Sarah's Grand (Mal) Story

The NOT unknown Epilepsy Story

7/18/2021

It was a Sunday morning and I'm normally the first one up at around 8am and get that 1st cup of coffee. No matter what day it is my day always starts the same way. A big cup of water to get the juices flowing and that 1st cup of coffee while going through the morning's emails and news events around the world.

I heard Sarah's toilet flush and I looked up at the clock and it was about 9am and thought she's up early but not completely uncommon. It was a couple minutes later I heard a big thud! Of course, I jumped out of my seat ran as fast as I could to her room and she was nowhere to be seen. Without losing stride I turned the corner into her bathroom and there she was.

She was on her back shaking from head to toe uncontrollably, eyes rolled back in her head and struggling to breath. I paused for a nano-second and yelled SARAH! No response. I immediately picked her up which was hard because of the intense shaking and laid her in her bed. I continued screaming at her, "BREATH, BREATH!". "Sarah, you have to FIGHT! FIGHT!".

She was struggling to breath and started foaming at the mouth before she stopped breathing and her body went limp. I smacked her in the face still screaming at the top of my lungs as I was watching my daughter die right in front of me. Sarah's lips and face started turning blue.

I recall thinking, "ok, I got this! I must start CPR." I recall looking at her chest for the right spot to start compressions when I heard her gasp for air. As I type this, I'm tearing up again.

I ran out of the room really quick to tell my ex-wife, Sheryl, who was in the spare room and she was running towards me because she heard me screaming through solid exterior walls and a double pain slider. I simply yelled, "CALL 911, CALL 911". Sheryl did not ask any questions or hesitate, she simply started dialing.

I ran back to Sarah seconds later and her breathing was getting better and better. It seemed like an eternity before the emergency service arrived. Her breathing was becoming stable, and I continued coaching her to focus on breathing.

I'm going to say about 5 minutes of this continued while we were waiting for the emergency services. When they arrived, I explained what had just happened and there was about 6 or 7 of them between EMS and firemen. They took over and by now she was conscious and scared because all these people were in her room and she had no idea what had just happened.

The EMS person asked her name and she responded, "Sarah". He asked her last name and she responded correctly.

That is the first moment I thought to myself she is going to be ok.

Sarah is a 17 year old, healthy athletic girl. She received her black belt when she was 12 years old as she started at the age of 5. She played two years on the high school water pole team. She is a very well-like kid in school and has many friends. A very, cowgirl like, Chevy Duramax, 7 inch lifted truck type girl. It's her baby and her proud and joy.

Although this is about Sarah and her seizures (yes, there have been more than one) and for the purpose of helping other parents that may go through this, I must talk a little about myself, so you understand how I approach problems and always keep looking for solutions never giving up until I succeed.

My name is Eric, father of Sarah and Ricky (15 years old). I started martial arts at the age of 15 because I was tired of getting picked on or beat up. I grew up watching Bruce Lee and chuck Norris movies and decided I want to be like that; fearless, confident with the ability to help myself and others, if needed.

I'm now 56 and feel that being a martial artist has trained me to never give up and give me the confidence I need to solve problems that come up in life.

I'm also a computer guy. We used to call us "computer scientists" but that just seems weird in today's world with so many kids very fluent in computers and mobile devices. So, by default I've been trained to be a very logical thinker/problem solver and focus on data and numbers. At the end of the day, numbers always tell the truth.

Being in martial arts I also found a hobby of health and wellness. When Sheryl was pregnant with Sarah, we were at a routine check-up when I asked the nurse to also check my blood pressure. At this time, I had left the technology world and become a very successful General Contractor in Lake Tahoe so I could be with my

kids as they grew up. In the tech world I was always on the road, worldwide hardly ever home.

Anyway, the nurse looked at me funny and said we need to check-it again. She had this scary look on her face; like she was looking at a dead man walking. My blood pressure was 155/102. This is not good if you know what those numbers mean. I went to my primary care doctor and the first thing he wanted to do was put me on meds to help control my blood pressure.

I said, "no, I will try to work on this problem myself. I have learned that once they start you on meds, before you know it, you are taking 5 different meds to start controlling all the side effects. I always like looking for the root cause of something instead of trying to hide the problem.

For many years I was able to keep my blood pressure in check but still not normal. More like 140/96. To me those numbers looked good but they are really not. It wasn't until many years later I discovered the ketogenic diet and really started understanding our western diet and so many sugars and carbohydrates.

When people here keto they think I'm eating a pound of bacon, raw meat, and lots of butter all day long. It's not really like that. There is a "healthy keto" I follow and it's a very healthy diet with many vegetables and quality meats. My blood pressure is now consistently around 110/78. I've been as low as 107/72 and started thinking may be too low. It is not.

Yes, sometimes this can be hard to maintain but if you are keto adapted and you have a cheat day you can pop right back into ketosis. I guess I should briefly describe ketosis as this is relevant to Sarah.

Our body has two choices for fuel. Glucose (sugar) or Ketones from fat. The body prefers ketones but has no choice to release ample amounts of insulin to combat the sugar in our bodies which causes inflammation. Why do you think we have a diabetes epidemic in this country?

