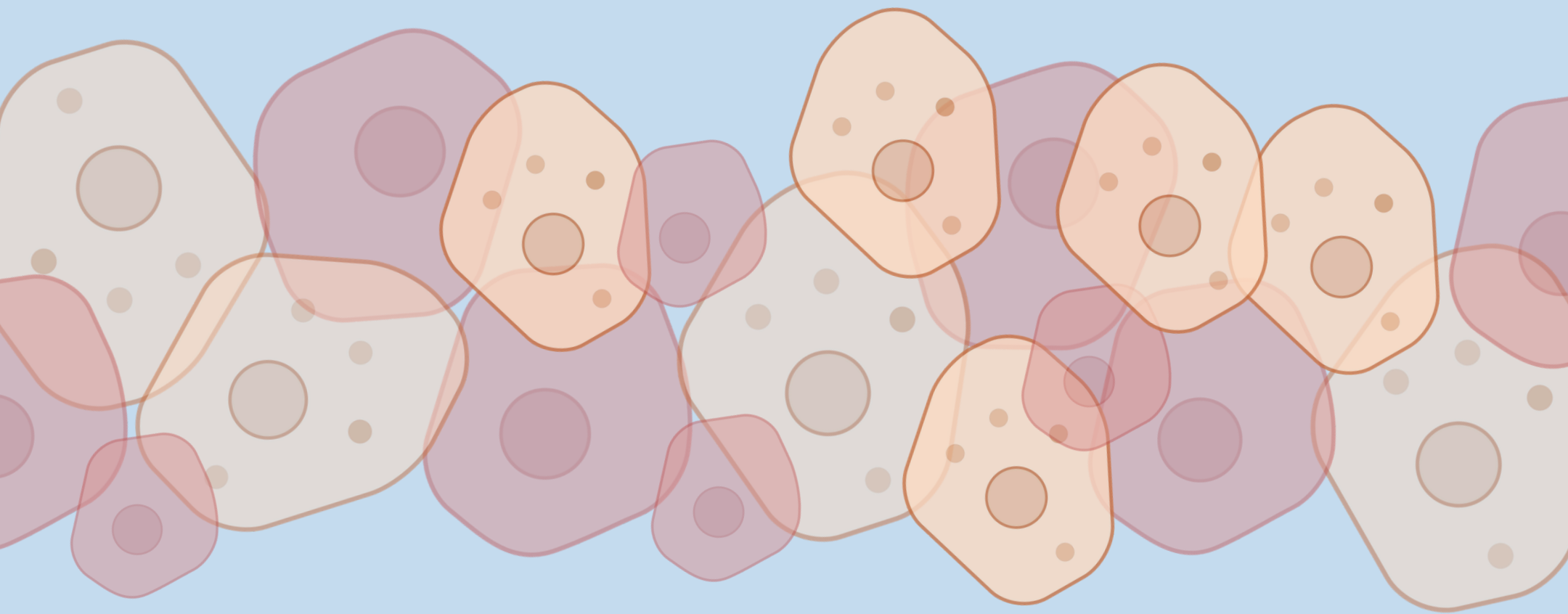


26 YEARS

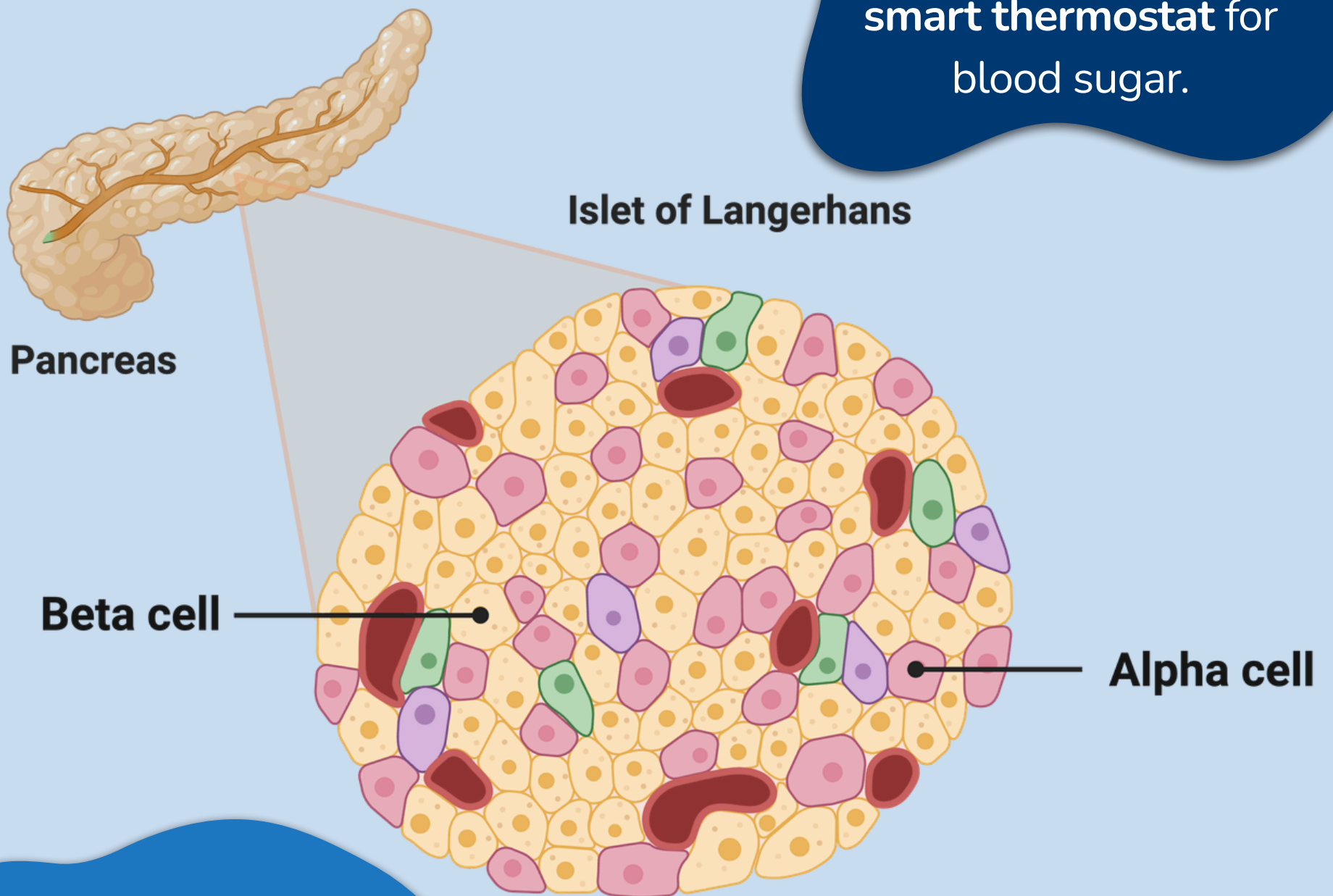
OF PROGRESS IN CELL THERAPY FOR TYPE 1 DIABETES

For 26 years, researchers and people with diabetes have been working toward one goal: restoring insulin made by the body.



