

The content of this podcast has not been evaluated by Health Canada or the FDA. It is educational in nature and should not be taken as medical advice. Always consult a qualified medical professional to see if a diet, lifestyle change, or supplement is right for you. Any supplements mentioned are not intended to diagnose, treat, cure, or prevent any disease. Please note that the opinions of the guest or host are their own and may not reflect those of Advanced Orthomolecular Research Incorporated.

*** Intro Music***

[00:44: Dr. Paul Hrkal] Hello, and welcome to Supplementing Health, a podcast presented by Advanced Orthomolecular Research. I'm your host Dr. Paul Hrkal. This show is all about applying evidence-based and effective dietary lifestyle and natural health product strategies for your optimal health. We are going to feature some very engaging clinicians and experts from the world of functional and naturopathic medicine to achieve our mission to empower people to lead their best lives naturally.

[01:15: Dr. Paul Hrkal] Welcome to the Supplementing Health Show. My name is Dr, Paul Hrkal, I'm you host. I'd like to welcome back our special guests, Dr. Robyn Murphy and Dr. Aaron Goldman. This is part two of our show all about genetics and the application to our health. Part one we really talked about the base line, understanding what genetics and genomics is, why should we even care about understanding our genetics. We talked a lot about precision and personalised medicine which is the future of medicine and that is something that we believe here at AOR and as clinicians I think we are seeing that with the speed of technology and how its advancing. In part two, what we are going to talk about today, is all about how to apply genetics and the information you can glean from and understand your lifestyle and genetics to your health. I think this is really where the rubber meets the road. I'm really excited for this episode because it is going to be the meat and potatoes of why you do in practice, Robyn, and why we have developed a test like MyBlueprint™. So, let's start by welcoming you both back to the show.

[02:27: Dr. Robyn Murphy] Thank you. Thanks for having me.

[02:30: Dr Paul Hrkal] Okay, let's start right into it because we have a lot to cover. Were not going to talk about what genes are, we talked about that in episode one, so if you missed that, anybody listening can go back and listen to part one, all about that kind of background information. At this point were assuming everyone understands why you would want to do a genetic test, and hopefully if they haven't done one already, they're really intrigued to do it. Now, were going to talk about what is some of the information in certain areas of health that you might learn. There is many different things that we can learn, so I'll start with you Aaron, and maybe let's start talking about the specific area of nutrients because I know you've had, in part one, you gave me a couple of examples of Iron and Beta Carotene. What are some of the other important things that you might learn from a genetic test like MyBlueprint™? Then we'll move to you Robyn, and well talk a little bit about food allergies, sensitivities and gluten which is a huge topic that everyone is kind of deciding on, like 'should I go gluten free or not?'. Let's start with you Aaron and dive right in with those nutrients.

[03:44: Dr. Aaron Goldman] Sure yeah, we have as part of MyBlueprint™, a whole specific nutrient section we look at all of the different vitamins, Vitamin A, B, C, D, E. Also, we look at probiotics, Omegas 3s, antioxidants, so we are really looking at genes associated with certain needs that can be taken care of by supplementation, by adjusting your diet and so on. Other section of the report we look at physical fitness, we look at obesity risk, we look at hormonal health, we look at food sensitivities, and mental health, so it's quite a comprehensive test. There's quite a lot to cover there.

[04:33 Dr. Paul Hrkal] I think a person looking at the report, hopefully is going to get an understanding of just how many different ways there are of applying it to their health. Robyn, where to start with the report with your patients and how do you kind of evolve that conversation?

