My great pleasure to introduce our grand round speaker doctor Lana Riley. She’s the 1st in water. Hope is going to be a long series of lecturers speaking on education, training and career development. This was actually Barbara Burtness idea, so Doctor Riley Hills to us from the Fox Chase Cancer Center where she’s in associate professor in the Molecular therapeutics program. She’s a scientific director of the immersion science program at Fox Chase,
and she's also the executive director of the Eccles Institute, which is a hub where students, teachers and scientists. All joined forces to focus on critical biomedical problems, such as dietary effects on cancer. They're developing cutting edge projects and they are enhancing scientific leadership within the community in Philadelphia. For these efforts, Dr. Riley recently received the Elizabeth W. Jones Award for Excellence in Education from the Genetics Society of America. Among her many accolades,
she received her Ph.D. in cell and developmental biology at Harvard and a research interest involved nutritional mechanisms that influence stem cell function and development. She’s the recipient of multiple NIH awards for her research on stem cells and epithelial homeostasis, and today she’s going to be talking to us both about her outreach and education and her own research. In a talk that’s entitled kids conquering cancer, flipping the hierarchy to find new diet based interventions for
00:01:21.102 --> 00:01:22.907 EGFR and HPV driven cancers.

00:01:22.910 --> 00:01:24.142 So, without further ado,

00:01:24.142 --> 00:01:25.990 it’s my pleasure to turn the

00:01:26.051 --> 00:01:27.966 platform over to Doctor O’Reilly.

00:01:32.530 --> 00:01:34.364 It’s really a pleasure to be here

00:01:34.364 --> 00:01:36.109 and thank you for inviting me.

00:01:36.110 --> 00:01:39.869 I’m also my very first research mentor.

00:01:39.870 --> 00:01:42.656 Anton Bennett is one of your faculty

00:01:42.656 --> 00:01:44.827 members and everything I know I

00:01:44.827 --> 00:01:47.126 learned from Anton and Venelles lab.

00:01:47.126 --> 00:01:49.946 So yeah, today I’m going to talk to

00:01:49.946 --> 00:01:52.389 you about mostly about our diet based

00:01:52.389 --> 00:01:55.460 programs involving high school students.

00:01:55.460 --> 00:01:57.764 So one of the things I want you all to start

00:01:57.764 --> 00:01:59.852 thinking about as we start here is why.

00:01:59.860 --> 00:02:02.210 Why did you enter science?
A lot of times you know people ask us this question in all kinds of different applications and most of the answers are fairly similar. A little bit canned. I've loved science since childhood. I like to answer questions. I have some aspect of love, love for science here or I care about somebody very much. So one of the things that we wanna do is to connect these puzzle pieces together to make an inclusive environment so that everyone can participate. So why do we even want inclusion?
Why does it matter if we’re all kind of similar people with similar ideas and we’re going to work together better, right? But that sort of limits our discoveries, right? So if we don’t embrace the life experiences and knowledge of all different types of people, then we’re essentially missing things that we could otherwise gather together. Why is inclusion so hard? Why is it so hard like we keep hearing about diversity, equity inclusion efforts, and failing and failing and failing? So one of the really big problems we have,
especially in a city like Philadelphia, which is 80% underrepresented minorities in science, is that we have a major attrition of scientists as they move up in the scientific pipeline. So in terms of bachelors degrees, it’s still under representation, but this number plummets by the time you get to postdocs. And then there has been exactly 0 gains in full professors for underrepresented minorities. In many decades. So what’s the deal? Why is this happening?
One of the reasons is this why the why that people who are minority scientists enter this field is to help address health challenges of their own communities, and so the topic choice in papers recently published by the NIH about their own grants, shows that awards to African American and black scientists are prohibitively low because of the topic choice of addressing the health disparities that plague their own communities. And this. Makes no sense, right?

This makes no sense,
but recruiting people into science to address the problems that other people can address and then pushing them out by not allowing them to have funding. So these are both very excellent papers for anyone who is interested in this topic and wants to read more about it. So this lack of representation in science and medicine is a primary driver of health disparities. Just recently, if we highlight the COVID-19 pandemic the underrepresentation in science is exactly reflected by the numbers of deaths of COVID-19 with black
Americans having the highest rates of death and the lowest representation. This is the same across all chronic diseases, including cardiovascular disease, hypertension, diabetes, and cancer. So here in Philadelphia, our demographics are flipped from the predominant demographics in science, where 70% of US faculty researchers are white. In contrast, only 5% or fewer are African American or black in the school district of Philadelphia. This is opposite, so our predominant populations are black and Hispanic, and these students essentially have no chance of achieving a research career.
given the predominant prevailing culture.

So this is something that we want to change.

This first of all, is not fair and second of all, puts people in a situation if they don’t even try to pursue science because they know they have no chance.

And our goal is to try to help Philadelphia address these health disparities in COVID-19, cancer, diabetes, and Alzheimer’s that are really destroying their communities.

So how are we going to do this?

We already know that 77% of college students switch out of STEM majors after one semester,
we created a program where 72% of our graduates actually continue conducting paid research in college completely flipping these numbers. Fewer than 6% of Philadelphia and other inner city students complete their stem degrees with fewer than 10% of those completing graduate degrees. In contrast, 100% of our students complete their stem degrees on time. So how do we do this? This is a big change, right? A big change.

So we created a program built on citizen science. So a staircase of discovery
NOTE Confidence: 0.935979718
00:06:38.770 --> 00:06:40.600 is comprised of four steps.
NOTE Confidence: 0.935979718
00:06:40.600 --> 00:06:42.670 Which level one is crowdsourcing,
NOTE Confidence: 0.935979718
00:06:42.670 --> 00:06:44.806 and many people have heard of apps where
NOTE Confidence: 0.935979718
00:06:44.806 --> 00:06:47.398 people can measure clouds, and you know,
NOTE Confidence: 0.935979718
00:06:47.398 --> 00:06:49.834 say how many animals they saw.
NOTE Confidence: 0.935979718
00:06:49.840 --> 00:06:51.406 In the woods near their house.
NOTE Confidence: 0.935979718
00:06:51.410 --> 00:06:53.738 So it’s sort of like an observation
NOTE Confidence: 0.935979718
00:06:53.738 --> 00:06:55.881 where the data gets transmitted back
NOTE Confidence: 0.935979718
00:06:55.881 --> 00:06:57.756 to scientists who interpret it.
NOTE Confidence: 0.935979718
00:06:57.760 --> 00:07:00.058 The second level is distributed intelligence,
NOTE Confidence: 0.935979718
00:07:00.060 --> 00:07:01.986 so this the citizens can actually
NOTE Confidence: 0.935979718
00:07:01.986 --> 00:07:03.930 collect the data and start to
NOTE Confidence: 0.935979718
00:07:03.930 --> 00:07:05.415 think about what it means.
NOTE Confidence: 0.935979718
00:07:05.420 --> 00:07:07.436 Then participatory science,
NOTE Confidence: 0.935979718
00:07:07.436 --> 00:07:10.796 where the students or participants
NOTE Confidence: 0.935979718
define the problems that participate in the data collection, and then finally where they’re basically independent scientists like like all of us. So we created a program that matches these steps, starting with students as young as fifth grade. Our primary participants are 5th to 12th grade. They start in school, they do their first research experience in school, then they can continue focusing on a junk food diet more in their classroom, summer camps and undergraduate bridge to
research that’s built on a graduate rotation, and finally independent research and Foxchase Labs. And by the time they’re ready to go to college. Remember, this is just before college. They already have up to two years of research experience under their belt and tend to get paid research positions their first year of college, and then they go up from there.