WHAT ARE ISLETS?

Tiny cell clusters in your pancreas that act like a **smart thermostat** for blood sugar.



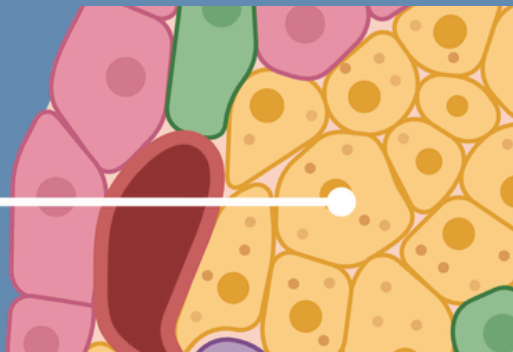
Different cells working together to form the **body's blood sugar control system**.

Scan to get the images



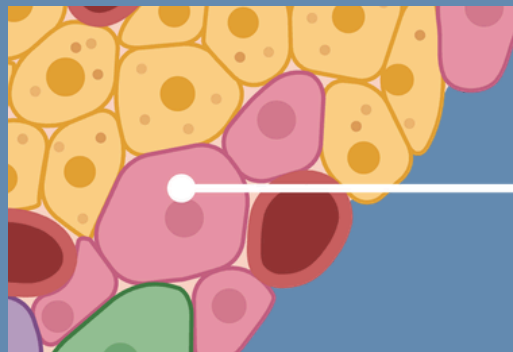
WHAT DO ISLETS DO?

Beta Cell

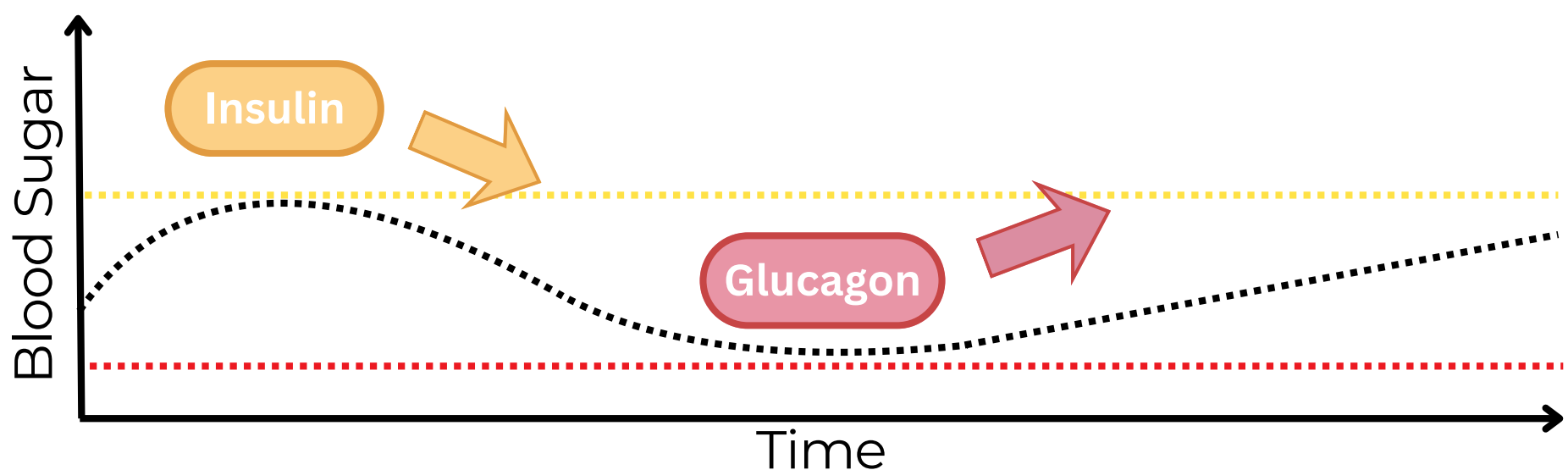


BETA CELLS are the “lead actors,” releasing insulin when blood sugar goes up and stopping the release of insulin when blood sugar goes down.

Alpha Cell



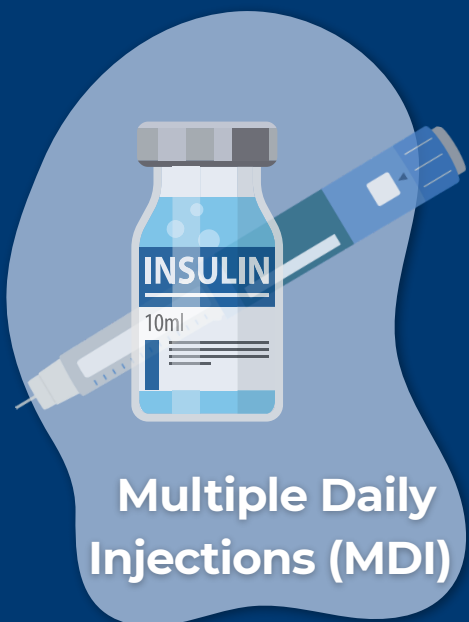
ALPHA CELLS are the “supporting actors,” supporting the work of beta cells by releasing glucagon when blood sugar goes down.



TYPE 1 DIABETES

In Type 1 Diabetes, the immune system destroys beta cells, so insulin must be injected instead

Main Treatment Options:



“

“Counting carbs, reading labels, responding to both high and low blood sugar levels coupled with frequent trips to the emergency room. I became a full time student on how to manage diabetes, however with all of my efforts there was little success.” - Nina, T1D 21yrs, MDI

”

THE BREAKTHROUGH

THE EDMONTON PROTOCOL (1999)



THE FIRST REAL SUCCESS:

- All 7 participants were able to stop taking insulin for at least one year

WHAT MADE THE DIFFERENCE?

