

THE BLOODLINE WITH LLS

A PODCAST FOR PATIENTS AND CAREGIVERS

Episode: 'Mantle Cell Lymphoma (MCL) Part Two: CAR T-Cell Therapy'

Description:

Join us as we speak to Dr. Benjamin Lampson of Dana-Farber Cancer Institute in Boston, MA. In Part Two of this two-part series on mantle cell lymphoma (MCL), Dr. Lampson discusses the development and utilization of CAR T-cell therapy for MCL. Approved in July of 2020 for relapsed or refractory MCL, CAR T-cell therapy has shown incredible promise and is already giving hope to patients and doctors as a potential cure.

Be sure to tune into Part 1, where Dr. Lampson discussed the current treatments and latest advances for MCL.

Transcript:

Elissa: Welcome to *The Bloodline with LLS*. I'm Elissa.

Lizette: And I'm Lizette. Thank you so much for joining us on this episode.

Elissa: Today we will be speaking to Dr. Benjamin Lampson, a Hematologist/Oncologist and Instructor of Medicine at Dana-Farber Cancer Institute in Boston, Massachusetts. His clinical research focuses on clinical trials for the treatment of lymphoma and chronic lymphocytic leukemia, or CLL, and his laboratory research focuses on the identification of new ways to treat lymphoma.

Dr. Lampson was previously featured on *The Bloodline* podcast in July of 2020 in the episode titled, "*Mantle Cell Lymphoma with Dr. Benjamin Lampson: What Patients Should Know*," where he shared his journey into lymphoma research from a high school internship in a well-known doctor's lab to his brother's lymphoma diagnosis during college.

This is a special two-part series covering mantle cell lymphoma, or MCL. In part two, we will be discussing CAR T-cell therapy for MCL. Be sure to listen to part one, where we went over the latest advances in treatment for MCL.

Welcome Dr. Lampson.

Benjamin Lampson, MD, PhD: Hello.

Elissa: Thank you for being here with us again today, Dr. Lampson, in the next episode of the mantle cell lymphoma series. Today, we're going to be discussing CAR T-cell therapy, which is so exciting. This therapy is a very hot topic right now in the world of blood cancer. Can you tell our listeners what CAR T-cell therapy is and when it was approved for use in mantle cell lymphoma?

Dr. Lampson: Yes, so, CAR T cells, which were FDA approved in 2020, are the latest therapy that's been FDA approved for mantle cell lymphoma; and it's not an over exaggeration or hype to say that this therapy has completely revolutionized the field and has changed how we approach treatment of this disease.

So to understand how CAR T cells work, first you have to understand an important aspect of cancer biology; and that is this fact - that for a cell to become a cancer and to grow in a patient's body, it must figure out a way to hide from the immune system. Everyone knows that we have an immune system to fight off infections like bacteria and viruses, but our immune system also has another job, and that job is to go around the body looking for cancerous and precancerous cells and eliminating them.

So all cancer cells have to figure out a way to escape this immune surveillance, and lymphoma cells are no different. So researchers have often wondered what if there's a way to make the immune system recognize the cancer cells again? Can we engineer normal immune cells to recognize the lymphoma and then let them do the work of eliminating the cancer cells? This has been a dream for cancer researchers for many decades; and it took decades to work out the details.

But eventually researchers at institutions like the National Cancer Institute, University of Pennsylvania, Memorial Sloan Kettering, actually figured out a way to do this. They realized you could take out a patient's normal immune cells, a specific type of immune cell called a T cell. You could introduce a piece of DNA to those cells, introduce new instructions that tells those cells how to recognize lymphoma. You can then put the cells back into the patient, and amazingly, almost miraculously, these cells grow and divide, and they recognize the cancer and attack it.

And the name for the instructions that are put in, for that piece of DNA is chimeric antigen receptor, abbreviated C.A.R. or CAR. So we call these reengineered immune cells CAR T cells.

We've never had a type of therapy like this in mantle cell lymphoma before, a living therapy. This isn't a chemo. It's not a drug. It's living cells. So since it's not chemo and works differently than chemo, it can work very well when chemo does not. And an important clinical trial showed that this is indeed the case for mantle cell lymphoma. CAR T cells are very effective at attacking mantle cell lymphoma and based on clinical trials, these cells were FDA approved for use as I mentioned in July 2020.

Elissa: Wow, that's really great. So kind of like you mentioned in the last episode about chemo, how it can be really indiscriminate, right? It can go after both the cancer cells and our normal cells and just kind of kill everything it sees versus the CAR T cells is very specifically going after the lymphoma cells, the cancer cells. Are they leaving all the rest of the healthy cells alone?

