

Revolutionizing Diabetes Healthcare with Organoid Technology

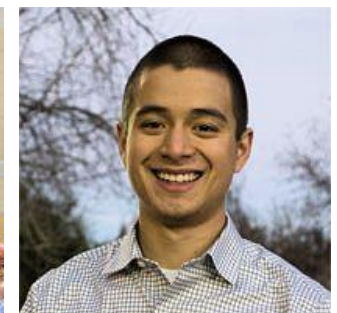
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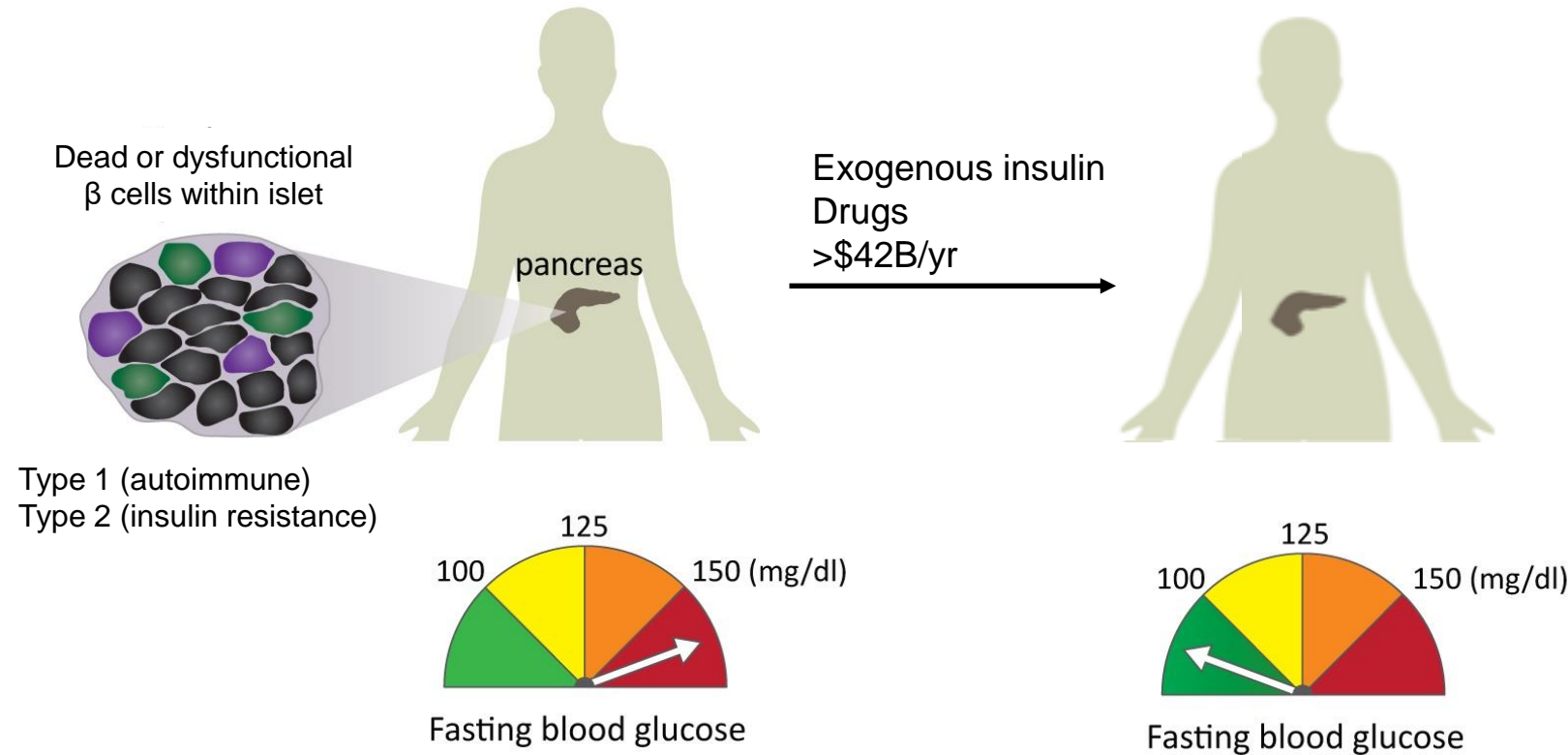
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The Millman Lab Team

