WEBVTT

NOTE duration:"00:57:10.3790000"

NOTE language:en-us

NOTE Confidence: 0.7699789

00:00:00.000 --> 00:00:02.170 Rounds we have two speakers

NOTE Confidence: 0.7699789

00:00:02.170 --> 00:00:04.340 today from male to wonderful

NOTE Confidence: 0.7699789

00:00:04.422 --> 00:00:07.054 speakers first or Hegel on my own,

NOTE Confidence: 0.7699789

00:00:07.060 --> 00:00:09.538 introduced and then the cold diesel,

NOTE Confidence: 0.7699789

00:00:09.540 --> 00:00:12.330 who Linda Irwin will introduce.

NOTE Confidence: 0.7699789

00:00:12.330 --> 00:00:13.795 I've known Jorge since

NOTE Confidence: 0.7699789

00:00:13.795 --> 00:00:15.620 before he arrived at Yale.

NOTE Confidence: 0.7699789

00:00:15.620 --> 00:00:17.816 He's now the Lucille P Marquis,

NOTE Confidence: 0.7699789

00:00:17.820 --> 00:00:19.221 professor, microbial pathogenesis

NOTE Confidence: 0.7699789

00:00:19.221 --> 00:00:21.556 and chair of the Department.

NOTE Confidence: 0.7699789

00:00:21.560 --> 00:00:23.680 In his lab studies bacterial infections,

NOTE Confidence: 0.7699789

00:00:23.680 --> 00:00:25.810 he's probably best known for his

NOTE Confidence: 0.7699789

00:00:25.810 --> 00:00:27.224 discovery and characterization of

NOTE Confidence: 0.7699789

00:00:27.224 --> 00:00:28.989 the Type 3 secretion apparatus,

NOTE Confidence: 0.7699789

00:00:28.990 --> 00:00:30.760 which is this microscopic needle

NOTE Confidence: 0.7699789

00:00:30.760 --> 00:00:32.529 that injects proteins into cells.

NOTE Confidence: 0.7699789

00:00:32.530 --> 00:00:33.592 A fantastic story,

NOTE Confidence: 0.7699789

00:00:33.592 --> 00:00:35.720 and in recognition of this work,

NOTE Confidence: 0.7699789

00:00:35.720 --> 00:00:37.838 he's received numerous awards and been

NOTE Confidence: 0.7699789

00:00:37.838 --> 00:00:40.318 elected to the National Academy of Sciences,

NOTE Confidence: 0.7699789

00:00:40.318 --> 00:00:42.796 but more recently he's got interested in

NOTE Confidence: 0.7699789

00:00:42.800 --> 00:00:44.922 the Association between cancer and bacteria,

NOTE Confidence: 0.7699789

00:00:44.922 --> 00:00:47.046 and mechanistically, how does that work,

NOTE Confidence: 0.7699789

00:00:47.046 --> 00:00:48.820 and he's shown, for example,

NOTE Confidence: 0.7699789

00:00:48.820 --> 00:00:50.589 that some bacterial toxins can

NOTE Confidence: 0.7699789

00:00:50.590 --> 00:00:51.748 induce DNA damage.

NOTE Confidence: 0.7699789

00:00:51.748 --> 00:00:53.542 And therefore are potential carcinogens.

NOTE Confidence: 0.7699789

00:00:53.542 --> 00:00:55.446 And so today we'll hear about

NOTE Confidence: 0.7699789

00:00:55.446 --> 00:00:56.718 this very exciting work.

NOTE Confidence: 0.7699789

00:00:56.720 --> 00:00:59.218 So Jorge, the floor is yours.

NOTE Confidence: 0.7699789

00:00:59.220 --> 00:01:00.096 Thanks Dan,

NOTE Confidence: 0.7699789

00:01:00.096 --> 00:01:03.162 thank you very much for the introduction.

NOTE Confidence: 0.7699789

00:01:03.170 --> 00:01:05.258 And yeah as then.

NOTE Confidence: 0.7699789

00:01:05.258 --> 00:01:09.152 Imply microbes and cancer are a lot

NOTE Confidence: 0.7699789

00:01:09.152 --> 00:01:13.076 more intertwined that many would think.

NOTE Confidence: 0.7699789

00:01:13.080 --> 00:01:18.484 If we start with the obvious that.

NOTE Confidence: 0.7699789

00:01:18.490 --> 00:01:20.900 20% of cancers are caused

NOTE Confidence: 0.7699789

00:01:20.900 --> 00:01:22.346 by microbial infections.

NOTE Confidence: 0.7699789

00:01:22.350 --> 00:01:25.558 The you know of all these examples of

NOTE Confidence: 0.7699789

00:01:25.558 --> 00:01:28.609 gastric cancer and helicobacter anogenital,

NOTE Confidence: 0.7699789

00:01:28.610 --> 00:01:30.056 cancer and HPV,

NOTE Confidence: 0.7699789

00:01:30.056 --> 00:01:32.948 and so on and so forth.

NOTE Confidence: 0.7699789

00:01:32.950 --> 00:01:35.704 So these are the known causes

NOTE Confidence: 0.7699789

00:01:35.704 --> 00:01:38.250 of microbial causes of cancer.

NOTE Confidence: 0.7699789

00:01:38.250 --> 00:01:40.660 That amount to that 20%.

NOTE Confidence: 0.7699789

00:01:40.660 --> 00:01:44.258 But by all accounts this is probably

NOTE Confidence: 0.7699789

00:01:44.258 --> 00:01:46.795 rose underestimate in terms of

NOTE Confidence: 0.7699789

00:01:46.795 --> 00:01:49.055 the influence in the etiology

NOTE Confidence: 0.7699789

00:01:49.055 --> 00:01:51.300 of cancer of microbes.

NOTE Confidence: 0.7699789

00:01:51.300 --> 00:01:52.222 But Microsoft,

NOTE Confidence: 0.7699789

00:01:52.222 --> 00:01:55.910 either toying with cancer in many other ways.

NOTE Confidence: 0.7699789

00:01:55.910 --> 00:01:56.764 For example,

NOTE Confidence: 0.7699789

00:01:56.764 --> 00:01:59.326 the study of microbial pathogens really

NOTE Confidence: 0.7699789

00:01:59.326 --> 00:02:01.249 have provided fundamental knowledge

NOTE Confidence: 0.7699789

00:02:01.249 --> 00:02:03.744 for the understanding of cancer.

NOTE Confidence: 0.7699789

00:02:03.750 --> 00:02:05.004 You, of course,

NOTE Confidence: 0.7699789

00:02:05.004 --> 00:02:07.512 are aware that Uncle genes really

NOTE Confidence: 0.7699789

00:02:07.512 --> 00:02:09.528 were discovered through the

NOTE Confidence: 0.7699789

00:02:09.528 --> 00:02:12.048 study of a chicken ritualize.

NOTE Confidence: 0.7699789

00:02:12.050 --> 00:02:15.053 And today the study of host pathogen

NOTE Confidence: 0.7699789

00:02:15.053 --> 00:02:17.340 interactions have provided insight into

NOTE Confidence: 0.7699789

00:02:17.340 --> 00:02:19.655 cancer that are extremely important

NOTE Confidence: 0.7699789

00:02:19.655 --> 00:02:21.800 for the fundamental knowledge.

NOTE Confidence: 0.7699789

00:02:21.800 --> 00:02:23.832 Of of these disease.

NOTE Confidence: 0.7699789

00:02:23.832 --> 00:02:24.848 Of course,

NOTE Confidence: 0.7699789

00:02:24.850 --> 00:02:27.195 infectious diseases as an entity

NOTE Confidence: 0.7699789

00:02:27.195 --> 00:02:29.540 are really a significant challenge

NOTE Confidence: 0.7699789

00:02:29.610 --> 00:02:31.986 in the context of cancer patients.

NOTE Confidence: 0.7699789

00:02:31.990 --> 00:02:34.524 Many of the drugs that we administer

NOTE Confidence: 0.7699789

00:02:34.524 --> 00:02:37.021 to treat cancer or course have

NOTE Confidence: 0.7699789

00:02:37.021 --> 00:02:38.805 immunosuppressive power an and

NOTE Confidence: 0.7699789

00:02:38.805 --> 00:02:40.728 that increases the susceptibility

NOTE Confidence: 0.7699789

00:02:40.728 --> 00:02:43.303 of patients to infectious diseases

NOTE Confidence: 0.7699789

00:02:43.303 --> 00:02:46.500 and imposes it challenge in many.

NOTE Confidence: 0.7699789

00:02:46.500 --> 00:02:49.325 In many therapeutic set settings.

NOTE Confidence: 0.7699789

00:02:49.330 --> 00:02:52.849 And of course, the the elephant in the room.

NOTE Confidence: 0.7699789

00:02:52.850 --> 00:02:54.086 The resident microbiome,

NOTE Confidence: 0.7699789

00:02:54.086 --> 00:02:57.929 which in the last you know five years or so,

NOTE Confidence: 0.7699789

00:02:57.930 --> 00:03:00.667 is quickly emerging as a major factor,

NOTE Confidence: 0.7699789

00:03:00.670 --> 00:03:03.430 both in terms of cancer etiology

NOTE Confidence: 0.7699789

00:03:03.430 --> 00:03:04.810 and cancer treatment.

NOTE Confidence: 0.7699789

00:03:04.810 --> 00:03:07.169 So what what I'm trying to tell

NOTE Confidence: 0.7699789

00:03:07.169 --> 00:03:09.481 you here is something that it

NOTE Confidence: 0.7699789

00:03:09.481 --> 00:03:12.330 should be obvious and that this is

NOTE Confidence: 0.7699789

00:03:12.415 --> 00:03:15.000 an extremely important aspect of

NOTE Confidence: 0.7699789

00:03:15.000 --> 00:03:17.585 cancer biology and quite frankly,

NOTE Confidence: 0.7699789

00:03:17.590 --> 00:03:21.102 is one of the most exciting times to

NOTE Confidence: 0.7699789

00:03:21.102 --> 00:03:24.179 be involved in this research space.

NOTE Confidence: 0.7699789

00:03:24.180 --> 00:03:26.352 So the that's perhaps the reason

NOTE Confidence: 0.7699789

00:03:26.352 --> 00:03:29.644 why maybe some of us were a bit

NOTE Confidence: 0.7699789

00:03:29.644 --> 00:03:31.412 disappointed when the cancer

NOTE Confidence: 0.7699789

00:03:31.412 --> 00:03:33.707 microbiology piece of the Cancer

NOTE Confidence: 0.7699789

00:03:33.707 --> 00:03:35.045 Center was interrupted.

NOTE Confidence: 0.7699789

00:03:35.050 --> 00:03:35.886 In fact,

NOTE Confidence: 0.7699789

00:03:35.886 --> 00:03:39.230 when I was invited to give this talk,

NOTE Confidence: 0.85875857

00:03:39.230 --> 00:03:42.065 I was invited as a member of

NOTE Confidence: 0.85875857

00:03:42.065 --> 00:03:43.830 the Cancer Microbiology Group,

NOTE Confidence: 0.85875857

00:03:43.830 --> 00:03:45.610 which now doesn't exist.

NOTE Confidence: 0.85875857

00:03:45.610 --> 00:03:47.835 And although I completely understand

NOTE Confidence: 0.85875857

00:03:47.835 --> 00:03:50.268 why the leadership of the Cancer

NOTE Confidence: 0.85875857

00:03:50.268 --> 00:03:52.183 Center to please this step,

NOTE Confidence: 0.85875857

00:03:52.190 --> 00:03:55.480 they had to tend to an impending.

NOTE Confidence: 0.85875857

00:03:55.480 --> 00:03:59.788 Cancer Center grant that.

NOTE Confidence: 0.85875857

00:03:59.790 --> 00:04:01.454 That obviously didn't take

NOTE Confidence: 0.85875857

00:04:01.454 --> 00:04:03.118 many of these things,

NOTE Confidence: 0.85875857

00:04:03.120 --> 00:04:06.448 and it is clear that you know cancer,

NOTE Confidence: 0.85875857

00:04:06.450 --> 00:04:08.315 microbiology or microbes really are

NOTE Confidence: 0.85875857

00:04:08.315 --> 00:04:11.139 not the this the so called cancer

NOTE Confidence: 0.85875857

00:04:11.139 --> 00:04:13.344 establishment from which reviewers will

NOTE Confidence: 0.85875857

00:04:13.344 --> 00:04:16.848 be drawn to review the Cancer Center grant.

NOTE Confidence: 0.85875857

00:04:16.850 --> 00:04:19.340 I'm not really friendly to the

NOTE Confidence: 0.85875857

00:04:19.340 --> 00:04:21.835 concept of Micros, Ann and cancer.

NOTE Confidence: 0.85875857

00:04:21.835 --> 00:04:23.495 For for whatever reason,

NOTE Confidence: 0.85875857

00:04:23.500 --> 00:04:25.164 and even other considerations,

NOTE Confidence: 0.85875857

00:04:25.164 --> 00:04:27.660 other currencies that are used in

NOTE Confidence: 0.85875857

00:04:27.725 --> 00:04:29.740 the evaluation of these grants,

NOTE Confidence: 0.85875857

00:04:29.740 --> 00:04:33.688 such As for example in CI grants.

NOTE Confidence: 0.85875857

00:04:33.690 --> 00:04:34.410 You know,

NOTE Confidence: 0.85875857

00:04:34.410 --> 00:04:36.930 people work with my girls that that

NOTE Confidence: 0.85875857

00:04:36.930 --> 00:04:39.521 don't score high on that because it

NOTE Confidence: 0.85875857

00:04:39.521 --> 00:04:41.880 will be a fundraising malpractice.

NOTE Confidence: 0.85875857

00:04:41.880 --> 00:04:44.624 If you can send your grant when

NOTE Confidence: 0.85875857

00:04:44.624 --> 00:04:47.339 I need to send it to NCI,

NOTE Confidence: 0.85875857

00:04:47.340 --> 00:04:49.566 which is much less generous and

NOTE Confidence: 0.85875857

00:04:49.566 --> 00:04:52.020 certainly less friendly to these courses.

NOTE Confidence: 0.85875857

00:04:52.020 --> 00:04:55.140 So I I although I totally understand these,

NOTE Confidence: 0.85875857

00:04:55.140 --> 00:04:57.480 I think is is an opportunity

NOTE Confidence: 0.85875857

00:04:57.480 --> 00:04:58.650 loss for leadership,

NOTE Confidence: 0.85875857

00:04:58.650 --> 00:05:01.107 particularly with the really the the history

NOTE Confidence: 0.85875857

00:05:01.107 --> 00:05:03.829 of deal with the tremendous leadership.

NOTE Confidence: 0.85875857

00:05:03.830 --> 00:05:08.765 People like Dundee Moniot or Charles Miller.

NOTE Confidence: 0.85875857

00:05:08.770 --> 00:05:10.846 In the space of Uncle Virus, for example,

NOTE Confidence: 0.85875857

00:05:10.846 --> 00:05:13.849 there is a lot of history here on this space.

NOTE Confidence: 0.85875857

00:05:13.850 --> 00:05:15.880 But life is life and the cancer

NOTE Confidence: 0.85875857

00:05:15.880 --> 00:05:17.980 establishment is the cancer establishment.

NOTE Confidence: 0.85875857

00:05:17.980 --> 00:05:19.730 This is the same establishment

NOTE Confidence: 0.85875857

00:05:19.730 --> 00:05:22.450 that 10 years ago or 20 years ago,

NOTE Confidence: 0.85875857

00:05:22.450 --> 00:05:24.508 worse naughty related to cancer immunology.

NOTE Confidence: 0.85875857

00:05:24.510 --> 00:05:27.606 It with people like blow it all the late,

NOTE Confidence: 0.85875857

00:05:27.610 --> 00:05:30.018 allowing all that was advocating for it.

NOTE Confidence: 0.85875857

00:05:30.020 --> 00:05:32.428 And he was really honestly looked down.

NOTE Confidence: 0.85875857

00:05:32.430 --> 00:05:34.150 I was a close collaborator,

NOTE Confidence: 0.85875857

00:05:34.150 --> 00:05:36.208 the law and he always complained.

NOTE Confidence: 0.85875857

00:05:36.210 --> 00:05:38.274 Of course he was shielded by

NOTE Confidence: 0.85875857

00:05:38.274 --> 00:05:39.650 the Ludwig Cancer Center.

NOTE Confidence: 0.85875857

00:05:39.650 --> 00:05:41.708 He didn't have to worry about,

NOTE Confidence: 0.85875857

00:05:41.710 --> 00:05:42.322 but anyway,

NOTE Confidence: 0.85875857

00:05:42.322 --> 00:05:45.720 I think he said more of a loss opportunity.

NOTE Confidence: 0.85875857

00:05:45.720 --> 00:05:47.685 But I totally understand why

NOTE Confidence: 0.85875857

00:05:47.685 --> 00:05:49.650 this this decision was made,

NOTE Confidence: 0.85875857

00:05:49.650 --> 00:05:52.008 so enough venting enough Priscilla Teising.

NOTE Confidence: 0.85875857

00:05:52.010 --> 00:05:55.122 Let's get back to business here and in

NOTE Confidence: 0.85875857

00:05:55.122 --> 00:05:58.299 order to put in context a little bit,

NOTE Confidence: 0.85875857

00:05:58.300 --> 00:06:00.908 what I will tell you briefly is is

NOTE Confidence: 0.85875857

00:06:00.908 --> 00:06:03.388 to consider the general mechanisms by

NOTE Confidence: 0.85875857

00:06:03.388 --> 00:06:06.022 which microbes induce cancer and and

NOTE Confidence: 0.85875857

00:06:06.099 --> 00:06:08.505 there are two types of mechanisms.

NOTE Confidence: 0.85875857

00:06:08.510 --> 00:06:09.599 If you will.

NOTE Confidence: 0.85875857

00:06:09.599 --> 00:06:12.140 The direct Uncle Genesis and that is

NOTE Confidence: 0.85875857

00:06:12.218 --> 00:06:15.123 obvious when a virus is introduces an

NOTE Confidence: 0.85875857

00:06:15.123 --> 00:06:18.282 Uncle gene itself. This is of course.

NOTE Confidence: 0.85875857

00:06:18.282 --> 00:06:21.540 The mechanisms behind HPB or a BB,

NOTE Confidence: 0.85875857

00:06:21.540 --> 00:06:22.582 for example.

NOTE Confidence: 0.85875857

00:06:22.582 --> 00:06:25.708 Or when it when they integration

NOTE Confidence: 0.85875857

00:06:25.708 --> 00:06:28.459 event itself access and origin,

NOTE Confidence: 0.85875857

00:06:28.460 --> 00:06:30.865 because obviously the viruses integrate

NOTE Confidence: 0.85875857

00:06:30.865 --> 00:06:34.247 upstream of some gene that can drive

NOTE Confidence: 0.85875857

00:06:34.247 --> 00:06:36.487 sort of proliferation and growth.

NOTE Confidence: 0.85875857

00:06:36.490 --> 00:06:39.316 That's that's direct on Go Genesis,

NOTE Confidence: 0.85875857

00:06:39.320 --> 00:06:41.680 but arguably more common is

NOTE Confidence: 0.85875857

00:06:41.680 --> 00:06:43.568 the indirect organ Genesis,

NOTE Confidence: 0.85875857

00:06:43.570 --> 00:06:45.930 and this takes several forms.

