

Diabetes Mellitus

Fb/Nurse-Info

Definition of Diabetes Mellitus

- Diabetes Mellitus is a disease marked by high levels of sugar in the blood.
- Mellitus is Latin for “sweet as honey”.

Diabetes Insipidus

- Insipidus is Latin for 'tasteless'.
- Diabetes Insipidus the urine, although passed in excess, is 'insipid' and does not contain sugar.



Definition of Terms

- **Incidence**
 - the frequency with which something, such as a disease, appears in a particular population or area.
- **Prevalence**
 - The proportion of individuals in a population having a disease.
- **Morbidity**
 - Morbidity is the occurrence of a disease or condition that alters health and quality of life
- **Mortality**
 - Causing death

Incidence of Diabetes

- There are currently over 2 million people diagnosed with diabetes in the UK and there are up to another 1 million people with diabetes who have the condition and don't know it!
(www.diabetes.org.uk)

Prevalence

- Type 1
 - Type 1 diabetes develops if the body is unable to produce any insulin.
 - This type of diabetes usually appears before the age of 40.
 - Accounts for between 5 – 15% of all people with diabetes.

Prevalence

- Type 2
 - Type 2 diabetes develops when the body can still make some insulin, but not enough, or when the insulin that is produced does not work properly (known as insulin resistance).
 - In most cases this is linked with being overweight.
 - This type of diabetes usually appears in people over the age of 40.
 - However, recently, more children are being diagnosed with the condition.
 - Type 2 diabetes is the most common of the two main types and accounts for between 85 - 95% of all people with diabetes.

Prevalence

- Gestational diabetes mellitus is a type of diabetes that arises during pregnancy (usually during the second or third trimester).

- Complications of diabetes can be divided into three categories (BHF 2007).
- Metabolic complications of low blood glucose levels (**hypoglycaemia**) and of high blood glucose levels (**hyperglycaemia**).
 - e.g. Diabetic coma

Morbidity

- Damage to small blood vessels (**microvascular**) leading in turn to damage of:
 - retina (retinopathy)
 - kidney (nephropathy)
 - nerves (neuropathy)
- Damage to the larger arteries (**macrovascular**) leading to damage of:
 - brain (leading to stroke)
 - heart (leading to coronary heart disease)
 - legs and feet (leading to peripheral vascular disease)

Mortality

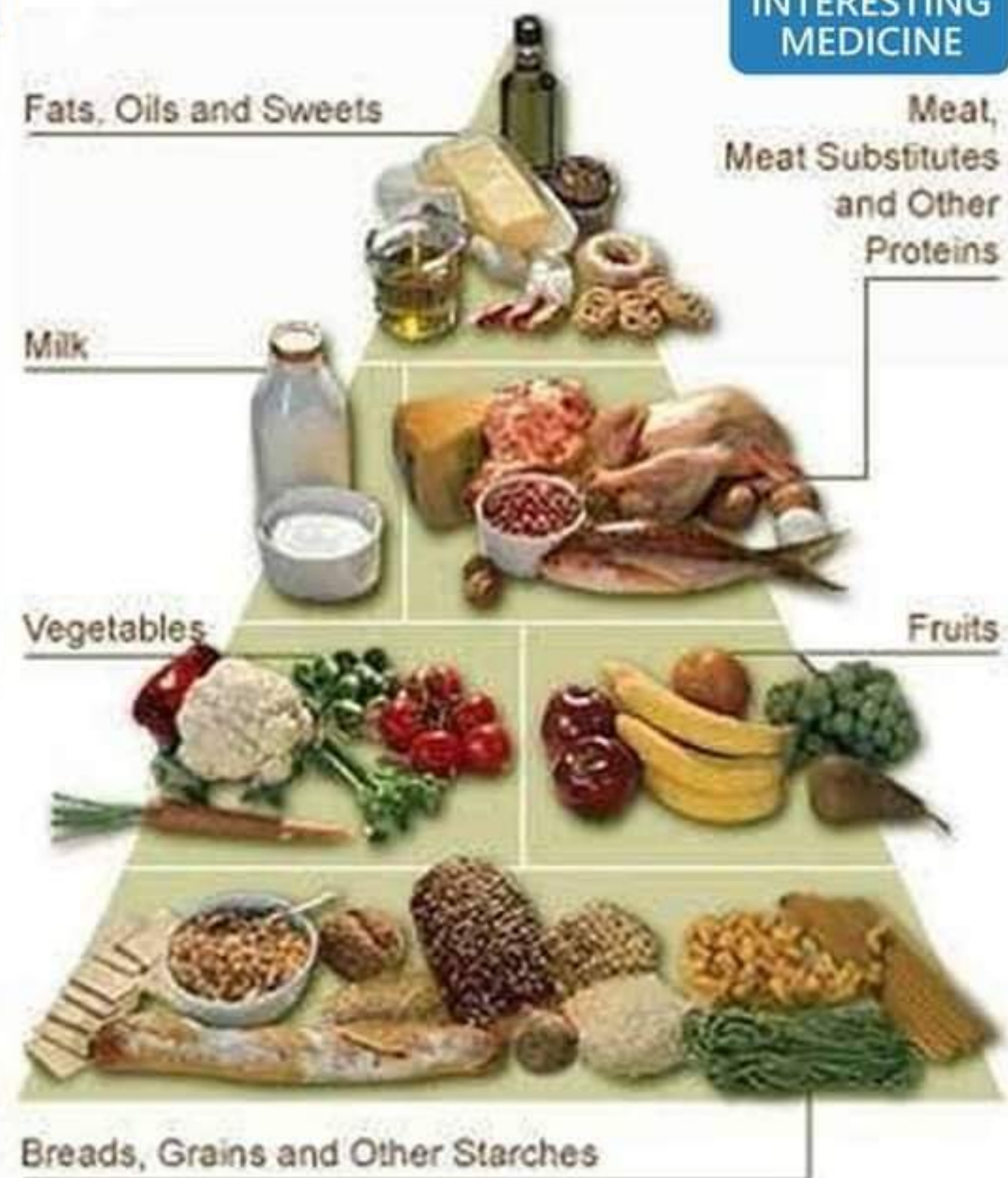
- 7,000 deaths due to diabetes in UK in 2001 (BHF 2001)
- This is likely to be a huge underestimate of the actual number of deaths caused by diabetes.
- This is because other diseases caused by diabetes - such as CVD - are normally given as the cause of death in the death certificates.

Risk Factor which predispose to Diabetes

- A parent, brother, or sister with diabetes
- Obesity
- Age greater than 45 years
- Some ethnic groups
- Gestational diabetes or delivering a baby weighing more than 9 pounds
- High blood pressure
- High blood cholesterol level
- Not getting enough exercise

Normal Metabolism of Glucose

- Food is turned into sugar, called glucose.
- Glucose is carried to the cells via the blood stream.
- Glucose is required by all cells for energy.

