WEBVTT

00:00:00.000 --> 00:00:03.096 Funding for Yale Cancer Answers is

NOTE Confidence: 0.93437621

00:00:03.096 --> 00:00:06.040 provided by Smilow Cancer Hospital.

NOTE Confidence: 0.93437621

00:00:06.040 --> 00:00:08.260 Welcome to Yale Cancer Answers

NOTE Confidence: 0.93437621

00:00:08.260 --> 00:00:10.036 with Doctor Anees Chagpar.

NOTE Confidence: 0.93437621

00:00:10.040 --> 00:00:11.915 Yale Cancer Answers features the

NOTE Confidence: 0.93437621

00:00:11.915 --> 00:00:13.790 latest information on cancer care

NOTE Confidence: 0.93437621

00:00:13.854 --> 00:00:15.334 by welcoming oncologists and

NOTE Confidence: 0.93437621

00:00:15.334 --> 00:00:17.554 specialists who are on the forefront

NOTE Confidence: 0.93437621

00:00:17.612 --> 00:00:19.316 of the battle to fight cancer.

NOTE Confidence: 0.93437621

00:00:19.320 --> 00:00:21.300 This week it's a conversation about

NOTE Confidence: 0.93437621

00:00:21.300 --> 00:00:24.030 the role of forever chemicals in cancer

NOTE Confidence: 0.93437621

00:00:24.030 --> 00:00:26.280 metastasis with Doctor Caroline Johnson.

NOTE Confidence: 0.93437621

00:00:26.280 --> 00:00:28.350 Doctor Johnson is an associate

NOTE Confidence: 0.93437621

00:00:28.350 --> 00:00:30.006 professor of epidemiology and

NOTE Confidence: 0.93437621

00:00:30.006 --> 00:00:31.454 Environmental Health Sciences at

NOTE Confidence: 0.93437621

00:00:31.454 --> 00:00:33.392 the Yale School of Public Health,

NOTE Confidence: 0.93437621

00:00:33.400 --> 00:00:35.242 and Doctor Chagpar is a professor

NOTE Confidence: 0.93437621

00:00:35.242 --> 00:00:36.831 of surgical oncology at the

NOTE Confidence: 0.93437621

00:00:36.831 --> 00:00:38.039 Yale School of Medicine.

NOTE Confidence: 0.948566586363636

00:00:38.920 --> 00:00:40.635 Caroline, maybe we can start off by

NOTE Confidence: 0.948566586363636

00:00:40.635 --> 00:00:42.342 you telling us a little bit more

NOTE Confidence: 0.948566586363636

00:00:42.342 --> 00:00:44.119 about yourself and what it is you do.

NOTE Confidence: 0.960626231428571

00:00:44.640 --> 00:00:46.236 For the past seven or eight years

NOTE Confidence: 0.960626231428571

00:00:46.240 --> 00:00:49.180 my main research interests have been to

NOTE Confidence: 0.960626231428571

00:00:49.180 --> 00:00:51.237 understand the metabolism of colorectal

NOTE Confidence: 0.960626231428571

00:00:51.237 --> 00:00:53.409 cancer and actually how this can

NOTE Confidence: 0.960626231428571

00:00:53.409 --> 00:00:56.078 relate to the prognosis of the patient.

NOTE Confidence: 0.960626231428571

00:00:56.080 --> 00:00:57.979 And one of the ways that we do this

NOTE Confidence: 0.960626231428571

00:00:57.979 --> 00:01:00.621 is actually by looking at those small

NOTE Confidence: 0.960626231428571

00:01:00.621 --> 00:01:01.806 differences between individuals

NOTE Confidence: 0.960626231428571

00:01:01.806 --> 00:01:03.928 that can actually influence their

NOTE Confidence: 0.960626231428571

00:01:03.928 --> 00:01:05.596 metabolism and their prognosis.

NOTE Confidence: 0.960626231428571

00:01:05.600 --> 00:01:08.248 So aspects such as the genetics of the

NOTE Confidence: 0.960626231428571

00:01:08.248 --> 00:01:10.806 tumour or an exposure that they may

NOTE Confidence: 0.960626231428571

00:01:10.806 --> 00:01:13.493 receive or even things like where the

NOTE Confidence: 0.960626231428571

00:01:13.493 --> 00:01:15.458 tumour occurs within the colorectum

NOTE Confidence: 0.960626231428571

00:01:15.458 --> 00:01:17.712 or even the sex of the individual.

NOTE Confidence: 0.960626231428571

00:01:17.712 --> 00:01:19.725 As we know this can also affect

NOTE Confidence: 0.960626231428571

00:01:19.725 --> 00:01:21.435 the prognosis of the patient.

NOTE Confidence: 0.794975509333333

00:01:22.920 --> 00:01:26.112 And so we can kind of

NOTE Confidence: 0.794975509333333

00:01:26.112 --> 00:01:28.394 understand that individuals may

NOTE Confidence: 0.794975509333333

00:01:28.394 --> 00:01:30.972 have different prognosis either

NOTE Confidence: 0.794975509333333

00:01:30.972 --> 00:01:34.416 based on genetics of the tumor or

NOTE Confidence: 0.794975509333333

00:01:34.416 --> 00:01:36.984 their environmental factors,

NOTE Confidence: 0.794975509333333

00:01:36.984 --> 00:01:39.360 their gender, etcetera.

NOTE Confidence: 0.794975509333333

00:01:39.360 --> 00:01:41.646 Talk a little bit more about

NOTE Confidence: 0.794975509333333

00:01:41.646 --> 00:01:43.674 how that translates into this

NOTE Confidence: 0.794975509333333

00:01:43.674 --> 00:01:45.398 metabolism of the cancer?

NOTE Confidence: 0.794975509333333

00:01:45.400 --> 00:01:47.720 Many of us, when we think about metabolism,

NOTE Confidence: 0.794975509333333

00:01:47.720 --> 00:01:50.960 we're thinking about our own metabolism,

NOTE Confidence: 0.794975509333333

00:01:50.960 --> 00:01:53.240 calories in, calories out, weight loss,

NOTE Confidence: 0.794975509333333

00:01:53.240 --> 00:01:55.400 weight gain, that kind of thing.

NOTE Confidence: 0.794975509333333

00:01:55.400 --> 00:01:59.229 Clearly tumors also have a metabolism in

NOTE Confidence: 0.794975509333333

00:01:59.229 --> 00:02:03.408 terms of how they grow and spread.

NOTE Confidence: 0.794975509333333

00:02:03.408 --> 00:02:07.760 Talk a little bit more about how those

NOTE Confidence: 0.794975509333333

00:02:07.870 --> 00:02:11.080 factors influence that metabolism.

NOTE Confidence: 0.929002875714286

00:02:11.920 --> 00:02:13.796 Yeah, that's a really good point actually.

NOTE Confidence: 0.929002875714286

00:02:13.800 --> 00:02:17.034 So when we talk about tumor metabolism,

NOTE Confidence: 0.929002875714286

00:02:17.040 --> 00:02:19.105 we're talking about specifically what

NOTE Confidence: 0.929002875714286

00:02:19.105 --> 00:02:21.901 is happening in those groups of cells

NOTE Confidence: 0.929002875714286

00:02:21.901 --> 00:02:24.232 that are growing within the the tumor.

NOTE Confidence: 0.929002875714286

00:02:24.240 --> 00:02:26.560 And as the the tumor starts to grow,

NOTE Confidence: 0.929002875714286

00:02:26.560 --> 00:02:28.736 it's actually very metabolically

NOTE Confidence: 0.929002875714286

00:02:28.736 --> 00:02:32.000 dependent for its ability to metastasize.

NOTE Confidence: 0.929002875714286

00:02:32.000 --> 00:02:34.958 So when the the primary tumor,

NOTE Confidence: 0.929002875714286

00:02:34.960 --> 00:02:37.872 so the initial tumor in the case of

NOTE Confidence: 0.929002875714286

00:02:37.872 --> 00:02:39.954 colorectal cancer is present in the

NOTE Confidence: 0.929002875714286

00:02:39.954 --> 00:02:42.659 colon or the rectum it actually starts

NOTE Confidence: 0.929002875714286

00:02:42.659 --> 00:02:45.497 to produce some small chemicals called

NOTE Confidence: 0.929002875714286

00:02:45.497 --> 00:02:47.759 metabolites that can be quite acidic.

NOTE Confidence: 0.929002875714286

00:02:47.760 --> 00:02:50.640 So this can increase the local

NOTE Confidence: 0.929002875714286

00:02:50.640 --> 00:02:52.660 environment of the tumor,

NOTE Confidence: 0.929002875714286

00:02:52.660 --> 00:02:55.185 increase its acidity by

NOTE Confidence: 0.929002875714286

00:02:55.185 --> 00:02:57.223 decreasing the pH and this can

NOTE Confidence: 0.929002875714286

00:02:57.223 --> 00:02:58.928 actually cause breakdown of the

NOTE Confidence: 0.929002875714286

00:02:58.928 --> 00:03:01.168 membranes in the tumor and

NOTE Confidence: 0.929002875714286

00:03:01.168 --> 00:03:03.072 the cell membranes and cause the

NOTE Confidence: 0.929002875714286

00:03:03.072 --> 00:03:04.802 cells to undergo intraversation so

NOTE Confidence: 0.929002875714286

00:03:04.802 --> 00:03:07.460 they can then do things like move

NOTE Confidence: 0.929002875714286

00:03:07.460 --> 00:03:09.080 towards a circulatory system.

NOTE Confidence: 0.929002875714286

00:03:09.080 --> 00:03:10.780 So that's very dependent on

NOTE Confidence: 0.929002875714286

00:03:10.780 --> 00:03:12.480 the metabolism of the tumor.

NOTE Confidence: 0.929002875714286

00:03:12.480 --> 00:03:14.508 And then again when they enter

NOTE Confidence: 0.929002875714286

00:03:14.508 --> 00:03:16.288 the circulatory system the

NOTE Confidence: 0.929002875714286

00:03:16.288 --> 00:03:17.756 individual tumor cells,

NOTE Confidence: 0.929002875714286

00:03:17.760 --> 00:03:19.608 they're bombarded with things

NOTE Confidence: 0.929002875714286

00:03:19.608 --> 00:03:20.994 like oxidative stress.

