Welcome to the Huberman Lab podcast where we discuss science and science-based tools for everyday life. I'm Andrew Huberman and I'm a professor of neurobiology and ophthalmology at Stanford School of Medicine. Today we are discussing supplements, we're more specifically a rational guide to supplementation. Now to be forthright, I want to tell you that I am not a fan of the word supplements because it stems from this idea that all supplements are somehow food supplements or designed to compensate for what one could otherwise get from food. And that's simply not the case. Many supplements are compounds that are extremely efficacious for instance for enhancing sleep or for enhancing hormone function or for enhancing focus. And many of those compounds are simply not found in food or are not found in enough abundance in food to have the desired effect. Now that raises the issue as to whether or not these compounds are good to take, safe to take and whether or not they are actually beneficial for us. And the short answer is that like everything else, supplements can either be good for us or dangerous for us depending on dosage, sourcing, etc. But more importantly, we need to think about supplements and a rational guide to supplementation as taking into account a number of different factors. And we need to set aside the idea that all non-prescription compounds that fall under this umbrella term supplements are simply things that could be extracted from food. But most people don't either ingest enough of those foods or pay a nut for tension to their diet in order to attain them. In fact, during today's episode, I'm going to give you a number of different very specific questions that you can answer. In order to decide whether or not you should be taking any so-called supplements or not and whether or not you should be taking one type of supplement or another type of supplement more or less than the other. I'm also going to discuss safety, of course. And I will discuss cost because obviously monetary cost is a serious consideration for most if not everybody considering the use of supplements. During today's episode, I will also discuss which specific supplements are optimal for achieving specific endpoints such as improved sleep, such as improved focus, and such as improved hormone function among other things. I plan to cover the full range of what are referred to as supplements, including so-called foundational supplements that are designed to act as a sort of insurance policy against any deficiencies that might exist within your diet, all the way up to very targeted outcome supplements and compounds. That is compounds that are non-prescription that are designed to achieve very specific endpoints such as enhanced focus over the next four to six hours of physical work or mental work, so on and so forth. I plan to cover everything in between that as well. And I promise to cover how supplements interact with other things such as behavioral tools, prescription drugs, when supplements might be a good alternative to prescription drugs, when they might not be a good alternative to prescription drugs, when supplements can serve as an augment to already excellent nutrition and prescription protocols, and every feature of supplements as it relates to mental health, physical health, and performance. By the end of today's episode, you should be armed with a number of different questions, as I mentioned before, that will allow you to develop the most biologically effective and cost effective supplement regimen for you. And of course, I want to acknowledge that for some people, the total amount or dosages of a given supplement or supplements that you might need to take could be zero. There are such individuals, but that many people can in fact arrive tremendous benefit from supplements in a way that can be more cost effective than trying to obtain the same non prescription nutrients from food. As we head into today's conversation, I want to emphasize something very important, not just as it relates to supplements, but as it relates to all aspects of mental health, physical health, and performance. And that is, I take the stance that behavioral tools, that is specific actions that we take and specific actions that we avoid form the foundation of mental health, physical health, and performance. So things like viewing morning sunlight and exercise are behavioral tools. They don't require the ingestion of anything. Within the realm of behavioral tools, there are also some don'ts or do nots that can greatly enhance our mental health, physical health, and performance, such as avoiding bright light exposure to your eyes between the hours of 10 p.m. and 4 a.m. or avoiding caffeine too late in the afternoon, because even if you can fall asleep after ingesting caffeine in the late afternoon, we know it disrupts the architecture of your sleep in ways that greatly diminish your mental health, physical health, and performance the following day, for instance. So behavioral tools form the foundational layer of all tools for mental health, physical health, and performance. Second to that, I would say the next layer is in fact nutrition. No amount of supplementation or non-prescription compounds or prescription compounds for that matter can ever compensate for poor nutrition, at least not for very long. So this is a key point, even though many supplements are not simply food supplements, because they are not designed to compensate for anything that you could otherwise get from food, that is not to say that you can live on supplements. I suppose you could live on way protein and fish oil capsules and vitamin capsules or tablets for a short while. But before long you either suffer from boredom to the extent you want to go back to food or some other deficiency would show up. I think it's the rare individual that tries to survive entirely on food supplements and things of that sort. Most everybody, and I would hope everybody is paying attention to their nutrition, so I would place behavioral tools, do's and do not, as layer one, the deepest layer, the bedrock of all mental health, physical health and performance. On top of that, I would place nutrition, and of course that's going to mean different things to different people with the understanding that there's a huge array of different food choices and nutritional programs. Nutrition is fundamentally important for macronutrients, for storage of energy in the form of glycogen fats and phosphocuritine stores and so forth, but also for obtaining basic nutrients, vitamins, minerals and micronutrients. So we've got behavioral tools, nutritional tools, and then on top of that, I would place what is typically called supplementation, although today I'm trying to expand that word to include not just things that compensate for food deficiencies or that are layered on top of food as a way to enhance the amount of nutrients that you could get from food. But as I mentioned before, compounds that are non-prescription that can be for a variety of different purposes and many of which are not available in food, so I would place supplementation right on top of nutrition. Then past that, I would say prescription drugs, obviously prescribed from a board certified MD, can serve a very vital purpose in the treatment or augmentation of mental health, physical health and performance goals. So some people do in fact need prescription antidepressants, other people do not. Some people do in fact need prescription drugs for attention deficit, hyperactivity disorder or sleep related disorders, so on and so forth. The whole issue of whether or not there is an over prescription epidemic or not is a separate conversation for a separate podcast. I would argue that many prescription drugs do in fact save lives. This includes the category of prescription drugs related to statins and cardiovascular health related to any number of different things, even sleep disorders and insomnia, narcolepsy and so forth. That said, there are many instances in which people can either reduce their dosages of prescription compounds or can replace those prescription compounds with quality behavioral tools, nutrition and supplementation. But there are many instances in which prescription drugs are the only route by which people can achieve the mental health, physical health and performance goals that they wish to achieve. So I would place that as the fourth layer in the stack of layers directed towards mental health, physical health and performance. So just to list off again, I fundamentally believe that behaviors, do's and do not form the foundation of mental health, physical health performance. Next in line would be nutrition. That is the specific foods we eat, the amount that we eat, the combinations of foods that we eat in a given sitting and the timing in which we eat our food. Then on top of that, I would place supplementation, the topic of today's episode and finally prescription drugs and of course all of these things interact in important and interesting ways, many of which interactions we will discuss during today's podcast as we drill into the topic of supplementation, developing a rational supplementation protocol and one that is most biologically and cost effective. Before moving further into today's episode, I want to emphasize a very important point, which is that I am not a physician, that is I'm not a clinician, so I do not prescribe anything nor am I going to do that today. I'm a professor, I review the research literature, I describe tools, gleaned from the research literature and developed from the research literature. So I profess many things but I do not prescribe anything and I think it's vitally important that any time you are thinking of adding or subtracting any behavioral protocols, nutritional protocols, supplementation based protocols and certainly prescription drug based protocols. For whatever purpose that you consult a trusted board certified physician, that's absolutely essential. I don't say that merely to protect me, I mainly say that to protect you. The most important aspect of today's episode is not going to be that you discover one particular supplement or category of supplements or blend of supplements that is going to transform your mental health physical health and performance. No, the purpose of today's episode is for you to understand where you have needs that can be met by supplementation better than any other approach and most importantly how to think about supplementation. That is how to think about the different categories of supplements that are out there and how those interact with your nutrition and your behaviors so that you can maximize your immediate and long term health. What I mean by this is that we have this word supplements or supplementation but that means many, many different things. It means vitamins, it means minerals, it means adaptogens. Most people probably don't even know what an adaptogen really is and in fact many people talking about adaptogens never actually define what an adaptogen is or it's designed for or the fact that many adaptogens are also used for other purposes. So today's discussion is really about you learning how to think about supplementation the same way you would learn to think about nutrition or exercise or anything related to brain and body health for that matter. In a way that lets you navigate this vast space that we call supplementation and develop protocols that are optimal for you and indeed it may be the case that the ideal dosage of a given supplement for you is zero milligrams. For instance, if I ask you are you sleeping deeply and enough each night do you feel rested throughout the day maybe you need a short nap and that's it or maybe you don't. And you say yes I feel great I sleep great I wake up feeling great I only need a short nap or no nap during the day to feel rested throughout the day. Well then there's really no discussion about sleep supplementation to be had between you and me. However, if you are not sleeping well then a big discussion opens up as to what the reasons are is it related to nutrition or when you're exercising or ingesting caffeine. In other words, no discussion about supplementation can be had in a vacuum rather discussions about supplementation need to be considered in a larger context. So today you're going to learn how to place the discussion and thinking about supplementation in a larger context and think about how specific supplements that is specific ingredients and combinations of ingredients can indeed be used to buffer and support your overall health and lead you to specific health and performance outcomes. Before we begin I'd like to emphasize that this podcast is separate from my teaching and research roles at Stanford. It is however part of my desire and effort to bring zero cost to consumer information about science and science related tools to the general public. Let's talk about supplements and supplementation and how to develop a rational supplementation regimen. One of the things that's really emerged over the last 20 years is that supplements and there I'm referring to non-prescription compounds designed to augment nutrition, prescription drugs and behavioral protocols. Have emerged as a mainstay within the health and wellness but also the medical communities that are focused on developing mental health physical health and performance for their patients and their athletes and for the everyday person. Essentially what I'm saying is that 20 years ago a discussion about supplements would mainly take place within the niche communities of health food stores or particular athletes. But nowadays I think almost everyone is familiar with the fact that yes indeed there are standard vitamin supplements but that there are also supplements such as vitamin D3 which are designed to make sure that people have certain amounts of hormones in their bloodstream because they might not be getting enough sunshine. Although I'll be very clear over and over throughout this episode that there is no pill replacement for sunshine nor is there a pill replacement or food replacement for that matter for exercise or for social connection or for sleep or for simply getting smarter. Again there is no pill that's going to replace excellent behavioral protocols. In fact a physician friend of mine has a great saying that I think everybody should keep in mind as we weighed into this conversation which is that better living through chemistry still requires better living. I think that's a very important phrase to keep in mind when thinking about the optimal supplementation or prescription drug protocol for you. So what is an ideal supplementation protocol? I think what we need to do is to take a step back and ask what are different supplements designed to do. For instance there are foundational supplements. These are supplements that are designed to establish a foundation or provide insurance along with your nutritional intake to ensure that you're getting all the things that you need in order to have a basic level of mental health, physical health and opportunity for optimal performance. Now this is the one category of supplements for which I think it's appropriate and in fact advantageous to have multiple ingredients