightarrow \textbf{Glucose-6-O}^{-}\textbf{Na}^{+} + \textbf{Insulin-(H)}_{11} \textbf{ .... (1)}$$

The overall outcome of the glucose-insulin interaction should thus be:

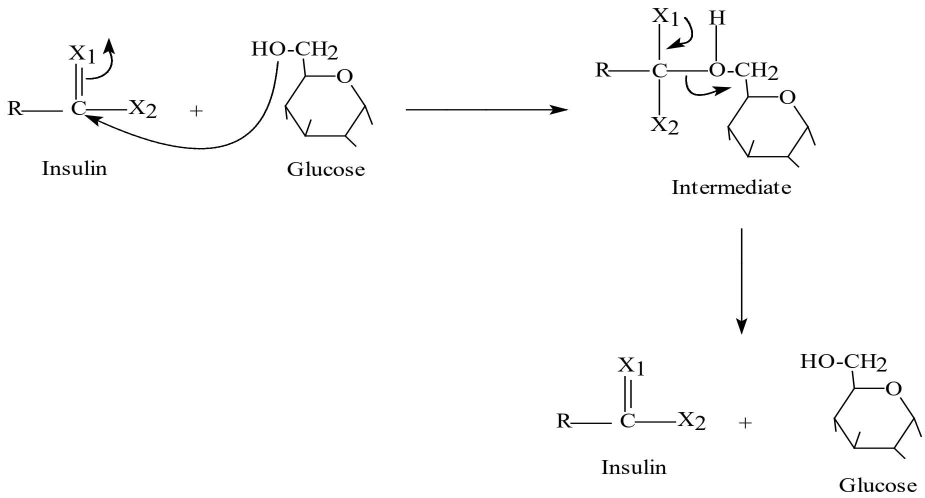
$$\textbf{Insulin + 13 Glucose} \xleftrightarrow{\text{13 Na+}} \textbf{13 Sodium-Gluconate + Insulin-(H)}_{13} \textbf{ .... (2)}$$

The primary reaction between glucose and insulin, which was catalyzed by sodium ions, is shown in equation (2). Insulin is similar to other catalysts in that it reacts and produces without changing its structure. It also functions as a reactant, which is crucial for the reaction equation (2) above. It is clear that the primary function of insulin molecules is to add sodium atoms to glucose molecules' carbon 6. This suggests that humans obtain glucose from the environment while obtaining "insulin," the second reactant, from within. Although the sources of the two reactants are different, they are both crucial for the production of bioenergy, which allows humans and other similar organisms to perform various tasks.

Equation (2), the aforementioned explanations, and the pictures above all demonstrate how crucial sodium ions are for glucose entry into many human cells. One of its two key physiological principles in the glucose-insulin response is that it is required to activate insulin molecules so that they may react with glucose. This suggests that insulin action should decrease when sodium ions in human blood decrease. The second rule, however, is to increase the stability of sodium-gluconate salt so that the forward reaction of reaction (2) is more likely than the backward reaction.

Therefore, it is crucial to explain the significance of sodium in the glucose-insulin response before moving on to the second phase of how glucose enters human cells. According to chemistry, glucose contains an active hydroxyl group that is attached to carbon number six. Because of its high electron density, this group should attack atoms that are either fully or partially charged. As previously established, the electronegativity disparities between carbon (less electronegativity) and (X1) (high electronegativity) in (R-($C^{\delta+}$=X1)-X2) caused the partial positive charges that are present in the chemical structure of insulin.

The glucose-insulin interaction must thereafter occur, but what should happen if salt is absent from the primary reaction? Because both molecules are at high blood concentrations and have good nucleophiles (glucose) and electrophiles (insulin), the reaction between glucose and insulin should occur even in the absence of sodium ions. However, it should proceed slowly, and the products should differ from the main reaction with sodium equation (2). This should be as follows:



Scheme (7): Sodium-free glucose-insulin interaction.

The atoms of X_1=O or NH are both unstable and must return to produce insulin again, which removes glucose molecules because of their molecular size, making the above intermediate extremely unstable. Furthermore, since H^+ does not exist in the blood, X_1 is unable to obtain any other positive atoms save Na^+. The above scheme's equation should be:

$$\textbf{Insulin + Glucose} \longrightarrow \textbf{Insulin + glucose............ (3)}$$

The primary reaction should occur in the absence of sodium ions when the electrophile of glucose carbon six attaches to the 13 nucleophile centers of insulin, creating unstable intermediates that re-produce the reactants. This implies that insulin and glucose remain in the blood when salt is absent. It should be noted that the primary reaction does not take place in the absence of sodium or hydrogen ions (H^+). This is because potassium has a very large volume and finds it difficult to participate in the primary process, whereas sodium has a relatively small volume and can participate. Additionally, blood has a pH of 7.2–7.4, which indicates that no hydrogen ions (H^+)

are present.

Since insulin has a short half-life and does not react with glucose in the absence of sodium ions, it should be digested in the blood to release various amino acids that travel via various processes in human or similar bodies. One of these pathways is hydrolyzed to produce ammonia, which the liver then converts to urea, which causes diabetes patients to exhibit elevated urea concentrations.