NOTE Confidence: 0.929002875714286

00:03:21.000 --> 00:03:23.520 So the metabolism of the tumor

NOTE Confidence: 0.929002875714286

00:03:23.520 --> 00:03:26.000 cells themselves change again to

NOTE Confidence: 0.929002875714286

00:03:26.000 --> 00:03:29.200 counteract this oxidative stress.

NOTE Confidence: 0.929002875714286

00:03:29.200 --> 00:03:30.358 And then when these tumor cells

NOTE Confidence: 0.929002875714286

00:03:30.358 --> 00:03:32.582 reach a new organ or a new site

NOTE Confidence: 0.929002875714286

00:03:32.582 --> 00:03:34.651 such as the lung or the liver in

NOTE Confidence: 0.929002875714286

00:03:34.651 --> 00:03:36.599 the case of colorectal cancer,

NOTE Confidence: 0.929002875714286

00:03:36.600 --> 00:03:39.318 they undergo this state of dormancy.

NOTE Confidence: 0.929002875714286

00:03:39.320 --> 00:03:41.623 And then they ramp up their metabolism

NOTE Confidence: 0.929002875714286

00:03:41.623 --> 00:03:43.442 again by taking in different

NOTE Confidence: 0.929002875714286

00:03:43.442 --> 00:03:45.357 nutrients from those new sites,

NOTE Confidence: 0.929002875714286

00:03:45.360 --> 00:03:46.830 so from the surrounding tissue

NOTE Confidence: 0.929002875714286

00:03:46.830 --> 00:03:48.720 in the lung or the liver.

NOTE Confidence: 0.929002875714286

00:03:48.720 --> 00:03:51.048 And then they start to produce

NOTE Confidence: 0.929002875714286

00:03:51.048 --> 00:03:53.041 things like nucleic acids and

NOTE Confidence: 0.929002875714286

00:03:53.041 --> 00:03:55.255 amino acids and proteins to survive

NOTE Confidence: 0.929002875714286

00:03:55.255 --> 00:03:58.328 and grow in that new site.

NOTE Confidence: 0.929002875714286

00:03:58.328 --> 00:04:01.238 So actually metabolism is really

NOTE Confidence: 0.929002875714286

00:04:01.238 --> 00:04:03.380 intrinsic to going from being

NOTE Confidence: 0.929002875714286

00:04:03.380 --> 00:04:05.480 in that initial primary tumor

NOTE Confidence: 0.929002875714286

00:04:05.480 --> 00:04:08.240 state to the metastatic state.

NOTE Confidence: 0.900729723888889

00:04:10.080 --> 00:04:13.062 And so that really interesting when

NOTE Confidence: 0.900729723888889

00:04:13.062 --> 00:04:16.484 we think about how these cancer cells kind

NOTE Confidence: 0.900729723888889

00:04:16.484 --> 00:04:19.780 of use different milieu that they may find

NOTE Confidence: 0.900729723888889

00:04:19.780 --> 00:04:22.351 themselves in to really take advantage

NOTE Confidence: 0.900729723888889

00:04:22.351 --> 00:04:25.354 of the system to grow and flourish.

NOTE Confidence: 0.900729723888889

00:04:25.360 --> 00:04:27.280 You know as you think about that,

NOTE Confidence: 0.900729723888889

00:04:27.280 --> 00:04:29.604 some of our listeners may be thinking

NOTE Confidence: 0.900729723888889

00:04:29.604 --> 00:04:31.999 about how do you counteract that.

NOTE Confidence: 0.900729723888889

00:04:32.000 --> 00:04:36.944 And I think some of this then

NOTE Confidence: 0.900729723888889

00:04:36.944 --> 00:04:39.340 leads to people having perceptions

NOTE Confidence: 0.900729723888889

00:04:39.340 --> 00:04:42.875 that may or may not be true.

NOTE Confidence: 0.900729723888889

00:04:42.880 --> 00:04:44.164 So for example,

NOTE Confidence: 0.900729723888889

00:04:44.164 --> 00:04:46.488 when we think about cancer cells,

NOTE Confidence: 0.900729723888889

00:04:46.488 --> 00:04:51.351 as you mentioned, initially creating a

NOTE Confidence: 0.900729723888889

00:04:51.351 --> 00:04:54.177 acidic environment where they can then

NOTE Confidence: 0.900729723888889

00:04:54.177 --> 00:04:57.159 migrate towards the circulatory system,

NOTE Confidence: 0.900729723888889

00:04:57.160 --> 00:04:58.664 some people might think,

NOTE Confidence: 0.900729723888889

00:04:58.664 --> 00:05:01.679 well then that's a good reason to try to,

NOTE Confidence: 0.900729723888889

00:05:01.680 --> 00:05:02.946 for example,

NOTE Confidence: 0.900729723888889

00:05:02.946 --> 00:05:06.460 drink alkaline water or try to

NOTE Confidence: 0.900729723888889

00:05:06.460 --> 00:05:09.400 alkalinize your system so that cancer

NOTE Confidence: 0.900729723888889

00:05:09.400 --> 00:05:12.437 cells then don't grow and spread.

NOTE Confidence: 0.900729723888889

00:05:12.440 --> 00:05:15.398 Is there any fact to that?

NOTE Confidence: 0.900729723888889

00:05:15.400 --> 00:05:17.032 Is there any weight to that

NOTE Confidence: 0.900729723888889

00:05:17.032 --> 00:05:18.120 kind of an argument?

NOTE Confidence: 0.913389092857143

00:05:19.440 --> 00:05:20.959 Yeah, that is a really good point.

NOTE Confidence: 0.913389092857143

00:05:20.960 --> 00:05:23.240 And in this case,

NOTE Confidence: 0.913389092857143

00:05:23.240 --> 00:05:26.318 I don't think that would work.

NOTE Confidence: 0.913389092857143

00:05:26.320 --> 00:05:28.408 I think because

NOTE Confidence: 0.913389092857143

00:05:28.408 --> 00:05:30.191 there's many different aspects as

NOTE Confidence: 0.913389092857143

00:05:30.191 --> 00:05:32.171 well that can control the local

NOTE Confidence: 0.913389092857143

00:05:32.171 --> 00:05:34.040 environment within the tumor.

NOTE Confidence: 0.913389092857143

00:05:34.040 --> 00:05:35.756 So some of these

NOTE Confidence: 0.913389092857143

00:05:35.760 --> 00:05:37.454 are due to the genetic make up

NOTE Confidence: 0.913389092857143

00:05:37.454 --> 00:05:39.472 of the tumor that

NOTE Confidence: 0.913389092857143

00:05:39.472 --> 00:05:41.852 can control the expression of

NOTE Confidence: 0.913389092857143

00:05:41.852 --> 00:05:44.342 proteins that control how these

NOTE Confidence: 0.913389092857143

00:05:44.342 --> 00:05:46.030 metabolites are actually produced.

NOTE Confidence: 0.913389092857143

00:05:46.030 --> 00:05:48.160 And there's other aspects as well,

00:05:49.198 --> 00:05:51.274 such as the presence of the microbiome,

00:05:52.018 --> 00:05:53.494 which we know that there are thousands

NOTE Confidence: 0.913389092857143

00:05:53.494 --> 00:05:54.640 of different species.

NOTE Confidence: 0.913389092857143

00:05:54.640 --> 00:05:57.328 They all have their own genome and

NOTE Confidence: 0.913389092857143

00:05:57.328 --> 00:05:59.568 they can produce and metabolise

NOTE Confidence: 0.913389092857143

00:05:59.568 --> 00:06:01.928 various metabolites as well and

NOTE Confidence: 0.913389092857143

00:06:01.928 --> 00:06:03.916 control this local environment.

NOTE Confidence: 0.913389092857143

00:06:03.920 --> 00:06:07.142 So it really is a complicated

NOTE Confidence: 0.913389092857143

00:06:07.142 --> 00:06:10.106 mix of various factors that

NOTE Confidence: 0.913389092857143

00:06:10.106 --> 00:06:12.918 can influence the metabolism

NOTE Confidence: 0.913389092857143

00:06:12.920 --> 00:06:15.098 within the colorectum itself

NOTE Confidence: 0.913389092857143

00:06:15.098 --> 00:06:17.382 and things that you may ingest

NOTE Confidence: 0.913389092857143

00:06:17.382 --> 00:06:19.292 obviously go through various processes

NOTE Confidence: 0.913389092857143

00:06:19.292 --> 00:06:21.810 in your body to actually

NOTE Confidence: 0.913389092857143

00:06:21.810 --> 00:06:24.824 reach that area of the colon.

00:06:25.960 --> 00:06:27.416 So direct ingestion of something

NOTE Confidence: 0.913389092857143

00:06:27.416 --> 00:06:29.236 like alkaline water I wouldn't

NOTE Confidence: 0.913389092857143

00:06:29.236 --> 00:06:30.479 expect would

NOTE Confidence: 0.913389092857143

00:06:30.480 --> 00:06:31.888 affect an acidic environment,

NOTE Confidence: 0.913389092857143

00:06:31.888 --> 00:06:34.480 within the the tumor itself.

NOTE Confidence: 0.899523215

00:06:35.760 --> 00:06:40.008 So let's dive a bit more into your research

NOTE Confidence: 0.899523215

00:06:40.008 --> 00:06:43.520 that hopefully will be more impactful.

NOTE Confidence: 0.899523215

00:06:43.520 --> 00:06:46.152 Talk a little bit more about how

NOTE Confidence: 0.899523215

00:06:46.152 --> 00:06:48.680 your study of this metabolism,

NOTE Confidence: 0.899523215

00:06:48.680 --> 00:06:50.726 what exactly you're doing in your

NOTE Confidence: 0.899523215

00:06:50.726 --> 00:06:53.317 lab and how you hope that

NOTE Confidence: 0.899523215

00:06:53.317 --> 00:06:55.615 that will then lead to meaningful

NOTE Confidence: 0.899523215

00:06:55.615 --> 00:06:57.679 impacts for patients long term.

NOTE Confidence: 0.8582305675

00:06:58.920 --> 00:07:00.838 We're trying to look at

NOTE Confidence: 0.8582305675

00:07:00.838 --> 00:07:02.200 all these different

NOTE Confidence: 0.8582305675

00:07:02.200 --> 00:07:06.078 aspects of individuals such as

NOTE Confidence: 0.8582305675

00:07:06.080 --> 00:07:07.442 we've done a lot of research

NOTE Confidence: 0.8582305675

00:07:07.442 --> 00:07:08.680 so far on

NOTE Confidence: 0.8582305675

00:07:08.680 --> 00:07:10.558 whether the sex of the patient

NOTE Confidence: 0.8582305675

00:07:10.560 --> 00:07:13.560 can influence prognosis

NOTE Confidence: 0.8582305675

00:07:13.560 --> 00:07:15.192 and other aspects too.