Think my daughters HUGE lifted, diesel truck. It is loud, smells from the Duramax diesel engine; think of that as glucose. Think of ketones as a Tesla electric car with no noise and no exhaust. Our body prefers the Tesla if given the chance.

I had a skin tag on my inner thigh that had been there for years. Just thought that's what happens as you get older because I've so many other people with them. One morning in the shower I noticed it was shriveled a little and a purple like color. I thought oh great I have skin cancer. A few days later it was gone. It had simply dried up and fallen off. Yes. Keto.

I could go on for hours with keto as it has made such a difference in my life along with intermittent fasting. I promise I will be getting back to Sarah as it ties into what I hope will ultimately be her solution.

The ketogenic diet has so many benefits to healthy living and I we should screaming this at the top of our lungs so we can help with our health crisis in the country. Just to rattle off a few things; weight loss, insulin resistance, inflammation, visceral fat (the bad kind), acne, quality sleep, IBS, leaky gut, candida overgrowth, wrinkles, mid-day slump, energy etc. I used to have to take a mid-day nap. Now I just plow through the day like a bull in a china shop.

Sarah was able to walk out of her room to the ambulance. I really didn't want to go to the ER but I had no idea what just happened and thought it could happen again. Sheryl and I followed the ambulance to the hospital and walked right. It was not busy in there at all on a Sunday morning.

She was put in a room and wired up to the machines. I spoke the ER doctor on duty and he started talking about seizures and epilepsy and definitions around it. I had heard of epilepsy but really had no knowledge around it. As of today, she is not considered epileptic but who knows if that could change. By definition, if you have more than 1 seizure in a 24-hour period you are considered epileptic. I have seen other definitions but this one seems to be the most common.

The doctor continued and used the term grand-mal seizure based on my description of what had happened. That term I had heard of but nowadays it's called tonic-clonic seizure.

As I'm writing this, I realized I started this today because I'm going crazy and I need to keep my mind focused on something else. Today is Sarah's second day of high school, her senior year and I'm a nervous wreck praying that it will not happen at school. I can't even imagine how she would feel if an event happens around all her friends. It's heart breaking. I do feel a little more at ease as the day goes on because the events seem to be a morning thing but one just never knows.

The doctor explained what was going to happen while were there and that he would come back later. He said most likely all the tests will not show anything as many seizures fall into the category of unknown. This may sound like bad news but it is better they don't find a brain tumor or lesions. That would be real bad news.

He continued and said she will most like be released after the blood and urine tests along with a CT scan of the brain. And as he said, all tests came back clear and we were out of the hospital by about 2pm.

While we sat there with Sarah, I had asked, "do you recall anything leading up to the event?" I think I call it an event because I don't like the word seizure. Doesn't make it sound so serious even though it is but I don't want to scare Sarah any more than she it.

Sarah started remembering that before she went to the bathroom, her hands were twitching a little and she kept dropping the phone while she was doing her morning snapchat, Instagram check or whatever it is they do on the phones all day long.

I asked was this the first time your arms twitched and she responded no. Now we are going to start getting into the meat of this. Today is August 13th and I have been researching non-stop since the 1st event.

I'm not going to give you my current theory right out of the gate because I think it is important to understand the discovery process I went through to get to where I'm at today. And yes, this is still a theory at this time and only time will tell if it is proven valid.

I have been keeping a day-to-day log as to what I've learned, what Sarah has eaten, how she is sleeping and Sarah's favorite question when was the last time you pooped? She is much better now on that once I explained it is the only way for me to get some idea of how her gut is working.

Back to the twitch. It was February 2020 when we finally put her on Accutane after resisting for the last two years. We know it is nasty stuff, but we also know many of her friends that were on it with great success. Sarah was resisting right along with us for two years but finally said I want to go on Accutane.

Her cystic acne became so bad her self-esteem was at rock bottom and her desire to go to school was gone. It was horrible for us parents to see this. This brings up

another great question; what in our society has changed that so many kids are having severe enough acne that Accutane is the only solution.
I had acne as a kid of course but not bad at all. The occasional zit that I would just pop. Same with Sheryl. I do believe this is an environmental problem and what is in our food supply.

As we were driving home, Sarah biggest concern was that the doctor had to report this incident to the DMV so her license would get suspended. She kept asking when can I drive again and of course we didn't have a clear answer nor did the ER doctor. But once I explained the danger if an event happened while she was driving, not only to herself, but that she could hurt someone else she understood but still didn't like it.

She was exhausted as we all were. We went home to change clothes and went a great breakfast restaurant. She ate well as did we all. We went home and she crashed for the afternoon. While she was sleeping Sheryl and I had our first opportunity to chat alone about what the hell just happened.

I started talking about the morning event and what I saw as Sheryl didn't see the worst of it (thank God!) and completely broke down. All that emotion and adrenaline just released and turned me into a sobbing baby and all I wanted to do was lay down into a fetal position. I had to walk away from Sheryl to regain my composure which took a little bit. It didn't really hit me what just happened until then; I simply was in "poppa bear mode" saving/protecting my baby.

I still have a hard time going to sleep when those images pop into my head and will forever be engrained in my brain.

