WEBVTT

NOTE duration: ”00:19:35.296”

NOTE Confidence: 0.983225

00:00:00.160 --> 00:00:02.500 And finally, we have our

NOTE Confidence: 0.983225

00:00:02.639 --> 00:00:04.180 tech keynote speaker,

NOTE Confidence: 0.9458515

00:00:04.480 --> 00:00:05.779 doctor Luke Lee,

NOTE Confidence: 0.99756455

00:00:06.160 --> 00:00:07.779 who is professor of medicine

NOTE Confidence: 0.99756455

00:00:07.919 --> 00:00:09.519 at Harvard Medical School and

NOTE Confidence: 0.99756455

00:00:09.519 --> 00:00:10.500 senior investigator

NOTE Confidence: 0.99585164

00:00:11.039 --> 00:00:12.660 at Brigham and Women's Hospital.

NOTE Confidence: 0.8677988

00:00:14.215 --> 00:00:15.815 Doctor Lee has a very

NOTE Confidence: 0.8677988

00:00:15.815 --> 00:00:16.315 illustrious,

NOTE Confidence: 0.99863803

00:00:17.015 --> 00:00:17.515 career.

NOTE Confidence: 0.9364246

00:00:18.055 --> 00:00:19.595 He, was the distinguished

NOTE Confidence: 0.985091

00:00:20.215 --> 00:00:21.995 professor at UC Berkeley,

NOTE Confidence: 0.9787363

00:00:23.575 --> 00:00:24.055 and,

NOTE Confidence: 0.9732044

00:00:24.454 --> 00:00:26.295 he was the the chair

NOTE Confidence: 0.9732044

00:00:26.295 --> 00:00:26.614 in

NOTE Confidence: 0.9803313

00:00:27.200 --> 00:00:29.300 chair professor in systems nanobiology

NOTE Confidence: 0.99390465

00:00:30.000 --> 00:00:31.680 at the ETH Zurich in

NOTE Confidence: 0.99390465

00:00:31.680 --> 00:00:32.420 in Switzerland.

NOTE Confidence: 0.9962573

00:00:32.960 --> 00:00:34.979 He has received many prizes

NOTE Confidence: 0.9860789

00:00:35.520 --> 00:00:37.300 and is recognized as fellow

NOTE Confidence: 0.9860789

00:00:37.600 --> 00:00:38.900 of the Royal Society

NOTE Confidence: 0.9720887

00:00:39.520 --> 00:00:40.180 of Chemistry

NOTE Confidence: 0.99657047

00:00:40.755 --> 00:00:42.435 and the American Institute of

NOTE Confidence: 0.99657047

00:00:42.435 --> 00:00:44.135 Medical and Biological Engineering.

NOTE Confidence: 0.9972857

00:00:44.995 --> 00:00:45.495 So,

NOTE Confidence: 0.99310195

00:00:46.435 --> 00:00:48.354 Luke, welcome. Good to see

NOTE Confidence: 0.99310195

00:00:48.354 --> 00:00:50.034 you back here, and I'm

NOTE Confidence: 0.99310195

00:00:50.034 --> 00:00:51.735 looking forward to doing

NOTE Confidence: 0.9846736

00:00:52.115 --> 00:00:54.375 clinical trial on your Parkinson's

NOTE Confidence: 0.9846736

00:00:54.595 --> 00:00:56.040 brains on a chip. K.

NOTE Confidence: 0.9846736

00:00:56.360 --> 00:00:57.800 Thank you very much. It

NOTE Confidence: 0.9846736

00:00:57.800 --> 00:00:58.780 is my honor

NOTE Confidence: 0.95691574

00:00:59.160 --> 00:00:59.880 and joy,

NOTE Confidence: 0.9988281

00:01:00.600 --> 00:01:01.420 to be here.

NOTE Confidence: 0.9268282

00:01:01.880 --> 00:01:03.400 Actually, I learned a lot

NOTE Confidence: 0.9268282

00:01:03.400 --> 00:01:04.600 today because I'm not a

NOTE Confidence: 0.9268282

00:01:04.600 --> 00:01:07.000 really Parkinson's disease biologist or

NOTE Confidence: 0.9268282

00:01:07.000 --> 00:01:07.500 clinician,

NOTE Confidence: 0.9374552

00:01:08.255 --> 00:01:09.075 but I'm learning.

NOTE Confidence: 0.93564826

00:01:09.694 --> 00:01:10.515 And so,

NOTE Confidence: 0.99884427

00:01:10.975 --> 00:01:11.715 it is

NOTE Confidence: 0.8000455

00:01:12.095 --> 00:01:13.935 quite exciting because all the

NOTE Confidence: 0.8000455

00:01:13.935 --> 00:01:14.435 speaker

NOTE Confidence: 0.9632405

00:01:15.455 --> 00:01:16.655 actually told me a lot

NOTE Confidence: 0.9632405

00:01:16.655 --> 00:01:17.935 of new things. I realized

NOTE Confidence: 0.9632405

00:01:17.935 --> 00:01:18.975 that, wow, I have to

NOTE Confidence: 0.9632405

00:01:18.975 --> 00:01:20.194 still study more.

NOTE Confidence: 0.92516315

00:01:21.055 --> 00:01:21.555 So,

NOTE Confidence: 0.9889073

00:01:22.015 --> 00:01:22.835 at the beginning,

NOTE Confidence: 0.9558607

00:01:23.260 --> 00:01:24.619 I'll talk about some of

NOTE Confidence: 0.9558607

00:01:24.619 --> 00:01:26.720 the engineering background or molecular

NOTE Confidence: 0.9558607

00:01:26.780 --> 00:01:28.619 diagnostic, which is which you

NOTE Confidence: 0.9558607

00:01:28.619 --> 00:01:29.979 might think that it's nothing

NOTE Confidence: 0.9558607

00:01:29.979 --> 00:01:31.280 to do with the Parkinson's

NOTE Confidence: 0.9558607

00:01:31.420 --> 00:01:32.319 disease, but

NOTE Confidence: 0.99451005

00:01:32.860 --> 00:01:35.259 imagine that, you want to

NOTE Confidence: 0.99451005

00:01:35.259 --> 00:01:37.020 make a very fast early

NOTE Confidence: 0.99451005

00:01:37.020 --> 00:01:37.520 diagnosis

NOTE Confidence: 0.99389255

00:01:37.819 --> 00:01:38.319 of

NOTE Confidence: 0.88862485

00:01:38.805 --> 00:01:40.745 Parkinson's disease or Alzheimer disease,

NOTE Confidence: 0.90044504

00:01:41.605 --> 00:01:42.105 on-site,

NOTE Confidence: 0.99028575

00:01:42.965 --> 00:01:45.125 or every few months or

NOTE Confidence: 0.99028575

00:01:45.125 --> 00:01:46.825 every week, you can make

NOTE Confidence: 0.99028575

00:01:46.965 --> 00:01:48.965 nice diagnostics. So I'll talk

NOTE Confidence: 0.99028575

00:01:48.965 --> 00:01:50.405 about some of the basic

NOTE Confidence: 0.99175143

00:01:51.205 --> 00:01:52.025 oh, sorry.

NOTE Confidence: 0.9037077

00:01:54.800 --> 00:01:55.700 You know, basic,

NOTE Confidence: 0.9853859

00:01:56.080 --> 00:01:57.140 of the device.

NOTE Confidence: 0.99964327

00:01:57.840 --> 00:01:59.440 So our group is known

NOTE Confidence: 0.99964327

00:01:59.440 --> 00:01:59.940 as

NOTE Confidence: 0.90212595

00:02:00.240 --> 00:02:02.480 a patient oriented engineering medicine

NOTE Confidence: 0.90212595

00:02:02.480 --> 00:02:04.240 group. We like to write

NOTE Confidence: 0.90212595

00:02:04.240 --> 00:02:05.700 a poem on the chip.

NOTE Confidence: 0.98957026

00:02:06.745 --> 00:02:07.245 But,

NOTE Confidence: 0.9255387

00:02:07.945 --> 00:02:09.944 William Blake, you already know,

NOTE Confidence: 0.9255387

00:02:09.944 --> 00:02:10.444 but,

NOTE Confidence: 0.8421049

00:02:10.905 --> 00:02:12.584 he summarized my research in

NOTE Confidence: 0.8421049

00:02:12.584 --> 00:02:13.785 four line, but I just

NOTE Confidence: 0.8421049

00:02:13.785 --> 00:02:15.225 introduced you to the time

NOTE Confidence: 0.8421049

00:02:15.225 --> 00:02:17.145 first line, two CO in

NOTE Confidence: 0.8421049

00:02:17.145 --> 00:02:18.205 the grain of sand.

NOTE Confidence: 0.98526466

00:02:19.080 --> 00:02:20.519 To see the world in

NOTE Confidence: 0.98526466

00:02:20.519 --> 00:02:21.660 a grain of sand.