The glucose-insulin interaction should provide the above compounds in the absence of salt. The products of equation (2) (with sodium ion) are completely different from these results. Without sodium ions, the above equation is slower than the initial reaction (2). Actually, each of the aforementioned replies points to a significant issue that needs to be addressed separately, as shown in the following:

1. "Glucose" is the first product, indicating that glucose entered the process and was generated exactly as it was. Glucose cannot penetrate human cells because it remains the same as it is in the blood. To put it another way, insulin works by preparing glucose for entry into human cells. However, insulin cannot work without sodium. As a result, thirteen glucose molecules enter the reaction above and are produced in the same way, which raises blood glucose levels and causes diabetes. This implies that diabetes should develop in the absence of salt.
2. When insulin is hydrolyzed, the second product is keto acids from amino acids that lose their amine moieties, which raises the blood's urea levels. Patients with diabetes should experience fatigue and decreased kidney activity compared to normal people. This condition persists in diabetics until it gets worse, such as in "Diabetic Ketoacidosis," where the blood pH becomes acidic due to insulin's hydrogen ions. Bicarbonate, also known as sodium bicarbonate (8–9), is used to treat this condition, indicating that the patients received the proper treatment.
3. Ammonia molecules (NH3) are another byproduct of insulin that is secreted into the bloodstream by insulin molecules. As previously shown, this occurs when the sodium ion is absent. Since ammonia molecules should be formed by every insulin molecule, 10,000 insulin molecules should result in a large number of ammonia molecules. The following equation describes how the urea cycle will change these generating molecules into urea molecules:

$$\mathbf{2\ NH_3 + CO_2 + 3\ ATP \longrightarrow \underset{Urea}{H_2N\text{-}CO\text{-}NH_2} + H_2O + 3\ ADP \ldots (6).}$$

According to references, diabetic patients have higher blood levels of urea molecules than people without the disease [8,10–12].

High blood urea levels are only a sign of diabetes illness [10–12], and they provide solid support for the aforementioned findings. Thus, the aforementioned three criteria and the explanation above suggest that when sodium ions are absent from the glucose-insulin process, blood glucose levels should rise, blood pH will drop to an acidic level, and blood ammonia (urea) levels should rise. In other words, diabetes should develop if sodium ions are absent from the glucose-insulin interaction. However, three crucial points need to be made clear before moving on to the second step of how glucose enters human cells. These are as follows:

1. Diabetes does not imply that sodium ions are absent from all glucose-insulin events that take place in a person's blood! It indicates that not all of the glucose-insulin interactions that occur in human blood can be adequately facilitated by sodium ions. This suggests that two sorts of reactions—reactions 2 and 3—occur in the body of a patient with diabetes. Depending on the blood's sodium ion content, diabetic patients should experience these reactions in varying percentages. As a result, diabetic patients have varying degrees of diabetes. The reason for this is that a diabetic patient's ability to talk, move, think, breathe, and so on indicates that a large portion of its body cells receive sodium-gluconate, but a very small portion of its cells do not. Since a human die at a pH of 6.8, the blood's acidity should rise to less than 5 if all of the body's cells do not receive sodium gluconate, which will bring death within minutes! In the first few minutes, the concentration

of glucose will be 500 mg/dL or higher, which can cause several illnesses and even death. Furthermore, the concentration of urea molecules should rise significantly beyond the body's tolerance, which can also result in death. Any individual should be killed by these elements in a matter of minutes, if not less.

However, sodium-gluconate is not received by every cell in the human body. As a result, diabetic patients have two bodily reactions, the percentage of which is determined by the blood's salt levels. There is no diabetes and the following reaction should happen if this concentration is high enough to cause it:

$$\textbf{Insulin + 13 Glucose} \xleftrightarrow{13\ Na^{+}} \textbf{13 Sodium Gluconate + Insulin-(H)}_{13} \ \ldots\ (2)$$

Alternatively, the reaction above should occur in a high ratio and the reaction below should occur in a low ratio if the sodium ion concentration is insufficient:

$$\textbf{Glucose + Insulin} \longleftrightarrow \textbf{Glucose + Insulin} \ \ldots\ldots\ (3)$$

In actuality, there is more solid evidence supporting the aforementioned facts, and "medical rules" ought to be explained in later sections as they reflect a heinous crime that has occurred and continues to occur in hospitals around the globe.

2. The second observation is that half or more of the 1014 distinct cells that make up the human body are not positioned close to blood circulations. Thus, how can all of these cells obtain essential substances like sodium glutamate? This fact raises the crucial question of how sodium glutamate or other essential atoms or molecules are distributed equally among all of the body's cells! Because they are not put close to blood, the third group does not receive any sodium gluconate at all, and some of these cells should absorb it more quickly than others. In actuality, not every cell in the human body receives the same amount of the products of the glucose-insulin reaction with sodium ions (equation 2).

Human bodies are in balance with their environment, and their cells are in balance with one another. Humans exist on our planet because of these two equilibrium states, and any alteration to them results in human death. The equilibrium of human cells is not strong enough to withstand many changes, but the surrounding factors are extremely robust. The equilibrium of the body's cells means that when cells are positioned close to the blood circulation, they receive the ions and chemicals they need, like sodium gluconate, and their internal concentrations should rise while those of groups or series of nearby cells should not.

Equilibrium occurs when the body's cells that are close to the blood supply the ions and compounds that are needed, and these cells then transfer these ions and compounds to nearby cells, which in turn transfer them to subsequent cells, and so on, until all of the body's cells receive the same amounts of vital ions and various chemicals. Consequently, the equilibrium of the body's cells indicates that the essential ions and chemicals are flowing from one cell to another until each cell receives the same quantity from them. Actually, this procedure should carry water molecules and other small molecules to every cell in the body. Another equilibrium state exists between the blood's contents from various ions and chemicals and the body's cell contents.