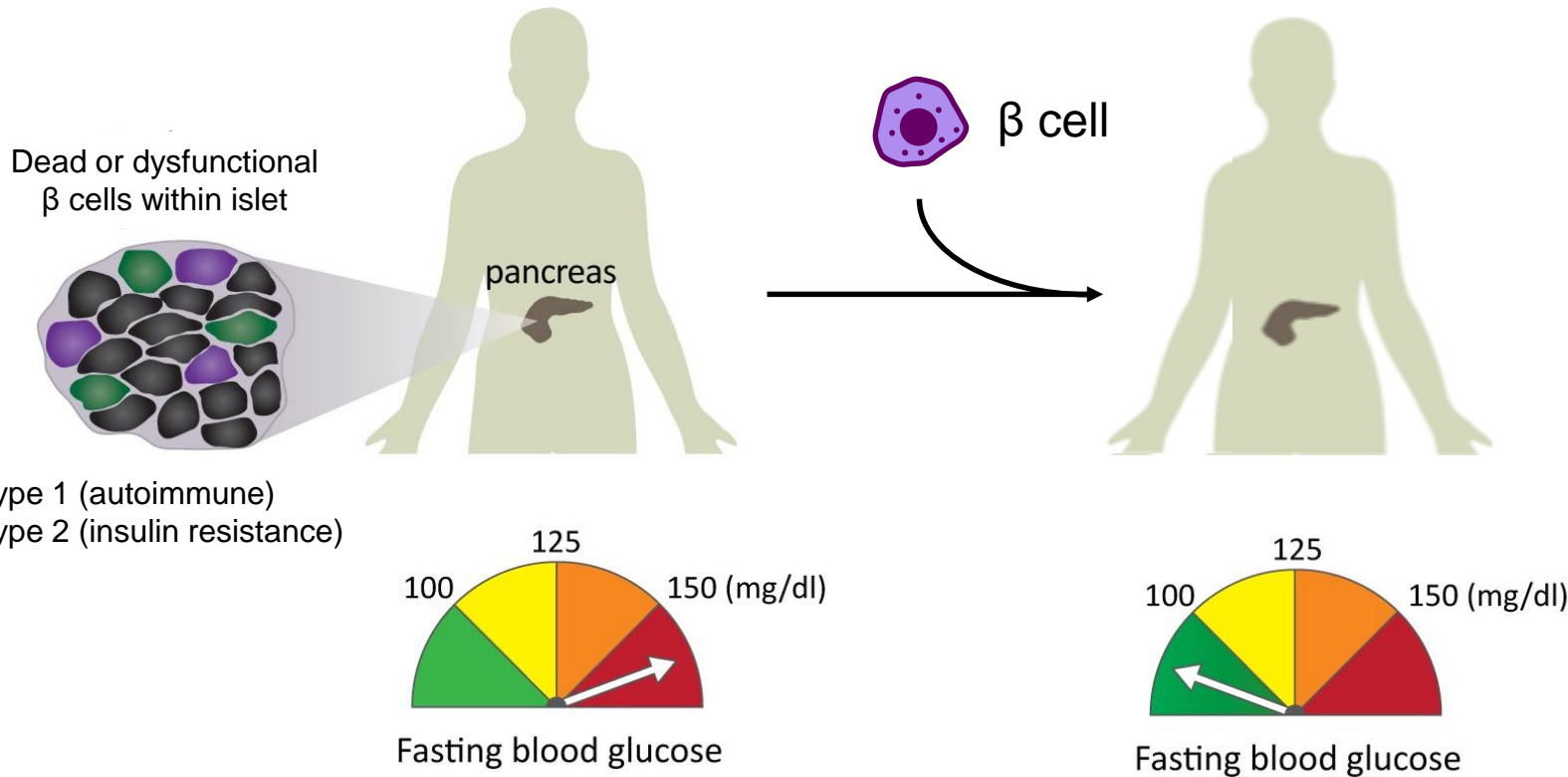


Current Problems With Diabetes Management



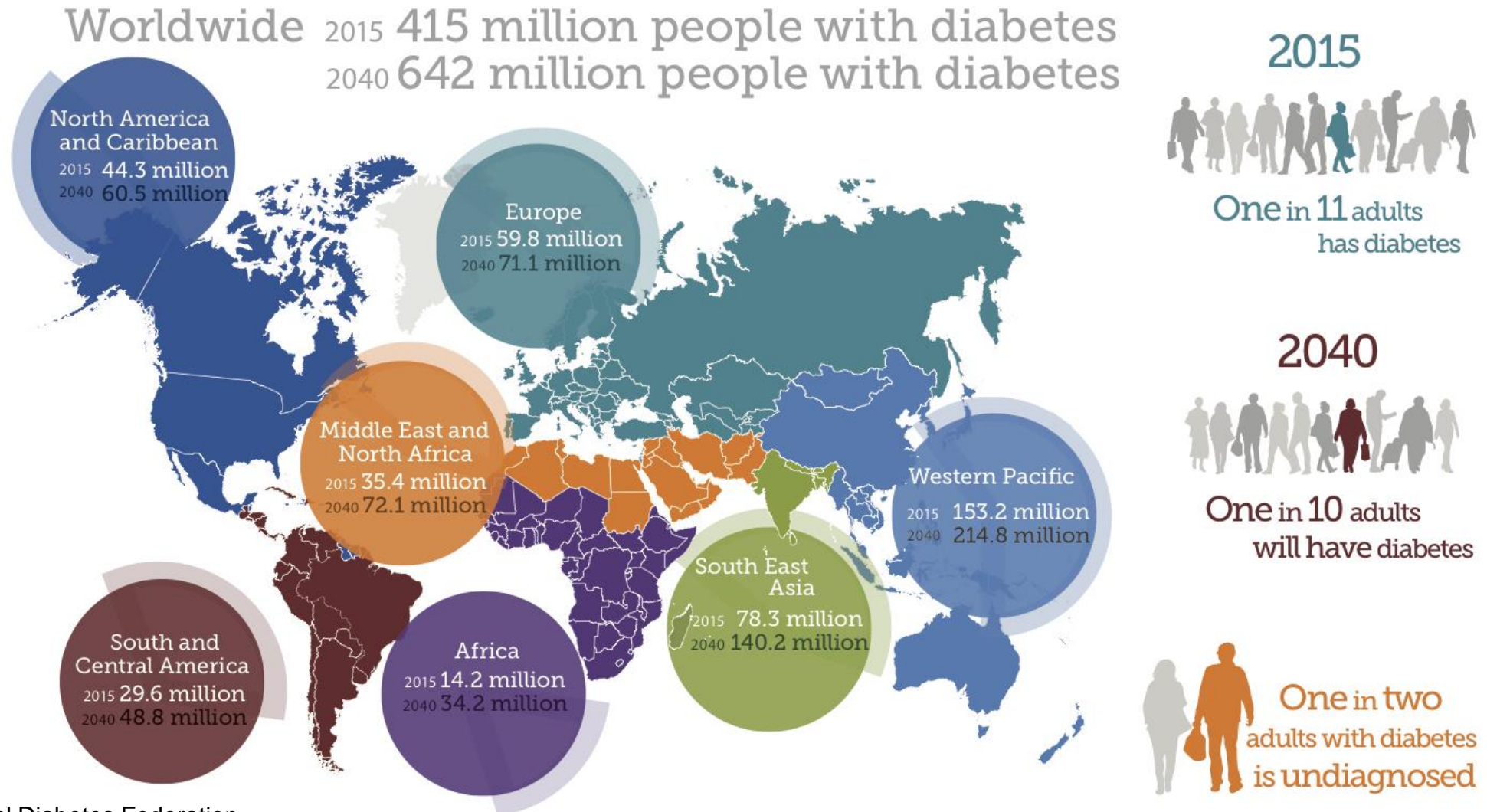
- Poor blood sugar control persists
- Requires multiple daily blood sugar measurements and insulin injections by the patient
- Many associated health problems
 - Eye, kidney, vascular, cardiac disease
 - Coma, seizure, stroke

