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00:00:00.076 --> 00:00:21.461 Announcer Funding for Yale Cancer Answers is provided by Smilow Cancer Hospital. Welcome to Yale Cancer Answers with the director of the Yale Cancer Center, Doctor Eric Winer. Yale Cancer Answers features conversations with oncologists and specialists who are on the forefront of the battle to fight cancer. Here's Doctor Winer.

00:00:21.538 --> 00:00:51.269 Eric Winer Today we're talking about pancreatic cancer, and we're talking about research related to fat and pancreatic cancer with a physician scientist who is at Yale and who both sees patients and does laboratory research related to pancreatic cancer. So our guest is Doctor Mandar Muzumdar, who is an associate professor of genetics and internal medicine and a member of the Yale Cancer Biology Institute.

00:00:51.269 --> 00:01:01.423 Eric Winer And he's the scientific director of our center for Gastrointestinal Malignancies. Welcome to the show Mandar It's nice to have you.

00:01:01.500 --> 00:01:03.807 Mandar Muzumdar It's wonderful to be here. Thanks for inviting me.

00:01:04.115 --> 00:01:32.307 Eric Winer Before we get to your science, which might be the second half of the show, we'll see how this all plays out. Let me just ask you a little bit about you and then a little bit about pancreatic cancer in general. So how did you get interested in becoming a cancer scientist? What is it that triggered you during the course of your childhood or in college or whenever?

00:01:32.384 --> 00:01:44.307 Mandar Muzumdar I would say probably the biggest motivation for me to get into cancer research in cancer clinical care was probably my father, who passed away a cancer when I was only two. And though.

00:01:44.346 --> 00:01:45.153 Eric Winer Oh my goodness.

00:01:45.192 --> 00:02:05.653 Mandar Muzumdar Yeah, I don't, though I don't remember much of his presence. It's the absence of his presence, I think that really sticks with me. And I think that was a major motivating factor for me to think about cancer as a career. Over the years, I was exposed to cancer biology research through great mentors when I was in high school and college.

00:02:05.730 --> 00:02:19.500 Mandar Muzumdar And really that drew me to the science and to the need in terms of clinical care. And I think that only made the feelings for moving towards a career in cancer even stronger.

00:02:19.576 --> 00:02:32.846 Eric Winer And, you know, we've talked on this show, and of course, there's been much written about cancers in younger people. How old was your father when? When he died.

00:02:33.153 --> 00:02:35.269 Mandar Muzumdar He was in his late 30s.

00:02:35.346 --> 00:02:48.038 Eric Winer Yeah. So he was. He's clearly young and clearly young for such a such a really unusual cancer. And and was there any underlying cause that you know of?

00:02:48.115 --> 00:02:53.730 Mandar Muzumdar No. They couldn't really figure out why it occurred and why it occurred in someone so young.

00:02:53.807 --> 00:02:55.038 Eric Winer Yeah. Oh my goodness.

00:02:55.076 --> 00:03:17.038 Mandar Muzumdar And at the time, as you know, there weren't a lot of effective treatments for any of these cancers. So it's really relegated to some chemotherapy surgery ended up not being an option for him, unfortunately, due to the spread of the cancer. And I think we've come a long way in terms of cancer research that has led to really significant advances in cancer care.

00:03:17.115 --> 00:03:19.307 Eric Winer So this was in the early 80s.

00:03:19.346 --> 00:03:20.307 Mandar Muzumdar Correct. Yeah.

00:03:20.346 --> 00:03:23.692 Eric Winer And how long did he live after being diagnosed?

00:03:23.730 --> 00:03:27.153 Mandar Muzumdar Yeah, he passed away within about a year after diagnosis.

00:03:27.230 --> 00:03:29.269 Eric Winer And do you have siblings?

00:03:29.269 --> 00:03:38.461 Mandar Muzumdar I have two older brothers, the oldest of which was old enough to remember. And the middle brother was just about that age. And I was young. I was only about two years old.

00:03:38.461 --> 00:03:40.615 Eric Winer And what are your brothers do?

00:03:40.692 --> 00:03:53.576 Mandar Muzumdar They're both engineers and computer scientists, as you'd expect in a good Indian family. Its doctors are engineers. And I guess I was the the black sheep and chose the doctor route.

00:03:53.730 --> 00:04:06.576 Eric Winer And is it the mentoring that that brought you into laboratory science or, you know, something that just you felt drawn to the to the laboratory yourself?

