WEBVTT

NOTE duration:"00:58:26"

NOTE recognizability:0.770

NOTE language:en-us

NOTE Confidence: 0.634726308333333

00:00:00.000 --> 00:00:02.400 New Cancer Center grand rounds and

NOTE Confidence: 0.634726308333333

00:00:02.400 --> 00:00:05.424 actually we have a really interesting

NOTE Confidence: 0.634726308333333

00:00:05.424 --> 00:00:06.944 thematic presentations today,

NOTE Confidence: 0.634726308333333

00:00:06.944 --> 00:00:10.493 which is two of our faculty who

NOTE Confidence: 0.634726308333333

00:00:10.493 --> 00:00:13.007 are focused on imaging technologies

NOTE Confidence: 0.634726308333333

00:00:13.007 --> 00:00:17.324 in a way that I think is going to

NOTE Confidence: 0.634726308333333

00:00:17.324 --> 00:00:19.140 provide important insights into.

NOTE Confidence: 0.634726308333333

00:00:19.140 --> 00:00:21.040 Not only neuroscience but most

NOTE Confidence: 0.634726308333333

00:00:21.040 --> 00:00:22.560 specifically in brain tumors,

NOTE Confidence: 0.634726308333333

00:00:22.560 --> 00:00:25.008 and obviously for a disease like

NOTE Confidence: 0.634726308333333

00:00:25.008 --> 00:00:26.640 that novel imaging studies,

NOTE Confidence: 0.634726308333333

00:00:26.640 --> 00:00:29.448 I think are critical for true

NOTE Confidence: 0.634726308333333

00:00:29.448 --> 00:00:31.320 human in vivo research.

NOTE Confidence: 0.634726308333333

00:00:31.320 --> 00:00:33.588 Soum without further ado,

NOTE Confidence: 0.634726308333333

00:00:33.588 --> 00:00:36.990 let me introduce our first speaker,

NOTE Confidence: 0.634726308333333

00:00:36.990 --> 00:00:40.189 Doctor Jason Kai is an assistant professor

NOTE Confidence: 0.634726308333333

00:00:40.189 --> 00:00:43.110 of radiology and biomedical imaging.

NOTE Confidence: 0.634726308333333

00:00:43.110 --> 00:00:45.195 Jason did his postdoctoral work

NOTE Confidence: 0.634726308333333

00:00:45.195 --> 00:00:47.280 at University of Pittsburgh and

NOTE Confidence: 0.634726308333333

00:00:47.348 --> 00:00:49.070 then ultimately recruited.

NOTE Confidence: 0.634726308333333

00:00:49.070 --> 00:00:51.716 TL to be an assistant professor

NOTE Confidence: 0.634726308333333

00:00:51.716 --> 00:00:54.587 and his research group is focused

NOTE Confidence: 0.634726308333333

00:00:54.587 --> 00:00:57.132 on developing novel approaches of

NOTE Confidence: 0.634726308333333

00:00:57.132 --> 00:00:59.578 PET imaging for drug development,

NOTE Confidence: 0.634726308333333

00:00:59.578 --> 00:01:02.434 as well as the investigation of

NOTE Confidence: 0.634726308333333

00:01:02.440 --> 00:01:05.330 neurologic disorders and brain tumors.

NOTE Confidence: 0.634726308333333

00:01:05.330 --> 00:01:07.280 Jason received the bursts in

NOTE Confidence: 0.634726308333333

00:01:07.280 --> 00:01:09.726 Yellow award for his original work

NOTE Confidence: 0.634726308333333

00:01:09.726 --> 00:01:10.989 in nuclear medicine,

NOTE Confidence: 0.634726308333333

00:01:10.990 --> 00:01:12.730 and also the Arch of Foundation

NOTE Confidence: 0.634726308333333

00:01:12.730 --> 00:01:13.310 Research Award,

NOTE Confidence: 0.634726308333333

00:01:13.310 --> 00:01:15.755 which force which advances his

NOTE Confidence: 0.634726308333333

00:01:15.755 --> 00:01:17.711 novel research in neuroscience

NOTE Confidence: 0.634726308333333

00:01:17.711 --> 00:01:19.640 and Jason welcome and.

NOTE Confidence: 0.634726308333333

00:01:19.640 --> 00:01:22.118 Looking forward to your hearing about

NOTE Confidence: 0.634726308333333

00:01:22.118 --> 00:01:24.879 your work in brain tumor imaging.

NOTE Confidence: 0.634726308333333

00:01:24.880 --> 00:01:25.170 Thank

NOTE Confidence: 0.892233856666667

00:01:25.180 --> 00:01:29.014 you, thank you. Action so I'm

NOTE Confidence: 0.892233856666667

00:01:29.014 --> 00:01:32.270 gonna share my screen. OK.

NOTE Confidence: 0.482518762333333

00:01:37.330 --> 00:01:38.128 Here we go.

NOTE Confidence: 0.672631086

00:01:40.950 --> 00:01:42.300 Alright, are you looking at

NOTE Confidence: 0.631243223333333

00:01:42.310 --> 00:01:46.000 the right screen? Yes. OK, great.

NOTE Confidence: 0.770314362

00:01:47.380 --> 00:01:49.372 I'm very excited to be here

NOTE Confidence: 0.770314362

00:01:49.372 --> 00:01:51.547 to talk about our research in

NOTE Confidence: 0.770314362

00:01:51.547 --> 00:01:53.700 the context of cancer imaging.

NOTE Confidence: 0.770314362

00:01:53.700 --> 00:01:55.825 So our life, you know,

NOTE Confidence: 0.770314362

00:01:55.825 --> 00:01:58.252 spend a lot of time working on

NOTE Confidence: 0.770314362

00:01:58.252 --> 00:01:59.620 neuroimaging and tensor imaging.

NOTE Confidence: 0.770314362

00:01:59.620 --> 00:02:03.576 So neurology is a virtually

NOTE Confidence: 0.770314362

00:02:03.576 --> 00:02:06.590 crosstalk between these two fields.

NOTE Confidence: 0.770314362

00:02:06.590 --> 00:02:08.945 So I'll be introduce introduce

NOTE Confidence: 0.770314362

00:02:08.945 --> 00:02:11.300 in pet imaging very quickly.

NOTE Confidence: 0.770314362

00:02:11.300 --> 00:02:14.184 A little bit of a brain tumor.

NOTE Confidence: 0.770314362

00:02:14.190 --> 00:02:17.592 I believe Rene is going to talk about

NOTE Confidence: 0.770314362

00:02:17.592 --> 00:02:20.750 that like in more details in the next talk.

NOTE Confidence: 0.770314362

00:02:20.750 --> 00:02:23.220 And next I will talk about some

NOTE Confidence: 0.770314362

00:02:23.220 --> 00:02:24.990 some of the radio pharmaceuticals

NOTE Confidence: 0.770314362

00:02:24.990 --> 00:02:27.706 or pet users that are commonly used

NOTE Confidence: 0.770314362

00:02:27.710 --> 00:02:30.830 in clinical research or clinical

NOTE Confidence: 0.770314362

00:02:30.830 --> 00:02:34.410 management of brain tumors using pads.

NOTE Confidence: 0.770314362

00:02:34.410 --> 00:02:35.112 And lastly,

NOTE Confidence: 0.770314362

00:02:35.112 --> 00:02:37.569 talk about some of the new targets.

NOTE Confidence: 0.770314362

00:02:37.570 --> 00:02:39.720 For Brent tumor imaging,

NOTE Confidence: 0.770314362

00:02:39.720 --> 00:02:41.748 which are not specifically

NOTE Confidence: 0.770314362

00:02:41.748 --> 00:02:44.283 interested in us for us,

NOTE Confidence: 0.770314362

00:02:44.290 --> 00:02:46.530 you know as research lab.

NOTE Confidence: 0.770314362

00:02:46.530 --> 00:02:48.546 So first blue bus stoma is fatal

NOTE Confidence: 0.770314362

00:02:48.546 --> 00:02:50.424 disease with less than 10% of

NOTE Confidence: 0.770314362

00:02:50.424 --> 00:02:52.894 patients surviving five years after

NOTE Confidence: 0.770314362

00:02:52.894 --> 00:02:54.870 initial diagnosis and treatment,

NOTE Confidence: 0.770314362

00:02:54.870 --> 00:02:58.314 and 15% of all parental merge and

NOTE Confidence: 0.770314362

00:02:58.314 --> 00:03:02.200 half of the ugly omas is glioblastoma,

NOTE Confidence: 0.770314362

00:03:02.200 --> 00:03:05.475 there's still no early detection

NOTE Confidence: 0.770314362

00:03:05.475 --> 00:03:07.575 method available, so.

NOTE Confidence: 0.770314362

00:03:07.575 --> 00:03:10.780 No people in this world you are

NOTE Confidence: 0.770314362

00:03:10.780 --> 00:03:13.744 calling for new and better imaging

NOTE Confidence: 0.770314362

00:03:13.744 --> 00:03:16.080 measures manage this disease.

NOTE Confidence: 0.582865496666667

00:03:18.110 --> 00:03:22.058 So pat imaging. In a shell composed

NOTE Confidence: 0.6369722075

00:03:22.100 --> 00:03:23.264 US 4 components.

NOTE Confidence: 0.6369722075

00:03:23.264 --> 00:03:26.573 So first we need to have a pet

NOTE Confidence: 0.6369722075

00:03:26.573 --> 00:03:29.435 scanner to detect all the packs

NOTE Confidence: 0.6369722075

00:03:29.435 --> 00:03:31.933 signals and 2nd we need to have a

NOTE Confidence: 0.6369722075

00:03:31.933 --> 00:03:34.689 patch razor or pet radiopharmaceuticals.

NOTE Confidence: 0.6369722075

00:03:34.690 --> 00:03:36.955 We call it patch razor because we

NOTE Confidence: 0.6369722075

00:03:36.955 --> 00:03:39.090 read missed the turn of very small

NOTE Confidence: 0.6369722075

00:03:39.090 --> 00:03:41.130 amount of radiopharmaceuticals.

NOTE Confidence: 0.6369722075

00:03:41.130 --> 00:03:43.450 The trace amounts and also

NOTE Confidence: 0.6369722075

00:03:43.450 --> 00:03:45.770 because those molecules tend to

NOTE Confidence: 0.6369722075

00:03:45.850 --> 00:03:48.370 be tracing the biological process

NOTE Confidence: 0.6369722075

00:03:48.370 --> 00:03:50.890 or receptor protein and then.

NOTE Confidence: 0.6369722075

00:03:50.890 --> 00:03:54.446 So it's patches are for for each.

NOTE Confidence: 0.6369722075

00:03:54.450 --> 00:03:57.124 And next we need to have a quantification

NOTE Confidence: 0.6369722075

00:03:57.124 --> 00:03:59.126 managers mathematical models to generate

NOTE Confidence: 0.6369722075

00:03:59.126 --> 00:04:01.796 physiological parameters on this path.

NOTE Confidence: 0.6369722075

00:04:01.796 --> 00:04:04.687 Imaging studies and the last and most

NOTE Confidence: 0.6369722075

00:04:04.687 --> 00:04:07.458 important component is in clinical impact.

NOTE Confidence: 0.6369722075

00:04:07.460 --> 00:04:10.512 So this is up to nuclear physicians

NOTE Confidence: 0.6369722075

00:04:10.512 --> 00:04:13.480 to how to use these tools.

NOTE Confidence: 0.6369722075

00:04:13.480 --> 00:04:15.160 The combination of the scanner,

NOTE Confidence: 0.6369722075

00:04:15.160 --> 00:04:16.928 patch tracer and quantification

NOTE Confidence: 0.6369722075

00:04:16.928 --> 00:04:19.580 measures to make an impact in

NOTE Confidence: 0.6369722075

00:04:19.660 --> 00:04:21.908 patient and disease management.

NOTE Confidence: 0.639889024

00:04:25.220 --> 00:04:28.252 So we just published a mini review on

NOTE Confidence: 0.639889024

00:04:28.252 --> 00:04:30.712 the current video pharmaceuticals or

NOTE Confidence: 0.639889024

00:04:30.712 --> 00:04:33.752 patterns in brain tumor. This year,

NOTE Confidence: 0.639889024

00:04:33.752 --> 00:04:36.804 so this talk is mainly around this.

NOTE Confidence: 0.639889024

00:04:36.810 --> 00:04:40.830 Same from this review.

NOTE Confidence: 0.639889024

00:04:40.830 --> 00:04:42.665 So first the most classic

NOTE Confidence: 0.639889024

00:04:42.665 --> 00:04:44.500 patches are used for brain.

NOTE Confidence: 0.639889024

00:04:44.500 --> 00:04:47.850 Tumor is obviously a glucose

NOTE Confidence: 0.639889024

00:04:47.850 --> 00:04:51.216 and called effed floral deoxy

NOTE Confidence: 0.639889024

00:04:51.216 --> 00:04:54.618 glucose and 1st application of

NOTE Confidence: 0.639889024

00:04:54.618 --> 00:04:59.102 EFG happen to be in brain tumor.

NOTE Confidence: 0.639889024

00:04:59.102 --> 00:05:02.300 That's back in 1982.

NOTE Confidence: 0.639889024

00:05:02.300 --> 00:05:06.430 Parties several case reports actually.

NOTE Confidence: 0.639889024

00:05:06.430 --> 00:05:08.406 As you can see from the image here,

NOTE Confidence: 0.639889024

00:05:08.410 --> 00:05:11.362 the 1st and 2nd are contrasting

NOTE Confidence: 0.639889024

00:05:11.362 --> 00:05:14.139 Hung City images and you can

NOTE Confidence: 0.639889024

00:05:14.139 --> 00:05:17.238 see the the brain tumor mass.

NOTE Confidence: 0.639889024

00:05:17.240 --> 00:05:18.904 Indicated by enhanced mass.

NOTE Confidence: 0.639889024

00:05:18.904 --> 00:05:20.568 By this contrast city.

NOTE Confidence: 0.47784661246

00:05:23.380 --> 00:05:25.060 And also from the patch

NOTE Confidence: 0.47784661246

00:05:25.060 --> 00:05:26.740 you actually see a hypo.

NOTE Confidence: 0.855454168

00:05:30.300 --> 00:05:33.030 Because this happened to be a low

NOTE Confidence: 0.855454168

00:05:33.030 --> 00:05:36.078 grade brain tumors and later after

NOTE Confidence: 0.855454168

00:05:36.078 --> 00:05:38.890 after approved in 1997 and as

NOTE Confidence: 0.855454168

00:05:38.890 --> 00:05:41.060 you can see at the earliest time,

NOTE Confidence: 0.855454168

00:05:41.060 --> 00:05:42.735 the pass scanner has very

NOTE Confidence: 0.855454168

00:05:42.735 --> 00:05:43.740 low spatial resolution,

NOTE Confidence: 0.855454168

00:05:43.740 --> 00:05:46.820 is about 1.7 centimeter resolution

NOTE Confidence: 0.855454168

00:05:46.820 --> 00:05:49.016 and now we have dedicated brain

NOTE Confidence: 0.855454168

00:05:49.016 --> 00:05:52.239 PET scanners up with up to one or

NOTE Confidence: 0.855454168

00:05:52.239 --> 00:05:53.927 two millimeters spatial resolution.

NOTE Confidence: 0.557064715833333

00:05:56.300 --> 00:05:58.688 So after G as you see,

NOTE Confidence: 0.557064715833333

00:05:58.690 --> 00:06:02.098 it has a high background in the brain

NOTE Confidence: 0.557064715833333

00:06:02.098 --> 00:06:05.337 because the brain uses sugar as it's

NOTE Confidence: 0.557064715833333

00:06:05.337 --> 00:06:08.340 a major metabolism or energy source.

NOTE Confidence: 0.557064715833333

00:06:08.340 --> 00:06:10.686 You can see from the green

NOTE Confidence: 0.557064715833333

00:06:10.686 --> 00:06:11.859 matter higher uptake.

NOTE Confidence: 0.557064715833333

00:06:11.860 --> 00:06:15.248 Well I lower, but after you still

NOTE Confidence: 0.557064715833333

00:06:15.248 --> 00:06:18.041 useful for grading gliomas because

NOTE Confidence: 0.557064715833333

00:06:18.041 --> 00:06:22.402 for low grade or benign gliomas usea

NOTE Confidence: 0.557064715833333

00:06:22.402 --> 00:06:24.711 hypometabolism you have lower uptake

NOTE Confidence: 0.557064715833333

00:06:24.711 --> 00:06:26.959 in the brain region in the brain tumor

NOTE Confidence: 0.557064715833333

00:06:26.959 --> 00:06:28.817 region relative to the Gray matter,

NOTE Confidence: 0.557064715833333

00:06:28.820 --> 00:06:32.761 while at higher grade gliomas you have

NOTE Confidence: 0.557064715833333

00:06:32.761 --> 00:06:36.008 a higher optic for which is higher

NOTE Confidence: 0.557064715833333

00:06:36.008 --> 00:06:39.978 than Gray matter and white matter.

NOTE Confidence: 0.557064715833333

00:06:39.980 --> 00:06:41.988 With a global stoma,

NOTE Confidence: 0.557064715833333

00:06:41.988 --> 00:06:45.708 you can have even higher and also you can.

NOTE Confidence: 0.557064715833333

00:06:45.708 --> 00:06:47.726 You can see there's microsys

NOTE Confidence: 0.557064715833333

00:06:47.726 --> 00:06:51.597 car in the center of the tumor.

NOTE Confidence: 0.557064715833333

00:06:51.600 --> 00:06:54.222 So based on paper published in 1995,

NOTE Confidence: 0.557064715833333

00:06:54.222 --> 00:06:57.474 there's a cut off level for

NOTE Confidence: 0.557064715833333

00:06:57.480 --> 00:06:59.640 differentiating low grade from

NOTE Confidence: 0.557064715833333

00:06:59.640 --> 00:07:03.384 high grade glioma which is 1.5 for

NOTE Confidence: 0.557064715833333

00:07:03.384 --> 00:07:06.233 tumor to white matter and one zero

NOTE Confidence: 0.557064715833333

00:07:06.233 --> 00:07:09.450 point 6 for tumor to cortex ratio.

NOTE Confidence: 0.557064715833333

00:07:09.450 --> 00:07:11.580 Nowadays, because of the, uh,

NOTE Confidence: 0.557064715833333

00:07:11.580 --> 00:07:15.192 the fusion of pet with anatomical

NOTE Confidence: 0.557064715833333

00:07:15.192 --> 00:07:17.600 radiological imaging methods such

NOTE Confidence: 0.557064715833333

00:07:17.692 --> 00:07:20.339 as the city and actually you can

NOTE Confidence: 0.557064715833333

00:07:20.339 --> 00:07:22.911 use a contrast enhance and topical

NOTE Confidence: 0.557064715833333

00:07:22.911 --> 00:07:25.317 modalities to define the region of

NOTE Confidence: 0.557064715833333

00:07:25.317 --> 00:07:27.872 interest for the tumor to better

NOTE Confidence: 0.557064715833333

00:07:27.872 --> 00:07:29.756 quantify the FDG uptake.

NOTE Confidence: 0.703443634444444

00:07:32.130 --> 00:07:35.076 So because of the high background

NOTE Confidence: 0.703443634444444

00:07:35.076 --> 00:07:38.202 of sugar analogs, so people in this

NOTE Confidence: 0.703443634444444

00:07:38.202 --> 00:07:41.286 field have been calling for a pet

NOTE Confidence: 0.703443634444444

00:07:41.286 --> 00:07:45.820 imaging agents with lower burn uptake.

NOTE Confidence: 0.703443634444444

00:07:45.820 --> 00:07:48.484 So that turned out to be a amino acids,

NOTE Confidence: 0.703443634444444

00:07:48.490 --> 00:07:51.717 so amino acid analogues tend to have

NOTE Confidence: 0.703443634444444

00:07:51.717 --> 00:07:55.149 lower uptick in healthy brain tissues,

NOTE Confidence: 0.703443634444444

00:07:55.150 --> 00:07:57.975 while higher uptake in tumors

NOTE Confidence: 0.703443634444444

00:07:57.975 --> 00:08:00.235 because tumor cells overexpress.