[04:53: Dr. Robyn Murphy] Well, the test is for people who are looking at their lifestyle, they are looking at the quality of life, they are looking to prevent disease, to make really impactful choices in their everyday life and maybe they're dealing with a disease as well. So, when you look at where to start with people, you have to start with doing an assessment, looking at symptoms, but also looking at objective measurements, looking at some of the things that we don't see in people. You know those underlying biochemical nuances as well as genetic predispositions. So, when you do the test specifically, I will start with the ground level, start with diet, start with nutrients because the nutrients is what is providing all of our biochemical pathways with the ability to actually function properly. You are not going to get anywhere with disease per say or moving the barometer unless someone is nutrient enriched in minerals. What's interesting is we kind of take for granted that the food that we are eating, we are breaking it down properly, we are absorbing it and we are getting all of the nutrients as expected. Health Canada has these blanket recommended daily allowances that are really for the general population, but that doesn't account for individual needs. What we find with genetics is we can predict who needs how much of certain vitamins because they may be at a risk for vitamins. And, these might be even vitamins that we can't even test for in clinic. One in particular is choline. This is my new favourite vitamin because I find the genetics of this so interesting.

[06:44: Dr. Paul Hrkal] Tell us more, I'm intrigued.

[06:45: Dr. Robyn Murphy] The chemicals about it. The body has its own natural process of producing choline. Choline is part of the cellular membrane, you know it makes Phosphatidylcholine.

[06:56: Dr Paul Hrkal] It's a fat, right?.

[06:58: Dr. Robyn Murphy] Yes, it's a fat. It helps with our neural transmitters, acetylcholine, it helps with our memory, it helps with our brain, it helps with our muscles, its also part of bile production so it helps with our bile synthesis as well as fat absorption, therefore our essential fatty acid and vitamin absorption too. So, it does quite a bit. I won't get on the topic of methylation but, also it is one of the major pools that uses our methyl donors. If someone is deficient in choline it can cause a lot of problems with liver, fatty liver disease, issues with bile, sluggishness, memory issues. A lot of vague symptoms that we see commonly.

[07:45: Dr. Paul Hrkal] Many people are walking around experiencing those things?

[07:46: Dr. Robyn Murphy] Yeah and we wouldn't even think about it. It takes decades for nutrient deficiencies sometimes to pop up. So, what you are doing you are identifying where these little nuances can happen, and you are providing the body with either the foods that they need in order to get the amount or with supplementation. Sometimes with supplementation, it doesn't always have to be long term it just has to be for a few months as you are making those assessments with symptoms.

[08:16: Dr. Paul Hrkal] So, what you're saying is that using a genetic test, like MyBlueprint™, there is a section on nutrients specifically. It doesn't tell you if you are deficient in that nutrient, though right? It tells you if you have a predisposition to become deficient. I think that's a very important point because a lot of people are like, "so, am I deficient in iron now?" when they read the report. No. That means that you need to be tested and maybe need to be a little bit more vigilant and on

top of it with your health care provider to test regularly for iron or choline that you can't test for. So that is something that may not inform a lab test, but it may inform that you are eating foods that are higher in choline. For example, egg yolks are higher in choline. There are certain conditions and states in life, like pregnancy, that you are focusing on neurodevelopment in utero and you need higher levels of these fats. Choline is a huge factor of that, so I think that is an important distinction, I think that a lot of people get confused on.

Let's talk about methylation, this is quite a scary topic for some people. Maybe if you're listening you've heard of methylation before. Let's break down methylation for the person that really has never had it explained to them before. We'll start with you Aaron and then we'll bring in Robyn.

[09:48: Dr. Aaron Goldman] Yeah sure, so as people that study molecular biology when we think of epigenetics, when we hear the term epigenetics, which is above genetics, were thinking about methylation. Really all it means is that we have an enzyme that puts a methylation or methyl group, a carbon dioxide with a couple of hydrogens, onto a molecule. By doing that it changes the shape of the molecule and then the molecule can be moved onto the next step of the pathway which could be degradation or whatever. So, we have a number of enzymes, the MyBlueprint™ test looks at some of those, that is involved in that whole methylation process.

[10:36: Dr. Paul Hrkal] Do you have anything to add Robyn?

[10:38: Dr. Robyn Murphy] Yeah, methylation within itself, it occurs in pretty much every single one of our cells in the body, I believe other than red blood cells. What it's doing, maybe it does in red blood cells.

