WEBVTT

NOTE duration: ”00:03:05.045”

NOTE Confidence: 0.9926054

00:00:05.920 --> 00:00:07.220 Each of our cells

NOTE Confidence: 0.9644662

00:00:07.600 --> 00:00:09.840 have about six feet of

NOTE Confidence: 0.9644662

00:00:09.840 --> 00:00:10.820 genomic DNA,

NOTE Confidence: 0.9780408

00:00:11.119 --> 00:00:12.480 and it's packaged in a

NOTE Confidence: 0.9780408

00:00:12.480 --> 00:00:13.840 cell nucleus that's about ten

NOTE Confidence: 0.9780408

00:00:13.840 --> 00:00:14.900 micron in diameter.

NOTE Confidence: 0.97128963

00:00:15.545 --> 00:00:17.145 The ratio of this packaging

NOTE Confidence: 0.97128963

00:00:17.145 --> 00:00:18.745 is about the same as

NOTE Confidence: 0.97128963

00:00:18.745 --> 00:00:20.745 packaging the whole circumference of

NOTE Confidence: 0.97128963

00:00:20.745 --> 00:00:22.765 Manhattan into a soccer ball.

NOTE Confidence: 0.9188712

00:00:23.465 --> 00:00:24.904 So the three d genome

NOTE Confidence: 0.9188712

00:00:24.904 --> 00:00:25.404 organization

NOTE Confidence: 0.9185553

00:00:25.785 --> 00:00:27.225 on the biological front is

NOTE Confidence: 0.9185553

00:00:27.225 --> 00:00:29.065 actually linked to many essential

NOTE Confidence: 0.9185553

00:00:29.065 --> 00:00:30.689 genomic functions. And also when

NOTE Confidence: 0.9185553

00:00:30.689 --> 00:00:31.890 it goes awry, it's linked

NOTE Confidence: 0.9185553

00:00:31.890 --> 00:00:33.090 to all kinds of diseases

NOTE Confidence: 0.9185553

00:00:33.090 --> 00:00:34.149 and also aging.

NOTE Confidence: 0.9625776

00:00:38.210 --> 00:00:39.729 We are quite a technology

NOTE Confidence: 0.9625776

00:00:39.729 --> 00:00:41.890 driven lab. We develop state

NOTE Confidence: 0.9625776

00:00:41.890 --> 00:00:43.575 of the art image based

NOTE Confidence: 0.9625776

00:00:43.815 --> 00:00:45.195 spatial omics technologies.

NOTE Confidence: 0.92105466

00:00:46.055 --> 00:00:47.735 We're quite well known for

NOTE Confidence: 0.92105466

00:00:47.735 --> 00:00:49.815 developing such technologies for studying

NOTE Confidence: 0.92105466

00:00:49.815 --> 00:00:51.195 the three d genome organization.

NOTE Confidence: 0.90403706

00:00:51.575 --> 00:00:53.015 Although in recent years, we're

NOTE Confidence: 0.90403706

00:00:53.015 --> 00:00:54.535 also branching out to other

NOTE Confidence: 0.90403706

00:00:54.535 --> 00:00:56.615 modes of spatial omics, such

NOTE Confidence: 0.90403706

00:00:56.615 --> 00:00:58.500 as spatial transcriptomics and and

NOTE Confidence: 0.90403706

00:00:58.500 --> 00:00:59.320 spatial epigenomics.

NOTE Confidence: 0.93956214

00:01:00.179 --> 00:01:01.800 We also apply these technologies

NOTE Confidence: 0.93956214

00:01:01.859 --> 00:01:03.940 that we develop into different

NOTE Confidence: 0.93956214

00:01:03.940 --> 00:01:05.780 areas of biological study as

NOTE Confidence: 0.93956214

00:01:05.780 --> 00:01:07.399 well, particularly with a focus

NOTE Confidence: 0.93956214

00:01:07.619 --> 00:01:09.299 on cancer, aging, and immuno

NOTE Confidence: 0.93956214

00:01:09.299 --> 00:01:09.799 biology.

NOTE Confidence: 0.9816704

00:01:14.145 --> 00:01:15.845 The whole lab actually started,

NOTE Confidence: 0.9115919

00:01:16.385 --> 00:01:17.985 based on a technology I

NOTE Confidence: 0.9115919

00:01:17.985 --> 00:01:19.185 developed in my post shock

NOTE Confidence: 0.9115919

00:01:19.185 --> 00:01:20.885 phase called the chromatin tracing.

NOTE Confidence: 0.9115919

00:01:21.105 --> 00:01:22.065 So it was the first

NOTE Confidence: 0.9115919

00:01:22.065 --> 00:01:24.165 in kind image based genomics

NOTE Confidence: 0.8962943

00:01:24.545 --> 00:01:26.065 technology that really really opened

NOTE Confidence: 0.8962943

00:01:26.065 --> 00:01:28.100 up this subfield of three

NOTE Confidence: 0.8962943

00:01:28.100 --> 00:01:29.080 d genome organization.

NOTE Confidence: 0.9936671

00:01:30.020 --> 00:01:31.000 And this allows

NOTE Confidence: 0.9858319

00:01:31.380 --> 00:01:33.300 us to essentially trace the

NOTE Confidence: 0.9858319

00:01:33.300 --> 00:01:34.819 three d folding organization of

NOTE Confidence: 0.9858319

00:01:34.819 --> 00:01:36.360 the DNA or the genome

NOTE Confidence: 0.9858319

00:01:36.500 --> 00:01:37.720 directly by imaging.

