WEBVTT

NOTE duration: ”00:03:58.336”

NOTE Confidence: 0.94740516

00:00:05.200 --> 00:00:06.879 If we think of our

NOTE Confidence: 0.94740516

00:00:06.879 --> 00:00:08.320 body or our tissue organs

NOTE Confidence: 0.94740516

00:00:08.320 --> 00:00:10.340 are built by different

NOTE Confidence: 0.9616699

00:00:10.719 --> 00:00:12.639 type of cells working as

NOTE Confidence: 0.9616699

00:00:12.639 --> 00:00:13.365 a collection,

NOTE Confidence: 0.9994507

00:00:13.925 --> 00:00:15.205 It's almost like a little

NOTE Confidence: 0.9994507

00:00:15.205 --> 00:00:16.345 kid putting together

NOTE Confidence: 0.93166775

00:00:16.725 --> 00:00:18.885 blocks. The pieces together can

NOTE Confidence: 0.93166775

00:00:18.885 --> 00:00:20.105 be anything you want.

NOTE Confidence: 0.9582332

00:00:20.645 --> 00:00:22.585 So then the each different

NOTE Confidence: 0.9582332

00:00:22.645 --> 00:00:24.665 cell type or cell fate

NOTE Confidence: 0.9582332

00:00:24.884 --> 00:00:25.945 is a particular

NOTE Confidence: 0.9934489

00:00:26.404 --> 00:00:29.250 shaped or sized piece. They

NOTE Confidence: 0.9934489

00:00:29.250 --> 00:00:29.750 are

NOTE Confidence: 0.8334961

00:00:30.290 --> 00:00:31.350 expressing themselves,

NOTE Confidence: 0.96473527

00:00:31.730 --> 00:00:33.110 could either as a neuron,

NOTE Confidence: 0.96473527

00:00:33.250 --> 00:00:34.710 a skin, a blood.

NOTE Confidence: 0.98063153

00:00:35.489 --> 00:00:37.570 But imagine that the kid

NOTE Confidence: 0.98063153

00:00:37.570 --> 00:00:38.950 could have a masterpiece.

NOTE Confidence: 0.98377824

00:00:39.890 --> 00:00:41.745 The magic about this piece

NOTE Confidence: 0.98377824

00:00:41.745 --> 00:00:43.184 is that it can assume

NOTE Confidence: 0.98377824

00:00:43.184 --> 00:00:45.585 or adopt any shape. That's

NOTE Confidence: 0.98377824

00:00:45.585 --> 00:00:46.485 a stem cell.

NOTE Confidence: 0.9724392

00:00:52.385 --> 00:00:53.765 What we're trying to understand

NOTE Confidence: 0.9724392

00:00:53.905 --> 00:00:55.765 is how to mold

NOTE Confidence: 0.9898856

00:00:56.600 --> 00:00:58.199 that stem cell or any

NOTE Confidence: 0.9898856

00:00:58.199 --> 00:01:00.460 given cell into any particular

NOTE Confidence: 0.9898856

00:01:00.600 --> 00:01:02.360 piece or any particular cell

NOTE Confidence: 0.9898856

00:01:02.360 --> 00:01:04.440 type with absolute certainty and

NOTE Confidence: 0.9898856

00:01:04.440 --> 00:01:04.940 control.

NOTE Confidence: 0.9860026

00:01:06.280 --> 00:01:07.259 Now, you know,

NOTE Confidence: 0.9324409

00:01:08.119 --> 00:01:09.880 it's really not going too

NOTE Confidence: 0.9324409

00:01:09.880 --> 00:01:11.159 far fetched to saying if

NOTE Confidence: 0.9324409

00:01:11.159 --> 00:01:11.865 I take a drop of

NOTE Confidence: 0.9324409

00:01:11.865 --> 00:01:13.305 of your blood, that we

NOTE Confidence: 0.9324409

00:01:13.305 --> 00:01:14.424 can do something to the

NOTE Confidence: 0.9324409

00:01:14.424 --> 00:01:15.704 cells and then bring it

NOTE Confidence: 0.9324409

00:01:15.704 --> 00:01:17.084 all the way back to

NOTE Confidence: 0.9324409

00:01:17.305 --> 00:01:17.805 embryonic

NOTE Confidence: 0.95523506

00:01:18.185 --> 00:01:19.704 like state, and then we

NOTE Confidence: 0.95523506

00:01:19.704 --> 00:01:20.444 can redifferentiate

NOTE Confidence: 0.99609375

00:01:20.905 --> 00:01:21.405 these

NOTE Confidence: 0.9925537

00:01:21.944 --> 00:01:23.705 embryonic like cells to become

NOTE Confidence: 0.9925537

00:01:23.705 --> 00:01:25.145 neurons, to become heart, to

NOTE Confidence: 0.9925537

00:01:25.145 --> 00:01:26.045 become skin.