[10:50: Dr. Aaron Goldman] Well, red blood cells are the only cells that don't have the nucleus or the genome so there is no DNA methylation there...

[10:57: Dr. Paul Hrkal] ...there's other methylation there. I understand it that methylation is one of the key processes that turns things on. It kind of makes things happen so it gives that little bit more context.

[11:09: Dr. Robyn Murphy] Yeah, so it's occurring it pretty much every single one of our cells. And what it's doing, it's inducing one of these chemical tags which is providing the body with methyl donors and the way that we get that is through a vitamin called SAMe. The reason the body is doing this, the methyl tags, the SAMe, these methyl donors are being used for hundreds of biochemical pathways. So, it's really like one of those stop points, those check points, for the body to be able to change and direct the metabolism and the state at which the body is in. So, what you'll see is that the body will increase SAMe and methylation when it is in an anabolic, high metabolic state. When it is in more of a detox, or trying to recover or high oxidative state, it will shut down the methylation and it will go more towards producing protective molecules for our body, things like glutathione which is a strong antioxidant, it helps with DNA protection. So, methylation is used to repair our DNA and RNA, it's used to produce our DNA, it's used for energy production, for detoxification, for hormones, for mood and neurotransmitters.

[12:37: Dr. Paul Hrkal] Pretty much everything.

[12:38: Dr. Robyn Murphy] So, really it has its hand in everything. It's kind of this check stop that the body uses.

[12:42: Dr. Paul Hrkal] So, my next question you kind of beat me to it, was why should we even care about this methylation? As clinicians we hear a lot about 'methyl this' and 'methyl that'. This is a

methylated form of a vitamin if you want to get it at your food store. You might look at your B12 bottle and say this is methyl cobalamin. Cobalamin is the actual B12, this is the methylated version. So, I think this has the role to play with stimulating methylation, right?

[13:08: Dr. Robyn Murphy] This is why people and companies are starting to gear toward these active forms of these vitamins because this pathway is reliant on the active forms of the B12 as well as the folate and in our genetics we may not have the highest efficiency at converting that. So, the reason that there has been an explosion of information on methylation is because as I mentioned this is one of the foundational pathways. If this is disrupted it is going to have an effect in so many different areas of our health. What people have really focused on is how the genes are associated with all these diseases. I would say that it is contributing, but it is not necessarily the cause, and so people want to kind of buy stuff to make sure that their methylation pathways are working properly. You can see when someone comes in with widespread issues with methylation, you are going to see issues with any part of the system that has a high cellular turnover because it's for DNA repair.

[14:10: Dr. Paul Hrkal] So, give me some examples.

[14:11: Dr. Robyn Murphy] So, gastrointestinal issues. You're having troubles, the GI lining repairs very rapidly. Hair skin nails as well, neurotransmitters, detoxification, hormones, So all of these are relying on constant...

[14:29: Dr. Paul Hrkal] The daily processes.

[14:29: Dr. Robyn Murphy] Yeah, the daily processes. Sso you'll see fatigue, generalised gastrointestinal issues, maybe problems with repair like skin repair with wounds, hair not growing, lower metabolic function.

[14:46: Dr. Paul Hrkal] If someone has an issue with methylation, which is something that a genetic test will tell you, it looks at how well do you use folic acid for example. Folic acid is one of the main methylators. Talk a little bit about, we might have heard about the active forms of vitamins, talk a little bit about folic acids, specifically because that is something that people are now even asking for, like pregnant women, "I want the active form of folic acid" because that's an area that there is lots of dividing cells right?

[15:24: Dr. Robyn Murphy] Oh yeah, that's where folic acid kind of made its claim to fame it think. We all know that fortification and increase in folic acid prevents neural tube defects. So, issues with babies being born and their nervous system being developed because there is such a high demand. Folic acid is the synthetic form. The body still has to convert the synthetic form into the active form. The natural form that we find it in, comes from folate and it comes from the word foliage, so plants, leafy greens. This is where we get a lot of our sources from. If we were to be eating active vitamins all the time, there would be no control system for our bodies to control what's happening. There needs to be these check points and balances. The body has these pathways, methylation, to activate the vitamins, so it is very tightly regulated to make sure that your body matches the supply and demand. And so, if you have a high amount of folate and the demand is there then your body is going to convert it into the active form. Now, if there is an increase in the demand and you have a genetic variation or version that is leading to a deficiency in how quickly you can keep up with that demand, now you are putting the body at a risk in the deficiency in the active form. That can put a stop, or a pin, in some of these metabolic functions.