The equilibrium status of all cells is deviated by differences in how they contain ions and chemicals with the blood and each other. To fix this, cells should divide their resources among themselves in order to restore equilibrium. Moving particles from high concentration to low concentration until they reach equilibrium is known to follow this rule. According to this theory, sodium gluconate will spread to every cell in the body until each cell receives the same quantity.

3. Insulin injection therapy is widely recognized in the medical community worldwide, and it is known that increasing the amount of insulin injected into the bloodstream should promote a reversible reaction (2).

The reversible nature of reaction (2) means that raising the concentration of one reactant should enhance the forward reaction, while increasing the concentration of one product should increase the backward reaction. As a result, injecting more insulin should increase the forward reaction velocity in equation (2).

$$\textbf{Insulin + 13 Glucose} \xrightleftharpoons{13\ Na^+} \textbf{13 Sodium Gluconate + Insulin-(H)}_{13} \ldots(2)$$

Furthermore, insulin should be consumed by diabetic patients when they receive injections, which implies that all reactants in the aforementioned reaction (2) should increase, producing the aforementioned outcomes. Because of this, insulin injections are an effective way to treat diabetes.

2.<u>Human cells allow sodium glutamate to enter through their membranes</u>:

Step one of "how glucose enter human cells" explains the results of the glucose-insulin process with and without sodium ions. Step two then explains how sodium gluconate enters human cells through the cell membrane. This stage consists of two steps: the first is the entry of glucose into human cells, and the second is the selection of sodium gluconate for passage across the cell membrane:

A. The first stage involves the entry of glucose into human cells. Reaction (2) shows that glucose, after reacting with insulin, is transformed to sodium gluconate with the aid of sodium ions, as previously mentioned and as shown in reaction (2) below:

$$\textbf{Insulin + 13Glucose} \xrightleftharpoons{13Na^+} \textbf{13 Sodium Gluconate + Insulin-(H)}_{13}\textbf{... (2)}$$

Glucose is very soluble in aquatic fluids, including blood, with a solubility of around 158.3 g/100 mL at 37 oC. In chemistry, "solubility" refers to the many interactions (bonds) that should take place between the solvent and the solute. As a result, additional interactions result from a solute's solubility. For instance, when glucose is present in blood, hydrogen bonds between glucose and water molecules should form. This is because glucose contains five hydrogen atoms (H+) and five hydroxyl groups (OH-) that are joined to oxygen atoms with strong electronegativity. Furthermore, water molecules are hydrogen (H+) and hydroxyl (OH-) ions, just as hydroxyl moieties atoms possess strong electronegativity and bond to atoms. Consequently, glucose molecules should form hydrogen bonds with as follow:

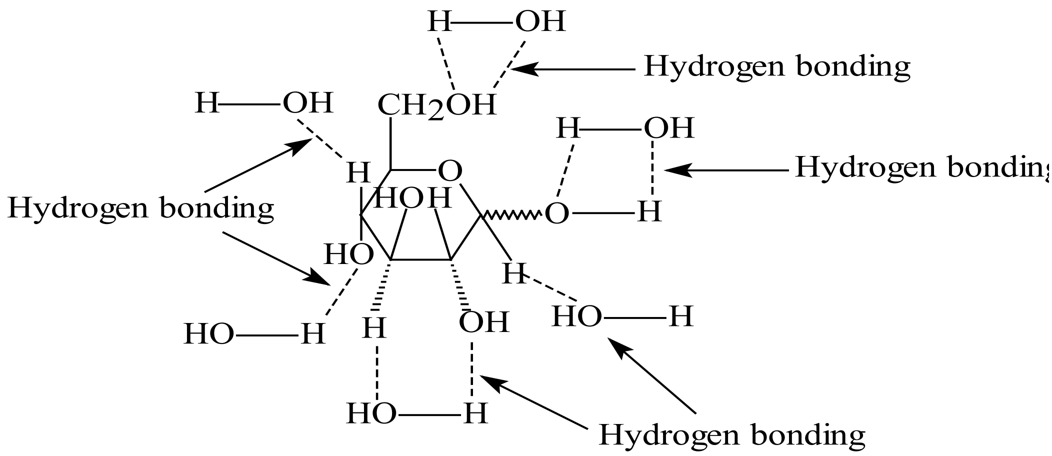


Figure (8): demonstrated the formation of hydrogen bonds between water and glucose molecules.

The hydrogen bonds that formed between glucose and water molecules are seen in the above figure. Since blood contains a variety of molecules, including proteins, lipids, enzymes, hormones, and more, each of which has its own moieties, including O, N, H, and S atoms, glucose should form more than just these linkages. Consequently, glucose should form bonds with many blood molecules in addition to water through hydrogen bonding or other interactions because it is extremely soluble in blood. The above hydrogen bonds between glucose and various blood components stop glucose from passing through the membranes of human cells. In other words, glucose molecules are captured by hydrogen bonds in human blood and are unable to enter other cells.

This explains why insulin is necessary for glucose to enter bodily cells. This is due to the fact that insulin not only modifies the structure of glucose but also breaks all of its hydrogen bonds, allowing it to freely enter the body's cells. This indicates that insulin has two purposes: it breaks hydrogen bonds that form between glucose and various blood components (water molecules and other blood molecules) and transforms glucose into the salt "sodium gluconate."

