Robert Connors: 00:01 Hi, this is Dr. Robert Connors. I'm the Medical Director here at Pinnacle Care and I'm with our Chief Medical Officer, Dr. Miles Varn. We'll be talking a little bit about genetic testing and stem cells today.

Miles Varn: 00:12 Hey, everyone.

Robert Connors: 00:13 So let's get started. Dr. Varn, can you give us some idea of what consumer based genetic testing actually is?

Miles Varn: 00:22 Sure. In the last five years, there have been companies that have developed protocols and panels to test individual patients for different genetic findings, and those findings can be related to risk of developing disease, they can be related to the efficacy of certain medications, so blood thinners, and some of the mental health drugs can all be tested for efficacy based on your genetic profile. There are genomic tests that look at the type of diet that might be better for you or the type of exercise that might be better for you. The reason this has become so much more in the news today is because first of all, the technology has gotten more and more efficient, more widely available. What used to cost hundreds of thousands of dollars now cost hundreds of dollars, and so it's more affordable for people. And so labs have developed and they've gone to marketing to you as a patient, not through your doctor.

Miles Varn: 01:33 Now, the FDA has shut down a number of these initiatives, but they've allowed them to reopen under certain sort of conditions and so forth. So now, you can take these tests, they have interpretations and you can have anything from a panel that's simply about wellness, meaning diet and exercise and supplements, to having your complete genome evaluated with tetrabytes of data and so forth. So that's really what's out there today. It's exciting, but you need to know what is involved in this.

Robert Connors: 02:13 Yeah. So how does that testing actually work? Like what's actually getting sent and what's getting tested?

Miles Varn: 02:19 Sure. Some of the kits that they use involve saliva, so you might take a swab from the inside of your mouth, or you spit into a cup and then drop it in a FedEx box that ships to the company. They put it on these microchips, and then put the chip in a machine and the machine analyzes what the genomic profile is, what your profile is. Everyone is unique, but there are certain characteristics that indicate certain things, and so they're looking for those patterns. There also are blood based tests. It's
the same thing, they use your blood, but they extract out of that the DNA and then run the analysis. Generally, it takes a couple of weeks and then they come back with a report, and the report, at least hopefully, explains in layman's terms what the findings mean and so forth.

Robert Connors: **03:13** Okay, so this sounds fantastic. Why wouldn't everybody just get these tests done?

Miles Varn: **03:21** It has to do somewhat with what's proven and what's not proven. Some of these conditions are widely known to have risk profiles that are based in your genomics. And some are really out there, they're still studying. Every day, we get more and more data, and more clarity on which tests are accurate and dependable. The other part of the problem is DNA is just predictive, so even if you are at risk by your DNA of certain diseases or conditions, it doesn't mean you're going to get them. So for some people, that may be anxiety provoking. You have a higher risk of Alzheimer's? You want to know that, you don't know whether you're going to develop it, there's not a drug today that really treats it. You want to know or not? Are you someone who embraces information, and even if it's bad news, you'd rather know it than not know the bad news?

Miles Varn: **04:26** It really is something that you need to think through carefully. The other aspect of it is your genes pass on to your family, your kids, so what you may have in these findings can have implications for them as well. You want to know that knowing that then you have to ask your kids whether they want to know that. Again, it's early stage, I think it demands a real thoughtful conversation with someone who knows what the risks are.

Robert Connors: **05:03** Yeah. So you touched on some of the advantages and then also some of the disadvantages. I think my take on that is that this really should be a careful discussion weighing both those advantages and disadvantages before you actually embark on some of this testing.

Miles Varn: **05:19** Yeah, absolutely. It's one thing if you know you're going to go on a blood thinner and there's a test that tells you which one is likely to work and which one is likely not to work.

Robert Connors: **05:31** Right.

Miles Varn: **05:31** That's a different decision. Or you know you would benefit from an antidepressant according to your doctor, but you don't know and he doesn't know, he or she doesn't know, which one might
work better on you. Those examples are really where the science has led to practical ways to really help with treatment decisions. On the other hand, full genome testing gives you literally a 25 page document of findings, and for all but about 0.001%, those DNA findings have no meaning today. No one knows what they mean. So, is it worth the expense? Well, if money isn't the issue, maybe it is to know your entire genetic profile, and over time, we're going to know what those other things mean. Is it worth the time? Is it worth the expense to have 0.001% of the data have any meaning for you? I think that's a personal decision. Some people just want to know, some people don't want to know.

Robert Connors: 06:46 Is there any other information that you would get from these tests that would be worth discovering?

Miles Varn: 06:54 Yeah, so for people who are planning a pregnancy, there are panels that look at carrier risk. There are certain conditions that if the mother and the father have these conditions, then the likelihood of having a child with those conditions is much higher. So if you know in your family you have a risk of certain genetic conditions, or are of certain ethnic backgrounds, then you can do the screening to then plan whether that risk is significant for you in advance, and take advantage of the science and the information to make thoughtful decisions.

Miles Varn: 07:42 There are also in situations where there's higher family risk of heart disease, of different neurologic conditions like ALS or MS, if you're interested in knowing whether your risk profile is higher or lower, you can do this through genetic testing. There are more and more clinical trials that involve families that have a predisposition to certain conditions, trying to use medications when we know the risk is so high that you're likely to develop a debilitating disease. You at least have the opportunity to enter a clinical trial and maybe be part of a group that has success in preventing that from happening.

Robert Connors: 08:29 Okay. Any other advantages or disadvantages that we haven't discussed or missed?

Miles Varn: 08:33 Yeah again, just to kind of summarize, it's not for everyone. You got to think about the risk and the benefit. Talk to someone who knows what they're talking about, who knows the different companies. They all have machines that to do the same thing, but they certainly have different flavors in terms of the interpretation, the reports you get back and the panels. There are very few companies that do consumer based total genome,
your entire genome. So that's a whole nother discussion about where do we find this? But for people who want information about themselves that may actually have implications for their kids and they can intervene in a good way, or who are planning a pregnancy or planning to be on a medication, then there may be more reason to consider this than just as a screening.

Miles Varn: 09:28 So again, I think we're used to dealing with these questions all the time. Not every primary care doctor, in fact, most primary care doctors are not used to these decisions because their patients either aren't interested, don't think about it or can't afford it. But this is what we do, and we educate people and help them understand the pros and the cons, and then it's their decision.


Miles Varn: 09:56 All right, thank you. Take care everyone.