NAADAC

GENETICS OF SUBSTANCE USE DISORDER
AND NEUROTRANSMITTER SOLUTIONS
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>> On the non-substance, we got thrill seeking or novelty seeking. We'll talk more about what some of these mean that can be a little confusing. The sexual masochism, gambling. We got in the impulsive category, the spectrum disorders, ADD, ADHD, Tourette and tic syndrome, autism. These are all tied to relative dopamine homeostasis. Disruptive conduct intermittent explosive, exhibitionalistic. In the obsessive compulsive, we got body dysmorphic, hoarding, Trichotillomania, hair pulling, skin picking, and non-suicidal self-injury. These are things commonly tied to trauma. We often see that as a therapist, we know that when we see these exhibited in a patient, that we want to look into trauma issues and trauma is definitely tied to these. But then we got to ask ourselves, why is it some trauma patients don't have these experiences and others do? And we believe that genetics is one of the strong ties that makes the differentiation. And again, you may have the predisposition genetically, but not have the experience to drive you there, and thus, the genetic factor.

Personality disorders come under this umbrella of RDS as well, paranoid, schizoid, borderline schizotypal, histrionic, narcissistic, avoidant, PTSD. I do work with first responders and some asked me why is PTSD list listed under personality disorders? And the reason is categorized there, because of the way memories are processed in PTSD. We are -- it falls under that category although it's not typically we would think of as a personality disorder.

So polling question.

>> Hello, everyone. This is Samson, we will go ahead and launch your first polling questions. This is the first of many opportunities to interact with your presenter. Polling question 1 asks, genetic testing for RDS can provide diagnosis for SUD's. True or false? You'll see two options there. Looks like a lot of you have already responded. It's popped up on your screen now. We'll give you 20 more seconds to respond to this first poll.

Excellent. Thank you so much, everyone. It looks like about three quarters of the votes have come in. So about 75 percent of you have voted. We'll give you just about a few more seconds. As you're voting as a reminder, you can click on the questions box and send any questions you may have for our presenter today to the questions box, and they'll get answered in the order in which they were received. Towards the end of the webinar, we'll do a live Q&A. Right now, I'm going to turn this back over to our presenter and share the results so that lisle can speak to these results.

>> Okay. So it is false. And that's one of the things I want to make clear because there's risk with any time we're doing genetic testing, that people will see their results and believe that means they have something. And I've done research with a variety of other things in genetics, including Alzheimer's. Having a predisposition does not mean Alzheimer's. There may be preventive measures you can take to avoid it. That's the beauty of what we're doing here today, not just resolving issues that have existed or do exist but be able to prevent them from ever being experienced in the first place. Not diagnostic, but it is talking about predispositions, likely hoods.

So there's a lot of folks from a lot of different backgrounds here, and I'm not sure how deep to going into some over things. I'll gloss over things. If you have questions, I'll be happy to answer them. I think most people who work in the field understand the limbic systems. It affects our behaviors. I did want to talk about it a little anyway. Understanding the limbic system and how it speaks to our prefrontal cortex, that portion of our brain that does our decision-making has our self-control. It has our planning, reasoning. So the limbic system is a pleasure reward center. I love NIDA's explanation here. We call it the reward pathway in several parts of the brain, some of which are highlighted in the image. The nucleus accumbens and prefrontal cortex. What happens is the message in the reward center where the dopamine is activated goes through the frontal cortex and drives that decision-making. So you heard of the reptilian brain at the brain stem and that's the part you have no control over. So if you try to hold your breath, you're going to pass out and breathe anyway because it's being functioned by a portion of your brain that you really can't control. You can't control your rate of breath

perhaps but you can't decide to breathe or not or have your heartbeat or not. Then you have the prefrontal cortex on the other hand, which is the executive function, the primary thinking area. And again, planning, self-control. All of those things happen there. In between both geographically and in function is the limbic system. So when the limbic system says, this is what's going on and it sends that message to the prefrontal cortex, it changes your ability to make those decisions outside of that effect. Your limbic is there as a survival mechanism. When you're thirsty, that's because you need water, you need hydration to stay alive. When you're hungry, it's because we need food to continue to exist. Your sex drive continues the species. The problem is when these things get out of control or when they're affected by other things.