Long-Term Treatment

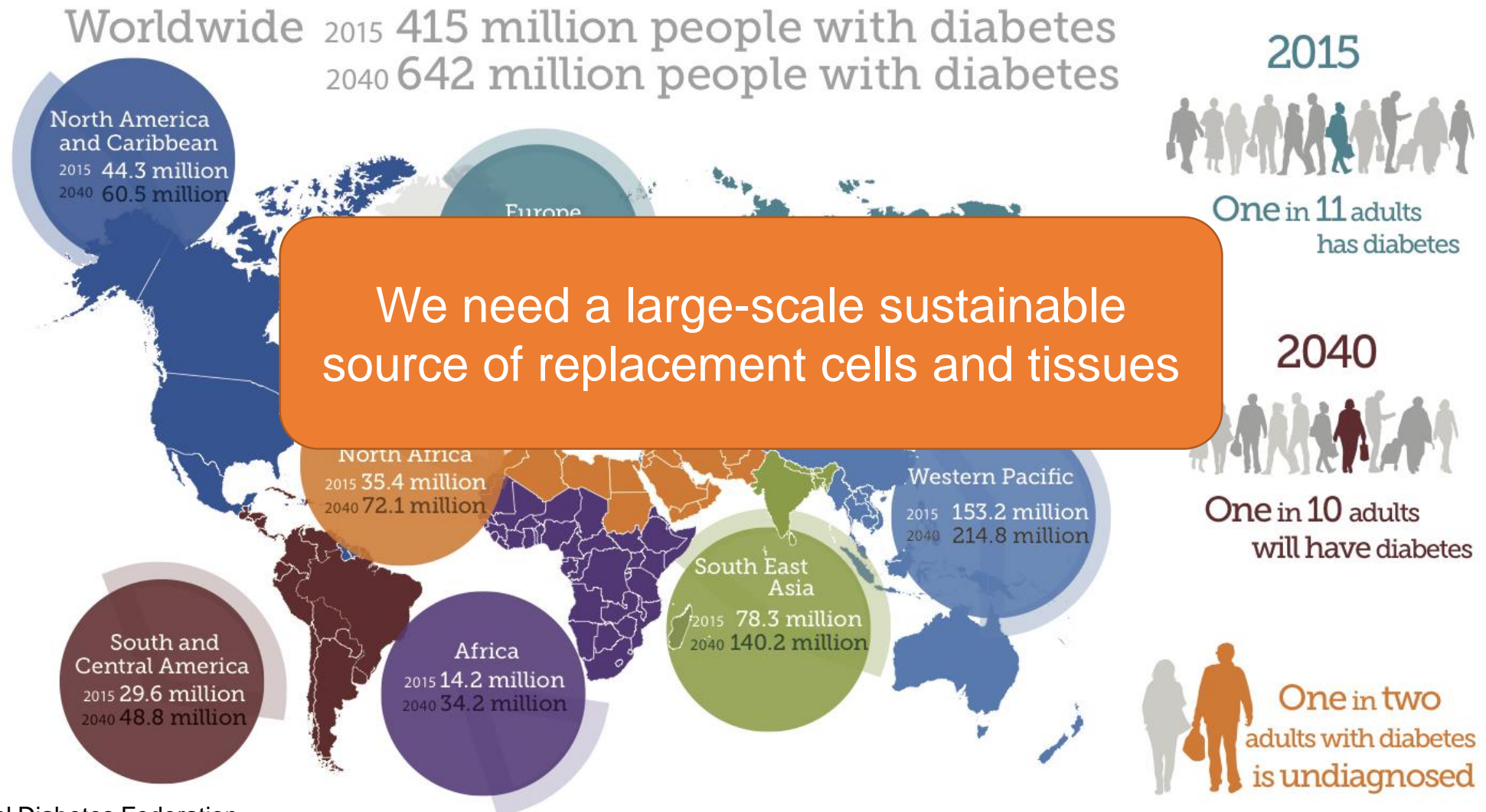


Functional
Cure

Target Population

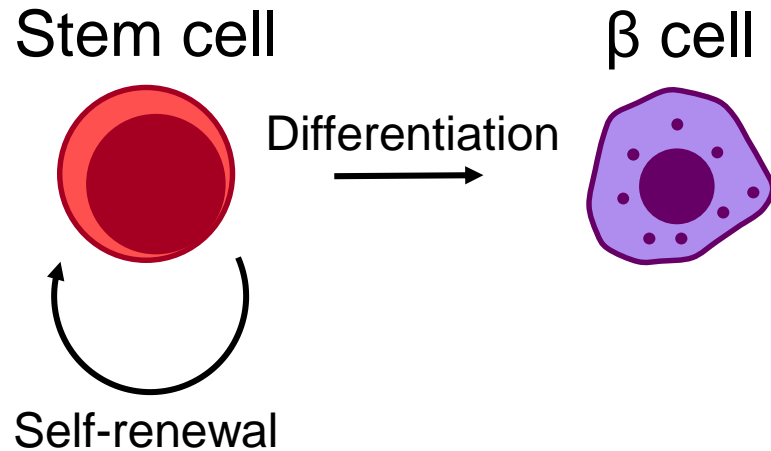


Target Population



Our Technological Solution

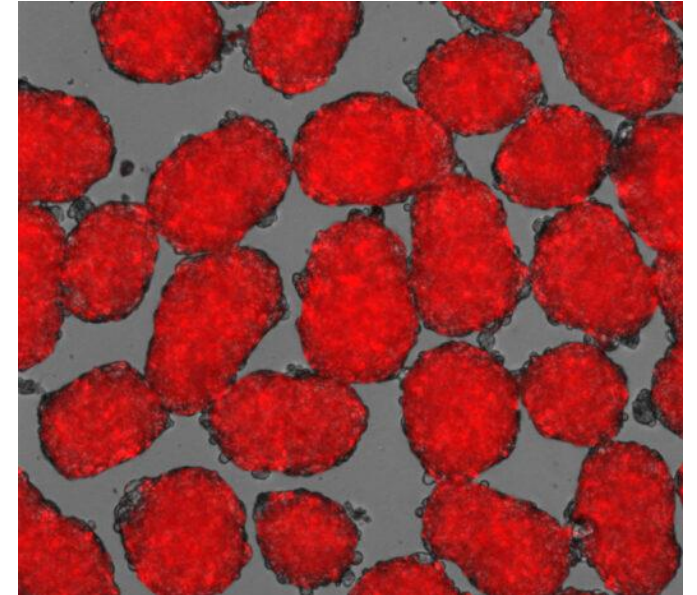