in a given supplement. Throughout the rest of today's discussion I'm going to talk about the advantage of mainly focusing on taking single ingredient formulations for a variety of reasons. But when it comes to foundational supplements what we're mainly talking about are supplements that contain vitamins and minerals that are designed to compensate for any deficiencies you might have from diet or from lack of adequate diet. How would such a lack of vitamin and mineral intake arise? Well for instance if you're somebody that practices intermittent fasting or other components of fasting or if you're somebody who does not get enough vitamins and minerals from vegetables and fruits and grains and meats. Well then taking a supplement that can act as an insurance policy against any vitamin and mineral deficiencies in many ways can be advantageous. Although I will talk about some of the safety concerns in just a few minutes. Now I want to acknowledge that as soon as we talk about vitamin mineral supplements the skeptics immediately raise their hands and say all that vitamin and mineral supplements do is give you very expensive urine and there the skeptics are referring to the fact the reality that when you ingest high levels of water soluble vitamins so think vitamin C and some of the other vitamins that indeed you will excrete them in your urine. However it's also the case that many people are not getting enough of the water soluble vitamins from their foods and it's also the case that many people are and it's also the case that ingesting higher than needed amounts of most water soluble vitamins provided those levels aren't exceedingly high is or at least we should say can be safe and again this is provided that the levels that they're ingesting are not exceedingly high. So the typical vitamin mineral supplement is indeed going to cover any gaps or deficiencies that might arise in the water soluble vitamins from your food intake but the reality is that most people are getting enough of the water soluble vitamins from their food if they are paying attention to a couple of things. And those things are very simple to lay out regardless of whether or not you're a vegan of vegetarian a more traditional omnivore eating from both animal based and plant based sources grains etc or even if you're in the pure carnivore or strict I guess it's called the lion diet where it's just meat and salt. Regardless of what type of nutrition you follow you will get vitamins and minerals but you'll get more or fewer of them depending on the nutritional program you follow and of course depending on how often and how much you eat that's just sort of obvious most people who take a vitamin mineral supplement will indeed excrete a lot of the water soluble vitamins they will retain the fat soluble vitamins and there again the skeptics will raise their hands and say you do not want to take high levels of fat soluble vitamins because they will be stored in your system potentially to levels that are dangerous again provided that vitamin mineral supplements are not taken in excess it's unlikely that you're going to have such a build up of the fat soluble vitamins in your system that they're going to be a problem. So that raises a very specific question that you need to ask do you want to take a vitamin mineral supplement well the answer to that will be highly individual but you really just need to address two things first of all is the cost within the range that you can afford and want. And you can see the full range of ones that are pennies per day all the way up to many dollars or tens of dollars per day because of what are reported to be variations in quality and sourcing and so forth. So the real differences between the quality of the water soluble and fat soluble vitamins found in the less expensive versus the more expensive vitamin mineral supplements more typically the cost scales with the dosages of these different vitamins and minerals and as could probably be expected the more expensive to obtain and source vitamins and minerals tend to be in lower quantities in the less expensive versions of vitamin mineral supplements. This is kind of obvious so you need to ask yourself can you afford it financially and then you need to ask yourself are you able to regularly ingest enough foods with enough variety to cover your vitamin mineral. Needs just from food and for some people the answer is going to be an immediate yes they are careful to get enough of the foods that allow them to obtain their vitamin and mineral quota and for other individuals the answer will be no I would say for people that are extremely physically and or mentally active. And for people that perhaps are following a intermittent fasting schedule so they are not ingesting a lot of food in general or restricting their food intake to specific times of day well then a vitamin mineral supplement likely make sense for them however it's going to be very important to ingest that vitamin mineral supplement with food and ideally early in the day so that can set up a little bit of a challenge for the intermittent faster is who are restricting their feeding window to late in the day why do I say this well many of the water soluble vitamins in particular the B. Vitamins need to be ingested with food because otherwise they can cause some stomach upset and again there's a range there some people like myself can take B vitamins on an empty stomach and feel fine other people feel really lousy when they take B vitamins there are a few other things that we'll talk about later namely zinc and coins I'm q 10 that really should also be taken with food but the best time to take a vitamin mineral supplement is with food and I believe that if you're going to take a vitamin mineral supplement. That you want to take it with food and you don't want to take dosages of vitamins and minerals from supplements that are exceedingly high for a couple of reasons one is the build up of fat soluble vitamins that we talked about before the other reason is that when people tend to take very high levels of vitamins and minerals from supplements they tend to spend less time and focus on making sure that they're optimizing their nutrition or at least trying to get their nutrition right what do I mean by getting their nutrition right well I think regardless of what they're doing is a lot of the same thing. Well I think regardless of whether or not you're keto omnivore carnivore vegan or any other nutritional plan the key thing is to get most that is about 75 to 80% of your foods or more from non processed or minimally processed sources I think there is agreement across the board that most people should avoid highly processed foods highly processed foods are going to be foods with very long ingredient lists that have very long ingredients. So this often includes snack foods it does include snack foods like chips etc pastries that could sit on the shelf a long time but it also includes things like canned soups and number of different other foods that have many many ingredients preservatives most people would do well to avoid those kinds of foods and focus most of their intake on things that are non processed so these would be things like fruits and vegetables you notice that the non processed foods will tend to have very short shelf life or require refrigeration in some cases. Such as meat eggs etc or minimally processed foods such as rice and oatmeal and pastas beans and things of that sort beans oftentimes can be completely unprocess as well of course this is two general categories unprocessed and minimally processed that should make up about 80% or more of your food intake if your goal is health and obtaining adequate amounts of vitamins and minerals. The so called foundational supplements include of course vitamin and mineral supplements but has expanded over the last decade or more to also include supplements that have vitamins and minerals but also things like digestive enzymes and again here we have an example where indeed you can get digestive enzymes from foods for instance eating a bit of papaya or even a little bit of pineapple can assist in the digestion of certain aspects of macronutrients because these are naturally processed. These are naturally occurring enzymes that help digest things like carbohydrates fats and proteins and there are other food based sources of enzymes you're welcome to look those up online if you just put food based sources of enzymes and you'll find those but nowadays a lot of the foundational supplements will include papain or they will include different light paces or anytime you hear the word ace by the way it means a enzyme and enzymes designed to break down or to catalyze some sort of reaction. Biology and nutrition in particular so you can find foundational supplements that include vitamins and minerals and digestive enzymes and nowadays more and more the quality foundational supplements are also including things like adaptogens and here the name adaptogens sort of vague and indeed has no specific operational definition this is something really important to understand about supplementation is that companies and indeed podcasts can talk about adaptogens without any problems. So we can talk about adaptogens without actually defining what an adaptogen is in an operational way when we say operational what we mean is a definition that everyone in a given arena or space research for instance can agree on so that when we talk about the adaptogenic effects of a given compound we're all talking about the same things well foundational supplements nowadays include vitamins minerals, digestive enzymes and the so called adaptogens and the adaptogens broadly speaking are thought to improve the body and brains ability to adapt to the body. And brains ability to buffer against various stressors so these could be things like herbs like ashwaganda that are designed to reduce cortisol levels in that sense ashwaganda is an adaptogen but ashwaganda has other effects related to hormone augmentation in both the testosterone and estrogen and maybe even the thyroid pathways we'll talk about this a little bit later when we talk about supplements for hormone augmentation. So foundational supplements has really expanded to include a lot of different categories of nutrients and micronutrients vitamins and minerals digestive enzymes designed to achieve a broad spectrum of effects again this is the one category of supplementation where I think it makes sense to explore multi ingredient formulations and the other thing that's often included in these so called foundational supplements or probiotics or prebiotics which are designed to be a lot of different types of supplements. Which are designed to augment and support the so called gut microbiome the gut microbiome is the collection of trillions of little micro bacteria that exist in all of us they mainly exist in the mucus membrane lined tissues of the body so that would be your nasal passages your mouth the vagina the urethra and the gut the whole way from your mouth all the way out the other end so not just your stomach trillions of bacteria live there. Trillions of micro bacteria also live on your skin in fact every time you shake someone's hand you're exchanging micro bacteria these micro bacteria often are healthy for us good for us they support a huge number of positive biological functions but there are other micro bacteria that live in our gut and elsewhere on those mucus line tissues that can be disadvantageous for us they can harm our health. A growing idea these days based on a number of different laboratories work including the laboratory of my upstairs neighbor at Stanford Dr Justin Saunemberg who's been a guest on this podcast is that having a great diversity a range of microbiota as they're called micro biome microbiota and these micro bacteria are all essentially referring to the same thing the microbiome is the whole collection of these micro bacteria but having a lot of different so called species of these micro bacteria is known as micro bacteria. It is known to be advantageous for immune system function hormone function it supports the so called gut brain access that's important for a number of things including mood and motivation actually supports the production of neurotransmitters in the brain in body that can help keep you motivated elevated mood support the general function of neurons well not surprisingly there are ways to support the gut microbiome and there are ways to harm the gut microbiome I'll refer to the podcast episode we did with just a few of you guys. We did with Justin Saunemberg you can find that at hubermanlab.com if you want to learn all the different ways that you can support your gut microbiome but for sake of today's discussion I want to emphasize that some of those methods of supporting the gut microbiome are through the direct consumption of particular foods and there are two categories of foods that if you're getting enough of them it's likely that your gut microbiome is diverse and is going to support all those important functions I just listed off and other functions as well. So these two sources of gut microbiota supporting foods are low sugar fermented foods so these would be things like sour cow kimchi Greek yogurt again low sugar Greek yogurt kombucha in particular as a drink things like kefir there are a bunch of other varieties of fermented foods different cultures at different fermented foods so the Japanese natto is another source of ferment that is very good for the gut microbiome and work from Justin Saunemberg's lab and close by labs at Stanford School of Medicine have shown that if people ingest for servings a day of these low sugar fermented foods it greatly improves the function of the gut microbiome and in particular enhances the function of the immune system and it reduces the so-called inflammatory it reduces inflammation in the brain and body in ways that are helpful and effective for brain and body that is mental health physical health and performance. So there are ways to support your gut microbiome strictly from food but it should come as no surprise that most people are not ingesting for servings a day of fermented foods. Hopefully they're getting enough fiber especially prebiotic fiber which is one other way to support the gut microbiome although the studies from Justin Saunemberg's lab point to the fact that fiber intake itself was not directly supportive of the gut microbiome in everybody it was in some individuals but not in others in some had no effect and in other individuals it actually made the category or I should say the array of inflammatory markers worse it actually led to more inflammation. So that's not to say that fiber is bad in fact in the episode that we did with Dr. Lane Norton he discussed the many benefits of getting enough fiber there are a lot of reasons why people should get enough fiber in their diet but at least for supporting the gut microbiome for servings a day of low sugar fermented foods seems to be the best way to support the gut microbiome through the intake of nutrition. Again most people are not achieving that and therefore these foundational supplements that can be just vitamin and mineral supplements or could