So how does dopamine get released in the brain to enhance well-being, motivation and reduce stress? Well, a neurotransmitter is a chemical messenger which carries messages between neurons and dopamine is one of those neurotransmitters. The interaction liar serotonin, cannabinoid, endorphins, GABA and glutamate causes the net release of dopamine in the reward site of the brain, the nucleus accumbens. But to -- stress induces the release of the stress molecule Norfenefrine but dopamine blocks the effects. We have a balance in our brain that is healthy. And at different times, the balance is different, what is most valuable at different times is different. If I'm hiking to the woods and a bear starts charging after me or there's a rattlesnake, being all chill out and relaxed is not the best mode for me to be in. The Norfenefrine, kicks in and they should, the fight or flight kind of thing. Oh, it dumps your -- your brain dumps out all the chill factors if you will. The serotonin and dopamine, all the relaxing neurotransmitters sort of vacate so that your body can be on alert. So they don't work in concert except in perfect balance. So if we have too much dopamine, it can interfere with the Norfenefrine, but mostly the stress factors can interfere with the release of serotonin as well. Dopamine is a good solution.

So again, it causes feelings of well-being, motivation. Lacking that, we'll try and find ways to fulfill that. To understand how our brain does this, there's something called the brain reward cascade. So serotonin stimulates the endorphins at the 5 HT 2 receptor, which in turn stimulates the mu opiate receptors, which inhibit GABA at the substantia nigra and allows for disinhibition of glutamate at the VTA to fine tune the amount of dopamine released at the reward site. So serotonin, this is the cascade. Imagine a water fall cascade. The pool at the bottom, the end result is always the dopamine issue. And that's why when we talk about substance use disorders, we spend so much time talking about dopamine even though there are other neurotransmitters involved because the final effect is the dopamine effect. I hope that made sense. [Chuckling].

So if you have -- GABA is an inhibitor. Think of it as a governor, a restrictor. If you have too much GABA, you're going to have not enough dopamine. And this is one of the reasons why people find they take certain medications or have certain things that cause an excess of GABA, benzodiazepines are known for this. And they -- naturally, because it's an inhibitor reduces the dopamine. You may have a patient come to you with anxiety, and then we treat the anxiety and it's treated very well. Again, using the benzodiazepine example. They're a wonderful tool when used properly and they're very

effective for anxiety. The problem is that as you increase that heavy hit on the GABA, increase that GABA so much, you're decreasing the dopamine and you're interfering with the endorphins and serotonin. So the person with anxiety often ends up with post anxiety and depression, a lack of motivation, all the things dopamine does is less able to do because too much GABA has reduced the dopamine level.

So in the absence of neurotransmitters, there's just no capacity to feel pleasant feelings. These are where we get all our moods for, good and bad, but particularly the good. Endorphins are particularly helpful in stopping cravings. So we need -- again, we need cravings. So endorphins can stop the cravings -- without changing normal thirst. And endorphins then tie into the dopamine again. This is a study which I can give you links to. This is from 1983. Just so you know, Dr. Blum found some of these in the 90's -- actually in the 80's. These studies on genetics were originally done because there was a pair of twins raised in separate homes. They were both obese but both of their adopted families were not. And so the researchers said, well, that's interesting. They're not in an [indiscernible] environment but they're obese. Maybe there's a genetic connection. So they began to study the screens that might lead one to overeat and they stumbled upon a genetic risk factor for alcoholism, which is that aforementioned DRD 2 A 1 allele.

Stress lowers endorphins and increases craving behavior. Again, this is all happening through that limbic system issue, which then speaks into the amygdala and prefrontal cortex. So what happens in one place affects another, much like the different neurotransmitters affects one another different parts of the brain affect one another. And we're ready for polling question No. 2.