So we started this program in 2013. This is Darius well and she’s the science educator, curriculum guru genius,
who created basically translates how we do Advanced Research into something that can be done in high school classrooms. And since 2013 we’ve trained over 2000 students using this method. This is 570 of them on the steps of the Franklin Institute, where they came to present their Cancer Research data in 2019. As a collective group sharing with each other with scientists with the community that there are 18 new cancer gene hits of nutrients that affect cancer. We’re also collecting tons of education, data points, and 60% of these new scientists are underrepresented.
Currently in biomedical research. So does it actually work? Do the students want to continue so this is a kind of a complicated diagram, but just focus on the the Blues and the Reds, which are the bad things, right? You don’t see much blue and red in any of these pie charts, indicating that the students make tremendous gains in life skills, including peer collaboration, confidence adjusting to projects, and thinking outside the box that they can apply to any career. And keep in mind that these students
This is a bunch of 9th, 10th, 11th and 12th graders who are taking a class. Their teacher decided to participate in the program. They are not pre selected or filled out. An application saying they’re interested in science, so this is actually a fairly huge gain. A fairly huge gain. He also made gains in research skills, how studying the topic addresses real-world issues, which is something that’s incredibly important given the COVID-19 pandemic and other issues.
How to formulate a hypothesis, explain projects and prepare and present their work and then finally the most important part perhaps is inclusion and interest, whereas students think and feel like a scientist. We have a little work to do on feeling like part of the scientific community to make sure that that number that red bar goes down that number that red bar goes down that number that red bar goes down and then this was something that we never in a million years expected. We sort of expected. Maybe 20% would be interested.
00:10:16.964 --> 00:10:17.956 in being a scientist.
NOTE Confidence: 0.956227373333333
00:10:17.960 --> 00:10:22.263 But 56% saying maybe was mind blowing, right?
NOTE Confidence: 0.956227373333333
00:10:22.263 --> 00:10:23.601 Think about all of the things
NOTE Confidence: 0.956227373333333
00:10:23.601 --> 00:10:25.212 these kids could be and now just
NOTE Confidence: 0.956227373333333
00:10:25.212 --> 00:10:26.332 from this one little experience,
NOTE Confidence: 0.956227373333333
00:10:26.340 --> 00:10:26.936 they’re thinking.
NOTE Confidence: 0.956227373333333
00:10:26.936 --> 00:10:29.959 Maybe I want to be a scientist and even more,
NOTE Confidence: 0.956227373333333
00:10:29.960 --> 00:10:31.364 the numbers are even higher for
NOTE Confidence: 0.956227373333333
00:10:31.364 --> 00:10:33.118 students who want to do more research,
NOTE Confidence: 0.956227373333333
00:10:33.120 --> 00:10:35.144 emphasizing the disconnect between
NOTE Confidence: 0.956227373333333
00:10:35.144 --> 00:10:38.180 what students think of as science
NOTE Confidence: 0.956227373333333
00:10:38.262 --> 00:10:40.866 and now what they know as research.
NOTE Confidence: 0.956227373333333
00:10:40.870 --> 00:10:43.502 So in 2019 we had over 1000
NOTE Confidence: 0.956227373333333
00:10:43.502 --> 00:10:45.070 students in one run,
NOTE Confidence: 0.956227373333333
00:10:45.070 --> 00:10:47.130 our biggest auditorium at Fox
NOTE Confidence: 0.956227373333333
00:10:47.130 --> 00:10:49.290 Chase only holds 320 people.
So we created a nonprofit organization called the E close Institute, which is a hub where students, teachers, scientists, community, and hopefully we’ll be building accessible databases for everyone, come together to try to solve these community health problems. So we have summer camps where students participate for a week, really delving into high level techniques, including running gels, doing microscopy, lots of pipetting and measuring skills.
And in the summer camps again, more even more students want to be scientists with nobody saying they no. Nobody said no, I don’t ever want to be a scientist. And 90% of the students want to do more research. And so one of the things I think we need to think about in general is how to infuse research into more other subjects. Because the students love doing the research, even those who don’t necessarily want to be scientists. So this is our undergraduate bridge to research. This is actually where we started.
In 2013, we have 230 students who've now completed this program. They have started to grow up since we started in 2013. We have 16% in medical school and absolutely shocking 17.3% pursuing PHD’s in biomedicine. We have a number of them who are doing gap years in research labs 22 percent, 18% are engineers and 6%. Are in other stem related careers, especially business entrepreneurship, math type stuff? So yeah, so since this has been working so well,
we expanded this to be true community science.

Having an outreach citizen science event in the fall where we had church members and kids and families.

Oh that’s all blurry, all participating in providing their thoughts, their ideas and their input and how to solve the problem of diabetes.

And in the Philadelphia community.

So how does this all work? Like?

Why is this working better than other things and the key thing is the Y. This is a video of