NOTE Confidence: 0.97302306

00:02:22.120 --> 00:02:23.639 Is it possible to gaze

NOTE Confidence: 0.97302306

00:02:23.639 --> 00:02:25.080 at the health status of

NOTE Confidence: 0.97302306

00:02:25.080 --> 00:02:26.840 humanity and the earth in

NOTE Confidence: 0.97302306

00:02:26.840 --> 00:02:28.440 a grain of sand? Can

NOTE Confidence: 0.97302306

00:02:28.440 --> 00:02:30.360 we create smart sands to

NOTE Confidence: 0.97302306

00:02:30.360 --> 00:02:32.540 view DNA and RNA fingerprints

NOTE Confidence: 0.97302306

00:02:32.595 --> 00:02:33.635 from our blood and the

NOTE Confidence: 0.97302306

00:02:33.635 --> 00:02:35.575 earth in real time. Reflecting

NOTE Confidence: 0.97302306

00:02:35.635 --> 00:02:37.315 on Blake's poem in our

NOTE Confidence: 0.97302306

00:02:37.315 --> 00:02:39.315 fast paced world provides an

NOTE Confidence: 0.97302306

00:02:39.315 --> 00:02:39.815 inspiration

NOTE Confidence: 0.98090565

00:02:40.115 --> 00:02:41.975 to find a proactive solution

NOTE Confidence: 0.98090565

00:02:42.115 --> 00:02:43.415 for our global biosecurity.

NOTE Confidence: 0.99931794

00:02:44.115 --> 00:02:45.690 The world is more dangerous

NOTE Confidence: 0.99761194

00:02:46.169 --> 00:02:47.550 today due to the emergence

NOTE Confidence: 0.99761194

00:02:47.610 --> 00:02:49.310 and spread of new infectious

NOTE Confidence: 0.99761194

00:02:49.530 --> 00:02:50.030 diseases.

NOTE Confidence: 0.9328388

00:02:50.410 --> 00:02:52.169 With smart SANS, we can

NOTE Confidence: 0.9328388

00:02:52.169 --> 00:02:54.270 prevent such outbreaks from happening

NOTE Confidence: 0.9328388

00:02:54.330 --> 00:02:55.550 through early detection.

NOTE Confidence: 0.9897365

00:02:56.090 --> 00:02:56.830 We propose

NOTE Confidence: 0.9911423

00:02:57.210 --> 00:02:57.710 SANS

NOTE Confidence: 0.7701367

00:02:58.275 --> 00:02:59.014 speedy analytical

NOTE Confidence: 0.954852

00:02:59.794 --> 00:03:00.775 nano optofluidic

NOTE Confidence: 0.9885236

00:03:02.115 --> 00:03:02.775 diagnostic systems.

NOTE Confidence: 0.98437816

00:03:03.315 --> 00:03:05.475 Smart SANDS are on chip

NOTE Confidence: 0.98437816

00:03:05.475 --> 00:03:07.575 for rapid and accurate molecular

NOTE Confidence: 0.9998622

00:03:07.875 --> 00:03:08.375 diagnostics.

NOTE Confidence: 0.99917287

00:03:09.395 --> 00:03:10.835 Smart SANDS can be used

NOTE Confidence: 0.99917287

00:03:10.835 --> 00:03:12.535 by anyone with a smartphone

NOTE Confidence: 0.9573188

00:03:12.995 --> 00:03:14.650 even in areas where rapid

NOTE Confidence: 0.9573188

00:03:14.650 --> 00:03:16.269 and accurate diagnostics

NOTE Confidence: 0.9987132

00:03:16.569 --> 00:03:17.629 are usually inaccessible.

NOTE Confidence: 0.924097

00:03:18.569 --> 00:03:20.510 Smart sands will be globally

NOTE Confidence: 0.924097

00:03:20.650 --> 00:03:22.730 connected to an integrated data

NOTE Confidence: 0.924097

00:03:22.730 --> 00:03:25.129 hub. Smart sands rapid and

NOTE Confidence: 0.924097

00:03:25.129 --> 00:03:26.349 accurate molecular

NOTE Confidence: 0.9979651

00:03:26.650 --> 00:03:27.150 diagnostic

NOTE Confidence: 0.95622087

00:03:27.530 --> 00:03:29.055 network for human, agricultural,

NOTE Confidence: 0.9844098

00:03:29.995 --> 00:03:32.334 and environmental health will radically

NOTE Confidence: 0.9844098

00:03:32.475 --> 00:03:34.635 improve global health care and

NOTE Confidence: 0.9844098

00:03:34.635 --> 00:03:36.315 empower us to create a

NOTE Confidence: 0.9844098

00:03:36.315 --> 00:03:37.295 new proactive,

NOTE Confidence: 0.99216986

00:03:37.755 --> 00:03:39.295 predictive, and preventative

NOTE Confidence: 0.9501721

00:03:39.595 --> 00:03:42.240 paradigm for enhancing global biosecurity.

NOTE Confidence: 0.9501721

00:03:42.400 --> 00:03:42.900 Security.

NOTE Confidence: 0.99912167

00:03:43.200 --> 00:03:45.040 Is it possible to gaze

NOTE Confidence: 0.99912167

00:03:45.040 --> 00:03:46.560 at the health status of

NOTE Confidence: 0.99912167

00:03:46.560 --> 00:03:47.060 humanity

NOTE Confidence: 0.95407563

00:03:47.360 --> 00:03:48.480 and the earth in a

NOTE Confidence: 0.95407563

00:03:48.480 --> 00:03:49.780 grain of sand?

NOTE Confidence: 0.8857983

00:03:51.120 --> 00:03:53.060 So this was actually proposed

NOTE Confidence: 0.8857983

00:03:53.200 --> 00:03:53.700 that,

NOTE Confidence: 0.97361344

00:03:54.080 --> 00:03:55.920 to Singapore government ten years

NOTE Confidence: 0.97361344

00:03:55.920 --> 00:03:56.420 ago.

NOTE Confidence: 0.98802394

00:03:57.385 --> 00:03:59.165 Imagine if we had this

NOTE Confidence: 0.9957463

00:03:59.625 --> 00:04:01.325 molecular diagnostic system

NOTE Confidence: 0.84925765

00:04:01.865 --> 00:04:03.865 that we developed the, photonic

NOTE Confidence: 0.84925765

00:04:03.865 --> 00:04:05.165 PCR on a chip

NOTE Confidence: 0.9440209

00:04:05.705 --> 00:04:06.685 in three minute.

NOTE Confidence: 0.9811519

00:04:07.065 --> 00:04:07.565 The

NOTE Confidence: 0.94704455

00:04:07.865 --> 00:04:09.785 the COVID situation could be

NOTE Confidence: 0.94704455

00:04:09.785 --> 00:04:10.765 completely different.

NOTE Confidence: 0.9575086

00:04:11.240 --> 00:04:12.760 But now, I didn't give

NOTE Confidence: 0.9575086

00:04:12.760 --> 00:04:13.880 up. So I'm trying to

NOTE Confidence: 0.9575086

00:04:13.880 --> 00:04:14.860 add the molecular,

NOTE Confidence: 0.99943304

00:04:15.480 --> 00:04:15.980 biomarker

NOTE Confidence: 0.9823335

00:04:16.680 --> 00:04:18.440 of the different disease, not

NOTE Confidence: 0.9823335

00:04:18.440 --> 00:04:20.440 only infectious disease. So you

NOTE Confidence: 0.9823335

00:04:20.440 --> 00:04:21.420 can think about,

NOTE Confidence: 0.7994547

00:04:22.040 --> 00:04:22.540 monitoring,

NOTE Confidence: 0.9739714

00:04:23.160 --> 00:04:24.540 molecular level informations.

NOTE Confidence: 0.90256476

00:04:26.105 --> 00:04:28.265 So, just for example, this

NOTE Confidence: 0.90256476

00:04:28.265 --> 00:04:29.305 is quite a long time

NOTE Confidence: 0.90256476

00:04:29.305 --> 00:04:31.145 ago. We developed a a

NOTE Confidence: 0.90256476

00:04:31.145 --> 00:04:31.964 smart sand,

NOTE Confidence: 0.9979019

00:04:32.665 --> 00:04:34.285 genomic diagnostic system

NOTE Confidence: 0.89668673

00:04:34.665 --> 00:04:35.945 so that we can really

NOTE Confidence: 0.89668673

00:04:35.945 --> 00:04:38.265 make automation sample of sample

NOTE Confidence: 0.89668673

00:04:38.265 --> 00:04:38.845 to prep

NOTE Confidence: 0.987659

00:04:39.150 --> 00:04:41.310 detection can be very fast

NOTE Confidence: 0.987659

00:04:41.310 --> 00:04:42.450 because we integrate

NOTE Confidence: 0.96202356

00:04:42.990 --> 00:04:44.990 sample preparation, which is separating

NOTE Confidence: 0.96202356

00:04:44.990 --> 00:04:46.670 the cell as well, I

NOTE Confidence: 0.96202356

00:04:46.670 --> 00:04:47.410 mean, plasma

NOTE Confidence: 0.7576933

00:04:47.790 --> 00:04:48.430 and then,

NOTE Confidence: 0.8244543

00:04:48.990 --> 00:04:49.490 making,

NOTE Confidence: 0.99773407

00:04:50.110 --> 00:04:51.170 nucleic acid

NOTE Confidence: 0.99663496

00:04:51.525 --> 00:04:53.145 amplification reaction on-site.