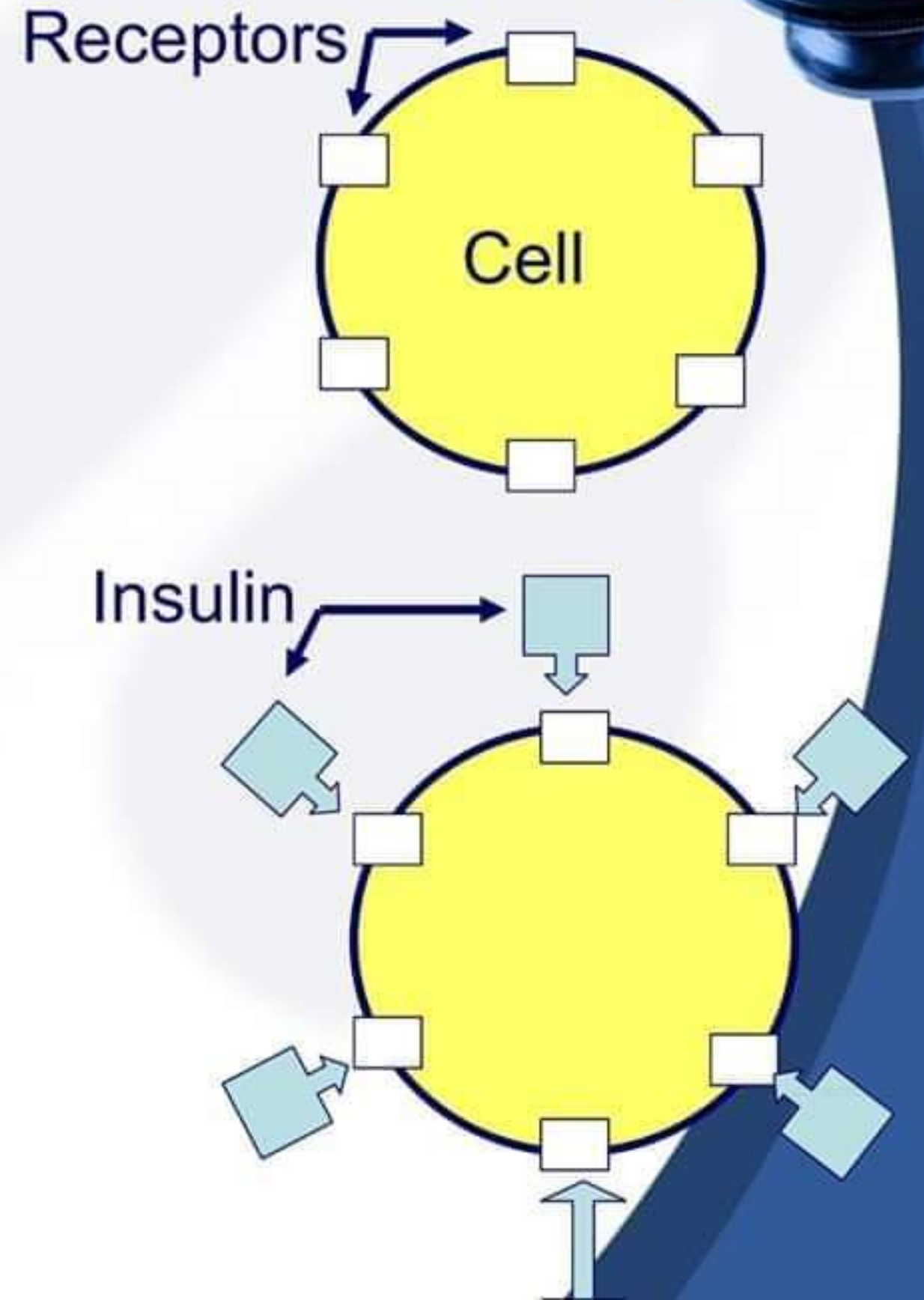


Normal Metabolism of Glucose

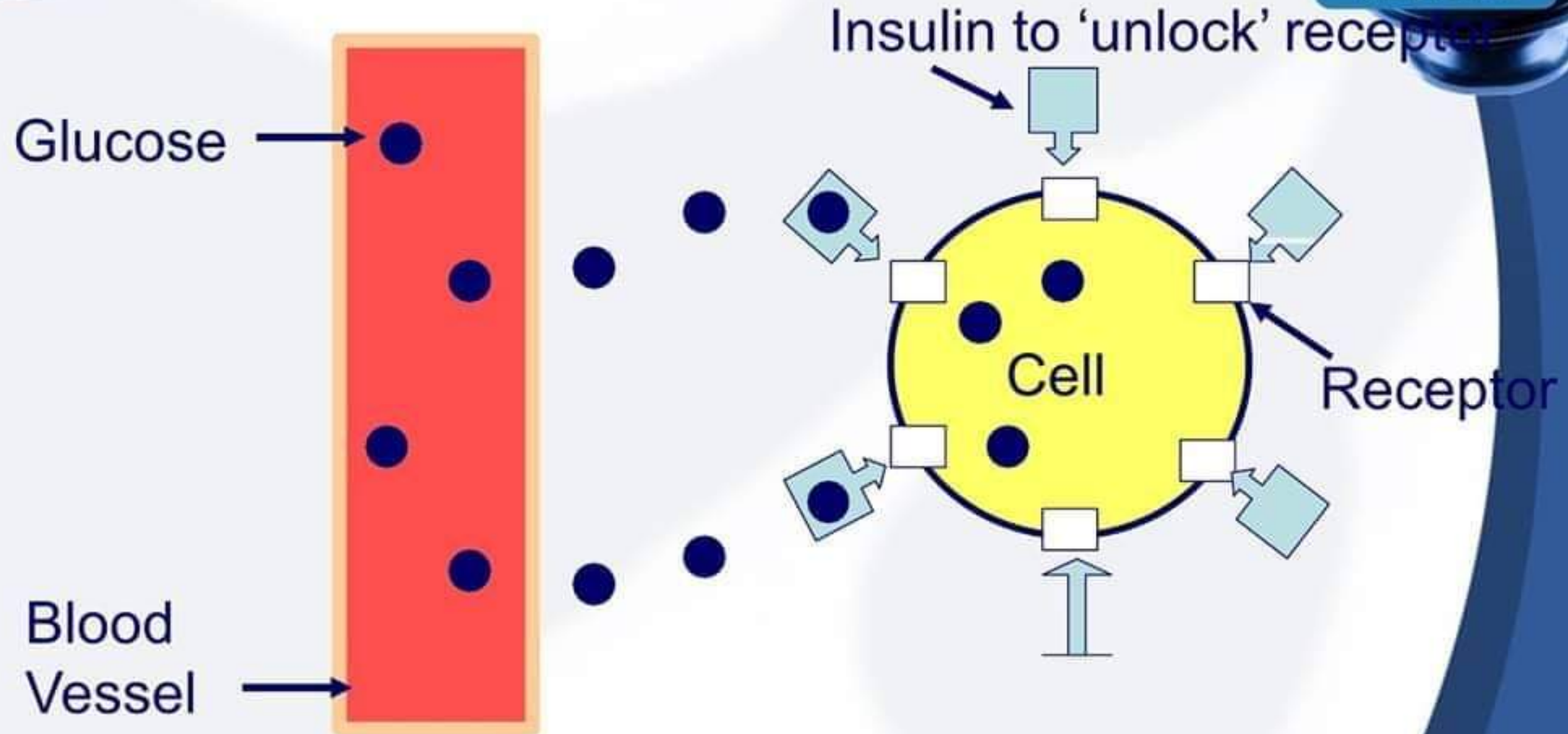
- For Glucose to enter the cell: -

- 1 – the cell should have enough receptors.

- 2 – insulin is needed to 'unlock the receptors'.



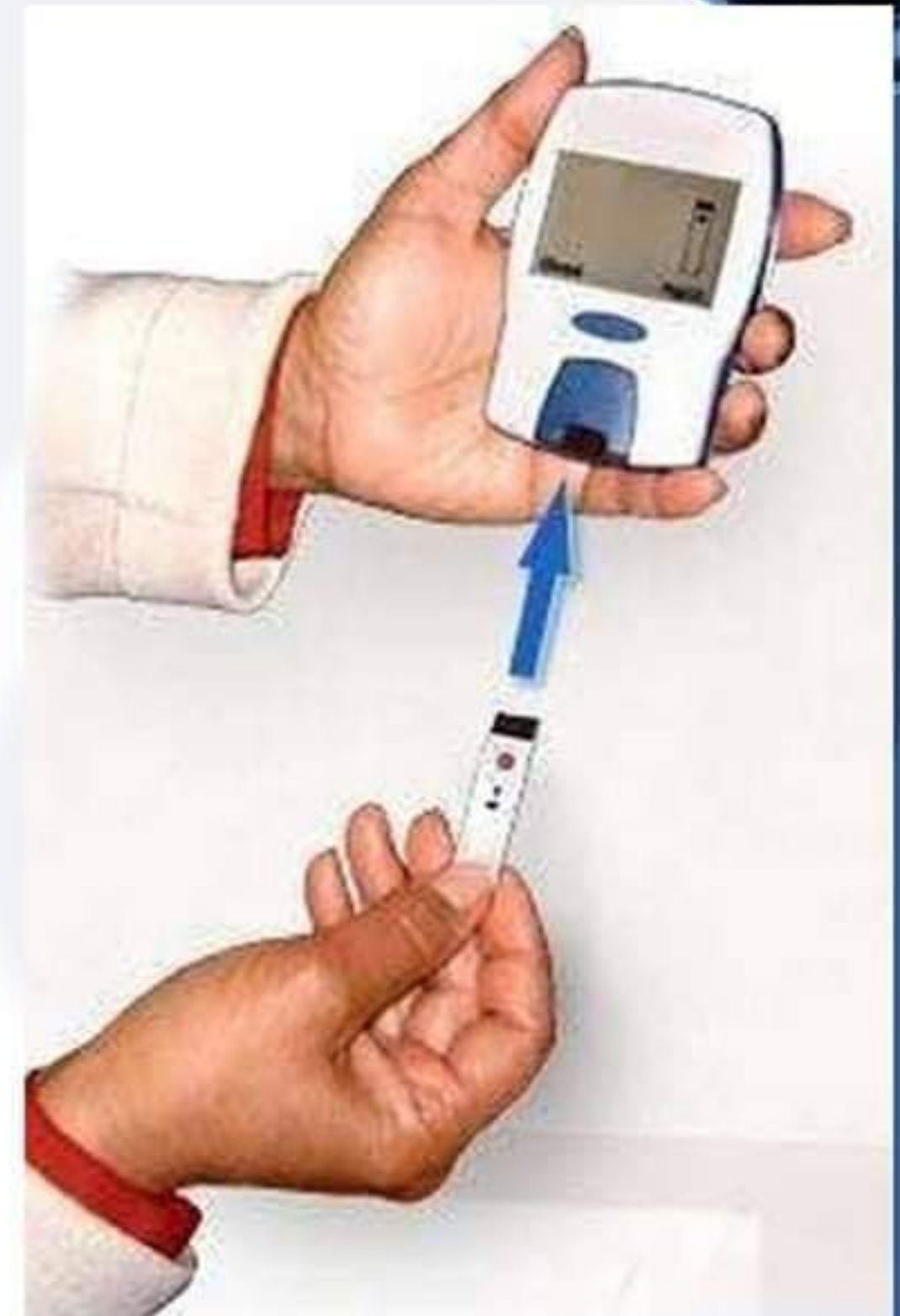
Normal Metabolism of Glucose



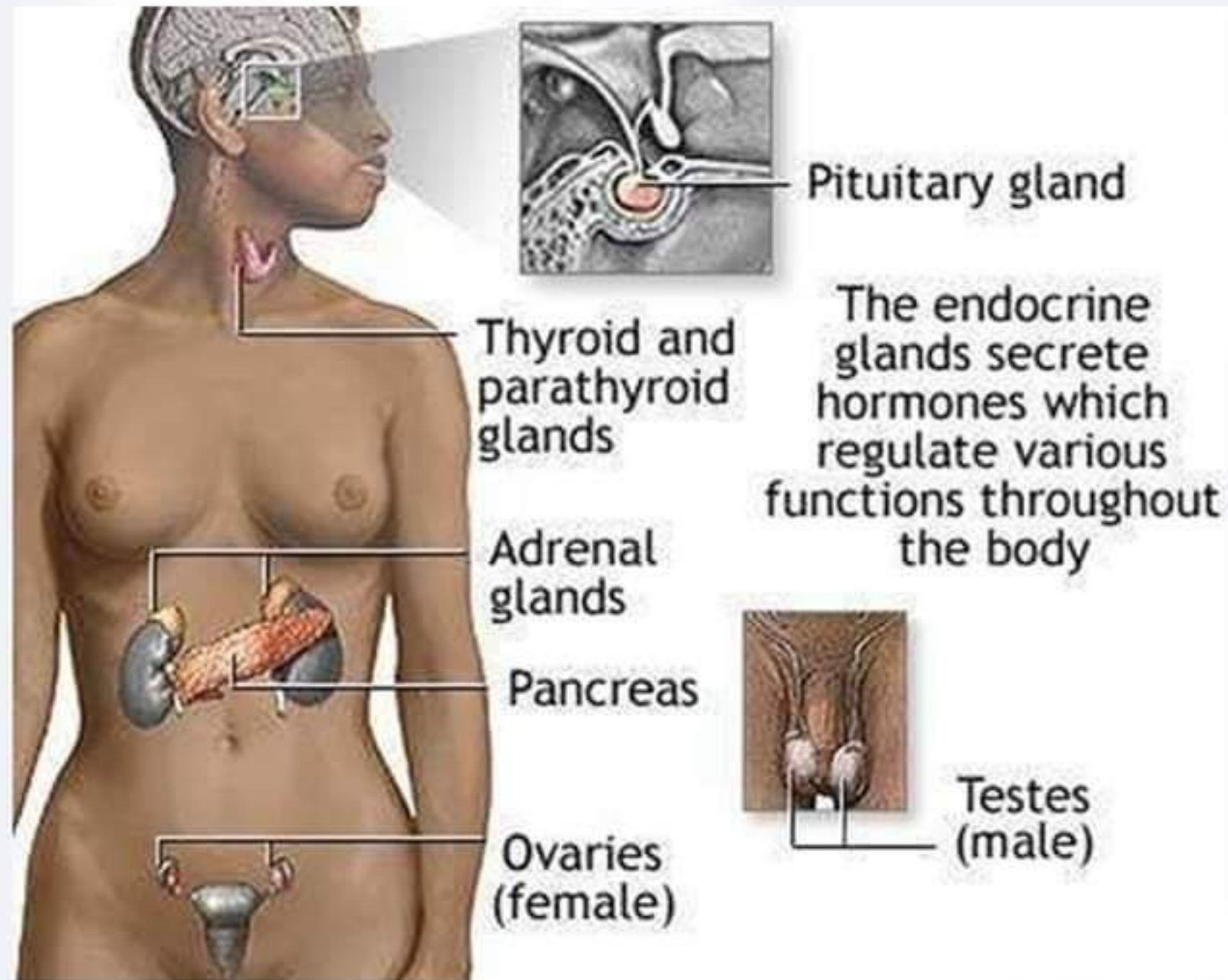
- Glucose can then enter the cell to make energy.
- Without energy the cell will die.