one of our presenters that emphasizes
the importance of the why this project I was most interested in studying squamous cell carcinoma, which is a type of skin cancer that affects over a million people in the US every year. One of those people was my grandmother who I lost to disease in 2015. You might notice a small blue butterfly floating around front presentation, that’s why. Joining us today. So one of the most important things for our students is that they are here to cure somebody they love, and so one of the things I think we lose sight of as scientists.
in our training is is that why?
NOTE Confidence: 0.948238083
So we come in? Oh yeah,
NOTE Confidence: 0.948238083
that’s great that you came in
NOTE Confidence: 0.948238083
because your zeami is sick.
NOTE Confidence: 0.948238083
But here’s how we do things here.
NOTE Confidence: 0.948238083
Here’s the project I’m giving you
NOTE Confidence: 0.948238083
and so this is something I want
NOTE Confidence: 0.948238083
everybody here to really start
NOTE Confidence: 0.948238083
thinking about is do you know what
NOTE Confidence: 0.948238083
the why is for all of your trainees?
NOTE Confidence: 0.948238083
Does it matter right?
NOTE Confidence: 0.948238083
Is that why they’re still here?
NOTE Confidence: 0.948238083
Is that what’s driving them to
NOTE Confidence: 0.948238083
succeed in a very difficult,
NOTE Confidence: 0.948238083
particularly funding environment?
NOTE Confidence: 0.948238083
And is that something that can be
leveraged to identify new ways to treat, you know, treat and prevent cancer or other diseases? So diet is a particularly accessible. Topic for children. Everybody knows what’s good to eat, what’s bad to eat. Children in particular have body image challenges and then many people in their families also have more advanced diseases like diabetes and cancer that they want to understand and help. So we start with the question of what should I eat? Our main goal is to improve research literacy.
so that students understand what research is, how it’s conducted, what the vocabulary is, what’s expected of them and including that. The existing hierarchy. So the program is student centered, it’s transdisciplinary. It promotes self efficacy of each and every student and it improves the agency of the instructors and the students to take charge of their own research questions and projects. So why diet? Why does diet matter? You know my my research lab works on how nutrients impact signal transduction pathways,
which is the core of how we
started and in this area.
For this large scale outreach program and
diet is unambiguously a key to health,
so this is a current sort of
diagram of the recommendations for
a healthy diet where you have.
Lots of fruits and vegetables.
Probably too many grains.
A small amount of meat and
protein products and some dairy
with a very tiny little pie.
Slice of junk food here.
And I think most people
don’t really eat this.
Most people. It's a little bit expanded down here on this end and reduced a lot here on this end, but this type of healthy diet is known to reduce the symptoms of aging and to promote healthy aging throughout the lifetime. So we all know, right? We all know what we should be eating, but we don't always do that. So what do we do? How do we make this better? There's diets. Dietary cookbooks that are about longevity, reducing calories, eat less,
live longer, and this. These diets are actually very, very well supported by basic science data showing that in every Organism caloric restriction extends lifespan and improves health. Most recently, intermittent feeding. Probably much easier way to reduce the metabolism challenges that occur during unhealthy aging in a similar way to caloric restriction and so, so how do we leverage these types of diets? Is intermittent feeding a good thing for a young teenager with a body image issue?
00:16:56.760 --> 00:16:57.236 Probably not.
NOTE Confidence: 0.852221148571429

00:16:57.236 --> 00:16:59.960 So how do we start to have the conversations?
NOTE Confidence: 0.852221148571429

00:16:59.960 --> 00:17:01.856 How do we promote health through diet and how do we leverage chemicals
NOTE Confidence: 0.852221148571429

00:17:01.856 --> 00:17:04.212 in the diet to try to improve?
NOTE Confidence: 0.852221148571429

00:17:04.212 --> 00:17:06.606 Existing therapies so another really cool thing about diet is it’s very cultural,
NOTE Confidence: 0.852221148571429

00:17:06.610 --> 00:17:08.752 so every religion has very specific dietary recommendations.
NOTE Confidence: 0.852221148571429

00:17:08.752 --> 00:17:11.348 There is herbal medicine that is widely used in almost all areas of the world
NOTE Confidence: 0.852221148571429

00:17:11.350 --> 00:17:16.525 so every religion has very specific dietary recommendations.
NOTE Confidence: 0.852221148571429

00:17:16.525 --> 00:17:19.150 There is herbal medicine that is widely used in almost all areas of the world
NOTE Confidence: 0.852221148571429

00:17:19.150 --> 00:17:21.688 and then just think about where you’re from, right?
NOTE Confidence: 0.852221148571429

00:17:21.688 --> 00:17:24.310 So there’s some kind of a cultural cuisine where you’re from.
NOTE Confidence: 0.852221148571429

00:17:24.636 --> 00:17:26.918 That is something that’s to
be celebrated in holidays.

And all of these things, so why not celebrate those same things to promote health?

So in the United States, a lot of people do. The herbal medicine type thing using dietary supplements, and just as a thing to note, dietary supplements are not regulated by the FDA. The FDA is not authorized to review dietary supplement products before they are marketed, and so we are relying completely.
on manufacturers and distributors to make sure the products are safe before they go to market.

So no, dietary supplements are regulated by the government.

70% of cancer patients are using dietary supplements. Compared to 56.6% of the general population, this is an extraordinarily high number. These studies were done on predominantly white patients with very few I couldn’t actually find any studies that were done exclusively on minority patients. The one study I did find said that 76.3% of Hispanic patients...
do not tell their doctor that

they’re taking the supplements, which I think is true for most people.

So this is something that’s also important to.

Consider is that people are taking stuff that might be interrupting the therapy that they’re being prescribed.

So what’s our goal?

Our goal is to understand how every chemical that you can consume as part of a diet impacts signal transduction pathways that are involved in disease.

So this is a proteome diagram from Joseph L.A.
So the entire Drosophila genome. Translated into proteins with interaction maps here. So what we would like to do is take each and every compound that’s found in the diet and identify those that inhibit or activate individual proteins to create a new diet map on top of the proteome map so that we can create tailored diets for individual diseases based on the genetics, the protein expression, and the dietary access of the patient. So that’s obviously an extremely daunting task, like it’s something where our usual
one protein one project 1 mechanism,

one person is not going to work, and so this is one of the reasons

Getting high school students involved, which is a population that’s eager and in desperate need of having these types of experiences.

We have 16 million high school students in the United States with fifty 550 million worldwide. So suddenly a daunting task maybe becomes a little bit more feasible.

Each of these students comes from a family that eats right.
They have their own particular types of cuisine that are important to them, some of which may have chemical compounds that can inhibit cancer signaling pathways to enhance the efficacy of existing therapies.

So how do we do this? We have a bunch of dietary supplements or other things that the students bring in. We feed them to fruit flies, either wild type fruit flies or flys bearing mutations in oncogenes, tumor suppressor genes, or more recently in pathways related to diabetes. And then we screen to see what happens to...
the developmental life cycle of the fly.

So do they continue to lay eggs?

Do they develop into pupae and then do they close as adults?

And So what we found is the most reproducible assay is counting the the number of pupae on the side of the vial.

So you can see here. These are like the little larvae, and then they crawl up and become pupa like a chrysalis for a butterfly.

And if we have hundreds of people scoring the same exact sample, we actually get pretty tight.

Pretty tight statistics for
determining the numbers of pupae, and so you can clearly see that wild type can be compared to loss of function mutants in P-10, which are fairly similar to gain of function mutants in PI3 kinase which are in the same related pathway. Things like the FOXO mutants have much more broad variability, so it’s going to be a little bit more difficult to interpret. The results of those experiments could be done with any gene that anybody is interested in, for which there is a mutant in the fly model.
So we focus with the students initially on basics, so signal transduction. You have a leg and you have a receptor. You have an effect. Are you drive proliferation that causes cancer? Keep it simple and a cancer passed away. You could have too much lag and that drives the whole pathway. You can mutate the receptor or you can have a mutant effector, all of which will give the same outcome of having too much proliferation. So it since 2013 we’ve had a big project on the EGF receptor pathway and
all of the genes that you see here.