NOTE Confidence: 0.9164623

00:01:38.420 --> 00:01:40.180 But the one issue we

NOTE Confidence: 0.9164623

00:01:40.180 --> 00:01:42.194 had is if you want

NOTE Confidence: 0.9164623

00:01:42.194 --> 00:01:44.034 to discover new regulators of

NOTE Confidence: 0.9164623

00:01:44.034 --> 00:01:45.075 the three d genome, it's

NOTE Confidence: 0.9164623

00:01:45.075 --> 00:01:46.054 very low throughput.

NOTE Confidence: 0.9206721

00:01:47.075 --> 00:01:48.914 We basically developed another technology

NOTE Confidence: 0.9206721

00:01:48.914 --> 00:01:50.134 called perturb tracing

NOTE Confidence: 0.96139276

00:01:50.435 --> 00:01:52.134 to address that. We combined

NOTE Confidence: 0.82709026

00:01:52.594 --> 00:01:53.970 pooled whisper screen

NOTE Confidence: 0.9986437

00:01:54.530 --> 00:01:55.030 technology

NOTE Confidence: 0.98470545

00:01:55.570 --> 00:01:56.070 with

NOTE Confidence: 0.83610094

00:01:56.370 --> 00:01:57.670 the quantum tracing technology.

NOTE Confidence: 0.8697139

00:01:58.210 --> 00:02:00.310 And we developed a new

NOTE Confidence: 0.8697139

00:02:00.530 --> 00:02:01.990 in situ barcoding

NOTE Confidence: 0.85558283

00:02:02.370 --> 00:02:03.750 and the decoding technique

NOTE Confidence: 0.9772673

00:02:04.210 --> 00:02:05.990 that allows us to

NOTE Confidence: 0.9936929

00:02:06.290 --> 00:02:08.050 distinguish which cell has which

NOTE Confidence: 0.9936929

00:02:08.050 --> 00:02:08.550 perturbation

NOTE Confidence: 0.9693272

00:02:09.205 --> 00:02:10.245 and at the same time,

NOTE Confidence: 0.9693272

00:02:10.245 --> 00:02:11.305 in the same cells,

NOTE Confidence: 0.98164725

00:02:11.605 --> 00:02:13.044 trace their three d folding

NOTE Confidence: 0.98164725

00:02:13.044 --> 00:02:13.544 organization.

NOTE Confidence: 0.99123585

00:02:14.084 --> 00:02:15.764 So this allows us to

NOTE Confidence: 0.99123585

00:02:15.764 --> 00:02:17.705 screen for hundreds of potential,

NOTE Confidence: 0.9862109

00:02:18.245 --> 00:02:19.444 regulators of the three d

NOTE Confidence: 0.9862109

00:02:19.444 --> 00:02:20.425 genome organization.

NOTE Confidence: 0.9465356

00:02:24.709 --> 00:02:25.750 If we can find a

NOTE Confidence: 0.9465356

00:02:25.750 --> 00:02:27.030 way, for example, to use

NOTE Confidence: 0.9465356

00:02:27.030 --> 00:02:28.569 this three d genome regulators

NOTE Confidence: 0.9465356

00:02:28.629 --> 00:02:29.450 as handles

NOTE Confidence: 0.9476359

00:02:30.310 --> 00:02:31.450 to either halt

NOTE Confidence: 0.9815447

00:02:31.750 --> 00:02:33.370 or revert the deleterious

NOTE Confidence: 0.9390271

00:02:34.069 --> 00:02:35.930 three d genome changes during

NOTE Confidence: 0.9390271

00:02:36.150 --> 00:02:37.849 diseases such as cancer,

NOTE Confidence: 0.9613424

00:02:38.474 --> 00:02:39.135 Or if,

NOTE Confidence: 0.99721766

00:02:39.514 --> 00:02:40.254 for example,

NOTE Confidence: 0.99714994

00:02:41.194 --> 00:02:43.294 some protein is a downstream

NOTE Confidence: 0.9487937

00:02:43.595 --> 00:02:44.794 effector of the three d

NOTE Confidence: 0.9487937

00:02:44.794 --> 00:02:45.294 genome.

NOTE Confidence: 0.9855492

00:02:45.834 --> 00:02:47.355 Maybe just by removing that

NOTE Confidence: 0.9855492

00:02:47.355 --> 00:02:47.855 protein,

NOTE Confidence: 0.97255886

00:02:48.794 --> 00:02:50.894 one can have beneficial effect

NOTE Confidence: 0.97255886

00:02:50.955 --> 00:02:51.775 to the patient.

NOTE Confidence: 0.94377947

00:02:53.090 --> 00:02:54.549 So either from the upstream,

NOTE Confidence: 0.94377947

00:02:54.610 --> 00:02:55.970 correct the three d genome,

NOTE Confidence: 0.94377947

00:02:55.970 --> 00:02:57.489 or from the downstream, block

NOTE Confidence: 0.94377947

00:02:57.489 --> 00:02:58.689 the factor that leads to

NOTE Confidence: 0.94377947

00:02:58.689 --> 00:02:59.189 diseases.