WEBVTT

NOTE duration:"01:03:48"

NOTE recognizability:0.884

NOTE language:en-us

NOTE Confidence: 0.910193244

00:00:00.000 --> 00:00:00.912 Welcome everyone.

NOTE Confidence: 0.910193244

00:00:00.912 --> 00:00:04.560 We're pleased and honored to be hosting Dr.

NOTE Confidence: 0.910193244

00:00:04.560 --> 00:00:06.792 Kiki Owasaki this evening and to

NOTE Confidence: 0.910193244

00:00:06.792 --> 00:00:09.096 have so many people in attendance.

NOTE Confidence: 0.910193244

00:00:09.096 --> 00:00:10.320 I'm Leslie Krumholz.

NOTE Confidence: 0.910193244

00:00:10.320 --> 00:00:12.323 I'm the Co founder of Hugo Health, Kindred.

NOTE Confidence: 0.910193244

00:00:12.323 --> 00:00:14.261 And for those of you that

NOTE Confidence: 0.910193244

00:00:14.261 --> 00:00:15.800 don't know really quickly,

NOTE Confidence: 0.910193244

00:00:15.800 --> 00:00:17.546 Kindred's building a network of what

NOTE Confidence: 0.910193244

00:00:17.546 --> 00:00:19.560 we call data enabled people who've

NOTE Confidence: 0.910193244

00:00:19.560 --> 00:00:21.276 been impacted by COVID and who

NOTE Confidence: 0.910193244

00:00:21.276 --> 00:00:23.358 want to contribute to research in

NOTE Confidence: 0.910193244

00:00:23.358 --> 00:00:25.118 partnership with leading scientists.

NOTE Confidence: 0.910193244

00:00:25.120 --> 00:00:27.198 I I strongly encourage anyone

NOTE Confidence: 0.924982092857143

00:00:27.200 --> 00:00:29.160 who is not a member of Kindred

NOTE Confidence: 0.948806335

00:00:29.600 --> 00:00:30.960 to check us out.

NOTE Confidence: 0.948806335

00:00:30.960 --> 00:00:34.130 I have put our a link to the website as

NOTE Confidence: 0.948806335

00:00:34.130 --> 00:00:35.879 well as information about the Listen Study.

NOTE Confidence: 0.948806335

00:00:35.880 --> 00:00:37.158 If you're interested in joining Listen,

NOTE Confidence: 0.948806335

00:00:37.160 --> 00:00:39.554 you need to actually join Kindred first.

NOTE Confidence: 0.948806335

00:00:39.560 --> 00:00:41.246 The Listen Study is being led

NOTE Confidence: 0.948806335

00:00:41.246 --> 00:00:42.800 by Doctor Akiko Iwasaki and Dr.

NOTE Confidence: 0.948806335

00:00:42.800 --> 00:00:43.920 Harlan Krumholz.

NOTE Confidence: 0.948806335

00:00:43.920 --> 00:00:45.426 So I'm not going to take up

NOTE Confidence: 0.948806335

00:00:45.426 --> 00:00:47.156 another second of your time.

NOTE Confidence: 0.948806335

00:00:47.160 --> 00:00:48.546 I'm going to pass this right

NOTE Confidence: 0.948806335

00:00:48.546 --> 00:00:49.986 over to Akiko for introductions,

NOTE Confidence: 0.948806335

00:00:49.986 --> 00:00:51.520 kick off this very important

NOTE Confidence: 0.948806335

00:00:51.520 --> 00:00:52.680 presentation and once again,

NOTE Confidence: 0.948806335

00:00:52.680 --> 00:00:55.128 just to say thank you so much for

NOTE Confidence: 0.948806335

00:00:55.128 --> 00:00:57.600 spending an hour of your evening with us.

NOTE Confidence: 0.948806335

00:00:57.600 --> 00:00:58.240 So, Akiko,

NOTE Confidence: 0.933528492

00:00:59.600 --> 00:01:00.960 thank you so much. Leslie.

NOTE Confidence: 0.933528492

00:01:00.960 --> 00:01:03.948 I'm delighted to be back on the town hall

NOTE Confidence: 0.933528492

00:01:03.948 --> 00:01:06.374 again with the Kindred, Hugo Health.

NOTE Confidence: 0.933528492

00:01:06.374 --> 00:01:09.223 And I'm also delighted to be sharing

NOTE Confidence: 0.933528492

00:01:09.223 --> 00:01:11.640 the stage with my colleagues,

NOTE Confidence: 0.933528492

00:01:11.640 --> 00:01:13.359 Ornali, Cesar Arlen,

NOTE Confidence: 0.933528492

00:01:13.359 --> 00:01:17.600 So very happy to be here. All right.

NOTE Confidence: 0.933528492

00:01:17.600 --> 00:01:21.400 So I'm going to jump in to my talk.

NOTE Confidence: 0.933528492

00:01:21.400 --> 00:01:25.200 Let's see. OK.

NOTE Confidence: 0.933528492

00:01:25.200 --> 00:01:26.360 Hope you can see this.

NOTE Confidence: 0.951244890588235

00:01:28.480 --> 00:01:30.760 OK, So what I wanted to do today

NOTE Confidence: 0.951244890588235

00:01:30.760 --> 00:01:33.593 was to give you an overview of our

NOTE Confidence: 0.951244890588235

00:01:33.593 --> 00:01:36.120 current understanding of long COVID,

NOTE Confidence: 0.951244890588235

00:01:36.120 --> 00:01:39.360 particularly immune responses in long COVID.

NOTE Confidence: 0.951244890588235

00:01:39.360 --> 00:01:43.528 And also I'll spend some time at the

NOTE Confidence: 0.951244890588235

00:01:43.528 --> 00:01:46.848 end speculating on how vaccine related

NOTE Confidence: 0.951244890588235

00:01:46.848 --> 00:01:50.460 long haul could occur based on some

NOTE Confidence: 0.951244890588235

00:01:50.460 --> 00:01:53.451 of the data that the Yale Listen

NOTE Confidence: 0.951244890588235

00:01:53.451 --> 00:01:55.136 study has already collected from

NOTE Confidence: 0.951244890588235

00:01:55.136 --> 00:01:57.440 many of you participating tonight.

NOTE Confidence: 0.810630484444445

00:01:59.560 --> 00:02:02.116 So before I go in to discuss long COVID,

NOTE Confidence: 0.810630484444445

00:02:02.120 --> 00:02:03.848 I just want to emphasize that

NOTE Confidence: 0.810630484444445

00:02:03.848 --> 00:02:05.895 COVID is not the only infection

NOTE Confidence: 0.810630484444445

00:02:05.895 --> 00:02:07.955 that results in post infection,

NOTE Confidence: 0.810630484444445

00:02:07.960 --> 00:02:09.800 post acute infection syndromes.

NOTE Confidence: 0.810630484444445

00:02:09.800 --> 00:02:12.560 And I was fortunate enough to

NOTE Confidence: 0.810630484444445

00:02:12.644 --> 00:02:14.759 co-author a review with Yon,

NOTE Confidence: 0.810630484444445

00:02:14.760 --> 00:02:18.156 Choko and others on this topic.

NOTE Confidence: 0.810630484444445

00:02:18.160 --> 00:02:20.278 Which is really important to keep

NOTE Confidence: 0.810630484444445

00:02:20.278 --> 00:02:22.906 in mind because it means that many

NOTE Confidence: 0.810630484444445

00:02:22.906 --> 00:02:25.186 other viral and non viral infections

NOTE Confidence: 0.810630484444445

00:02:25.186 --> 00:02:27.479 can lead to prolonged symptoms,

NOTE Confidence: 0.810630484444445

00:02:27.480 --> 00:02:31.176 some of them leading for decades of

NOTE Confidence: 0.810630484444445

00:02:31.176 --> 00:02:34.216 disease and others kind of having

NOTE Confidence: 0.810630484444445

00:02:34.216 --> 00:02:37.330 an offset that is much later than

NOTE Confidence: 0.810630484444445

00:02:37.330 --> 00:02:39.880 what we're seeing with long COVID,

NOTE Confidence: 0.810630484444445

00:02:39.880 --> 00:02:41.684 something that happens decades

NOTE Confidence: 0.810630484444445

00:02:41.684 --> 00:02:43.037 after the infection.

NOTE Confidence: 0.810630484444445

00:02:43.040 --> 00:02:45.496 So there is a lot of complexity into

NOTE Confidence: 0.810630484444445

00:02:45.496 --> 00:02:47.880 these post acute infection syndromes.

NOTE Confidence: 0.810630484444445

00:02:47.880 --> 00:02:50.082 They haven't been really well studied

NOTE Confidence: 0.810630484444445

00:02:50.082 --> 00:02:52.251 and that's something that we're going

NOTE Confidence: 0.810630484444445

00:02:52.251 --> 00:02:54.491 to change by studying these diseases at

NOTE Confidence: 0.810630484444445

00:02:54.491 --> 00:02:56.800 the molecular and immunological level

NOTE Confidence: 0.810630484444445

00:02:56.800 --> 00:02:58.354 to understand what might be going on.

NOTE Confidence: 0.870160992

00:03:00.600 --> 00:03:03.120 So the long COVID pathogenesis,

NOTE Confidence: 0.870160992

00:03:03.120 --> 00:03:04.880 there are multiple hypothesis

NOTE Confidence: 0.870160992

00:03:04.880 --> 00:03:06.640 that have been raised.

NOTE Confidence: 0.870160992

00:03:06.640 --> 00:03:08.158 I just want to go over

NOTE Confidence: 0.870160992

00:03:08.158 --> 00:03:09.600 the four major ones there.

NOTE Confidence: 0.870160992

00:03:09.600 --> 00:03:11.220 There are many others

NOTE Confidence: 0.870160992

00:03:11.220 --> 00:03:12.840 that have been proposed.

NOTE Confidence: 0.870160992

00:03:12.840 --> 00:03:15.936 The first hypothesis is the viral

NOTE Confidence: 0.870160992

00:03:15.936 --> 00:03:18.667 reservoir or viral pathogen associated

NOTE Confidence: 0.870160992

00:03:18.667 --> 00:03:21.955 molecular patterns and this is you

NOTE Confidence: 0.870160992

00:03:21.955 --> 00:03:23.930 know hypothesis that says that

NOTE Confidence: 0.870160992

00:03:23.930 --> 00:03:26.113 they're even though the viruses

NOTE Confidence: 0.870160992

00:03:26.113 --> 00:03:28.237 are considered acute infection,

NOTE Confidence: 0.870160992

00:03:28.240 --> 00:03:29.164 it could.

NOTE Confidence: 0.870160992

00:03:29.164 --> 00:03:31.936 It's possible that these viruses may

NOTE Confidence: 0.870160992

00:03:31.936 --> 00:03:35.676 remain in some form of replication capacity,

NOTE Confidence: 0.870160992

00:03:35.680 --> 00:03:37.780 may not be infectious particles

NOTE Confidence: 0.870160992

00:03:37.780 --> 00:03:40.685 but they are remnants or they are

NOTE Confidence: 0.870160992

00:03:40.685 --> 00:03:43.480 parts of the virus that resist being

NOTE Confidence: 0.870160992

00:03:43.480 --> 00:03:47.080 removed and that could be persisting

NOTE Confidence: 0.870160992

00:03:47.080 --> 00:03:50.880 in a person and and that could lead

NOTE Confidence: 0.870160992

00:03:50.880 --> 00:03:53.708 to recognition of these pathogen

NOTE Confidence: 0.870160992

00:03:53.708 --> 00:03:56.136 associated molecular patterns like

NOTE Confidence: 0.870160992

00:03:56.136 --> 00:03:59.537 RNA structures or it could also lead

NOTE Confidence: 0.870160992

00:03:59.537 --> 00:04:01.647 to the expression and persistence

NOTE Confidence: 0.870160992

00:04:01.729 --> 00:04:04.771 of viral antigens that lead to

NOTE Confidence: 0.870160992

00:04:04.771 --> 00:04:06.799 chronic stimulation of lymphocytes.

NOTE Confidence: 0.870160992

00:04:06.800 --> 00:04:09.040 So that's one hypothesis.

NOTE Confidence: 0.870160992

00:04:09.040 --> 00:04:11.280 Another one is autoimmunity.

NOTE Confidence: 0.870160992

00:04:11.280 --> 00:04:14.759 Many infections are are precede the onset

NOTE Confidence: 0.870160992

00:04:14.759 --> 00:04:18.278 of multiple types of autoimmune diseases,

NOTE Confidence: 0.870160992

00:04:18.280 --> 00:04:21.318 multiple sclerosis and lupus and many others.

NOTE Confidence: 0.870160992

00:04:21.320 --> 00:04:23.912 So it's possible that the COVID

NOTE Confidence: 0.870160992

00:04:23.912 --> 00:04:26.583 infection can be leading to stimulation

NOTE Confidence: 0.870160992

00:04:26.583 --> 00:04:30.098 of bystander or molecular mimicry

NOTE Confidence: 0.870160992

00:04:30.098 --> 00:04:33.760 autoimmune responses and that could be

NOTE Confidence: 0.870160992

00:04:33.760 --> 00:04:38.200 prolonged and having leading to symptoms.

NOTE Confidence: 0.870160992

00:04:38.200 --> 00:04:42.715 The other possibility is dysbiosis of gut

NOTE Confidence: 0.870160992

00:04:42.715 --> 00:04:46.920 microbiome or reactivation of latent viruses.

NOTE Confidence: 0.870160992

00:04:46.920 --> 00:04:48.540 So all of us,

NOTE Confidence: 0.870160992

00:04:48.540 --> 00:04:49.755 many of us,

NOTE Confidence: 0.870160992

00:04:49.760 --> 00:04:52.190 most of us carry multiple different

NOTE Confidence: 0.870160992

00:04:52.190 --> 00:04:54.844 viruses and many of these viruses

NOTE Confidence: 0.870160992

00:04:54.844 --> 00:04:56.760 don't cause any diseases,

NOTE Confidence: 0.870160992

00:04:56.760 --> 00:04:59.854 but they are remain in the host

NOTE Confidence: 0.870160992

00:04:59.854 --> 00:05:01.800 as a latent form.

NOTE Confidence: 0.870160992

00:05:01.800 --> 00:05:05.004 And these types of viruses can

NOTE Confidence: 0.870160992

00:05:05.004 --> 00:05:07.140 become reactivated upon immunological

NOTE Confidence: 0.870160992

00:05:07.228 --> 00:05:09.397 stimulation or immune suppression

NOTE Confidence: 0.870160992

00:05:09.397 --> 00:05:13.533 that may be caused by COVID and that

NOTE Confidence: 0.870160992

00:05:13.533 --> 00:05:15.840 reactivation itself could trigger

NOTE Confidence: 0.870160992

00:05:15.840 --> 00:05:19.000 this virus to become activated,

NOTE Confidence: 0.870160992

00:05:19.000 --> 00:05:22.040 replicate and then cause disease.

NOTE Confidence: 0.870160992

00:05:22.040 --> 00:05:24.710 The final possibility is tissue

NOTE Confidence: 0.870160992

00:05:24.710 --> 00:05:28.344 damage and this is you know virus

NOTE Confidence: 0.870160992

00:05:28.344 --> 00:05:30.664 infection and or immune responses

NOTE Confidence: 0.870160992

00:05:30.664 --> 00:05:33.968 that are in induced by the infection

NOTE Confidence: 0.870160992

00:05:33.968 --> 00:05:36.704 that can be triggering tissue damage

NOTE Confidence: 0.870160992

00:05:36.704 --> 00:05:39.677 that is hard to repair like fibrosis

NOTE Confidence: 0.870160992

00:05:39.680 --> 00:05:43.417 and that could be lingering or very

NOTE Confidence: 0.870160992

00:05:43.417 --> 00:05:46.070 difficult to restore in a long term

NOTE Confidence: 0.870160992

00:05:46.148 --> 00:05:48.440 and could be leading to disease.

NOTE Confidence: 0.870160992

00:05:48.440 --> 00:05:50.672 And I'll give you examples of

NOTE Confidence: 0.870160992

00:05:50.672 --> 00:05:53.080 each these of these hypothesis.

NOTE Confidence: 0.870160992

00:05:53.080 --> 00:05:56.188 So there are over 100 papers now

NOTE Confidence: 0.870160992

00:05:56.188 --> 00:05:58.239 demonstrating some form of viral

NOTE Confidence: 0.870160992

00:05:58.240 --> 00:06:02.531 antigen or RNA that's present in people

NOTE Confidence: 0.870160992

00:06:02.531 --> 00:06:05.612 with COVID months after the infection.

NOTE Confidence: 0.870160992

00:06:05.612 --> 00:06:08.390 And many of these virus antigens

NOTE Confidence: 0.870160992

00:06:08.472 --> 00:06:11.304 and RNA has been located in

NOTE Confidence: 0.870160992

00:06:11.304 --> 00:06:12.720 the gastrointestinal tract.

NOTE Confidence: 0.870160992

00:06:12.720 --> 00:06:14.316 So this may be a a,

NOTE Confidence: 0.870160992

00:06:14.320 --> 00:06:17.561 a place of reservoir or at least

NOTE Confidence: 0.870160992

00:06:17.561 --> 00:06:20.319 some antigen being remnant there.

NOTE Confidence: 0.870160992

00:06:20.320 --> 00:06:23.336 There was a very nice study by Jim

NOTE Confidence: 0.870160992

00:06:23.336 --> 00:06:25.695 Heath's group that demonstrated that

NOTE Confidence: 0.870160992

00:06:25.695 --> 00:06:28.702 Ebb Epstein Barr virus viremia at

NOTE Confidence: 0.870160992

00:06:28.702 --> 00:06:31.854 the time of COVID diagnosis is one

NOTE Confidence: 0.870160992

00:06:31.854 --> 00:06:33.936 of the four predictive factors for

NOTE Confidence: 0.870160992

00:06:33.936 --> 00:06:36.224 developing long COVID over the three

NOTE Confidence: 0.870160992

00:06:36.224 --> 00:06:38.672 months period that they were studying.

NOTE Confidence: 0.870160992

00:06:38.680 --> 00:06:42.390 So it's been reported in other studies

NOTE Confidence: 0.870160992

00:06:42.390 --> 00:06:45.650 also that EBV can reactivate and and

NOTE Confidence: 0.870160992

00:06:45.650 --> 00:06:48.146 seems to be happening preferentially

NOTE Confidence: 0.870160992

00:06:48.146 --> 00:06:51.674 in people who develop long COVID.

NOTE Confidence: 0.870160992

00:06:51.680 --> 00:06:54.650 The other finding from the same

NOTE Confidence: 0.870160992

00:06:54.650 --> 00:06:57.230 paper demonstrated that Lupus related

NOTE Confidence: 0.870160992

00:06:57.230 --> 00:07:00.344 auto antibodies are elevated at the

NOTE Confidence: 0.870160992

00:07:00.344 --> 00:07:02.748 subclinical level in patients at

NOTE Confidence: 0.870160992

00:07:02.748 --> 00:07:05.796 the COVID acute face who then go on

NOTE Confidence: 0.861107306666667

00:07:05.800 --> 00:07:08.200 to develop long COVID,

NOTE Confidence: 0.861107306666667

00:07:08.200 --> 00:07:12.220 the second second of the four predictive

NOTE Confidence: 0.861107306666667

00:07:12.220 --> 00:07:15.040 factors for developing long COVID

NOTE Confidence: 0.861107306666667

00:07:15.040 --> 00:07:17.786 and then there is this tissue damage.

NOTE Confidence: 0.861107306666667

00:07:17.786 --> 00:07:21.207 So we with with Professor Michelle Monje's

NOTE Confidence: 0.861107306666667

00:07:21.207 --> 00:07:23.752 group at Stanford demonstrated that

NOTE Confidence: 0.861107306666667

00:07:23.752 --> 00:07:26.826 even a mild respiratory only infection

NOTE Confidence: 0.861107306666667

00:07:26.826 --> 00:07:30.234 with SARS COVID 2 in the mouse model,

NOTE Confidence: 0.861107306666667

00:07:30.240 --> 00:07:33.131 it can lead to significant damage in

NOTE Confidence: 0.861107306666667

00:07:33.131 --> 00:07:35.970 the brain for extended time period

NOTE Confidence: 0.861107306666667

00:07:35.970 --> 00:07:39.000 for over six weeks post infection.

NOTE Confidence: 0.861107306666667

00:07:39.000 --> 00:07:41.862 Whereas similar types of prolonged damage

NOTE Confidence: 0.861107306666667

00:07:41.862 --> 00:07:45.878 was not seen with mild influenza infection.

NOTE Confidence: 0.861107306666667

00:07:45.880 --> 00:07:48.682 So there's something about SARS COV

NOTE Confidence: 0.861107306666667

00:07:48.682 --> 00:07:52.063 two that may trigger this long term

NOTE Confidence: 0.861107306666667

00:07:52.063 --> 00:07:54.913 tissue damage even if the infection

NOTE Confidence: 0.861107306666667

00:07:54.913 --> 00:07:57.400 itself is completely resolved.

