

## FUNDRAISING

### A Year Without Events

It was a year where events were cancelled, but our incredible friends and advocates kept pushing and helping us as much as they could, always providing inspiration for everything we do.



Our wall of heroes keeps on growing.

### Donor Spotlight: Sue Root

For many years, Sue Root has been one of the Lab's most ardent supporters. We asked her to share some of her story.

**How long have you been supporting the lab?** My family and I have been supporting this research for over 16 years. My first visit to the MGH lab was in October of 2003. After meeting Dr. Faustman and taking 6 months to investigate the type 1 diabetes research by reading published papers and contacting scientists around the globe, I believed that BCG could be the first potential treatment for someone like my daughter, who at the time had been living with diabetes for 7 years and was otherwise healthy.

**Tell us the story of the fundraising ride to Boston.** I wanted to help raise awareness and, more importantly, funding for the Phase I human trial. Working together with my good friend Jackie Fusco, who has two children living with type 1 diabetes, we put together a fundraising event that all of our children could be a part of. What better way than to bike over 200 miles from CT to the MGH lab? Amazingly, and to our surprise, we raised over \$150,000. The success of our first bike ride pushed us to do 3 additional bike rides, which we opened up to the public to participate. We raised over \$1 million to help support the Phase I human trial.

**What have you learned along the way?** Our daughter, Alex, was diagnosed with type 1 diabetes the week of her 3rd birthday, back in 1996. She is 26 years old now, working and living in New York City. Alex was one of the youngest children to be put on the insulin pump when she was in kindergarten. Although we are grateful for these devices, about 10 years ago I started witnessing a shift from curative research to management of the disease for those who are already living with type 1 diabetes, which is why I am so passionate about Dr.

Faustman's research. I have learned so many things along the way. I learned how important it is to educate yourself about scientific research, especially if you are going to take the time to fundraise and donate money to any project.

**Why are you still excited?** There is so much more to learn about BCG and the effects it has on the body in regards to autoimmunity. I am excited for my daughter to participate and receive the BCG treatment when it is available. I'm also excited to see the effect of BCG in the pediatric population, especially when given to those who are recently diagnosed in the hospital.



Sue and Alex Root in 1995.

## How You Can Help

Please consider making a tax-deductible donation to this type 1 diabetes research program. Every gift makes a difference.

1. To make a secure online donation, visit [www.faustmanlab.org](http://www.faustmanlab.org) and click on "Donate."
2. You may make a gift by check (payable to "Massachusetts General Hospital") and mail it to:

*Diabetes Clinical Trial  
c/o Dr. Denise Faustman  
Immunobiology Laboratory  
MGH - East  
Building 149, 13th Street, CNY-3601  
Charlestown, MA 02129*

On the memo line, please write: "Faustman T1D research."

Thank you for joining us in the fight against diabetes!

For more information, visit [www.faustmanlab.org](http://www.faustmanlab.org) or email [DiabetesTrial@partners.org](mailto:DiabetesTrial@partners.org).

Find us on Facebook: [www.facebook.com/FaustmanLab](https://www.facebook.com/FaustmanLab)

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# Updates

from the Faustman Laboratory at Massachusetts General Hospital

Fall 2020



## A Note from Dr. Faustman

The year 2020 was eventful for all of us, and it is one we certainly will not forget anytime soon. Despite the pandemic, the lab pushed forward. Patients in the diabetes trials found ways to come in for trial appointments and, while the golf events, bike rides and dozens of other events we always look forward to did not happen, we were able to stay in touch with the people who continue to make these trials possible.

The COVID-19 pandemic also presented a new opportunity for BCG. Shortly after the pandemic emerged, researchers who are part of our global BCG working group began looking again at BCG's efficacy in preventing complications from respiratory infections overall, as well as the emerging trend of lower death rates from COVID-19 in countries that have BCG vaccination programs. Several members of our group have initiated



BCG COVID-19 trials. Our lab, in collaboration with Brigham & Women's Hospital and the Immune Tolerance Network, will begin a BCG trial that is enrolling 2,800 healthcare workers at high-risk of COVID-19 infection.

The Phase II type 1 diabetes clinical trial continues and we can look forward to unblinding the trial and analyzing the data in about two years. An Expanded Access protocol and pediatric trial will hopefully launch soon.

BCG is considered a "generic" vaccine because it has been

used for more than 100 years. This means we need to fund this not-for-profit research with donations from individuals and private philanthropies. We hope you will help us move this important work forward.

Please contact the lab if you have any questions by emailing [diabetestrial@partners.org](mailto:diabetestrial@partners.org).

Thank you for your support!

Sincerely,

Denise L. Faustman, MD, PhD

## Updates on BCG for Type 1 Diabetes

The Phase II trial continues to progress. All 150 enrolled patients have been followed for almost three years of the five-year trial. New trials are launching (pediatric and expanded access protocol) and we have been publishing new findings on the underlying mechanisms of how BCG alters the immune system. This includes new insights on Myc, a pivotal transcription factor for four metabolic pathways that accelerates the utilization of sugar. This is the first documentation of BCG induction of Myc and its association with the correction of blood sugars as seen in the Phase I trial.

