Thank you all for joining us. It's a real privilege to welcome our new chair of pathology at Yale, Doctor Chen Liu, who joined us on March 1st. So really right into the thick of it. In the short time he's been here, he has collaborated with all of us, particularly in his efforts to champion the testing efforts that were essential in our response to COVID.
Chen received his training in China
NOTE Confidence: 0.889155149459839
received his postgraduate training
NOTE Confidence: 0.889155149459839
at Peking Medical College,
NOTE Confidence: 0.889155149459839
his PhD in pathology at University of
NOTE Confidence: 0.889155149459839
Pennsylvania and most recently had
NOTE Confidence: 0.889155149459839
served as the chair of pathology immunology
NOTE Confidence: 0.889155149459839
and Laboratory Medicine,
NOTE Confidence: 0.889155149459839
as well as the chair of the center
NOTE Confidence: 0.889155149459839
of dermatology at the Robert Wood
NOTE Confidence: 0.889155149459839
Johnson Medical School in New Jersey.
NOTE Confidence: 0.889155149459839
Chen’s career has been focused on the
NOTE Confidence: 0.889155149459839
work in viral hepatitis liver cancer
NOTE Confidence: 0.889155149459839
immunotherapy graph versus host disease,
NOTE Confidence: 0.889155149459839
as well as cancer epigenetics,
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where he’s made important
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contributions in all of these areas.
Really understanding mechanisms of carcinogenesis defining cancer biomarkers and equally importantly developing new therapeutic approaches and we’re really so privileged to have Chen not only as the new chair, but as a member of our Cancer Center, and this really gives us, I think, really great additional expertise and strength among the talent we have here. Thank you very much Charlie, and this really gives us, I think, really great additional expertise and strength among the talent we have here. Thank you very much Charlie,
GI pathologist so I’m actually practicing in the clinical service and I’m also a pretty good mouse pathologist in general, so I think basically I serve as a sort of expert consultant.

So today I would adjust the top one of the you know. You know main research project. And you might laboratory, which is sort of how to divide up how to developer mode. Effective email Sara pay for hyper cellular carcinoma.
OK, so good.

So uh, as you know a better seller cars.

Nobody is very deadly disease.

You know it’s actually really they

will come and you know we have almost

new cases a year globally.

In contrast to many other type of cancers,

you can see it’s almost 80% of those

Mostly theology is a relatively well not.

For instance,

you can see it’s almost 80% of those

cases are caused by two viruses,

hepatitis B and hepatitis C virus is,

and then the other,

so you know it’s a toxin alcohol awesome.
Recently fatty liver disease and some metabolic liver disease. You know all contributed to the etiology of hyper server carcinoma. I think one thing in common is in majority of the cases an there is long standing. Monitor liver disease and then develop chronic. You know hepatitis and also cirrhosis, which is almost like a precancerous condition, and then become my father Cellular Carcinoma because of this uniquely theology and the pathogenesis there at
least two things we can think about.

Why is the best way to eliminate it’s, you know cancer is really with it is emitted, the ideology. So in this case, if you can eliminate hepatitis B, hepatitis C with. Pretty much he limited 80% of the of the cancer, so hepatitis B vaccine has been practice of over multiple decades. I think the data is already show because the incidence of liver cancer indeed has seen trending down in the hepatitis B. Prevalent regions and so the other thing is.
Question is because there is a longstanding process for, you know, from the initial lever insult to the cancer formation is you already talked? We're talking about a 20 to 30 years and then we do have very high risk population, so we know this high risk population, so this provides a window of opportunity for us to develop ball markers or something. Therapeutic interventions. In other words, we can identify the underlying pathogenesis and hopefully we can identify targets. And to intervene to prevent out trade. Now I've had this order carcinoma, so currently you know.
Unfortunately the you know, liver cancer therapy is really behind too many of other solid tumors.

We did not have really big progress. You know, for hyper server carcinoma therapy and there is absolutely unmet need in this cancer, so we were transplantation can be considered as a curatives therapy. If we had identified the tumor earlier and also there is a lever available for their patients, those can be considered cured. Killer and the surgical resection is,
you know,

has been performed by the recurrence is,

you know it’s almost 70% of patients

So overall,

with the typical therapy currently,

you know the three year survival

is still less than 20%.

And, uh, in about a 10 years ago that,

one first therapy was approved,

which is arrive in a, you know.

So resonator is terrorism Chinese

inhibitor and so that only showed moderate

effect in the small number of patients.

And all only the pasta two or three years

we have seen in another momentum which
NOTE Confidence: 0.872145533561707
00:07:38.988 --> 00:07:42.070 is a checkpoint inhibitors role in the
NOTE Confidence: 0.872145533561707
00:07:42.070 --> 00:07:44.230 treatment of other Cellular Carcinoma.
NOTE Confidence: 0.872145533561707
00:07:44.230 --> 00:07:47.840 So we can talk a little bit more about the
NOTE Confidence: 0.872145533561707
00:07:47.929 --> 00:07:51.800 checkpoint inhibitors in nice to feel slides.
NOTE Confidence: 0.872145533561707
00:07:51.800 --> 00:07:52.912 So first of all,
NOTE Confidence: 0.872145533561707
00:07:52.912 --> 00:07:55.050 these are the tires in kind is
NOTE Confidence: 0.872145533561707
00:07:55.050 --> 00:07:57.045 currently being tried and approved
NOTE Confidence: 0.872145533561707
00:07:57.045 --> 00:08:01.524 of tested in hypothetical carcinoma.
NOTE Confidence: 0.872145533561707
00:07:59.340 --> 00:08:01.524 So rifle name wrecker ever made
NOTE Confidence: 0.872145533561707
00:08:01.524 --> 00:08:03.382 neighbor which is basically another
NOTE Confidence: 0.872145533561707
00:08:03.382 --> 00:08:05.416 version of the revenue and then
NOTE Confidence: 0.872145533561707
00:08:05.416 --> 00:08:07.239 the other tools also tested.
NOTE Confidence: 0.872145533561707
00:08:07.240 --> 00:08:10.104 But all of those types and kindness is.
NOTE Confidence: 0.872145533561707
00:08:10.110 --> 00:08:11.900 It’s really more broad inhibitors
NOTE Confidence: 0.872145533561707
00:08:11.900 --> 00:08:13.332 rather than specific target,
NOTE Confidence: 0.872145533561707
so it’s been believed.

You know those kind of.

You know the haters.

