WEBVTT

NOTE duration: ”00:05:12.064”

NOTE Confidence: 0.9937744

00:00:03.840 --> 00:00:05.299 A neuron has information

NOTE Confidence: 0.94215304

00:00:05.839 --> 00:00:07.040 and it goes through the

NOTE Confidence: 0.94215304

00:00:07.040 --> 00:00:08.320 axons, which you can think

NOTE Confidence: 0.94215304

00:00:08.320 --> 00:00:10.559 about as electrical wires to

NOTE Confidence: 0.94215304

00:00:10.559 --> 00:00:11.539 another neuron.

NOTE Confidence: 0.9946638

00:00:12.320 --> 00:00:15.015 Electrical impulses, they travel down

NOTE Confidence: 0.9946638

00:00:15.015 --> 00:00:16.935 the axon and trigger the

NOTE Confidence: 0.9946638

00:00:16.935 --> 00:00:18.395 release of some chemical

NOTE Confidence: 0.8787842

00:00:19.015 --> 00:00:19.515 neurotransmitters.

NOTE Confidence: 0.9977214

00:00:20.614 --> 00:00:21.835 And these neurotransmitters

NOTE Confidence: 0.98083496

00:00:22.215 --> 00:00:24.535 can cause either excitation or

NOTE Confidence: 0.98083496

00:00:24.535 --> 00:00:26.235 inhibition of the brain function.

NOTE Confidence: 0.9815119

00:00:26.855 --> 00:00:28.679 And it allows our brain

NOTE Confidence: 0.9815119

00:00:28.679 --> 00:00:30.839 cells, also called neurons, to

NOTE Confidence: 0.9815119

00:00:30.839 --> 00:00:31.339 communicate.

NOTE Confidence: 0.92419434

00:00:32.199 --> 00:00:33.719 You have over a billion

NOTE Confidence: 0.92419434

00:00:33.719 --> 00:00:35.079 neurons in the brain, and

NOTE Confidence: 0.92419434

00:00:35.079 --> 00:00:37.100 so it's pretty magical.

NOTE Confidence: 0.9397533

00:00:37.879 --> 00:00:39.640 So seizures are caused by

NOTE Confidence: 0.9397533

00:00:39.640 --> 00:00:41.675 sudden abnormal burst of electrical

NOTE Confidence: 0.9397533

00:00:41.815 --> 00:00:43.415 activity in the brain. And

NOTE Confidence: 0.9397533

00:00:43.415 --> 00:00:44.375 a seizure can look like

NOTE Confidence: 0.9397533

00:00:44.375 --> 00:00:46.055 almost anything. If it is

NOTE Confidence: 0.9397533

00:00:46.055 --> 00:00:47.655 affecting the motor areas in

NOTE Confidence: 0.9397533

00:00:47.655 --> 00:00:49.175 the brain, patients may notice

NOTE Confidence: 0.9397533

00:00:49.175 --> 00:00:50.955 some jerking movements of the

NOTE Confidence: 0.9397533

00:00:51.095 --> 00:00:52.395 certain part of the extremity.

NOTE Confidence: 0.9473032

00:00:52.935 --> 00:00:54.295 More and more brain when

NOTE Confidence: 0.9473032

00:00:54.295 --> 00:00:55.915 it gets involved, it causes

NOTE Confidence: 0.9473032

00:00:56.215 --> 00:00:57.270 loss of impairment.

NOTE Confidence: 0.96413577

00:00:58.770 --> 00:01:00.290 The seizure can be provoked

NOTE Confidence: 0.96413577

00:01:00.290 --> 00:01:01.750 or it can be unprovoked.

NOTE Confidence: 0.9787322

00:01:02.290 --> 00:01:04.130 Provoked seizures can occur in

NOTE Confidence: 0.9787322

00:01:04.130 --> 00:01:05.970 response to a specific trigger

NOTE Confidence: 0.9787322

00:01:05.970 --> 00:01:07.890 or a temporary condition. It

NOTE Confidence: 0.9787322

00:01:07.890 --> 00:01:09.090 could be high fever, low

NOTE Confidence: 0.9787322

00:01:09.090 --> 00:01:11.715 blood sugar, versus unprovoked seizures,

NOTE Confidence: 0.9787322

00:01:11.715 --> 00:01:13.415 they occur without an immediate

NOTE Confidence: 0.9787322

00:01:13.475 --> 00:01:13.975 trigger.

