



Med Lab: Cracking the Code of Diabetes

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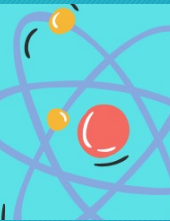
Andy Honda, MD

- Andy was born and raised in Hawaii, where she learned that anything is possible when you follow your dreams. For her, that dream was medicine. She earned her doctorate, became a published clinical researcher, and built a career on the belief that **knowledge is power**. Now, she's taking that passion to empower others
- Andy's passion is the key ingredient to success—she combines her deep love for medicine with a drive to make a difference in every aspect of life
- That's why she created **The Med Lab**—a space dedicated to **making learning medicine and science fun and approachable for everyone**. By breaking down complex topics, The Med Lab helps people **learn with confidence and curiosity**





SPARKS



**MORE THAN
420 MILLION PEOPLE
HAVE DIABETES**



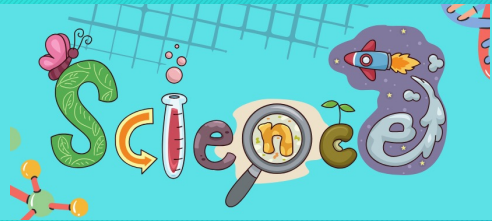
Overview

- What is Diabetes?
- Epidemiology & Burden of Disease
- The Two Main Types of Diabetes
- Normal Glucose Metabolism
- Pathophysiology of Diabetes
- Risk Factors for Type 2 Diabetes
- Management and Prevention of Type 2 Diabetes
- Living Your Best Life with Diabetes

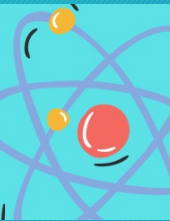
What is Diabetes?

- Your body loves sugar (glucose) for energy! Your body breaks down food into glucose, which is released into your bloodstream
- Diabetes happens when your body has trouble using glucose properly and blood glucose (sugar) is too high
- When blood sugar rises, the pancreas releases insulin, which acts like a key to let glucose into your body's cells for energy
- If the key doesn't work, sugar stays in the blood

Insulin = The key that lets sugar into your cells



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Ancient Egyptians were the first to describe diabetes around 1550 BCE!
They called it the “honey urine disease” because ants were attracted to the sugar in urine!



Frederick Banting (right) joined by Charles Best in office, 1924

Epidemiology & Burden of Disease

DIABETES A US REPORT CARD



About 38 million
people **have diabetes**

DIABETES



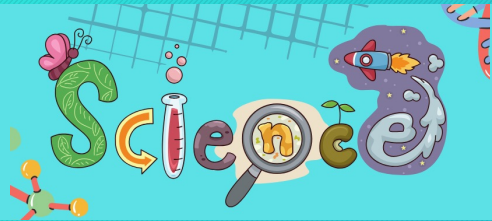
That's about **1 in every**
10 people



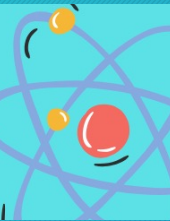
1 in 5 people don't
know they have it



Diabetes is the **8th** leading
cause of death



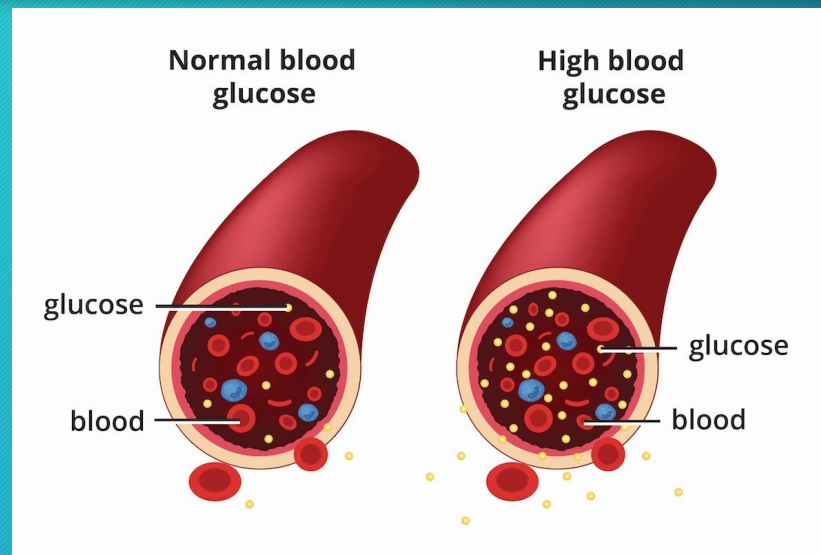
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The country with the highest diabetes prevalence?