NOTE Confidence: 0.85875857

00:06:45.930 --> 00:06:48.762 For example the form in which

NOTE Confidence: 0.85875857

00:06:48.762 --> 00:06:50.650 viruses in a cost,

NOTE Confidence: 0.85875857

00:06:50.650 --> 00:06:52.174 immunosuppression and immunosuppression

NOTE Confidence: 0.85875857

00:06:52.174 --> 00:06:53.698 activates for example.

NOTE Confidence: 0.85875857

00:06:53.700 --> 00:06:55.288 Other two more viruses.

NOTE Confidence: 0.85875857

00:06:55.288 --> 00:06:57.670 In the case of Kaposi sarcoma,

NOTE Confidence: 0.85875857

00:06:57.670 --> 00:06:59.660 is an HIV HIV infection.

NOTE Confidence: 0.85875857

00:06:59.660 --> 00:07:02.432 It comes to mind or when viruses

NOTE Confidence: 0.85875857

00:07:02.432 --> 00:07:04.024 viral infection, for example,

NOTE Confidence: 0.85875857

00:07:04.024 --> 00:07:05.612 triggers chromosome instability or

NOTE Confidence: 0.85875857

00:07:05.612 --> 00:07:07.200 translocation that eventually die.

NOTE Confidence: 0.79306287

00:07:07.200 --> 00:07:09.748 Of course, leads to cancer and other

NOTE Confidence: 0.79306287

00:07:09.748 --> 00:07:11.769 aspects of the Director Genesis

NOTE Confidence: 0.79306287

00:07:11.769 --> 00:07:14.337 more related to what I'm being,

NOTE Confidence: 0.79306287

00:07:14.340 --> 00:07:17.516 I'm going to be telling you today is,

NOTE Confidence: 0.79306287

00:07:17.520 --> 00:07:19.448 for example, chronic inflammation,

NOTE Confidence: 0.79306287

00:07:19.448 --> 00:07:22.340 which is very well established to

NOTE Confidence: 0.79306287

00:07:22.413 --> 00:07:24.537 be linked to to Uncle Genesis.

NOTE Confidence: 0.79306287

00:07:24.540 --> 00:07:26.184 The production of proinflammatory

NOTE Confidence: 0.79306287

00:07:26.184 --> 00:07:28.239 cytokines that have growth promoting

NOTE Confidence: 0.79306287

00:07:28.239 --> 00:07:30.247 abilities combined with oxygen radicals.

NOTE Confidence: 0.79306287

00:07:30.250 --> 00:07:33.169 They have a mutation or mutagenesis ability

NOTE Confidence: 0.79306287

00:07:33.169 --> 00:07:35.958 leads to setting the stage for Franco,

NOTE Confidence: 0.79306287

00:07:35.960 --> 00:07:37.512 Genesis is the case,

NOTE Confidence: 0.79306287

00:07:37.512 --> 00:07:39.064 for example with Helicobacter

NOTE Confidence: 0.79306287

00:07:39.064 --> 00:07:40.859 pylori and gastric cancer,

NOTE Confidence: 0.79306287

00:07:40.860 --> 00:07:43.856 and in addition something that has been

NOTE Confidence: 0.79306287

00:07:43.856 --> 00:07:46.563 emerging over the last few years and

NOTE Confidence: 0.79306287

00:07:46.563 --> 00:07:49.556 that we sort of Pioneer in this area

NOTE Confidence: 0.79306287

00:07:49.556 --> 00:07:52.214 is the fact that certain organisms

NOTE Confidence: 0.79306287

00:07:52.214 --> 00:07:54.651 really produce direct Gina toxins

NOTE Confidence: 0.79306287

00:07:54.651 --> 00:07:57.753 that will drive the oncogenic event.

NOTE Confidence: 0.79306287

00:07:57.760 --> 00:08:00.576 So I say alluded these last two are

NOTE Confidence: 0.79306287

00:08:00.576 --> 00:08:03.440 the ones more relevant to bacteria,

NOTE Confidence: 0.79306287

00:08:03.440 --> 00:08:05.888 which is the type of microbes

NOTE Confidence: 0.79306287

00:08:05.888 --> 00:08:08.320 that we study in the lab.

NOTE Confidence: 0.79306287

00:08:08.320 --> 00:08:10.552 So bacterial is in this context

NOTE Confidence: 0.79306287

00:08:10.552 --> 00:08:12.040 bacterial colonization leads to

NOTE Confidence: 0.79306287

00:08:12.105 --> 00:08:13.761 both inflammation and genotoxin

NOTE Confidence: 0.79306287

00:08:13.761 --> 00:08:16.245 production and exposures of tissues to

NOTE Confidence: 0.79306287

00:08:16.305 --> 00:08:17.985 genotoxin and therefore predisposing

NOTE Confidence: 0.79306287

00:08:17.985 --> 00:08:20.085 those tissues to to cancel.

NOTE Confidence: 0.79306287

00:08:20.090 --> 00:08:23.121 What I'm gonna be telling you today

NOTE Confidence: 0.79306287

00:08:23.121 --> 00:08:26.088 is the paradigm of two organisms that

NOTE Confidence: 0.79306287

00:08:26.088 --> 00:08:29.354 we study in the lab. Both of them.

NOTE Confidence: 0.79306287

00:08:29.354 --> 00:08:31.066 These organisms are salmonella

NOTE Confidence: 0.79306287

00:08:31.066 --> 00:08:32.350 and campylobacter jejuni.

NOTE Confidence: 0.79306287

00:08:32.350 --> 00:08:34.912 Both of them have been very

NOTE Confidence: 0.79306287

00:08:34.912 --> 00:08:35.766 strongly epidemiological.

NOTE Confidence: 0.79306287

00:08:35.770 --> 00:08:37.940 He associated with the development

NOTE Confidence: 0.79306287

00:08:37.940 --> 00:08:39.676 of cancer Campylobacter jejuni

NOTE Confidence: 0.79306287

00:08:39.676 --> 00:08:41.770 associated with an intestinal lymphoma,

NOTE Confidence: 0.79306287

00:08:41.770 --> 00:08:43.430 and while Salmonella Typhi,

NOTE Confidence: 0.79306287

00:08:43.430 --> 00:08:46.648 one of these family that we study in

NOTE Confidence: 0.79306287

00:08:46.648 --> 00:08:49.240 the lab is really a major cause of

NOTE Confidence: 0.79306287

00:08:49.323 --> 00:08:51.435 Gallbladder cancer and Gallbladder

NOTE Confidence: 0.79306287

00:08:51.435 --> 00:08:55.085 cancer in endemic areas is actually one

NOTE Confidence: 0.79306287

00:08:55.085 --> 00:08:58.410 of the main cancers that affect those.

NOTE Confidence: 0.79306287

00:08:58.410 --> 00:09:01.620 Individuals and it infections with

NOTE Confidence: 0.79306287

00:09:01.620 --> 00:09:04.188 Salmonella Typhi and associated

NOTE Confidence: 0.79306287

00:09:04.188 --> 00:09:06.560 with a 204 risk of hip,

NOTE Confidence: 0.79306287

00:09:06.560 --> 00:09:07.101 hip,

NOTE Confidence: 0.79306287

00:09:07.101 --> 00:09:08.724 hepatobiliary carcinoma and

NOTE Confidence: 0.79306287

00:09:08.724 --> 00:09:09.806 Gallbladder cancer,

NOTE Confidence: 0.79306287

00:09:09.810 --> 00:09:14.038 so these are important causes of cancer

NOTE Confidence: 0.79306287

00:09:14.038 --> 00:09:17.052 which incidentally are not in that

NOTE Confidence: 0.79306287

00:09:17.052 --> 00:09:21.860 20% statistic that I told you about.

NOTE Confidence: 0.79306287

00:09:21.860 --> 00:09:22.246 Now,

NOTE Confidence: 0.79306287

00:09:22.246 --> 00:09:24.176 in the case of Campylobacter,

NOTE Confidence: 0.79306287

00:09:24.180 --> 00:09:26.508 what we discovered that was sort

NOTE Confidence: 0.79306287

00:09:26.508 --> 00:09:28.853 of central to understand how these

NOTE Confidence: 0.79306287

00:09:28.853 --> 00:09:31.019 organisms linked to oncogenesis is a

NOTE Confidence: 0.79306287

00:09:31.019 --> 00:09:33.389 is the characterization of a toxin

NOTE Confidence: 0.79306287

00:09:33.389 --> 00:09:36.321 that we did almost two decades ago

NOTE Confidence: 0.79306287

00:09:36.321 --> 00:09:40.248 actually scary more than two decades ago?

NOTE Confidence: 0.79306287

00:09:40.250 --> 00:09:42.966 That he said toxin that caught our

NOTE Confidence: 0.79306287

00:09:42.966 --> 00:09:45.897 attention because of what you see here in in.

NOTE Confidence: 0.79306287

00:09:45.900 --> 00:09:46.959 In these images,

NOTE Confidence: 0.79306287

00:09:46.959 --> 00:09:49.077 these are cells that are intoxicated.

NOTE Confidence: 0.79306287

00:09:49.080 --> 00:09:51.824 You see them very much expanded with a

NOTE Confidence: 0.79306287

00:09:51.824 --> 00:09:53.955 large nuclei in comparison to control

NOTE Confidence: 0.79306287

00:09:53.955 --> 00:09:56.490 cell at the same excuse me Jorge,

NOTE Confidence: 0.79306287

00:09:56.490 --> 00:09:57.549 your your slide

NOTE Confidence: 0.8167658

00:09:57.550 --> 00:09:59.668 is not. It did not advance.

NOTE Confidence: 0.820451730769231

00:10:00.120 --> 00:10:01.347 Papa you mean?

NOTE Confidence: 0.820451730769231

00:10:01.347 --> 00:10:05.640 I mean what they have you on the 1st slide?

NOTE Confidence: 0.820451730769231

00:10:05.640 --> 00:10:09.060 Oh gosh, that's that's not good.

NOTE Confidence: 0.820451730769231

00:10:09.060 --> 00:10:11.780 That can you see them this way now?

NOTE Confidence: 0.820451730769231

00:10:11.780 --> 00:10:14.484 Yeah, that I can see those OK when

NOTE Confidence: 0.820451730769231

00:10:14.484 --> 00:10:17.558 I when I do it that way because OK,

NOTE Confidence: 0.820451730769231

00:10:17.560 --> 00:10:18.580 yeah unfortunately because

NOTE Confidence: 0.820451730769231

00:10:18.580 --> 00:10:20.620 whatever it would have been easier.

NOTE Confidence: 0.820451730769231

00:10:20.620 --> 00:10:23.000 But thank you for letting me know.

NOTE Confidence: 0.820451730769231

00:10:23.000 --> 00:10:25.720 OK so anyway, so here it is the.

NOTE Confidence: 0.76506776

00:10:28.960 --> 00:10:31.402 OK, so this image is showing

NOTE Confidence: 0.76506776

00:10:31.402 --> 00:10:34.754 you the the cells that have been

NOTE Confidence: 0.76506776

00:10:34.754 --> 00:10:36.930 intoxicated with this toxin,

NOTE Confidence: 0.76506776

00:10:36.930 --> 00:10:39.194 showing this unusual morphology.

NOTE Confidence: 0.76506776

00:10:39.194 --> 00:10:42.024 In comparison we control cell

NOTE Confidence: 0.76506776

00:10:42.024 --> 00:10:45.352 and the reason these cells have

NOTE Confidence: 0.76506776

00:10:45.352 --> 00:10:47.488 that morphology is becaused.

NOTE Confidence: 0.76506776

00:10:47.490 --> 00:10:50.698 The cells are stuck on the G2M phase

NOTE Confidence: 0.76506776

00:10:50.698 --> 00:10:53.828 of the cell cycle and we found

NOTE Confidence: 0.76506776

00:10:53.828 --> 00:10:57.141 that the reason for that is that

NOTE Confidence: 0.76506776

00:10:57.141 --> 00:11:00.075 this toxin that we had discovered.

NOTE Confidence: 0.76506776

00:11:00.080 --> 00:11:03.360 It has a genotoxicity DNA damage in capacity,

NOTE Confidence: 0.76506776

00:11:03.360 --> 00:11:05.844 those this is a toxin typical

NOTE Confidence: 0.76506776

00:11:05.844 --> 00:11:07.870 toxin of we call AB.

NOTE Confidence: 0.76506776

00:11:07.870 --> 00:11:10.740 Toxins have two two types of parts.

NOTE Confidence: 0.76506776

00:11:10.740 --> 00:11:13.200 If you will the be part,

NOTE Confidence: 0.76506776

00:11:13.200 --> 00:11:16.456 which is what targets the payload to a

NOTE Confidence: 0.76506776

00:11:16.456 --> 00:11:18.938 particular cell and the payload part.

NOTE Confidence: 0.76506776

00:11:18.940 --> 00:11:21.971 The nucleus is is an endonuclease is

NOTE Confidence: 0.76506776

00:11:21.971 --> 00:11:24.531 actually an unusual in the nucleus

NOTE Confidence: 0.76506776

00:11:24.531 --> 00:11:26.895 in the sense that primary amino

NOTE Confidence: 0.76506776

00:11:26.895 --> 00:11:28.916 acid sequence would not overtly

NOTE Confidence: 0.76506776

00:11:28.916 --> 00:11:32.340 tell you that this is a new case.

NOTE Confidence: 0.76506776

00:11:32.340 --> 00:11:36.740 But when you look at the atomic structure,

NOTE Confidence: 0.76506776

00:11:36.740 --> 00:11:40.765 you can make out the catalytic side.

NOTE Confidence: 0.76506776

00:11:40.770 --> 00:11:44.874 So so this is a typical case of

NOTE Confidence: 0.76506776

00:11:44.874 --> 00:11:48.518 genotoxin that is responsible for for

NOTE Confidence: 0.76506776

00:11:48.518 --> 00:11:52.268 driving driving the day on today.

NOTE Confidence: 0.8201903

00:11:54.500 --> 00:11:57.930 Cancer development and in fact just recently,

NOTE Confidence: 0.8201903

00:11:57.930 --> 00:12:00.460 this has been formally demonstrated

NOTE Confidence: 0.8201903

00:12:00.460 --> 00:12:04.243 in an animal model that that this

NOTE Confidence: 0.8201903

00:12:04.243 --> 00:12:07.158 toxin is responsible for Campylobacter

NOTE Confidence: 0.8201903

00:12:07.158 --> 00:12:10.538 jejuni's ability to promote cancer so.

NOTE Confidence: 0.8201903

00:12:10.540 --> 00:12:13.308 It's kind of awkward to have to advise

NOTE Confidence: 0.8201903

00:12:13.308 --> 00:12:16.240 it like this, but I will go ahead.

NOTE Confidence: 0.8201903

00:12:16.240 --> 00:12:18.388 So the second example is Salmonella

NOTE Confidence: 0.8201903

00:12:18.388 --> 00:12:21.296 Typhi and I need to tell you that

NOTE Confidence: 0.8201903

00:12:21.296 --> 00:12:23.819 the the basic about something that I

NOTE Confidence: 0.8201903

00:12:23.819 --> 00:12:25.883 think people things in context again

NOTE Confidence: 0.8201903

00:12:25.883 --> 00:12:28.340 and that is that someone had typhus

NOTE Confidence: 0.8201903

00:12:28.340 --> 00:12:30.115 and exclusive pathogen of humans.

NOTE Confidence: 0.8201903

00:12:30.120 --> 00:12:31.584 It causes typhoid fever.

NOTE Confidence: 0.8201903

00:12:31.584 --> 00:12:34.389 One of those historical diseases if you will,

NOTE Confidence: 0.8201903

00:12:34.390 --> 00:12:36.679 but important for Genesis is the fact

NOTE Confidence: 0.8201903

00:12:36.679 --> 00:12:39.020 that those that survived the disease,

NOTE Confidence: 0.8201903

00:12:39.020 --> 00:12:41.638 many of them go on to persistently

NOTE Confidence: 0.8201903

00:12:41.638 --> 00:12:42.760 harbored the Organism.

NOTE Confidence: 0.8201903

00:12:42.760 --> 00:12:45.749 Within the Gallbladder and that is where

NOTE Confidence: 0.8201903

00:12:45.749 --> 00:12:48.693 the rubber meets the road and that

NOTE Confidence: 0.8201903

00:12:48.693 --> 00:12:51.075 is the reason why those individuals

NOTE Confidence: 0.8201903

00:12:51.150 --> 00:12:53.135 that are harboring salmonella typing

NOTE Confidence: 0.8201903

00:12:53.135 --> 00:12:56.356 in the in the in the areas are

NOTE Confidence: 0.8201903

00:12:56.356 --> 00:12:58.416 prone to develop Gallbladder cancer.

NOTE Confidence: 0.8201903

00:12:58.420 --> 00:13:00.891 And in the case of Salmonella the

NOTE Confidence: 0.8201903

00:13:00.891 --> 00:13:02.990 paradigm is slightly different than

NOTE Confidence: 0.8201903

00:13:02.990 --> 00:13:05.420 the paradigm in Campylobacter jejuni.

NOTE Confidence: 0.8201903

00:13:05.420 --> 00:13:07.480 But it shares it remarkably,

NOTE Confidence: 0.8201903

00:13:07.480 --> 00:13:10.357 is shares more than what would expect.

NOTE Confidence: 0.8201903

00:13:10.360 --> 00:13:13.640 You need to think in terms of evolution

NOTE Confidence: 0.8201903

00:13:13.640 --> 00:13:16.240 that Campylobacter and Salmonella are they.

NOTE Confidence: 0.8201903

00:13:16.240 --> 00:13:18.320 Couldn't be more far apart.

NOTE Confidence: 0.8201903

00:13:18.320 --> 00:13:20.390 One is an epsilon bacteria,

NOTE Confidence: 0.8201903

00:13:20.390 --> 00:13:22.470 the other is a gammaproteobacteria.

NOTE Confidence: 0.8201903

00:13:22.470 --> 00:13:24.795 It's like absolutely no evolutionary

NOTE Confidence: 0.8201903

00:13:24.795 --> 00:13:28.058 connection and yet what is remarkable is

NOTE Confidence: 0.8201903

00:13:28.058 --> 00:13:31.054 that we discover a toxin in Salmonella

NOTE Confidence: 0.8201903

00:13:31.054 --> 00:13:33.559 typhi that we call typhoid toxin.

NOTE Confidence: 0.8201903

00:13:33.560 --> 00:13:35.882 That also has the ability to

NOTE Confidence: 0.8201903

00:13:35.882 --> 00:13:37.043 induce DNA damage,

NOTE Confidence: 0.8201903

00:13:37.050 --> 00:13:39.378 as shown here in this image,

NOTE Confidence: 0.8201903

00:13:39.380 --> 00:13:41.708 and when we characterize this toxin,

NOTE Confidence: 0.8201903

00:13:41.710 --> 00:13:43.756 we were surprised to see that

NOTE Confidence: 0.8201903

00:13:43.756 --> 00:13:46.125 the active subunit of this toxin

NOTE Confidence: 0.8201903

00:13:46.125 --> 00:13:47.529 was virtually identical,

NOTE Confidence: 0.8201903

00:13:47.530 --> 00:13:49.972 that the active subunit of the

NOTE Confidence: 0.8201903

00:13:49.972 --> 00:13:51.600 completely unrelated toxin Curry

NOTE Confidence: 0.8201903

00:13:51.669 --> 00:13:53.349 by camping of active June.

