



American Healthcare Professionals and Friends for Medicine in Israel

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Dr. Uri Greenbaum is helping turn bad blood into good.

The 41-year-old hematologist is an APF 2019-2020 Clinical and Research Fellow in the Department of Stem Cell Transplantation and Cellular Therapy at The University of Texas MD Anderson Cancer Center.

In particular, he is mastering a new blood cancer treatment called CAR T cell therapy, which he will take home to Soroka University Medical Center, where he is a hematologist. Soroka, the South's only tertiary-level hospital, also will be the only peripheral medical center offering this therapy. And, after his two-year-fellowship, Greenbaum will be one of only a handful of Israeli experts in the field. He will lead Soroka's foray into this new territory.

The Yeruham resident says he's made a great match – with both the personal element of hematology and with the science.

"I was always looking for a specialty in which people got to know their patients very well. Relationships in this field can go on for years. My patients become like family.

"Also, this is a very scientifically advanced area that is moving forward very quickly. The things we do and know today were not considered even possibilities 10 years ago. The treatment I'm learning, the first time we heard of it was maybe 2012, 2013. Now it's already FDA-approved and patients with no other option are being cured.

"It's an exciting time in the field of blood cancer."

CAR (for Chimeric Antigen Receptor) T cell therapy uses specially engineered white blood cells, called T cells, to hunt down and destroy abnormal cells,

including cancer cells. The body's T cells, for unknown reasons, according to Boston's Dana Farber Cancer Institute, don't always recognize cancer cells or don't "mount an all-out attack on them," allowing tumors to take root and expand. Turning them into CAR T cells seeks to overcome those deficiencies by directing them against the tumor, says Greenbaum.

To make CAR T cells, a machine that resembles a dialysis unit first draws blood and centrifuges it. The process takes a few hours. Later the cells grow and are expanded in the lab, he says. Technicians genetically engineer the cells to sprout special structures, chimeric antigen receptors, on their surfaces. When these CAR T cells are reinjected into patients, the receptors may help the T cells identify and attack cancer cells throughout the body.

Greenbaum says antitumor effects may show as soon as two to three days after treatment. But a post-injection scan is done after about four weeks.

A single treatment is standard, he says. "The cells multiply in the body and you get many more than you injected."

Even though clinicians know better how to control side effects, they still can be quite serious. Side effects include: fever, low blood pressure, low oxygen level and neurological problems such as being unable to think clearly and, in rare cases, seizures.

CAR T cell therapy is approved for some lymphomas and some leukemias. It is being explored for use against other blood cancers. Greenbaum says multiple myeloma is a next likely target.

"We also are doing experimental treatments for other cancers, not just blood cancers," he says. "If

they work, they will become the mainstay in a few years. It's a glimpse into the future."

A glimpse back – From the ages of 10-13, Greenbaum lived in Boston where the family had come for work in the computer industry. "At that time, we learned about red blood cells in school. I began reading a lot about blood properties. It was really back then that I decided I was fascinated by anything to do with medical science."

The Jerusalem native served as a tank commander in the Hativa Sheva, the oldest armored brigade in the IDF. Two weeks after discharge he was in medical school at Ben Gurion University of The Negev. "I was just waiting for the opportunity to study; in the army you don't get to use your intellect in the same way."

In medical school Greenbaum thought he'd become a pediatrician. But during internship at Soroka he decided internal medicine was more interesting and remained at the hospital for residency.

"It's a great hospital, the third largest in Israel, and as a family we decided we loved the South and wanted to stay and live there."

He thought, at first, he might specialize in cardiology. Greenbaum says initially he didn't think much about hematology because, "you don't see that many cases in internal medicine. Typically, these patients are transferred out after diagnosis."

"But then I started talking about it with hematologists I'd meet when we'd need a consult. I noticed they knew a lot more about their patients, it seemed, than other subspecialists."

He asked one why. The hematologist replied that the field is almost like primary care in that regard and suggested Greenbaum try it. "And so I did, for a three-month rotation."

After residency Greenbaum continued at Soroka for his hematology fellowship. He also commuted, once a week for about six months, to Tel Aviv for a fellowship studying and treating another blood cancer, myelodysplastic syndrome. He worked with

Dr. Moshe Mittelman, a specialist at Sourasky Medical Center.

CAN YOU GET THIS EDUCATIONAL EXPERIENCE WITHOUT LEAVING ISRAEL?

"No.

"You get a much wider view of your field. You see how they do it in larger institutions.

"The volume, especially at a place like MD Anderson, is much greater. Here they do about 100 cases a year of the therapies I came here to learn; whereas in all of Israel they may do half of that. I'm also doing bone marrow transplants and this place does 900 a year, whereas in Israel they do between 500 and 700 a year.