Dr. Lampson: For the most part, yes. They're specifically targeted to the mantle cells and can recognize the mantle cells. However, they can also target normal immune cells of a subtype called B cells. So in addition to recognizing the lymphoma cells, they recognize a closely related normal cell called B cells.

There are side effects to the fact that they recognize B-cells; but it turns out that even if our body is completely missing all B-cells, we can still go on living a happy, normal

life. So, while there are some off-target effects of CAR T cells, those risks can be mitigated; and patients can still enjoy very long remissions, very healthy remissions from this therapy.

Elissa: Yeah, I'm curious since you mentioned B cells, and we talked a little bit in the last episode about COVID and vaccines, and B cells are what make the antibodies, right? So are patients who get CAR T-cell therapy also having difficulties with either COVID or developing antibodies after the vaccine?

Dr. Lampson: Yeah, you're exactly right. So B cells are the primary cells in the body responsible for making antibodies, which are proteins that recognize foreign invaders like coronavirus and kill them. So as I mentioned, CAR T cells can kill normal B cells, which means that patients without B cells, patients who have gotten CAR T cells, can have trouble making antibodies.

And so most relevant in today's world is the antibodies that are made to fight off coronavirus or the antibodies that are made in response to the coronavirus vaccine. So patients, particularly those who have just received CAR, need to be very careful and cautious; and they need to talk with their doctor about things they can do to decrease the risk of catching coronavirus.

And often we have to repeat vaccines, because it's not just the COVID vaccine that patients no longer make antibodies to. CAR T cells can totally reset the immune system, so we often need to reeducate it with multiple other vaccines, the vaccines that we got as kids or as young adults after getting CAR T cells. So, yes, the effect on B cells is important. It's an important side effect of CAR T cells that patients should know. But there are things we can do about it. We can repeat vaccines. We can give antibodies to patients who don't make them. So, there are ways to treat this side effect.

Elissa: That's good.

Lizette: Yeah, it's good to know that there are ways to treat it.

Now CAR T-cell therapy is available for use in several blood cancers, but not all. So what makes MCL patients good candidates for CAR t-cell therapy?

Dr. Lampson: The reason that mantle cell lymphoma patients are good candidates for CAR T-cell therapy is because we know that CAR T cells work in this disease. CAR T cells have had varying degrees of success in different subtypes of lymphoma, but mantle cell lymphoma is one of the subtypes where we absolutely know that they work.

So to give you some numbers, the pivotal clinical trial that led to the FDA approval of CAR T cells for this disease was published in April of 2020, shortly before the cells were approved. And I should also just take a moment to point out that the lead investigator on this trial was a physician named Michael Wang, a giant in the mantle cell lymphoma field, a researcher who's long been supported by and worked with LLS. Dr. Wang and his colleagues published data that showed patients who got CAR T cells saw shrinkage of their mantle cell lymphoma in over 90% of cases.

Elissa: Wow.

Dr. Lampson: Yeah, that's truly amazing. It's very rare to have a treatment that works 90% of the time. For comparison, I drive an old car; and if I go out on an early Boston winter and try to start it, I think the chances that it starts are probably less than 90%. Like this treatment is more reliable than my car is.

As with any research, we want to see these numbers replicated by other scientists. We want to see what happens when we use mantle cell lymphoma in the real world? And we are actually hearing about that now.

At a large hematology meeting called ASH [American Society of Hematology], which took place in December of 2021, two groups, one from the United States, one from Europe, talked about their experience using CAR T cells to treat mantle cell lymphoma.

And the takeaway was that these kind of fantastic results that Dr. Wang reported in the initial trial are being seen all across the world, wherever CAR T cells are being used. The response rate remains in like 80 to 90% range. So, in summary, CAR T cells are just very good at attacking and shrinking mantle cell lymphoma.

Elissa: That's great. Now with CAR T cell being another option in addition to chemotherapy, stem cell transplant, is it used on all MCL patients? And if not, which patients are eligible for CAR T?

Dr. Lampson: So, as exciting as this therapy is, I think it is important to recognize that it's not available to all patients, at least not yet. We'll see where the research takes us, right?