NOTE Confidence: 0.93875486

00:04:53.845 --> 00:04:55.605 So this just chip there's

NOTE Confidence: 0.93875486

00:04:55.605 --> 00:04:57.545 no external pump, but it

NOTE Confidence: 0.93875486

00:04:57.605 --> 00:04:59.125 automatically running because there is

NOTE Confidence: 0.93875486

00:04:59.125 --> 00:05:01.765 a mechanical vacuum battery that

NOTE Confidence: 0.93875486

00:05:01.765 --> 00:05:03.065 allow to separate

NOTE Confidence: 0.9695737

00:05:03.650 --> 00:05:05.810 and isolate each chamber. Each

NOTE Confidence: 0.9695737

00:05:05.810 --> 00:05:07.589 chamber will be isolated soon,

NOTE Confidence: 0.9695737

00:05:07.729 --> 00:05:09.409 and then each chamber, you

NOTE Confidence: 0.9695737

00:05:09.409 --> 00:05:09.909 can

NOTE Confidence: 0.9852338

00:05:10.210 --> 00:05:11.909 put different marker

NOTE Confidence: 0.89851654

00:05:12.449 --> 00:05:13.110 so that,

NOTE Confidence: 0.99954283

00:05:13.569 --> 00:05:15.750 you can separate plasma quickly

NOTE Confidence: 0.91115236

00:05:16.529 --> 00:05:17.029 on-site

NOTE Confidence: 0.90218145

00:05:18.585 --> 00:05:19.545 to to the vacuum,

NOTE Confidence: 0.9170389

00:05:19.945 --> 00:05:21.305 battery so you can have

NOTE Confidence: 0.9170389

00:05:21.305 --> 00:05:22.925 a plasma in each chamber

NOTE Confidence: 0.71825665

00:05:24.425 --> 00:05:24.925 that,

NOTE Confidence: 0.95798534

00:05:25.464 --> 00:05:26.904 this is the bad design.

NOTE Confidence: 0.95798534

00:05:26.904 --> 00:05:28.045 And then good design

NOTE Confidence: 0.8846151

00:05:28.505 --> 00:05:30.525 allowed to isolate each each

NOTE Confidence: 0.8846151

00:05:30.665 --> 00:05:31.165 well.

NOTE Confidence: 0.99912876

00:05:31.589 --> 00:05:33.029 So each well can be

NOTE Confidence: 0.99912876

00:05:33.029 --> 00:05:34.250 separated like this

NOTE Confidence: 0.8264813

00:05:35.990 --> 00:05:36.650 and immediately

NOTE Confidence: 0.95362353

00:05:37.350 --> 00:05:38.310 react so that you can

NOTE Confidence: 0.95362353

00:05:38.310 --> 00:05:38.810 detect,

NOTE Confidence: 0.97073317

00:05:39.510 --> 00:05:40.410 different disease.

NOTE Confidence: 0.9238752

00:05:41.350 --> 00:05:43.210 You can really see, even,

NOTE Confidence: 0.8859043

00:05:43.750 --> 00:05:45.270 ten copies per microliter can

NOTE Confidence: 0.8859043

00:05:45.270 --> 00:05:46.390 be detected in a few

NOTE Confidence: 0.8859043

00:05:46.390 --> 00:05:46.890 minutes.

NOTE Confidence: 0.99811435

00:05:47.485 --> 00:05:48.145 This is

NOTE Confidence: 0.73957163

00:05:48.605 --> 00:05:49.105 possible,

NOTE Confidence: 0.97552866

00:05:49.485 --> 00:05:51.325 but, anyway, why I'm showing

NOTE Confidence: 0.97552866

00:05:51.325 --> 00:05:52.525 you this? I want to

NOTE Confidence: 0.97552866

00:05:52.525 --> 00:05:53.965 just give you hope that

NOTE Confidence: 0.97552866

00:05:53.965 --> 00:05:55.085 we can make a very

NOTE Confidence: 0.97552866

00:05:55.085 --> 00:05:57.404 fast diagnostic early diagnostic of,

NOTE Confidence: 0.89610136

00:05:58.205 --> 00:06:00.145 Parkinson's disease or Alzheimer's disease

NOTE Confidence: 0.9580248

00:06:00.525 --> 00:06:02.045 so that we can map

NOTE Confidence: 0.9580248

00:06:02.045 --> 00:06:02.545 out

NOTE Confidence: 0.94356114

00:06:02.910 --> 00:06:04.910 environmental factor because we can

NOTE Confidence: 0.94356114

00:06:04.910 --> 00:06:06.130 detect also,

NOTE Confidence: 0.9224595

00:06:06.830 --> 00:06:07.650 water pollution,

NOTE Confidence: 0.93273723

00:06:08.190 --> 00:06:08.690 based,

NOTE Confidence: 0.7945332

00:06:10.190 --> 00:06:10.930 the marker,

NOTE Confidence: 0.88158244

00:06:11.390 --> 00:06:11.950 can be,

NOTE Confidence: 0.8644287

00:06:12.510 --> 00:06:13.010 identified

NOTE Confidence: 0.95394576

00:06:13.630 --> 00:06:15.150 or even food as well

NOTE Confidence: 0.95394576

00:06:15.150 --> 00:06:16.270 as our body and so

NOTE Confidence: 0.95394576

00:06:16.270 --> 00:06:16.770 on.

NOTE Confidence: 0.9234599

00:06:18.214 --> 00:06:19.675 But now I'll talk about

NOTE Confidence: 0.9234599

00:06:19.735 --> 00:06:21.034 dynamic cell culture.

NOTE Confidence: 0.91226256

00:06:21.414 --> 00:06:21.654 So,

NOTE Confidence: 0.9151398

00:06:22.214 --> 00:06:22.714 since,

NOTE Confidence: 0.9848996

00:06:23.095 --> 00:06:24.534 early two thousand, we've been

NOTE Confidence: 0.9848996

00:06:24.534 --> 00:06:26.875 working on so called cultural

NOTE Confidence: 0.9848996

00:06:26.935 --> 00:06:27.435 revolution

NOTE Confidence: 0.9227462

00:06:27.815 --> 00:06:28.714 in recapitulating

NOTE Confidence: 0.8407264

00:06:29.650 --> 00:06:30.150 physiology.

NOTE Confidence: 0.87797827

00:06:30.610 --> 00:06:31.970 Why I'm so talking about

NOTE Confidence: 0.87797827

00:06:31.970 --> 00:06:32.949 cultural revolution?

NOTE Confidence: 0.87011576

00:06:33.650 --> 00:06:35.270 This is fantastic patronage

NOTE Confidence: 0.7392599

00:06:35.729 --> 00:06:37.750 invention of patronage to fantastic

NOTE Confidence: 0.889985

00:06:38.210 --> 00:06:40.449 so that, Robert Koch got

NOTE Confidence: 0.889985

00:06:40.449 --> 00:06:42.529 Nobel Prize because of Petri.

NOTE Confidence: 0.889985

00:06:42.529 --> 00:06:44.525 His student or technician made

NOTE Confidence: 0.889985

00:06:44.525 --> 00:06:45.645 the Picchu dish as an

NOTE Confidence: 0.889985

00:06:45.645 --> 00:06:46.145 invention.

NOTE Confidence: 0.9996915

00:06:46.765 --> 00:06:47.425 This is

NOTE Confidence: 0.931959

00:06:47.885 --> 00:06:49.505 excellent, invention for

NOTE Confidence: 0.82404333

00:06:50.045 --> 00:06:50.865 static condition.

NOTE Confidence: 0.9898468

00:06:51.404 --> 00:06:52.625 But imagine,

NOTE Confidence: 0.9217271

00:06:53.165 --> 00:06:54.705 our cell and our body

NOTE Confidence: 0.9217271

00:06:54.765 --> 00:06:56.045 is supposed to expose to

NOTE Confidence: 0.9217271

00:06:56.045 --> 00:06:57.105 dynamic flow.

NOTE Confidence: 0.9825528

00:06:57.420 --> 00:06:58.400 It's not static.

NOTE Confidence: 0.96433944

00:06:58.860 --> 00:07:00.700 So if you're still, culturing

NOTE Confidence: 0.96433944

00:07:00.700 --> 00:07:02.320 the cell in static condition,

NOTE Confidence: 0.96433944

00:07:02.460 --> 00:07:04.140 you have to question that

NOTE Confidence: 0.96433944

00:07:04.140 --> 00:07:05.520 whether we are still

NOTE Confidence: 0.8018156

00:07:06.380 --> 00:07:08.160 arguing that earth is flat.

NOTE Confidence: 0.9169736

00:07:09.660 --> 00:07:11.440 Well, earth is not moving.

