

# Mayo Clinic Q & A “ Dr. Wendy Sherman “ Liquid biopsy for ca...

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## SUMMARY KEYWORDS

liquid biopsy, cancer, mayo clinic, test, cancer cells, spinal fluid, biopsy, fluid, mutation, patients, types, spinal cord, metastases, tumor, wendy, drugs, treatment, metastasize, sampling, learn

## SPEAKERS

Dr. Halena Gazelka, Narrator, Dr. Wendy Sherman

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**N** Narrator 00:01  
Coming up on Mayo Clinic Q&A,

**D** Dr. Wendy Sherman 00:03  
A liquid biopsy just means you're getting information like you would from any biopsy from some form of liquid. So, that liquid can be blood, it can be urine, or in our case, we perform it on the spinal fluid.

**N** Narrator 00:16  
A spinal fluid biopsy is a straightforward procedure that is now used to detect the metastatic progression of cancer cells and can help determine the treatment plan.

**D** Dr. Wendy Sherman 00:27  
Essentially, you're sampling that fluid to find out are there cancer cells there, what they are, what do they look like?

**D** Dr. Halena Gazelka 00:34  
Welcome, everyone to Mayo Clinic Q&A. I'm your host, Dr. Halena Gazelka. When cancer spreads from its original location to other parts of the body, we say that it has metastasized. Central nervous system metastases occur when cancer cells spread to the brain and the spinal cord. Treatment for CNS tumors can help ease symptoms, slow tumor growth and extend a life.

In order to determine which treatment might work best for a person's tumor type, some health care professionals are now using liquid biopsies. Here to discuss is Mayo Clinic neurologist, Dr. Wendy Sherman. Thanks for being here today, Wendy.

**D** Dr. Wendy Sherman 01:13  
Yeah, thank you for having me.

**D** Dr. Halena Gazelka 01:15  
What an interesting topic. First of all, can you tell us Wendy, what causes cancer to metastasize or to spread from other areas in the body to the brain and the spinal cord?

**D** Dr. Wendy Sherman 01:26  
Now, that's a good question. And I'll tell you that, you know, there are multiple different ways that cancer cells can reach the brain and the spinal cord. You know, it can enter through the bloodstream, or through the lymph nodes, or sometimes even if it is in the bones of the spine, because the spine is right next to the spinal fluid into the spinal cord, it can invade through there and enter that way. So, there's a few different ways they can sneak in.

**D** Dr. Halena Gazelka 01:56  
Is it possible that any type of cancer at all can spread to the central nervous system, or CNS as we call it?

**D** Dr. Wendy Sherman 02:03  
It is possible, but there are some players that are much more likely to go there. You know, the three most common ones we see are lung cancer, breast cancer, and melanoma. Those are by far the most common that we see. But we've honestly have seen all kinds of spread there, the other kinds are much rarer.

**D** Dr. Halena Gazelka 02:22  
So, let's get to the topic of the day. What is a liquid biopsy?

**D** Dr. Wendy Sherman 02:27  
It's a good question. So, and it can apply to different things. So, you know, really a liquid biopsy just means you're getting information like you would from any biopsy, from some form of liquid. So, that liquid can be blood, it can be urine, or in our case, we perform it on the spinal fluid. So, that's the fluid that coats the brain and the spinal cord. And so, essentially, you're sampling

that fluid to find out, you know, are there cancer cells there, what they are, what do they look like, you know, what mutations do they have? So, we're trying to get as much information just like you would if you had a brain biopsy and were to take out that piece of the tumor and look at it under a microscope, and send it for testing, same kind of thing, just off of fluid.

**D** Dr. Halena Gazelka 03:13

Well, but that brings up a good question then. You lead right into my next question. When would someone decide to use a liquid biopsy instead of doing a surgical or tissue type of biopsy?

**D** Dr. Wendy Sherman 03:26

Sure. So, you know, in our case specifically within the neuro-oncology field, we use it on the spinal fluid most commonly when we're worried that there are cancer cells in the spinal fluid. So, someone can have cancer cells in the brain or the spinal cord and not necessarily be floating around in the fluid. But if it is in the fluid, that's very difficult to get by biopsy, you know. People can try to biopsy the meninges, or the lining of the sack that holds the fluid, but that can be a very difficult biopsy too and often can be inconclusive. So, if we suspect that the cancer cells are in the fluid, that's the right time to do this test.

**D** Dr. Halena Gazelka 04:09

Okay, so you might have just answered my next question then.

**D** Dr. Wendy Sherman 04:11

Okay.

**D** Dr. Halena Gazelka 04:12

Which is, can you use this for any type of tumor?

**D** Dr. Wendy Sherman 04:16

So, currently, yeah, I mean, that's a question because there's testing available currently for specific cancer types, so for breast cancer, and lung cancer, and GI cancers, gastrointestinal cancers like stomach cancer and such. More in the research field that's being looked at for other cancer types. So, it could still be done for other cancer types, but that's still for research purposes and for, you know, the care of the patient in the clinic, those are the primary cancer types that we can look for.