Well, now that that was out of the way it was time to roll up my sleeves and get to work. What did happen? Why? Why did her brain decide to do this? What's with the arm tremors? Could she have potentially had a seizure back when on the Accutane and we were just lucky then? Is it going to happen again? Is there anything I can do to help mitigate another event? How to get to a specialist?

7/19/2021
We were able to get into see Sarah's general doctor in the afternoon once we explained what had happened. We knew we weren't really going to learn anything there but that is where you must start to get a referral for a specialist. That is dumb. And of course, they couldn't tell us when to expect the referral other than 3-5 days. UGH!

7/21/2021
We got the referral! It's a "good news and bad news" thing. The appointment isn't until August 24th. As I write this now, we still haven't seen a specialist! We have been calling every day to see if there have been any cancelations we can walk into and have also been put on a wait list. This is crazy! The good news; The specialist is at Stanford's Children Center! From the research I have already been doing I saw it is a level 4 epilepsy facility. The best of the best!

One of the first things my research led me to was how the ketogenic evolved from a doctor back in the early 1900's. I don't recall his name but I also started seeing ketogenic diet as a solution to seizures on many other epilepsy websites. I was like holy shit!

I was already a big advocate of healthy eating with the keto diet but I was just shocked because it was something I know so well. Of course, Sarah knows about it only since she knows that is how I keep a healthy blook pressure. So, we immediately put her on keto diet.

If the brain has a choice between glucose or ketones it will always prefer the ketones but only if you give it the chance by eating a healthy ketogenic diet and getting your body into a keto adapted state. When the brain runs on ketones you have so much more energy, no mid-day slumps and the processing power of the brain is amazing.

It takes time to get into ketosis and each varies on time. If I'm real strict I can get myself in ketosis in about 4-5 days. But some can take weeks. Sarah is a very disciplined girl when she puts her mind to it, so I wasn't worried about her being strict keto.

By the way, Sarah is a HUGE pasta and carb junkie. She loves her spaghetti loaded with parmesan cheese. I would joke with her and say, "hey, why don't you have some spaghetti with your parmesan cheese." And in case I didn't say this already, carbohydrates equal glucose. When you eat a carb the body turns into glucose for energy. *Remember the parmesan cheese.*

7/22/2021
Every day starts with so much anxiety wondering if anything is going to happen today. And to try and act normal with Sarah so we are not so obvious of our

concern. I'm sure she senses it but she's been a trouper and as barbie might say, "keeping a stiff upper lip".

Everyday I'm spending hours researching from every possible angle. If it looks like a duck, quacks like a duck, and walks like a duck, it must be a duck! Well, since these arm tremors started into her 4th or 5th month on Accutane and the event on July 18th was preceded by arm tremors, there must be some connection.

I looked hard. I may have found a few things of interest such as Accutane causes depletion of zinc and creates increases in copper, but I could not corroborate this in any way. I like validating information, concepts, and theories from many different sources.

I did start coming across MCT oil many times as it can produce ketones quickly in the blood and get to the brain fast, so we started taking a tablespoon of coconut oil right when waking and before bed since I already had it in the house. I ordered some MCT oil only directly from amazon.

Since I know there is no way she could be in ketosis yet I figured the MCT oil is a quick way to start getting her brain/body utilizing ketones and assist in becoming keto adapted.

I also got her back on fish oils which are high in Omega-3s and Turmeric. Just stuff I know that is safe and can't make things worse. I have been taking Turmeric for 20 years twice a day.

7/27/2021

I do have notes in my folder for everyday but sometimes not much change in anything in terms of how she's feeling or what we doing to hopefully prevent a second event.

She's been in a great mood and sleeping well. I know she is very close to being in ketosis if not already in it as she is not waking up hungry as she normally does every morning. This is a clear sign the body is becoming keto adapted. Oh, and your pee stinking real bad is a good sign. You'll know!

While I have been working on getting her into ketosis, my goal is to get her body ready for some serious intermittent fasting (IF). I am a HUGE believer in IF and the healing powers it has in the body. One of the main healing features of our body is called autophagy which basically means eating yourself.

Serious autophagy doesn't really get started until about 18 hours into your fast and really get cranking in the 24-48 hour range. I myself have done this several times this year with amazing results.

To try and fast without being in ketosis is nearly impossible without becoming miserable and effecting other people around you because you are being such a $%^^$@. You fill in the blank.

I could spend hours on talking about the benefits of IF and autophagy but there is so much information out there already on this topic. But I will say the reason I want to do IF is I'm assuming the Accutane has some sort of damage and we need to give the body a chance to heal itself.

Remember, we have not been to a doctor yet other than the ER doctor with some simple basic tests, so I'm simply praying to God to guide me. I am not the type of person to just sit back and wait; I have to do anything I can think to help my daughter not have to go through that again.

My MCT oil as not yet arrived from Amazon. And because I believe she is in ketosis I have stopped having her eat a tablespoon of coconut oil twice a day. It's not horrible but it's not the best thing in the world either.

7/29/2021

We have all started our 1st major fast today at about 5pm. She has been already getting up to 18 hours daily just by eating 2 meals a day. I have always told anyone on ketosis, "if you are hungry, eat". When you are on ketosis you just don't get very hungry which is why it makes IF so much easier.