NOTE Confidence: 0.9849558

00:07:12.335 --> 00:07:14.435 Earth is dynamically moving.

NOTE Confidence: 0.86743677

00:07:15.055 --> 00:07:16.355 Our cell is supposed to

NOTE Confidence: 0.86743677

00:07:16.495 --> 00:07:18.575 expose to dynamic condition. For

NOTE Confidence: 0.86743677

00:07:18.575 --> 00:07:19.075 example,

NOTE Confidence: 0.99901426

00:07:20.575 --> 00:07:20.895 this is

NOTE Confidence: 0.95811796

00:07:22.015 --> 00:07:22.675 oh, sorry.

NOTE Confidence: 0.9787624

00:07:24.750 --> 00:07:26.030 So this is a tissue.

NOTE Confidence: 0.9787624

00:07:26.030 --> 00:07:27.170 Right? There is a circulatory

NOTE Confidence: 0.9787624

00:07:27.230 --> 00:07:28.190 flow as well as the

NOTE Confidence: 0.9787624

00:07:28.190 --> 00:07:30.030 interstitial flow. So we have

NOTE Confidence: 0.9787624

00:07:30.030 --> 00:07:31.810 to provide similar dynamic

NOTE Confidence: 0.95764905

00:07:32.430 --> 00:07:33.890 when we culture the,

NOTE Confidence: 0.9155436

00:07:34.590 --> 00:07:35.950 our cell so that we

NOTE Confidence: 0.9155436

00:07:35.950 --> 00:07:36.450 develop

NOTE Confidence: 0.8762277

00:07:36.830 --> 00:07:38.430 the, microfluidic that allow to

NOTE Confidence: 0.8762277

00:07:38.430 --> 00:07:40.095 have, like, blood flow as

NOTE Confidence: 0.8762277

00:07:40.095 --> 00:07:41.535 well as the interstitial flow

NOTE Confidence: 0.8762277

00:07:41.535 --> 00:07:42.655 with the control with the

NOTE Confidence: 0.8762277

00:07:42.655 --> 00:07:43.155 different,

NOTE Confidence: 0.9110165

00:07:44.655 --> 00:07:45.475 flow rate.

NOTE Confidence: 0.9926647

00:07:46.895 --> 00:07:48.335 And then, we can really

NOTE Confidence: 0.9926647

00:07:48.335 --> 00:07:49.935 study what is the best

NOTE Confidence: 0.9926647

00:07:49.935 --> 00:07:51.875 way to reprogram stem cell

NOTE Confidence: 0.96891534

00:07:52.900 --> 00:07:54.120 as well as manipulating,

NOTE Confidence: 0.97950274

00:07:54.740 --> 00:07:55.720 different concentration

NOTE Confidence: 0.9614645

00:07:56.580 --> 00:07:57.620 exposed so that we can

NOTE Confidence: 0.9614645

00:07:57.620 --> 00:07:58.520 have a nice,

NOTE Confidence: 0.87139326

00:07:59.139 --> 00:08:01.220 dynamic cell culture chip so

NOTE Confidence: 0.87139326

00:08:01.220 --> 00:08:02.759 that, this one was

NOTE Confidence: 0.9523283

00:08:03.060 --> 00:08:04.740 acquired by Merck, but then

NOTE Confidence: 0.9523283

00:08:04.740 --> 00:08:07.240 we're still continuing making organoid.

NOTE Confidence: 0.95279026

00:08:07.625 --> 00:08:09.065 Organoid is different than even

NOTE Confidence: 0.95279026

00:08:09.065 --> 00:08:11.385 typical cell culture. So, this

NOTE Confidence: 0.95279026

00:08:11.385 --> 00:08:13.385 is a beautiful organoid that

NOTE Confidence: 0.95279026

00:08:13.385 --> 00:08:14.445 you already know,

NOTE Confidence: 0.988195

00:08:14.985 --> 00:08:15.885 by Lancaster

NOTE Confidence: 0.8960681

00:08:16.745 --> 00:08:17.305 and then,

NOTE Confidence: 0.96875226

00:08:17.865 --> 00:08:19.325 they this is a typical

NOTE Confidence: 0.96875226

00:08:19.625 --> 00:08:21.225 procedure and everybody has a

NOTE Confidence: 0.96875226

00:08:21.225 --> 00:08:22.890 different recipe. You might have

NOTE Confidence: 0.96875226

00:08:22.890 --> 00:08:24.990 a different cooking style. But,

NOTE Confidence: 0.988007

00:08:25.370 --> 00:08:27.070 however, my concern is

NOTE Confidence: 0.9824254

00:08:27.370 --> 00:08:27.870 this

NOTE Confidence: 0.89190745

00:08:28.490 --> 00:08:30.270 is lack of the precision

NOTE Confidence: 0.89190745

00:08:30.330 --> 00:08:30.830 control.

NOTE Confidence: 0.98366606

00:08:32.330 --> 00:08:33.210 How do you deal with

NOTE Confidence: 0.98366606

00:08:33.210 --> 00:08:34.670 this for the drug discovery?

NOTE Confidence: 0.98366606

00:08:34.730 --> 00:08:36.350 Because it's all different stage

NOTE Confidence: 0.9918155

00:08:37.225 --> 00:08:38.985 and different size and different

NOTE Confidence: 0.9918155

00:08:38.985 --> 00:08:39.485 condition

NOTE Confidence: 0.7560251

00:08:40.025 --> 00:08:41.885 even though your culture in

NOTE Confidence: 0.7560251

00:08:42.105 --> 00:08:43.325 same pitcher dish

NOTE Confidence: 0.92757577

00:08:43.865 --> 00:08:45.465 to start with. But when

NOTE Confidence: 0.92757577

00:08:45.465 --> 00:08:47.005 you drop in the bioreactor,

NOTE Confidence: 0.99291956

00:08:47.625 --> 00:08:49.545 you generate all different size

NOTE Confidence: 0.99291956

00:08:49.545 --> 00:08:50.285 and different

NOTE Confidence: 0.7941427

00:08:50.665 --> 00:08:51.165 stage.

NOTE Confidence: 0.8968337

00:08:52.110 --> 00:08:53.570 So, we identify

NOTE Confidence: 0.9480262

00:08:54.110 --> 00:08:55.470 this problem of the non

NOTE Confidence: 0.9480262

00:08:55.470 --> 00:08:55.970 uniformity

NOTE Confidence: 0.97595155

00:08:56.270 --> 00:08:56.770 and

NOTE Confidence: 0.88189334

00:08:57.150 --> 00:08:57.809 and also,

NOTE Confidence: 0.6835226

00:08:58.830 --> 00:08:59.330 oh,

NOTE Confidence: 0.81664115

00:09:00.830 --> 00:09:02.850 sorry. Problem is, also,

NOTE Confidence: 0.9553143

00:09:03.470 --> 00:09:05.890 random screening and operator dependent.

NOTE Confidence: 0.9915023

00:09:06.215 --> 00:09:07.255 So we want to make

NOTE Confidence: 0.9915023

00:09:07.255 --> 00:09:08.455 a solution to make a

NOTE Confidence: 0.9915023

00:09:08.455 --> 00:09:09.995 lab automation and lab

NOTE Confidence: 0.88654953

00:09:10.455 --> 00:09:10.955 skill

NOTE Confidence: 0.8289855

00:09:11.335 --> 00:09:12.395 formation and monitoring.

NOTE Confidence: 0.8332244

00:09:13.735 --> 00:09:14.934 So we call it as

NOTE Confidence: 0.8332244

00:09:14.934 --> 00:09:15.995 a BRAIN MAP,

NOTE Confidence: 0.79776144

00:09:17.095 --> 00:09:17.595 Microphysiological

NOTE Confidence: 0.7974477

00:09:18.215 --> 00:09:19.835 Analysis Platform Map

NOTE Confidence: 0.9607891

00:09:20.279 --> 00:09:21.399 to really make a real

NOTE Confidence: 0.9607891

00:09:21.399 --> 00:09:23.420 time detection and non invasive

NOTE Confidence: 0.9607891

00:09:23.559 --> 00:09:24.779 and sensitive monitoring

NOTE Confidence: 0.98895764

00:09:25.160 --> 00:09:25.899 of neurogenesis

NOTE Confidence: 0.9832982

00:09:26.360 --> 00:09:27.179 or neuropathogenesis

NOTE Confidence: 0.9485376

00:09:28.360 --> 00:09:29.480 as well as a drug

NOTE Confidence: 0.9485376

00:09:29.480 --> 00:09:29.980 discovery.

NOTE Confidence: 0.955278

00:09:31.160 --> 00:09:32.839 So, the purpose of the

NOTE Confidence: 0.955278

00:09:32.839 --> 00:09:34.279 map is to provide a

NOTE Confidence: 0.955278

00:09:34.279 --> 00:09:35.339 dynamic condition

NOTE Confidence: 0.96520406

00:09:35.675 --> 00:09:37.915 and recapitulating physiology and so

NOTE Confidence: 0.96520406

00:09:37.915 --> 00:09:38.415 on.