NOTE Confidence: 0.861107306666667

00:07:57.400 --> 00:08:00.902 So we suspect that long COVID is a

NOTE Confidence: 0.861107306666667

00:08:00.902 --> 00:08:02.957 multiple diseases under one umbrella

NOTE Confidence: 0.861107306666667

00:08:02.960 --> 00:08:05.882 and that there are multiple endotypes

NOTE Confidence: 0.861107306666667

00:08:05.882 --> 00:08:08.520 of diseases with different drivers,

NOTE Confidence: 0.861107306666667

00:08:08.520 --> 00:08:09.364 molecular drivers.

NOTE Confidence: 0.861107306666667

00:08:09.364 --> 00:08:11.474 And if we can identify,

NOTE Confidence: 0.861107306666667

00:08:11.480 --> 00:08:14.680 if we can subset long COVID into the

NOTE Confidence: 0.861107306666667

00:08:14.680 --> 00:08:17.398 right types of disease drivers and

NOTE Confidence: 0.861107306666667

00:08:17.400 --> 00:08:20.718 target the root cause of disease,

NOTE Confidence: 0.861107306666667

00:08:20.720 --> 00:08:22.785 that would be the best way to

NOTE Confidence: 0.861107306666667

00:08:22.785 --> 00:08:24.600 go forward with therapeutics.

NOTE Confidence: 0.888588987272727

00:08:27.120 --> 00:08:30.936 There's also the interesting paper where

NOTE Confidence: 0.888588987272727

00:08:30.936 --> 00:08:34.880 they train dogs to detect inactivated

NOTE Confidence: 0.888588987272727

00:08:34.880 --> 00:08:38.080 source COVID to infected supernatant.

NOTE Confidence: 0.888588987272727

00:08:38.080 --> 00:08:40.894 And these dogs were able to identify

NOTE Confidence: 0.888588987272727

00:08:40.894 --> 00:08:44.704 in a blinded manner 51% of the long

NOTE Confidence: 0.888588987272727

00:08:44.704 --> 00:08:47.880 COVID patients their their clothes,

NOTE Confidence: 0.888588987272727

00:08:47.880 --> 00:08:50.430 whereas 0% of the controls

NOTE Confidence: 0.888588987272727

00:08:50.430 --> 00:08:52.280 were identified by these dogs.

NOTE Confidence: 0.888588987272727

00:08:52.280 --> 00:08:55.164 This to me indicates that there there

NOTE Confidence: 0.888588987272727

00:08:55.164 --> 00:08:57.323 are volatile organic compounds released

NOTE Confidence: 0.888588987272727

00:08:57.323 --> 00:09:00.302 by the people with long COVID and

NOTE Confidence: 0.888588987272727

00:09:00.302 --> 00:09:03.256 likely having to do with the virus

NOTE Confidence: 0.888588987272727

00:09:03.256 --> 00:09:06.023 infection itself and that's why I put

NOTE Confidence: 0.888588987272727

00:09:06.023 --> 00:09:08.640 that in the viral reservoir category.

NOTE Confidence: 0.888588987272727

00:09:08.640 --> 00:09:11.839 And there's also papers from David Waltz

NOTE Confidence: 0.888588987272727

00:09:11.839 --> 00:09:13.748 group that demonstrated circulating

NOTE Confidence: 0.888588987272727

00:09:13.748 --> 00:09:16.996 spike protein in people with long COVID.

NOTE Confidence: 0.888588987272727

00:09:17.000 --> 00:09:20.440 So so this sort of reservoir antigen RNA,

NOTE Confidence: 0.888588987272727

00:09:20.440 --> 00:09:23.128 there's a lot of accumulating evidence

NOTE Confidence: 0.888588987272727

00:09:23.128 --> 00:09:26.831 for it but that that may not be the

NOTE Confidence: 0.888588987272727

00:09:26.831 --> 00:09:29.240 only root cause for long COVID.

NOTE Confidence: 0.888588987272727

00:09:29.240 --> 00:09:32.264 So today I want to discuss our latest

NOTE Confidence: 0.888588987272727

00:09:32.264 --> 00:09:35.262 work on collaboration research that we

NOTE Confidence: 0.888588987272727

00:09:35.262 --> 00:09:38.987 we've done with Mount Sinai Group led

NOTE Confidence: 0.888588987272727

00:09:38.987 --> 00:09:42.202 by Doctor David Petrino who is just an

NOTE Confidence: 0.888588987272727

00:09:42.202 --> 00:09:44.869 amazing human being and a great leader

NOTE Confidence: 0.888588987272727

00:09:44.869 --> 00:09:48.000 who is treating people with long COVID.

NOTE Confidence: 0.888588987272727

00:09:48.000 --> 00:09:50.618 Thousands of people with long COVID from

NOTE Confidence: 0.888588987272727

00:09:50.618 --> 00:09:53.720 the very beginning of the pandemic and he,

NOTE Confidence: 0.888588987272727

00:09:53.720 --> 00:09:55.640 his team listed here.

NOTE Confidence: 0.888588987272727

00:09:55.640 --> 00:09:57.010 Jamie Wood,

NOTE Confidence: 0.888588987272727

00:09:57.010 --> 00:09:58.380 Laura Tabakov,

NOTE Confidence: 0.888588987272727

00:09:58.380 --> 00:10:02.808 Dana McCarthy and our team at Yale

NOTE Confidence: 0.888588987272727

00:10:02.808 --> 00:10:05.768 have collaborated to dissect the

NOTE Confidence: 0.888588987272727

00:10:05.768 --> 00:10:08.619 immunological phenotypes of people

NOTE Confidence: 0.888588987272727

00:10:08.619 --> 00:10:13.120 with long COVID and these are the

NOTE Confidence: 0.888588987272727

00:10:13.120 --> 00:10:16.480 Co first authors of the paper.

NOTE Confidence: 0.888588987272727

00:10:16.480 --> 00:10:19.560 John Klein who led the study and and

NOTE Confidence: 0.888588987272727

00:10:19.560 --> 00:10:21.789 currently working on the revision of

NOTE Confidence: 0.888588987272727

00:10:21.789 --> 00:10:24.790 this paper along with Jill Jaycox who

NOTE Confidence: 0.888588987272727

00:10:24.790 --> 00:10:27.952 is a MDPHD student in arm ring slab

NOTE Confidence: 0.888588987272727

00:10:27.952 --> 00:10:30.840 who is using this rapid extrasolar

NOTE Confidence: 0.888588987272727

00:10:30.840 --> 00:10:34.272 antigen profiling to look for

NOTE Confidence: 0.888588987272727

00:10:34.272 --> 00:10:36.964 antibodies against our own antigens,

NOTE Confidence: 0.888588987272727

00:10:36.964 --> 00:10:39.960 auto antigens as well as viral antigens.

NOTE Confidence: 0.888588987272727

00:10:39.960 --> 00:10:43.796 Rahul is a brilliant student in David

NOTE Confidence: 0.888588987272727

00:10:43.796 --> 00:10:46.622 van Dyke's slab who does machine

NOTE Confidence: 0.888588987272727

00:10:46.622 --> 00:10:48.986 learning on all the parameters that

NOTE Confidence: 0.888588987272727

00:10:48.986 --> 00:10:51.975 we've measured to try to predict which

NOTE Confidence: 0.888588987272727

00:10:51.975 --> 00:10:54.680 factors are most contributing to long COVID.

NOTE Confidence: 0.888588987272727

00:10:54.680 --> 00:10:58.348 Paywin Liu tirelessly looks at everyone's

NOTE Confidence: 0.888588987272727

00:10:58.348 --> 00:11:00.540 peripheral blood mononuclear cells

NOTE Confidence: 0.888588987272727

00:11:00.540 --> 00:11:03.952 using real time flow cytometry to look

NOTE Confidence: 0.888588987272727

00:11:03.952 --> 00:11:06.640 at the cell types in in the blood.

NOTE Confidence: 0.888588987272727

00:11:06.640 --> 00:11:09.608 Jeff and Sasha have been working very

NOTE Confidence: 0.888588987272727

00:11:09.608 --> 00:11:12.256 closely together to look at the patient

NOTE Confidence: 0.888588987272727

00:11:12.256 --> 00:11:14.492 data as well as antibody reactivity

NOTE Confidence: 0.888588987272727

00:11:14.492 --> 00:11:17.754 to extra extra SARS COV 2 antigens.

NOTE Confidence: 0.906474915

00:11:19.960 --> 00:11:24.335 So this Mount Sinai Yale long COVID

NOTE Confidence: 0.906474915

00:11:24.335 --> 00:11:27.280 study is currently in Med archive.

NOTE Confidence: 0.906474915

00:11:27.280 --> 00:11:29.848 Anyone interested can read this about

NOTE Confidence: 0.906474915

00:11:29.848 --> 00:11:32.948 Just to briefly go over what we've

NOTE Confidence: 0.906474915

00:11:32.948 --> 00:11:35.128 done was to recruit participants

NOTE Confidence: 0.906474915

00:11:35.128 --> 00:11:37.757 from the Mount Sinai long COVID

NOTE Confidence: 0.906474915

00:11:37.760 --> 00:11:41.528 Clinic and to study a variety

NOTE Confidence: 0.906474915

00:11:41.528 --> 00:11:44.040 of electronic medical records,

NOTE Confidence: 0.906474915

00:11:44.040 --> 00:11:45.976 symptoms survey flow cytometry,

NOTE Confidence: 0.906474915

00:11:45.976 --> 00:11:50.078 to look at cells that are in the blood.

NOTE Confidence: 0.906474915

00:11:50.080 --> 00:11:50.992 Human exoproadium.

NOTE Confidence: 0.906474915

00:11:50.992 --> 00:11:54.184 This is the reef technology developed by

NOTE Confidence: 0.906474915

00:11:54.184 --> 00:11:57.680 Doctor Rensolm to look at auto antibodies.

NOTE Confidence: 0.906474915

00:11:57.680 --> 00:12:00.585 We we did start scopy 2 antibody

NOTE Confidence: 0.906474915

00:12:00.585 --> 00:12:02.458 profiling peptide display library

NOTE Confidence: 0.906474915

00:12:02.458 --> 00:12:05.570 to look at linear epitope mapping

NOTE Confidence: 0.906474915

00:12:05.570 --> 00:12:08.320 of antibodies from these patients

NOTE Confidence: 0.906474915

00:12:08.320 --> 00:12:11.506 and used plasma proteomics to look

NOTE Confidence: 0.906474915

00:12:11.506 --> 00:12:14.550 at plasma factors that are distinct

NOTE Confidence: 0.906474915

00:12:14.550 --> 00:12:16.558 in long COVID patients.

NOTE Confidence: 0.966106774

00:12:18.800 --> 00:12:22.136 First, just briefly about the demographic

NOTE Confidence: 0.966106774

00:12:22.136 --> 00:12:24.360 nature of these participants.

NOTE Confidence: 0.966106774

00:12:24.360 --> 00:12:27.720 The long COVID patients listed and

NOTE Confidence: 0.966106774

00:12:27.720 --> 00:12:31.076 always in purple have most of them

NOTE Confidence: 0.966106774

00:12:31.076 --> 00:12:34.360 are between 30 to 60 years of age.

NOTE Confidence: 0.966106774

00:12:34.360 --> 00:12:36.397 There were some younger and some older,

NOTE Confidence: 0.966106774

00:12:36.400 --> 00:12:39.160 and similarly the convalescent control.

NOTE Confidence: 0.966106774

00:12:39.160 --> 00:12:41.275 These convalescent control groups were

NOTE Confidence: 0.966106774

00:12:41.275 --> 00:12:44.074 people who were infected around the same

NOTE Confidence: 0.966106774

00:12:44.074 --> 00:12:46.237 time as those people with long COVID,

NOTE Confidence: 0.966106774

00:12:46.240 --> 00:12:49.000 but have recovered from COVID

NOTE Confidence: 0.966106774

00:12:49.000 --> 00:12:51.520 and their age group was similarly

NOTE Confidence: 0.966106774

00:12:51.520 --> 00:12:54.865 enriched in 30 to 60 years of age

NOTE Confidence: 0.966106774

00:12:54.865 --> 00:12:57.235 and some younger and some older.

NOTE Confidence: 0.966106774

00:12:57.240 --> 00:13:00.075 There is no significant difference in the

NOTE Confidence: 0.966106774

00:13:00.075 --> 00:13:02.839 age and the sex is a female dominant.

NOTE Confidence: 0.966106774

00:13:02.840 --> 00:13:05.346 This is seen over and over in

NOTE Confidence: 0.966106774

00:13:05.346 --> 00:13:07.638 in every study on long COVID.

NOTE Confidence: 0.966106774

00:13:07.640 --> 00:13:12.440 There's definitely sex bias for female.

NOTE Confidence: 0.966106774

00:13:12.440 --> 00:13:16.010 Also we focused on people who did

NOTE Confidence: 0.966106774

00:13:16.010 --> 00:13:18.624 not who were not hospitalized.

NOTE Confidence: 0.966106774

00:13:18.624 --> 00:13:22.206 We wanted to focus on so-called mild

NOTE Confidence: 0.966106774

00:13:22.206 --> 00:13:25.517 COVID that then turn into long COVID

NOTE Confidence: 0.966106774

00:13:25.520 --> 00:13:28.632 because this is we believe is a distinct

NOTE Confidence: 0.966106774

00:13:28.632 --> 00:13:31.133 disease from those people who were in

NOTE Confidence: 0.966106774

00:13:31.133 --> 00:13:34.013 the ICU and who were receiving drastic

NOTE Confidence: 0.966106774

00:13:34.013 --> 00:13:36.478 medical treatment versus people who

NOTE Confidence: 0.966106774

00:13:36.478 --> 00:13:39.666 were staying at home and you know,

NOTE Confidence: 0.966106774

00:13:39.666 --> 00:13:41.478 fighting the virus infection.

NOTE Confidence: 0.966106774

00:13:41.480 --> 00:13:44.280 But then develop long COVID.

NOTE Confidence: 0.966106774

00:13:44.280 --> 00:13:46.765 So days from acute COVID in the

NOTE Confidence: 0.966106774

00:13:46.765 --> 00:13:49.135 convalescent control and the long COVID

NOTE Confidence: 0.966106774

00:13:49.135 --> 00:13:51.195 or again not significantly different,

NOTE Confidence: 0.966106774

00:13:51.200 --> 00:13:54.312 they were overall 400 days out

NOTE Confidence: 0.966106774

00:13:54.312 --> 00:13:55.880 from the original infection.

NOTE Confidence: 0.966106774

00:13:55.880 --> 00:13:58.750 So these are the first wave of

NOTE Confidence: 0.966106774

00:13:58.750 --> 00:14:01.600 COVID that hit New York City.

NOTE Confidence: 0.966106774

00:14:01.600 --> 00:14:03.805 And so we're looking at a much

NOTE Confidence: 0.966106774

00:14:03.805 --> 00:14:06.027 later time point than most studies

NOTE Confidence: 0.966106774

00:14:06.027 --> 00:14:07.635 that have been reported.

NOTE Confidence: 0.966106774

00:14:07.640 --> 00:14:10.436 First looking at the immune cells

NOTE Confidence: 0.966106774

00:14:10.436 --> 00:14:14.302 that are in the peripheral blood and

NOTE Confidence: 0.966106774

00:14:14.302 --> 00:14:16.594 looking at various different cell types.

NOTE Confidence: 0.966106774

00:14:16.600 --> 00:14:19.547 What we noticed was that there is

NOTE Confidence: 0.966106774

00:14:19.547 --> 00:14:22.879 increase in non conventional monocytes.

NOTE Confidence: 0.966106774

00:14:22.880 --> 00:14:25.232 These monocytes are known to patrol

NOTE Confidence: 0.966106774

00:14:25.232 --> 00:14:27.456 the body for viral infections

NOTE Confidence: 0.966106774

00:14:27.456 --> 00:14:29.199 and other infections.

NOTE Confidence: 0.966106774

00:14:29.200 --> 00:14:31.636 So that's elevated in long COVID,

NOTE Confidence: 0.966106774

00:14:31.640 --> 00:14:33.945 there's a reduction in dendrite

NOTE Confidence: 0.966106774

00:14:33.945 --> 00:14:36.801 cell subset known as CDC ones

NOTE Confidence: 0.966106774

00:14:36.801 --> 00:14:39.567 and these cells are critical in

NOTE Confidence: 0.966106774

00:14:39.567 --> 00:14:42.252 priming cytotoxic T cells and type

NOTE Confidence: 0.966106774

00:14:42.252 --> 00:14:45.080 1 TH one cells which are important

NOTE Confidence: 0.966106774

00:14:45.080 --> 00:14:47.400 to fighting the virus infection.

NOTE Confidence: 0.966106774

00:14:47.400 --> 00:14:49.435 We also see elevated activation

NOTE Confidence: 0.966106774

00:14:49.435 --> 00:14:51.944 of activated B cells as well

NOTE Confidence: 0.966106774

00:14:51.944 --> 00:14:53.919 as double negative B cells.

NOTE Confidence: 0.966106774

00:14:53.920 --> 00:14:55.960 So these are the features that

NOTE Confidence: 0.966106774

00:14:55.960 --> 00:14:58.036 are were elevated in long COVID.

NOTE Confidence: 0.966106774

00:14:58.040 --> 00:15:01.184 So it it again suggests that the B

NOTE Confidence: 0.966106774

00:15:01.184 --> 00:15:03.392 cells are being stimulated by something,

NOTE Confidence: 0.966106774

00:15:03.400 --> 00:15:04.213 whether it's SARS,

NOTE Confidence: 0.966106774

00:15:04.213 --> 00:15:05.839 COVID 2 or some other antigens,

NOTE Confidence: 0.966106774

00:15:05.840 --> 00:15:06.560 we don't know

NOTE Confidence: 0.889844152857143

00:15:08.920 --> 00:15:11.398 in terms of the T cell subset.

NOTE Confidence: 0.889844152857143

00:15:11.400 --> 00:15:15.228 So here we're listing the CD 4T cells

NOTE Confidence: 0.889844152857143

00:15:15.228 --> 00:15:18.400 on the top and CD8T cells on the bottom.

NOTE Confidence: 0.889844152857143

00:15:18.400 --> 00:15:20.178 There's really no need to go into

NOTE Confidence: 0.889844152857143

00:15:20.178 --> 00:15:21.759 the detail of these markers,

NOTE Confidence: 0.889844152857143

00:15:21.760 --> 00:15:24.478 but suffice to say that the

NOTE Confidence: 0.889844152857143

00:15:24.480 --> 00:15:26.196 CD 4T cell and CD8T cells,

NOTE Confidence: 0.889844152857143

00:15:26.200 --> 00:15:28.480 there is a significant increase

NOTE Confidence: 0.889844152857143

00:15:28.480 --> 00:15:30.760 in the exhausted T cells.

NOTE Confidence: 0.889844152857143

00:15:30.760 --> 00:15:33.316 And so these exhausted T cells

NOTE Confidence: 0.889844152857143

00:15:33.320 --> 00:15:35.984 have been seen in chronic viral

NOTE Confidence: 0.889844152857143

00:15:35.984 --> 00:15:37.316 infections and cancer.

NOTE Confidence: 0.889844152857143

00:15:37.320 --> 00:15:39.896 When the T cells are stimulated over

NOTE Confidence: 0.889844152857143

00:15:39.896 --> 00:15:42.224 and over seeing the same antigen

NOTE Confidence: 0.889844152857143

00:15:42.224 --> 00:15:44.516 and they basically go into this

NOTE Confidence: 0.889844152857143

00:15:44.516 --> 00:15:47.067 state of exhaustion where they are

NOTE Confidence: 0.889844152857143

00:15:47.067 --> 00:15:49.157 not no longer very functional.

NOTE Confidence: 0.889844152857143

00:15:49.160 --> 00:15:50.940 And so that is elevated

NOTE Confidence: 0.889844152857143

00:15:50.940 --> 00:15:52.720 in the long COVID patients

NOTE Confidence: 0.73809711625

00:15:55.000 --> 00:15:57.850 and interestingly when pay when

NOTE Confidence: 0.73809711625

00:15:57.850 --> 00:16:00.700 looked at the ability of these

NOTE Confidence: 0.73809711625

00:16:00.700 --> 00:16:02.600 T cells to secrete cytokines.

NOTE Confidence: 0.73809711625

00:16:02.600 --> 00:16:05.042 So cytokines are important factors that

NOTE Confidence: 0.73809711625

00:16:05.042 --> 00:16:08.088 are released by T cells to communicate

NOTE Confidence: 0.73809711625

00:16:08.088 --> 00:16:11.231 with other cell types throughout the body.

NOTE Confidence: 0.73809711625

00:16:11.240 --> 00:16:14.754 What we saw was an elevated cytokine

NOTE Confidence: 0.73809711625

00:16:14.754 --> 00:16:17.434 secretion or production from CD4T cells

NOTE Confidence: 0.73809711625

00:16:17.434 --> 00:16:20.073 from long COVID patients for Illinois 2,

NOTE Confidence: 0.73809711625

00:16:20.080 --> 00:16:21.840 Illinois 4, Illinois 6,

NOTE Confidence: 0.73809711625

00:16:21.840 --> 00:16:23.160 these are cytokines.

NOTE Confidence: 0.73809711625

00:16:23.160 --> 00:16:25.415 Illinois 4 in particular are

NOTE Confidence: 0.73809711625

00:16:25.415 --> 00:16:27.426 known as TH2 cytokines.

