WEBVTT

NOTE duration: "00:03:28.725"

NOTE Confidence: 0.99058414

00:00:05.120 --> 00:00:05.620 Immunotherapy

NOTE Confidence: 0.9749136

00:00:06.640 --> 00:00:09.119 is, by definition, the therapy

NOTE Confidence: 0.9749136

00:00:09.119 --> 00:00:10.740 to harness the immune system

NOTE Confidence: 0.9749136

00:00:10.880 --> 00:00:11.619 as therapeutics.

NOTE Confidence: 0.53653055

00:00:12.414 --> 00:00:12.994 It utilize

NOTE Confidence: 0.99739414

00:00:13.295 --> 00:00:14.355 your own cells

NOTE Confidence: 0.9722593

00:00:14.735 --> 00:00:16.275 and turn them into

NOTE Confidence: 0.99053144

00:00:16.655 --> 00:00:18.114 disease fighting drugs.

NOTE Confidence: 0.99766046

00:00:18.975 --> 00:00:20.114 Our own cells

NOTE Confidence: 0.92964447

00:00:20.654 --> 00:00:22.175 are also controlled by our

NOTE Confidence: 0.92964447

00:00:22.175 --> 00:00:24.270 own genome. So we have

NOTE Confidence: 0.9863062

00:00:24.829 --> 00:00:25.890 a three billion

NOTE Confidence: 0.9514798

00:00:26.270 --> 00:00:28.030 base pair genome that encodes

NOTE Confidence: 0.9514798

00:00:28.030 --> 00:00:29.870 the secret of life that

NOTE Confidence: 0.9514798

00:00:29.870 --> 00:00:32.210 governs the development, the morphology,

NOTE Confidence: 0.99623525

00:00:32.510 --> 00:00:33.330 your height,

NOTE Confidence: 0.97970843

00:00:33.710 --> 00:00:35.790 your behavior, and diseases when

NOTE Confidence: 0.97970843

00:00:35.790 --> 00:00:36.675 they go wrong.

NOTE Confidence: 0.9906018

00:00:37.235 --> 00:00:37.735 So

NOTE Confidence: 0.80982226

00:00:38.515 --> 00:00:39.495 our own cells

NOTE Confidence: 0.91430855

00:00:40.195 --> 00:00:41.815 that we utilize in neurotherapy

NOTE Confidence: 0.91430855

00:00:42.114 --> 00:00:44.034 to stimulate, to attack cancer

NOTE Confidence: 0.91430855

00:00:44.034 --> 00:00:44.534 cells,

NOTE Confidence: 0.98154277

00:00:44.915 --> 00:00:46.434 they're also governed by those

NOTE Confidence: 0.98154277

00:00:46.434 --> 00:00:46.934 genes.

NOTE Confidence: 0.963464

00:00:47.394 --> 00:00:48.595 So in order to understand

NOTE Confidence: 0.963464

00:00:48.595 --> 00:00:50.354 how immunotherapy work, we need

NOTE Confidence: 0.963464

00:00:50.354 --> 00:00:51.635 to know how the genes

NOTE Confidence: 0.963464

00:00:51.635 --> 00:00:52.829 work in in order to

NOTE Confidence: 0.963464

00:00:52.829 --> 00:00:54.050 control the immune cells.

NOTE Confidence: 0.988085

00:00:57.790 --> 00:00:59.390 We try to understand what

NOTE Confidence: 0.988085

00:00:59.390 --> 00:01:01.469 genes control what immune cells

NOTE Confidence: 0.988085

00:01:01.469 --> 00:01:03.010 in what disease settings

NOTE Confidence: 0.9514726

00:01:03.870 --> 00:01:05.709 in a systems manner, which

NOTE Confidence: 0.9514726

00:01:05.709 --> 00:01:08.064 means, broadly speaking, we look

NOTE Confidence: 0.9514726

00:01:08.064 --> 00:01:09.284 at every gene,

NOTE Confidence: 0.97787356

00:01:09.744 --> 00:01:10.645 every molecule,

NOTE Confidence: 0.96622705

00:01:11.345 --> 00:01:12.865 and all the possible cell

NOTE Confidence: 0.96622705

00:01:12.865 --> 00:01:13.365 types,

NOTE Confidence: 0.98713535

00:01:13.744 --> 00:01:15.104 trying to understand what are

NOTE Confidence: 0.98713535

00:01:15.104 --> 00:01:17.444 the key problems of immunotherapy

NOTE Confidence: 0.98713535

00:01:17.665 --> 00:01:18.944 and how we can overcome

NOTE Confidence: 0.98713535

00:01:18.944 --> 00:01:19.444 them.

