

# Type 3c Diabetes

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# Overview

- What is Diabetes.
- Diabetes:classification
- What is Type 3c Diabetes
- Characteristics and differences from other types of diabetes
- Prevalence
- Diagnosis



# What is Diabetes?

Diabetes is a condition where the amount of glucose in the blood is too high.

This can be due to the inability of the body to produce insulin, or the insulin that is produced is not being used properly.

# Poll Question



# What is insulin for?

- We eat food (carbohydrates)

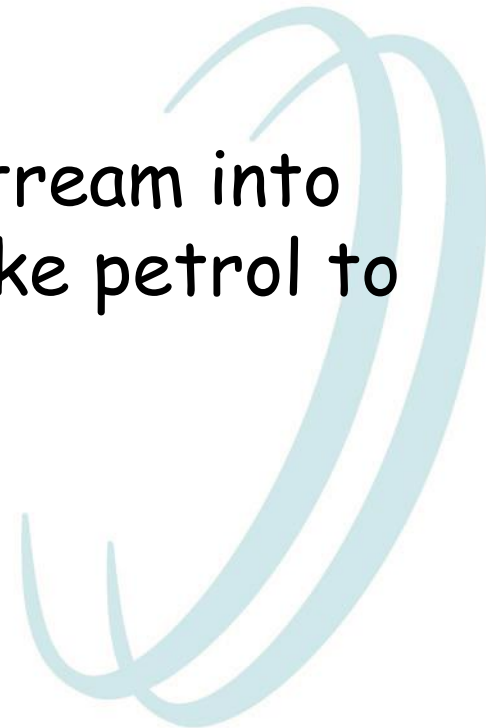


# What is insulin for cont.

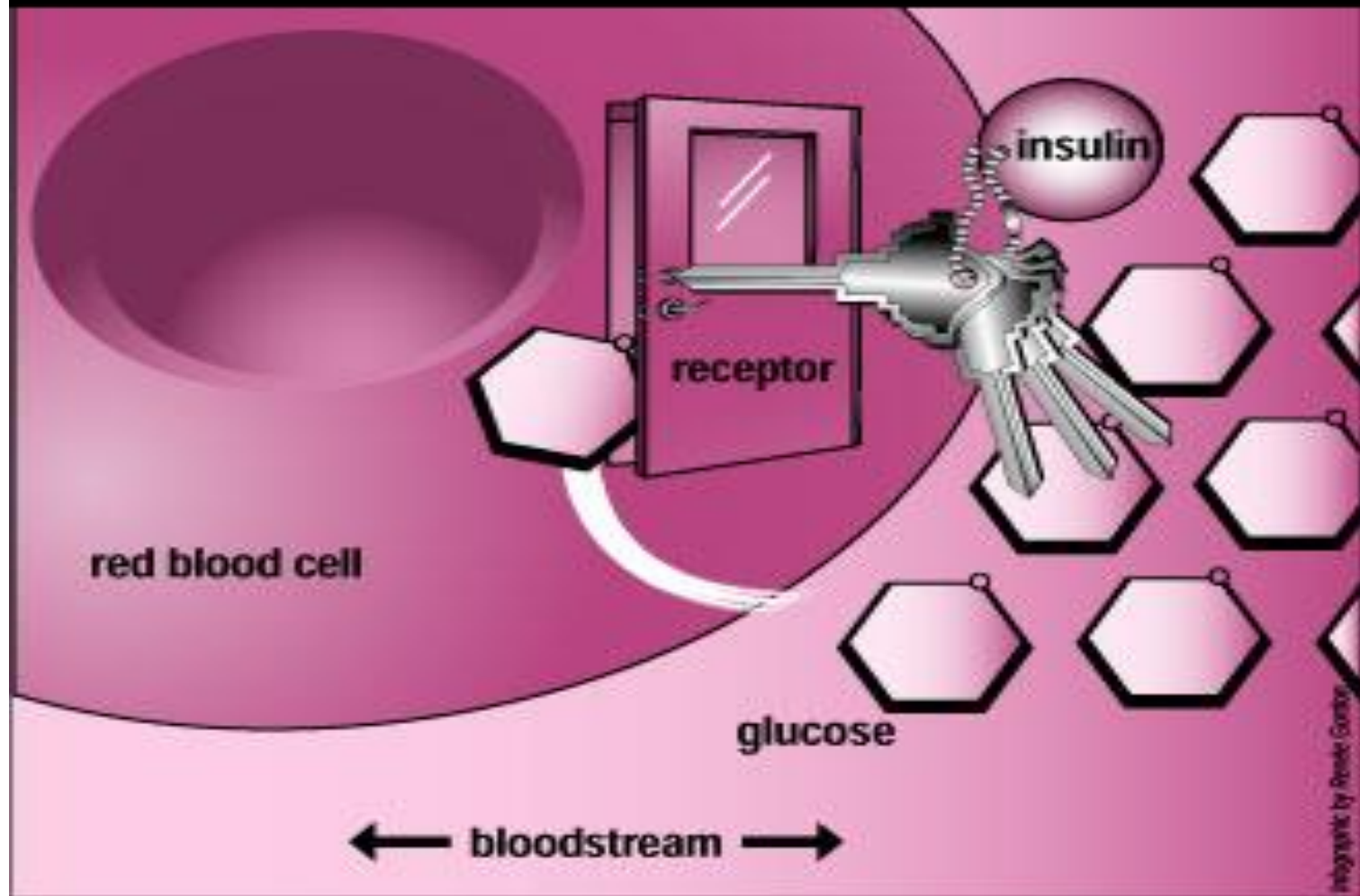
- Our bodies turn carbohydrate into sugar
- This sugar circulates in the bloodstream
- We need to get it from the bloodstream into the body cells to provide energy (like petrol to a car engine)