Now because we are not eating as much, we must be careful about a few things. A byproduct of ketosis and IF is weight loss which for most of us is very good thing. But for a 17-year-old healthy girl who is not overweight I must be cautious.

Her weight on 7/23/2021 was 115 lbs. Her weight on 8/1/2021 was 113 lbs. when she completed her 40 hours fast. We broke the fast on a Saturday morning about 9:30am with some bone broth and a big breakfast. So, she only lost a few pounds, and most was probably water weight.

The other thing to be aware of is when on ketosis and/or IF you must supplement with electrolytes. You are simply not eating enough food to get the needed

electrolytes. The main ones are potassium, sodium chloride (sea salt) and magnesium. To be honest, even if you were not doing ketosis and IF I think most people are deficient in potassium and magnesium. But you still need to be careful to make sure you get enough salt.

7/31/2021

Afterward breaking our fast, we went to the farmers market and bought some vegetables, fresh Salman, halibut, and large gulf prawns. We also bought *3 or 4 baskets of strawberries*. The keto diet does require some good planning to make tasty creative meals so eating doesn't become so boring.

I really don't care what I eat; I could eat the same thing every day and it wouldn't bother me, but I did not want to force my daughter to be like me in that regard.

Well, now I have this great, fresh, wild-caught fish from the farmers market, and I want to make something tasty. I started searching recipes and came across a seafood soup type dish. I normally grill the fish which is fine but again I wanted something different since we just broke our 40 hours fast; kind of like a celebration meal.

I cut the fish (both Halibut and Salmon) into cubes and created a seafood dish in a heavy white cream sauce with lots of *parmesan cheese* for thickness and taste. Remember Sarah loves this cheese so I bought some fresh shredded *parmesan cheese*. I also seasoned the dish with one of her favorite *Ranch Seasoning Salt*.

She loves this *Ranch Salt* so much she puts it on everything she eats. Even in the morning when she eats a whole avocado, she would just smother it with this *Ranch Salt*. She recently discovered this salt a few months ago, so I started buying from Costco in a two-pack because we were using so much of it.

Between herself and me just starting to put this salt on everything we/she was eating, she was getting this Ranch Salt all day long, every day and more and more each day. Yes, I'm going somewhere with this.

8/2/2021

The kids and I had planned a trip to Ohio on August 3rd back in May to visit with my father and stepmom. My father has stage 4 lung cancer and it's been a while since we have seen them, so we were looking forward to this trip for many reasons. I still have many friends out there, so we planned a week in various cities with various activities such as camping, white water rafting etc.

Up until today we have had no issues since the first event on July 18th and we were all feeling very good that 15 days have gone by and everything has been great! We've made some changes, primarily the keto diet, some fasting and some supplementation.

Although berries are generally ok when on keto diet in small amounts, Sarah did eat about 3 baskets of strawberries on Saturday when we broke the fast. I later learned that the 3 baskets of strawberries contained about 80 grams of carbs and 73 gram of sugar. I do believe this would have popped her out of ketosis and since she may not have been fully adapted it may have taken a little longer to pop back in.

Although it was not my intent to pop her out of ketosis I was feeling pretty good about everything and wanted to relax a little and let her enjoy whatever she wanted to eat.

On Sunday (8/1/2021), we had the left-overs from Saturday's dinner. So more of the fish in white cream sauce with lots of *parmesan cheese* and lots of the *Ranch Salt*. And we were putting *parmesan cheese* now on our salads.

Back to August 2nd (a Monday), it was a standard morning about 9am, Sarah and I were in the kitchen. I was close to her but turned when I heard water hitting the kitchen floor. I turned to Sarah and asked what happened there?

I was just thinking she hit the bottom of the cup against the counter and spilled some water. No big deal. But also, hyper-sensitive to arm tremors. She said, " I just had one of those arm things".

Talk about being instantly crushed! But that doesn't matter right now. I said, "Sarah, I told you if that ever happen you go directly to bed to get yourself laid down, come on, let's gets to bed."

I now for the very first time was able to witness the arm tremors. They were uncontrollable, usually both arms, just twitching or popping up in the air. It was so disheartening to watch these happens and her looking so scared. Of course, I texted Sheryl who came home immediately from work.

Well, besides feeling so helpless, I was destroyed feeling like everything we had been working so hard on has failed. But as a father we simply start doing whatever we know how to do and move forward.

I immediately gave her a tablespoon of coconut oil which I had stopped giving her on 7/27/2021. I mixed up a batch of electrolytes. And an NAC supplement which I had bought years ago for the kids but had recently learned it is a great antioxidant for the brain. I started rubbing her thumbs because I had recently read that the pressure points by the "drumstick" part of the thumb could help alleviate a seizure.

By about 9:20 there were no more arm tremors, and she did not have a seizure. By 11am, still clear, by 1:30pm, still clear. We had averted a seizure either by using the supplements or luck or both. God only knows.

Keep in mind, I have never stopped researching since the 1st event on July 18th. It's time to talk a little bit about what is the science behind a grand-mal seizure. There are many types but since Sarah had the grand-mal seizure that is what I focused on.

The brain has two types of neurons: excitatory and inhibitory. The excitatory wants to fire and the inhibitory wants to suppress. Think of a gas pedal and brakes in a car. These two types of neurons, when not in balance, will cause a seizure.