NOTE Confidence: 0.8582305675

00:07:15.192 --> 00:07:18.387 And the way that we look at

NOTE Confidence: 0.8582305675

00:07:18.387 --> 00:07:21.880 this is by using a technology called

NOTE Confidence: 0.8582305675

00:07:21.880 --> 00:07:24.152 mass spectrometry based metabolomics.

NOTE Confidence: 0.8582305675

00:07:24.160 --> 00:07:27.342 And what we do here is that

NOTE Confidence: 0.8582305675

00:07:27.342 --> 00:07:29.799 we take the tumor samples from individuals.

NOTE Confidence: 0.8582305675

00:07:29.800 --> 00:07:33.055 So our very first study actually looked

NOTE Confidence: 0.8582305675

00:07:33.055 --> 00:07:36.118 at 200 different tumor tissues from

NOTE Confidence: 0.8582305675

00:07:36.120 --> 00:07:39.494 males and females and we analyze each

NOTE Confidence: 0.8582305675

00:07:39.494 --> 00:07:42.640 of these tumors to see what their

00:07:43.142 --> 00:07:44.397 metabolism look like.

NOTE Confidence: 0.8582305675

00:07:44.400 --> 00:07:46.175 So all the individual metabolites

NOTE Confidence: 0.8582305675

00:07:46.175 --> 00:07:47.240 that were present.

NOTE Confidence: 0.8582305675

00:07:47.240 --> 00:07:49.214 So we take these tumor samples

NOTE Confidence: 0.8582305675

00:07:49.214 --> 00:07:51.867 and we use this technology called

NOTE Confidence: 0.8582305675

00:07:51.867 --> 00:07:53.760 liquid chromatography based

NOTE Confidence: 0.8582305675

00:07:53.760 --> 00:07:55.077 mass spectrometry metabolomics.

NOTE Confidence: 0.8582305675

00:07:55.077 --> 00:07:58.617 And this essentially is like using a giant

NOTE Confidence: 0.8582305675

00:07:58.617 --> 00:08:00.999 molecular sieve and a weighing scale.

NOTE Confidence: 0.8582305675

00:08:01.000 --> 00:08:02.872 And it can give chemical information

NOTE Confidence: 0.8582305675

00:08:02.872 --> 00:08:05.088 on the thousands of different small

NOTE Confidence: 0.8582305675

00:08:05.088 --> 00:08:07.128 molecules or chemicals or metabolites

NOTE Confidence: 0.8582305675

00:08:07.128 --> 00:08:09.432 that are present within each tumor.

NOTE Confidence: 0.8582305675

00:08:09.432 --> 00:08:11.112 And these metabolites can come

NOTE Confidence: 0.8582305675

00:08:11.112 --> 00:08:12.870 from things like

NOTE Confidence: 0.8582305675

00:08:12.870 --> 00:08:14.370 your diet, from different

NOTE Confidence: 0.8582305675

00:08:14.370 --> 00:08:15.120 environmental exposures.

NOTE Confidence: 0.8582305675

00:08:15.120 --> 00:08:17.234 If they're at a high enough level,

NOTE Confidence: 0.8582305675

00:08:17.240 --> 00:08:19.820 we can tell about different aspects

NOTE Confidence: 0.8582305675

00:08:19.820 --> 00:08:21.960 of microbial metabolism as well.

NOTE Confidence: 0.8582305675

00:08:21.960 --> 00:08:23.773 And we look at all of these

NOTE Confidence: 0.8582305675

00:08:23.773 --> 00:08:25.120 metabolites together as

NOTE Confidence: 0.8582305675

00:08:25.120 --> 00:08:27.280 as they do have some dependency

NOTE Confidence: 0.8582305675

00:08:27.280 --> 00:08:30.226 on each other and we can predict

NOTE Confidence: 0.8582305675

00:08:30.226 --> 00:08:32.134 what biological effects these

NOTE Confidence: 0.8582305675

00:08:32.134 --> 00:08:34.160 metabolites could be having.

NOTE Confidence: 0.8582305675

00:08:34.160 --> 00:08:36.944 And I guess one analogy that I like

NOTE Confidence: 0.8582305675

00:08:36.944 --> 00:08:39.236 to think about when I'm thinking

NOTE Confidence: 0.8582305675

00:08:39.236 --> 00:08:41.384 of metabolites and how they link

NOTE Confidence: 0.8582305675

00:08:41.384 --> 00:08:43.703 to biology is kind of like the

NOTE Confidence: 0.8582305675

00:08:43.703 --> 00:08:45.238 New York City subway system.

NOTE Confidence: 0.8582305675

00:08:45.240 --> 00:08:48.884 So we know that the New York City subway

NOTE Confidence: 0.8582305675

00:08:48.884 --> 00:08:50.489 system has various different train

NOTE Confidence: 0.8582305675

00:08:50.489 --> 00:08:52.698 lines and each of these train lines

NOTE Confidence: 0.8582305675

00:08:52.698 --> 00:08:54.235 has specific subway stations along

NOTE Confidence: 0.8582305675

00:08:54.235 --> 00:08:56.299 them and we know which train lines go

NOTE Confidence: 0.8582305675

00:08:56.299 --> 00:08:58.600 along which to which subway stations.

NOTE Confidence: 0.8582305675

00:08:58.600 --> 00:09:00.040 It's the same with metabolism.

NOTE Confidence: 0.8582305675

00:09:00.040 --> 00:09:02.146 So if we think of each of these train

NOTE Confidence: 0.8582305675

00:09:02.146 --> 00:09:04.339 lines as metabolic pathways and each of

NOTE Confidence: 0.8582305675

00:09:04.339 --> 00:09:06.320 these subway stations as metabolites,

NOTE Confidence: 0.8582305675

00:09:06.320 --> 00:09:08.612 we know which metabolites are linked

NOTE Confidence: 0.8582305675

00:09:08.612 --> 00:09:10.632 to certain metabolic pathways that

NOTE Confidence: 0.8582305675

00:09:10.632 --> 00:09:12.757 control metabolism and control biology.

NOTE Confidence: 0.8582305675

00:09:12.760 --> 00:09:17.424 So things like controlling oxidative stress,

NOTE Confidence: 0.8582305675

00:09:17.424 --> 00:09:19.040 producing energy,

NOTE Confidence: 0.8582305675

00:09:19.040 --> 00:09:20.135 controlling fat metabolism

NOTE Confidence: 0.8582305675

00:09:20.135 --> 00:09:21.595 and things like that.

NOTE Confidence: 0.8582305675

00:09:21.600 --> 00:09:23.888 So then we start to put together a

NOTE Confidence: 0.8582305675

00:09:23.888 --> 00:09:25.960 picture of how certain factors such

NOTE Confidence: 0.8582305675

00:09:25.960 --> 00:09:28.102 as the influence of an exposure

NOTE Confidence: 0.8582305675

00:09:28.165 --> 00:09:30.482 or the sex of the individual can

NOTE Confidence: 0.8582305675

00:09:30.482 --> 00:09:32.560 alter these aspects of biology and

NOTE Confidence: 0.8582305675

00:09:32.560 --> 00:09:34.720 can be health indicators for us.

NOTE Confidence: 0.899809129166667

00:09:36.400 --> 00:09:38.465 And that really interesting

NOTE Confidence: 0.899809129166667

00:09:38.465 --> 00:09:41.360 and important work in the sense that,

NOTE Confidence: 0.899809129166667

00:09:41.360 --> 00:09:43.985 you know, if you're finding that there

NOTE Confidence: 0.899809129166667

00:09:43.985 --> 00:09:46.248 are differences based on gender in

NOTE Confidence: 0.899809129166667

00:09:46.248 --> 00:09:48.380 terms of these metabolites, then by

NOTE Confidence: 0.899809129166667

00:09:48.380 --> 00:09:50.480 definition that means that the biology,

NOTE Confidence: 0.899809129166667

00:09:50.480 --> 00:09:54.841 how men and women, their biologic systems

NOTE Confidence: 0.899809129166667

00:09:54.841 --> 00:09:58.040 process these metabolites is different.

NOTE Confidence: 0.899809129166667

00:09:58.040 --> 00:10:01.596 And so that has really profound implications,

NOTE Confidence: 0.899809129166667

00:10:01.600 --> 00:10:04.197 not only in terms of the differences,

NOTE Confidence: 0.899809129166667

00:10:04.200 --> 00:10:06.412 in terms of the rate at which

NOTE Confidence: 0.899809129166667

00:10:06.412 --> 00:10:08.319 men and women get cancers,

NOTE Confidence: 0.899809129166667

00:10:08.320 --> 00:10:09.780 but potentially in terms of

NOTE Confidence: 0.899809129166667

00:10:09.780 --> 00:10:11.240 how they're treated as well.

NOTE Confidence: 0.899809129166667

00:10:11.240 --> 00:10:11.879 Is that right?

NOTE Confidence: 0.86175494625

00:10:12.640 --> 00:10:14.040 Yeah, that is correct.

NOTE Confidence: 0.86175494625

00:10:14.040 --> 00:10:15.440 And in colorectal cancer,

NOTE Confidence: 0.86175494625

00:10:15.440 --> 00:10:17.320 to my knowledge, I'm not a clinician.

NOTE Confidence: 0.86175494625

00:10:17.320 --> 00:10:21.320 I'm a basic science researcher,

NOTE Confidence: 0.86175494625

00:10:21.320 --> 00:10:24.435 is that men and women aren't stratified

00:10:25.320 --> 00:10:26.728 by sex for treatment.

NOTE Confidence: 0.86175494625

00:10:26.728 --> 00:10:29.276 And there have been a couple of

NOTE Confidence: 0.86175494625

00:10:29.276 --> 00:10:32.156 publications that I saw over the past year

NOTE Confidence: 0.86175494625

00:10:32.160 --> 00:10:35.170 where they've seen that men and women have

NOTE Confidence: 0.86175494625

00:10:35.170 --> 00:10:37.520 different outcomes when they receive

NOTE Confidence: 0.86175494625

00:10:37.520 --> 00:10:39.920 the same type of chemotherapeutics.