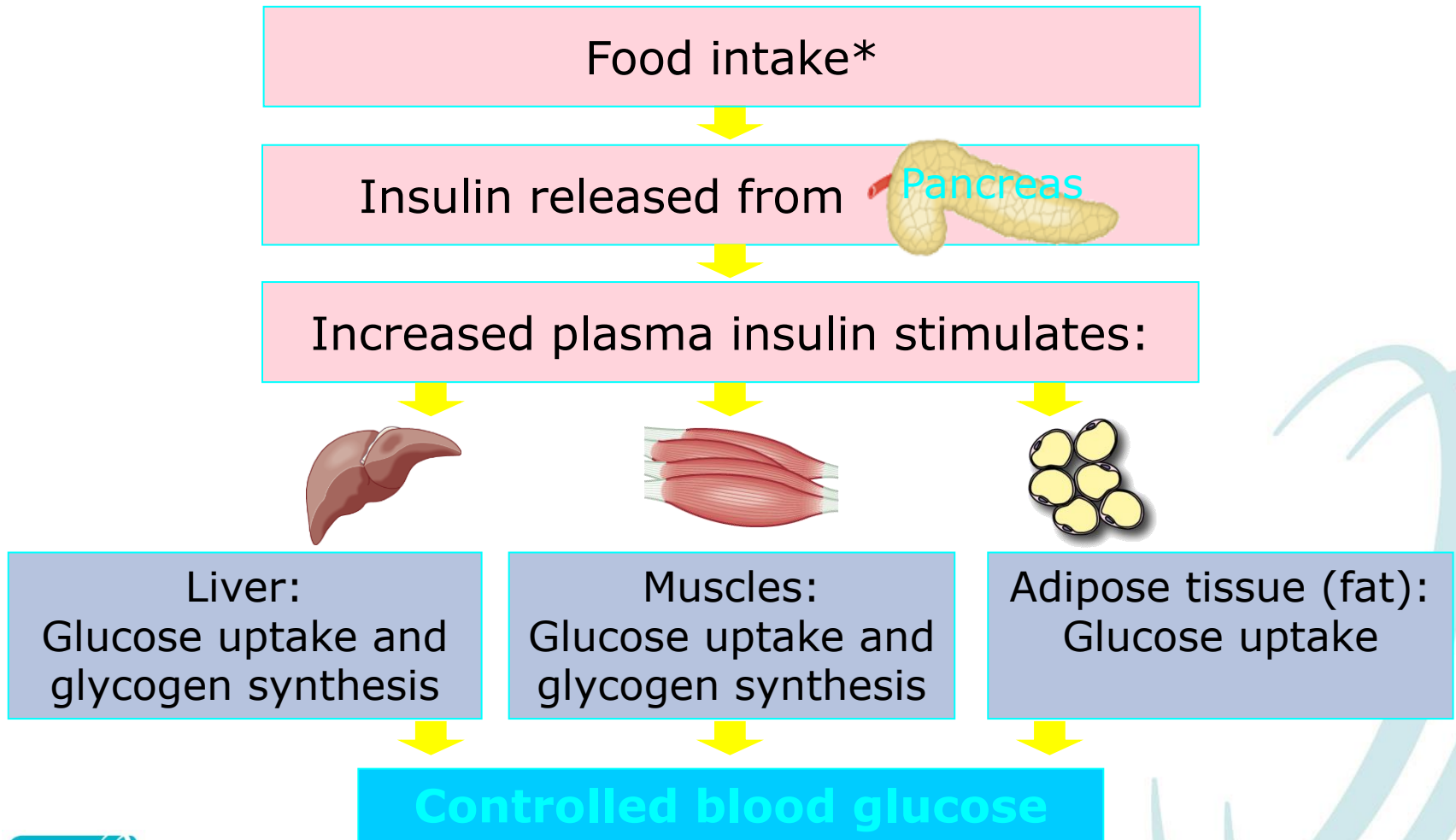
INSULIN does this



# The Role of Insulin



# How insulin works





# TYPES

- Type 1 (insulin dependant)
- Type 2
- MODY ( maturity onset diabetes of the young)  
6 sub-types
- LADA ( latent autoimmune diabetes in adults) -  
type 1.5
- Gestational diabetes
- Type 3c
- Secondary causes

# Type 1

- The beta cells (insulin producing cells in the pancreas) have been destroyed therefore the pancreas STOPS making insulin

Complete lack of insulin

Auto-immune / genetic factors

Usually in younger people



# MAIN SYMPTOMS OF TYPE 1

- Increased thirst
- Passing more urine than usual, especially at night
- Extreme tiredness
- Weight loss

Dramatic onset (compared with type 2)  
due to cessation of insulin production



# Type 2

- Pancreas can make some insulin-but not enough
- The insulin that is produced does not work properly

Reduced levels of insulin

Body is resistant to insulin that is produced

Certain risk factors can lead to this



# MAIN SYMPTOMS OF TYPE 2

May initially present with:-

- Thrush infections (genital)
- Erectile dysfunction