In the case of a grand-mal, all neurons start firing overloading the brain causing uncontrollable convulsions (clonic-tonic), unconsciousness, eyes rolled back, foaming of the mouth, stops breathing turning blue and lifelessness when the convulsions stop.

Yep, that is exactly what happened during the 1st event on July 18th. In simple terms as a father, I watched my daughter die in front of me and there wasn't a damn thing I could do about it.

8/3/2021
Today is the day we are supposed to leave for Ohio. Our flight is at 8:05am which meant we had to get up around 5:45 to get ready and go. I probably should have canceled this trip after the 1st event but maybe I was in denial or felt like I may have solved or helped mitigate the problem.

I mean really, who do I think I am? How about a desperate father who wants nothing but the best for his children and would give his life without hesitation for

them. And since I can't see a doctor yet, I must try myself. At the very least become knowledgably in the condition so when the time comes, I can have a real conversation with the doctor.

As I said above, this was an important trip for many reasons, and we haven't been to Ohio for several years now. We were all looking forward to this trip.

At about 6:15 I passed Sheryl in the kitchen as I was getting all the suitcases closed and ready to load. I saw the look on her face, and she said, "she is having tremors". Destroyed again. Well, I started to do what I did yesterday with the coconut oil, NAC and thumbs. Right? Why not, it seemed to work yesterday. They did not stop so I canceled our flights.

Well, at about 6:30 Sarah went completely rigid, shot straight up in the air before falling to the bed and went into a full-on grand-mal seizure. This time we did not call 911. We stayed with her, talked to her, held her. Damn, I'm crying again right now.

Oh, this next part is going to be hard. We have been trying so hard to do whatever we can to not have a second seizure for multiple reasons such as getting her driver license reinstated. That may sound silly, but this is very important to any 17-year-old. And second, not to be classified as an epileptic.

Sarah came too after about 5 minutes and looked at me and asked, "what happened"? I simply responded, "you had a seizure". She just started crying uncontrollably because she knew what that meant; we had a second seizure. I started crying as well.

Being the only person in the world who has witnessed both of Sarah's seizures, I can say that her second seizure was a lot less in intensity, she did not stop breathing, she did not turn blue, she did not foam at the mouth, and it was less in duration.

I have always been a type of person where the glass is always half full. Although this was devastating for all of us, I found the positives as I always do. While I'm a glass is half full type of guy, I'm also a realist and plan for the worst. Anticipate. Don't ever be a deer in headlights. Do something. I pray for the best, plan for the worst.

As in the first event, she was exhausted and took a long nap in the afternoon. I made the appropriate phone calls to family and friends that we were planning on visiting, and each time broke down.

Today is August 13th, my birthday. It of course does not matter to me, but it was the day I felt I had to start writing this. I'm going through my notes to help with recollection because to be honest, I can't believe almost a month has gone by.

8/4/2021
Sarah woke at 10:30am. Now that I have the pure MCT oil from amazon, I gave to her first thing (1 TBSP). I also gave her C60 (1 TSPN) which is an antioxidant 270 times stronger than vitamin C.

Please don't judge. Why do I say that? Because C60 is not approved for human consumption by the FDA. But you must decide if you trust the FDA guidelines. I do not. Not sure if you heard of this thing called covid but nothing coming out of CDC or FDA makes any sense.

I do my research extensively and come to my own conclusions. I am not perfect but who is. I am not a doctor. I am a dad. I'm a commonsense type of person. I'm a very logical person sometimes to my detriment. I expect you to do your own research.

8/5/2021
This is a big day because I think I may have discovered something. But before I talk about what I think is a big deal, I need to talk a little more about those neurons in the brain and what makes them tick.

I had mentioned the excitatory neurons and the inhibitory neurons. It is time to introduce their names. Glutamate. What is Glutamate? Here is a simple description of Glutamate from Dr. Axe:

Glutamate is the most abundant amino acid available in the human diet and also the most concentrated amino acid in the brain. It's similar to the other 19 amino acids because it's used to make proteins, facilitate metabolic functions and for energy production. But what makes the glutamate amino acid unique is that it's considered the primary excitatory neurotransmitter of the human nervous system.

That is a simple explanation of Glutamate. But did you catch the part about it being responsible for the excitatory neurotransmitter? Well, of course I did.

From what I have read, Glutamate is required for life and it is in all of our foods. Well, time to introduce the name of the inhibitory transmitter. It is called Gamma-aminobutyric acid or GABA. From healthline.com:

Gamma aminobutyric acid (GABA) is a naturally occurring amino acid that works as a neurotransmitter in your brain. Neurotransmitters function as chemical messengers. GABA is considered an inhibitory neurotransmitter because it blocks, or inhibits, certain brain signals and decreases activity in your nervous system.

When GABA attaches to a protein in your brain known as a GABA receptor, it produces a calming effect. This can help with feelings of anxiety, stress, and fear. It may also help to prevent seizures.

GABA's natural calming effect on the brain has led to countless claims about the use of GABA supplements to reduce stress. Too much stress is linked to poor sleep, a weaker immune system, and a higher risk of depression, among other things.