NOTE Confidence: 0.86175494625

00:10:39.920 --> 00:10:41.696 So using combination chemotherapeutics,

NOTE Confidence: 0.86175494625

00:10:41.696 --> 00:10:44.360 one study saw that the female

NOTE Confidence: 0.86175494625

00:10:44.433 --> 00:10:46.493 patients actually had a poorer

NOTE Confidence: 0.86175494625

00:10:46.493 --> 00:10:48.553 prognosis than the male patients.

NOTE Confidence: 0.86175494625

00:10:48.560 --> 00:10:49.994 And this is probably

NOTE Confidence: 0.86175494625

00:10:49.994 --> 00:10:51.240 a combination of

NOTE Confidence: 0.86175494625

00:10:51.240 --> 00:10:54.312 metabolism and immune responses.

NOTE Confidence: 0.86175494625

00:10:54.312 --> 00:10:56.184 So yes, there's definitely

NOTE Confidence: 0.86175494625

00:10:56.184 --> 00:10:58.392 a difference that we see,

NOTE Confidence: 0.86175494625

00:10:58.400 --> 00:11:00.506 and in terms of

NOTE Confidence: 0.86175494625

00:11:00.506 --> 00:11:01.559 incidence and mortality,

00:11:02.254 --> 00:11:04.336 males generally have a higher incidence

NOTE Confidence: 0.86175494625

00:11:04.336 --> 00:11:06.360 and mortality from colorectal cancer.

NOTE Confidence: 0.86175494625

00:11:06.360 --> 00:11:08.760 But for women, for colorectal cancer

00:11:09.960 --> 00:11:11.906 it is still the third leading cause

NOTE Confidence: 0.86175494625

00:11:11.906 --> 00:11:13.639 of cancer related deaths for them.

NOTE Confidence: 0.86175494625

00:11:13.640 --> 00:11:17.096 So it is still very important I think to

NOTE Confidence: 0.86175494625

00:11:17.096 --> 00:11:20.088 study both males and females separately,

NOTE Confidence: 0.86175494625

00:11:20.088 --> 00:11:22.840 in terms of colorectal cancer,

NOTE Confidence: 0.893560627272727

00:11:23.840 --> 00:11:26.794 and I think

NOTE Confidence: 0.893560627272727

00:11:26.794 --> 00:11:29.332 we've seen similar things in terms

NOTE Confidence: 0.893560627272727

00:11:29.332 --> 00:11:31.062 of research looking at gender

NOTE Confidence: 0.893560627272727

00:11:31.062 --> 00:11:33.218 differences even in things like heart

NOTE Confidence: 0.893560627272727

00:11:33.218 --> 00:11:35.330 disease where initially all of the

NOTE Confidence: 0.893560627272727

00:11:35.330 --> 00:11:37.472 trials were done using white males.

NOTE Confidence: 0.893560627272727

00:11:37.472 --> 00:11:40.384 And what we then discovered was that

NOTE Confidence: 0.893560627272727

00:11:40.384 --> 00:11:43.905 men and women are different in terms

NOTE Confidence: 0.893560627272727

00:11:43.905 --> 00:11:45.917 of their cardiovascular health.

NOTE Confidence: 0.893560627272727

00:11:45.920 --> 00:11:48.656 And that's why I think it's so important

NOTE Confidence: 0.893560627272727

00:11:48.656 --> 00:11:51.688 that we try to get a diversity of people

NOTE Confidence: 0.893560627272727

00:11:51.688 --> 00:11:53.546 to participate in clinical trials

NOTE Confidence: 0.893560627272727

00:11:53.546 --> 00:11:56.136 so that we really can understand the

NOTE Confidence: 0.893560627272727

00:11:56.208 --> 00:11:58.363 biology of different particular

NOTE Confidence: 0.893560627272727

00:11:58.363 --> 00:12:02.760 groups who may have different biologies.

00:12:04.560 --> 00:12:07.470 I think that certainly

NOTE Confidence: 0.893560627272727

00:12:07.470 --> 00:12:10.760 might be an area for further work.

NOTE Confidence: 0.893560627272727

00:12:10.760 --> 00:12:12.956 I know you're not a clinician,

00:12:14.640 --> 00:12:17.104 but thinking about how different drugs

NOTE Confidence: 0.893560627272727

00:12:17.104 --> 00:12:19.792 get metabolized in men versus women,

NOTE Confidence: 0.893560627272727

00:12:19.800 --> 00:12:22.360 how different drugs might

NOTE Confidence: 0.893560627272727

00:12:22.360 --> 00:12:26.572 affect the immune system in different

NOTE Confidence: 0.893560627272727

00:12:26.572 --> 00:12:29.445 people may actually potentially have an

NOTE Confidence: 0.893560627272727

00:12:29.445 --> 00:12:32.960 impact in terms of how they're treated.

NOTE Confidence: 0.893560627272727

00:12:32.960 --> 00:12:34.948 Is that kind of where your

NOTE Confidence: 0.893560627272727

00:12:34.948 --> 00:12:37.111 research is heading in terms of

NOTE Confidence: 0.893560627272727

00:12:37.111 --> 00:12:38.359 highlighting these differences?

NOTE Confidence: 0.910526806666667

00:12:39.160 --> 00:12:40.540 Yeah, exactly.

NOTE Confidence: 0.910526806666667

00:12:40.540 --> 00:12:43.504 And you know, some of the research

NOTE Confidence: 0.910526806666667

00:12:43.504 --> 00:12:46.434 that we're doing at the moment is

NOTE Confidence: 0.910526806666667

00:12:46.434 --> 00:12:49.758 actually looking at some of the

NOTE Confidence: 0.910526806666667

00:12:49.760 --> 00:12:52.070 in vitro data that has

NOTE Confidence: 0.910526806666667

00:12:52.070 --> 00:12:54.160 been generated on the

NOTE Confidence: 0.910526806666667

00:12:54.160 --> 00:12:56.440 genomes of various different colorectal

NOTE Confidence: 0.910526806666667

00:12:56.440 --> 00:12:58.818 cancer cell lines that come from males

NOTE Confidence: 0.910526806666667

00:12:58.818 --> 00:13:01.041 and females and looking at how the

NOTE Confidence: 0.910526806666667

00:13:01.041 --> 00:13:03.473 drugs can actually work in these cell lines.

NOTE Confidence: 0.910526806666667

00:13:03.480 --> 00:13:06.423 And we do see that there are sex differences

NOTE Confidence: 0.910526806666667

00:13:06.423 --> 00:13:09.475 in how effective these drugs may be.

NOTE Confidence: 0.910526806666667

00:13:09.480 --> 00:13:12.144 So my PHD student we have in the lab

NOTE Confidence: 0.910526806666667

00:13:12.144 --> 00:13:15.182 is currently working on this as part

NOTE Confidence: 0.910526806666667

00:13:15.182 --> 00:13:17.858 of her dissertation, thesis.

NOTE Confidence: 0.910526806666667

00:13:17.858 --> 00:13:19.196 But you know,

NOTE Confidence: 0.910526806666667

00:13:19.200 --> 00:13:21.531 what we hope to do is to then translate

NOTE Confidence: 0.910526806666667

00:13:21.531 --> 00:13:23.756 these findings that we have in the

NOTE Confidence: 0.910526806666667

00:13:23.756 --> 00:13:25.719 cell lines eventually into looking at,

NOTE Confidence: 0.910526806666667

00:13:25.720 --> 00:13:28.186 you know, if we see the same effect in

NOTE Confidence: 0.910526806666667

00:13:28.186 --> 00:13:30.040 patients by sex and gender as well.

NOTE Confidence: 0.908537800769231

00:13:31.280 --> 00:13:33.134 Fantastic. Well, we're going to take

NOTE Confidence: 0.908537800769231

00:13:33.134 --> 00:13:35.399 a short break for a medical minute.

NOTE Confidence: 0.908537800769231

00:13:35.400 --> 00:13:36.524 But please stay tuned

NOTE Confidence: 0.908537800769231

00:13:36.524 --> 00:13:39.058 to learn more about the role of forever

NOTE Confidence: 0.908537800769231

00:13:39.058 --> 00:13:40.638 chemicals and cancer metastasis,

NOTE Confidence: 0.908537800769231

00:13:40.640 --> 00:13:43.048 a topic we'll get more into right

NOTE Confidence: 0.908537800769231

00:13:43.048 --> 00:13:45.199 after the break with my guest,

NOTE Confidence: 0.908537800769231

00:13:45.199 --> 00:13:46.318 Doctor Caroline Johnson.

NOTE Confidence: 0.896286936

00:13:46.760 --> 00:13:48.820 Funding for Yale Cancer Answers

NOTE Confidence: 0.896286936

00:13:48.820 --> 00:13:50.880 comes from Smilow Cancer Hospital,

NOTE Confidence: 0.896286936

00:13:50.880 --> 00:13:53.004 where all patients have access to

NOTE Confidence: 0.896286936

00:13:53.004 --> 00:13:55.357 cutting edge clinical trials at several

NOTE Confidence: 0.896286936

00:13:55.357 --> 00:13:57.557 convenient locations throughout the region.

NOTE Confidence: 0.896286936

00:13:57.560 --> 00:14:02.560 To learn more, visit smilowcancerhospital.org.

NOTE Confidence: 0.896286936

00:14:02.560 --> 00:14:04.365 It's estimated that over 240,000

NOTE Confidence: 0.896286936

00:14:04.365 --> 00:14:07.133 men in the US will be diagnosed

NOTE Confidence: 0.896286936

00:14:07.133 --> 00:14:09.358 with prostate cancer this year,

NOTE Confidence: 0.896286936

00:14:09.360 --> 00:14:11.832 with over 3000 new cases being

NOTE Confidence: 0.896286936

00:14:11.832 --> 00:14:13.480 identified here in Connecticut.

NOTE Confidence: 0.896286936

00:14:13.480 --> 00:14:15.508 One in eight American men will

NOTE Confidence: 0.896286936

00:14:15.508 --> 00:14:16.860 develop prostate cancer in

NOTE Confidence: 0.896286936

00:14:16.919 --> 00:14:18.519 the course of his lifetime.