Normal Metabolism of Glucose

- Normally blood glucose is 4 to 8mmol/l.
- They are higher after meals and usually lowest in the morning.
- Fasting blood glucose of below 6mmol/l is normal.



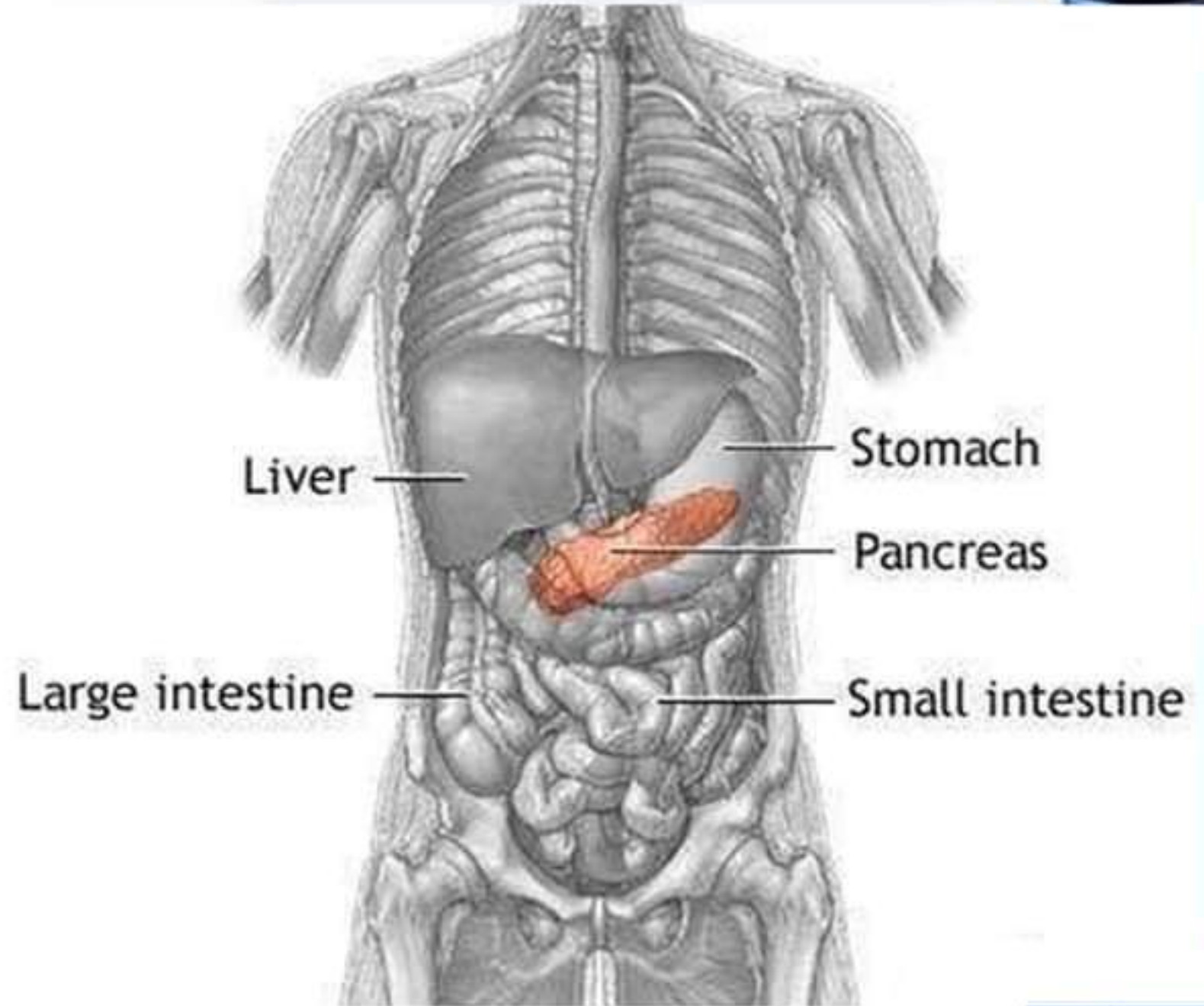
Endocrine System Overview



- Endocrine glands release hormones into the bloodstream.

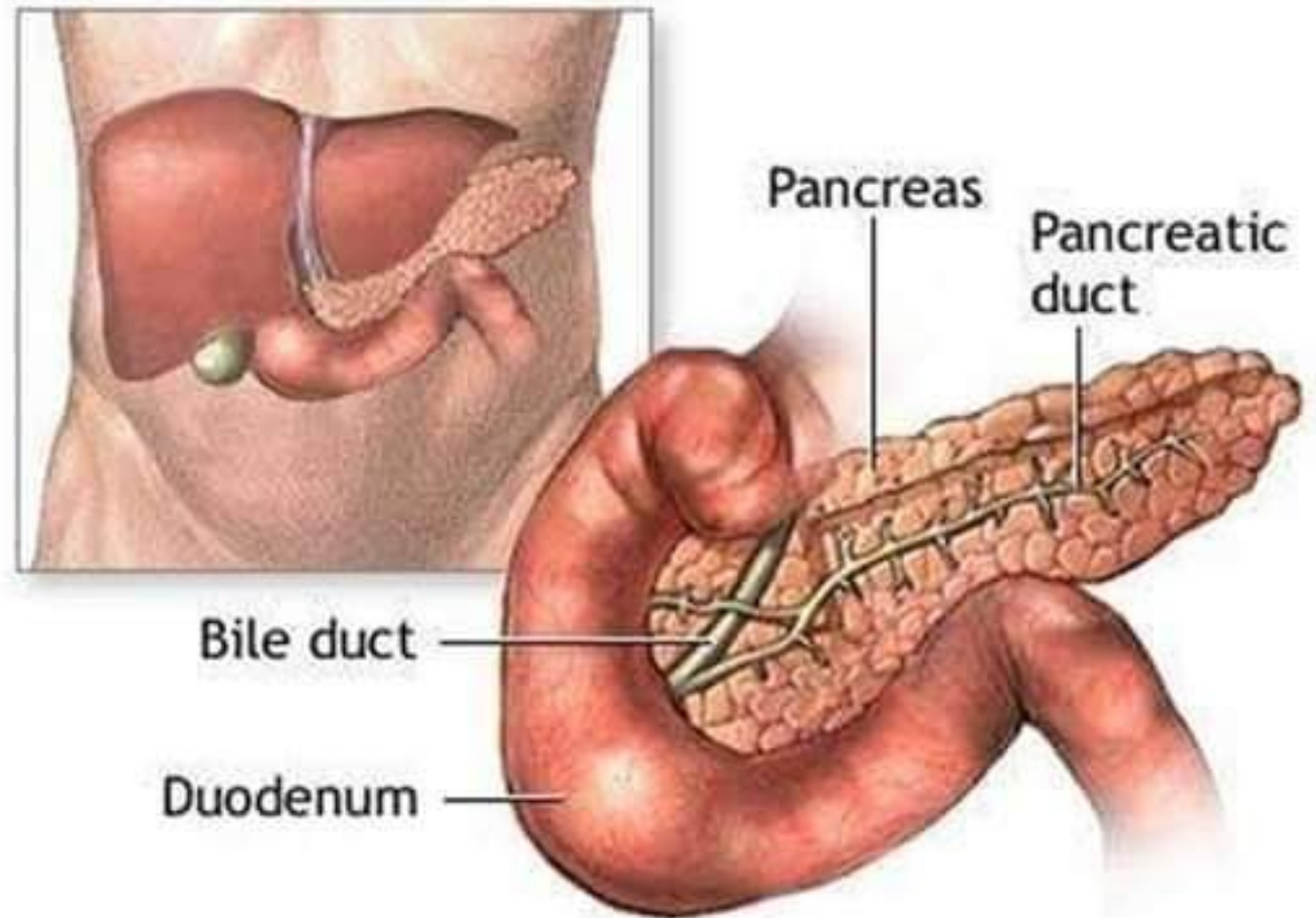
The Pancreas

- The pancreas is an elongated, tapered gland that is located behind the stomach and secretes digestive enzymes and the hormones insulin and glucagon.



