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UK T1D Research Consortium
Moving towards insulin-free T1D

Immunotherapy: beyond insulin for Type 1 diabetes, the past, present and future

Colin M Dayan, Birmingham University

UK T1D Research Consortium

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CMD - Disclosures

- I have lectured for or been involved as an advisor to the following companies:

Vielo Bio, Provention Bio, Sanofi, Amarna, Astrazeneca, Shoreline Bio, SAB Therapeutics, Immunocore, Quell, Vertex.

- I hold a patent jointly with Biodexa plc.

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It’s a very exciting time for T1D

VIACYTE

Careers FAQ Contact

COMPANY TECHNOL

ViaCyte’s Stem Cell-Derived Treatment for Type 1 Diabetes Shows Promising Results in Two Published Studies

- Findings from an international, first-in-human clinical trial show that the ViaCyte stem cell-derived therapy can produce insulin in people with type 1 diabetes
- Results from the proof-of-concept study reported in *Cell Reports Medicine* and *Cell Stem Cell*

NEWS

Home | Cost of Living | War in Ukraine | Coronavirus | Climate | UK | World | Business | Politics | Tech

Health

Diabetes artificial pancreas tech recommended for thousands on NHS

10 January

FDA NEWS RELEASE

FDA Approves First Drug That Can Delay Onset of Type 1 Diabetes

For Immediate Release:

November 17, 2022

Today, the U.S. Food and Drug Administration approved Tzield (teplizumab-mzwv) injection to delay the onset of stage 3 type 1 diabetes in adults and pediatric patients 8 years and older who currently have stage 2 type 1 diabetes.

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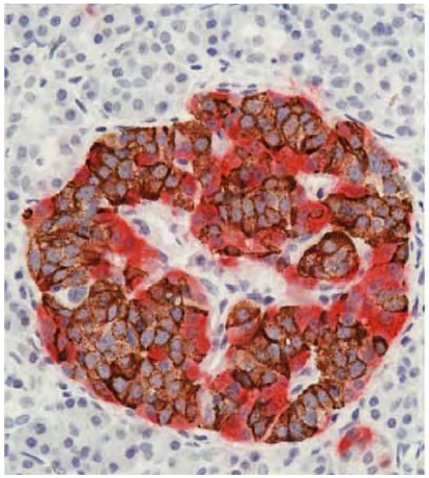
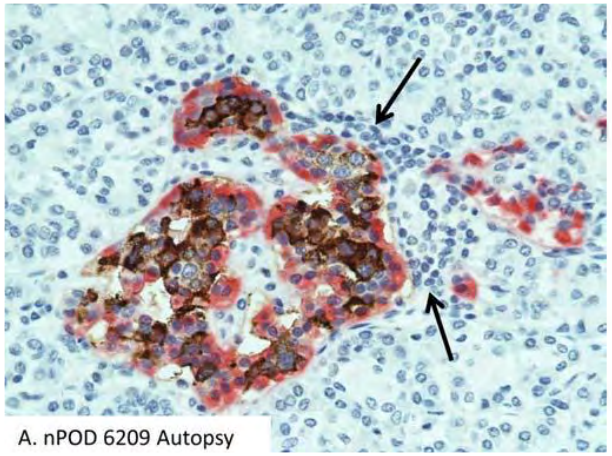
T1D is an autoimmune process

Intact

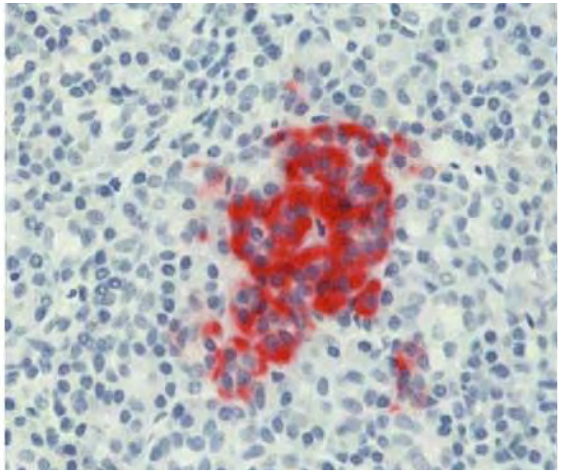


Insulitis



A. nPOD 6209 Autopsy

No insulin



Brown – insulin
Red - glucagon

Morgan et al 2014

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Treating Type 1 Diabetes

- Type 1 diabetes is not primarily a metabolic disease
- Type 1 diabetes is an autoimmune disease which targets the insulin making beta cells
- If we can slow or halt the autoimmune process….we can delay or avoid the need for insulin therapy….

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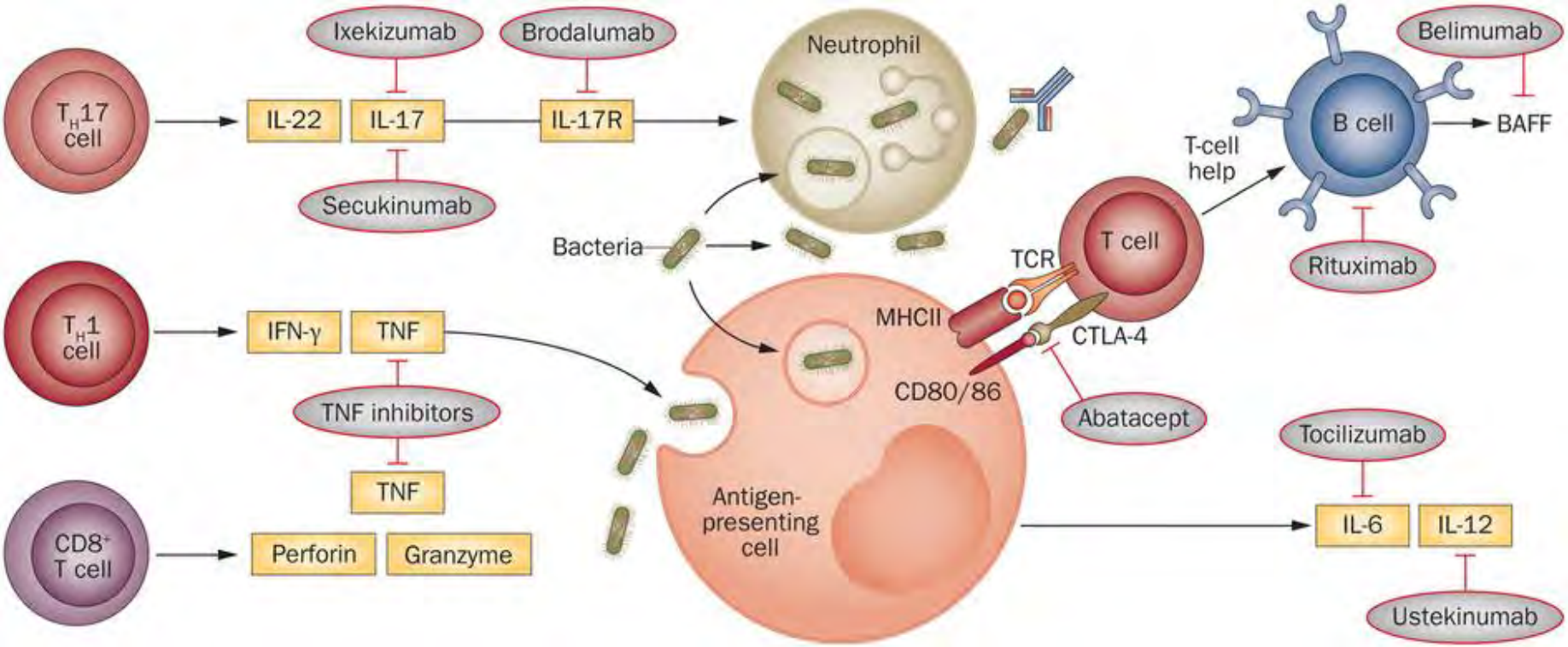
The immune system



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Different types of immunotherapy

Treatment	Example	Risk of side-effects
General Immunosuppression	Drugs use for organ transplants	High
Selective immunosuppression	Newer drugs used for example in arthritis, skin diseases	Low
Boosting immune regulation	“vaccines”, protective cells, drugs to boost protective cells	Very low

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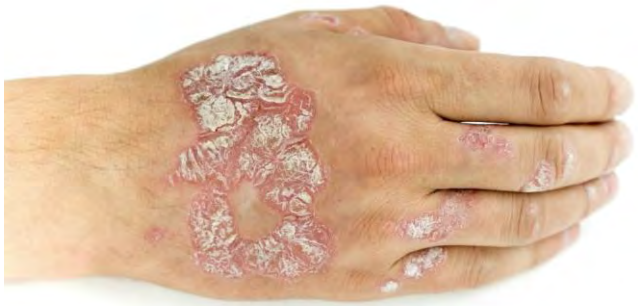
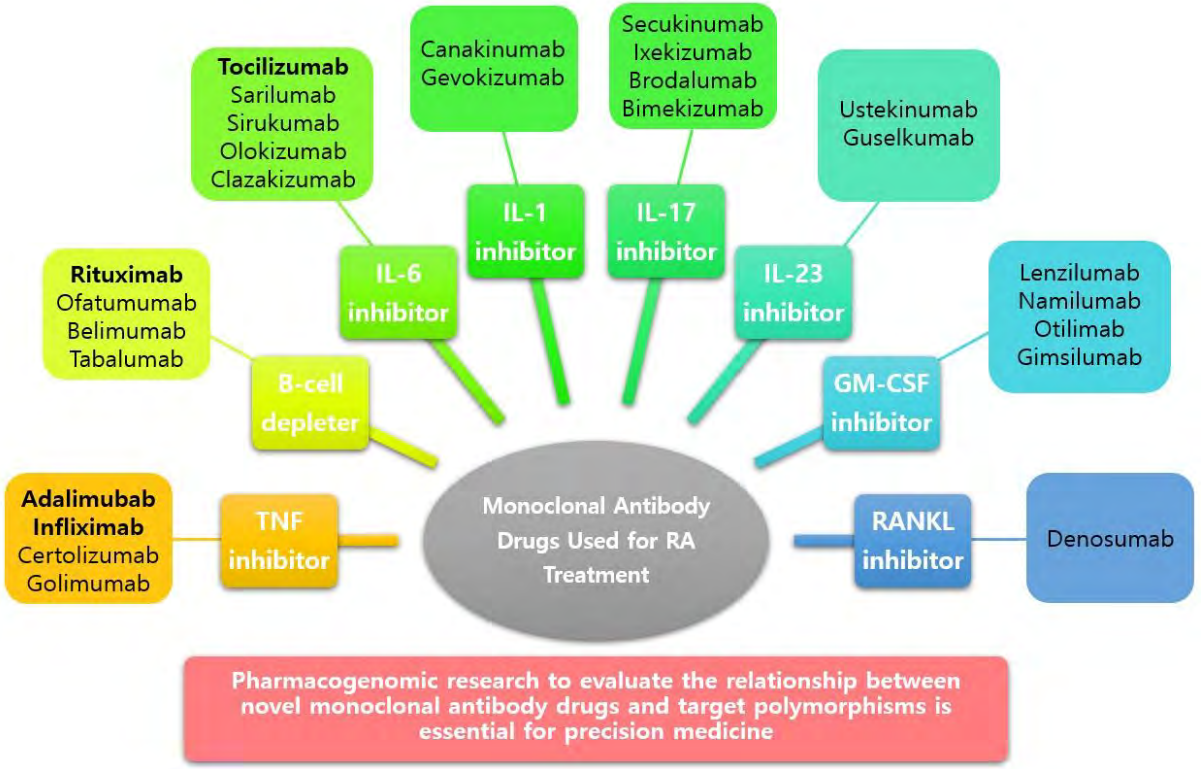
Immunobiologics licensed for psoriasis

- Anti-TNF
  - Infliximab
  - Etanercept
  - Adilimumab
- Anti-IL-12/IL-23
  - Ustekinumab
- Anti-IL-17
  - Ixekizumab
  - Secukinumab
  - Brodalumab
- Anti-IL-23
  - Guselkumab



MAbs in RA



Lim et al 2022

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TOMI-T1D
TRIAL OUTCOME MARKERS INITIATIVE IN TYPE 1 DIABETES

Therapies with clinical trial evidence of beta cell preservation in stage 3 T1D

- Anti-CD3
- Anti-CD2
- Anti-CD20
- ATG
- CTLA-4Ig
- anti-TNF (Golimumab)
- Imatinib
- Verapamil
- Baricitinib
- Ustekinumab

Greenbaum, C et al (2019). Drugs, 79(1), 43–61.

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TOMI-T1D
TRIAL OUTCOME MARKERS INITIATIVE IN TYPE 1 DIABETES

Therapies with clinical trial evidence of beta cell preservation in stage 3 T1D

1.Deplete T cells

- Anti-CD3
- Anti-CD2
- ATG
- CTLA-4Ig
- Ustekinumab

2.Block cytokines

- anti-TNF (Golimumab)

3.Reduce Beta cell stress

- Verapamil
- Baricitinib
- Imatinib

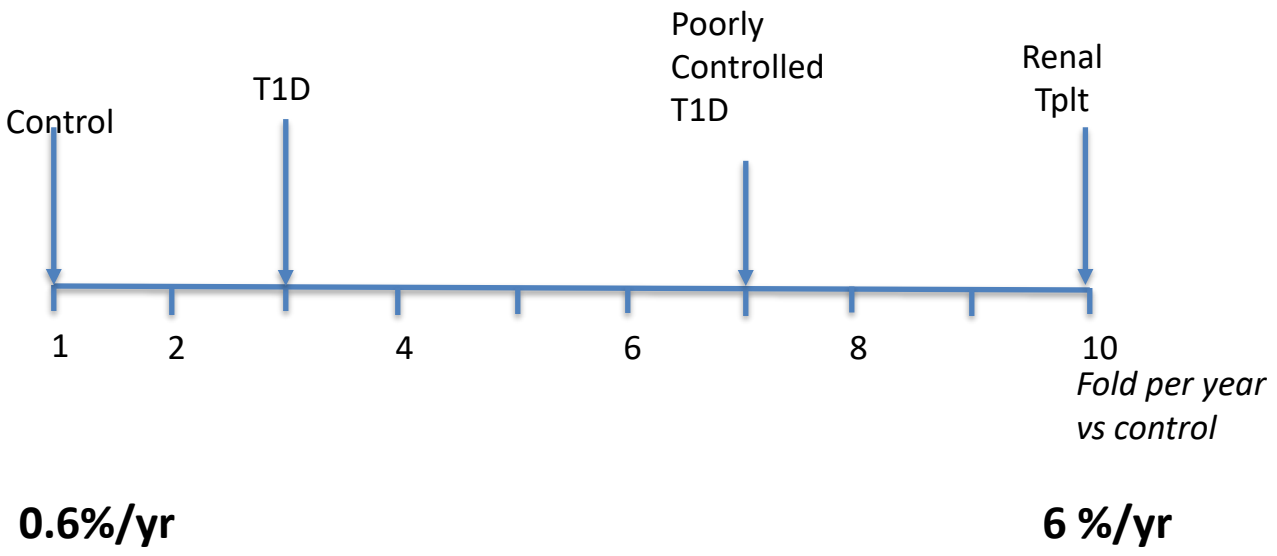
5. Deplete B cells

- Anti-CD20
- CTLA-4Ig

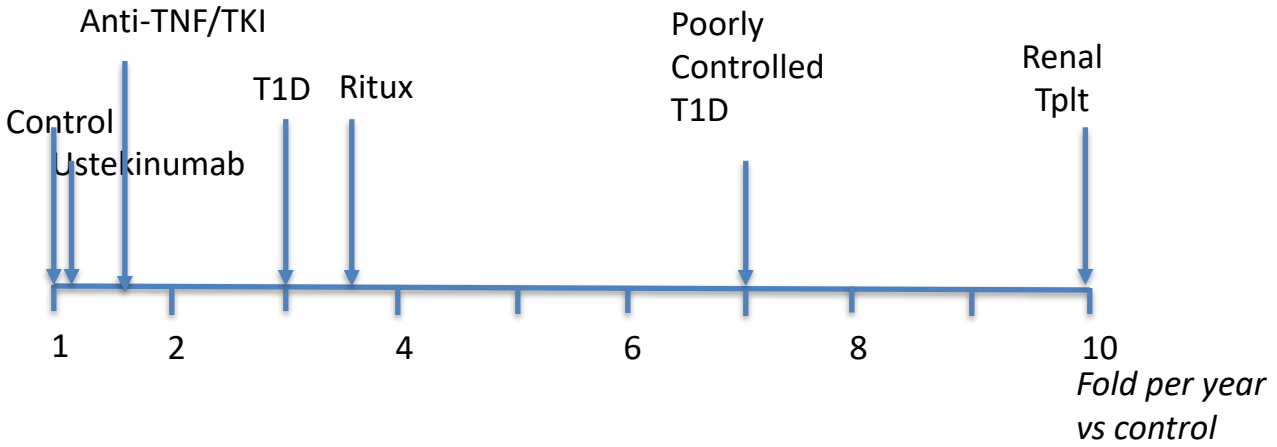
4.Boost Tregs

- ?