We have representative viable mutations and flies which are modifiable.

Meaning if a compound makes the phenotype worse, that will be detected. If the compound makes the phenotype better, that will be detected because these are mutants that are not complete nulls, so the the great thing about this is that many high schools have eight groups of students who are doing experiments.

Together so we give them sequential mutants in the EGF receptor signaling pathway. Have them screen the same drugs and in doing so we can map exactly
which of the components of the signaling pathway are affected.

So in order to approve the proof of principle for this, we started by treating flies with gefitinib, which is an inhibitor of the EGF receptor, and what happens is the same thing that happens if you have a loss of function, which is you fuse these respiratory structures called dorsal appendages on the egg, so in a wild type there are two in a gefitinib treated or an EGF receptor mutant.

There’s only one.
So this is a very robust, easy to score phenotype for anybody, just even using a magnifying glass. And then we screened a bunch of different kinase inhibitors and the ones in red are known, e.g., F receptor inhibitors and you can see that all of them had some effect on induction of dorsal appendage fusion. There were a couple others imatinib which inhibits ABL kinase and missib which inhibits VEGF receptor. Also had had effects which is something will follow up at some time later. Uhm, we also noticed that at a low dose of gefitinib you have
the dorsal appendage defects, but normal numbers of eggs.

If you increase the dose now, you reduce the numbers of eggs, which turns out to be a much more easy and robust to score phenotype, which is loss of development.

And then finally, there's excellent reagents for measuring downstream signaling, including Erk activity, so here is no good fit in. If you see nice Erk activity and as soon as you start adding the gefitinib you inhibit the Erk.
downstream of the EGF receptor

and you know these are like the

students learn how to do this and

they do it once and so you get some

variability in the loading but.

At the end of the day,

what we're looking for is something to

pursue in a professional lab down the road.

So once the students started

screening the dietary supplements,

the first thing that popped

out with Selena methionine,

which gives an EGF receptor like

phenotype of a single dorsal appendage.

You also see dramatically reduced

numbers of pupil pupil cases,
meaning that the Salina methionine is behaving like a high dose of gefitinib innocence of reducing the numbers of eggs laid.

So in order to figure out if this was real, so one student doesn’t mean it’s right, they could have killed everything, right? Like you, you just don’t know.

So we put this into a classroom project. For this 570 students I showed you on the steps of the Franklin Institute and they screened. All of the steps in the EGF receptor signaling pathway. Mutants in all of these different
00:25:39.050 --> 00:25:40.994 steps for effects by selenium and
NOTE Confidence: 0.942827996
00:25:40.994 --> 00:25:44.699 what we see is that the high dose of
NOTE Confidence: 0.942827996
00:25:44.699 --> 00:25:46.967 selenomethionine basically affects everybody,
NOTE Confidence: 0.942827996
00:25:46.970 --> 00:25:50.008 meaning it’s probably toxic for any fly,
NOTE Confidence: 0.942827996
00:25:50.010 --> 00:25:52.187 but the low dose was actually quite
NOTE Confidence: 0.942827996
00:25:52.187 --> 00:25:54.569 variable such that only rats and Corkscrew,
NOTE Confidence: 0.942827996
00:25:54.570 --> 00:25:56.676 which is the fly homologue of
NOTE Confidence: 0.942827996
00:25:56.676 --> 00:25:58.390 the tyrosine phosphatase SHP two,
NOTE Confidence: 0.942827996
00:25:58.390 --> 00:26:00.497 were the only two affected and they
NOTE Confidence: 0.942827996
00:26:00.497 --> 00:26:02.269 were affected in opposite ways.
NOTE Confidence: 0.942827996
00:26:02.270 --> 00:26:04.382 Such that the wrasse mutants were
NOTE Confidence: 0.942827996
00:26:04.382 --> 00:26:06.770 less viable and the Corkscrew mutants
NOTE Confidence: 0.942827996
00:26:06.770 --> 00:26:09.446 were more viable upon treatment
NOTE Confidence: 0.942827996
00:26:09.446 --> 00:26:11.420 with Selena methionine.
NOTE Confidence: 0.942827996
00:26:11.420 --> 00:26:14.020 So then we use the Erk activation again.
NOTE Confidence: 0.942827996
00:26:14.020 --> 00:26:15.025 Here’s wild type.
This is the activated EGF receptor mutant you see a dramatic increase. We can also do this by immunostaining to see specifically which cells are affected by various treatments. What we found here is that the Salina methionine was a surprise. We expected the Salina methionine to reduce the arc activity instead. If you compare the wild type here in lane one to this lane over here, this Lena methionine. Actually blasted the Erk signaling bypassing any type of inhibition of VEGF receptor so. This turned out to be true in.
multiple different cancer cells, which the students went on to do in foxchase labs in the summer. So breast cancer, colorectal cancer, and pancreatic cancer with gain of function RASP mutations all showed the similar effect, with SELENOMETHIONINE actually increasing Erk activity up until at least in two cases the dose got too high. On K CO2 which is a non rast dependent colorectal cancer cell line had less of an effect suggesting that like in the fly the gain of function wrasse mutations make the the cells more
00:27:27.634 --> 00:27:31.078 sensitive to this Selena methionine effect.

00:27:31.080 --> 00:27:32.376 So we’ve done this with it.

00:27:32.380 --> 00:27:34.450 We’re still in the process of

00:27:34.450 --> 00:27:35.960 finishing finishing this project.

00:27:35.960 --> 00:27:39.250 Over 300 students have worked on it,

00:27:39.250 --> 00:27:41.301 in addition to the 1001 students who

00:27:41.301 --> 00:27:43.219 did the screening in the classrooms.

00:27:43.220 --> 00:27:45.533 So it’s going to be a lot of authors

00:27:45.540 --> 00:27:47.124 on the paper that we’re planning

00:27:47.124 --> 00:27:48.180 to publish this year,

00:27:48.180 --> 00:27:49.937 but we have a number of other

00:27:49.937 --> 00:27:51.088 compounds that inhibit specific

00:27:51.088 --> 00:27:52.476 components of this pathway,

00:27:52.480 --> 00:27:55.140 so burdock root is a very potent

00:27:55.140 --> 00:27:57.270 inhibitor in this case of AKT.