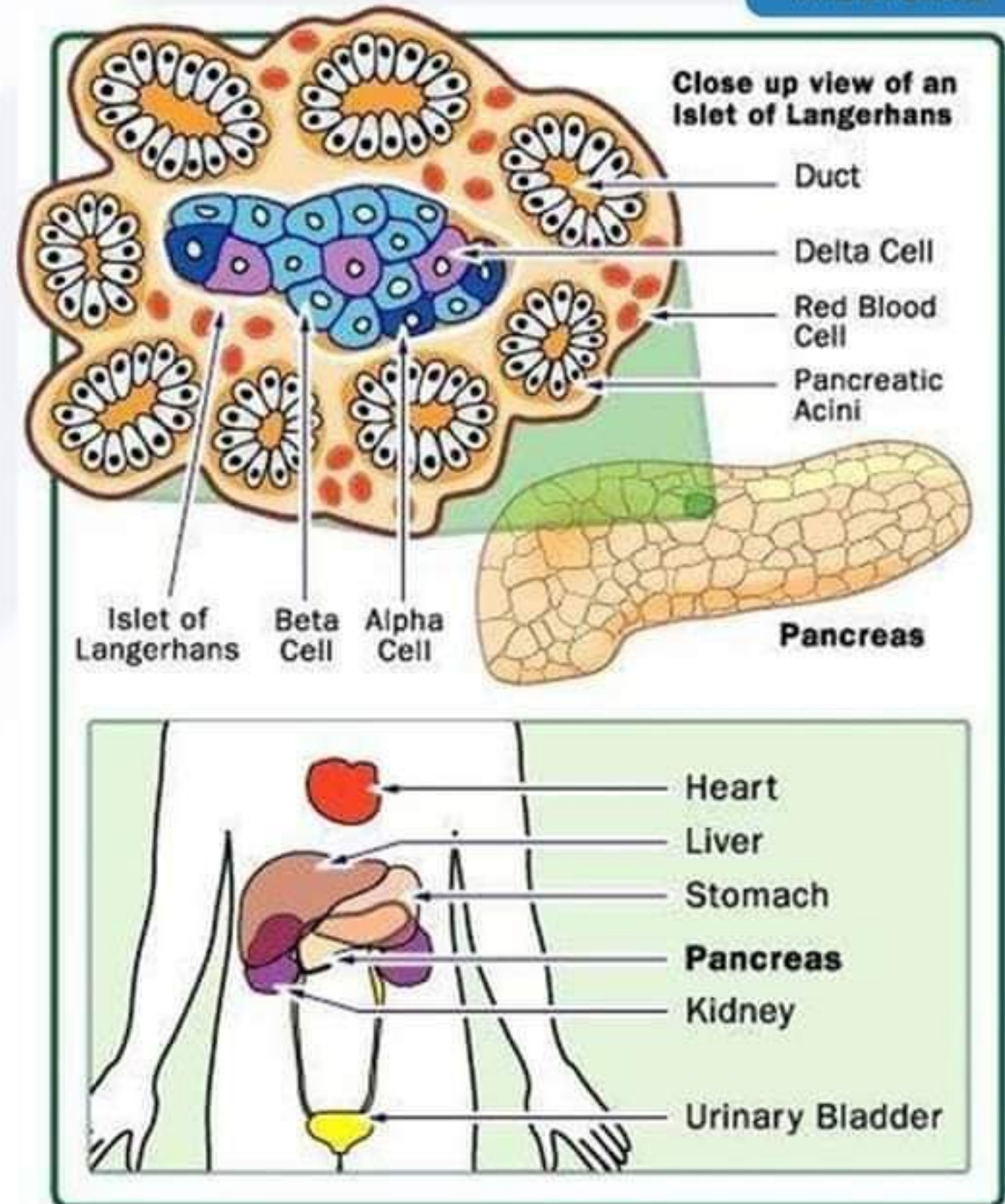
The Pancreas

- The Pancreas secretes insulin and Glucagon directly into the blood stream.
- It also secretes digestive enzymes into the pancreatic duct, which joins the common bile duct from the liver and drains into the small intestine.



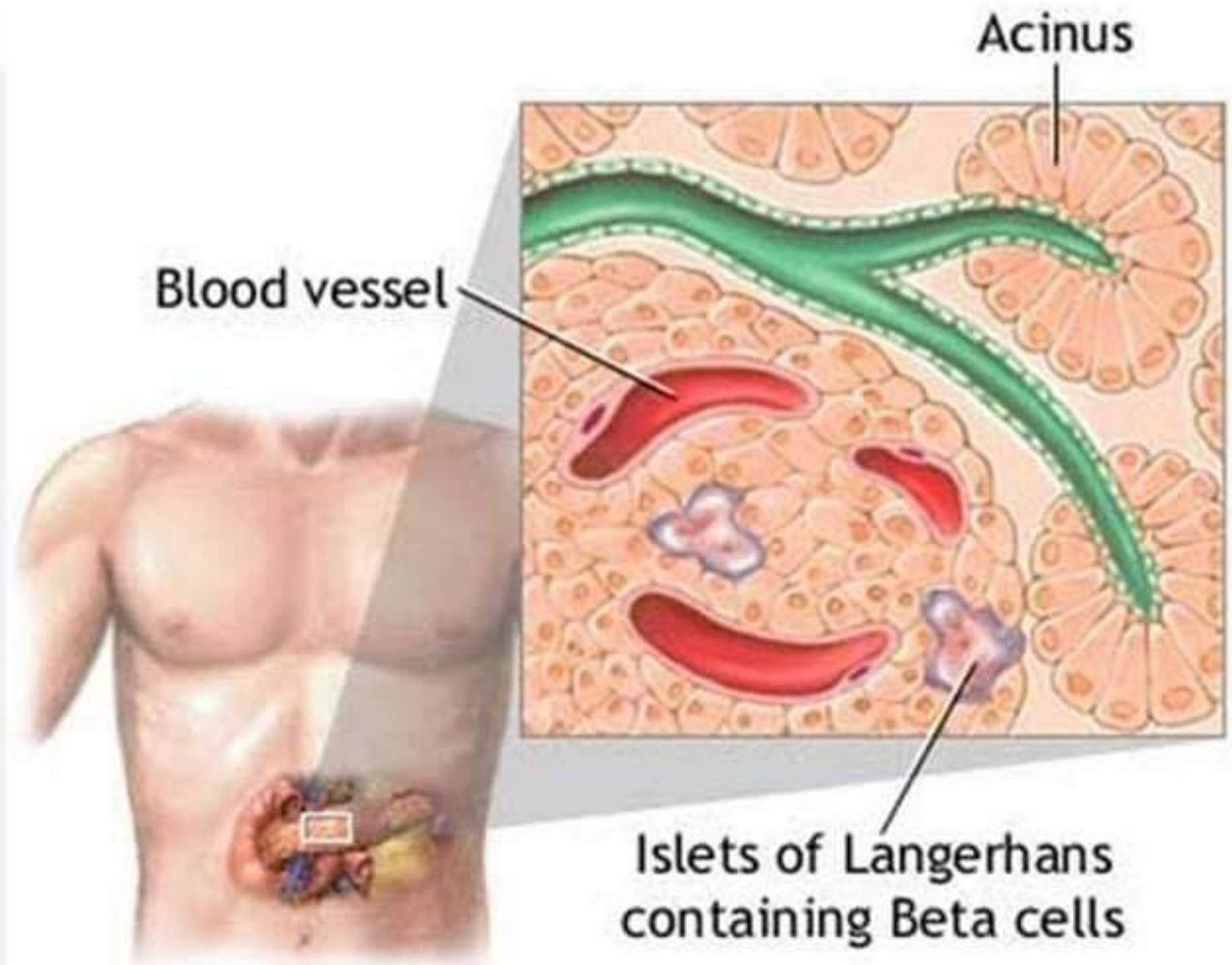
Glucagon (α alpha cells)

- Glucagon is produced in the α cells and is released when the glucose level in the blood is low.
- The liver then convert stored glycogen into glucose and release it into the bloodstream.



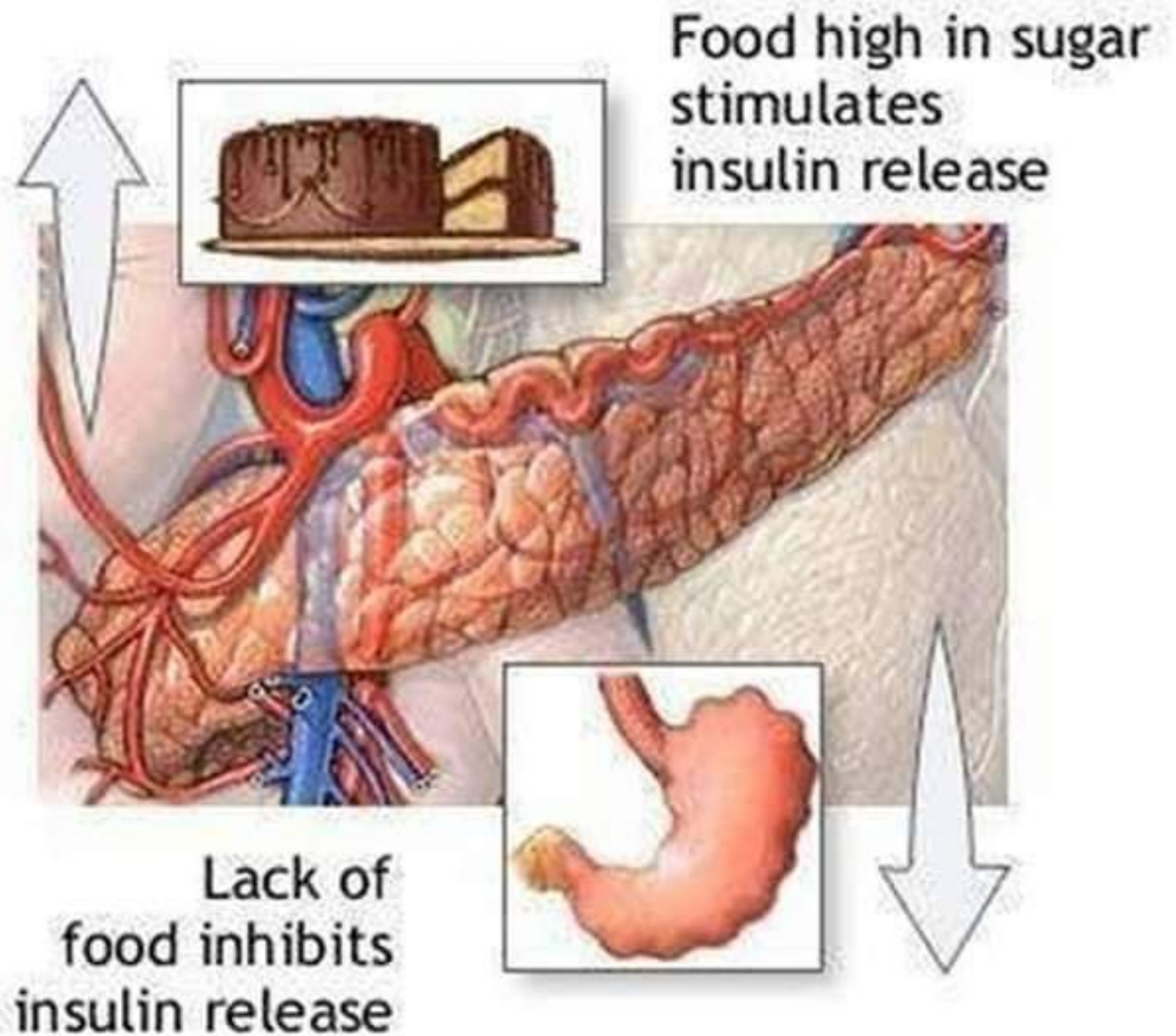
Insulin (β Beta cells)