NOTE Confidence: 0.896286936

00:14:18.520 --> 00:14:20.620 Major advances in the detection and

NOTE Confidence: 0.896286936

00:14:20.620 --> 00:14:22.393 treatment of prostate cancer have

NOTE Confidence: 0.896286936

00:14:22.393 --> 00:14:23.661 dramatically decreased the number

NOTE Confidence: 0.896286936

00:14:23.661 --> 00:14:25.960 of men who die from the disease.

NOTE Confidence: 0.896286936

00:14:25.960 --> 00:14:27.670 Screening can be performed quickly

NOTE Confidence: 0.896286936

00:14:27.670 --> 00:14:29.426 and easily in a physician's

NOTE Confidence: 0.896286936

00:14:29.426 --> 00:14:31.356 office using two simple tests,

NOTE Confidence: 0.896286936

00:14:31.360 --> 00:14:33.796 a physical exam and a blood test.

NOTE Confidence: 0.896286936

00:14:33.800 --> 00:14:35.588 Clinical trials are currently

NOTE Confidence: 0.896286936

00:14:35.588 --> 00:14:37.376 underway at federally designated

NOTE Confidence: 0.896286936

00:14:37.376 --> 00:14:38.760 comprehensive Cancer Centers,

NOTE Confidence: 0.896286936

00:14:38.760 --> 00:14:40.620 such as Yale Cancer Center

NOTE Confidence: 0.896286936

00:14:40.620 --> 00:14:42.480 and Smilow Cancer Hospital,

NOTE Confidence: 0.896286936

00:14:42.480 --> 00:14:44.040 where doctors are also

NOTE Confidence: 0.896286936

00:14:44.040 --> 00:14:45.600 using the Artemis machine,

NOTE Confidence: 0.896286936

00:14:45.600 --> 00:14:47.040 which enables targeted

NOTE Confidence: 0.896286936

00:14:47.040 --> 00:14:48.960 biopsies to be performed.

NOTE Confidence: 0.896286936

00:14:48.960 --> 00:14:51.232 More information is available

NOTE Confidence: 0.896286936

00:14:51.232 --> 00:14:52.394 at yalecancercenter.org.

NOTE Confidence: 0.896286936

00:14:52.394 --> 00:14:55.958 You're listening to Connecticut Public Radio.

NOTE Confidence: 0.896286936

00:14:55.960 --> 00:14:56.360 Welcome

NOTE Confidence: 0.961271706

00:14:56.360 --> 00:14:58.000 back to Yale Cancer Answers.

NOTE Confidence: 0.961271706

00:14:58.000 --> 00:14:59.600 This is Doctor Anees Chagpar

NOTE Confidence: 0.961271706

00:14:59.600 --> 00:15:01.798 and I'm joined tonight by my guest,

NOTE Confidence: 0.961271706

00:15:01.800 --> 00:15:03.759 doctor Caroline Johnson.

NOTE Confidence: 0.961271706

00:15:03.759 --> 00:15:07.655 We're talking about the role of

NOTE Confidence: 0.961271706

00:15:07.655 --> 00:15:10.880 forever chemicals in cancer metastases.

NOTE Confidence: 0.961271706

00:15:10.880 --> 00:15:12.880 Before the break, Caroline,

NOTE Confidence: 0.961271706

00:15:12.880 --> 00:15:15.522 we were talking about the work

NOTE Confidence: 0.961271706

00:15:15.522 --> 00:15:18.090 that your lab is doing in terms of

NOTE Confidence: 0.961271706

00:15:18.168 --> 00:15:20.559 understanding cancer metabolism,

NOTE Confidence: 0.961271706

00:15:20.560 --> 00:15:24.648 how these cancers kind of use energy

NOTE Confidence: 0.961271706

00:15:24.648 --> 00:15:27.479 and various metabolites to really,

NOTE Confidence: 0.961271706

00:15:27.480 --> 00:15:29.712 you know, do their work as it were

NOTE Confidence: 0.961271706

00:15:29.712 --> 00:15:32.046 and the differences that we see

NOTE Confidence: 0.961271706

00:15:32.046 --> 00:15:34.176 in different populations based on

NOTE Confidence: 0.961271706

00:15:34.176 --> 00:15:36.597 either gender or exposures, etcetera.

NOTE Confidence: 0.961271706

00:15:36.600 --> 00:15:39.288 Now one of the things that your

NOTE Confidence: 0.961271706

00:15:39.288 --> 00:15:42.621 lab has been looking at is this

NOTE Confidence: 0.961271706

00:15:42.621 --> 00:15:44.713 concept of forever chemicals.

NOTE Confidence: 0.961271706

00:15:44.720 --> 00:15:46.540 Can you define what that is and

NOTE Confidence: 0.961271706

00:15:46.540 --> 00:15:48.574 talk a little bit more about

NOTE Confidence: 0.961271706

00:15:48.574 --> 00:15:50.771 the work that your lab has been

NOTE Confidence: 0.961271706

00:15:50.771 --> 00:15:52.159 doing looking at these?

NOTE Confidence: 0.667376052666667

00:15:53.080 --> 00:15:55.185 Yes. So forever chemicals are

NOTE Confidence: 0.667376052666667

00:15:55.185 --> 00:15:58.072 sort of another name for these

NOTE Confidence: 0.667376052666667

00:16:00.880 --> 00:16:03.008 polyfluoroalcohol substances or PFAS.

NOTE Confidence: 0.667376052666667

00:16:03.008 --> 00:16:06.581 And there's been a lot of media

NOTE Confidence: 0.667376052666667

00:16:06.581 --> 00:16:08.486 attention about these recently because

NOTE Confidence: 0.667376052666667

00:16:08.486 --> 00:16:10.902 they have been linked to various

NOTE Confidence: 0.667376052666667

00:16:10.902 --> 00:16:12.558 health effects including cancer.

NOTE Confidence: 0.667376052666667

00:16:12.560 --> 00:16:14.728 And what these are,

NOTE Confidence: 0.667376052666667

00:16:14.728 --> 00:16:17.980 are synthetic chemicals that have very

NOTE Confidence: 0.667376052666667

00:16:18.079 --> 00:16:20.720 strong carbon and fluorine atom bonds,

NOTE Confidence: 0.667376052666667

00:16:20.720 --> 00:16:23.678 which means that they're very difficult

NOTE Confidence: 0.667376052666667

00:16:23.678 --> 00:16:26.208 to break down and they stick around

NOTE Confidence: 0.667376052666667

00:16:26.208 --> 00:16:28.085 in the environment and in our bodies

NOTE Confidence: 0.667376052666667

00:16:28.085 --> 00:16:29.793 for a very long period of time.

NOTE Confidence: 0.667376052666667

00:16:29.800 --> 00:16:31.720 And they have been found in,

NOTE Confidence: 0.667376052666667

00:16:31.720 --> 00:16:33.640 you know, blood samples from

NOTE Confidence: 0.667376052666667

00:16:33.640 --> 00:16:36.156 humans and also in tissues as well

NOTE Confidence: 0.667376052666667

00:16:36.156 --> 00:16:38.400 such as the liver and the lung.

NOTE Confidence: 0.667376052666667

00:16:38.400 --> 00:16:39.912 And you know,

NOTE Confidence: 0.667376052666667

00:16:39.912 --> 00:16:42.860 they are the general sort of exposure

NOTE Confidence: 0.667376052666667

00:16:42.860 --> 00:16:45.316 that an individual may have that would

NOTE Confidence: 0.667376052666667

00:16:45.316 --> 00:16:47.531 come from potentially their drinking

NOTE Confidence: 0.667376052666667

00:16:47.531 --> 00:16:50.332 water or from dietary sources as they

NOTE Confidence: 0.667376052666667

00:16:50.332 --> 00:16:52.581 are used to make non stick surfaces.

NOTE Confidence: 0.667376052666667

00:16:52.581 --> 00:16:54.543 So you would find them perhaps

NOTE Confidence: 0.667376052666667

00:16:54.543 --> 00:16:56.358 on a non stick frying pan.

NOTE Confidence: 0.667376052666667

00:16:56.360 --> 00:16:58.808 They are present on the inside

NOTE Confidence: 0.667376052666667

00:16:58.808 --> 00:17:00.032 of microwave popcorn.

NOTE Confidence: 0.667376052666667

00:17:00.040 --> 00:17:02.662 They're even present on waterproof cosmetics

NOTE Confidence: 0.667376052666667

00:17:02.662 --> 00:17:06.320 and in some types of dental flosses as well.

NOTE Confidence: 0.667376052666667

00:17:06.320 --> 00:17:08.168 And there is also greater concern for

NOTE Confidence: 0.667376052666667

00:17:08.168 --> 00:17:10.360 those who may be occupationally exposed,

NOTE Confidence: 0.667376052666667

00:17:10.360 --> 00:17:11.689 such as firefighters,

NOTE Confidence: 0.667376052666667

00:17:11.689 --> 00:17:14.347 as it's present in the firefighting

NOTE Confidence: 0.667376052666667

00:17:14.347 --> 00:17:15.440 foam as well.

NOTE Confidence: 0.667376052666667

00:17:15.440 --> 00:17:17.560 And it really is unfortunately,

NOTE Confidence: 0.667376052666667

00:17:17.560 --> 00:17:20.120 you know, everywhere in our supplies

00:17:21.520 --> 00:17:26.016 So they are for me an area that I've

NOTE Confidence: 0.667376052666667

00:17:26.016 --> 00:17:28.020 been wanting to look into because

NOTE Confidence: 0.667376052666667

00:17:28.093 --> 00:17:30.212 they have had this link to cancer,

NOTE Confidence: 0.667376052666667

00:17:30.212 --> 00:17:31.448 particularly kidney cancer,

NOTE Confidence: 0.667376052666667

00:17:31.448 --> 00:17:33.920 but there have been some studies

NOTE Confidence: 0.667376052666667

00:17:33.983 --> 00:17:35.873 that have shown that they are

NOTE Confidence: 0.667376052666667

00:17:35.873 --> 00:17:38.093 also linked to certain types of

NOTE Confidence: 0.667376052666667

00:17:38.093 --> 00:17:39.437 inflammatory bowel diseases.