The Pacific island of Nauru, where over 40% of adults have diabetes!

Normal Glucose Metabolism



You eat → Carbs break down into glucose → Insulin helps glucose enter cells for energy

The Two Main Types of Diabetes

Feature	Type 1	Type 2
Cause	Autoimmune	Lifestyle & genetics
Insulin	Little to none	Body resists insulin
Onset	Children and young adults	Can develop at any age, usually adults
Management	Daily insulin injections	Diet, exercise, meds, insulin

Type 2 is the Most Common Type of Diabetes

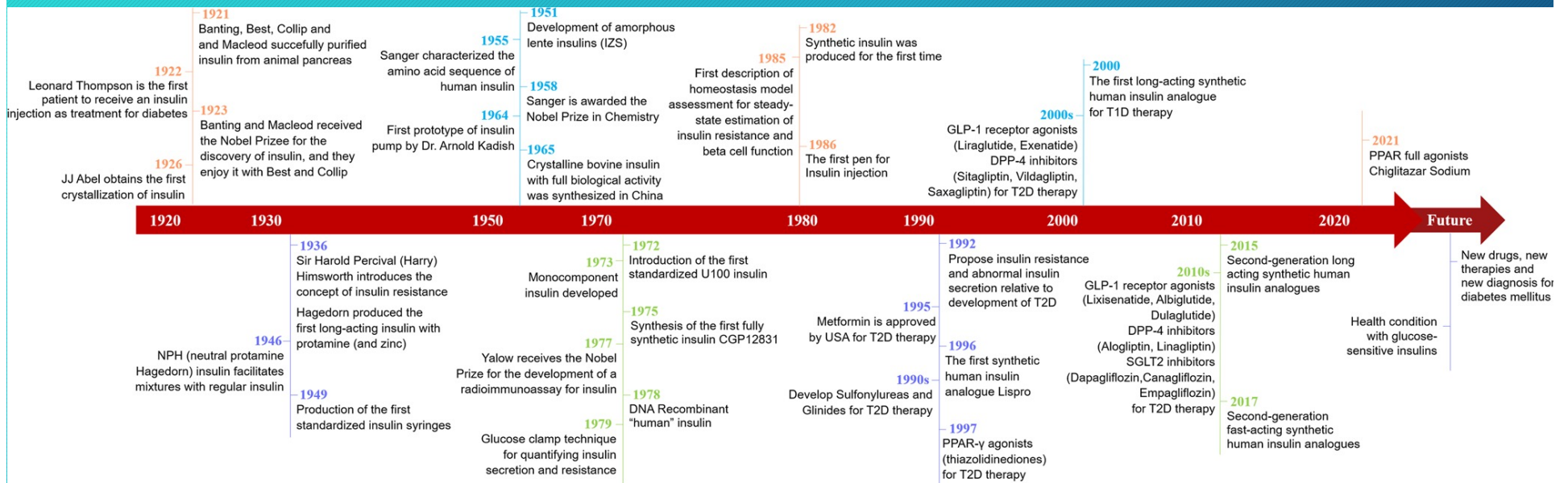
Pathophysiology of Type 2 Diabetes

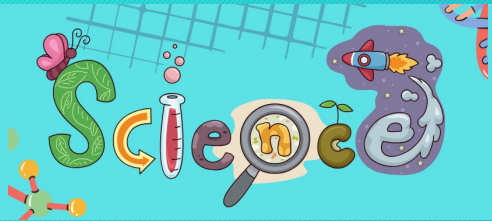
- Insulin Resistance

- Insulin resistance is a central feature of T2DM, characterized by reduced responsiveness of insulin-targeting tissues to normal insulin levels². This occurs through several mechanisms:
 - Defects in insulin signaling: Abnormalities in the insulin signaling pathway, including reduced activity of insulin receptor tyrosine kinase (IRTK), insulin receptor substrate 1 (IRS1), phosphatidylinositol 3-kinase (PI3K), and protein kinase B (AKT)
 - Impaired glucose transport: Defects in the translocation of glucose transporter 4 (GLUT4) to the cell membrane, limiting glucose uptake into cells
 - Ectopic lipid accumulation: Excess fatty acids in muscle and liver tissues contribute to insulin resistance