- Expert extraction of islets and a new combination of more islet-friendly anti-rejection drugs

NO MORE SEVERE LOWS!

- All participants stopped having dangerous low blood sugar events

PATIENT PERSPECTIVES ON ISLET CELL TRANSPLANT



“My mental well-being has significantly improved. I would not trade these past 13 years for anything.”
- Danielle

“My journey with T1D has been arduous, but the islet cell transplants have given me a new lease on life.”
- Deborah

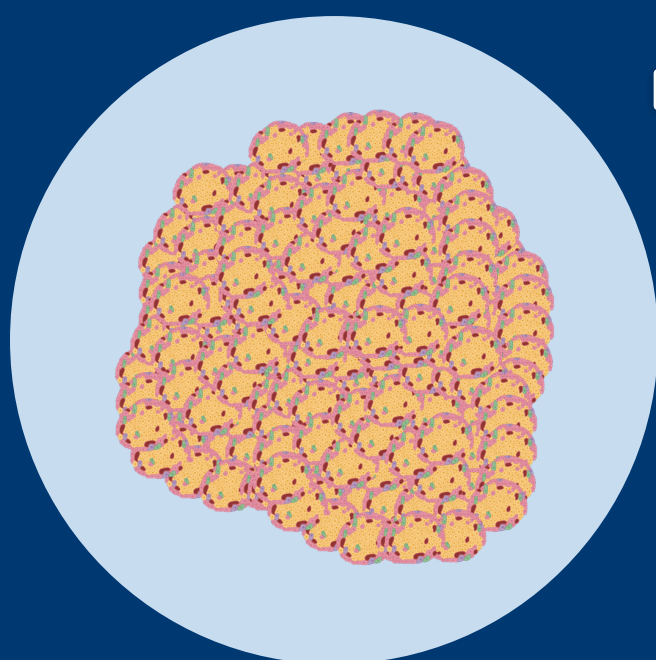


“Sleeping without worrying I wouldn't wake up in the morning was a gift.”
- Jennifer

WHAT MADE THE EDMONTON PROTOCOL WORK?

NEW DRUG COMBINATION

- Dropped steroids (widely used in transplant but cause diabetes)
- Used a new combination of antirejection drugs used in liver transplant



ENOUGH ISLET CELLS

- 2-3 donor pancreases are needed to get one recipient off insulin
- Extracting islets needs a careful balance of chemicals to extract as many as possible without damaging them

CAREFUL PATIENT SELECTION

- Mainly focused on people with Type 1 diabetes experiencing severe, life-threatening low blood sugars - usually without warning symptoms
- Benefits in these cases outweighed the risks of the procedure and immunosuppression

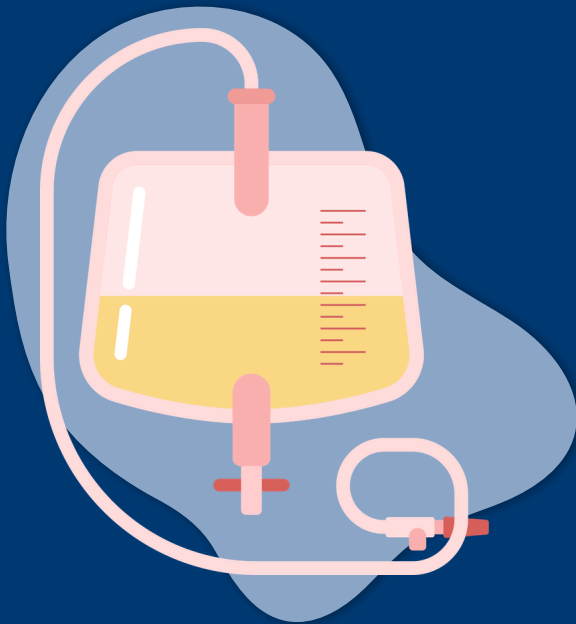


THE GAPS THAT PERSIST



LIMITED DONOR SUPPLY

Islet cells must come from deceased organ donors and not all donors have a healthy pancreas.



INSUFFICIENT ISLETS PER DONOR

A single pancreas rarely provides enough cells, meaning most patients need 2–3 transplants for lasting benefit.



LIFELONG ANTI-REJECTION DRUGS

The body attacks transplanted islets, so daily immune-suppressing medication is required.