- Blurred vision
- Slow healing of cuts and wounds

As in Type 1:-

- Increased thirst
- Passing more urine than usual, especially at
- Extreme tiredness
- Weight loss



However...

Sometimes there is an absence of noticeable symptoms

# Definition & Characteristics

## Type 3c

- Type 3c diabetes is **diabetes secondary to pancreatic disease / damage to the pancreas**
- Also known as **pancreatogenic diabetes**
- Characterised by **progressive insulin deficiency.**

# Characteristics

Parameter	Type 1 IDDM	Type 2 NIDDM	Type 3c Pancreatogenic
Ketoacidosis	Common	Rare	<u>Rare</u>
Hyperglycemia	Severe	Usually mild	<u>Mild</u>
Hypoglycemia	Common	Rare	<u>Common</u>
Peripheral insulin sensitivity	Normal or increased	Decreased	<u>Increased</u>
Hepatic insulin sensitivity	Normal	Normal or decreased	<u>Decreased</u>
Insulin levels	Low	High	Low
Glucagon levels	Normal or high	Normal or high	Low
PP levels	Normal or low (late)	High	Low
GIP levels	Normal or low	Normal	Low
GLP1 levels	Normal	Normal or low	Normal or high
Typical age of onset	Childhood or adolescence	Adulthood	Any