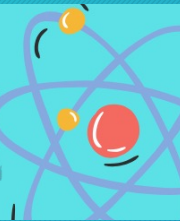
Trends in Insulin Resistance

A timeline of key discoveries in our understanding of insulin and insulin resistance

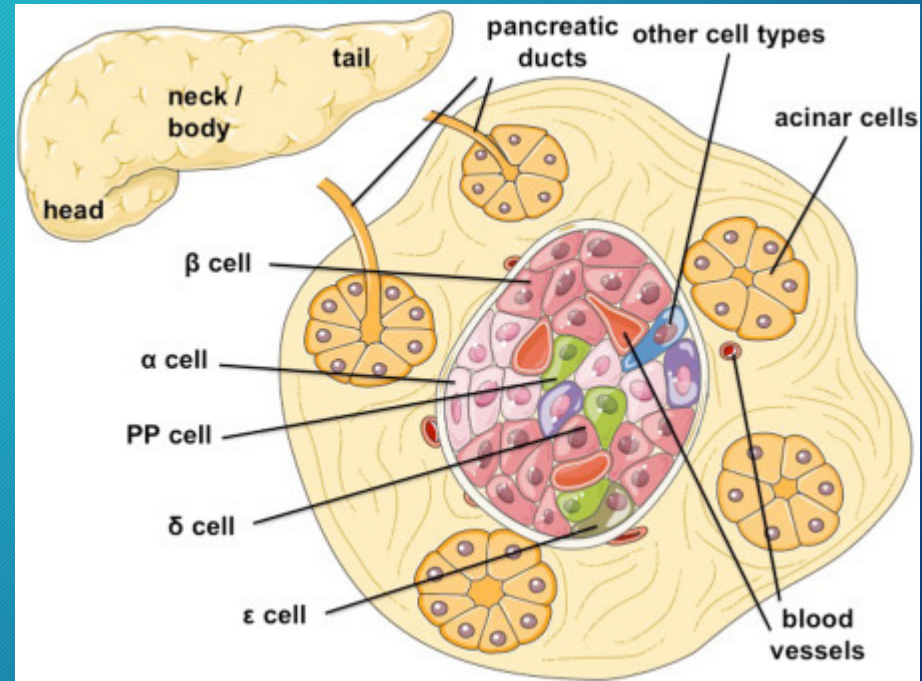


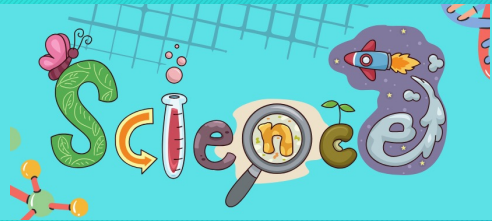


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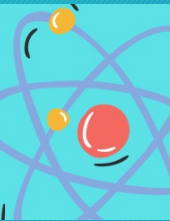


The pancreas has tiny insulin-producing “islands” called the Islets of Langerhans!





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DID YOU KNOW?
Dogs are trained to detect diabetes!

Diabetic Alert Dogs (DADs) can detect changes in their owner's blood sugar levels through scent.

Swipe for fun facts about DADs

The complex block features a golden retriever on the left. To its right is a blue circle containing the text 'DID YOU KNOW? Dogs are trained to detect diabetes!'. Below the dog and circle is a blue banner with the text 'Diabetic Alert Dogs (DADs) can detect changes in their owner's blood sugar levels through scent.' and a small instruction 'Swipe for fun facts about DADs'.

Blood Sugar – Too High or Too Low?

- Hyperglycemia (too high) = Thirsty, tired, blurry vision
- Hypoglycemia (too low) = Dizzy, shaky, confused

- The goal? Keep blood sugar just right—like Goldilocks and her porridge!