be vitamin and mineral supplements plus digestive enzymes or both of those things plus adaptogens now also tend to include prebiotics and probiotics that are designed to support the proliferation and maintenance of enough gut microbiota in order to support the gut microbiome and the gut brain axis. Now because of the importance of the gut microbiome and because most people are not getting enough support for the gut microbiome in the form of low sugar fermented foods and prebiotic fiber from their diet I think perhaps one of the most essential foundational supplements. Irrespective of whether or not it includes vitamins and minerals adaptogens and digestive enzymes is some way to support the gut microbiome. Now this gets into a whole dimension of categories of prebiotic and probiotic capsules and one needs to be very careful there I do want to say that most of the prebiotic and probiotic capsules that you can buy first of all are very expensive the best ones are going to be refrigerator to require refrigeration just as do any good low sugar fermented foods by the way. So for instance pickles are a low sugar fermented food that can support the gut microbiome but if you're buying pickles from the section of the grocery store where they the pickles are not refrigerated well then you're not going to get the gut microbiome supporting effects from those pickles so funny where you even having this conversation talking about pickles but the reality is they can greatly enhance the microbiota if you are getting the pickles that are and require refrigeration include the brine which is the the liquid around them the same is true for sourcracker. Non refrigerated sourcrout is not going to support your gut microbiome it will supply some other things perhaps but it's not going to support your gut microbiome it has to be the refrigerated versions for the reason that most people are not getting enough food based support for the gut microbiome and because of the importance of the gut microbiome one of the key categories of foundational supplements are supplements that create support for the microbiome through prebiotics or probiotics again they tend to be the refrigerated varieties are the ones that are actually going to work those also the best ones are the best ones that are going to work. Those also tend to be very expensive and there are some evidence that taking excessive amounts of prebiotics and probiotics that is typical of these capsule forms of prebiotics and probiotics if they're taken ongoing not for short periods of time but if they're taken ongoing can lead to some issues like brain fog there's a nice literature on this and a growing one at that so my suggestion is that if people are going to take supplements to support the microbiome that those some of the people that are going to take the supplements include low enough levels that is small enough amounts of prebiotics and probiotics that you don't start to venture into the realm of brain fog and some of the other issues that could be associated with taking too much prebiotic and probiotic in the form of supplements I'd like to take a brief break and thank our sponsor inside tracker inside tracker is a personalized nutrition platform that analyzes data from your blood and DNA to help you better understand your body and help you reach your health goals. I've long been a believer in getting regular blood work done for the simple reason that many of the factors that impact your immediate and long term health can only be analyzed from a quality blood test. The problem with a lot of blood and DNA tests out there however is that you get data back about metabolic factors lipids and hormones and so forth but you don't know what to do with those data inside tracker solves that problem and makes it very easy for you to understand what sorts of nutritional behavioral maybe even supplementation based interventions you might have been able to do it. In other interventions you might want to take on in order to adjust the numbers of those metabolic factors, hormones, lipids and other things that impact your immediate and long term health to bring those numbers into the ranges that are appropriate and indeed optimal for you. If you'd like to try inside tracker you can visit inside tracker.com slash huberman and get 20% off any of inside tracker's plans that's inside tracker.com slash huberman to get 20% off. The category of foundational supplements are those adaptogens that we mentioned earlier. Adaptogens again being a very poorly defined category but these are typically micronutrients, herbs, sometimes they go into the mushroom category and these are non psychedelic mushrooms that provide either some buffering to the stress system by reducing cortisol typically or that are thought to or known to based on research studies to enhance things like blood flow to the brain. Or to enhance some aspect of cognitive function by way of enhancing neurotransmitter function. This category of so-called adaptogens is an important one. We'll get back to this a little bit later. The reason I mentioned it now is that it is indeed hard to get the so-called adaptogens in sufficient concentrations from food-based sources. I have to assume that most people aren't out there collecting chaga mushroom or the asho agonda herbs and then combining them with their salads or their foods. And so that's why this adaptogen category fits into foundational. Now this opens up the category of foundational supplements that are broad spectrum that is that include vitamins and minerals that have digestive enzymes that have adaptogens and that also have prebiotics and probiotics at the appropriate dosages. This is one reason why I'm a big fan of supplements like athletic greens, which is as many of you know a sponsor of this podcast and does really nicely cover all of these categories of foundational nutrition. But I do want to emphasize that this is not a way to focus on athletic greens specifically. There are other categories and brands of excellent foundational nutritional supplements that cover these categories of vitamins and minerals, probiotics, prebiotics, digestive enzymes and adaptogens. It just so happens that athletic greens is the one that I discovered and that works best for me and that many people find works really well for them. So this is why when people approach me and they ask me as they often do very, very often do I should say if I'm only going to take one supplement what supplement should I take rather than just give them one specific answer I actually ask them three questions. First question I asked them is how well are you sleeping at night? Are you getting enough sleep? Are you waking up feeling rested? Because if they're not that opens up a whole different set of interactions that we need to have and discussions around what sorts of things they need to do and possibly take in order to get their sleep right because sleep is the foundation of mental health physical health and performance. We will have that discussion a little bit later in this episode. The second question I asked them is how's your nutrition? That is are you eating regularly? Have you found the combination of macronutrients or which diet is right for you? Do you think you're getting enough vitamins and minerals? How's your digestion? We have that conversation. And then the third thing that I ask which is extremely important is what's your budget? Because if somebody has $10 a month total to spend on supplements versus $1000 a month to spend on supplements total well then there's a different set of conversations to be had as to which supplements they should take. Now once those three questions have been answered assuming that somebody is able to spend about $100 or more on supplements per month then my recommendation is that they not focus on any specific supplements directed towards sleep or towards focus or hormone augmentation but rather that they focus on buffering and enhancing their foundational nutrition, adaptogens, probiotics, prebiotics and digestive enzymes. Because of the simple fact that if they do that they're going to raise the tide on all the biological and organ systems that are going to lead to enhanced mental health physical health and performance including sleep. So this is one reason why if people say well if I can only take one supplement what should I take I say well what's your budget if they say they can meet that $100 threshold per month then my recommendation would be athletic greens or something like it or that they invest the time and energy to go find the various combinations of vitamins and minerals. And probiotics and prebiotics and adaptogens and so forth in individual components that they can then take in combination in order to meet their foundational needs but most people are not interested in doing all that homework and legwork to figure out exactly what the dosages are that's one reason why indeed I have taken that let it green since 2012 I like it it makes me feel better I have more energy I sleep better my digestion is certainly better and it supports they got microbiome I do that for that reason. But again I want to emphasize that there are other great sources of all the relevant things within those foundational formulas that athletic greens contains so it's certainly not the only route to covering your foundational health needs there are other ways to do that now if somebody has a budget lower than $100 per month to spend on foundational supplementation well then there are a couple of discussions to be had now if the amount of money that they have to devote to foundational supplementation is zero of course we're so happy to have that. So of course respect that and then it becomes a discussion about what sorts of foods and patterns of food intake are going to best support their mental health physical health and performance. Now if somebody has somewhere between zero dollars and $50 to spend on supplementation for sake of this thing we're calling foundational health per month well then a different category of supplement discussion arises and we'll have that in a moment but to sort of close the conversation on foundational supplementation. Again that means many different things it's vitamins and minerals sometimes that's one vitamin and mineral supplement it means digestive enzymes that could be its own supplement or in combination with vitamins and minerals it means often not always adaptogens things like ashwagandha different plant based and mushroom based formulations that can buffer stress and provide other brain and body support and it often although not always but should I believe include the probiotics and prebiotics or anything that supports healthy gut microbiome once again I think a broad spectrum supplement that has many many ingredients of high quality that covers all these bases is going to be the best route to ensuring foundational supplementation is covered and I do think that should be the starting place for any and all supplementation regimens. I'll say that once again I think covering your foundational needs in the realm of vitamins minerals probiotics digestive enzymes and adaptogens is going to give you the most benefit by cost and the most benefit across the board in terms of brain and body systems that's going to allow you to feel better overall sleep better overall focus better overall and support all the different systems in your brain and body that are going to allow you to be at your best well. Of course also paying careful attention to your nutrition because you simply cannot abandon nutrition again better living through chemistry still requires better living so now that we've had that discussion about foundational supplementation and again highlighting the fact that that's the one category of supplementation where multi ingredient formulations make the most sense. I'd like to now shift our attention to single ingredient formulation supplements that are designed to achieve specific endpoints and here again rather than focus on specific ingredients and supplements to achieve specific endpoints because we've done that already in episodes related to sleep and focus etc. I'd like to take a step back and focus on the larger theme of today's episode which is how to think about supplementation in a rational cost effective and biologically effective way for each of these categories and the three categories that I'm going to cover are sleep, hormone support and cognitive enhancement and focus cognitive enhancement and focus being the final third category. Let's talk about sleep and the rational approach to thinking about supplementation for sleep as I mentioned earlier in this episode and on many previous episodes of this podcast sleep is the foundation of mental health physical health and performance. You might be somebody who can do an all-nighter and feel okay the next day or maybe even great but most everybody once they start to have minimal sleep for one or two nights in the form of broken sleep poor sleep not enough sleep or sleeping at the wrong time of night there is such a thing or day they start to suffer their mood starts to suffer their cognitive clarity and performance starts to suffer their mental health can suffer severely and physical health. So, severely and physical performance definitely suffers hormone suffer everything suffers conversely when people are sleeping well that is deeply end enough 80% of the nights of their life mental health physical health and performance all flourish and I think most people start to be almost amazed at how well they're doing in various domains of life that previously they might have struggled with. Sleep is fundamental that's that's established when thinking about supplementation for sleep we need to ask ourselves a number of important questions first of all you should ask yourself how well that is how deeply and how much you sleeping per night assuming you're somebody who can fall asleep easily stay sleep through the night wake up feeling relatively rested maybe a little groggy and then can move about your day with plenty of energy and focus you're not falling asleep in class or at work or behind the wheel or you're on public transportation well then you're probably getting enough sleep and by the way it's perfectly normal to require anywhere from a 10 minute to a 90 minute nap in the afternoon for some people if you're not a napper no big deal it's known that naps can disrupt nighttime sleep but provided that you're not feeling enough in the day if you take a nap and you are still able to fall asleep at night then naps are fine for you if you're someone who doesn't like naps because you wake up groggy or grumpy which often happens to certain people then don't nap you certainly do not need to but if you're feeling energetic throughout the day chances are you're getting enough sleep at night but there are people of course who are struggling with sleep either falling asleep staying asleep or they're not feeling alert or sleeping in the day or all of the above and then it makes sense to step back and take a look at what supplementation can provide if you are one of those people who is not sleeping enough or well enough at night that you are suffering during the day in whatever