NOTE Confidence: 0.667376052666667

00:17:39.440 --> 00:17:42.374 So we were interested to look to

NOTE Confidence: 0.667376052666667

00:17:42.374 --> 00:17:44.803 see if any of these chemicals have

NOTE Confidence: 0.667376052666667

00:17:44.803 --> 00:17:46.798 been linked to colorectal cancer

NOTE Confidence: 0.667376052666667

00:17:46.798 --> 00:17:49.668 etiology or in more so in prognosis

NOTE Confidence: 0.667376052666667

00:17:49.668 --> 00:17:52.695 of the patient as we know they could

NOTE Confidence: 0.667376052666667

00:17:52.695 --> 00:17:54.390 be linked to metabolic effects

NOTE Confidence: 0.667376052666667

00:17:54.458 --> 00:17:56.478 and also immune system effects.

NOTE Confidence: 0.667376052666667

00:17:56.480 --> 00:17:58.750 And in the literature we had

NOTE Confidence: 0.667376052666667

00:17:58.750 --> 00:18:00.400 a deep dive into the literature

NOTE Confidence: 0.667376052666667

00:18:00.400 --> 00:18:02.118 of the link between PFAS,

NOTE Confidence: 0.667376052666667

00:18:02.120 --> 00:18:04.000 these forever chemicals, and colorectal

NOTE Confidence: 0.667376052666667

00:18:04.000 --> 00:18:06.912 cancer as part of a project by an

NOTE Confidence: 0.667376052666667

00:18:06.912 --> 00:18:09.320 MPH student in our lab last year.

NOTE Confidence: 0.667376052666667

00:18:09.320 --> 00:18:10.937 And we found there was very few

NOTE Confidence: 0.667376052666667

00:18:10.937 --> 00:18:12.474 papers that had looked at this

NOTE Confidence: 0.667376052666667

00:18:12.474 --> 00:18:14.064 association and when they had looked

NOTE Confidence: 0.667376052666667

00:18:14.064 --> 00:18:16.147 at the association there was very

NOTE Confidence: 0.667376052666667

00:18:16.147 --> 00:18:17.912 contradictory findings in the literature.

NOTE Confidence: 0.667376052666667

00:18:17.920 --> 00:18:19.402 So this is something we wanted

NOTE Confidence: 0.667376052666667

00:18:19.402 --> 00:18:20.640 to look into within our

NOTE Confidence: 0.667376052666667

00:18:20.640 --> 00:18:22.218 samples in vitro

NOTE Confidence: 0.667376052666667

00:18:22.218 --> 00:18:24.283 at the moment to see if there

NOTE Confidence: 0.667376052666667

00:18:24.283 --> 00:18:25.555 was any potential effects.

NOTE Confidence: 0.934836637142857

00:18:27.360 --> 00:18:29.558 So, tell us more about that.

NOTE Confidence: 0.934836637142857

00:18:29.560 --> 00:18:31.820 What did you find?

NOTE Confidence: 0.934836637142857

00:18:31.820 --> 00:18:34.483 I mean clearly when you start

NOTE Confidence: 0.934836637142857

00:18:34.483 --> 00:18:36.088 talking about these chemicals that

NOTE Confidence: 0.934836637142857

00:18:36.088 --> 00:18:38.118 are very difficult to break down,

NOTE Confidence: 0.934836637142857

00:18:38.120 --> 00:18:39.896 that hang around in the body

NOTE Confidence: 0.934836637142857

00:18:39.896 --> 00:18:41.952 for a long period of time and

NOTE Confidence: 0.934836637142857

00:18:41.952 --> 00:18:43.360 that are essentially everywhere.

NOTE Confidence: 0.934836637142857

00:18:43.360 --> 00:18:45.640 I mean we just think

NOTE Confidence: 0.934836637142857

00:18:45.640 --> 00:18:47.877 about what we've done this morning.

NOTE Confidence: 0.934836637142857

00:18:47.880 --> 00:18:50.001 We might have used a non stick

NOTE Confidence: 0.934836637142857

00:18:50.001 --> 00:18:52.359 frying pan to make some breakfast,

NOTE Confidence: 0.934836637142857

00:18:52.360 --> 00:18:54.718 put some coffee in the microwave

NOTE Confidence: 0.934836637142857

00:18:54.720 --> 00:18:56.645 and maybe last night enjoyed

NOTE Confidence: 0.934836637142857

00:18:56.645 --> 00:18:57.800 some microwave popcorn.

NOTE Confidence: 0.934836637142857

00:18:57.800 --> 00:18:59.308 We are ingesting these

NOTE Confidence: 0.934836637142857

00:18:59.308 --> 00:19:01.193 chemicals all of the time.

NOTE Confidence: 0.934836637142857

00:19:01.200 --> 00:19:04.840 So what are your data showing in

NOTE Confidence: 0.934836637142857

00:19:04.840 --> 00:19:07.374 terms of whether these chemicals

NOTE Confidence: 0.934836637142857

00:19:07.374 --> 00:19:09.864 actually get from these surfaces

NOTE Confidence: 0.934836637142857

00:19:09.864 --> 00:19:13.233 into our bodies and to what

NOTE Confidence: 0.934836637142857

00:19:13.233 --> 00:19:15.677 degree and more importantly,

NOTE Confidence: 0.934836637142857

00:19:15.680 --> 00:19:19.660 the link or lack thereof of these

NOTE Confidence: 0.934836637142857

00:19:19.660 --> 00:19:22.480 chemicals to the development of cancer?

NOTE Confidence: 0.818763350625

00:19:23.640 --> 00:19:26.120 Yes, so the first set of experiments that

NOTE Confidence: 0.818763350625

00:19:26.120 --> 00:19:28.475 we've done have been done in vitro.

NOTE Confidence: 0.818763350625

00:19:28.480 --> 00:19:29.520 So these are cell lines

NOTE Confidence: 0.818763350625

00:19:29.520 --> 00:19:30.800 that are grown in the lab.

NOTE Confidence: 0.818763350625

00:19:30.800 --> 00:19:32.949 So we'd like to preface this that

NOTE Confidence: 0.818763350625

00:19:32.949 --> 00:19:34.821 we haven't looked in human samples

NOTE Confidence: 0.818763350625

00:19:34.821 --> 00:19:36.886 or in animal models right now to

NOTE Confidence: 0.818763350625

00:19:36.951 --> 00:19:38.757 see if we see the same effect.

NOTE Confidence: 0.818763350625

00:19:38.760 --> 00:19:41.244 But what we saw in the cancer cell lines

NOTE Confidence: 0.818763350625

00:19:41.244 --> 00:19:43.597 was surprising and quite concerning.

NOTE Confidence: 0.818763350625

00:19:43.600 --> 00:19:46.360 So we used 2 two of these chemicals,

NOTE Confidence: 0.818763350625

00:19:46.360 --> 00:19:47.860 PFOS and PFOA,

NOTE Confidence: 0.818763350625

00:19:47.860 --> 00:19:50.360 And they have actually recently

NOTE Confidence: 0.818763350625

00:19:50.360 --> 00:19:53.094 been classified as class one and

NOTE Confidence: 0.818763350625

00:19:53.094 --> 00:19:55.154 Class 2B carcinogens by IARC,

NOTE Confidence: 0.818763350625

00:19:55.160 --> 00:19:58.674 which is an agency of the WHO.

NOTE Confidence: 0.818763350625

00:19:58.680 --> 00:20:00.423 And what we did was to

NOTE Confidence: 0.818763350625

00:20:00.423 --> 00:20:02.319 do a dose response study.

NOTE Confidence: 0.818763350625

00:20:02.320 --> 00:20:04.672 So we took low levels and high levels

NOTE Confidence: 0.818763350625

00:20:04.672 --> 00:20:06.891 of these chemicals and we applied

NOTE Confidence: 0.818763350625

00:20:06.891 --> 00:20:08.841 them to colorectal cancer cell

NOTE Confidence: 0.818763350625

00:20:08.841 --> 00:20:11.156 lines that were growing in the lab.

NOTE Confidence: 0.818763350625

00:20:11.160 --> 00:20:13.356 And these cell lines were derived

NOTE Confidence: 0.818763350625

00:20:13.356 --> 00:20:16.185 from a female patient and one of the

NOTE Confidence: 0.818763350625

00:20:16.185 --> 00:20:18.399 cell lines contains AK res mutation

NOTE Confidence: 0.818763350625

00:20:18.399 --> 00:20:20.464 that's commonly found in about

NOTE Confidence: 0.818763350625

00:20:20.464 --> 00:20:23.720 40% of colorectal cancer patients.

NOTE Confidence: 0.818763350625

00:20:23.720 --> 00:20:25.295 And so we don't see the cell

NOTE Confidence: 0.818763350625

00:20:25.295 --> 00:20:26.520 lines with these chemicals.

NOTE Confidence: 0.818763350625

00:20:26.520 --> 00:20:28.980 And the first striking observation that

NOTE Confidence: 0.818763350625

00:20:28.980 --> 00:20:31.132 we made was that when these cell lines

NOTE Confidence: 0.818763350625

00:20:31.132 --> 00:20:32.880 were given high doses of these chemicals,

NOTE Confidence: 0.818763350625

00:20:32.880 --> 00:20:35.800 so those seen by potentially

NOTE Confidence: 0.818763350625

00:20:35.800 --> 00:20:36.630 occupational exposure,

NOTE Confidence: 0.818763350625

00:20:36.630 --> 00:20:39.535 so from a firefighter that these cells

NOTE Confidence: 0.818763350625

00:20:39.535 --> 00:20:41.760 started to move away from each other.

NOTE Confidence: 0.818763350625

00:20:41.760 --> 00:20:43.585 So it looked like they

NOTE Confidence: 0.818763350625

00:20:43.585 --> 00:20:44.680 had increased motility.

NOTE Confidence: 0.818763350625

00:20:44.680 --> 00:20:46.983 And at first we weren't sure whether

NOTE Confidence: 0.818763350625

00:20:46.983 --> 00:20:48.750 this was something related to

NOTE Confidence: 0.818763350625

00:20:48.750 --> 00:20:50.545 potentially increased growth of the

NOTE Confidence: 0.818763350625

00:20:50.545 --> 00:20:53.118 cells or even death of the cells.

NOTE Confidence: 0.818763350625

00:20:53.120 --> 00:20:54.828 But what we found was that the

NOTE Confidence: 0.818763350625

00:20:54.828 --> 00:20:56.237 cell numbers were not increasing

NOTE Confidence: 0.818763350625

00:20:56.237 --> 00:20:57.797 and the cells weren't dying,

NOTE Confidence: 0.818763350625

00:20:57.800 --> 00:20:58.772 they were moving.