NOTE Confidence: 0.73809711625

00:16:27.426 --> 00:16:30.191 And these cytokines are very

NOTE Confidence: 0.73809711625

00:16:30.191 --> 00:16:32.595 important for fighting Hellman's

NOTE Confidence: 0.73809711625

00:16:32.595 --> 00:16:35.875 infection like these worm infections,

NOTE Confidence: 0.73809711625

00:16:35.880 --> 00:16:39.132 but are not very effective in

NOTE Confidence: 0.73809711625

00:16:39.132 --> 00:16:40.758 fighting virus infections.

NOTE Confidence: 0.73809711625

00:16:40.760 --> 00:16:42.225 And we're seeing elevated levels

NOTE Confidence: 0.73809711625

00:16:42.225 --> 00:16:43.397 of all these cytokines,

NOTE Confidence: 0.73809711625

00:16:43.400 --> 00:16:45.480 in particular the Illinois 4,

NOTE Confidence: 0.73809711625

00:16:45.480 --> 00:16:47.958 Illinois 6 double positive T cells,

NOTE Confidence: 0.73809711625

00:16:47.960 --> 00:16:50.186 T cells that secrete both of these

NOTE Confidence: 0.73809711625

00:16:50.186 --> 00:16:52.186 cytokines were pretty much only uniquely

NOTE Confidence: 0.73809711625

00:16:52.186 --> 00:16:54.154 found in the long COVID patients.

NOTE Confidence: 0.73809711625

00:16:54.160 --> 00:16:56.080 So this is interesting because the

NOTE Confidence: 0.73809711625

00:16:56.080 --> 00:16:58.731 the kind of T cell you want to

NOTE Confidence: 0.73809711625

00:16:58.731 --> 00:17:00.687 fight a virus infection is known

NOTE Confidence: 0.73809711625

00:17:00.760 --> 00:17:02.500 as type 1 or TH1 immunity.

NOTE Confidence: 0.73809711625

00:17:02.500 --> 00:17:04.400 And we're not seeing that.

NOTE Confidence: 0.73809711625

00:17:04.400 --> 00:17:06.136 We're seeing something that's

NOTE Confidence: 0.73809711625

00:17:06.136 --> 00:17:07.872 diverting from that protective

NOTE Confidence: 0.73809711625

00:17:07.872 --> 00:17:09.719 immune response against viruses.

NOTE Confidence: 0.863362835

00:17:12.320 --> 00:17:15.560 We then looked at antibody responses to SARS,

NOTE Confidence: 0.863362835

00:17:15.560 --> 00:17:20.530 COV 2 antigens. So what we noticed was

NOTE Confidence: 0.863362835

00:17:20.530 --> 00:17:23.696 that antibody against the spike protein

NOTE Confidence: 0.863362835

00:17:23.696 --> 00:17:27.456 or the S1 region of the spike protein

NOTE Confidence: 0.863362835

00:17:27.456 --> 00:17:30.489 or the receptor binding domain that

NOTE Confidence: 0.863362835

00:17:30.489 --> 00:17:33.597 actually binds to the target cells,

NOTE Confidence: 0.863362835

00:17:33.600 --> 00:17:38.040 they were elevated in the long COVID patients

NOTE Confidence: 0.863362835

00:17:38.040 --> 00:17:41.238 over healthy controls or combosion controls.

NOTE Confidence: 0.863362835

00:17:41.240 --> 00:17:44.152 So the healthy controls I forgot to mention

NOTE Confidence: 0.863362835

00:17:44.152 --> 00:17:46.388 are people who've never been infected

NOTE Confidence: 0.863362835

00:17:46.388 --> 00:17:49.280 with COVID but live in the same area.

NOTE Confidence: 0.863362835

00:17:49.280 --> 00:17:51.266 And all of these people have

NOTE Confidence: 0.863362835

00:17:51.266 --> 00:17:53.600 gotten 2 doses of MRA vaccines,

NOTE Confidence: 0.863362835

00:17:53.600 --> 00:17:56.280 so they should have equal levels of antibody.

NOTE Confidence: 0.863362835

00:17:56.280 --> 00:17:59.094 And yet what we're seeing is an

NOTE Confidence: 0.863362835

00:17:59.094 --> 00:18:01.401 elevated levels of anti spike

NOTE Confidence: 0.863362835

00:18:01.401 --> 00:18:03.437 antibody from lung haulers.

NOTE Confidence: 0.863362835

00:18:03.440 --> 00:18:05.988 And I'll come back to the functionality

NOTE Confidence: 0.863362835

00:18:05.988 --> 00:18:07.520 of these antibodies later.

NOTE Confidence: 0.964434475714286

00:18:10.840 --> 00:18:14.687 We next looked at what are the most

NOTE Confidence: 0.964434475714286

00:18:14.687 --> 00:18:17.369 distinct factors that are found in

NOTE Confidence: 0.964434475714286

00:18:17.369 --> 00:18:20.155 long COVID patients compared to long

NOTE Confidence: 0.964434475714286

00:18:20.155 --> 00:18:22.188 long COVID patients or controls.

NOTE Confidence: 0.964434475714286

00:18:22.188 --> 00:18:25.200 And what we found was that the number one,

NOTE Confidence: 0.964434475714286

00:18:25.200 --> 00:18:26.880 the most significantly different

NOTE Confidence: 0.964434475714286

00:18:26.880 --> 00:18:30.065 factor we found in the plasma of long

NOTE Confidence: 0.964434475714286

00:18:30.065 --> 00:18:33.240 COVID patients for the cortisol level.

NOTE Confidence: 0.964434475714286

00:18:33.240 --> 00:18:36.194 So cortisol is a very important hormone,

NOTE Confidence: 0.964434475714286

00:18:36.200 --> 00:18:38.200 it's known as stress hormone,

NOTE Confidence: 0.964434475714286

00:18:38.200 --> 00:18:41.845 but that is a bit of a misnomer because

NOTE Confidence: 0.964434475714286

00:18:41.845 --> 00:18:44.829 it's needed for everyday physiological

NOTE Confidence: 0.964434475714286

00:18:44.829 --> 00:18:49.672 function like how we the nutrient handling,

NOTE Confidence: 0.964434475714286

00:18:49.672 --> 00:18:53.760 glucose utilization, wakefulness.

NOTE Confidence: 0.964434475714286

00:18:53.760 --> 00:18:56.628 You know many different aspects of

NOTE Confidence: 0.964434475714286

00:18:56.628 --> 00:18:59.320 Physiology is controlled by cortisol.

NOTE Confidence: 0.964434475714286

00:18:59.320 --> 00:19:01.216 And if you look at this panel here

NOTE Confidence: 0.964434475714286

00:19:01.216 --> 00:19:03.330 on the bottom, the long COVID,

NOTE Confidence: 0.964434475714286

00:19:03.330 --> 00:19:05.280 the COVID patients in purple,

NOTE Confidence: 0.964434475714286

00:19:05.280 --> 00:19:07.394 they had about half the level of

NOTE Confidence: 0.964434475714286

00:19:07.400 --> 00:19:11.036 cortisol compared to the healthy control.

NOTE Confidence: 0.964434475714286

00:19:11.040 --> 00:19:13.524 And this is the most significant

NOTE Confidence: 0.964434475714286

00:19:13.524 --> 00:19:15.664 because they were uniformly lower

NOTE Confidence: 0.964434475714286

00:19:15.664 --> 00:19:17.320 than the control groups.

NOTE Confidence: 0.964434475714286

00:19:17.320 --> 00:19:19.445 Whereas other factors there is

NOTE Confidence: 0.964434475714286

00:19:19.445 --> 00:19:20.720 a huge variation.

NOTE Confidence: 0.964434475714286

00:19:20.720 --> 00:19:22.160 Some people have very high

NOTE Confidence: 0.964434475714286

00:19:22.160 --> 00:19:23.312 levels and low levels,

NOTE Confidence: 0.964434475714286

00:19:23.320 --> 00:19:25.175 but the cortisol level was

NOTE Confidence: 0.964434475714286

00:19:25.175 --> 00:19:27.266 the most tightly different,

NOTE Confidence: 0.964434475714286

00:19:27.266 --> 00:19:29.958 distinct between these groups.

NOTE Confidence: 0.964434475714286

00:19:29.960 --> 00:19:33.600 So cortisol is secreted by the adrenal glands

NOTE Confidence: 0.964434475714286

00:19:33.600 --> 00:19:36.156 and it performs very important function.

NOTE Confidence: 0.964434475714286

00:19:36.160 --> 00:19:37.720 It's a diurnal hormone,

NOTE Confidence: 0.964434475714286

00:19:37.720 --> 00:19:40.565 which means it it is the highest

NOTE Confidence: 0.964434475714286

00:19:40.565 --> 00:19:43.533 level right around the time you wake

NOTE Confidence: 0.964434475714286

00:19:43.533 --> 00:19:46.096 up and then it level levels down

NOTE Confidence: 0.964434475714286

00:19:46.096 --> 00:19:48.680 during the during the day and the

NOTE Confidence: 0.964434475714286

00:19:48.680 --> 00:19:50.880 wakefulness is controlled by cortisol.

NOTE Confidence: 0.964434475714286

00:19:50.880 --> 00:19:52.440 If you have very low cortisol,

NOTE Confidence: 0.964434475714286

00:19:52.440 --> 00:19:55.366 it's very difficult to wake up and

NOTE Confidence: 0.964434475714286

00:19:55.366 --> 00:19:58.564 be motivated to start your day and

NOTE Confidence: 0.964434475714286

00:19:58.564 --> 00:20:01.984 it's tightly regulated through this

NOTE Confidence: 0.964434475714286

00:20:01.984 --> 00:20:04.720 hypothalamic pituitary adrenal axis,

NOTE Confidence: 0.964434475714286

00:20:04.720 --> 00:20:06.622 the HPA axis.

NOTE Confidence: 0.964434475714286

00:20:06.622 --> 00:20:09.158 And so we wondered,

NOTE Confidence: 0.964434475714286

00:20:09.160 --> 00:20:11.880 this low cortisol whether it's.

NOTE Confidence: 0.964434475714286

00:20:11.880 --> 00:20:15.583 Driving higher levels of this other hormones

NOTE Confidence: 0.964434475714286

00:20:15.583 --> 00:20:19.638 for them from the pituitary called ACTH.

NOTE Confidence: 0.964434475714286

00:20:19.640 --> 00:20:21.320 Usually when you have lower

NOTE Confidence: 0.964434475714286

00:20:21.320 --> 00:20:23.000 than normal level of cortisol,

NOTE Confidence: 0.964434475714286

00:20:23.000 --> 00:20:25.574 ACTH goes up in order to

NOTE Confidence: 0.964434475714286

00:20:25.574 --> 00:20:27.920 compensate for that low level.

NOTE Confidence: 0.964434475714286

00:20:27.920 --> 00:20:30.475 So you make more and more cortisol.

NOTE Confidence: 0.964434475714286

00:20:30.480 --> 00:20:32.410 That is not what's happening

NOTE Confidence: 0.964434475714286

00:20:32.410 --> 00:20:33.954 with long COVID patients,

NOTE Confidence: 0.964434475714286

00:20:33.960 --> 00:20:35.175 meaning that something

NOTE Confidence: 0.964434475714286

00:20:35.175 --> 00:20:36.795 upstream about adrenal gland,

NOTE Confidence: 0.964434475714286

00:20:36.800 --> 00:20:38.720 potentially the pituitary

NOTE Confidence: 0.964434475714286

00:20:38.720 --> 00:20:41.280 glands or the hypothalamus,

NOTE Confidence: 0.964434475714286

00:20:41.280 --> 00:20:44.031 there may be dysfunction up in the

NOTE Confidence: 0.964434475714286

00:20:44.031 --> 00:20:46.692 CNS region and that's leading to

NOTE Confidence: 0.964434475714286

00:20:46.692 --> 00:20:49.476 this low lower levels of cortisol.

NOTE Confidence: 0.964434475714286

00:20:49.480 --> 00:20:51.832 And it's important to note that the

NOTE Confidence: 0.964434475714286

00:20:51.832 --> 00:20:54.131 collection of the the plasma of the

NOTE Confidence: 0.964434475714286

00:20:54.131 --> 00:20:56.370 blood was around the same time in

NOTE Confidence: 0.964434475714286

00:20:56.370 --> 00:20:58.440 the all the three different groups,

NOTE Confidence: 0.964434475714286

00:20:58.440 --> 00:21:00.966 meaning that the changes in the

NOTE Confidence: 0.964434475714286

00:21:00.966 --> 00:21:03.784 cortisol level has nothing to do with

NOTE Confidence: 0.964434475714286

00:21:03.784 --> 00:21:06.888 the diurnal nature or when we pick

NOTE Confidence: 0.964434475714286

00:21:06.888 --> 00:21:10.880 these blood samples from these patients.

NOTE Confidence: 0.964434475714286

00:21:10.880 --> 00:21:13.904 So and then cortisol is #1 but there

NOTE Confidence: 0.964434475714286

00:21:13.904 --> 00:21:16.526 are other inflammatory factors such as

NOTE Confidence: 0.964434475714286

00:21:16.526 --> 00:21:20.500 interleuking 8 Iol 8 is a very well

NOTE Confidence: 0.964434475714286

00:21:20.500 --> 00:21:23.555 known chemokine that attracts neutrophils.

NOTE Confidence: 0.964434475714286

00:21:23.560 --> 00:21:26.640 These are highly inflammatory cells.

NOTE Confidence: 0.964434475714286

00:21:26.640 --> 00:21:29.386 We also have many different chemokines.

NOTE Confidence: 0.964434475714286

00:21:29.386 --> 00:21:29.932 Again,

NOTE Confidence: 0.964434475714286

00:21:29.932 --> 00:21:32.662 chemokines are these factors that

NOTE Confidence: 0.964434475714286

00:21:32.662 --> 00:21:35.164 recruit white blood cells to

NOTE Confidence: 0.964434475714286

00:21:35.164 --> 00:21:37.134 many different tissues as well

NOTE Confidence: 0.964434475714286

00:21:37.134 --> 00:21:39.344 as some some complement factors.

NOTE Confidence: 0.964434475714286

00:21:39.344 --> 00:21:41.392 So there was definitely

NOTE Confidence: 0.964434475714286

00:21:41.392 --> 00:21:43.440 something inflammatory going on.

NOTE Confidence: 0.964434475714286

00:21:43.440 --> 00:21:45.855 What's driving this and why the cortisol

NOTE Confidence: 0.964434475714286

00:21:45.855 --> 00:21:48.280 level is lower is currently unknown.

NOTE Confidence: 0.964434475714286

00:21:48.280 --> 00:21:50.755 We suspected something to do

NOTE Confidence: 0.964434475714286

00:21:50.755 --> 00:21:53.840 with the HPA access deficiency.

NOTE Confidence: 0.896398568571429

00:21:56.240 --> 00:21:59.355 OK, So what about these other hypothesis,

NOTE Confidence: 0.896398568571429

00:21:59.360 --> 00:22:02.480 We didn't look at dysbiosis in this study.

NOTE Confidence: 0.896398568571429

00:22:02.480 --> 00:22:04.800 We probably should do this in the future,

NOTE Confidence: 0.896398568571429

00:22:04.800 --> 00:22:08.776 but we did look at reactivation of

NOTE Confidence: 0.896398568571429

00:22:08.776 --> 00:22:11.804 latent viruses and we did this in three

NOTE Confidence: 0.896398568571429

00:22:11.804 --> 00:22:14.158 different ways and found the same answer.

NOTE Confidence: 0.896398568571429

00:22:14.160 --> 00:22:16.528 So one way in which we did this

NOTE Confidence: 0.896398568571429

00:22:16.528 --> 00:22:19.000 was to look at the REAP score.

NOTE Confidence: 0.896398568571429

00:22:19.000 --> 00:22:21.406 This is the rapid extrasolar antigen

NOTE Confidence: 0.896398568571429

00:22:21.406 --> 00:22:23.769 profiling which enables us to look

NOTE Confidence: 0.896398568571429

00:22:23.769 --> 00:22:25.833 at an antibody reactivity to like

NOTE Confidence: 0.896398568571429

00:22:25.833 --> 00:22:27.800 thousands of different antigens,

NOTE Confidence: 0.896398568571429

00:22:27.800 --> 00:22:31.040 some of which were viral antigens.

NOTE Confidence: 0.896398568571429

00:22:31.040 --> 00:22:33.515 And as I mentioned just a few slides ago,

NOTE Confidence: 0.896398568571429

00:22:33.520 --> 00:22:36.920 the antibody level against the

NOTE Confidence: 0.896398568571429

00:22:36.920 --> 00:22:39.172 spike receptor binding domain,

NOTE Confidence: 0.896398568571429

00:22:39.172 --> 00:22:43.480 it was elevated for long COVID patients.

NOTE Confidence: 0.896398568571429

00:22:43.480 --> 00:22:47.043 However, what was striking is that we

NOTE Confidence: 0.896398568571429

00:22:47.043 --> 00:22:50.688 also saw elevated antibody levels against

NOTE Confidence: 0.896398568571429

00:22:50.688 --> 00:22:53.300 these latent viruses that normally we

NOTE Confidence: 0.896398568571429

00:22:53.300 --> 00:22:55.240 wouldn't have these antibodies against.

NOTE Confidence: 0.896398568571429

00:22:55.240 --> 00:22:58.295 So it's seen by virus their

NOTE Confidence: 0.896398568571429

00:22:58.295 --> 00:22:59.900 steroid zoster virus.

NOTE Confidence: 0.896398568571429

00:22:59.900 --> 00:23:03.110 These are sort of mononucleosis and

NOTE Confidence: 0.896398568571429

00:23:03.204 --> 00:23:06.525 chickenpox viruses that most of us

NOTE Confidence: 0.896398568571429

00:23:06.525 --> 00:23:08.800 before the vaccination for chickenpox.

NOTE Confidence: 0.896398568571429

00:23:08.800 --> 00:23:10.996 Most of us carry these viruses

NOTE Confidence: 0.896398568571429

00:23:10.996 --> 00:23:13.400 inside of us without any symptom.

NOTE Confidence: 0.896398568571429

00:23:13.400 --> 00:23:15.480 But under certain stress,

NOTE Confidence: 0.896398568571429

00:23:15.480 --> 00:23:18.080 such as a COVID infection.

NOTE Confidence: 0.896398568571429

00:23:18.080 --> 00:23:20.648 Some people are elevating this level

NOTE Confidence: 0.896398568571429

00:23:20.648 --> 00:23:23.000 of reactivation of these viruses.

NOTE Confidence: 0.896398568571429

00:23:23.000 --> 00:23:24.930 And what's intriguing is that

NOTE Confidence: 0.896398568571429

00:23:24.930 --> 00:23:27.365 this is highly elevated in long

NOTE Confidence: 0.896398568571429

00:23:27.365 --> 00:23:29.505 COVID compared to the convalescent

NOTE Confidence: 0.896398568571429

00:23:29.505 --> 00:23:31.840 control or the healthy control.

NOTE Confidence: 0.896398568571429

00:23:31.840 --> 00:23:34.608 And what's also important to note is that

NOTE Confidence: 0.896398568571429

00:23:34.608 --> 00:23:37.477 the serum prevalence meaning that people,

NOTE Confidence: 0.896398568571429

00:23:37.480 --> 00:23:39.520 how many people have latent viruses,

NOTE Confidence: 0.896398568571429

00:23:39.520 --> 00:23:41.914 there was no difference in these groups.

NOTE Confidence: 0.896398568571429

00:23:41.920 --> 00:23:43.880 So it's only the reactive,

NOTE Confidence: 0.896398568571429

00:23:43.880 --> 00:23:46.256 so reactivation dependent antibodies

NOTE Confidence: 0.896398568571429

00:23:46.256 --> 00:23:49.264 that are elevated and there were

NOTE Confidence: 0.896398568571429

00:23:49.264 --> 00:23:51.304 some other differences like herpes

NOTE Confidence: 0.896398568571429

00:23:51.304 --> 00:23:53.530 simplex virus specific antibody was

NOTE Confidence: 0.896398568571429

00:23:53.530 --> 00:23:55.760 slightly lower than the controls.

NOTE Confidence: 0.922977136

00:23:58.480 --> 00:24:00.328 So I told you we did this

NOTE Confidence: 0.922977136

00:24:00.328 --> 00:24:01.120 three different ways.

NOTE Confidence: 0.922977136

00:24:01.120 --> 00:24:04.690 Another way we measured ABV reactive

NOTE Confidence: 0.922977136

00:24:04.690 --> 00:24:06.946 antibody is through ceremune

NOTE Confidence: 0.922977136

00:24:06.946 --> 00:24:09.742 which is a linear epitope mapping

NOTE Confidence: 0.922977136

00:24:09.742 --> 00:24:11.920 strategy very different from REAP,

NOTE Confidence: 0.922977136

00:24:11.920 --> 00:24:13.678 but we found the same answer.

NOTE Confidence: 0.922977136

00:24:13.680 --> 00:24:16.584 So this is the REAP data for the

NOTE Confidence: 0.922977136

00:24:16.584 --> 00:24:19.325 GP 42 which is a glycoprotein

NOTE Confidence: 0.922977136

00:24:19.325 --> 00:24:22.193 on the surface of the EBB.