Summary of risk of hospitalisation for infection



Summary of risk of hospitalisation for infection



0.6%/yr

6 %/yr

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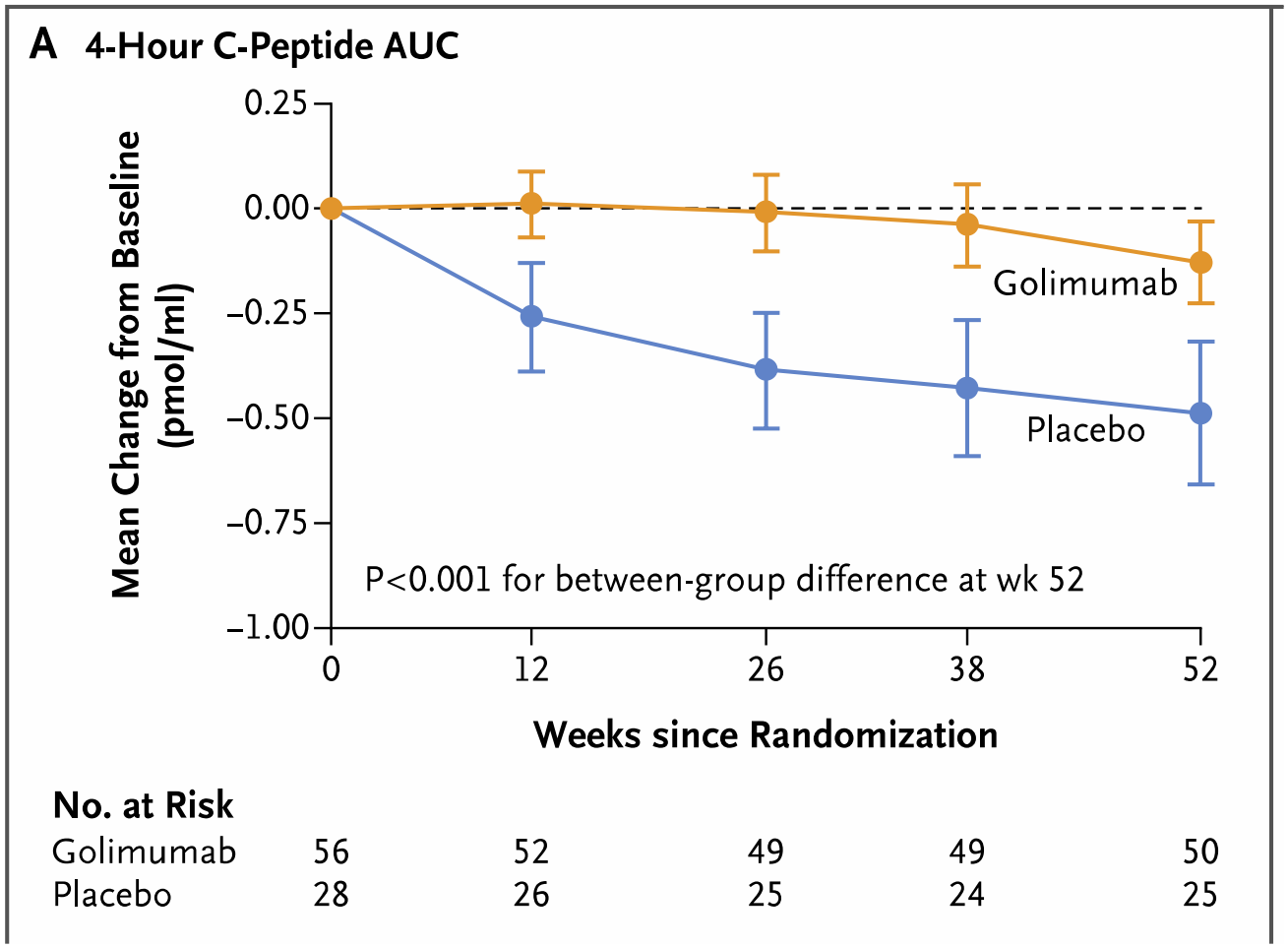
Golimumab treatment (s.c. every 2 weeks)



Quattrin et al 2020

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Dec 7 2023

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Baricitinib and β-Cell Function in Patients with New-Onset Type 1 Diabetes

Michaela Waibel, Ph.D., John M. Wentworth, M.B., B.S., Ph.D., Michelle So, M.B., B.S., Ph.D., Jennifer J. Couper, M.D., Fergus J. Cameron, M.D., Richard J. MacIsaac, M.B., B.S., Ph.D., Gabby Atlas, M.B., B.S., Alexandra Gorelik, M.Sc., Sara Litwak, Ph.D., Laura Sanz-Villanueva, B.Sc., Prerak Trivedi, Ph.D., Simi Ahmed, Ph.D., Francis J. Martin, Ph.D., Madeleine E. Doyle, D.M., Jessica E. Harbison, M.B., B.S., Ph.D., Candice Hall, B.Sc., Balasubramanian Krishnamurthy, M.D., Peter G. Colman, M.D., Leonard C. Harrison, M.D., D.Sc., Helen E. Thomas, Ph.D., and Thomas W.H. Kay, M.B., B.S., Ph.D., for the BANDIT Study Group*

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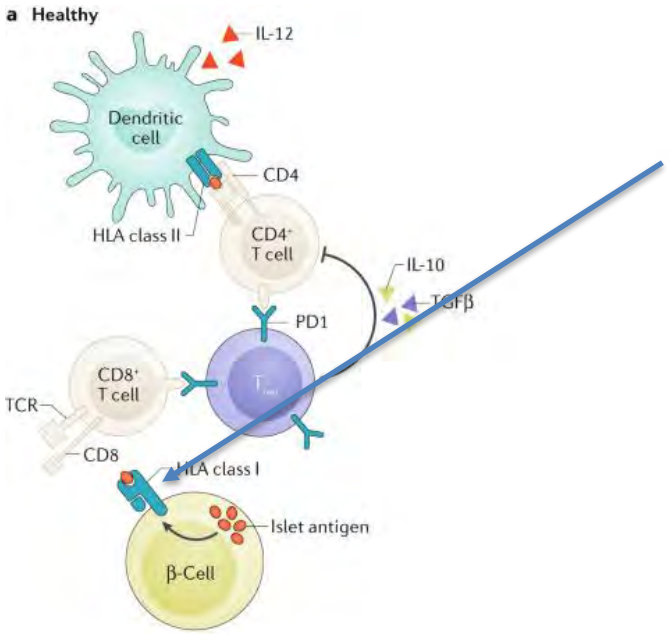
Action of baricitinib on beta cells



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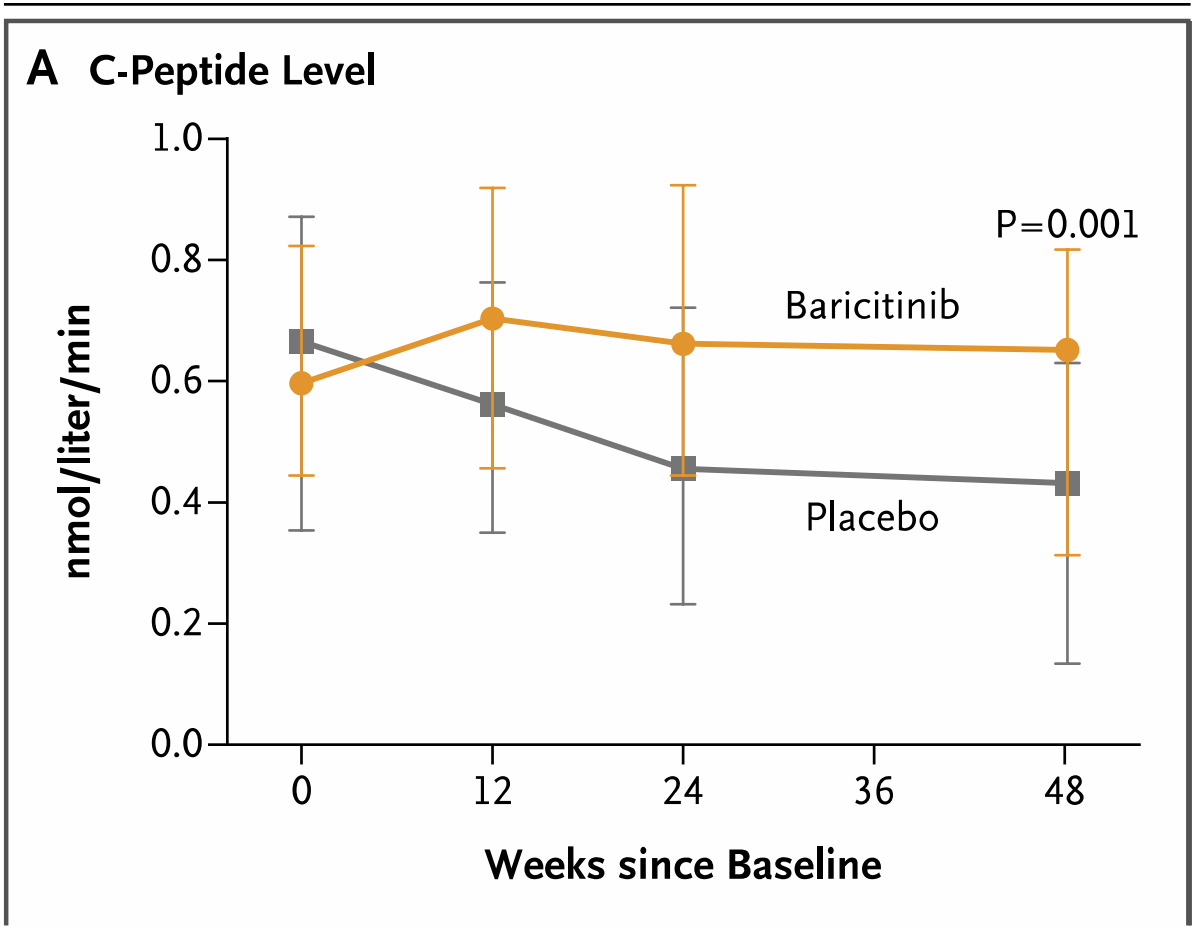
Baricitinib



Waibel et al 2023

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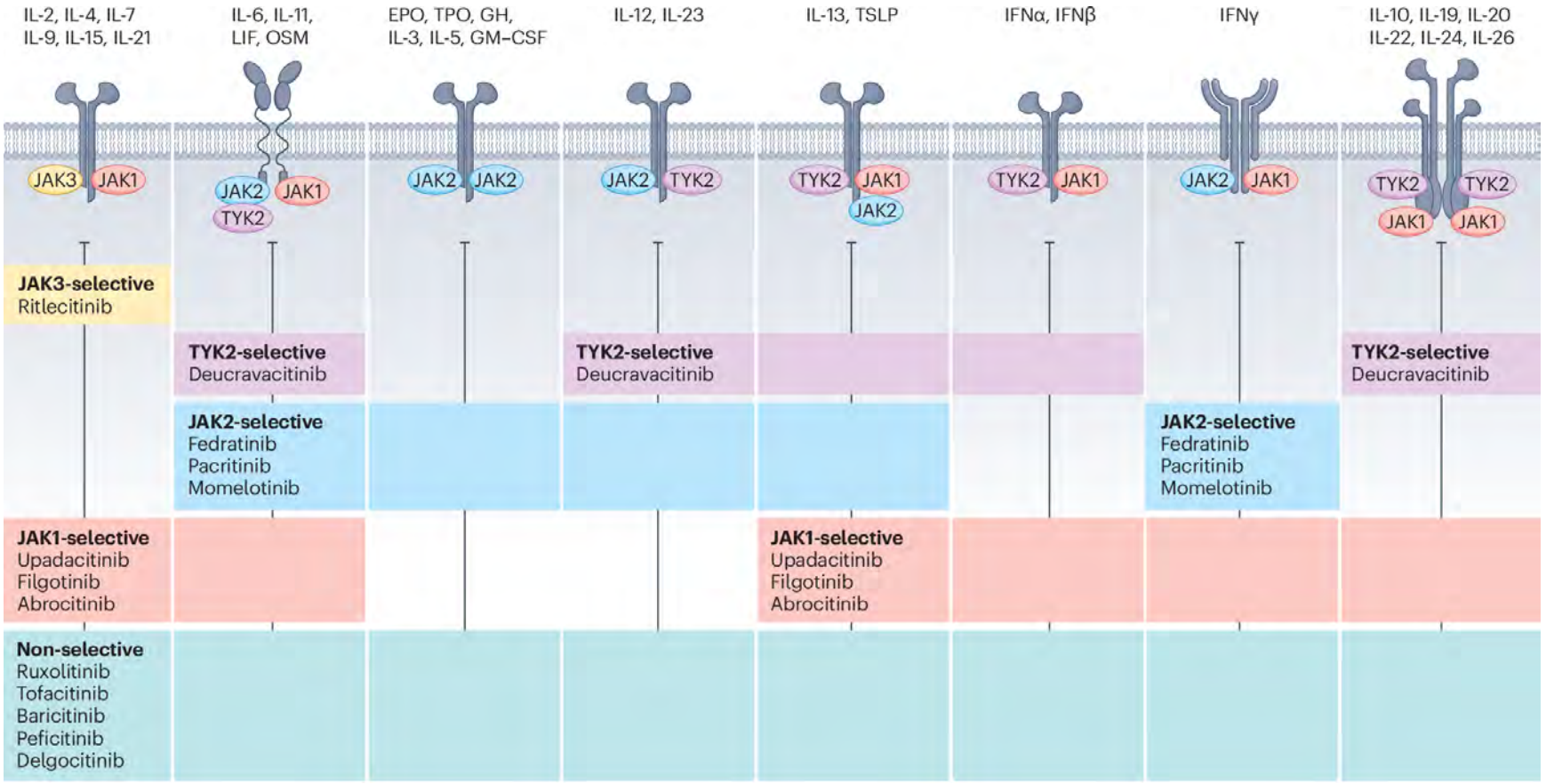
Targets of JAK inhibitors



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RESEARCH SPOTLIGHT

New onset study now open for enrollment — TrialNet launches study to test JAK inhibitors in type 1 diabetes

TrialNet researchers are testing two promising new treatments to see if either or both can preserve insulin production in people recently diagnosed with type 1 diabetes (T1D).

The JAKPOT T1D Study will test abrocitinib and ritlecitinib, a new class of autoimmune treatments called Janus kinase (JAK) inhibitors. If either or both treatments are successful, they may be studied in earlier stages of the disease to see if they can prevent or delay clinical diagnosis (stage 3).