NOTE Confidence: 0.8201903

00:13:53.350 --> 00:13:55.672 So this is really a remarkable

NOTE Confidence: 0.8201903

00:13:55.672 --> 00:13:56.833 piece of evolution.

NOTE Confidence: 0.8201903

00:13:56.840 --> 00:13:59.423 This is one of those head turning

NOTE Confidence: 0.8201903

00:13:59.423 --> 00:14:01.810 toxins that actually evolution put it

NOTE Confidence: 0.8201903

00:14:01.810 --> 00:14:04.210 together by fusing two toxins, one.

NOTE Confidence: 0.8201903

00:14:04.210 --> 00:14:06.940 That some of you may be familiar,

NOTE Confidence: 0.8201903

00:14:06.940 --> 00:14:08.136 it called pertussis toxin,

NOTE Confidence: 0.8201903

00:14:08.136 --> 00:14:11.087 is what makes you a what is central for

NOTE Confidence: 0.8201903

00:14:11.087 --> 00:14:12.917 the pathogenesis of whooping cough.

NOTE Confidence: 0.8201903

00:14:12.920 --> 00:14:15.244 And then these other talks in that

NOTE Confidence: 0.8201903

00:14:15.244 --> 00:14:16.240 I described earlier.

NOTE Confidence: 0.8201903

00:14:16.240 --> 00:14:18.226 They cite a little distending toxin,

NOTE Confidence: 0.8201903

00:14:18.230 --> 00:14:20.253 so this lower part of the talks

NOTE Confidence: 0.8201903

00:14:20.253 --> 00:14:22.220 in comes from pertussis toxin,

NOTE Confidence: 0.8201903

00:14:22.220 --> 00:14:24.170 and this upper Paradox income from

NOTE Confidence: 0.8201903

00:14:24.170 --> 00:14:25.870 side a little extended talks,

NOTE Confidence: 0.8201903

00:14:25.870 --> 00:14:27.380 so evolution hook them together

NOTE Confidence: 0.8201903

00:14:27.380 --> 00:14:29.324 to make this head turning toxin

NOTE Confidence: 0.8201903

00:14:29.324 --> 00:14:30.848 that Salmonella typhi encodes,

NOTE Confidence: 0.8201903

00:14:30.850 --> 00:14:33.272 and that it is responsible for the

NOTE Confidence: 0.8201903

00:14:33.272 --> 00:14:35.000 genotoxicity of these organisms.

NOTE Confidence: 0.8201903

00:14:35.000 --> 00:14:37.064 And easy sent unusual toxin in

NOTE Confidence: 0.8201903

00:14:37.064 --> 00:14:39.023 many different ways that I don't

NOTE Confidence: 0.8201903

00:14:39.023 --> 00:14:40.318 have time to go into,

NOTE Confidence: 0.8201903

00:14:40.320 --> 00:14:42.574 but one of the remarkable ways in

NOTE Confidence: 0.8201903

00:14:42.574 --> 00:14:45.019 which this toxin is unique is that it

NOTE Confidence: 0.8201903

00:14:45.019 --> 00:14:47.210 is other patient to the human host.

NOTE Confidence: 0.8201903

00:14:47.210 --> 00:14:49.394 And what do I mean by that?

NOTE Confidence: 0.8201903

00:14:49.400 --> 00:14:51.278 Well, the receptor for these talks,

NOTE Confidence: 0.8201903

00:14:51.280 --> 00:14:52.440 you know the receptors.

NOTE Confidence: 0.8201903

00:14:52.440 --> 00:14:54.720 I should say we discovered two proteins,

NOTE Confidence: 0.8201903

00:14:54.720 --> 00:14:55.896 part of policing,

NOTE Confidence: 0.8201903

00:14:55.896 --> 00:14:58.950 one in epithelial cells and CD 45 in.

NOTE Confidence: 0.8201903

00:14:58.950 --> 00:15:00.042 In immune cells,

NOTE Confidence: 0.8201903

00:15:00.042 --> 00:15:02.226 but what is important here is

NOTE Confidence: 0.8201903

00:15:02.226 --> 00:15:04.727 what does the toxin see on this

NOTE Confidence: 0.8201903

00:15:04.727 --> 00:15:06.099 block of proteins and

NOTE Confidence: 0.76375777

00:15:06.174 --> 00:15:09.030 is the glycan power and we through like

NOTE Confidence: 0.76375777

00:15:09.030 --> 00:15:11.385 Andres and other types of studies for

NOTE Confidence: 0.76375777

00:15:11.385 --> 00:15:13.466 to address these kinds of questions

NOTE Confidence: 0.76375777

00:15:13.466 --> 00:15:15.764 we discovered that what what Typhoid

NOTE Confidence: 0.76375777

00:15:15.764 --> 00:15:18.407 toxin likes if you will is glycans

NOTE Confidence: 0.76375777

00:15:18.407 --> 00:15:20.187 terminated in the sitting room.

NOTE Confidence: 0.76375777

00:15:20.190 --> 00:15:22.374 We know that many Kacian hooked to

NOTE Confidence: 0.76375777

00:15:22.374 --> 00:15:24.994 galactose and and to glucose or setting

NOTE Confidence: 0.76375777

00:15:24.994 --> 00:15:27.024 glucosamine in this particular fashion.

NOTE Confidence: 0.76375777

00:15:27.030 --> 00:15:28.960 And why is this relevant?

NOTE Confidence: 0.76375777

00:15:28.960 --> 00:15:31.414 Well, this is important because you

NOTE Confidence: 0.76375777

00:15:31.414 --> 00:15:34.342 may not know these or many of you

NOTE Confidence: 0.76375777

00:15:34.342 --> 00:15:36.725 May is that we humans are actually

NOTE Confidence: 0.76375777

00:15:36.725 --> 00:15:39.647 rather unusual mammals in many ways,

NOTE Confidence: 0.76375777

00:15:39.650 --> 00:15:42.378 and one of the ways in which terribly

NOTE Confidence: 0.76375777

00:15:42.378 --> 00:15:45.197 unusual is in our glycosylation pattern.

NOTE Confidence: 0.76375777

00:15:45.200 --> 00:15:47.170 All our sciullo glycans are

NOTE Confidence: 0.76375777

00:15:47.170 --> 00:15:49.550 terminated in a city neuraminic acid,

NOTE Confidence: 0.76375777

00:15:49.550 --> 00:15:51.926 but all other mammals in fact,

NOTE Confidence: 0.76375777

00:15:51.930 --> 00:15:53.910 like answer, terminated in Blakely,

NOTE Confidence: 0.76375777

00:15:53.910 --> 00:15:54.730 neuraminic acid,

NOTE Confidence: 0.76375777

00:15:54.730 --> 00:15:57.190 and the reason is that the

NOTE Confidence: 0.76375777

00:15:57.190 --> 00:15:59.510 enzyme that is responsible for.

NOTE Confidence: 0.76375777

00:15:59.510 --> 00:16:02.000 Can you see this slide and?

NOTE Confidence: 0.76375777

00:16:02.000 --> 00:16:02.371 Maybe.

NOTE Confidence: 0.76375777

00:16:02.371 --> 00:16:04.597 Well, whatever I continuously the inside

NOTE Confidence: 0.76375777

00:16:04.597 --> 00:16:07.038 that is responsible for putting these acts.

NOTE Confidence: 0.76375777

00:16:07.040 --> 00:16:09.200 Oxygen here is mutated in humans.

NOTE Confidence: 0.76375777

00:16:09.200 --> 00:16:11.482 We have a pseudogene there and therefore

NOTE Confidence: 0.76375777

00:16:11.482 --> 00:16:14.692 we are unique in that fashion and typhoid

NOTE Confidence: 0.76375777

00:16:14.692 --> 00:16:16.428 toxin combined likens exclusively

NOTE Confidence: 0.76375777

00:16:16.428 --> 00:16:18.197 terminated in a city in America.

NOTE Confidence: 0.76375777

00:16:18.200 --> 00:16:19.187 And in fact,

NOTE Confidence: 0.76375777

00:16:19.187 --> 00:16:21.490 if you just change one oxidant in

NOTE Confidence: 0.76375777

00:16:21.562 --> 00:16:23.836 any of these glycans that Typhoid

NOTE Confidence: 0.76375777

00:16:23.836 --> 00:16:26.138 toxin likes and you already meaning

NOTE Confidence: 0.76375777

00:16:26.138 --> 00:16:28.994 in in an array make like an array,

NOTE Confidence: 0.76375777

00:16:29.000 --> 00:16:30.800 typhoid toxin does not bind.

NOTE Confidence: 0.76375777

00:16:30.800 --> 00:16:33.390 It also has the ability to distinguish.

NOTE Confidence: 0.76375777

00:16:33.390 --> 00:16:35.580 Just one Atom of oxygen.

NOTE Confidence: 0.76375777

00:16:35.580 --> 00:16:37.685 Remarkable piece of evolution that

NOTE Confidence: 0.76375777

00:16:37.685 --> 00:16:40.764 makes it able to target human cells

NOTE Confidence: 0.76375777

00:16:40.764 --> 00:16:42.994 and have that oncogenic effect.

NOTE Confidence: 0.76375777

00:16:43.000 --> 00:16:45.622 But in addition to having a

NOTE Confidence: 0.76375777

00:16:45.622 --> 00:16:46.496 genotoxin somewhere,

NOTE Confidence: 0.76375777

00:16:46.500 --> 00:16:49.116 typhi is actually has the 241.

NOTE Confidence: 0.76375777

00:16:49.120 --> 00:16:50.599 In other words,

NOTE Confidence: 0.76375777

00:16:50.599 --> 00:16:53.064 is also the chronic inflammation

NOTE Confidence: 0.76375777

00:16:53.064 --> 00:16:56.433 part that plays a role in the

NOTE Confidence: 0.76375777

00:16:56.433 --> 00:16:58.728 Uncle Genesis of Salmonella Typhi.

NOTE Confidence: 0.76375777

00:16:58.730 --> 00:17:01.747 And so it's something that I think

NOTE Confidence: 0.76375777

00:17:01.747 --> 00:17:04.092 causes chronic inflammation of the

NOTE Confidence: 0.76375777

00:17:04.092 --> 00:17:06.527 Gallbladder and that chronic inflammation,

NOTE Confidence: 0.76375777

00:17:06.530 --> 00:17:08.334 as is well known,

NOTE Confidence: 0.76375777

00:17:08.334 --> 00:17:11.040 leads to the development of cancer

NOTE Confidence: 0.76375777

00:17:11.135 --> 00:17:13.785 or contributes to development of

NOTE Confidence: 0.76375777

00:17:13.785 --> 00:17:16.881 cancer and the paradigm here is

NOTE Confidence: 0.76375777

00:17:16.881 --> 00:17:19.387 is well known where as I said,

NOTE Confidence: 0.76375777

00:17:19.390 --> 00:17:21.222 the production of growth.

NOTE Confidence: 0.76375777

00:17:21.222 --> 00:17:23.054 Promoting cytokines combined with

NOTE Confidence: 0.76375777

00:17:23.054 --> 00:17:25.314 or radical oxygens that Armenta

NOTE Confidence: 0.76375777

00:17:25.314 --> 00:17:27.439 Genic eventually leads to the

NOTE Confidence: 0.76375777

00:17:27.439 --> 00:17:29.670 development of cancer angiogenesis.

NOTE Confidence: 0.76375777

00:17:29.670 --> 00:17:33.126 Growth stimulation and so on and so forth.

NOTE Confidence: 0.76375777

00:17:33.130 --> 00:17:36.399 So the issue is how does salmonella

NOTE Confidence: 0.76375777

00:17:36.399 --> 00:17:38.738 trigger inflammation now on this on?

NOTE Confidence: 0.76375777

00:17:38.740 --> 00:17:39.994 On the surface,

NOTE Confidence: 0.76375777

00:17:39.994 --> 00:17:42.920 this could be a rather simple story

NOTE Confidence: 0.76375777

00:17:43.005 --> 00:17:45.957 and you may know that we are in now

NOTE Confidence: 0.76375777

00:17:45.957 --> 00:17:48.500 with innate immune receptors famously

NOTE Confidence: 0.76375777

00:17:48.500 --> 00:17:52.069 put into the scientific space by the

NOTE Confidence: 0.76375777

00:17:52.069 --> 00:17:54.652 late Charlie Janeway here at Yale and

NOTE Confidence: 0.76375777

00:17:54.652 --> 00:17:57.543 this innate immune receptors have the

NOTE Confidence: 0.76375777

00:17:57.543 --> 00:18:00.138 capacity to recognize bacterial products.

NOTE Confidence: 0.76375777

00:18:00.140 --> 00:18:00.664 Uh,

NOTE Confidence: 0.76375777

00:18:00.664 --> 00:18:02.760 like polysaccharide peptidoglycan flagella.

NOTE Confidence: 0.76375777

00:18:02.760 --> 00:18:04.179 You name it,

NOTE Confidence: 0.76375777

00:18:04.179 --> 00:18:07.017 many bacterial products can be detected

NOTE Confidence: 0.76375777

00:18:07.017 --> 00:18:10.079 by this innate immune receptors.

NOTE Confidence: 0.76375777

00:18:10.080 --> 00:18:12.292 Them essentially coordinate an

NOTE Confidence: 0.76375777

00:18:12.292 --> 00:18:14.504 inflammatory response and that

NOTE Confidence: 0.76375777

00:18:14.504 --> 00:18:16.162 inflammatory response eventually

NOTE Confidence: 0.76375777

00:18:16.162 --> 00:18:18.592 leads to pathogen rejection and

NOTE Confidence: 0.76375777

00:18:18.592 --> 00:18:20.536 they acquired immune response.

NOTE Confidence: 0.76375777

00:18:20.540 --> 00:18:25.238 So this is central to the way we hosts,

NOTE Confidence: 0.76375777

00:18:25.240 --> 00:18:26.890 not just humans.

NOTE Confidence: 0.76375777

00:18:26.890 --> 00:18:30.190 But all mammals defend against microbial.

NOTE Confidence: 0.76375777

00:18:30.190 --> 00:18:32.479 Pathogens now it turns out that then

NOTE Confidence: 0.76375777

00:18:32.479 --> 00:18:34.672 from these framework it will be very

NOTE Confidence: 0.76375777

00:18:34.672 --> 00:18:36.394 simple to think that someone other

NOTE Confidence: 0.858762

00:18:36.456 --> 00:18:37.566 triggers inflammation simply

NOTE Confidence: 0.858762

00:18:37.566 --> 00:18:39.786 because he has plenty of LPS.

NOTE Confidence: 0.858762

00:18:39.790 --> 00:18:41.608 He has plenty of these product

NOTE Confidence: 0.858762

00:18:41.608 --> 00:18:43.621 and is the detection of the

NOTE Confidence: 0.858762

00:18:43.621 --> 00:18:45.089 host that drives inflammation.

NOTE Confidence: 0.858762

00:18:45.090 --> 00:18:46.059 In other words,

NOTE Confidence: 0.858762

00:18:46.059 --> 00:18:48.730 this will be like a host centric view,

NOTE Confidence: 0.858762

00:18:48.730 --> 00:18:50.778 but work that we have done in our

NOTE Confidence: 0.858762

00:18:50.778 --> 00:18:53.537 lab for the last 15 years or so has

NOTE Confidence: 0.858762

00:18:53.537 --> 00:18:55.362 completely turn around this paradigm

NOTE Confidence: 0.858762

00:18:55.362 --> 00:18:57.422 and discovered that that's actually

NOTE Confidence: 0.858762

00:18:57.422 --> 00:18:59.734 incorrect in the case of Salmonella,

NOTE Confidence: 0.858762

00:18:59.734 --> 00:19:01.166 that salmonella really has

NOTE Confidence: 0.858762

00:19:01.166 --> 00:19:02.240 a specific adaptations.

NOTE Confidence: 0.858762

00:19:02.240 --> 00:19:04.736 Evolve by similar to trigger inflammation.

NOTE Confidence: 0.858762

00:19:04.740 --> 00:19:07.659 So this is a pathogen driven process,

NOTE Confidence: 0.858762

00:19:07.660 --> 00:19:09.750 not a host driven process,

NOTE Confidence: 0.858762

00:19:09.750 --> 00:19:12.252 and the reason is very simple

NOTE Confidence: 0.858762

00:19:12.252 --> 00:19:13.920 or not so simple.

NOTE Confidence: 0.858762

00:19:13.920 --> 00:19:16.000 Salmonella, like many other microbes,

NOTE Confidence: 0.858762

00:19:16.000 --> 00:19:18.496 when they encounter a mucosal site,

NOTE Confidence: 0.858762

00:19:18.500 --> 00:19:20.168 being an intestinal being

NOTE Confidence: 0.858762

00:19:20.168 --> 00:19:21.419 the Gallbladder mucosa,

NOTE Confidence: 0.858762

00:19:21.420 --> 00:19:24.048 they need to compete with resident

NOTE Confidence: 0.858762

00:19:24.048 --> 00:19:27.002 microbiota who has a foothold on that

NOTE Confidence: 0.858762

00:19:27.002 --> 00:19:30.180 issue and really put up a good fight.

NOTE Confidence: 0.858762

00:19:30.180 --> 00:19:31.752 This is actually over.

NOTE Confidence: 0.858762

00:19:31.752 --> 00:19:33.717 One of our main barriers

NOTE Confidence: 0.858762

00:19:33.717 --> 00:19:35.609 against bacterial pathogens,

NOTE Confidence: 0.858762

00:19:35.610 --> 00:19:37.254 particularly in this time,

NOTE Confidence: 0.858762

00:19:37.254 --> 00:19:38.898 is the resident microbiota.

NOTE Confidence: 0.858762

00:19:38.900 --> 00:19:40.548 The inflammatory response crosses

NOTE Confidence: 0.858762

00:19:40.548 --> 00:19:42.196 it causes profound dysbiosis,

NOTE Confidence: 0.858762

00:19:42.200 --> 00:19:44.354 which is essential for someone else

NOTE Confidence: 0.858762

00:19:44.354 --> 00:19:47.550 to be able to colonize and replicate.

NOTE Confidence: 0.858762

00:19:47.550 --> 00:19:48.786 Not only that,

NOTE Confidence: 0.858762

00:19:48.786 --> 00:19:50.434 inflammation makes nutrients available,

NOTE Confidence: 0.858762

00:19:50.440 --> 00:19:52.236 electron acceptors camper sourcers

NOTE Confidence: 0.858762

00:19:52.236 --> 00:19:54.481 that otherwise would not be

NOTE Confidence: 0.858762

00:19:54.481 --> 00:19:56.617 available in the an inflamed tissue,

NOTE Confidence: 0.858762

00:19:56.620 --> 00:19:58.845 and that drives the replication

NOTE Confidence: 0.858762

00:19:58.845 --> 00:20:00.180 of the aluminum.

NOTE Confidence: 0.858762

00:20:00.180 --> 00:20:02.120 Population of salmon are so,

NOTE Confidence: 0.858762

00:20:02.120 --> 00:20:04.448 so is the inflammatory response that

NOTE Confidence: 0.858762

00:20:04.448 --> 00:20:06.486 causes even though someone else

NOTE Confidence: 0.858762

00:20:06.486 --> 00:20:08.606 and intracellular pathogen the bulk

NOTE Confidence: 0.858762

00:20:08.606 --> 00:20:10.711 of the bacterial replication comes

NOTE Confidence: 0.858762

00:20:10.711 --> 00:20:12.739 from this lumenal population that is

NOTE Confidence: 0.858762

00:20:12.739 --> 00:20:14.534 fed from the inflammatory response

NOTE Confidence: 0.858762

00:20:14.534 --> 00:20:16.856 triggered by this in this bacteria.