NOTE Confidence: 0.703443634444444

00:08:00.240 --> 00:08:03.628 I mean, I'll type amino acid transporters.

NOTE Confidence: 0.703443634444444

00:08:03.630 --> 00:08:08.460 So the most advanced of C arguably

NOTE Confidence: 0.703443634444444

00:08:08.460 --> 00:08:11.869 is a missile in its carbon 11,

NOTE Confidence: 0.703443634444444

00:08:11.870 --> 00:08:13.361 labeled my selling,

NOTE Confidence: 0.703443634444444

00:08:13.361 --> 00:08:17.312 so this is essential amino acids that are

NOTE Confidence: 0.703443634444444

00:08:17.312 --> 00:08:20.758 taken by tumor cells while its uptake

NOTE Confidence: 0.703443634444444

00:08:20.758 --> 00:08:24.991 in healthy tissues or cells are limited.

NOTE Confidence: 0.703443634444444

00:08:24.991 --> 00:08:28.477 So it's useful in the clinic

NOTE Confidence: 0.703443634444444

00:08:28.477 --> 00:08:31.546 clinic to distinguish a tumor

NOTE Confidence: 0.703443634444444

00:08:31.546 --> 00:08:34.198 progression from radio necrosis.

NOTE Confidence: 0.703443634444444

00:08:34.200 --> 00:08:36.615 For example, in this in this case,

NOTE Confidence: 0.703443634444444

00:08:36.620 --> 00:08:38.428 from the anatomical images,

NOTE Confidence: 0.703443634444444

00:08:38.428 --> 00:08:40.688 it's it's pretty hard to

NOTE Confidence: 0.703443634444444

00:08:40.688 --> 00:08:42.338 distinguish these two cases,

NOTE Confidence: 0.703443634444444

00:08:42.340 --> 00:08:45.352 but from my selling is also

NOTE Confidence: 0.703443634444444

00:08:45.352 --> 00:08:47.880 called Matt from Matt Pat.

NOTE Confidence: 0.703443634444444

00:08:47.880 --> 00:08:50.659 You can easily tell the top cases

NOTE Confidence: 0.703443634444444

00:08:50.659 --> 00:08:52.683 a tumor progression while the

NOTE Confidence: 0.703443634444444

00:08:52.683 --> 00:08:55.270 bottom case is actually a radio.

NOTE Confidence: 0.703443634444444

00:08:55.270 --> 00:08:55.980 This.

NOTE Confidence: 0.716899157142857

00:08:59.240 --> 00:09:02.418 So besides, I mean the acid pat.

NOTE Confidence: 0.716899157142857

00:09:02.420 --> 00:09:06.090 There's also imaging agents derived

NOTE Confidence: 0.716899157142857

00:09:06.090 --> 00:09:09.760 from nuclear sites because nucleotides

NOTE Confidence: 0.716899157142857

00:09:09.861 --> 00:09:12.536 are used for DNA synthesis.

NOTE Confidence: 0.716899157142857

00:09:12.540 --> 00:09:15.739 And it's up taken into the tumor

NOTE Confidence: 0.716899157142857

00:09:15.739 --> 00:09:17.572 cells through, for example,

NOTE Confidence: 0.716899157142857

00:09:17.572 --> 00:09:21.000 this is a floral submitting I freaking

NOTE Confidence: 0.716899157142857

00:09:21.000 --> 00:09:24.087 labeled for submitting is a nuclear

NOTE Confidence: 0.716899157142857

00:09:24.087 --> 00:09:27.636 size up taken into cells by submitting

NOTE Confidence: 0.716899157142857

00:09:27.636 --> 00:09:30.879 kindness 1 and submitting kindness.

NOTE Confidence: 0.716899157142857

00:09:30.880 --> 00:09:34.759 One is over twice during the in the tumor

NOTE Confidence: 0.716899157142857

00:09:34.759 --> 00:09:38.476 cell because some of the DNA synthesis.

NOTE Confidence: 0.716899157142857

00:09:38.480 --> 00:09:41.190 Sides are involved in general

NOTE Confidence: 0.716899157142857

00:09:41.190 --> 00:09:42.816 in cellular proliferation,

NOTE Confidence: 0.716899157142857

00:09:42.820 --> 00:09:46.010 and they can correlate.

NOTE Confidence: 0.716899157142857

00:09:46.010 --> 00:09:49.310 Histological grade of brain tumors and

NOTE Confidence: 0.716899157142857

00:09:49.310 --> 00:09:52.673 its accumulation also correlates with

NOTE Confidence: 0.716899157142857

00:09:52.673 --> 00:09:55.979 the activity of summoning Chinese one.

NOTE Confidence: 0.716899157142857

00:09:55.980 --> 00:09:59.436 And it's a ideal tracer for

NOTE Confidence: 0.716899157142857

00:09:59.436 --> 00:10:01.164 imaging tumor proliferation.

NOTE Confidence: 0.716899157142857

00:10:01.170 --> 00:10:03.698 But also, but also because I felt is

NOTE Confidence: 0.716899157142857

00:10:03.698 --> 00:10:06.009 not actually it's not brain penetrant.

NOTE Confidence: 0.716899157142857

00:10:06.010 --> 00:10:08.980 It doesn't cross blood brain barrier.

NOTE Confidence: 0.716899157142857

00:10:08.980 --> 00:10:11.788 So in order to have any signal up take

NOTE Confidence: 0.716899157142857

00:10:11.788 --> 00:10:14.830 the tumors, BBB needs to be compromised.

NOTE Confidence: 0.716899157142857

00:10:14.830 --> 00:10:17.368 So it's not suitable for our

NOTE Confidence: 0.716899157142857

00:10:17.368 --> 00:10:20.520 lower create imaging.

NOTE Confidence: 0.716899157142857

00:10:20.520 --> 00:10:22.284 But nevertheless, it's it's.

NOTE Confidence: 0.716899157142857

00:10:22.284 --> 00:10:26.520 It's has its role in the tumor imaging pad.

NOTE Confidence: 0.716899157142857

00:10:26.520 --> 00:10:29.535 So from this case you can see the contrast

NOTE Confidence: 0.716899157142857

00:10:29.535 --> 00:10:31.877 getting contrast enhanced MRI images,

NOTE Confidence: 0.716899157142857

00:10:31.880 --> 00:10:33.820 which can clearly delineate

NOTE Confidence: 0.716899157142857

00:10:33.820 --> 00:10:35.275 the tumor regions,

NOTE Confidence: 0.716899157142857

00:10:35.280 --> 00:10:37.395 and you can see the hypermetabolism

NOTE Confidence: 0.716899157142857

00:10:37.395 --> 00:10:40.370 sugar metabolism in the center

NOTE Confidence: 0.716899157142857

00:10:40.370 --> 00:10:44.036 of the tumor and also my selling

NOTE Confidence: 0.716899157142857

00:10:44.036 --> 00:10:47.457 uptake in a larger area while found

NOTE Confidence: 0.716899157142857

00:10:47.457 --> 00:10:50.007 felt pad you can actually.

NOTE Confidence: 0.716899157142857

00:10:50.010 --> 00:10:52.030 See not only the tumor,

NOTE Confidence: 0.716899157142857

00:10:52.030 --> 00:10:53.495 but also the infiltration of

NOTE Confidence: 0.716899157142857

00:10:53.495 --> 00:10:55.420 the tumor to the brain region.

NOTE Confidence: 0.568739178

00:10:59.100 --> 00:11:01.980 So besides my sounding match,

NOTE Confidence: 0.568739178

00:11:01.980 --> 00:11:04.980 there are other amino acid analogs

NOTE Confidence: 0.568739178

00:11:04.980 --> 00:11:08.406 being used in brain tumor pet.

NOTE Confidence: 0.568739178

00:11:08.410 --> 00:11:13.868 For example, tossing and floral floral

NOTE Confidence: 0.568739178

00:11:13.868 --> 00:11:17.940 dopa F dopa F dopa is actually approved

NOTE Confidence: 0.568739178

00:11:18.043 --> 00:11:21.283 by FDA to image Parkinsonian syndrome

NOTE Confidence: 0.568739178

00:11:21.283 --> 00:11:26.880 back in 2019 because after reflects its

NOTE Confidence: 0.568739178

00:11:26.880 --> 00:11:30.488 accumulated in dopaminergic neurons.

NOTE Confidence: 0.568739178

00:11:30.490 --> 00:11:34.246 Neurons are damaged in Parkinson's disease,

NOTE Confidence: 0.568739178

00:11:34.250 --> 00:11:36.890 but but there are also a lot of

NOTE Confidence: 0.568739178

00:11:36.890 --> 00:11:39.711 efforts in applying F DOPA in brain

NOTE Confidence: 0.568739178

00:11:39.711 --> 00:11:42.860 tumor imaging because F DOPA is also

NOTE Confidence: 0.568739178

00:11:42.860 --> 00:11:45.315 transported into brain tumor cells

NOTE Confidence: 0.568739178

00:11:45.315 --> 00:11:49.078 through all type of transporters

NOTE Confidence: 0.568739178

00:11:49.080 --> 00:11:51.126 and once it's inside the cells,

NOTE Confidence: 0.568739178

00:11:51.130 --> 00:11:54.180 it's metabolize into DOPA and

NOTE Confidence: 0.568739178

00:11:54.180 --> 00:11:57.230 it's trapped in the cell.

NOTE Confidence: 0.568739178

00:11:57.230 --> 00:12:01.490 A recent relative recent Patricia for

NOTE Confidence: 0.568739178

00:12:01.490 --> 00:12:05.228 amino acids imaging is a floozy chlorine.

NOTE Confidence: 0.568739178

00:12:05.230 --> 00:12:09.064 This is this treasure is approved by FDA in

NOTE Confidence: 0.568739178

00:12:09.070 --> 00:12:13.228 2016 for imaging recurrent prostate cancer,

NOTE Confidence: 0.568739178

00:12:13.230 --> 00:12:15.762 but they're still great effort in

NOTE Confidence: 0.568739178

00:12:15.762 --> 00:12:20.510 applying this treasure in global imaging.

NOTE Confidence: 0.568739178

00:12:20.510 --> 00:12:25.977 And actually the tumor uptake of F18.

NOTE Confidence: 0.568739178

00:12:25.980 --> 00:12:28.988 In quality well with.

NOTE Confidence: 0.568739178

00:12:28.990 --> 00:12:32.714 Bring to my images through night myself.

NOTE Confidence: 0.568739178

00:12:32.720 --> 00:12:34.680 Uhm?

NOTE Confidence: 0.568739178

00:12:34.680 --> 00:12:38.026 And it's actually useful when the MRI

NOTE Confidence: 0.568739178

00:12:38.026 --> 00:12:41.000 contrast enhanced MRI is non diagnostic.

NOTE Confidence: 0.568739178

00:12:41.000 --> 00:12:41.608 But still,

NOTE Confidence: 0.568739178

00:12:41.608 --> 00:12:43.736 based on the preliminary data we have

NOTE Confidence: 0.568739178

00:12:43.736 --> 00:12:45.959 in the following clinical studies,

NOTE Confidence: 0.568739178

00:12:45.960 --> 00:12:49.302 we can't tell whether the uptake

NOTE Confidence: 0.568739178

00:12:49.302 --> 00:12:53.250 of flu cycle is solely due to the

NOTE Confidence: 0.568739178

00:12:53.250 --> 00:12:55.520 recurrent tumor or perhaps some

NOTE Confidence: 0.568739178

00:12:55.609 --> 00:12:58.408 of the signals contributed from

NOTE Confidence: 0.568739178

00:12:58.408 --> 00:13:00.520 inflammation and other processes.

NOTE Confidence: 0.568739178

00:13:00.520 --> 00:13:04.442 So further studies is needed to establish

NOTE Confidence: 0.568739178

00:13:04.442 --> 00:13:06.584 the role of this treasure in the

NOTE Confidence: 0.568739178

00:13:06.584 --> 00:13:08.529 management of brain tumor in the clinic.

NOTE Confidence: 0.597757023833333

00:13:13.180 --> 00:13:17.462 So with that, I'd like to introduce some of

NOTE Confidence: 0.597757023833333

00:13:17.462 --> 00:13:21.060 the emerging imaging targets for brain tumor.

NOTE Confidence: 0.597757023833333

00:13:21.060 --> 00:13:23.664 So my interest in bringing my image

NOTE Confidence: 0.597757023833333

00:13:23.664 --> 00:13:26.604 and actually is originated from this

NOTE Confidence: 0.597757023833333

00:13:26.604 --> 00:13:29.672 part X Sigma 1 receptor imaging.

NOTE Confidence: 0.597757023833333

00:13:29.672 --> 00:13:32.450 So we were initially interested in

NOTE Confidence: 0.597757023833333

00:13:32.534 --> 00:13:36.142 using Sigma 1 receptor PET to study

NOTE Confidence: 0.597757023833333

00:13:36.142 --> 00:13:38.804 in your degenerative disorders and

NOTE Confidence: 0.597757023833333

00:13:38.804 --> 00:13:41.779 in one summer there was a visiting

NOTE Confidence: 0.597757023833333

00:13:41.780 --> 00:13:44.456 student from Germany and he brought

NOTE Confidence: 0.597757023833333

00:13:44.456 --> 00:13:48.150 in a product to use Sigma 1 receptor

NOTE Confidence: 0.597757023833333

00:13:48.150 --> 00:13:51.929 developed in their lab to image burn tumor.

NOTE Confidence: 0.597757023833333

00:13:51.930 --> 00:13:54.912 So to evaluate their imaging probe so

NOTE Confidence: 0.597757023833333

00:13:54.912 --> 00:13:57.458 we collaborate with John being slab.

NOTE Confidence: 0.597757023833333

00:13:57.460 --> 00:13:59.988 So this is gone down from his lab,

NOTE Confidence: 0.597757023833333

00:13:59.990 --> 00:14:02.122 generated you 87 look,

NOTE Confidence: 0.597757023833333

00:14:02.122 --> 00:14:05.320 which is a blue blastoma tumor

NOTE Confidence: 0.597757023833333

00:14:05.429 --> 00:14:08.449 cell and expresses luciferase.

NOTE Confidence: 0.597757023833333

00:14:08.450 --> 00:14:12.034 So we use valid methods to monitor

NOTE Confidence: 0.597757023833333

00:14:12.034 --> 00:14:15.380 the tumor growth over three weeks.

NOTE Confidence: 0.597757023833333

00:14:15.380 --> 00:14:19.992 After the tumor reaches a certain size,

NOTE Confidence: 0.597757023833333

00:14:19.992 --> 00:14:26.360 we scan them by using pet small animal pet.

NOTE Confidence: 0.597757023833333

00:14:26.360 --> 00:14:29.804 Pet city and we used 2 pets

NOTE Confidence: 0.597757023833333

00:14:29.810 --> 00:14:30.680 and their natural.

NOTE Confidence: 0.64455577

00:14:33.500 --> 00:14:35.544 From the pet images, we can tell

NOTE Confidence: 0.64455577

00:14:35.544 --> 00:14:37.147 that rumor update is significantly

NOTE Confidence: 0.64455577

00:14:37.147 --> 00:14:39.464 higher than the rest of the brain,

NOTE Confidence: 0.64455577

00:14:39.470 --> 00:14:42.380 while the two updates decrease overtime,

NOTE Confidence: 0.64455577

00:14:42.380 --> 00:14:44.880 eventually getting lower than the

NOTE Confidence: 0.64455577

00:14:44.880 --> 00:14:49.500 healthy brain tissue. For each.

NOTE Confidence: 0.64455577

00:14:49.500 --> 00:14:53.052 Natural nurse and found the T2 MRI.

NOTE Confidence: 0.64455577

00:14:53.052 --> 00:14:55.488 We can clearly visualize the tumor

NOTE Confidence: 0.64455577

00:14:55.488 --> 00:14:58.779 so we can analyze the region of

NOTE Confidence: 0.64455577

00:14:58.779 --> 00:15:00.708 interest for the tumor uptake.

NOTE Confidence: 0.651361646266667

00:15:04.140 --> 00:15:06.450 So this tells us the Sigma 1

NOTE Confidence: 0.651361646266667

00:15:06.450 --> 00:15:07.955 receptor expression in healthy

NOTE Confidence: 0.651361646266667

00:15:07.955 --> 00:15:09.719 brain is also significant,

NOTE Confidence: 0.651361646266667

00:15:09.720 --> 00:15:12.276 which may similarly to FG pad,

NOTE Confidence: 0.651361646266667

00:15:12.280 --> 00:15:14.998 complicates the PATH imaging data analysis.

NOTE Confidence: 0.651361646266667

00:15:15.000 --> 00:15:17.387 So this is also confirmed by doing

NOTE Confidence: 0.651361646266667

00:15:17.387 --> 00:15:18.930 nonhuman primate patting imaging.

NOTE Confidence: 0.651361646266667

00:15:18.930 --> 00:15:25.120 So Sigma 1 receptor uptake in healthy

NOTE Confidence: 0.651361646266667

00:15:25.120 --> 00:15:28.920 brain regions significantly overtime.

NOTE Confidence: 0.651361646266667

00:15:28.920 --> 00:15:31.860 So the question now is to identify

NOTE Confidence: 0.651361646266667

00:15:31.860 --> 00:15:35.467 by marker for global stoma with low

NOTE Confidence: 0.651361646266667

00:15:35.467 --> 00:15:38.287 expression in healthy brain tissues.

NOTE Confidence: 0.651361646266667

00:15:38.290 --> 00:15:42.826 So that turned out to Park Park is

NOTE Confidence: 0.651361646266667

00:15:42.826 --> 00:15:46.190 the Poly ADP Ribosyl polymerase pop.

NOTE Confidence: 0.651361646266667

00:15:46.190 --> 00:15:49.346 One is the DNA repair enzyme.

NOTE Confidence: 0.651361646266667

00:15:49.350 --> 00:15:51.975 It's always provides in blastoma

NOTE Confidence: 0.651361646266667

00:15:51.975 --> 00:15:54.075 with overall lower expression

NOTE Confidence: 0.651361646266667

00:15:54.075 --> 00:15:56.378 in healthy brain tissue.

NOTE Confidence: 0.651361646266667

00:15:56.380 --> 00:15:57.468 So in that sense,

NOTE Confidence: 0.651361646266667

00:15:57.468 --> 00:15:59.100 it might be an ideal image

NOTE Confidence: 0.651361646266667

00:15:59.166 --> 00:16:00.898 engines for globalist tumor,

NOTE Confidence: 0.651361646266667

00:16:00.900 --> 00:16:03.950 imaging and parks functions to

NOTE Confidence: 0.651361646266667

00:16:03.950 --> 00:16:07.000 recognize DNA damage and recruit

NOTE Confidence: 0.651361646266667

00:16:07.097 --> 00:16:10.454 proteins to repair single strand or

NOTE Confidence: 0.651361646266667

00:16:10.454 --> 00:16:13.144 even double strength daily damage.

NOTE Confidence: 0.651361646266667

00:16:13.150 --> 00:16:15.772 There are multiple active clinical trials

NOTE Confidence: 0.651361646266667

00:16:15.772 --> 00:16:19.220 going on actually targeting part as a

NOTE Confidence: 0.651361646266667

00:16:19.220 --> 00:16:21.790 therapeutic target in global storm,

NOTE Confidence: 0.651361646266667

00:16:21.790 --> 00:16:24.478 so up at imaging agent targeting

NOTE Confidence: 0.651361646266667

00:16:24.478 --> 00:16:27.576 Park could be also helpful in

NOTE Confidence: 0.651361646266667

00:16:27.576 --> 00:16:30.000 facilitating the drug development

NOTE Confidence: 0.651361646266667

00:16:30.000 --> 00:16:33.107 or stratify patients for park

NOTE Confidence: 0.651361646266667

00:16:33.107 --> 00:16:35.080 targeted images therapeutics.

NOTE Confidence: 0.673882655454545

00:16:37.440 --> 00:16:39.920 To evaluate any imaging agents

NOTE Confidence: 0.673882655454545

00:16:39.920 --> 00:16:42.980 before we do clinical imaging study,

NOTE Confidence: 0.673882655454545

00:16:42.980 --> 00:16:45.782 we need to evaluate those imaging

NOTE Confidence: 0.673882655454545

00:16:45.782 --> 00:16:47.650 probes using animal models.