Abrocitinib
Ritlecitinib
Placebo
Age 12-35

nature medicine

Article

https://doi.org/10.1038/s41591-024-03115-2

Ustekinumab for type 1 diabetes in adolescents: a multicenter, double-blind, randomized phase 2 trial

Received: 9 February 2024

A list of authors and their affiliations appears at the end of the paper

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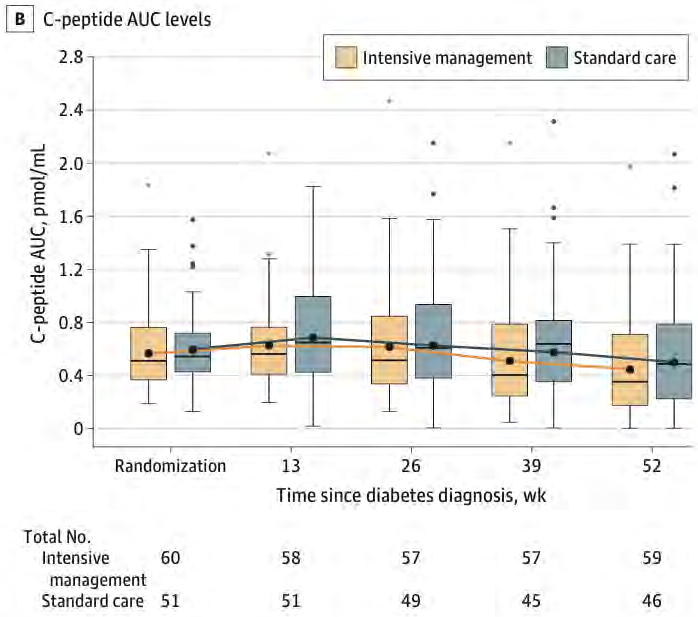
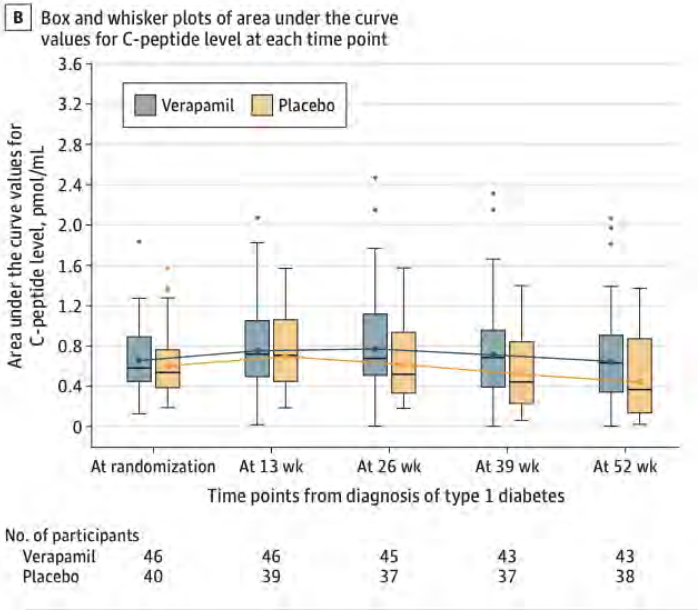
Verapamil – CLVer (Factorial design)



Negative: intensive management vs SoC



Positive: verapamil vs placebo

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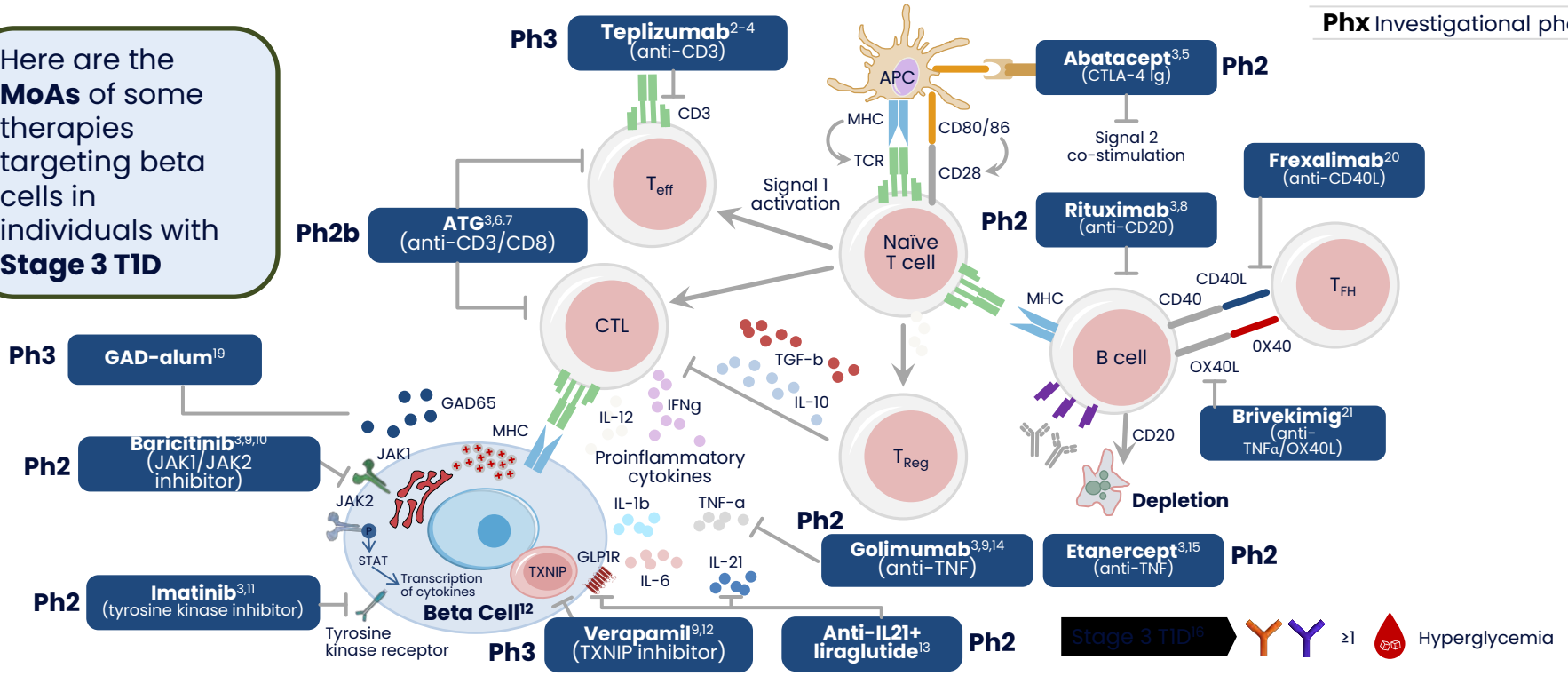
Investigational Strategies to Preserve Beta-cell Function in Stage 3 T1D: Therapeutic Drug Targets[1]

Here are the **MoAs** of some therapies targeting beta cells in individuals with **Stage 3 T1D**



- Schematic adapted from Jacobsen et al. 2018,[1] Gurzov et al. 2016[17] and Choi EH, and Park SJ 2023.[18]
- APC, antigen-presenting cell; ATG, anti-thymocyte globulin; CD, cluster of differentiation; CTLA-4, cytotoxic T-lymphocyte associated protein 4; GAD, glutamic acid decarboxylase; GLP1R, glucagon-like peptide 1 receptor; IFN, interferon; Ig, immunoglobulin; IL, interleukin; JAK, Janus kinase; MHC, major histocompatibility complex; OX40L, OX40 Ligand; P, phosphate; Ph, phase; T1D, type 1 diabetes; TCR, T-cell receptor; Teff, effector T cell; TGF, transforming growth factor; TNF, tumor necrosis factor; Treg, regulatory T cell; TXNIP, thioredoxin-interacting protein.
- 1. Jacobsen LM, et al. Curr Diab Rep. 2018;18(10):90. 2. Ramos EL, et al. N Engl J Med. 2023;389(23):2151-61. 3. Herold KC, et al. Nat Rev Immunol. 2024;doi:10.1038/s41577-023-00985-4. 4. Tzield (Teplizumab) Prescribing Information. December 2023. 5. Russell WE, et al. Diabetes Care. 2023;46(5):1005-13. 6. Gitelman SE, et al. Diabetologia. 2016;59(6):1153-61. 7. Haller MJ, et al. Diabetes Care. 2018;41:1917-25. 8. Yu L, et al. Diabetes. 2011;60(10):2560-5. 9. Weiskorn J, et al. Horm Res Paediatr. 2024. doi: 10.1159/000539120. 10. Waibel M, et al. N Engl J Med. 2023;389:2140-50. 11. Gitelman SE, et al. Lancet Diabetes Endocrinol. 2021;9(8):502-14. 12. Forlenza GP, et al. JAMA. 2023;329(12):990-9. 13. von Herrath M, et al. Lancet Diabetes Endocrinol. 2021;9:212-24. 14. Quattrin T, et al. N Eng J Med. 2020;383(21):2007-17. 15. Mastrandrea L, et al. Diabetes Care. 2009;32:1244-9. 16. Insel RA, et al. Diabetes Care. 2015;38(10):1964-74. 17. Gurzov EN, et al. FEBS J. 2016;283(16):3002-15. 18. Choi EH and Park SJ. Experiment Mol Med. 2023;55:1348-1356. 19. ClinicalTrials.gov. NCT05018585. Accessed March 2025. 20, Haller et al. Diabetes 2024;73(Supplement_1):2021-LB 21. 21. https://clinicaltrials.gov/study/NCT06812988?term=NCT06812988&rank=1 (Accessed July 2025)

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Treating Type 1 Diabetes

- Type 1 diabetes is not primarily a metabolic disease
- Type 1 diabetes is an autoimmune disease which targets the insulin making beta cells
- If we can slow or halt the autoimmune process….we can delay or avoid the need for insulin therapy….

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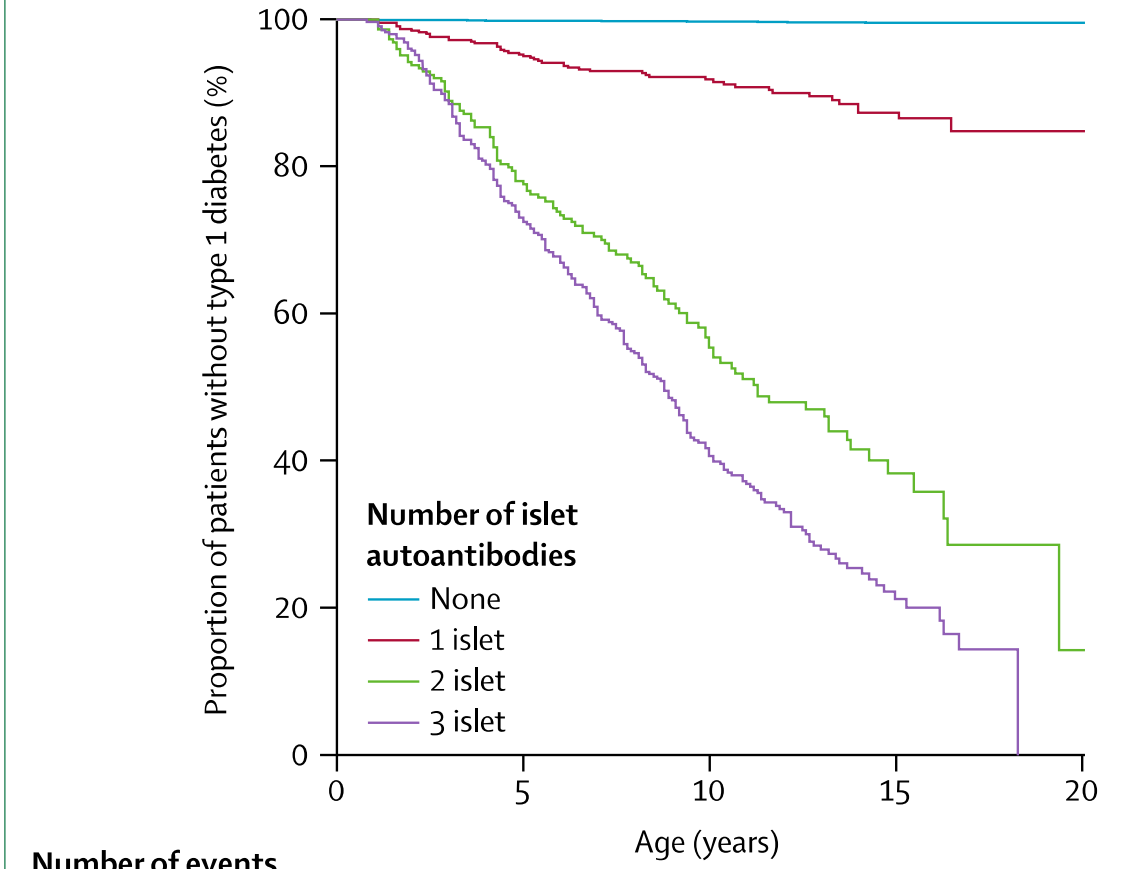
Autoantibodies are present many years before people are diagnosed with type 1 diabetes



Number of events					
3 islet	358	250	112	20	..
2 islet	227	168	82	19	1
1 islet	474	430	272	118	9
None	12318	8875	5253	1161	44

Ziegler AG et al. JAMA. 2013 309(23):2473-9.

Insel, RA et al (2015). Diabetes care, 38(10), 1964–1974.

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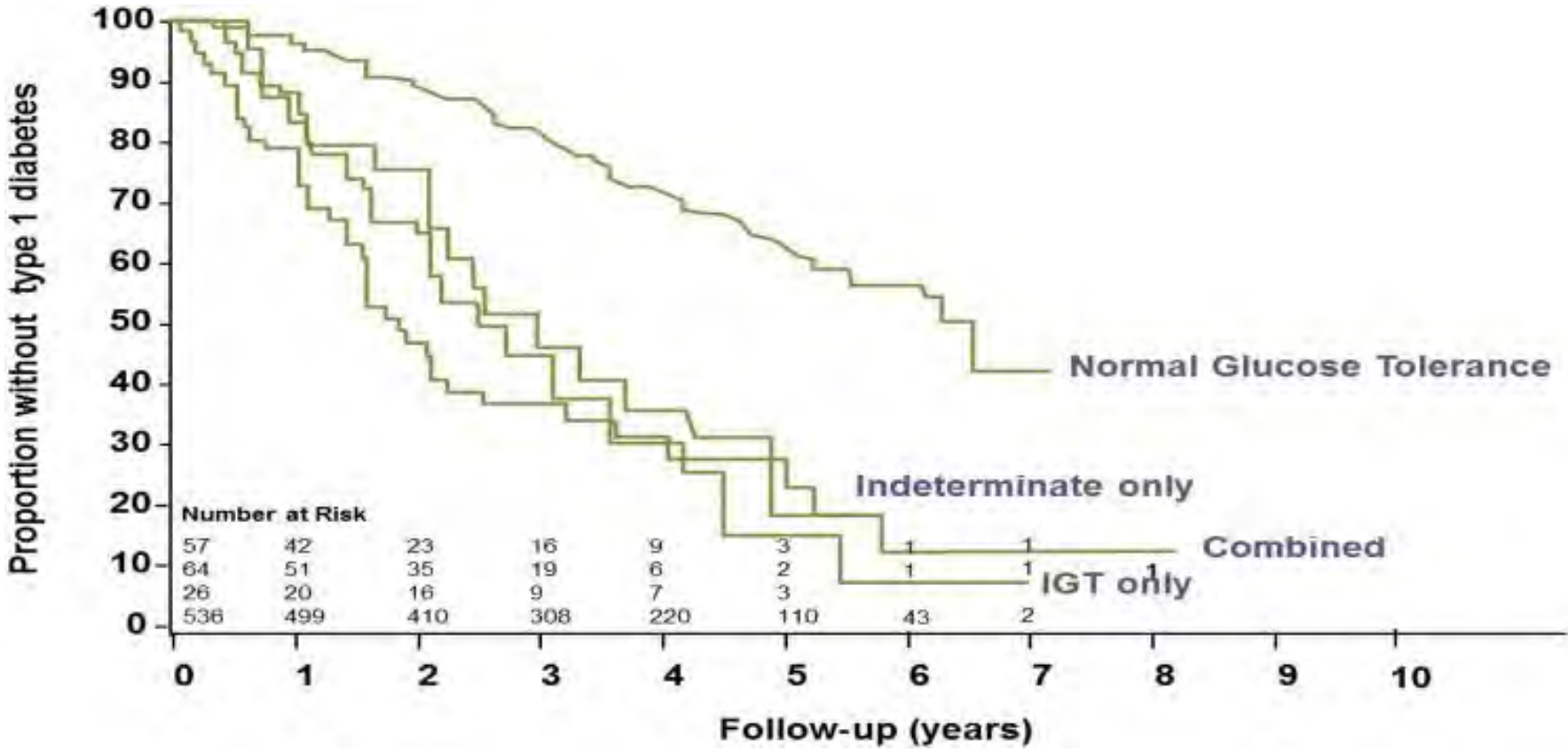
Progression from dysglycaemia (stage 2)



Insel, RA et al (2015). Diabetes care, 38(10), 1964–1974.