NOTE Confidence: 0.858762

00:20:16.860 --> 00:20:19.576 Here. So a nice division of Labor.

NOTE Confidence: 0.858762

00:20:19.580 --> 00:20:21.776 Now how does someone even managed

NOTE Confidence: 0.858762

00:20:21.776 --> 00:20:23.850 to trigger an inflammatory response?

NOTE Confidence: 0.858762

00:20:23.850 --> 00:20:25.850 Mucosal sites which are actually

NOTE Confidence: 0.858762

00:20:25.850 --> 00:20:27.850 is pretty difficult because mucosal

NOTE Confidence: 0.858762

00:20:27.917 --> 00:20:30.215 sites are subject to various stringent

NOTE Confidence: 0.858762

00:20:30.215 --> 00:20:32.220 negative regulation of his native.

NOTE Confidence: 0.858762

00:20:32.220 --> 00:20:34.136 Respected receptors precisely to

NOTE Confidence: 0.858762

00:20:34.136 --> 00:20:36.531 prevent this microbiota that in

NOTE Confidence: 0.858762

00:20:36.531 --> 00:20:39.170 theory can also stimulate in Amy

NOTE Confidence: 0.858762

00:20:39.170 --> 00:20:41.260 receptors to trigger an inflammatory

NOTE Confidence: 0.858762

00:20:41.333 --> 00:20:43.757 response and for all of us to be

NOTE Confidence: 0.858762

00:20:43.757 --> 00:20:45.894 working with IBD or Crohn's disease.

NOTE Confidence: 0.858762

00:20:45.894 --> 00:20:48.180 To avoid that they're very precise

NOTE Confidence: 0.858762

00:20:48.253 --> 00:20:50.373 mechanisms to keep those innate

NOTE Confidence: 0.858762

00:20:50.373 --> 00:20:52.069 immune receptors in check,

NOTE Confidence: 0.858762

00:20:52.070 --> 00:20:54.824 and somebody had to trigger inflammation

NOTE Confidence: 0.858762

00:20:54.824 --> 00:20:57.739 in that environment has does he do it?

NOTE Confidence: 0.858762

00:20:57.740 --> 00:20:58.133 Well,

NOTE Confidence: 0.858762

00:20:58.133 --> 00:21:00.491 it does sit through this amazing

NOTE Confidence: 0.858762

00:21:00.491 --> 00:21:03.054 machine that Dan alluded earlier that

NOTE Confidence: 0.858762

00:21:03.054 --> 00:21:06.106 we discovered more than two decades ago.

NOTE Confidence: 0.858762

00:21:06.110 --> 00:21:09.470 It's an amazing sort of bacterial

NOTE Confidence: 0.858762

00:21:09.470 --> 00:21:12.300 injection device if you will.

NOTE Confidence: 0.858762

00:21:12.300 --> 00:21:15.280 That injects bacterially encoded

NOTE Confidence: 0.858762

00:21:15.280 --> 00:21:16.770 proteins that.

NOTE Confidence: 0.858762

00:21:16.770 --> 00:21:20.382 Have the capacity to modulate many

NOTE Confidence: 0.858762

00:21:20.382 --> 00:21:22.188 signal transduction pathways.

NOTE Confidence: 0.858762

00:21:22.190 --> 00:21:24.680 And it's the ability to stimulate

NOTE Confidence: 0.858762

00:21:24.680 --> 00:21:26.340 those signal transduction pathways

NOTE Confidence: 0.858762

00:21:26.410 --> 00:21:28.275 and modulate cellular process for

NOTE Confidence: 0.858762

00:21:28.275 --> 00:21:30.140 the benefit of the pathogen

NOTE Confidence: 0.858762

00:21:30.203 --> 00:21:32.035 specifically relevant to inflammation

NOTE Confidence: 0.858762

00:21:32.035 --> 00:21:34.783 are three of these effective proteins

NOTE Confidence: 0.858762

00:21:34.790 --> 00:21:37.331 that activate Rho Family GT P aces

NOTE Confidence: 0.858762

00:21:37.331 --> 00:21:39.701 by either being exchange factors of

NOTE Confidence: 0.858762

00:21:39.701 --> 00:21:42.501 the Pro Family GPs is or forcefully

NOTE Confidence: 0.858762

00:21:42.575 --> 00:21:44.029 nocetti phosphatase.

NOTE Confidence: 0.858762

00:21:44.030 --> 00:21:46.364 In the case of this particular

NOTE Confidence: 0.858762

00:21:46.364 --> 00:21:47.920 effector that wouldn't activate

NOTE Confidence: 0.858762

00:21:47.987 --> 00:21:50.747 endogenous change factors and activate that,

NOTE Confidence: 0.858762

00:21:50.750 --> 00:21:54.230 and that leads to the activation of CDC.

NOTE Confidence: 0.858762

00:21:54.230 --> 00:21:56.462 42 and then the activation of CDC 42

NOTE Confidence: 0.858762

00:21:56.462 --> 00:21:58.079 leads to transcriptional responses

NOTE Confidence: 0.858762

00:21:58.079 --> 00:22:00.063 that really are proinflammatory

NOTE Confidence: 0.858762

00:22:00.063 --> 00:22:02.047 and really looked like

NOTE Confidence: 0.8360523

00:22:02.116 --> 00:22:03.109 in 18 responses.

NOTE Confidence: 0.8360523

00:22:03.110 --> 00:22:05.350 This was a bit puzzling for a

NOTE Confidence: 0.8360523

00:22:05.350 --> 00:22:07.895 number of years because CDC 42 had

NOTE Confidence: 0.8360523

00:22:07.895 --> 00:22:10.157 never been linked to innate immune

NOTE Confidence: 0.8360523

00:22:10.233 --> 00:22:12.369 responses until very recently,

NOTE Confidence: 0.8360523

00:22:12.370 --> 00:22:14.722 where we sort of cracked this little

NOTE Confidence: 0.8360523

00:22:14.722 --> 00:22:17.013 puzzle and we discovered that the

NOTE Confidence: 0.8360523

00:22:17.013 --> 00:22:19.834 activation of CDC 42 by Salmonella leads

NOTE Confidence: 0.8360523

00:22:19.910 --> 00:22:22.334 to the formation of a noncanonical

NOTE Confidence: 0.8360523

00:22:22.334 --> 00:22:24.618 signaling complex made by pack one.

NOTE Confidence: 0.8360523

00:22:24.618 --> 00:22:26.622 A target of CDC 42 and

NOTE Confidence: 0.8360523

00:22:26.622 --> 00:22:28.210 these other components.

NOTE Confidence: 0.8360523

00:22:28.210 --> 00:22:29.226 Trap 6 Tab Tak,

NOTE Confidence: 0.8360523

00:22:29.226 --> 00:22:32.097 One Tab 1 Tab 2 that leads to the

NOTE Confidence: 0.8360523

00:22:32.097 --> 00:22:34.217 inflammatory response and what is

NOTE Confidence: 0.8360523

00:22:34.217 --> 00:22:36.889 what explains the whole thing is

NOTE Confidence: 0.8360523

00:22:36.889 --> 00:22:38.641 that these signaling complexes

NOTE Confidence: 0.8360523

00:22:38.641 --> 00:22:40.651 identical to the signaling complex

NOTE Confidence: 0.8360523

00:22:40.651 --> 00:22:42.913 that is tripped by narimi receptors.

NOTE Confidence: 0.8360523

00:22:42.920 --> 00:22:45.286 So what someone in essence is doing

NOTE Confidence: 0.8360523

00:22:45.286 --> 00:22:47.365 is going down the signaling pathway

NOTE Confidence: 0.8360523

00:22:47.365 --> 00:22:50.285 so that so as to avoid the negative

NOTE Confidence: 0.8360523

00:22:50.285 --> 00:22:52.409 regulatory system and trigger

NOTE Confidence: 0.8360523

00:22:52.409 --> 00:22:55.064 essentially an innate immune response.

NOTE Confidence: 0.8360523

00:22:55.070 --> 00:22:57.080 But by non Canonical methods,

NOTE Confidence: 0.8360523

00:22:57.080 --> 00:22:59.327 so he uses other type of mechanism

NOTE Confidence: 0.8360523

00:22:59.327 --> 00:23:01.409 similar to this going downstream

NOTE Confidence: 0.8360523

00:23:01.409 --> 00:23:03.509 of Canonical signaling pathways.

NOTE Confidence: 0.8360523

00:23:03.510 --> 00:23:06.921 But since my time is up I just gonna

NOTE Confidence: 0.8360523

00:23:06.921 --> 00:23:10.435 put up a sort of a summary of these

NOTE Confidence: 0.8360523

00:23:10.435 --> 00:23:14.286 and sort of to give you a flavor or

NOTE Confidence: 0.8360523

00:23:14.286 --> 00:23:17.146 how these effector proteins can go down.

NOTE Confidence: 0.8360523

00:23:17.146 --> 00:23:18.328 Different signaling pathways

NOTE Confidence: 0.8360523

00:23:18.328 --> 00:23:19.990 intersect with signaling pathway.

NOTE Confidence: 0.8360523

00:23:19.990 --> 00:23:22.145 For example this effector can

NOTE Confidence: 0.8360523

00:23:22.145 --> 00:23:24.879 activate the rig I and MD I5.

NOTE Confidence: 0.8360523

00:23:24.880 --> 00:23:26.556 A nucleotide sensing pathway,

NOTE Confidence: 0.8360523

00:23:26.556 --> 00:23:29.490 but without the need of nuclear dice.

NOTE Confidence: 0.8360523

00:23:29.490 --> 00:23:32.166 It just simply activates regay by

NOTE Confidence: 0.8360523

00:23:32.166 --> 00:23:34.938 interfacing with dream 56 and trim 65.

NOTE Confidence: 0.8360523

00:23:34.940 --> 00:23:37.448 Two regulators of this pathway you.

NOTE Confidence: 0.8360523

00:23:37.450 --> 00:23:40.327 We could make them activates them and

NOTE Confidence: 0.8360523

00:23:40.327 --> 00:23:42.897 trips this signaling pathway without the

NOTE Confidence: 0.8360523

00:23:42.897 --> 00:23:45.830 need of The Agonist of those receptors,

NOTE Confidence: 0.8360523

00:23:45.830 --> 00:23:47.810 and the same applies to another

NOTE Confidence: 0.8360523

00:23:47.810 --> 00:23:49.778 effector here that it actually

NOTE Confidence: 0.8360523

00:23:49.778 --> 00:23:52.118 inhibits an anti-inflammatory pathway.

NOTE Confidence: 0.8360523

00:23:52.120 --> 00:23:55.347 So, but since I don't have time.

NOTE Confidence: 0.8360523

00:23:55.350 --> 00:23:57.100 I had to skip it,

NOTE Confidence: 0.8360523

00:23:57.100 --> 00:23:59.179 so I hope that you got a sense of

NOTE Confidence: 0.8360523

00:23:59.179 --> 00:24:01.254 the sophistication by which bacterial

NOTE Confidence: 0.8360523

00:24:01.254 --> 00:24:03.918 pathogens manipulate cells in in ways

NOTE Confidence: 0.8360523

00:24:03.984 --> 00:24:06.546 that benefit them but doesn't benefit us.

NOTE Confidence: 0.8360523

00:24:06.550 --> 00:24:08.300 And through the production of

NOTE Confidence: 0.8360523

00:24:08.300 --> 00:24:09.700 Gina toxins or inflammation,

NOTE Confidence: 0.8360523

00:24:09.700 --> 00:24:12.234 it leads to the predisposition to cancer

NOTE Confidence: 0.8360523

00:24:12.234 --> 00:24:14.599 and then finally last but not least,

NOTE Confidence: 0.8360523

00:24:14.600 --> 00:24:17.435 people that were involved in this work

NOTE Confidence: 0.8360523

00:24:17.435 --> 00:24:19.905 obviously and talked to work that was

NOTE Confidence: 0.8360523

00:24:19.905 --> 00:24:22.300 done a number of years ago as well,

NOTE Confidence: 0.8360523

00:24:22.300 --> 00:24:25.014 but for the inflammation pathway, who we?

NOTE Confidence: 0.8360523

00:24:25.014 --> 00:24:27.424 Indiana were involved and one

NOTE Confidence: 0.8360523

00:24:27.424 --> 00:24:30.760 whose did all this work and Mary,

NOTE Confidence: 0.8360523

00:24:30.760 --> 00:24:31.708 of course,

NOTE Confidence: 0.8360523

00:24:31.708 --> 00:24:34.078 had made the pioneering discoveries

NOTE Confidence: 0.8360523

00:24:34.078 --> 00:24:36.749 of the Genotoxin in Campillo Bacter

NOTE Confidence: 0.8360523

00:24:36.749 --> 00:24:39.940 Jejuni and set in motion all this work.

NOTE Confidence: 0.8360523

00:24:39.940 --> 00:24:42.130 And thank you very much.

NOTE Confidence: 0.8360523

00:24:42.130 --> 00:24:45.178 And with that I'm gonna stop

NOTE Confidence: 0.8360523

00:24:45.178 --> 00:24:47.210 sharing if I can.

NOTE Confidence: 0.8360523

00:24:47.210 --> 00:24:47.980 And.

NOTE Confidence: 0.7746913

00:24:50.600 --> 00:24:52.268 OK, well thank you very much.

NOTE Confidence: 0.7746913

00:24:52.270 --> 00:24:53.390 Jorge is very interesting.

NOTE Confidence: 0.7746913

00:24:53.390 --> 00:24:54.230 Very exciting work.

NOTE Confidence: 0.7746913

00:24:54.230 --> 00:24:55.866 I don't know how to swim.

NOTE Confidence: 0.7746913

00:24:55.866 --> 00:24:57.833 I should know how to stop sharing

NOTE Confidence: 0.7746913

00:24:57.833 --> 00:24:59.807 but you help me on that one.

NOTE Confidence: 0.7746913

00:24:59.810 --> 00:25:01.760 Yeah, OK.

NOTE Confidence: 0.7746913

00:25:01.760 --> 00:25:03.260 If people have questions,

NOTE Confidence: 0.7746913

00:25:03.260 --> 00:25:05.890 you can type them into the chat,

NOTE Confidence: 0.7746913

00:25:05.890 --> 00:25:07.390 or Renee's, or way

NOTE Confidence: 0.8369269

00:25:07.390 --> 00:25:08.509 to unmute them.

NOTE Confidence: 0.8457918

00:25:11.560 --> 00:25:12.870 We can, if you'd like, sure.

NOTE Confidence: 0.8003514

00:25:14.760 --> 00:25:16.522 I'm ask a quick question.

NOTE Confidence: 0.8003514

00:25:16.522 --> 00:25:18.852 I was very struck by that by

NOTE Confidence: 0.8003514

00:25:18.852 --> 00:25:20.760 what appears to be the convergent

NOTE Confidence: 0.8003514

00:25:20.822 --> 00:25:22.877 evolution of these two nucleases.

NOTE Confidence: 0.8003514

00:25:22.880 --> 00:25:24.640 Yeah, it's really very striking.

NOTE Confidence: 0.8003514

00:25:24.640 --> 00:25:27.469 Is there? What is the advantage of the

NOTE Confidence: 0.8003514

00:25:27.470 --> 00:25:30.710 bacteria to induce cell cycle arrest?

NOTE Confidence: 0.8003514

00:25:30.710 --> 00:25:32.385 What cell cycle arrest actually

NOTE Confidence: 0.8003514

00:25:32.385 --> 00:25:33.725 is also growing flammatory?

NOTE Confidence: 0.8003514

00:25:33.730 --> 00:25:35.760 So probably one of the main drivers

NOTE Confidence: 0.8003514

00:25:35.760 --> 00:25:37.739 is the Pro inflammatory response and

NOTE Confidence: 0.8003514

00:25:37.739 --> 00:25:40.961 also in the case of some type is using

NOTE Confidence: 0.8003514

00:25:40.961 --> 00:25:43.139 this activity to target immune cells.

NOTE Confidence: 0.8003514

00:25:43.140 --> 00:25:45.471 So obviously if you're a virus and

NOTE Confidence: 0.8003514

00:25:45.471 --> 00:25:48.323 you know you you know a thing or two

NOTE Confidence: 0.8003514

00:25:48.323 --> 00:25:50.336 about them and you integrate your

NOTE Confidence: 0.8003514

00:25:50.336 --> 00:25:52.882 genome in in the host, you're free.

NOTE Confidence: 0.8003514

00:25:52.882 --> 00:25:53.890 You know you.

NOTE Confidence: 0.8003514

00:25:53.890 --> 00:25:55.846 That's the way you can persist

NOTE Confidence: 0.8003514

00:25:55.846 --> 00:25:57.590 as long as you want.

NOTE Confidence: 0.8003514

00:25:57.590 --> 00:26:00.406 If you're somebody that I feel you have.

NOTE Confidence: 0.8003514

00:26:00.410 --> 00:26:02.350 4761 those are the number

NOTE Confidence: 0.8003514

00:26:02.350 --> 00:26:03.902 of open reading frames,

NOTE Confidence: 0.8003514

00:26:03.910 --> 00:26:06.250 potential antigens you need to hide.

NOTE Confidence: 0.8003514

00:26:06.250 --> 00:26:08.190 You can't do that right?

NOTE Confidence: 0.8003514

00:26:08.190 --> 00:26:10.542 So the way somebody that he does it

NOTE Confidence: 0.8003514

00:26:10.542 --> 00:26:13.633 is by creating a sort of immunological

NOTE Confidence: 0.8003514

00:26:13.633 --> 00:26:15.577 suppression around the site,

NOTE Confidence: 0.8003514

00:26:15.580 --> 00:26:17.132 wherein colonizes and these

NOTE Confidence: 0.8003514

00:26:17.132 --> 00:26:19.072 toxin is central for that.

NOTE Confidence: 0.8003514

00:26:19.080 --> 00:26:20.632 For the persistent infection,

NOTE Confidence: 0.8003514

00:26:20.632 --> 00:26:22.184 by targeting immune cells.

NOTE Confidence: 0.8003514

00:26:22.190 --> 00:26:25.310 So so, and in the case of Campylobacter,

NOTE Confidence: 0.8003514

00:26:25.310 --> 00:26:26.014 of course,

NOTE Confidence: 0.8003514

00:26:26.014 --> 00:26:28.830 inflammation is central for the bug and and

NOTE Confidence: 0.8003514

00:26:28.905 --> 00:26:31.647 this proinflammatory aspect of DNA damage.

NOTE Confidence: 0.8003514

00:26:31.650 --> 00:26:33.030 Is probably what evolutionary

NOTE Confidence: 0.8003514

00:26:33.030 --> 00:26:34.065 selected for these,

NOTE Confidence: 0.8003514

00:26:34.070 --> 00:26:34.762 you know,

NOTE Confidence: 0.8003514

00:26:34.762 --> 00:26:36.838 toxins and the in the process.

NOTE Confidence: 0.8003514

00:26:36.840 --> 00:26:38.916 We you know we got clipped.