00:04:06.653 --> 00:04:36.384 Mandar Muzumdar Yeah, it was interested in science. I had a great high school biology teacher, Scott Carpenter, who was a real motivator, maybe realized that there was a little bit of scientific talent within me at the time, and I got really interested in science and had an opportunity to do an early laboratory research while I was in high school in Boston, in Boston University with a physician scientist, cancer biologist, Doctor David Selden, who was a really great mentor for me.

00:04:36.384 --> 00:05:05.346 Mandar Muzumdar And I think that sort of fired a passion in me to pursue a potential career in scientific research. And I continued doing scientific work more on fundamental aspects of developmental biology

when I was in undergrad. And as I moved towards medical school, I started to shift my focus towards more disease relevant research in cancer. And by the time I went into my clinical training training in oncology, I was able to pursue a research fellowship dedicated to cancer biology.

00:05:05.423 --> 00:05:09.153 Mandar Muzumdar And that's where my interest in pancreatic cancer really blossomed.

00:05:09.230 --> 00:05:40.192 Eric Winer Well, it's it's great. So let's just talk a little bit about pancreatic cancer we've talked about on this show before, but we almost can't talk enough about pancreatic cancer because it has become more common. It is a major source of mortality within cancer. And while we have some exciting news about a new treatment there, the treatments have been pretty limited.

00:05:40.230 --> 00:05:45.538 Eric Winer So how many people a year get pancreatic cancer? In the US?

00:05:45.615 --> 00:05:56.538 Mandar Muzumdar Just over about 60,000 individuals will be diagnosed with pancreatic cancer in the United States, and nearly a little over 50,000 will pass away in any given year.

00:05:56.615 --> 00:06:20.461 Eric Winer So which, you know, assuming the numbers are relatively constant, that means that somewhere in the range of 80% or more of people who are diagnosed with pancreatic cancer do lose their lives to pancreatic cancer. And although survival statistics are have improved a little. People still don't live a long time with pancreatic cancer.

00:06:20.538 --> 00:06:44.615 Mandar Muzumdar That's right. I would say that prior to perhaps recent developments in pancreatic cancer therapy, most patients who are diagnosed with advanced pancreatic cancer didn't live more than a year. And we'll see how these new developments progress in terms of how we can change that. And I think even these therapies that we're developing are not necessarily curative of the disease.

00:06:44.615 --> 00:06:53.846 Mandar Muzumdar They don't take it away for good. And a lot of what we're trying to do and understand in the laboratory is ways that we might be able to prevent it in the first place.

00:06:54.000 --> 00:07:28.500 Eric Winer Which is, of course, really critical. Do we know why there's more pancreatic cancer than there used to be? Because it has been climbing in the charts. And this is not something that that anybody wants to see. But in terms of the number of deaths that are caused and it's now either the second or third or fourth leading cause of cancer deaths in the US, is it not?

00:07:28.576 --> 00:08:07.730 Mandar Muzumdar That's that's correct. You know, when I started in pancreatic cancer research, about 10 to 15 years ago, there were less than 50,000 cases diagnosed per year. And over the ensuing

time period, we've seen a slow but steady increase in the incidence of pancreatic cancer, where it's now above 60,000. And due to the rise in pancreatic cancer incidence compared to lung cancer and colorectal cancer, which have really benefited from reduction in smoking and screening technologies such as colonoscopies, pancreatic cancer is slowly moving up the mortality, the mortality list, and so it is currently the third leading cause of cancer related death in the United States.

00:08:07.846 --> 00:08:10.269 Eric Winer Behind lung cancer and colon cancer.

00:08:10.269 --> 00:08:14.884 Mandar Muzumdar But it's soon to pass colorectal cancer to become the second within the next few years.

00:08:15.115 --> 00:08:39.730 Eric Winer Although there are over 300,000 cases of breast cancer every year. The total number of breast cancer deaths is in the low 40,000 range, and it just shows you that, you know, some cancers, a much greater proportion of people are cured of their disease than is the case in others. And what are some of the risk factors for pancreatic cancer?

00:08:39.807 --> 00:09:09.538 Mandar Muzumdar Yeah, there's several risk factors that have been identified through epidemiological studies. I would say one of the strongest risk factors, of course, the family history, particularly those with more than one first degree relative with pancreatic cancer. There are some genetic predisposition syndromes that we've identified, whereas particular mutations in specific genes can be identified through sequencing studies that will then enable screening modalities.

