DIABETES MILLETUS

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BLOOD GLUCOSE LEVELS
LOW
NORMAL
HIGH
POGLYCEMIA
NORMAL
HYPERGLYCEMIA

The major sources of the glucose that circulates in the blood are through the absorption of ingested food in the gastrointestinal tract and formation of glucose by the liver from food substances.

Diabetes mellitus is a group of metabolic diseases that occurs with **increased levels of glucose in the blood.** Diabetes mellitus most often results in defects in insulin secretion, insulin action, or even both.

Classification

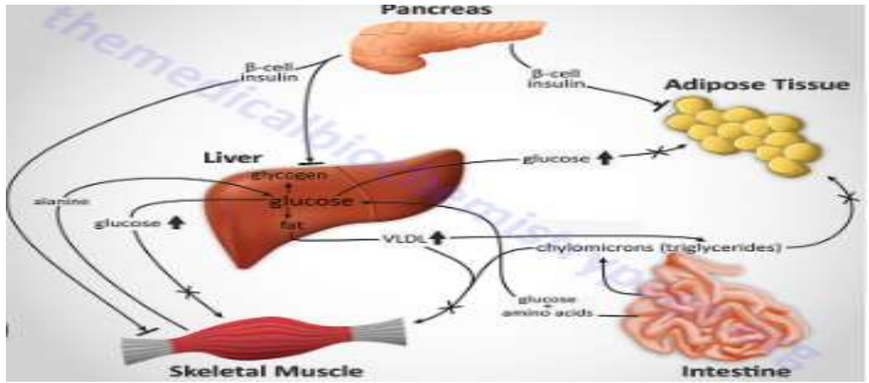
Diabetes has major classifications that include **type 1 diabetes**, **type 2 diabetes**, **gestational diabetes**, and diabetes mellitus associated with other conditions.

The two types of diabetes mellitus are differentiated based on their causative factors, clinical course, and management.

PATHOPHYSIOLOGY

Diabetes Mellitus has different courses of pathophysiology because of it has several types

Insulin is secreted by beta cells in the pancreas and it is an anabolic hormone.
When we consume food, insulin moves glucose from blood to muscle, liver, and fat cells as insulin level increases.



PATHOPHYSIOLOGY

The functions of insulin include the **transport and metabolism of glucose** for energy, stimulation of storage of glucose in the liver and muscle, serves as the signal of the liver to stop releasing glucose, enhancement of the storage of dietary fat in adipose tissue, and acceleration of the transport of amino acid into cells.

Insulin and **glucagon** maintain a constant level of glucose in the blood by stimulating the release of glucose from the liver.