We recapitulate embryonic development to β cells in the lab



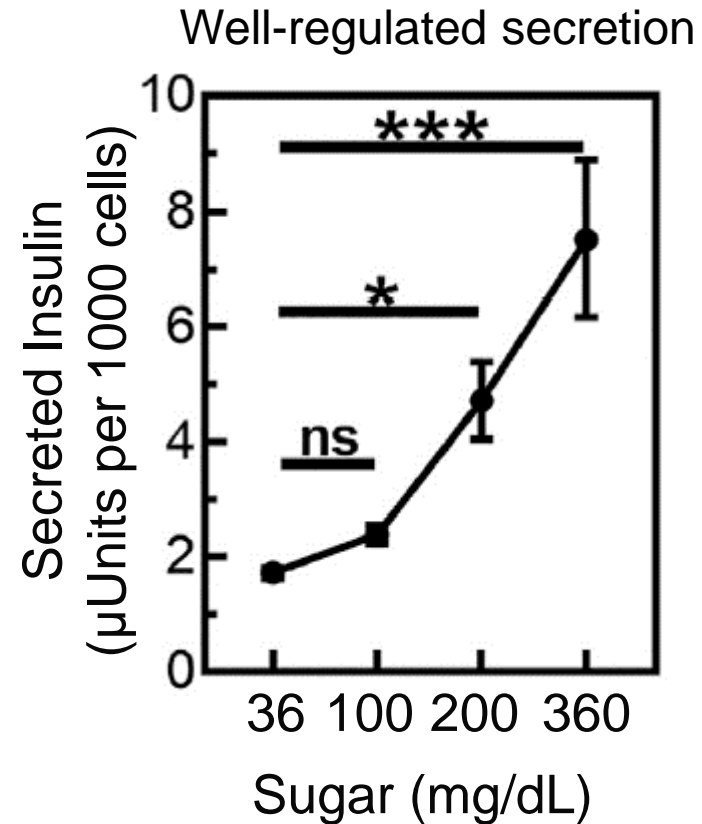
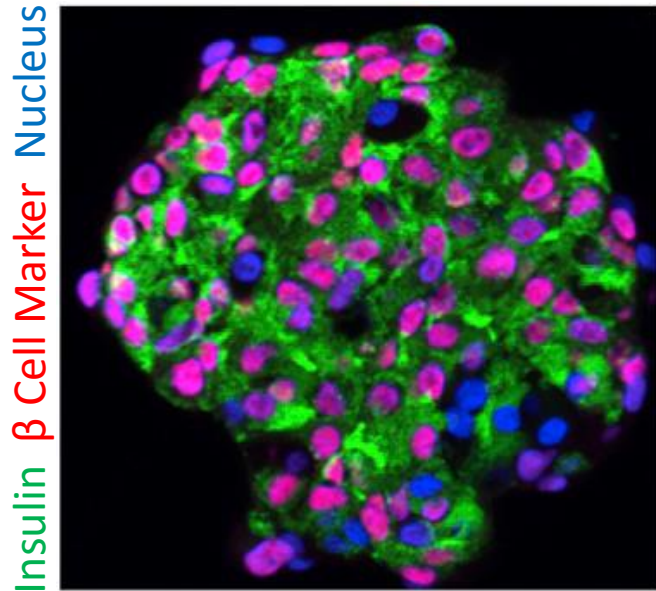
Bioreactors capable of producing $>10^9$ cells in an academic lab