NOTE Confidence: 0.673882655454545

00:16:47.650 --> 00:16:50.358 So this is work done by Carney

NOTE Confidence: 0.673882655454545

00:16:50.358 --> 00:16:53.640 and colleagues published in 2018.

NOTE Confidence: 0.673882655454545

00:16:53.640 --> 00:16:56.890 They actually surveyed part one

NOTE Confidence: 0.673882655454545

00:16:56.890 --> 00:16:59.920 expression over a panel of human

NOTE Confidence: 0.673882655454545

00:16:59.920 --> 00:17:02.800 PDX small cell lung cancer PDX,

NOTE Confidence: 0.673882655454545

00:17:02.800 --> 00:17:05.894 and together with healthy tissues,

NOTE Confidence: 0.673882655454545

00:17:05.894 --> 00:17:06.642 found rodents.

NOTE Confidence: 0.673882655454545

00:17:06.642 --> 00:17:08.138 As you can see,

NOTE Confidence: 0.673882655454545

00:17:08.140 --> 00:17:11.392 the park is generally positive and

NOTE Confidence: 0.673882655454545

00:17:11.392 --> 00:17:14.508 highly expressed in these PDX tissues

NOTE Confidence: 0.673882655454545

00:17:14.508 --> 00:17:17.908 as well as in spleen of the animal,

NOTE Confidence: 0.673882655454545

00:17:17.910 --> 00:17:19.760 while its expression in brain

NOTE Confidence: 0.673882655454545

00:17:19.760 --> 00:17:21.240 tissue is relatively low.

NOTE Confidence: 0.483214868333333

00:17:24.120 --> 00:17:27.882 So further, they injected a like

NOTE Confidence: 0.483214868333333

00:17:27.882 --> 00:17:31.050 rip derived TARP imaging pad

NOTE Confidence: 0.483214868333333

00:17:31.050 --> 00:17:33.940 agents into this PDX models.

NOTE Confidence: 0.483214868333333

00:17:33.940 --> 00:17:36.280 They were able to.

NOTE Confidence: 0.483214868333333

00:17:36.280 --> 00:17:37.896 Identify the tumor uptake

NOTE Confidence: 0.483214868333333

00:17:37.896 --> 00:17:40.320 overtime and compare it with the

NOTE Confidence: 0.483214868333333

00:17:40.397 --> 00:17:42.417 muscle as a reference region.

NOTE Confidence: 0.483214868333333

00:17:42.420 --> 00:17:44.390 Normally muscle has because muscle

NOTE Confidence: 0.483214868333333

00:17:44.390 --> 00:17:47.200 has very low uptake of the tracer,

NOTE Confidence: 0.483214868333333

00:17:47.200 --> 00:17:49.750 indicating slow part expression in muscle.

NOTE Confidence: 0.505861753333333

00:17:52.170 --> 00:17:54.846 And the park image agents showed

NOTE Confidence: 0.505861753333333

00:17:54.850 --> 00:17:56.890 quick uptake into the tumor,

NOTE Confidence: 0.505861753333333

00:17:56.890 --> 00:18:00.510 which is slowly decrease overtime

NOTE Confidence: 0.505861753333333

00:18:00.510 --> 00:18:03.150 and mass tumor to muscle region

NOTE Confidence: 0.505861753333333

00:18:03.150 --> 00:18:05.725 reaches the highest level at 2

NOTE Confidence: 0.505861753333333

00:18:05.725 --> 00:18:07.433 hours post Twitter injection.

NOTE Confidence: 0.717613647777778

00:18:09.770 --> 00:18:12.060 So by using pad imaging

NOTE Confidence: 0.717613647777778

00:18:12.060 --> 00:18:14.610 they were able to study.

NOTE Confidence: 0.717613647777778

00:18:14.610 --> 00:18:17.450 They found kinetics of

NOTE Confidence: 0.717613647777778

00:18:17.450 --> 00:18:19.580 the library derivatives.

NOTE Confidence: 0.717613647777778

00:18:19.580 --> 00:18:23.548 I did about the same time back in 2018.

NOTE Confidence: 0.717613647777778

00:18:23.548 --> 00:18:26.536 Another group at Upenn and

NOTE Confidence: 0.717613647777778

00:18:26.536 --> 00:18:28.444 Studies another park,

NOTE Confidence: 0.717613647777778

00:18:28.444 --> 00:18:29.716 Paddington agents,

NOTE Confidence: 0.717613647777778

00:18:29.720 --> 00:18:30.809 which is derived.

NOTE Confidence: 0.544967931111111

00:18:34.230 --> 00:18:36.014 From a different scaffold,

NOTE Confidence: 0.544967931111111

00:18:36.014 --> 00:18:38.244 they name it F18 FT.

NOTE Confidence: 0.544967931111111

00:18:38.250 --> 00:18:42.426 So they did first in human study in.

NOTE Confidence: 0.544967931111111

00:18:42.430 --> 00:18:44.134 They recruited 20 patients.

NOTE Confidence: 0.544967931111111

00:18:44.134 --> 00:18:47.215 And scan them at baseline and the

NOTE Confidence: 0.544967931111111

00:18:47.215 --> 00:18:49.420 patients underwent surgery so they

NOTE Confidence: 0.544967931111111

00:18:49.420 --> 00:18:52.659 were able to collect the tissues to

NOTE Confidence: 0.544967931111111

00:18:52.659 --> 00:18:54.979 correlate the packaging results with

NOTE Confidence: 0.544967931111111

00:18:54.979 --> 00:18:58.253 the immuno histo fluorescence results

NOTE Confidence: 0.544967931111111

00:18:58.253 --> 00:19:02.158 as well as autoradiography study.

NOTE Confidence: 0.544967931111111

00:19:02.160 --> 00:19:06.024 So in this study they actually showed.

NOTE Confidence: 0.544967931111111

00:19:06.030 --> 00:19:09.254 A panel of parks specific uptick in the

NOTE Confidence: 0.544967931111111

00:19:09.254 --> 00:19:13.170 tumor by PAT as well as a immunofluorescence.

NOTE Confidence: 0.544967931111111

00:19:13.170 --> 00:19:16.240 And there's strong correlation between

NOTE Confidence: 0.544967931111111

00:19:16.240 --> 00:19:19.270 values and the fluorescence results,

NOTE Confidence: 0.544967931111111

00:19:19.270 --> 00:19:22.810 as well as between out radiography

NOTE Confidence: 0.544967931111111

00:19:22.810 --> 00:19:25.225 signal and fluorescence signal,

NOTE Confidence: 0.544967931111111

00:19:25.225 --> 00:19:27.160 but the part?

NOTE Confidence: 0.544967931111111

00:19:27.160 --> 00:19:30.738 Expression level doesn't correlate with PAT,

NOTE Confidence: 0.544967931111111

00:19:30.738 --> 00:19:33.174 so FG cannot be used in place

NOTE Confidence: 0.544967931111111

00:19:33.174 --> 00:19:34.620 of park imaging.

NOTE Confidence: 0.755895912

00:19:37.070 --> 00:19:39.430 So about earlier this year,

NOTE Confidence: 0.755895912

00:19:39.430 --> 00:19:41.894 there's they expanded their

NOTE Confidence: 0.755895912

00:19:41.894 --> 00:19:44.974 clinical trials of power pat

NOTE Confidence: 0.755895912

00:19:44.974 --> 00:19:47.820 into a breast cancer patients.

NOTE Confidence: 0.678939088

00:19:50.650 --> 00:19:54.500 However, all of the park imaging agents.

NOTE Confidence: 0.678939088

00:19:54.500 --> 00:19:57.338 We have currently do not penetrate

NOTE Confidence: 0.678939088

00:19:57.338 --> 00:20:00.203 intact blood brain barrier so that

NOTE Confidence: 0.678939088

00:20:00.203 --> 00:20:02.879 limits its application in brain tumor.

NOTE Confidence: 0.70875592625

00:20:05.790 --> 00:20:08.100 And this is confirmed by their nonhuman

NOTE Confidence: 0.70875592625

00:20:08.100 --> 00:20:11.858 primate, pet brain imaging study.

NOTE Confidence: 0.70875592625

00:20:11.860 --> 00:20:15.444 So we took a look at the

NOTE Confidence: 0.70875592625

00:20:15.444 --> 00:20:16.980 pharmacokinetic information of

NOTE Confidence: 0.70875592625

00:20:17.076 --> 00:20:21.529 the current park inhibitors and.

NOTE Confidence: 0.70875592625

00:20:21.530 --> 00:20:24.790 Decided to pursue base

NOTE Confidence: 0.70875592625

00:20:24.790 --> 00:20:28.050 scaffold for Patty medium,

NOTE Confidence: 0.70875592625

00:20:28.050 --> 00:20:30.900 hopefully to identify a brain penetrant.

NOTE Confidence: 0.70875592625

00:20:30.900 --> 00:20:34.420 Potting medium agents for park.

NOTE Confidence: 0.70875592625

00:20:34.420 --> 00:20:37.598 So in that direction, so we have.

NOTE Confidence: 0.70875592625

00:20:37.600 --> 00:20:40.638 I don't know if I'd and synthesized

NOTE Confidence: 0.70875592625

00:20:40.640 --> 00:20:45.236 lead park imaging agents derived from.

NOTE Confidence: 0.70875592625

00:20:45.240 --> 00:20:47.982 And did a pilot study in

NOTE Confidence: 0.70875592625

00:20:47.982 --> 00:20:50.520 collaboration with Hank for memory.

NOTE Confidence: 0.70875592625

00:20:50.520 --> 00:20:53.895 Using their RG2 rank mode burn to more model,

NOTE Confidence: 0.70875592625

00:20:53.900 --> 00:20:56.208 we were able to.

NOTE Confidence: 0.70875592625

00:20:56.210 --> 00:21:00.004 Image CRD 2 tumor here the baseline

NOTE Confidence: 0.70875592625

00:21:00.004 --> 00:21:03.652 scans using the power pad imaging

NOTE Confidence: 0.70875592625

00:21:03.652 --> 00:21:06.876 agents and for this one we pre

NOTE Confidence: 0.70875592625

00:21:06.876 --> 00:21:10.500 injected the animal with a code.

NOTE Confidence: 0.70875592625

00:21:10.500 --> 00:21:13.491 Well, if a rate which is also

NOTE Confidence: 0.70875592625

00:21:13.491 --> 00:21:16.246 part specific molecule that can

NOTE Confidence: 0.70875592625

00:21:16.246 --> 00:21:18.616 compete with Patrick to displace

NOTE Confidence: 0.70875592625

00:21:18.616 --> 00:21:20.764 a tutor uptick in the tumor.

NOTE Confidence: 0.631713194315789

00:21:22.940 --> 00:21:25.448 So after semiquantitative analysis.

NOTE Confidence: 0.631713194315789

00:21:25.448 --> 00:21:31.146 We can tell from the average values from 30

NOTE Confidence: 0.631713194315789

00:21:31.146 --> 00:21:34.806 to 60 minutes post tracer administration.

NOTE Confidence: 0.631713194315789

00:21:34.810 --> 00:21:37.666 The tumor optic is about one

NOTE Confidence: 0.631713194315789

00:21:37.670 --> 00:21:40.145 after the blocking drug update

NOTE Confidence: 0.631713194315789

00:21:40.145 --> 00:21:42.579 was decreased to about 0.5,

NOTE Confidence: 0.631713194315789

00:21:42.579 --> 00:21:44.824 indicating the new park padding

NOTE Confidence: 0.631713194315789

00:21:44.824 --> 00:21:46.620 medium tracer actually really

NOTE Confidence: 0.631713194315789

00:21:46.689 --> 00:21:49.025 target Park in vivo as they ban to

NOTE Confidence: 0.631713194315789

00:21:49.025 --> 00:21:51.179 the same target as a Liberator,

NOTE Confidence: 0.631713194315789

00:21:51.180 --> 00:21:54.060 blocking drug at the same time we

NOTE Confidence: 0.631713194315789

00:21:54.060 --> 00:21:55.410 look at the control later role,

NOTE Confidence: 0.631713194315789

00:21:55.410 --> 00:21:57.195 which is presumably to be

NOTE Confidence: 0.631713194315789

00:21:57.195 --> 00:21:58.623 the healthy brain tissue.

NOTE Confidence: 0.631713194315789

00:21:58.630 --> 00:22:02.098 And it showed relatively lower uptake.

NOTE Confidence: 0.631713194315789

00:22:02.100 --> 00:22:05.656 Send a tumor and the blocking doesn't

NOTE Confidence: 0.631713194315789

00:22:05.656 --> 00:22:08.190 have significant effect over there.

NOTE Confidence: 0.631713194315789

00:22:08.190 --> 00:22:10.638 So here's the tumor to contralateral

NOTE Confidence: 0.631713194315789

00:22:10.638 --> 00:22:13.510 ratio and at baseline it's about 2.5

NOTE Confidence: 0.631713194315789

00:22:13.510 --> 00:22:16.274 after blocking drops to about 1.5,

NOTE Confidence: 0.631713194315789

00:22:16.274 --> 00:22:20.380 indicating about 46% blockade from the.

NOTE Confidence: 0.522463101666667

00:22:22.650 --> 00:22:25.266 To validate the path image data,

NOTE Confidence: 0.522463101666667

00:22:25.270 --> 00:22:28.550 we perform pilot biodistribution study.

NOTE Confidence: 0.522463101666667

00:22:28.550 --> 00:22:32.155 We look at the tracer distribution among

NOTE Confidence: 0.522463101666667

00:22:32.155 --> 00:22:37.590 the different different tissues of animal.

NOTE Confidence: 0.522463101666667

00:22:37.590 --> 00:22:40.650 Not surprising me that Rooster has

NOTE Confidence: 0.522463101666667

00:22:40.650 --> 00:22:43.829 high spleen uptake because spleen is

NOTE Confidence: 0.522463101666667

00:22:43.829 --> 00:22:46.967 another large organ and that's positive.

NOTE Confidence: 0.522463101666667

00:22:46.970 --> 00:22:48.920 Also, it's a blocked by the.

NOTE Confidence: 0.563172714285714

00:22:51.230 --> 00:22:53.505 And consistent with the pattern medium data,

NOTE Confidence: 0.563172714285714

00:22:53.510 --> 00:22:56.807 we see high uptick in the tumor,

NOTE Confidence: 0.563172714285714

00:22:56.810 --> 00:23:00.098 and it's blocked by the brick as well.

NOTE Confidence: 0.650973323666667

00:23:03.230 --> 00:23:06.056 Further analysis of this pilot data

NOTE Confidence: 0.650973323666667

00:23:06.060 --> 00:23:11.060 indicates very high spleen to blood ratio

NOTE Confidence: 0.650973323666667

00:23:11.060 --> 00:23:14.657 and also very high tumor to blood ratio.

NOTE Confidence: 0.650973323666667

00:23:14.660 --> 00:23:17.636 For the power quality of regions and it

NOTE Confidence: 0.650973323666667

00:23:17.636 --> 00:23:20.845 also shows some extent of the brain uptake,

NOTE Confidence: 0.650973323666667

00:23:20.850 --> 00:23:24.560 which is seem to be blocked by the cold drug.

NOTE Confidence: 0.650973323666667

00:23:24.560 --> 00:23:26.325 So further study confirmative study

NOTE Confidence: 0.650973323666667

00:23:26.325 --> 00:23:29.572 needs to be done to see if this traitor

NOTE Confidence: 0.650973323666667

00:23:29.572 --> 00:23:32.210 actually goes into the intact brain or not.

NOTE Confidence: 0.449307408

00:23:35.390 --> 00:23:36.526 OK, the next part,

NOTE Confidence: 0.449307408

00:23:36.526 --> 00:23:38.230 like the next image in target,

NOTE Confidence: 0.449307408

00:23:38.230 --> 00:23:40.288 I'd like to introduce is PDL one.

NOTE Confidence: 0.449307408

00:23:40.290 --> 00:23:42.495 I think for this target this is

NOTE Confidence: 0.449307408

00:23:42.495 --> 00:23:44.354 probably the targets that doesn't

NOTE Confidence: 0.449307408

00:23:44.354 --> 00:23:46.896 need much introduction PDL 1 so

NOTE Confidence: 0.449307408

00:23:46.896 --> 00:23:49.850 we do have PDL 1 targeted PET

NOTE Confidence: 0.449307408

00:23:49.965 --> 00:23:53.300 imaging tracers in this field.

NOTE Confidence: 0.449307408

00:23:53.300 --> 00:23:56.441 Dave Donnelly published paper in 2017

NOTE Confidence: 0.449307408

00:23:56.441 --> 00:24:00.858 about their protein based PDL 1 Patricia.

NOTE Confidence: 0.53119207073

00:24:04.720 --> 00:24:09.940 Nine, six, 182 so the use a simple xenograft

NOTE Confidence: 0.53119207073

00:24:09.940 --> 00:24:13.184 with PD L1 positive tumor on one side and

NOTE Confidence: 0.53119207073

00:24:13.184 --> 00:24:16.426 PDL one negative tumor on the other side.

NOTE Confidence: 0.53119207073

00:24:16.430 --> 00:24:18.859 So they did the baseline scan without

NOTE Confidence: 0.53119207073

00:24:18.859 --> 00:24:21.392 blocking agents and they did a blocking scan

NOTE Confidence: 0.53119207073

00:24:21.392 --> 00:24:23.860 that you can see after blocking agents.

NOTE Confidence: 0.53119207073

00:24:23.860 --> 00:24:25.895 The Twitter uptake was diminished

NOTE Confidence: 0.53119207073

00:24:25.895 --> 00:24:28.561 to the same level of the unspecific

NOTE Confidence: 0.53119207073

00:24:28.561 --> 00:24:30.808 update to the same level of Cpl.

NOTE Confidence: 0.53119207073

00:24:30.810 --> 00:24:33.210 One negative tumor uptake.

NOTE Confidence: 0.53119207073

00:24:33.210 --> 00:24:37.050 Well, the baseline scan showed higher uptake,

NOTE Confidence: 0.53119207073

00:24:37.050 --> 00:24:38.910 so they also did autoradiography.

NOTE Confidence: 0.53119207073

00:24:38.910 --> 00:24:43.596 This is in virtual autoradiography study.

NOTE Confidence: 0.53119207073

00:24:43.600 --> 00:24:46.498 Not not only look at this too,

NOTE Confidence: 0.53119207073

00:24:46.500 --> 00:24:47.940 they don't draft silence.

NOTE Confidence: 0.53119207073

00:24:47.940 --> 00:24:50.549 They also look at some some human

NOTE Confidence: 0.53119207073

00:24:50.549 --> 00:24:53.167 tissues and they sell like higher PDL.

NOTE Confidence: 0.53119207073

00:24:53.170 --> 00:24:57.020 One expression in those human tumor tissues.

NOTE Confidence: 0.53119207073

00:24:57.020 --> 00:24:59.102 So with that data they translated

NOTE Confidence: 0.53119207073

00:24:59.102 --> 00:25:01.156 their imaging probes to 1st in

NOTE Confidence: 0.53119207073

00:25:01.156 --> 00:25:02.950 human study they they chose non

NOTE Confidence: 0.53119207073

00:25:02.950 --> 00:25:05.484 small cell lung cancer as there.

NOTE Confidence: 0.53119207073

00:25:05.484 --> 00:25:08.494 Patient population in that study,

NOTE Confidence: 0.53119207073

00:25:08.500 --> 00:25:10.678 published in 2018.

NOTE Confidence: 0.53119207073

00:25:10.678 --> 00:25:14.905 They actually compared with PDL one pad and

NOTE Confidence: 0.53119207073

00:25:14.905 --> 00:25:18.180 another at the only making nine labeled.

NOTE Confidence: 0.53119207073

00:25:18.180 --> 00:25:22.570 If I look at the PD one pad so those

NOTE Confidence: 0.53119207073

00:25:22.702 --> 00:25:27.586 three imaging modalities can all detect.

NOTE Confidence: 0.53119207073

00:25:27.590 --> 00:25:28.990 Non small cell lung cancer,

NOTE Confidence: 0.53119207073

00:25:28.990 --> 00:25:30.142 not you,

NOTE Confidence: 0.53119207073

00:25:30.142 --> 00:25:33.570 but with the heterogeneous imaging patterns

NOTE Confidence: 0.53119207073

00:25:33.570 --> 00:25:36.370 indicating those three modalities are

NOTE Confidence: 0.53119207073

00:25:36.370 --> 00:25:38.876 actually complementary to each other.