>> Thank you all. Yes, everybody will see the next polling question pop up on your screen in just a moment. The question is can asking, what parts of the brain are affected by SUD's? And you'll see four options there. It looks like a lot of you have already answered. And I'll leave this on the screen for another 15 to 20 seconds or so and give you a chance to respond. . Excellent. Thank you so much everyone. Almost 75 percent of you have responded. We'll go ahead and close this poll in just a moment and share the results on the screen.

Before I do, just giving you -- I'm seeing some last minute answers come in. Those of you who do have questions, we got 5 to 10 questions come in. For those of you who do have questions, send them into the questions box and we will have a live Q&A with lisle towards the end of this webinar. I'm going to close the poll and share the results and turn this back over to your presenter. And he will be able to speak to these results.

>> Okay. Very good. It does affect all of the above. The main area it starts in is the limbic system through the amygdala through the prefrontal cortex. Well done.

We've talked a little bit about stress, and I think I kind of went over this with my bear in the woods example. So increased stress elevates cortisol, adrenaline and other factors and then leaves an -- decreases the access to chill neurotransmitters as I call

them. So when our brains are highly adaptive and they understand when there's a lack. So when our brain is dopamine deficient, we will crave things to fulfill that. There's a few problems that happen here, and I want to talk about how they happen. One of them is that stress factor. So we know that stress depletes us of those healthy, happy feel-good neurotransmitter. But I want to talk about the sources of stress because some of them people aren't aware of. Poor sleep is huge. Sleep affects everything in our bodies and very much so stress. Obvious things like death of a loved one, divorce, losing a job, financial issues, too much responsibility. Attitudes and perceptions about these things is probably the biggest factor there. And what I want to show you on the top right is that even good things can cause stress, getting married, buying your first home. Those are wonderful events in our life. Joy filled events but also stress filled events. Emotional issues or mood problems those obviously create stress, and traumatic events, natural disaster, theft, sexual assault, any violence, typical trauma effects, all are stress inducers, and some of them long term stress inducers.

So what do we do? And we found that there are some things that boost up that dopamine level. The DA release above resting level. Food, again, raises dopamine because we want to crave it because it's necessary for survival, raises 6 above normal. Music takes you up to 9. Music therapies or adding music to their stress anxiety and recovery processes. Cocaine goes to 22. It works really good. Unfortunately, it works way too good. And remember, we talked about too much of a good thing is a bad thing, and the schizophrenia is an example of too much dopamine. But cocaine, meth, and some other ones that push you way high in dopamine are extremely risky, not just because of the potential for a drug induced psychosis but because of the aftereffects as well.

So this is a chart of Tourette's dopamine release during sexual intercourse. The male gets a peek -- and normal net release, peek is at 100. Whatever you do in life, that brings you the most joy, 100 is your normal maximum net release. The male reached that release in about 5 minutes but went up so quickly then dove very quickly as well. He went really quick to his maximum. Because of that quick elevation, there was a quick drop as well. There's no correlation here, folks. If you go home and talk to your spouse, now you guys have an excuse. But you see that the female is just getting started. She's reaching peek at 40 minutes but the male rat, because he went so high so quick, he's down in the negatives. He's at negative 20. So imagine if he's trying to do something to raise this dopamine levels again, he's starting in the seller. He's not even starting at the resting level. The same thing happens with substances. The slow release is much healthier. So the other thing that happens and we'll talk more about that up and down effect shortly, is that our brain -- and remember it's highly adaptive, beautifully made mechanism, wonderful designed.