NOTE Confidence: 0.97003174

00:01:26.380 --> 00:01:27.420 This is what this,

NOTE Confidence: 0.99960935

00:01:28.060 --> 00:01:29.920 stem cell research is about.

NOTE Confidence: 0.9950009

00:01:30.940 --> 00:01:32.640 As great as the reprogramming

NOTE Confidence: 0.9950009

00:01:32.860 --> 00:01:34.000 process is,

NOTE Confidence: 0.99902344

00:01:34.620 --> 00:01:35.360 it is

NOTE Confidence: 0.95825195

00:01:35.740 --> 00:01:37.660 a coin toss. But it's

NOTE Confidence: 0.95825195

00:01:37.660 --> 00:01:38.720 like you have

NOTE Confidence: 0.9698661

00:01:39.100 --> 00:01:40.459 a coin that has one

NOTE Confidence: 0.9698661

00:01:40.459 --> 00:01:41.440 thousand faces,

NOTE Confidence: 0.99930245

00:01:42.015 --> 00:01:43.055 and we know one of

NOTE Confidence: 0.99930245

00:01:43.055 --> 00:01:43.715 the faces

NOTE Confidence: 0.9091797

00:01:44.015 --> 00:01:45.235 is going to be like

NOTE Confidence: 0.84375

00:01:45.535 --> 00:01:47.475 a embryonic like state.

NOTE Confidence: 0.9800415

00:01:48.255 --> 00:01:49.695 But you can never know

NOTE Confidence: 0.9800415

00:01:49.695 --> 00:01:51.215 which one of these one

NOTE Confidence: 0.9800415

00:01:51.215 --> 00:01:53.055 thousand coins are going to

NOTE Confidence: 0.9800415

00:01:53.055 --> 00:01:54.540 be showing up as the

NOTE Confidence: 0.9800415

00:01:54.860 --> 00:01:56.380 face that you want. So

NOTE Confidence: 0.9800415

00:01:56.380 --> 00:01:57.660 this is what we're trying

NOTE Confidence: 0.9800415

00:01:57.660 --> 00:01:58.320 to understand.

NOTE Confidence: 0.99891496

00:01:58.620 --> 00:01:59.500 We want to be able

NOTE Confidence: 0.99891496

00:01:59.500 --> 00:02:00.640 to have the ability

NOTE Confidence: 0.99325794

00:02:01.980 --> 00:02:03.500 that every time we toss

NOTE Confidence: 0.99325794

00:02:03.500 --> 00:02:04.780 a coin, we get to

NOTE Confidence: 0.99325794

00:02:04.780 --> 00:02:06.400 exactly that one

NOTE Confidence: 0.98554146

00:02:12.325 --> 00:02:13.925 We started working with a

NOTE Confidence: 0.98554146

00:02:13.925 --> 00:02:16.004 particular cell type that their

NOTE Confidence: 0.98554146

00:02:16.004 --> 00:02:17.944 normal job are to make

NOTE Confidence: 0.98554146

00:02:18.165 --> 00:02:19.544 differentiated blood cells.

NOTE Confidence: 0.9942627

00:02:20.084 --> 00:02:20.985 These cells,

NOTE Confidence: 0.898112

00:02:21.285 --> 00:02:22.504 they are fascinating

NOTE Confidence: 0.92822266

00:02:22.805 --> 00:02:23.580 in the sense

NOTE Confidence: 0.9731771

00:02:24.060 --> 00:02:25.660 if you toss these as

NOTE Confidence: 0.9731771

00:02:25.660 --> 00:02:27.820 the coin toss, they have

NOTE Confidence: 0.9731771

00:02:27.820 --> 00:02:29.760 a much, much higher chance

NOTE Confidence: 0.9892578

00:02:30.300 --> 00:02:30.800 landing

NOTE Confidence: 0.97352296

00:02:31.260 --> 00:02:32.380 on the face that we

NOTE Confidence: 0.97352296

00:02:32.380 --> 00:02:33.980 want them. We can videotape

NOTE Confidence: 0.97352296

00:02:33.980 --> 00:02:35.740 them and watch them as

NOTE Confidence: 0.97352296

00:02:35.740 --> 00:02:37.840 they change step by step.