**D** Dr. Halena Gazelka 04:55

**D** Dr. Halena Gazeika 04:55

I can see one very obvious benefit to patients, and that it is simple to remove cerebral spinal fluid. It might sound awful to patients, but it's very commonly done and a fairly straightforward procedure. But do you see improvement in outcomes for individuals who have cerebral spinal metastasis and have a liquid biopsy versus a tissue?

**D** Dr. Wendy Sherman 05:18

We absolutely do. And I'll tell you, you know, in our day and age of treating cancer, it's no longer one size fits all. Right, so we have excellent drugs for different cancer types that are really based off of your specific cancer. So, not just your lung cancer, but does your lung cancer have a specific mutation, and there are drugs that match up to the mutation that had been very effective. And the tricky thing is that if someone has a cancer, say in their lung, and they have mutation, let's just say an EGFR mutation. That's a common mutation that had lung cancer can have. We know that upwards of 50% of the time when that cancer travels to somewhere else, particularly in the brain, it can change, meaning it may lose that mutation. So, if you treat someone based off of that information, you know, that you had a couple years ago from where the cancer started, that may not reflect, you know, the current state of your cancer and what it looks like. And so, our treatment really depends on that. And with a lot of these new generation treatments that are going after these mutations, it has been very beneficial to look for those in the spinal fluid. And it absolutely, I would say, has extended how people deal with this in both from a symptom standpoint, because we're able to give them often drugs that are better tolerated because they're more targeted, and also it seems to extend survival.

**D** Dr. Halena Gazeika 06:44

That is really interesting. Wendy, I'm sure that many of us have never thought about the fact that a tumor cell that came from our original tumor and is now somewhere else in the body isn't exactly the same cell necessarily.

**D** Dr. Wendy Sherman 06:57

True. And I think it's increasingly being recognized. You know, another example would be, you know, a breast cancer, people talk about HER2 positive breast cancer, and there are drugs that match up to that HER2, and we can actually inject those HER2 drugs into the spinal fluid if the cancer cells are in the spinal fluid. And so, it's all the more important to know, once it's in the spinal fluid, is that HER2 there or not? And it can change. We've all seen it.

**D** Dr. Halena Gazeika 07:27

So, there must be limitations. What are some of the limitations of using liquid biopsy when you're wanting to treat metastases?

**D** Dr. Wendy Sherman 07:35

Well, as it is still a newer test. So, you know, we commonly prior to having this test, we had

well, so it is still a newer test. So, you know, we commonly prior to having this test, we had cytology. And what cytology means is when you sample the fluid, it tells us yes, we see cancer cells or not. It doesn't tell you how many cancer cells or what their mutations are. So, we still do run that test. This new test we're doing is a lot more specific. So, we do get a number of cancer cells, and like I said, you know, we do get the genomics of it, too, or what mutations it has. But we're learning. And I think, you know, for example, we've all had patients where maybe the cytology results and this test don't always line up. And so, we're studying those cases, so we can understand how to incorporate both sets of tests are both data points. But it's, you know, it's a test that we can draw while we're sampling fluid anyways. So, you know, for example, in patients who are getting treatments in their fluid, while we give them the treatment, we can pull fluid at the same time and send for this test. So, you're right in that it's a relatively, you know, low invasive, low level of invasiveness when we do this test. And I think just as we continue to do the test, and we do research too in other cancer types, we're going to learn more about how we can apply it and how sensitive it is.

**D** Dr. Halena Gazelka 08:57

Well, speaking of that, is Mayo Clinic doing research on the use of liquid biopsy?

**D** Dr. Wendy Sherman 09:02

So, we are. And it's exciting because, you know, we want to learn more about the use of liquid biopsy, you know, particularly as it pertains to spinal fluid for not just our brain metastases, but also for our cancers that start in the brain. So, the ones that don't travel from other organs, and we're not there with that test yet, but we're looking, we're looking at that. And then also, can we use other fluids in the body? You know, like I said urine, blood. Those samples are being collected and tested so that hopefully we can make progress towards that.

**D** Dr. Halena Gazelka 09:37

Wendy, how widely available is this test for patients who may not be at Mayo Clinic but are listening elsewhere.

**D** Dr. Wendy Sherman 09:44

So, as long as it's for those approved indications, like the breast cancer, and lung cancer, and GI cancer, it's a commercially available test that most insurances do seem to be covering. So, this is something that you could request, you know, from your physician outside of Mayo Clinic, but also here at Mayo Clinic, you know, we routinely do this and are, you know, happy to do that as well.

**D** Dr. Halena Gazelka 10:07

Well, thank you so much for being here today, Wendy. This has been a fascinating conversation.

**D** Dr. Wendy Sherman 10:12  
Yeah. Thank you for having me.

**D** Dr. Halena Gazelka 10:14  
Our thanks to Mayo Clinic neurologist, Dr. Wendy Sherman, for being here today to talk to us about how liquid biopsy is being used to treat metastasis into the cerebrospinal fluid. I hope that you learned something. I know that I did. And we wish each of you a wonderful day.

**N** Narrator 10:33  
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