way mild to severe there are two questions you should ask yourself first of all are you ingesting caffeine after 2pm if the answer is yes you want to limit or eliminate caffeine after 2pm you can push it back to noon or earlier I know that can be excruciating for some folks but it can really help with your ability to fall and stay asleep at night second thing is most people would do well to avoid food within the two hours prior to bedtime but of course you don't want to be so hungry that you can't fall asleep so those are the nutrition and behavioral tools that everyone needs to consider if you are not ingesting caffeine 2pm or onwards and you are not eating excessively immediately prior to bedtime or within the two hours prior to bedtime and you're not hungry when you go to sleep well then there are certain supplements that can support your sleep and we've talked about these in the perfect sleep episode and in the episode with our guest expert Matt Walker from University of California Berkeley and in the master of your sleep episode and we have a toolkit for sleep that you can access zero cost by going to here and learn lab.com and going to the menu go to newsletter and you can find that toolkit you can sign up for other free toolkits like it but the point here is not to go systematically through each of the supplements that is beneficial or has been shown to be beneficial for sleep but rather to address specific aspects of sleep that can suffer and why and how certain patterns of supplementation can support or alleviate those pain points if for instance you're somebody who falls asleep just fine but wakes up in the middle of the night around 2 or 3am or anytime for that matter and has trouble falling back asleep there are two categories of supplements that you might want to consider the first is myoenostatol typically taken as 900mg of myoenostatol myoenostatol can help shorten the amount of time that it takes to fall back asleep if you wake up in the middle of the night myoenostatol has other beneficial uses as well for mood etc. if you'd like to see many of the different effects that have been explored in the scientific literature for myoenostatol you can go to examine.com it's an excellent site not just for inocital but for all supplements for that matter it talks about the human effect matrix that is the different effects of different supplement compounds on different aspects of hormone, brain and body health where the evidence is strong where the evidence is weak has links to studies and so on again it's examine.com, amazing website, wonderful website provided such a rich resource for me and for many many other people other people who wake up in the middle of the night will wake up because their dreams are very intense or they were having dreams that were so vivid that suddenly they were jolted from their dreams those people would do well to avoid certain supplements so in a moment I'll talk about the value of a supplement called the anine for falling asleep but the anine which typically is taken in dosages anywhere from 100 milligrams to 400 milligrams depending on body weight and experience and what you find to be most effective for you, minimally effective for you well the anine can be great for many people but for people who have excessively vivid dreams those excessively vivid dreams can lead to immediate waking and sometimes a little bit of anxiety upon waking in the middle of the night so some people who wake up in the middle of the night sort of jolted mentally and physically out of sleep because of their intense dreams would do well to avoid theanine supplementation. I've talked about this a bit before but it's something that I think a lot of night time middle of the night wakers might be familiar with and would want to take into consideration. Now for those of you that are not waking up in the middle of the night or not having excessively vivid dreams but are having trouble falling asleep two supplements in particular have been shown to be effective for shortening the transition time to sleep and allowing people to ease into sleep more readily and those are magnesium 3 innate which is interchangeable with magnesium bisglycinate magnesium bisglycinate and magnesium 3 and 8 both have transporter systems that allow them to readily cross the blood brain barrier and they lead to a mild form of drowsiness mild in the sense that it's not going to prevent you from operating a motor vehicle or kind of any conditions under emergency that might arise in the middle of the night or if they did arise during the middle of the night you'd still be able to function so it's not like a sleeping pill but people who take those often find that their transition time into sleep is much faster and their sleep is also much deeper. Incidentally those supplements are also thought to be useful for cognitive support and neuro protection although there's less data on that. Okay so that's for falling asleep that's one category either magnesium 3 and 8 or bisglycinate would be interchangeable for assisting the transition time into sleep and then the other supplement is apigenin apigene which is a derivative of chamomile I've talked about this in various podcasts before also acts as a bit of a anxiety lowering compound which is essential prior to sleep for people to essentially turn off their thinking or to be able to reduce the amount of ruminating and problem solving and future anticipation that they're doing which is a requirement for falling asleep so what's the rational approach to supplementing in a way that allows you to fall asleep more quickly and stay asleep well would you immediately take magnesium 3 and 8 and apigenin together? Well that depends if you have the budget and you just simply want to fall asleep quicker and you don't care which of those two ingredients is going to be more effective for you well then you could try one for instance magnesium 3 and 8 and try it for perhaps a week and see how that affects your latency the sleep time that is how quickly fall asleep or you could try apogenin in the first week or you could combine them both or you could try magnesium 3 and 8 for a week then switch to only apogenin for a week and evaluate which one works better for you if neither works for you I do recommend trying the combination together again this is just the way that any scientist would design an experiment to try and understand which variables that is which ingredients are most effective for the result that you want as opposed to just lumping them together and taking them that said a lot of people want excellent sleep so badly that they just say okay I'm just going to take magnesium 3 and 8 I'm going to take apogenin I'm going to take theanine if my dreams are too vivid or I'm waking up in the middle of the night from excessively vivid dreams I'll drop the theanine and many people actually derive great benefit from that approach but because today we're talking about the most rational cost effective and biologically effective approach to supplementation if you're not sleeping as well as you would like to or if you want to explore what sleeping even more deeply might do for your mental health physical health and performance well then it makes sense to think about the various supplements for falling asleep versus remaining asleep what to include what not to include and to do that systematically and again I think one week's time of taking something provided it doesn't induce any negative effects if something induces a negative effect I recommend ceasing taking it immediately but if something does not produce any negative effects then I think you want to try a single ingredient formulation for about a week while not varying anything else not changing anything else in your overall protocols of nutrition or supplementation it's impossible to clamp everything perfectly from week to week but you know don't change anything else dramatically and just add that supplement for a given week see how it benefits your sleep maybe add in a second supplement if you like or rather swap and try a different supplement for a week and then see what works best and see if the combination works even better now I acknowledge that what I just described is exceedingly basic but it's something that I don't think most people do most people either decide they have the budget and the interest in just improving their sleep across the board and they don't care what ingredient is providing the maximum benefit or they simply try something and decide oh well it didn't work for me and so I'm not going to try anything else supplements don't work for me or magnesium doesn't work for me or you know I woke up in the middle of the night from vivid dreams and that's because they're taking more of a shotgun approach without teasing out the different variables in fact if there's an overriding theme of today's conversation it's really about learning how to isolate variables in the realm of supplementation because once you do that and once you start to develop that intuition or sensitivity of sorts to how different ingredients impact you it is an enormously powerful stance to have because you're going to keep your costs limited you're also going to find the things that work particularly poorly for you and more importantly the things that work particularly well for you toward your goals any discussion about supplementation for sleep I feel has to include a discussion about melatonin I've talked about melatonin before on numerous podcasts mine and others and I will say once again I am not a fan of melatonin for a couple of reasons melatonin is a hormone known to induce sleepiness but not keep us asleep so oftentimes people take melatonin fall deeply sleep and then wake up and have trouble falling back asleep the other reason is that melatonin supplements almost always include levels of melatonin or amounts of melatonin that far far exceed the normal biological levels are so called endogenous levels of melatonin that we would normally produce and yes it's true that as we age reproduce less melatonin but melatonin as a hormone also impacts other hormone systems particularly the reproductive hormone access to testosterone estrogen etc which is not to say that if you've been taking melatonin for some period of time that you've disrupted your fertility or those hormone axes but it's possible that you've disrupted them somewhat and it's very clear that melatonin can impact not just sleep but other systems in the brain and body it can be useful for jet lag and for occasional use but there also I want to voice a message of caution there have been studies exploring the dosages of melatonin contained in various supplements and whether or not what's listed on the bottle matches what's actually contained in those formulations and despite those formulations coming from quite reliable quote unquote or thought to be reliable sources it was found that these supplements contain anywhere from 15% of what's thought to be or is told to be in those supplements or many times more melatonin than is listed on the bottle so the dosaging does not seem to be consistent with what's often listed on the bottle and this is even true within some of the more reputable brands so that's of real concern so we need to highlight melatonin as perhaps something that's only used occasionally if you want to talk about dosages for melatonin use for jet lag etc go to examine.com there's some excellent references to studies there just put melatonin into the search function it'll tell you everything you need to know about melatonin but now you know my stance on melatonin one question I often get about supplementation for sleep is does it create a dependency that's an excellent question to ask I think most people worry about even fear relying on something so heavily that if they did not have it for whatever reason that they couldn't sleep in my experience there is no problem falling and staying asleep in the absence of a supplement for sleep even if you've been taking that supplement for sleep consistently seven days a week for months and months maybe even years on end I confess that I occasionally fall asleep having not taken my pre-sleep supplements and I happen to take magnesium 3 and 8, theanine and apogenin I also taken osatol it greatly enhances my sleep and there been nights when I fall asleep not having taken any of those things and I've slept fine that said if I were to explore multiple nights of trying to sleep without that supplementation I find that my sleep is not as good I'm still able to fall asleep but the depth of my sleep and the duration of my sleep is not as good as when I'm supplementing so I think that's refreshing news at least to me that there isn't a dependence on these supplements in order to be able to fall asleep it's not the same sort of dependence that people experience from things like sleeping pills that said any compound any compound can create a placebo type of fact where we think we need something in order to achieve a certain effect we had a guest on this podcast some time ago Dr. Ali Kromu is a professor at Stanford and works on these mindset effects, belief effects and placebo effects and placebo effects can be very real and in some sense dovetail with any conversation about dependency meaning if you are somebody who loves your sleep supplements and sleeps great with them and one night you discover you don't have them or you can't access them for whatever reason that can create a little bit of an anxiety around the idea that oh in their absence you're not going to be able to sleep and that's a sort of a placebo effect in reverse if you will because what it suggests is that there's a emotional or a cognitive association with taking these things that allows you to sleep well I would highly recommend that people explore this issue of dependency and placebo effects for sleep supplements on their own and under conditions in which there's nothing pressing the next day that is you don't have a big presentation etc. So what I recommend is that every two weeks or so maybe every month or so take one night off completely from all your sleep supplements or leave out one sleep supplement try to understand to what extent you might have established a dependency either real or placebo based on these sleep supplements and again I suggest doing this on perhaps a Friday night so that you know it's a weekend the next day so you don't have to work if perhaps you don't sleep well. I think what you'll find is what most people find and that's in the absence of taking your supplement stack for sleep one night you're still going to sleep just fine does that mean that these supplements are not actually working under normal conditions where you're taking them each night no what this means is that many of these things magnesium's in particular can build up in the body and brain in a way that can be beneficial and what probably explains the fact that you can still sleep if you miss a night of taking them is that the neural circuits that are involved in turning off thinking or not thinking and falling asleep those neural circuits undergo what's called plasticity in other words if you get better at falling and staying asleep over time even if you got