



TAKING THE FEAR OUT OF FOOD

**SICKKIDS FOOD ALLERGY AND
ANAPHYLAXIS PROGRAM**

2020 PROGRESS REPORT

SickKids



FoodAllergy

A LETTER FROM THE FOOD ALLERGY AND ANAPHYLAXIS PROGRAM CO-DIRECTORS

Our mission always has been, and always will be, to improve the diagnosis and treatment of children and adults with food allergy. But in late 2020, we would be remiss to not speak about the other epidemic in our midst: COVID-19.

For most children, the effects of COVID-19 disease are mild. And yet, the impact that the pandemic has had on SickKids care and research has been profound. In March, as cases surged in Ontario, the Research Institute shuttered, forcing staff out of the building and bringing dozens of experiments—including our own—to an abrupt stop. In our clinic, all but the most urgent visits were halted. And while some care continued virtually, our oral food challenges could not.

Today, things look a lot different. Our clinicians may be masked, gowned, and gloved, but they're seeing patients—in person—and running oral food challenges. Clinical trials have been reactivated, and our mouse model and gut slice model research have been, too. We may not be at full capacity yet, but we're getting there.

With our research and clinical care both back up and running, we are now focused on the future. In Phase One of the Food Allergy and Anaphylaxis plan, we laid the foundation—hiring staff, creating allergic models, and developing clinical trials. In Phase Two, we are leveraging that great work to go even farther—testing our various hypotheses, broadening our understanding of the mechanisms of food allergy, and refining our treatments.

To help us realize our ambitious vision, we plan on hiring a new microbiome scientist. Working in tandem with our research team, this scientist will help us understand the ways in which individual microbiomes—each consisting of trillions of bacteria—affect the development and treatment of food allergy.

Of course, all of what we've accomplished, and all that we will accomplish, is only possible because of our greatest champions: you.

You helped launch this program, and you continue to fuel its growth. For that, and all your support over the years, we both just wanted to say thank you.

Sincerely,

Dr. Eyal Grunebaum and Dr. Thomas Eiwegger



FUNDRAISING TO DATE

Thanks to you, in Phase One, we reached our \$7.2-million goal.

Over the last six years, our community has rallied behind us. We've had support from all avenues: our community events, corporate partners, and individual donors.

For Phase Two, we have added a new \$14-million fundraising goal. With your support, we will broaden our reach, continue to fund critical allergy initiatives, and build upon our successes.

We are thrilled to share news of two landmark gifts to the Program. First, founding benefactors, Dr. Amy Kaiser and Ken Rotman, have made a new \$2.5-million gift to support this second phase of the Food Allergy Program. Amy and Ken's gift will serve as an anchor to our plans over the next decade. In addition to their financial support, they will continue as program ambassadors and champions, helping us to engage an ever-widening circle of support as we pursue our ultimate goal: curing or stopping the threat of anaphylaxis.

We are also excited to announce that Cyndy and Marc Campbell have made their second major gift to the program. Initially inspired by a newspaper ad talking about the program, they made a personal gift, and Marc, together with his brothers Scott, David and Reid, directed a gift from the Donald and Audrey Campbell Foundation. This past December, after our last report, Marc and Cyndy determined that they wanted to do more, and made a new \$2-million commitment, half endowed and half expendable, to support the scientists of the program, now and in perpetuity.

Amy and Ken, Cyndy and Marc, we cannot thank you enough for your inspiring leadership. We look forward to sharing with you great results and progress against food allergy.

PHASE ONE:
\$7.2M ACHIEVED

PHASE TWO:
\$14M, WITH \$4.5 MILLION ACHIEVED.

GOAL FOR PHASE ONE AND PHASE TWO:
\$17.2M

FROM FEARING FOOD ALLERGY TO FIGHTING IT: ONE SICKKIDS SCIENTIST'S STORY

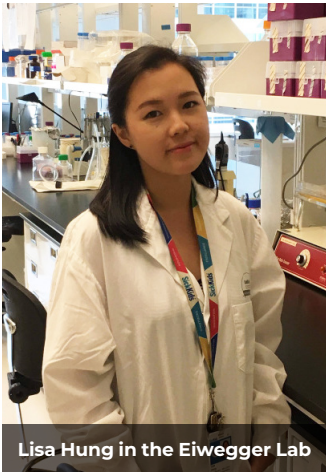
For most kids, the question “What do I want to be when I grow up?” takes years to answer. Not Lisa Hung. She’s wanted to become a food allergy scientist since elementary school—and she’s never wavered.

“From childhood to now, it’s been one streamlined decision,” Lisa says.

That’s because Lisa is severely allergic to milk and peanuts. At six months old, she had her first reaction. Since then, she’s been hospitalized more than 20 times. So, Lisa knows what it’s like to live in fear of food. But she also knows the other, subtler ways food allergy affects a kid’s life.