But you hate this kinase activity,

and you know inconsequence surprised

play some sort of anti angiogenesis effect so you know we have

actually also shown that you know,

for example, survivor name can also interfere. The mitochondria is in a

particular carcinoma. In other words,

they’re probably multiple mechanism for

the tyrosine kinase mechanism of action.

We have had our cars in them and I would

like to show you this slice and this is a uh,
you know, you know, uh, the slides made by a charmer and Addison, so this tell you, you know how you know the therapy. You can see the chemotherapy, you know this is for cancer as a whole. So one thing you can tell you can see the email server which represented by this green line is, certainly is superior to any other sort of monotherapy. However, if you combine the Indian up check behind it, therapy with more targeted, you know genomically targeted agent,
00:09:27.790 --> 00:09:29.930 you can see dramatic improvement,
NOTE Confidence: 0.853822588920593
00:09:29.930 --> 00:09:32.723 so that’s probably why you know the
NOTE Confidence: 0.853822588920593
00:09:32.723 --> 00:09:35.050 email therapy attract such attention.
NOTE Confidence: 0.853822588920593
00:09:35.050 --> 00:09:37.506 I think as you know over the past
NOTE Confidence: 0.853822588920593
00:09:37.506 --> 00:09:40.389 decade we have been talking a lot about
NOTE Confidence: 0.853822588920593
00:09:40.389 --> 00:09:42.514 the email therapy and particularly
NOTE Confidence: 0.853822588920593
00:09:42.514 --> 00:09:45.484 the clinical application of female
NOTE Confidence: 0.853822588920593
00:09:45.484 --> 00:09:47.860 checkpoint inhibitor really created
NOTE Confidence: 0.853822588920593
00:09:47.860 --> 00:09:50.540 this momentum for cancer therapy.
NOTE Confidence: 0.853822588920593
00:09:50.540 --> 00:09:50.964 Alright,
NOTE Confidence: 0.853822588920593
00:09:50.964 --> 00:10:00.720 so with that background,
NOTE Confidence: 0.853822588920593
00:10:00.720 --> 00:10:03.880 will see you how to look at the liver.
NOTE Confidence: 0.853822588920593
00:10:03.880 --> 00:10:06.548 So what is the unique aspect unique
NOTE Confidence: 0.853822588920593
00:10:06.548 --> 00:10:09.720 aspect of carcinoma?
NOTE Confidence: 0.853822588920593
00:10:09.720 --> 00:10:03.880 So this I have to say we have not much
NOTE Confidence: 0.853822588920593
00:10:03.880 --> 00:10:06.548 understanding on the overall immunology
or you know biology of the liver as well as the hypothetical question.

So we were had. It has been considered as an immunologically tolerant organ, and that means you know there are data shows all the humans. Activity cells actually are eliminate in liver. In other words, in the liver is, well, very well protected. And the dancing in the in deliver, you know you have a wait. There are a lot of energy and presenting cells.
However, there are data shows. Most of the antigen presenting cells actually induced or you know T ara phenotype rather than, activate the cellular immunity and as well as I mentioned earlier majority for the hyper Cellular carcinoma is actually rising from the background of chronic viral infections, hepatitis B, hepatitis C. So this has been known. All has been extensively studied. Long standing chronic very affection, actually rendering T cell exhaustion.
So this is another challenge is we have to think about when we talk about how to develop more effective immunotherapy for Heather Cellular Carcinoma so that you know that. Also HTC, you know it has a very higher expression of PD L1. That's probably why this is, you know how you use anti tumor teazles.
You know you can actually use checkpoint inhibitor to block this interaction between TDLPDL One and 51. The other aspect is there are many regulatory T cells in hypothetical carcinoma. So we have shown you know that there is a higher number of regulatory T cell as well as myeloid derived. The tumors surprise if TS LMDS sees, so those are the challenges we have to consider. And then you know when put all these things together, you know the probably we need to think about the multiple
strategy to really develop a more effective immunotherapy for HTC.

And now you know, staying is more broadly. Currently in clinical application also has been very exciting. Is a checkpoint in Hibbett are you see the impact will check component inhibitors really is acting on multiple spy type of the middle. You know regulation most specifically blocking PDYPTL. Interaction. So the other so you can think about is to really eliminate.
Also at least inhibit regulatory T cell in the cancer, and the other is so more exciting. You know, that’s what I’m going to talk about a little bit more. Is adoptive cell transfer therapy for those adoptive transfer therapy. We really can’t think about Tuesday. Why is non antigen specific, you know? Autologous tiles, for example, in case hours, all tumor infiltrating the emphasize and then the other, emphasize and then the other, is actually another modified version of adoptive cell transfer.
Transfer therapy is engineering T cells, so this will be the CAR T cells. Also, I will spend a little bit of time to. Another thing is, think about if we can identify tumor specific antigens. We can think about is to use to developers. We had done some working in this area so I will show you what we have found. So we had done some working in this area so I will show you what we have found. This is just the introductory slide you know for what we are. You know, you know,
for this audience you probably all very well now what you know, the started for email. Check it. Check Point inhibitor therapy for example is really blocking these two inhibitory pathways under treated as a way to activate the T cells. So for liver cancer, as you know, at least right now I mean this. You know the update is I say
this is updated today. Maybe it will be changed. You know very soon as well, because for right now we have at least three FDA approved. The trackpoint inhibitor is when the pipe and temporal needle and the other one is against the CTLA is I believe mad. So those are three FDA approved and certainly there are many in the pipeline. You see how busy this lies is, you know you see those. Those are the current. In Eagle trials registered away is,
you know, a clinical trial data. And those are the space three trials with all kinds of transforming hitters, so you will notice is the most of the trials actually is looking at the combination therapy, particularly with tyrosine kinase inhibitor also entity. EG Eiffel you hitters as well as the combined with some, you know, a local regional therapy or surgical resection so you can see the estimated releasing date. You know complete, complete, complete completion date. It will be in the next year or two.
We're going to see a lot about you know the results you know related to checkpoint inhibitors for HTC, so this is really exciting part of you know for the in this field right now. So now let me try to talk about a little bit more like other approach which is active investigation by quite a number of groups in the world. So which is really adopted cell transfer, you know, therapy. So for those you know this concept was in the really knew. So the first tumor,
infiltrating lymphocytes, are paid.

As you may know, it was divided decades ago by Rosenberg at NCI.

So in that case you know he isolated tail. Infiltrating lymphocytes for isolated fuel from Melanoma patients and reinfused ourselves back to the patient.