NOTE Confidence: 0.83454424

00:26:40.490 --> 00:26:41.710 Thank you are there

NOTE Confidence: 0.83454424

00:26:41.710 --> 00:26:43.528 are there other questions for Jorge?

NOTE Confidence: 0.91647124

00:26:50.550 --> 00:26:52.236 Alright, well thank you very much.

NOTE Confidence: 0.83337504

00:26:59.580 --> 00:27:03.090 I think I think Dan froze.

NOTE Confidence: 0.83337504

00:27:03.090 --> 00:27:05.360 You were frozen Dan.

NOTE Confidence: 0.83337504

00:27:05.360 --> 00:27:07.628 Oh, I'm sorry, frozen.

NOTE Confidence: 0.8219546

00:27:09.110 --> 00:27:10.849 I guess introduce you,

NOTE Confidence: 0.8219546

00:27:10.850 --> 00:27:14.216 Melinda Kay. Great don't we love

NOTE Confidence: 0.8219546

00:27:14.216 --> 00:27:16.460 the advances in technology.

NOTE Confidence: 0.8219546

00:27:16.460 --> 00:27:19.988 Thank you Doctor Glenn that was fabulous Ann.

NOTE Confidence: 0.8219546

00:27:19.990 --> 00:27:22.198 I am now delighted to introduce

NOTE Confidence: 0.8219546

00:27:22.198 --> 00:27:24.258 Doctor Nicole Diesel to present

NOTE Confidence: 0.8219546

00:27:24.258 --> 00:27:26.314 her research on environmental

NOTE Confidence: 0.8219546

00:27:26.314 --> 00:27:28.370 carcinogens and thyroid cancer.

NOTE Confidence: 0.8219546

00:27:28.370 --> 00:27:30.915 Doctor Diesel is an associate

NOTE Confidence: 0.8219546

00:27:30.915 --> 00:27:33.460 professor of environmental health in

NOTE Confidence: 0.8219546

00:27:33.544 --> 00:27:35.998 the Yale School Public Health and

NOTE Confidence: 0.8219546

00:27:35.998 --> 00:27:38.950 she received her pH D in her Masters

NOTE Confidence: 0.8219546

00:27:38.950 --> 00:27:41.593 in industrial hygiene from the Johns

NOTE Confidence: 0.8219546

00:27:41.593 --> 00:27:43.798 Hopkins School of Public Health.

NOTE Confidence: 0.8219546

00:27:43.800 --> 00:27:45.548 Her environmental exposure assessment

NOTE Confidence: 0.8219546

00:27:45.548 --> 00:27:47.733 strategies aimed to reduce exposure

NOTE Confidence: 0.8219546

00:27:47.733 --> 00:27:49.190 misclassification for epidemiological.

NOTE Confidence: 0.8219546

00:27:49.190 --> 00:27:51.425 Studies and in advance understanding

NOTE Confidence: 0.8219546

00:27:51.425 --> 00:27:53.660 of the relationship between exposure

NOTE Confidence: 0.8219546

00:27:53.726 --> 00:27:54.920 to environmental environmental

NOTE Confidence: 0.8219546

00:27:54.920 --> 00:27:57.308 chemicals in the risk of cancer

NOTE Confidence: 0.8219546

00:27:57.308 --> 00:27:59.607 in other adverse health outcomes,

NOTE Confidence: 0.8219546

00:27:59.610 --> 00:28:02.346 she serves as the Pi of a study funded

NOTE Confidence: 0.8219546

00:28:02.346 --> 00:28:05.506 by the American Cancer Society and

NOTE Confidence: 0.8219546

00:28:05.506 --> 00:28:08.286 investigating exposure to flame retardants,

NOTE Confidence: 0.8219546

00:28:08.290 --> 00:28:08.750 pesticides,

NOTE Confidence: 0.8219546

00:28:08.750 --> 00:28:11.050 and other persistent pollutants in

NOTE Confidence: 0.8219546

00:28:11.050 --> 00:28:13.489 thyroid cancer risk and of note,

NOTE Confidence: 0.8219546

00:28:13.490 --> 00:28:16.522 she is the winner of the Yale Cancer

NOTE Confidence: 0.8219546

00:28:16.522 --> 00:28:19.648 Center 2020 Research Prize in population.

NOTE Confidence: 0.8219546

00:28:19.650 --> 00:28:22.226 Science for her research on this topic,

NOTE Confidence: 0.8219546

00:28:22.230 --> 00:28:24.450 so we're delighted for your presentation.

NOTE Confidence: 0.8219546

00:28:24.450 --> 00:28:25.186 Doctor diesel.

NOTE Confidence: 0.8219546

00:28:25.186 --> 00:28:26.290 Take it away.

NOTE Confidence: 0.8562479

00:28:27.930 --> 00:28:30.450 OK, thank you so much Melinda

NOTE Confidence: 0.8562479

00:28:30.450 --> 00:28:32.130 for the generous introduction.

NOTE Confidence: 0.8562479

00:28:32.130 --> 00:28:34.853 Very pleased to be here to share

NOTE Confidence: 0.8562479

00:28:34.853 --> 00:28:38.010 some of my recent work with you.

NOTE Confidence: 0.8562479

00:28:38.010 --> 00:28:40.374 I really enjoyed Doctor Galanes presentation

NOTE Confidence: 0.8562479

00:28:40.374 --> 00:28:42.470 looking at exposure to microbial

NOTE Confidence: 0.8562479

00:28:42.470 --> 00:28:44.730 pathogens and the associated toxins,

NOTE Confidence: 0.8562479

00:28:44.730 --> 00:28:47.628 and I'll be switching gears a little

NOTE Confidence: 0.8562479

00:28:47.628 --> 00:28:51.544 bit to look at work looking at the

NOTE Confidence: 0.8562479

00:28:51.544 --> 00:28:54.129 Epidemiology of exposures to chemical

NOTE Confidence: 0.8562479

00:28:54.224 --> 00:28:56.899 toxins and thyroid cancer risk.

NOTE Confidence: 0.8562479

00:28:56.900 --> 00:29:00.276 OK, so I've advanced my slide and someone

NOTE Confidence: 0.8562479

00:29:00.276 --> 00:29:04.229 can let me know if there's any issue there.

NOTE Confidence: 0.8562479

00:29:04.230 --> 00:29:06.934 I first wanted to take a moment just

NOTE Confidence: 0.8562479

00:29:06.934 --> 00:29:09.848 to tell you about the motivation of

NOTE Confidence: 0.8562479

00:29:09.848 --> 00:29:12.588 my research and the research I'll

NOTE Confidence: 0.8562479

00:29:12.588 --> 00:29:15.636 be presenting today and talk about

NOTE Confidence: 0.8562479

00:29:15.636 --> 00:29:17.962 environmental risk factors for cancer.

NOTE Confidence: 0.8562479

00:29:17.962 --> 00:29:20.769 We know that third of cancers are

NOTE Confidence: 0.8562479

00:29:20.769 --> 00:29:22.760 attributable to modifiable factors.

NOTE Confidence: 0.8562479

00:29:22.760 --> 00:29:26.208 We often think of things related to diet,

NOTE Confidence: 0.8562479

00:29:26.210 --> 00:29:27.150 alcohol, tobacco,

NOTE Confidence: 0.8562479

00:29:27.150 --> 00:29:29.030 these so-called lifestyle factors.

NOTE Confidence: 0.8562479

00:29:29.030 --> 00:29:32.114 But this also includes infections which

NOTE Confidence: 0.8562479

00:29:32.114 --> 00:29:36.088 we just heard about as well as pollution.

NOTE Confidence: 0.8562479

00:29:36.090 --> 00:29:39.240 So how much of cancer cases can

NOTE Confidence: 0.8562479

00:29:39.240 --> 00:29:42.130 we attribute to this pollution?

NOTE Confidence: 0.8562479

00:29:42.130 --> 00:29:46.282 While a doll and Peto in their landmark

NOTE Confidence: 0.8562479

00:29:46.282 --> 00:29:49.689 study estimated about 7% of cancer deaths

NOTE Confidence: 0.8562479

00:29:49.689 --> 00:29:52.204 could be attributable to occupation,

NOTE Confidence: 0.8562479

00:29:52.210 --> 00:29:54.230 pollution and industrial products,

NOTE Confidence: 0.8562479

00:29:54.230 --> 00:29:57.260 in many experts agree that this

NOTE Confidence: 0.8562479

00:29:57.340 --> 00:29:59.560 percentage is likely grossly.

NOTE Confidence: 0.8562479

00:29:59.560 --> 00:30:02.500 Under arrest Maded due to the extremely

NOTE Confidence: 0.8562479

00:30:02.500 --> 00:30:05.380 limited data on the commercial chemicals

NOTE Confidence: 0.8562479

00:30:05.380 --> 00:30:08.964 that we encounter in our day-to-day lives.

NOTE Confidence: 0.8562479

00:30:08.970 --> 00:30:11.688 So in the United States there

NOTE Confidence: 0.8562479

00:30:11.688 --> 00:30:14.118 are 80,000 chemicals that are

NOTE Confidence: 0.8562479

00:30:14.118 --> 00:30:16.230 licensed for commercial use,

NOTE Confidence: 0.8562479

00:30:16.230 --> 00:30:18.650 and of those only 200.

NOTE Confidence: 0.8562479

00:30:18.650 --> 00:30:22.124 So not even a percentage of them have been

NOTE Confidence: 0.8562479

00:30:22.124 --> 00:30:24.940 screened adequately for carcinogenicity.

NOTE Confidence: 0.8562479

00:30:24.940 --> 00:30:28.328 And every time I share this statistic,

NOTE Confidence: 0.8562479

00:30:28.330 --> 00:30:32.170 I find it really striking.

NOTE Confidence: 0.8562479

00:30:32.170 --> 00:30:34.844 Another reason why this is so important

NOTE Confidence: 0.8562479

00:30:34.844 --> 00:30:38.570 is that you know many of these exposures

NOTE Confidence: 0.8562479

00:30:38.570 --> 00:30:40.570 are outside individual control.

NOTE Confidence: 0.8562479

00:30:40.570 --> 00:30:43.222 These are things in air pollution

NOTE Confidence: 0.8562479

00:30:43.222 --> 00:30:44.548 or water supply,

NOTE Confidence: 0.8562479

00:30:44.550 --> 00:30:45.876 the food supply,

NOTE Confidence: 0.8562479

00:30:45.876 --> 00:30:46.760 our workplaces,

NOTE Confidence: 0.8562479

00:30:46.760 --> 00:30:49.224 so we really rely on the government

NOTE Confidence: 0.8562479

00:30:49.224 --> 00:30:52.402 to protect us from exposure to these

NOTE Confidence: 0.8562479

00:30:52.402 --> 00:30:54.446 potentially harmful chemicals and

NOTE Confidence: 0.8562479

00:30:54.446 --> 00:30:57.328 our regulatory system really is quite

NOTE Confidence: 0.8562479

00:30:57.328 --> 00:30:59.563 inadequate to serve this purpose.

NOTE Confidence: 0.8562479

00:30:59.570 --> 00:31:01.666 The way it's structured.

NOTE Confidence: 0.8562479

00:31:01.666 --> 00:31:04.810 Chemicals have to be proven harmful

NOTE Confidence: 0.8562479

00:31:04.900 --> 00:31:08.218 rather than proven safe at the outset,

NOTE Confidence: 0.8562479

00:31:08.220 --> 00:31:10.665 so it normally requires researchers

NOTE Confidence: 0.8562479

00:31:10.665 --> 00:31:14.567 like myself and others in my fields who

NOTE Confidence: 0.8562479

00:31:14.567 --> 00:31:17.309 study chemicals you know for decades

NOTE Confidence: 0.8562479

00:31:17.309 --> 00:31:20.696 before we acquire enough evidence to

NOTE Confidence: 0.8562479

00:31:20.696 --> 00:31:23.541 demonstrate harm for particular chemical.

NOTE Confidence: 0.8562479

00:31:23.550 --> 00:31:24.963 And also importantly,

NOTE Confidence: 0.8562479

00:31:24.963 --> 00:31:27.789 we know these exposures are not

NOTE Confidence: 0.8562479

00:31:27.789 --> 00:31:29.549 distributed equitably across

NOTE Confidence: 0.8562479

00:31:29.549 --> 00:31:31.965 populations and that populations.

NOTE Confidence: 0.8562479

00:31:31.970 --> 00:31:34.022 Experiencing other social disadvantages

NOTE Confidence: 0.8562479

00:31:34.022 --> 00:31:35.561 are often disproportionately

NOTE Confidence: 0.8562479

00:31:35.561 --> 00:31:37.810 exposed to certain pollutants,

NOTE Confidence: 0.8562479

00:31:37.810 --> 00:31:41.344 and some of these points are

NOTE Confidence: 0.8562479

00:31:41.344 --> 00:31:44.364 highlighted in a forthcoming book

NOTE Confidence: 0.8562479

00:31:44.364 --> 00:31:48.270 chapter that I worked on with Doctor

NOTE Confidence: 0.8562479

00:31:48.270 --> 00:31:51.250 Orwin edited by Charlie Fuchs.

NOTE Confidence: 0.8562479

00:31:51.250 --> 00:31:53.686 So turning to the specific research

NOTE Confidence: 0.8562479

00:31:53.686 --> 00:31:56.369 I want to talk about today,

NOTE Confidence: 0.8562479

00:31:56.370 --> 00:31:58.938 which is related to thyroid cancer,

NOTE Confidence: 0.8562479

00:31:58.940 --> 00:32:01.929 thyroid cancer is the one of the

NOTE Confidence: 0.8562479

00:32:01.929 --> 00:32:03.210 fastest growing malignancy's.

NOTE Confidence: 0.8562479

00:32:03.210 --> 00:32:05.766 It has nearly tripled over the

NOTE Confidence: 0.8562479

00:32:05.766 --> 00:32:07.044 past few decades.

NOTE Confidence: 0.8562479

00:32:07.050 --> 00:32:10.046 As you can see in these graphs

NOTE Confidence: 0.8562479

00:32:10.046 --> 00:32:12.859 of SEER cancer incidence data.

NOTE Confidence: 0.8562479

00:32:12.860 --> 00:32:16.644 You can also know by looking at the

NOTE Confidence: 0.8562479

00:32:16.644 --> 00:32:21.204 Y axis that females have three times

NOTE Confidence: 0.8562479

00:32:21.204 --> 00:32:24.699 the incidence compared to males.

NOTE Confidence: 0.8562479

00:32:24.700 --> 00:32:27.640 Can thyroid cancer, you know,

NOTE Confidence: 0.8562479

00:32:27.640 --> 00:32:30.570 has a very good prognosis.

NOTE Confidence: 0.84964806

00:32:30.570 --> 00:32:35.266 It's more than 90% survival after 20 years.

NOTE Confidence: 0.84964806

00:32:35.270 --> 00:32:38.890 However, survivors face many. Physical,

NOTE Confidence: 0.84964806

00:32:38.890 --> 00:32:41.910 psychological and financial challenges.

NOTE Confidence: 0.84964806

00:32:41.910 --> 00:32:44.930 With the prolonged treatments,

NOTE Confidence: 0.84964806

00:32:44.930 --> 00:32:50.312 increased surveillance risk of second primary

NOTE Confidence: 0.84964806

00:32:50.312 --> 00:32:55.959 cancer and other quality of life issues.

NOTE Confidence: 0.84964806

00:32:55.960 --> 00:32:59.152 So this increase is likely certainly

NOTE Confidence: 0.84964806

00:32:59.152 --> 00:33:03.610 due at least in part to improvements

NOTE Confidence: 0.84964806

00:33:03.610 --> 00:33:07.320 and changes to diagnostic techniques,

NOTE Confidence: 0.84964806

00:33:07.320 --> 00:33:09.213 imaging techniques and

NOTE Confidence: 0.84964806

00:33:09.213 --> 00:33:11.737 an fine needle biopsy's.

NOTE Confidence: 0.84964806

00:33:11.740 --> 00:33:15.220 So there's some debate about what

NOTE Confidence: 0.84964806

00:33:15.220 --> 00:33:18.352 proportion can be attributed to

NOTE Confidence: 0.84964806

00:33:18.352 --> 00:33:21.196 this increased diagnostic scrutiny,

NOTE Confidence: 0.84964806

00:33:21.200 --> 00:33:24.485 but many analysis suggests that

NOTE Confidence: 0.84964806

00:33:24.485 --> 00:33:27.113 about half of this.

NOTE Confidence: 0.84964806

00:33:27.120 --> 00:33:31.350 Trend can be linked to

NOTE Confidence: 0.84964806

00:33:31.350 --> 00:33:33.888 these diagnostic changes,

NOTE Confidence: 0.84964806

00:33:33.890 --> 00:33:37.270 leaving half for environmental

NOTE Confidence: 0.84964806

00:33:37.270 --> 00:33:39.805 or lifestyle factors.

NOTE Confidence: 0.8233529

00:33:44.950 --> 00:33:47.830 I'm so we've hypothesized that increasing

NOTE Confidence: 0.8233529

00:33:47.830 --> 00:33:50.405 exposure to thyroid hormone disrupting

NOTE Confidence: 0.8233529

00:33:50.405 --> 00:33:53.325 environmental chemicals such as these

NOTE Confidence: 0.8233529

00:33:53.325 --> 00:33:55.661 polybrominated diphenyl ether flame

NOTE Confidence: 0.8233529

00:33:55.735 --> 00:33:58.703 retardants or PVD ES may be partially

NOTE Confidence: 0.8233529

00:33:58.703 --> 00:34:00.445 driving this increasing trend.

NOTE Confidence: 0.8233529

00:34:00.445 --> 00:34:03.235 So I'll just talk a little

NOTE Confidence: 0.8233529

00:34:03.235 --> 00:34:05.990 bit more about these people.

NOTE Confidence: 0.8233529

00:34:05.990 --> 00:34:10.064 These are actually a lot of thyroid

NOTE Confidence: 0.8233529

00:34:10.064 --> 00:34:11.810 hormone disrupting environmental

NOTE Confidence: 0.8233529

00:34:11.900 --> 00:34:15.239 chemicals in use an in the environment.

NOTE Confidence: 0.8233529

00:34:15.240 --> 00:34:18.246 These flame retardants were widely added.

NOTE Confidence: 0.8233529

00:34:18.250 --> 00:34:20.330 Too many different products.

NOTE Confidence: 0.8233529

00:34:20.330 --> 00:34:23.450 The polyurethane foam in mattress is

NOTE Confidence: 0.8233529

00:34:23.539 --> 00:34:26.264 an couch, cushions and vehicle seats,

NOTE Confidence: 0.8233529

00:34:26.264 --> 00:34:28.268 including baby car seats.

NOTE Confidence: 0.8233529

00:34:28.270 --> 00:34:31.270 They were also added to electronics

NOTE Confidence: 0.8233529

00:34:31.270 --> 00:34:33.932 like phones, cell phones, televisions,

NOTE Confidence: 0.8233529

00:34:33.932 --> 00:34:37.256 computers and the reason they were

NOTE Confidence: 0.8233529

00:34:37.256 --> 00:34:40.210 added was to meet a flammability

NOTE Confidence: 0.8233529

00:34:40.210 --> 00:34:43.088 standards such that if these products

NOTE Confidence: 0.8233529

00:34:43.088 --> 00:34:46.469 you know caught fire they would burn.