GROWING SUCCESS OVER 26 YEARS

1999

7 PATIENTS
15 TRANSPLANTS



2025

331 PATIENTS
784 TRANSPLANTS

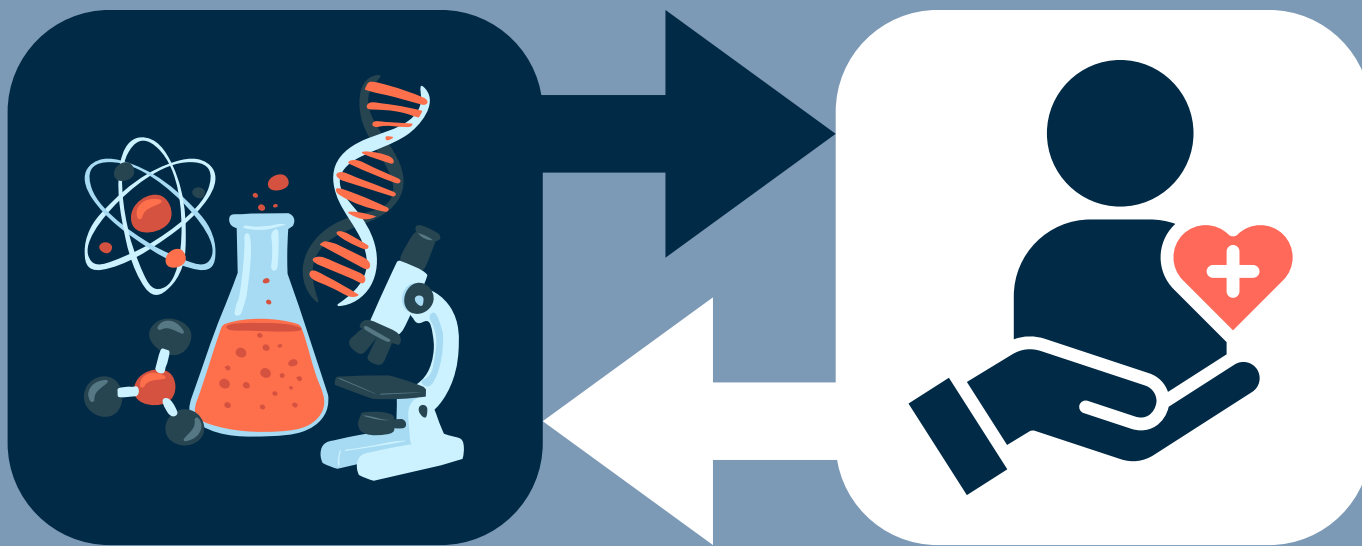


KEY WINS

- First 7 patients (1999) stayed insulin-free with excellent blood sugar outcomes for at least 1 year
- 331 people have received islet transplants at the University of Alberta over 26 years
- Almost 800 transplants performed, since many patients needed 2-3 procedures to achieve insulin independence

FOLLOW THE RESEARCH

In the future, the hope is to expand the availability of islet cell transplant so that this becomes a treatment people can choose, rather than a last-resort option

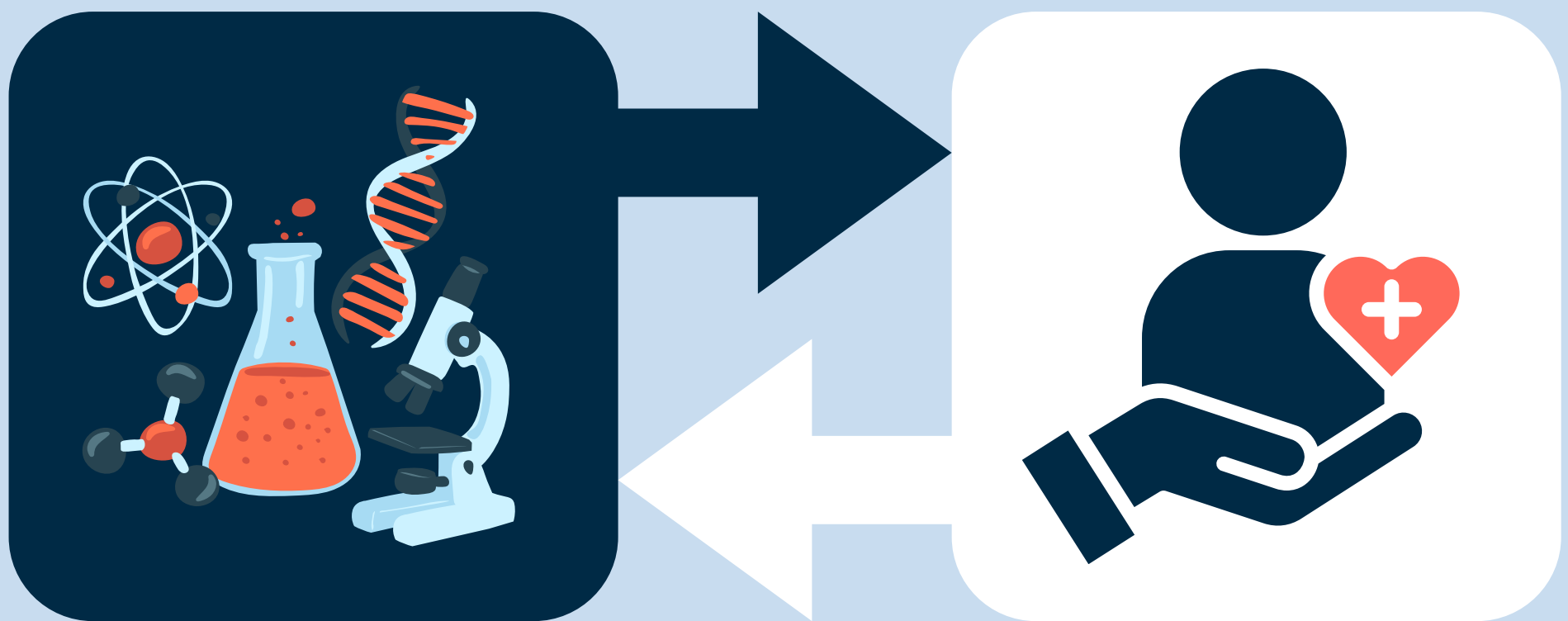


Scan the QR code
to stay up to date
with this project
and research news.



CELL THERAPY TODAY

TURNING RESEARCH INTO CARE



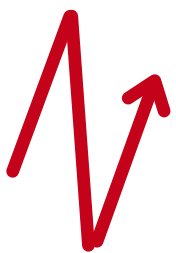
How cell therapy is already changing lives for people with Type 1 diabetes

WHO IS ISLET CELL THERAPY FOR?

Currently, this therapy is mainly offered to people with Type 1 diabetes whose condition/treatment puts them at serious or potentially life-threatening risk.



People who experience frequent and severe low blood sugar episodes which can cause confusion, fainting, accidents, and may be life-threatening.



People with highly unpredictable blood sugar levels.



People who no longer feel early warning signs of low blood sugar. This makes it difficult to recognize or treat low blood sugar in time.

The goal is that this becomes a treatment people can choose, rather than a last-resort option.

HOW IT WORKS: REFERRAL & WAITLIST

A referral to the Islet Transplant Program at the University of Alberta can be made by you, your family doctor, or your diabetes specialist.