NOTE Confidence: 0.53119207073

00:25:38.876 --> 00:25:40.724 They provide different information

NOTE Confidence: 0.53119207073

00:25:40.724 --> 00:25:43.608 on the tumor metabolism and PDL.

NOTE Confidence: 0.53119207073

00:25:43.610 --> 00:25:45.620 One expression as well as PDL.

NOTE Confidence: 0.53119207073

00:25:45.620 --> 00:25:46.220 One expression.

NOTE Confidence: 0.80292092

00:25:50.840 --> 00:25:53.192 Also they showed one case where

NOTE Confidence: 0.80292092

00:25:53.192 --> 00:25:54.760 there's a tumor metastasis

NOTE Confidence: 0.80292092

00:25:54.760 --> 00:25:56.760 because the tumor metastasis,

NOTE Confidence: 0.80292092

00:25:56.760 --> 00:25:59.619 so it could be the low PDL expression

NOTE Confidence: 0.80292092

00:25:59.619 --> 00:26:01.660 over there, or it could be the

NOTE Confidence: 0.80292092

00:26:01.660 --> 00:26:04.180 more intact blood brain barrier.

NOTE Confidence: 0.80292092

00:26:04.180 --> 00:26:07.876 So in order to apply PDL 1 packaging

NOTE Confidence: 0.80292092

00:26:07.876 --> 00:26:12.280 in in tumor imaging or glioma patch,

NOTE Confidence: 0.80292092

00:26:12.280 --> 00:26:15.380 we initiated a project to

NOTE Confidence: 0.80292092

00:26:15.380 --> 00:26:16.860 develop brain punishment.

NOTE Confidence: 0.80292092

00:26:16.860 --> 00:26:19.010 PDL 1 patting million agents

NOTE Confidence: 0.80292092

00:26:19.010 --> 00:26:21.080 based on small molecules.

NOTE Confidence: 0.80292092

00:26:21.080 --> 00:26:24.432 So this project at early stage I don't

NOTE Confidence: 0.80292092

00:26:24.432 --> 00:26:27.432 have animal data to share with you,

NOTE Confidence: 0.80292092

00:26:27.432 --> 00:26:31.230 so do not just say very briefly the

NOTE Confidence: 0.80292092

00:26:31.230 --> 00:26:33.960 process for discovery and development of

NOTE Confidence: 0.80292092

00:26:34.039 --> 00:26:36.947 radiopharmaceuticals or patch research.

NOTE Confidence: 0.80292092

00:26:36.950 --> 00:26:39.092 So if you look at this project

NOTE Confidence: 0.80292092

00:26:39.092 --> 00:26:41.104 it's actually very similar to the

NOTE Confidence: 0.80292092

00:26:41.104 --> 00:26:43.150 R&D process of a therapeutic drug.

NOTE Confidence: 0.80292092

00:26:43.150 --> 00:26:46.139 You need to identify a target or

NOTE Confidence: 0.80292092

00:26:46.139 --> 00:26:47.420 clinically relevant biomarkers

NOTE Confidence: 0.80292092

00:26:47.492 --> 00:26:49.820 and you need to do met Cam to

NOTE Confidence: 0.80292092

00:26:49.820 --> 00:26:51.360 develop small molecules or.

NOTE Confidence: 0.80292092

00:26:51.360 --> 00:26:53.885 Micro molecules specific binding to

NOTE Confidence: 0.80292092

00:26:53.885 --> 00:26:57.469 the target after initial essay and in

NOTE Confidence: 0.80292092

00:26:57.469 --> 00:26:59.924 vivo essays using patent distribution.

NOTE Confidence: 0.673238764444444

00:27:02.570 --> 00:27:05.167 You can move on to the toxicity

NOTE Confidence: 0.673238764444444

00:27:05.167 --> 00:27:07.774 and dosimetry study and file and

NOTE Confidence: 0.673238764444444

00:27:07.774 --> 00:27:10.139 application after doing clinical trial,

NOTE Confidence: 0.673238764444444

00:27:10.140 --> 00:27:12.700 initial validations and clinical

NOTE Confidence: 0.673238764444444

00:27:12.700 --> 00:27:16.540 trials finally reached to FDA approval.

NOTE Confidence: 0.673238764444444

00:27:16.540 --> 00:27:19.268 So I'd like to use the last few

NOTE Confidence: 0.673238764444444

00:27:19.268 --> 00:27:21.981 minutes to update you the latest

NOTE Confidence: 0.673238764444444

00:27:21.981 --> 00:27:24.416 advancement in the past scanner,

NOTE Confidence: 0.673238764444444

00:27:24.420 --> 00:27:26.592 because pass scanner is a critical

NOTE Confidence: 0.673238764444444

00:27:26.592 --> 00:27:30.660 component in the pet imaging research.

NOTE Confidence: 0.673238764444444

00:27:30.660 --> 00:27:32.838 So very excitingly recently we saw

NOTE Confidence: 0.673238764444444

00:27:32.838 --> 00:27:34.940 a prototype for total body pad,

NOTE Confidence: 0.673238764444444

00:27:34.940 --> 00:27:37.830 so traditionally the path scanner needs

NOTE Confidence: 0.673238764444444

00:27:37.830 --> 00:27:40.620 to move the bed to get the whole body.

NOTE Confidence: 0.673238764444444

00:27:40.620 --> 00:27:42.212 PET imaging study done,

NOTE Confidence: 0.673238764444444

00:27:42.212 --> 00:27:44.600 but with a total body PAT

NOTE Confidence: 0.673238764444444

00:27:44.600 --> 00:27:46.290 we can collect all the.

NOTE Confidence: 0.673238764444444

00:27:46.290 --> 00:27:49.350 Emission signals from the patients,

NOTE Confidence: 0.673238764444444

00:27:49.350 --> 00:27:51.934 so that means significantly.

NOTE Confidence: 0.673238764444444

00:27:51.934 --> 00:27:54.518 Increase some detection sensitivity

NOTE Confidence: 0.673238764444444

00:27:54.518 --> 00:27:57.881 and we which allows much lower

NOTE Confidence: 0.673238764444444

00:27:57.881 --> 00:28:00.356 dose for for the patient.

NOTE Confidence: 0.575742701666667

00:28:02.480 --> 00:28:05.150 So supposedly we can reduce the.

NOTE Confidence: 0.498854314444444

00:28:07.590 --> 00:28:09.162 The real pharmaceutical injection.

NOTE Confidence: 0.498854314444444

00:28:09.162 --> 00:28:11.127 The dose by 40 fold.

NOTE Confidence: 0.498854314444444

00:28:11.130 --> 00:28:14.890 This means the whole body PET scan will

NOTE Confidence: 0.498854314444444

00:28:14.890 --> 00:28:19.158 will cause 0.15 million safe dosimetry.

NOTE Confidence: 0.498854314444444

00:28:19.158 --> 00:28:22.186 Well, the national background.

NOTE Confidence: 0.498854314444444

00:28:22.186 --> 00:28:25.274 Every year, 2.4 million safe and

NOTE Confidence: 0.498854314444444

00:28:25.274 --> 00:28:27.304 long Trip international round trip

NOTE Confidence: 0.498854314444444

00:28:27.304 --> 00:28:30.365 is about 1.1 million save this means

NOTE Confidence: 0.498854314444444

00:28:30.365 --> 00:28:33.614 the whole body pet can reduce the

NOTE Confidence: 0.498854314444444

00:28:33.614 --> 00:28:36.149 dosimetry to almost equivalent to

NOTE Confidence: 0.498854314444444

00:28:36.149 --> 00:28:39.639 a round trip international flight.

NOTE Confidence: 0.498854314444444

00:28:39.640 --> 00:28:41.266 And also with the whole body

NOTE Confidence: 0.498854314444444

00:28:41.266 --> 00:28:42.079 pet scanner system,

NOTE Confidence: 0.498854314444444

00:28:42.080 --> 00:28:44.180 we can study the diseases

NOTE Confidence: 0.498854314444444

00:28:44.180 --> 00:28:45.891 at the systemic level.

NOTE Confidence: 0.498854314444444

00:28:45.891 --> 00:28:49.230 So looking at the cancer throughout the body.

NOTE Confidence: 0.85089961

00:28:52.310 --> 00:28:56.376 So in summary. Pat's imaging

NOTE Confidence: 0.85089961

00:28:56.376 --> 00:28:58.548 and potentially application in

NOTE Confidence: 0.85089961

00:28:58.548 --> 00:29:01.290 glioblastoma is to demonstrate the

NOTE Confidence: 0.85089961

00:29:01.290 --> 00:29:03.770 final type and disease severity

NOTE Confidence: 0.85089961

00:29:03.770 --> 00:29:05.786 correlations and hopefully you will

NOTE Confidence: 0.85089961

00:29:05.786 --> 00:29:08.060 be able to discover new therapeutic

NOTE Confidence: 0.85089961

00:29:08.134 --> 00:29:10.229 targets based on morgue imaging,

NOTE Confidence: 0.85089961

00:29:10.230 --> 00:29:12.984 clinical imaging studies and it's also

NOTE Confidence: 0.85089961

00:29:12.984 --> 00:29:16.184 very helpful in the drug development

NOTE Confidence: 0.85089961

00:29:16.184 --> 00:29:18.748 process in demonstrating the

NOTE Confidence: 0.85089961

00:29:18.748 --> 00:29:21.976 penetration and pharmacokinetics of the

NOTE Confidence: 0.85089961

00:29:21.976 --> 00:29:24.876 experimental drug in effect compartment.

NOTE Confidence: 0.85089961

00:29:24.880 --> 00:29:26.446 It can be used to quantify

NOTE Confidence: 0.85089961

00:29:26.450 --> 00:29:28.016 commutate from Cortana,

NOTE Confidence: 0.85089961

00:29:28.016 --> 00:29:31.148 mix by doing receptor occupancy study

NOTE Confidence: 0.85089961

00:29:31.148 --> 00:29:34.364 to maximize the the dose range to be

NOTE Confidence: 0.85089961

00:29:34.364 --> 00:29:38.179 used in efficacy clinical trials.

NOTE Confidence: 0.85089961

00:29:38.180 --> 00:29:41.610 And also how could be useful for

NOTE Confidence: 0.85089961

00:29:41.610 --> 00:29:43.818 patients stratification and to

NOTE Confidence: 0.85089961

00:29:43.818 --> 00:29:45.777 evaluate therapeutic effects?

NOTE Confidence: 0.85089961

00:29:45.780 --> 00:29:49.556 And in the clinic pet can be used

NOTE Confidence: 0.85089961

00:29:49.556 --> 00:29:52.872 for diagnosis or prognosis as well

NOTE Confidence: 0.85089961

00:29:52.872 --> 00:29:54.996 as tracking disease progression.

NOTE Confidence: 0.85089961

00:29:55.000 --> 00:29:58.700 I finally achieve precision medicine,

NOTE Confidence: 0.85089961

00:29:58.700 --> 00:30:01.227 so at last I'd like to acknowledge

NOTE Confidence: 0.85089961

00:30:01.227 --> 00:30:03.076 my group and staff,

NOTE Confidence: 0.85089961

00:30:03.076 --> 00:30:06.454 faculty and students at your pet

NOTE Confidence: 0.85089961

00:30:06.454 --> 00:30:09.000 center or internal and external

NOTE Confidence: 0.85089961

00:30:09.000 --> 00:30:10.980 collaborators and or finding

NOTE Confidence: 0.85089961

00:30:10.980 --> 00:30:13.584 agents for supporting our research,

NOTE Confidence: 0.85089961

00:30:13.584 --> 00:30:17.216 and this is picture we took last year

NOTE Confidence: 0.85089961

00:30:17.220 --> 00:30:19.506 and this is what we look at this year.

NOTE Confidence: 0.7139220458

00:30:22.390 --> 00:30:24.222 Well, Jason, thank you.

NOTE Confidence: 0.7139220458

00:30:24.222 --> 00:30:27.281 It was a really terrific review of,

NOTE Confidence: 0.7139220458

00:30:27.281 --> 00:30:29.147 you know, novel approaches to imaging

NOTE Confidence: 0.7139220458

00:30:29.147 --> 00:30:31.090 both for clinical care and research.

NOTE Confidence: 0.7139220458

00:30:31.090 --> 00:30:33.526 And yeah, thank you for changing

NOTE Confidence: 0.7139220458

00:30:33.526 --> 00:30:36.329 the context of your research group

NOTE Confidence: 0.7139220458

00:30:36.330 --> 00:30:39.389 photo in terms of the current world.

NOTE Confidence: 0.7139220458

00:30:39.390 --> 00:30:42.160 You know, Jason, we're at, why don't we?

NOTE Confidence: 0.7139220458

00:30:42.160 --> 00:30:43.900 Why don't I suggest that for

NOTE Confidence: 0.7139220458

00:30:43.900 --> 00:30:45.708 folks who have questions for you

NOTE Confidence: 0.7139220458

00:30:45.708 --> 00:30:47.710 to direct them to you offline?

NOTE Confidence: 0.7139220458

00:30:47.710 --> 00:30:49.691 Just 'cause we're at the we're a

NOTE Confidence: 0.7139220458

00:30:49.691 --> 00:30:51.960 little late in the time and I want

NOTE Confidence: 0.7139220458

00:30:51.960 --> 00:30:53.620 to make sure there's time for.

NOTE Confidence: 0.7139220458

00:30:53.620 --> 00:30:57.109 For Zach but Jason thank you for us.

NOTE Confidence: 0.7139220458

00:30:57.109 --> 00:30:58.576 Superb presentation again.

NOTE Confidence: 0.7139220458

00:30:58.576 --> 00:31:01.510 I invite people to submit send

NOTE Confidence: 0.7139220458

00:31:01.593 --> 00:31:04.155 questions to Jason to his email,

NOTE Confidence: 0.7139220458

00:31:04.160 --> 00:31:05.994 but let me now turn to our.

NOTE Confidence: 0.7139220458

00:31:06.000 --> 00:31:07.431 Our second speaker.

NOTE Confidence: 0.7139220458

00:31:07.431 --> 00:31:09.339 Did Doctor Zachary Corbin,

NOTE Confidence: 0.7139220458

00:31:09.340 --> 00:31:11.908 Zach as many of you know as an

NOTE Confidence: 0.7139220458

00:31:11.908 --> 00:31:13.897 assistant professor of neurology, he.

NOTE Confidence: 0.7139220458

00:31:13.897 --> 00:31:16.519 Received his medical degree at Yale

NOTE Confidence: 0.7139220458

00:31:16.519 --> 00:31:18.823 and thereafter did his residency

NOTE Confidence: 0.7139220458

00:31:18.823 --> 00:31:21.118 training at the University of

NOTE Confidence: 0.7139220458

00:31:21.118 --> 00:31:23.330 California at San Francisco,

NOTE Confidence: 0.7139220458

00:31:23.330 --> 00:31:26.560 ultimately being recruited back here to

NOTE Confidence: 0.7139220458

00:31:26.560 --> 00:31:30.340 join the faculty in neurology and neurology.

NOTE Confidence: 0.7139220458

00:31:30.340 --> 00:31:33.724 Zacks interest beyond CNS

NOTE Confidence: 0.7139220458

00:31:33.724 --> 00:31:36.734 malignancies has been in research,

NOTE Confidence: 0.7139220458

00:31:36.734 --> 00:31:39.439 most notably in understanding the

NOTE Confidence: 0.7139220458

00:31:39.439 --> 00:31:42.049 biology of brain tumors through

NOTE Confidence: 0.7139220458

00:31:42.050 --> 00:31:44.170 novel approaches to imaging,

NOTE Confidence: 0.7139220458

00:31:44.170 --> 00:31:44.700 and.

NOTE Confidence: 0.7139220458

00:31:44.700 --> 00:31:46.288 Particularly the metabolic changes

NOTE Confidence: 0.7139220458

00:31:46.288 --> 00:31:48.273 that occur in these tumors.

NOTE Confidence: 0.7139220458

00:31:48.280 --> 00:31:50.205 So is Zach thank you for agreeing

NOTE Confidence: 0.7139220458

00:31:50.205 --> 00:31:52.120 to present and really interested.

NOTE Confidence: 0.7139220458

00:31:52.120 --> 00:31:53.355 Really excited to hear about

NOTE Confidence: 0.7139220458

00:31:53.355 --> 00:31:55.208 your work and Jason if you could

NOTE Confidence: 0.7139220458

00:31:55.208 --> 00:31:56.340 stop sharing your screen.

NOTE Confidence: 0.56232667

00:32:03.850 --> 00:32:06.315 Perfect thank you very much. Let me start.

NOTE Confidence: 0.39773166

00:32:08.360 --> 00:32:09.730 Sharing my screen.

NOTE Confidence: 0.8933656

00:32:15.860 --> 00:32:19.332 OK. Doctor Fuchs thank you

NOTE Confidence: 0.8933656

00:32:19.332 --> 00:32:20.697 so much for the introduction.

NOTE Confidence: 0.8933656

00:32:20.700 --> 00:32:22.860 Can everyone hear me and see my screen?

NOTE Confidence: 0.8933656

00:32:22.860 --> 00:32:25.670 Yes and thank you very much,

NOTE Confidence: 0.8933656

00:32:25.670 --> 00:32:28.132 Jason and thank you for the introduction

NOTE Confidence: 0.8933656

00:32:28.132 --> 00:32:30.579 or thank you for the invitation.

NOTE Confidence: 0.8933656

00:32:30.580 --> 00:32:34.414 So I'm one of the neuro oncologist at Smilow

NOTE Confidence: 0.8933656

00:32:34.420 --> 00:32:38.060 and it's my privilege today to talk about.

NOTE Confidence: 0.8933656

00:32:38.060 --> 00:32:40.358 In vivo metabolic imaging of primary

NOTE Confidence: 0.8933656

00:32:40.358 --> 00:32:42.533 brain tumors and what a great

NOTE Confidence: 0.8933656

00:32:42.533 --> 00:32:44.850 segue or transition to move on.

NOTE Confidence: 0.8933656

00:32:44.850 --> 00:32:48.315 I'm going to start really by giving.

NOTE Confidence: 0.8933656

00:32:48.320 --> 00:32:50.348 Some background clinical

NOTE Confidence: 0.8933656

00:32:50.348 --> 00:32:52.376 background on glioma,

NOTE Confidence: 0.8933656

00:32:52.380 --> 00:32:53.520 clinical treatments and

NOTE Confidence: 0.8933656

00:32:53.520 --> 00:32:54.660 limitations of glioma,

NOTE Confidence: 0.8933656

00:32:54.660 --> 00:32:56.208 and specifically glioblastoma

NOTE Confidence: 0.8933656

00:32:56.208 --> 00:32:57.756 as was introduced.

NOTE Confidence: 0.8933656

00:32:57.760 --> 00:33:00.552 I'm going to talk a little bit more

NOTE Confidence: 0.8933656

00:33:00.552 --> 00:33:02.550 specifically about pseudo progression.

NOTE Confidence: 0.8933656

00:33:02.550 --> 00:33:04.992 Which is something that Jason Jason

NOTE Confidence: 0.8933656

00:33:04.992 --> 00:33:07.135 mentioned and also has been discussed

NOTE Confidence: 0.8933656

00:33:07.135 --> 00:33:09.805 in this venue by Doctor Chang with

NOTE Confidence: 0.8933656

00:33:09.805 --> 00:33:12.430 metastatic disease in the brain.

NOTE Confidence: 0.8933656

00:33:12.430 --> 00:33:14.362 I'm gonna talk about metabolism and

NOTE Confidence: 0.8933656

00:33:14.362 --> 00:33:16.374 cancer and the Warburg effect in

NOTE Confidence: 0.8933656

00:33:16.374 --> 00:33:18.039 particular as a prominent metabolic

NOTE Confidence: 0.8933656

00:33:18.039 --> 00:33:20.429 change that we could potentially image.

NOTE Confidence: 0.8933656

00:33:20.430 --> 00:33:23.600 The transition to methods results.