NOTE Confidence: 0.84693736

00:09:38.795 --> 00:09:40.074 So this give you idea

NOTE Confidence: 0.84693736

00:09:40.074 --> 00:09:41.355 this is the top view,

NOTE Confidence: 0.84693736

00:09:41.355 --> 00:09:42.554 but in the cross sectional

NOTE Confidence: 0.84693736

00:09:42.554 --> 00:09:44.554 view, I'll skip this process

NOTE Confidence: 0.84693736

00:09:44.634 --> 00:09:45.134 processing,

NOTE Confidence: 0.98308724

00:09:45.675 --> 00:09:47.214 but this is a purely,

NOTE Confidence: 0.998949

00:09:47.915 --> 00:09:49.054 precise engineering

NOTE Confidence: 0.9922103

00:09:49.889 --> 00:09:51.569 issue that we can really

NOTE Confidence: 0.9922103

00:09:51.569 --> 00:09:53.170 think about how to form

NOTE Confidence: 0.9922103

00:09:53.170 --> 00:09:54.629 the brain organoid uniformly

NOTE Confidence: 0.8683808

00:09:55.170 --> 00:09:56.610 and the red channel is

NOTE Confidence: 0.8683808

00:09:56.610 --> 00:09:58.290 a proficient channel that we

NOTE Confidence: 0.8683808

00:09:58.290 --> 00:10:01.269 can provide precisely the transcription

NOTE Confidence: 0.96118134

00:10:01.584 --> 00:10:03.745 factor at specific time and

NOTE Confidence: 0.96118134

00:10:03.745 --> 00:10:05.825 specific amount as well as

NOTE Confidence: 0.96118134

00:10:05.825 --> 00:10:06.464 a different,

NOTE Confidence: 0.9680497

00:10:07.345 --> 00:10:08.945 inflammation factor and so on.

NOTE Confidence: 0.9680497

00:10:08.945 --> 00:10:10.144 So you can control and

NOTE Confidence: 0.9680497

00:10:10.144 --> 00:10:11.285 perturbate precisely.

NOTE Confidence: 0.9665427

00:10:12.225 --> 00:10:13.445 So by doing this,

NOTE Confidence: 0.955235

00:10:13.825 --> 00:10:14.644 you can also,

NOTE Confidence: 0.91840804

00:10:15.184 --> 00:10:16.245 put integrate

NOTE Confidence: 0.82857096

00:10:17.100 --> 00:10:17.600 this

NOTE Confidence: 0.9740536

00:10:18.380 --> 00:10:20.240 EEG like electrode

NOTE Confidence: 0.9340917

00:10:20.620 --> 00:10:21.980 so that we can detect

NOTE Confidence: 0.9340917

00:10:21.980 --> 00:10:23.980 the brainwave without touching the

NOTE Confidence: 0.9340917

00:10:23.980 --> 00:10:26.779 cell. Many people use MEA

NOTE Confidence: 0.9340917

00:10:26.779 --> 00:10:29.279 but MEA is providing good

NOTE Confidence: 0.696707

00:10:29.660 --> 00:10:30.480 action potential,

NOTE Confidence: 0.94083786

00:10:31.065 --> 00:10:33.065 local field potential, but you

NOTE Confidence: 0.94083786

00:10:33.065 --> 00:10:34.745 cannot detect the brain wave

NOTE Confidence: 0.94083786

00:10:34.745 --> 00:10:36.585 by touching the cell. So

NOTE Confidence: 0.94083786

00:10:36.585 --> 00:10:37.785 we have to also think

NOTE Confidence: 0.94083786

00:10:37.785 --> 00:10:38.765 about noninvasive

NOTE Confidence: 0.92582107

00:10:39.625 --> 00:10:41.465 way of detecting brain wave

NOTE Confidence: 0.92582107

00:10:41.465 --> 00:10:42.684 as well as exosomes.

NOTE Confidence: 0.94027257

00:10:44.429 --> 00:10:45.730 So this is uniformity

NOTE Confidence: 0.9308822

00:10:46.110 --> 00:10:47.710 that we form due to

NOTE Confidence: 0.9308822

00:10:47.710 --> 00:10:49.870 the this precise control of

NOTE Confidence: 0.9308822

00:10:49.870 --> 00:10:52.130 the forming this cell culture.

NOTE Confidence: 0.99065006

00:10:53.630 --> 00:10:55.330 And then, we can detect,

NOTE Confidence: 0.9941188

00:10:56.110 --> 00:10:56.610 this

NOTE Confidence: 0.96125835

00:10:57.485 --> 00:10:58.785 real time EEG

NOTE Confidence: 0.96419394

00:10:59.565 --> 00:11:01.005 cyst I mean, from either

NOTE Confidence: 0.96419394

00:11:01.005 --> 00:11:02.765 midbrain or cortical. By the

NOTE Confidence: 0.96419394

00:11:02.765 --> 00:11:04.545 way, I really appreciate,

NOTE Confidence: 0.99268544

00:11:05.325 --> 00:11:05.985 the collaborator,

NOTE Confidence: 0.8911669

00:11:07.005 --> 00:11:09.265 doctor Park, at Yale and

NOTE Confidence: 0.8911669

00:11:09.429 --> 00:11:11.030 provide the cortical organoid, but

NOTE Confidence: 0.8911669

00:11:11.030 --> 00:11:12.470 then we compare with the

NOTE Confidence: 0.8911669

00:11:12.470 --> 00:11:14.550 middle brain. So, we can

NOTE Confidence: 0.8911669

00:11:14.550 --> 00:11:15.270 really see,

NOTE Confidence: 0.90044534

00:11:15.670 --> 00:11:17.929 really different, behavior, electrophysiological

NOTE Confidence: 0.98210084

00:11:18.470 --> 00:11:20.570 behavior of this. And then,

NOTE Confidence: 0.95869285

00:11:21.472 --> 00:11:22.955 another factor is when we

NOTE Confidence: 0.95869285

00:11:22.955 --> 00:11:25.915 participate with LPS, inflammation factor,

NOTE Confidence: 0.95869285

00:11:25.915 --> 00:11:26.735 you can see

NOTE Confidence: 0.9191789

00:11:27.755 --> 00:11:29.515 why, there's a beta wave

NOTE Confidence: 0.9191789

00:11:29.515 --> 00:11:31.274 and gamma wave is increasing.

NOTE Confidence: 0.9191789

00:11:31.274 --> 00:11:32.175 So you can,

NOTE Confidence: 0.97414345

00:11:32.635 --> 00:11:33.675 use this kind of the

NOTE Confidence: 0.97414345

00:11:33.675 --> 00:11:35.434 system as a drug screening

NOTE Confidence: 0.97414345

00:11:35.434 --> 00:11:35.910 or

NOTE Confidence: 0.7954448

00:11:36.309 --> 00:11:36.809 pathogenesis,

NOTE Confidence: 0.9733669

00:11:38.309 --> 00:11:38.809 detection.

NOTE Confidence: 0.87847805

00:11:39.190 --> 00:11:40.889 So here, with the Shanjun

NOTE Confidence: 0.87847805

00:11:41.110 --> 00:11:41.610 Dong,

NOTE Confidence: 0.9102626

00:11:42.069 --> 00:11:43.269 we have this r o

NOTE Confidence: 0.9102626

00:11:43.269 --> 00:11:44.870 n. So I am really

NOTE Confidence: 0.9102626

00:11:44.870 --> 00:11:46.709 thankful that I met Clement

NOTE Confidence: 0.9102626

00:11:46.709 --> 00:11:47.449 and Shanjun

NOTE Confidence: 0.9843979

00:11:48.515 --> 00:11:50.135 before they came to Yale.

NOTE Confidence: 0.9386215

00:11:50.595 --> 00:11:53.175 But here, we we are,

NOTE Confidence: 0.9617485

00:11:53.554 --> 00:11:54.835 you know, working on this

NOTE Confidence: 0.9617485

00:11:54.835 --> 00:11:55.815 PD model.