00:09:09.538 --> 00:09:33.846 Mandar Muzumdar And in fact, at Yale, we have a pancreatic cancer high risk clinic to try and identify pancreatic cancer early. Many of the other risk factors include age, of course, which is the median age of pancreatic cancer. Diagnosis is about 68 to 69. And then there are several modifiable factors that are risk factors. Smoking is probably the biggest one and increases your risk about two and a half fold.

00:09:33.846 --> 00:10:06.500 Mandar Muzumdar But the an area that our laboratory has been very interested in studying, which I think is becoming more important given to its rising prevalence, is obesity, which has been associated with pancreatic cancer recurrently in almost every study that it's been examined. And it's at least one and a half to two fold increase risk. But given the rising number of individuals with obesity, I think understanding how it promotes pancreatic cancer development and trying to intervene, I think is becoming paramount.

00:10:06.576 --> 00:10:45.653 Eric Winer Of course, obesity is associated with an increased risk of many cancers. And, you know, every time I try to say what the number of cancers is, I'm wrong because, you know, each year there's a new cancer that's associated with it. But there are probably about 15 different cancers that obesity is associated with. And it'll be interesting as we learn more to understand whether the cause is the same in different cancers or whether there

are different aspects of obesity and the sequelae of obesity that lead to these increased cancer risks.

00:10:45.730 --> 00:11:16.153 Mandar Muzumdar Yeah, I think, you know, it remains unknown in many cancer types. How obesity increases risk. As you alluded to, obesity is associated with strongly associated with an increased risk of over a dozen cancer types. But the mechanisms by which obesity promotes the development of those cancers, I think, is not completely understood and maybe very well, different. And in fact, in our research in pancreatic cancer, we have reason to believe that some of the mechanisms we've identified may be specific to the pancreas.

00:11:16.230 --> 00:11:32.269 Eric Winer Yeah, no. And people have talked of obesity as a state of general inflammation, and that it may be the inflammation going on that that plays a role more than anything else. But that may not hold true across the board.

00:11:32.346 --> 00:12:04.769 Mandar Muzumdar No, I think, you know, obesity is associated with a number of differences in our physiology that includes changes in how the immune system responds and inflammation. It also increases changes in hormone levels, hormones that are made, for example, in the pancreas itself. And it can change other aspects of our biology, including our microbiome, for example. And I think many of these potential factors could contribute alone or together to the development of various cancers, including pancreatic cancer.

00:12:04.807 --> 00:12:33.192 Eric Winer Well, you know, I'm always fascinated by the the association of differences in the microbiome and the possibility that it changes both cancer risk and cancer prognosis, because it sort of goes back to what everyone's parents always told them, which is, you know, pay attention to what you eat and, and how your system is functioning. And the microbiome turns out to be way more important than I think any of us would have ever believed.

00:12:33.269 --> 00:12:41.153 Mandar Muzumdar Totally agree, but also been very challenging to study given how dynamic it is and how different it is from person to person.

00:12:41.230 --> 00:12:48.653 Eric Winer Just before we take a break as a non surgeon, can you comment on the role of surgery in pancreatic cancer?

00:12:48.692 --> 00:13:08.192 Mandar Muzumdar Yes, surgery is really our mainstay for curing patients with pancreatic cancer, but it depends on us being able to identify pancreatic cancer at an early stage, when it's really confined to the pancreas, and in which our surgeons are able to take it out together all at once without leaving, ideally, any residual cancer behind.

00:13:08.384 --> 00:13:31.846 Eric Winer And do you think that's because some number of lucky individuals somehow are diagnosed very early, either because they just happen to have a scan that showed something, or they have some

minimal symptom that's picked up. Or do you think that these, these early cancers are biologically a little different than those that present at a later stage?

00:13:32.000 --> 00:13:54.230 Mandar Muzumdar I think there's a combination of both. I think catching it early before it has a chance to spread is likely one part of it. But I will say that even when we do surgery in patients and give additional therapy to try and reduce its recurrence, more than half of patients will recur, and not usually within the pancreas but elsewhere within the body.

00:13:54.307 --> 00:14:13.576 Mandar Muzumdar Arguing that pancreatic cancer has a high propensity to leave the pancreas very early. And so I think it's a probably a combination of catching it early and being fortunate enough to catch it early, but also something about the unique biology of pancreatic cancer, where some individuals have cancer that just doesn't spread so quickly and others do.

00:14:13.615 --> 00:14:30.769 Eric Winer All right. Well, we're going to need to take just a brief break. We will be back in just a minute with Mandar Muzumdar, our our guest, who is an associate professor of both genetics and internal medicine at the School of Medicine.