better at that through the assistance or with the assistance of some supplement or combination of supplements well then those circuits are still going to function just fine even in the absence of not taking those supplements just once we'll get back into this conversation a little bit later when we talk about cognitive enhancement and focus it's the same story there where indeed there are things that people can take in stimulant form and non stimulant form that can enhance cognitive ability and focus but that does not mean that you become so dependent on those that you can't focus unless you take them this has been shown multiple times over so again to answer the question is there a dependency established by taking supplements for sleep the short answer is no with the caveat that placebo effects and belief effects are always going to be at play whether or not you're talking about supplementation prescription drugs or even behavioral protocols for that matter I'd like to take a brief break and acknowledge our sponsor athletic greens athletic greens is an all in one vitamin mineral probiotic drink that also contains digestive enzymes and adaptogens I started taking athletic greens way back in 2012 so that's 10 years now of taking athletic greens every single day so I'm delighted that they're sponsoring this podcast reason I started taking athletic greens and the reason I still take athletic greens is that it covers all of my foundational nutritional needs so whether or not I'm eating well or enough or not I'm sure that I'm covering all of my needs for vitamins minerals probiotics adaptogens to combat stress and the digestive enzymes really help my digestion I just feel much better when I'm drinking athletic greens you like to try athletic greens you can go to athletic greens dot com slash uberman and for the month of January they have a special offer where they'll give you 10 free travel packs plus a year supply of vitamin D3 K2 vitamin D3 and K2 are vital for immune function metabolic function hormone health but also calcium regulation and heart health again that's athletic greens dot com slash uberman to claim their special offer in the month of January of 10 free travel packs plus a year supply of vitamin D3 K2 the next category of supplementation that I'd like to talk about is hormone support improving or so called optimizing your hormones is a critical aspect of mental health physical health and performance we've done multiple episodes about hormones including testosterone and estrogen for both men and women and for people of different ages also had episodes on thyroid hormone growth hormone and so on you can find all those at uberman lab dot com in fact you can go to the uberman lab dot com website there's a search function where you can just put in a keyword and it will take you to all the episodes and specific time points where that topic happens to be covered now hormone health is such an important topic to discuss in the context of supplementation because indeed there are compounds that are non prescription based so how supplements that can improve hormone function again anytime we are discussing a particular aspect of mental health physical health or performance we need to start with a mention of the few behavioral tools and nutrition based tools or at least some top contour coverage of those in a way that frames up the discussion about some of the things that we're going to do is to get a little bit more on the new summer allowing you to build aすごい collaboration reb country zooming out on the table and something and other sets are cũnging back an ongoing trailer contour coverage of those in a way that frames up the discussion about supplementation appropriately. So in the context of hormone support and augmentation and optimization, if you are not getting adequate calories from high quality sources, hormones like testosterone and estrogen will suffer. This is one of the reasons why women will stop having their periods if they're not ingesting enough calories. This is one of the reasons why testosterone levels will drop if people are not ingesting enough calories. In fact, on the episode with expert guest and medical doctor Peter Otea, he described how sex hormone binding globulin. This is a protein that's present in males and females that binds to testosterone and other hormones and prevents it from being in its free form, which is the more active form. Well, insulin, which of course is going to increase after the ingestion of carbohydrates in particular. And then actually inhibits or reduces sex hormone binding globulin. This means is that for you intermittent fasters or people that are ingesting very few carbohydrates who have very low blood glucose or perhaps are taking things like metformin or berberine, which is a supplement based approach to reducing blood glucose. Well, your sex hormone binding globulin is going to increase dramatically, conversely, if you are eating enough calories in the form of foods that allow your insulin to be a bit higher, not excessively high, we hope, but a bit higher. Well, then sex hormone binding globulin will go down and free testosterone will go up. So the discussion about hormones support and augmentation has to include some nod toward or understanding the fact that nutrition and the way that nutrition impacts hormones and the way that hormones such as insulin impact other hormones such as free testosterone. That all has to be acknowledged. That is not the topic of today's discussion, but it's important that I remind everybody that nutrition matters for general hormone status. It's also important to remember that behaviors matter for hormone status. Getting morning sunlight increases cortisol levels. Cortisol levels are very important to have elevated early in the day for focus and alertness and for immune function and to make sure that cortisol levels are low at night and thereby levels of growth hormone and testosterone, which is secreted mainly in the early morning, and be elevated at night and in the early morning. So getting morning sunlight, getting strenuous exercise in the form of both cardiovascular exercise, but also relatively short, meaning an hour or less, about of intense resistance training a few times per week can also dramatically alter hormone profiles. In fact, in the episode that we did with Dr. Duncan French, again, you find that episode at uriminlab.com. He described a very strenuous, but still brief, two day a week protocol of using resistance training specifically to increase testosterone and free testosterone and growth hormone and so on. So nutrition matters, exercise matters when it comes to increasing, supporting or augmenting different hormones. And that's just the discussion about testosterone, free testosterone and estrogen. There's also the vast discussion about thyroid hormone, et cetera. And we covered all those topics in previous episodes, but once those behavioral tools are in place, once you're doing the right things and you're avoiding the wrong things, doing the right things to support your hormones and avoiding the things that diminish hormones in the ways that can be detrimental, once your nutrition is in place to support your hormones, then it makes sense to turn and consider what supplements can support hormones. And I do believe that you want to get your behaviors and your nutrition correct before you start thinking about supplementation for hormones. Again, I'll repeat that. Get your nutrition and your behaviors correct, for sake of hormones and for other health purposes before you start thinking about supplementation for hormones. And certainly before you start thinking about prescription-based approaches to improving hormones. Once all of those other elements are in place, the supplements that make sense in terms of augmenting hormones come in two forms. One, our broad band support for multiple hormones and then the others are supplements that are designed to increase, or in some cases decrease, specific hormones or hormone pathways. So let's consider each of those in tandem. There are certain supplements, things like Sheila G, for instance, something from Ayurvedic Medicine, which mainly has the active ingredient, full-vic acid, which is known to, for instance, increase things like FSH follicle stimulating hormone, which in women is going to increase certain aspects of egg growth, hence the name follicle stimulating hormone. It's going to stimulate certain aspects of fertility. It's pro-fertile and in males can make for more sperm production or more motile sperm. FSH is also going to indirectly increase testosterone in males. It's known to increase libido in both males and females. So things like Sheila G can indeed augment multiple hormones and support multiple hormone systems generally in the direction of pro-fertility, pro-libido, and increasing estrogen and testosterone. Now, there are other supplements such as Ashruganda that also fall into this category of affecting multiple hormones. Ashruganda is a very potent supplement in terms of reducing cortisol levels. It has also been shown to increase testosterone levels, but probably indirectly. And that's because cortisol and testosterone sort of exist on a seesaw in terms of pathways. They're on separate pathways, but those pathways interact enough that when cortisol is lowered in general, testosterone tends to increase. Now it is important that with certain hormones like Ashruganda that you don't take them for more than two weeks at a time at high dosages, if you want to know more of the specifics around Ashruganda and how long to take it, how to cycle it, et cetera. Please see our episode on master stress. Please also see the examin.com website and put in Ashruganda. It will get into some of that description. But Sheila G, Ashruganda, and things, for instance, like alchornitine, a supplement that we often discuss in terms of fertility because it can indeed improve sperm mortality and quality and egg quality. So it's a pro-fertile compound, but it also impacts various mitochondrial pathways. So it's having a more indirect effect on hormones. There are many other compounds present and available supplements that are purported to be pro-hormone support in particular for testosterone, estrogen, fertility, and libido. There is a description, for instance, of things like Makarute. Makarute can increase libido. It's found to be particularly effective in women, but in men as well. And in all people who are suffering from lower libido due to intake of SSRIs, selective serotonin reuptake inhibitors for whatever reason. SSRIs are used to treat OCD. They're used to treat depression, any number of different things. Makarute can be, in many instances, effective in increasing libido. It does that, however, through augmentation of dopamine-related pathways and some of the hormone pathways upstream of testosterone and estrogen, the reports that Makarute increases testosterone are somewhat scant and a little bit weak, to be honest. So it's having these indirect effects that may impact testosterone downstream. So again, I'd put Makar alongside Ashwaganda alongside Shilogy as supplements that are impacting multiple hormone pathways toward increased libido, increased fertility, increased testosterone or estrogen likely through indirect pathways. Okay, now with all that said, I'd like to provide some examples of supplements that work more directly on specific hormone pathways aimed at achieving more specific goals, such as elevated testosterone, or elevated free testosterone, or elevated growth hormone for that matter, and elevated thyroid hormone. I'd like to talk about growth hormone first, because it's actually a pretty short discussion. First of all, the best way to augment growth hormone is to get quality deep sleep, especially the sleep that occurs in the first three or four hours of the night is when growth hormone is released, and it's going to be beneficial to avoid caloric intake in the two hours preceding sleep. Again, don't go to bed so hungry that you wake up an hour or an hour and a half later or you have trouble falling asleep, but avoiding food intake in the two hours prior to sleep and certainly avoiding alcohol and cannabis is going to facilitate growth hormone release in the first hours of sleep. Many people use intermittent fasting or even longer periods of fasting to increase growth hormone. One of the interesting things I learned from an expert guest, Dr. Kyle Gillette, who's a medical doctor, on this podcast is that indeed while lengthier, fast, or intermittent fasting can increase growth hormone levels very substantially, it has indirect effects on the genetic pathways and the receptors for growth hormone that actually are detrimental for the function of growth hormone. Avoiding food for the two hours prior to bedtime is a good idea if you avoid food for longer, that's just going to assist even more. It certainly isn't going to hurt in terms of growth hormone release, but extended fast specifically for the purpose of increasing growth hormone are not really logical when you look at the broader effects of extended fast. That is not to say that extended fasting is not appropriate for some people. It can be in certain instances or that intermittent fasted so-called time restricted feeding is not beneficial for some people. It can be. Here I'm only referring to the effects or in this case the lack of effects of intermittent fasting, time restricted feeding on growth hormone specifically. Now in terms of supplements to increase growth hormone, there are very few supplements that have been shown to augment this pathway. There is some idea that arginine supplementation prior to bedtime can further elevate levels of growth hormone, especially when fasted. That literature is rather weak to be honest, I encourage you to go to examine.com if you want to peruse those particular studies. Really the things that increase growth hormone very potently fall outside the realm of supplementation. They include exercise, again look at the Duncan Friendship episode or in the Kyle Gillette episode on optimizing hormones and males in particular, but this also pertains to females that avoiding food two hours prior to bedtime really can boost growth hormone significantly in sleep beyond what it would be otherwise. It's really only once you get into the realm of prescription compounds, things like peptides like sermerellen, which increase IGF1 and growth hormone, things like growth hormone itself by prescription, and only if it's prescribed by a doctor of course, and it's safe for you. That's when you start getting into really significant increases in growth hormone. Not a lot of supplements out there to increase growth hormone potently. It's a different story when you start thinking about and talking about testosterone and free testosterone and luteinizing hormone. Luteinizing hormone is released from the pituitary, which is this gland not far from the roof of your mouth, and it's nearby neighbor. The hypothalamus is a collection of neurons that sits above the roof of your mouth and talks to the pituitary, talks to it through neural connections and hormone based connections. There is a hormone called GNRH, gonadotropin releasing hormone that