In addition, people with certain medical conditions may have lower levels of GABA. Some of these conditions include:

- seizure disorders
- movement disorders, such as Parkinson's disease
- attention deficit hyperactivity disorder
- anxiety
- panic disorder
- mood disorders, such as depression

Some people with these conditions take GABA supplements to help manage their symptoms. While this makes sense in theory, there hasn't been much evidence to

suggest that GABA supplements can help with these conditions, aside from anxiety.

Well, there you go. You have the proverbial ying and yang, Glutamate and GABA. The ironic thing is GABA is created from Glutamate through a process or enzyme called Glutamic Acid Decarboxylase (GAD).
From the glutamate.org website:

The glutamate that naturally occurs in many foods and the glutamate added as monosodium glutamate (MSG) are exactly the same. The body metabolizes all glutamate in the same way, whatever its source. Glutamate is glutamate whether it comes from seasoning (in the form of MSG, 'salt from seaweed', mushroom extract, or hydrolysates) or foods such as cheese, tomatoes or mushrooms. Glutamate is important for healthy metabolism, however, most of the dietary glutamate we consume is used as fuel by the cells of the digestive system.

A couple of very important things to highlight from that excerpt. Glutamate is in much of our food naturally and can be added artificially with MSG. MSG is added to make foods taste better so you will buy more of it. It's all about money. If you are unaware of MSG, start researching now!

In the last sentence, I would like to suggest a slight modification. It should read, "Glutamate is important for healthy metabolism, however, most of the dietary glutamate we consume is used as fuel by the cells of ~~the~~ ***a healthy*** digestive system."

Ever heard of "Chinese Restaurant Syndrome"? Have you ever been to any Asian restaurant and left with heart palpitations, increased blood pressure, and/or headaches? Or must run home and shit your brains out. One study concluded that MSG injures brain cells creating inflammation which leads to the headache.

Although they say whether Glutamate comes from natural foods or manufactured MSG, I would argue why would ever want to put something man-made in your body. I have also read there is a difference between natural occurring glutamate and MSG.

MSG is considered “free glutamate” vs most naturally occurring glutamate is bound to a protein allowing the body to deal with easier and slower before turning into free glutamate.

We don’t need to ingest glutamate and therefore is considered a non-essential amino acid since the body can create its own supply as needed from other amino acids.

I had heard of MSG but never really thought to much about it until now. I had no idea what glutamate was and that it was responsible for our neurons firing in the brain.

When I read the connection between MSG and seizures I ran into the kitchen and grabbed that ranch seasoning salt we have been using so much in our foods that Sarah loves. Now I know why she loves it. Yes, the label explicitly had “monosodium glutamate” specified right in front of me!

I felt like I was really onto something now. I still do today. I also read that if the amount of MSG is less than 79% the FDA says they don’t have to explicitly specify the MSG on the label. WTF! That means since it was specified on the ingredient list it probably mostly MSG.

Some of the other label ingredients that have MSG in them (less than 79%) are:

- Hydrolyzed vegetable protein
- Autolyzed yeast
- Hydrolyzed yeast
- Yeast extract
- Soy extracts
- Protein isolate

The list goes on and on. Basically, anything that is processed has a high chance of containing MSG and other crap you should not be putting in your body. It is best to eat organic, whole foods prepared yourself, so you know exactly what is in your food.

8/6/2021
I have never been so excited to make the connection of MSG (glutamate in general) and the possibility to seizures. We started reading all the labels of food in

the pantry and wow. They all contain the code words for hiding MSG. They know it has a bad rap so they hide in a plethora of different types of labeling names.

Here's a good one. Natural Flavoring. Sounds innocent, right? Its natural and it's a flavoring so it should be fine. Hell no. They hide the MSG in there and God only knows what else is in there.

A couple other foods we are going to throw out or donate we found in our house. I actually feel bad donating the food now that I know what's in them so I've actually been throwing out.

Campbells soups, Cheerios, bagged pasta's, chicken broth, canned vegetables, Progresso soups, Stagg Chili, Prego sauces etc. The list is endless.

The first goal was very clear; get rid of all processed, canned food from the house. My second goal was to start understanding what foods are naturally high in glutamate to eliminate all intake of glutamate since the body can make its own when needed.

That's hard to do because most foods contain some level of natural glutamate. I searched with "foods highest in glutamate". For example, per 100grams, chicken contains 22mg of glutamate, beef 10mg, fish 215mg, egg yolks 46mg, broccoli 176mg, *parmesan cheese* 1680mg. As you can see you can't avoid it completely.

Did you catch the parmesan cheese I just mentioned! Yes! 1680mg per 3.5 ounces! So not only were we putting the MSG salt (that is what I'm going to call it now since that's what it is) on everything we were eating, we were making the keto dishes with heavy whipping cream loaded with parmesan cheese for thickness and flavor.

Here's another interesting tidbit. The process of making parmesan cheese creates glutamate and attaches to sodium and water naturally creating monosodium glutamate (MSG). The theory at this point is Sarah was getting overloaded with free glutamate.

She was also adding parmesan cheese on her salads. I find it interesting Sarah likes stuff with MSG whether man-made or natural. Not sure if that means anything at this point. We were eating healthy, organic, whole foods loaded with MSG by our own doing.