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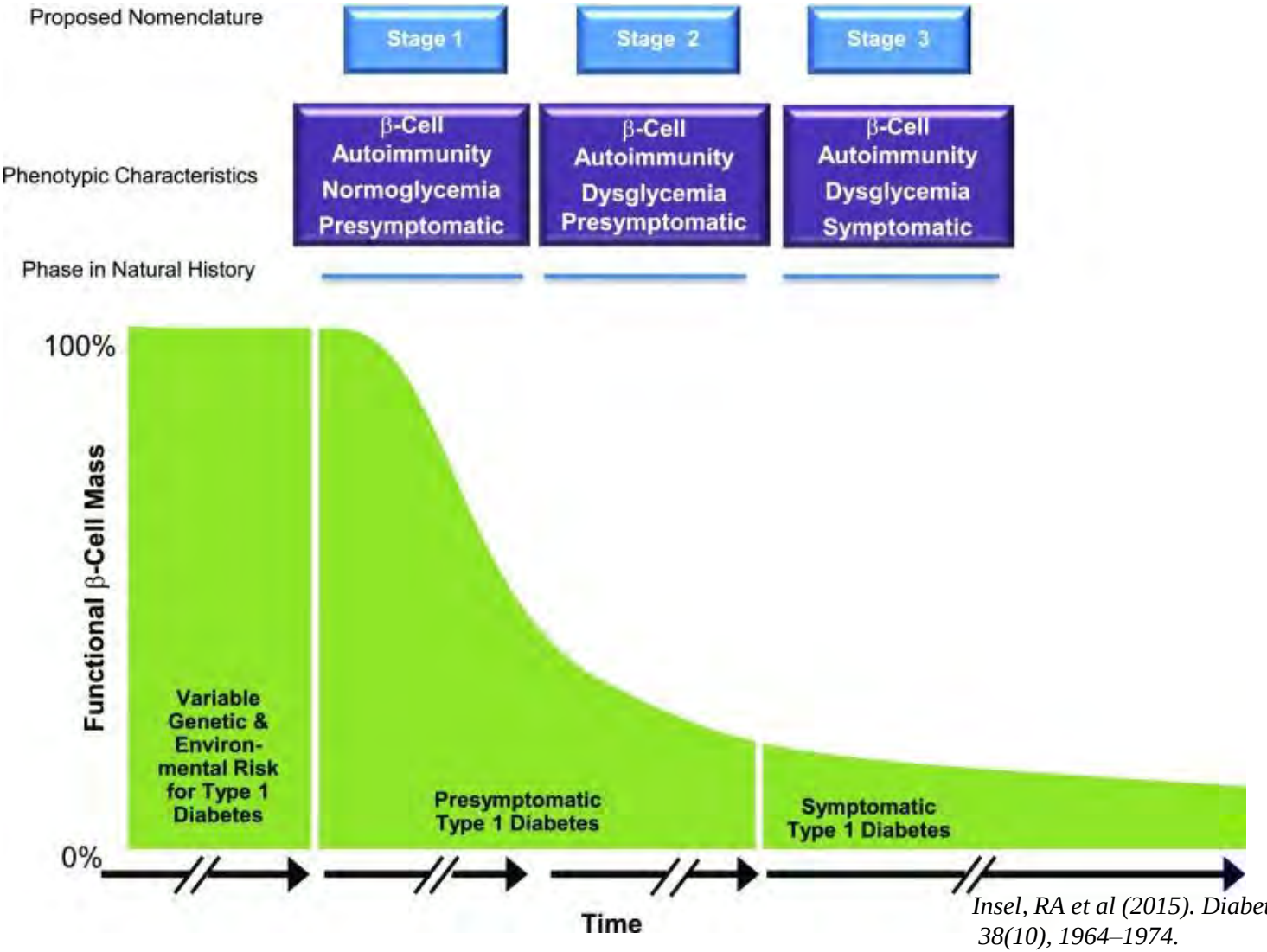
Staging of type 1 diabetes



Insel, RA et al (2015). Diabetes care, 38(10), 1964–1974.

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2. Diagnosis and Classification of Diabetes: Standards of Care in Diabetes—2025

*American Diabetes Association Professional Practice Committee**

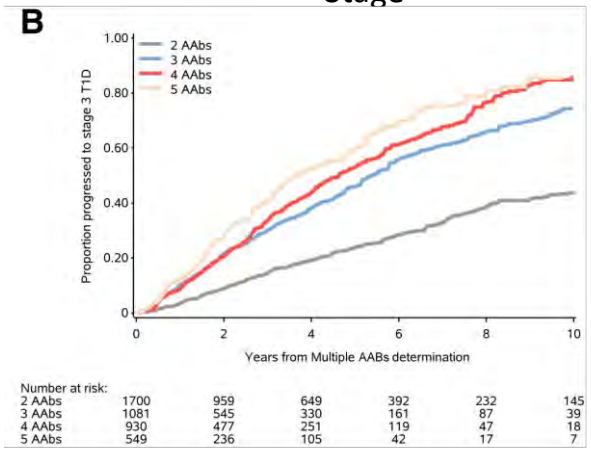
Table 2.4—Staging of type 1 diabetes

	Stage 1	Stage 2	Stage 3
Characteristics	• Autoimmunity • Normoglycemia • Presymptomatic	• Autoimmunity • Dysglycemia • Presymptomatic	• Autoimmunity • Overt hyperglycemia • Symptomatic
Diagnostic criteria	• Multiple islet autoantibodies • No IGT or IFG, normal A1C	• Islet autoantibodies (usually multiple) • Dysglycemia: ◦ IFG: FPG 100–125 mg/dL (5.6–6.9 mmol/L) or ◦ IGT: 2-h PG 140–199 mg/dL (7.8–11.0 mmol/L) or ◦ A1C 5.7–6.4% (39–47 mmol/mol) or ≥10% increase in A1C	• Autoantibodies may become absent • Diabetes by standard criteria

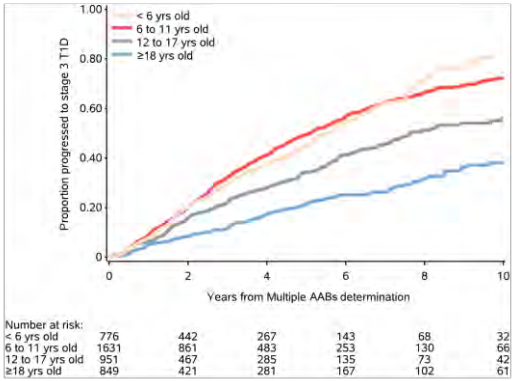
Adapted from Skyler et al. (38). FPG, fasting plasma glucose; IFG, impaired fasting glucose; IGT, impaired glucose tolerance; 2-h PG, 2-h plasma glucose. Alternative additional stage 2 diagnostic criteria of 30-, 60-, or 90-min plasma glucose on oral glucose tolerance test ≥200 mg/dL (≥11.1 mmol/L) and confirmatory testing in those aged ≥18 years have been used in clinical trials (84). Dysglycemia can be defined by one or more criteria as outlined in the table.

Progression is heterogenous and can be predicted

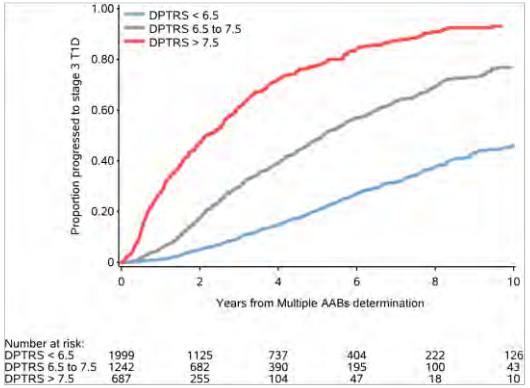
Stage



Age



DPTRS



Evolving Concepts in Pathophysiology, Screening, and Prevention of Type 1 Diabetes: Report of Diabetes Mellitus Interagency Coordinating Committee Workshop

Carla J. Greenbaum,[1] Gerald T. Nepom,[2] Lauren K. Wood-Heickman,[3] Diane K. Wherrett,[4] Linda A. DiMeglio,[5] Kevan C. Herold,[6] and Jeffrey P. Krischer[7]

Diabetes 2024;73:1780–1790 | https://doi.org/10.2337/dbi24-0020

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June 9 2019

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

An Anti-CD3 Antibody, Teplizumab, in Relatives at Risk for Type 1 Diabetes

Kevan C. Herold, M.D., Brian N. Bundy, Ph.D., S. Alice Long, Ph.D., Jeffrey A. Bluestone, Ph.D., Linda A. DiMeglio, M.D., Matthew J. Dufort, Ph.D., Stephen E. Gitelman, M.D., Peter A. Gottlieb, M.D., Jeffrey P. Krischer, Ph.D., Peter S. Linsley, Ph.D., Jennifer B. Marks, M.D., Wayne Moore, M.D., Ph.D., Antoinette Moran, M.D., Henry Rodriguez, M.D., William E. Russell, M.D., Desmond Schatz, M.D., Jay S. Skyler, M.D., Eva Tsalikian, M.D., Diane K. Wherrett, M.D., Anette-Gabriele Ziegler, M.D., and Carla J. Greenbaum, M.D., for the Type 1 Diabetes TrialNet Study Group*

Disease Modifying Therapy

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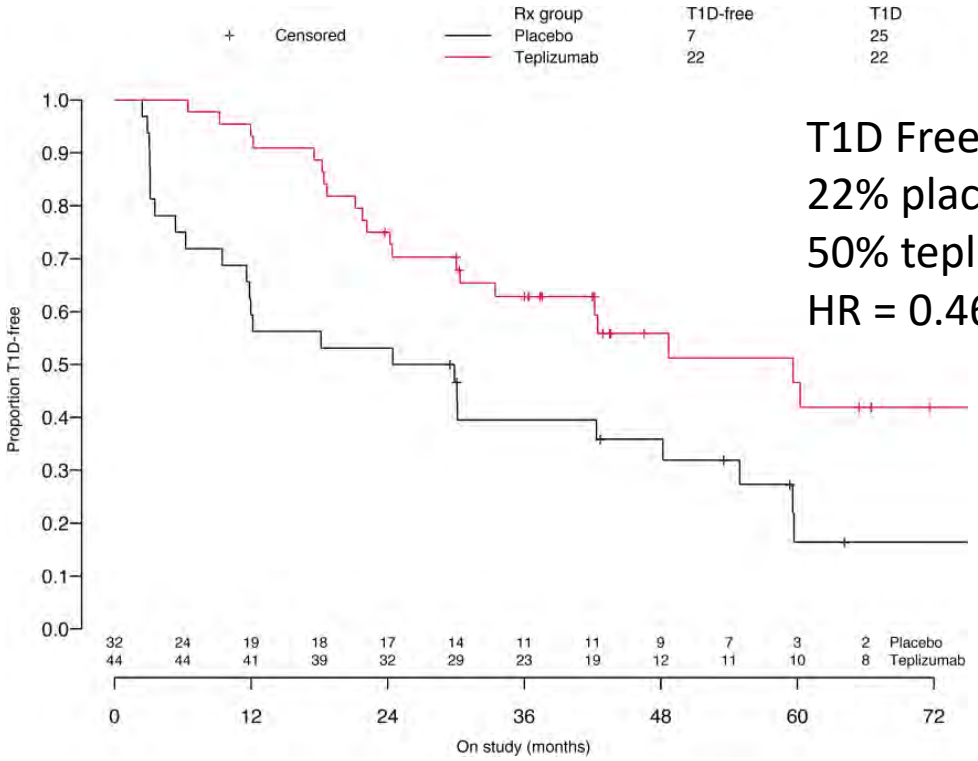
Median 32.5 mth delay in onset of stage 3 T1D after 14d treatment at stage 2

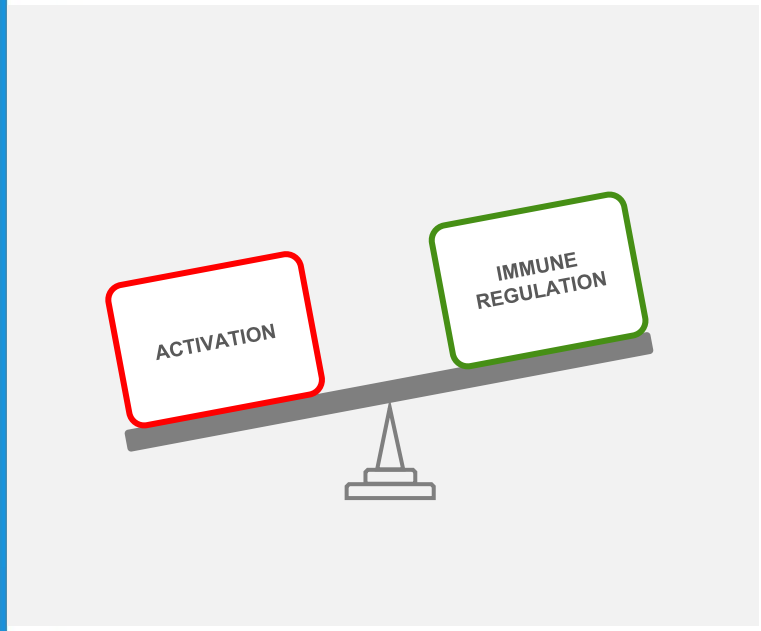


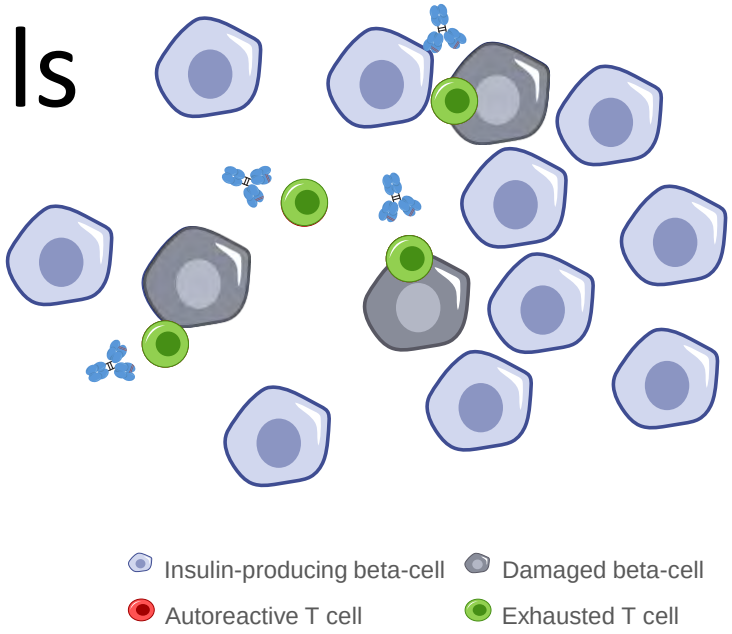
T1D Free at median 2.5 yrs f/u
22% placebo
50% teplizumab
HR = 0.46 p=0.01

Fig. 1. Teplizumab treatment is associated with a sustained effect on T1D progression over 923 days of follow-up. Updated Kaplan-Meier curve based on 923 days of follow-up (range, 74 to 3119 days). The hazard ratio for development of T1D in teplizumab-treated participants versus placebo was 0.457; $P = 0.01$. The median time to diabetes was 27.1 and 59.6 months in the placebo and teplizumab treatment groups, respectively. At the conclusion of this period, 7 (22%) and 22 (50%) individuals, respectively, were not diagnosed with T1D.