is released from the hypothalamus into the pituitary. It stimulates the release of luteinizing hormone or LH, which then travels in the bloodstream to impact multiple tissues in the body, but mainly the ovary in females and the testes in males to stimulate estrogen production and testosterone production. There are supplements that can potently increase GNRH and or luteinizing hormone and then indirectly increase testosterone and estrogen. I would like to remind people to testosterone and estrogen are present in both males and females. Both are important for things like libido, muscle growth, and so on. A lot of people think that in males having very high testosterone and low estrogen is actually ideal. It's actually not ideal if you want to keep your libido. Anything that lowers your estrogen too far is going to reduce your libido. You don't want estrogen too high, but you also do not want it too low. Things that can tickle this pathway or actually can act as a bit more of a directed hammer on this luteinizing hormone pathway may also impact GNRH are things like Fodogia agressis. This is an herb that I've talked about before in the podcast that when taken at dosages of 600 milligrams per day, many people not all report elevated levels of libido, elevated sperm production, elevated testosterone, in some cases elevated estrogen, a bunch of hormones downstream of luteinizing hormone. Are you going to be a Fodogia agressis responder or a non-responder? There's simply no way to know except by trying it. If you are going to go down this route, there are two very important considerations. First of all, there's a fairly extensive literature on the fact that Fodogia agressis can be toxic to testicular cells and perhaps other cells when taken at very high dosages. So obeying the particular dosages of Fodogia agressis that are recommended on various product labels and cycling Fodogia agressis can be important. Some people need to cycle it eight weeks on, two weeks off, other people opt for 12 weeks on, a month off. I know a few people who have taken it continuously with no issues, but I do want to suggest caution when taking Fodogia agressis. The cautionary notes are stay within the recommended dosage ranges. You can go lower, but certainly don't go higher. I think it is wise to cycle every eight weeks or so to come off it for two weeks and then going back on, if that's your choice, if you feel it benefited you, or taking it for 12 week periods of time and then cycling off for a full month before repeating again. The best way to know whether or not Fodogia or any of these other supplements is impacting your hormone levels in the direction that you want and not impacting your hormone levels or other aspects of your biology and ways that you don't want is from a blood test. There is simply no better tool to evaluate whether or not these supplements are working to support your hormones in the ways that you want and not causing issues except to take a blood test. This podcast has inside tracker as a sponsor that can do in home blood tests and give you blood panels. There are other sources of blood tests that are quite good as well. Of course, and in the first episode of the human lab podcast that I did with Dr. Kyle Gillette, again a medical doctor, expert in hormones, diabetes and various other aspects of medicine, he described and it is timestamped how to stand the best probability of getting your insurance to cover a blood test, how to talk to your doctor about getting a hormone panel and so on. So I'll refer you to that episode for that. The blood tests are going to be very important. I recommend taking them before adding in any supplement to increase hormones of any kind or decrease hormones of any kind for that matter. Then again, after about four to eight weeks of taking that particular supplement in order to evaluate whether or not it worked and whether or not it had any negative effects that you would like to avoid. I also want to remind people of the dosage conversation that we had earlier just because there's a recommended dosage of Fodogioogrestis of say 600 milligrams per day. First of all, that is not an invitation to take twice as much and expect twice the positive effects. That is not a good approach, especially with something like Fodogioogrestis, which can at high dosages be toxic, but it's also important to perhaps consider taking a lower dosage and seeing how that affects your hormones. That approach requires a bit more patience. I know most people are thinking I want the effect and I want it now, but I think it's very important when thinking about exercise or nutrition or supplementation to really play the long game to think about what's going to work for you in the immediate end in the long term and to ease into any kind of supplement regimen. For instance, by taking one thing at a time, varying one supplement out and one supplement in, starting at minimal effective dose and build up your protocols over a year or several years, it really can be beneficial. I can say for myself, I started exploring the supplement space and taking different supplements in different combination and alone, evaluating which ones work and did not work for me. Some were absolutely dreadful for me. I have tons of stories about supplement fails, some of which were just kind of innocuous, meaning they were a waste of money, which isn't innocuous, but at least it was indebtedremental to my health. Other supplements which fortunately don't exist on the market anymore, I think actually were quite dangerous and I feel lucky that I did not experience even greater negative effects from them. Other supplements have been tremendously useful for me and for other people for things like sleep and hormone support, focus and so on. For Dogeo Agressis, this is a good example of a supplement that is known to have potent effects, but you need to approach it with the appropriate, I would say, respect for the fact that the dosage ranges in which it works have to be kept pretty narrow without causing issues. It does increase luteinizing hormone and thereby testosterone and estrogen, so if you're somebody who's already excessively high in one or the other, it's going to be very hard to just direct it to only testosterone or only estrogen. Now the topic of today's episode is not about Fidoji Agressis per se. I highlight it because it is one of the more potent supplements for sake of hormone augmentation, but it's still fairly broad band. It's a little more specific than something like Sheilaji, but it's still fairly broad band in terms of hitting multiple endpoint hormones, testosterone and estrogen and maybe some other hormones as well. There are other supplements in particular Tonga Ali, which is known to, for instance, increase libido, whether or not it does that by way of augmenting dopamine related pathways or testosterone pathways still isn't clear. It is known to increase free testosterone by reducing sex hormone binding globulin. Tonga Ali can be beneficial both for men and for women in dosages anywhere from 200 milligrams to 600 milligrams per day. So there I would say scale according to body size, although start with the minimum amount and find the minimal effective dose for you. Again, blood work is going to be the most effective way to determine what's working or not working at the level of objective numbers, but subjective experience matters too. If you take it at 400 milligrams for four weeks and you don't notice any effect, you might try it at 600 milligrams, but not higher. If you still don't see an effect, well, then it doesn't appear to have worked for you. Other people experience dramatic effects from things like Phidogen, Tonga Ali. Why would that be the case? Well, if you look to the scientific literature, what you find is that the studies that report the biggest effects of any supplement usually start with a population that somehow diminished or back on its heels in one particular dimension. So for instance, people that are hypo-gonadol, that are not making enough testosterone or free testosterone, in fact, their levels are very, very low. They're subclinical off-range in terms of the charts below the normal. Well those people, when they take supplements like Tonga Ali, Phidogen tend to experience greater effects because they're starting from a lower level than people who perhaps are close to the optimal levels achieved through either age, genetics, exercise, nutrition or some combination of those. So that's an important thing to think about. These are called floor effects and ceiling effects. Sealing effects are, for instance, if an individual already has very high testosterone and free testosterone and they take a supplement to increase it further, they might not see any increase, whereas somebody who sits more in the middle to low range stands to experience a much greater increase. In fact, one individual I know who took Tonga Ali admittedly on my recommendation, his testosterone was initially very low and he was having a number of different symptoms. He did blood work. That's how he knew it was low. And he then took Tonga Ali and Phidogen in combination because he decided he just wanted results. He didn't care which thing was going to give him the results. And he experienced big increases in testosterone. This would be not free, but total testosterone of, he experienced as much as 600 nanograms per desolate or increase from where he was before, which is very dramatic. It was a near tripling of where his testosterone had started off to where he ended up. I don't know if he's ever done the experiment of removing Phidogen or Tonga to find out which one it was. And this is why many people just take them in combination. And if you have the budget for it and you are interested in just finding what works, but not isolating what works at the level of single ingredients, that would be the approach I recommend. However, again, I think most people do well to figure out which specific ingredients are going to work best for them by isolating the variables the way I've described repeatedly throughout this episode. To my knowledge, Tonga Ali does not need to be cycled. Meaning you don't have to take periods of time off from it. I should note that the effects of Tonga Ali can take a little bit longer to experience. So perhaps blood work should be done eight to 12 weeks after initiating the Tonga Ali protocol as opposed to earlier. And it does seem to have sort of cumulative effects on libido. And that points to the likelihood that it's having some impact on neural pathways as opposed to hormone pathways. Hormone pathways can be slow, but in general, neural pathways are the ones that are going to explain slow rising shifts in any kind of physical or mental aspect that then remain stable over time. So the exact effects of Tonga Ali and where meaning where they arise in the brain and body aren't known, I will provide a link to a really beautiful review article that covers the literature on Tonga Ali. This came out fairly recently and that I've reviewed with a number of other MDs and medical or medicine-related podcasters. It's a really nice review. I'll provide a link to that. It gives a survey of Tonga Ali, what people are discovering, what they're finding, what they're not finding, and so forth. As a final note on supplements for hormone augmentation and supplementation, I want to make a brief mention of something specifically related to female health, which is of course the menstrual cycle. And across the menstrual cycle, different hormones are present at different levels. Follicle stimulating hormone is very high during the so-called follicular phase, right? And then you have your luteal phase. We have an entire episode coming up about female hormones and hormone health that will cover this. We also covered a little bit of this in the other episodes on testosterone and estrogen. But the point I'd like to make now is that for women, they should fully expect that certain supplements, not all, but certain supplements because of the way they impact different hormones, would have different effects, maybe even opposite effects at different phases of the menstrual cycle. And for that reason, I believe it is especially important to have tight control over dosage and individual ingredients in your supplement regimen. So for instance, if you're somebody who takes shilajee, and I know many women who take shilajee or tonga Ali, for instance, or maka, and you find that it really serves you well. That is, it provides the mental and physical benefits that you want and enjoy at certain phases of your menstrual cycle. But at other phases of your menstrual cycle, it feels like too much or it actually can start to give you negative mental or physical effects. Well then, obviously having control over those specific ingredients is going to be extremely important so that you can titrate the dosage or increase the dosage as the case may be, or cease taking those things entirely at certain phases of your menstrual cycle. Now, that's not to say that some women can't just continuously take these supplements throughout their menstrual cycle. Some can, but some find that that makes them very uncomfortable or that they would do well to alter different ingredients at different phases of their cycle. So again, this speaks to the critical importance of single ingredient control, dosage control, and the ability to cease taking individual or multiple ingredients according to the backdrop of your health generally. And obviously the menstrual cycle is a profound shift in the hormone and thus the entire biological and psychological milieu that exists in the body. And of course, there's the issue of birth control and whether or not people are taking hormone-based birth control, certain forms of hormone-based birth control and women involve tonically elevating, that means consistently elevating estrogen. That's certainly going to reduce the fluctuations and thus the probability that certain hormones and hormone pathways will change across the menstrual cycle, but not eliminate it altogether. Also there's the key issue of fertility in both males and females. One important note, even though this is not an episode about fertility, we're going to have one soon, but the important point about fertility is that there are supplements, not just cheligy, but there are supplements and supplement protocols such as alkanantine and particular injectable alkanantine, which does require prescription at least in the US, but also early ingested alkanantine that can improve sperm health and motility. And egg health and motility, I mentioned that earlier, but if couples are trying to conceive, it is important that if you're going to take something that is a supplement directed towards sperm and or egg health, that you also consider how that interfaces with some of the other hormone-based compounds. That is prescription drugs that you may be taking. This is true for people who are doing IVF and vitro fertilization or not. Again that entire discussion will be handled in our episode on fertility and on female hormone health, and we already did the episode with Dr. College-Leth on male hormone health optimization. The next category of supplementation that