### Key Facts - Phase IIb Clinical Trial

- Double-blinded, placebo-controlled
- 150 patients enrolled (100 BCG and 50 placebo)
- All are patients with established type 1 diabetes (not a new-onset trial)
- Six doses of BCG over five years
- Expected to unblind in 2023

## Updates from FOCIS Meeting

The 2020 annual meeting of the Federation of Clinical Immunology Societies (FOCIS) was held in October as a virtual event. The lab presented two key updates on the BCG clinical trial program. The first was new data on the role of BCG in glucose utilization in type 1 and type 2 diabetes. The second presentation was an update on how BCG alters the function of a key subset of immune cells called regulatory T cells (Tregs). Tregs have been identified as key to changing the underlying immune defect associated with type 1 diabetes.

### Our FOCIS abstracts:

- **Correction of Underlying Lymphoid Glucose Utilization Defects with the BCG Microorganism: Implications for Type 1 and Type 2 Diabetes through Quantitative Method Development**
- **Beneficial Effects of BCG Vaccinations in Long-Term Type 1 Diabetes: Updated Clinical Trial Data and Epigenetic Impact on Foxp3 Treg Methylation**

## The 2020 COVID-19 Pandemic and BCG

It has been known for many years that BCG appears to protect recipients from a variety of non-tuberculosis-related infections, including respiratory infections, as seen in global studies. Further, multiple studies suggest that the impact of COVID-19 is more severe—with more illness and more death—in countries that do not routinely administer the BCG vaccination to their populations. The positive effect of BCG is most striking in countries who administer the Tokyo strain of BCG (the strain MGH is using in the diabetes trials). BCG is now being investigated in multiple global trials using different strains. Historically, vaccine design has involved the identification of a specific antigen that generates long-term, infection-specific immune responses and protection from the same disease-causing agent later. This is the approach taken by most of the COVID-19 vaccine programs. BCG is another approach, aimed at boosting the immune system to fight infection by triggering a form of boosted immune memory, called innate immunity, which can arm cells against a broad range of infectious diseases. BCG has the added advantage of being very safe and available in many places, and holds the potential to prevent complications from the current pandemic. Type 1 diabetes subjects in our trials may have added benefits from BCG.

### About BCG

BCG is a live, attenuated bacterial vaccine derived from *Mycobacterium bovis*. Introduced in 1921, BCG has historically been given to protect against tuberculosis and it is generally considered to be extremely safe. BCG is on the World Health Organization's Model List of Essential Medicines for adults and children and is given to roughly 100 million children per year globally. Over the last twenty years, a growing group of researchers and clinicians have begun to explore the "off target" effects of BCG for diseases including type 1 diabetes, multiple sclerosis, allergy, fibromyalgia, Alzheimer's and respiratory infections, including COVID-19.

## BCG-JAPAN Vaccination to Prevent COVID-19 and Other Viral Respiratory Infections in Healthcare Workers

This Boston-based trial is funded by the National Institutes of Health and will test if one dose of BCG-Japan can protect healthcare workers at high risk for SARS-CoV-2 infection from COVID-19 and other viral respiratory illnesses. A total of 2,800 patients will be enrolled across multiple sites in collaboration with the Immune Tolerance Network and Brigham & Women's Hospital. Dr. Faustman and Dr. Baden are co-principal investigators on the trial. This is the only major COVID-19 trial using BCG-Japan.

## The Fourth International BCG and Autoimmunity Conference

In the Fall of 2019, the BCG Working Group ([www.bcgworkinggroup.org](http://www.bcgworkinggroup.org)) convened our fourth conference in Barcelona. The meeting happened well before the start of COVID-19, but the participants in our conferences and books have been laying the groundwork for trials like the new BCG/COVID-19 clinical trials for several years. Our group has become the leading voice for the off-target effects of BCG and the potential on autoimmune diseases such as Type 1 diabetes. Peter Aaby and Christine Stabell Benn did pivotal early trials showing BCG protected infants from respiratory infections and have started a COVID-19 trial in Denmark. Mihai Netea (Holland), Nigel Curtis (Australia) and Gobardhan Das (India) among others are all conducting major trials of BCG for COVID-19 protection.

## Value of BCG

As more clinical data emerges on the potential of BCG, groups have started to calculate the value BCG could create if approved for type 1 diabetes. Boundless Impact, an independent research organization focused on assessing new technologies, looked at multiple factors including:

- Quality Adjusted Life Years
- Average Annual Cost of Care Per Patient
- Invasiveness
- Severe Complications

In all major categories, Boundless Impact found considerable value to health systems and patients. A full copy of the report is available on our web site, [www.faustmanlab.org](http://www.faustmanlab.org).