Because sugar dissolves more readily in water than salt, it is more soluble than sodium gluconate, which is an extra factor in addition to hydrogen bonding. This indicates that whereas glucose as sodium gluconate (salt) wants to leave circulation rather than remain in it, glucose as sugar prefers to remain in blood rather than leave it. Insulin helps glucose become free to connect with sodium to generate sodium gluconate, which can leave the human circulation and enter human cells through cell membranes. This reaction between insulin and glucose occurs in a few phases, as shown in the above figures and schemes.

B. Sodium gluconate passes through cell membranes in the second stage! As previously stated, the primary components of a cell's membrane are proteins [1-3] and lipids (triglycerides and cholesterol). Hydrophobic and hydrophilic amino acids combine to generate the proteins that make up a cell's membrane. The truth is that the hydrophobic portion of the proteins in a membrane share many of the same chemical characteristics as the lipid portion of the same membrane. This is due to the fact that they are both made of the identical atoms—hydrogen and carbon.

Another truth is that the membrane of a cell is situated between two hydrophilic solutions: the cytoplasm and the blood. Furthermore, phosphoglycerides and cholesterol, which make up the lipids of cell membranes, contain hydrophilic moieties such phosphate groups (which contain oxygen-negative ions) and hydroxyl groups. Thus, lipids and hydrophobic protein amino acids make up the hydrophobic portion of the cell membrane, whereas hydrophilic protein amino acids and hydrophilic lipid molecules (phosphoglycerides and cholesterol) make up the hydrophilic portion.

As previously discussed, many cell membrane molecules come into touch with the aquatic liquids known as blood and cytoplasm. According to references (1-4), all cell membranes have hydrophilic moieties that are found outside the membrane and come into touch with the cytoplasm and blood, while the membranes of all cells have hydrophobic moieties that are found inside. Furthermore, all of the atoms in the cell membrane are in motion, particularly when they are positioned between two aquatic liquids, one of which is blood. Depending on how the atoms in the cell membrane are connected to one another, the internal spaces between them are always altering. For each and every cell membrane molecule, compared to hydrophilic moieties, hydrophobic moieties have greater interior gaps. This is due to the fact that a variety of interactions, such as hydrogen bonding between hydrophilic and hydrophobic moieties, cause internal spaces to diminish, whereas repulsion causes internal spaces to grow. Because it is a salt and may pass through three different sections of the membrane—two hydrophilic areas (inward and outward) and one hydrophobic area (inward), sodium glutamate can easily pass-through cell membranes. According to references [1-3], the lipids in the plasma membrane determine its fundamental structure.

Important details regarding the above indicator should be noted:

1. According to chemical data, two molecules' penetrating activities are NaCl > $C_6H_{12}O_6$. The polarity of these molecules varies based on their chemical characteristics; NaCl has a higher polarity than glucose since it is a salt that has both positive and negative charges, whereas glucose does not. Because glucose contains five oxygen atoms with high electronegativity, its high electron density causes partial negative charges to develop on the oxygen atoms. This suggests that while glucose should have partial charges, they do not have full charges like salts do. a summary of the findings and justifications about the cell membrane; For molecules to pass through them, the polarity component is more crucial, but other elements should also regulate penetration.
2. Despite the fact that they may pass through oil and continue to move about so readily, sodium chloride molecules are not soluble in it according to chemical rules since they are polar molecules and oil is not polar "like dissolve like." Although this behavior is unthinkable for these polar molecules, there must be powerful forces causing them to continue going through oil. These forces are demonstrated by the fact that different salts represent top polar molecules. For this reason, most medications are prepared as salts rather than in their original organic structure since salts may hydrolyze in aquatic solvents and pass-through various oils. This characteristic allows salts to flow through different oils because of the repulsion between salts and oils, which forces molecules of different oils to be a certain direction from salts so that salts can pass through. As a result, glucose as sodium gluconate penetrates cell membranes far more effectively than glucose does.
3. While other molecules cannot move through layers, glucose and sodium chloride may! These behaviors pertain to separate molecules that are moving through different levels, not to different layers themselves. To put it another way, the chemical characteristics of various molecules allow them to flow through the layers of oil; hence, this activity is not for the layers, but rather for the molecules themselves. Bilayers of "cell's membrane" are therefore unable to choose which ions or molecules should flow through; instead, they are limited by the chemical characteristics of the many ions and molecules that do so. Passing processes rely on the chemical characteristics of both molecules because these membranes include certain molecules and passing molecules have various molecules.
4. Another fact is that human cells are structured so that they connect to one another to produce various tissues throughout the body. The remaining 0.75% of the cell diameter may therefore be in contact with nearby cells, whereas the remaining 0.25% may be in contact with blood. Furthermore, some human tissues contain cells that are not in contact with blood. This indicates that each cell that comes into contact with blood has a very short (approximately 0.25%) distance to exchange vital ions and molecules with blood before delivering them to nearby cells. This cell functions as a bridge to transfer vital ions and molecules from blood to nearby cells that are not in contact with the blood. High concentrations of numerous ions and molecules should then flow through this brief contact with blood.