[16:58: Dr. Paul Hrkal] You can easily see how it gets complex pretty quick, where we are talking about different metabolic pathways, you're talking about different forms, there are many forms of that folic acid conversion gene, MTHFR, maybe you've heard about it.

I wanted to ask you Aaron, is there a problem of too many active forms or too much methylation? I think you've already touched on it there Robyn, but I would like to get your take Aaron, on over methylation, is that a thing?

[17:30: Dr. Aaron Goldman] I will let Robyn talk about the clinical impact of that, but definitely. One analogy that I like to use when thinking about these types of things is, imagine you have a drain in your sink that is the normal size, you turn the water on full blast, and it might fill up a little bit of water. Maybe you want a little bit of water in the bottom of your sink, and the rest will just flow through, right? Now, imagine that the drain is a bit clogged, imagine that an enzyme isn't working as efficiently as you would like, then you would get too much water in the sink and not enough going through, so its all about having the right balance. Likewise, if the drain is way too big, water will just flow through and you won't have any accumulation of water.

[18:21: Dr. Paul Hrkal] So, it's more about balance. We tend to think about I want things high or I want things low in conventional medicine, where this is more about the body has an intelligence to it and there are pathways and there are redundancies built in. So, people that are slow at this one pathway that there is a build up there, there are symptoms associated with that and they are missing out on the other end with some of the key nutrients and the body tries to work around in some cases it can't, right? You see this in your practice all the time. Bringing it back to just what listeners might be experiencing, what are some of the things that you find in your practice that when you correct methylation that they have that 'ah hah' moments that they feel a lot better?

[19:12: Dr. Robyn Murphy] Yes, so as I mentioned, these pathways get represented in different systems like neurology or our mood, our hormones, our ability to repair in our gut, in our skin, just definitely sharpness, memory and that cognitive capacity. A lot of times what I'll see, if there are methylation issues, it will affect detox, and there will be this overwhelming amount of toxic burden or chemicals that our body is not necessarily clearing as quickly.

[19:49: Dr. Paul Hrkal] What would be a couple of signs of that, one that comes to my mind would be walking through a mall and you walk through the perfume department and you get a massive headache right away, right?

[19:59: Dr. Robyn Murphy] Yeah, headaches, brain-fog, word relocation, you know the ideas there.

[20:03: Dr. Paul Hrkal] Not as sharp anymore.

[20:05: Dr. Robyn Murphy] Yeah, kind of noticing these vague declines in brain function. People usually chop it up to aging but I've seen some pretty sharp 90-year olds and I don't think we should just accept that as status quo. I do find that I won't just dive in with these methylated B12 or folates because this whole system is very eloquently designed to work with these checks and balances. It's about providing the minerals, providing all the B vitamins, getting those status' up and then you can, if the demand is there and needed and genetic variants you know, a history of deficiencies or bio-markers that we use to see how well the cells are methylating, then definitely I will start adding in B's or the B12's. I like using the Tri B12, all three versions, because there are different pockets, different areas in our body that these are going to. Just making sure that, we are trying to mimic as much as possible, the natural states that we would find and help to support the body where needed.