At this point I truly believe the MSG was the catalyst causing the immediate issues with her seizures. But, let's be honest, this is not an answer. Why did this affect her? Why now? Why was Sarah having arm tremors back in 2020 when she was on Accutane. Why does Sarah have issues with Glutamate? She is not allergic to anything. We could call it an allergy but that's too easy.

8/11/2021
I have learned a lot in the last few weeks. We are still waiting for our first appointment with the specialist on August 24th.

It took us several days to learn about hidden chemicals in our food and get rid of them. Now it was time for me to go down the next rabbit hole. Why is she sensitive to MSG? I keep going back to the question why she had arm tremors half-way into her Accutane treatment which we now know is a pre-cursor to a seizure.

I kept reviewing the data we got from the hospital visit which was limited to minimal blood and urine tests. Everything fell within normal ranges except for 1 thing. The level of bacteria in her urine was listed as "moderate" when it should have been negative. Yes, it could be a false positive because the sample was contaminated but I'm just going to assume it was not.

This made me remember something Sheryl and Sarah organized back in September 2020. Even though Sarah was done with the Accutane her face was still red and inflamed. They found a doctor who ran a very extensive blood test and stool test just to see where everything was at making sure she is getting the right nutrients.

I ran into the other room to ask Sheryl if we still have the lab results. We did. I reviewed them again and this helped me remember the second meeting we had with Dr. Nicole

When we had our second online meeting to review the results, we discovered she had moderate overgrowth of candida. I don't know much about this but we all have some level of candida in our gut, but our body naturally keeps it in check.

The doctor explained the heavy use of antibiotics will do this since it kills off all the gut floral we need in order to have a heathy digestive system. I think you see where I'm going with this. Above I had made a correction to the definition of Glutamate where it said most Glutamate is handled in the digestive system. I corrected it to say it must be a **healthy** gut.

Sarah was on antibiotics for months to manage the infections in her toes. Sarah said the tremors started about half-way in the 7-month treatment and I will be going back to that doctor to get a complete list of antibiotics she was on and when she started.

It's also a possibility Sarah has a "leaky gut". This term was new to me as well so did some research to understand what it meant. I also learned there is a test that can be done to determine if one has a leaky gut.

8/12/2021
Today is the first day back to school. The day before I made a few calls the school nurse and Sarah's counselor and explained the situation. A note went out to all teachers and staff and what to do in the event a seizure happens at school. The thought is just horrific to think about that but she really wants to go to school and we want her to go as well.

I told her if she feels the arm tremors to text her BFF and she will come to her immediately and in the meantime step outside and sit on the grass waiting for her. All teachers have seated Sarah but the door. Based on the past events we know the arm tremors are a pre-cursor to the possibility of an event and she has about 15 minutes if one is going to happen. Of course, that could change.

Plus her BFF is in her first two morning classes and since this has always been a morning thing that helped comfort me. Her BFF is also a certified lifeguard and in CPR. Plus I gave her specific instructions on how to handle if an event should occur.

Sheryl came and woke me that morning which she never does so I immediately knew something was up. She said, "first day of school" but she looked scared.

Sure enough Sarah was having arm tremors at about 8:00am. Oh boy, here we go again. But this was different in the sense that were not as frequent, not as many, and very minimal in nature. I immediately gave her more MCT oil which I know gets into the blood very fast to give and immediate release of ketones.

I also gave her a tsp of C60. So, two tablespoons of MCT, 1 she took when she first woke and the second at about 8:15. The arm tremors stopped. 9:30 still clear since 8:30. 10:00am still clear. She was adamant about going to school.

We took her to school at about 10:45am. Talk about nervous parents. I could not focus on anything but the clock that day. Well, I also asked myself why did this happen since we thought we were doing so good. I review my notes from the day before and found something that would have knocked her out of ketosis.

Sheryl had found some pasta made from foods like almond flour, cauliflower flower and when I looked and just quickly said it looks heathy. What didn't register to me was that it was not keto friendly. I calculated she had about 65-80 grams of carbs. That will for sure kick someone out of ketosis. Is that the reason? Hell if I know but that's all I had to go on.

The last time she arm tremors on August 2nd and 3rd, it was shortly after eating 3 baskets of strawberries which I believe also kicked her out of ketosis. The rest of the day went without issue

8/13/2021
No issues at all on the second day of school. She woke and all was well and went to school on time.

Today I decided to reach out to Dr. Nicole to see if we can do another round of test on Sarah to see if we are still having candida issues and perhaps a leaky gut. She responded right away, and the test kit was in the mail same day. We will also be doing another series of blood tests to be complete.

During my research about candida and leaky gut I came across how MCT oil also helps kill candida in the gut and assist in restoring gut health. This was great to come across because we have been doing this already for the ketones. I have increased the MCT from 2 TBSP/day to 5TBSP/day. 2 in the am, when she gets home from school, and 2 before bed.

I also learned how bone broth is very healthy for the gut and can help restore a leaky gut. We are now eating many of my prepared meals with kettle and fire bone broth.

I made a killer homemade soup that everybody loved with 6 cups of the bone broth.