But now over particular, over the past few years, more and more evidence point of the really efficacy of this sort of therapy, and also most recently you can actually, you know culture. Certain cells in X-ray invaluable in Mitchell and stimulative certainty cells,
and to induce so-called settle toxic T cells and then refilled. So cells back to cancer patients. And another is really the innate immune response arm, which is in case else, where Seville’s role in the party at that will check out all the auto kill tumor cells. So there are a lot of attention on empty cells as well, so I will share a little bit of data we
00:17:29.949 --> 00:17:32.355 have written that down within himself
NOTE Confidence: 0.877010703086853
00:17:32.355 --> 00:17:34.895 and of course the excitement coming
NOTE Confidence: 0.877010703086853
00:17:34.895 --> 00:17:38.335 from the engineer T cells which is party.
NOTE Confidence: 0.877010703086853
00:17:38.340 --> 00:17:41.356 So those are we’ll just talk back so.
NOTE Confidence: 0.877010703086853
00:17:41.360 --> 00:17:43.999 So let’s first to look at it.
NOTE Confidence: 0.877010703086853
00:17:44.000 --> 00:17:46.298 This how we can induce more.
NOTE Confidence: 0.877010703086853
00:17:46.300 --> 00:17:47.419 After specific immunity.
NOTE Confidence: 0.877010703086853
00:17:47.419 --> 00:17:47.792 Alright,
NOTE Confidence: 0.877010703086853
00:17:47.792 --> 00:17:50.030 so in this case you know
NOTE Confidence: 0.877010703086853
00:17:50.098 --> 00:17:51.898 you probably won’t find out.
NOTE Confidence: 0.877010703086853
00:17:51.900 --> 00:17:54.210 Is there any tumor antigen or is
NOTE Confidence: 0.877010703086853
00:17:54.210 --> 00:17:56.131 there any specific tumor energy
NOTE Confidence: 0.877010703086853
00:17:56.131 --> 00:17:57.855 you had asserted carcinoma?
NOTE Confidence: 0.877010703086853
00:17:57.860 --> 00:17:58.478 So indeed,
NOTE Confidence: 0.877010703086853
00:17:58.478 --> 00:18:00.641 you know over the years we know
NOTE Confidence: 0.877010703086853
00:18:00.641 --> 00:18:03.257 Alpha fetal protein is one of the
first tumor antigen associated

However with multiple different groups of trying to use Alpha Fetoprotein for email therapy, the results are really mcleese mixed because maybe the Alpha fetal protein is. Really highly expressed in embryo Genesis and also in some other highly proliferating cells, so it’s great it louder challenge so this slide show that you over the years and actually for hyper disorder carcinoma. Fortunately we do with you know
we did find a variable to render gene called glide different three. You can see this is likely country expression. You know fairly specifically Carcinoma So what is great because it’s you know it’s an X chromosome, so it’s highly expressed in the Amber Genesis and stuff you know in adult issue and then re over express in more than 90% of hypothesized personal. So unfortunately we really do not understand the role of the life agents rate at the moment.
I mean I had two graduate student had dedicated their season. Trying to figure out what is the biological role of glycogen 3. After disappointing, you know we have say it looks like the gladness re somehow interact with other growth factor and to create a micro environment on the cell surface and it would direct the downstream safely to regular cell growth. Interestingly enough gladly constraint. And now there is a general like a genetic syndrome which is a Simpson Globby, you know a Homer syndrome.
I have never seen temptation like this is only rated from textbook, so this is a syndrome actually. Is that loss of function of by pigments rate so you can see it in overall if you look at the syndrome it looks like deletions of glycogen straight create some sort of overgrowth. Alright, so this you know that it has been confirmed in the now customize. Look at this. Now customize the embryo is just the much larger than the white type so this is almost the antithesis for us to think about.
If it’s a delight, beacon three can somehow as you know looks like tumor antigen mold, cancer formation but somehow during development is actually typing. Three seems to act as surprising function and to check the development. You know during the. And then if you look at it, overall expression pad network IP gains rate there, it’s really you know, three major organs expressed, blindness Ray and organize. Well, I you know the highest one.
00:20:51.326 --> 00:20:53.439 actually is a play center, right?
NOTE Confidence: 0.816829929749171
00:20:53.439 --> 00:20:55.293 So the play center has highest
NOTE Confidence: 0.816829929749171
00:20:55.293 --> 00:20:56.790 expression of the clapping.
NOTE Confidence: 0.816829929749171
00:20:56.790 --> 00:20:57.436 Answer it,
NOTE Confidence: 0.816829929749171
00:20:57.436 --> 00:21:00.020 but that’s why I think that just last
NOTE Confidence: 0.816829929749171
00:21:00.090 --> 00:21:03.114 month I went to see and Harvey Doctor Harvey,
NOTE Confidence: 0.816829929749171
00:21:03.120 --> 00:21:03.491 Claimant,
NOTE Confidence: 0.816829929749171
00:21:03.491 --> 00:21:06.459 who is really the leading expert in press
NOTE Confidence: 0.816829929749171
00:21:06.459 --> 00:21:09.104 enter here at you and I talked with him.
NOTE Confidence: 0.816829929749171
00:21:09.110 --> 00:21:10.840 So I said, You know?
NOTE Confidence: 0.816829929749171
00:21:10.840 --> 00:21:13.078 Let’s figure out what is it.
NOTE Confidence: 0.816829929749171
00:21:13.080 --> 00:21:13.454 Skype,
NOTE Confidence: 0.816829929749171
00:21:13.454 --> 00:21:16.446 even serious role in place and are right.
NOTE Confidence: 0.816829929749171
00:21:16.450 --> 00:21:18.688 I know what the other organisms,
NOTE Confidence: 0.816829929749171
00:21:18.690 --> 00:21:20.178 fatal liver you see.
NOTE Confidence: 0.816829929749171
00:21:20.178 --> 00:21:21.666 This looks pretty express
and then also fatal lock.
And then I add other tissue.
Long is completely zero expression.
I thought you know like make sure they were tissue.
Now normally they do not express flight.
PS3 but however is expressed in.
Is the you know the email,
his chemistry, you see all the you know,
the cancer cells expressed those things.
You know the proteins on the cell.
membrane and actually this is one.
of the market you know in full.
pathologist will liver pathology.
Sometimes when we question
about whether this is cancer or not, we tend to do email history, chemistry to confirm, you know, to help us to make a diagnosis of hypothesis, elder personal. Alright, so this is also we checked with all the different cancer cell lines, tissues and both at mouse and human. So Interestingly, the mouse, iPad or cellular carcinoma does not express. Could I pick three and only in the humans of different cell lines we have checked and the overexpressed clapping in the normal hypothesize. But does not express, so this is a because of the mouse
had a salad or carcinoma does not express quite happy constraint.