The Islet Transplant Program offers information and evaluation for people with Type 1 diabetes

This may include but is not limited to:

- A review of your overall health
- Blood work and other diagnostic tests
- Visits with medical, surgical, and other specialist teams as needed



If an islet cell transplant is right for you, the program will:

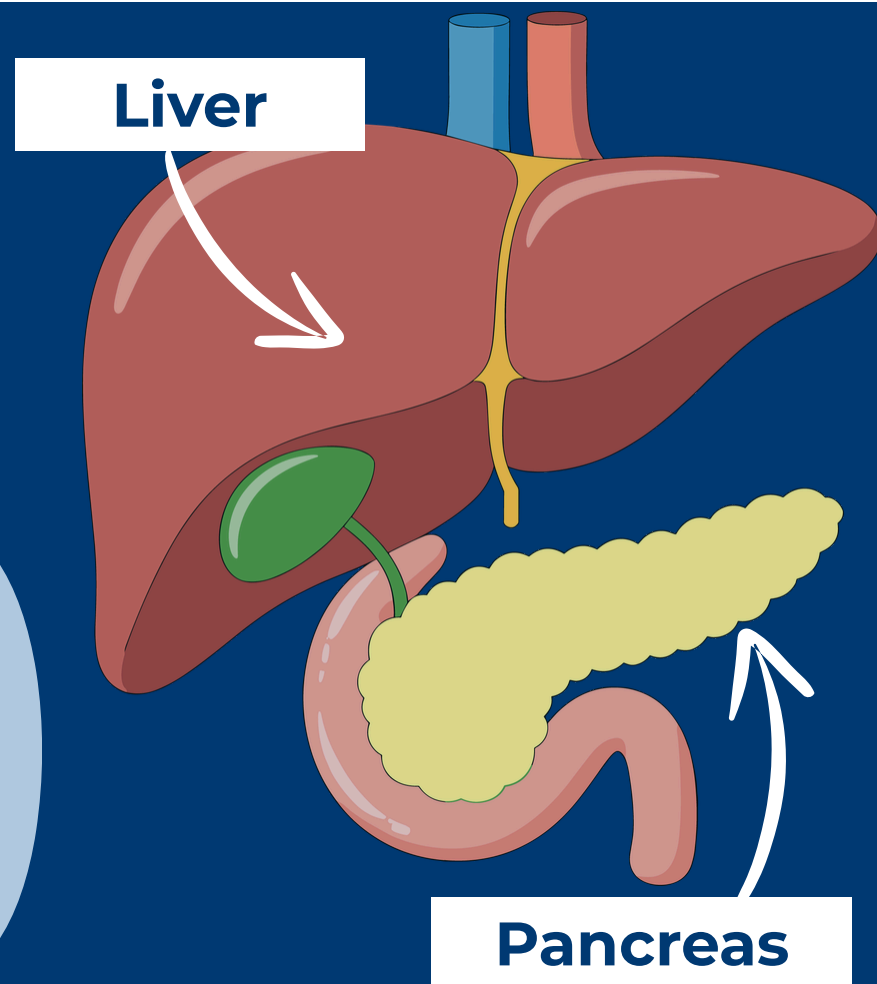
- Place you on the transplant waitlist
- Work with your family doctor and/or endocrinologist to monitor your health while you are waiting
- Provide education, guidance, and support before, during, and after the transplant process

HOW IT WORKS: TRANSPLANT PROCEDURE

Once someone is selected for a transplant and a donor is available...

Step 1: Islets Are Separated

About a teaspoon of islets are carefully extracted from a donated pancreas and prepared for you.



Step 2: You Get Ready

You receive numbing medicine. You'll be awake (but relaxed) while a doctor puts a thin tube into your abdomen. This is not a surgery.

Step 3: Islets Are Given

The islets flow through the tube into the portal vein and the liver. They get lodged in the liver and start regulating blood sugar levels right away.

HOW IT WORKS: POST-PROCEDURE

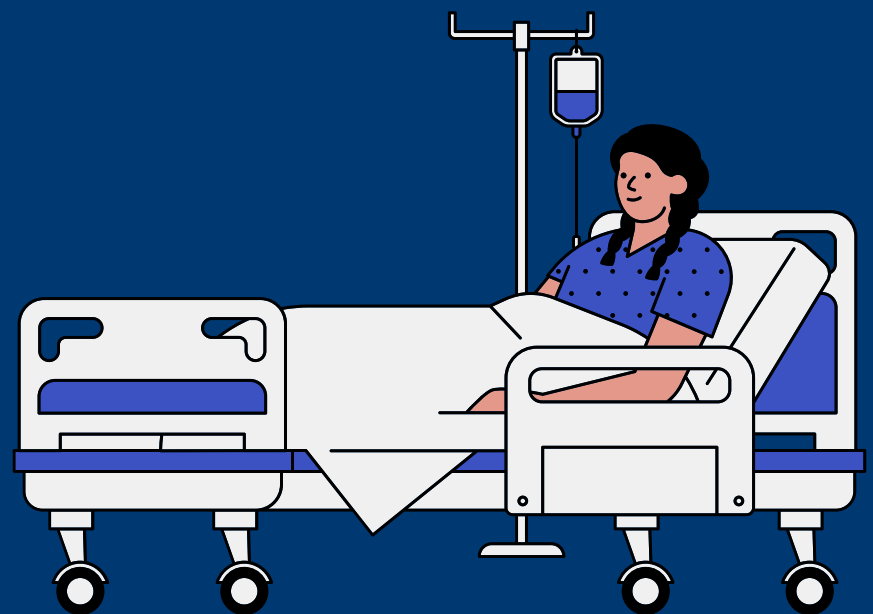


After Transplant

- Islets start making insulin straight away - but take about 4 weeks to fully kick in.
- You rest on your side for a few hours while the team checks for bleeding.
- Most people go home in 1-4 days, with clear instructions for follow-up.

Short-Term Procedure Risks

- About 5 in 100 people have a small bleed or small blood clot in the liver.
- So far, there have been no deaths from this procedure at Edmonton's Clinical Islet Transplant Program.

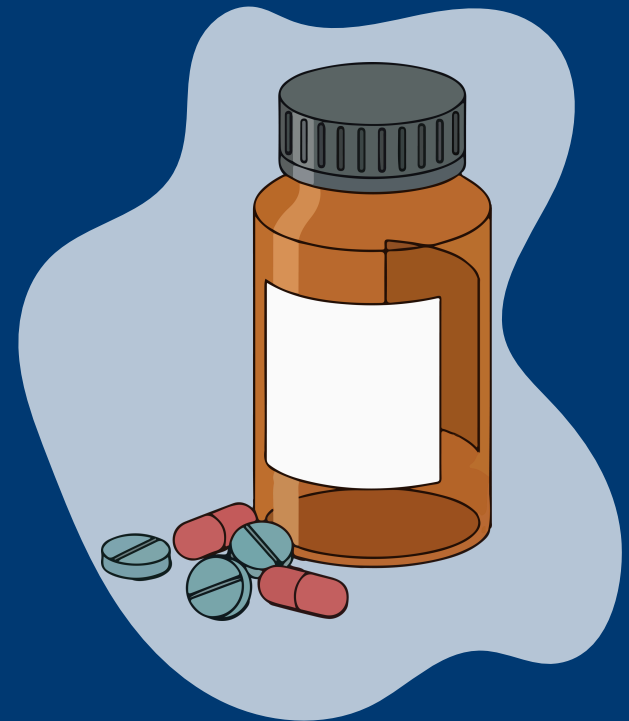


LIFE AFTER TRANSPLANT

AFTER AN ISLET TRANSPLANT

You take daily anti-rejection pills and stay connected with your care team through regular check-ins.