- Beta Cells within the Islets of Langerhans produce insulin which is needed to metabolize glucose within the body.



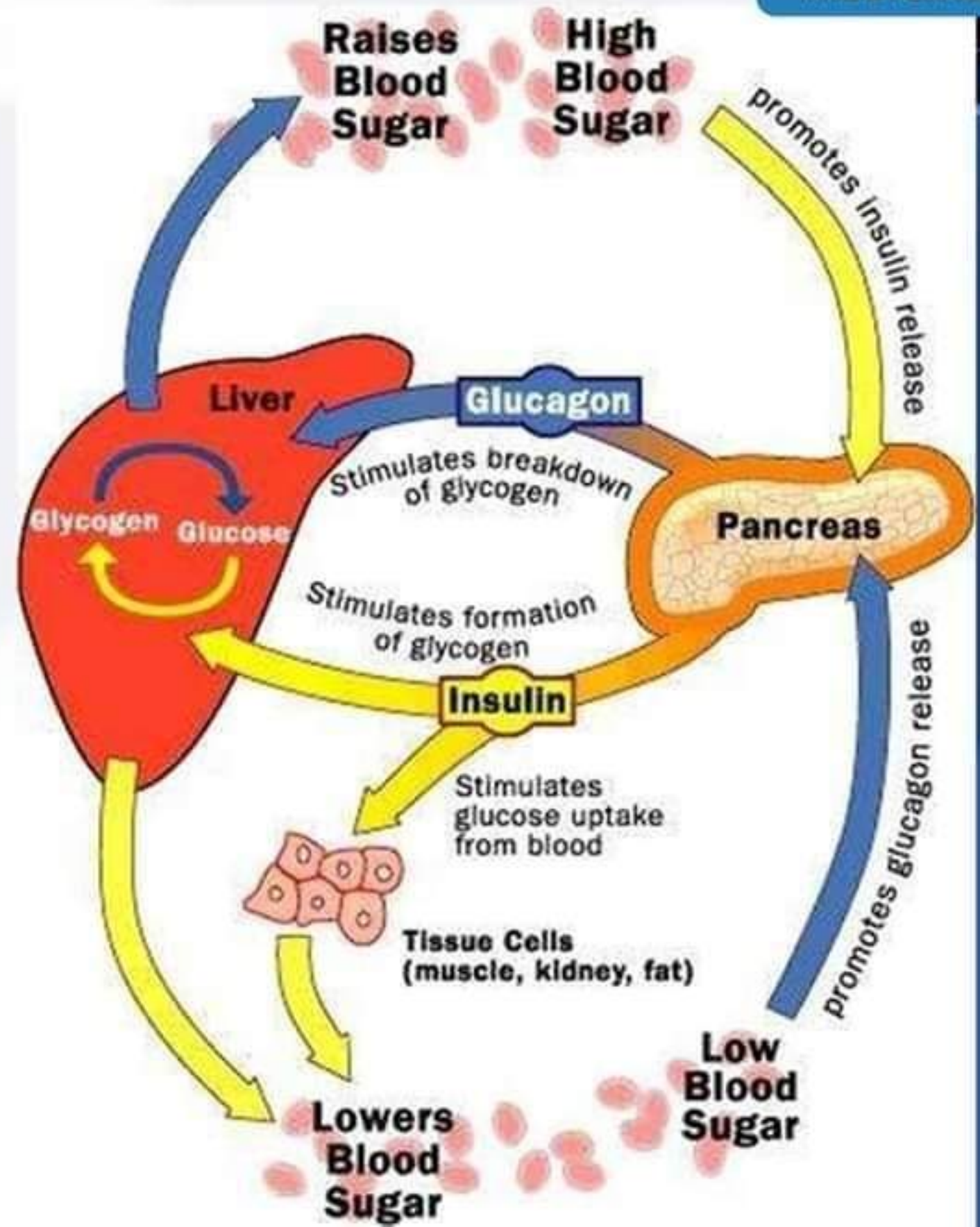
Insulin

- Insulin is secreted in response to increased glucose levels in the blood.



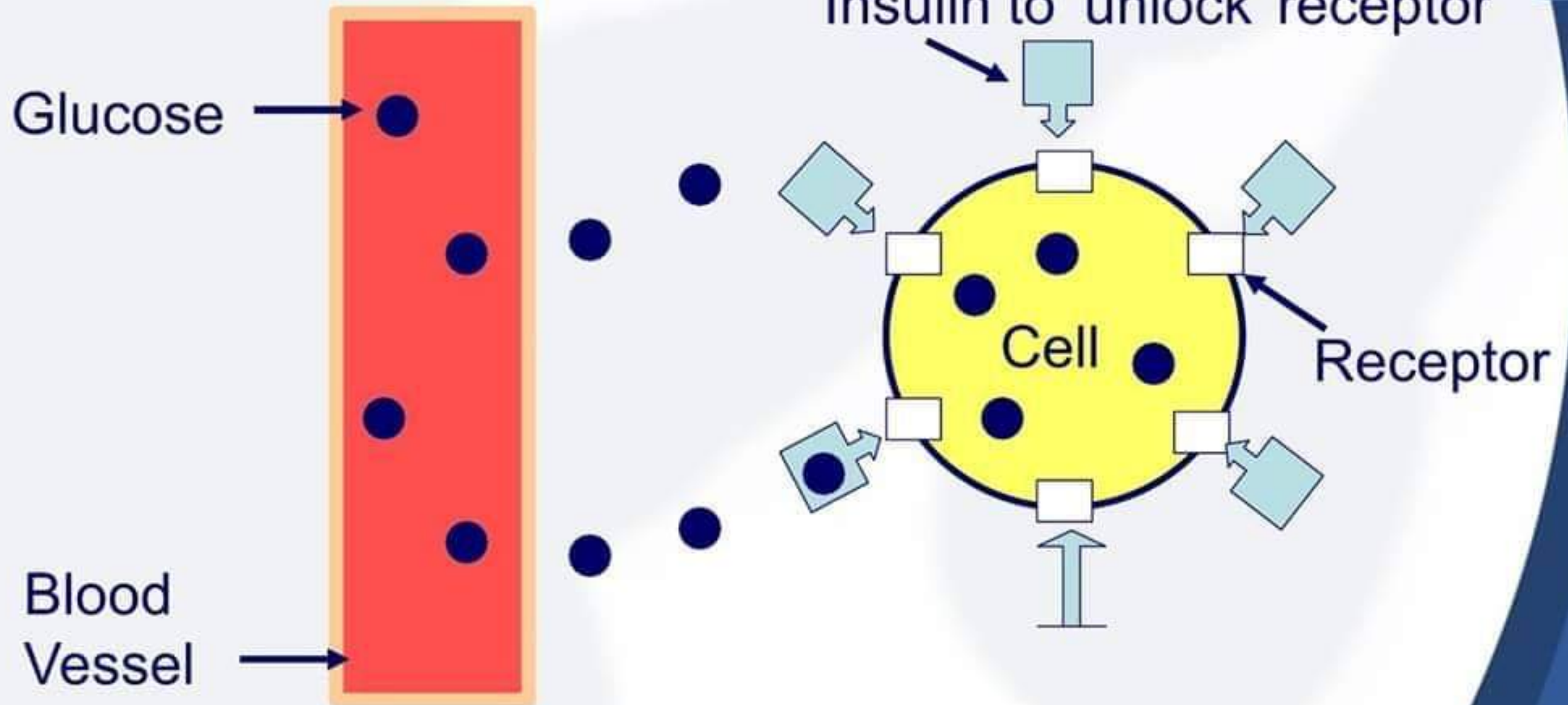
Insulin & Glucagon

- Insulin and Glucagon have opposite effects on liver and other tissues for controlling blood-glucose levels.