You see here the neurotransmitter being released in the synaptic cleft and then climbing up to pull it in and take advantage of it. The problem is our brain knows when we have too much of a good thing. When we take a substance into our body, cocaine as an example we just used, it's too much for our brain and the brain says wait a minute, it's not normal, it begins to close down some of these receptors to protect itself. So the next time you try and put more in there, there's less receptors that are active in

receiving it. So guess what? In order to get the same effect, you need to do more because there's less receptors available. At the same time, because you've gone artificially high artificially fast, you've dove down into the cellar. So you're starting at a negative, a lower baseline. This is our typical what they call chasing the dragon. Every time you go up there, you shut down some of the receptors and B, start at a lower base line and have to work harder to get to the same place. So you can see here the green line is somebody with reward deficiency syndrome. Remember I told you just with that one risk factor, the DRG 2 A 1 allele, they're losing 30 to 40 percent of their receptors. With the other factors in there, they may be only getting a total net release of 10, 120, 30 percent of normal. So the blue line is normal. Someone getting up to that 100 max release. The green line is the deficiency. And then you see someone who does opioids, that will take them to 900, 9 times the normal rate, 20 times the rate of someone that had experienced RDS. Approximately, RDS is different. Imagine that your brain suddenly find something different that's 20 times as much dopamine as you can ever find any other way and your brain says, yay, baby, that's what's been missing. And so wants more of that. Artificially high, artificially fast and then dropped you below base line and it takes a while just to get back up to normal.

Now, when you use crack or meth or MDMA ecstasy, that will take you to 1200, 25 times to what RDS has been experiencing. Very unhealthy. This is why cravings remain so much longer for these drugs than they do for other things. Your brain -- your neuroplasticity, your healing process is going to take longer because you've abused it. You've shut down more receptors and dropped yourself in the basement. That's why people on long term drug abuse are often prone of all people for anhedonia, complete inability to feel joy because they've depleted their ability to receive or produce dopamine.

In 1990, Dr. Kenneth Blum and Dr. Earnest Noble found the first clear association between specific genes and addictive behaviors. In that study, DNA variant of the DRD 2 gene was associated significant with severe alcoholism. Now, nearly 30 years and thousands of studies later, the field of psychiatric genetics is now firmly established, and Dr. Blum -- oops, has developed -- I switched slides too quickly -- different approaches including the GARSs we talked about, looking for predispositions. They now test for ten different genetic sites. We'll talk more about that in a second. But I want you to know that they have studied in their meta-analysis over 10,000 cases and over 120,000 controls were evaluates to prove the validity of the selected genes and amounts of amino acids and cofactors that they formulated to help reach dopamine homeostasis in the brain. So this is not just conjecture. There's, again, 110 cases and 120,000 controls that they've evaluated to get to this.

Now, the genes that are tested in specific are -- keeps going too far -- are the DRD 1, dopamine receptor gene DRD 1, 2, 3, 4, dopamine transporter gene, the serotonin transporter gene, opioid receptor gene, the GABA receptor gene, the MAOA, and the catechol means. Cat dole means are known for ADD and ADHD. Everyone's heard of MAOA inhibitors. These are all known issues and now we actually have specific genes and gene variance that we know to look for to see one's predispositions to these areas. So what does it look like? Genetic testing in most cases is a simple

cheek swab that you can mail in. When you get your results for this particular one -- and there are others. We'll tell you that I'm an unpaid advisor for the scientific ward. So I make no money off of this, and I can tell you of other versions out there. Some more complex, more expensive. This is the one I've done research with. So when you receive your results, you're going to get a basic score, how many risk factors do you have and where are those risk factors located? And then a read out if you're at high, medium, low, or no predisposition for. This individual had five different risk factors. You'll notice in the circled areas above the brain graphic, there's only three gene sites circled. How do we get to five? You can have more than one risk factor at a particular gene site. Women can have up to 22 on these ten different genes that we test. Men can have 21. So this individual is shown to have a high predisposition towards stimulants as well as anxiety, internet gaming, OCD, oppositional defiant disorder and a panic disorder. A moderate disposition towards food, overeating, sedatives, and pathological aggression. I'm going to talk about what some of these things mean that you're going to see on the results. I'll tell you pathological aggression is often misunderstood. What does it mean? What does it look like?