NOTE Confidence: 0.8933656

00:33:23.600 --> 00:33:25.340 And our current investigations things

NOTE Confidence: 0.8933656

00:33:25.340 --> 00:33:28.220 we can show you now and things we're

NOTE Confidence: 0.8933656

00:33:28.220 --> 00:33:30.374 very excited about showing you soon.

NOTE Confidence: 0.8933656

00:33:30.380 --> 00:33:30.860 In particular,

NOTE Confidence: 0.8933656

00:33:30.860 --> 00:33:32.780 I'm going to talk to you about something

NOTE Confidence: 0.8933656

00:33:32.826 --> 00:33:34.176 that we call the Warburg index,

NOTE Confidence: 0.8933656

00:33:34.180 --> 00:33:36.508 which we created here at Yale.

NOTE Confidence: 0.8933656

00:33:36.510 --> 00:33:38.568 And then future directions and things.

NOTE Confidence: 0.8933656

00:33:38.570 --> 00:33:40.560 We're looking forward to sharing

NOTE Confidence: 0.8933656

00:33:40.560 --> 00:33:42.550 with everyone in the future.

NOTE Confidence: 0.8933656

00:33:42.550 --> 00:33:45.826 So to move forward and talk about

NOTE Confidence: 0.8933656

00:33:45.826 --> 00:33:48.633 some background. I think that.

NOTE Confidence: 0.8933656

00:33:48.633 --> 00:33:51.738 Glioma has a profound impact.

NOTE Confidence: 0.8933656

00:33:51.740 --> 00:33:54.260 It's a relatively rare disease.

NOTE Confidence: 0.8933656

00:33:54.260 --> 00:33:58.082 But the public burden is substantial, right?

NOTE Confidence: 0.8933656

00:33:58.082 --> 00:34:00.014 I when thinking about the disease,

NOTE Confidence: 0.8933656

00:34:00.020 --> 00:34:03.218 I like to think about important.

NOTE Confidence: 0.8933656

00:34:03.220 --> 00:34:05.458 Public events that have happened recently,

NOTE Confidence: 0.8933656

00:34:05.460 --> 00:34:07.698 so this is.

NOTE Confidence: 0.8933656

00:34:07.700 --> 00:34:11.280 Ted Kennedy, President Kennedy's brother.

NOTE Confidence: 0.8933656

00:34:11.280 --> 00:34:13.610 Who died of glioblastoma as

NOTE Confidence: 0.8933656

00:34:13.610 --> 00:34:16.025 Senator of Massachusetts in 2009?

NOTE Confidence: 0.8933656

00:34:16.025 --> 00:34:18.750 And this is Beau Biden.

NOTE Confidence: 0.8933656

00:34:18.750 --> 00:34:21.650 Vice President Joe Biden son.

NOTE Confidence: 0.8933656

00:34:21.650 --> 00:34:23.216 So he was.

NOTE Confidence: 0.8933656

00:34:23.216 --> 00:34:25.651 Previously, Attorney General Delaware, but.

NOTE Confidence: 0.8933656

00:34:25.651 --> 00:34:28.720 He did die of what is known as an

NOTE Confidence: 0.8933656

00:34:28.814 --> 00:34:31.598 aggressive primary brain tumor,

NOTE Confidence: 0.8933656

00:34:31.600 --> 00:34:34.372 while his father was vice president

NOTE Confidence: 0.8933656

00:34:34.372 --> 00:34:35.758 of our country.

NOTE Confidence: 0.8933656

00:34:35.760 --> 00:34:37.780 And this is John McCain.

NOTE Confidence: 0.8933656

00:34:37.780 --> 00:34:41.585 Who died of glioblastoma as

NOTE Confidence: 0.8933656

00:34:41.585 --> 00:34:43.868 senator from Arizona?

NOTE Confidence: 0.8933656

00:34:43.870 --> 00:34:45.818 And so you know.

NOTE Confidence: 0.8933656

00:34:45.818 --> 00:34:48.740 That was a good introduction to

NOTE Confidence: 0.8933656

00:34:48.849 --> 00:34:51.612 what is a disease that has an annual

NOTE Confidence: 0.8933656

00:34:51.612 --> 00:34:53.670 incidence in the US of 20,000.

NOTE Confidence: 0.8933656

00:34:53.670 --> 00:34:57.400 Is is glioma in general and glioblastoma in

NOTE Confidence: 0.8933656

00:34:57.400 --> 00:35:00.576 particular has an annual incidence of 11,000.

NOTE Confidence: 0.8933656

00:35:00.576 --> 00:35:04.310 Actually almost 12,000 / 11,000.

NOTE Confidence: 0.8933656

00:35:04.310 --> 00:35:06.495 It's the most common primary

NOTE Confidence: 0.8933656

00:35:06.495 --> 00:35:07.806 malignant brain tumor.

NOTE Confidence: 0.8933656

00:35:07.810 --> 00:35:10.530 As Doctor Kai already mentioned,

NOTE Confidence: 0.8933656

00:35:10.530 --> 00:35:12.750 and its five year relative survival,

NOTE Confidence: 0.8933656

00:35:12.750 --> 00:35:14.422 it has increased recently.

NOTE Confidence: 0.8933656

00:35:14.422 --> 00:35:17.552 I'm an optimist, so this is an

NOTE Confidence: 0.8933656

00:35:17.552 --> 00:35:19.754 improvement at 6.8% in five years.

NOTE Confidence: 0.8933656

00:35:19.754 --> 00:35:22.153 Only a few years ago we were

NOTE Confidence: 0.8933656

00:35:22.153 --> 00:35:25.480 discussing numbers in 5% and so.

NOTE Confidence: 0.8933656

00:35:25.480 --> 00:35:26.593 We're moving forward,

NOTE Confidence: 0.8933656

00:35:26.593 --> 00:35:29.699 but we have a lot of movement to do.

NOTE Confidence: 0.8933656

00:35:29.700 --> 00:35:32.360 Glioblastoma is a profound disease,

NOTE Confidence: 0.8933656

00:35:32.360 --> 00:35:33.902 frequently at presentation.

NOTE Confidence: 0.8933656

00:35:33.902 --> 00:35:35.958 This is a case.

NOTE Confidence: 0.8933656

00:35:35.960 --> 00:35:38.060 That I cared for when I was

NOTE Confidence: 0.8933656

00:35:38.060 --> 00:35:39.730 a fellow at Stanford.

NOTE Confidence: 0.8933656

00:35:39.730 --> 00:35:41.870 This is a relatively common

NOTE Confidence: 0.8933656

00:35:41.870 --> 00:35:44.660 scan we see here you have.

NOTE Confidence: 0.8933656

00:35:44.660 --> 00:35:45.232 MRI,

NOTE Confidence: 0.8933656

00:35:45.232 --> 00:35:47.520 gadolinium enhanced T1 sequence

NOTE Confidence: 0.8933656

00:35:47.520 --> 00:35:50.380 where you can see boundaries

NOTE Confidence: 0.8933656

00:35:50.474 --> 00:35:52.498 of blood brain barrier,

NOTE Confidence: 0.8933656

00:35:52.500 --> 00:35:55.190 breakdown of the primary tumor.

NOTE Confidence: 0.8933656

00:35:55.190 --> 00:35:59.096 This is flare processed T2 sequence.

NOTE Confidence: 0.757142588

00:35:59.100 --> 00:36:00.570 Axial projection of the MRI.

NOTE Confidence: 0.757142588

00:36:00.570 --> 00:36:02.395 We can see some changes

NOTE Confidence: 0.757142588

00:36:02.395 --> 00:36:03.490 surrounding the tumor.

NOTE Confidence: 0.757142588

00:36:03.490 --> 00:36:04.920 This is a substantial tumor

NOTE Confidence: 0.757142588

00:36:04.920 --> 00:36:06.350 with lots of Mass Effect.

NOTE Confidence: 0.757142588

00:36:06.350 --> 00:36:09.350 You can see shifting of the normal brain.

NOTE Confidence: 0.757142588

00:36:09.350 --> 00:36:12.146 This patient had relatively mild symptoms.

NOTE Confidence: 0.757142588

00:36:12.150 --> 00:36:14.594 If I recall he had visual field

NOTE Confidence: 0.757142588

00:36:14.594 --> 00:36:17.268 changes and he had a neglect syndrome,

NOTE Confidence: 0.757142588

00:36:17.270 --> 00:36:19.290 but actually really presented

NOTE Confidence: 0.757142588

00:36:19.290 --> 00:36:20.805 mostly because his.

NOTE Confidence: 0.757142588

00:36:20.810 --> 00:36:22.850 Family brought him in and that is true.

NOTE Confidence: 0.757142588

00:36:22.850 --> 00:36:25.405 This is a sudden and dramatic disease,

NOTE Confidence: 0.757142588

00:36:25.410 --> 00:36:27.235 but can actually be relatively

NOTE Confidence: 0.757142588

00:36:27.235 --> 00:36:29.750 subtle as well to some patients,

NOTE Confidence: 0.757142588

00:36:29.750 --> 00:36:30.599 which is remarkable.

NOTE Confidence: 0.856130180909091

00:36:32.930 --> 00:36:35.415 And I like to show this slide

NOTE Confidence: 0.856130180909091

00:36:35.415 --> 00:36:37.090 for three reasons really.

NOTE Confidence: 0.856130180909091

00:36:37.090 --> 00:36:39.650 So despite what is really

NOTE Confidence: 0.856130180909091

00:36:39.650 --> 00:36:41.186 an absolutely remarkable,

NOTE Confidence: 0.856130180909091

00:36:41.190 --> 00:36:44.669 as it's a privilege to talk here.

NOTE Confidence: 0.856130180909091

00:36:44.670 --> 00:36:48.030 Research and clinical endeavor to improve

NOTE Confidence: 0.856130180909091

00:36:48.030 --> 00:36:51.410 care for this category of diseases.

NOTE Confidence: 0.856130180909091

00:36:51.410 --> 00:36:53.366 We still have a standard of

NOTE Confidence: 0.856130180909091

00:36:53.366 --> 00:36:55.063 care in glioblastoma from 2005.

NOTE Confidence: 0.856130180909091

00:36:55.063 --> 00:36:57.028 This is the Stroop paper,

NOTE Confidence: 0.856130180909091

00:36:57.030 --> 00:36:59.750 also called the Spook Protocol from 2005,

NOTE Confidence: 0.856130180909091

00:36:59.750 --> 00:37:02.590 and it demonstrated that patients with

NOTE Confidence: 0.856130180909091

00:37:02.590 --> 00:37:04.750 glioblastoma have improved outcomes

NOTE Confidence: 0.856130180909091

00:37:04.750 --> 00:37:06.508 when they are treated with radiotherapy.

NOTE Confidence: 0.856130180909091

00:37:06.510 --> 00:37:08.605 It's really chemo radiation radiotherapy

NOTE Confidence: 0.856130180909091

00:37:08.605 --> 00:37:12.490 plus temodar at the same time, followed by.

NOTE Confidence: 0.856130180909091

00:37:12.490 --> 00:37:15.676 Excuse me, temozolomide after radiation.

NOTE Confidence: 0.856130180909091

00:37:15.676 --> 00:37:18.391 And they have improved outcomes

NOTE Confidence: 0.856130180909091

00:37:18.391 --> 00:37:20.570 compared to radiation alone.

NOTE Confidence: 0.856130180909091

00:37:20.570 --> 00:37:21.226 But as I said,

NOTE Confidence: 0.856130180909091

00:37:21.226 --> 00:37:22.829 I like to show a few things here.

NOTE Confidence: 0.856130180909091

00:37:22.830 --> 00:37:25.230 So we have a great deal of patients

NOTE Confidence: 0.856130180909091

00:37:25.230 --> 00:37:27.739 who have died and very quickly and

NOTE Confidence: 0.856130180909091

00:37:27.739 --> 00:37:29.990 this is relatively noisy out here,

NOTE Confidence: 0.856130180909091

00:37:29.990 --> 00:37:32.104 but we still have a number of

NOTE Confidence: 0.856130180909091

00:37:32.104 --> 00:37:34.014 patients to measure the effect so

NOTE Confidence: 0.856130180909091

00:37:34.014 --> 00:37:35.982 you can see that there's a lot

NOTE Confidence: 0.856130180909091

00:37:35.982 --> 00:37:37.550 of room to grow as I mentioned.

NOTE Confidence: 0.856130180909091

00:37:37.550 --> 00:37:38.300 But in addition,

NOTE Confidence: 0.856130180909091

00:37:38.300 --> 00:37:39.800 you can see something else that's

NOTE Confidence: 0.856130180909091

00:37:39.800 --> 00:37:41.424 interesting, which is that.

NOTE Confidence: 0.856130180909091

00:37:41.424 --> 00:37:44.172 There are a number of patients

NOTE Confidence: 0.856130180909091

00:37:44.172 --> 00:37:47.476 that survive and a long time years.

NOTE Confidence: 0.856130180909091

00:37:47.480 --> 00:37:49.972 And it's very difficult to predict as

NOTE Confidence: 0.856130180909091

00:37:49.972 --> 00:37:51.970 doctor time mentioned at the start.

NOTE Confidence: 0.856130180909091

00:37:51.970 --> 00:37:54.140 Who is going to come from here

NOTE Confidence: 0.856130180909091

00:37:54.220 --> 00:37:55.279 and still live?

NOTE Confidence: 0.856130180909091

00:37:55.280 --> 00:37:57.940 We don't have prognostic or

NOTE Confidence: 0.856130180909091

00:37:57.940 --> 00:38:00.600 diagnostic ways of determining this.

NOTE Confidence: 0.856130180909091

00:38:00.600 --> 00:38:06.018 So in order to discuss another related

NOTE Confidence: 0.856130180909091

00:38:06.018 --> 00:38:10.488 but somewhat complementary fact of care for.

NOTE Confidence: 0.856130180909091

00:38:10.490 --> 00:38:12.644 Brain tumors currently is the delayed

NOTE Confidence: 0.856130180909091

00:38:12.644 --> 00:38:14.813 results of other clinical trials in

NOTE Confidence: 0.856130180909091

00:38:14.813 --> 00:38:16.829 patients who have tumors that are

NOTE Confidence: 0.856130180909091

00:38:16.829 --> 00:38:18.589 less aggressive than glioblastoma.

NOTE Confidence: 0.856130180909091

00:38:18.590 --> 00:38:23.604 So these are the results of the RTOG 9402.

NOTE Confidence: 0.856130180909091

00:38:23.604 --> 00:38:24.818 Clinical trial.

NOTE Confidence: 0.856130180909091

00:38:24.818 --> 00:38:27.853 That really targeted a moderate

NOTE Confidence: 0.856130180909091

00:38:27.853 --> 00:38:29.640 severity brain tumor,

NOTE Confidence: 0.856130180909091

00:38:29.640 --> 00:38:31.672 and anaplastic oligodendroglia OMA

NOTE Confidence: 0.856130180909091

00:38:31.672 --> 00:38:34.212 and oligo astrocytoma although oligo.

NOTE Confidence: 0.856130180909091

00:38:34.220 --> 00:38:37.580 Astrocytoma is a relatively antiquated term.

NOTE Confidence: 0.856130180909091

00:38:37.580 --> 00:38:38.672 In this.

NOTE Confidence: 0.856130180909091

00:38:38.672 --> 00:38:40.310 Protocol enrolled patients,

NOTE Confidence: 0.856130180909091

00:38:40.310 --> 00:38:42.842 and similarly to the Stu Protocol

NOTE Confidence: 0.856130180909091

00:38:42.842 --> 00:38:44.530 patients received either chemotherapy,

NOTE Confidence: 0.856130180909091

00:38:44.530 --> 00:38:46.278 this time with PCV,

NOTE Confidence: 0.856130180909091

00:38:46.278 --> 00:38:47.589 chemotherapy with radiation,

NOTE Confidence: 0.856130180909091

00:38:47.590 --> 00:38:50.348 or radiation alone. And you can see.

NOTE Confidence: 0.856130180909091

00:38:50.350 --> 00:38:52.750 Approximately 10 years in 2006,

NOTE Confidence: 0.856130180909091

00:38:52.750 --> 00:38:54.190 approximately 10 years after

NOTE Confidence: 0.856130180909091

00:38:54.190 --> 00:38:55.630 the study was started,

NOTE Confidence: 0.856130180909091

00:38:55.630 --> 00:38:57.835 there was no indication as

NOTE Confidence: 0.856130180909091

00:38:57.835 --> 00:38:59.599 to which was superior.

NOTE Confidence: 0.856130180909091

00:38:59.600 --> 00:39:00.752 10 years later,

NOTE Confidence: 0.856130180909091

00:39:00.752 --> 00:39:03.440 almost 20 years after the study began,

NOTE Confidence: 0.856130180909091

00:39:03.440 --> 00:39:04.718 you can actually see a signal,

NOTE Confidence: 0.856130180909091

00:39:04.720 --> 00:39:07.168 and by this analysis it demonstrated

NOTE Confidence: 0.856130180909091

00:39:07.168 --> 00:39:09.666 that patients do better with PCV

NOTE Confidence: 0.856130180909091

00:39:09.666 --> 00:39:11.258 with radiotherapy as compared

NOTE Confidence: 0.856130180909091

00:39:11.258 --> 00:39:13.830 to radiotherapy alone.

NOTE Confidence: 0.856130180909091

00:39:13.830 --> 00:39:15.558 So we have.

NOTE Confidence: 0.856130180909091

00:39:15.560 --> 00:39:17.342 Two processes going on where you

NOTE Confidence: 0.856130180909091

00:39:17.342 --> 00:39:19.480 have a substantial burden of a very

NOTE Confidence: 0.856130180909091

00:39:19.480 --> 00:39:20.965 aggressive disease and difficult to

NOTE Confidence: 0.856130180909091

00:39:20.965 --> 00:39:23.208 predict long term survivors in that disease.

NOTE Confidence: 0.856130180909091

00:39:23.210 --> 00:39:26.997 And then less aggressive tumors we have.

NOTE Confidence: 0.856130180909091

00:39:27.000 --> 00:39:28.257 Prolonged 20 years,

NOTE Confidence: 0.856130180909091

00:39:28.257 --> 00:39:30.352 potentially wait between when we

NOTE Confidence: 0.856130180909091

00:39:30.352 --> 00:39:32.695 institute a standard of care or or

NOTE Confidence: 0.856130180909091

00:39:32.695 --> 00:39:34.867 when we are trying to define the

NOTE Confidence: 0.856130180909091

00:39:34.867 --> 00:39:37.198 same care when we have results that

NOTE Confidence: 0.856130180909091

00:39:37.198 --> 00:39:38.698 help us with that standard of care.

NOTE Confidence: 0.856130180909091

00:39:38.700 --> 00:39:41.227 So this is really good fodder for

NOTE Confidence: 0.856130180909091

00:39:41.227 --> 00:39:43.157 exactly what the context today

NOTE Confidence: 0.856130180909091

00:39:43.157 --> 00:39:44.697 is for other ways.

NOTE Confidence: 0.856130180909091

00:39:44.700 --> 00:39:47.930 Biomarkers of measuring this disease.

NOTE Confidence: 0.856130180909091

00:39:47.930 --> 00:39:49.649 So I want to switch gears for a second

NOTE Confidence: 0.856130180909091

00:39:49.649 --> 00:39:51.347 and also discuss pseudo progression.

NOTE Confidence: 0.856130180909091

00:39:51.350 --> 00:39:51.681 Specifically,

NOTE Confidence: 0.856130180909091

00:39:51.681 --> 00:39:53.998 this is another case that was brought

NOTE Confidence: 0.856130180909091

00:39:53.998 --> 00:39:56.174 up to me when I was a fellow at

NOTE Confidence: 0.925849231666667

00:39:56.180 --> 00:40:00.338 Stanford. This patient had a glioblastoma.

NOTE Confidence: 0.925849231666667

00:40:00.340 --> 00:40:03.484 He underwent treatment and then this is very

NOTE Confidence: 0.925849231666667

00:40:03.484 --> 00:40:05.260 similar pictures as I've shown you before,

NOTE Confidence: 0.925849231666667

00:40:05.260 --> 00:40:08.122 so gadolinium enhanced MRI and flare

NOTE Confidence: 0.925849231666667

00:40:08.122 --> 00:40:11.899 T2 MRI and you can see tumor here.