Actually created item vantage for us to create some model to study this date.

Potential human or therapy. Because when we talk about it, we want to do emails Arabic. You can see it so here is, you know,
almost exclusively expressed in HTC and
the same time you can see it is correlation.
It seems to be correlated with worst personalities.
So now, as I mentioned, that has turned to see how we built this model because we have over the years and longer we built this model which is the Bob semis totally immune are committed and then we have this person normal cell like original derived from optimise.
So as I mentioned earlier so this cell line does not express any guy picking three.
So what we did is to overexpress human.
like Bacon three in the mouse outline

and then inoculate through this minus.

And it will see you know whether

we can have a model to test the,

you know anti tumor immunity.

so this is,

For example whenever you introduce this

cell line to the opposite minus you see.

This is why type spleen and then

tumor. Very mouse split.

This is a bother significantly

large sometimes you know obvious

between 3 to 5 four,

so the indicating indeed the
Bobbsey might will see this.

Far into Hypersolar Carcinoma ISO for in the summer.

Hawk trying to Mount immune response, but at the end the tumor wins because within two or three weeks there is. You know, big tumor produce. Either, you know when we do the subq injection or we do the also topically rejection, you can quickly develop this HTC in the box emails and then we look at the worst. The cells in the privacy you know. Certainly we have all the different type of. Salsa peace out most of the T cells, but actually if you will be
further phenotype of those cells, most of those actually there is significant regulatory T cell components and also MD SC components, so indicating so in this box model. Indeed there is email, surprised phenotype and so that’s why the tumor wins and two produces. So we think this probably is very good model for us to look how we can develop a model to test some of the ideas we wanted to detach. ’cause I’m wiser, circular. We want to also think about how
to manipulate the different immune system and to check to see if we can have some more effective and the tumor immunity. So first you know, as I mentioned, the clapping and straight, you know this highly expressed tumors. It’ll specific energy. So when we did that, go in the traditional method that you say, OK, we will just be recreated. Called in and trying to you know, build recombinant protein both in front bacterial from the East, and then use the protein.
As you know energy and to email those mice so this data show you just show you after we immunize those mice, and then we check, you know, we did not really see any significant changes into in terms of humor before and after vaccination, and then we check the cellular immunity and humoral immunity and overall. Conclusion from that is we tried multiple times. If we just inject eclectic and straight to the mice with another really created any, I need two more community in this,
at least in this mouse model. And then we say, you know, you know. Then we check the tumor within our really see any you know, tumor infiltrating emphasize as well. So then we just tested this idea to see how about. You know, we think that different approach. So why I'm proud that we feel is maybe we should think about how to allow the light beacon to guide to the real, you know the immune organs in case like go to the split or go through the lymph node. So one idea we did try,
thought about it is you know, how about we conjugate? Collecting three with lymphocytes so using this chemical I do not try to pronounce it, you know. Basically we conjugated the glide Pickens, reporting with lymphocytes. So that hypothesis hypothesis was to use in the table in full size carry this protein, the energy and the lymphocytes has this natural homing capability and they will go to the right email. Maybe that will excite, you know.
to initiate, and the tumor immunity.

So actually that’s indeed it was the case.

So this is just to show you.

You know we conjugated and emphasize with,

you know, with the protein,

and then we inject, you know,

enjoy the back.

Those info size you know to the mice,

and then we look at the tumor.

You fancy the conjugated what

so you can efficiently surprise

the tumor growth and this will

different treatment protocol.

You can see it’s really time dependent,

and so this is very exciting.

And then we say, OK,
00:28:13.460 --> 00:28:15.357 let’s check it was, you know all
00:28:15.357 --> 00:28:17.479 the cells and different components.
00:28:17.480 --> 00:28:20.522 So this just to show you which acted like.
00:28:20.530 --> 00:28:22.340 This is an ileus part,
00:28:22.340 --> 00:28:24.140 definitely compared to the control,
00:28:24.140 --> 00:28:27.389 you can see a lot of activated T cells.
00:28:27.390 --> 00:28:28.473 More importantly exciting
00:28:28.473 --> 00:28:29.917 is after this congregation.
00:28:29.920 --> 00:28:32.068 Actually we can see the lymphocytes
00:28:32.068 --> 00:28:33.890 actually infiltrated into the tumor.
00:28:33.890 --> 00:28:35.690 So this is a boy.
00:28:35.690 --> 00:28:36.378 We believe.
00:28:36.378 --> 00:28:39.130 This is probably why we you know this
00:28:39.201 --> 00:28:42.146 sortable bikes vaccination approach works.
00:28:42.150 --> 00:28:42.860 So again,
00:28:42.860 --> 00:28:44.990 this is just another different data.
NOTE Confidence: 0.85026603937149
00:28:44.990 --> 00:28:46.904 I you know to show you
NOTE Confidence: 0.85026603937149
00:28:46.904 --> 00:28:48.900 you know how this country,
NOTE Confidence: 0.85026603937149
00:28:48.900 --> 00:28:51.024 you know that just this is
NOTE Confidence: 0.85026603937149
00:28:51.024 --> 00:28:52.086 just demonstrated indeed,
NOTE Confidence: 0.85026603937149
00:28:52.090 --> 00:28:54.183 although the fact that we have seen
NOTE Confidence: 0.85026603937149
00:28:54.183 --> 00:28:56.509 is related to the conjugation between
NOTE Confidence: 0.85026603937149
00:28:56.509 --> 00:29:01.236 the lymphocytes and the collective
NOTE Confidence: 0.85026603937149
00:29:01.236 --> 00:29:03.073 is but anyways summarize this data,
NOTE Confidence: 0.85026603937149
00:29:03.073 --> 00:29:05.071 so we think you know later
NOTE Confidence: 0.85026603937149
00:29:05.071 --> 00:29:07.000 on we actually purified we.
NOTE Confidence: 0.85026603937149
00:29:07.000 --> 00:29:09.840 Initially we just use the total invoice size,
NOTE Confidence: 0.85026603937149
00:29:09.840 --> 00:29:12.720 but now actually we test it’s just isolated.
NOTE Confidence: 0.85026603937149
00:29:12.720 --> 00:29:15.680 These results and it was a tease out,
NOTE Confidence: 0.85026603937149
00:29:15.680 --> 00:29:18.270 so this is a work is ongoing.
So basically is what our working model of our working hypothesis.
We want to continue to try.
That is we are using T cell as a carrier for tumors,
therapeutic vaccine delivery.
So this is where we’re testing
this in hypotheticals.
Normal,
I think there’s a possibility so those
can be become a sort of platform for sell.
You know like you know.
So this is a work I’m going
to get my laboratory.
Now let me you know,
00:29:47.920 --> 00:29:50.773 share it with you or some of the other
NOTE Confidence: 0.85026603937149
00:29:50.773 --> 00:29:53.130 things which will also cellular therapy
NOTE Confidence: 0.85026603937149
00:29:53.130 --> 00:29:55.880 related and this one is the Carty.
NOTE Confidence: 0.85026603937149
00:29:55.880 --> 00:29:57.690 So we didn’t develop find,
NOTE Confidence: 0.85026603937149
00:29:57.690 --> 00:29:59.500 you know the valuable gladness
NOTE Confidence: 0.85026603937149
00:29:59.500 --> 00:30:02.323 So this is just a diagram to
NOTE Confidence: 0.85026603937149
00:30:02.323 --> 00:30:04.641 show you we use the landing
NOTE Confidence: 0.85026603937149
00:30:04.641 --> 00:30:06.881 viral vector and then basically
NOTE Confidence: 0.85026603937149
00:30:06.881 --> 00:30:09.279 created this Jeep 3 car T cells.
NOTE Confidence: 0.85026603937149
00:30:09.280 --> 00:30:12.960 So right now we created both in the T cell.
NOTE Confidence: 0.85026603937149
00:30:12.960 --> 00:30:16.061 Sales and also we you know we
NOTE Confidence: 0.85026603937149
00:30:16.061 --> 00:30:18.266 created this platform using NK
NOTE Confidence: 0.85026603937149
00:30:18.266 --> 00:30:21.003 cells which I will talk a little
NOTE Confidence: 0.85026603937149
00:30:21.003 --> 00:30:24.007 bit more in the next few minutes.
NOTE Confidence: 0.85026603937149
00:30:24.010 --> 00:30:26.140 So those hasn’t been shown.
You know this is another diagram.