00:14:30.846 --> 00:14:50.846 Announcer Funding for Yale Cancer Answers comes from Smilow Cancer Hospital, where the early onset cancer program provides care and support for patients from 18 to 45 years old. Their mission is to reduce the burden of cancer and improve patients' quality of life. Smilow-CancerHospital.org.

00:14:51.000 --> 00:15:18.884 Announcer Breast cancer is one of the most common cancers in women. In Connecticut alone, approximately 3500 women will be diagnosed with breast cancer this year. But there is hope thanks to earlier detection, noninvasive treatments, and the development of novel therapies to fight breast cancer. Women should schedule a baseline mammogram beginning at age 40 or earlier if they have risk factors associated with the disease, with screening, early detection, and a healthy lifestyle,

00:15:19.000 --> 00:15:48.115 Announcer breast cancer can be defeated. Clinical trials are currently underway at federally designated comprehensive cancer centers, such as Yale Cancer Center and its Milo Cancer Hospital, to make innovative new treatments available to patients. Digital breast homosynthesis, or 3D mammography is also transforming breast cancer screening by significantly reducing unnecessary procedures while picking up more cancers. More information is available at YaleCancerCenter.org.

00:15:48.192 --> 00:15:51.230 Announcer You're listening to Connecticut Public Radio.

00:15:51.307 --> 00:16:25.807 Eric Winer Hello again. I'm Eric Winer I'm the director of the Yale Cancer Center, and I'm speaking with Doctor Mandar Muzumdar, who is a researcher focusing on pancreatic cancer and also a clinician. Let's talk a little bit about these recent finding of these rats inhibitors. This

was a new treatment that was described in a presentation at our big cancer meetings just now, about six weeks ago, met with a standing ovation from the audience.

00:16:25.846 --> 00:16:47.461 Eric Winer But the truth is, it was just a first building block. Patients did better, but not everyone responded. And ultimately the cancer got worse. So what do you think the next steps are going to be with these drugs and with other drugs that could be combined or other approaches?

00:16:47.653 --> 00:17:19.230 Mandar Muzumdar Yeah. So as you know, this inhibitor called direction targets the mutated form of a particular protein called Kras, which we think is the driving force for pancreatic cancer development. And we've developed targeted therapies that go after other mutated proteins and other cancer types for some time, particularly in cancers of the lung and the breast. And we know that in those cases, curing patients is is often not possible and resistance occurs.

00:17:19.230 --> 00:17:53.576 Mandar Muzumdar The cancer comes back. And so we've learned lessons from that, which would suggest that developing better drugs that overcome some of the ways in which cancers evade our drugs is possible, and we can take lessons from that. In fact, in this case, we knew for some time, even though we didn't have inhibitors, and we we had studied this in the lab, that if you inhibited Kras in pancreatic cancer cells, that while it would have a great effect on their growth, the cells would find a way of surviving despite that inhibition.

00:17:53.576 --> 00:18:12.500 Mandar Muzumdar So arguing that they were going to evade the inhibitors that develop. And that's what we do see eventually. But that also gave us an opportunity to try and understand how these cancers evade these inhibitors in advance. And so we've already been doing some of this leg work for the last five or 6 or 7 years within the field.

00:18:12.500 --> 00:18:35.653 Mandar Muzumdar And so we already understand that biology to some extent, and have already started to move towards clinical trials to combine Cras inhibitors with additional therapies to overcome resistance. So again, learning lessons from what we've learned previously from other cancer types, integrated therapy, I think we're ahead of the game here in terms of making further investments in in Kras inhibition.

00:18:35.653 --> 00:18:49.500 Mandar Muzumdar And I would say that this is really just the beginning of combining Kras inhibitors with other inhibitor approaches, taking advantage of the biology we've already learned and new biology that we're learning with these inhibitors in clinical practice.

00:18:49.576 --> 00:19:17.115 Eric Winer Well, I think you made an incredibly important point, which is that when we develop a new drug, our assumption really should be that the cancer cell, which is at times seemingly much smarter than any of us are, is going to find a way around the treatment. And so looking into resistance mechanisms before it's even a drug that's on the market is really

critical.

00:19:17.115 --> 00:19:33.846 Eric Winer And if we're going to make progress and we're going to really tackle some of these problems in a, in a in a timely way, we just have to be doing this far in advance of when we used to.