“Food is such a conduit for social connection,” Lisa says. “And because as a food allergic child, you don’t experience it in the same way, you can feel very ostracized, and that can be very damaging for your mental health.”

For all those reasons, Lisa chose to fight back—with science.



Lisa Hung in the Eiwegger Lab

Today, as part of her thesis project, she’s working inside Dr. Thomas Eiwegger’s allergy research lab on a gut slice model of food allergy. It works like this: First, they gather leftover intestinal tissue from surgeries at SickKids and the University Health Network. Then, using a precise, top-of-the-line machine, they slice it 400 micrometers thick—about the size of a grain of sand.

Because the tissue comes from non-food-allergic kids, Lisa and her coworkers must then incubate it in plasma from food-allergic kids. Once the tissue is sensitized, the model is ready, and they can use it to study the mechanics of allergic reactions and test potential treatments.

“We can actually see a response after we add the allergen in,” Lisa says. “And because it comes from a person, the results are more relevant and directly translatable.”

For her work on the gut slice model, Lisa was awarded a four-year Restracom scholarship (\$26,000 a year) from the Research Institute in 2018—a career highlight.

“The people in charge of distributing these awards are SickKids researchers,” Lisa says. “So they know exactly what we’re doing and how important it is.”

Lisa has also received a number of additional accolades, including the SickKids Exceptional Trainee Award in 2020, and the Sabrina Shannon Memorial Award in 2018 from Food Allergy Canada for raising awareness about life-threatening food allergies.

Once Lisa finishes her PhD, she’s hoping to do post-doctorate work, preferably in one of SickKids collaborating labs. From there, she’s not entirely sure where she’ll land. But she is sure of this: She’s going to stay in food allergy research, forever.

SCHOOLING THE NEXT GENERATION

As much as the Food Allergy and Anaphylaxis Program is a hub for world-leading research, it’s also a training ground, a place where the next generation of researchers can learn from SickKids experts.

PhD student Lisa Hung (see article to the left) is just one of many such scientists. Akash Kothari, an undergraduate student, is another. Since joining SickKids, he’s netted four different awards, including a \$5,000 summer research award from Victoria College, plus a \$1,000 award from Food Allergy Canada for raising awareness about life-threatening allergies.

Jennifer Hoang, an MSc student in the program, is yet another. In August, she published her second major study in the top journal *Allergy*—a towering achievement for a scientist so young. Now, she is supervising students and playing a central role in multiple test-related projects in the Eiwegger lab.

Dr. Thomas Eiwegger considers a great training program a “barometer of a successful lab.” And given the success of our students, he’s very encouraged indeed.

BEYOND FOOD CHALLENGES: REIMAGINING ALLERGY TESTING FOR THE 21ST CENTURY

Ten years ago, if you were diagnosed with a food allergy, you didn't question the accuracy of the diagnosis. You avoided the food—for life.

Then, very slowly, things began to change.

Doctors began to realize that scratch tests and blood tests—which remain the diagnostic standard—often lead to false positives. While different in approach, both tests measure the presence of Immunoglobulin E (IgE) antibodies, which the immune system produces in response to an allergen. Because there are other actors in the blood and tissue that can suppress an allergic reaction, the presence of IgE antibodies alone isn't always indicative of an allergy. In tandem with a patient history, scratch tests and blood tests are good diagnostic tools. But without one, they're really no better than a coin flip.

So, about seven or eight years ago, SickKids allergists like Dr. Adelle Atkinson started to look to colleagues in Europe, who were doing more and more oral food challenges—medically supervised tests during which patients eat the food to which they were diagnosed as allergic. If they react, their original diagnosis is confirmed. If they don't, they're de-labelled—and freed from the fear of an anaphylactic reaction. Oral food challenges weren't unheard of in Canada, but they were considered risky and not often practised.

"We really started to increase the number of kids whom we chose to challenge," Dr. Atkinson says. "And we were able to de-label all kinds of kids."

After being vetted for an oral food challenge, Dr. Atkinson says that 90% of children are de-labelled—an astonishing number.

"It's absolutely lifechanging for them," she says. "I've had parents weeping in the clinic, I've had kids weeping."

Now, community clinics handle most of the food challenges, so SickKids can focus on the riskier ones needing a hospital and specialized expertise. For Dr. Atkinson, it's incredible to watch her patients' lives be transformed so quickly. But she also recognizes how taxing oral food challenges can be—on patients and medical staff.

Once again, SickKids is searching for a solution: a diagnostic tool more accurate than skin and blood tests, but less demanding than an oral food challenge. Dr. Thomas Eiwegger believes he has the answer: the basophil activation test.