In our world, aggression, particularly in our culture now, aggression is frowned upon. Anti-bullying campaigns and what not, as it should be. What happens is many of us know it's culturally know it's unacceptable so pathological just means out of our control. It has to go somewhere. What happens in individuals it becomes internal, negative self-talk, self-harm. So the aggression can be turned inward. So when people say I've never been aggressive toward anybody, don't forget to include yourself. The lower ones were alcohol, cannabis, cocaine. You see there's a low predisposition cords cocaine but a high predisposition to stimulants. When you break it down case-by-case, you'll understand why. AD did recollect, ADHD and novelty seeking. Thrill seeking, novelty seeking is that need for new. The people who maybe change relationships regularly, change jobs all the time, move where they live, shop alcoholism is tied to novelty seeking. You went to the mall and bought a pair of red shoes but you have five other red shoes. I didn't need that. But it's the thrill of the new that got you there.

>> Hello, everyone. This is Samson here. Your third poll coming up. We'll launch this on your screen. The question asks, why provide the GARS test to someone who already know has a SUD or RDS behavior?

Thanks, everyone, for getting your answers in. Your questions and answers you can send directly to the chat box. They will be collected and added to our Q&A document. Any questions not answered on this webinar will be answered in a week or two. We'll close the poll and show the results.

>> And it is used in all of the above as well as some other things. I want to talk about what that -- I'm going to run out of time to go through all the slides but I'll explain some of them and move forward with it. So yes, it's used for mat dosing. So here's the trick. We did a study with a doctor out of D.C. in conjunction with Howard university. He had a high population of folks on medication assisted treatment. They kept coming in and telling him that they needed more medication, that he wasn't giving them enough. He's an African American doctor and he felt his African American patients were the

ones asking for this increased dosage. And he thought that was unusual. So we did some genetic testing and found that sure enough, African Americans metabolize those medications faster and therefore did need higher dosing. It's not drug seeking behavior. It was simply trying to get the right dose. So the same thing is true with pain medications. We understand that you metabolize opioids faster than other people, then proper dosing is going to be extremely helpful. As far as guiding nutritional efforts, absolutely. Your body needs to take in the right amino acids which are broken down for proteins in order for your brain to have the neurochemical balance it needs.

The guilt processing is often done for people who feel like failures. I must be a screw up. They've been told it's a moral failing that they have, this issue. And we can help them understand that there's some neurochemical, biological drivers and genetic drivers that have led them to where they are. Combatting denial, I don't have a problem. Here's a reason why you may. And a whole lot more that we can do.

I'm most excited about the potential for prevention. So I want to get into a few of these real quick.

Each gene site tested has a page that looks like this and it'll explain if you have a predispositions and what to do about it. So for the COMT, you can see it includes alcohol, cannabis, glucose, opioids, stimulants and nicotine. The non-substance is ADD, ADHD, oppositional defiant, pathological aggression, panic disorder, anxiety, OCD, and internet gaming. It goes on to tell you about the clinical impact and function and how it works. Certainly read through these at your leisure, if you like. I will tell you that if you really want some good sleeping material, the description, it gets into more of the genomics of the patients, the chromosomal order will do that for you. I love this stuff and it still puts me to sleep. It gives you a way to resolve this from a nutritional approach. I'll tell you Blum and others put together formulas specific to your needs. You can certainly look at this and see if I have that issue, here's a solution. I'm not going to go through each of these pages individually for the sake of time. But you can see these pages have that information for each of the ten sites. I'm going to get through these real quick so I can get to the next one where I'm talking about the -- there are some of these you'll see as we get into the impact discuss different things that are more important than just the typical mood disorders and stuff. Again, you'll see up to the right here, 5 hydroxy tryptophan, chromium [indiscernible]. Some of these are not amino acids. It's the cofactors that help your brain or possibly the inhibitors that had your brain not produce too much of something.