Risk Factors for Type 2 Diabetes

Non-modifiable Risk Factors

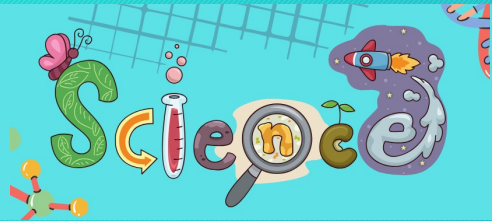
- **Age:** The risk increases as you get older, especially after age 45
- **Family history:** Having a parent or sibling with type 2 diabetes increases your risk
- **Race and ethnicity:** African Americans, Hispanic/Latino Americans, American Indians, Alaska Natives, Pacific Islanders, and some Asian Americans are at higher risk
- **History of gestational diabetes:** Women who developed diabetes during pregnancy have an increased risk later in life

Modifiable Risk Factors

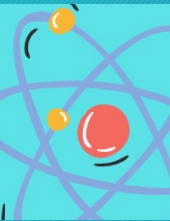
- **Weight:** Being overweight or obese is a primary risk factor
- **Physical inactivity:** Less than 150 minutes of moderate-intensity exercise per week increases risk
- **Diet:** Poor diet, including high consumption of sugar-sweetened drinks and refined carbohydrates, contributes to risk
- **Body fat distribution:** Storing fat mainly in the abdomen rather than hips and thighs indicates greater risk
- **Blood pressure:** Untreated high blood pressure is linked to diabetes complications
- **Smoking:** Tobacco use appears to increase the risk of type 2 diabetes
- **Sleep patterns:** Lack of sleep has been linked to increased risk

Diabetes Symptoms





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A brisk 30-minute walk can lower blood sugar for up to 24 hours!
Time to lace up those sneakers!

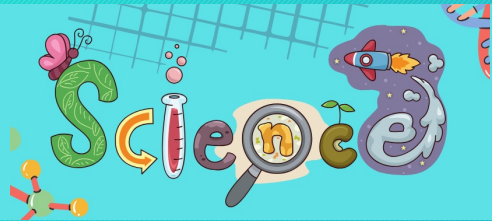


Management and Prevention of Type 2 Diabetes

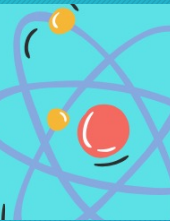
- Maintain a healthy diet
- Exercise daily, stay active—find something fun
- May require medication, insulin or other prescribed treatments
- Regular check-ups—your doctor is your teammate!

Myth-Busting Time!

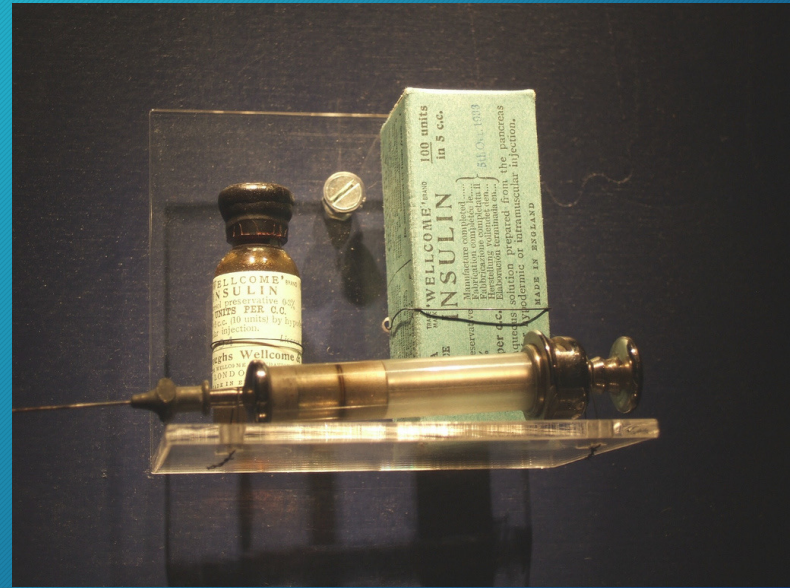
- “Eating sugar causes diabetes” – MYTH!
- “Only overweight people get diabetes” – Nope! Anyone can develop it
- “Diabetes isn’t serious” – FALSE. If not managed, it can cause complications



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The first insulin injection was given in 1922—before that, diabetes was untreatable!



Living Your Best Life with Diabetes

- Millions thrive with diabetes—it's manageable!
- Support system = doctors, dietitians, and family
- Be proactive and keep learning!

Key Takeaways

- Diabetes is all about blood sugar control
- Type 1 = No insulin; Type 2 = Insulin resistance
- Healthy lifestyle choices can help prevent and manage Type 2 diabetes.
- Regular monitoring and medical care are essential
- You can live a full and active life with diabetes!



Thank You