CLASSIFICATION

Type 1 Diabetes Mellitus

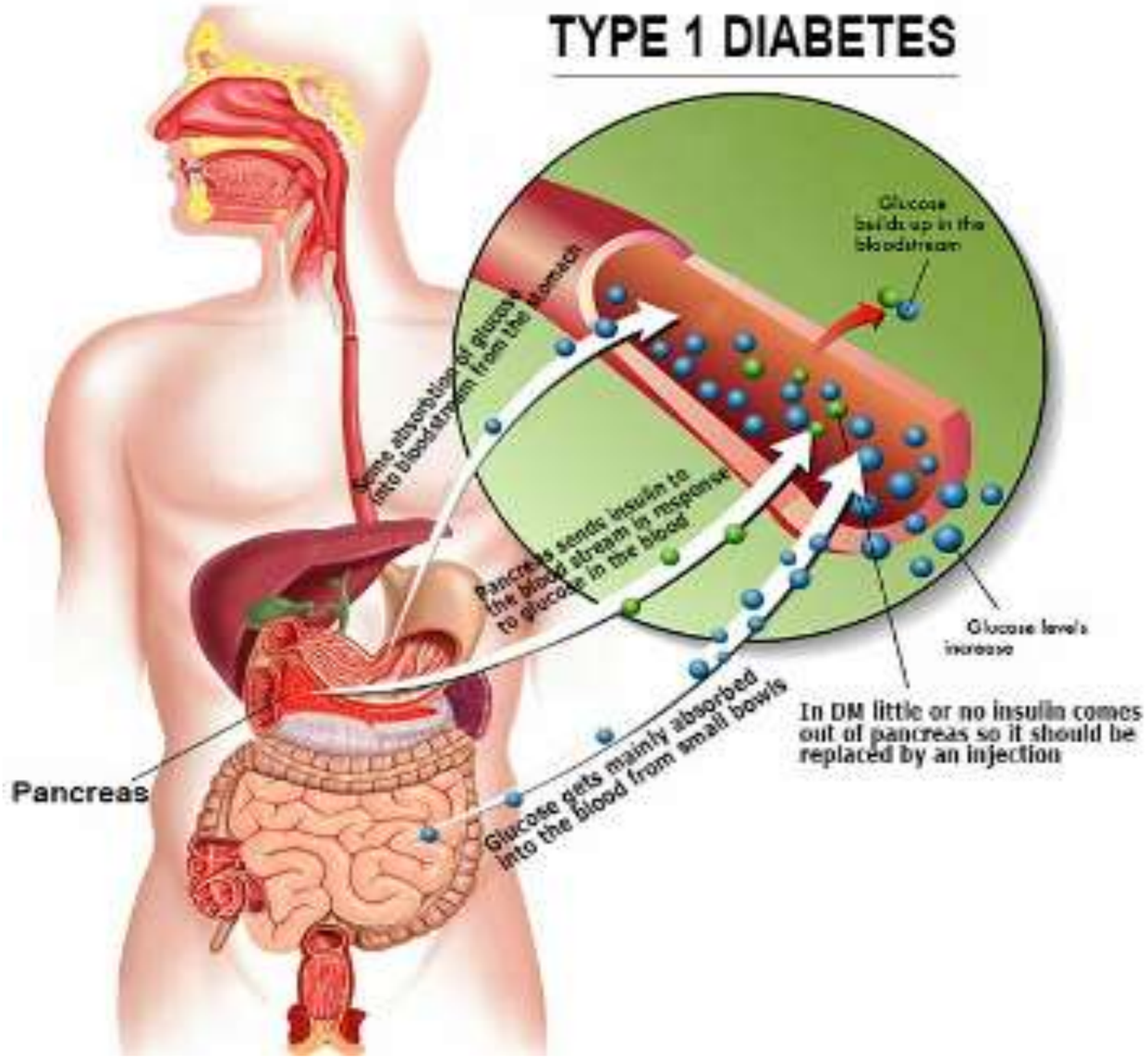
Type 1 diabetes mellitus is characterized by **destruction of the pancreatic beta cel**ls.

A common underlying factor in the development of type 1 diabetes is a **genetic susceptibility**.

Destruction of beta cells leads to a decrease in insulin production, unchecked glucose production by the liver and fasting hyperglycemia

CLASSIFICATION

Glucose taken from food cannot be stored in the liver anymore but remains in the blood stream.
The kidneys will not reabsorb the glucose once it has exceeded the renal threshold, so it will appear in the urine and be called **glycosuria**.
Excessive loss of fluids is accompanied by excessive excretion of glucose in the urine leading to osmotic diuresis.
There is **fat breakdown** which results in **ketone production**, the by-product of fat breakdown


TYPE 1 DIABETES
Glucose builds up in the bloodstream
Some absorption of glucose into bloodstream from the stomach
Pancreas sends insulin to the blood stream in response to glucose in the blood
Glucose levels increase
In DM little or no insulin comes out of pancreas so it should be replaced by an injection
Pancreas
Glucose gets mainly absorbed into the blood from small bowls

CLASSIFICATION

Cause

Genetics. Genetics may have played a role in the destruction of the beta cells in type 1 DM.

Environmental factors. Exposure to some environmental factors like viruses can cause the destruction of the beta cells

CLASSIFICATION

Type 2 Diabetes Mellitus

Type 2 diabetes mellitus has major problems of **insulin resistance** and **impaired insulin secretion**.

Insulin could not bind with the special receptors so insulin becomes less effective at stimulating glucose uptake and at regulating the glucose release.