[21:23: Dr. Paul Hrkal] So, to those listening, there are three main forms of that B12 that Robyn just spoke about there, methylcobalamin, adenosylcobalamin, are the at the real active end of the pathways and there is the precursor hydroxocobalamin that kind of precursor for even before that that is cyanocobalamin. Which when you look at most supplements found in pharmacies and health food stores they will contain the cyanocobalamin form. If a person has trouble methylating, which we just talked about where that might be the case, there is an increased benefit of using a form that doesn't need to be converted because it is bypassing the enzymes that need to be converted to the active form. Its no longer sluggish, we've gone to the bottom of the drain already and its already on the other side. So, in this case, it is important to understand the difference. You could apply that to any single B vitamin going down the line, there are forms that are more absorbable that is something that we are going to be covering a lot more on Supplementing Health, on this show. Where we are going to talk about that, so stay tuned for other episodes and check back into some of the descriptions and we're going to talk about B vitamins. For the sake of time, lets keep going and plodding forward on this subject of genetics specifically.

So, let's talk a little more and shift gears into diet. One of the things that is huge right now, is the Ketogenic diet, one of the other things that is equally huge is the plant-based, veganism. How can, or can it at all, a genetic report like MyBlueprint™ give a person insight into what diet is better for them? We'll start with you Aaron.

[23:11: Dr. Aaron Goldman] Sure, yeah, when you're talking about going plant based there are certain nutrients that are found in animals that are not found in plants. One example, which we talked about earlier, is vitamin A. Beta carotene is in plants, if you are going to a vegan diet and you can't convert beta carotene into active vitamin A, then maybe you should be self-medicating with active vitamin A.

[23:46: Dr. Paul Hrkal] And, you would never know that if you didn't do this report. That right there in itself is one example of if you've chosen to eat a certain way, just based on personal preference, ethics, whatever it may be, there may be some consequences on your metabolism that you don't know. Vitamin A is one of those example.

00:24:04: *Dr. Aaron Goldman:* Omega 3 is another example where there are animal and plant sources of Omega 3's and some people can't rely only on the plant sources.

00:24:15: *Dr. Paul Hrkal:* You can get pre-formed EPA and BHA from algal sources so those are the active versions of it.

[24:21: Dr. Aaron Goldman] Exactly. If you're vegan and you want to stay that way, but you need that animal 'source of omega 3' then you can get it from an algaecal supplement.

[24:32: Dr. Robyn Murphy] Or active forms, because that is what they really are, is the active.

[24:35: Dr. Paul Hrkal] You just won't get the benefit of getting linolenic acid from flaxseed. That's the conversion so.

[24:45: Dr. Aaron Goldman] Yeah.

[24:45: Dr. Paul Hrkal] So that's an important one, we know how important Omega 3s are. Anything else that you can think of just based on dietary choice?

[24:55: Dr. Aaron Goldman] You mentioned the ketogenic diet, so a lot of people cut out carbs and focus on fats, but there are good fats and bad fats. Sometimes your genetics can point you in the right direction, you know avoid the saturated fats, make sure you are getting enough Omega 3s.

[25:12: Dr. Robyn Murphy] I find this so fascinating because if we look at the genetics and what it is, it is a history of our ancestors and where we came from so what was your culture? What were the tendencies from what you were eating? Were you eating a lot of root vegetables? Were you eating a lot of whale blubber? Where were you relying on your energy and metabolic resources from? We know that not everybody came from the same, well if you go far enough back sure we come from the same part of the world, but over the last couple of thousand years humans have really diverged into unique sort of specimens. This is where we can see some of the genetics is helping us to understand where certain people are responding to macro nutrients including fats and so there is really particular genes that are influencing how we are hormonally responding to fats. Typically when we eat fat there's certain cues, there are hormones that tell us that were satiated, were full, were good. Typically, when we eat fat, we should feel full but based on our genes not everyone is getting that same strength of signal so it actually changes how the hormones are being released so people are still feeling hungry even though they are having high caloric dense foods including saturated fats.

[26:46: Dr. Paul Hrkal] Would that somehow inform whether you should be eating high fats, or not? Does that mean that you should be eating other foods that do make you feel full?