NOTE Confidence: 0.925849231666667

00:40:11.900 --> 00:40:13.560 So the patient actually

NOTE Confidence: 0.925849231666667

00:40:13.560 --> 00:40:15.635 had growth of the lesion.

NOTE Confidence: 0.925849231666667

00:40:15.640 --> 00:40:18.172 And it was raised whether this

NOTE Confidence: 0.925849231666667

00:40:18.172 --> 00:40:20.860 lesion wasn't true tumor progression,

NOTE Confidence: 0.925849231666667

00:40:20.860 --> 00:40:22.756 or whether it was pseudo progression.

NOTE Confidence: 0.925849231666667

00:40:22.760 --> 00:40:23.696 Pseudo progression,

NOTE Confidence: 0.925849231666667

00:40:23.696 --> 00:40:25.100 largely in necrosis,

NOTE Confidence: 0.925849231666667

00:40:25.100 --> 00:40:26.380 but really a response,

NOTE Confidence: 0.925849231666667

00:40:26.380 --> 00:40:29.010 probably by the tumor and also the brain

NOTE Confidence: 0.925849231666667

00:40:29.010 --> 00:40:31.264 to treatment that we give the patient.

NOTE Confidence: 0.925849231666667

00:40:31.270 --> 00:40:33.770 And so standard of care

NOTE Confidence: 0.925849231666667

00:40:33.770 --> 00:40:35.770 studies include FDG PET,

NOTE Confidence: 0.925849231666667

00:40:35.770 --> 00:40:37.336 which we've heard a lot about in this study,

NOTE Confidence: 0.925849231666667

00:40:37.340 --> 00:40:38.648 and you can see the background,

NOTE Confidence: 0.925849231666667

00:40:38.650 --> 00:40:40.666 as was mentioned, is quite bright.

NOTE Confidence: 0.925849231666667

00:40:40.670 --> 00:40:42.690 This is all normal brain.

NOTE Confidence: 0.925849231666667

00:40:42.690 --> 00:40:44.727 But in the area of this tumor,

NOTE Confidence: 0.925849231666667

00:40:44.730 --> 00:40:46.046 you can see that there is uptake,

NOTE Confidence: 0.925849231666667

00:40:46.050 --> 00:40:47.390 and so this is hypermetabolic.

NOTE Confidence: 0.925849231666667

00:40:47.390 --> 00:40:49.628 It was felt that favored tumor,

NOTE Confidence: 0.925849231666667

00:40:49.630 --> 00:40:51.527 and so this patient went to surgery.

NOTE Confidence: 0.925849231666667

00:40:51.530 --> 00:40:51.907 Unfortunately,

NOTE Confidence: 0.925849231666667

00:40:51.907 --> 00:40:54.169 surgery showed that this patient had

NOTE Confidence: 0.925849231666667

00:40:54.169 --> 00:40:56.090 in crisis with his pseudo progression.

NOTE Confidence: 0.925849231666667

00:40:56.090 --> 00:40:58.209 So it's very challenging to deal with

NOTE Confidence: 0.925849231666667

00:40:58.209 --> 00:41:00.165 pseudo progression in primary brain tumors,

NOTE Confidence: 0.925849231666667

00:41:00.170 --> 00:41:02.501 especially in the setting of the need

NOTE Confidence: 0.925849231666667

00:41:02.501 --> 00:41:05.348 to have a large surgery to confirm.

NOTE Confidence: 0.925849231666667

00:41:05.350 --> 00:41:08.332 So one of the potential areas to

NOTE Confidence: 0.925849231666667

00:41:08.332 --> 00:41:11.043 expand our knowledge is imaging and

NOTE Confidence: 0.925849231666667

00:41:11.043 --> 00:41:13.743 really imaging has moved forward with

NOTE Confidence: 0.925849231666667

00:41:13.743 --> 00:41:16.849 the overall understanding of cancer,

NOTE Confidence: 0.925849231666667

00:41:16.850 --> 00:41:19.034 which has been maybe 100 years

NOTE Confidence: 0.925849231666667

00:41:19.034 --> 00:41:20.490 ago in anatomical disease,

NOTE Confidence: 0.925849231666667

00:41:20.490 --> 00:41:22.940 tumors, balls that are growing

NOTE Confidence: 0.925849231666667

00:41:22.940 --> 00:41:24.410 to physiologic disease,

NOTE Confidence: 0.925849231666667

00:41:24.410 --> 00:41:26.280 tumors that acquire blood vessels

NOTE Confidence: 0.925849231666667

00:41:26.280 --> 00:41:28.984 and other changes as they grow and

NOTE Confidence: 0.925849231666667

00:41:28.984 --> 00:41:30.889 become more aggressive to really,

NOTE Confidence: 0.925849231666667

00:41:30.890 --> 00:41:32.675 what is a metabolic disease

NOTE Confidence: 0.925849231666667

00:41:32.675 --> 00:41:34.103 where they are fundamental,

NOTE Confidence: 0.925849231666667

00:41:34.110 --> 00:41:34.852 likely metabolic?

NOTE Confidence: 0.925849231666667

00:41:34.852 --> 00:41:37.078 Changes that might be the night

NOTE Confidence: 0.925849231666667

00:41:37.078 --> 00:41:39.914 is of cancer and certainly are

NOTE Confidence: 0.925849231666667

00:41:39.914 --> 00:41:41.938 associated with aggressive disease.

NOTE Confidence: 0.925849231666667

00:41:41.940 --> 00:41:43.575 Imaging is really move forward

NOTE Confidence: 0.925849231666667

00:41:43.575 --> 00:41:44.556 with our understanding.

NOTE Confidence: 0.925849231666667

00:41:44.560 --> 00:41:46.037 Anatomical and 1st we were able to,

NOTE Confidence: 0.925849231666667

00:41:46.040 --> 00:41:48.730 just as we showed here.

NOTE Confidence: 0.925849231666667

00:41:48.730 --> 00:41:49.770 See the tumor ball.

NOTE Confidence: 0.925849231666667

00:41:49.770 --> 00:41:51.712 Then we learn much more about the

NOTE Confidence: 0.925849231666667

00:41:51.712 --> 00:41:53.668 tumor by things like perfusion imaging,

NOTE Confidence: 0.925849231666667

00:41:53.670 --> 00:41:55.902 which can tell us a great

NOTE Confidence: 0.925849231666667

00:41:55.902 --> 00:41:57.390 deal about the heterogeneity,

NOTE Confidence: 0.925849231666667

00:41:57.390 --> 00:41:58.839 especially of aggressive

NOTE Confidence: 0.925849231666667

00:41:58.839 --> 00:42:00.288 primary brain tumors.

NOTE Confidence: 0.925849231666667

00:42:00.290 --> 00:42:01.825 And metabolic imaging now has

NOTE Confidence: 0.925849231666667

00:42:01.825 --> 00:42:03.644 become at the forefront where we

NOTE Confidence: 0.925849231666667

00:42:03.644 --> 00:42:05.240 might be able to do many things.

NOTE Confidence: 0.925849231666667

00:42:05.240 --> 00:42:07.424 Potentially, I'll show you.

NOTE Confidence: 0.925849231666667

00:42:07.424 --> 00:42:10.154 Do some prognosis and diagnosis,

NOTE Confidence: 0.925849231666667

00:42:10.160 --> 00:42:11.753 but in addition,

NOTE Confidence: 0.925849231666667

00:42:11.753 --> 00:42:13.877 potentially treatment effect measurements.

NOTE Confidence: 0.925849231666667

00:42:13.880 --> 00:42:15.904 So to understand a little bit more about

NOTE Confidence: 0.925849231666667

00:42:15.904 --> 00:42:18.246 how we could use metabolism in this way,

NOTE Confidence: 0.925849231666667

00:42:18.250 --> 00:42:19.783 I want to talk a little bit

NOTE Confidence: 0.925849231666667

00:42:19.783 --> 00:42:20.830 about the Warburg effect.

NOTE Confidence: 0.925849231666667

00:42:20.830 --> 00:42:21.584 In particular,

NOTE Confidence: 0.925849231666667

00:42:21.584 --> 00:42:23.846 this is probably the most famous

NOTE Confidence: 0.925849231666667

00:42:23.846 --> 00:42:25.768 metabolic change that is known to

NOTE Confidence: 0.925849231666667

00:42:25.768 --> 00:42:27.430 occur in cancer and in primary

NOTE Confidence: 0.925849231666667

00:42:27.489 --> 00:42:29.077 brain tumors in particular.

NOTE Confidence: 0.925849231666667

00:42:29.080 --> 00:42:31.089 So to take everyone back to biochemistry,

NOTE Confidence: 0.925849231666667

00:42:31.090 --> 00:42:32.122 here is a cell,

NOTE Confidence: 0.925849231666667

00:42:32.122 --> 00:42:33.670 and this is the cell membrane,

NOTE Confidence: 0.925849231666667

00:42:33.670 --> 00:42:35.224 and so there's glucose outside the cell,

NOTE Confidence: 0.925849231666667

00:42:35.230 --> 00:42:37.134 and as glucose comes into the cell,

NOTE Confidence: 0.925849231666667

00:42:37.140 --> 00:42:39.478 one of the large junctures is pyruvate,

NOTE Confidence: 0.925849231666667

00:42:39.480 --> 00:42:42.588 and pyruvate can get processed basically

NOTE Confidence: 0.925849231666667

00:42:42.588 --> 00:42:44.142 into oxidative phosphorylation.

NOTE Confidence: 0.925849231666667

00:42:44.150 --> 00:42:45.305 In One Direction.

NOTE Confidence: 0.925849231666667

00:42:45.305 --> 00:42:46.845 And in that direction,

NOTE Confidence: 0.925849231666667

00:42:46.850 --> 00:42:49.490 is mediated largely through the mitochondria.

NOTE Confidence: 0.925849231666667

00:42:49.490 --> 00:42:51.956 You have evolution of CO2 in

NOTE Confidence: 0.925849231666667

00:42:51.956 --> 00:42:53.189 the aqueous cytosol.

NOTE Confidence: 0.925849231666667

00:42:53.190 --> 00:42:54.818 It really transfers back

NOTE Confidence: 0.925849231666667

00:42:54.818 --> 00:42:56.446 and forth to bicarbonate.

NOTE Confidence: 0.925849231666667

00:42:56.450 --> 00:42:56.983 However,

NOTE Confidence: 0.925849231666667

00:42:56.983 --> 00:42:59.648 glycolysis is also a potential

NOTE Confidence: 0.925849231666667

00:42:59.648 --> 00:43:01.780 route for for processing

NOTE Confidence: 0.838773749166667

00:43:01.869 --> 00:43:04.878 of pyruvate, and the end result

NOTE Confidence: 0.838773749166667

00:43:04.878 --> 00:43:06.886 is lactate in glycolysis.

NOTE Confidence: 0.838773749166667

00:43:06.890 --> 00:43:09.514 And so the Warburg effect is in the

NOTE Confidence: 0.838773749166667

00:43:09.514 --> 00:43:11.668 absence of any other stressors,

NOTE Confidence: 0.838773749166667

00:43:11.670 --> 00:43:13.542 including normal blood flow,

NOTE Confidence: 0.838773749166667

00:43:13.542 --> 00:43:16.350 tumors are known to favor glycolysis.

NOTE Confidence: 0.838773749166667

00:43:16.350 --> 00:43:17.778 They shift to lactate,

NOTE Confidence: 0.838773749166667

00:43:17.778 --> 00:43:19.206 they produce more lactate,

NOTE Confidence: 0.838773749166667

00:43:19.210 --> 00:43:21.514 and they undergo less

NOTE Confidence: 0.838773749166667

00:43:21.514 --> 00:43:22.666 oxidative phosphorylation.

NOTE Confidence: 0.838773749166667

00:43:22.670 --> 00:43:23.962 And in this diagram,

NOTE Confidence: 0.838773749166667

00:43:23.962 --> 00:43:26.390 as you move further to the right,

NOTE Confidence: 0.838773749166667

00:43:26.390 --> 00:43:29.050 you have more Warburg effect.

NOTE Confidence: 0.838773749166667

00:43:29.050 --> 00:43:30.866 This preference for glycolysis

NOTE Confidence: 0.838773749166667

00:43:30.866 --> 00:43:32.556 seems unusual initially, however,

NOTE Confidence: 0.838773749166667

00:43:32.556 --> 00:43:34.512 there's really a lot of reasons

NOTE Confidence: 0.838773749166667

00:43:34.512 --> 00:43:36.453 why tumors may benefit hydrocarbon

NOTE Confidence: 0.838773749166667

00:43:36.453 --> 00:43:38.868 backbones and also redox species

NOTE Confidence: 0.838773749166667

00:43:38.868 --> 00:43:41.910 may be usable in biosynthesis,

NOTE Confidence: 0.838773749166667

00:43:41.910 --> 00:43:43.239 especially through the

NOTE Confidence: 0.838773749166667

00:43:43.239 --> 00:43:44.568 pentose phosphate pathway,

NOTE Confidence: 0.838773749166667

00:43:44.570 --> 00:43:46.434 to produce more tumor.

NOTE Confidence: 0.838773749166667

00:43:46.434 --> 00:43:47.366 In addition,

NOTE Confidence: 0.838773749166667

00:43:47.370 --> 00:43:49.022 energy production and also

NOTE Confidence: 0.838773749166667

00:43:49.022 --> 00:43:50.674 really more simpler energy

NOTE Confidence: 0.838773749166667

00:43:50.674 --> 00:43:52.715 apparatus is less vulnerable to

NOTE Confidence: 0.838773749166667

00:43:52.715 --> 00:43:54.625 the oxidative damage that occurs

NOTE Confidence: 0.838773749166667

00:43:54.625 --> 00:43:56.770 in tumors and in normal tissue.

NOTE Confidence: 0.838773749166667

00:43:56.770 --> 00:43:58.738 The resulting acidic environment

NOTE Confidence: 0.838773749166667

00:43:58.738 --> 00:44:01.198 is important for many physiologic

NOTE Confidence: 0.838773749166667

00:44:01.198 --> 00:44:02.890 changes related to tumor,

NOTE Confidence: 0.838773749166667

00:44:02.890 --> 00:44:04.420 including tumor invasion.

NOTE Confidence: 0.905427083333333

00:44:06.990 --> 00:44:09.540 Excuse me and also immunosuppression

NOTE Confidence: 0.905427083333333

00:44:09.540 --> 00:44:12.010 so immune cells less able to attack the

NOTE Confidence: 0.905427083333333

00:44:12.010 --> 00:44:14.403 tumor in the acidic environment and also

NOTE Confidence: 0.905427083333333

00:44:14.403 --> 00:44:16.635 normal tissue that's able to survive.

NOTE Confidence: 0.905427083333333

00:44:16.640 --> 00:44:19.165 It's been linked to tumor

NOTE Confidence: 0.905427083333333

00:44:19.165 --> 00:44:20.175 aggressiveness already.

NOTE Confidence: 0.905427083333333

00:44:20.180 --> 00:44:24.284 And so really is a great target to image.

NOTE Confidence: 0.905427083333333

00:44:24.290 --> 00:44:26.162 So to move forward to how we would image

NOTE Confidence: 0.905427083333333

00:44:26.162 --> 00:44:27.835 them with those methods and some results

NOTE Confidence: 0.905427083333333

00:44:27.835 --> 00:44:30.029 we have as well as current investigations.

NOTE Confidence: 0.905427083333333

00:44:30.030 --> 00:44:32.559 So first I'd like to talk about the deuterium

NOTE Confidence: 0.905427083333333

00:44:32.559 --> 00:44:34.686 metabolic imaging and then the Warburg index.

NOTE Confidence: 0.905427083333333

00:44:34.690 --> 00:44:36.058 So deuterium metabolic imaging.

NOTE Confidence: 0.905427083333333

00:44:36.058 --> 00:44:37.768 Really the credit goes to

NOTE Confidence: 0.905427083333333

00:44:37.768 --> 00:44:39.250 my colleagues at Yale.

NOTE Confidence: 0.905427083333333

00:44:39.250 --> 00:44:42.197 Dr Defeater, Hank debater as well as

NOTE Confidence: 0.905427083333333

00:44:42.197 --> 00:44:45.282 Doctor Robin de Graff who have really done

NOTE Confidence: 0.905427083333333

00:44:45.282 --> 00:44:47.650 an amazing job in developing this tool.

NOTE Confidence: 0.905427083333333

00:44:47.650 --> 00:44:49.750 We are able to give patients

NOTE Confidence: 0.905427083333333

00:44:49.750 --> 00:44:51.150 due to rated glucose,

NOTE Confidence: 0.905427083333333

00:44:51.150 --> 00:44:53.565 so this is heavy water or sorry,

NOTE Confidence: 0.905427083333333

00:44:53.570 --> 00:44:54.634 heavy glucose.

NOTE Confidence: 0.905427083333333

00:44:54.634 --> 00:44:57.826 Basically protons with a neutron attached.

NOTE Confidence: 0.905427083333333

00:44:57.830 --> 00:44:59.720 Patients can drink them and it

NOTE Confidence: 0.905427083333333

00:44:59.720 --> 00:45:01.322 actually goes into their cells

NOTE Confidence: 0.905427083333333

00:45:01.322 --> 00:45:03.275 over the course of about an hour.

NOTE Confidence: 0.905427083333333

00:45:03.280 --> 00:45:05.968 And we can see due to rated lactates

NOTE Confidence: 0.905427083333333

00:45:05.968 --> 00:45:09.571 evolving in tumor and we can see the

NOTE Confidence: 0.905427083333333

00:45:09.571 --> 00:45:11.475 evolution through oxidative phosphorylation

NOTE Confidence: 0.905427083333333

00:45:11.552 --> 00:45:14.072 of glutamate and technically it

NOTE Confidence: 0.905427083333333

00:45:14.072 --> 00:45:16.592 includes glutamate and glutamine signal.

NOTE Confidence: 0.905427083333333

00:45:16.600 --> 00:45:18.500 And as you can see,

NOTE Confidence: 0.905427083333333

00:45:18.500 --> 00:45:21.510 the shifting more towards glycolysis.

NOTE Confidence: 0.905427083333333

00:45:21.510 --> 00:45:24.282 You can actually image a really direct

NOTE Confidence: 0.905427083333333

00:45:24.282 --> 00:45:26.938 bound worker of the Warburg effect.

NOTE Confidence: 0.905427083333333

00:45:26.940 --> 00:45:28.662 So once again, so you have due

NOTE Confidence: 0.905427083333333

00:45:28.662 --> 00:45:30.240 to rated lactate over glutamate,

NOTE Confidence: 0.905427083333333

00:45:30.240 --> 00:45:33.246 really glutamate glutamine is related to

NOTE Confidence: 0.905427083333333

00:45:33.246 --> 00:45:35.250 glycolysis over oxidative phosphorylation,

NOTE Confidence: 0.905427083333333

00:45:35.250 --> 00:45:38.080 which is the Warburg effect.

NOTE Confidence: 0.905427083333333

00:45:38.080 --> 00:45:41.312 So we were able to start with multiple

NOTE Confidence: 0.905427083333333

00:45:41.312 --> 00:45:43.398 different types of brain tumors,

NOTE Confidence: 0.905427083333333

00:45:43.400 --> 00:45:46.097 and I'm going to show you a few today to

NOTE Confidence: 0.905427083333333

00:45:46.097 --> 00:45:47.879 discuss the tumor I mentioned before.

NOTE Confidence: 0.905427083333333

00:45:47.880 --> 00:45:51.030 That medium grade tumor and

NOTE Confidence: 0.905427083333333

00:45:51.030 --> 00:45:52.290 anaplastic oligodendroglia.

NOTE Confidence: 0.905427083333333

00:45:52.290 --> 00:45:53.660 Here you have a patient.

NOTE Confidence: 0.905427083333333

00:45:53.660 --> 00:45:56.754 This is flare. This is post contrast.

NOTE Confidence: 0.905427083333333

00:45:56.760 --> 00:45:58.920 You can see residual chamber.