NOTE Confidence: 0.9816352

00:01:14.275 --> 00:01:15.555 So if you've had two

NOTE Confidence: 0.9816352

00:01:15.555 --> 00:01:17.155 seizures that are unprovoked, you

NOTE Confidence: 0.9816352

00:01:17.155 --> 00:01:18.595 have epilepsy. Or if you

NOTE Confidence: 0.9816352

00:01:18.595 --> 00:01:19.655 have one seizure

NOTE Confidence: 0.98679197

00:01:19.955 --> 00:01:21.415 and you have a structural

NOTE Confidence: 0.98679197

00:01:21.635 --> 00:01:22.834 problem in your brain that

NOTE Confidence: 0.98679197

00:01:22.834 --> 00:01:24.435 can cause another seizure, that

NOTE Confidence: 0.98679197

00:01:24.435 --> 00:01:26.055 is how epilepsy is defined.

NOTE Confidence: 0.9433594

00:01:29.500 --> 00:01:31.360 So diagnosis is so important

NOTE Confidence: 0.96085614

00:01:31.660 --> 00:01:33.020 because there are many different

NOTE Confidence: 0.96085614

00:01:33.020 --> 00:01:34.240 ways to treat seizures.

NOTE Confidence: 0.9666041

00:01:34.540 --> 00:01:35.980 And so understanding where they

NOTE Confidence: 0.9666041

00:01:35.980 --> 00:01:37.819 come from, the parts of

NOTE Confidence: 0.9666041

00:01:37.819 --> 00:01:39.100 the brain they affect, and

NOTE Confidence: 0.9666041

00:01:39.100 --> 00:01:40.560 the functions they affect

NOTE Confidence: 0.98328996

00:01:41.115 --> 00:01:43.035 has a direct correlation with

NOTE Confidence: 0.98328996

00:01:43.035 --> 00:01:44.095 what can be done.

NOTE Confidence: 0.99827814

00:01:44.555 --> 00:01:45.995 A brain MRI is one

NOTE Confidence: 0.99827814

00:01:45.995 --> 00:01:47.755 of the most useful tools

NOTE Confidence: 0.99827814

00:01:47.755 --> 00:01:49.055 that we have in evaluating

NOTE Confidence: 0.99827814

00:01:49.115 --> 00:01:50.255 a patient with epilepsy

NOTE Confidence: 0.95996094

00:01:50.795 --> 00:01:53.295 because it helps identify structural

NOTE Confidence: 0.95996094

00:01:53.435 --> 00:01:53.935 abnormalities

NOTE Confidence: 0.94277954

00:01:54.235 --> 00:01:55.410 in the brain. Like a

NOTE Confidence: 0.94277954

00:01:55.570 --> 00:01:56.770 stroke or if there is

NOTE Confidence: 0.94277954

00:01:56.770 --> 00:01:58.370 a brain tumor benign or

NOTE Confidence: 0.94277954

00:01:58.370 --> 00:01:58.870 malignant.

NOTE Confidence: 0.89750975

00:01:59.410 --> 00:02:01.110 So EEG is an electroencephalogram.

NOTE Confidence: 0.99834734

00:02:01.810 --> 00:02:03.250 It is basically measuring the

NOTE Confidence: 0.99834734

00:02:03.250 --> 00:02:05.250 electrical signals of the brain.

NOTE Confidence: 0.99834734

00:02:05.250 --> 00:02:06.310 You put some

NOTE Confidence: 0.99958146

00:02:06.850 --> 00:02:08.530 electrodes on the surface of

NOTE Confidence: 0.99958146

00:02:08.530 --> 00:02:09.165 the head

NOTE Confidence: 0.99825615

00:02:09.965 --> 00:02:11.405 to know where seizures are

NOTE Confidence: 0.99825615

00:02:11.405 --> 00:02:12.224 coming from.

NOTE Confidence: 0.94046724

00:02:13.484 --> 00:02:15.185 EEG is a fantastic technique,

NOTE Confidence: 0.94046724

00:02:15.325 --> 00:02:16.284 but it also has some

NOTE Confidence: 0.94046724

00:02:16.284 --> 00:02:17.105 of its limitations.

NOTE Confidence: 0.99759114

00:02:17.805 --> 00:02:19.165 Because when things come from

NOTE Confidence: 0.99759114

00:02:19.165 --> 00:02:20.704 very deep in the brain,

NOTE Confidence: 0.99759114

00:02:20.844 --> 00:02:22.944 it's difficult for EEG to

NOTE Confidence: 0.99311966

00:02:23.460 --> 00:02:25.380 accurately tell you where in

NOTE Confidence: 0.99311966

00:02:25.380 --> 00:02:26.500 that deep part of the

NOTE Confidence: 0.99311966

00:02:26.500 --> 00:02:27.000 brain

NOTE Confidence: 0.9675293

00:02:27.300 --> 00:02:28.760 decisions are coming from.