NOTE Confidence: 0.99658203

00:02:39.064 --> 00:02:40.264 We could see that these

NOTE Confidence: 0.99658203

00:02:40.264 --> 00:02:40.764 cells

NOTE Confidence: 0.9499163

00:02:41.224 --> 00:02:42.985 that easier to change into

NOTE Confidence: 0.9499163

00:02:42.985 --> 00:02:44.745 a new new identity, they

NOTE Confidence: 0.9499163

00:02:44.745 --> 00:02:46.364 divide much more rapidly.

NOTE Confidence: 0.93364257

00:02:47.224 --> 00:02:48.985 So we started off really

NOTE Confidence: 0.93364257

00:02:48.985 --> 00:02:51.150 wondering whether this rapid division

NOTE Confidence: 0.95236546

00:02:55.709 --> 00:02:57.090 pluripotent stem cells

NOTE Confidence: 0.9611003

00:02:57.709 --> 00:02:58.610 with the resolution

NOTE Confidence: 0.9187012

00:02:59.069 --> 00:03:01.230 both temporarily, how frequently we

NOTE Confidence: 0.9187012

00:03:01.230 --> 00:03:01.889 need to

NOTE Confidence: 0.93037415

00:03:02.269 --> 00:03:03.870 track them or what kind

NOTE Confidence: 0.93037415

00:03:03.870 --> 00:03:04.974 of label we put on

NOTE Confidence: 0.93037415

00:03:04.974 --> 00:03:07.135 them, under what conditions. So

NOTE Confidence: 0.93037415

00:03:07.135 --> 00:03:07.635 it's

NOTE Confidence: 0.944987

00:03:08.014 --> 00:03:08.514 iteratively,

NOTE Confidence: 0.9670139

00:03:09.135 --> 00:03:10.415 we learn more and more,

NOTE Confidence: 0.9670139

00:03:10.655 --> 00:03:11.875 to watch them really.

NOTE Confidence: 0.9750279

00:03:16.254 --> 00:03:18.060 The kind of principles we

NOTE Confidence: 0.9750279

00:03:18.220 --> 00:03:19.040 extract immediately

NOTE Confidence: 0.97294104

00:03:19.419 --> 00:03:21.120 seems to be informing only

NOTE Confidence: 0.97294104

00:03:21.180 --> 00:03:22.720 how do these blood progenitors

NOTE Confidence: 0.97294104

00:03:22.940 --> 00:03:24.400 that can become iPSCs.

NOTE Confidence: 0.9479167

00:03:25.180 --> 00:03:26.380 But I think this is

NOTE Confidence: 0.9479167

00:03:26.380 --> 00:03:28.220 the tool system that are

NOTE Confidence: 0.9479167

00:03:28.220 --> 00:03:29.040 telling us.

NOTE Confidence: 0.9888427

00:03:29.419 --> 00:03:30.940 If we now want to,

NOTE Confidence: 0.9888427

00:03:30.940 --> 00:03:32.540 say, take a drop of

NOTE Confidence: 0.9888427

00:03:32.540 --> 00:03:35.205 blood to reprogram into neurons

NOTE Confidence: 0.9888427

00:03:35.345 --> 00:03:36.405 or into cardiomyocytes,

NOTE Confidence: 0.92514646

00:03:37.745 --> 00:03:39.185 the same set of rules

NOTE Confidence: 0.92514646

00:03:39.185 --> 00:03:40.725 or knowledge or the laws,

NOTE Confidence: 0.8804796

00:03:41.345 --> 00:03:42.545 most likely they'll,

NOTE Confidence: 0.99902344

00:03:43.105 --> 00:03:43.605 apply.

NOTE Confidence: 0.97477216

00:03:45.110 --> 00:03:47.030 It is helping us to

NOTE Confidence: 0.97477216

00:03:47.030 --> 00:03:48.890 understand the larger picture.