NOTE Confidence: 0.905427083333333

00:45:58.920 --> 00:46:01.872 The patient has two voxels that are shown

NOTE Confidence: 0.905427083333333

00:46:01.872 --> 00:46:04.606 here in the Mr spectroscopic spectrum,

NOTE Confidence: 0.905427083333333

00:46:04.606 --> 00:46:07.448 and so you can see the glucose

NOTE Confidence: 0.905427083333333

00:46:07.448 --> 00:46:09.540 is measurable in both Spectra,

NOTE Confidence: 0.905427083333333

00:46:09.540 --> 00:46:11.324 and you can see in the map that

NOTE Confidence: 0.905427083333333

00:46:11.324 --> 00:46:13.493 you can see lots of glutamate and

NOTE Confidence: 0.905427083333333

00:46:13.493 --> 00:46:15.560 glutamine evolving in the normal brain,

NOTE Confidence: 0.905427083333333

00:46:15.560 --> 00:46:18.017 so this is really wonderful this tumor.

NOTE Confidence: 0.905427083333333

00:46:18.020 --> 00:46:19.049 So the black,

NOTE Confidence: 0.905427083333333

00:46:19.049 --> 00:46:21.450 sorry the red voxel showing you this

NOTE Confidence: 0.905427083333333

00:46:21.519 --> 00:46:23.919 tumor is producing glutamate and

NOTE Confidence: 0.905427083333333

00:46:23.919 --> 00:46:25.747 glutamine through oxidative phosphorylation,

NOTE Confidence: 0.905427083333333

00:46:25.747 --> 00:46:28.890 similar to perhaps normal brain and really.

NOTE Confidence: 0.905427083333333

00:46:28.890 --> 00:46:30.468 Lactate measurement would be out here.

NOTE Confidence: 0.905427083333333

00:46:30.470 --> 00:46:33.750 We don't see the lactate in either side.

NOTE Confidence: 0.905427083333333

00:46:33.750 --> 00:46:35.843 One of the reasons why this tumor

NOTE Confidence: 0.905427083333333

00:46:35.843 --> 00:46:37.918 may actually have a more favorable

NOTE Confidence: 0.905427083333333

00:46:37.918 --> 00:46:39.783 character is the idea expectation,

NOTE Confidence: 0.905427083333333

00:46:39.790 --> 00:46:42.618 which is famous all over the world.

NOTE Confidence: 0.905427083333333

00:46:42.620 --> 00:46:43.646 Many different cancers,

NOTE Confidence: 0.905427083333333

00:46:43.646 --> 00:46:44.330 including glioma,

NOTE Confidence: 0.905427083333333

00:46:44.330 --> 00:46:46.330 and we have one of the world experts

NOTE Confidence: 0.905427083333333

00:46:46.330 --> 00:46:48.088 and IDH mutant glioma at Yale

NOTE Confidence: 0.905427083333333

00:46:48.088 --> 00:46:50.218 which who is one of my mentors.

NOTE Confidence: 0.905427083333333

00:46:50.220 --> 00:46:53.000 Dr Bendure Ranjit bindra.

NOTE Confidence: 0.905427083333333

00:46:53.000 --> 00:46:55.898 Has really been able to help me

NOTE Confidence: 0.905427083333333

00:46:55.898 --> 00:46:58.205 understand this better isocitrate and

NOTE Confidence: 0.905427083333333

00:46:58.205 --> 00:47:01.636 ideates wild type pathology or sorry

NOTE Confidence: 0.905427083333333

00:47:01.636 --> 00:47:03.592 Physiology produces alphabetically

NOTE Confidence: 0.905427083333333

00:47:03.592 --> 00:47:05.930 rate and with the IDH mutation

NOTE Confidence: 0.905427083333333

00:47:05.930 --> 00:47:07.274 that occurs in tumors,

NOTE Confidence: 0.905427083333333

00:47:07.280 --> 00:47:09.896 there's a hetero diamond and a

NOTE Confidence: 0.905427083333333

00:47:09.896 --> 00:47:12.360 heterodimer produces 2 hydroxy butyrate.

NOTE Confidence: 0.905427083333333

00:47:12.360 --> 00:47:15.167 This has been called a onco metabolite,

NOTE Confidence: 0.905427083333333

00:47:15.170 --> 00:47:17.240 which is a metabolite that

NOTE Confidence: 0.905427083333333

00:47:17.240 --> 00:47:19.310 may actually be involved in

NOTE Confidence: 0.904593892352941

00:47:19.395 --> 00:47:21.675 the production or the

NOTE Confidence: 0.904593892352941

00:47:21.675 --> 00:47:23.385 continuation of tumorigenesis.

NOTE Confidence: 0.904593892352941

00:47:23.390 --> 00:47:24.962 Downstream to two hydroxy

NOTE Confidence: 0.904593892352941

00:47:24.962 --> 00:47:26.534 glutarate in IDH mutant,

NOTE Confidence: 0.904593892352941

00:47:26.540 --> 00:47:28.988 pathophysiology is methylation changes.

NOTE Confidence: 0.904593892352941

00:47:28.988 --> 00:47:31.436 DNA hypermethylation in particularly

NOTE Confidence: 0.904593892352941

00:47:31.436 --> 00:47:33.450 MGMT methylation in gliomas,

NOTE Confidence: 0.904593892352941

00:47:33.450 --> 00:47:36.598 but also histone methylation.

NOTE Confidence: 0.904593892352941

00:47:36.600 --> 00:47:39.072 So I actually had the privilege of caring

NOTE Confidence: 0.904593892352941

00:47:39.072 --> 00:47:41.271 for what is a relatively rare patient

NOTE Confidence: 0.904593892352941

00:47:41.271 --> 00:47:43.577 who is an IDH mutant glioblastoma and

NOTE Confidence: 0.904593892352941

00:47:43.577 --> 00:47:46.196 we were able to actually image the

NOTE Confidence: 0.904593892352941

00:47:46.196 --> 00:47:48.376 tumor with deuterium metabolic imaging.

NOTE Confidence: 0.904593892352941

00:47:48.380 --> 00:47:50.276 This is prior to the patient having surgery,

NOTE Confidence: 0.904593892352941

00:47:50.280 --> 00:47:53.276 so this is really a perfect case

NOTE Confidence: 0.904593892352941

00:47:53.280 --> 00:47:55.120 and so with this case we can see

NOTE Confidence: 0.904593892352941

00:47:55.120 --> 00:47:56.798 here is the recurrent tumor.

NOTE Confidence: 0.904593892352941

00:47:56.800 --> 00:47:58.958 This is once again an idea, glioblastoma.

NOTE Confidence: 0.904593892352941

00:47:58.958 --> 00:48:01.166 You can see that post gadolinium

NOTE Confidence: 0.904593892352941

00:48:01.166 --> 00:48:03.278 scan is showing you tumor there.

NOTE Confidence: 0.904593892352941

00:48:03.280 --> 00:48:05.640 This is evidence of bleeding,

NOTE Confidence: 0.904593892352941

00:48:05.640 --> 00:48:06.648 which is common.

NOTE Confidence: 0.904593892352941

00:48:06.648 --> 00:48:08.664 And this is evidence of diffusion

NOTE Confidence: 0.904593892352941

00:48:08.664 --> 00:48:10.812 weighted changes, which is also common.

NOTE Confidence: 0.904593892352941

00:48:10.812 --> 00:48:12.427 I wanna call your attention

NOTE Confidence: 0.904593892352941

00:48:12.427 --> 00:48:14.429 to voxels one and three here,

NOTE Confidence: 0.904593892352941

00:48:14.430 --> 00:48:15.734 which are up here.

NOTE Confidence: 0.904593892352941

00:48:15.734 --> 00:48:17.364 These are within the tumor.

NOTE Confidence: 0.904593892352941

00:48:17.370 --> 00:48:19.050 And you can see the maps that are

NOTE Confidence: 0.904593892352941

00:48:19.050 --> 00:48:20.272 generated by deterring metabolic

NOTE Confidence: 0.904593892352941

00:48:20.272 --> 00:48:21.768 imaging are really marvelous.

NOTE Confidence: 0.904593892352941

00:48:21.770 --> 00:48:22.900 They show that glucose is

NOTE Confidence: 0.904593892352941

00:48:22.900 --> 00:48:24.030 going everywhere in the brain.

NOTE Confidence: 0.904593892352941

00:48:24.030 --> 00:48:25.350 They show that glutamate and

NOTE Confidence: 0.904593892352941

00:48:25.350 --> 00:48:26.406 glutamine is being produced

NOTE Confidence: 0.904593892352941

00:48:26.406 --> 00:48:27.889 by oxidative phosphorylation,

NOTE Confidence: 0.904593892352941

00:48:27.890 --> 00:48:29.388 as is expected in the normal brain.

NOTE Confidence: 0.904593892352941

00:48:29.390 --> 00:48:31.520 And it's really a totally different

NOTE Confidence: 0.904593892352941

00:48:31.520 --> 00:48:33.370 picture over the brain tumor.

NOTE Confidence: 0.904593892352941

00:48:33.370 --> 00:48:35.106 You can see this is the Warburg index,

NOTE Confidence: 0.904593892352941

00:48:35.110 --> 00:48:36.313 lactate over glutamate.

NOTE Confidence: 0.904593892352941

00:48:36.313 --> 00:48:39.120 Glutamine is a very large peak over

NOTE Confidence: 0.904593892352941

00:48:39.197 --> 00:48:41.934 the tumor and here you have the lactate

NOTE Confidence: 0.904593892352941

00:48:41.934 --> 00:48:44.466 visible on these spectrum and you can see.

NOTE Confidence: 0.904593892352941

00:48:44.466 --> 00:48:46.470 That there is a glutamate glutamine peak.

NOTE Confidence: 0.904593892352941

00:48:46.470 --> 00:48:48.864 It's a little easier to see with voxel one,

NOTE Confidence: 0.904593892352941

00:48:48.864 --> 00:48:50.908 so I'm going to call your attention

NOTE Confidence: 0.904593892352941

00:48:50.908 --> 00:48:52.688 in particular to voxel one,

NOTE Confidence: 0.904593892352941

00:48:52.690 --> 00:48:54.722 and I'm going to show you an IDH

NOTE Confidence: 0.904593892352941

00:48:54.722 --> 00:48:56.571 wild type of much more common

NOTE Confidence: 0.904593892352941

00:48:56.571 --> 00:48:58.920 glioblastoma that we were able to image.

NOTE Confidence: 0.904593892352941

00:48:58.920 --> 00:49:01.097 Call your attention to two voxels in

NOTE Confidence: 0.904593892352941

00:49:01.097 --> 00:49:03.023 the spectroscopy so you can see there

NOTE Confidence: 0.904593892352941

00:49:03.023 --> 00:49:05.113 is 2 which is within the tumor and

NOTE Confidence: 0.904593892352941

00:49:05.113 --> 00:49:07.318 there's one which is within normal brain.

NOTE Confidence: 0.904593892352941

00:49:07.320 --> 00:49:08.646 No lack tating the normal brain,

NOTE Confidence: 0.904593892352941

00:49:08.650 --> 00:49:10.176 lots of glutamate and glutamine in the

NOTE Confidence: 0.904593892352941

00:49:10.176 --> 00:49:12.492 normal brain, but lactate and glutamate,

NOTE Confidence: 0.904593892352941

00:49:12.492 --> 00:49:14.153 glutamine really within the tumor.

NOTE Confidence: 0.904593892352941

00:49:14.153 --> 00:49:15.358 Very little within the tumor,

NOTE Confidence: 0.904593892352941

00:49:15.360 --> 00:49:16.124 almost noise.

NOTE Confidence: 0.904593892352941

00:49:16.124 --> 00:49:18.416 But a very large Warburg effect.

NOTE Confidence: 0.858992581

00:49:20.990 --> 00:49:23.166 This is really an N of 1 experiment

NOTE Confidence: 0.858992581

00:49:23.166 --> 00:49:25.463 but it is very intriguing to see

NOTE Confidence: 0.858992581

00:49:25.463 --> 00:49:27.583 that there is more lactate and

NOTE Confidence: 0.858992581

00:49:27.583 --> 00:49:29.428 almost no glutamate and glutamine

NOTE Confidence: 0.858992581

00:49:29.428 --> 00:49:31.840 in the IDH wildtype yield estimate

NOTE Confidence: 0.858992581

00:49:31.840 --> 00:49:34.165 compared to much more even.

NOTE Confidence: 0.858992581

00:49:34.170 --> 00:49:35.822 Presentation and ideates mutant.

NOTE Confidence: 0.858992581

00:49:35.822 --> 00:49:37.474 We have Western ma.

NOTE Confidence: 0.858992581

00:49:37.480 --> 00:49:39.910 So we've developed a theory that

NOTE Confidence: 0.858992581

00:49:39.910 --> 00:49:41.992 we're very excited about that

NOTE Confidence: 0.858992581

00:49:41.992 --> 00:49:44.296 really the Warburg effect may be

NOTE Confidence: 0.858992581

00:49:44.296 --> 00:49:47.371 blunted or muted in an IDH mutant

NOTE Confidence: 0.858992581

00:49:47.371 --> 00:49:49.681 pathophysiology such that it displays

NOTE Confidence: 0.858992581

00:49:49.681 --> 00:49:53.042 metabolism more like normal brain.

NOTE Confidence: 0.858992581

00:49:53.042 --> 00:49:55.934 Where oxidative phosphorylation occurs.

NOTE Confidence: 0.858992581

00:49:55.940 --> 00:49:57.830 To a greater extent than

NOTE Confidence: 0.858992581

00:49:57.830 --> 00:50:00.350 in a idea 12 type tumor.

NOTE Confidence: 0.858992581

00:50:00.350 --> 00:50:03.437 So you've heard a lot about today,

NOTE Confidence: 0.858992581

00:50:03.440 --> 00:50:05.528 FDG pets, just to go briefly,

NOTE Confidence: 0.858992581

00:50:05.530 --> 00:50:07.636 the way that we would use this to help

NOTE Confidence: 0.858992581

00:50:07.636 --> 00:50:09.817 us with a clinical tool that might

NOTE Confidence: 0.858992581

00:50:09.817 --> 00:50:11.710 show the Warburg effect right now.

NOTE Confidence: 0.858992581

00:50:11.710 --> 00:50:12.100 Really,

NOTE Confidence: 0.858992581

00:50:12.100 --> 00:50:14.830 the the deuterium about imaging is wonderful,

NOTE Confidence: 0.858992581

00:50:14.830 --> 00:50:18.650 but really its preclinical technology.

NOTE Confidence: 0.858992581

00:50:18.650 --> 00:50:21.320 We could actually use potentially

NOTE Confidence: 0.858992581

00:50:21.320 --> 00:50:23.990 EFG patent FDA approved study.

NOTE Confidence: 0.858992581

00:50:23.990 --> 00:50:25.725 Its phosphorylated by hexokinase as

NOTE Confidence: 0.858992581

00:50:25.725 --> 00:50:28.581 it comes into the cell but then really

NOTE Confidence: 0.858992581

00:50:28.581 --> 00:50:30.693 it kind of represents glucose demand.

NOTE Confidence: 0.858992581

00:50:30.700 --> 00:50:32.092 For my purposes,

NOTE Confidence: 0.858992581

00:50:32.092 --> 00:50:35.340 I'm referring to it as the representation

NOTE Confidence: 0.858992581

00:50:35.420 --> 00:50:37.604 of oxidative phosphorylation or from

NOTE Confidence: 0.858992581

00:50:37.604 --> 00:50:41.559 the call of all energy into the tumor.

NOTE Confidence: 0.858992581

00:50:41.560 --> 00:50:44.276 We are combining that it's a multi

NOTE Confidence: 0.858992581

00:50:44.276 --> 00:50:47.215 modality test so the patient also will

NOTE Confidence: 0.858992581

00:50:47.215 --> 00:50:48.939 receive magnetic resonance spectroscopy,

NOTE Confidence: 0.858992581

00:50:48.940 --> 00:50:51.598 this time without a stable isotope

NOTE Confidence: 0.858992581

00:50:51.600 --> 00:50:53.390 measure like the deuterium and

NOTE Confidence: 0.858992581

00:50:53.390 --> 00:50:55.604 we'll be able to measure lactate

NOTE Confidence: 0.858992581

00:50:55.604 --> 00:50:58.054 which we can measure in the clinic.

NOTE Confidence: 0.858992581

00:50:58.060 --> 00:51:00.880 Actually in brain tumors.

NOTE Confidence: 0.858992581

00:51:00.880 --> 00:51:02.488 In the research context,

NOTE Confidence: 0.858992581

00:51:02.488 --> 00:51:04.900 we can also measure 2 hydroxybutyrate,

NOTE Confidence: 0.858992581

00:51:04.900 --> 00:51:06.940 which will be very interesting in this study.

NOTE Confidence: 0.858992581

00:51:06.940 --> 00:51:09.125 To correlate the IDH character

NOTE Confidence: 0.858992581

00:51:09.125 --> 00:51:11.840 of the tumor if you will,

NOTE Confidence: 0.858992581

00:51:11.840 --> 00:51:14.225 and the the other measures

NOTE Confidence: 0.858992581

00:51:14.225 --> 00:51:16.133 including the Warburg index.

NOTE Confidence: 0.858992581

00:51:16.140 --> 00:51:18.444 So the Warburg effect being measured

NOTE Confidence: 0.858992581

00:51:18.444 --> 00:51:21.139 with a multi modality image where we

NOTE Confidence: 0.858992581

00:51:21.139 --> 00:51:23.323 have lactate by Mr spectroscopy over

NOTE Confidence: 0.858992581

00:51:23.323 --> 00:51:25.820 the standard uptake value with dog pet

NOTE Confidence: 0.858992581

00:51:25.820 --> 00:51:28.238 and we are saying that that should

NOTE Confidence: 0.858992581

00:51:28.238 --> 00:51:29.968 be relatively equal hopefully to

NOTE Confidence: 0.858992581

00:51:29.968 --> 00:51:32.099 glycolysis over oxidative phosphorylation.

NOTE Confidence: 0.858992581

00:51:32.100 --> 00:51:33.440 Which is the warburger connectbot.

NOTE Confidence: 0.858992581

00:51:33.440 --> 00:51:35.318 We're labeling that the Warburg index,

NOTE Confidence: 0.858992581

00:51:35.320 --> 00:51:37.602 'cause this can be a tool that

NOTE Confidence: 0.858992581

00:51:37.602 --> 00:51:40.027 we could use now in the clinic.

NOTE Confidence: 0.858992581

00:51:40.030 --> 00:51:42.346 So we're looking forward to starting

NOTE Confidence: 0.858992581

00:51:42.346 --> 00:51:45.573 soon as we transform into a normal

NOTE Confidence: 0.858992581

00:51:45.573 --> 00:51:48.378 process of enrolling patients and

NOTE Confidence: 0.858992581

00:51:48.378 --> 00:51:50.150 observational clinical trials.

NOTE Confidence: 0.858992581

00:51:50.150 --> 00:51:54.046 Will have cohorts of 17 and 1788

NOTE Confidence: 0.858992581

00:51:54.046 --> 00:51:56.362 mutant gliomas and 98 well take

NOTE Confidence: 0.858992581

00:51:56.362 --> 00:51:59.332 llamas and will be performing marked

NOTE Confidence: 0.858992581

00:51:59.332 --> 00:52:01.236 prosperity imaging with protons,

NOTE Confidence: 0.858992581

00:52:01.236 --> 00:52:03.474 no label and measure lactate in

NOTE Confidence: 0.858992581

00:52:03.474 --> 00:52:05.816 two hydroxy glutarate and all of

NOTE Confidence: 0.858992581

00:52:05.816 --> 00:52:08.504 these patients and we will also

NOTE Confidence: 0.858992581

00:52:08.504 --> 00:52:11.270 perform FDG PET and and determine

NOTE Confidence: 0.858992581

00:52:11.270 --> 00:52:14.170 the sort of overall glucose demand

NOTE Confidence: 0.858992581

00:52:14.170 --> 00:52:17.020 energy demand from the tumor.