IDDM, insulin-dependent diabetes mellitus; NIDDM, non-insulin-dependent diabetes mellitus; PP, pancreatic polypeptide; GIP, glucose-dependent insulinotropic polypeptide; GLP1, glucagon-like peptide 1. Modified, with permission, from Slezak LA & Andersen DK 2001 Pancreatic resection: effects on glucose metabolism. *World Journal of Surgery* **25** 452–460. Copyright 2001 International Society of Surgery.

# Poll Question





# Prevalence of Type 3c diabetes

- **5%-10%** of all diabetes mellitus cases in Western populations
- Chronic pancreatitis accounts for up to **80%** of all type 3c diabetes mellitus cases
- Could be higher as often cases are misclassified

(Ewald & Hardt, 2013)

# Conditions related to Type 3c Diabetes

- Pancreatitis
- **Pancreatic cancer**
- Cystic fibrosis
- Haemochromatosis.



If you have pancreatic cancer there is a high risk of developing diabetes ie: poor glycaemic control

If you have Type 1 or Type 2 diabetes there increased risk of developing pancreatic cancer – linked to pancreatic atrophy

# Pancreatic Cancer and Diabetes

- New-onset diabetes can be an early warning sign of the presence of pancreatic cancer, and individuals with new-onset diabetes are a high-risk group for pancreatic cancer.
- Approximately 1% of individuals (1 in 100) diagnosed with new onset type 2 DM (T2DM) have undiagnosed pancreatic cancer. This group of individuals actually has pancreatic cancer associated DM, although it is mistakenly diagnosed as T2DM.
- Currently individuals with new-onset DM are not screened for pancreatic cancer as there are no reliable tests to distinguish between T2DM and pancreatic cancer associated DM



# Diagnosis

**Table 2 Proposed diagnostic criteria for type 3c diabetes mellitus**

Major criteria (must be present)

Presence of exocrine pancreatic insufficiency (monoclonal fecal elastase-1 test or direct function tests)

Pathological pancreatic imaging (endoscopic ultrasound, MRI, CT)

Absence of type 1 diabetes mellitus associated autoimmune markers

Minor criteria

Absent pancreatic polypeptide secretion

Impaired incretin secretion (*e.g.*, GLP-1)

No excessive insulin resistance (*e.g.*, HOMA-IR)

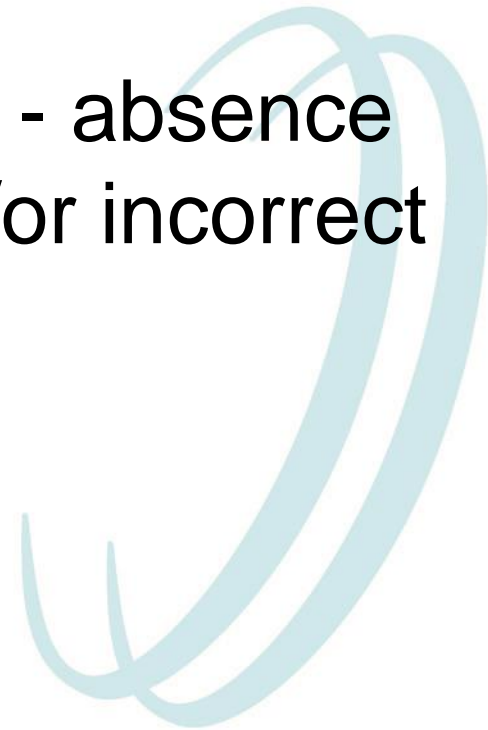
Impaired beta cell function (*e.g.*, HOMA-B, C-Peptide/glucose-ratio)