Sims et al., Sci. Transl. Med. ***13****, eabc8980 (2021)*

Exhaustion of Autoreactive T Cells Restores Tolerance and Preserves Functional Beta-cells





proventionbio

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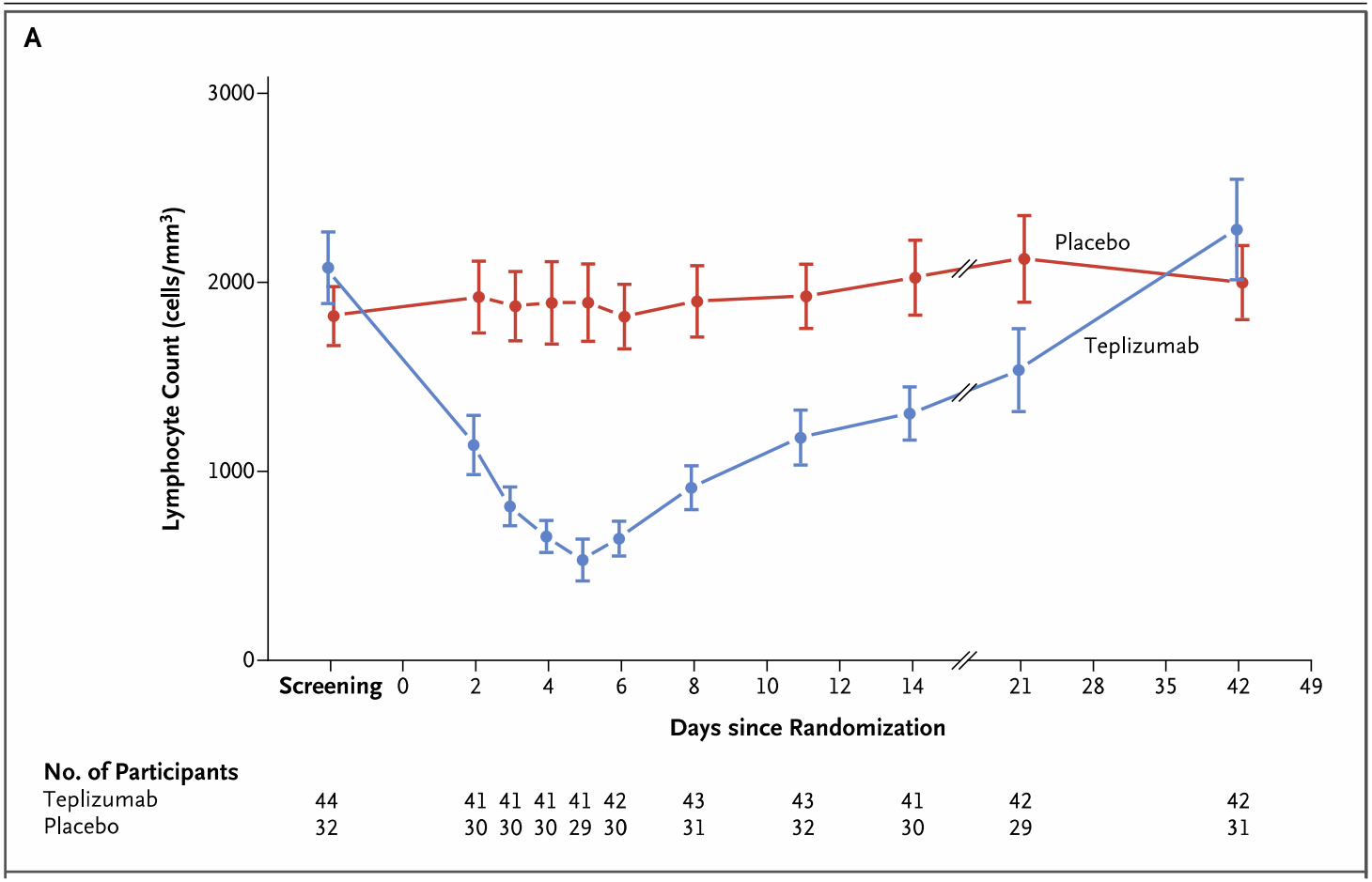
Transient T cell depletion with teplizumab



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FDA Advisory panel 27th May 2021

Does the information (from)…the Applicant and FDA show that the benefits of teplizumab outweigh the risks in support of approval to delay clinical type 1 diabetes mellitus

a. If you voted yes, provide your opinion on the appropriate indication statement and discuss whether you recommend any post-marketing safety studies.

b. If you voted no, provide your rationale and provide recommendations for additional data and/or analyses that would support a favorable benefit-risk profile and approval of teplizumab.

Question 5: VOTE

FDA

Yes	(10)
No	(7)
Abstain	(0)

Attendee	Answer
AC - Skvarca, Carling	Yes
AC - Blaha, Michael	Yes
AC - Ellenberg, Susan	Yes
AC - de Lemos, James	No
AC - Nathan, David	No
AC - Newman, Connie	No
AC - Becker, Mara	Yes
AC - Cooke, David	No
AC - Weber, Thomas	No

Attendee	Answer
AC - Nason, Martha	No
AC - Chrischilles, Elizabeth	Yes
AC - Munir, Kashif	Yes
AC - Konstam, Marvin	Yes
AC - McCollister, Anna	Yes
AC - Yanovski, Jack	Yes
AC - Low Wang, Cecilia C	No
AC - Brittain, Erica	Yes

www.fda.gov

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GOV.UK Menu

Home > Health and social care > Medicines, medical devices > Marketing authorisations, variations and licensing guidance

News story

MHRA approves teplizumab to delay progression of type 1 diabetes

As with any medicine, the MHRA will keep the safety and effectiveness of teplizumab under close review.

From: Medicines and Healthcare products Regulatory Agency

Published 14 August 2025

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NICE National Institute for Health and Care Excellence

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Home > NICE Guidance > Conditions and diseases > Diabetes and other endocrinal, nutritional and metabolic conditions > Diabetes

Teplizumab for delaying the onset of stage 3 type 1 diabetes in people 8 years and over with stage 2 type 1 diabetes [ID6259]

In development | GID-TA10981 | Expected publication date: 26 November 2025

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NICE National Institute for Health and Care Excellence

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Guidance | Standards and indicators | Clinical Knowledge Summaries (CKS) | British National Formulary (BNF) | British National Formulary for Children (BNFC) | Life sciences | More from NICE

Teplizumab for delaying the onset of stage 3 type 1 diabetes in people 8 years and over with stage 2 type 1 diabetes [ID6259]

In development | GID-TA10981 | Expected publication date: TBC

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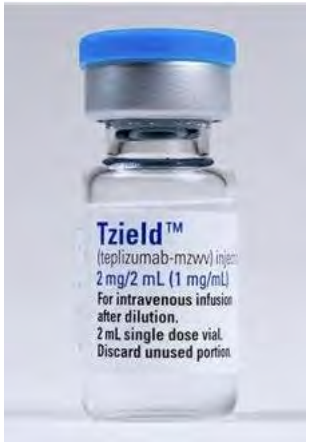
Tzield dosing

RECOMMENDED DOSING SCHEDULE					
Day	1	2	3	4	5–14
Dose µg/m²	65	125	250	500	1,030

Premedication

Premedicate prior to TZIELD infusion for the first 5 days of dosing with a non-steroidal anti-inflammatory drug (NSAID) or paracetamol, an antihistamine, and/or an antiemetic. Administer additional doses of premedication if needed.



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Intervention in stage 1?

Diabetes Care

American Diabetes Association

Abatacept for Delay of Type 1 Diabetes Progression in Stage 1 Relatives at Risk: A Randomized, Double-Masked, Controlled Trial

William E. Russell, Brian N. Bundy, Mark S. Anderson, Laura A. Cooney, Stephen E. Gitelman, Robin S. Goland, Peter A. Gottlieb, Carla J. Greenbaum, Michael J. Haller, Jeffrey P. Krischer, Ingrid M. Libman, Peter S. Linsley, S. Alice Long, Sandra M. Lord, Daniel J. Moore, Wayne V. Moore, Antoinette M. Moran, Andrew B. Muir, Philip Raskin, Jay S. Skyler, John M. Wentworth, Diane K. Wherrett, Darrell M. Wilson, Anette-Gabriele Ziegler, and Kevan C. Herold, and the Type 1 Diabetes TrialNet Study Group

Diabetes Care 2023;46(5):1–9 | *https://doi.org/10.2337/dc22-2200*

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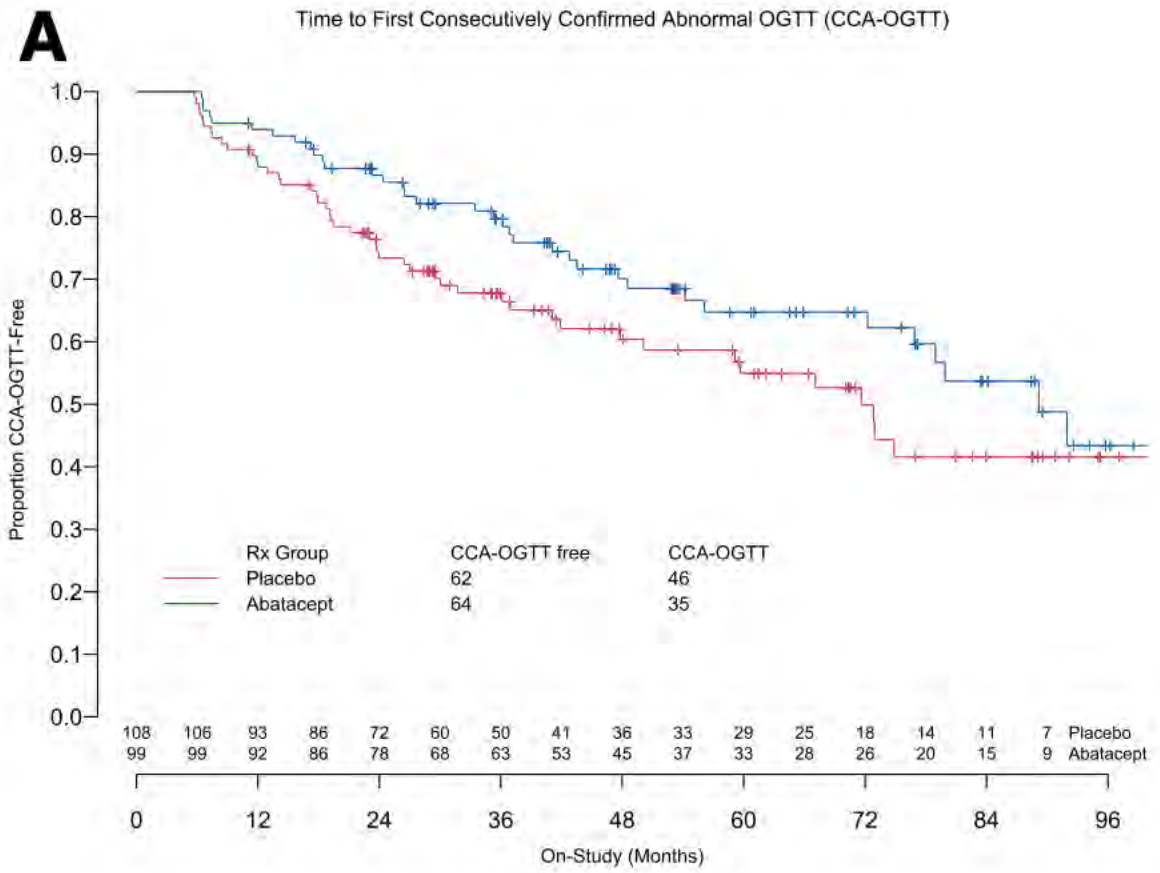
TN18 abatacept study



(hazard ratio 0.702; 95% CI 0.452, 1.09; P = 0.11)

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Too honest?

Supplemental Table 4: Hazard Ratios by Treatment Interval

Month	No of events		Chi-Square Test	Hazard Ratio (95% CI)	
	Abatacept	Placebo		Cumulative	Interval
6 mos.	5 (7.17)	10 (7.83)	1.35	0.545 (0.198, 1.50)	0.545 (0.198, 1.50)
12 mos.	2 (3.92)	6 (4.08)	3.09	0.470 (0.207, 1.06)	0.348 (0.0869, 1.39)
18 mos.	5 (6.03)	7 (5.97)	3.19	0.545 (0.281, 1.06)	0.706 (0.228, 2.19)
24 mos.	4 (5.03)	6 (4.97)	3.57	0.569 (0.317, 1.02)	0.659 (0.191, 2.28)
30 mos.	1 (2.55)	4 (2.45)	5.03	0.527 (0.303, 0.918)	0.240 (0.0415, 1.39)
36 mos.	5 (3.81)	2 (3.19)	3.15	0.628 (0.374, 1.06)	2.10 (0.474, 9.27)
42 mos.	3 (2.78)	2 (2.22)	2.71	0.663 (0.403, 1.09)	1.19 (0.205, 6.98)
48 mos.	2 (2.22)	2 (1.78)	2.72	0.671 (0.414, 1.09)	0.800 (0.111, 5.75)
54 mos.	2 (1.13)	0 (0.872)	1.98	0.716 (0.445, 1.15)	-
60 mos.	0 (1.01)	2 (0.985)	2.68	0.681 (0.426, 1.09)	-
66 mos.	0 (0.544)	1 (0.456)	3.09	0.664 (0.417, 1.06)	-
72 mos.	1 (2.75)	4 (2.25)	4.46	0.620 (0.396, 0.973)	0.205 (0.0353, 1.2)
78 mos.	3 (1.88)	0 (1.13)	3.29	0.671 (0.431, 1.04)	-
84 mos.	0 (0)	0 (0.0)	3.29	0.671 (0.431, 1.04)	-
90 mos.	2 (1.08)	0 (0.917)	2.50	0.710 (0.459, 1.1)	-

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diabetes®

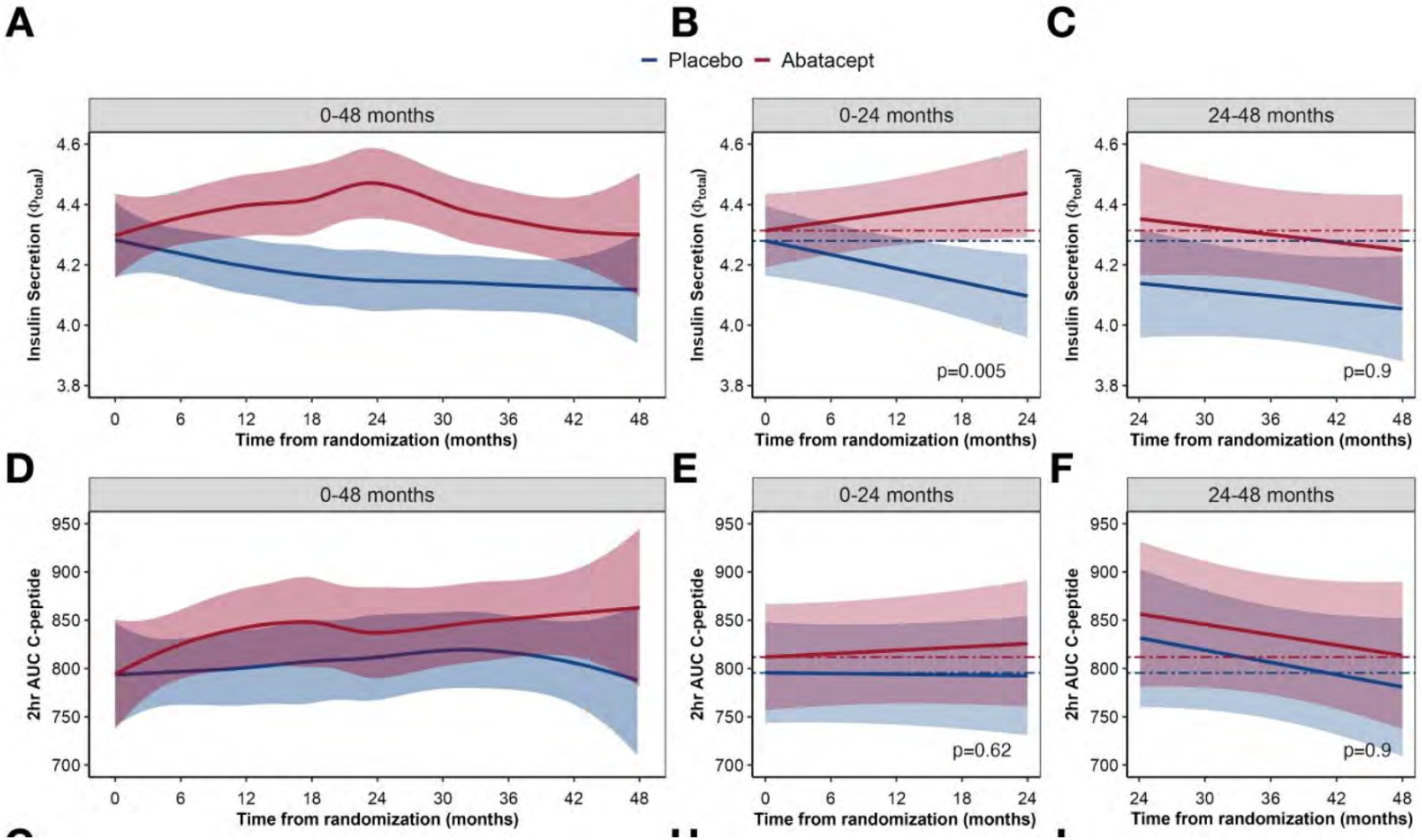
American Diabetes Association®

Baseline Insulin Secretion Determines Response to Abatacept in Stage 1 Type 1 Diabetes