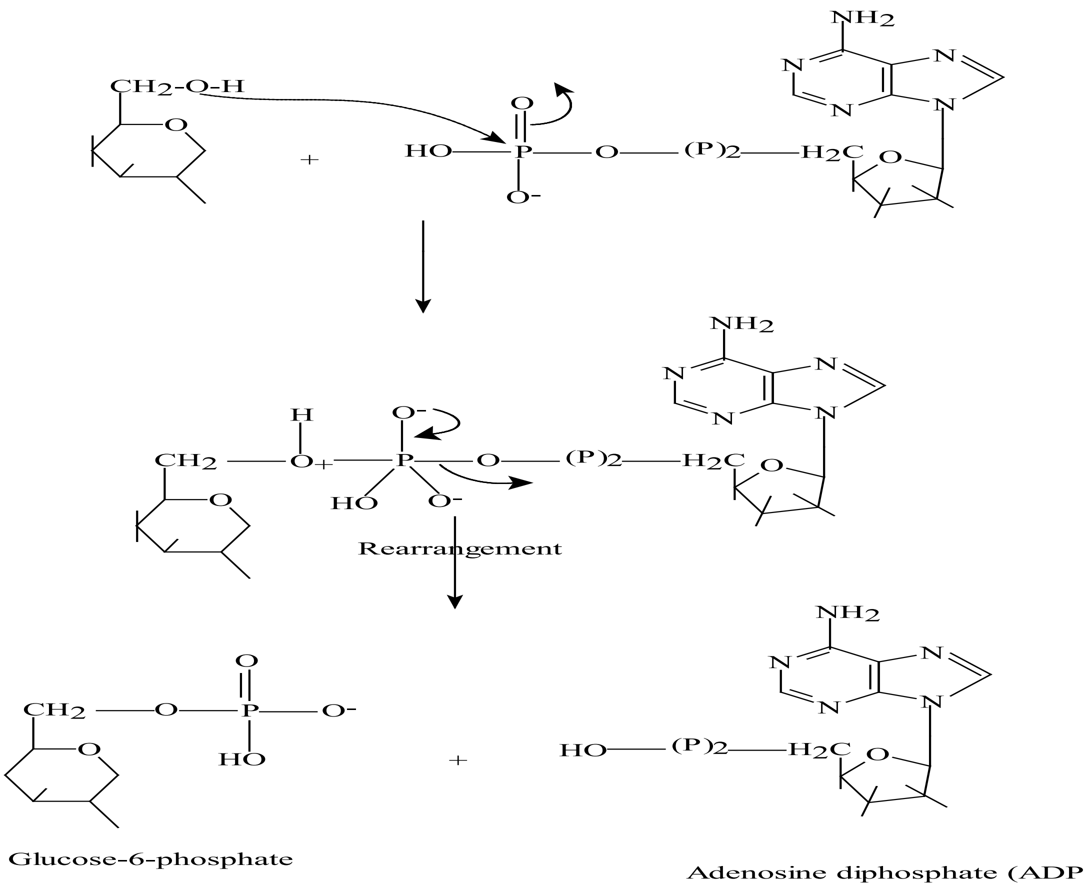
It should be noted that after harmful substances have passed through the cell membrane, the molecules in the membrane revert to their initial configuration, and the cell membrane itself regains its form due to constant motion. But for the lipid and hydrophobic portions of the cell membrane, penetration activity should be dependent on these charges as well as other parameters because the hydrophilic and protein portions may have positive or negative charges.

There are factors in every condition, and as this study focuses on how glucose enters human cells, the circumstances surrounding glucose factors are fully detailed in the descriptions above. Since gluconate ions have negative ions that are simple to pass through cell membranes, as is the case with sodium chloride salt, sodium gluconate is superior to glucose in terms of cell membrane penetration. This study aims to determine whether other ions or molecules that enter human cells should have the same or a different explanation, as the penetration process may be affected by several circumstances.

4. The role of potassium ions in the entry of glucose into the various cells of humans:

This is the final stage of glucose's entry into human cells. Insulin transforms glucose into sodium gluconate, a salt, which is then absorbed by various human cells. As previously stated, sodium ions are essential to this process. As a result, potassium ions play a crucial role in this process since they enter the cell, which causes three sodium ions to escape [(1-4)]. As a result, potassium ions work to get sodium ions ready to produce the gluconate ion. Activating insulin to react with glucose and stabilizing glucose ions for entry into various cells are the two key functions of sodium ions.

Blood insulin levels must be sufficient to match blood glucose levels for insulin molecules to bind to and react with glucose molecules. Blood should become more soluble as a salt when glucose breaks down hydrogen bonds that have formed between its molecules and other blood molecules. Due to its high solubility, glucose would rather remain in blood than leave it. Gluconate ions react with adenosine triphosphate (ATP) as they enter human cells. The following scheme serves as an illustration of the primary response that takes place:



Scheme (9): The process by which gluconate and ATP molecules interact.

The glucose process can be summarized as follows by compiling the information on the three ways that glucose enters human cells:

Since the quantity of potassium ions inside human cells is thirty times higher than that outside of them, the first step is crucial for all glucose entry into human cells [1-3]. In order to supply its blood with salt and potassium ions, humans must consume foods, plants, and other items high in these ions. Due to the lack of its sources, potassium ion concentration falls in between human meals. Prior to the potassium level inside the cell surpassing that in the blood, equilibrium forces operate on both sides. As a result, equilibrium forces cause various cells to lose some of their potassium in order to achieve the equilibrium point. On the other hand, potassium levels outside the cell should be higher than those within after each meal in order for these ions to pass through.