NOTE Confidence: 0.942827996
Butcher’s Broom is an activator of Corkscrew, as is Selena methionine and grape seed extract inhibits raft, so so this is something where you can see like. Eventually we will kind of have a really nice map of this particular pathway and the different compounds that that can affect it. So this was a project that I designed thinking it’s accessible. It’s easy, it’s straightforward. It’s part of the curriculum for the students. What they need to learn in high school, and then we started having students come in with their own ideas. So one student brought in apricot seeds, which is mom who was a breast cancer.
survivor was taking as God’s cure for cancer.

It turns out as soon as you digest this,
it turns into a molecule of cyanide and a molecule of benzaldehyde and
women who are taking this are dying of cyanide poisoning.
So this is a really serious public health issue that nobody reports to
their doctor 'cause as soon as you tell
your doctor I’m taking apricot seeds,
they say you can die from cyanide poisoning.
So, so this is something that’s essentially people taking poison
that needs to be addressed.
Another student came in.
Saying that her grandfather had stage four lung cancer and was eating 100 live weevils in a glass of Sprite every day and it cured his stage.

Four lung cancer and so this is, another curiosity like you. Don’t just tell people you shouldn’t do that like we need to figure this out and it turns out what she found out was that the defense chemicals secreted by these weevils when they get dropped into a glass of Sprite are actually very potent. Chemotherapeutics against lung cancer. So so this is something where
there’s truth and there’s danger.

In the same thing and these are not things that most scientists would be like.

Oh let’s go investigate weevils so so these are things that are happening in our communities that we don’t know about and are extremely important.

And finally, just last summer we had a kid come in who was interested in lean, which is a combination of codeine based cough syrup and Sprite. And kids are using this to get high and he was very concerned that his friends who were all doing this because
It’s healthier than taking drugs.

We’re going to get brain cancer and these are the sorts of things that are going on that the students want to research because it’s affecting the people they love and we don’t want to bring them in and tell them that’s not important because. This is important.

So this is a project at all. I’ll just highlight a lot, which is a project designed by 5 young ladies starting with Eliana here young ladies starting with Eliana here who was doing a cultural awareness project to find out what cancers particularly affect people from Puerto Rico,
and So what she found is that Puerto Ricans have an extremely high rate of HPV based cervical cancer. Even though Hispanic girls were more likely to get vaccinated than white girls, and so this was something that was really bothering her, so most of the studies have been done on HPV types 16 and 18. So here’s 8100 cases of this. But it turns out that in Hispanic and black communities, other strains of HPV are more prevalent, and so these are not small numbers.
So 1800 from these types, and then another 1200 from these types is not a small number, and it turns out that many of these strains of the virus are not actually protected by available vaccines, so this started a conversation among these predominantly minority women of what’s going on with this. So a lot of it has to do with poverty, access to health care and various life choices that are generally
considered explanations for why these health disparities exist. But Eliana’s discovery, sort of made it seem like maybe there’s some genetic basis to some of these differences. So Nicole Harrington came in with this concept that black mothers don’t trust the medical community enough to get vaccinated, and so this is an example for the COVID-19 vaccine where you can see that black Americans had a very very low vaccination rate compared to white Americans.
And similarly for the HPV vaccine, the same thing is true where Hispanic and black Americans are less likely to get vaccinated and then what we also need to really realize is that they think the vaccine is harmful and even more that. They think people are being treated like Guinea pigs by scientists like us, so so this is a really big issue in terms of how to get information out how to reduce this mistrust and our take on this is that we need to increase representation and understanding of the fears that the
00:32:58.194 --> 00:33:01.609 public has about these vaccines.

00:33:01.610 --> 00:33:03.934 So then we went down to the cellular molecular level,

00:33:03.934 --> 00:33:08.160 so HPV happens with a.

00:33:08.160 --> 00:33:09.294 Initial infection,

00:33:09.294 --> 00:33:13.263 but the virus can move into sort of the the basic sort of stem cell areas of the of the cervix,

00:33:13.263 --> 00:33:16.542 and then it can just hang out for awhile and then eventually it can come out and create invasive neoplasia and so this is a pathway that’s basically mediated by inhibition of P53 and RB,

00:33:16.542 --> 00:33:19.356 cell areas of the of the cervix,

00:33:19.360 --> 00:33:21.888 and then it can just hang out for awhile and then eventually it can come out and create invasive neoplasia and so this is a pathway that’s basically mediated by inhibition of P53 and RB,

00:33:21.888 --> 00:33:23.918 awhile and then eventually it can come out and create invasive neoplasia and so this is a pathway that’s basically mediated by inhibition of P53 and RB,
control the cell cycle, and so two students neelys and Allison. Decided to screen dietary supplements to find something that would kill flies bearing mutations in P53 or RB to sort of mimic virus infection and what they found was multiple components that drive a process called ferroptosis which is a type of iron dependent cell death and you can see here that. The P53 null flies are highly susceptible to acetaminophen, which is Tylenol or iron in terms of being killed. And then they went on and did a dose curve.
to find doses that really had little or no effect on wild type but still were potent for RB and P53 mutants. And so we’re very interested in this kind of experience, and it turns out that HPV inhibits a receptor that is a major controller of ferroptosis through a protein called G. PX4P53 is also a regulator of this process. Acetaminophen, which is one of the things that scored in the screen actually affects this whole process, and so a colleague of mine, Jeff Peterson, who’s also at Fox Chase,
is a lab that studies ferroptosis, and so they had two compounds, ESA. And harassed in that act in different ways to induce ferroptosis. And so we wanted to see. Whether the observations that the students made in the fly would be true also in HPV depending cancer cells, so this was done by Jesse Rynok with the help of postdoc and Jeff Slabtown who sing and what we see is differential sensitivity to the ESA compound, such that in cervical cancer cells, HPV positive cells are resistant to induction of ferroptosis and in the head and neck cancer cells there
are actually more sensitive. And so this is something that we’re trying to figure out now, like, what is the difference between these? And obviously the cells have more things going on in them other than just HPV infection. But we know that this was actually a ferroptosis process because if you add an inhibitor of ferroptosis then you abrogated the response. So using a different inducer of Ferroptosis, Calder, Aston there didn’t seem to be any effect at all on HPV minus head.
and neck cancer cells, but there really was a dose dependent reduction increase in killing basically of the HPV positive cells that Jesse is going to be further exploring this summer. So the two projects together maybe actually centered on on one particular thing, which is selenium. Uh, which is an activator of GPX 4G. P X4 is a selenium dependent protein that prevents the production of lipid radicals, which are what causes this ferroptosis and at the same time we found that if we reduced Selena, if we increase selenomethionine in the EGF receptor pathway,
we drive activity of ERC which we know I did.

I didn’t show, but it’s through Corkscrew S HP2, which happens to also be a tyrosine phosphatase that’s regulated by these lipid radicals.