[26:53: Dr. Robyn Murphy] Part of it is behavioural modification. You know that maybe you can't rely on that chemically signalling that you are full. What I do see typically with patients is that rather than saying I feel good I'm going to stop; they are eating until they are engorged. To the point of distention and really, they feel sick after and that is going to lead to weight gain. A lot of people do ketogenic diet to lose weight so you are kind of working against yourself there. It helps to direct behavioural modifications, so relying more on food size and portions as opposed to those chemical signals. But also, studies show that if you change the amount of saturated fat that people are eating then they will lose weight, so it does have to do with those macro nutrient ratios.

[27:51: Dr. Paul Hrkal] So, meaning, that if you eat low fat you'll lose weight?

[27:51: Dr. Robyn Murphy] Low saturated fat, but increase in polyunsaturated fat and monounsaturated fats, so more of these plant based.

[28:00: Dr. Paul Hrkal] So, you could be keto, but you just have to be careful and be specific. You shouldn't be eating bacon when you're on keto for example.

[28:05: Dr. Robyn Murphy] Yeah, you shouldn't be eating cheese, you shouldn't be eating bacon, any of the high saturated fats.

[28:11: Dr. Paul Hrkal] A lot of the foods that keto people are like, "I love keto because I can eat as much bacon as I want".

[28:14: Dr. Robyn Murphy] Butter.

[28:16: Dr. Paul Hrkal] Genetically, that may actually not be good for you, and you might be doing yourself a long-time disservice right? You want to add anything Aaron?

[28:25: Dr. Aaron Goldman] Yeah a couple of things, you talked about the strength of the signal in your brain that tells you when to stop eating. Its also the timing of that signal so sometimes just slowing down to give your brain time to accumulate that signal would be important right? The other thing is just about genetic testing in general. When people have their genetic results and they know the basis of an issue that they might be having or the deficiency that they might be having they are much more likely to stick to a program. If you tell a patient to reduce saturated fat in your diet,

most people might do that for a month or two and then go back to bad habits. Whereas, if you have the genetic information and you know its in your genetics, you have an increased risk of metabolic disorder if you saturated fats, then they are more likely to be mindful of that.

[29:24: Dr. Paul Hrkal] That's an excellent point, we see that as clinicians all the time. You tell someone to do something, like take vitamin D, people are like "I know" and they take it for like a month but if you show them that they are majorly deficient in vitamin D they are going to take their vitamin D until you can tell that your levels are good.

[29:44: Dr. Robyn Murphy] When you equate it with an end point too, we know that if you modify your diet in this way, we know that your genetics are likely to respond.

[29:53: Dr. Paul Hrkal] Such fascinating information, just based on what we talked about you can inform your decisions based on dietary preferences. By knowing your genetics, we can look at nutrients that you may be predisposed to being deficient in. For example the MyBlueprint™ report looks at Vitamin D. It looks at both the receptor and the way you turn it to the active form and a person who has these particular mutations may need to be even more diligent with their supplementation. There are so many other examples we could look at. Just by Omega 3, vitamin D, iron, beta carotene, some of these foundation things, a person can get that personalised precision health and either go test more or be a little bit more diligent in what they are doing.

We have so much more that we can talk about, I think I am going to bring you guys back for a part three. It's so dense, we haven't talked about things like hormones. We haven't talked about estrogen metabolism which is huge. I really, really want to talk about gluten and that whole idea of whether you should be gluten free or not. The testing can actually give you some insight into that. I want to talk about detoxification. We touched on it a little bit in terms of methylation but there are antioxidants like glutathione that are incredibly important for our detox pathways. I personally have some issues on my genetic test in that area, so I want to pick your brains on that. So, I would like to thank you both for sharing your insights again and thank you for joining me.

[31:40: Dr. Robyn Murphy] Always a pleasure.

[31:41: Dr. Paul Hrkal] Well see you soon.

31:42: Dr. Aaron Goldman] Thank you

****Outro Music****

Thank you for listening today. For more information about our guests, past shows and future topics please visit aor.ca/podcasts. Do have a topic that you want us to cover? We invite you to engage with us on social media to request a future topic, or email us at marketing@aor.ca. We hope you tune in again next week to learn more about supplementing your health.