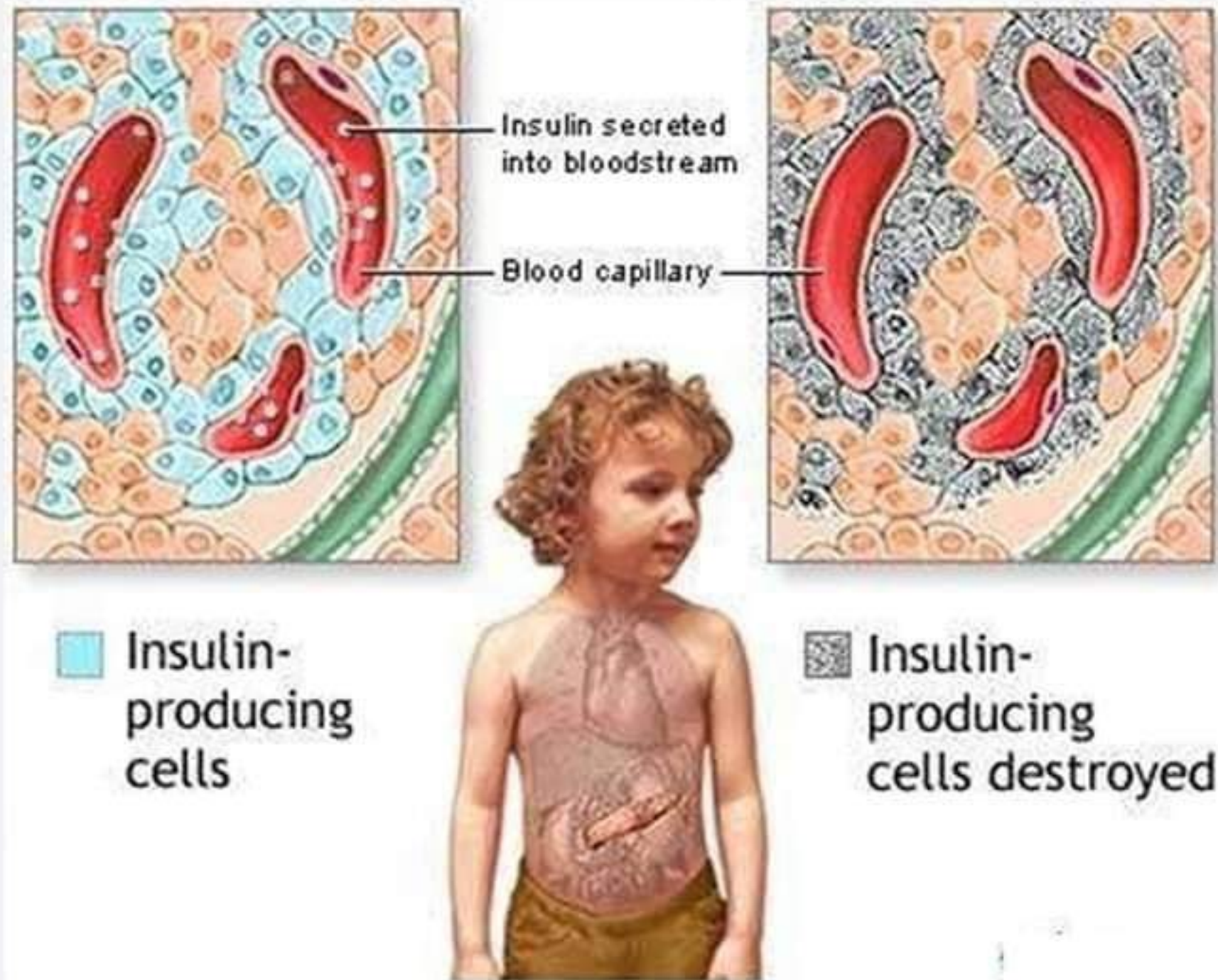
Diabetes

Normal Metabolism of Glucose



- Diabetes is a disease where the cells do not get the glucose they need for energy.

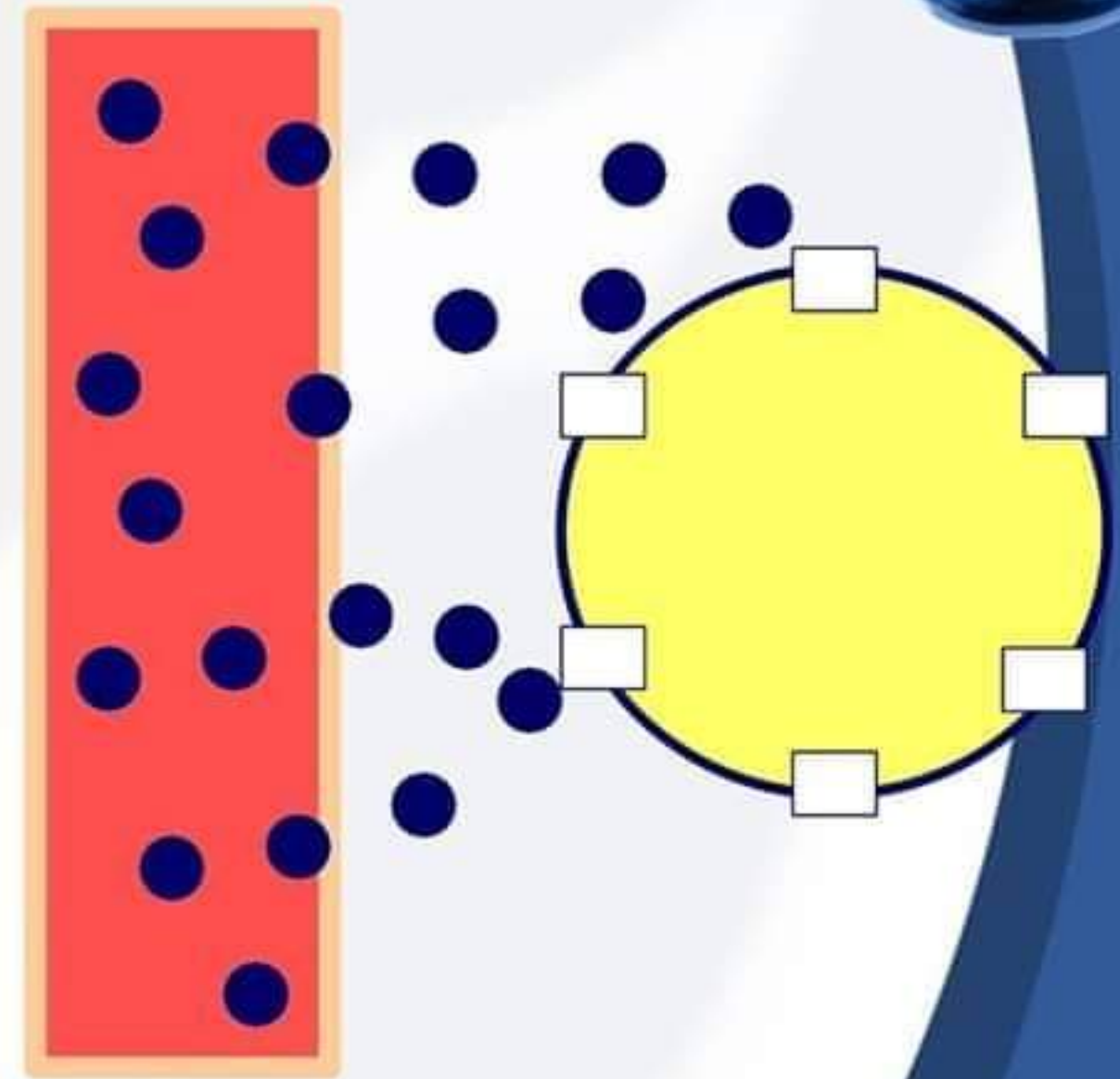
Type 1 Diabetes



- Type 1 diabetes occurs when the α cells are destroyed by the body's own immune system.

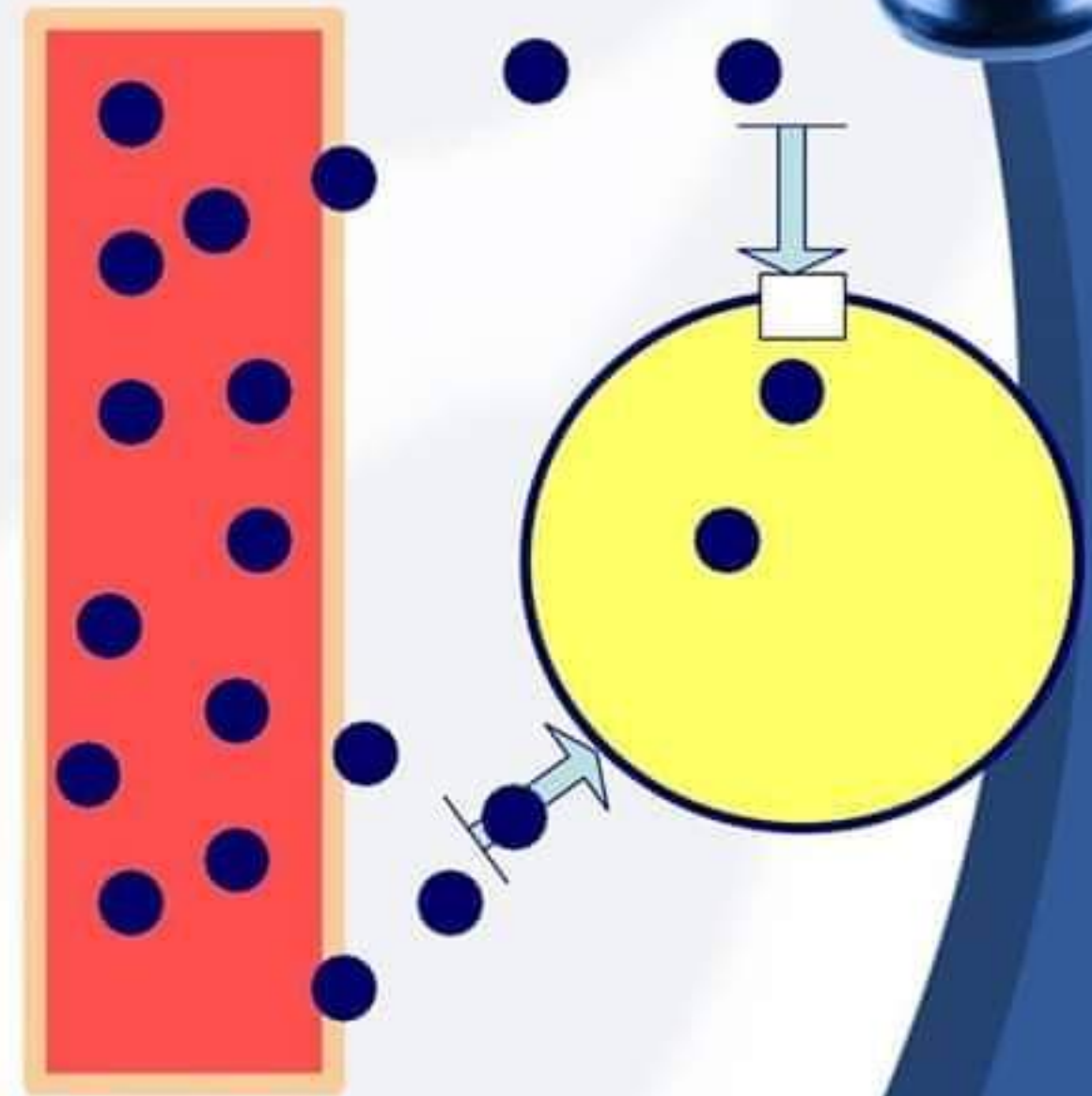
Type 1 Diabetes

- Insulin not produced →
- No insulin to 'unlock' the receptors →
- Glucose cannot enter the cell →
- Glucose re-enters the blood stream →
- Blood glucose levels rise.