Instead of solely focusing on the presence of IgE antibodies, the basophil activation test measures specific proteins to determine how a patient would react in real life. Dr. Eiwegger likes to think of it as an "oral food challenge in a test tube." And judging by a recently completed study of 200 patients (the manuscript is currently in review), it's about 90% accurate.

For SickKids allergists like Dr. Atkinson, it doesn't just look promising. It looks like the future.

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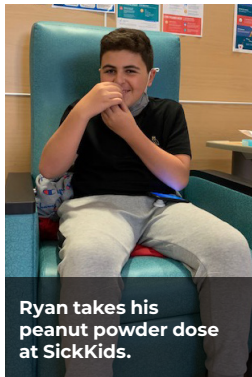


SICKKIDS PATIENTS FACE THEIR FEAR, ONE BITE AT A TIME

Ryan was three-and-a-half years old the first time he was injected with an EpiPen.

He was sitting on the kitchen countertop, unable to speak, his symptoms getting worse by the second. His mother, Jennifer, was on the phone with 911, frantic. His father, Steve, hovered nearby, clutching an EpiPen.

Steve was a Toronto firefighter, a man of calm in emergencies. But the prospect of stabbing his own son with a needle gave him pause.



Ryan takes his peanut powder dose at SickKids.

“They’re saying administer!” Jennifer said, phone in hand.

“Wait,” Steve said, still nervous.

“NOW!” she screamed.

Steve jabbed his son within the EpiPen.

Within minutes, their house was swarming with cops and paramedics, but by that time Ryan was fine.

From then on, Jennifer and Steve enforced a strict avoidance protocol—no peanuts, no “may contain peanuts,” ever. That is, until 2019, when Jennifer began looking for oral immunotherapy clinical trials for Ryan to join.

“I stumbled upon one at SickKids,” says Jennifer. “It was just kind of in the beginning phases.”

That trial was Dr. Julia Upton’s “How Low Can We Go” study. Ryan was one of its first three participants.

Within the study, there are three groups. The first is building towards 30 mg of peanut; the second, 300mg; and the third waits a year before starting oral immunotherapy. Neither Ryan nor Jennifer know which group he’s in—and that’s the point.

“We’re hopeful no matter what group we’re in,” says Jennifer.

Ryan, now 12, agrees. “Even if I’m at 30 milligrams, I’m eventually going to be able to tolerate food that I can’t have,” he explains.

Each night Ryan takes his peanut powder dose in a shot glass, mixed with chocolate milk. Because he hates the taste and smell so much, he slurps it down quickly with a straw.

For him, the goal isn’t to be able to eat a peanut-butter-and-jam sandwich. It’s to free himself—and his parents—from fear and worry.

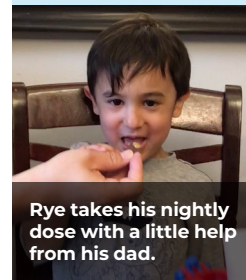
Given how well he’s progressed so far, that’s looking more and more likely.

RYE’S STORY

Rye was hospitalized for severe anaphylactic reactions three times within his first 18 months of life. For his mother, Simal, they were harrowing experiences, reminders of just how fragile his life was. For little Rye, they felt more like an adventure.

That’s because, by the time the ambulance arrived, Rye had already been injected with his EpiPen and was feeling better.

“He’s just like, ‘Wow, this is so cool!’” Simal says, laughing as she impersonates her son. “I got a teddy bear, a moose, and I get to sit in the back of this truck with these cool people.”



Rye takes his nightly dose with a little help from his dad.

Rye, now four, has been diagnosed with asthma and allergies to peanuts, walnuts, peas, eggs, and lentils. And while young, he’s well aware of his allergies and what to avoid.

Still, the number and severity of allergies takes its toll on Rye—and his mom.

“We have to comb through all the foods that we buy,” says Simal. “We don’t go and eat at certain family member’s houses because of ‘things may contain.’”

While OIT was initially appealing to Simal, it was also a bit worrying, especially after years of avoidance. But as a Research Associate in Interventional Radiology at SickKids, she knew how rigorous the hospital was when it came to safety. So, she enrolled Rye in Dr. Julia Upton’s low-dose multi-allergen oral immunotherapy study for peanuts and walnuts.

Since beginning, Rye has progressed through each up-dose without any trouble. Now, he’s in his maintenance phase, eating the same amount of peanut and walnut each night to retain his tolerance.

For Simal, OIT is a way to keep her son safe.

“Eventually, he’ll be on his own care,” she says. “And I just want to make sure that he is protected.”

THANK YOU.

Every day, SickKids works towards improving the lives of children, and our success depends on the generosity of donors like you. Your commitment to the Food Allergy and Anaphylaxis Program ensures that we can continue to offer the best possible outcomes for children with food allergies. Thank you for your remarkable generosity.

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