00:19:33.884 --> 00:19:54.538 Mandar Muzumdar And I think in the research field, we've we've anticipated that already. And I think we have a head start. And so I'm really excited about the coming years and how these combination therapies are going to be approached and tested. And I'm hopeful that we're going to see even more significant advances in a shorter term, rather than the 40 plus years it took us to develop a Kras inhibitor.

00:19:54.576 --> 00:20:09.346 Eric Winer Sure. And I was just going to say, you know, and the other piece of it, of course, is that we should also anticipate side effects that are going to be problematic and begin to think about ways that we're going to dial those side effects out of the drugs.

00:20:09.423 --> 00:20:33.692 Mandar Muzumdar Absolutely. And I think we're doing that already with the these new Keras inhibitors, which do, as was discussed previously, do have some toxicity. And we're actually have a number of new drugs that we've been able to adapt from the immunology and rheumatology space that can be helpful to minimize some of the side effects associated with these Keras inhibitors.

00:20:33.692 --> 00:20:43.769 Mandar Muzumdar So I think there's both advances in therapeutic targeting of the cancer cells, but also advances in how we manage the side effects that are associated with these new drugs.

00:20:43.807 --> 00:21:05.730 Eric Winer So let's talk about your laboratory research. It of course, as we've said focuses on pancreatic cancer. It is focused on Crest to some extent. Recently has also been focusing on fats and pancreatic cancer and the role that different fats play in different people. So maybe you can tell us a little bit about that.

00:21:05.730 --> 00:21:31.576 Mandar Muzumdar As we discussed earlier, obesity is a major risk factor for pancreatic cancer. And over the last 50 years, we've seen a dramatic increase in the proportion of individuals with obesity. Concurrent with that, we've seen an increase in the consumption of fat. And so a number of studies that suggested that eating fat and high quantities can be associated with various cancer types, including pancreatic cancer.

00:21:31.692 --> 00:21:58.576 Mandar Muzumdar However, the associations have never been as strong or consistent as we would see with obesity itself. And so that got us thinking that perhaps it's not just the total amount of fat that one eats, but perhaps the types of fat that one needs. And that's really hard to study in humans, because it's actually very challenging to to get information on exactly what people eat over time that is accurate and consistent.

00:21:58.576 --> 00:22:26.576 Mandar Muzumdar And so we decided to ap-

proach this problem in the laboratory using systems that we could actually control the diets of the subjects. And in this case, we use animal models in which we can engineer mutations found in pancreas human pancreatic cancer, such as Kras, specifically in the pancreas. And they mimic the genetic features, the appearance of how pancreatic cancer looks under a microscope and how it behaves.

00:22:26.576 --> 00:23:00.230 Mandar Muzumdar So we can really determine how particular additional factors contribute to the development of pancreatic cancer in a very controlled fashion. And so we did a simple experiment. We said that if we fed these mice that were predisposed to pancreatic cancer, a variety of different diets that were identical in their carbohydrate and protein content, but only differed in the source of the fat, they had the same amount of calories, but we had versified the fat across a dozen different diets, and so this included fish oil and lard, olive oil, safflower, royal peanut oil.

00:23:00.230 --> 00:23:19.423 Mandar Muzumdar And interestingly enough, when we fed these mice, these these diets and again, they were predisposed to get pancreatic cancer. And we watched what happened in terms of the amount of tumors that developed. We saw that certain diets were very tumor promoting. These these mice developed a lot of pancreatic cancer, whereas others had very marginal effects in terms of tumor promotion.

00:23:19.423 --> 00:23:32.384 Mandar Muzumdar Yet the mice were eating a lot of these fats. They were gaining weight, and yet they were not getting more cancer. So that really suggested that the fat source dictated how much are the effect of it on the on tumor development?

00:23:32.384 --> 00:23:43.576 Eric Winer What were the types of fats that were particularly problematic? And what were the fats that perhaps didn't cause risk or might have even been somewhat protective?

00:23:43.615 --> 00:24:04.346 Mandar Muzumdar It's a great question. So given that we had provided the diocese of these mice, and we can analyze the presence of these fats within the mice, both within the bloodstream and in the tumors, we can use some advanced methodologies to really narrow it down to specific fatty acids within these diets. That could either be tumor promoting or tumor preventing.