Low serum levels of lipid soluble vitamins (A, D, E and K)

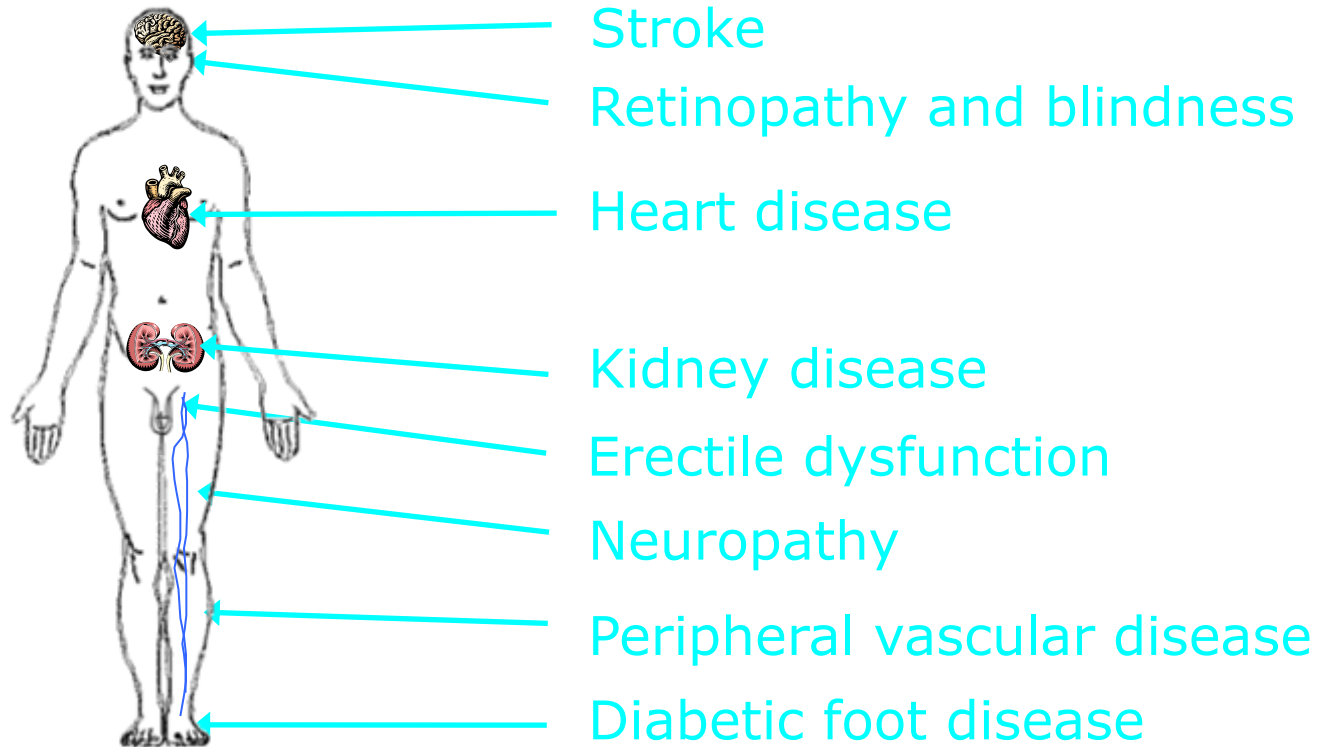
MRI: Magnetic resonance imaging; CT: Computed tomography; GLP-1: Glucagon-like peptide-1; HOMA-IR: Homeostasis model assessment of insulin resistance; HOMA-B: Homeostasis model assessment of beta-cell.

# Issues

- Lack of Awareness
- “Brittle Diabetes”
- Pancreatic Exocrine Insufficiency - absence of PERT, inadequate dosing and/or incorrect use
- Undernutrition



# Poor glucose control is associated with increased risk of complications



Diabetes is a serious condition; there is no such thing as 'mild diabetes' or a 'touch of diabetes'

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