NOTE Confidence: 0.858992581

00:52:17.020 --> 00:52:19.600 Hopefully we'll be able to enroll

NOTE Confidence: 0.858992581

00:52:19.600 --> 00:52:21.869 these patients in more technical

NOTE Confidence: 0.858992581

00:52:21.869 --> 00:52:24.695 studies where we'll have really a

NOTE Confidence: 0.858992581

00:52:24.700 --> 00:52:26.365 research standard of the Warburg

NOTE Confidence: 0.858992581

00:52:26.365 --> 00:52:28.030 effect through things like the

NOTE Confidence: 0.858992581

00:52:28.091 --> 00:52:29.507 deuterium metabolic imaging stable

NOTE Confidence: 0.858992581

00:52:29.507 --> 00:52:31.922 isotope methods at the same time we

NOTE Confidence: 0.858992581

00:52:31.922 --> 00:52:33.614 all work together in Doctor Defeaters,

NOTE Confidence: 0.858992581

00:52:33.620 --> 00:52:35.840 one of my closest collaborators.

NOTE Confidence: 0.858992581

00:52:35.840 --> 00:52:37.478 And we will then follow this

NOTE Confidence: 0.858992581

00:52:37.478 --> 00:52:39.390 cohort of patients to produce our

NOTE Confidence: 0.858992581

00:52:39.390 --> 00:52:40.918 own clinical outcome measures.

NOTE Confidence: 0.858992581

00:52:40.920 --> 00:52:42.688 Especially interested in progression

NOTE Confidence: 0.858992581

00:52:42.688 --> 00:52:44.898 free survival and overall survival,

NOTE Confidence: 0.858992581

00:52:44.900 --> 00:52:46.772 which will be diverse in this

NOTE Confidence: 0.858992581

00:52:46.772 --> 00:52:48.020 group of patients where

NOTE Confidence: 0.886202197894737

00:52:48.081 --> 00:52:49.887 some patients will have an IDH

NOTE Confidence: 0.886202197894737

00:52:49.887 --> 00:52:52.042 wild type tumor more similar to a

NOTE Confidence: 0.886202197894737

00:52:52.042 --> 00:52:53.920 glioblastoma as I've shown you here,

NOTE Confidence: 0.886202197894737

00:52:53.920 --> 00:52:55.126 and some will have an idea,

NOTE Confidence: 0.886202197894737

00:52:55.130 --> 00:52:56.890 it's mutant chamber more similar

NOTE Confidence: 0.886202197894737

00:52:56.890 --> 00:52:59.350 to these long term patients that

NOTE Confidence: 0.886202197894737

00:52:59.350 --> 00:53:01.975 have very slow growing tumors.

NOTE Confidence: 0.886202197894737

00:53:01.980 --> 00:53:04.370 We will also through collaborations

NOTE Confidence: 0.886202197894737

00:53:04.370 --> 00:53:06.282 with Doctor Marat Daniels.

NOTE Confidence: 0.886202197894737

00:53:06.290 --> 00:53:08.255 Laboratory be able to perform

NOTE Confidence: 0.886202197894737

00:53:08.255 --> 00:53:09.827 whole genome methylation studies

NOTE Confidence: 0.886202197894737

00:53:09.827 --> 00:53:11.608 in all of these patients.

NOTE Confidence: 0.886202197894737

00:53:11.610 --> 00:53:13.224 So we'll have.

NOTE Confidence: 0.886202197894737

00:53:13.224 --> 00:53:15.376 An extraordinarily diverse and

NOTE Confidence: 0.886202197894737

00:53:15.376 --> 00:53:18.698 deep data set where we'll be able

NOTE Confidence: 0.886202197894737

00:53:18.698 --> 00:53:20.483 to potentially use preclinical

NOTE Confidence: 0.886202197894737

00:53:20.483 --> 00:53:22.788 Warburg effect measures to compare

NOTE Confidence: 0.886202197894737

00:53:22.788 --> 00:53:25.210 to Clinical Warburg index measures.

NOTE Confidence: 0.886202197894737

00:53:25.210 --> 00:53:26.965 Compare both of these measures

NOTE Confidence: 0.886202197894737

00:53:26.965 --> 00:53:28.018 to clinical outcomes,

NOTE Confidence: 0.886202197894737

00:53:28.020 --> 00:53:30.603 and then also in a vein of

NOTE Confidence: 0.886202197894737

00:53:30.603 --> 00:53:31.710 precision medicine implications.

NOTE Confidence: 0.886202197894737

00:53:31.710 --> 00:53:33.992 Be able to show exactly how much

NOTE Confidence: 0.886202197894737

00:53:33.992 --> 00:53:36.383 perhaps 2 hydroxy glutarate is being

NOTE Confidence: 0.886202197894737

00:53:36.383 --> 00:53:39.077 produced by the IDH mutant pathophysiology.

NOTE Confidence: 0.886202197894737

00:53:39.080 --> 00:53:41.390 And then what the implications to

NOTE Confidence: 0.886202197894737

00:53:41.390 --> 00:53:43.406 the methylome and the methylation

NOTE Confidence: 0.886202197894737

00:53:43.406 --> 00:53:45.030 of the genome is?

NOTE Confidence: 0.886202197894737

00:53:45.030 --> 00:53:48.318 So future directions we have actually

NOTE Confidence: 0.886202197894737

00:53:48.318 --> 00:53:51.642 recently been able to to image a

NOTE Confidence: 0.886202197894737

00:53:51.642 --> 00:53:53.490 patient within their treatment.

NOTE Confidence: 0.886202197894737

00:53:53.490 --> 00:53:54.750 So I've shown you once again,

NOTE Confidence: 0.886202197894737

00:53:54.750 --> 00:53:56.030 IDH mutant glioblastoma and

NOTE Confidence: 0.886202197894737

00:53:56.030 --> 00:53:57.770 I've shown you idh, wildtype,

NOTE Confidence: 0.886202197894737

00:53:57.770 --> 00:53:58.690 Leo Lester,

NOTE Confidence: 0.886202197894737

00:53:58.690 --> 00:54:00.530 mother relatively similar appearing.

NOTE Confidence: 0.886202197894737

00:54:00.530 --> 00:54:02.270 If you're not looking at the

NOTE Confidence: 0.886202197894737

00:54:02.270 --> 00:54:03.140 spectrum per say.

NOTE Confidence: 0.886202197894737

00:54:03.140 --> 00:54:05.438 Looks like very large warburger effects.

NOTE Confidence: 0.886202197894737

00:54:05.440 --> 00:54:07.948 Classic aggressive tumor.

NOTE Confidence: 0.886202197894737

00:54:07.950 --> 00:54:10.414 We had a patient who had a glioblastoma

NOTE Confidence: 0.886202197894737

00:54:10.414 --> 00:54:11.751 shortly following chemoradiation and

NOTE Confidence: 0.886202197894737

00:54:11.751 --> 00:54:14.061 when we imaged this patient we were

NOTE Confidence: 0.886202197894737

00:54:14.061 --> 00:54:16.290 unable to detect the word with effect on.

NOTE Confidence: 0.886202197894737

00:54:16.290 --> 00:54:18.022 This is very exciting.

NOTE Confidence: 0.886202197894737

00:54:18.022 --> 00:54:20.620 We potentially have not only implications

NOTE Confidence: 0.886202197894737

00:54:20.688 --> 00:54:23.528 to diagnostic and prognostic implications,

NOTE Confidence: 0.886202197894737

00:54:23.530 --> 00:54:25.714 as I was mentioning before with

NOTE Confidence: 0.886202197894737

00:54:25.714 --> 00:54:27.476 the Warburg Index clinical study.

NOTE Confidence: 0.886202197894737

00:54:27.476 --> 00:54:30.140 But now we have the potential to follow

NOTE Confidence: 0.886202197894737

00:54:30.200 --> 00:54:32.438 the same patient during their course.

NOTE Confidence: 0.886202197894737

00:54:32.440 --> 00:54:33.715 Where perhaps there are dynamic

NOTE Confidence: 0.886202197894737

00:54:33.715 --> 00:54:34.735 changes within the tumor.

NOTE Confidence: 0.886202197894737

00:54:34.740 --> 00:54:36.596 Perhaps this is just a time when we,

NOTE Confidence: 0.886202197894737

00:54:36.600 --> 00:54:39.453 when we caught this tumor and it was less,

NOTE Confidence: 0.886202197894737

00:54:39.460 --> 00:54:42.015 had less expression of the Warburg effect.

NOTE Confidence: 0.886202197894737

00:54:42.020 --> 00:54:43.838 But perhaps we're able to modify

NOTE Confidence: 0.886202197894737

00:54:43.838 --> 00:54:45.473 the Warburg effect and perhaps

NOTE Confidence: 0.886202197894737

00:54:45.473 --> 00:54:47.308 the aggressiveness of the tumor.

NOTE Confidence: 0.886202197894737

00:54:47.310 --> 00:54:48.870 With treatment that we do,

NOTE Confidence: 0.886202197894737

00:54:48.870 --> 00:54:50.902 and really if we can find that this

NOTE Confidence: 0.886202197894737

00:54:50.902 --> 00:54:53.079 is what we're really targeting and not

NOTE Confidence: 0.886202197894737

00:54:53.079 --> 00:54:55.509 the changes that can be so confusing.

NOTE Confidence: 0.886202197894737

00:54:55.510 --> 00:54:57.840 For example with pseudo progression.

NOTE Confidence: 0.886202197894737

00:54:57.840 --> 00:55:00.036 Then that's a very exciting frontier,

NOTE Confidence: 0.886202197894737

00:55:00.040 --> 00:55:01.700 so we're hopeful with the

NOTE Confidence: 0.886202197894737

00:55:01.700 --> 00:55:03.028 translational award moving forward,

NOTE Confidence: 0.886202197894737

00:55:03.030 --> 00:55:05.614 that we'll be able to scan some of

NOTE Confidence: 0.886202197894737

00:55:05.614 --> 00:55:07.477 these patients longitudinally both

NOTE Confidence: 0.886202197894737

00:55:07.477 --> 00:55:09.562 before and after chemo radiation.

NOTE Confidence: 0.886202197894737

00:55:09.562 --> 00:55:10.696 But in addition,

NOTE Confidence: 0.886202197894737

00:55:10.700 --> 00:55:12.206 along the way we scan patients

NOTE Confidence: 0.886202197894737

00:55:12.206 --> 00:55:13.820 in the clinic every two months.

NOTE Confidence: 0.886202197894737

00:55:13.820 --> 00:55:16.445 And so if we could potentially get

NOTE Confidence: 0.886202197894737

00:55:16.445 --> 00:55:19.109 metabolic imaging for all of these patients.

NOTE Confidence: 0.886202197894737

00:55:19.110 --> 00:55:21.860 Then it would potentially change

NOTE Confidence: 0.886202197894737

00:55:21.860 --> 00:55:23.510 our management fundamentally.

NOTE Confidence: 0.886202197894737

00:55:23.510 --> 00:55:26.146 I want to thank lots of people

NOTE Confidence: 0.886202197894737

00:55:26.146 --> 00:55:27.706 for all of this effort.

NOTE Confidence: 0.886202197894737

00:55:27.710 --> 00:55:30.250 It's definitely a village doing

NOTE Confidence: 0.886202197894737

00:55:30.250 --> 00:55:31.774 translational neuro oncology.

NOTE Confidence: 0.886202197894737

00:55:31.780 --> 00:55:34.390 This is really my laboratory size.

NOTE Confidence: 0.886202197894737

00:55:34.390 --> 00:55:36.940 My current research assistant and

NOTE Confidence: 0.886202197894737

00:55:36.940 --> 00:55:40.586 I have alumni who are already at

NOTE Confidence: 0.886202197894737

00:55:40.586 --> 00:55:43.580 Duke and NYU and medical school.

NOTE Confidence: 0.886202197894737

00:55:43.580 --> 00:55:45.710 I'm extremely grateful for the

NOTE Confidence: 0.886202197894737

00:55:45.710 --> 00:55:47.840 support I've had here through

NOTE Confidence: 0.886202197894737

00:55:47.915 --> 00:55:49.620 the Y CCI Scholar award.

NOTE Confidence: 0.886202197894737

00:55:49.620 --> 00:55:50.148 Also,

NOTE Confidence: 0.886202197894737

00:55:50.148 --> 00:55:52.260 my collaborators are A1.

NOTE Confidence: 0.886202197894737

00:55:52.260 --> 00:55:54.600 I'm grateful to Doctor Fuchs and

NOTE Confidence: 0.886202197894737

00:55:54.600 --> 00:55:56.160 to the Cancer Center.

NOTE Confidence: 0.886202197894737

00:55:56.160 --> 00:55:58.988 As well as just a multi institutional

NOTE Confidence: 0.886202197894737

00:55:58.988 --> 00:56:00.200 collaboration Dr Wrecked

NOTE Confidence: 0.869939625625

00:56:00.272 --> 00:56:02.360 one of my mentors from Stanford.

NOTE Confidence: 0.869939625625

00:56:02.360 --> 00:56:03.404 All of these individuals.

NOTE Confidence: 0.869939625625

00:56:03.404 --> 00:56:05.400 It's not even a complete list at Yale.

NOTE Confidence: 0.869939625625

00:56:05.400 --> 00:56:06.828 Really need no introduction,

NOTE Confidence: 0.869939625625

00:56:06.828 --> 00:56:08.613 but especially grateful for this

NOTE Confidence: 0.869939625625

00:56:08.613 --> 00:56:10.770 talk for contributions from Doctor

NOTE Confidence: 0.869939625625

00:56:10.770 --> 00:56:12.120 Defeater and Doctor Rothman,

NOTE Confidence: 0.869939625625

00:56:12.120 --> 00:56:14.220 and I want to thank you very

NOTE Confidence: 0.869939625625

00:56:14.283 --> 00:56:16.215 much for all of your attention,

NOTE Confidence: 0.869939625625

00:56:16.220 --> 00:56:17.940 and I think this is time for questions.

NOTE Confidence: 0.7286282868

00:56:18.930 --> 00:56:20.680 Derek, thank you. And yes, we do.

NOTE Confidence: 0.7286282868

00:56:20.680 --> 00:56:22.030 Actually, it's a great talk and

NOTE Confidence: 0.7286282868

00:56:22.030 --> 00:56:23.886 and we do have time for questions.

NOTE Confidence: 0.7286282868

00:56:23.890 --> 00:56:25.678 If if individuals want to submit

NOTE Confidence: 0.7286282868

00:56:25.678 --> 00:56:27.686 that on the chat, so is Zach.

NOTE Confidence: 0.7286282868

00:56:27.686 --> 00:56:29.318 Let me ask you given the

NOTE Confidence: 0.7286282868

00:56:29.318 --> 00:56:31.288 the the thrust of your work,

NOTE Confidence: 0.7286282868

00:56:31.290 --> 00:56:34.839 are there potentially?

NOTE Confidence: 0.7286282868

00:56:34.840 --> 00:56:39.370 Developing on or ongoing targeted approaches.

NOTE Confidence: 0.7286282868

00:56:39.370 --> 00:56:42.478 That would sort of focus on metabolic

NOTE Confidence: 0.7286282868

00:56:42.478 --> 00:56:45.154 pathways coming along that your technology.

NOTE Confidence: 0.7286282868

00:56:45.154 --> 00:56:47.394 Your assessments would actually be

NOTE Confidence: 0.7286282868

00:56:47.394 --> 00:56:49.968 informative for or and or does this

NOTE Confidence: 0.7286282868

00:56:49.968 --> 00:56:51.259 potentially OfferUp new targets.

NOTE Confidence: 0.933018215

00:56:52.220 --> 00:56:53.270 Well, I think it's a great.

NOTE Confidence: 0.933018215

00:56:53.270 --> 00:56:56.894 It's a great question and and I think.

NOTE Confidence: 0.933018215

00:56:56.900 --> 00:56:58.444 There's a couple ways,

NOTE Confidence: 0.933018215

00:56:58.444 --> 00:57:00.720 so actually I VH mutation targeting

NOTE Confidence: 0.933018215

00:57:00.720 --> 00:57:02.420 has really gone both ways.

NOTE Confidence: 0.933018215

00:57:02.420 --> 00:57:04.646 In our field it has been proposed

NOTE Confidence: 0.933018215

00:57:04.646 --> 00:57:06.152 that IDH mutant pathophysiology

NOTE Confidence: 0.933018215

00:57:06.152 --> 00:57:09.044 should be blocked with an inhibitor.

NOTE Confidence: 0.933018215

00:57:09.050 --> 00:57:10.730 And there's current clinical

NOTE Confidence: 0.933018215

00:57:10.730 --> 00:57:12.122 trials in that vein.

NOTE Confidence: 0.933018215

00:57:12.122 --> 00:57:14.390 And then there's the exact opposite approach,

NOTE Confidence: 0.933018215

00:57:14.390 --> 00:57:16.742 which is that IDH mutant pathophysiology

NOTE Confidence: 0.933018215

00:57:16.742 --> 00:57:19.513 conveys really a weakness that needs to

NOTE Confidence: 0.933018215

00:57:19.513 --> 00:57:21.408 be targeted and potentially promoted,

NOTE Confidence: 0.933018215

00:57:21.410 --> 00:57:23.610 which is really not just.

NOTE Confidence: 0.933018215

00:57:23.610 --> 00:57:26.410 To paraphrase simply Doctor Bender,

NOTE Confidence: 0.933018215

00:57:26.410 --> 00:57:27.859 thrust of work,

NOTE Confidence: 0.933018215

00:57:27.859 --> 00:57:30.274 and so this is actually.

NOTE Confidence: 0.933018215

00:57:30.280 --> 00:57:31.856 Pretty interested in potentially

NOTE Confidence: 0.933018215

00:57:31.856 --> 00:57:33.432 performing animal models where

NOTE Confidence: 0.933018215

00:57:33.432 --> 00:57:35.408 we can show them metabolic,

NOTE Confidence: 0.933018215

00:57:35.410 --> 00:57:37.006 correlate, Stew these interventions,

NOTE Confidence: 0.933018215

00:57:37.006 --> 00:57:39.400 but we have the potential also

NOTE Confidence: 0.933018215

00:57:39.469 --> 00:57:41.077 for doing so in the clinic,

NOTE Confidence: 0.933018215

00:57:41.080 --> 00:57:44.034 and that's really why I find the

NOTE Confidence: 0.933018215

00:57:44.034 --> 00:57:46.911 Warburg index as opposed to the pre

NOTE Confidence: 0.933018215

00:57:46.911 --> 00:57:48.777 clinical measures to be so exciting.

NOTE Confidence: 0.933018215

00:57:48.780 --> 00:57:51.388 This could be put in as an endpoint

NOTE Confidence: 0.933018215

00:57:51.388 --> 00:57:53.420 and potentially a phase two or

NOTE Confidence: 0.933018215

00:57:53.420 --> 00:57:55.055 phase three study very shortly,

NOTE Confidence: 0.933018215

00:57:55.060 --> 00:57:57.334 so hopefully over the next year

NOTE Confidence: 0.933018215

00:57:57.334 --> 00:57:59.758 I'll be able to recruit these

NOTE Confidence: 0.933018215

00:57:59.758 --> 00:58:01.048 cohorts and really have some

NOTE Confidence: 0.933018215

00:58:01.048 --> 00:58:02.080 exciting things to share.

NOTE Confidence: 0.7861976375

00:58:03.170 --> 00:58:05.866 Great, well I look forward to it Zack.

NOTE Confidence: 0.7861976375

00:58:05.870 --> 00:58:07.920 So it is the top of the hour and I

NOTE Confidence: 0.7861976375

00:58:07.989 --> 00:58:09.801 want to be sensitive to everyone's

NOTE Confidence: 0.7861976375

00:58:09.801 --> 00:58:12.184 time so I wanna thank Zack and

NOTE Confidence: 0.7861976375

00:58:12.184 --> 00:58:14.029 Jason for really 2 outstanding

NOTE Confidence: 0.7861976375

00:58:14.029 --> 00:58:15.925 and informative talks about novel

NOTE Confidence: 0.7861976375

00:58:15.925 --> 00:58:18.235 approaches to imaging for the CNS.

NOTE Confidence: 0.7861976375

00:58:18.240 --> 00:58:20.744 And of course thank all of you for

NOTE Confidence: 0.7861976375

00:58:20.744 --> 00:58:22.476 joining us today and enjoy the

NOTE Confidence: 0.7861976375

00:58:22.476 --> 00:58:23.780 rest of your day. Thank you.

NOTE Confidence: 0.28943613

00:58:25.930 --> 00:58:26.000 She.