Other group also developed this.

They use a different regions.

They’re focusing on the sea.

Turn up the protein and then we decided to focus in on the end terminal because the end terminal may have better access, so this is our party.

We divided both in the lending terminal.

Basically this is also called a third generation that you know a platform.

We divided both in the lending.
virus as well in collaboration with rockers you know, He has a virtual various platform. We actually work together and also make made made this construct in the regional various platform as well. So then you know, testing again, So it seems to work very well. And also we test it in the animals. You know this just show you a different types of satellites and this is actually immortalized hypothesize, set, immortalized levers, allies, developer in my laboratories of.
the basis serve as a control. You can see though. Also the target because this
also the target because this
tells you know does not have the
tells you know does not have the
tells you know the the 1545 cells does
tells you know the the 1545 cells does
not have a clapping’s resort.
not have a clapping’s resort.
There’s no target and the others
There’s no target and the others
you know the commonly used a
you know the commonly used a
you know the commonly used a
commonly used a
commonly used a
cellular carcinoma cell address
cellular carcinoma cell address
cellular carcinoma cell address
themselves and those type 2 so
themselves and those type 2 so
themselves and those type 2 so
show significant killing effect.
show significant killing effect.
show significant killing effect.
So this is this is in cell culture
So this is this is in cell culture
So this is this is in cell culture
and then then we also decided to
and then then we also decided to
and then then we also decided to
introduce it into into animals.
introduce it into into animals.
introduce it into into animals.
And indeed you know they were treated.
And indeed you know they were treated.
Those animals this.

Our volume compared to the controls.

And at the Cardinal applicants repartee.

Indeed, so very effective,

and also lost almost two months.

You know, this is really exciting,

and I think we pretty much feel

very confident in this construct.

you know construct will be actually

certainly eventually will need to bring

this to human trial and to see if this this,

this to human.

So that’s certainly you know need a lot.
Effort and also some other you know funding and that will get this stuff.

So this is a really you know, exciting and also we tested the similar Carty using PDX mouse model because to develop that you know that’s another thing I mentioned earlier.

We are very happy to share with people you know working on hyper disorder carcinoma also. Edit cancers as well.

But we build a multiple PD exercise and over the years not only we have the PDX MI, so we also have the corresponding cell card.

Sterilize so you know,
for you know for both liver cancer, pancreatic cancer, and we also have other tumors PDX as well. So this is just to give allow us in future to developer mode. You know, you know, I would say precision of personal email therapy because this way we can see if we can derive some. More specific hydrogen, and from this particular patient, and then from that platform to build a specific artifice, patients, certainly, that’s what he, what you know in the future. Endeavor for that.
Alright, so the last section of my talk, you know it’s just one share the lights. Turn attention to the you know another inmate. Email cells which is encased in HTC, so you probably ask why we are so interested in today. So if you look at the. The human body. The organ contains the highest numbers in case ours is a liver. If you look at the liver almost 2% of the Leeward nucleated cells are in case of you probably say it’s very, you know, surprised you know.
Actually it’s you know, but it does.
In case I’ll do indeed work is very I.
I would say to say minimum
is poorly understood.
Alright, so however, over the years,
So people already shown
In case files from the hypothetic are
still like compared to the non tumor cells,
they show the empty cells.
Had this dysfunctional in terms,
they have lice killing effect
and this also reached 2013.
Another group also reported this,
but very few later Richard to really show.
It’s a strong evidence.

Say what is it?

The NK cells function in hypo thyroid carcinoma.

Alright, so as I mentioned, it’s a such a big pop.

You know they have more.

In case else that many other lymphocytes in the liver.

So that question is how we can find that was in his house would do in those are the others, you know.

So this is some people also just very reason.

You know shredded.

They were recently recorded.
If you expand the NK cells and then you know you feel so badly in the mouse model, actually expand it out. In case else does precise anti tumor activity in mouse models. So this will be like an invisible experiment. So it’s just indicate you know NK cells after expansion they still maintained. Activity I think that’s a very critical for us to talk about. if we ever wanted to make in case to PSR building platform, we have to make sure the expanded engage cells would hire that function. Right, This is, you know,
a couple years ago and this is also in collaboration with another faculty.
Don’t found in rockers, and so we decided.
Just let’s start, you know, some of the basics of NK cells in HTC.
So what the platform we use so is, you know we had a transplant program there.
So we basically for any HTC transplant fever so will get the tumor and then we will, isolate NK cells from the tumor and isolated.
You know from the adjacent that you know
zone we call the adjacent alone from the,
you know, the Beamer tissue and also isolated the NK cells from the non tumor. You know, like you said, Mount tumor distance period I DS 5 centimeter away from the tumor and we isolate all those NK cells and then we expand it. Also in case cells and that’s all what we do in the same time we get the blood. You know patients per for blood in case else. And then you know to compare with different orders at least. Oh groups and see what’s the function or was the basic plan in case out.
So what do you know?