NOTE Confidence: 0.818763350625

00:20:58.772 --> 00:21:01.425 So we wanted to validate this to make

NOTE Confidence: 0.818763350625

00:21:01.425 --> 00:21:03.637 sure this was what we were seeing.

NOTE Confidence: 0.818763350625

00:21:03.640 --> 00:21:06.594 So we repeated the experiment many times,

NOTE Confidence: 0.818763350625

00:21:06.600 --> 00:21:09.078 but then we tried two different assays

NOTE Confidence: 0.818763350625

00:21:09.078 --> 00:21:11.639 which can evaluate potential metastases.

NOTE Confidence: 0.818763350625

00:21:11.640 --> 00:21:14.304 So one is called a wound healing assay and

NOTE Confidence: 0.818763350625

00:21:14.304 --> 00:21:17.120 the other one is called a transwell assay.

NOTE Confidence: 0.818763350625

00:21:17.120 --> 00:21:19.856 And what we found was that the cells did

NOTE Confidence: 0.818763350625

00:21:19.856 --> 00:21:22.142 move when we applied these higher doses

NOTE Confidence: 0.818763350625

00:21:22.142 --> 00:21:25.038 of PFOS and PFOA to the cell lines.

NOTE Confidence: 0.818763350625

00:21:25.040 --> 00:21:27.160 And then we did two follow up experiments.

NOTE Confidence: 0.818763350625

00:21:27.160 --> 00:21:30.328 One was at a protein level to see

NOTE Confidence: 0.818763350625

00:21:30.328 --> 00:21:32.911 if there were known biomarkers of

NOTE Confidence: 0.818763350625

00:21:32.911 --> 00:21:35.096 metastasis that were increased with

NOTE Confidence: 0.818763350625

00:21:35.096 --> 00:21:37.337 or were changed with application

NOTE Confidence: 0.818763350625

00:21:37.337 --> 00:21:40.993 of these PFOS to the cell lines.

NOTE Confidence: 0.818763350625

00:21:41.000 --> 00:21:43.997 And indeed we did see these change as well.

NOTE Confidence: 0.818763350625

00:21:44.000 --> 00:21:45.925 And then we looked at the metabolism

NOTE Confidence: 0.818763350625

00:21:45.925 --> 00:21:48.070 of the cell line and we saw

NOTE Confidence: 0.818763350625

00:21:48.070 --> 00:21:50.233 again when we applied PFOS and P4A

NOTE Confidence: 0.818763350625

00:21:50.233 --> 00:21:52.200 to the cell lines that the metabolism

NOTE Confidence: 0.818763350625

00:21:52.200 --> 00:21:55.301 changed in a way that indicated

NOTE Confidence: 0.818763350625

00:21:55.301 --> 00:21:58.358 migration of the cells or metastasis.

NOTE Confidence: 0.818763350625

00:21:58.360 --> 00:22:00.957 So all of these four things together

00:22:01.642 --> 00:22:04.370 sort of led us to the hypothesis that

NOTE Confidence: 0.818763350625

00:22:04.444 --> 00:22:06.838 at high levels of PFOS exposure,

NOTE Confidence: 0.818763350625

00:22:06.840 --> 00:22:10.519 it's possible that the colorectal

NOTE Confidence: 0.818763350625

00:22:10.519 --> 00:22:13.237 cancer cells can migrate and metastasize.

NOTE Confidence: 0.827493858333333

00:22:15.720 --> 00:22:18.516 So a couple of questions there.

NOTE Confidence: 0.827493858333333

00:22:18.520 --> 00:22:21.234 So the first question is,

NOTE Confidence: 0.827493858333333

00:22:21.234 --> 00:22:23.136 it sounds like you were using

NOTE Confidence: 0.827493858333333

00:22:23.136 --> 00:22:24.920 cell lines that already had,

NOTE Confidence: 0.827493858333333

00:22:24.920 --> 00:22:27.680 for example, a KRas mutation,

NOTE Confidence: 0.827493858333333

00:22:27.680 --> 00:22:30.410 and that you were looking at cancer

NOTE Confidence: 0.827493858333333

00:22:30.410 --> 00:22:32.348 cells themselves and found that

NOTE Confidence: 0.827493858333333

00:22:32.348 --> 00:22:35.080 they were more likely to move when

NOTE Confidence: 0.827493858333333

00:22:35.080 --> 00:22:38.135 exposed to these chemicals in

NOTE Confidence: 0.827493858333333

00:22:38.135 --> 00:22:41.600 cell lines or in people who don't

NOTE Confidence: 0.827493858333333

00:22:41.600 --> 00:22:44.280 necessarily have a cancer already.

NOTE Confidence: 0.827493858333333

00:22:44.280 --> 00:22:46.560 Do these chemicals cause that

NOTE Confidence: 0.827493858333333

00:22:46.560 --> 00:22:50.189 kind of a cancer or is this really

NOTE Confidence: 0.827493858333333

00:22:50.189 --> 00:22:53.122 more so a risk of metastasis

NOTE Confidence: 0.827493858333333

00:22:53.219 --> 00:22:56.315 in people who already have cancer?

NOTE Confidence: 0.9707842725

00:22:57.560 --> 00:23:00.600 So based on the findings in our research,

NOTE Confidence: 0.9707842725

00:23:00.600 --> 00:23:03.248 the sort of only hypothesis I can make

NOTE Confidence: 0.9707842725

00:23:03.248 --> 00:23:06.408 at the moment is that this would be an

NOTE Confidence: 0.9707842725

00:23:06.408 --> 00:23:09.360 issue for those that already have cancer.

NOTE Confidence: 0.9707842725

00:23:09.360 --> 00:23:12.320 I haven't seen,

NOTE Confidence: 0.9707842725

00:23:12.320 --> 00:23:15.560 as I said initially, that

NOTE Confidence: 0.9707842725

00:23:15.560 --> 00:23:17.696 the literature right right now surrounding

NOTE Confidence: 0.9707842725

00:23:17.696 --> 00:23:20.055 the effects of these chemicals in

NOTE Confidence: 0.9707842725

00:23:20.055 --> 00:23:22.235 colorectal cancer is really inconsistent.

NOTE Confidence: 0.9707842725

00:23:22.240 --> 00:23:25.152 So at the moment we are concerned about

NOTE Confidence: 0.9707842725

00:23:25.152 --> 00:23:27.899 how these chemicals could actually be

NOTE Confidence: 0.9707842725

00:23:27.899 --> 00:23:30.803 causing the cell lines to metastasize

NOTE Confidence: 0.9707842725

00:23:30.878 --> 00:23:33.758 because as you know at the

NOTE Confidence: 0.9707842725

00:23:33.758 --> 00:23:36.760 latest stage that the cancer is at,

NOTE Confidence: 0.9707842725

00:23:36.760 --> 00:23:38.158 the harder it is to treat.

NOTE Confidence: 0.9707842725

00:23:38.160 --> 00:23:40.368 So we don't want to be having you

NOTE Confidence: 0.9707842725

00:23:40.368 --> 00:23:42.436 know the tumors to get to the

NOTE Confidence: 0.9707842725

00:23:42.440 --> 00:23:45.600 metastatic stage.

NOTE Confidence: 0.9707842725

00:23:45.600 --> 00:23:47.600 And what we've seen as well through our

NOTE Confidence: 0.9707842725

00:23:47.600 --> 00:23:49.560 results is that this could be

NOTE Confidence: 0.9707842725

00:23:49.560 --> 00:23:51.716 potentially due to a number of things,

NOTE Confidence: 0.9707842725

00:23:51.720 --> 00:23:53.757 it could be altering these

NOTE Confidence: 0.9707842725

00:23:53.760 --> 00:23:57.250 proteins that could be initiating metastasis.

NOTE Confidence: 0.9707842725

00:23:57.250 --> 00:24:00.400 We also see from some predictive models

NOTE Confidence: 0.9707842725

00:24:00.400 --> 00:24:03.426 that it could be linked to inflammation

NOTE Confidence: 0.9707842725

00:24:03.426 --> 00:24:06.756 and immune modulation as well.

NOTE Confidence: 0.9707842725

00:24:06.760 --> 00:24:09.560 So there is definitely a lot for

NOTE Confidence: 0.9707842725

00:24:09.560 --> 00:24:10.760 us to investigate.

NOTE Confidence: 0.9707842725

00:24:10.760 --> 00:24:12.573 This has just been

NOTE Confidence: 0.9707842725

00:24:12.573 --> 00:24:14.491 one set of cell lines and

NOTE Confidence: 0.9707842725

00:24:14.491 --> 00:24:16.111 grown in the lab.

NOTE Confidence: 0.9707842725

00:24:16.120 --> 00:24:18.605 So that's something that we are looking

NOTE Confidence: 0.9707842725

00:24:18.605 --> 00:24:21.078 to investigate in the next year.

NOTE Confidence: 0.931176745454545

00:24:22.200 --> 00:24:24.365 The second question

NOTE Confidence: 0.931176745454545

00:24:24.365 --> 00:24:27.040 is with regards to the dose.

NOTE Confidence: 0.931176745454545

00:24:27.040 --> 00:24:29.712 So you had mentioned people or

NOTE Confidence: 0.931176745454545

00:24:29.712 --> 00:24:32.308 cell lines that were exposed to high

NOTE Confidence: 0.931176745454545

00:24:32.308 --> 00:24:35.288 doses of these chemicals had this effect.

NOTE Confidence: 0.931176745454545

00:24:35.288 --> 00:24:37.880 And so the question is,

NOTE Confidence: 0.931176745454545

00:24:37.880 --> 00:24:40.708 as you mentioned something that

NOTE Confidence: 0.931176745454545

00:24:40.708 --> 00:24:43.476 you would see more in people who were

NOTE Confidence: 0.931176745454545

00:24:43.480 --> 00:24:45.188 occupationally exposed like firefighters

NOTE Confidence: 0.931176745454545

00:24:45.188 --> 00:24:48.120 or is this something that

NOTE Confidence: 0.931176745454545

00:24:48.120 --> 00:24:50.576 we would see even in people who were

NOTE Confidence: 0.931176745454545

00:24:50.576 --> 00:24:52.905 exposed with all of the other ways that

NOTE Confidence: 0.931176745454545

00:24:52.905 --> 00:24:55.079 we are exposed to these chemicals.