NOTE Confidence: 0.922977136

00:24:22.200 --> 00:24:25.104 The IgG against this is elevated

NOTE Confidence: 0.922977136

00:24:25.104 --> 00:24:28.624 in long COVID and also this middle

NOTE Confidence: 0.922977136

00:24:28.624 --> 00:24:31.720 panel is from the Ceremune analysis.

NOTE Confidence: 0.922977136

00:24:31.720 --> 00:24:34.492 We found that only GP 42

NOTE Confidence: 0.922977136

00:24:34.492 --> 00:24:35.878 reactive antibody elevated,

NOTE Confidence: 0.922977136

00:24:35.880 --> 00:24:38.995 but we can pinpoint the specific amino

NOTE Confidence: 0.922977136

00:24:38.995 --> 00:24:41.824 acid sequences within the GP 42 that

NOTE Confidence: 0.922977136

00:24:41.824 --> 00:24:44.150 the patients are reacting to and we

NOTE Confidence: 0.922977136

00:24:44.150 --> 00:24:46.075 mapped that right here in this pink.

NOTE Confidence: 0.922977136

00:24:46.080 --> 00:24:49.536 So this particular set of amino acid is

NOTE Confidence: 0.922977136

00:24:49.536 --> 00:24:52.000 being recognized much higher in long

NOTE Confidence: 0.922977136

00:24:52.000 --> 00:24:54.240 COVID patients compared to controls.

NOTE Confidence: 0.922977136

00:24:54.240 --> 00:24:57.626 And GP 42 is a very important

NOTE Confidence: 0.922977136

00:24:57.626 --> 00:25:00.251 viral antigen that is required

NOTE Confidence: 0.922977136

00:25:00.251 --> 00:25:03.000 for entry into B cells,

NOTE Confidence: 0.922977136

00:25:03.000 --> 00:25:05.320 so activated B cells,

NOTE Confidence: 0.922977136

00:25:05.320 --> 00:25:07.640 GP 42 reactive antibodies.

NOTE Confidence: 0.922977136

00:25:07.640 --> 00:25:10.256 Type 2 is like Illinois 4L6

NOTE Confidence: 0.922977136

00:25:10.256 --> 00:25:11.744 secreting CD4T cells.

NOTE Confidence: 0.922977136

00:25:11.744 --> 00:25:15.640 They're coming together to tell us something.

NOTE Confidence: 0.922977136

00:25:15.640 --> 00:25:19.462 And indeed when we look at the

NOTE Confidence: 0.922977136

00:25:19.462 --> 00:25:22.624 correlation between GP23 or 42

NOTE Confidence: 0.922977136

00:25:22.624 --> 00:25:24.768 specific antibody in aisle 4,

NOTE Confidence: 0.922977136

00:25:24.768 --> 00:25:25.280 aisle 6,

NOTE Confidence: 0.922977136

00:25:25.280 --> 00:25:28.320 double positive CD4T cell frequency,

NOTE Confidence: 0.922977136

00:25:28.320 --> 00:25:30.931 we see there is a linear correlation

NOTE Confidence: 0.922977136

00:25:30.931 --> 00:25:33.320 in in long COVID patients,

NOTE Confidence: 0.922977136

00:25:33.320 --> 00:25:35.104 meaning that these things

NOTE Confidence: 0.922977136

00:25:35.104 --> 00:25:37.740 may be linked to each other.

NOTE Confidence: 0.922977136

00:25:37.740 --> 00:25:41.050 And it's well known that EBV because

NOTE Confidence: 0.922977136

00:25:41.050 --> 00:25:44.854 they express this GP 42 blocks the

NOTE Confidence: 0.922977136

00:25:44.854 --> 00:25:47.289 T cell activation through blocking

NOTE Confidence: 0.922977136

00:25:47.289 --> 00:25:50.392 of MHC Class 2 and they kind of

NOTE Confidence: 0.922977136

00:25:50.392 --> 00:25:54.100 divert these T cells into a TH2 bio 4

NOTE Confidence: 0.922977136

00:25:54.100 --> 00:25:57.600 secreting cell type compared to TH one.

NOTE Confidence: 0.922977136

00:25:57.600 --> 00:26:00.372 So in our heads we're kind of making some

NOTE Confidence: 0.922977136

00:26:00.372 --> 00:26:02.719 links in between these observations.

NOTE Confidence: 0.878479218125

00:26:05.080 --> 00:26:06.487 What about autoimmunity?

NOTE Confidence: 0.878479218125

00:26:06.487 --> 00:26:10.413 Well, we found a lot of functional auto

NOTE Confidence: 0.878479218125

00:26:10.413 --> 00:26:13.198 antibodies during severe acute COVID.

NOTE Confidence: 0.878479218125

00:26:13.200 --> 00:26:16.432 When we look during the early phase of

NOTE Confidence: 0.878479218125

00:26:16.432 --> 00:26:18.284 the pandemic hospitalized patients and

NOTE Confidence: 0.878479218125

00:26:18.284 --> 00:26:21.166 ICU patients had a lot of these auto

NOTE Confidence: 0.878479218125

00:26:21.166 --> 00:26:23.086 antibodies that blocked the immune

NOTE Confidence: 0.878479218125

00:26:23.086 --> 00:26:25.646 system itself like type 1 interference

NOTE Confidence: 0.878479218125

00:26:25.646 --> 00:26:27.558 specific antibodies for example.

NOTE Confidence: 0.878479218125

00:26:27.560 --> 00:26:30.208 So we were expecting to see a lot

NOTE Confidence: 0.878479218125

00:26:30.208 --> 00:26:33.343 of auto antibodies, but we didn't,

NOTE Confidence: 0.878479218125

00:26:33.343 --> 00:26:36.349 we did not see auto antibodies

NOTE Confidence: 0.878479218125

00:26:36.349 --> 00:26:38.542 significantly different in long

NOTE Confidence: 0.878479218125

00:26:38.542 --> 00:26:41.100 COVID patients compared to controls.

NOTE Confidence: 0.878479218125

00:26:41.100 --> 00:26:44.040 We did this in many different ways.

NOTE Confidence: 0.878479218125

00:26:44.040 --> 00:26:47.316 This is the Jill Jacobs work with

NOTE Confidence: 0.878479218125

00:26:47.316 --> 00:26:49.770 Aaron Ring and this is basically

NOTE Confidence: 0.878479218125

00:26:49.770 --> 00:26:51.520 looking at different patients on

NOTE Confidence: 0.878479218125

00:26:51.520 --> 00:26:53.416 the different columns and different

NOTE Confidence: 0.878479218125

00:26:53.416 --> 00:26:55.306 rows to indicate auto antibody

NOTE Confidence: 0.878479218125

00:26:55.306 --> 00:26:57.159 presence against different antigens.

NOTE Confidence: 0.878479218125

00:26:57.160 --> 00:27:00.310 There really isn't a universal pattern

NOTE Confidence: 0.878479218125

00:27:00.310 --> 00:27:03.318 or anything enriched that we can see

NOTE Confidence: 0.878479218125

00:27:03.320 --> 00:27:05.959 in the long COVID patients compared to

NOTE Confidence: 0.878479218125

00:27:05.959 --> 00:27:08.265 the controls and antibody reactivity

NOTE Confidence: 0.878479218125

00:27:08.265 --> 00:27:10.840 per patient was not different.

NOTE Confidence: 0.878479218125

00:27:10.840 --> 00:27:13.354 There was no difference in antibody

NOTE Confidence: 0.878479218125

00:27:13.354 --> 00:27:15.626 reactivity number to long COVID

NOTE Confidence: 0.878479218125

00:27:15.626 --> 00:27:16.678 propensity score.

NOTE Confidence: 0.878479218125

00:27:16.680 --> 00:27:19.032 This is sort of the severity score

NOTE Confidence: 0.878479218125

00:27:19.032 --> 00:27:20.040 that we calculated.

NOTE Confidence: 0.878479218125

00:27:20.040 --> 00:27:21.604 So All in all,

NOTE Confidence: 0.878479218125

00:27:21.604 --> 00:27:24.899 we don't see a signature for auto

NOTE Confidence: 0.878479218125

00:27:24.899 --> 00:27:28.319 antibodies against extracellular antigens.

NOTE Confidence: 0.878479218125

00:27:28.320 --> 00:27:30.290 It's possible though that there

NOTE Confidence: 0.878479218125

00:27:30.290 --> 00:27:32.260 are intracellular antigens that are

NOTE Confidence: 0.878479218125

00:27:32.320 --> 00:27:34.320 being targeted by auto antibodies,

NOTE Confidence: 0.878479218125

00:27:34.320 --> 00:27:36.156 and that's something that we need

NOTE Confidence: 0.878479218125

00:27:36.156 --> 00:27:37.074 to separately examine.

NOTE Confidence: 0.96597271125

00:27:39.640 --> 00:27:41.820 Using the machine learning

NOTE Confidence: 0.96597271125

00:27:41.820 --> 00:27:44.495 algorithms that have been conducted

NOTE Confidence: 0.96597271125

00:27:44.495 --> 00:27:47.960 by Rahul in David van Dyke's lab,

NOTE Confidence: 0.96597271125

00:27:47.960 --> 00:27:50.054 we were able to separate long

NOTE Confidence: 0.96597271125

00:27:50.054 --> 00:27:52.566 COVID versus non long long COVID

NOTE Confidence: 0.96597271125

00:27:52.566 --> 00:27:55.186 participants just based on immunological

NOTE Confidence: 0.96597271125

00:27:55.186 --> 00:27:57.772 phenotyping alone with a 96% accuracy.

NOTE Confidence: 0.96597271125

00:27:57.772 --> 00:28:00.629 And when when they asked what are

NOTE Confidence: 0.96597271125

00:28:00.629 --> 00:28:03.004 the factors contributing to this

NOTE Confidence: 0.96597271125

00:28:03.004 --> 00:28:05.680 distinction of long COVID patients,

NOTE Confidence: 0.96597271125

00:28:05.680 --> 00:28:08.345 they saw that autoantibody had

NOTE Confidence: 0.96597271125

00:28:08.345 --> 00:28:10.477 very little predictive ability,

NOTE Confidence: 0.96597271125

00:28:10.480 --> 00:28:13.696 whereas antibody against the spike of

NOTE Confidence: 0.96597271125

00:28:13.696 --> 00:28:18.239 source COVID 2 had some predictive ability.

NOTE Confidence: 0.96597271125

00:28:18.240 --> 00:28:21.243 But it was really the cytokines for

NOTE Confidence: 0.96597271125

00:28:21.243 --> 00:28:23.349 cytometry and antibody against our

NOTE Confidence: 0.96597271125

00:28:23.349 --> 00:28:25.838 EBV and things like that that were

NOTE Confidence: 0.96597271125

00:28:25.840 --> 00:28:28.325 able to distinguish people with

NOTE Confidence: 0.96597271125

00:28:28.325 --> 00:28:30.280 long COVID versus those without.

NOTE Confidence: 0.950660692

00:28:32.560 --> 00:28:35.185 And when they looked at all the

NOTE Confidence: 0.950660692

00:28:35.185 --> 00:28:36.729 different parameters that we've

NOTE Confidence: 0.950660692

00:28:36.729 --> 00:28:38.823 included in the analysis and asked

NOTE Confidence: 0.950660692

00:28:38.823 --> 00:28:41.437 what are the most significant and

NOTE Confidence: 0.950660692

00:28:41.437 --> 00:28:43.469 most differential factors that we

NOTE Confidence: 0.950660692

00:28:43.469 --> 00:28:45.870 see that are either lower in long

NOTE Confidence: 0.950660692

00:28:45.940 --> 00:28:48.040 COVID or higher in long COVID.

NOTE Confidence: 0.950660692

00:28:48.040 --> 00:28:50.903 We found that cortisol came out as

NOTE Confidence: 0.950660692

00:28:50.903 --> 00:28:54.208 the number one factor as a lowest

NOTE Confidence: 0.950660692

00:28:54.208 --> 00:28:57.184 factor in long COVID patients with

NOTE Confidence: 0.950660692

00:28:57.184 --> 00:29:01.279 the highest degree of specificity.

NOTE Confidence: 0.950660692

00:29:01.280 --> 00:29:04.320 But there were other things like the TCM,

NOTE Confidence: 0.950660692

00:29:04.320 --> 00:29:07.020 these are the central memory CD4T

NOTE Confidence: 0.950660692

00:29:07.020 --> 00:29:09.953 cells that were also lower and

NOTE Confidence: 0.950660692

00:29:09.953 --> 00:29:12.551 then CD8T cells for example were

NOTE Confidence: 0.950660692

00:29:12.551 --> 00:29:15.558 also lower but not as significant.

NOTE Confidence: 0.950660692

00:29:15.560 --> 00:29:18.080 What's higher in long COVID patients

NOTE Confidence: 0.950660692

00:29:18.080 --> 00:29:21.038 are these activated B cells,

NOTE Confidence: 0.950660692

00:29:21.038 --> 00:29:23.156 EBV reactive antibodies,

NOTE Confidence: 0.950660692

00:29:23.160 --> 00:29:24.992 and exhausted T cells.

NOTE Confidence: 0.950660692

00:29:24.992 --> 00:29:28.498 So this is starting to paint a

NOTE Confidence: 0.950660692

00:29:28.498 --> 00:29:31.158 picture of dysfunctional immune

NOTE Confidence: 0.950660692

00:29:31.158 --> 00:29:33.818 responses and reactivation of

NOTE Confidence: 0.950660692

00:29:33.818 --> 00:29:36.277 endogenous viruses that may be

NOTE Confidence: 0.950660692

00:29:36.280 --> 00:29:39.200 sort of distinguishing at least the

NOTE Confidence: 0.950660692

00:29:39.200 --> 00:29:41.600 biological factor for long COVID.

NOTE Confidence: 0.879959342222222

00:29:44.400 --> 00:29:46.710 So these are the keys

NOTE Confidence: 0.879959342222222

00:29:46.710 --> 00:29:48.558 findings from this study.

NOTE Confidence: 0.879959342222222

00:29:48.560 --> 00:29:50.471 I didn't have even time to talk

NOTE Confidence: 0.879959342222222

00:29:50.471 --> 00:29:51.800 about patient reported outcomes,

NOTE Confidence: 0.879959342222222

00:29:51.800 --> 00:29:55.840 but they alone were able to predict or

NOTE Confidence: 0.879959342222222

00:29:55.840 --> 00:29:59.368 identify COVID patients with 94% accuracy.

NOTE Confidence: 0.879959342222222

00:29:59.368 --> 00:30:03.036 So ask the patients in order to

NOTE Confidence: 0.879959342222222

00:30:03.036 --> 00:30:05.030 diagnose Second immuno phenotyping

NOTE Confidence: 0.879959342222222

00:30:05.030 --> 00:30:07.480 reveal these distinct increases and

NOTE Confidence: 0.879959342222222

00:30:07.480 --> 00:30:09.918 decreases in different cell types.

NOTE Confidence: 0.879959342222222

00:30:09.920 --> 00:30:12.848 I guess notably the exhausted T

NOTE Confidence: 0.879959342222222

00:30:12.848 --> 00:30:14.704 cells being elevated pteroscopy

NOTE Confidence: 0.879959342222222

00:30:14.704 --> 00:30:16.240 2 specific antibody response,

NOTE Confidence: 0.879959342222222

00:30:16.240 --> 00:30:18.619 particularly spike specific

NOTE Confidence: 0.879959342222222

00:30:18.619 --> 00:30:21.464 ones were elevated evidence

NOTE Confidence: 0.879959342222222

00:30:21.464 --> 00:30:23.320 of herpes virus reactivation.

NOTE Confidence: 0.879959342222222

00:30:23.320 --> 00:30:26.005 EBB and VCB were detected

NOTE Confidence: 0.879959342222222

00:30:26.005 --> 00:30:29.318 in a subset of patients.

NOTE Confidence: 0.879959342222222

00:30:29.320 --> 00:30:31.780 We did not see any significant

NOTE Confidence: 0.879959342222222

00:30:31.780 --> 00:30:34.174 increases in auto antibody to

NOTE Confidence: 0.879959342222222

00:30:34.174 --> 00:30:36.792 extracellular antivisions and long

NOTE Confidence: 0.879959342222222

00:30:36.792 --> 00:30:39.972 COVID alone using machine learning

NOTE Confidence: 0.879959342222222

00:30:39.972 --> 00:30:42.402 can efficiently predict sorry.

NOTE Confidence: 0.879959342222222

00:30:42.402 --> 00:30:45.534 Immunological data alone can predict long

NOTE Confidence: 0.879959342222222

00:30:45.534 --> 00:30:48.638 COVID patients with very high accuracy,

NOTE Confidence: 0.879959342222222

00:30:48.640 --> 00:30:51.342 and the low cortisol level was the

NOTE Confidence: 0.879959342222222

00:30:51.342 --> 00:30:54.799 strongest predictor for long COVID.

NOTE Confidence: 0.879959342222222

00:30:54.800 --> 00:30:58.890 So I'm going to show you a couple of slides

NOTE Confidence: 0.879959342222222

00:30:58.890 --> 00:31:00.597 looking at sex differences in long COVID.

NOTE Confidence: 0.879959342222222

00:31:00.600 --> 00:31:02.959 This is not even on Medarchive yet.

NOTE Confidence: 0.879959342222222

00:31:02.960 --> 00:31:06.358 It's fresh off the press or whatever lab.

NOTE Confidence: 0.879959342222222

00:31:06.358 --> 00:31:10.500 And this is analysis that are done by

NOTE Confidence: 0.879959342222222

00:31:10.500 --> 00:31:13.120 Julio Silva and Takahiro Takahashi.

NOTE Confidence: 0.879959342222222

00:31:13.120 --> 00:31:16.680 They took the same set of my long COVID data

NOTE Confidence: 0.879959342222222

00:31:16.680 --> 00:31:20.439 and started to look at sex differences.

NOTE Confidence: 0.879959342222222

00:31:20.440 --> 00:31:23.860 And what's striking about this analysis

NOTE Confidence: 0.879959342222222

00:31:23.860 --> 00:31:27.200 is that female and male patients

NOTE Confidence: 0.879959342222222

00:31:27.200 --> 00:31:29.400 suffer from distinct symptoms.

NOTE Confidence: 0.879959342222222

00:31:29.400 --> 00:31:31.176 There are some that are overlapping

NOTE Confidence: 0.879959342222222

00:31:31.176 --> 00:31:33.272 but some that are very distinct.

NOTE Confidence: 0.879959342222222

00:31:33.272 --> 00:31:35.552 So females are indicated in

NOTE Confidence: 0.879959342222222

00:31:35.552 --> 00:31:37.960 blue and males are in pink.

NOTE Confidence: 0.879959342222222

00:31:37.960 --> 00:31:40.920 So please forget your stereotype.

NOTE Confidence: 0.879959342222222

00:31:40.920 --> 00:31:43.592 Basically over here on the top with the

NOTE Confidence: 0.879959342222222

00:31:43.592 --> 00:31:46.197 curves are overlapping with each other.

NOTE Confidence: 0.879959342222222

00:31:46.200 --> 00:31:48.594 There are some of the common symptoms

NOTE Confidence: 0.879959342222222

00:31:48.594 --> 00:31:51.224 that is you know for example,

NOTE Confidence: 0.879959342222222

00:31:51.224 --> 00:31:52.196 sleep disorientation,

NOTE Confidence: 0.879959342222222

00:31:52.200 --> 00:31:53.973 urinary issues, ingestion,

NOTE Confidence: 0.879959342222222

00:31:53.973 --> 00:31:54.564 reflux.

NOTE Confidence: 0.879959342222222

00:31:54.564 --> 00:31:57.519 These are similarly reported for

NOTE Confidence: 0.879959342222222

00:31:57.519 --> 00:31:59.838 male and female patients,

NOTE Confidence: 0.879959342222222

00:31:59.840 --> 00:32:03.670 whereas there are some symptoms that

NOTE Confidence: 0.879959342222222

00:32:03.670 --> 00:32:06.435 are slightly higher in female over male

NOTE Confidence: 0.879959342222222

00:32:06.435 --> 00:32:09.116 but they're not that that separated.

NOTE Confidence: 0.879959342222222

00:32:09.120 --> 00:32:11.479 Whereas there are these sets of symptoms,

NOTE Confidence: 0.879959342222222

00:32:11.480 --> 00:32:13.480 at least in our in the Mylan COVID,

NOTE Confidence: 0.879959342222222

00:32:13.480 --> 00:32:15.520 participants were quite different.

NOTE Confidence: 0.879959342222222

00:32:15.520 --> 00:32:17.560 There were female dominant

NOTE Confidence: 0.86424292

00:32:20.280 --> 00:32:23.832 symptoms that included numbness,

NOTE Confidence: 0.86424292

00:32:23.832 --> 00:32:26.370 dizziness, and many other

NOTE Confidence: 0.86424292

00:32:26.370 --> 00:32:29.120 features that are listed here.

NOTE Confidence: 0.86424292

00:32:29.120 --> 00:32:31.409 And there was the only one that

NOTE Confidence: 0.86424292

00:32:31.409 --> 00:32:33.000 was significantly male dominant,

NOTE Confidence: 0.86424292

00:32:33.000 --> 00:32:36.115 which is sexual dysfunction and hair loss,

NOTE Confidence: 0.86424292

00:32:36.120 --> 00:32:38.508 is the most significantly

NOTE Confidence: 0.86424292

00:32:38.508 --> 00:32:40.299 different reported symptoms

NOTE Confidence: 0.86424292

00:32:40.299 --> 00:32:42.720 that were predominantly female.