NOTE Confidence: 0.868478

00:11:57.075 --> 00:11:59.175 And here we show the

NOTE Confidence: 0.6783339

00:11:59.715 --> 00:12:00.375 is just

NOTE Confidence: 0.955886

00:12:00.959 --> 00:12:01.699 using traditional

NOTE Confidence: 0.9457722

00:12:02.319 --> 00:12:04.079 way of making organoid, but

NOTE Confidence: 0.9457722

00:12:04.079 --> 00:12:05.459 we compare with

NOTE Confidence: 0.92643416

00:12:06.079 --> 00:12:07.360 with the, organoid on the

NOTE Confidence: 0.92643416

00:12:07.360 --> 00:12:09.439 chip. And, we like to

NOTE Confidence: 0.92643416

00:12:09.439 --> 00:12:11.459 really make a correlation with

NOTE Confidence: 0.7500922

00:12:11.920 --> 00:12:13.300 multi omic expression,

NOTE Confidence: 0.92935497

00:12:13.679 --> 00:12:15.300 especially circular RNA,

NOTE Confidence: 0.96708703

00:12:16.170 --> 00:12:17.355 with electrophysiological

NOTE Confidence: 0.9531295

00:12:17.815 --> 00:12:19.434 data. This is still ongoing,

NOTE Confidence: 0.9531295

00:12:19.735 --> 00:12:20.795 so, just

NOTE Confidence: 0.9111216

00:12:21.175 --> 00:12:23.015 wait for us maybe next

NOTE Confidence: 0.9111216

00:12:23.015 --> 00:12:24.934 year. But here, showing that

NOTE Confidence: 0.9111216

00:12:24.934 --> 00:12:25.915 using our,

NOTE Confidence: 0.7690717

00:12:26.215 --> 00:12:26.715 system,

NOTE Confidence: 0.9249876

00:12:27.255 --> 00:12:28.695 and we were able to

NOTE Confidence: 0.9249876

00:12:28.695 --> 00:12:29.595 really capture

NOTE Confidence: 0.74559677

00:12:30.029 --> 00:12:30.429 nice,

NOTE Confidence: 0.996485

00:12:30.910 --> 00:12:31.410 characterization

NOTE Confidence: 0.9897579

00:12:31.790 --> 00:12:33.329 of this midbrain organoid

NOTE Confidence: 0.9600679

00:12:33.630 --> 00:12:35.230 and expression level can be

NOTE Confidence: 0.9600679

00:12:35.230 --> 00:12:35.730 detected.

NOTE Confidence: 0.9099661

00:12:37.550 --> 00:12:39.329 And, this showing you that,

NOTE Confidence: 0.954817

00:12:40.110 --> 00:12:41.230 the difference between,

NOTE Confidence: 0.9565742

00:12:41.630 --> 00:12:42.370 our noninvasive

NOTE Confidence: 0.955242

00:12:42.829 --> 00:12:44.050 EEG like system

NOTE Confidence: 0.97634

00:12:44.505 --> 00:12:46.265 and compared to MEA. When

NOTE Confidence: 0.97634

00:12:46.265 --> 00:12:47.725 you drop the organoid

NOTE Confidence: 0.8750911

00:12:48.665 --> 00:12:49.945 and on top of this

NOTE Confidence: 0.8750911

00:12:49.945 --> 00:12:50.445 MEA,

NOTE Confidence: 0.94341516

00:12:51.145 --> 00:12:52.105 as you can see due

NOTE Confidence: 0.94341516

00:12:52.105 --> 00:12:52.925 to the mechanobiological

NOTE Confidence: 0.7087585

00:12:53.625 --> 00:12:54.125 aspect,

NOTE Confidence: 0.93319666

00:12:55.145 --> 00:12:56.905 after a few days you

NOTE Confidence: 0.93319666

00:12:56.905 --> 00:12:57.645 can form

NOTE Confidence: 0.94930476

00:12:58.105 --> 00:12:59.565 the scar and astrocyte

NOTE Confidence: 0.9313072

00:12:59.910 --> 00:13:01.110 so that you you are

NOTE Confidence: 0.9313072

00:13:01.269 --> 00:13:02.809 instead of reading the brainwave,

NOTE Confidence: 0.9313072

00:13:02.870 --> 00:13:04.230 you are reading the response

NOTE Confidence: 0.9313072

00:13:04.230 --> 00:13:06.069 of the astrocyte. So there's

NOTE Confidence: 0.9313072

00:13:06.069 --> 00:13:06.569 the,

NOTE Confidence: 0.9270084

00:13:07.269 --> 00:13:09.449 issue of the, MEA data.

NOTE Confidence: 0.9270084

00:13:09.670 --> 00:13:11.029 You can get data, but

NOTE Confidence: 0.9270084

00:13:11.029 --> 00:13:12.309 that data doesn't mean that

NOTE Confidence: 0.9270084

00:13:12.309 --> 00:13:13.769 the brainwave that is

NOTE Confidence: 0.8350327

00:13:14.629 --> 00:13:15.585 generated by

NOTE Confidence: 0.8970421

00:13:15.985 --> 00:13:17.845 neural network of this organoid.

NOTE Confidence: 0.920879

00:13:23.105 --> 00:13:24.465 And then, also, you can

NOTE Confidence: 0.920879

00:13:24.465 --> 00:13:26.245 take advantage of this organoid,

NOTE Confidence: 0.97285247

00:13:27.105 --> 00:13:29.459 to really capture the the

NOTE Confidence: 0.97285247

00:13:29.459 --> 00:13:31.160 optical imaging of the calcium

NOTE Confidence: 0.97285247

00:13:31.220 --> 00:13:31.720 wave.

NOTE Confidence: 0.8734251

00:13:32.500 --> 00:13:34.279 And also, you can see,

NOTE Confidence: 0.9965711

00:13:34.980 --> 00:13:36.420 real time detection of the

NOTE Confidence: 0.9965711

00:13:36.420 --> 00:13:36.920 evolution

NOTE Confidence: 0.9288304

00:13:37.300 --> 00:13:39.059 during the growth, like forty

NOTE Confidence: 0.9288304

00:13:39.059 --> 00:13:40.820 days, fifty days, sixty days

NOTE Confidence: 0.9288304

00:13:40.820 --> 00:13:41.480 of this,

NOTE Confidence: 0.9009887

00:13:42.525 --> 00:13:44.525 the brain organoid can generate

NOTE Confidence: 0.9009887

00:13:44.525 --> 00:13:46.225 different brain, wave.

NOTE Confidence: 0.92212

00:13:46.925 --> 00:13:47.745 And, also,

NOTE Confidence: 0.99813086

00:13:49.565 --> 00:13:50.865 as you already know,

NOTE Confidence: 0.9343815

00:13:51.565 --> 00:13:52.525 if you treat it with

NOTE Confidence: 0.9343815

00:13:52.525 --> 00:13:53.725 the aldopa, what happened to

NOTE Confidence: 0.9343815

00:13:53.725 --> 00:13:55.645 this brain organoid? It's really

NOTE Confidence: 0.9343815

00:13:55.645 --> 00:13:57.184 fascinating that it responds

NOTE Confidence: 0.97662586

00:13:57.590 --> 00:13:58.870 even though this is tiny,

NOTE Confidence: 0.97662586

00:13:58.870 --> 00:13:59.770 tiny organoid.

NOTE Confidence: 0.87896055

00:14:01.670 --> 00:14:02.970 And we we intentionally,

NOTE Confidence: 0.9552805

00:14:03.510 --> 00:14:05.690 use MPP plus to check

NOTE Confidence: 0.744841

00:14:06.309 --> 00:14:07.030 how this,

NOTE Confidence: 0.9938206

00:14:07.670 --> 00:14:08.170 this

NOTE Confidence: 0.87250435

00:14:08.630 --> 00:14:11.450 toxin toxin neurotoxin can really

NOTE Confidence: 0.9647007

00:14:13.145 --> 00:14:14.525 show us neurodegenerative

NOTE Confidence: 0.8960053

00:14:15.065 --> 00:14:15.565 progress.

NOTE Confidence: 0.7345201

00:14:16.985 --> 00:14:17.485 So,

NOTE Confidence: 0.89827406

00:14:17.785 --> 00:14:19.145 I'll skip this one but

NOTE Confidence: 0.89827406

00:14:19.145 --> 00:14:21.065 here, as you can see,

NOTE Confidence: 0.90529513

00:14:21.625 --> 00:14:23.305 this is before and early

NOTE Confidence: 0.90529513

00:14:23.305 --> 00:14:25.145 MPP plus and middle of

NOTE Confidence: 0.90529513

00:14:25.145 --> 00:14:26.880 MPP plus and later. So,

NOTE Confidence: 0.90529513

00:14:26.880 --> 00:14:28.820 it takes time to really

NOTE Confidence: 0.90529513

00:14:28.880 --> 00:14:30.899 respond to this neurotoxin

NOTE Confidence: 0.92282

00:14:32.079 --> 00:14:32.579 neurodegenerative

NOTE Confidence: 0.9338513

00:14:33.120 --> 00:14:34.560 progress and so you can

NOTE Confidence: 0.9338513

00:14:34.560 --> 00:14:35.700 really watch this.

NOTE Confidence: 0.9898757

00:14:38.399 --> 00:14:39.779 Now I'm showing you

NOTE Confidence: 0.79561484

00:14:40.399 --> 00:14:41.139 the exodus

NOTE Confidence: 0.89202106

00:14:41.834 --> 00:14:43.535 because we want to really

NOTE Confidence: 0.89202106

00:14:43.755 --> 00:14:45.055 analyze the EB,

NOTE Confidence: 0.93664205

00:14:45.595 --> 00:14:46.095 from,

NOTE Confidence: 0.99073315

00:14:46.555 --> 00:14:47.774 this brain organoid.