Citations [1–4] stated that while there are some sodium ions in the blood outside of human cells, these are insufficient for the glucose-insulin reaction because each insulin molecule requires 13 sodium ions. Therefore, it is crucial to remove sodium ions from human cells in order for glucose to enter inside body cells rather than outside ions.

Lastly, equilibrium forces must push these products across cell membranes into various human cells since the concentration of (13) sodium gluconate produced should be larger than the concentration inside human cells. Since sodium glutamate is an active molecule, it should react with adenosine triphosphate (ATP) to create the initial glycolysis products. Adenosine diphosphate (ADP) and glucose-6-phosphate, as shown in scheme (8) above and as shown in the equation below:

$$\mathbf{(C_6H_{11}O_6)^- Na^+ + ATP \longrightarrow Glucose\text{-}6\text{-}phosphate + ADP \;\; .....(7)}$$

During glycolysis, glucose-6-phosphate transforms into fructose-6-phosphate and continues to do so until it is transformed into CO2, water molecules, and the energy that the human body needs.

Another explanation is that scientists have shown that sodium ions are more important outside of human cells while potassium ions are more important inside human cells [1–8 and 10–14]. Additionally, as previously indicated, references [1-4] demonstrated that an active ion exchange known as the sodium-potassium (Na^+-K^+) pump occurs between human cells that are inward and outward. Insufficient potassium ions in the blood should cause a major reaction and raise the levels of hydrogen, ammonia, and glucose ions. Furthermore, equilibrium forces operate in opposition to the aforementioned action when potassium ions are insufficient, and human cells remove potassium ions in order to achieve the equilibrium point.

In addition to the aforementioned ions and molecules (glucose, ammonia, and hydrogen ions), this implies that human cells should release potassium ions rather than absorb them, increasing the concentration of potassium ions in the body. As previously stated, references showed that patients with diabetes had elevated levels of potassium ions, glucose, ammonia, and acidity [1-4 and 7-13]. Because glycolysis occurs inside human cells after consuming potassium ions, the body needs a lot of these ions in meals. The kidneys then have to remove the extra ions. The kidneys remove around 92% of the potassium ions that are consumed [3].

This mechanism of getting glucose into human cells is so precise and clean that the only purpose of eating potassium is to aid potassium ions enter human cells so they can produce three sodium ions that can connect with three glucose ions. Due to equilibrium forces, all of the potassium ions are only used to aid gluconate enter human cells because the concentration of potassium ions inside human cells is thirty times greater than that outside. This indicates that human cells only absorb 8% of the 100% that comes from consuming potassium ions, with the kidneys handling the other 92%.

When people drink commercial water, their potassium elimination ratio should be circulating in their water sources. This isn't the case since potassium ions are removed by various filters because of their large volumes. Because most individuals consume commercial waters that are devoid of potassium ions, diabetes has become more common over the past few decades. As a conclusion, because potassium ions are crucial for glucose to enter human cells, a decrease in them must also result in a drop in sodium gluconate production, which raises blood glucose levels along with ammonia, H^+ ions, and potassium ions. This implies that diabetic disease should result from a decrease in potassium ions that are ingested by humans through food and other sources.
The distribution of glucose in the body's different tissues must be noted before delving deeper than what has already been covered.

Equilibrium forces push these essential elements across cell membranes until every cell has the same number of molecules or atoms as the rest of the body because human cells are interrelated and not all of them are adjacent to blood arteries. Following each meal, equilibrium forces make sure that all cells, no matter where they are in the body, take the same ions and chemicals in order to function.

Because potassium ions are insufficient for all of the body's cells in diabetes, some of them do not receive them, which means sodium ions remain inside various cells and prevent the aforementioned activities from occurring. As a result, glucose molecules remain in the blood because they are increasing its concentration; ammonia molecule concentration should also rise due to insulin hydrolysis, which raises the blood's urea concentration; and, lastly, blood acidity resulting from insulin hydrolysis should decrease unless the patient is receiving special treatment [1-3]. Additionally, as previously noted, potassium ions rise in the patient's blood to reach an equilibrium point between the patient's cells inside and outside.

Given that blood pressure depends on sodium ions at 90% [1-3] and that sodium and potassium are related in the Na^+-K^+ pump [1-3], this should have an impact on blood pressure. Therefore, any abnormality in the quantities of the aforementioned ions in human cells must alter blood pressure or result in diabetes because sodium and potassium levels are crucial for both conditions. In order to eliminate sodium ions, which cause blood pressure, this modification should be dependent on the concentration of potassium ions that enter the human body and enter the cells. In other words, because potassium has a larger atomic size than sodium, low concentrations of potassium ions in food cause sodium ions to fall and potassium ions to increase, raising blood pressure.

In actuality, each illness that affects a person should have an impact on other bodily systems. For example, potassium ions are particularly important in many bodily systems, including the sexual system's aldosterone, thus any disturbance in potassium ions will have an impact on the sexual system. As a result, modifications to the potassium system that result in glucose entering human cells cause numerous alterations throughout the body.

The human body is perfectly ordered by equilibrium forces, therefore any changes to this equilibrium must also alter the body's balance, which can result in a variety of illnesses as diabetes, high blood pressure, and others.