Alfonso Galderisi, Alice L.J. Carr, Peter Taylor, Jacopo Bonet, David Cuthbertson, Jay Sosenko, Emily K. Sims, Carmella Evans-Molina, Chiara Dalla Man, Heba M. Ismail, Brandon Nathan, Alessandra Petrelli, Peter Senior, Jennifer L. Sherr, Kevan C. Herold, William E. Russell, Antoinette Moran, and Colin Dayan

Diabetes 2026;75(2):229–240 | https://doi.org/10.2337/db25-0801

Baseline Insulin Secretion Significantly Modified the Treatment Effect of Abatacept in Stage 1 Type 1 Diabetes


A
B
C
Placebo
Abatacept
0-48 months
0-24 months
24-48 months
Insulin Secretion (Φ_{total})
4.6
4.4
4.2
4.0
3.8
p=0.005
p=0.9
0
6
12
18
24
30
36
42
48
Time from randomization (months)
D
E
F
2hr AUC C-peptide
950
900
850
800
750
700
p=0.62
p=0.9

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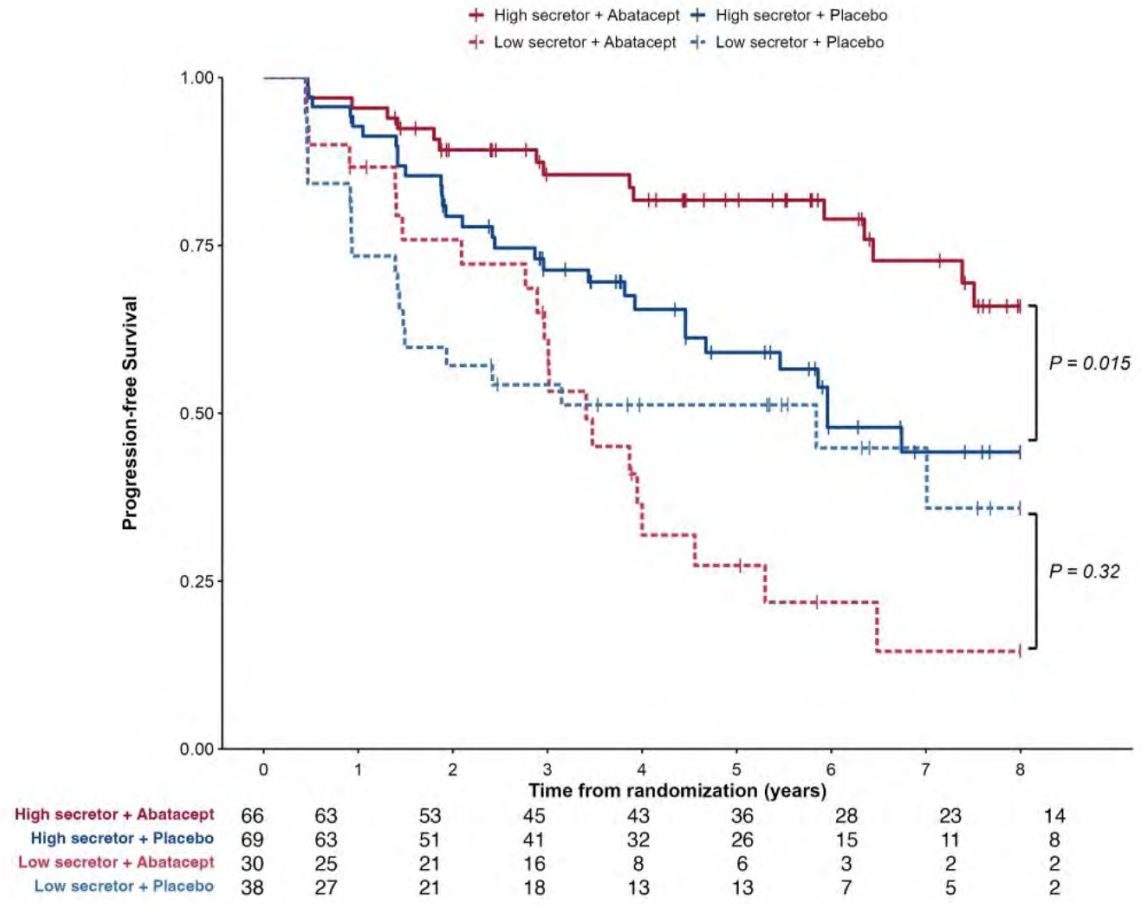

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What are the advantages of insulin-free T1D

- No hypoglycaemic risk
- No need for lifestyle limitation
- No need for daily monitoring
- No risk of metabolic complications
- Likely reduction in risks of future complications
- …..improved quality of life

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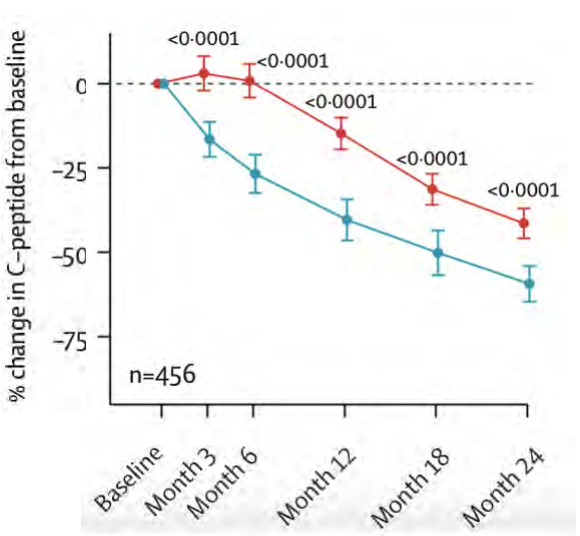
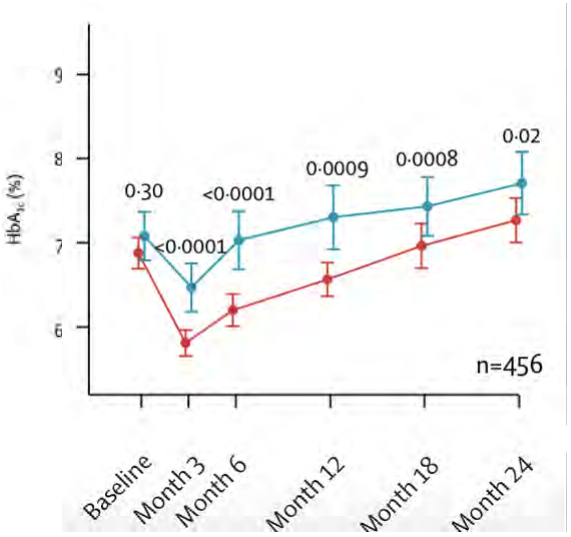
Need for more effective and more durable therapies





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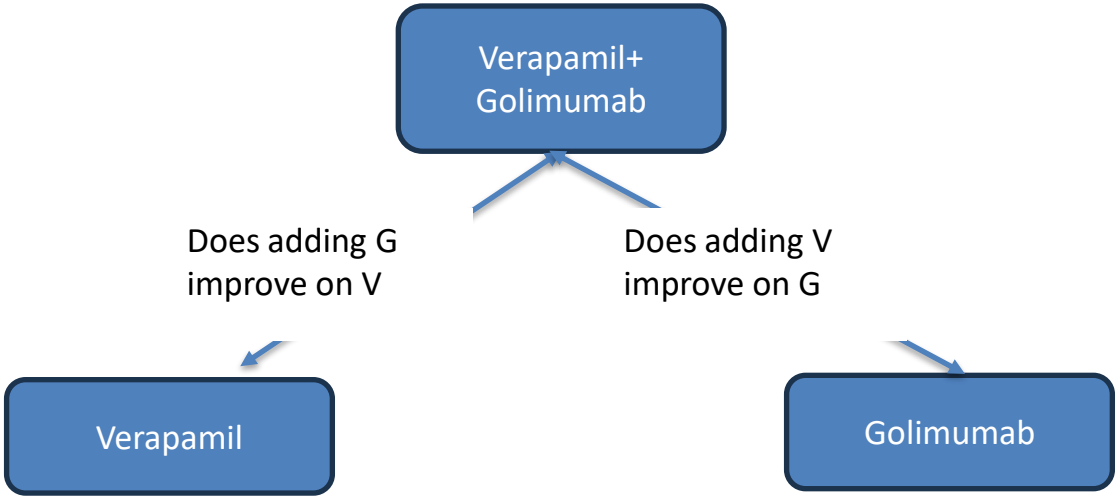
T1DPlus-VG

A CLINICAL TRIAL FACILITATED BY INNODIA

Verapamil + Golimumab



Age 5-21

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Ongoing studies with verapamil

Centre	Agents	Age	Outcome	n	Start
Miami/UF	ATG +/- verapamil	6-35	12 months	60	Oct 2025
City of Hope	ATG followed by golimumab or verapamil	9-21	24 months	120	Oct 2025
Sweden	Verapamil vs placebo	4-10	12 months	36	June 2025

**Participants will be randomized 2:2:1:1 using blocked randomization to ATG + Adalimumab, ATG + Verapamil, ATG + injectable placebo, ATG + oral placebo.*

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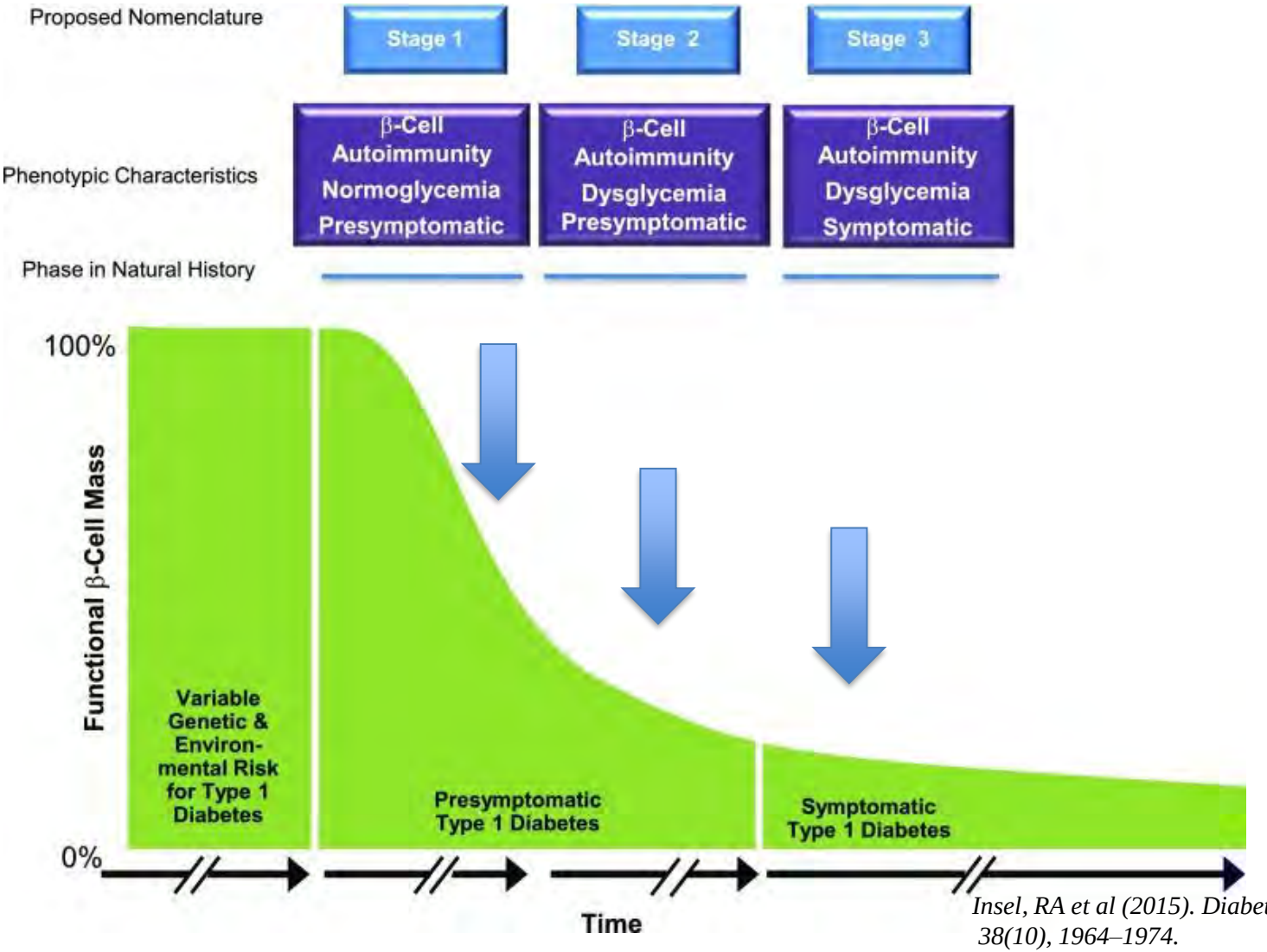
Staging of type 1 diabetes



Insel, RA et al (2015). Diabetes care, 38(10), 1964–1974.