NOTE Confidence: 0.86424292

00:32:42.720 --> 00:32:44.800 And if you look at the symptom burden,

NOTE Confidence: 0.86424292

00:32:44.800 --> 00:32:48.085 there is overall higher symptom

NOTE Confidence: 0.86424292

00:32:48.085 --> 00:32:51.418 burden in the female and then

NOTE Confidence: 0.86424292

00:32:51.418 --> 00:32:53.163 organ system involvement was also

NOTE Confidence: 0.86424292

00:32:53.163 --> 00:32:55.519 higher in the female participants.

NOTE Confidence: 0.907430517142857

00:32:58.680 --> 00:33:01.188 And what was another striking thing

NOTE Confidence: 0.907430517142857

00:33:01.188 --> 00:33:04.598 that we found was that in long haulers,

NOTE Confidence: 0.907430517142857

00:33:04.600 --> 00:33:07.399 especially in females,

NOTE Confidence: 0.907430517142857

00:33:07.400 --> 00:33:10.112 I already told you that long haulers have

NOTE Confidence: 0.907430517142857

00:33:10.112 --> 00:33:12.397 higher levels of anti spike antibodies.

NOTE Confidence: 0.907430517142857

00:33:12.400 --> 00:33:14.892 But when you ask the question of

NOTE Confidence: 0.907430517142857

00:33:14.892 --> 00:33:16.568 are these antibodies functional

NOTE Confidence: 0.907430517142857

00:33:16.568 --> 00:33:18.716 in neutralizing the antibody,

NOTE Confidence: 0.907430517142857

00:33:18.720 --> 00:33:20.504 the answer is no.

NOTE Confidence: 0.907430517142857

00:33:20.504 --> 00:33:23.052 That these people with long COVID,

NOTE Confidence: 0.907430517142857

00:33:23.052 --> 00:33:25.117 even though they have elevated

NOTE Confidence: 0.907430517142857

00:33:25.117 --> 00:33:27.157 levels of anti spike antibody,

NOTE Confidence: 0.907430517142857

00:33:27.160 --> 00:33:29.800 their functionality is quite low.

NOTE Confidence: 0.907430517142857

00:33:29.800 --> 00:33:31.232 So female and male.

NOTE Confidence: 0.907430517142857

00:33:31.232 --> 00:33:33.380 If you look at the long

NOTE Confidence: 0.907430517142857

00:33:33.464 --> 00:33:35.344 COVID compared to control,

NOTE Confidence: 0.907430517142857

00:33:35.344 --> 00:33:38.272 the steepness of the curve indicates

NOTE Confidence: 0.907430517142857

00:33:38.272 --> 00:33:41.490 how potent the antibody is against

NOTE Confidence: 0.907430517142857

00:33:41.490 --> 00:33:43.496 neutralizing the virus and you

NOTE Confidence: 0.907430517142857

00:33:43.496 --> 00:33:44.952 see that there is a lot lower.

NOTE Confidence: 0.907430517142857

00:33:44.960 --> 00:33:48.386 So slope for the female and

NOTE Confidence: 0.907430517142857

00:33:48.386 --> 00:33:50.920 male participants and when you

NOTE Confidence: 0.907430517142857

00:33:50.920 --> 00:33:52.880 calculate the relative potency,

NOTE Confidence: 0.907430517142857

00:33:52.880 --> 00:33:54.915 the female long COVID patients

NOTE Confidence: 0.907430517142857

00:33:54.915 --> 00:33:57.575 have the lowest level of potency

NOTE Confidence: 0.907430517142857

00:33:57.575 --> 00:33:59.759 with respect to neutralizing

NOTE Confidence: 0.907430517142857

00:33:59.759 --> 00:34:02.712 antibodies compared to male patients.

NOTE Confidence: 0.907430517142857

00:34:02.712 --> 00:34:05.618 So even though the elevating

NOTE Confidence: 0.907430517142857

00:34:05.618 --> 00:34:07.494 levels of antibodies suggest

NOTE Confidence: 0.907430517142857

00:34:07.494 --> 00:34:10.000 that there is persistent antigen,

NOTE Confidence: 0.907430517142857

00:34:10.000 --> 00:34:11.780 we are seeing that these

NOTE Confidence: 0.907430517142857

00:34:11.780 --> 00:34:13.560 antibodies are not very functional.

NOTE Confidence: 0.907430517142857

00:34:13.560 --> 00:34:16.482 So it would be consistent with

NOTE Confidence: 0.907430517142857

00:34:16.482 --> 00:34:19.200 presence of virus or antigen

NOTE Confidence: 0.907430517142857

00:34:19.200 --> 00:34:20.708 remaining in these people.

NOTE Confidence: 0.907430517142857

00:34:20.708 --> 00:34:23.280 But these are pure speculation at this time

NOTE Confidence: 0.958340326666667

00:34:25.400 --> 00:34:28.930 and people with high disease

NOTE Confidence: 0.958340326666667

00:34:28.930 --> 00:34:31.835 burden tended to have lower levels

NOTE Confidence: 0.958340326666667

00:34:31.835 --> 00:34:34.030 of antibody potency compared to

NOTE Confidence: 0.958340326666667

00:34:34.105 --> 00:34:36.760 those with moderate levels or or

NOTE Confidence: 0.958340326666667

00:34:36.760 --> 00:34:38.200 the organ system involvement.

NOTE Confidence: 0.958340326666667

00:34:38.200 --> 00:34:40.735 Again, it's consistent with the

NOTE Confidence: 0.958340326666667

00:34:40.735 --> 00:34:44.033 notion that if you have very

NOTE Confidence: 0.958340326666667

00:34:44.033 --> 00:34:46.037 high potency antibodies,

NOTE Confidence: 0.958340326666667

00:34:46.040 --> 00:34:47.420 you're slightly better off

NOTE Confidence: 0.958340326666667

00:34:47.420 --> 00:34:48.800 with the symptom burden.

NOTE Confidence: 0.790046131666667

00:34:51.640 --> 00:34:55.360 So based on these hypothesis data,

NOTE Confidence: 0.790046131666667

00:34:55.360 --> 00:34:58.615 we hypothesize that the original

NOTE Confidence: 0.790046131666667

00:34:58.615 --> 00:35:01.912 four different pathways to long

NOTE Confidence: 0.790046131666667

00:35:01.912 --> 00:35:05.160 COVID it's unlikely or at least

NOTE Confidence: 0.790046131666667

00:35:05.160 --> 00:35:07.080 for the extracellular antibodies.

NOTE Confidence: 0.790046131666667

00:35:07.080 --> 00:35:10.140 We don't see much correlation of

NOTE Confidence: 0.790046131666667

00:35:10.140 --> 00:35:13.560 auto antibodies for long COVID.

NOTE Confidence: 0.790046131666667

00:35:13.560 --> 00:35:18.093 And we also think that with the increased

NOTE Confidence: 0.790046131666667

00:35:18.093 --> 00:35:21.158 levels of antibody with decreased

NOTE Confidence: 0.790046131666667

00:35:21.158 --> 00:35:24.344 level of potency in long COVID,

NOTE Confidence: 0.790046131666667

00:35:24.344 --> 00:35:26.584 it's possible that it supports

NOTE Confidence: 0.790046131666667

00:35:26.584 --> 00:35:29.240 this viral reservoir hypothesis.

NOTE Confidence: 0.790046131666667

00:35:29.240 --> 00:35:32.340 And we also found EBV and VCB

NOTE Confidence: 0.790046131666667

00:35:32.340 --> 00:35:34.890 reactivation that is much more

NOTE Confidence: 0.790046131666667

00:35:34.890 --> 00:35:37.879 prevalent in long COVID patients.

NOTE Confidence: 0.790046131666667

00:35:37.880 --> 00:35:40.800 So and then tissue damage we did not look at,

NOTE Confidence: 0.790046131666667

00:35:40.800 --> 00:35:42.750 we just looked at the blood

NOTE Confidence: 0.790046131666667

00:35:42.750 --> 00:35:43.400 from participants.

NOTE Confidence: 0.790046131666667

00:35:43.400 --> 00:35:45.422 So we don't know the tissue

NOTE Confidence: 0.790046131666667

00:35:45.422 --> 00:35:47.800 level analysis yet.

NOTE Confidence: 0.790046131666667

00:35:47.800 --> 00:35:49.792 So this is sort of like

NOTE Confidence: 0.790046131666667

00:35:49.792 --> 00:35:51.120 what we're seeing overall.

NOTE Confidence: 0.790046131666667

00:35:51.120 --> 00:35:52.444 It's still a very,

NOTE Confidence: 0.790046131666667

00:35:52.444 --> 00:35:53.437 very early phase.

NOTE Confidence: 0.790046131666667

00:35:53.440 --> 00:35:56.692 This is a sort of hypothesis

NOTE Confidence: 0.790046131666667

00:35:56.692 --> 00:35:57.490 generating research.

NOTE Confidence: 0.790046131666667

00:35:57.490 --> 00:35:59.740 We don't we we need to do a lot

NOTE Confidence: 0.790046131666667

00:35:59.803 --> 00:36:01.999 more work to understand this better.

NOTE Confidence: 0.790046131666667

00:36:02.000 --> 00:36:04.442 But at least we're seeing some

NOTE Confidence: 0.790046131666667

00:36:04.442 --> 00:36:07.159 hypothesis that's more likely or less likely.

NOTE Confidence: 0.790046131666667

00:36:07.160 --> 00:36:10.400 And what I wanted to do for the

NOTE Confidence: 0.790046131666667

00:36:10.400 --> 00:36:12.557 remaining hopefully 5 minutes or so,

NOTE Confidence: 0.790046131666667

00:36:12.560 --> 00:36:13.880 I don't know if I can do it so quickly.

NOTE Confidence: 0.790046131666667

00:36:13.880 --> 00:36:17.330 But I I wanted to share with you a again

NOTE Confidence: 0.790046131666667

00:36:17.330 --> 00:36:21.600 unpublished data on post vaccine long haul.

NOTE Confidence: 0.790046131666667

00:36:21.600 --> 00:36:24.400 So this is all based on Yale

NOTE Confidence: 0.790046131666667

00:36:24.400 --> 00:36:28.576 Listen study that many of you are

NOTE Confidence: 0.790046131666667

00:36:28.576 --> 00:36:31.292 participating and this it was done by

NOTE Confidence: 0.790046131666667

00:36:31.292 --> 00:36:34.560 Bornelli who is on the panel tonight.

NOTE Confidence: 0.790046131666667

00:36:34.560 --> 00:36:36.270 So any specific question you

NOTE Confidence: 0.790046131666667

00:36:36.270 --> 00:36:37.638 can address to her.

NOTE Confidence: 0.790046131666667

00:36:37.640 --> 00:36:40.489 But she asked the question how do

NOTE Confidence: 0.790046131666667

00:36:40.489 --> 00:36:42.615 symptoms and demographics compare between

NOTE Confidence: 0.790046131666667

00:36:42.615 --> 00:36:45.513 long COVID and post vaccine long haul?

NOTE Confidence: 0.790046131666667

00:36:45.520 --> 00:36:48.754 And because the Yale Listen study

NOTE Confidence: 0.790046131666667

00:36:48.754 --> 00:36:51.430 already has many participants who

NOTE Confidence: 0.790046131666667

00:36:51.430 --> 00:36:53.998 have either long COVID or Long,

NOTE Confidence: 0.790046131666667

00:36:54.000 --> 00:36:57.500 the purple is the pasque control not

NOTE Confidence: 0.790046131666667

00:36:57.500 --> 00:37:00.336 control pasque participants and green

NOTE Confidence: 0.790046131666667

00:37:00.336 --> 00:37:03.676 bars indicate vaccine adverse events.

NOTE Confidence: 0.790046131666667

00:37:03.680 --> 00:37:06.068 The Grays are people with both

NOTE Confidence: 0.790046131666667

00:37:06.068 --> 00:37:08.698 who have both long COVID and

NOTE Confidence: 0.790046131666667

00:37:08.698 --> 00:37:11.078 vaccine post vaccine long haul.

NOTE Confidence: 0.790046131666667

00:37:11.080 --> 00:37:13.332 And here's the demographics.

NOTE Confidence: 0.790046131666667

00:37:13.332 --> 00:37:16.147 There seems to be again

NOTE Confidence: 0.790046131666667

00:37:16.147 --> 00:37:18.638 dominant female over male.

NOTE Confidence: 0.790046131666667

00:37:18.638 --> 00:37:21.833 The numbers of participants reporting

NOTE Confidence: 0.790046131666667

00:37:21.833 --> 00:37:25.792 these symptoms in our study and then

NOTE Confidence: 0.790046131666667

00:37:25.792 --> 00:37:29.008 total number of participants in these

NOTE Confidence: 0.790046131666667

00:37:29.008 --> 00:37:31.840 three groups is 200-6135 and one O 8.

NOTE Confidence: 0.790046131666667

00:37:31.840 --> 00:37:34.542 We would love to increase these numbers

NOTE Confidence: 0.790046131666667

00:37:34.542 --> 00:37:37.237 by recruiting more people into the study.

NOTE Confidence: 0.790046131666667

00:37:37.240 --> 00:37:38.496 This is already revealing

NOTE Confidence: 0.790046131666667

00:37:38.496 --> 00:37:39.438 something very important.

NOTE Confidence: 0.790046131666667

00:37:39.440 --> 00:37:40.987 So I encourage for those of you

NOTE Confidence: 0.790046131666667

00:37:40.987 --> 00:37:42.639 who are not on the listen yet,

NOTE Confidence: 0.790046131666667

00:37:42.640 --> 00:37:44.998 please get on to this study.

NOTE Confidence: 0.790046131666667

00:37:45.000 --> 00:37:48.768 It's you basically join through Kindred

NOTE Confidence: 0.790046131666667

00:37:48.768 --> 00:37:51.530 online and Leslie can help you if

NOTE Confidence: 0.790046131666667

00:37:51.530 --> 00:37:53.840 you have any problems getting on.

NOTE Confidence: 0.790046131666667

00:37:53.840 --> 00:37:57.130 And the mean age again is very

NOTE Confidence: 0.790046131666667

00:37:57.130 --> 00:37:59.040 similar much younger than what

NOTE Confidence: 0.790046131666667

00:37:59.040 --> 00:38:01.200 you would see for severe COVID

NOTE Confidence: 0.790046131666667

00:38:01.272 --> 00:38:03.037 but typical of long COVID.

NOTE Confidence: 0.810572549444445

00:38:05.280 --> 00:38:08.334 So Bernali wanted to compare the

NOTE Confidence: 0.810572549444445

00:38:08.334 --> 00:38:11.578 health status of people with ask

NOTE Confidence: 0.810572549444445

00:38:11.578 --> 00:38:14.363 versus vaccine adverse event versus

NOTE Confidence: 0.810572549444445

00:38:14.363 --> 00:38:18.064 both and these are your data people

NOTE Confidence: 0.810572549444445

00:38:18.064 --> 00:38:21.199 who reporting poor health fair good,

NOTE Confidence: 0.810572549444445

00:38:21.200 --> 00:38:22.619 very good, excellent,

NOTE Confidence: 0.810572549444445

00:38:22.619 --> 00:38:26.116 do not know the percentages are very

NOTE Confidence: 0.810572549444445

00:38:26.116 --> 00:38:29.230 similar overall in the three groups

NOTE Confidence: 0.810572549444445

00:38:29.322 --> 00:38:32.437 and also another survey with EQ VAS,

NOTE Confidence: 0.810572549444445

00:38:32.440 --> 00:38:35.080 again very similar pattern we're seeing.

NOTE Confidence: 0.810572549444445

00:38:35.080 --> 00:38:36.490 There's nothing significantly

NOTE Confidence: 0.810572549444445

00:38:36.490 --> 00:38:38.840 different in the three groups.

NOTE Confidence: 0.868027434

00:38:41.320 --> 00:38:43.168 This is based on a questionnaire

NOTE Confidence: 0.868027434

00:38:43.168 --> 00:38:46.239 that we have on, you know, listen,

NOTE Confidence: 0.868027434

00:38:46.240 --> 00:38:49.765 it asks you, have you ever been

NOTE Confidence: 0.868027434

00:38:49.765 --> 00:38:51.955 told by a doctor before COVID,

NOTE Confidence: 0.868027434

00:38:51.960 --> 00:38:53.472 so before January 2020,

NOTE Confidence: 0.868027434

00:38:53.472 --> 00:38:57.320 that you have any of the following diseases?

NOTE Confidence: 0.868027434

00:38:57.320 --> 00:39:00.680 And there are two questions here.

NOTE Confidence: 0.868027434

00:39:00.680 --> 00:39:04.000 But essentially, if you look at the bars,

NOTE Confidence: 0.868027434

00:39:04.000 --> 00:39:08.200 there are strikingly similar percentages of

NOTE Confidence: 0.868027434

00:39:08.200 --> 00:39:11.736 people reporting allergies or arthritis,

NOTE Confidence: 0.868027434

00:39:11.736 --> 00:39:13.160 asthma, whatever,

NOTE Confidence: 0.868027434

00:39:13.160 --> 00:39:14.720 whatever diseases you look at,

NOTE Confidence: 0.868027434

00:39:14.720 --> 00:39:18.160 they're very, very similar there.

NOTE Confidence: 0.868027434

00:39:18.160 --> 00:39:20.560 There may be some differences and

NOTE Confidence: 0.868027434

00:39:20.560 --> 00:39:22.532 some of these psychiatric diseases,

NOTE Confidence: 0.868027434

00:39:22.532 --> 00:39:25.234 but these numbers are just very low.

NOTE Confidence: 0.868027434

00:39:25.240 --> 00:39:26.865 We can't really make any

NOTE Confidence: 0.868027434

00:39:26.865 --> 00:39:27.840 conclusions from this.

NOTE Confidence: 0.868027434

00:39:27.840 --> 00:39:29.616 We need more people to participate

NOTE Confidence: 0.868027434

00:39:29.616 --> 00:39:31.720 so we can understand the differences.

NOTE Confidence: 0.868027434

00:39:31.720 --> 00:39:32.640 If there is any

NOTE Confidence: 0.959428302777778

00:39:35.000 --> 00:39:36.182 another questionnaire currently,

NOTE Confidence: 0.959428302777778

00:39:36.182 --> 00:39:39.345 have you ever been told by a doctor

NOTE Confidence: 0.959428302777778

00:39:39.345 --> 00:39:41.718 that you have any of the following?

NOTE Confidence: 0.959428302777778

00:39:41.720 --> 00:39:44.986 Again there are two sets of questions and

NOTE Confidence: 0.959428302777778

00:39:44.986 --> 00:39:49.034 and of course the the the most different

NOTE Confidence: 0.959428302777778

00:39:49.040 --> 00:39:51.560 answers turned out to be Pask itself.

NOTE Confidence: 0.959428302777778

00:39:51.560 --> 00:39:54.233 So people with Pask or people who have both,

NOTE Confidence: 0.959428302777778

00:39:54.240 --> 00:39:56.830 obviously they have the highest

NOTE Confidence: 0.959428302777778

00:39:56.830 --> 00:39:59.914 level of unanswered yes compared to

NOTE Confidence: 0.959428302777778

00:39:59.914 --> 00:40:02.300 vaccine advanced event adverse events,

NOTE Confidence: 0.959428302777778

00:40:02.300 --> 00:40:05.874 whereas reverse is true people who have

NOTE Confidence: 0.959428302777778

00:40:05.874 --> 00:40:08.479 vaccine adverse events or reporting.

NOTE Confidence: 0.959428302777778

00:40:08.480 --> 00:40:11.400 Obviously these two last groups,

NOTE Confidence: 0.959428302777778

00:40:11.400 --> 00:40:13.800 but the PASK people, there's nothing.

NOTE Confidence: 0.959428302777778

00:40:13.800 --> 00:40:16.440 So this is sort of an internal control.

NOTE Confidence: 0.959428302777778

00:40:16.440 --> 00:40:18.918 The, the survey is working very well,

NOTE Confidence: 0.959428302777778

00:40:18.920 --> 00:40:20.920 but if you look across the other things,

NOTE Confidence: 0.959428302777778

00:40:20.920 --> 00:40:23.158 they were just very little difference.

NOTE Confidence: 0.959428302777778

00:40:23.160 --> 00:40:27.005 The only significance that we saw is

NOTE Confidence: 0.959428302777778

00:40:27.005 --> 00:40:29.230 migraines and neurological conditions that

NOTE Confidence: 0.959428302777778

00:40:29.230 --> 00:40:31.839 are slightly different between these groups.

NOTE Confidence: 0.959428302777778

00:40:31.840 --> 00:40:34.752 But again we need a lot more people

NOTE Confidence: 0.959428302777778

00:40:34.752 --> 00:40:37.126 to participate so we can really

NOTE Confidence: 0.959428302777778

00:40:37.126 --> 00:40:38.960 understand you know how significant

NOTE Confidence: 0.959428302777778

00:40:38.960 --> 00:40:40.760 these differences if any are.