NOTE Confidence: 0.93043303

00:14:48.315 --> 00:14:50.334 So exodus is nothing but

NOTE Confidence: 0.93043303

00:14:50.555 --> 00:14:51.055 exosome,

NOTE Confidence: 0.9993456

00:14:51.514 --> 00:14:52.014 detection

NOTE Confidence: 0.96984935

00:14:52.394 --> 00:14:54.735 using this ultra purification system

NOTE Confidence: 0.96984935

00:14:55.035 --> 00:14:55.535 that

NOTE Confidence: 0.97412723

00:14:56.930 --> 00:14:59.089 that we can really, use

NOTE Confidence: 0.97412723

00:14:59.089 --> 00:15:00.230 acoustic device

NOTE Confidence: 0.94815683

00:15:00.690 --> 00:15:03.010 to, clean out all other

NOTE Confidence: 0.94815683

00:15:03.010 --> 00:15:03.510 unnecessary,

NOTE Confidence: 0.96315116

00:15:04.050 --> 00:15:05.750 stuff and then, purify

NOTE Confidence: 0.9955663

00:15:06.290 --> 00:15:07.510 only the specific

NOTE Confidence: 0.8789894

00:15:07.890 --> 00:15:08.850 size of the,

NOTE Confidence: 0.74401593

00:15:09.730 --> 00:15:10.230 EB.

NOTE Confidence: 0.9996938

00:15:11.285 --> 00:15:12.665 So you can imagine

NOTE Confidence: 0.80223465

00:15:13.045 --> 00:15:14.165 even this is a really

NOTE Confidence: 0.80223465

00:15:14.165 --> 00:15:14.645 small,

NOTE Confidence: 0.9641886

00:15:15.125 --> 00:15:15.625 nanoparticle

NOTE Confidence: 0.9294776

00:15:16.485 --> 00:15:17.945 that you can see hopefully,

NOTE Confidence: 0.92002285

00:15:18.565 --> 00:15:19.385 from this,

NOTE Confidence: 0.9812393

00:15:19.925 --> 00:15:20.425 purified

NOTE Confidence: 0.8867208

00:15:20.885 --> 00:15:21.385 exosome,

NOTE Confidence: 0.9866234

00:15:22.005 --> 00:15:22.825 how this

NOTE Confidence: 0.99791646

00:15:23.610 --> 00:15:24.510 RNA expression

NOTE Confidence: 0.96169394

00:15:25.130 --> 00:15:25.630 or

NOTE Confidence: 0.9213733

00:15:26.170 --> 00:15:28.170 other protein expression can be

NOTE Confidence: 0.9213733

00:15:28.170 --> 00:15:28.670 detected.

NOTE Confidence: 0.93956405

00:15:29.370 --> 00:15:30.730 So this is one example.

NOTE Confidence: 0.93956405

00:15:30.730 --> 00:15:32.330 It's not really a Parkinson

NOTE Confidence: 0.93956405

00:15:32.330 --> 00:15:33.870 disease, but using,

NOTE Confidence: 0.9840503

00:15:34.810 --> 00:15:35.310 basically,

NOTE Confidence: 0.95055616

00:15:36.330 --> 00:15:38.270 the exosome from tiers,

NOTE Confidence: 0.9639132

00:15:39.435 --> 00:15:40.815 we can really analyze,

NOTE Confidence: 0.90111834

00:15:41.595 --> 00:15:43.615 the where the, this exosome

NOTE Confidence: 0.90111834

00:15:43.675 --> 00:15:45.275 is coming from. So some

NOTE Confidence: 0.90111834

00:15:45.275 --> 00:15:46.555 part it's not only the

NOTE Confidence: 0.90111834

00:15:46.555 --> 00:15:48.155 eye disease. I mean, from

NOTE Confidence: 0.90111834

00:15:48.155 --> 00:15:49.935 the eye part but different

NOTE Confidence: 0.90111834

00:15:50.235 --> 00:15:50.735 organs.

NOTE Confidence: 0.9814749

00:15:51.035 --> 00:15:51.775 I mean, this

NOTE Confidence: 0.8441464

00:15:52.080 --> 00:15:53.860 exosome from the tears

NOTE Confidence: 0.76643956

00:15:54.880 --> 00:15:55.380 represent

NOTE Confidence: 0.91837317

00:15:55.680 --> 00:15:56.800 different parts of the organs

NOTE Confidence: 0.91837317

00:15:56.800 --> 00:15:57.920 so that you can really

NOTE Confidence: 0.91837317

00:15:57.920 --> 00:15:59.620 take advantage of the,

NOTE Confidence: 0.8835244

00:16:00.160 --> 00:16:01.060 the diagnostics

NOTE Confidence: 0.9120084

00:16:01.440 --> 00:16:02.340 using tear.

NOTE Confidence: 0.8919027

00:16:04.225 --> 00:16:04.725 So,

NOTE Confidence: 0.96329725

00:16:05.825 --> 00:16:06.945 in the in the future,

NOTE Confidence: 0.96329725

00:16:06.945 --> 00:16:08.225 we are still ongoing. We

NOTE Confidence: 0.96329725

00:16:08.225 --> 00:16:09.205 are really detecting.

NOTE Confidence: 0.9067432

00:16:10.305 --> 00:16:11.845 Okay. Five minutes.

NOTE Confidence: 0.98826236

00:16:12.225 --> 00:16:13.285 I'll speed up.

NOTE Confidence: 0.95229506

00:16:14.145 --> 00:16:15.445 We can we are collecting

NOTE Confidence: 0.95229506

00:16:15.505 --> 00:16:16.005 exosome

NOTE Confidence: 0.9897227

00:16:16.430 --> 00:16:17.329 and then analyze

NOTE Confidence: 0.8043198

00:16:17.630 --> 00:16:19.490 and compare with the healthy

NOTE Confidence: 0.8043198

00:16:19.550 --> 00:16:20.050 NPD.

NOTE Confidence: 0.8953444

00:16:22.110 --> 00:16:23.569 And then this is ongoing

NOTE Confidence: 0.7642786

00:16:24.350 --> 00:16:24.850 profiling.

NOTE Confidence: 0.90435886

00:16:26.190 --> 00:16:27.149 But I'd like to just

NOTE Confidence: 0.90435886

00:16:27.149 --> 00:16:28.050 highlight briefly

NOTE Confidence: 0.9623729

00:16:29.005 --> 00:16:30.605 different design of chip because

NOTE Confidence: 0.9623729

00:16:30.605 --> 00:16:32.045 you might, have a different

NOTE Confidence: 0.9623729

00:16:32.045 --> 00:16:34.125 biological question for PD, but

NOTE Confidence: 0.9623729

00:16:34.125 --> 00:16:34.524 here,

NOTE Confidence: 0.9515462

00:16:35.245 --> 00:16:36.765 it's not really PD, but

NOTE Confidence: 0.9515462

00:16:36.765 --> 00:16:37.645 I like to just show

NOTE Confidence: 0.9515462

00:16:37.645 --> 00:16:39.084 you how we can make

NOTE Confidence: 0.9515462

00:16:39.084 --> 00:16:40.625 a long and brain axis

NOTE Confidence: 0.9515462

00:16:40.845 --> 00:16:42.220 on a chip. So we

NOTE Confidence: 0.9515462

00:16:42.220 --> 00:16:42.960 can develop,

NOTE Confidence: 0.9071634

00:16:43.500 --> 00:16:45.260 the chip that allow to

NOTE Confidence: 0.9071634

00:16:45.260 --> 00:16:47.120 have, both a barrier

NOTE Confidence: 0.9354558

00:16:47.580 --> 00:16:48.700 in the lung as well

NOTE Confidence: 0.9354558

00:16:48.700 --> 00:16:49.440 as a BBB.

NOTE Confidence: 0.9732073

00:16:49.820 --> 00:16:51.580 Then we connect together to

NOTE Confidence: 0.9732073

00:16:51.580 --> 00:16:52.080 understand,

NOTE Confidence: 0.78694695

00:16:52.620 --> 00:16:53.020 how,

NOTE Confidence: 0.99938494

00:16:53.740 --> 00:16:54.400 the infection

NOTE Confidence: 0.94835335

00:16:54.940 --> 00:16:56.540 through the lung can influence

NOTE Confidence: 0.94835335

00:16:56.540 --> 00:16:58.485 the brain. So, you can

NOTE Confidence: 0.94835335

00:16:58.485 --> 00:16:59.225 take advantage

NOTE Confidence: 0.9010843

00:16:59.605 --> 00:17:01.144 of this kind of chip

NOTE Confidence: 0.9706334

00:17:01.685 --> 00:17:02.345 to analyze

NOTE Confidence: 0.98731756

00:17:03.045 --> 00:17:03.865 many different

NOTE Confidence: 0.727082

00:17:04.725 --> 00:17:05.225 diseases.

NOTE Confidence: 0.91476583

00:17:05.605 --> 00:17:07.044 In this case it's COVID,

NOTE Confidence: 0.91476583

00:17:07.044 --> 00:17:08.484 but however you can think

NOTE Confidence: 0.91476583

00:17:08.484 --> 00:17:09.225 about different

NOTE Confidence: 0.86419547

00:17:10.165 --> 00:17:11.304 neurological toxins

NOTE Confidence: 0.88972217

00:17:11.670 --> 00:17:12.950 influenced to the lung and

NOTE Confidence: 0.88972217

00:17:12.950 --> 00:17:14.170 then goes to the brain.