So that trial that I just mentioned that trial that was led by Dr. Wang, well that trial looked only at CAR T cells for the treatment of mantle cell lymphoma that had come back after chemotherapy. The term for that being relapsed disease. When you present a clinical trial to the FDA and you ask them to approve your treatment for broad use, they look very carefully at the patients who enrolled in that trial. And if the drug is approved, it's only approved for use in the types of patients who match those that were in the clinical trial.

So since this clinical trial was done only in patients with relapsed disease, when the FDA approved this therapy, they said it's only FDA approved for patients with relapsed disease. So right now the only patients who are eligible to receive this therapy outside of a clinical trial are patients with relapsed mantle cell lymphoma that's returned after one or more treatments.

There's also functional limitations as well; so one drawback of CAR T cells is that they take a while to make. I talked in the beginning about that education process where after we take the T cells out of the body, if we take them out of the patient and we engineer them to recognize lymphoma cells by putting that new piece of DNA in there, that whole manufacturing process is quite complex. It can take anywhere from three

to six weeks. And some patients have very aggressive disease and can't wait those weeks for the T-cells to be made.

CAR T cells do also have side effects, which I anticipate we'll probably chat about later. But these side effects can make it difficult to give CAR T cells to certain patients; and I particularly get nervous giving CAR T cells to patients in their 80s and in their 90s. That's a patient population where CAR T cells just aren't routinely used because it's hard to give to older patients.

The final point I'll make about who's eligible is you're only eligible if your doctor thinks about it, right? So, if you have relapsed mantle cell lymphoma, that's come back after treatment, make sure that your doctor has at least considered the possibility of CAR T cells; and sometimes this means you need a referral to a large cancer center where treatments like CAR T cells are given. So keep that in mind as well as in terms of eligibility.

Elissa: That's good advice because I'm sure we have a lot of listeners that are at community cancer clinics; and they might not be near a major center. So that's very good advice. Do you see it ever becoming a frontline treatment, so a very first treatment for mantle cell lymphoma?

Dr. Lampson: It's certainly possible, and I'll say that we are seeing this explored in other types of lymphoma where we know CAR T cells work very well. CAR T cells are also used to treat a type of lymphoma called diffuse large B-cell lymphoma; and as with any therapy, we first start by testing in patients who have had multiple lines of treatment. Then if it works there, we test in patients who have just had one or two lines of treatment. And if it works really well there, we start testing in the patients who have had no treatment to see if it's better than chemo.

And that's the path the CAR T cells have taken in diffuse large B-cell lymphoma; and they've been shown to be effective for relapsed, diffuse large B-cell lymphoma. And now there's clinical trials where they're being tested for frontline treatment of diffuse

large B-cell lymphoma. And I anticipate we'll see that sort of steady march happen in mantle cell lymphoma as well. That, after we can all agree that CAR T cells are clearly effective for the treatment of relapsed disease, we're going to want to test it and compare it to our very effective frontline chemotherapy options.

Elissa: I'm curious how that works in clinical trials. We've talked to a lot of doctors about clinical trials where we don't really use a placebo. Right, we don't use a sugar pill. We just compare it against the standard treatment.

So, when patients are going into a trial where you might be testing CAR T on the patients who had no treatment, are you just separating them out into groups of the standard treatment and the CAR T? Are you letting them know what treatment they'll be given because I assume they would kind of figure it out if they had CAR T cell therapy versus a standard chemotherapy. How does that work?

Dr. Lampson: I think this is important, sort of how the mechanics of a clinical trial works and concerns that patients have when entering trials. There's two concerns that patients have in their mind about clinical trials that I should probably address.

And one is, well, I don't want to be a guinea pig. Right, I don't want to be experimented on. And, and the second one is, well, aren't clinical trials only for patients who don't have anything else left, right? So to first address the second one, as you and I are talking about here, right, clinical trials are something that we consider at every line of therapy.

Elissa: Yes.

Dr. Lampson: When I meet a patient and I am about to start their frontline treatment for mantle cell lymphoma, I think about what are the standard FDA-approved options; and what are the clinical trials that I have available that they might be a good candidate for? And I think about that at therapy 1, therapy 2, therapy 3,

and therapy 4. So clinical trials are really something that all patients with cancer who are about to embark on a treatment should be asking their doctor about.

Okay, and then the second question of, well, I don't want to be a guinea pig. I don't want to be an experiment, these kind of things. What I would say is that when we are studying something in a clinical trial, we are doing this because it's gone through a lot of rigorous testing. And we think that what we are doing may potentially be better than standard of care, may potentially be better than what we already have to offer.