Once you are past the first year, this often looks like blood tests every three months and one clinic visit each year.



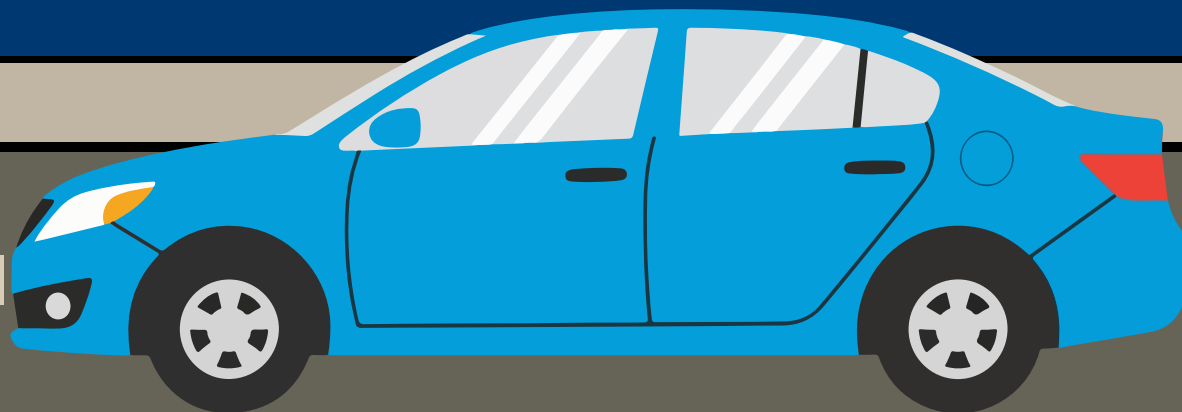
ANTI-REJECTION MEDICINES - POSSIBLE SIDE EFFECTS

- Upset stomach, diarrhea, headache, or shaky hands
- Higher chance of infections
- Over time, higher chance of some cancers and some strain on the kidneys

LIFE AFTER TRANSPLANT

After an islet transplant, some people no longer need insulin. Others still use a small amount, often just one daily long-acting dose.

Staying insulin-free forever can be hard, but the transplant can give strong, lasting protection from severe low blood sugar.



Over time, the islets can slow down and insulin may be needed again. In some cases, a “top-up” transplant can be offered to boost them again, a bit like changing the batteries in a car.

Ongoing research is helping islet transplants work better and last longer, offering hope for the future.

PATIENT PERSPECTIVES



“I have not had one low sugar since my transplant. Mentally I have had such a weight lifted.”

- Karla

“I wish people knew how life changing cell therapy can be. Although it may not be for everyone, it has saved my life.”

- Lori



“Many people are anxious about side effects. For me, the whole transplant process was worth it and I would do it again in a flash.”

- Stephen



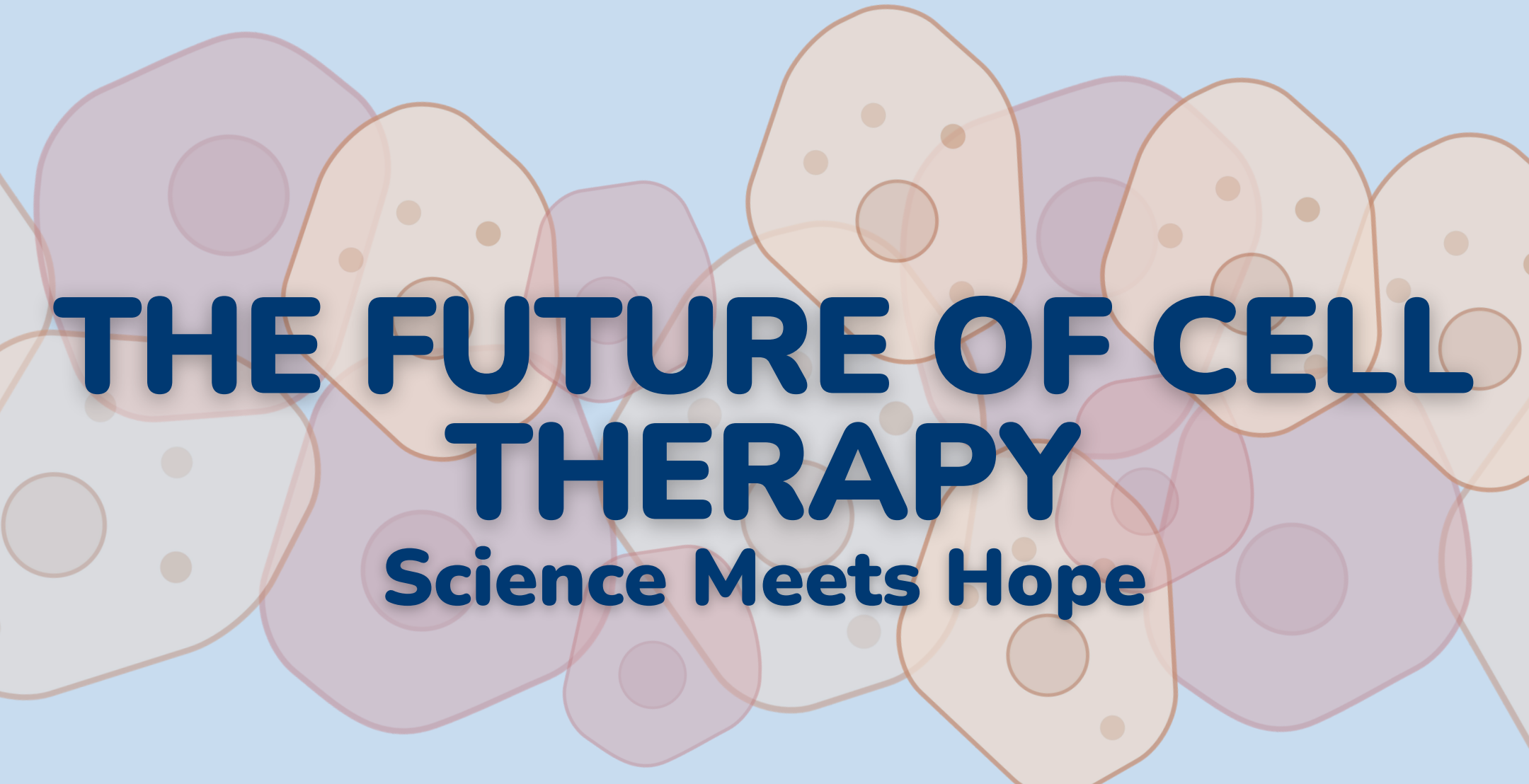
FOLLOW THE RESEARCH

For 26 years, researchers and people with diabetes have been working toward one goal: restoring insulin made by the body.