NOTE Confidence: 0.959428302777778

00:40:40.760 --> 00:40:43.200 But overall again incredibly similar,

NOTE Confidence: 0.959428302777778

00:40:43.200 --> 00:40:43.560 right.

NOTE Confidence: 0.944560136666666

00:40:46.840 --> 00:40:50.168 This is a question about select all that

NOTE Confidence: 0.944560136666666

00:40:50.168 --> 00:40:53.248 you believe you have had as a result

NOTE Confidence: 0.944560136666666

00:40:53.248 --> 00:40:55.878 of past or vaccine adverse events and

NOTE Confidence: 0.944560136666666

00:40:55.878 --> 00:40:59.016 this is a patient's own assessment of

NOTE Confidence: 0.944560136666666

00:40:59.016 --> 00:41:02.580 what symptoms may be attributable to

NOTE Confidence: 0.944560136666666

00:41:02.673 --> 00:41:05.540 long COVID or post vaccine long haul.

NOTE Confidence: 0.944560136666666

00:41:05.540 --> 00:41:07.846 And again they're very, very similar.

NOTE Confidence: 0.944560136666666

00:41:07.846 --> 00:41:10.107 There are some things that are slightly

NOTE Confidence: 0.944560136666666

00:41:10.107 --> 00:41:12.364 different and brain fog, memory issues,

NOTE Confidence: 0.944560136666666

00:41:12.364 --> 00:41:15.274 difficulty speaking and so on,

NOTE Confidence: 0.944560136666666

00:41:15.280 --> 00:41:19.840 but overall very similar.

NOTE Confidence: 0.944560136666666

00:41:19.840 --> 00:41:22.584 Now I mentioned over and over we need

NOTE Confidence: 0.944560136666666

00:41:22.584 --> 00:41:24.705 more people so that we can really

NOTE Confidence: 0.944560136666666

00:41:24.705 --> 00:41:27.400 look at this in a larger population.

NOTE Confidence: 0.944560136666666

00:41:27.400 --> 00:41:30.508 But so far these surveys are showing

NOTE Confidence: 0.944560136666666

00:41:30.508 --> 00:41:33.729 us that these these three groups

NOTE Confidence: 0.944560136666666

00:41:33.729 --> 00:41:36.117 are very strikingly similar.

NOTE Confidence: 0.944560136666666

00:41:36.120 --> 00:41:38.585 So currently there's this remarkable

NOTE Confidence: 0.944560136666666

00:41:38.585 --> 00:41:41.400 overlap in symptoms and sex ratio

NOTE Confidence: 0.944560136666666

00:41:41.400 --> 00:41:44.400 for long COVID and age group.

NOTE Confidence: 0.944560136666666

00:41:44.400 --> 00:41:46.684 So based on this,

NOTE Confidence: 0.944560136666666

00:41:46.684 --> 00:41:49.561 what we hypothesize is that there

NOTE Confidence: 0.944560136666666

00:41:49.561 --> 00:41:51.883 must be a significant overlap in

NOTE Confidence: 0.944560136666666

00:41:51.883 --> 00:41:54.360 the drivers of these diseases.

NOTE Confidence: 0.944560136666666

00:41:54.360 --> 00:41:55.390 For instance,

NOTE Confidence: 0.944560136666666

00:41:55.390 --> 00:41:57.965 it's possible that the vaccine

NOTE Confidence: 0.944560136666666

00:41:57.965 --> 00:42:00.839 stimulation of innate immune responses

NOTE Confidence: 0.944560136666666

00:42:00.840 --> 00:42:03.924 could be similar between the acute

NOTE Confidence: 0.944560136666666

00:42:03.924 --> 00:42:06.564 COVID infection and vaccine and

NOTE Confidence: 0.944560136666666

00:42:06.564 --> 00:42:08.709 what's trigger downstream is similar.

NOTE Confidence: 0.944560136666666

00:42:08.709 --> 00:42:11.987 And we know for both of these that

NOTE Confidence: 0.944560136666666

00:42:11.987 --> 00:42:14.051 there is inflamosome activation

NOTE Confidence: 0.944560136666666

00:42:14.051 --> 00:42:16.115 on RNA sensor stimulation.

NOTE Confidence: 0.944560136666666

00:42:16.120 --> 00:42:19.156 These are two key innate recognition

NOTE Confidence: 0.944560136666666

00:42:19.156 --> 00:42:21.180 pathways that are triggered

NOTE Confidence: 0.944560136666666

00:42:21.260 --> 00:42:22.920 by vaccine and virus.

NOTE Confidence: 0.944560136666666

00:42:22.920 --> 00:42:25.620 So that could be the commonality

NOTE Confidence: 0.944560136666666

00:42:25.620 --> 00:42:28.674 and this should result in acute you

NOTE Confidence: 0.944560136666666

00:42:28.674 --> 00:42:31.758 know within within hours or days

NOTE Confidence: 0.944560136666666

00:42:31.760 --> 00:42:34.100 symptoms whereas vaccine stimulation

NOTE Confidence: 0.944560136666666

00:42:34.100 --> 00:42:36.440 of adaptive immune response.

NOTE Confidence: 0.944560136666666

00:42:36.440 --> 00:42:39.050 There's also one thing that

NOTE Confidence: 0.944560136666666

00:42:39.050 --> 00:42:41.138 overlaps between COVID infection

NOTE Confidence: 0.944560136666666

00:42:41.138 --> 00:42:44.278 and vaccination which is the spike.

NOTE Confidence: 0.944560136666666

00:42:44.280 --> 00:42:47.700 So it's possible that anti

NOTE Confidence: 0.944560136666666

00:42:47.700 --> 00:42:50.436 spike antibodies that form,

NOTE Confidence: 0.944560136666666

00:42:50.440 --> 00:42:51.546 you know,

NOTE Confidence: 0.944560136666666

00:42:51.546 --> 00:42:54.160 it's causing immune complexes that

NOTE Confidence: 0.944560136666666

00:42:54.160 --> 00:42:56.866 may be leading to vascular activation,

NOTE Confidence: 0.944560136666666

00:42:56.866 --> 00:42:59.078 microblogs or other issues.

NOTE Confidence: 0.944560136666666

00:42:59.080 --> 00:43:00.976 Now whatever hypothesis here

NOTE Confidence: 0.944560136666666

00:43:00.976 --> 00:43:02.398 is absolutely speculative.

NOTE Confidence: 0.944560136666666

00:43:02.400 --> 00:43:03.600 There's no evidence for this.

NOTE Confidence: 0.944560136666666

00:43:03.600 --> 00:43:05.672 So please take this with a huge

NOTE Confidence: 0.944560136666666

00:43:05.672 --> 00:43:06.560 grain of salt.

NOTE Confidence: 0.944560136666666

00:43:06.560 --> 00:43:09.302 But based on the symptom data

NOTE Confidence: 0.944560136666666

00:43:09.302 --> 00:43:10.673 and demographic data,

NOTE Confidence: 0.944560136666666

00:43:10.680 --> 00:43:12.157 these are the kinds of things that

NOTE Confidence: 0.944560136666666

00:43:12.157 --> 00:43:13.319 we're starting to think about.

NOTE Confidence: 0.944560136666666

00:43:13.320 --> 00:43:15.392 Because of the similarity,

NOTE Confidence: 0.944560136666666

00:43:15.392 --> 00:43:18.500 there is also anti spike antibodies

NOTE Confidence: 0.944560136666666

00:43:18.591 --> 00:43:21.447 or T cells that could attack

NOTE Confidence: 0.944560136666666

00:43:21.447 --> 00:43:23.351 spike expressing host cells.

NOTE Confidence: 0.944560136666666

00:43:23.360 --> 00:43:24.640 It could be endothelium,

NOTE Confidence: 0.944560136666666

00:43:24.640 --> 00:43:25.920 it could be epithelium.

NOTE Confidence: 0.944560136666666

00:43:25.920 --> 00:43:27.960 Epithelium is definitely a

NOTE Confidence: 0.944560136666666

00:43:27.960 --> 00:43:30.000 target of virus infection.

NOTE Confidence: 0.944560136666666

00:43:30.000 --> 00:43:31.626 The the vaccine can be taken

NOTE Confidence: 0.944560136666666

00:43:31.626 --> 00:43:33.475 up by different cell types and

NOTE Confidence: 0.944560136666666

00:43:33.475 --> 00:43:34.879 expressed the spike protein.

NOTE Confidence: 0.944560136666666

00:43:34.880 --> 00:43:37.666 So again there may be some overlapping

NOTE Confidence: 0.944560136666666

00:43:37.666 --> 00:43:39.719 on the vulnerable cell types.

NOTE Confidence: 0.944560136666666

00:43:39.720 --> 00:43:42.432 There may also be antibodies that

NOTE Confidence: 0.944560136666666

00:43:42.432 --> 00:43:45.162 target auto antigen that is similarly

NOTE Confidence: 0.944560136666666

00:43:45.162 --> 00:43:47.676 induced by spike in the virus.

NOTE Confidence: 0.944560136666666

00:43:47.680 --> 00:43:51.635 Similarly for T cells and vaccine induces

NOTE Confidence: 0.944560136666666

00:43:51.635 --> 00:43:54.640 potentially reactivation of latent viruses,

NOTE Confidence: 0.944560136666666

00:43:54.640 --> 00:43:56.974 in which case we're kind of

NOTE Confidence: 0.944560136666666

00:43:56.974 --> 00:43:58.918 triggering the same pathway as

NOTE Confidence: 0.944560136666666

00:43:58.918 --> 00:44:00.796 what we see with long COVID.

NOTE Confidence: 0.944560136666666

00:44:00.800 --> 00:44:03.124 So Oh yeah,

NOTE Confidence: 0.944560136666666

00:44:03.124 --> 00:44:04.480 I don't know if I have time for this,

NOTE Confidence: 0.944560136666666

00:44:04.480 --> 00:44:05.656 but just very briefly,

NOTE Confidence: 0.944560136666666

00:44:05.656 --> 00:44:07.420 I know some people are very

NOTE Confidence: 0.944560136666666

00:44:07.486 --> 00:44:09.371 interested in the peripheral pain

NOTE Confidence: 0.944560136666666

00:44:09.371 --> 00:44:11.621 and small fiber neuropathy and I've

NOTE Confidence: 0.944560136666666

00:44:11.621 --> 00:44:13.439 been thinking a lot about this.

NOTE Confidence: 0.944560136666666

00:44:13.440 --> 00:44:16.100 There may be a way of connecting

NOTE Confidence: 0.944560136666666

00:44:16.100 --> 00:44:18.856 the low cortisol level that we see

NOTE Confidence: 0.944560136666666

00:44:18.856 --> 00:44:22.132 in the long haulers to release of

NOTE Confidence: 0.944560136666666

00:44:22.132 --> 00:44:24.952 immune suppression in the local

NOTE Confidence: 0.944560136666666

00:44:24.952 --> 00:44:30.045 tissue that enables sort of chronic

NOTE Confidence: 0.944560136666666

00:44:30.045 --> 00:44:32.920 pain trigger by damaging the

NOTE Confidence: 0.927222685454545

00:44:32.920 --> 00:44:34.760 endothelial cells within the skin

NOTE Confidence: 0.927222685454545

00:44:34.760 --> 00:44:37.400 as well as the neurons themselves.

NOTE Confidence: 0.927222685454545

00:44:37.400 --> 00:44:40.284 And there are lots of regulatory and

NOTE Confidence: 0.927222685454545

00:44:40.284 --> 00:44:42.274 stimulatory lymphocytes that are controlled

NOTE Confidence: 0.927222685454545

00:44:42.274 --> 00:44:44.668 by cortisol that could be released as

NOTE Confidence: 0.927222685454545

00:44:44.668 --> 00:44:47.236 a result of this low level cortisol.

NOTE Confidence: 0.927222685454545

00:44:47.240 --> 00:44:50.432 There is also local factors that immune

NOTE Confidence: 0.927222685454545

00:44:50.432 --> 00:44:53.226 cells can secrete that can increase

NOTE Confidence: 0.927222685454545

00:44:53.226 --> 00:44:57.133 pain sensitivity or increase the the

NOTE Confidence: 0.927222685454545

00:44:57.133 --> 00:44:58.998 the pain inducing factors themselves.

NOTE Confidence: 0.927222685454545

00:44:59.000 --> 00:45:01.436 So there's a lot to think about,

NOTE Confidence: 0.927222685454545

00:45:01.440 --> 00:45:04.130 but I'm trying to kind of put a lot of

NOTE Confidence: 0.927222685454545

00:45:04.209 --> 00:45:07.135 the findings that we've already have into

NOTE Confidence: 0.927222685454545

00:45:07.135 --> 00:45:09.959 trying to explain what may be going on.

NOTE Confidence: 0.927222685454545

00:45:09.960 --> 00:45:12.834 These are all just hypothesis generating

NOTE Confidence: 0.927222685454545

00:45:12.834 --> 00:45:16.599 things and so we haven't tested these.

NOTE Confidence: 0.927222685454545

00:45:16.600 --> 00:45:18.294 OK, I'm going to end here because

NOTE Confidence: 0.927222685454545

00:45:18.294 --> 00:45:20.000 I really want to take questions,

NOTE Confidence: 0.927222685454545

00:45:20.000 --> 00:45:22.436 but I can't end without thanking

NOTE Confidence: 0.927222685454545

00:45:22.436 --> 00:45:24.529 everyone who's like really dedicated

NOTE Confidence: 0.927222685454545

00:45:24.529 --> 00:45:26.923 to try to understand long COVID

NOTE Confidence: 0.927222685454545

00:45:26.923 --> 00:45:28.880 and post vaccine long haul.

NOTE Confidence: 0.927222685454545

00:45:28.880 --> 00:45:31.380 And that includes not only

NOTE Confidence: 0.927222685454545

00:45:31.380 --> 00:45:33.880 members of my own laboratory,

NOTE Confidence: 0.927222685454545

00:45:33.880 --> 00:45:37.396 but the Yale lesson and Yale

NOTE Confidence: 0.927222685454545

00:45:37.396 --> 00:45:39.154 recover study participants.

NOTE Confidence: 0.927222685454545

00:45:39.160 --> 00:45:41.460 And particularly when I highlight

NOTE Confidence: 0.927222685454545

00:45:41.460 --> 00:45:44.304 Harlan without whom none of these

NOTE Confidence: 0.927222685454545

00:45:44.304 --> 00:45:47.232 Yale lesson study could be done.

NOTE Confidence: 0.927222685454545

00:45:47.240 --> 00:45:50.257 And also David Petrino just an amazing

NOTE Confidence: 0.927222685454545

00:45:50.257 --> 00:45:52.742 partner that enabled this first study

NOTE Confidence: 0.927222685454545

00:45:52.742 --> 00:45:55.346 on Mylan COVID to be happening and

NOTE Confidence: 0.927222685454545

00:45:55.427 --> 00:45:58.290 all the amazing people who do this

NOTE Confidence: 0.927222685454545

00:45:58.290 --> 00:46:00.603 immune profiling data analysis day in,

NOTE Confidence: 0.927222685454545

00:46:00.603 --> 00:46:03.130 day out without whom none of these

NOTE Confidence: 0.927222685454545

00:46:03.202 --> 00:46:05.677 insights could have been developed.

NOTE Confidence: 0.927222685454545

00:46:05.680 --> 00:46:08.355 We're also expanding this to MECFS

NOTE Confidence: 0.927222685454545

00:46:08.355 --> 00:46:11.515 cohort with the help of Amy and Michael

NOTE Confidence: 0.927222685454545

00:46:11.515 --> 00:46:14.918 and the Polybio team and and also

NOTE Confidence: 0.927222685454545

00:46:14.918 --> 00:46:16.790 the CNS information collaborators

NOTE Confidence: 0.927222685454545

00:46:16.790 --> 00:46:18.170 that I didn't really even have

NOTE Confidence: 0.927222685454545

00:46:18.170 --> 00:46:19.598 a chance to talk about today.

NOTE Confidence: 0.927222685454545

00:46:19.600 --> 00:46:22.106 But we are enabling these studies with

NOTE Confidence: 0.927222685454545

00:46:22.106 --> 00:46:25.647 a huge team of people who are dedicated

NOTE Confidence: 0.927222685454545

00:46:25.647 --> 00:46:27.559 to understanding these diseases.

NOTE Confidence: 0.927222685454545

00:46:27.560 --> 00:46:29.720 So thank you for your attention.

NOTE Confidence: 0.954853494

00:46:33.040 --> 00:46:35.000 I'm happy to take questions

NOTE Confidence: 0.952954649

00:46:36.040 --> 00:46:38.608 and I will start with the

NOTE Confidence: 0.952954649

00:46:38.608 --> 00:46:40.320 first question that's there.

NOTE Confidence: 0.952954649

00:46:40.320 --> 00:46:42.795 A young man told me that he had long

NOTE Confidence: 0.952954649

00:46:42.795 --> 00:46:45.039 COVID that caused cardiac symptoms.

NOTE Confidence: 0.952954649

00:46:45.040 --> 00:46:47.136 He said that he was sure it wasn't

NOTE Confidence: 0.952954649

00:46:47.136 --> 00:46:48.703 a vaccine reaction because his

NOTE Confidence: 0.952954649

00:46:48.703 --> 00:46:50.992 doctor told him he had long COVID.

NOTE Confidence: 0.952954649

00:46:51.000 --> 00:46:53.440 How would his doctor disaggregate

NOTE Confidence: 0.952954649

00:46:53.440 --> 00:46:55.392 COVID from vaccine reaction?

NOTE Confidence: 0.870094764285714

00:46:56.920 --> 00:47:01.132 Yeah, that's very difficult to disaggregate

NOTE Confidence: 0.870094764285714

00:47:01.132 --> 00:47:05.400 because it's it's known that COVID can

NOTE Confidence: 0.870094764285714

00:47:05.400 --> 00:47:07.400 cause a significant heart problems.

NOTE Confidence: 0.870094764285714

00:47:07.400 --> 00:47:09.608 I mean Harlan is the expert

NOTE Confidence: 0.870094764285714

00:47:09.608 --> 00:47:11.080 cardiologist on this panel,

NOTE Confidence: 0.870094764285714

00:47:11.080 --> 00:47:14.636 but COVID itself can have a significant,

NOTE Confidence: 0.870094764285714

00:47:14.640 --> 00:47:18.440 you know, cardiovascular problem and

NOTE Confidence: 0.870094764285714

00:47:18.440 --> 00:47:22.452 so does mRNA vaccine in a in a subset

NOTE Confidence: 0.870094764285714

00:47:22.452 --> 00:47:25.720 of people younger, younger male,

NOTE Confidence: 0.870094764285714

00:47:25.720 --> 00:47:28.716 adolescent males in a very small subset.

NOTE Confidence: 0.870094764285714

00:47:28.720 --> 00:47:34.039 So if he had COVID and have been vaccinated,

NOTE Confidence: 0.870094764285714

00:47:34.040 --> 00:47:35.640 it's it's a little difficult

NOTE Confidence: 0.870094764285714

00:47:35.640 --> 00:47:37.240 to tell what caused what.

NOTE Confidence: 0.870094764285714

00:47:37.240 --> 00:47:40.936 But if you look at the post

NOTE Confidence: 0.870094764285714

00:47:40.936 --> 00:47:42.520 vaccine myocarditis studies,

NOTE Confidence: 0.870094764285714

00:47:42.520 --> 00:47:46.004 they often tend to occur a few

NOTE Confidence: 0.870094764285714

00:47:46.004 --> 00:47:47.914 days after the second dose.

NOTE Confidence: 0.870094764285714

00:47:47.920 --> 00:47:50.240 So you might be able to kind of

NOTE Confidence: 0.870094764285714

00:47:50.240 --> 00:47:52.644 look at the timing of the cardiac,

NOTE Confidence: 0.870094764285714

00:47:52.644 --> 00:47:56.032 cardiac issues that this person had to

NOTE Confidence: 0.870094764285714

00:47:56.032 --> 00:47:59.720 try to link what what may have led to this.

NOTE Confidence: 0.870094764285714

00:47:59.720 --> 00:48:00.020 Again,

NOTE Confidence: 0.870094764285714

00:48:00.020 --> 00:48:02.120 it's very hard to parse these apart.

NOTE Confidence: 0.973027488571429

00:48:05.000 --> 00:48:06.600 The next question is,

NOTE Confidence: 0.973027488571429

00:48:06.600 --> 00:48:08.576 I would like to know if there

NOTE Confidence: 0.973027488571429

00:48:08.576 --> 00:48:10.130 is a study forthcoming in

NOTE Confidence: 0.973027488571429

00:48:10.130 --> 00:48:12.555 children living with long COVID.

NOTE Confidence: 0.973027488571429

00:48:12.560 --> 00:48:15.052 There are doctors at Yale Pediatrics who

NOTE Confidence: 0.973027488571429

00:48:15.052 --> 00:48:17.359 have been working on long COVID kids.

NOTE Confidence: 0.973027488571429

00:48:17.360 --> 00:48:19.142 I'm hoping that your team is

NOTE Confidence: 0.973027488571429

00:48:19.142 --> 00:48:20.821 working with Pediatrics to start

NOTE Confidence: 0.973027488571429

00:48:20.821 --> 00:48:22.117 some longitudinal studies.

