

## C. Patrick Reynolds, M.D., Ph.D.

Tell us about the focus of your cancer research.

0:06

My research is really translational, and it is interacting between the laboratory and the clinic. So one of the things we do a lot of is developing patient derived models so we can study the cancers. So the Children's Oncology Group sends us viable cancer samples, and we grow them in the laboratory in special culture conditions, so we can use those to understand the cancer biology as well as to develop new drugs. It's important to have these models to test these new therapies on before we go to the patients.

Why is this work so important?

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The nice thing about developing these models is that we can crowd preserve them so they basically last forever. And so once you build up this bank, it keeps growing, and it becomes more and more valuable to more and more laboratories as you go. Of course, my laboratory also does drug development, and so we use these same models to understand the biology that cancers find a drug that will work specifically, hopefully with less toxicity, and most importantly, with the ability to kill cancer cells that don't respond to our current therapy.

How do you balance levels of toxicity with effectiveness in developing treatments?

1:19

Well, the first thing I think I could say for all pediatric oncologists is that the number one goal is to keep the patient alive. And so yes, there's a lot of toxicity, but children, and we say this all the time, we say children are not small adults. So the pharmacology is different, the way they react to the drugs are different. But the other thing that's different, they tend to tolerate therapy much better than a 70 or 80 year old with cancer, so we use very aggressive approaches, and we use chemotherapy that's very toxic. It's unfortunate that we don't have better ways to do this, but that works and keeps patients alive.

Why do these drugs need to be so toxic in order to be effective?

2:04

Well, I think most of what the field is doing is trying to develop agents that are more targeted towards the biology of the cancer cells, rather than just the fact that they're growing cells. So most of what we use still in treating childhood cancer are DNA damaging agents. These are agents that affect cells that are growing more rapidly than normal cells, and they have one of the toxicities, as you point out, is nausea and vomiting. It's unfortunate, but it again, is, is not something that is usually what we call dose limiting. Some children don't do very well with it. Others do okay. And you know, the age ranges go from, you know, one year on up to our adolescents. So there's a large range of ages in there that we're dealing with. But I think that the the more that we understand the biology of the cancer, the more we get things like

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antibodies and immunotherapy working, which we already have, working in some childhood cancers. And of course, you know that major breakthrough in leukemias with CAR T-cells. So you know, those are things that will deliver less toxicity. But for example, with CAR T-cells, they're, you know, you look at the toxicity that some of these patients have, it's really significant. They end up in the ICU, but at the end of it, they're alive and the toxicity is gone. So, you know, I think the most thing I would say about toxicity is it's, it'd be lovely to get rid of it, but it's short lived for the most part,

**What do you think is driving innovation in cancer research?**

3:48

Cancer investigation. Okay, you know, I think we really started in the Nixon era with the declared war on cancer, okay? And I think that built over the years into an enterprise across this country that is nothing short of remarkable.

**Do you have any advice for families dealing with a pediatric cancer diagnosis?**

4:08

You know, first of all, my favorite people on the planet are pediatric oncologists. All right, they care so deeply about their patients, they collaborate with one another, and they really try to do the best for the patients. We network across the country through the Children's Oncology Group. And so I think the first thing is you're not alone. Even if you're out in West Texas, you're plugged in with the experts across the world, because we talk to people across the pond in Europe, in Japan, Asia. So you know, it's got to be, as a parent, a horrible news to hear that your child has cancer, but you're still in the best hands here in the US than you could be anywhere. And advances occur every single day.