After we did that so we did quite a number page and yet you know the most common transplant deliveries, hepatitis C liver and also the other, alcohol induced cirrhosis?

And so that’s how we literally focusing on HC deliver an also alcoholic.

So with that will do the functional I say and then we did a lot of irony.

Take try to see you with any changes in those cells and then later out toward you.

Know quantitative PCR to determine certain specific jeans.

So this. All right?
OK, thought to make a Long story short because the timing so I will not get into the killing I see.

So basically what we find is that there are significant differences between all the NK cells we isolated from different liver. So that might be interesting enough. It's TV related liver NK cells and the alcohol related liver cancer. They are also different in terms of function. You know they have light skin activity in alcohol, but how interesting they have even higher connectivity.

HC way.
Which isn’t really surprising to us compared, you know. So we that suspension with it artistic and then you got all the data, but we still have sitting on large amount of data is still waiting to be analyzed, but at least right. The moment I can share, you know this really very fairly recently. Just few months ago with that we actually identify the CD 62 L of course share cell or I also liked. So this has been really significantly changed. You know, between all those different.
So here the summary. We can see really tabley how for whatever reason in NK cells isolated from HC be related. HTC you know the HC way related HTC you actually have a higher expression of selected and. However in the alcohol related NK you have lower expression so all the guys average as a baseline. So it’s really interesting. You know how this dichotomy, which by itself may not be very surprising because the difference is if you look at the Histology.
between the cancers arising from HCV and the cancers arising from Alcohol, the big difference is you know, in the HTV Kaiser or background deliver as well.
You always have the inflammatory activity going on. In other words, you have the inflammatory Emilio within those levers, which in alcohol induced liver which in alcohol induced liver cancer or liver cirrhosis.
You have minimum inflammatory activity. So I think this is sort of a exciting we want.
We are thinking about is right now.

It's really easy to further and you know exactly what's the actual role of the CD 62.

All out selecting the role in this in case sales particularly is, we wanted to see if the inflammatory thing all hepatitis virus itself contribute that to that is different.

So this is our model right now, so this is a working model we are actively pursuing that.

As I mentioned, this summarize with all our current data with NK cells.

What do you see?
The in case are higher expression, what actually they are? Higher higher killing capacity. So those are mainly from the HC way steaming the HTC, right? That’s very interesting. And however, in contrast, the alcohol induced the HTC that will lower CD 62. And also lower kidding capacity. So that’s really, you know. Allow us to think about if we ever do. You know the next step in the future? If we develop a therapy? Maybe this is where if we understand
more about the Rover LCD, you know the CD six tool and we potentially can think about is you know how we can turn this CD6 tool. You know, lower expression one and to get together them to be more active against. HTC in the alcohol siding because of all the HC way. However, I don’t think for this stimulation by CT62 will be good idea, because if they already have a pretty strong in as you know, HC way you know for this way they already have higher. In case our activity and I was also
So we may have to think about if you know what other strategies for HCA induces. So this is a working hypothesis. As I mentioned, we need to do more cases and then to see if we can find something most specific and to treat you know HTC this is the bottom line is I think more and more we see this trend which is the tumor heterogeneity. So we can outline some of the HTC altogether. You know, apparently you know for HTC,
you know differently etiology. It seems like to have very different. Biology, so we thinking about it, developing therapeutic strategy, we have to really think about it. Take that into a consideration. But on the Furthermore, I decide you don’t mention that those two testing that model will be the movie thing. It might be the HDD itself with somehow engage the NK cells. So this is our current very preliminary is out here. We basically culture the HIV positive because we can grow hepatitis C in
those tumor cells and then do code stimulate.

We called priming the NK cells.

You know, in this case we can just use another.

You know the NK cells and testing the targets.

In other words, it’s the priming the monkey cells with hepatitis C.

Indeed, in deals that you know NK cell functionality.

But now the question you know come to the point.
I say even you have a strong confidence and creating activity in iPad.

HC, they induce Apple cider carcinoma somehow. The HCS, you know, take CC is still prevail. So In other words. So maybe this is by itself is not enough, or maybe because remember what we have so far. Test data is all in the individual isolated condition, so this is really coming to the point that there may be some other immune surprising signal type in the micro environment which even in visual you know the NK cells maintain their.
In and out, and as you know anti tumor activity. But however in the surprising micro environment. Those are simply just cannot function, so that's really tell us you know when we deal with HTC is causing by C virus versus you know like a narco. We have to think about differently so this is really, you know, just the game with this idea in a long days and we are actively investigated the possibilities. Alright so I think my time
is almost up and I think. This will be the summary and I will say you know you can see you know this. From both you know, patients and mice, so there is an email response in HTC. That’s good sign. That means that there is engagement between the tumor and then they and ominous. Not in the music thing, so this created opportunity for us to develop an you know; better therapy so that it seems like this email surprising cells are dominant in HD situation and about human patients and also adding.
00:45:00.343 --> 00:45:02.298 models and we demonstrate uniform.

00:45:02.300 --> 00:45:03.320 Our own study.

00:45:03.320 --> 00:45:03.660 Also,

00:45:03.660 --> 00:45:05.700 many other people study also show

00:45:05.764 --> 00:45:07.999 the tumor explanation of specifically

00:45:07.999 --> 00:45:10.628 molasar PewDiePie scene and those car

00:45:10.628 --> 00:45:13.252 T cells in case cells are indeed promising,

00:45:13.260 --> 00:45:14.788 you know, a therapy.

00:45:14.788 --> 00:45:16.316 And as you know.

00:45:16.320 --> 00:45:18.492 Imagine that in the last section

00:45:18.492 --> 00:45:21.525 of other than in case also we see

00:45:21.525 --> 00:45:23.787 the differences between the HC way

00:45:23.861 --> 00:45:26.207 induce the HTC and alcohol induced

00:45:26.207 --> 00:45:29.308 ACC really tell us we have to think

00:45:29.308 --> 00:45:31.600 about a personalized email therapy approach.
We have to really see if we can separate those cancers with you according to their ideology and then see developper you know more effective therapy accordingly.