NOTE Confidence: 0.914493885

00:48:23.560 --> 00:48:24.886 Absolutely. Great question.

NOTE Confidence: 0.914493885

00:48:24.886 --> 00:48:27.980 So we're very fortunate to have one

NOTE Confidence: 0.914493885

00:48:28.058 --> 00:48:30.272 of the clinical fellows from Yale

NOTE Confidence: 0.914493885

00:48:30.272 --> 00:48:33.480 Pediatrics working with us on long COVID.

NOTE Confidence: 0.914493885

00:48:33.480 --> 00:48:37.365 So she and her colleagues are starting

NOTE Confidence: 0.914493885

00:48:37.365 --> 00:48:40.494 to collect by specimen to be able

NOTE Confidence: 0.914493885

00:48:40.494 --> 00:48:43.240 to do similar kinds of studies.

NOTE Confidence: 0.914493885

00:48:43.240 --> 00:48:47.320 You know that that study is just beginning,

NOTE Confidence: 0.914493885

00:48:47.320 --> 00:48:48.840 you know, so it's it's it's not we

NOTE Confidence: 0.914493885

00:48:48.840 --> 00:48:50.319 don't have any data or anything yet,

NOTE Confidence: 0.914493885

00:48:50.320 --> 00:48:52.112 but we would like to extend the

NOTE Confidence: 0.914493885

00:48:52.112 --> 00:48:53.600 study of course to children.

NOTE Confidence: 0.914493885

00:48:53.600 --> 00:48:55.720 Yeah. Thank

NOTE Confidence: 0.80017266

00:48:55.720 --> 00:48:59.080 you. OK, cool. The next question is,

NOTE Confidence: 0.80017266

00:48:59.080 --> 00:49:01.986 so somebody says kudos to you,

NOTE Confidence: 0.80017266

00:49:01.986 --> 00:49:05.105 but however elegant this study academic

NOTE Confidence: 0.80017266

00:49:05.105 --> 00:49:08.413 recognition of the pathogenicity of SARS

NOTE Confidence: 0.80017266

00:49:08.413 --> 00:49:11.597 Co V2 S protein via vaccine is impaired.

NOTE Confidence: 0.80017266

00:49:11.600 --> 00:49:14.085 All five of my physicians and myself

NOTE Confidence: 0.80017266

00:49:14.085 --> 00:49:17.264 who is also a physician were not aware

NOTE Confidence: 0.80017266

00:49:17.264 --> 00:49:20.301 of the clinical relevance of S protein

NOTE Confidence: 0.80017266

00:49:20.301 --> 00:49:23.073 vaccine in my significant CNS autonomic,

NOTE Confidence: 0.80017266

00:49:23.080 --> 00:49:25.520 retinal and cardiac events.

NOTE Confidence: 0.80017266

00:49:25.520 --> 00:49:28.028 There are publications for long COVID

NOTE Confidence: 0.80017266

00:49:28.028 --> 00:49:30.625 yet which are silent about vaccine

NOTE Confidence: 0.80017266

00:49:30.625 --> 00:49:33.600 impacts and this person is also talking

NOTE Confidence: 0.80017266

00:49:33.600 --> 00:49:36.465 about multiple recent articles impacting

NOTE Confidence: 0.80017266

00:49:36.465 --> 00:49:39.440 spike in blood pressure dysregulation.

NOTE Confidence: 0.80017266

00:49:39.440 --> 00:49:41.678 Could you please comment on this?

NOTE Confidence: 0.900141175

00:49:42.480 --> 00:49:44.960 Yeah, I mean we need to change that.

NOTE Confidence: 0.900141175

00:49:44.960 --> 00:49:46.640 That's why we're doing this.

NOTE Confidence: 0.900141175

00:49:46.640 --> 00:49:50.616 Yeah, listen study is we are going

NOTE Confidence: 0.900141175

00:49:50.616 --> 00:49:53.266 to approach vaccine related long

NOTE Confidence: 0.900141175

00:49:53.266 --> 00:49:55.631 haul with the same scientific

NOTE Confidence: 0.900141175

00:49:55.631 --> 00:49:58.718 rigor as we do for long COVID.

NOTE Confidence: 0.900141175

00:49:58.720 --> 00:50:01.580 And so hopefully this question

NOTE Confidence: 0.900141175

00:50:01.580 --> 00:50:04.440 can be no longer relevant.

NOTE Confidence: 0.900141175

00:50:04.440 --> 00:50:06.910 You know in a in in once we do these

NOTE Confidence: 0.900141175

00:50:06.983 --> 00:50:09.248 studies and hopefully others are

NOTE Confidence: 0.900141175

00:50:09.248 --> 00:50:11.513 also engaging in similar studies,

NOTE Confidence: 0.900141175

00:50:11.520 --> 00:50:13.672 the vaccine related adverse

NOTE Confidence: 0.900141175

00:50:13.672 --> 00:50:16.900 events are a very tricky issue

NOTE Confidence: 0.900141175

00:50:17.000 --> 00:50:19.880 that many people shy away from.

NOTE Confidence: 0.900141175

00:50:19.880 --> 00:50:22.106 Of course all of us here

NOTE Confidence: 0.900141175

00:50:22.106 --> 00:50:23.647 are pro vaccine people.

NOTE Confidence: 0.900141175

00:50:23.647 --> 00:50:26.370 I mean I developed my own vaccines

NOTE Confidence: 0.900141175

00:50:26.445 --> 00:50:28.678 in the lab using a nasal spray.

NOTE Confidence: 0.900141175

00:50:28.680 --> 00:50:31.795 So we know the importance and the

NOTE Confidence: 0.900141175

00:50:31.800 --> 00:50:33.480 clinical benefit of vaccination.

NOTE Confidence: 0.900141175

00:50:33.480 --> 00:50:36.400 But we also have to acknowledge that

NOTE Confidence: 0.900141175

00:50:36.400 --> 00:50:38.738 there are small subset of people we

NOTE Confidence: 0.900141175

00:50:38.738 --> 00:50:41.447 don't know how small but a subset of

NOTE Confidence: 0.900141175

00:50:41.447 --> 00:50:43.832 people who are suffering extreme you
NOTE Confidence: 0.900141175
00:50:43.832 --> 00:50:46.404 know health issues after vaccination
NOTE Confidence: 0.900141175
00:50:46.404 --> 00:50:49.778 and it's it's not healthy to ignore
NOTE Confidence: 0.900141175
00:50:49.778 --> 00:50:53.106 or dismiss the potential link between
NOTE Confidence: 0.900141175
00:50:53.106 --> 00:50:56.355 the timing of the vaccination and
NOTE Confidence: 0.900141175
00:50:56.355 --> 00:50:59.183 the onset of these diseases and if
NOTE Confidence: 0.900141175
00:50:59.183 --> 00:51:01.480 we don't look we won't find it.
NOTE Confidence: 0.900141175
00:51:01.480 --> 00:51:04.400 So I agree with this person's
NOTE Confidence: 0.900141175
00:51:04.400 --> 00:51:07.480 comment that we we have very little
NOTE Confidence: 0.900141175
00:51:07.480 --> 00:51:09.599 evidence for vaccine induced
NOTE Confidence: 0.900141175
00:51:09.600 --> 00:51:11.980 impact on the health but we that's
NOTE Confidence: 0.900141175
00:51:11.980 --> 00:51:13.520 because we haven't looked.
NOTE Confidence: 0.900141175
00:51:13.520 --> 00:51:15.830 I think we really need to start
NOTE Confidence: 0.900141175
00:51:15.830 --> 00:51:18.012 looking at this and that that's
NOTE Confidence: 0.900141175
00:51:18.012 --> 00:51:20.244 the whole point of this comparison
NOTE Confidence: 0.900141175
00:51:20.244 --> 00:51:21.960 in Yale lesson study.

NOTE Confidence: 0.900141175

00:51:21.960 --> 00:51:22.240 So

NOTE Confidence: 0.929729384444445

00:51:22.240 --> 00:51:24.124 the next question is talking about

NOTE Confidence: 0.929729384444445

00:51:24.124 --> 00:51:26.718 if we have looked at reactivation of

NOTE Confidence: 0.929729384444445

00:51:26.718 --> 00:51:28.833 bacteria like Borrelia or Bartonella.

NOTE Confidence: 0.864836956875

00:51:30.240 --> 00:51:33.488 Yeah. So the great thing about using

NOTE Confidence: 0.864836956875

00:51:33.488 --> 00:51:36.364 this stereo immune technology is that

NOTE Confidence: 0.864836956875

00:51:36.364 --> 00:51:39.692 they have many tick borne diseases and

NOTE Confidence: 0.864836956875

00:51:39.692 --> 00:51:42.590 vector borne diseases in their panel

NOTE Confidence: 0.864836956875

00:51:42.676 --> 00:51:44.798 that's BeenVerified using distinct

NOTE Confidence: 0.864836956875

00:51:44.798 --> 00:51:48.074 cohorts that are prior to COVID.

NOTE Confidence: 0.864836956875

00:51:48.080 --> 00:51:50.257 And so we are very fortunate to

NOTE Confidence: 0.864836956875

00:51:50.257 --> 00:51:51.994 be working with their development

NOTE Confidence: 0.864836956875

00:51:51.994 --> 00:51:54.356 team to be looking at antibodies

NOTE Confidence: 0.864836956875

00:51:54.356 --> 00:51:57.452 against other pathogens that are not

NOTE Confidence: 0.864836956875

00:51:57.452 --> 00:52:00.353 necessarily just viral in order to

NOTE Confidence: 0.864836956875

00:52:00.353 --> 00:52:03.460 be able to detect anti bacterial,

NOTE Confidence: 0.864836956875

00:52:03.460 --> 00:52:06.060 anti parasitic antifungal antibodies

NOTE Confidence: 0.864836956875

00:52:06.060 --> 00:52:10.306 that may be also elevated in post

NOTE Confidence: 0.864836956875

00:52:10.306 --> 00:52:12.836 vaccine or post COVID diseases.

NOTE Confidence: 0.864836956875

00:52:12.840 --> 00:52:15.036 So we are absolutely going to

NOTE Confidence: 0.864836956875

00:52:15.036 --> 00:52:17.279 be looking at all of those.

NOTE Confidence: 0.864836956875

00:52:17.280 --> 00:52:18.120 Thank you, Akiko.

NOTE Confidence: 0.864836956875

00:52:18.120 --> 00:52:20.520 The next question is most general

NOTE Confidence: 0.864836956875

00:52:20.520 --> 00:52:22.920 physicians have no information or

NOTE Confidence: 0.948526368

00:52:22.920 --> 00:52:25.640 ability on testing cytokine profiles.

NOTE Confidence: 0.948526368

00:52:25.640 --> 00:52:28.166 Are there any specific resources available

NOTE Confidence: 0.948526368

00:52:28.166 --> 00:52:30.400 to individuals for cytokine testing?

NOTE Confidence: 0.8323046

00:52:31.520 --> 00:52:35.412 Yeah, I don't I there is a

NOTE Confidence: 0.8323046

00:52:35.412 --> 00:52:37.666 clinical test that looks at

NOTE Confidence: 0.8323046

00:52:37.666 --> 00:52:39.838 different inflammatory cytokines,

NOTE Confidence: 0.8323046

00:52:39.840 --> 00:52:42.540 but the types of cytokines and

NOTE Confidence: 0.8323046

00:52:42.540 --> 00:52:44.845 chemokines that we're detecting goes

NOTE Confidence: 0.8323046

00:52:44.845 --> 00:52:47.413 much wider than the clinical panel

NOTE Confidence: 0.8323046

00:52:47.413 --> 00:52:49.720 that the physicians normally use.

NOTE Confidence: 0.8323046

00:52:49.720 --> 00:52:51.640 And if you use those panels,

NOTE Confidence: 0.8323046

00:52:51.640 --> 00:52:53.677 you may not pick up the differences.

NOTE Confidence: 0.8323046

00:52:53.680 --> 00:52:58.496 So unfortunately I don't know of any

NOTE Confidence: 0.8323046

00:52:58.496 --> 00:53:01.545 commercially available sites that would

NOTE Confidence: 0.8323046

00:53:01.545 --> 00:53:04.875 do a cytokine profiling for patients,

NOTE Confidence: 0.8323046

00:53:04.880 --> 00:53:08.124 but we are doing it.

NOTE Confidence: 0.8323046

00:53:08.124 --> 00:53:10.880 So if you are enrolling in our study,

NOTE Confidence: 0.8323046

00:53:10.880 --> 00:53:13.400 we will be looking at those and we will be

NOTE Confidence: 0.8323046

00:53:13.460 --> 00:53:15.917 sharing some data back with the patients,

NOTE Confidence: 0.8323046

00:53:15.920 --> 00:53:17.495 not everything because some of

NOTE Confidence: 0.8323046

00:53:17.495 --> 00:53:19.070 them are very complicated in

NOTE Confidence: 0.8323046

00:53:19.132 --> 00:53:20.706 terms of interpreting the data.

NOTE Confidence: 0.8323046

00:53:20.706 --> 00:53:23.380 But for some standard things we can

NOTE Confidence: 0.8323046

00:53:23.447 --> 00:53:25.804 certainly give back to the patients and that

NOTE Confidence: 0.8323046

00:53:25.804 --> 00:53:28.080 that's the whole point of this you know,

NOTE Confidence: 0.8323046

00:53:28.080 --> 00:53:30.480 collaboration with the patients.

NOTE Confidence: 0.8323046

00:53:30.480 --> 00:53:31.398 So, yeah,

NOTE Confidence: 0.8323046

00:53:31.398 --> 00:53:32.988 if you're interested again doing

NOTE Confidence: 0.8323046

00:53:32.988 --> 00:53:35.360 the study and we can work together.

NOTE Confidence: 0.929285524

00:53:36.480 --> 00:53:37.600 So the next question is,

NOTE Confidence: 0.929285524

00:53:37.600 --> 00:53:40.090 was the reactivated virus like what

NOTE Confidence: 0.929285524

00:53:40.090 --> 00:53:42.506 the antibodies IG GS or IG Ms.

NOTE Confidence: 0.929285524

00:53:42.506 --> 00:53:46.960 was any live reactivation studied or seen?

NOTE Confidence: 0.8247120375

00:53:46.960 --> 00:53:50.480 Yeah, so we focus on IgG for now.

NOTE Confidence: 0.8247120375

00:53:50.480 --> 00:53:55.097 We are doing some IG M and other isotypes

NOTE Confidence: 0.8247120375

00:53:55.097 --> 00:53:58.700 just to be thorough in our analysis.

NOTE Confidence: 0.8247120375

00:53:58.700 --> 00:54:02.896 We also did EBV virenia analysis,

NOTE Confidence: 0.8247120375

00:54:02.896 --> 00:54:06.952 which is detecting the DNA from ABV in

NOTE Confidence: 0.8247120375

00:54:06.952 --> 00:54:09.880 the circulation and we don't see that.

NOTE Confidence: 0.8247120375

00:54:09.880 --> 00:54:12.892 So it suggests that the reactivation

NOTE Confidence: 0.8247120375

00:54:12.892 --> 00:54:14.844 must have occurred recently,

NOTE Confidence: 0.8247120375

00:54:14.844 --> 00:54:17.508 but it's not an active Vibrania

NOTE Confidence: 0.8247120375

00:54:17.508 --> 00:54:19.719 that's going on and that's been

NOTE Confidence: 0.8247120375

00:54:19.719 --> 00:54:21.477 seen by other groups as well.

NOTE Confidence: 0.8247120375

00:54:21.480 --> 00:54:23.768 So it's the acute phase of the COVID

NOTE Confidence: 0.8247120375

00:54:23.768 --> 00:54:25.600 that you're likely reactivating.

NOTE Confidence: 0.8247120375

00:54:25.600 --> 00:54:28.396 But after that, the virus itself,

NOTE Confidence: 0.8247120375

00:54:28.400 --> 00:54:29.968 the genome is gone,

NOTE Confidence: 0.8247120375

00:54:29.968 --> 00:54:32.320 but you're still have this antibody

NOTE Confidence: 0.8247120375

00:54:32.320 --> 00:54:35.520 signature in these people. So

NOTE Confidence: 0.939799932857143

00:54:35.520 --> 00:54:38.040 the next question is talking about cortisol.

NOTE Confidence: 0.939799932857143

00:54:38.040 --> 00:54:40.140 Do the lower levels of cortisol

NOTE Confidence: 0.939799932857143

00:54:40.140 --> 00:54:41.896 fall outside normal lab values

NOTE Confidence: 0.939799932857143

00:54:41.896 --> 00:54:44.232 for the time of day that they are

NOTE Confidence: 0.939799932857143

00:54:44.232 --> 00:54:46.440 being drawn in long COVID patients?

NOTE Confidence: 0.909854879375

00:54:47.480 --> 00:54:51.016 Yeah. So I should emphasize that all of

NOTE Confidence: 0.909854879375

00:54:51.016 --> 00:54:54.599 our studies are done in the research labs.

NOTE Confidence: 0.909854879375

00:54:54.600 --> 00:54:57.156 These are not the clinical cortisol

NOTE Confidence: 0.909854879375

00:54:57.156 --> 00:54:59.320 measurements that the doctors order.

NOTE Confidence: 0.909854879375

00:54:59.320 --> 00:55:02.940 So and we are actually trying to do a more

NOTE Confidence: 0.909854879375

00:55:03.030 --> 00:55:06.654 thorough study on cortisol by collecting

NOTE Confidence: 0.909854879375

00:55:06.654 --> 00:55:09.760 saliva from participants over 2 days,

NOTE Confidence: 0.909854879375

00:55:09.760 --> 00:55:12.901 so many many time sampling so that we can

NOTE Confidence: 0.909854879375

00:55:12.901 --> 00:55:15.872 look at the diurnal pattern of cortisol

NOTE Confidence: 0.909854879375

00:55:15.872 --> 00:55:18.924 level in long COVID participants compared to

NOTE Confidence: 0.909854879375

00:55:18.924 --> 00:55:21.197 convalescent control and healthy control.

NOTE Confidence: 0.909854879375

00:55:21.200 --> 00:55:24.134 So that study is ongoing and once we have

NOTE Confidence: 0.909854879375

00:55:24.134 --> 00:55:27.012 data from that that that's what the My

NOTE Confidence: 0.909854879375

00:55:27.012 --> 00:55:29.040 long COVID study once we have the data,

NOTE Confidence: 0.909854879375

00:55:29.040 --> 00:55:31.208 we should be able to tell much better

NOTE Confidence: 0.909854879375

00:55:31.208 --> 00:55:33.438 what is the pattern during the day,

NOTE Confidence: 0.909854879375

00:55:33.440 --> 00:55:35.432 throughout the day of the cortisol

NOTE Confidence: 0.909854879375

00:55:35.432 --> 00:55:39.240 in the long COVID participants.

NOTE Confidence: 0.909854879375

00:55:39.240 --> 00:55:42.000 So here's a question which was sent by

NOTE Confidence: 0.8344670425

00:55:42.000 --> 00:55:44.100 mail by one of the participants.

NOTE Confidence: 0.8344670425

00:55:44.100 --> 00:55:46.593 I believe I suffer from

NOTE Confidence: 0.8344670425

00:55:46.593 --> 00:55:48.877 vaccine related adverse events.

NOTE Confidence: 0.8344670425

00:55:48.880 --> 00:55:51.520 Is there any test that can ascertain

NOTE Confidence: 0.8344670425

00:55:51.520 --> 00:55:53.900 if any and how many spike proteins

NOTE Confidence: 0.8344670425

00:55:53.900 --> 00:55:56.830 are in your system and if so is there

NOTE Confidence: 0.8344670425

00:55:56.830 --> 00:55:58.600 an any approach to remove them?

NOTE Confidence: 0.857767479333333

00:55:59.760 --> 00:56:03.428 Right. So I did mention David Walt's

NOTE Confidence: 0.857767479333333

00:56:03.428 --> 00:56:06.563 paper that looks at circulating

NOTE Confidence: 0.857767479333333

00:56:06.563 --> 00:56:10.335 spike and nucleocapsid using a very

NOTE Confidence: 0.857767479333333

00:56:10.335 --> 00:56:12.960 sensitive assay called Simoa assay.

NOTE Confidence: 0.857767479333333

00:56:12.960 --> 00:56:15.802 And in their hands they did see

NOTE Confidence: 0.857767479333333

00:56:15.802 --> 00:56:17.840 spike that's being elevated,

NOTE Confidence: 0.857767479333333

00:56:17.840 --> 00:56:20.040 especially the full length spike,

NOTE Confidence: 0.857767479333333

00:56:20.040 --> 00:56:22.758 not so much the S1 region of the spike,

NOTE Confidence: 0.857767479333333

00:56:22.760 --> 00:56:25.196 but they were able to detect the

NOTE Confidence: 0.857767479333333

00:56:25.196 --> 00:56:27.664 full length spike as well as some

NOTE Confidence: 0.857767479333333

00:56:27.664 --> 00:56:29.800 nucleic caps but not too much.