To me, one of the most exciting things is the results we've seen. I will tell you honestly this is early and I left the references on this so you can follow-up on these yourselves, these numbers are gaudy. I find them hard to believe and I'm involved in some of the research that came up with some of the bindings. It's just -- I think it's too early to be this excited. The differences here are so dramatic. So with cocaine, using these amino approaches based on your genetics, precision control. Precision addiction or amino treatments is just that. Finding out which particular genetic factors you have and giving specific amino acids to meet your personal genetic needs. And when you do that, we're finding dramatic relapse rate drops. Again, too dramatic for me to be

comfortable with [chuckling]. Going from 93 to 47, 62 to 7, 91 to 18 percent is hard to believe even though I watched the studies. So beyond those studies, there's also some other support for it, including neuroimaging.

So here, you see yellow is the dopamine activation in neuroimaging. The area we want the dopamine to be active is highlighted in blue. The area we want less activated is highlighted in the magenta. This was a study done over in China in abstinent heroin addicts. One hour after administering the first dose, the scan on the right was done. And there's a placebo on the left. You can see the lack of dopamine activation in the right and then the added activation on the test subject. And in the reduction in the unhealthy activity, and as your pleasure seeking activity in the magenta area. So we have seen not just from the studies but the actual neuroimaging that we've seen a difference. I've got a case study -- I wrote a paper on this. It's coming out in upcoming publication on current psychopharmacology is the journal it'll be published based on a family. It started with the daughter. And I'm going to run out of time. So real quick, she had an issue, came to me with extensive history of a mental health issues and addiction issues. We put her on the neurotransmitters and her family was so amazed at the changes that the family wanted to get tested as well. We tested her mother and father. The mother came out with a low score of 3. Her father with a score of 6, higher than the daughter. He was a binge alcoholic. He found that after taking these, he began to lose his desire to drink and his binge drinking stopped. The daughter got back on track, did well. She stopped taking the neurotransmitter support, relapsed got back and has been healthy since. We did a genogram on the family to track what happened. We noticed a high predisposition and then we tested her son and daughter who had already begun to show some predispositions themselves, just in their behavior.

So through this, we're able to test and find out that the son was at high risk and had already exhibited some of the behaviors. We put him on an age appropriate dose of nutraceuticals and started to excel in school where he was about to be kicked out. Relapse prevention is huge in our world, but to me, an effective approach to prevention is just so exciting to me because really, let's be honest, preventive measures have been lacking. This is really awesome information going on. And last Friday, USA today announced that additional research will be done, which Dr. Blum and others have been contacted. If you want to look up that article from USA today, we now have a large scale preventions studied in large universities and hospitals. It's moving along quite well. So real quick, we can reduce cravings or possibly even eliminate them, reduce stress, elevate mood, and improve decision-making.

Okay. Last poll question.

>> Yes, last polling question, we will launch this so you can interact with your presenter and we'll have time for just a couple of questions in your Q&A. This question asked, which parts of the brain are affected by SUDs? You'll see four options. Looks like almost all of you responded. You're getting pretty quick on this. We'll give you about 10 more seconds.

Excellent. Thank you so much, everyone, for your participation. I'm going to close this poll and I'll show the results on the screen. I'll let lisle answer this as we wrap up this webinar.

>> Pretty good, it does absolutely start in the limbic system, but it does affect all of it. Good answers. We have time for a couple questions.

>> Thank you, lisle. Yes, so here is our first question. When you give different nutrients and know they are bioavailable for that client, their microbiome might not be healthy and thus not take nutrients where they are needed. Any suggestions for this?

>> Excellent. First of all, there is work being done right now and being finished as we speak on combining gut biome testing with this genetic testing and even including blood type to be more specific to that ability to absorb. There is of course also the option, although it's expensive and complicated, to do intravenous delivery of amino solutions. That's pretty much reserved for seriously compromised guts. It's not something we would recommend you start with.

>> Thank you, lisle. And the next question is, where is a reputable place to get GARS testing?