Type 2 Diabetes

- Insulin is produced however there is less and there is a decrease in the number of receptors (insulin resistance) →
- Glucose does not enter the cell effectively →
- Glucose re-enters the blood stream →
- Blood glucose levels rise.



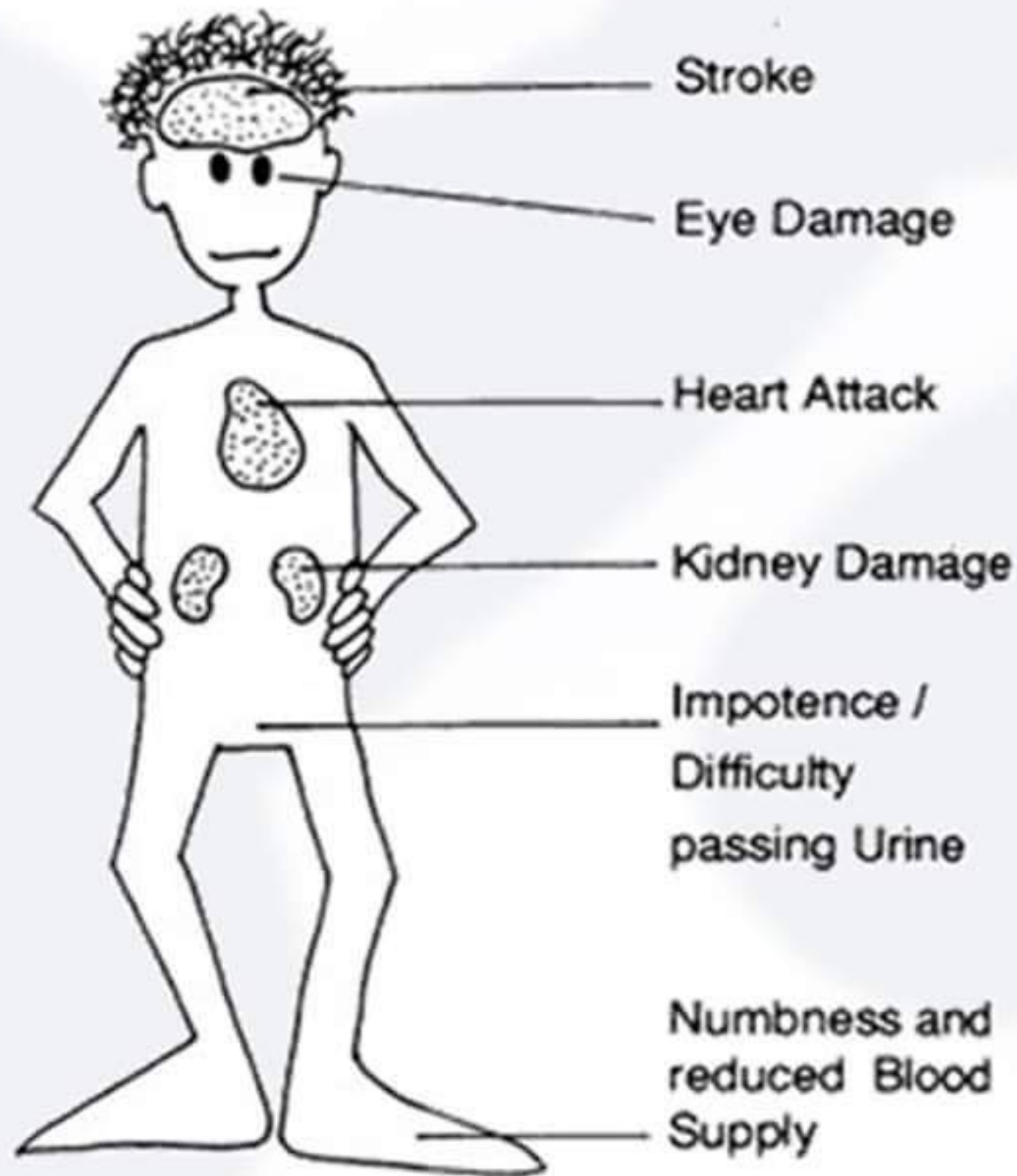
Symptoms of Type 1 Diabetes

- Increased thirst
- Increased urination
- Weight loss in spite of increased appetite
- Fatigue
- Nausea
- Vomiting
- Coma
- Patients with type 1 diabetes usually develop symptoms over a short period of time, and the condition is often diagnosed in an emergency setting.

Symptoms of Type 2 Diabetes

- Slower onset:
- Increased thirst
- Increased urination
- Increased appetite
- Fatigue
- Blurred vision
- Slow-healing infections
- Impotence in men

Complications of Diabetes



Metabolic Complications

- Hypoglycemia is caused by not eating enough sugary foods, taking too much insulin therapy or too much exercise.
- Low blood glucose can lead to coma.

Metabolic Complications

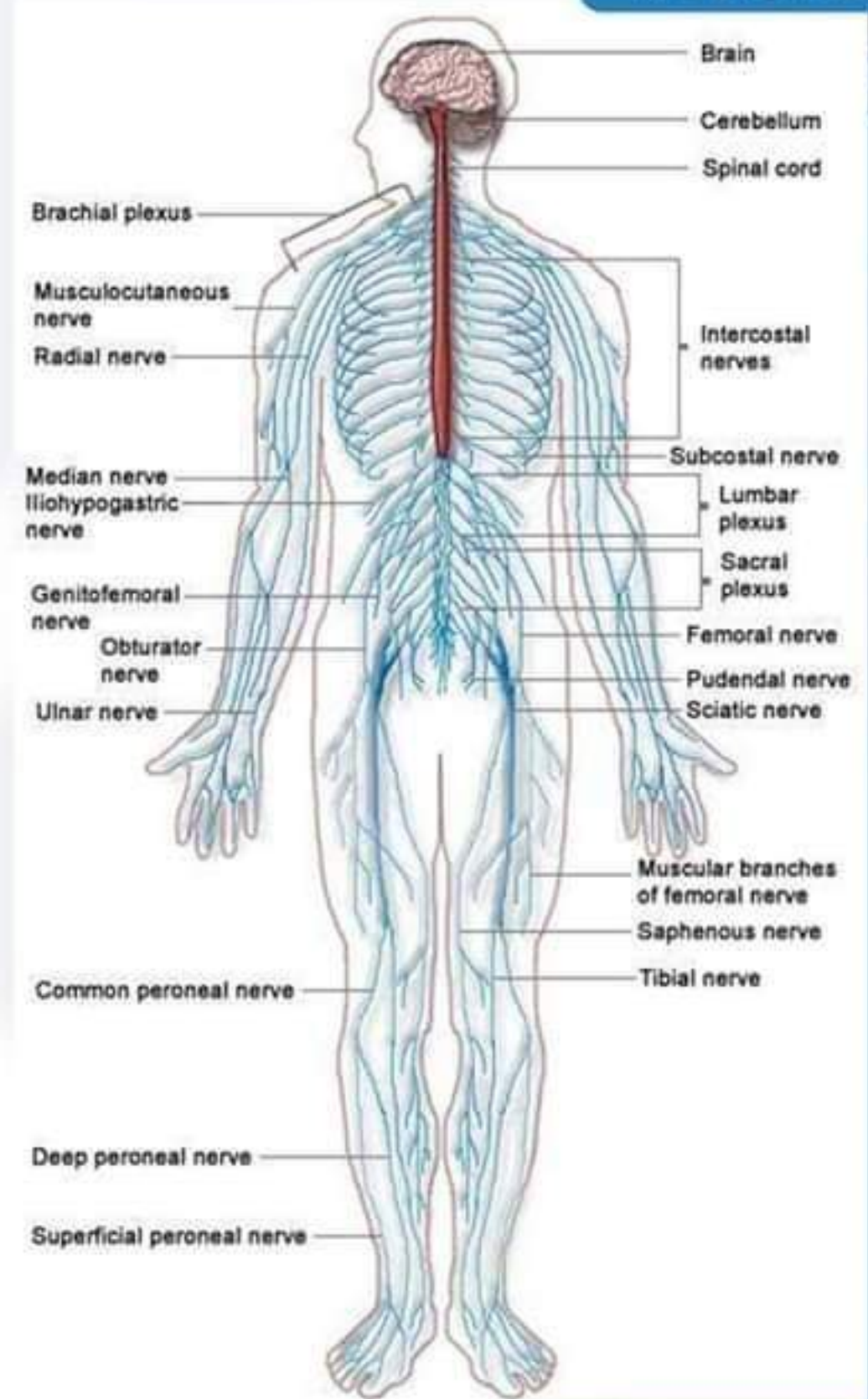
- Hyperglycemia is caused by eating too much sugary food / drinking alcohol, not complying with insulin therapy or no exercise.
- High blood glucose can lead to –
- Diabetic Ketoacidosis / DKA / Diabetic Coma, which is caused by the buildup of by-products of fat breakdown, called ketones. This occurs when glucose is not available as a fuel source for the body, and fat is used instead.

Symptoms of DKA

- Polyuria (frequent urination)
- Polydipsia (frequent thirst)
- Fatigue
- Nausea and vomiting
- Muscular stiffness or aching
- Mental stupor/ decreased consciousness may progress to coma
- Rapid breathing
- Fruity breath (pear drops / nail varnish smell)
- Headache
- Low blood pressure
- Decreased appetite
- Abdominal pain

Nervous & Vascular System complications

- Complication of Diabetes include damage to the nerves and blood vessels.