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- No risk of metabolic complications
- Likely reduction in risks of future complications
- …..improved quality of life

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Moving towards insulin-free T1D

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Other approaches

- Diabetes Technology
- Beta cell preservation: Immunotherapy and prevention
- Beta cell replacement
- Beta cell regeneration

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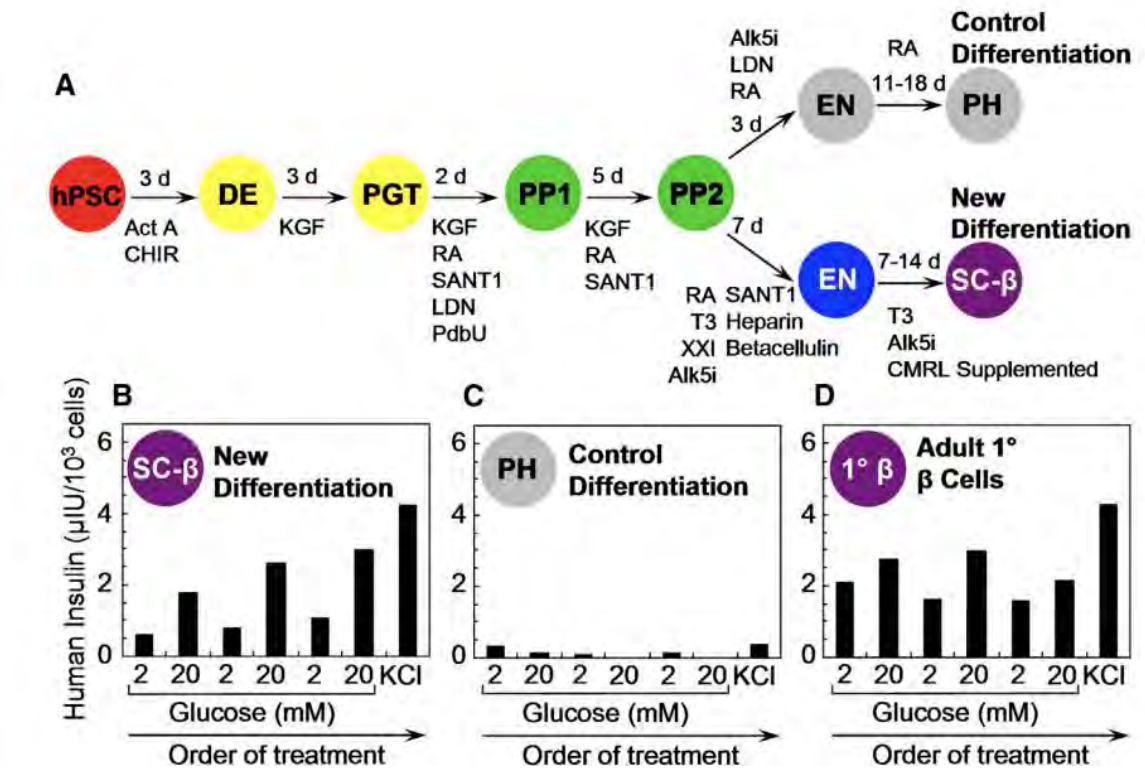
From Stem Cells to islet cells



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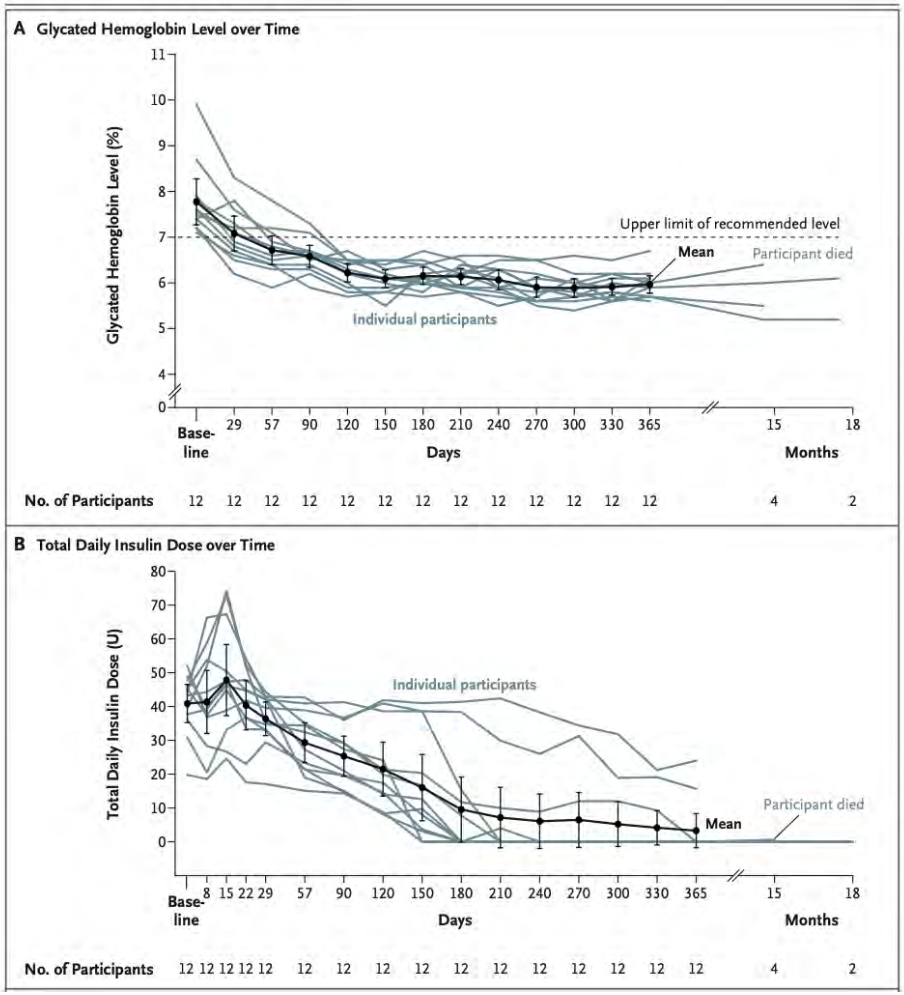
ORIGINAL ARTICLE

Stem Cell–Derived, Fully Differentiated Islets for Type 1 Diabetes

T.W. Reichman,[1] J.F. Markmann,[2] J. Odorico,[3] P. Witkowski,[4] J.J. Fung,[4] M. Wijkstrom,[5] F. Kandeel,[6] E.J.P. de Koning,[7] A.L. Peters,[8] C. Mathieu,[9] L.S. Kean,[10] B.G. Bruinsma,[11] C. Wang,[11] M. Mascia,[11] B. Sanna,[11] G. Marigowda,[11] F. Pagliuca,[11] D. Melton,[11] C. Ricordi,[12] and M.R. Rickels,[2] for the VX-880-101 FORWARD Study Group*



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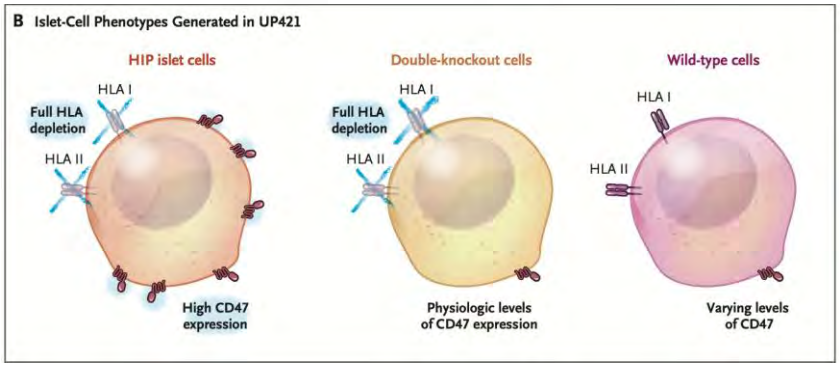
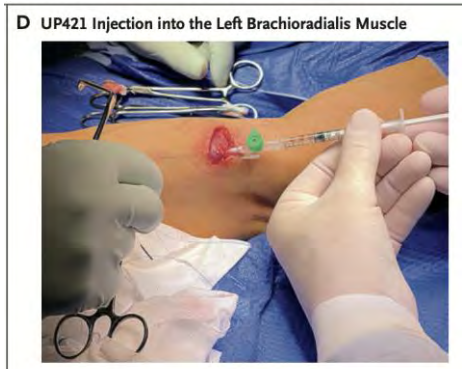
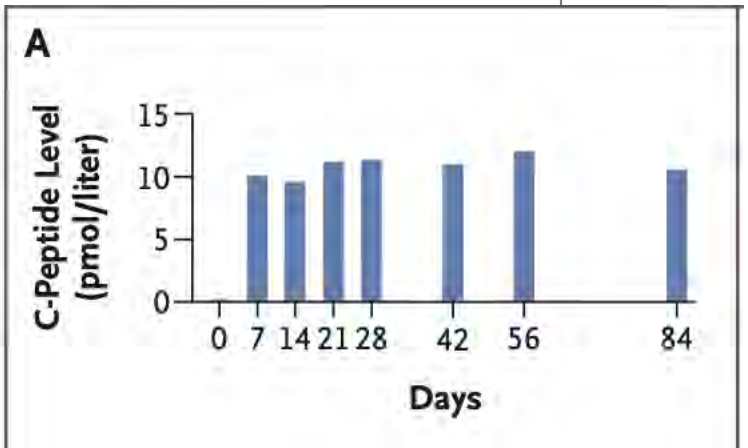
Survival of Transplanted Allogeneic Beta Cells with No Immunosuppression

Per-Ola Carlsson, M.D., Ph.D.,[1,2] Xiaomeng Hu, Ph.D.,[3] Hanne Scholz, Ph.D.,[4-6] Sofie Ingvast, B.Sc.,[6] Torbjörn Lundgren, M.D., Ph.D.,[7] Tim Scholz, M.D., Ph.D.,[8] Olof Eriksson, Ph.D.,[9] Per Liss, M.D., Ph.D.,[8] Di Yu, Ph.D.,[6] Tobias Deuse, M.D.,[10] Olle Korsgren, M.D., Ph.D.,[6] and Sonja Schrepfer, M.D., Ph.D.[3]







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Key areas

- Diabetes Technology
- Beta cell preservation: Immunotherapy and prevention
- Beta cell replacement
- Beta cell regeneration

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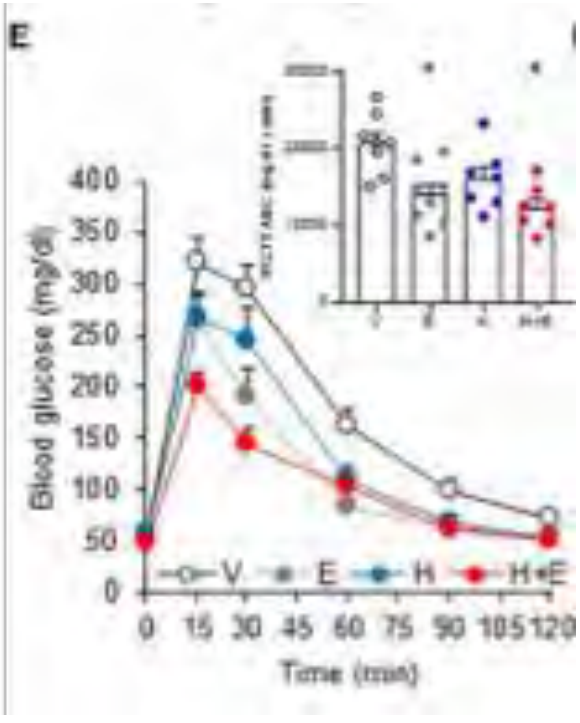
Regeneration?

SCIENCE TRANSLATIONAL MEDICINE | RESEARCH ARTICLE

DIABETES

Harmine and exendin-4 combination therapy safely expands human β cell mass in vivo in a mouse xenograft system

Carolina Rosselot[1]†, Yansui Li[1]†, Peng Wang[1]†, Alexandra Alvarsson[1]†, Kara Beliard[1], Geming Lu[2], Randy Kang[2], Rosemary Li[1], Hongtao Liu[1], Virginia Gillespie[3], Nikolaos Tzavaras[4], Kunal Kumar[5], Robert J. DeVita[5], Andrew F. Stewart[1]‡, Sarah A. Stanley[1,6]‡, Adolfo Garcia-Ocaña[2]*‡



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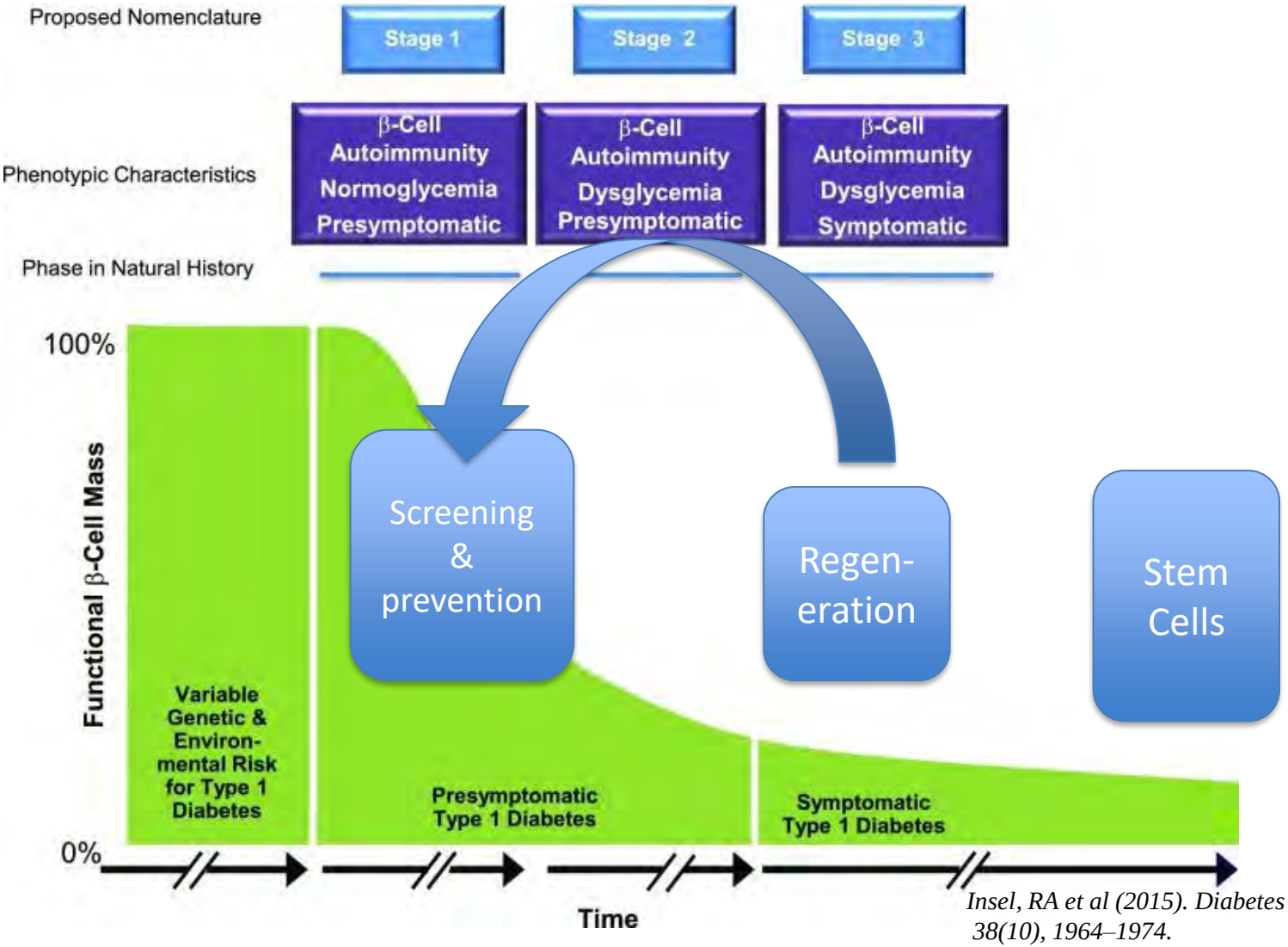
Future therapy for T1D



Insel, RA et al (2015). Diabetes care, 38(10), 1964–1974.

Conclusions

- T1D is an autoimmune disease not primarily a metabolic
- We have low-risk therapies to target many of these “failures”
- The first immunotherapy to delay the need for insulin has been licensed
- Delaying the need for insulin carries major health and quality of life benefits
- In future T1D will be managed with immunotherapy not insulin

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Paediatric diabetes care in the next decade

- The majority of children are diagnosed in stage 1 or 2
- DKA/Late presentation is rare
- All children > 2 yrs old receive first line preventive therapy
- Clinics manage second line therapies according to UCPCR/random c-peptide/capillary OGTT
- Insulin therapy in childhood is the exception rather than the rule

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Backups

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The Journal of Clinical Endocrinology & Metabolism, 2025, **00**, 1–11
https://doi.org/10.1210/clinem/dgaf265
Advance access publication 7 May 2025
Clinical Research Article

ENDOCRINE SOCIETY

OXFORD

Real-World Glycemic and Person-Reported Outcomes After Tandem Control-IQ Initiation in Children With Type 1 Diabetes

Jolien De Meulemeester,[1] Laura Valgaerts,[1] Guy Massa,[2] Inge Gies,[3] Sylvia Depoorter,[4] Sara Van Aken,[5] Olimpia Chivu,[6] Marieke den Brinker,[7] Thierry Mouraux,[8] Marlies Van Loocke,[9] Marie-Christine Lebrethon,[10] Anissa Messaaoui,[11] Philippe Lysy,[12] Lut Dooms,[13] Chantal Mathieu,[1] Kristina Casteels,[14] and Pieter Gillard[1]

Between December 2021 and December 2022, all children aged 6-18 years who started Control-IQ at 13 Belgian centers were consecutively recruited.