00:24:04.346 --> 00:24:34.576 Mandar Muzumdar And what we found is what diets that were rich in a particular mono and saturated fatty acid called oleic acid. This included diets such as high oleic, safflower, and high sunflower and even olive oil were associated with an increased development of pancreatic tumors. In contrast, diets that were enriched in polyunsaturated fatty acids this included things like fish oil and safflower oil had the opposite effect, and it was really the balance of these mono and saturated and polyunsaturated fatty acids.

00:24:34.807 --> 00:24:41.769 Mandar Muzumdar It's within the diets that was the strongest correlate to how much disease developed in these mice.

00:24:41.846 --> 00:25:01.000 Eric Winer So what's the next step. And other data, for example, in the very well-known Nurses Health study that's been conducted out of the Harvard School of Public Health and the Channing Labs. And, you know, any any cohorts like that that you can turn to.

00:25:01.038 --> 00:25:20.346 Mandar Muzumdar So we haven't been able to turn to that data yet, but that's an area that we want to move towards. We were able to look at the cohort that was within the UK Biobank, which includes about half a million individuals who are healthy at the time and about 2000 of them over the course of the study developed pancreatic cancer.

00:25:20.346 --> 00:25:50.884 Mandar Muzumdar And when these patients enrolled in the study, they had blood samples taken in which they could look at the fatty acids that were circulating in the bloodstream of those individuals and those individuals that had higher mono unsaturated fatty acids by proportion in the bloodstream, had a higher risk of developing pancreatic cancer down the road. And those that had higher polyunsaturated fatty acids in the bloodstream had a lower risk of developing pancreatic cancer, which was consistent with the direction that we saw in the animal model.

00:25:50.884 --> 00:26:10.538 Mandar Muzumdar So suggests it might be plausible in humans. But, you know, it's a single cohort, a single study. I don't know if we can say strongly that that is going to pan out in humans, but I think it's intriguing nonetheless in an area that we're very interested in following up in additional cohorts to see whether this is true in a broader population individual.

00:26:10.538 --> 00:26:33.730 Eric Winer Interestingly, the Mediterranean diet, which includes both olive oil, which in your work is bad, and fish oil, which of course comes from fish. And these diets are contained a great deal of fish. What happens with people who are who follow a mediterranean diet? Do they get less pancreatic cancer?

00:26:33.807 --> 00:27:00.615 Mandar Muzumdar Yeah. So it's a good question. I would say there are some limited studies, though there aren't large, that have suggested a mediterranean diet could be productive in certain cohorts and in other cohorts. That hasn't been replicated. And I think this is the challenge that in these studies, it's hard to know the balance of these different fatty acids. And I've already told you that it's really the proportions of each of these individual components that matters, not any individual fatty acid or fat source.

00:27:00.846 --> 00:27:22.153 Mandar Muzumdar And so I would say that one lesson that we learned from here is perhaps moderation is probably the best way of thinking about it. The other thing that we learned from this study is how these different proportions of fatty acids actually cause, promote or suppress cancer. And what we discovered is that these fats actually incorporate into the cell membranes of cells within the pancreas.

00:27:22.153 --> 00:27:55.000 Mandar Muzumdar These are the barriers of each of our cells. And it turns out these fatty acids can be modified in the membranes

through a process called oxidation. And certain of them, like polyunsaturated fatty acids, are at a higher risk of of being oxidized. While the mono and saturated fatty acids are resistant. And we postulate and we have some evidence in the in the laboratory to suggest that having a higher number of these polyunsaturated fatty acids within the membranes of the cells within the pancreas can lead to increased oxidation and cell death of these emerging tumor cells.

00:27:55.000 --> 00:28:17.730 Mandar Muzumdar And that leads to the prevention. So we may not have a specific fatty acid regimen that we would propose down the road. Perhaps if we can leverage these biologic downstream mechanisms within the cells with drugs that could enhance those pathways that would kill off those early cancer cells, that would be an alternative way of taking advantage of the science that we've developed here.

00:28:17.769 --> 00:28:31.576 Eric Winer It's really fascinating and has huge implications in terms of the prevention of cancers. Well, we're going to have to end. So I've been speaking with Mandar Muzumdar,

00:28:31.653 --> 00:28:38.230 Eric Winer Professor in genetics and internal medicine at the Yale School of Medicine. It's been a pleasure talking to you.

00:28:38.346 --> 00:28:57.500 Announcer If you have questions, the address is CancerAnswers@Yale.edu and past editions of the program are available in audio and written form at Yale Cancer Center. We hope you'll join us next time to learn more about the fight against cancer. Funding for Yale Cancer Answers is provided by Smilow Cancer Hospital.