NOTE Confidence: 0.8233529

00:34:46.470 --> 00:34:47.316 More slowly,

NOTE Confidence: 0.8233529

00:34:47.316 --> 00:34:50.277 which is a good thing from a

NOTE Confidence: 0.8233529

00:34:50.277 --> 00:34:52.470 public health perspective.

NOTE Confidence: 0.8233529

00:34:52.470 --> 00:34:52.970 However,

NOTE Confidence: 0.8233529

00:34:52.970 --> 00:34:56.470 these chemicals once added to these products,

NOTE Confidence: 0.8233529

00:34:56.470 --> 00:35:00.382 did not stay bound in the matrices as

NOTE Confidence: 0.8233529

00:35:00.382 --> 00:35:03.368 indicated by their manufacturers and

NOTE Confidence: 0.8233529

00:35:03.368 --> 00:35:07.820 instead have migrated out into our homes.

NOTE Confidence: 0.8233529

00:35:07.820 --> 00:35:09.748 At home environments, cars,

NOTE Confidence: 0.8233529

00:35:09.748 --> 00:35:10.613 workplaces, etc.

NOTE Confidence: 0.8233529

00:35:10.613 --> 00:35:12.911 So due to this widespread use

NOTE Confidence: 0.8233529

00:35:12.911 --> 00:35:15.981 as well as disposal and improper

NOTE Confidence: 0.8233529

00:35:15.981 --> 00:35:18.417 disposal of these chemicals,

NOTE Confidence: 0.8233529

00:35:18.420 --> 00:35:21.312 they aren't ubiquitous and more than

NOTE Confidence: 0.8233529

00:35:21.312 --> 00:35:26.136 90% of the population here in the US and

NOTE Confidence: 0.8233529

00:35:26.136 --> 00:35:30.320 globally are exposed to these chemicals.

NOTE Confidence: 0.8233529

00:35:30.320 --> 00:35:34.324 And this also they are extremely persistent

NOTE Confidence: 0.8233529

00:35:34.324 --> 00:35:39.260 once they get into their homes or our bodies,

NOTE Confidence: 0.8233529

00:35:39.260 --> 00:35:42.620 they do not degrade very easily,

NOTE Confidence: 0.8233529

00:35:42.620 --> 00:35:47.084 so they stick around for years and decades.

NOTE Confidence: 0.8233529

00:35:47.090 --> 00:35:50.444 So due to concerns about this

NOTE Confidence: 0.8233529

00:35:50.444 --> 00:35:52.680 persistence and potential toxicities,

NOTE Confidence: 0.8233529

00:35:52.680 --> 00:35:55.480 these particular group of chemicals,

NOTE Confidence: 0.8233529

00:35:55.480 --> 00:35:58.505 the PDE's were phase outs

NOTE Confidence: 0.8233529

00:35:58.505 --> 00:36:01.530 were initiated over the last.

NOTE Confidence: 0.8233529

00:36:01.530 --> 00:36:02.859 Past decade, however,

NOTE Confidence: 0.8233529

00:36:02.859 --> 00:36:04.631 exposures do continue for

NOTE Confidence: 0.8233529

00:36:04.631 --> 00:36:06.770 the reasons I described.

NOTE Confidence: 0.8233529

00:36:06.770 --> 00:36:08.016 Their persistence,

NOTE Confidence: 0.8233529

00:36:08.016 --> 00:36:09.262 you know,

NOTE Confidence: 0.8233529

00:36:09.262 --> 00:36:13.560 their presence in products made before then.

NOTE Confidence: 0.8233529

00:36:13.560 --> 00:36:16.104 As well as their presence in

NOTE Confidence: 0.8233529

00:36:16.104 --> 00:36:18.780 the food supply and elsewhere.

NOTE Confidence: 0.8233529

00:36:18.780 --> 00:36:21.066 One other group of chemicals that

NOTE Confidence: 0.8233529

00:36:21.066 --> 00:36:24.126 will be talking about today are the

NOTE Confidence: 0.8233529

00:36:24.126 --> 00:36:26.070 polychlorinated biphenyls or PCB's.

NOTE Confidence: 0.8233529

00:36:26.070 --> 00:36:28.220 These were also used widely

NOTE Confidence: 0.8233529

00:36:28.220 --> 00:36:29.510 in electrical equipment,

NOTE Confidence: 0.8233529

00:36:29.510 --> 00:36:31.222 hydraulic machinery construction materials.

NOTE Confidence: 0.8233529

00:36:31.222 --> 00:36:33.362 These were banned in 1979,

NOTE Confidence: 0.8233529

00:36:33.370 --> 00:36:35.938 so again, you might say why?

NOTE Confidence: 0.8233529

00:36:35.940 --> 00:36:38.936 Why are we even studying these now?

NOTE Confidence: 0.8233529

00:36:38.940 --> 00:36:39.366 Well,

NOTE Confidence: 0.8233529

00:36:39.366 --> 00:36:41.496 there's still around and they're

NOTE Confidence: 0.8233529

00:36:41.496 --> 00:36:44.089 still around in our our bodies.

NOTE Confidence: 0.8233529

00:36:44.090 --> 00:36:46.240 Our bloodstreams in the environment,

NOTE Confidence: 0.8233529

00:36:46.240 --> 00:36:48.778 and in fact here in Connecticut

NOTE Confidence: 0.8233529

00:36:48.778 --> 00:36:51.093 there's been some renewed concern

NOTE Confidence: 0.8233529

00:36:51.093 --> 00:36:53.289 about these legacy chemicals.

NOTE Confidence: 0.8233529

00:36:53.290 --> 00:36:56.038 They were commonly used in buildings,

NOTE Confidence: 0.8233529

00:36:56.040 --> 00:36:57.420 including schools constructed

NOTE Confidence: 0.8233529

00:36:57.420 --> 00:36:59.720 in the 1950s to 1970s,

NOTE Confidence: 0.8233529

00:36:59.720 --> 00:37:02.380 and many of these schools now are

NOTE Confidence: 0.8233529

00:37:02.380 --> 00:37:05.680 in need of repairs and renovations,

NOTE Confidence: 0.8233529

00:37:05.680 --> 00:37:08.410 and there have been some notable

NOTE Confidence: 0.8233529

00:37:08.410 --> 00:37:11.215 schools in Connecticut that I've had

NOTE Confidence: 0.8233529

00:37:11.215 --> 00:37:13.490 PCB levels exceeding safe levels.

NOTE Confidence: 0.8233529

00:37:13.490 --> 00:37:15.780 Closures of schools you know,

NOTE Confidence: 0.8233529

00:37:15.780 --> 00:37:18.234 insufficient funds to do a proper

NOTE Confidence: 0.8233529

00:37:18.234 --> 00:37:20.830 and safe remodeling or renovations,

NOTE Confidence: 0.8233529

00:37:20.830 --> 00:37:23.668 and again, often these are in.

NOTE Confidence: 0.8233529

00:37:23.670 --> 00:37:27.740 Kind of environmental justice communities.

NOTE Confidence: 0.8233529

00:37:27.740 --> 00:37:31.114 So another reason to study these legacy

NOTE Confidence: 0.8233529

00:37:31.114 --> 00:37:34.399 chemicals is as they get phased out,

NOTE Confidence: 0.8233529

00:37:34.400 --> 00:37:37.739 new chemicals come to take their place,

NOTE Confidence: 0.8233529

00:37:37.740 --> 00:37:41.268 and many of those are also also have

NOTE Confidence: 0.8233529

00:37:41.268 --> 00:37:43.918 similar properties and so understanding.

NOTE Confidence: 0.8233529

00:37:43.920 --> 00:37:46.764 These may help us inform greener

NOTE Confidence: 0.8233529

00:37:46.764 --> 00:37:48.660 chemistry or future regulations

NOTE Confidence: 0.8233529

00:37:48.737 --> 00:37:50.589 of other other chemicals.

NOTE Confidence: 0.84945095

00:37:54.200 --> 00:37:56.666 So we hypothesize that these PV

NOTE Confidence: 0.84945095

00:37:56.666 --> 00:37:59.252 East could be contributing to that

NOTE Confidence: 0.84945095

00:37:59.252 --> 00:38:01.427 increasing trend in thyroid cancer.

NOTE Confidence: 0.84945095

00:38:01.430 --> 00:38:04.587 Here is a graph showing increasing exposure

NOTE Confidence: 0.84945095

00:38:04.587 --> 00:38:08.127 over a similar time period where we saw

NOTE Confidence: 0.84945095

00:38:08.127 --> 00:38:10.780 thyroid cancer cases start to go up.

NOTE Confidence: 0.84945095

00:38:10.780 --> 00:38:13.727 So these are measurements taken from blood

NOTE Confidence: 0.84945095

00:38:13.727 --> 00:38:16.933 samples from a blood bank. In the US.

NOTE Confidence: 0.84945095

00:38:16.933 --> 00:38:20.009 You can see about a doubling every five

NOTE Confidence: 0.84945095

00:38:20.009 --> 00:38:22.679 years of these particular chemicals.

NOTE Confidence: 0.79974365

00:38:24.870 --> 00:38:27.630 So looking at more recent data,

NOTE Confidence: 0.79974365

00:38:27.630 --> 00:38:29.470 I, as I mentioned,

NOTE Confidence: 0.79974365

00:38:29.470 --> 00:38:32.230 these have been somewhat phased out.

NOTE Confidence: 0.79974365

00:38:32.230 --> 00:38:34.804 You can see that well levels

NOTE Confidence: 0.79974365

00:38:34.804 --> 00:38:37.107 have come down since those

NOTE Confidence: 0.79974365

00:38:37.107 --> 00:38:39.587 some of those earlier years,

NOTE Confidence: 0.79974365

00:38:39.590 --> 00:38:42.810 but then they really have somewhat plateaued.

NOTE Confidence: 0.79974365

00:38:42.810 --> 00:38:45.570 Or are, you know some some

NOTE Confidence: 0.79974365

00:38:45.570 --> 00:38:47.410 particular congeners of these?

NOTE Confidence: 0.79974365

00:38:47.410 --> 00:38:50.980 In this family of chemicals are still

NOTE Confidence: 0.79974365

00:38:50.980 --> 00:38:53.878 increasing slightly an we see similar.

NOTE Confidence: 0.79974365

00:38:53.880 --> 00:38:56.040 Trends with the PCB's that levels

NOTE Confidence: 0.79974365

00:38:56.040 --> 00:38:58.688 have come down since they were banned,

NOTE Confidence: 0.79974365

00:38:58.690 --> 00:39:01.168 but then they reached this plateau

NOTE Confidence: 0.79974365

00:39:01.168 --> 00:39:03.640 in the population because of their

NOTE Confidence: 0.79974365

00:39:03.640 --> 00:39:05.872 persistence and then as new chemicals

NOTE Confidence: 0.79974365

00:39:05.872 --> 00:39:08.238 come on we may be introduced to

NOTE Confidence: 0.79974365

00:39:08.238 --> 00:39:10.160 those on top of these exposures.

NOTE Confidence: 0.81618255

00:39:12.440 --> 00:39:13.976 Hey and so why?

NOTE Confidence: 0.81618255

00:39:13.976 --> 00:39:16.280 Why do we think these may

NOTE Confidence: 0.81618255

00:39:16.382 --> 00:39:19.007 be linked to thyroid cancer?

NOTE Confidence: 0.81618255

00:39:19.010 --> 00:39:20.762 These chemicals are established

NOTE Confidence: 0.81618255

00:39:20.762 --> 00:39:22.076 thyroid hormone disruptors.

NOTE Confidence: 0.81618255

00:39:22.080 --> 00:39:23.840 Their endocrine disruptors and

NOTE Confidence: 0.81618255

00:39:23.840 --> 00:39:27.429 over here I have an image of our

NOTE Confidence: 0.81618255

00:39:27.429 --> 00:39:29.589 thyroid hormone thyroxine and then

NOTE Confidence: 0.81618255

00:39:29.589 --> 00:39:33.091 the PCB's and the PVD ES and their

NOTE Confidence: 0.81618255

00:39:33.091 --> 00:39:35.211 general chemical structure so you

NOTE Confidence: 0.81618255

00:39:35.220 --> 00:39:37.405 can see immediately how structurally

NOTE Confidence: 0.81618255

00:39:37.405 --> 00:39:39.153 similar these chemicals are.

NOTE Confidence: 0.81618255

00:39:39.160 --> 00:39:42.345 Shut thyrax, and we've got the two.

NOTE Confidence: 0.81618255

00:39:42.350 --> 00:39:44.278 Aromatic rings and then

NOTE Confidence: 0.81618255

00:39:44.278 --> 00:39:46.206 while thyroxine has iodine,

NOTE Confidence: 0.81618255

00:39:46.210 --> 00:39:48.630 these chemicals have other halogens.

NOTE Confidence: 0.81618255

00:39:48.630 --> 00:39:51.528 They have either chlorine or bromine's.

NOTE Confidence: 0.81618255

00:39:51.530 --> 00:39:54.230 Just to further illustrate when for

NOTE Confidence: 0.81618255

00:39:54.230 --> 00:39:57.319 example this particular PDE gets metabolised,

NOTE Confidence: 0.81618255

00:39:57.320 --> 00:40:00.860 it gets this hydroxyl group added.

NOTE Confidence: 0.81618255

00:40:00.860 --> 00:40:03.884 And now even more closely resembles

NOTE Confidence: 0.81618255

00:40:03.884 --> 00:40:07.923 Thyrax in so the in vitro studies

NOTE Confidence: 0.81618255

00:40:07.923 --> 00:40:11.763 have shown that these chemicals can

NOTE Confidence: 0.81618255

00:40:11.763 --> 00:40:14.598 competitively binds with thyroid

NOTE Confidence: 0.81618255

00:40:14.598 --> 00:40:18.088 transport proteins and results in

NOTE Confidence: 0.81618255

00:40:18.088 --> 00:40:21.242 reduced circulation of thyroid hormones,

NOTE Confidence: 0.81618255

00:40:21.242 --> 00:40:24.746 which could then result in dysregulation

NOTE Confidence: 0.81618255

00:40:24.746 --> 00:40:28.809 of the transport and signaling pathways,

NOTE Confidence: 0.81618255

00:40:28.810 --> 00:40:30.832 potentially leading to.

NOTE Confidence: 0.81618255

00:40:30.832 --> 00:40:31.506 Overproduction,

NOTE Confidence: 0.81618255

00:40:31.506 --> 00:40:34.876 of of hormones to compensate

NOTE Confidence: 0.81618255

00:40:34.876 --> 00:40:37.323 proliferation in the thyroid

NOTE Confidence: 0.81618255

00:40:37.323 --> 00:40:39.009 and potentially neoplasia.

NOTE Confidence: 0.85149497

00:40:41.810 --> 00:40:45.198 So as you know the the hypothalamus,

NOTE Confidence: 0.85149497

00:40:45.200 --> 00:40:47.615 pituitary, thyroid axis is this

NOTE Confidence: 0.85149497

00:40:47.615 --> 00:40:49.547 very well choreographed system.

NOTE Confidence: 0.85149497

00:40:49.550 --> 00:40:51.574 So these perturbations or

NOTE Confidence: 0.85149497

00:40:51.574 --> 00:40:53.598 dysregulation of these systems

NOTE Confidence: 0.85149497

00:40:53.598 --> 00:40:56.327 can perhaps trigger some of these.

NOTE Confidence: 0.85149497

00:40:56.330 --> 00:40:59.168 Some proliferation of the thyroid and

NOTE Confidence: 0.85149497

00:40:59.168 --> 00:41:01.650 potentially lead to thyroid cancer.

NOTE Confidence: 0.85149497

00:41:01.650 --> 00:41:03.990 I'm just I'm showing this slide

NOTE Confidence: 0.85149497

00:41:03.990 --> 00:41:06.231 to also illustrate that some

NOTE Confidence: 0.85149497

00:41:06.231 --> 00:41:08.663 chemicals have some additional

NOTE Confidence: 0.85149497

00:41:08.663 --> 00:41:10.912 hypothesized mechanisms, such as.

NOTE Confidence: 0.85149497

00:41:10.912 --> 00:41:14.008 Some have been shown to be

NOTE Confidence: 0.85149497

00:41:14.008 --> 00:41:17.510 capable to directly bind to DNA,

NOTE Confidence: 0.85149497

00:41:17.510 --> 00:41:20.606 leading to mutations and could potentially

NOTE Confidence: 0.85149497

00:41:20.606 --> 00:41:23.040 lead to carcinogenesis that way.

NOTE Confidence: 0.83227754

00:41:26.390 --> 00:41:28.976 So before we launched our study,

NOTE Confidence: 0.83227754

00:41:28.980 --> 00:41:31.572 there had only been two other

NOTE Confidence: 0.83227754

00:41:31.572 --> 00:41:33.300 studies examining this hypothesis.

NOTE Confidence: 0.83227754

00:41:33.300 --> 00:41:35.766 This idea that these PPDS could

NOTE Confidence: 0.83227754

00:41:35.766 --> 00:41:38.050 be linked to thyroid cancer.

NOTE Confidence: 0.83227754

00:41:38.050 --> 00:41:41.902 So the first two rows of this table or

NOTE Confidence: 0.83227754

00:41:41.902 --> 00:41:45.292 the two prior epidemiologic studies in

NOTE Confidence: 0.83227754

00:41:45.292 --> 00:41:50.089 the third row was the study that I lead.

NOTE Confidence: 0.83227754

00:41:50.090 --> 00:41:53.202 A couple things to point out here is

NOTE Confidence: 0.83227754

00:41:53.202 --> 00:41:56.763 that the case is the studies that came

NOTE Confidence: 0.83227754

00:41:56.763 --> 00:42:00.209 before us had moderate study populations,

NOTE Confidence: 0.83227754

00:42:00.210 --> 00:42:01.878 and ours was larger.

NOTE Confidence: 0.83227754

00:42:01.878 --> 00:42:03.963 We also looked at more

NOTE Confidence: 0.83227754

00:42:03.963 --> 00:42:05.730 chemicals and importantly,

NOTE Confidence: 0.83227754

00:42:05.730 --> 00:42:08.030 we looked at single and

NOTE Confidence: 0.83227754

00:42:08.030 --> 00:42:09.870 multi pollutant models so.

NOTE Confidence: 0.8642995

00:42:12.080 --> 00:42:14.798 So what I mean by that is that in

NOTE Confidence: 0.8642995

00:42:14.798 --> 00:42:17.775 the real world you know we're not

NOTE Confidence: 0.8642995

00:42:17.775 --> 00:42:20.409 exposed to one chemical at a time,

NOTE Confidence: 0.8642995

00:42:20.410 --> 00:42:22.222 where typically exposed to groups of

NOTE Confidence: 0.8642995

00:42:22.222 --> 00:42:23.982 chemicals or mixtures of chemicals

NOTE Confidence: 0.8642995

00:42:23.982 --> 00:42:25.470 and traditional environmental.

NOTE Confidence: 0.8642995

00:42:25.470 --> 00:42:26.918 Epidemiologic studies have looked

NOTE Confidence: 0.8642995

00:42:26.918 --> 00:42:29.460 at chemicals just one at a time,

NOTE Confidence: 0.8642995

00:42:29.460 --> 00:42:31.728 and in my work we're looking at

NOTE Confidence: 0.8642995

00:42:31.728 --> 00:42:33.132 these so-called mixtures using

NOTE Confidence: 0.8642995

00:42:33.132 --> 00:42:34.227 different modeling techniques

NOTE Confidence: 0.8642995

00:42:34.227 --> 00:42:36.886 to look at the joint effect of

NOTE Confidence: 0.8642995

00:42:36.886 --> 00:42:38.510 exposures to multiple chemicals.