"One more thing is that they have very early phase studies for therapies, which in other places we might see in five or 10 years. Some therapies done here are available in very few places in the world. You're truly peeking ahead.

"Even if I went to the most experienced hospital in Israel, I couldn't get this.

"But being here you also get a good perspective on the level of medicine in Israel. It lets you know the great things you already know and the great training you've had."

DO FELLOWSHIPS MAKE FOR BETTER DOCTORS?

"In this field, yes, for all the reasons above."

WHAT'S A WEEK LIKE FOR YOU?

"During the months I'm "on service" I usually leave the house sometime after 6 a.m. to get to work around 7. I look up all my team's patients in the computer to see their blood tests. (The department is divided into four teams.) I check on them all to see how they're doing, what treatment (Car T or bone marrow transplant, for example) they may need, etc. I'm responsible for all the patients on my team. Later the fellow leads team rounds.

"When I'm doing CAR T cell therapy I have five or six patients in the hospital at a time, in addition to

bone marrow transplant patients. I do five to seven of both CAR T cell therapy treatments and bone marrow transplants a week.

“Sometimes after rounds we have consults with other departments. Sometimes we have new admissions from home or through the emergency department.

“When I’m on service I’m on call every weekend and go in on each Saturday and Sunday morning to do rounds with an attending physician. After that it’s basically answering phone calls. I get one day off during the middle of the week.

“Other months we have a few outpatient clinics a week for those who are about to undergo treatment or have come for follow-up. We talk to them, examine them and discuss what’s next.

“There’s a lot of academic reading, and two or three times a week I attend different lectures given by specialists from MD Anderson and other institutions. I also present new papers and join many meetings. For a study I’m doing, I present updates or results.

“We have conferences to attend all over featuring world famous experts.”

Greenbaum then elaborated on the personal nature of his job. “Patients share life events and more. One woman, with a pretty bad case of cancer, told me she just wanted to survive to see her granddaughter’s wedding. Well, she lived longer than that and soon was telling me about her great grandchildren.

“And just recently I got a note from an Israeli patient wishing me a Happy Passover.

“It’s very gratifying to be with them during bad times too. When someone dies it doesn’t feel like a failure. I feel humbled that I could just be there for them, a source of comfort and help for them for as long as I could.”

WHAT ABOUT RESEARCH?

“Here I have much more protected research time than I would in Israel. During the months I’m not on service and when I’m not doing outpatient care, I try to do research.

“We’re collecting data from all those patients who’ve had CAR T cell therapy. Toxicity is one area we’re looking at. We’re asking who might do better or worse and how well can we predict how people might react.

“I’ve done a few review papers, papers that look at all the literature and summarize it in a way that someone can see where the research is now. We’ve submitted two review papers, one on the toxicity of CAR T cell therapy and another on CAR T cell therapy in solid tumors. Two more papers are in preparation; one of them is a research paper.

“Next year likely will be all research time in a lab. I’m hoping to gain a better understanding of the lab and research in general.”

WHAT HAS THE APF MONEY BEEN USED FOR?

“Without it I wouldn’t have been able to come here; it’s a major part of my salary. Soroka doesn’t have as much funding as hospitals in the center of the country.

“It’s never easy, financially, to move a family from one part of the world to another.” The Greenbaum family: Dad; Mom, Miriam, a 41-year-old-clinical psychologist; sons Roi, 14; Eishel Avraham, 7 ½; Yuval, 5 and daughters Adva, 12 and Hila, 10 arrived in the United States in July.

“Not only do we have to pay the rent, we have to pay tuition at the Jewish school – we are a religious family.

“We also want to give the children a feeling of what America’s like, such as the national parks. We went to the Louisiana swamps national park and, before Covid19, we’d hoped to go to the Grand Canyon. I hope we still will be able to tour. We’ve also been to Disney World. In Houston we always go to a lot of parks, museums and concerts; to the space

center, the zoo and more. I remember traveling with my parents when we were in Boston; I want that for my kids. Seeing things and having cultural experiences is very important.

“It was a big decision, but it’s a long-term investment. You lose money, but you gain a lot professionally, and it opens the way for financial opportunities down the road. For example, most people who have gone into medical management have completed fellowships. There are also opportunities for biotech consulting. I don’t know what will come my way.”

HOW WILL YOUR FELLOWSHIP EXPERIENCE CONTRIBUTE TO BETTER HEALTHCARE IN ISRAEL?

“I will take this promising new treatment back to Soroka, thus helping the diverse population of the Negev get innovative cancer care. It is very important to offer this treatment modality to our patients who would otherwise have to travel to different cities, far from the support of their families and communities.

“The research and clinical nature of the fellowship will have taught me how to manage research time more efficiently within a busy clinical schedule. And I will retain professional connections made here and use them for future consults and collaboration.”

American Physicians Fellowship for Medicine in Israel

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