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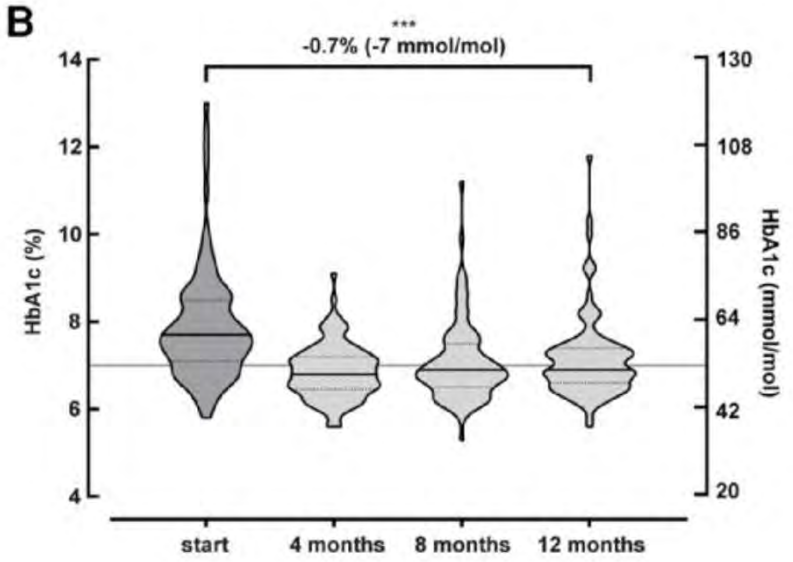
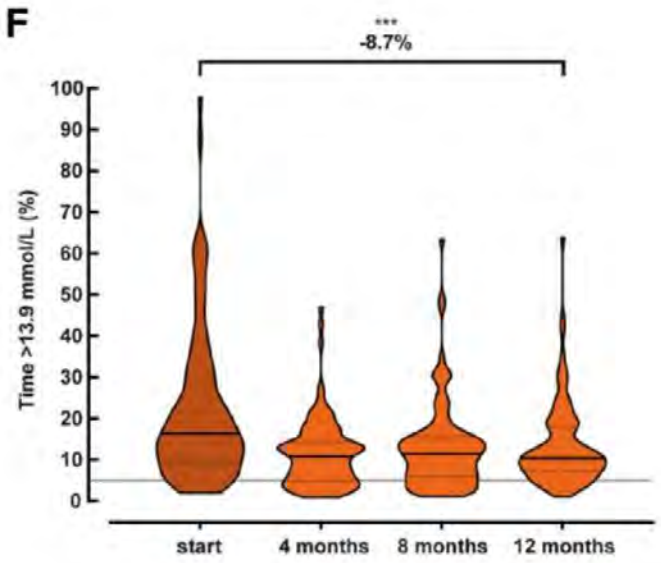
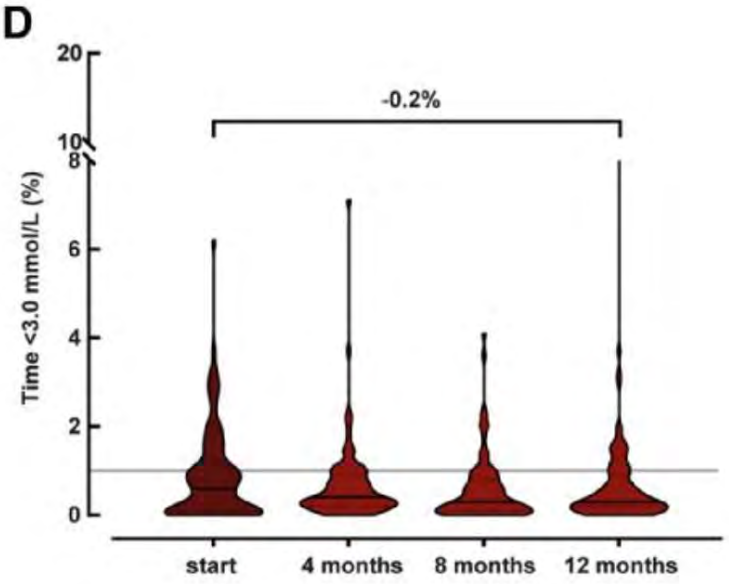


Meulemeester et al 2025





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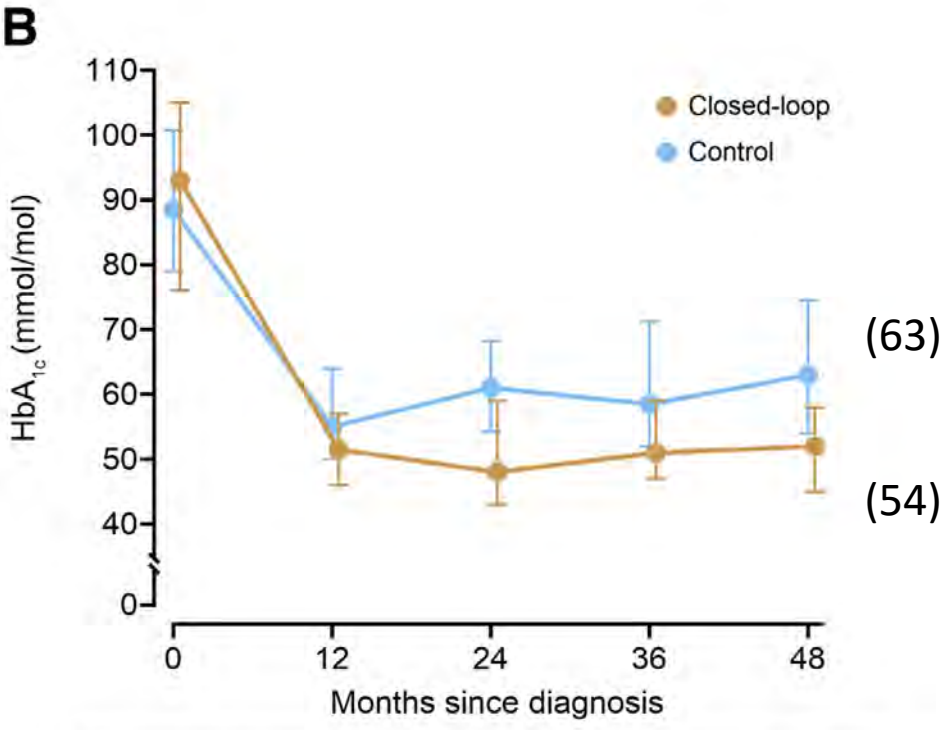
CLOuD 48 mth data



Control group, No (%) using

Insulin pump	4 (10)	16 (43)	15 (44)	13 (39)
Sensor	21 (57)	25 (68)	31 (91)	31 (94)
Hybrid CL	0 (0)	0 (0)	4 (12)	5 (15)

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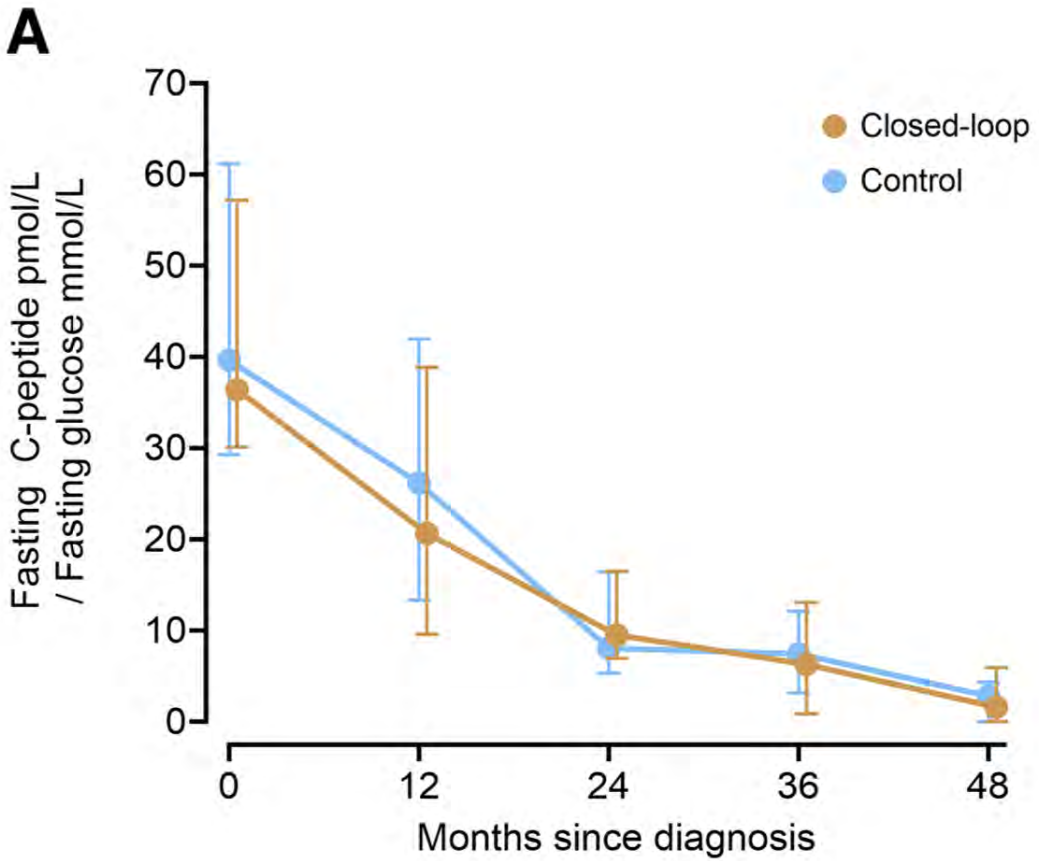
CLOuD 48 mth data



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HbA1c and technology

National Paediatric Diabetes Audit (NPDA) 2025 Report on Care and Outcomes 2023/24

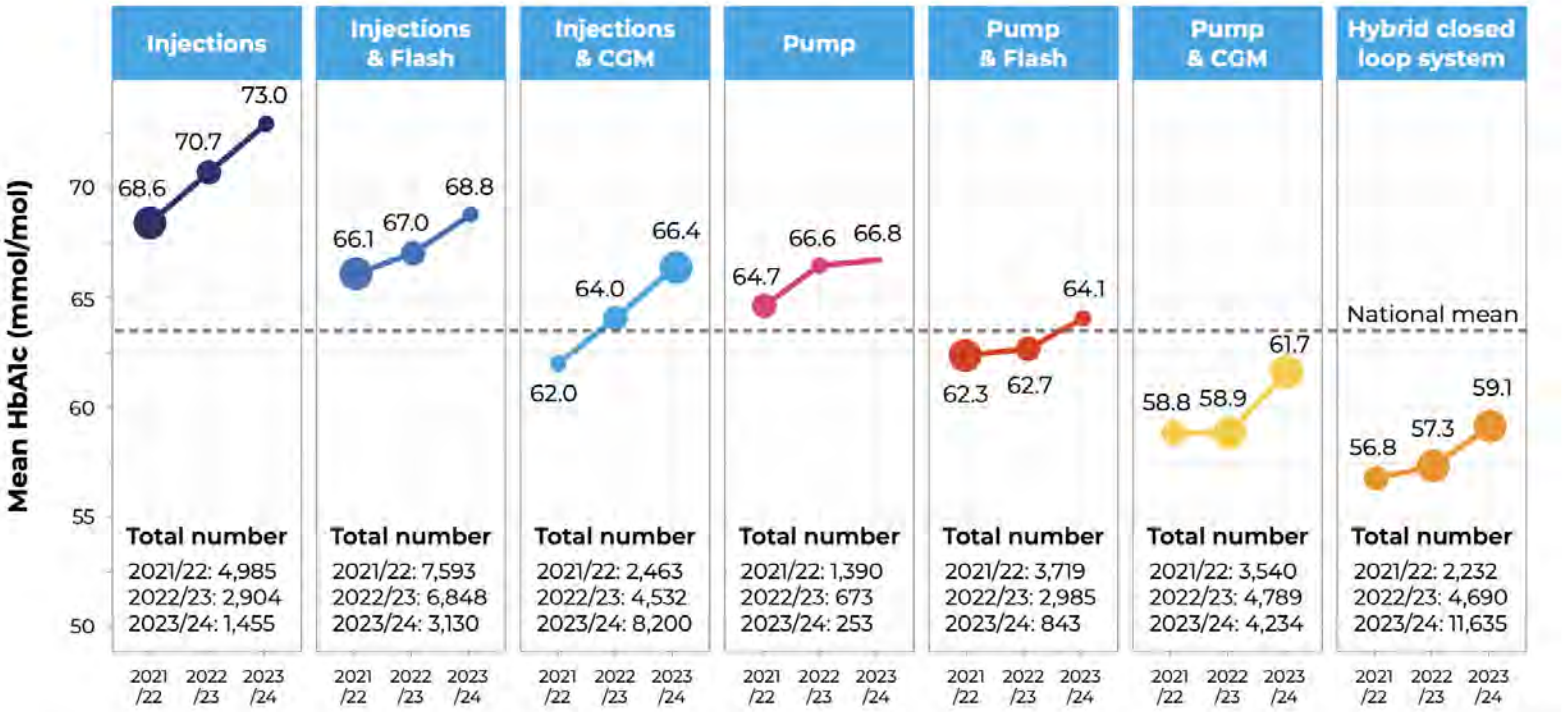

Figure 8: Mean HbA1c for children and young people with Type 1 diabetes using different combinations of treatment regimen and glucose monitoring in 2021/22 - 2023/24. Circle size represents the number of children and young people.

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Additional Tech/therapies

- Smart insulins
- Continuous ketone monitoring
- GLP-1
- SGLT2

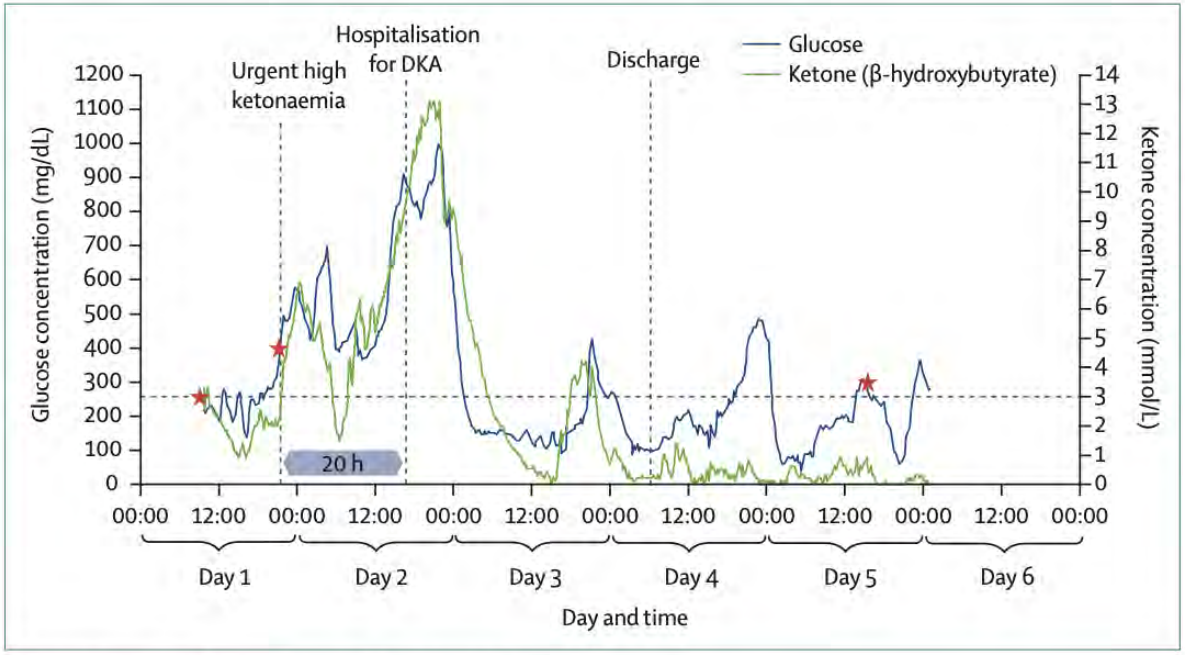

Figure 1: **Case study in continuous ketone monitoring**

Dhatariya et al 2026