NOTE Confidence: 0.857767479333333

00:56:29.800 --> 00:56:32.628 So it's really the full length spike

NOTE Confidence: 0.857767479333333

00:56:32.628 --> 00:56:34.666 that's being detected more from

NOTE Confidence: 0.857767479333333

00:56:34.666 --> 00:56:36.922 the long COVID participants in in

NOTE Confidence: 0.857767479333333

00:56:36.922 --> 00:56:39.805 that study we have done some Eliza

NOTE Confidence: 0.857767479333333

00:56:39.805 --> 00:56:42.506 which is another way of looking

NOTE Confidence: 0.857767479333333

00:56:42.506 --> 00:56:45.798 at proteins in the blood and have

NOTE Confidence: 0.857767479333333

00:56:45.798 --> 00:56:47.993 seen some spike circulating in

NOTE Confidence: 0.857767479333333

00:56:47.993 --> 00:56:51.120 a subset of long COVID patients.

NOTE Confidence: 0.857767479333333

00:56:51.120 --> 00:56:53.787 There isn't again there is no clinical

NOTE Confidence: 0.857767479333333

00:56:53.787 --> 00:56:56.065 test that doctors can order yet

NOTE Confidence: 0.857767479333333

00:56:56.065 --> 00:56:58.195 to look at the circulating spike.

NOTE Confidence: 0.857767479333333

00:56:58.200 --> 00:56:59.880 There should be that somebody

NOTE Confidence: 0.857767479333333

00:56:59.880 --> 00:57:01.560 should be developing these things,

NOTE Confidence: 0.857767479333333

00:57:01.560 --> 00:57:04.742 but we don't have it yet and we're trying

NOTE Confidence: 0.857767479333333

00:57:04.742 --> 00:57:07.839 to develop our own way of analyzing,

NOTE Confidence: 0.857767479333333

00:57:07.839 --> 00:57:11.517 but it's not widely available yet.

NOTE Confidence: 0.857767479333333

00:57:11.520 --> 00:57:14.720 And OK, so the spike, is it the spike,

NOTE Confidence: 0.857767479333333

00:57:14.720 --> 00:57:16.504 the the, the entire problem.

NOTE Confidence: 0.857767479333333

00:57:16.504 --> 00:57:20.776 If we get rid of spike, do we cure people?

NOTE Confidence: 0.857767479333333

00:57:20.776 --> 00:57:22.318 We don't know.

NOTE Confidence: 0.857767479333333

00:57:22.320 --> 00:57:24.880 There are things that we could do to

NOTE Confidence: 0.857767479333333

00:57:24.880 --> 00:57:27.997 look at these issues in a clinical trial,

NOTE Confidence: 0.857767479333333

00:57:28.000 --> 00:57:31.440 but no one has done those studies yet.

NOTE Confidence: 0.857767479333333

00:57:31.440 --> 00:57:33.039 So for instance,

NOTE Confidence: 0.857767479333333

00:57:33.039 --> 00:57:35.916 we could imagine monoclonal antibody

NOTE Confidence: 0.857767479333333

00:57:35.916 --> 00:57:40.382 therapy to remove spike from the patient

NOTE Confidence: 0.857767479333333

00:57:40.382 --> 00:57:45.079 if it if it works well in various tissues.

NOTE Confidence: 0.857767479333333

00:57:45.080 --> 00:57:46.963 There are some areas of the body

NOTE Confidence: 0.857767479333333

00:57:46.963 --> 00:57:48.520 that's not accessible by antibodies.

NOTE Confidence: 0.857767479333333

00:57:48.520 --> 00:57:51.080 So we may need to design A much

NOTE Confidence: 0.857767479333333

00:57:51.080 --> 00:57:53.117 smaller molecule to get rid of spike.

NOTE Confidence: 0.857767479333333

00:57:53.120 --> 00:57:55.269 But again this we don't know whether

NOTE Confidence: 0.857767479333333

00:57:55.269 --> 00:57:57.654 spike itself is causing the disease or

NOTE Confidence: 0.857767479333333

00:57:57.654 --> 00:58:00.087 it's something that was triggered by the

NOTE Confidence: 0.857767479333333

00:58:00.087 --> 00:58:03.200 spike that continues to to cause problems.

NOTE Confidence: 0.89652044

00:58:06.240 --> 00:58:07.885 So the next question is from

NOTE Confidence: 0.89652044

00:58:07.885 --> 00:58:09.210 a participant who is in

NOTE Confidence: 0.876602843333333

00:58:09.271 --> 00:58:10.676 another part of the world,

NOTE Confidence: 0.876602843333333

00:58:10.680 --> 00:58:12.636 so is unable to join us.

NOTE Confidence: 0.876602843333333

00:58:12.640 --> 00:58:14.160 But the question is regarding

NOTE Confidence: 0.876602843333333

00:58:14.160 --> 00:58:15.680 the two hypothesis after the

NOTE Confidence: 0.876602843333333

00:58:15.741 --> 00:58:17.157 four that you've discussed.

NOTE Confidence: 0.876602843333333

00:58:17.160 --> 00:58:20.835 So, so she is saying that in

NOTE Confidence: 0.876602843333333

00:58:20.835 --> 00:58:22.550 the previous meeting you had

NOTE Confidence: 0.876602843333333

00:58:22.622 --> 00:58:24.320 mentioned like in today's meeting

NOTE Confidence: 0.876602843333333

00:58:24.320 --> 00:58:26.000 you had mentioned that Aisle 2,

NOTE Confidence: 0.876602843333333

00:58:26.000 --> 00:58:28.133 Aisle 4, Aisle 6 cytokines are

NOTE Confidence: 0.876602843333333

00:58:28.133 --> 00:58:30.398 higher in long COVID participants,

NOTE Confidence: 0.876602843333333

00:58:30.400 --> 00:58:31.960 which means that a strategy

NOTE Confidence: 0.876602843333333

00:58:31.960 --> 00:58:33.413 could be to take ibuprofen,

NOTE Confidence: 0.876602843333333

00:58:33.413 --> 00:58:36.024 but if there is a new presence

NOTE Confidence: 0.876602843333333

00:58:36.024 --> 00:58:37.757 of residual virus that would

NOTE Confidence: 0.876602843333333

00:58:37.757 --> 00:58:39.878 not be a good thing to do.

NOTE Confidence: 0.876602843333333

00:58:39.880 --> 00:58:41.280 So she would like to hear your

NOTE Confidence: 0.748328414

00:58:41.280 --> 00:58:44.240 comment. Yeah, that's the thing.

NOTE Confidence: 0.748328414

00:58:44.240 --> 00:58:46.472 We can't just, you know jump

NOTE Confidence: 0.748328414

00:58:46.472 --> 00:58:48.531 to a conclusion that these

NOTE Confidence: 0.748328414

00:58:48.531 --> 00:58:50.996 cytokines are just generally bad.

NOTE Confidence: 0.748328414

00:58:51.000 --> 00:58:52.578 So for instance,

NOTE Confidence: 0.748328414

00:58:52.578 --> 00:58:54.632 cytokines suppressing therapies may

NOTE Confidence: 0.748328414

00:58:54.632 --> 00:58:57.464 make things worse if these cytokines

NOTE Confidence: 0.748328414

00:58:57.464 --> 00:59:00.279 are actually keeping the virus at Bay.

NOTE Confidence: 0.748328414

00:59:00.280 --> 00:59:03.500 And and so yeah, it's really difficult

NOTE Confidence: 0.748328414

00:59:03.500 --> 00:59:06.270 to recommend a particular therapy at this

NOTE Confidence: 0.748328414

00:59:06.270 --> 00:59:09.038 point because we just don't know enough.

NOTE Confidence: 0.748328414

00:59:09.040 --> 00:59:12.320 One thing that could be done is to

NOTE Confidence: 0.748328414

00:59:12.320 --> 00:59:15.256 treat the reservoir virus if there

NOTE Confidence: 0.748328414

00:59:15.256 --> 00:59:17.604 is with something like Paxilavit

NOTE Confidence: 0.748328414

00:59:17.604 --> 00:59:21.200 and that will tell us like how many,

NOTE Confidence: 0.748328414

00:59:21.200 --> 00:59:23.664 how many, what's the subset of people

NOTE Confidence: 0.748328414

00:59:23.664 --> 00:59:25.944 who benefit from antivirals like this

NOTE Confidence: 0.748328414

00:59:25.944 --> 00:59:28.639 and what are their sort of biomarkers.

NOTE Confidence: 0.748328414

00:59:28.640 --> 00:59:31.125 So we can target the right people

NOTE Confidence: 0.748328414

00:59:31.125 --> 00:59:32.880 for the right therapy.

NOTE Confidence: 0.748328414

00:59:32.880 --> 00:59:34.968 But right now I I don't think we

NOTE Confidence: 0.748328414

00:59:34.968 --> 00:59:36.680 have enough insights to say OK,

NOTE Confidence: 0.748328414

00:59:36.680 --> 00:59:38.584 you need to shut down this virus

NOTE Confidence: 0.748328414

00:59:38.584 --> 00:59:40.757 or you need to shut down this

NOTE Confidence: 0.748328414

00:59:40.757 --> 00:59:43.720 cytokine for treatment.

NOTE Confidence: 0.748328414

00:59:43.720 --> 00:59:43.920 So

NOTE Confidence: 0.909392025

00:59:43.920 --> 00:59:45.744 here is a question.

NOTE Confidence: 0.909392025

00:59:45.744 --> 00:59:48.480 Can you explain the elevated antibodies,

NOTE Confidence: 0.909392025

00:59:48.480 --> 00:59:50.278 are they less potent or effective

NOTE Confidence: 0.909392025

00:59:50.280 --> 00:59:51.760 because of the chronic activation

NOTE Confidence: 0.909392025

00:59:51.760 --> 00:59:53.576 or were they less potent and

NOTE Confidence: 0.909392025

00:59:53.576 --> 00:59:54.716 effective to begin with?

NOTE Confidence: 0.833761288888889

00:59:56.320 --> 00:59:57.146 Excellent question.

NOTE Confidence: 0.833761288888889

00:59:57.146 --> 01:00:01.448 I wish I had a time machine to go back and

NOTE Confidence: 0.833761288888889

01:00:01.448 --> 01:00:03.560 collect the samples from people before,

NOTE Confidence: 0.833761288888889

01:00:03.560 --> 01:00:06.116 I mean during the acute phase.

NOTE Confidence: 0.833761288888889

01:00:06.120 --> 01:00:07.840 There are other studies though,

NOTE Confidence: 0.833761288888889

01:00:07.840 --> 01:00:11.098 that have looked at the disease course of.

NOTE Confidence: 0.833761288888889

01:00:11.098 --> 01:00:12.722 People who've gotten COVID

NOTE Confidence: 0.833761288888889

01:00:12.722 --> 01:00:14.400 during the acute phase,

NOTE Confidence: 0.833761288888889

01:00:14.400 --> 01:00:17.522 they measure the antibody levels and they've

NOTE Confidence: 0.833761288888889

01:00:17.522 --> 01:00:20.288 they've seen a a positive correlation

NOTE Confidence: 0.833761288888889

01:00:20.288 --> 01:00:22.782 with having elevated anti nuclear

NOTE Confidence: 0.833761288888889

01:00:22.782 --> 01:00:25.758 antibody to a shorter disease course.

NOTE Confidence: 0.833761288888889

01:00:25.760 --> 01:00:28.060 So this makes immunological sense

NOTE Confidence: 0.833761288888889

01:00:28.060 --> 01:00:31.558 because if you can mount a rapid robust

NOTE Confidence: 0.833761288888889

01:00:31.560 --> 01:00:33.960 neutralizing or blocking antibody early

NOTE Confidence: 0.833761288888889

01:00:33.960 --> 01:00:36.360 during the phase of the infection,

NOTE Confidence: 0.833761288888889

01:00:36.360 --> 01:00:37.848 then you should be able to

NOTE Confidence: 0.833761288888889

01:00:37.848 --> 01:00:38.840 recover from the infection.

NOTE Confidence: 0.833761288888889

01:00:38.840 --> 01:00:40.155 Whereas if you started off

NOTE Confidence: 0.833761288888889

01:00:40.155 --> 01:00:42.040 with a poor level of antibody,

NOTE Confidence: 0.833761288888889

01:00:42.040 --> 01:00:44.480 poor level of T cells,

NOTE Confidence: 0.833761288888889

01:00:44.480 --> 01:00:46.160 you could have these lingering

NOTE Confidence: 0.833761288888889

01:00:46.160 --> 01:00:48.237 levels of virus and that could

NOTE Confidence: 0.833761288888889

01:00:48.237 --> 01:00:49.910 lead to these chronic syndromes.

NOTE Confidence: 0.833761288888889

01:00:49.910 --> 01:00:52.360 So I believe even though I have

NOTE Confidence: 0.833761288888889

01:00:52.360 --> 01:00:54.360 very little data to support it,

NOTE Confidence: 0.833761288888889

01:00:54.360 --> 01:00:58.120 that the failure to mount a robust immune

NOTE Confidence: 0.833761288888889

01:00:58.120 --> 01:01:00.961 response earlier in the phase of the

NOTE Confidence: 0.833761288888889

01:01:00.961 --> 01:01:03.759 infection may have led to long COVID.

NOTE Confidence: 0.833761288888889

01:01:03.760 --> 01:01:04.040 Yeah.

NOTE Confidence: 0.805397208571428

01:01:05.160 --> 01:01:07.358 So there are about 50 more questions.

NOTE Confidence: 0.805397208571428

01:01:07.360 --> 01:01:09.440 I know time wise we are running

NOTE Confidence: 0.805397208571428

01:01:09.440 --> 01:01:12.731 short for getting overtime. Yeah.

NOTE Confidence: 0.805397208571428

01:01:12.731 --> 01:01:15.888 So do we respond to them later

NOTE Confidence: 0.805397208571428

01:01:15.888 --> 01:01:18.798 or could a few questions be,

NOTE Confidence: 0.805397208571428

01:01:18.800 --> 01:01:19.840 there's a couple of options.

NOTE Confidence: 0.857459615

01:01:19.840 --> 01:01:20.760 I think you know there's

NOTE Confidence: 0.857459615

01:01:20.760 --> 01:01:21.680 that's a lot of questions.

NOTE Confidence: 0.857459615

01:01:21.680 --> 01:01:23.528 So I think it'll take a little while

NOTE Confidence: 0.857459615

01:01:23.528 --> 01:01:24.999 for you to kind of go through them.

NOTE Confidence: 0.857459615

01:01:25.000 --> 01:01:26.640 There probably some duplicates

NOTE Confidence: 0.857459615

01:01:26.640 --> 01:01:28.280 which might be helpful.

NOTE Confidence: 0.857459615

01:01:28.280 --> 01:01:30.472 What I would suggest is we go through

NOTE Confidence: 0.857459615

01:01:30.472 --> 01:01:32.956 them and then this will be recorded so we

NOTE Confidence: 0.857459615

01:01:32.956 --> 01:01:35.464 can add some slides to the end and put

NOTE Confidence: 0.857459615

01:01:35.464 --> 01:01:37.856 some answers to some of those questions.

NOTE Confidence: 0.857459615

01:01:37.856 --> 01:01:41.253 I can also say that you know November

NOTE Confidence: 0.857459615

01:01:41.253 --> 01:01:44.237 30th is the next town hall for Listen.

NOTE Confidence: 0.857459615

01:01:44.240 --> 01:01:45.466 So that's another opportunity

NOTE Confidence: 0.857459615

01:01:45.466 --> 01:01:47.278 for the Listen members.

NOTE Confidence: 0.857459615

01:01:47.280 --> 01:01:49.240 So if you aren't in Listen yet,

NOTE Confidence: 0.857459615

01:01:49.240 --> 01:01:50.340 you can do that.

NOTE Confidence: 0.857459615

01:01:50.340 --> 01:01:51.440 And then that we,

NOTE Confidence: 0.857459615

01:01:51.440 --> 01:01:54.660 they have Akiko and Harlan do a

NOTE Confidence: 0.857459615

01:01:54.660 --> 01:01:56.044 monthly town hall meeting for

NOTE Confidence: 0.857459615

01:01:56.044 --> 01:01:57.430 members of the LISTEN study to

NOTE Confidence: 0.857459615

01:01:57.483 --> 01:01:59.139 get questions and answers and talk

NOTE Confidence: 0.857459615

01:01:59.139 --> 01:02:00.560 more specifically about the study,

NOTE Confidence: 0.857459615

01:02:00.560 --> 01:02:02.640 but also to do this type of dialogue.

NOTE Confidence: 0.857459615

01:02:02.640 --> 01:02:04.956 So that's happening on November 30th.

NOTE Confidence: 0.857459615

01:02:04.960 --> 01:02:07.462 So there'll be another opportunity to

NOTE Confidence: 0.857459615

01:02:07.462 --> 01:02:10.532 answer more questions and you know Akiko,

NOTE Confidence: 0.857459615

01:02:10.532 --> 01:02:11.438 thank you.

NOTE Confidence: 0.857459615

01:02:11.440 --> 01:02:13.480 This has been an incredible,

NOTE Confidence: 0.857459615

01:02:13.480 --> 01:02:15.072 incredible opportunity for people

NOTE Confidence: 0.857459615

01:02:15.072 --> 01:02:17.460 to get answers to their questions

NOTE Confidence: 0.857459615

01:02:17.527 --> 01:02:19.489 and to hear the amazing research

NOTE Confidence: 0.857459615

01:02:19.489 --> 01:02:20.797 that you're all doing.

NOTE Confidence: 0.857459615

01:02:20.800 --> 01:02:23.920 I loved personally seeing those

NOTE Confidence: 0.857459615

01:02:23.920 --> 01:02:26.848 the the responses to our Listen

NOTE Confidence: 0.857459615

01:02:26.848 --> 01:02:29.320 to our Kindred surveys and to

NOTE Confidence: 0.857459615

01:02:29.320 --> 01:02:30.672 see what is coming from that,

NOTE Confidence: 0.857459615

01:02:30.672 --> 01:02:32.480 the information that's coming from that.

NOTE Confidence: 0.857459615

01:02:32.480 --> 01:02:34.880 So I encourage people that are on Kindred

NOTE Confidence: 0.857459615

01:02:34.880 --> 01:02:36.958 but haven't answered the surveys yet,

NOTE Confidence: 0.857459615

01:02:36.960 --> 01:02:38.394 to answer those surveys and get

NOTE Confidence: 0.857459615

01:02:38.394 --> 01:02:40.000 them over to the listen team.

NOTE Confidence: 0.857459615

01:02:40.000 --> 01:02:41.440 As you can see,

NOTE Confidence: 0.857459615

01:02:41.440 --> 01:02:43.240 that data is incredibly important.

NOTE Confidence: 0.857459615

01:02:43.240 --> 01:02:44.060 And so,

NOTE Confidence: 0.857459615

01:02:44.060 --> 01:02:46.110 so thank you to everyone

NOTE Confidence: 0.857459615

01:02:46.110 --> 01:02:47.720 who's participated so far.

NOTE Confidence: 0.857459615

01:02:47.720 --> 01:02:50.120 And I just want to call out Talia

NOTE Confidence: 0.857459615

01:02:50.120 --> 01:02:51.320 who you see on the screen as well.

NOTE Confidence: 0.857459615

01:02:51.320 --> 01:02:52.920 She's our community manager

NOTE Confidence: 0.857459615

01:02:52.920 --> 01:02:54.583 on Kindred and you'll,

NOTE Confidence: 0.857459615

01:02:54.583 --> 01:02:55.372 if you know,

NOTE Confidence: 0.857459615

01:02:55.372 --> 01:02:57.338 if you get emails from her and

NOTE Confidence: 0.857459615

01:02:57.338 --> 01:02:58.638 she's our content person,

NOTE Confidence: 0.857459615

01:02:58.640 --> 01:03:00.824 it's doing an incredible job on that end

NOTE Confidence: 0.857459615

01:03:00.824 --> 01:03:02.557 keeping everybody up to date and informed.

NOTE Confidence: 0.857459615

01:03:02.560 --> 01:03:07.160 So thank you to everybody here.

NOTE Confidence: 0.857459615

01:03:07.160 --> 01:03:07.880 Just saying thank you.

NOTE Confidence: 0.15407799

01:03:10.880 --> 01:03:12.386 Yeah, Thank you, everyone.

NOTE Confidence: 0.15407799

01:03:12.386 --> 01:03:13.914 Really appreciate your questions.

NOTE Confidence: 0.15407799

01:03:13.920 --> 01:03:15.608 Yeah. Thank you very much.

NOTE Confidence: 0.15407799

01:03:15.608 --> 01:03:17.144 And we'll we'll hear from you

NOTE Confidence: 0.15407799

01:03:17.144 --> 01:03:18.915 love all the hearts and claps

NOTE Confidence: 0.15407799

01:03:18.915 --> 01:03:20.079 and everything like that.

NOTE Confidence: 0.15407799

01:03:20.080 --> 01:03:25.492 Thank you screenshot that it's amazing.

NOTE Confidence: 0.15407799

01:03:25.492 --> 01:03:26.600 Oh, thank you.

NOTE Confidence: 0.796542505

01:03:29.200 --> 01:03:31.560 Thank you. See you in the next month.

NOTE Confidence: 0.67507315

01:03:34.360 --> 01:03:34.440 Wow.

NOTE Confidence: 0.513834094

01:03:37.360 --> 01:03:38.160 Thank you. Thank you all.

NOTE Confidence: 0.756936766666667

01:03:39.680 --> 01:03:40.880 Bye, bye. Bye.