NOTE Confidence: 0.98530275

00:02:29.380 --> 00:02:30.200 So magnetoencephalography

NOTE Confidence: 0.9581581

00:02:31.700 --> 00:02:33.060 is another way of looking

NOTE Confidence: 0.9581581

00:02:33.060 --> 00:02:34.580 deep in the brain. Rather

NOTE Confidence: 0.9581581

00:02:34.580 --> 00:02:35.505 than electrical signals,

NOTE Confidence: 0.79907227

00:02:48.145 --> 00:02:49.365 referral to

NOTE Confidence: 0.9826253

00:02:50.569 --> 00:02:52.590 early referral to a comprehensive

NOTE Confidence: 0.9826253

00:02:52.650 --> 00:02:54.250 epilepsy center is the key

NOTE Confidence: 0.9826253

00:02:54.250 --> 00:02:54.989 to success.

NOTE Confidence: 0.98142314

00:02:56.650 --> 00:02:58.489 For epilepsy, the first line

NOTE Confidence: 0.98142314

00:02:58.489 --> 00:03:00.810 of treatment is anti seizure

NOTE Confidence: 0.98142314

00:03:00.810 --> 00:03:01.310 medications.

NOTE Confidence: 0.9852783

00:03:01.610 --> 00:03:03.150 Seventy percent of the patients

NOTE Confidence: 0.9852783

00:03:03.370 --> 00:03:05.205 respond very well to medications

NOTE Confidence: 0.7687988

00:03:05.505 --> 00:03:06.005 usually,

NOTE Confidence: 0.97852725

00:03:06.305 --> 00:03:07.505 and they will not have

NOTE Confidence: 0.97852725

00:03:07.505 --> 00:03:09.185 another seizures if they are

NOTE Confidence: 0.97852725

00:03:09.185 --> 00:03:10.965 taking their medicines on time.

NOTE Confidence: 0.97852725

00:03:11.025 --> 00:03:12.465 Now, if you've tried two

NOTE Confidence: 0.97852725

00:03:12.465 --> 00:03:12.965 medications

NOTE Confidence: 0.9776408

00:03:13.985 --> 00:03:15.825 for epilepsy and you still

NOTE Confidence: 0.9776408

00:03:15.825 --> 00:03:17.525 have unprovoked seizures,

NOTE Confidence: 0.9981893

00:03:18.000 --> 00:03:19.760 that is the definition of

NOTE Confidence: 0.9981893

00:03:19.760 --> 00:03:21.540 medication refractory epilepsy.

NOTE Confidence: 0.9507141

00:03:23.040 --> 00:03:24.879 We've learned that you can

NOTE Confidence: 0.9507141

00:03:24.879 --> 00:03:26.419 use surgery actually

NOTE Confidence: 0.9904785

00:03:26.720 --> 00:03:27.459 to treat

NOTE Confidence: 0.9838867

00:03:27.760 --> 00:03:28.260 these

NOTE Confidence: 0.99226886

00:03:28.720 --> 00:03:30.645 medication refractory seizures.

NOTE Confidence: 0.9630534

00:03:32.465 --> 00:03:34.145 We do have very minimally

NOTE Confidence: 0.9630534

00:03:34.145 --> 00:03:34.645 invasive

NOTE Confidence: 0.99121094

00:03:34.945 --> 00:03:35.445 technologies

NOTE Confidence: 0.8857422

00:03:36.065 --> 00:03:36.645 such as laser

NOTE Confidence: 0.87045896

00:03:37.425 --> 00:03:39.685 where through a two millimeter

NOTE Confidence: 0.9404297

00:03:40.225 --> 00:03:41.605 hole, we can actually

NOTE Confidence: 0.97802734

00:03:42.145 --> 00:03:42.645 remove

NOTE Confidence: 0.9932454

00:03:42.945 --> 00:03:44.079 tissue that causes seizures in

NOTE Confidence: 0.9932454

00:03:44.079 --> 00:03:44.579 the

NOTE Confidence: 0.85961914

00:03:44.879 --> 00:03:45.379 brain.

NOTE Confidence: 0.907959

00:03:46.560 --> 00:03:47.379 And sometimes,

NOTE Confidence: 0.99902344

00:03:48.079 --> 00:03:49.459 seizures come from places

NOTE Confidence: 0.9995117

00:03:49.760 --> 00:03:51.620 that are extremely important

NOTE Confidence: 0.92961776

00:03:51.920 --> 00:03:53.040 in the brain such as

NOTE Confidence: 0.92961776

00:03:53.040 --> 00:03:54.099 language function.