Stay up to date as this research processes further.

Scan the QR code to stay up to date with this project and research news.





THE FUTURE OF CELL THERAPY

Science Meets Hope

**New research is building on 26
years of progress (and counting...)**

WHERE THE RESEARCH IS HEADED

While islet therapy can work very well, there are trade-offs:

- ✗ Patients must take anti-rejection drugs
- ✗ The immune system can still attack transplanted islets
- ✗ Staying insulin-free long term is often difficult



Researchers are working on solutions that:

- ✓ Increase the supply of islets
- ✓ Protect islets without suppressing the immune system
- ✓ Help transplanted islets survive longer and more reliably
- ✓ Make treatment safer and more widely available

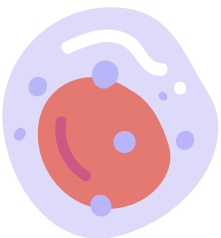


WHAT'S NEXT



Safer Anti-Rejection Medicines

- New drugs aim to protect transplanted cells while reducing side effects from immune suppression.



Islets Made From Stem Cells

- Lab-grown insulin-producing cells designed to replace damaged islets and reduce reliance on donor organs.



Gene-Edited Cells That Hide From the Immune System

- Islet cells are modified to be less visible to the immune system, helping prevent rejection.

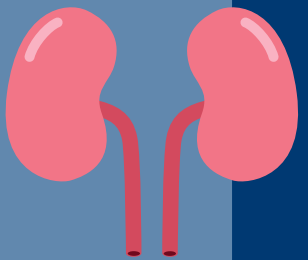
These approaches are not yet available, but researchers are actively developing and testing them to improve the safety, durability, and effectiveness of islet therapy.



SAFER ANTI-REJECTION MEDICINES

The Trade-Offs Today

- These medications can damage the transplanted islets
- Current anti-rejection medications prevent islet rejection but raise risks of infection, cancer, and kidney damage
- This limits who can receive an islet transplant (particularly people with kidney impairment)



CD40 Ligand Blockers

- Instead of shutting down your whole immune system, these new drugs work like a smart dimmer switch
- Targeting only the specific signals that cause rejection while leaving your other defences intact
- They block the “handshake” between immune cells that triggers attacks on transplanted islets



Benefits

- More targeted protection
- Potentially fewer medications
- Better quality of life
- Could make transplants safer for those who can't tolerate current drugs



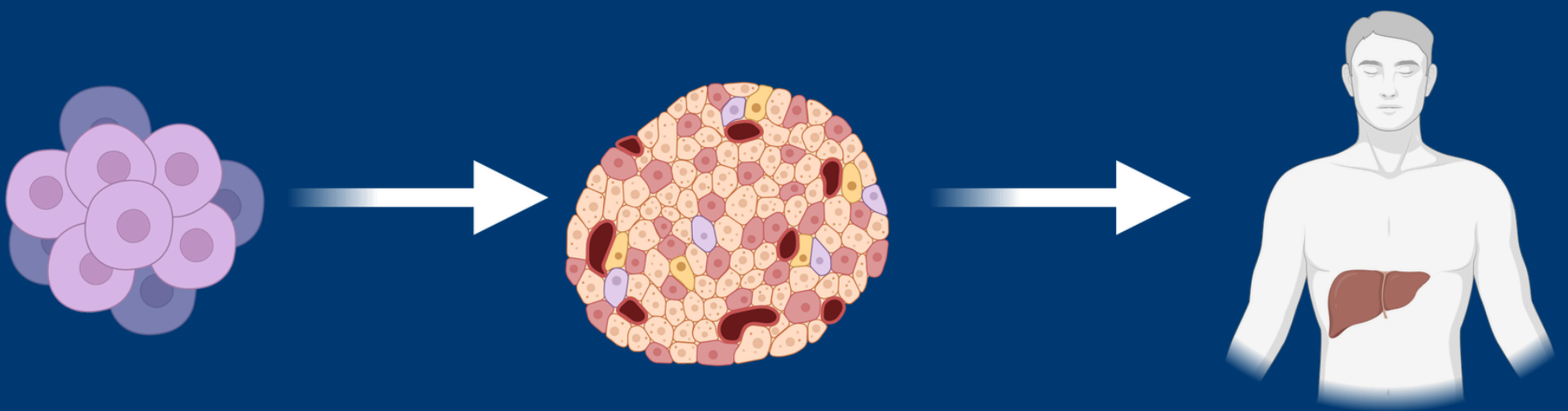
ISLETS FROM STEM CELLS

The Problem

- Right now, islet transplants depend upon deceased organ donors
- There are not enough donors to meet demand

Stem cells - A Solution?