NOTE Confidence: 0.8465663

00:42:41.910 --> 00:42:43.554 Similarly for the PCB's,

NOTE Confidence: 0.8465663

00:42:43.554 --> 00:42:46.479 the other chemicals there were also only

NOTE Confidence: 0.8465663

00:42:46.479 --> 00:42:49.174 two previous studies before we did ours.

NOTE Confidence: 0.8465663

00:42:49.180 --> 00:42:52.052 Also the other studies were a bit smaller

NOTE Confidence: 0.8465663

00:42:52.052 --> 00:42:55.236 and we also looked at mixture modeling.

NOTE Confidence: 0.8465663

00:42:55.240 --> 00:42:57.008 One other one shortcoming,

NOTE Confidence: 0.8465663

00:42:57.008 --> 00:43:00.502 I wanted to point out actually in reference

NOTE Confidence: 0.8465663

00:43:00.502 --> 00:43:03.993 to at least one of the other studies is

NOTE Confidence: 0.8465663

00:43:03.993 --> 00:43:06.953 that our study was a case control study.

NOTE Confidence: 0.8465663

00:43:06.960 --> 00:43:11.217 So we did collect serum samples to do our.

NOTE Confidence: 0.8465663

00:43:11.220 --> 00:43:12.204 Environmental chemical

NOTE Confidence: 0.8465663

00:43:12.204 --> 00:43:13.680 measurements after diagnosis.

NOTE Confidence: 0.8465663

00:43:13.680 --> 00:43:15.648 Whereas one other study

NOTE Confidence: 0.8465663

00:43:15.648 --> 00:43:17.616 collected pre diagnosis samples,

NOTE Confidence: 0.8465663

00:43:17.620 --> 00:43:19.580 we think you know.

NOTE Confidence: 0.8465663

00:43:19.580 --> 00:43:23.096 So we're using this post diagnosis sample

NOTE Confidence: 0.8465663

00:43:23.096 --> 00:43:26.952 to try to capture exposures in the past.

NOTE Confidence: 0.8465663

00:43:26.960 --> 00:43:28.596 While it's not optimal,

NOTE Confidence: 0.8465663

00:43:28.596 --> 00:43:31.772 we think this is actually a pretty

NOTE Confidence: 0.8465663

00:43:31.772 --> 00:43:34.336 strong and reasonable assumption,

NOTE Confidence: 0.8465663

00:43:34.340 --> 00:43:37.586 because we know that these chemicals

NOTE Confidence: 0.8465663

00:43:37.586 --> 00:43:41.630 have half lives of years and decades.

NOTE Confidence: 0.8465663

00:43:41.630 --> 00:43:44.540 Ends may may well reflect past

NOTE Confidence: 0.8465663

00:43:44.540 --> 00:43:47.470 past you some past exposure.

NOTE Confidence: 0.8271222

00:43:50.580 --> 00:43:53.191 OK, so just a few more details

NOTE Confidence: 0.8271222

00:43:53.191 --> 00:43:55.449 about the study we conducted.

NOTE Confidence: 0.8271222

00:43:55.450 --> 00:43:58.034 I LED a study within a study and

NOTE Confidence: 0.8271222

00:43:58.034 --> 00:44:00.719 that larger study was the Connecticut

NOTE Confidence: 0.8271222

00:44:00.719 --> 00:44:03.169 thyroid cancer case control study,

NOTE Confidence: 0.8271222

00:44:03.170 --> 00:44:05.600 which was led by Yahweh Chung,

NOTE Confidence: 0.8271222

00:44:05.600 --> 00:44:07.535 who was our former colleague

NOTE Confidence: 0.8271222

00:44:07.535 --> 00:44:10.070 here at the Yale Cancer Center.

NOTE Confidence: 0.8271222

00:44:10.070 --> 00:44:12.422 We focused on women because they

NOTE Confidence: 0.8271222

00:44:12.422 --> 00:44:14.940 have that three times higher risk.

NOTE Confidence: 0.8271222

00:44:14.940 --> 00:44:17.376 I showed earlier about 90% of

NOTE Confidence: 0.8271222

00:44:17.376 --> 00:44:19.986 our cases were white, so we.

NOTE Confidence: 0.8271222

00:44:19.986 --> 00:44:22.451 Focused on the white population

NOTE Confidence: 0.8271222

00:44:22.451 --> 00:44:25.682 because our numbers were really small

NOTE Confidence: 0.8271222

00:44:25.682 --> 00:44:28.447 for looking at other demographics.

NOTE Confidence: 0.8271222

00:44:28.450 --> 00:44:31.824 I do think now this is something

NOTE Confidence: 0.8271222

00:44:31.824 --> 00:44:35.685 I would like to follow up on

NOTE Confidence: 0.8271222

00:44:35.685 --> 00:44:37.989 more in another population,

NOTE Confidence: 0.8271222

00:44:37.990 --> 00:44:41.170 we focused on papillary thyroid cancers.

NOTE Confidence: 0.8271222

00:44:41.170 --> 00:44:43.820 That's about 85% of the

NOTE Confidence: 0.8271222

00:44:43.820 --> 00:44:45.940 new cases or papillary.

NOTE Confidence: 0.8271222

00:44:45.940 --> 00:44:48.590 We also collected very detailed

NOTE Confidence: 0.8271222

00:44:48.590 --> 00:44:50.180 information about demographics,

NOTE Confidence: 0.8271222

00:44:50.180 --> 00:44:51.158 lifestyle, diet.

NOTE Confidence: 0.8271222

00:44:51.158 --> 00:44:54.092 Many other risk factors that we

NOTE Confidence: 0.8271222

00:44:54.092 --> 00:44:56.620 can control for other factors.

NOTE Confidence: 0.8271222

00:44:56.620 --> 00:44:58.960 We collected the blood sample at

NOTE Confidence: 0.8271222

00:44:58.960 --> 00:45:02.190 the time of the interview and then

NOTE Confidence: 0.8271222

00:45:02.190 --> 00:45:04.830 measured the participants blood samples

NOTE Confidence: 0.8271222

00:45:04.830 --> 00:45:08.087 for 11 different peyizan 32 PCBS,

NOTE Confidence: 0.8271222

00:45:08.090 --> 00:45:10.958 which this analysis also gave us.

NOTE Confidence: 0.8271222

00:45:10.960 --> 00:45:12.856 Some pesticides like DDT,

NOTE Confidence: 0.8271222

00:45:12.856 --> 00:45:16.220 which are also structurally similar to these.

NOTE Confidence: 0.8271222

00:45:16.220 --> 00:45:19.388 These classes of chemicals.

NOTE Confidence: 0.8271222

00:45:19.390 --> 00:45:22.127 And again we looked at both pollutants,

NOTE Confidence: 0.8271222

00:45:22.130 --> 00:45:25.586 one at a time, like like most studies

NOTE Confidence: 0.8271222

00:45:25.586 --> 00:45:29.308 do and then multi pollutant models.

NOTE Confidence: 0.8271222

00:45:29.310 --> 00:45:31.872 OK, so here's some results from

NOTE Confidence: 0.8271222

00:45:31.872 --> 00:45:33.153 our study population.

NOTE Confidence: 0.8271222

00:45:33.160 --> 00:45:35.295 These are factors that differed

NOTE Confidence: 0.8271222

00:45:35.295 --> 00:45:37.003 between cases and controls,

NOTE Confidence: 0.8271222

00:45:37.010 --> 00:45:39.824 so our cases had a lower educational

NOTE Confidence: 0.8271222

00:45:39.824 --> 00:45:41.720 attainment compared to controls.

NOTE Confidence: 0.8271222

00:45:41.720 --> 00:45:43.855 They did have a history

NOTE Confidence: 0.8271222

00:45:43.855 --> 00:45:45.563 of benign thyroid disease.

NOTE Confidence: 0.8271222

00:45:45.570 --> 00:45:48.002 That's a strong risk

NOTE Confidence: 0.8271222

00:45:48.002 --> 00:45:50.434 factor for thyroid cancer.

NOTE Confidence: 0.8271222

00:45:50.440 --> 00:45:54.628 Alcohol consumption was actually.

NOTE Confidence: 0.8271222

00:45:54.630 --> 00:45:55.582 Higher, lower,

NOTE Confidence: 0.8271222

00:45:55.582 --> 00:45:57.010 lower in cases.

NOTE Confidence: 0.8271222

00:45:57.010 --> 00:46:00.482 This is one of the few cancers where

NOTE Confidence: 0.8271222

00:46:00.482 --> 00:46:02.968 alcohol actually has been consistently

NOTE Confidence: 0.8271222

00:46:02.968 --> 00:46:06.028 shown to have a protective effect.

NOTE Confidence: 0.8271222

00:46:06.030 --> 00:46:09.229 An cases also had a history of

NOTE Confidence: 0.8271222

00:46:09.229 --> 00:46:11.730 thyroid cancer and higher BMI,

NOTE Confidence: 0.8271222

00:46:11.730 --> 00:46:14.936 which has been shown now in several

NOTE Confidence: 0.8271222

00:46:14.936 --> 00:46:16.817 studies indicating another possible

NOTE Confidence: 0.8271222

00:46:16.817 --> 00:46:19.385 risk risk factor that can also

NOTE Confidence: 0.8271222

00:46:19.385 --> 00:46:21.860 be interrelated to like endocrine

NOTE Confidence: 0.8271222

00:46:21.860 --> 00:46:24.076 disrupting chemicals and also.

NOTE Confidence: 0.8689489

00:46:26.490 --> 00:46:29.479 OK, so here are some results from

NOTE Confidence: 0.8689489

00:46:29.479 --> 00:46:32.012 our single pollutant models where we

NOTE Confidence: 0.8689489

00:46:32.012 --> 00:46:34.728 looked at one chemical at a time.

NOTE Confidence: 0.8689489

00:46:34.730 --> 00:46:36.995 So these are increasing categories

NOTE Confidence: 0.8689489

00:46:36.995 --> 00:46:39.260 of exposure within each of

NOTE Confidence: 0.8689489

00:46:39.342 --> 00:46:41.349 these different pollutants.

NOTE Confidence: 0.8689489

00:46:41.350 --> 00:46:44.806 You know, odds Ratio 1 means no effects,

NOTE Confidence: 0.8689489

00:46:44.810 --> 00:46:48.104 and anything above one would indicate

NOTE Confidence: 0.8689489

00:46:48.104 --> 00:46:50.980 an Association with thyroid cancer.

NOTE Confidence: 0.8689489

00:46:50.980 --> 00:46:53.654 So you can see here that there's

NOTE Confidence: 0.8689489

00:46:53.654 --> 00:46:56.395 really not much going on with

NOTE Confidence: 0.8689489

00:46:56.395 --> 00:46:57.907 these individual models.

NOTE Confidence: 0.8689489

00:46:57.910 --> 00:47:00.268 If anything, the odds of thyroid

NOTE Confidence: 0.8689489

00:47:00.268 --> 00:47:03.292 cancer seem to be lower than those

NOTE Confidence: 0.8689489

00:47:03.292 --> 00:47:06.028 who are exposed compared to the

NOTE Confidence: 0.8689489

00:47:06.028 --> 00:47:08.300 reference group of low exposure.

NOTE Confidence: 0.8689489

00:47:08.300 --> 00:47:10.778 So the medium and high groups are

NOTE Confidence: 0.8689489

00:47:10.778 --> 00:47:13.941 not at an elevated odds of thyroid

NOTE Confidence: 0.8689489

00:47:13.941 --> 00:47:16.959 cancer except for this one chemical.

NOTE Confidence: 0.8689489

00:47:16.960 --> 00:47:18.259 This PB 153.

NOTE Confidence: 0.79854375

00:47:21.870 --> 00:47:24.648 So when we move to our

NOTE Confidence: 0.79854375

00:47:24.648 --> 00:47:26.037 multi pollutant models,

NOTE Confidence: 0.79854375

00:47:26.040 --> 00:47:28.818 the results are also somewhat null.

NOTE Confidence: 0.79854375

00:47:28.820 --> 00:47:31.598 We have two multi pollutant models

NOTE Confidence: 0.79854375

00:47:31.598 --> 00:47:33.450 here using Bayesian modeling,

NOTE Confidence: 0.79854375

00:47:33.450 --> 00:47:36.216 which I won't get into here.

NOTE Confidence: 0.79854375

00:47:36.220 --> 00:47:39.556 But here you can see that it's the

NOTE Confidence: 0.79854375

00:47:39.556 --> 00:47:43.168 picture is still pretty null except for.

NOTE Confidence: 0.79854375

00:47:43.170 --> 00:47:46.404 In this case we have this other,

NOTE Confidence: 0.79854375

00:47:46.410 --> 00:47:49.030 a different chemical PDE 100.

NOTE Confidence: 0.79854375

00:47:49.030 --> 00:47:52.306 Was associated with elevated odds of

NOTE Confidence: 0.79854375

00:47:52.306 --> 00:47:55.730 thyroid cancer using both those models.

NOTE Confidence: 0.8645845

00:47:57.760 --> 00:48:00.888 And then finally we did this one more

NOTE Confidence: 0.8645845

00:48:00.888 --> 00:48:03.478 mixture type approach of principle,

NOTE Confidence: 0.8645845

00:48:03.480 --> 00:48:06.978 components analysis and in this work

NOTE Confidence: 0.8645845

00:48:06.978 --> 00:48:11.159 we found that people who had had this.

NOTE Confidence: 0.8645845

00:48:11.160 --> 00:48:14.796 Combination of exposures which was higher.

NOTE Confidence: 0.8645845

00:48:14.800 --> 00:48:19.280 PBDE 153. An lower PDE 209 had an

NOTE Confidence: 0.8645845

00:48:19.280 --> 00:48:22.669 elevated odds of thyroid cancer.

NOTE Confidence: 0.8226875

00:48:26.300 --> 00:48:29.850 So then moving on to the PCB use in this

NOTE Confidence: 0.8226875

00:48:29.942 --> 00:48:33.134 for this one because we had so many,

NOTE Confidence: 0.8226875

00:48:33.140 --> 00:48:35.040 we had 32 different chemicals.

NOTE Confidence: 0.8226875

00:48:35.040 --> 00:48:37.574 I'm just going to present some some

NOTE Confidence: 0.8226875

00:48:37.574 --> 00:48:39.599 groups of structurally similar PCB's,

NOTE Confidence: 0.8226875

00:48:39.600 --> 00:48:41.754 which was another approach we used

NOTE Confidence: 0.8226875

00:48:41.754 --> 00:48:44.160 to look at groups of chemicals.

NOTE Confidence: 0.8226875

00:48:44.160 --> 00:48:48.120 So in this in this model this kind of

NOTE Confidence: 0.8226875

00:48:48.120 --> 00:48:52.358 we're just looking at one group at a time.

NOTE Confidence: 0.8226875

00:48:52.360 --> 00:48:55.096 Odds ratios are hovering around 1:00,

NOTE Confidence: 0.8226875

00:48:55.100 --> 00:48:57.966 so again pretty null findings. Not.

NOTE Confidence: 0.8226875

00:48:57.966 --> 00:49:01.422 We're not seeing a link between

NOTE Confidence: 0.8226875

00:49:01.422 --> 00:49:03.960 exposure and thyroid cancer.

NOTE Confidence: 0.8226875

00:49:03.960 --> 00:49:08.056 However, it said the most intriguing part of

NOTE Confidence: 0.8226875

00:49:08.056 --> 00:49:12.348 this study was when we took a closer look at.

NOTE Confidence: 0.8226875

00:49:12.350 --> 00:49:14.320 The the groups of people,

NOTE Confidence: 0.8226875

00:49:14.320 --> 00:49:17.468 people who are exposed.

NOTE Confidence: 0.8226875

00:49:17.470 --> 00:49:19.650 During who were younger

NOTE Confidence: 0.8226875

00:49:19.650 --> 00:49:21.285 during peak production,

NOTE Confidence: 0.8226875

00:49:21.290 --> 00:49:24.015 who were born during peak

NOTE Confidence: 0.8226875

00:49:24.015 --> 00:49:25.650 production of PCB's.

NOTE Confidence: 0.8226875

00:49:25.650 --> 00:49:28.375 So presumably would have their

NOTE Confidence: 0.8226875

00:49:28.375 --> 00:49:31.640 highest exposure in very early life.

NOTE Confidence: 0.8226875

00:49:31.640 --> 00:49:33.820 They consistently had higher

NOTE Confidence: 0.8226875

00:49:33.820 --> 00:49:36.000 odds of thyroid cancer,

NOTE Confidence: 0.8226875

00:49:36.000 --> 00:49:39.300 including this group of PCB's that

NOTE Confidence: 0.8226875

00:49:39.300 --> 00:49:40.950 were particularly structurally

NOTE Confidence: 0.8226875

00:49:40.950 --> 00:49:43.090 similar to thyroid hormones,

NOTE Confidence: 0.8226875

00:49:43.090 --> 00:49:46.898 so this was quite intriguing to me,

NOTE Confidence: 0.8226875

00:49:46.900 --> 00:49:49.152 suggesting maybe the timing.

NOTE Confidence: 0.8226875

00:49:49.152 --> 00:49:51.967 Of exposure could be important.

NOTE Confidence: 0.8235304

00:49:54.220 --> 00:49:57.994 OK. So just to summarize,

NOTE Confidence: 0.8235304

00:49:57.994 --> 00:50:00.400 some of the key takeaways from both.

NOTE Confidence: 0.8235304

00:50:00.400 --> 00:50:03.430 Of these studies.

NOTE Confidence: 0.8235304

00:50:03.430 --> 00:50:05.929 Strengths were that we looked at this

NOTE Confidence: 0.8235304

00:50:05.929 --> 00:50:07.456 larger population and incorporated

NOTE Confidence: 0.8235304

00:50:07.456 --> 00:50:09.814 these different models to account for

NOTE Confidence: 0.8235304

00:50:09.814 --> 00:50:12.269 Co exposure to multiple pollutants.

NOTE Confidence: 0.8235304

00:50:12.270 --> 00:50:14.280 The results were generally null.

NOTE Confidence: 0.8235304

00:50:14.280 --> 00:50:16.880 You know, we did see a few chemicals

NOTE Confidence: 0.8235304

00:50:16.880 --> 00:50:19.074 here and their associated with

NOTE Confidence: 0.8235304

00:50:19.074 --> 00:50:21.514 elevated odds of thyroid cancer.

NOTE Confidence: 0.8235304

00:50:21.520 --> 00:50:21.938 Particularly,

NOTE Confidence: 0.8235304

00:50:21.938 --> 00:50:24.446 this was more consistent when we

NOTE Confidence: 0.8235304

00:50:24.446 --> 00:50:27.655 looked at the group of women who were

NOTE Confidence: 0.8235304

00:50:27.655 --> 00:50:29.960 born during peak production of PCBS.

NOTE Confidence: 0.8235304

00:50:29.960 --> 00:50:33.176 However, this we only have 3 studies now.

NOTE Confidence: 0.8235304

00:50:33.180 --> 00:50:34.028 For these,

NOTE Confidence: 0.8235304

00:50:34.028 --> 00:50:36.996 each of these groups of chemicals so.