NOTE Confidence: 0.8537062

00:17:15.190 --> 00:17:16.470 So due to the time,

NOTE Confidence: 0.8537062

00:17:16.470 --> 00:17:17.990 I'm going to skip all

NOTE Confidence: 0.8537062

00:17:17.990 --> 00:17:19.590 the details of this chip,

NOTE Confidence: 0.8537062

00:17:19.590 --> 00:17:22.310 but I hope you can

NOTE Confidence: 0.8537062

00:17:22.310 --> 00:17:22.810 read

NOTE Confidence: 0.70578974

00:17:23.190 --> 00:17:24.410 this Nature BME.

NOTE Confidence: 0.9665673

00:17:25.234 --> 00:17:26.595 And then another one is

NOTE Confidence: 0.9665673

00:17:26.595 --> 00:17:27.575 a gut brain.

NOTE Confidence: 0.978786

00:17:28.355 --> 00:17:28.835 So,

NOTE Confidence: 0.95278287

00:17:29.234 --> 00:17:30.915 you can imagine this,

NOTE Confidence: 0.9715667

00:17:31.635 --> 00:17:32.695 toxin from,

NOTE Confidence: 0.94860256

00:17:33.075 --> 00:17:35.395 even from the gut, can

NOTE Confidence: 0.94860256

00:17:35.395 --> 00:17:36.615 influence. So, hopefully,

NOTE Confidence: 0.99338025

00:17:37.395 --> 00:17:39.015 you can in this chip,

NOTE Confidence: 0.72516924

00:17:39.430 --> 00:17:40.730 we can drop

NOTE Confidence: 0.9912727

00:17:41.030 --> 00:17:41.530 three-dimensional

NOTE Confidence: 0.8524064

00:17:41.910 --> 00:17:43.690 we can culture three-dimensional,

NOTE Confidence: 0.9391309

00:17:45.109 --> 00:17:45.609 like,

NOTE Confidence: 0.8143183

00:17:45.990 --> 00:17:47.050 neuron astrocyte,

NOTE Confidence: 0.7245426

00:17:48.550 --> 00:17:49.290 like, spheroid.

NOTE Confidence: 0.9916606

00:17:49.670 --> 00:17:51.285 But then, we can also

NOTE Confidence: 0.8434299

00:17:51.685 --> 00:17:52.265 co culture

NOTE Confidence: 0.90110993

00:17:52.645 --> 00:17:53.145 microglia.

NOTE Confidence: 0.99724555

00:17:53.605 --> 00:17:54.744 So you can understand,

NOTE Confidence: 0.9986527

00:17:55.205 --> 00:17:56.025 this together

NOTE Confidence: 0.85828865

00:17:56.645 --> 00:17:58.665 along with, also gut

NOTE Confidence: 0.5466137

00:17:59.125 --> 00:17:59.625 barrier

NOTE Confidence: 0.96987885

00:18:00.885 --> 00:18:02.585 so that, you can really

NOTE Confidence: 0.96987885

00:18:02.645 --> 00:18:04.425 analyze detail of the

NOTE Confidence: 0.9727051

00:18:04.770 --> 00:18:05.270 different,

NOTE Confidence: 0.99496925

00:18:06.210 --> 00:18:07.190 toxin effect

NOTE Confidence: 0.98384273

00:18:07.570 --> 00:18:09.750 due to the, this inflammation.

NOTE Confidence: 0.9154388

00:18:10.290 --> 00:18:11.730 So to I'm gonna just

NOTE Confidence: 0.9154388

00:18:11.730 --> 00:18:12.470 skip this.

NOTE Confidence: 0.9464025

00:18:15.010 --> 00:18:16.130 But I like to just

NOTE Confidence: 0.9464025

00:18:16.130 --> 00:18:17.650 highlight that using this kind

NOTE Confidence: 0.9464025

00:18:17.650 --> 00:18:18.869 of the, technology,

NOTE Confidence: 0.8941115

00:18:19.675 --> 00:18:21.195 you can really connect together

NOTE Confidence: 0.8941115

00:18:21.195 --> 00:18:22.075 different body.

NOTE Confidence: 0.9619268

00:18:22.395 --> 00:18:24.395 How does it Parkinson's disease

NOTE Confidence: 0.9619268

00:18:24.395 --> 00:18:26.395 is connected to lung or

NOTE Confidence: 0.9619268

00:18:26.395 --> 00:18:26.895 gut,

NOTE Confidence: 0.94963944

00:18:27.435 --> 00:18:28.555 so that we can really

NOTE Confidence: 0.94963944

00:18:28.555 --> 00:18:29.295 think about,

NOTE Confidence: 0.9953623

00:18:29.915 --> 00:18:32.155 nice body function using different,

NOTE Confidence: 0.99514174

00:18:32.715 --> 00:18:33.869 the connection

NOTE Confidence: 0.93408877

00:18:34.409 --> 00:18:35.230 of the microphysiological

NOTE Confidence: 0.8997119

00:18:35.770 --> 00:18:36.270 analysis

NOTE Confidence: 0.9944862

00:18:36.730 --> 00:18:37.230 platform.

NOTE Confidence: 0.9653835

00:18:38.330 --> 00:18:39.549 So in summary,

NOTE Confidence: 0.91369456

00:18:40.090 --> 00:18:41.210 I like to just highlight

NOTE Confidence: 0.91369456

00:18:41.210 --> 00:18:41.710 that,

NOTE Confidence: 0.99572486

00:18:42.169 --> 00:18:43.529 we can really create new

NOTE Confidence: 0.99572486

00:18:43.529 --> 00:18:44.029 technology

NOTE Confidence: 0.9614288

00:18:44.409 --> 00:18:46.350 for precision neuroscience and neurology

NOTE Confidence: 0.9946612

00:18:46.809 --> 00:18:48.250 so that we can really

NOTE Confidence: 0.9946612

00:18:48.250 --> 00:18:48.990 work together.

NOTE Confidence: 0.962666

00:18:49.585 --> 00:18:51.025 We not in order to

NOTE Confidence: 0.962666

00:18:51.025 --> 00:18:52.545 really work together we have

NOTE Confidence: 0.962666

00:18:52.545 --> 00:18:54.465 to converge the physical and

NOTE Confidence: 0.962666

00:18:54.465 --> 00:18:56.225 life science and engineering and

NOTE Confidence: 0.962666

00:18:56.225 --> 00:18:58.065 medicine to make active learning

NOTE Confidence: 0.962666

00:18:58.065 --> 00:18:58.565 spirit

NOTE Confidence: 0.82609826

00:18:58.865 --> 00:18:59.925 and then multidisciplinary

NOTE Confidence: 0.8603281

00:19:00.305 --> 00:19:00.805 teamwork,

NOTE Confidence: 0.8810012

00:19:01.425 --> 00:19:03.045 really need a humble spirit.

NOTE Confidence: 0.8810012

00:19:03.300 --> 00:19:05.480 So innovative design really need

NOTE Confidence: 0.8810012

00:19:05.540 --> 00:19:07.080 a a creative spirit,

NOTE Confidence: 0.9067617

00:19:07.700 --> 00:19:08.920 and micro nanotechnology

NOTE Confidence: 0.8129673

00:19:09.300 --> 00:19:10.020 will provide,

NOTE Confidence: 0.90262985

00:19:10.820 --> 00:19:12.740 with a precision spirit and

NOTE Confidence: 0.90262985

00:19:12.740 --> 00:19:14.680 mission oriented action and standardization

NOTE Confidence: 0.85050845

00:19:14.980 --> 00:19:15.800 need intentional

NOTE Confidence: 0.85917383

00:19:16.100 --> 00:19:17.415 spirit. And, hopefully,

NOTE Confidence: 0.9865033

00:19:18.275 --> 00:19:19.815 we have to really remember,

NOTE Confidence: 0.918332

00:19:20.195 --> 00:19:21.734 this knowing is not enough,

NOTE Confidence: 0.99281996

00:19:22.035 --> 00:19:23.095 we must apply.

NOTE Confidence: 0.99708116

00:19:23.475 --> 00:19:24.755 Willing is not enough, we

NOTE Confidence: 0.99708116

00:19:24.755 --> 00:19:26.115 must do. In the realm

NOTE Confidence: 0.99708116

00:19:26.115 --> 00:19:28.115 of ideas, everything depends on

NOTE Confidence: 0.99708116

00:19:28.115 --> 00:19:28.615 enthusiasm.

NOTE Confidence: 0.9992756

00:19:29.075 --> 00:19:30.811 In the real world, we

NOTE Confidence: 0.9992756

00:19:30.811 --> 00:19:31.311 all

NOTE Confidence: 0.9299372

00:19:32.171 --> 00:19:33.311 rest on perseverance.

NOTE Confidence: 0.9964396

00:19:34.411 --> 00:19:35.231 Thank you.