Three credible studies support the findings of this research and provide an explanation of the significance of potassium ions for human existence by showing that low serum potassium levels raise the risk of diabetes [14–17]; In the first study, 12209 participants participated over a span of almost 27 years, from 1985 to 2012 [15]. African Americans are more likely than white Americans to have type 2 diabetes, according to the second study that compared the two groups [16]. The most recent study, which recruited 4409 Japanese men over a period of four years, found that low serum potassium levels raise the risk of diabetes [17]. This indicates that in order to obtain a result that low serum levels, the aforementioned research involved over 16618 participants over a period of more than 30 years, from 1985 to 2014.

The findings of these investigations are consistent with the findings of this research and were obtained using practical approaches. Unfortunately, the previous research failed to find the proper explanation for its findings or the significance of serum potassium in type 2 diabetes. In contrast, this study found the correct explanation for all of its findings as well as those of previous studies. This study demonstrated the relationship between low serum potassium levels and an increased risk of type 2 diabetes. Since potassium ions are thirty times more abundant inside cells than outside, as was previously indicated, these ions need to be inside cells rather than escaping.

High urine is one of the symptoms of diabetes because human cells release potassium ions rather than absorbing them when there is insufficient potassium ion in the body. This should happen to water molecules that contain potassium ions. Furthermore, sodium ions remain unchanged in the blood. Osmotic pressure must therefore force water molecules to leave the patient's cells, which implies that these molecules are in the blood, because sodium and potassium ions are more concentrated outside the patient's cells than inside. The kidneys remove more water molecules from the circulation by producing more urine.

This is not the only effect; diabetics are smaller than average persons because, as previously mentioned, their cells are constantly losing water molecules due to osmotic pressure, which should result in fewer water molecules and smaller bodies. Although they are outside the purview of this study, there are further consequences of potassium ion depletion.

There are numerous herbal remedies available worldwide, but two months ago, an Arabic specialist demonstrated that the most effective way to treat diabetes was to combine honey and onions. Since this is an experimental treatment, many people have already tried it and found it to be beneficial. The truth is that because honey and onions are so high in potassium ions, this treatment is the best one, according to this study. Since they all contain significant levels of potassium ions, fruits, vegetables, herbs, and other foods that are used to treat diabetes are actually effective remedies for the disease. It should be noted that the potassium levels in the aforementioned fruits, vegetables, herbs, and other items vary depending on the type.

In actuality, the aforementioned fruits, vegetables, herbs, and other foods are common treatments for diabetes because they may include additional ions or chemicals that help treat the condition, with the exception of honey, which is a more contentious treatment because diabetes is characterized by elevated blood sugar levels. Even though the study results showed that honey is an effective treatment for diabetes, it is like dropping oil on fire. There is no scientific reason for why honey works so well as a diabetes therapy! The greatest reason for this is a study that showed honey is an effective treatment for diabetes because it contains a lot of potassium ions.

In addition to different foods, tap water or drinking water is a good source of potassium ions (the research's findings indicate that tap water contains roughly 3.1–3.2 mg/L of potassium ions). People also drink tap water more often than three times a day instead of three separate meals. This indicates that the body continuously receives potassium ions by drinking water throughout the day. Regretfully, a large number of individuals worldwide are already consuming filtered water devoid of potassium ions!

Since potassium (K^+) is a larger ion with an ionic radius of 1.33 °A, it cannot flow through basic filters. The findings of this study support the assumption that, due to their size, potassium ions are unable to flow through various filters, even the most basic ones. As a result, either too few or no potassium ions are present in filtered water.

Additionally, when certain meals are cooked, potassium ions are lost, hence heating foods with lower potassium ion contents is preferable to not cooking them. Because they contain less potassium, filtered water and cooked foods should result in diabetes, high blood pressure, and related conditions. This is especially true if the person does not consume foods that contain high potassium levels, such as various fruits, vegetables, and other foods. Diabetes is an imbalance in the many ions of foods or other substances that are eaten on a daily basis; it is not a sickness.

The only difference between fat people and type 2 diabetes or hypertension is that they have more cells than other people, which means they require more ions (potassium or sodium) than other healthy people. It is a known fact that normal people do not acquire enough ions from their food or water, so what about obese people? Therefore, overweight people need to consume more potassium and sodium ions from various foods and beverages than other people in order to prevent type 2 diabetes and various blood pressures, particularly hypertension. For instance, fat people must eat more than one apple, such as two or one and a half, if one apple is plenty for normal people. Because they have more cells and require more to stay healthy than others, overweight persons are more likely to develop the aforementioned disorders.

The residents of Missan consume filtered water, known as "Reverse Osmotic water," which is devoid of potassium ions. They also use it to prepare meals and make tea, milk, and other solutions. Because of this, a new sickness or disorder has emerged in this city: newborns are born with diabetes, an uncommon condition that also occurs in Los Angeles and other nearby cities. Since the moms of these infants do not consume enough potassium for their bodies, how do they provide potassium to their offspring? These incidences occurred when women's diets lacked adequate potassium ions.

According to this study, diabetes is caused by a decrease in potassium intake that occurs throughout a person's daily life and does not have two or three different forms. Thus, there are two situations: first, if a person's blood glucose and insulin levels are both normal, then low potassium ion levels entering the body are the cause of diabetes. In the second instance, β-cells are the cause of diabetes if the blood contains no insulin or an insulin concentration that is below normal. As a result, since blood glucose levels are always normal or close to normal, insulin levels should be measured instead of blood glucose levels. This suggests that people should monitor their insulin levels.