In frontline trials, where we're CAR T cells testing CAR T cells, a lot of times those are single-arm trials where the patients know what they're getting. There's no placebo. Every patient on the trial knows I'm getting the CAR T cells. And we watch them very closely to, to see, are the CAR T cells having an effect? Are they being as effective as we think chemo might be?

And if there's any sign or any hint that what we're doing is less than standard of care or more toxic than standard of care, then clinical trials can be stopped and halted. These things can happen.

So it's a very safe environment in which to explore these things. There are also another type of clinical trial called randomized clinical trials where patients can't choose what they're getting.

So, for example, some day we may want to know, CAR T cells, are they better than chemotherapy for the frontline treatment of mantle cell lymphoma? And the only way to know that is to take half of the patients and give them CAR T cells and take half of the patients and give them chemo.

Now the patients in each arm know what they're getting. It doesn't have to be blinded as we say. But they may not get to choose. They may be randomly assigned between the two. And then after the trial is over, we compare and we ask, "Okay, which patients did better? Which patients have less toxicities?" That's what's called a

randomized clinical trial; and those are very important clinical trials to move the field forward. And these kind of clinical trials are done in lymphoma all the time.

Lizette: One of the things that you mentioned in regards to if a patient is eligible or not, you mentioned the time to actually harvest the cells might be a long period of time for certain patients. Is there anything with allogeneic or off-the-shelf CAR T-cell therapies for mantle cell lymphoma?

Dr. Lampson: Yeah, that's a great question. You're right. Now I talked about how you take a patient's own T-cells and engineer a patient's own T-cells to recognize the mantle cell lymphoma and then infuse it back into the patient. But that engineering process takes time. So, you have to have four weeks or so. But what if, we could just take someone's T-cells, some random T-cells, engineer them to recognize mantle cell lymphoma, and put them on the shelf? And when we get a call from a doctor saying, "I have a patient that needs CAR T cells, can you give me some of those CAR T cells on the shelf?" all we have to do is thaw them and give them. That's not going to take weeks. That's going to take a day or two, right?

So that's a very exciting possible future route of therapy that's definitely being explored in lymphoma. There's challenges because when you give a patient cells that are not their own, you run the risk that their body may try to reject those cells, right? So there's definitely details that need to be worked out in terms of making the environment receptive to the allogeneic CAR T cells or the CAR T cells from another person and helping those CAR T cells persist in the body. So I'd say there's details that need to be worked out, but it's definitely an exciting area of research that I think holds a lot of promise and could greatly shorten that four-week window, thus opening up the categories of patients that might be eligible for this therapy.

Lizette: That sounds great. Like stem cell transplants, chemotherapy, other treatments, CAR t-cell therapy can come with side effects. Would you tell us what common side effects MCL patients might have after having this treatment? I know

that we hear about CRS or cytokine release syndrome, can you explain that and other side effects?

Dr. Lampson: Yes. So, like you said, there's no free lunch in medicine. While I've expressed a lot of enthusiasm for CAR T cells, I must acknowledge that they do have side effects. But the interesting thing about CAR T cells is that these side effects are different than the side effects that we see with chemotherapy. Because CAR T cells, after all, aren't chemo. Right? So the things that I'm going to mention or the things that we'll talk about are not nausea, vomiting, hair loss. I'll focus on, on the cytokine release syndrome, and then, briefly mention some of the other toxicities that we see. I should say we've already discussed one side effect which is that they kill normal B-cells, right, and decrease the response to vaccines and can cause immunosuppression in patients. So that's one we've discussed.

But to get to the question you asked, which is cytokine release syndrome, well, cytokine release syndrome is something that happens as the CAR T cells go to work and fight the cancer. As they do this, the body becomes inflamed. And the CAR T cells release proteins called cytokines, and these proteins make the patients experience side effects of inflammation – things like fever. And if the inflammation is severe enough, cytokines can cause organ dysfunction, so things like low blood pressure, lung dysfunction. Patients sometimes require extra oxygen or even a breathing tube, kidney dysfunction, heart dysfunction. Almost any organ system can potentially be affected by cytokine release syndrome.

And if the cytokine release syndrome is severe enough, then we intervene with anti-inflammatory medications like steroids to tamp down the CAR T cells. This inflammation, this cytokine release syndrome, it usually happens in the first week after CAR T cells are given, so right during the time when they're working their hardest. And some form of it, including very mild forms, can happen in up to 90% of patients that receive CAR T cells. So it's a very common side effect.

Now the more severe forms of CRS are obviously less common. And the studies tell us that using the CAR T-cell product that's approved for mantle cell lymphoma, the severe cytokine release syndrome happens in about 10% or less of patients.

