

*Imagine...*

A world where a single injection a day gives you insulin only when you actually need it.

# Glucose Responsive Insulin



**A**shley was diagnosed with type 1 diabetes (T1D) more than 15 years ago. She has been using an artificial pancreas system to manage her diabetes, and it has been extremely effective. Ashley recently started using a new form of glucose responsive insulin (GRI). This new insulin is given as a once-daily injection and it circulates in her body, only activating when her blood glucose starts to rise. Once her glucose levels return to the normal range, the insulin stops working and continues circulating until it's needed again. This just-in-time, just-as-needed source of insulin means that Ashley leaves behind many of the T1D chores she endured for years. Each morning, she gives herself enough insulin to cover her needs for the day...and that's it. She doesn't need to carb count, she doesn't need to inject for each meal, and she only does a finger stick once in a while. The new insulin does all the work that Ashley used to have to think about throughout her day. Now, when she eats, exercises, or deals with the stress of her job, the GRI does all the thinking for her.

***“Each morning, she gives herself enough insulin to cover her needs for the day...and that's it.”***

Insulin you take once a week with no need to carb count, vaccines that prevent T1D, regrowing your own beta cells, an artificial pancreas on your smartphone, “shark cages” for implanted beta cells—that’s just the beginning of the future JDRF is creating. Which is why JDRF is your partner for translating these ideas into life-changing advances.

But as we work to deliver these therapies, one fact is inescapable: increased funding is essential. Clinical trials and development are expensive. To fully exploit these opportunities, it is vital that JDRF invests even greater amounts to translate ideas into new therapies for those with T1D.

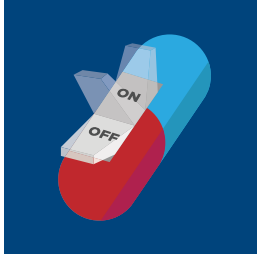
Help us close the gap between the possible and the affordable. Support JDRF now and together we will accelerate our progress down the path to making this future a reality.

**JDRF** IMPROVING  
LIVES.  
CURING  
TYPE 1  
DIABETES.

800-533-CURE

supportJDRF@jdrf.org

jdrf.org



# Glucose Responsive Insulin

## Why

Glucose responsive insulin (GRI) is a form of insulin that only works when the body's blood-glucose levels start to rise. When blood sugar levels are in proper range, the insulin is inactive. GRI would profoundly and positively change the lives of people with T1D. Their need for injections to lower blood-sugar levels would largely disappear. In short, GRI would not only make life much easier and simpler for T1D patients, it would also improve overall blood-glucose controls with all the positive benefits associated with that outcome. GRI is an example of JDRF's investment strategy to accelerate the pace of science leading to cures and treatments for people with T1D by promoting highly innovative approaches to new therapy development.

## Approach

A very exciting opportunity in the GRI field is "smart insulin." In 2003, an MIT researcher named Todd Zion founded a company called **SmartCells, Inc.** The company developed a form of GRI named *Smart Insulin*. JDRF invested in the company at an early, high-risk moment to help with early development efforts and to support preclinical safety and efficacy testing. Following JDRF's early investment, the pharmaceutical company Merck announced that it had acquired SmartCells with the intent of supporting the continued development of *Smart Insulin*—a validation of JDRF's strategy to support early stage, high-risk, therapy development to establish proof of concept to draw major drug manufacturers to the T1D field.

JDRF is also stimulating progress in the GRI field through its Glucose Responsive Insulin Grand Challenge Prize. As promising as "smart insulin" is, JDRF believes that it is always prudent to seed or support multiple approaches to the same goal. To that end, JDRF launched a competition in September 2011 to attract new researchers to the field to address several issues critical to accelerating progress on GRI. JDRF recently announced three winners of the first phase of the challenge. In the coming years, JDRF will support the approaches that show the most promise. While still years away from reaching patients, GRI will, with continued JDRF investment, become another life-changing therapy for those with T1D.

### Availability for T1Ds

Mid-term timeframe until widespread availability with growing portfolio of human testing in mid-term.

### Investment Need

Current Need:

**\$3 million**

Anticipated five-year need:

**\$25+ million**



**800-533-CURE**

**supportJDRF@jdrf.org**

**jdrf.org**