So now the challenge is, you know, there is another easy to get this done, but I think many are really, you know, not just in the confined within. You know liver cancer. Actually you can have this probably multi other cancers as well. I think this is one area we all need to think about how to do this. So certainly biomarker for getting service absolute liking.
So even though therapy specially but you know we’re making inroads right now. For example, total tumor. Antigen burden, you know. Like the microsatellite instability is, as you know, has something demonstrate you know as a predictive marker for more fighter effective therapy for check me. Hey, better so that’s the right direction. But we still need to think about more specific file markers for different cancers and see how to get everything. And then obviously we almost no. There will be some sort of
00:46:38.092 --> 00:46:39.480 tumor resistant coming out,
NOTE Confidence: 0.856032311916351
00:46:39.480 --> 00:46:41.832 so that’s where you know we need
NOTE Confidence: 0.856032311916351
00:46:41.832 --> 00:46:44.345 to pay attention or be at least
NOTE Confidence: 0.856032311916351
00:46:44.345 --> 00:46:46.135 consider the possibility of the.
NOTE Confidence: 0.856032311916351
00:46:46.140 --> 00:46:48.612 That the veloppement of resistance and
NOTE Confidence: 0.856032311916351
00:46:48.612 --> 00:46:51.070 its potential mechanism that causes high,
NOTE Confidence: 0.856032311916351
00:46:51.070 --> 00:46:51.892 particularly women,
NOTE Confidence: 0.856032311916351
00:46:51.892 --> 00:46:53.947 sing about personalized email therapy.
NOTE Confidence: 0.826214373111725
00:46:53.950 --> 00:46:56.939 We all know that tumor Hitler genetix
NOTE Confidence: 0.826214373111725
00:46:56.939 --> 00:46:58.880 really does dimension as well,
NOTE Confidence: 0.826214373111725
00:46:58.880 --> 00:47:02.504 but and the other is really, you know.
NOTE Confidence: 0.826214373111725
00:47:02.504 --> 00:47:05.480 There is a very active field right now
NOTE Confidence: 0.826214373111725
00:47:05.564 --> 00:47:08.112 is a target and you understand you
NOTE Confidence: 0.826214373111725
00:47:08.112 --> 00:47:10.779 know the new energy income information
NOTE Confidence: 0.826214373111725
00:47:10.779 --> 00:47:13.755 because that you can induce new
NOTE Confidence: 0.826214373111725
00:47:13.755 --> 00:47:15.508 energy through radiation therapy.
Awesome tumor, like original local regional therapy for hyper disorder, carcinoma injecting chemotherapy, agents of radiation, you know, create a new energy and so those new editions probably will be able to serve as a target for us to develop more. Like the potential 80 factor. You know emails are paid approach OK, so with that I would say you know thanks to people who are working in my life in especially houses MD, PhD student, graduate student ID TS. Who did all this in case our work and Frank and layout with the post office.
We did also by tumor vaccine work so have a lot of collaborations tools.

Thanks from you know by you know really the priority institution University of Florida and also ruckers University and especially assigned don’t phone bill who is actually. That they did not email about, you know shared his eyes, speaks parties with us, and also the regional viral vector system to build better effective party and also my long term collaborator animal clinic in the.

Again, you know saying You know the Funding
Agency for support our work over the years so I will stop there. And I welcome questions, ideas from the audience. Thank you.

Thank you all for your attention. A chain thank you and thank you for a terrific talk as well as you know the work you’re doing in this very challenging malignancy and and folks should submit their questions on the chat button. But let me if I may start. Yeah please. You very nicely identify the potential differences in immune response between alcoholic associated legacies as the alcohol associated legacies as opposed to viral.
where given the rise in the role of non alcoholic stay out of the tightest Nash in HTC pathogenesis,

where do you see that aligning compared to the models you now been studying?

Yeah,

so my so that’s that’s a thing.

There are two issues here alright.

So yes, Nash Associated Hypersolar Carcinoma, you know.

But these are epidemiologist study

has seen the rising incidence.

However, in practice we seem very little of those cases,

you know, because you know,
I think that’s the thing, because you know, we use in the liver transplant as our model. You know, we get those sites where it without that issue. I think this is it common. We just do not have a lot of cases. Actually human tissue cases. I would say HTC arising from the Nash patients. To really it was studied in detail, but there are, but they each center. They will have a really a fuel in. The implication is very hard to to do. The study. Second point is you know if
you look at it in terms.

You look at the Histology so the alcohol related cirrhosis probably will have more resembles to the Nash Associated Cirrhosis or carcinogenesis because they both contributed. For example, how alcohol. Induce enough cirrhosis and apparel carcinoma, probably by messing up the metabolic pathway within the liver, right? So that’s the same way you know. Nice related thing. It is basically part of the metabolic syndrome, so I would think if we want to guess,
I will assume those probably more or less related to the alcohol induced the HTC, which is less information. So that's the key difference if. If we look at that issue, you have very little information in Nash or alcohol related liver injury or hepatitis C. You always have this. I'm going chronic inflammation. I think that's the key difference. It was sort of a surprise was may not be a good surprise.
Become actually see the NK cells behavior differently in there supposed to groups. Interest rates are we don’t know, so you know to complete with complete and know that yeah yeah, so a number of our members of audience of submitting questions. I’ll start Marcus bosenberg is asking have you considered making Carty to either hepatitis B virus, hepatitis C virus antigens expressed on the cell surface? So we haven’t because the reason we haven’t you thought we really worry about that kind of therapy as a matter of fact, if you look at the viral
Distribution in the liver, we need, you know you have more very expression in the non tumor cells and tumor cells. You know, for example used in the liver. Sample I haven’t I disappear if you look at the hepatitis B. But you know, engaging expression in both the tumor tissue Anna noun tumor tissue. You tend to have higher expression. In the non tim liver tissue. So we really worry about it. You know you created this type of a target. You probably wipe out the liver instead of locating the tumor cell. So I don’t see those are really
again assumption as part of the reason we haven’t really seen. People reporting are making those hepatitis B or C in a car key yet. Yes, thank you so question from damper chain are the T cell infiltrating cells in the tumor? Are they different from the T cells in the adjacent hepatitis infected liver and related to that would be the effect of immune checkpoint therapy on the background liver vis-a-vis the tumor. If they are different.
Right, so that’s you know, uh, you know greater point, let’s see first so you know, for the first part, so we didn’t have to really look at the overall generic key. Infiltrating the middle size. So we basically we did not sign the whole T cells compared, you know, the tumor and the non tumor liver.