NOTE Confidence: 0.931176745454545

00:24:55.080 --> 00:24:57.040 So for example,

NOTE Confidence: 0.931176745454545

00:24:57.040 --> 00:24:59.572 would you advise cancer

NOTE Confidence: 0.931176745454545

00:24:59.572 --> 00:25:01.715 patients who potentially have nonstick

NOTE Confidence: 0.931176745454545

00:25:01.715 --> 00:25:04.382 frying pans to get rid of their

NOTE Confidence: 0.931176745454545

00:25:04.382 --> 00:25:06.774 nonstick frying pans or not use the

NOTE Confidence: 0.931176745454545

00:25:06.774 --> 00:25:09.500 microwave or not have microwave popcorn.

NOTE Confidence: 0.931176745454545

00:25:09.500 --> 00:25:13.417 I mean what is the exposure related

NOTE Confidence: 0.931176745454545

00:25:13.417 --> 00:25:16.757 to those everyday exposures versus

NOTE Confidence: 0.931176745454545

00:25:16.760 --> 00:25:18.518 the occupational exposure?

NOTE Confidence: 0.686547544

00:25:19.160 --> 00:25:20.973 Yes, so as I mentioned,

NOTE Confidence: 0.686547544

00:25:20.973 --> 00:25:23.317 we looked at those lower doses as well.

NOTE Confidence: 0.686547544

00:25:23.320 --> 00:25:25.792 So those that are more environmentally

NOTE Confidence: 0.686547544

00:25:25.792 --> 00:25:28.210 relevant that an individual would be

NOTE Confidence: 0.686547544

00:25:28.210 --> 00:25:30.660 exposed to through drinking water and we

NOTE Confidence: 0.686547544

00:25:30.660 --> 00:25:33.198 didn't see that the cells were spreading,

NOTE Confidence: 0.686547544

00:25:33.200 --> 00:25:35.954 but some follow up experiments in

NOTE Confidence: 0.686547544

00:25:35.954 --> 00:25:38.254 our laboratory where we've looked

NOTE Confidence: 0.686547544

00:25:38.254 --> 00:25:40.928 at very low levels of now about

NOTE Confidence: 0.686547544

00:25:40.928 --> 00:25:43.078 8 different types of PFAS

NOTE Confidence: 0.686547544

00:25:43.080 --> 00:25:46.048 what we've seen is that the cell

NOTE Confidence: 0.686547544

00:25:46.048 --> 00:25:48.753 lines are actually starting to grow.

NOTE Confidence: 0.686547544

00:25:48.753 --> 00:25:51.784 So they're starting to increase in number

NOTE Confidence: 0.686547544

00:25:51.784 --> 00:25:55.278 at these lower levels of exposure.

NOTE Confidence: 0.686547544

00:25:55.280 --> 00:25:56.400 But when we get to the higher

NOTE Confidence: 0.686547544

00:25:56.400 --> 00:25:58.280 levels of exposure,

NOTE Confidence: 0.686547544

00:25:58.280 --> 00:25:59.876 we don't see this cell growth,

NOTE Confidence: 0.686547544

00:25:59.880 --> 00:26:01.960 we see the cell motility.

NOTE Confidence: 0.686547544

00:26:01.960 --> 00:26:04.294 So what's kind of really fascinating

NOTE Confidence: 0.686547544

00:26:04.294 --> 00:26:06.604 about these chemicals and their effects

NOTE Confidence: 0.686547544

00:26:06.604 --> 00:26:09.327 in cancer is that they can actually to

NOTE Confidence: 0.686547544

00:26:09.327 --> 00:26:11.943 us in the lab appear to have different

NOTE Confidence: 0.686547544

00:26:11.943 --> 00:26:14.077 effects at low versus high levels.

NOTE Confidence: 0.686547544

00:26:14.080 --> 00:26:16.840 And I think this is something

00:26:18.074 --> 00:26:20.542 really important to investigate further.

00:26:24.120 --> 00:26:26.920 In terms of reducing exposure in general,

NOTE Confidence: 0.686547544

00:26:26.920 --> 00:26:28.936 I think as you mentioned about

NOTE Confidence: 0.686547544

00:26:28.936 --> 00:26:31.200 the non stick frying pans,

NOTE Confidence: 0.686547544

00:26:31.200 --> 00:26:34.340 these do tend to be coated in some

NOTE Confidence: 0.686547544

00:26:34.413 --> 00:26:37.473 of these PFAS chemicals and some of the older

00:26:38.338 --> 00:26:40.054 legacy PFAS have been

NOTE Confidence: 0.686547544

00:26:40.054 --> 00:26:41.515 removed but they've been replaced

NOTE Confidence: 0.686547544

00:26:41.515 --> 00:26:43.195 by other types of PFAS.

00:26:44.085 --> 00:26:46.489 My advice there would be to go back

NOTE Confidence: 0.686547544

00:26:46.489 --> 00:26:48.960 to using a a good old

NOTE Confidence: 0.686547544

00:26:48.960 --> 00:26:52.480 iron skillet and a seasoned skillet.

NOTE Confidence: 0.686547544

00:26:52.480 --> 00:26:54.360 That's what I use in my household now.

NOTE Confidence: 0.686547544

00:26:54.360 --> 00:26:57.034 It makes a really good fried egg,

NOTE Confidence: 0.686547544

00:26:57.040 --> 00:26:59.560 to try and reduce NOTE Confidence: 0.686547544

00:26:59.560 --> 00:27:01.432 exposure that way.

NOTE Confidence: 0.686547544

00:27:01.432 --> 00:27:02.680 But yeah,

NOTE Confidence: 0.686547544

00:27:02.680 --> 00:27:04.720 I think more knowledge in this area is

00:27:05.536 --> 00:27:06.896 really vital for cancer patients

NOTE Confidence: 0.686547544

00:27:06.896 --> 00:27:08.878 and I think it has been lacking.

00:27:11.450 --> 00:27:14.000 The other question is,

NOTE Confidence: 0.8201587

00:27:14.000 --> 00:27:16.817 if we step back and we look

NOTE Confidence: 0.8201587

00:27:16.817 --> 00:27:19.358 from an epidemiologic standpoint,

NOTE Confidence: 0.8201587

00:27:19.360 --> 00:27:22.920 have we seen the similar kind of effects?

NOTE Confidence: 0.8201587

00:27:22.920 --> 00:27:25.080 So are firefighters with

NOTE Confidence: 0.8201587

00:27:25.080 --> 00:27:27.240 colorectal cancer, for example,

NOTE Confidence: 0.8201587

00:27:27.240 --> 00:27:30.336 more likely to have distant metastatic

NOTE Confidence: 0.8201587

00:27:30.336 --> 00:27:32.400 spread than non firefighters?

NOTE Confidence: 0.8201587

00:27:32.400 --> 00:27:35.160 Do we have that kind of epidemiologic data?

NOTE Confidence: 0.845362606666667

00:27:36.600 --> 00:27:39.795 That isn't data that I'm aware of right now,

NOTE Confidence: 0.845362606666667

00:27:39.800 --> 00:27:42.050 but I think that's a really

NOTE Confidence: 0.845362606666667

00:27:42.050 --> 00:27:44.000 important thing to look into.

NOTE Confidence: 0.845362606666667

00:27:44.000 --> 00:27:48.688 There was a study out recently that I

NOTE Confidence: 0.845362606666667

00:27:48.688 --> 00:27:51.096 found was quite interesting and they saw

NOTE Confidence: 0.845362606666667

00:27:51.096 --> 00:27:53.798 that individuals that had been

NOTE Confidence: 0.845362606666667

00:27:53.798 --> 00:27:56.159 diagnosed with cancer such as uterine,

NOTE Confidence: 0.845362606666667

00:27:56.160 --> 00:27:57.318 ovarian, and melanomas,

NOTE Confidence: 0.845362606666667

00:27:57.318 --> 00:27:59.248 they did have high levels

NOTE Confidence: 0.845362606666667

00:27:59.248 --> 00:28:01.557 of PFAS in their blood,

NOTE Confidence: 0.845362606666667

00:28:01.560 --> 00:28:03.918 but it didn't specify in that study

NOTE Confidence: 0.845362606666667

00:28:03.920 --> 00:28:05.960 what their occupation was.

NOTE Confidence: 0.845362606666667

00:28:05.960 --> 00:28:07.104 But I think looking

NOTE Confidence: 0.845362606666667

00:28:07.104 --> 00:28:08.932 at firefighters it is

00:28:11.930 --> 00:28:13.155 really important to try and

NOTE Confidence: 0.845362606666667

00:28:13.160 --> 00:28:15.585 mitigate their potential

NOTE Confidence: 0.845362606666667

00:28:15.585 --> 00:28:17.958 exposure to these chemicals.

NOTE Confidence: 0.9147783345

00:28:18.560 --> 00:28:20.620 Doctor Caroline Johnson is an

NOTE Confidence: 0.9147783345

00:28:20.620 --> 00:28:22.268 associate professor of epidemiology

NOTE Confidence: 0.9147783345

00:28:22.268 --> 00:28:24.315 and environmental Health Sciences at

NOTE Confidence: 0.9147783345

00:28:24.315 --> 00:28:26.679 the Yale School of Public Health.

NOTE Confidence: 0.9147783345

00:28:26.680 --> 00:28:28.712 If you have questions,

NOTE Confidence: 0.9147783345

00:28:28.712 --> 00:28:30.697 the address is canceranswers@yale.edu.

NOTE Confidence: 0.9147783345

00:28:30.697 --> 00:28:33.439 And past editions of the program

NOTE Confidence: 0.9147783345

00:28:33.439 --> 00:28:35.813 are available in audio and written

NOTE Confidence: 0.9147783345

00:28:35.813 --> 00:28:36.748 form at yalecancercenter.org.

NOTE Confidence: 0.9147783345

00:28:36.748 --> 00:28:39.212 We hope you'll join us next week to

NOTE Confidence: 0.9147783345

00:28:39.212 --> 00:28:41.097 learn more about the fight against

NOTE Confidence: 0.9147783345

00:28:41.097 --> 00:28:42.960 cancer here on Connecticut Public Radio.

NOTE Confidence: 0.9147783345

00:28:42.960 --> 00:28:45.072 Funding for Yale Cancer Answers is

NOTE Confidence: 0.9147783345

00:28:45.072 --> 00:28:47.080 provided by Smilow Cancer Hospital.