NOTE Confidence: 0.98436147

00:01:23.130 --> 00:01:24.909 One of the most canonical

NOTE Confidence: 0.98693836

00:01:25.530 --> 00:01:27.530 approach we utilize is unbiased

NOTE Confidence: 0.98693836

00:01:27.530 --> 00:01:28.590 genetic screens.

NOTE Confidence: 0.9492137

00:01:29.049 --> 00:01:31.530 With the technology breakthroughs such

NOTE Confidence: 0.9492137

00:01:31.530 --> 00:01:33.069 as CRISPR gene editing,

NOTE Confidence: 0.96929044

00:01:33.530 --> 00:01:35.130 we can now edit every

NOTE Confidence: 0.96929044

00:01:35.130 --> 00:01:37.049 human genes in our hands

NOTE Confidence: 0.96929044

00:01:37.049 --> 00:01:38.645 in a massive parallel fashion.

NOTE Confidence: 0.9751835

00:01:39.104 --> 00:01:40.545 So we can perturb all

NOTE Confidence: 0.9751835

00:01:40.545 --> 00:01:41.744 the twenty thousand genes in

NOTE Confidence: 0.9751835

00:01:41.744 --> 00:01:43.844 your genome or every possible

NOTE Confidence: 0.9751835

00:01:43.905 --> 00:01:45.664 base you're interested in, and

NOTE Confidence: 0.9751835

00:01:45.664 --> 00:01:47.905 then see which genes, when

NOTE Confidence: 0.9751835

00:01:47.905 --> 00:01:49.024 you perturb, would have an

NOTE Confidence: 0.9751835

00:01:49.024 --> 00:01:49.524 effect

NOTE Confidence: 0.92412984

00:01:49.825 --> 00:01:51.685 influencing the outcome of immunotherapy.

NOTE Confidence: 0.9283391

00:01:52.320 --> 00:01:53.600 And then you can develop

NOTE Confidence: 0.9283391

00:01:53.600 --> 00:01:55.440 new therapy targeting those genes

NOTE Confidence: 0.9283391

00:01:55.440 --> 00:01:56.340 that we identified.

NOTE Confidence: 0.86624956

00:01:57.040 --> 00:01:58.980 So we utilized the shotgun

NOTE Confidence: 0.86624956

00:01:59.120 --> 00:02:00.580 approach, which is

NOTE Confidence: 0.9839369

00:02:01.280 --> 00:02:02.020 in vivo

NOTE Confidence: 0.76077205

00:02:02.640 --> 00:02:04.180 high throughput crystal screen,

NOTE Confidence: 0.9208541

00:02:04.805 --> 00:02:06.405 and we mutate every gene

NOTE Confidence: 0.9208541

00:02:06.405 --> 00:02:06.905 possible,

NOTE Confidence: 0.9700375

00:02:07.284 --> 00:02:08.725 and we eventually came up

NOTE Confidence: 0.9700375

00:02:08.725 --> 00:02:09.845 with a smaller number of

NOTE Confidence: 0.9700375

00:02:09.845 --> 00:02:11.925 genes that we believe truly

NOTE Confidence: 0.9700375

00:02:11.925 --> 00:02:13.605 have a profound effect on

NOTE Confidence: 0.9700375

00:02:13.605 --> 00:02:14.905 the immune cells function.

NOTE Confidence: 0.95758873

00:02:15.364 --> 00:02:17.364 And those, if we hit

NOTE Confidence: 0.95758873

00:02:17.364 --> 00:02:17.864 them,

NOTE Confidence: 0.8347384

00:02:18.245 --> 00:02:20.100 we can potentially develop novel

NOTE Confidence: 0.8347384

00:02:20.100 --> 00:02:21.000 novel therapeutics.