NOTE Confidence: 0.92626953

00:03:54.480 --> 00:03:55.695 And so now, we have

NOTE Confidence: 0.92626953

00:03:55.935 --> 00:03:57.155 closed loop neuromodulation

NOTE Confidence: 1

00:03:57.535 --> 00:03:58.035 devices

NOTE Confidence: 0.97892255

00:03:58.575 --> 00:04:00.495 that will detect seizures and

NOTE Confidence: 0.97892255

00:04:00.495 --> 00:04:00.995 stimulate

NOTE Confidence: 0.9623736

00:04:01.295 --> 00:04:02.895 to short circuit them and

NOTE Confidence: 0.9623736

00:04:02.895 --> 00:04:04.495 so people can continue with

NOTE Confidence: 0.9623736

00:04:04.495 --> 00:04:05.775 their lives and and not

NOTE Confidence: 0.9623736

00:04:05.775 --> 00:04:06.595 lose function.

NOTE Confidence: 0.97342354

00:04:07.135 --> 00:04:08.675 And now, we're actually having

NOTE Confidence: 0.97342354

00:04:08.895 --> 00:04:09.795 newer things

NOTE Confidence: 0.882704

00:04:10.255 --> 00:04:12.160 such as focused ultrasounds for

NOTE Confidence: 0.882704

00:04:12.160 --> 00:04:13.220 the treatment of epilepsy.

NOTE Confidence: 0.8206787

00:04:15.360 --> 00:04:17.279 And it's lifeless surgery. You

NOTE Confidence: 0.8206787

00:04:17.279 --> 00:04:18.420 can use ultrasound

NOTE Confidence: 0.91788

00:04:19.120 --> 00:04:21.680 waves to ablate regions of

NOTE Confidence: 0.91788

00:04:21.680 --> 00:04:23.440 brain that could be causing

NOTE Confidence: 0.91788

00:04:23.440 --> 00:04:23.940 seizures.

NOTE Confidence: 0.9765625

00:04:27.545 --> 00:04:28.665 So we have a really

NOTE Confidence: 0.9765625

00:04:28.665 --> 00:04:30.765 big research program at Yale.

NOTE Confidence: 0.9765625

00:04:30.985 --> 00:04:31.805 The epilepsy,

NOTE Confidence: 0.9799343

00:04:32.505 --> 00:04:34.105 teams are looking at, like,

NOTE Confidence: 0.9799343

00:04:34.105 --> 00:04:36.105 what impairs the consciousness during

NOTE Confidence: 0.9799343

00:04:36.105 --> 00:04:37.385 seizures. So if we can

NOTE Confidence: 0.9799343

00:04:37.385 --> 00:04:38.985 have a better understanding of

NOTE Confidence: 0.9799343

00:04:38.985 --> 00:04:40.770 consciousness, where it comes from,

NOTE Confidence: 0.9799343

00:04:40.770 --> 00:04:42.210 we can try to see

NOTE Confidence: 0.9799343

00:04:42.210 --> 00:04:43.250 how we can make our

NOTE Confidence: 0.9799343

00:04:43.250 --> 00:04:44.229 patients safer.

NOTE Confidence: 0.9899609

00:04:44.849 --> 00:04:46.690 In terms of epilepsy surgery,

NOTE Confidence: 0.9899609

00:04:46.690 --> 00:04:48.129 when we try to figure

NOTE Confidence: 0.9899609

00:04:48.129 --> 00:04:49.830 out what are the different

NOTE Confidence: 0.9899609

00:04:49.970 --> 00:04:52.150 zones doing, then we understand

NOTE Confidence: 0.9899609

00:04:52.210 --> 00:04:54.389 the epilepsy networks much better.

NOTE Confidence: 0.9856445

00:04:55.415 --> 00:04:57.435 At Yale, we have pioneered

NOTE Confidence: 1

00:04:57.975 --> 00:04:58.475 surgical

NOTE Confidence: 0.9753196

00:04:58.935 --> 00:05:00.775 interventions for epilepsy. We are

NOTE Confidence: 0.9753196

00:05:00.775 --> 00:05:02.795 involved in multiple clinical trials.

NOTE Confidence: 0.9753196

00:05:02.935 --> 00:05:04.695 Yale is definitely a forefront,

NOTE Confidence: 0.9753196

00:05:04.695 --> 00:05:05.815 a leader in the treatment

NOTE Confidence: 0.9753196

00:05:05.815 --> 00:05:06.395 of epilepsy.