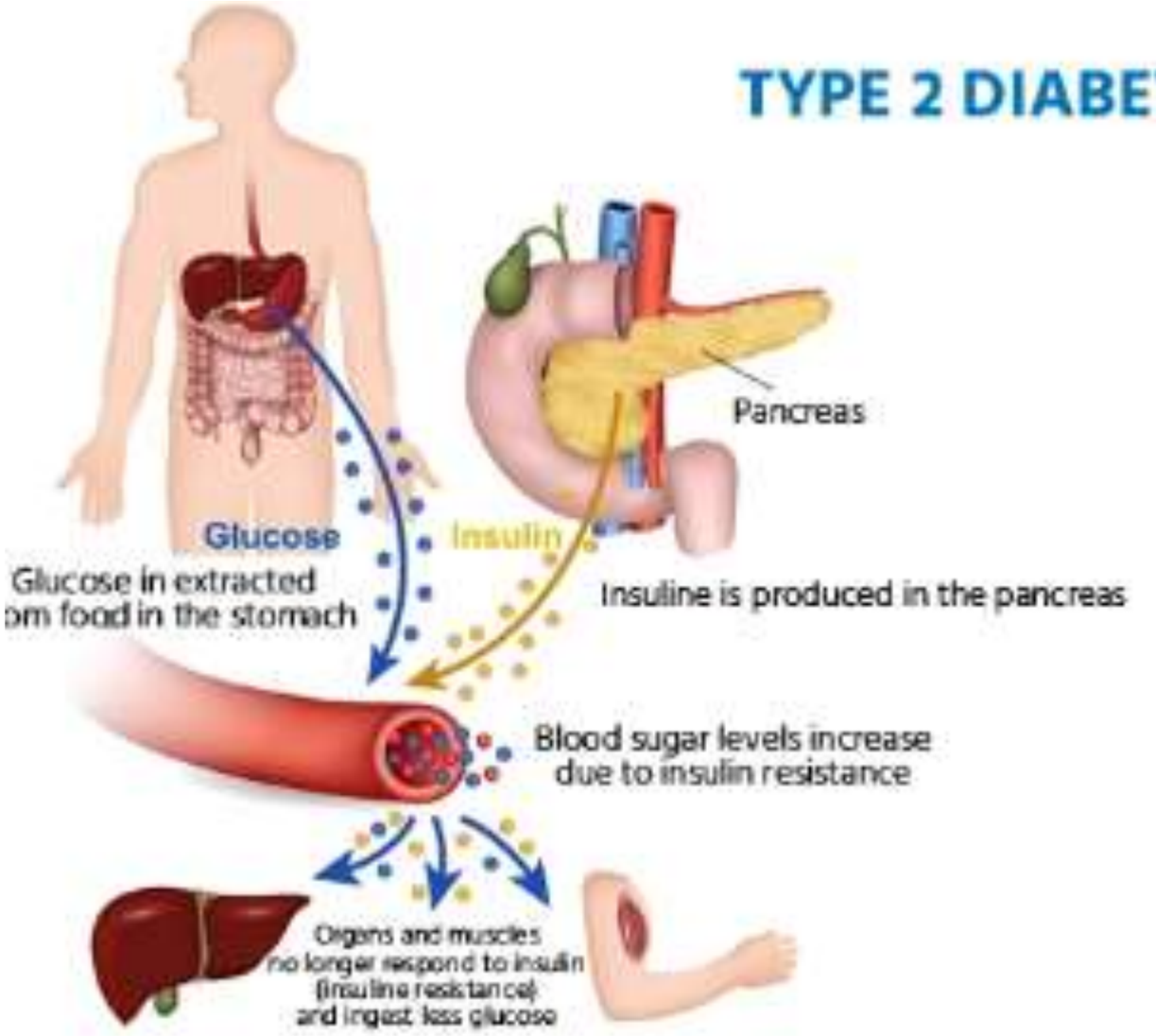
There must be increased amounts of insulin to maintain glucose level at a normal or slightly elevated level.

CLASSIFICATION

However, there is enough insulin to prevent the breakdown of fats and production of ketones.

Uncontrolled type 2 diabetes could lead to **hyperglycemic, hyperosmolar nonketotic syndrome**.

The usual symptoms that the patient may feel are polyuria, polydipsia, polyphagia, fatigue, irritability, poorly healing skin wounds, vaginal infections, or blurred vision.


TYPE 2 DIABETES
Pancreas
Glucose
Insulin
Glucose in extracted
om food in the stomach
Insuline is produced in the pancreas
Blood sugar levels increase
due to insulin resistance
Organs and muscles
no longer respond to insulin
(insuline resistance)
and ingest less glucose

CLASSIFICATION

Cause

Weight. Excessive weight or obesity is one of the factors that contribute to type 2 DM because it causes insulin resistance.

Inactivity. Lack of exercise and a sedentary lifestyle can also cause insulin resistance and impaired insulin secretion.

CLASSIFICATION

Gestational Diabetes Mellitus

With **gestational diabetes mellitus (GDM)**, the pregnant woman experiences any degree of glucose intolerance with the onset of pregnancy.

The secretion of placental hormones causes **insulin resistance**, leading to hyperglycemia.

After delivery, blood glucose levels in women with GDM usually return to normal or later on develop type 2 diabetes.

CLASSIFICATION

Cause

Weight. If you are overweight before pregnancy and added extra weight, it makes it hard for the body to use insulin.

Genetics. If you have a parent or a sibling who has type 2 DM, you are most likely predisposed to GDM.

CLINICAL MANIFESTATIONS

Polyuria or increased urination. Polyuria occurs because the kidneys remove excess sugar from the blood, resulting in a higher urine production.

Polydipsia or increased thirst. Polydipsia is present because the body loses more water as polyuria happens, triggering an increase in the patient's thirst.