NOTE Confidence: 0.8971928

00:02:24.420 --> 00:02:26.200 The way we develop therapeutics,

NOTE Confidence: 0.9666355

00:02:26.580 --> 00:02:28.280 we call the gene editing

NOTE Confidence: 0.36024454

00:02:28.580 --> 00:02:29.080 for

NOTE Confidence: 0.74586034

00:02:29.620 --> 00:02:30.600 NS immunotherapy.

NOTE Confidence: 0.9755348

00:02:31.460 --> 00:02:32.505 For the first bucket,

NOTE Confidence: 0.9407561

00:02:32.985 --> 00:02:34.665 we utilize gene editing to

NOTE Confidence: 0.9407561

00:02:34.665 --> 00:02:36.505 discover novel targets and then

NOTE Confidence: 0.9407561

00:02:36.505 --> 00:02:37.544 we hit it with a

NOTE Confidence: 0.9407561

00:02:37.544 --> 00:02:39.305 traditional modality such as small

NOTE Confidence: 0.9407561

00:02:39.305 --> 00:02:40.525 molecule or antibodies.

NOTE Confidence: 0.9417728

00:02:41.385 --> 00:02:42.905 And the second approach is

NOTE Confidence: 0.9417728

00:02:42.905 --> 00:02:44.685 that for those quote unquote

NOTE Confidence: 0.95417315

00:02:44.985 --> 00:02:46.905 undruggable or difficult to drug

NOTE Confidence: 0.95417315

00:02:46.905 --> 00:02:48.250 targets, we we don't need

NOTE Confidence: 0.95417315

00:02:48.250 --> 00:02:49.850 to make a molecule. We

NOTE Confidence: 0.95417315

00:02:49.850 --> 00:02:50.510 can directly

NOTE Confidence: 0.9987061

00:02:50.810 --> 00:02:52.190 edit these genes

NOTE Confidence: 0.8516988

00:02:52.650 --> 00:02:53.850 inside the genome of the

NOTE Confidence: 0.8516988

00:02:53.850 --> 00:02:54.350 cell,

NOTE Confidence: 0.99841434

00:02:54.730 --> 00:02:56.430 and we utilize those cells

NOTE Confidence: 0.9936944

00:02:56.730 --> 00:02:57.550 as therapeutics.

NOTE Confidence: 0.93736225

00:02:58.170 --> 00:02:59.610 And finally, what do I

NOTE Confidence: 0.93736225

00:02:59.610 --> 00:03:00.889 mean by gene editing as

NOTE Confidence: 0.93736225

00:03:00.889 --> 00:03:01.389 immunotherapy,

NOTE Confidence: 0.96685666

00:03:01.690 --> 00:03:02.750 right? I mean,

NOTE Confidence: 0.95598537

00:03:03.225 --> 00:03:04.825 forget about the traditional approach,

NOTE Confidence: 0.95598537

00:03:04.825 --> 00:03:06.505 forget about the cells, let's

NOTE Confidence: 0.95598537

00:03:06.505 --> 00:03:08.105 deliver the whole machinery of

NOTE Confidence: 0.95598537

00:03:08.105 --> 00:03:08.764 gene editing

NOTE Confidence: 0.9502543

00:03:09.145 --> 00:03:10.185 into the body as a

NOTE Confidence: 0.9502543

00:03:10.185 --> 00:03:11.965 gene therapy and let that

NOTE Confidence: 0.93706024

00:03:12.745 --> 00:03:13.965 stimulate or

NOTE Confidence: 0.99957925

00:03:14.345 --> 00:03:14.845 manipulate

NOTE Confidence: 0.9587674

00:03:15.225 --> 00:03:16.345 or fine tune the immune

NOTE Confidence: 0.9587674

00:03:16.345 --> 00:03:18.340 system so they can attack

NOTE Confidence: 0.9587674

00:03:18.340 --> 00:03:19.540 cancer or they can treat

NOTE Confidence: 0.9587674

00:03:19.540 --> 00:03:20.040 diseases.

NOTE Confidence: 0.99193436

00:03:20.500 --> 00:03:21.540 So those are the three

NOTE Confidence: 0.99193436

00:03:21.540 --> 00:03:22.660 buckets of how we develop

NOTE Confidence: 0.99193436

00:03:22.660 --> 00:03:23.320 new therapeutics.