>> I can certainly point you in the right direction. Contact me directly. I can put you in touch with Dr. Blum himself who originated and designed the test. That's really it. It may be available for different providers as well. I don't know. I'm not on a commercial end of it. But if you want to contact me, I'd be happy to contact Dr. Blum.

>> Perfect. Thank you, lisle. And another question, Whitney from South Carolina asked, could you explain the word cascade one more time, please?

>> Sure. Absolutely. So do you want me to go to that slide or you want me to just talk about it? The reward cascade is the interplay of different neurotransmitters. So to serotonin at the 5 HT 2 receptor, stipulates endorphins which in turn stimulate the delta and opioid receptors which then inhibit GABA -- because remember GABA restricts the flow -- so it inhibits the GABA to allow the flow to continue, and then disinhibition, allows more production for the glutamate at the VTA, and then fine tunes, which the right amount of dopamine release. By controlling from the beginning and understanding the way each one affects the other, we get the right answer at the end. Remember, dopamine is at the end of that cascade. So having the right serotonin get out and stimulate the in deferens and then the delta and opioid receptors you then get the inhibit the GABA which allows the disinhibition of the glutamate, which allows the right amount of dopamine. I hope that makes sense. Each one flows to the other. Each one gives you more. And having the right amount.

>> Awesome. I'll try to squeeze two in here. We have a long list of questions. We'll get them to our presenter and he'll email and get them up online. Just a couple more. What do you think are the biological or evolutionary reasons for Homo sapiens having the RDS gene?

>> You know, that's -- I don't know that I can give you that answer. Obviously, through time different gene pools have come along and maybe they served a purpose at some point or another, maybe in certain societies they needed to be craving the food more so that they can continue to keep hunting. I really don't know the answer to that. It's a great question. And I don't know that we can ever know the answer to that.

>> Okay. Last one, someone is wondering, if there's a list of dopamine boosting foods?

>> There is.

>> [Speaking away from microphone].

>> There's something known as the pro recovery diet, based on the fact that we can keep our proteins balanced and get the right amount of dopamine. I can try and put that list up on that Q&A on the website.

>> Wow, that would be amazing. Thank you so much, lisle. Everyone, thank you so much for your questions and sending those in. Again, we will make sure to get all of the questions that came into the questions box, even if you're just now typing them. They will get sent to our presenter and we'll post them online using a live Q&A document that everyone will have access to. It will be posted in a week or two at the most. I wanted to remind you that everything you need to know on this presentation is on the NAADAC website. It'll get posted about an hour or two max after this live webinar. You'll be able to download the PowerPoint slide, take the CE quiz, available in a few hours, and make a payment if you're not a NAADAC member. The website is www.NAADAC.org/genetics/neurotransmitter/SUD/webinar. You can go to this page in the future when you need information related to this webinar.

And here are the instructions again for receiving a CE certificate just one more time briefly for anyone who missed my introductory statement. If you do wish for a CE credit, you must be registered for the entire webinar, watch it in its entirety and pass the CE quiz located on the website here on this slide. It's free to NAADAC members. Otherwise, it's $15 fee for the one CE hour. If you have issues or questions regarding our CEs, please email us at CE@NAADAC.org. Here's the schedule for our upcoming webinars. And just like today, we have some incredibly gifted presenters. The new clinical supervision, specialty online series beginning with the author of the newest textbook on this subject, Dr. Thomas durum will be on October 11th, 2019. That's right, this week Friday. You can find this series on our website under the new heading, specialty online training. Those who complete this 6 part series on clinical supervision will also be eligible to apply for the certificate of achievement for clinical supervision in the addiction profession. Also, course three of a six part specialty training on addiction treatment in military and veteran culture continues on Saturday, October 19, 12:00 noon to 1:30 p.m. eastern standard down by Duane France. Family care center and retired combat veteran.

Make sure to join that veterans series if you are providing services to service members, veterans and their families pap. That includes a certificate of achievement and help become an additional resource to add to your career portfolio and your resume to validate your growing expertise in this field.

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[End of webinar].