CLINICAL MANIFESTATIONS

- **Polyphagia or increased appetite.** Although the patient may consume a lot of food but glucose could not enter the cells because of insulin resistance or lack of insulin production.
- **Fatigue and weakness.** The body does not receive enough energy from the food that the patient is ingesting.
- **Sudden vision changes.** The body pulls away fluid from the eye in an attempt to compensate the loss of fluid in the blood, resulting in trouble in focusing the vision.

CLINICAL MANIFESTATIONS

- **Tingling or numbness in hands or feet.** Tingling and numbness occur due to a decrease in glucose in the cells.
- **Dry skin.** Because of polyuria, the skin becomes dehydrated.
- **Skin lesions or wounds that are slow to heal.** Instead of entering the cells, glucose crowds inside blood vessels, hindering the passage of white blood cells which are needed for wound healing.

CLINICAL MANIFESTATIONS

- **Recurrent infections.** Due to the high concentration of glucose, bacteria thrives easily.
- cells because of insulin resistance or lack of insulin production.
- **Fatigue and weakness.** The body does not receive enough energy from the food that the patient is ingesting.
- **Sudden vision changes.** The body pulls away fluid from the eye in an attempt to compensate the loss of fluid in the blood, resulting in trouble in focusing the vision.

COMPLICATIONS

- **Hypoglycemia.** Hypoglycemia occurs when the blood glucose falls to **less than 50 to 60 mg/dL** because of too much insulin or oral hypoglycemic agents, too little food, or excessive physical activity.
- **Hyperglycemic Hyperosmolar Nonketotic Syndrome.** HHNS is a serious condition in which hyperosmolarity and hyperglycemia predominate with alteration in the sense of awareness.

COMPLICATIONS

- These are long-term problems that can develop gradually, and can lead to serious damage if they go unchecked and untreated.
- **Eye problems** (retinopathy)

Some people with diabetes develop an eye disease called diabetic retinopathy which can affect their eyesight.

- **Foot problems**

Diabetes foot problems are serious and can lead to amputation if untreated. Nerve damage can affect the feeling in your feet and raised blood sugar can damage the circulation, making it slower for sores and cuts to heal. That's why it's important to tell your GP if you notice any change in how your feet look or feel.

COMPLICATIONS

➢. **Heart attack** and **stroke**

When you have diabetes, high blood sugar for a period of time can damage your blood vessels. This can sometimes lead to heart attacks and strokes.

➢**Kidney problems** (nephropathy)

Diabetes can cause damage to your kidneys over a long period of time making it harder to clear extra fluid and waste from your body. This is caused by high blood sugar levels and high blood pressure. It is known as diabetic nephropathy or kidney disease

COMPLICATIONS

➢**Nerve damage** (neuropathy)

Some people with diabetes may develop nerve damage caused by complications of high blood sugar levels. This can make it harder for the nerves to carry messages between the brain and every part of our body so it can affect how we see, hear, feel and move.

➢**Gum disease**

Too much sugar in your blood can lead to more sugar in your saliva. This brings bacteria which produces acid which attacks your tooth enamel and damages your gums.

COMPLICATIONS

➢**Diabetic ketoacidosis** (DKA) – a life-threatening emergency where the lack of insulin and high blood sugars leads to a build-up of ketones

➢**Macrovascular disease** involves atherosclerosis of large vessels, which can lead to

•Angina pectoris and myocardial infarction

•Transient ischemic attacks and strokes

•Peripheral arterial disease.

TREATMENT

Insulin helps people living with diabetes live an active lifestyle. Excessive insulin can cause hypoglycemia, or extremely low blood sugar, and lead to nausea, sweating, and shaking.

TREATMENT

Metformin

➢ metformin in pill form to a person with type 2 diabetes. It contributes to:

•lowering blood sugar

•making insulin more effective

➢In 2018, new guidelines also recommended prescribing additional drugs for people with:

•atherosclerotic cardiovascular disease

•chronic kidney disease

TREATMENT

- These are sodium-glucose co transporter 2 (SGLT2) inhibitors or glucagon-like peptide-1 (GLP-1) receptor agonists.
- **GLP-1 receptor agonists** work by increasing the amount of insulin the body produces and decreasing the amount of glucose that enters the bloodstream. It is an injectable medication. People may use it with metformin or alone. Side effects include gastrointestinal problems, such as nausea and a loss of appetite.

TREATMENT

- **SLGT2 inhibitors** are a new typeTrusted Source of drug for lowering blood sugar levels. They work separately from insulin, and may be useful for people who are not ready to start using insulin. People can take it by mouth. Side effects include a higher risk of urinary and genital infections and ketoacidosis.

THANK YOU