Diabetes is caused by low potassium ion levels, as indicated by the two possible results of measuring the amount of insulin in a person's blood: high or normal. Alternatively, low blood insulin levels indicate that there is a problem with the β-cells.

Numerous facts and solid evidence supporting appropriate treatment for diabetes and hypertension diseases were presented in this study, including: a high percentage of newborns with diabetes (the research samples), approximately 70000 residents of Al-Mejar Al-Kabeer with a high diabetic ratio, chemical facts about insulin, glucose, and cell membranes, chemical explanations of other aspects, etc. The following facts are different from the research's facts since they are implausible and it is very hard to comprehend why they do this!
Physicians and experts [19] have stated that certain procedures should be adhered to in cases of diabetes, hypertension, and hypotension emergencies; Serum glucose levels in diabetic patients may exceed 400–500 mg/dl in both young and elderly persons. First, they administer insulin by injection. If, after some time, the glucose levels do not return to normal, they administer normal saline, which is sodium chloride solution (NaCl). They added that they need to adjust the concentration of this salt based on the patient's size because, in many situations,

the above method lowers blood sugar levels to dangerous levels. Instead, they give patients a solution of glucose and potassium, which should raise blood sugar levels back to normal. Furthermore, according to these experts, there are numerous situations that resulted in death because regular saline causes strokes that primarily kill elderly and young individuals.

This information is astounding and unexpected because it matches the findings of the research completely. As a result, those experts were frequently questioned about the source of this knowledge. Did they learn this knowledge from the 2013 Al-Darraji study, which had similar findings to this one? They were informed that they had previously used these techniques. They insisted that they learned these methods from medical publications, and the specialists and physicians adhere to these texts!

The fact that these books have long contained the best diabetic treatment but that no one is aware of it or that doctors and professionals do not inform patients, people, and the entire globe about it is an ugly crime! Indeed, they are experts in their field, and their books contain the best cures for more serious illnesses that millions of people suffer from. Words cannot adequately describe this behavior.

But it's crucial to note this before going over the material above; Since insulin is made entirely of amino acids (proteins), the human body requires enormous amounts of these acids on a daily basis. Although insulin does not alter after reacting with eleven glucose molecules, there are always some insulin molecules present because of its short half-life. When people, especially the elderly, do not consume enough protein, their systems are unable to produce enough insulin, which results in type 2 diabetes. Insulin injections are used to restore the deficient quantities.

The aforementioned medical data made it abundantly evident that although these individuals' blood contains insulin, glucose, and potassium, sodium ions are absent, causing the blood glucose levels to remain far higher than usual. Because sodium ions can bind to glucose but potassium ions cannot, normal saline or sodium chloride is the best treatment for these diseases.

Consequently, glucose-sodium molecules should be created with the help of insulin so they can enter various cells as opposed to remaining in the circulation as previously stated. This appropriate course of therapy has long been known, and it is a standard procedure that physicians and specialists in many hospitals use for patients with diabetes. However, sodium chloride lowers glucose levels in many patients but induces hypertension, which can be fatal. It has long been recognized that this salt raises blood pressure because, for every three sodium ions that enter various cells, roughly two potassium ions exit. Because potassium ions are larger than sodium ions, they put pressure on the walls of veins and arteries, which results in hypertension. Due to their larger size than sodium, potassium ions put pressure on the walls of veins and arteries, resulting in hypertension.

Lastly, diabetes, high blood pressure, and related ailments should be brought on by filtered water (like RO water), cooking, continuing to consume foods with low potassium ions, and other reasons. Since the aforementioned variables are merely manifestations of our society, civilization is the primary cause of diabetes, hypertension, and related illnesses. Three credible studies support the findings of this research and provide an explanation of the significance of potassium ions for human existence by showing that low serum potassium levels raise the risk of diabetes (14–17); In the first study, 12209 participants participated over a span of almost 27 years, from 1985 to 2012 (15). African Americans are more likely than white Americans to have type 2 diabetes, according to the second study that compared the two groups (16). The most recent study, which recruited 4409 Japanese men over a period of four years, found that low serum potassium levels raise the risk of diabetes (17). This indicates that in order to arrive at the conclusion that low serum potassium raises the risk of diabetes, the aforementioned research involved over 16618 participants over a period of more than 30 years, from 1985 to 2014. These studies, however, do not provide an explanation for their findings; however, this study did so in the aforementioned solid and convincing evidence and explanations that the balancing of crucial ions, sodium and potassium, getting adequate potassium and sodium ions with protein each day is essential for preventing diabetes, high blood pressure, and other relating illnesses.

Conclusion:

Since diabetes, hypertension, and related conditions are not common conditions, this study must find effective remedies for them using more than four distinct scientific approaches; First, according to 70,000 samples from a small city, nothing has changed in their life over the past 20 years, with the exception of changing their drinking water. The ratio of people with type 2 diabetes rose from roughly 2-3% prior to 2003 to 28.5% after that year. Second, research indicates that sodium ions and glucose molecules pass through the cell membrane, but it does not specify whether the bond between the two substances is covalent or ionic. Thirdly, this study explains what the above bond is in accordance with chemistry regulations, which leads to the discovery of the best cure for the most improbable illnesses. Fourth, following the completion of this study, three papers [(15–17)] were discovered that shared the same findings, namely that type 2 diabetes is caused by low serum potassium. Furthermore, there are other pieces of evidence that guide this research in order to find the best treatment for diabetes, hypertension, and related conditions.

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