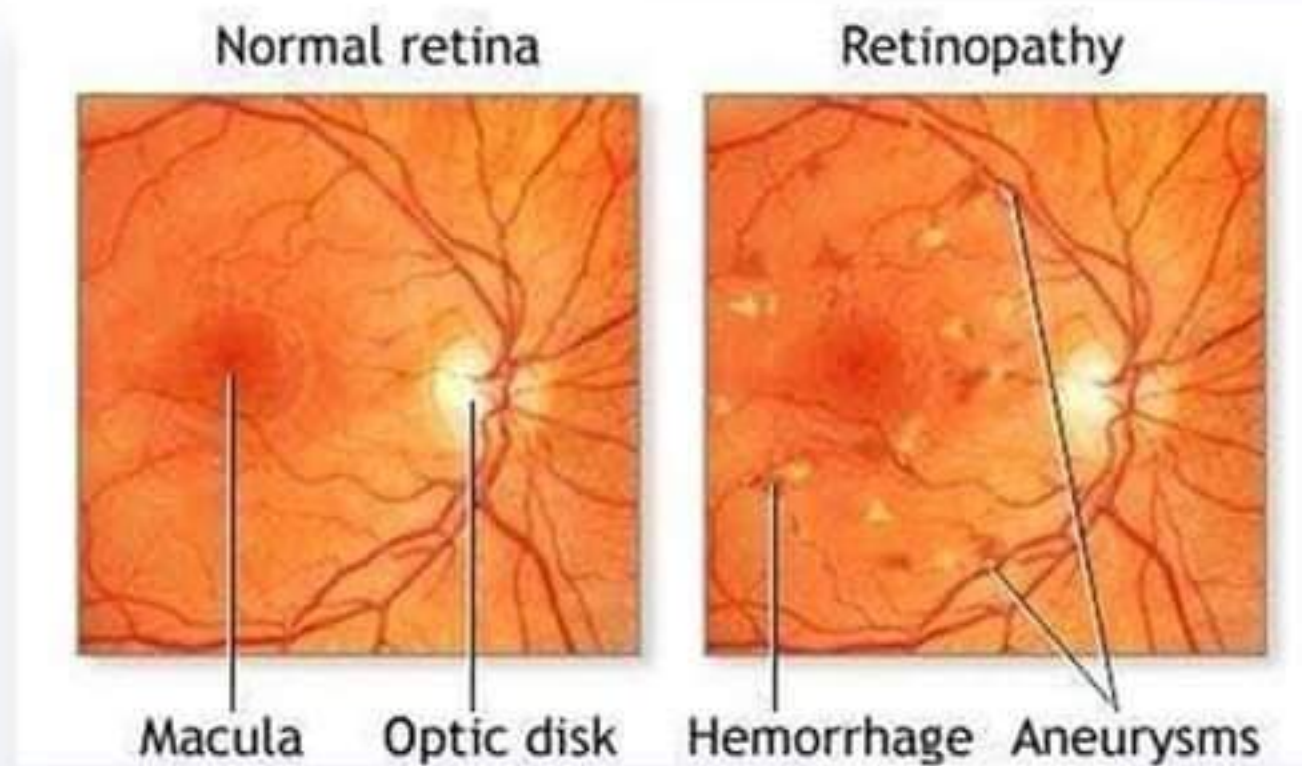


Microvascular (Small vessel) Complications



- Retinopathy
- Nephropathy
- Neuropathy

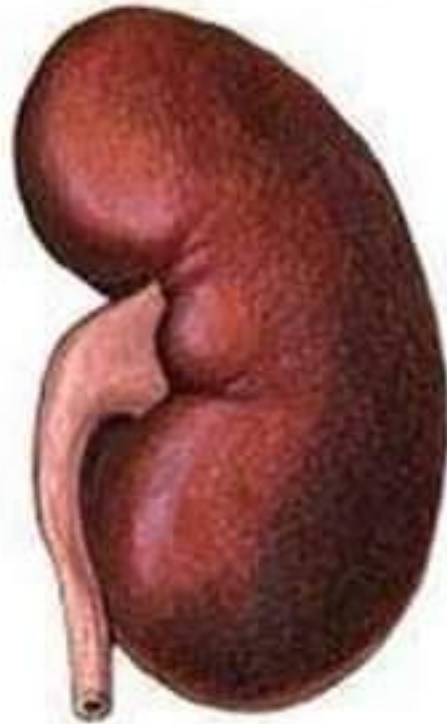
Diabetic Retinopathy



- Diabetes causes an excessive amount of glucose to remain in the blood stream which may cause damage to the blood vessels. Within the eye the damaged vessels may leak blood and fluid into the surrounding tissues and cause vision problems.

Diabetic Nephropathy

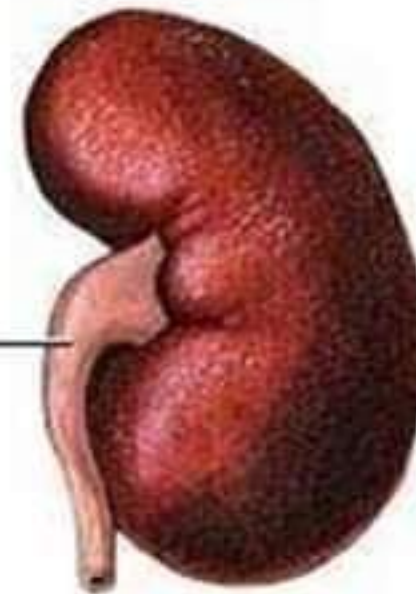
Normal kidney



- healthy function
- proper size
- low urine protein



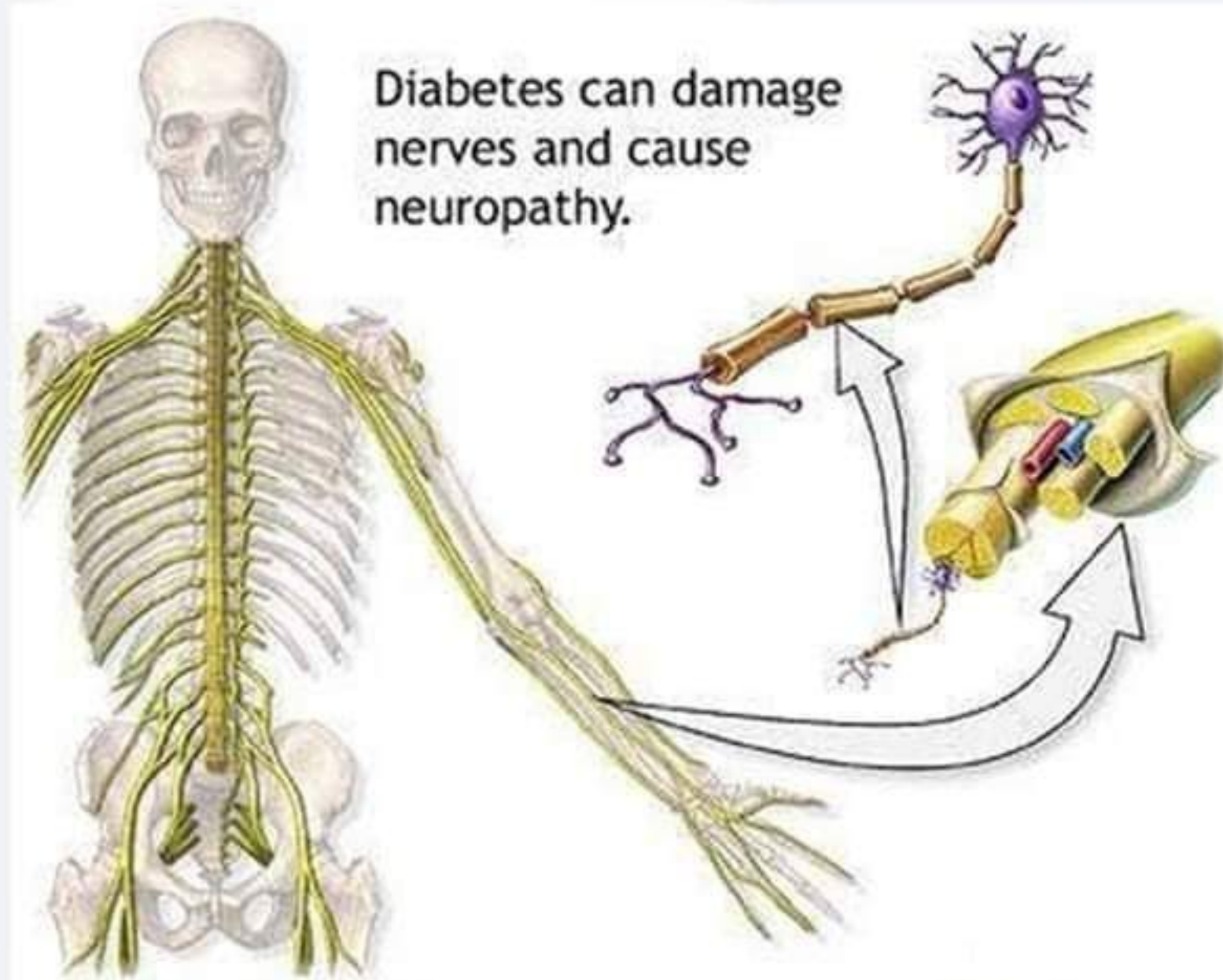
Kidney disease



- granular surface
- decreased function
- smaller size
- high urine protein

- The kidney becomes damaged and more protein than normal collects in the urine. Over time, the kidney's ability to function starts to decline, which may eventually lead to chronic kidney failure.

Diabetic Neuropathy



- Diabetes can damage the nerves. This generally begins as loss of sensation in the toes, and possibly fingers.

Macrovascular (Large vessel) Complications

- Due to high blood glucose levels and damage to vessels.
 - Stroke
 - Cardiovascular disease
 - Peripheral Vascular disease

Diabetic foot Disease

- Combination of Neuropathy and vascular disease, which may be severe enough to cause tissue damage in the legs and feet.
- Diabetic foot disease is the number 1 reason for amputation.



Date: 7/15/22 Site: Right breast
Client: [REDACTED]
I.D.#: 12744
L 11.7 x W 3.5 x D 1.4 cm
Approx. 100 g
cm 0 1 2 3 4 5