NOTE Confidence: 0.8235304

00:50:37.000 --> 00:50:38.089 There's really insufficient

NOTE Confidence: 0.8235304

00:50:38.089 --> 00:50:39.904 evidence to rule them out,

NOTE Confidence: 0.8235304

00:50:39.910 --> 00:50:42.381 and I think there can be some

NOTE Confidence: 0.8235304

00:50:42.381 --> 00:50:44.615 improvements to the study design to

NOTE Confidence: 0.8235304

00:50:44.615 --> 00:50:47.184 try to look at this more carefully.

NOTE Confidence: 0.8235304

00:50:47.190 --> 00:50:49.010 I think looking at early

NOTE Confidence: 0.8235304

00:50:49.010 --> 00:50:50.466 life would be important,

NOTE Confidence: 0.8235304

00:50:50.470 --> 00:50:52.558 and using a prospective design where

NOTE Confidence: 0.8235304

00:50:52.558 --> 00:50:54.393 we could have samples collected

NOTE Confidence: 0.8235304

00:50:54.393 --> 00:50:56.655 pre diagnosis could help you know.

NOTE Confidence: 0.8235304

00:50:56.660 --> 00:50:57.135 Really,

NOTE Confidence: 0.8235304

00:50:57.135 --> 00:50:59.985 try to nail nail down if

NOTE Confidence: 0.8235304

00:50:59.985 --> 00:51:02.269 anything is going on here.

NOTE Confidence: 0.8235304

00:51:02.270 --> 00:51:05.422 And then finally I just want to talk

NOTE Confidence: 0.8235304

00:51:05.422 --> 00:51:08.618 about how where I'm taking this work.

NOTE Confidence: 0.8235304

00:51:08.620 --> 00:51:11.434 I have now expanded this work in

NOTE Confidence: 0.8235304

00:51:11.434 --> 00:51:13.690 adults to looking at children.

NOTE Confidence: 0.8235304

00:51:13.690 --> 00:51:16.228 So with my collaborator Xiaomei MA,

NOTE Confidence: 0.8235304

00:51:16.230 --> 00:51:19.184 also very active in the Cancer Center.

NOTE Confidence: 0.8235304

00:51:19.190 --> 00:51:21.305 We are looking at environmental

NOTE Confidence: 0.8235304

00:51:21.305 --> 00:51:23.420 exposures and pediatric thyroid cancer,

NOTE Confidence: 0.8235304

00:51:23.420 --> 00:51:25.112 so here's some incidents.

NOTE Confidence: 0.8235304

00:51:25.112 --> 00:51:27.227 Data on pediatric thyroid cancer.

NOTE Confidence: 0.8235304

00:51:27.230 --> 00:51:30.184 It has also been increasing over time.

NOTE Confidence: 0.8235304

00:51:30.190 --> 00:51:32.360 An children are less likely.

NOTE Confidence: 0.8235304

00:51:32.360 --> 00:51:35.330 To be.

NOTE Confidence: 0.8235304

00:51:35.330 --> 00:51:37.070 Targeted for increased screening

NOTE Confidence: 0.8235304

00:51:37.070 --> 00:51:38.810 and diagnosis and imaging,

NOTE Confidence: 0.8235304

00:51:38.810 --> 00:51:41.420 so these trends are are concerning,

NOTE Confidence: 0.8235304

00:51:41.420 --> 00:51:43.786 so we have some projects underway to

NOTE Confidence: 0.8235304

00:51:43.786 --> 00:51:46.514 try to look at environmental exposures

NOTE Confidence: 0.8235304

00:51:46.514 --> 00:51:49.244 in this more vulnerable population.

NOTE Confidence: 0.8235304

00:51:49.250 --> 00:51:51.784 And with that I would like to

NOTE Confidence: 0.8235304

00:51:51.784 --> 00:51:53.474 acknowledge all my wonderful

NOTE Confidence: 0.8235304

00:51:53.474 --> 00:51:56.114 collaborators and my funding from

NOTE Confidence: 0.8235304

00:51:56.114 --> 00:51:59.100 American Cancer Society as well as

NOTE Confidence: 0.8235304

00:51:59.100 --> 00:52:01.494 the Yale Cancer Center for getting

NOTE Confidence: 0.8235304

00:52:01.494 --> 00:52:04.480 me started in this line of research.

NOTE Confidence: 0.8235304

00:52:04.480 --> 00:52:05.350 Thank you.

NOTE Confidence: 0.89094794

00:52:06.930 --> 00:52:08.298 Thank you Doctor Diesel,

NOTE Confidence: 0.89094794

00:52:08.298 --> 00:52:09.324 that was fantastic.

NOTE Confidence: 0.89094794

00:52:09.330 --> 00:52:10.320 A little alarming.

NOTE Confidence: 0.89094794

00:52:10.320 --> 00:52:12.630 I would say when we start to

NOTE Confidence: 0.89094794

00:52:12.708 --> 00:52:14.820 think about how many you know,

NOTE Confidence: 0.89094794

00:52:14.820 --> 00:52:16.535 carcinogens exist in our environment

NOTE Confidence: 0.89094794

00:52:16.535 --> 00:52:18.960 in the fact that I'm intrigued by

NOTE Confidence: 0.89094794

00:52:18.960 --> 00:52:21.235 the policy statement that we have to

NOTE Confidence: 0.89094794

00:52:21.235 --> 00:52:23.714 show harm before anything can be done

NOTE Confidence: 0.89094794

00:52:23.714 --> 00:52:25.453 and have these substances banned.

NOTE Confidence: 0.89094794

00:52:25.453 --> 00:52:27.511 Do you think there's any potential

NOTE Confidence: 0.89094794

00:52:27.511 --> 00:52:29.274 to being able to reverse

NOTE Confidence: 0.89094794

00:52:29.274 --> 00:52:30.939 that or change that policy?

NOTE Confidence: 0.89094794

00:52:30.940 --> 00:52:34.710 Or will it take years and more data to do so?

NOTE Confidence: 0.86721903

00:52:35.300 --> 00:52:37.910 Yeah, so a lot of the chemicals were kind

NOTE Confidence: 0.86721903

00:52:37.910 --> 00:52:41.241 of grandfathered in when we established the

NOTE Confidence: 0.86721903

00:52:41.241 --> 00:52:43.620 Environmental Protection Agency in 1970.

NOTE Confidence: 0.86721903

00:52:43.620 --> 00:52:46.612 There is a new act that is supposed

NOTE Confidence: 0.86721903

00:52:46.612 --> 00:52:49.157 to reverse this burden of proof,

NOTE Confidence: 0.86721903

00:52:49.160 --> 00:52:52.320 but I don't think it's going to be

NOTE Confidence: 0.86721903

00:52:52.320 --> 00:52:55.192 retroactive, so I am encouraged to with

NOTE Confidence: 0.86721903

00:52:55.192 --> 00:52:57.653 the current administration that we may

NOTE Confidence: 0.86721903

00:52:57.653 --> 00:53:00.250 start to move towards a different model.

NOTE Confidence: 0.86721903

00:53:00.250 --> 00:53:02.896 Also, in Europe they have stronger

NOTE Confidence: 0.86721903

00:53:02.896 --> 00:53:05.077 precautionary policies where if there's

NOTE Confidence: 0.86721903

00:53:05.077 --> 00:53:07.869 a safer alternative you have to use it.

NOTE Confidence: 0.86721903

00:53:07.870 --> 00:53:11.214 And you know not to wait until we

NOTE Confidence: 0.86721903

00:53:11.214 --> 00:53:13.513 prove something with certainty to

NOTE Confidence: 0.86721903

00:53:13.513 --> 00:53:15.803 take some sort of action.

NOTE Confidence: 0.7947095

00:53:15.810 --> 00:53:19.258 Great, right? So there's a couple of chat

NOTE Confidence: 0.7947095

00:53:19.258 --> 00:53:21.978 questions I'll just quickly read them.

NOTE Confidence: 0.7947095

00:53:21.980 --> 00:53:25.508 Heard a Chow asked about any data on

NOTE Confidence: 0.7947095

00:53:25.510 --> 00:53:27.720 Agent Orange and thyroid cancer.

NOTE Confidence: 0.7947095

00:53:27.720 --> 00:53:30.667 Yeah, so Dioxin's is one of the

NOTE Confidence: 0.7947095

00:53:30.667 --> 00:53:32.570 constituents of Agent Orange.

NOTE Confidence: 0.7947095

00:53:32.570 --> 00:53:33.893 Well, Agent Orange.

NOTE Confidence: 0.7947095

00:53:33.893 --> 00:53:36.539 Had you know these defoliant chemicals?

NOTE Confidence: 0.7947095

00:53:36.540 --> 00:53:37.902 So various herbicides?

NOTE Confidence: 0.7947095

00:53:37.902 --> 00:53:39.900 And then? Dioxin's

NOTE Confidence: 0.81728315

00:53:42.160 --> 00:53:43.660 that's a great question,

NOTE Confidence: 0.81728315

00:53:43.660 --> 00:53:45.535 'cause they're also very structurally

NOTE Confidence: 0.81728315

00:53:45.535 --> 00:53:47.213 similar to the other chemicals

NOTE Confidence: 0.81728315

00:53:47.213 --> 00:53:49.208 I presented, but I'd have to,

NOTE Confidence: 0.81728315

00:53:49.208 --> 00:53:52.099 and some of the chemicals we looked at.

NOTE Confidence: 0.81728315

00:53:52.100 --> 00:53:56.160 Some of the groups were dioxin, like.

NOTE Confidence: 0.81728315

00:53:56.160 --> 00:53:58.687 I'm not, I'm not sure of any

NOTE Confidence: 0.81728315

00:53:58.687 --> 00:54:00.400 specific studies coming to mind,

NOTE Confidence: 0.81728315

00:54:00.400 --> 00:54:02.320 but it it seems likely that

NOTE Confidence: 0.81728315

00:54:02.320 --> 00:54:04.280 it may follow a similar.

NOTE Confidence: 0.81728315

00:54:04.280 --> 00:54:06.180 Well, they're structurally similar

NOTE Confidence: 0.81728315

00:54:06.180 --> 00:54:08.990 to the other other chemicals. OK,

NOTE Confidence: 0.85703105

00:54:08.990 --> 00:54:11.100 great and then Jeffrey Townsend

NOTE Confidence: 0.85703105

00:54:11.100 --> 00:54:14.129 has a question where you do see

NOTE Confidence: 0.85703105

00:54:14.129 --> 00:54:16.229 elevated odds of thyroid cancer?

NOTE Confidence: 0.85703105

00:54:16.230 --> 00:54:18.906 Do you have any evidence discriminating

NOTE Confidence: 0.85703105

00:54:18.906 --> 00:54:21.159 between the two hypotheses of

NOTE Confidence: 0.85703105

00:54:21.159 --> 00:54:23.553 effects that occur due to hormone

NOTE Confidence: 0.85703105

00:54:23.553 --> 00:54:25.237 disruption compared to effects

NOTE Confidence: 0.85703105

00:54:25.237 --> 00:54:27.751 that might be arising due to

NOTE Confidence: 0.85703105

00:54:27.751 --> 00:54:29.436 induction of carcinogenic mutation?

NOTE Confidence: 0.85703105

00:54:29.436 --> 00:54:31.140 Do you see ways

NOTE Confidence: 0.85703105

00:54:31.140 --> 00:54:32.844 to do this? Yeah,

NOTE Confidence: 0.85703105

00:54:32.844 --> 00:54:34.548 that's a great question.

NOTE Confidence: 0.85703105

00:54:34.550 --> 00:54:36.870 I don't really do this

NOTE Confidence: 0.85703105

00:54:36.870 --> 00:54:38.726 type of mechanistic work.

NOTE Confidence: 0.85703105

00:54:38.730 --> 00:54:41.100 I know the the thyroid hormone

NOTE Confidence: 0.85703105

00:54:41.100 --> 00:54:41.890 disruption hypothesis.

NOTE Confidence: 0.85703105

00:54:41.890 --> 00:54:43.865 There's been a lot more

NOTE Confidence: 0.85703105

00:54:43.865 --> 00:54:45.840 mechanistic work in that area,

NOTE Confidence: 0.85703105

00:54:45.840 --> 00:54:48.073 but I'd be open to suggestions for

NOTE Confidence: 0.85703105

00:54:48.073 --> 00:54:50.090 how this could hopefully maybe

NOTE Confidence: 0.85703105

00:54:50.090 --> 00:54:52.560 inform some some mechanistic studies.

NOTE Confidence: 0.85703105

00:54:52.560 --> 00:54:54.530 I think it would be,

NOTE Confidence: 0.85703105

00:54:54.530 --> 00:54:57.476 you know, I really think that.

NOTE Confidence: 0.85703105

00:54:57.480 --> 00:54:59.505 The study could inform mechanistic

NOTE Confidence: 0.85703105

00:54:59.505 --> 00:55:01.125 work and vice versa.

NOTE Confidence: 0.85703105

00:55:01.130 --> 00:55:01.540 Yeah,

NOTE Confidence: 0.82208735

00:55:01.540 --> 00:55:03.570 that's a great great point.

NOTE Confidence: 0.82208735

00:55:03.570 --> 00:55:06.496 And then Ashida had mentioned in regards

NOTE Confidence: 0.82208735

00:55:06.496 --> 00:55:09.415 to the policy of showing harm that

NOTE Confidence: 0.82208735

00:55:09.415 --> 00:55:12.100 Europe does the reverse of the US.

NOTE Confidence: 0.82208735

00:55:12.100 --> 00:55:14.935 Do they see as a different trend?

NOTE Confidence: 0.8658378

00:55:17.560 --> 00:55:19.044 Actually, thyroid cancer cases

NOTE Confidence: 0.8658378

00:55:19.044 --> 00:55:21.270 are going up globally and the

NOTE Confidence: 0.8658378

00:55:21.336 --> 00:55:23.436 trends in exposure are consistent.

NOTE Confidence: 0.8658378

00:55:23.440 --> 00:55:25.565 Actually, they were first observed

NOTE Confidence: 0.8658378

00:55:25.565 --> 00:55:28.171 in Sweden where they have breast

NOTE Confidence: 0.8658378

00:55:28.171 --> 00:55:31.041 milk banks an they saw these flame

NOTE Confidence: 0.8658378

00:55:31.041 --> 00:55:33.241 retardants going up in human milk

NOTE Confidence: 0.8658378

00:55:33.241 --> 00:55:35.552 samples which caused a lot of alarm.

NOTE Confidence: 0.8658378

00:55:35.552 --> 00:55:38.016 At that time we didn't know if

NOTE Confidence: 0.8658378

00:55:38.016 --> 00:55:40.300 they were carcinogenic or not,

NOTE Confidence: 0.8658378

00:55:40.300 --> 00:55:42.701 but given that you know babies were

NOTE Confidence: 0.8658378

00:55:42.701 --> 00:55:45.779 going to be exposed to these chemicals,

NOTE Confidence: 0.8658378

00:55:45.780 --> 00:55:46.890 that sort of.

NOTE Confidence: 0.8658378

00:55:46.890 --> 00:55:48.740 Triggered this whole area of

NOTE Confidence: 0.8658378

00:55:48.740 --> 00:55:51.024 research on these flame retardants

NOTE Confidence: 0.8658378

00:55:51.024 --> 00:55:52.497 and other chemicals.

NOTE Confidence: 0.8658378

00:55:52.500 --> 00:55:52.860 Great

NOTE Confidence: 0.8349844

00:55:52.860 --> 00:55:55.756 and then I just have one final question.

NOTE Confidence: 0.8349844

00:55:55.760 --> 00:55:58.182 The email that we all received last

NOTE Confidence: 0.8349844

00:55:58.182 --> 00:56:00.215 week about benzene being in some

NOTE Confidence: 0.8349844

00:56:00.215 --> 00:56:02.371 of the hand sanitizers for for our

NOTE Confidence: 0.8349844

00:56:02.436 --> 00:56:05.168 COVID-19 protection? Do you have any

NOTE Confidence: 0.8349844

00:56:05.170 --> 00:56:07.342 thoughts or comments on that? Yeah,

NOTE Confidence: 0.8349844

00:56:07.342 --> 00:56:10.600 I read that I read some of the materials.

NOTE Confidence: 0.8349844

00:56:10.600 --> 00:56:12.772 I think benzene you know is

NOTE Confidence: 0.8349844

00:56:12.772 --> 00:56:14.220 a known human carcinogen.

NOTE Confidence: 0.8349844

00:56:14.220 --> 00:56:16.747 However, it is present in many sources,

NOTE Confidence: 0.8349844

00:56:16.750 --> 00:56:19.319 so I would really want to to

NOTE Confidence: 0.8349844

00:56:19.319 --> 00:56:21.100 understand how risky this is.

NOTE Confidence: 0.8349844

00:56:21.100 --> 00:56:24.124 I think we need to know how much.

NOTE Confidence: 0.8349844

00:56:24.130 --> 00:56:26.377 Benzene and how does that compare to?

NOTE Confidence: 0.8349844

00:56:26.380 --> 00:56:28.318 Like putting gasoline in your car,

NOTE Confidence: 0.8349844

00:56:28.320 --> 00:56:30.704 you know or being walking near the roadway

NOTE Confidence: 0.8349844

00:56:30.704 --> 00:56:33.466 so I didn't raise too many alarms yet,

NOTE Confidence: 0.8349844

00:56:33.470 --> 00:56:34.614 but I would need.

NOTE Confidence: 0.8349844

00:56:34.614 --> 00:56:37.114 I feel like I need more data to

NOTE Confidence: 0.8349844

00:56:37.114 --> 00:56:39.256 be able to reach that conclusion.

NOTE Confidence: 0.8349844

00:56:39.260 --> 00:56:41.514 And I mean, the so yell health,

NOTE Confidence: 0.8349844

00:56:41.520 --> 00:56:42.808 environmental, safety and health

NOTE Confidence: 0.8349844

00:56:42.808 --> 00:56:44.418 said like let's be precautionary.

NOTE Confidence: 0.8349844

00:56:44.420 --> 00:56:46.667 Let's just get rid of these sanitizers,

NOTE Confidence: 0.8349844

00:56:46.670 --> 00:56:48.868 you know, let's let's take an action

NOTE Confidence: 0.8349844

00:56:48.868 --> 00:56:50.858 before we have all the answers,

NOTE Confidence: 0.8349844

00:56:50.860 --> 00:56:52.470 so I think that's, uh,

NOTE Confidence: 0.8349844

00:56:52.470 --> 00:56:54.074 you know, very sensible.

NOTE Confidence: 0.8349844

00:56:54.074 --> 00:56:55.277 Approach OK great.

NOTE Confidence: 0.8349844

00:56:55.280 --> 00:56:55.640 Well

NOTE Confidence: 0.803357

00:56:55.640 --> 00:56:57.410 thank you so much Dan.

NOTE Confidence: 0.803357

00:56:57.410 --> 00:56:59.522 Do you have any other closing

NOTE Confidence: 0.803357

00:56:59.522 --> 00:57:01.300 comments? I'll just thank both

NOTE Confidence: 0.803357

00:57:01.300 --> 00:57:03.418 our speakers today. Two terrific talks.

NOTE Confidence: 0.803357

00:57:03.420 --> 00:57:05.900 I learned alot. Thank you. Yes thank

NOTE Confidence: 0.803357

00:57:05.900 --> 00:57:10.379 you. Have a great day. Thanks.