And so one of the things that’s kind of coming out just from this initial one single compound that we focused on is maybe there’s a vulnerability in in.

In these the head and neck cancer cells for a dependence on selenium, such that if a restriction diet that reduces the levels of selenium is used in conjunction with existing therapies,
maybe they'll work better.

So all of this is to say that the Y really matters for the students, and the way our scientific culture is set up right now we have a very high level principle investigator. It goes down, down, down depending on the level of training such that high school students are gifted with science and what we would like to do is change that so that the high school students come in with the science they already have that like to do is change that so that the high school students come in with the science they already have that we figure out what those projects, those questions those hypotheses are, and matched them to a scientist who is also.
Interested in the same thing and so that it comes in more as a kind of attack on the same problem and so one of the things I really want to say is that the culture matters and so this is an image of a boardroom from Time magazine from a little while ago where you can see the top guys are all up here talking down here to the diversity equity inclusion officers who are supposed to be the ones who are focused on changing the culture, but instead they’re being lectured on. This is our culture.
And so one of the things that’s really important is to consider whether this is your lab meeting, right? If this is your lab meeting and you’re not considering the ideas of the people down here at this end of the table, then that’s something that’s really time to change. Finally, one of the things that’s really our job if we take underrepresented students into our lab is to ensure their safety. You need to be the shield against the systemic racism that’s coming at them from every direction, every minute of every day so that
they can run behind you in a way that they can thrive and bring these new ideas into biomedicine. And finally, like I just want to share my own experience that the way these students think has completely changed the way I think about an important scientific question. Such that the biology, the environment, and the lifestyle all have to be considered so that we can really address particularly health disparities in cancer and other diseases.
So I just want to leave you with our group our crew from 2019 remember their faces. This is the future of Cancer Research. Isabella, here on the right side is just got accepted to a Yale summer program and she’s considering that, and we’ll see whether she comes. So we’ve had a bunch of funding, a lots, lots of support that we’re particularly excited about. A recent partnership with the American Cancer Society.
For the E close programs to support 300 young ladies doing Cancer Research this summer, and the team is amazing, I already mentioned Dara. I have my lab who’s who supports all the students summer learning and a whole bunch of foxchase mentors. Yeah, so that’s it. Thank you. Thank you so much, Alana. I’d like to ask folks to put questions into the chat, and if you don’t I can start off with one. If that’s OK with you, then maybe Barbara, I’m sure has questions.
So First off that was. That was a fascinating presentation in a real Tour de force that congratulations, a lot of questions about the nuts and bolts. So how do you fund this? How do you channel hundreds of high school students in 220 labs at best at Fox Chase? Right, we don’t. We can’t write. You can’t do that. You can’t have 2000. I mean, we’re actually hoping to reach 10,000 students a year by next year, and there’s no way that we can put each and every one of those students into a lab. It’s just not possible,
and so that’s what we’re trying to flip.

So when COVID-19 happened, it became unambiguous that students couldn’t come to the lab. And so what we did was we created a hybrid program where we create labs in a box, and we mail them to the students who create the lab in their house. And so, because fruit flies are safe, the dietary supplements are over the counter. Everything that they research is over the counter. That doesn’t mean it’s safe, but that just means it’s legal for them to investigate,
and so they do all of the research in their homes.

And so all of the initial data collection and analysis is done in a way where we don’t actually need any space, so we also train teachers. We have, I think 32 now Teacher partners, each training about 100 students a year, and so the teachers now we just got an award that I don’t think I’m allowed to say what it is. But it’s really big and exciting. That’s gonna pay for building of Eclose Labs in 10 Philadelphia schools this year. And so now the schools will.
We each have a fully equipped lab, just like the clothes lab for the students to do the work there.

Yeah, so. So and then the other thing we did was make it very inexpensive so dietary supplements don’t cost very much and flies cost almost nothing and so the cost for each participant once is only $15 a kid.

The primary driver of the revenue right now and the fund raising is that universities are sponsoring these programs.
00:42:39.360 --> 00:42:42.738 Everybody sort of wants well trained, underrepresented students to come to their school and so they are paying for us to run the programs for them. Which is, how could it get better right as a partnership like we help you get your students ready and you can get the funding. So that’s how it’s been so far. But yeah, funding is always, you know. Western blots being done in the echoes lab, and I presume that’s a physical lab inside Fox Chase.
No. So the western blots are done by the students who stay in the summer for the independent research. They get matched into the labs. We have too many westerns to do for that to remain feasible, and so last summer we developed a dot blot protocol which I should have put in. They were a little ugly and they weren’t related to the projects I was talking about, but it works. So so you can do Erk, Erk dot blots that give you the same answer that you get on a western and you can do them just by pipetting onto.
a membrane in a high school classroom.

And so, so that’s what we’re sort of doing, actually, we could call it kicking at old school, like how? How do we do things before we could do all these fancy things? And then we’re bringing those back with the idea that the professional labs will then confirm the results. Barb, Yep. So a lot of amazing work and to touch so many lives it’s just very inspirational. It’s sort of like the
NOTE Confidence: 0.966517365714286
00:44:15.210 --> 00:44:18.654 us back to when you started this.
NOTE Confidence: 0.966517365714286
00:44:18.660 --> 00:44:20.828 How did you get the Philadelphia Public
NOTE Confidence: 0.857977362
00:44:20.840 --> 00:44:22.820 Schools to let you in?
NOTE Confidence: 0.86120961111111
00:44:22.850 --> 00:44:24.822 And were there particular
NOTE Confidence: 0.88612096111111
00:44:24.822 --> 00:44:27.287 challenges in the beginning that?
NOTE Confidence: 0.88612096111111
00:44:27.290 --> 00:44:30.783 That if you knew now what you if you knew,
NOTE Confidence: 0.88612096111111
00:44:30.790 --> 00:44:32.300 then what you knew now,
NOTE Confidence: 0.88612096111111
00:44:32.300 --> 00:44:34.576 you would have structured a little
NOTE Confidence: 0.88612096111111
00:44:34.576 --> 00:44:35.428 differently in the beginning.
NOTE Confidence: 0.88612096111111
00:44:35.430 --> 00:44:37.391 Or how did it? How did it get
NOTE Confidence: 0.88612096111111
00:44:37.391 --> 00:44:38.837 off the ground to the scale?
NOTE Confidence: 0.780525136
00:44:39.090 --> 00:44:41.001 Yeah, so it it did end, right?
NOTE Confidence: 0.780525136
00:44:41.001 --> 00:44:42.807 We we started with 15 students.
NOTE Confidence: 0.780525136
00:44:42.810 --> 00:44:44.664 Our initial intention was eight because
NOTE Confidence: 0.780525136
00:44:44.664 --> 00:44:47.302 one of the reasons I went to Fox Chase was
NOTE Confidence: 0.780525136
because they had a high school program.