I'd like to address is supplements related to cognitive enhancement and focus. And here there are a number of very useful strategies that one could take. I'd like to divide this conversation into two general categories of supplements to address cognitive enhancement and focus. The first category are supplements that increase energy by way of stimulant properties. So the most obvious of these is caffeine. Caffeine is of course a molecule that can increase levels of alertness. It also can increase levels of focus provided that dosages are in the appropriate range. The appropriate range in most cases is going to be 1 to 3 milligrams per kilogram of body weight, taken 30 minutes or so before any kind of mental or physical endeavor. We did an entire episode about caffeine where you can learn lots of facts about caffeine, how best to utilize caffeine. And indeed I'll just give you a few of those now. It turns out that if you're a regular caffeine user, you can still derive the cognitive enhancing and focus enhancing effects of caffeine if you ingest caffeine every day. But if you were to take two days off from caffeine completely and right now I hear all the caffeine addicts out there, just kind of cringing at the idea and then take caffeine in the 30 minutes prior to some especially important event, physical or mental event where you really need to focus and be able to sustain that focus for long periods of time. It would have an even greater effect than it normally would. But since most people are taking caffeine in a kind of ongoing, regular way, I just want to emphasize that it still has pro-cognitive and pro-focus effects even if it's taken every day or even multiple times per day. Again, a cautionary note, don't drink caffeine too late in the day. Pass to PM, it can really start to impede your sleep at night even if you can fall asleep at night. The architecture of that sleep is not going to be great if you're ingesting caffeine in the preceding 8 to 10 and even 12 hours. And that actually raises another 10-general but still important point. I'm going to make it and then get back to supplements, which is the best cognitive enhancer that you will ever take is a really good night's sleep of sufficient duration. Okay, so sleep is going to be the betterock of your ability to focus and remember things. In fact, it's during sleep that neural connections remodel so-called neuroplasticity. It's actually not when you trigger learning but it's when you consolidate and reinforce learning and a number of other things that relate to cognitive enhancement and focus. The other thing, of course, is that you're going to need to have sufficient levels of nutrition so you don't want to be overly hungry or it's going to be hard to focus. Nor do you want to be overloaded with calories or a volume of food or have your blood glucose to be so high that it's going to make you sleepy. There's a reason why when discussing stress and the so-called autonomic nervous system that the phrase rest and digest comes into play, rest and digest, as the name implies, relates to the fact that when we have a lot of food in our gut, it tends to make us sleepy. In other words, it's hard for us to focus and it's hard for us to maintain cognitive attention and remember things, etc. So, there are a bunch of behavioral tools for enhancing focus. We did an entire episode on enhancing focus. It does touch on supplementation. Again, you can find links to that in all formats at hubermanlab.com. We also have a newsletter related to this topic also at hubermanlab.com at zero cost. With all of that said, and in particular, the highlight about sleep being the best way to enhance your cognitive abilities and focus, anytime we're having a discussion about supplements for enhancing cognitive ability and focus, a major category of those supplements is going to fall into the stimulant category. That's going to include most often caffeine, although there are other sources of stimulants. I'm not going to touch on those for the moment. Just talk about caffeine. When people hear caffeine, they think, well, I can just drink coffee and indeed, that's a great source of caffeine. As a year of a matte, I would caution people to, if you're going to use a year of a matte for whatever purpose, caffeine or otherwise, that you avoid the smoked versions of your ramaite. They are carcinogenic. That is the smoked versions are carcinogenic and to consume the non-smoked varieties instead. The important thing to understand about caffeine is that while it can be ingested in the form of a drink or an energy drink, tea or coffee, it can also be ingested as a pure supplement. That is, there are caffeine supplements. I know a number of people, including a very, very prominent podcaster whose name I won't mention, who drinks herbal tea, but takes a 100 to 300 milligram tablet of caffeine with the herbal tea. In that case, it is no longer herbal tea. It is caffeinated herbal tea. When you take caffeine in pill form, it tends to have a much more potent and long-lasting effect than when you take caffeine in the form of coffee or tea. It's actually a world apart in terms of its effects. If you haven't experienced this before, it might be something that you want to explore. It might not be something you want to explore. In particular, if you're somebody who experiences anxiety or panic attacks, be very careful with your intake of caffeine. Again, see the episode of the Hubert Mennel podcast all about caffeine for more on that. It is the case that even 100 milligrams of caffeine in tablet form, I suppose it could be in capsule form as well, but in its pure form leads to much greater enhancement of alertness and focus than does often the comparable amount or even twice the amount of caffeine contained in coffee or tea. Why would that be? has a lot to do with the other things that are in coffee and tea. Here I'm not encouraging people to become reliant on caffeine capsules or on caffeine tablets, but if you want to increase alertness and focus, caffeine is a potent way to do that. It works. The other category of stimulant that can work in terms of enhancing alertness and focus are going to be things that increase adrenaline in some other way or epinephrine as it's also called adrenaline epinephrine. Same thing in some other way that are going to touch into or augment the so-called adrenergic and adrenaline systems. There are things like you know, himbine and different forms of you, himbine like alpha you, himbine. There are multiple forms of these things. Now, I would go to examine.com to explore the different forms of you, himbine. About 10, 20 years ago, yohimbine was marketed primarily as a prolebedo and pro erectile agent. Turns out it has very low efficacy for both of those things, but there are certain forms of yohimbine that act as stimulants, that are effective and are separate from those claims in pathways. One particular form is called alpha yohimbine. It sometimes goes by the name Raul Wolstein and that's spelled R-A-U-W-O-L-S-C-I-N-E. Again, that's alpha yohimbine and it's used as a stimulant often to also promote fat loss and alertness. I have to say that it's a very potent and somewhat precarious supplement. Some people experience a lot of anxiety on it that could also be because they tend to take it on either an empty stomach or in combination with subchloric diets. It's sort of getting out on the edge of things that for some people can work not so well for other people, they might actually find it to be a very effective stimulant. In general, in terms of supplement based approaches to increase cognitive function and focus, caffeine either in coffee or T-form or in tablet or capsule form, but at lower dosages than you would find in coffee and tea, I think is actually a reasonable way to explore stimulant based approaches, enhancing cognitive function and focus. I mention all that not because I think that you probably already didn't know that caffeine can enhance alertness and focus. Most people already know that and acknowledge that, but rather as a contrast point for the other supplement based approach for increasing cognitive function and focus, which is to increase certain neurotransmitter pathways that are not stimulant based. For instance, alpha-GPC, which is essentially a colon donor, acts in the pathways related to the neuromodulator aceto-coline and can enhance focus. It dosages of anywhere from 300 to 600 milligrams. People experience heightened levels of focus for sake of mental work or physical work. The half-life of alpha-GPC is about four to six hours, so it's relatively short-lasting, although you wouldn't necessarily want to take it right before bed. I don't recommend that. It is not a stimulant. It tends to enhance focus by augmenting aceto-coline and aceto-coline pathways specifically. It does create a little bit of an increase in alertness, so some people actually perceive it subjectively as an increase in overall stimulation, but it's different than a caffeine-type stimulant. For instance, 300 milligrams to 600 milligrams of alpha-GPC taken alone will allow people to be more focused, but doesn't tend to make people feel jittery or overstimulated. Probably 500 milligrams to a thousand milligrams or somewhere in between of something like L-tyrosine, which is amino acid precursor to dopamine, a different neuromodulator, taken alone or in conjunction with, again, I believe in separating these things out by product, but I suppose you could take alpha-GPC and L-tyrosine together if you had already tried them separately and decided they worked well for you. Then you decided to combine them. What people tend to experience is that the cholinergic stimulation from alpha-GPC and the dopamine-ergic stimulation from L-tyrosine or simply L-tyrosine alone or alpha-GPC alone leads to increased levels of focus without the overall feelings of stimulant-based alertness that one would experience with caffeine. Indeed, or I should say, of course, there are products out there and there are people out there that combine all three of these things together, caffeine, alpha-GPC and L-tyrosine. While I'm not suggesting that's a good or a bad thing, I would suggest that any time you start to explore the cognitive enhancing effects and the focus enhancing effects of any supplement that you ask, which ones are stimulants? For instance, caffeine and alpha-yuhimbing, which ones tend to tap more into neuromodulator systems like alpha-GPC and L-tyrosine? To separate those out conceptually, because whereas things like alpha-yuhimbing and caffeine will mostly serve the role of increasing levels of alertness, but not tightening your focus. Things like alpha-GPC and L-tyrosine tend to serve the role of less elevation and alertness, but more tightening of focus. This, of course, is why people often stack these and take them in combination. I think it's a very important distinction that most people aren't aware of. I'm not here to tell you that the stimulant-based approach or the neuromodulator-based approach is better or worse. They are simply different from one another. Although, I will say that I think it is important to explore them separately if indeed you're going to explore any of them before you would start to combine them in a single formula. Again, individual ingredients are going to be the way to go in terms of figuring out what's best for you if anything. Some people may find that even the slightest bit of caffeine or even the slightest bit of alpha-GPC or L-tyrosine just places them into a state of mind and or body that's just uncomfortable and not compatible with the kind of work that they want to do. Whereas other people, such as myself, regularly rely on taking 300 milligrams of alpha-GPC. It turns out more than that doesn't work for me or it tends to send my mind down to pathway that I don't like to be in for sake of cognitive work. But I will routinely take 300 milligrams of alpha-GPC prior to some cognitive work or prior to a workout. I do often combine that with some caffeine, not in capsule or pill form, but rather in the form of cup of coffee or your bimante. It turns out that for me, just by way of example, L-tyrosine is something that works very powerfully to elevate my level of focus, but that I tend to crash pretty hard afterward. I tend to err away from L-tyrosine, but some people tolerate it really well and actually really like it. I rely on something else for dopamine augmentation, which is phenylethylamine, which is a little bit more short lasting. Again I arrived at these protocols for myself by mixing and matching, but mostly by trying individual ingredients alone before binding them into any cocktail before taking them before a workout or before a cognitive work about. I suggest that you explore them in the same way because that's going to deliver you to the best possible protocols for you, which only you can determine. And of course there's the category of supplements that can support cognitive function and focus, but that also touch on other general functions related to brain and body health, such as metabolic health, mood, etc. And the one that comes to mind here are the omega-3 fatty acids. I've talked a lot about omega-3 fatty acids that are available in the form of foods. For instance, fatty ocean fish. There's certain plant-based sources for these as well. There's certain algae and things of that sort. Touch on this in the episodes on depression that I've done, but this topic mainly comes up around the issue of fish oil, fish oil capsules and liquid. And this is a discussion I think is worth having. Early on in the episode we talked about foundational nutrition and supplements that include a bunch of different ingredients. We touched on the idea that some people might have the budget to take one such product or any number of different products that combine all those ingredients. I should say that for those that are interested in taking a supplement but have a lower budget then would allow for taking one of those general categories of supplements we talked about earlier for foundational nutrition that combines everything vitamins, minerals, probiotics, probiotics, aptapchitions, digestive enzymes. I do think that there's a category of supplements that can greatly enhance the probability of offsetting depression and maybe even improve mood directly or indirectly. There's evidence for what I'm about to tell you within the scientific literature and or offset the amount of antidepressant medication that people need to take that's also been demonstrated and improve metabolic function, cardiovascular function and also enhance our ability to do focused work. Here I'm referring to the so-called omega-3 essential fatty acids in particular the omega-3 form of the essential fatty acids. There's now a lot of data showing that ingesting 1 to 3 grams of EPA in particular in the form of either fish oil capsules or liquid can be beneficial for a number of different aspects of brain and body health and can enhance focus and cognitive ability. This is especially true in developing brains and there's actually an extensive data out of a laboratory at University of California, Santa Barbara talking about how mothers who supplement omega-3s in