So we really focusing on the NK cells because we decided just focusing on K cells and for different, you know for number reasons I mentioned so we don’t know.
The total tease out difference between humor and the surrounding labor.

In Hep C and also in alcohol cirrhosis.

So that’s what they II you know.

A question is whether or not you know the for this way,

the information you know driven

T cell weather.

You know you will be able to see

you know in the inflammatory

citing and how those are behave,

so we really don’t know at this one.

Her thank you question from

under whose and are asking.

Given the differences in tumor cell

biology and immune micro environment
between HTC of different etiologies, how do you think about modeling these ideologies in animals to more reliably test immunotherapeutic approaches? Yeah, that’s a great point, but I think at this moment I don’t see we have a good model to test that, particularly. You know if you look at the mouse model. You know if you look at the mouse model. I mean we we. Also created hypotheese, transgender demise but we’ve never been able to recapitulate the similar similar pathogenesis. Yes, if you have hepatitis C, you know like a transgenic mice, but somehow you do not have
all the information you would otherwise see in the human model. The reason is when you build a transgenic mice, you basically create this tolerance for the antigen. You know, for example, so that means that the minds of the host will trade that rise. Transgender put in. And as a Nitro, you know, own protein, so we never be able to initiate those kind of inflammatory model. The other model, Israel chemically induced the model. You know,
you know to look at the personal Genesis. It's really not the same as all because in that in those cases you have more liver damage rather than actually information driven. I don't think you know we have really good model to look at the email now. Check on inhibitor. So for that matter, alright, so you know the one we divided the Bobsey Miz will be good to look at the email check only hitter but again in that setting you know.
The difference is we don’t.
There is no hepatitis infection in that system.
We actually trying to get hepatitis C virus windows privacy, HTC and trying to do that, but for some some reason we still cannot. In a, you know, recapitulate the inflammatory response. You know whether you have inflammatory changes in HTC of lice inflammatory.

So again you know like you know just like them, please ask the earlier. So for those you know differences. You know whether you have inflammatory. Changes in HTC of lice inflammatory.
00:56:26.600 --> 00:56:28.827 transition alcohol induced that HTC will
00:56:28.827 --> 00:56:31.018 be when you use trackpoint in Haverhill.
00:56:31.020 --> 00:56:32.082 How they behave?
00:56:32.082 --> 00:56:34.560 We don’t know for whatever the reason.
00:56:34.560 --> 00:56:36.751 If you look at the clinical trial
00:56:36.751 --> 00:56:38.798 they conducted the network T service
00:56:38.798 --> 00:56:40.543 out because actually hoping serving
00:56:40.543 --> 00:56:43.048 as a reviewer when this separated.
00:56:43.050 --> 00:56:44.820 You know some middle ground.
00:56:44.820 --> 00:56:47.263 I say can you tell me can
00:56:47.263 --> 00:56:48.720 you separate this out?
00:56:48.720 --> 00:56:51.544 Can you say alcohol, HTC patient you know?
00:56:51.550 --> 00:56:54.398 And also HC? Wait patience when you use.
00:56:54.400 --> 00:56:55.096 Checkpoint inhibitor,
00:56:55.096 --> 00:56:56.488 do they behave differently?
Out behavior? Say I mean with them.

I mean, I guess probably you know the case number.

Overall, you know you'll still have a relatively fewer numbers of people with alcohol.

HTC I think majority the patient is still like a HC way or HP way related HTC.

I think that's really important because I think that you know.

What you got the checkpoint inhibitor should absolutely considered an I in

in the sighting of Nitro I will say to you know physiological difference

in terms of the path biology,

for example whether or not
they have the indulgence inflammatory milio or macro environment or not I think that could make this huge difference. I think this is actually one of the area I was saying is. We should have really look at the difference between the two groups for tumors and when we use the checkpoint inhibitor that we can probably learn a lot because one, as I said, almost no information. The others has a lot of information. Yeah I need to see more data on that. Yeah and last question
00:58:04.516 --> 00:58:07.373 from Jeff Score is DPC three
NOTE Confidence: 0.865558862686157
00:58:07.373 --> 00:58:09.437 expressed in Cholangio Carcinoma?
NOTE Confidence: 0.865558862686157
00:58:09.440 --> 00:58:12.632 And what about cells and HTC
NOTE Confidence: 0.865558862686157
00:58:12.632 --> 00:58:14.228 that show cholangiocarcinoma
NOTE Confidence: 0.865558862686157
00:58:14.228 --> 00:58:17.128 differentiation? As a feature of
NOTE Confidence: 0.773542881011963
00:58:17.130 --> 00:58:18.770 HTC. No, it doesn’t.
NOTE Confidence: 0.773542881011963
00:58:18.770 --> 00:58:21.902 You know a guy picking 3 does
NOTE Confidence: 0.773542881011963
00:58:21.902 --> 00:58:24.787 not express in Columbia Personal.
NOTE Confidence: 0.773542881011963
00:58:24.790 --> 00:58:27.769 And when you know with the mic style tumor,
NOTE Confidence: 0.773542881011963
00:58:27.770 --> 00:58:29.756 you know we call it the.
NOTE Confidence: 0.773542881011963
00:58:29.760 --> 00:58:32.400 You know, the mix type 2 in both.
NOTE Confidence: 0.773542881011963
00:58:32.400 --> 00:58:33.724 So you have hypercellular
NOTE Confidence: 0.773542881011963
00:58:33.724 --> 00:58:34.717 at Michelangelo Carcinoma.
NOTE Confidence: 0.773542881011963
00:58:34.720 --> 00:58:35.917 In that exciting?
NOTE Confidence: 0.773542881011963
00:58:35.917 --> 00:58:37.912 Yes, some other hypercellular carcinoma
NOTE Confidence: 0.773542881011963
00:58:37.912 --> 00:58:39.951 can be staying for clapping and
three so I have to say that I think this is we haven’t done that yet. So this is all this idea to the audience you know.

So in the later literature they have demonstrated by email his chemistry they have seen like a certain percentage of prostate cancer. Breast cancer colon cancer also expressed like if we say 10 between 5 to 10% of those cancers also expressed clapping and three right so those are in the literature.

Those really any doctor type of report out there.
We never look at it ourselves, but for some of you know anybody you know. You know if you are interested in that, it may be you know you can look into some of those. I mean, it’s not surprising that guy pick once we also exploiting some tumors. Because this is just one of those, you know. Amber Amber, Genesis type of property got re express and in the in cancer. So just through this information Thank you, that was really a superb talk and we’re so fortunate now to have you as a member of our cancer.
Centers are welcome and we look forward.