But when I'm talking with patients about CAR T cells, I make sure to mention this side effect to them because the chances are good that CRS, at least the very mild form, will happen. And a second side effect that I also talk to my patients about is what we call immune effector cell-associated neurotoxicity syndrome or ICANS. A better lay term for this is just brain dysfunction, okay.

So remember that CAR T cells are a living therapy that circulates throughout the body, and they circulate looking for the mantle cell lymphoma, hunting it down; but one of those places that CAR T cells circulate is the brain. And as they're circulating through the brain, they can cause brain dysfunction. So what do I mean by this term? Well, as with cytokine release syndrome, it ranges from the mild to severe. So mild forms can include things like confusion, headache, fatigue, tremors, sometimes language abnormalities. For example, I once had a patient, when I went to see her in the hospital, she was about five or six days after receiving her CAR T cells, and I held a pen in front of her and I asked her to tell me what this was, and she just couldn't say the word for pen. She couldn't find it. These types of brain dysfunction, milder forms can happen in 30 to 40% of patients. More severe forms can happen in 20 to 30% of patients. The more severe forms include things like seizures, brain swelling, episodes of unresponsiveness.

But the important thing to point out is that in nearly all cases the brain dysfunction is reversible. So that story that I mentioned about the patient who couldn't say the word pen, well, I saw her in clinic just a few weeks ago; and she's doing crosswords now, right.

So while these symptoms are concerning, particularly for family members as they're happening, we do expect them to improve. We do have ways to treat them, usually

with steroids and to prevent them from worsening if they do happen. But they need to be mentioned.

So these side effects, CRS and brain dysfunction, these side effects are the reason why we give CAR T cells in the hospital or particularly CAR T cells for mantle cell lymphoma, why we give them in the hospital and why CAR T cells have to be given at a few specialized treatment centers around the country. Staff need to be well-trained to monitor and recognize these symptoms when they occur so that we can intervene. Those are important things to keep in mind.

And then, the third side effect that we've talked about is that CAR T cells can also have off-target effects on B-cells which cause decreased immune responsiveness and increased risk of infections and complications from infections. These are things we can mitigate by giving patients antibodies, the things B cells make and also being very aggressive with our COVID prevention strategies.

Lizette: Sure, it's good to know that you are able to manage a lot of these side effects that are coming out of CAR T. That is hopeful.

Elissa: You talked a little bit earlier about a 90% effective response coming out of the clinical trials. Now that it has been approved for nearly two years, what has been the real-world response for mantle cell patients who have gotten CAR T-cell therapy? Has it really been shown to be an effective treatment?

Dr. Lampson: Yeah, that's a great point; and I think it speaks to the kind of rigorous science that we want and expect whenever we're investigating a therapy for lymphoma. And when I say rigorous, I mean while the initial paper on mantle cell lymphoma was very important for the approval, what's also just as important is to see these great successes that were initially happening, are they replicated when hundreds and thousands of doctors are giving mantle cell lymphoma across the country and across the world?

The general population can be different than a clinical trial population. In the case of mantle cell lymphoma and in the case of CAR T cells, the answer is absolutely yes. That 80 to 90% response rate was seen in the initial clinical trial, is seen in the United States when we use CAR T cells more broadly for the treatment of disease, and it's seen in Europe when we use CAR T cells more broadly. So yes. It definitely works, and it doesn't just work in the clinical trial. It works outside of the clinical trial setting.

I think it's important to clarify what do we mean by response; and what does that 90% number mean? So what I mean by a 90% response rate is that means that 90% of patients who got CAR T cells saw their mantle cell shrink after getting the CAR T cells.

Now, we often want more than just shrinkage, right, so another way of thinking about response is asking the question, "Well, how many patients had a clean scan after getting the CAR T cells?" That's called a complete remission. It ends up that that number's still pretty high. About 60% of patients have a clean scan after getting CAR T cells.

Of course, I want research to make that number higher; but that's pretty impressive already as it stands. That's after a single dose. Right, just one infusion of CAR T cells, 60% of patient will have a clean scan.

I think the final question that we ask about response is even more than a clean scan, and that is how many patients never hear from their mantle cell lymphoma again?
Right?

Elissa: That's what we want.

Dr. Lampson: And it's amazing to be talking about this, right? This is something that we could only dream of just a few years ago. And I would say that, well, never's a really long time. Right, and CAR T cells have only been used in this setting, only been studied, the longest follow-up we have is in the neighborhood of two to three years.