particular the EPA's although they also need to get the DHAs. That leads to greater brain weights and health of offspring. This is something we will definitely explore in a future episode likely with an expert guest who's doing that work in that laboratory at UC Santa Barbara. The point here is that if somebody has a limited budget to purchase supplements and cannot afford a foundational supplement in the sort that we talked about earlier, athletic greens are similar, but they do have a budget that would allow them to purchase a high-quality omega-3 fatty acid fish oil and to ingest it in quantity sufficient enough to get above that 1 gram of EPA per day. Again this is really important if you look at the product labels you'll often see 1500 or 1600 milligrams of essential fatty acids, but the key is you get above that 1 gram of EPA per day threshold and as high as 3 grams per day. We had a guest on this podcast Dr. Ronda Patrick who takes anywhere from I believe 3 to 4, maybe even more grams of EPA per day for a variety of reasons including some of the reasons we're discussing now. Before we move on to discussing some of the more global themes related to developing a rational supplementation protocol. I do want to touch on this vast category of supplementation that includes food-based or food mimic type supplements. This would be for instance way proteins or milk proteins or egg proteins or plant proteins. That's a discussion that in and of itself deserves an entire episode. If you want to understand which types of protein and source of proteins are going to be the most bioavailable, the best for protein synthesis, for recovery from exercise, building muscle, etc. Just to refer you to a segment within the episode that I did with Dr. Lane Norton where he talks about total protein needs per day, it's about 1 gram per pound of body weight per day for most people, although there's some variation depending on activity, etc. The quality of sourcing of those various proteins is extremely important. That of course leads to a discussion about the quality and type of protein that would be present in a supplement like a way protein supplement or casein, which is a milk protein based supplement. That discussion is segmented and timestamped in the episode that I did with him. You can find it at HubertmanLab.com. He actually pointed to some interesting data on potato protein as perhaps being a great plant-based substitute for those that don't want to take way-based protein. But the fact that way-based proteins can be very useful for getting two and above a protein threshold for all sorts of reasons, not just for muscle building, although it's great for that, but for other purposes as well. That's but one category of food-based or food mimic type supplements. There are, for instance, branch chanameno acids. There are, for instance, green tea supplements. There is a huge landscape of this far too much for us to get into in any kind of reasonable detail. But I do want to acknowledge that those all exist. The key thing to understand is that while they can serve a great role in providing replacement for meals that you perhaps couldn't have consumed otherwise, and while they often are very convenient because you can drink as opposed to eat your calories, I think that most people would agree that getting some significant fraction of your nutrition from whole foods is going to be useful for a variety of reasons, in particular the fiber that comes along with it, the bulk of the food that tends to make us feel sated, and of course the fact that a lot of vitamins and minerals and other things that are contained within foods as well as essential fatty acids in foods like animal-based proteins are not going to be present in most, if not all, of those kind of food mimic type powders and replacements for food. Another point is this question about age-related effects. So for instance, should kids be taking supplements? Well, I mentioned earlier that there's some evidence that making sure that kids are getting enough omega-3 fatty acids can be beneficial. They certainly could get those from food-based sources, just look up online food-based sources of omega-3 fatty acids and EPA's and you'll see lists there. Some people choose to supplement on top of that, in particular in kids that are developing very quickly, regardless of whether or not they're consuming enough EPA's from food, some parents choose to supplement on top of that. I am personally not a fan of children taking melatonin for the reason that melatonin is already chronically elevated in kids and there's a growing body of literature that melatonin supplementation in kids can be potentially harmful. I don't want to create alarm among those who have already been taking it or giving it to their kids or that gave it to their kids in the past, but I do think that melatonin in particular should be approached with a lot of caution, especially for kids. And then of course, there's the issue of whether or not all these other supplements that we've discussed, whether or not kids can take them safely. And again, it's highly individual. I would say that for the supplements that relate to hormone augmentation and support, unless your physician, a board certified MD specifically recommends them, I would strongly suggest avoiding intake of those things until at least after puberty and probably into the late teens and early 20s. Because the body and brain are still developing and hormone systems are still active, even though puberty might happen between ages 11 and 14 or even 15, puberty can be a long lasting event with a long taper and tail on it. So you want to be cautious about augmenting hormones in young people through the use of supplementation unless a physician is working very closely with you or rather you with them. And then in ages of say 22 years old, 24 and older, I don't see any reason why people who are in their 50s or 60s would have any different protocols than people in their 30s and 40s, except perhaps in the domain of cognitive enhancement where it might make sense, again, might provide it. It can be done safely and with the consult of a physician. It might be beneficial for people who are approaching their later years to consider increasing dosages or the variety of things and approaches that they take for cognitive enhancement because age-related cognitive decline is a reality. There is no person that escapes that. The question is whether or not the slope of that decline is very steep or very shallow. And of course, this is an opportunity for me to raise the point that I made much earlier and that I'll make over and over again because it really is the most important point to today's discussion, which is that behaviors both exercise, sleep, making sure that your relationship to light getting sufficient sunlight early in the day and throughout the day if you can and limiting your viewing of bright artificial light in the late evening and especially between the hours of 10 pm and 4 am, things of that sort, all the dos and don'ts. And of course, cardiovascular exercise and resistance training exercise and maybe even flexibility training exercise topics we've covered extensively on this podcast and for which we will soon have a special series airing with Dr. Andy Galpin that gets into a lot of detail and protocol development that you can all employ. All of that needs to be done at every age, certainly past puberty, in order to maximize cognitive function, in order to maximize cardiovascular function, in order to maximize focus in every aspect that we really all stand to and want to enhance when we think about supplementation. So again, get your sleep right, do that by getting your relationship to light right, get your exercise right, quality social connection right, and then of course, there's that landscape of nutrition that we talked about extensively earlier and for which we have other episodes that really dive deep, including that episode or I should say in particular that episode with Dr. Lane Norton where we really took a full survey of the landscape of nutrition, everything from protein needs, vitamins, minerals, fiber, microbiome, it's a deep, deep discussion with a lot of actionable takeaways. If you're curious about nutrition and in particular if you're a vegan or vegetarian or carnivore based, but even for the more common omnivores such as myself, I found that to be an incredible learning journey thanks to Dr. Lane Norton, just so much useful knowledge in that episode if you want to learn more about nutrition. The behavioral tools, the nutritional tools are really going to serve as the primary two layers upon which your supplementation protocols are going to rest. And again, I want to emphasize that your supplementation protocol may be zero supplements. It could include no supplements whatsoever and that would be perfectly fine provided that you're sleeping as well as you want to and need to. You're able to focus and work as well as you want to and need to. You're able to perform physically as well as you want to and need to and you feel that your hormones and related functions are where you want them. However, for most people who are doing most everything right, they want to explore how they can make things like their sleep, their focus, their hormone function even better and that's where supplementation makes a lot of sense. And when I say makes a lot of sense, I mean, it makes a lot of sense to explore in a rational and regimented way. There are a couple of big themes that we've talked about a few times during today's podcast that I'd like to reiterate now because they are so crucial to developing a rational supplementation protocol, the most important of which is unless we're talking about foundational nutritional support, that is coverage of vitamins, minerals, digestive enzymes, probiotics, prebiotics, and adaptogens. We should really be focusing on single ingredient formulations. Foundational supplements that include all those things I just listed off, all combined in one supplement are fine. I simply don't see any other practical or reasonable way to get each and every one of those things through single ingredient formulations. However, when you want to start thinking about and actually practically exploring, it's like supplementation for sleep or hormone health or cognitive function, the single ingredient formulations are going to give you the most power and control they're going to make sure that you can find the minimal effective doses that you can rule out things that are not effective for you or that maybe detrimental for you in whatever fashion. And it's not just about cost effectiveness, it's also about arriving at small kits or cocktails of supplements that you can really manage and work with that you're not dependent on but that you really feel can augment the various aspects of your health that are important to you. That's really what today's episode is about, even though we had coverage of specific supplements and their functions in these different domains of mental and physical health and performance. Today's episode was really geared toward giving you resources and a framework to think about how to approach supplementation, how to navigate sticking points and pain points in supplementation, how to get the most out of your supplementation regimen without spending an excessive amount of money and if you don't have finances to allow for a lot of exploration of supplements, how to narrow in on the most effective supplements the most quickly and derive all the benefits that you can from them. And there's a final point that is redundant with a few of the themes we talked about today, but that I don't think I ever really explicitly stated is that while the word supplement makes it sound like these compounds are something just to add on top of or compensate for deficiencies in nutrition or other areas of your life, many of them are actually quite potent compounds. These are potent non-prescription molecules that really can move the needle in terms of your ability to think more clearly, sleep better, support your hormone function. But as always, they are just one element within an ecosystem of other factors such as your behaviors, which includes dos and don'ts, such as your nutrition, maybe even such as prescription drugs that you also might happen to be taking or hoping to be taking less of or removing completely. Again, that has to be done in discussion with physicians if you're going to do it at all. But the real point here is that what we call supplements are actually a powerful gear within a larger system aimed at each and every one of us customizing tools for our mental, physical health and performance. If you're learning from Endor and enjoying this podcast, please subscribe to our YouTube channel. That's a terrific zero cost way to support us. In addition, please subscribe to the podcast on Apple and Spotify. And on both Apple and Spotify, you can leave us up to a five star review. If you have questions for us or topics you like me to cover or guests that you'd like me to invite onto the Huberman Lab podcast, please put those in the comment section on YouTube. I do read all the comments. Also please check out the sponsors mentioned at the beginning and throughout today's episode. That's the best way to support this podcast. During today's podcast and on many previous episodes of the Huberman Lab podcast, we discuss supplements. Again, while supplements aren't necessary for everybody, many people can derive tremendous benefit from them. We've partnered with momentous supplements because momentous supplements are of extremely high quality. They have single ingredient formulations and they ship internationally because we know many of you reside outside of the United States. If you'd like to learn more about the supplements discussed on the Huberman Lab podcast, please go to live momentous spelled OUS. So that's libmomentous.com slash Hubertman. If you're not already following us on social media, we are Huberman Lab on Instagram, Twitter, Facebook, and LinkedIn. And in particular on Instagram, I cover science and science related tools, some of which overlap with the contents of the Huberman Lab podcast, much of which is distinct, however, from the contents of the Huberman Lab podcast. Again, it's Huberman Lab on all social media platforms. And if you haven't already subscribed to our neural network newsletter, it's a zero-cost monthly newsletter. You simply sign up with your email by going to HubertmanLab.com. The newsletter includes summaries of podcast episodes. We have toolkits for sleep, toolkits for focus, toolkits related to deliberate cold exposure, heat exposure, and much, much more. Again, all zero-cost. You provide your email to sign up. We do not share your email with anybody. There are also sample newsletters there that you don't even need to sign up for. You can just download the PDF or just view them on your computer or phone screen. So thank you once again for joining me for today's discussion. All about supplementation and more importantly, how to develop a rational and especially effective supplementation protocol for you. And last but certainly not least, thank you for your interest in silence.