I participated in a program called Project Success when I was a grad student at Harvard and Ben Neal’s lab. And my student was.

So extraordinarily smart and extraordinarily unprepared.

And so we spent the whole summer doing a lot of stuff. It just became very clear that if a student like her instead of getting dropped into a lab like Ben’s lab had had a training experience ahead of time, so that she would know how to measure, like know what a gram was, that it would be much different.
So I knew that she's now a chief attending at CHOP in Philadelphia. So extraordinary success. And I know her and she has two little kids and it's amazing, but it transformed me a lot more than it did hurt like this is something where I can put this tiny little bit of effort into this and it can change somebody's whole family's life. So I knew that if I ever got a faculty job, I would want to create a training program ahead of time. So our first year we trained 15 students. Most of them were not actually
underrepresented from Philadelphia.

It took us a couple years to figure out that Philly students weren’t applying because they didn’t think they could compete.

With suburban kids, so we created a Philadelphia only section, and since then it’s just been exploding.

And then it’s actually Dara who got into the Philly school system by her connections with teachers.

So she was a teacher in the Philadelphia school system before she was a Community College professor.

And so she just used those connections and we started getting in.

We’re not actually throughout...
the Philadelphia school system,
yet we still partner with individual
the inner City Schools are so
 oppressive to try to get into,
and they don’t have any money.
To pay for STEM so.
So we’ve just accepted that that’s
our responsibility,
and yeah,
so now people at you close are
writing these grants to to make
sure that our Philly students
are our highest priority.
Atlanta can tell us a little more
00:46:46.461 --> 00:46:48.708 about E close. How big is it?
NOTE Confidence: 0.64789415422222

00:46:48.708 --> 00:46:50.250 How many people work there?
NOTE Confidence: 0.64789415422222

00:46:50.250 --> 00:46:52.700 How do they relate to Fox Chase?
NOTE Confidence: 0.67605859375

00:46:53.270 --> 00:46:56.126 So you close is separate from Fox Chase.
NOTE Confidence: 0.67605859375

00:46:56.130 --> 00:46:58.700 It’s a separate nonprofit foxchase.
NOTE Confidence: 0.67605859375

00:46:58.700 --> 00:47:01.420 Like I said is pretty small and so to run
NOTE Confidence: 0.67605859375

00:47:01.489 --> 00:47:04.086 a nationwide program with 10s of thousands
NOTE Confidence: 0.67605859375

00:47:04.086 --> 00:47:06.955 of students a year is not something
NOTE Confidence: 0.67605859375

00:47:06.955 --> 00:47:09.055 that’s that’s within that capacity.
NOTE Confidence: 0.67605859375

00:47:09.060 --> 00:47:11.868 So so we created it as a separate
NOTE Confidence: 0.67605859375

00:47:11.868 --> 00:47:13.449 nonprofit almost our third
NOTE Confidence: 0.67605859375

00:47:13.449 --> 00:47:15.454 year anniversary is coming up.
NOTE Confidence: 0.67605859375

00:47:15.460 --> 00:47:17.672 We have 21 employees,
NOTE Confidence: 0.67605859375

00:47:17.672 --> 00:47:20.990 all of them are part time.
NOTE Confidence: 0.67605859375

00:47:20.990 --> 00:47:22.570 Third of them are instructors.
NOTE Confidence: 0.67605859375

00:47:22.570 --> 00:47:24.358 A third of them are scientific
NOTE Confidence: 0.67605859375
00:47:24.358 --> 00:47:26.488 technicians who build the kits and and
NOTE Confidence: 0.67605859375
00:47:26.488 --> 00:47:28.826 and set up some of the experiments
NOTE Confidence: 0.67605859375
00:47:28.826 --> 00:47:30.710 depending on what the program is,
NOTE Confidence: 0.67605859375
00:47:30.710 --> 00:47:33.968 and then the the rest are.
NOTE Confidence: 0.67605859375
00:47:33.970 --> 00:47:35.420 You know, I’m a volunteer,
NOTE Confidence: 0.67605859375
00:47:35.420 --> 00:47:39.056 so I just said total volunteer.
NOTE Confidence: 0.67605859375
00:47:39.060 --> 00:47:42.340 Yeah, so it’s, uh, we’re in 14 U.S.
NOTE Confidence: 0.67605859375
00:47:42.340 --> 00:47:45.961 states now we have 11 university sponsors,
NOTE Confidence: 0.67605859375
00:47:45.961 --> 00:47:48.996 including seven comprehensive cancer centers,
NOTE Confidence: 0.67605859375
00:47:49.000 --> 00:47:50.664 the American Cancer Society
NOTE Confidence: 0.67605859375
00:47:50.664 --> 00:47:52.328 sponsoring that huge program,
NOTE Confidence: 0.67605859375
00:47:52.330 --> 00:47:54.094 and we have programs ranging all
NOTE Confidence: 0.67605859375
00:47:54.094 --> 00:47:56.306 the way from 5th grade through
NOTE Confidence: 0.67605859375
00:47:56.306 --> 00:47:58.250 through adults interested in
NOTE Confidence: 0.67605859375
00:47:58.250 --> 00:48:00.194 transitioning into biomedical careers.
NOTE Confidence: 0.67605859375

87
So it’s a very rapidly growing thing, and I think the COVID pandemic when nobody could actually do any science.

With you know all of a sudden they’re like, I heard about these people who started this thing, so I’m in the equals lab now.

It’s 500 square feet and it’s you know, we’ll grow as we grow.

There’s a question from the audience from Doctor Rose, so are these other resources to help these young people get into college, and do you
find these issues are barriers?

So we don’t have those resources.

Uhm, like I said, we don’t actually

even have full time employees yet

that that’s something that.

Yeah, I’m not.