Clusters of $\sim 2,000$ β cells glowing **red** when they produce insulin



Our Organoids Produce and Secrete Insulin



Our Organoids Functionally Cure Diabetes in Mice

Redacted

Next Steps

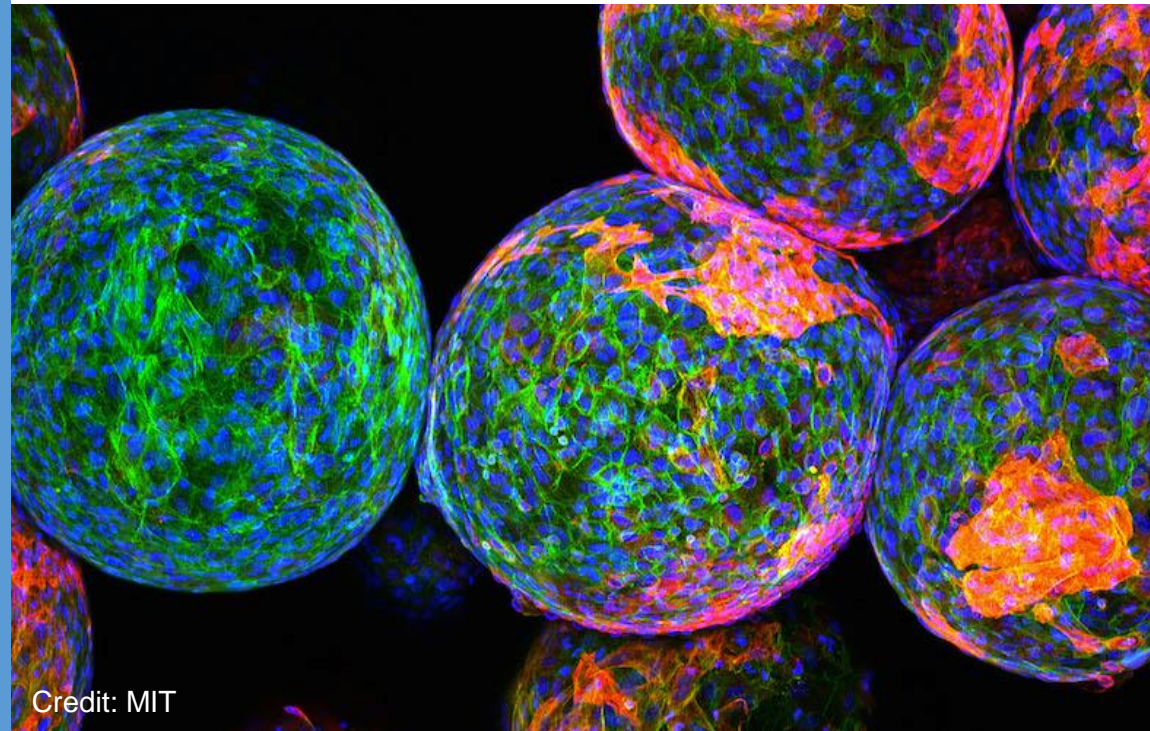
We have already successfully generated stem cell-derived β cells that secrete insulin

Better Engineer Organoids

- Tissue contains other cells and proteins
- Important to ensure therapeutic outcomes

Therapeutic Delivery Into Patients

- Protect β cells from immune attack
- Ensure safety of patients



Credit: MIT

Future Impact

**β cell replacement via
engineered organoids
will lead to:**

1

Greatly expanded
accessibility to the
millions of
patients that can
benefit

2

Continuous and
long-term control
of blood sugar
levels without
monitoring

3

Healthier
patients with
reduced risk of
complications

Acknowledgements and Thank You

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Millman Lab

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- Kristina Maxwell (T32)



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