- **Lab grown** Islets from stem cells can give the same results as human donors
- Removes the need for organ donors
- Immune suppression with anti-rejection drugs is still required



ISLETS FROM STEM CELLS

What Was Done

- Insulin-producing islets were developed from stem cells grown in the lab and transplanted into the liver
- Participants took anti-rejection drugs, similar to standard islet transplants
- After transplant, stem cell-derived islets gradually matured, so it took time for them to start controlling blood sugar

What This Could Mean

- No more waiting for donors, transplants can be scheduled
- Consistent quality and quantity of islets
- One transplant might be enough (vs. 2-3 with donor islets)
- More people could access this treatment

Where We Are

- In clinical trials now, early results show 10 out of 12 people stayed insulin-free for at least a year with an islet stem cell treatment called **zimislecel**



Reichman et al., 2025

GENE-EDITED ISLETS

The Problem

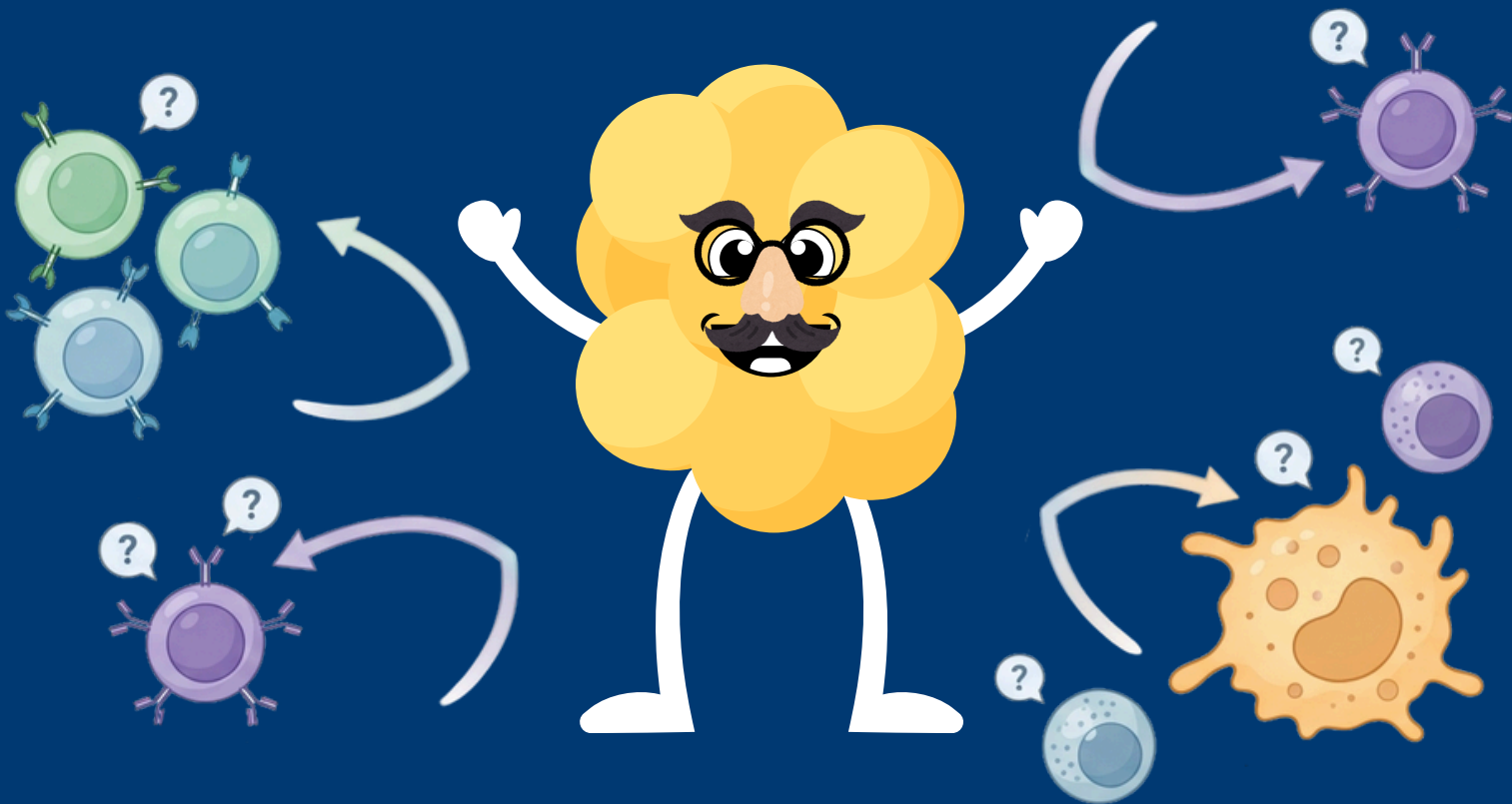
- The immune system attacks transplanted islets, that's why patients need anti-rejection drugs

A Possible Solution

- Research teams are using gene editing tools to modify lab-grown islets so they're "invisible" to the immune system
- Like giving the islet a disguise so your immune system doesn't recognize it

What This Could Mean

- Transplants without lifelong anti-rejection drugs
- Islets that survive longer in the body
- Safer for more people (those who can't take anti-rejection drugs)



GENE-EDITED ISLETS

Where We Are Now

- Researchers transplanted gene-edited insulin-producing cells into one person with Type 1 diabetes, without using anti-rejection drugs
- After 12 weeks, the body did not attack the transplanted cells, and the cells were making insulin and responding normally to sugar levels

Looking Even Further Ahead

Finding a way to combine gene-edited islets with islet stem cells could make transplant options safer and easier for more people:



- **Helps More People:** Stem cells remove donor limits, and gene editing may help those who can't take anti-rejection drugs
- **More Freedom:** Less management and lower risk of medication side effects
- **Reliable Supply:** Lab-grown cells provide consistent insulin production
- **No Donor Needed:** Reduces dependence on donors
- **Longer-Lasting Effects:** Without anti-rejection drugs affecting the islets, they may function better and control blood sugar for longer

Carlsson et al., 2025

LONG-TERM CHALLENGES AHEAD

Existing Challenges

- **Knowledge Gaps:** Limited awareness among patients and healthcare professionals
- **Referral Barriers:** Referrals for islet transplantation and emerging approaches remain limited due to low awareness
- **Clinical Caution:** Some endocrinologists remain apprehensive
- **Funding, Access & Equity:** Ensuring new treatments reach everyone who needs them
- **Patient Voice:** Lived experiences are often underrepresented

Main Goals

- Improve the supply and quality of islets
- Eliminate the need of immunosuppression drugs
- Amplify patient voices to improve the relevance, quality, and effectiveness of care and research in cell therapy and beyond



LOOKING FORWARD

**We've come so far, and the future
may change everything**



**“I am optimistic about future
developments and look forward to
sharing the next chapter.”
- Shauna**

**“When I embarked on my journey 13 years
ago...the Edmonton Protocol offered
something different. I am excited for
research into stem cells.”
- Kathleen**



FOLLOW THE RESEARCH

Scan the QR code
to stay up to date
with this project
and research news.