I’m not sure that we will get there

because most of our students end

up getting full ride scholarships,

so our biggest sending schools at this

point are University of Pennsylvania,

which has hosted 32 of our senior

level students and I don’t think

any of them has paid and our second

biggest sendings will now is MIT.
We also have a lot of students at Pitt and Drexel and Temple and I don’t think any single one of our students who’ve gone to Temple has not been assigned scholar, which is. For four year scholarship with room and board, the whole 9 yards. And so I think the unusual nature of having this kind of research experience a personal statement that’s talking about how discussing your personal why the person that you did this for and how you are going to bring together all of the interest that you gained from this.
program into creating a project is going to be transformative is pretty. It's pretty well received by. By colleges and universities. So far so so that may be something where there's another nonprofit that's doing that, like providing scholarships and things we would love to partner. Like I said, it closes a hub. We want to kind of drop down the barriers of competition so we don't really. You know, I've had a lot of people in fly land say, oh, we'll just replicate your program.
like that’s great, but now we’re your date is gonna be over there. Our date is what’s the point like why don’t we do this together so so that’s one of the main things we’re working on this year is how to. Collect the data so that if somebody does replicate the program just on their own, how is it that they can contribute to the database so that all of us can, you know, use this kind of screening data for advancement of science. And one of the things that struck me in your talk
00:50:39.217 --> 00:50:41.022 was that you said multiple times
NOTE Confidence: 0.931139047368421

00:50:41.022 --> 00:50:42.948 the students decided to do this,
NOTE Confidence: 0.931139047368421

00:50:42.950 --> 00:50:45.008 that or the other the student
NOTE Confidence: 0.931139047368421

00:50:45.008 --> 00:50:47.040 was interested in this question.
NOTE Confidence: 0.931139047368421

00:50:47.040 --> 00:50:49.230 So essentially none of us gets
NOTE Confidence: 0.931139047368421

00:50:49.230 --> 00:50:51.341 to really choose what we decide
NOTE Confidence: 0.931139047368421

00:50:51.341 --> 00:50:53.497 to do in science all the time.
NOTE Confidence: 0.931139047368421

00:50:53.500 --> 00:50:54.700 You have to have funding.
NOTE Confidence: 0.931139047368421

00:50:54.700 --> 00:50:57.346 It has to be practical and feasible
NOTE Confidence: 0.931139047368421

00:50:57.346 --> 00:51:01.520 and so on. So when a student.
NOTE Confidence: 0.931139047368421

00:51:01.520 --> 00:51:03.040 Their shows interest in something.
NOTE Confidence: 0.931139047368421

00:51:03.040 --> 00:51:05.695 How do you channel them to a lab that
NOTE Confidence: 0.931139047368421

00:51:05.695 --> 00:51:07.989 might actually have the expertise?
NOTE Confidence: 0.931139047368421

00:51:07.990 --> 00:51:09.775 See that you don’t have endless
NOTE Confidence: 0.931139047368421

00:51:09.775 --> 00:51:10.546 labs approx chase
NOTE Confidence: 0.832586933076923
right? So this is our that that's
NOTE Confidence: 0.832586933076923
like our newest newest thing. So the 1st.
NOTE Confidence: 0.832586933076923
Four years, maybe five years of the
NOTE Confidence: 0.832586933076923
F our years, maybe five years of the
NOTE Confidence: 0.832586933076923
Like let’s do EGM perceptor because you know,
NOTE Confidence: 0.832586933076923
we had to figure out how to do it all.
NOTE Confidence: 0.832586933076923
Does the data even mean
NOTE Confidence: 0.832586933076923
anything like thank heavens,
NOTE Confidence: 0.832586933076923
the people counting is really,
NOTE Confidence: 0.832586933076923
really really significant and important.
NOTE Confidence: 0.832586933076923
So, so we spent those five
NOTE Confidence: 0.832586933076923
years just doing my thing.
NOTE Confidence: 0.832586933076923
So in 2017 we started getting
NOTE Confidence: 0.832586933076923
kids bringing in bags of like my
NOTE Confidence: 0.832586933076923
mom’s eating this and then that’s
NOTE Confidence: 0.832586933076923
when that started to change.
And so it’s really only in the past two years where we’re trying to.

Bring together Foxchase faculty who do specific things so we have behaved.

Social behavioral researcher Carolyn Fang, who’s extremely interested in medical mistrust.

Who was more than happy to host Nicole in doing this?

This project that she’s doing and then together we got this small foundation grant for five more students to continue that work.
support them and developing educational interventions specifically designed for the communities of the participating five members? Of that research group, and then Jeff just happened to work on Ferroptosis and we landed on iron and acetaminophen, right? So so far, it’s like coming together. Last summer we had seven students. Everyone from a different cultural background who all were interested in BRCA driven breast cancer. All of them had a family member. We have another group that’s interested in beta thalassemia,
so a number of different again cultural groups that were interested in that.

And so right. This is why.

By the concept of eclose is going to become more and more and more important, especially with university sponsors, because where am I gonna send the kids I’m already way overwhelmed.

Like Oh my gosh,

I can’t think about all of these projects all at the same time, and so that’s what we sort of need.

And so we’re kind of thinking about creating like a fast pitch competition.
That’s a video based thing where every student would like hold up their phone and go.

Oh, and this is the project I’m really excited about. And then the scientists would just go through. You know no more than 30 seconds to a minute pitch and say that student is interested in what I’m interested in. You see what I mean? Like we’re hoping to kind of like change it so that the students actually can go into a lab. That celebrates their interests.
We also forgot to say we have a partnership with Penn Medicine that takes a number of our students each year and they have much bigger capacity.

Wow, that’s an amazing undertaking. The whole thing. But what percent of your time do you spend on this?

Just one last question. Unless Barbara I’m officially allowed to spend one day a week, that’s what I spent.

OK, we won porcian that yeah. Burp. Any closing coming up? You know I, I just want to say again that the creativity and
the way you’ve leveraged what started out as small experiences to. To extend to so many people and also you know. So I know that at Yale, over 50% of our first generation and underrepresented undergraduates when they show up as first years. Say that they want a major in STEM and the attrition is, over 70% of them don’t end up graduating in a stem. Programs or major. So the you know the fact that you are seeing 100% retention in
STEM and that your medical school balance because you know, we're also aware that minority communities are more familiar with the physician as a role model than the scientist. I think those just they said a very high bar for everybody else who works in this space. It's amazing. Well yeah, I mean we, you know we could just help you like that. That's one of the things that we I actually met. Tony Koloski at this huge professors competition that we were both finalists.
there and the goal behind that was to create undergraduate a first year undergraduate semester of doing this. Like doing the program that we designed and so that students wouldn’t go into that weed out class. Because every school has a weed out class which I cannot comprehend right at Temple, which was the partner they say we give them chemistry. We failed 70% out and so why would you recruit students who are already
vulnerable not based on their own fault, but because of the challenges of an inner city public education and then fail them out like that’s basically. You know it’s so unfair it’s basically taking any little tiny step on the rug that you had and yanking it right out. So, so that’s what we would be dreaming of having in the future is to be able to work with each and every school to say what’s the most important research that you’re doing? How do we create interdisciplinary groups to,
you know, have a student who's interested in public health together with a student who's interested in chemistry biology. Do you see what I mean to basically create those kind of program project groups from students as their very first research experience? That's what we really want to do. It's amazing, thank you so much. That was amazing. Incredibly inspiring. Thanks for taking the time to talk to us today. Thanks, thanks everybody. If you have questions, you can find me. Alana Fox Chase.
NOTE Confidence: 0.5825164
00:56:54.380 --> 00:56:56.000 OK.