So, I can't answer the question how many patients never hear from their mantle cell lymphoma again? Let's, put a date on the calendar for 10 or 20 years; and we'll have that discussion then. But I can say that in two to three years about 40% of patients still have not heard from their mantle cell lymphoma.

Elissa: That's incredible.

Dr. Lampson: Yeah, and after a single dose again of CAR T cells-

Lizette: Wow.

Dr. Lampson: -40% have not heard from it again.

And these are patients, right, who have already had chemo and who've already seen a lot of lines of therapy. And some of these patients have very aggressive forms of the disease. And to say that 40% have gone two to three years without hearing from their disease is amazing; and I also think it's very promising because we can improve on that. Research is always evolving. Research is always moving forward. I have no doubt that, as we further study CAR T cells, as we further study maybe things that we can combine with CAR T cells, we may be able to get that number even higher.

Elissa: That's just so amazing. It's so exciting considering what we talked about in the last episode when we really just didn't see a potential cure in sight. It was really just managing and seeing how long we could keep people without symptoms and quality of life. It is so exciting to hear that this could really happen for mantle cell patients all because of CAR T-cell therapy.

Dr. Lampson: Absolutely. Totally agree.

Elissa: So in these two episodes, we have discussed the latest advances in MCL treatments and now CAR T-cell therapy. I'd like to tie that back in with your initial takeaway and then your second one from the beginning of the episode.

It's truly amazing what donors, patients, family members, friends, and then, of course, healthcare professionals and scientists have been able to accomplish in the cancer space, particularly since 2017 like we talked about. The research funding from 10, 20, 30 years ago and right now is making a real difference in the lives of blood cancer patients. And what would you say to all of these groups of people as we continue moving forward towards a world of more blood cancer survivors?

Dr. Lampson: Yeah, that's a good question. I would first say thank you, because I in my research career have benefitted a lot from the supportive environment that donors and patients and my mentors at work that everyone has provided. And then I think the second thing I'd say is this is really working. This is an incredibly exciting time and let's continue doing what we're doing here. Let's continue this momentum; and it takes everyone working and doing their part from the people donating their money to the people donating their long hours at the bench, to the people donating their long hours in the clinic.

It's working. The system we have works, and let's continue doing what we're doing and supercharge it so that the amazing progress that we've already seen continues, this golden age continues.

Elissa: That's great. And I'd like to add an additional thank you, of course, to the patients who have participated in these clinical trials. We know that they do have to provide their consent and want to participate; and they can withdraw at any time. So having the patients participate in these trials has really made just such a huge difference. So I hope the listeners will take advantage of the trials, as you said, at any point in their treatment that they'll be looking for them. And hopefully we can continue this in the future.

Thank you so much, Dr. Lampson. You've been here with us for two episodes now sharing all about mantle cell lymphoma therapies and CAR T; and it has just been so exciting to hear about all of these advances. Really just since the last time we spoke



to you, two years ago, it's truly amazing. So thank you so very much for being here with us today.

Dr. Lampson: Yeah, and I echo your sentiments too about thanking the patients. The simple fact is that it takes a lot of bravery to sign that clinical trial consent form. And it's a bravery that is not asked of anyone else in the research chain. It's only asked of patients. They're the only ones who can do it, and hundreds and thousands of them have done it; and if they hadn't done it, we wouldn't be having this podcast today.

So it's a bravery that I can appreciate, but also that, maybe we can never truly understand till we go through it ourselves. But it's truly remarkable; and I completely agree with your sentiment that the patients are just as responsible for moving this field forward as everyone else in the chain.

Elissa: Absolutely.

Dr. Lampson: Thank you.

And thank you to everyone else listening today. *The Bloodline with LLS* is one part of the mission of The Leukemia & Lymphoma Society to improve the quality of lives of patients and their families.

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We would also like to know about you and how we can serve you better. The survey is completely anonymous and no identifying information will be taken. We hope this podcast helped you today. Stay tuned for more information on the resources that LLS has for you or your loved ones who have been affected by cancer.



Have you or a loved one been affected by a blood cancer? LLS has many resources available to you: financial support, peer-to-peer connection, nutritional support, and more. We encourage patients and caregivers to contact our Information Specialists at 1-800-955-4572 or go to LLS.org/PatientSupport. You can find more information about mantle cell lymphoma at LLS.org/Lymphoma or CAR T-cell therapy at LLS.org/CARTtherapy.

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