8/15/2021

There have been no further arm tremors or seizures! There was a rodeo in town that started on Friday, August 13th. She had been planning on going to this for months. We couldn't say no.

We decided that we would all go. I didn't want to take the chance of an event happening at the rodeo which is about 20 minutes away and her BFF being overwhelmed by medical services who may not understand how to handle the situation. Not only did she go Friday, but she also went Saturday and Sunday. Sheryl was there with her both Saturday and today.

This is a good point in the story to summarize where we are with our strategy to mitigate another seizure.

- 8-9 hours of sleep
- Strict healthy ketogenic diet with fresh, wild caught fish and we now order our meats from butcherbox.com. This is not a plug for them at all, but I am impressed with the quality of their all organic, grass-fed meats.
- 2 meals a day to maximize the number of hours for IF. We will be doing 24 hours fast once a week.
- 2 TBSP MCT when she first wakes and even gets out of bed and another TBSP before bed and 1 TBSP MCT mid-day.
- 1 TBSP mid-day
- 2 TSP of C60 before bed and when she first wakes to assist in neutralizing free radicals in her body.
- Electrolytes in the morning mixed in her first glass of water while she takes multi-vitamins and Turmeric.
- Brazil nuts – just a couple a day as they are high in Selenium.
- I also added Magnesium to her daily routine; 100mg in the morning and 100mg before bed. I kept coming across Magnesium and how it helped people control, if not eliminate seizures. The RDA is 300-400mg per day which is in most foods which makes me wonder if she is not absorbing the appropriate amounts of nutrients because of gut issues.

We only have 8 days to go before our visit to Stanford's Children Center. I only wish I'd have the results of these new test we ordered with Dr. Nicole. It is what it is. At least we have two paths we are working now.

8/16/2021

Today was a good day. Sarah did not go to school today only because her BFF didn't from subburn at the rodeo. Sarah looked tired all day anyway. She was able ot fall back asleep until 10am.

We had two great keto meals today and all is well. I have started down a more detailed rabbit hole on magnesium. There seems to be much more than just anecdotal evidence magnesium can help prevent seizures. This makes me wonder why anyone should be deficient in this mineral.

I's readily available in our foods and the RDA is about 300-400mg. Unless certain people have difficulty absorbing the mineral for some reason. Maybe gut issues?

8/19/2021

Today is a big day for me; there were 15 days between the 1st event on July 18th and the second event on August 3rd. Today is now 16 days since the second event. Like I said, I'm forever the optimist and a realist but I have teared up several times today hoping and praying I'm onto something.

It's so hard to believe it's been a month; on the one hand it feels like it was just yesterday and on the other hand it feels like it has been a hundred years.

I had a client text me today asking me to call him because it was an emergency. He has been a good, long-time client. I was in the middle of cooking a chicken soup dish for dinner. I called him and asked what can I do for you.

He asked if I could get him his userid and password to login to his account as his partner usually does all this and he doesn't know how too. I asked, "can't you call her?" He said, "she can't" and got very quiet. I know all too well what was going on. Something has happened. He started to break down telling me she was in an accident and in the hospital and it is not looking good. She was hit by a tractor-trailer.

I don't know this client really. Just someone who uses my services for quite some time. He started crying on the phone as I have done so much this past month that I started to cry and could hardly talk. I ended the call by saying my prayers are with you and I will get you your userid and password in a few minutes.

I don't know why I shared that other than it shows how much of an emotional wreck I have become while I research the hell out of Sarah's seizures. There is

nothing worse than one of your children suffering with an affliction and feeling so helpless.

I did not sleep well last night, and the garbage truck rolled by earlier than normal this morning waking me up, so I was cranky. I walked into Sarah's room, and she was getting ready trying to figure out what to wear for school. I looked where I left here electrolytes and magnesium pill and they were still there.

I said, "your first priority in the morning is to drink your electrolytes and take your magnesium, not figure out what to wear to school!" I have nothing to say expect my bad. I'm so hyper-sensitive in the morning with so much anxiety because all events have been early morning events, so in my mind I am trying to preempt another event.

Oh, it's 10pm now and Sarah has just finished a light meal after working today after school. She worked yesterday as well from about 5-9pm as a hostess at a local upscale restaurant. So yes, a wreck when she is at school and a wreck when she is working. How about just a wreck for the last month. Yesterday was 1 month to the day that the first event occurred.

My new book I ordered weeks ago finally arrived today. I'm already half-way through and it is worth whatever I paid for it. I'm half-way through it already and I just want to scream at the top of my lungs to the world how we are slowly being poisoned! I thought I was aware of MSG but oh boy, I was so wrong.

The book is called, **"EXCITOTOXINS, The Taste that Kills" by Russell L. Blaylock M.D.** Get it! It is a little technical but for me I love it with my technical mind. Everything I have been researching and learning about in the last month is being validated in this book.

This is so much bigger than seizures, although that is big for me right now. But I'm talking about ALS, Parkinson's, Alzheimer's etc. It looks like it is all related and we have no idea what we are doing to ourselves in our younger years that affect us later in life.

A quick little tidbit from the book. "Natural Flavorings" can contain anywhere from 20-60% MSG!

Here is an excerpt from the book I must quote here: "**It is important to appreciate the brain is an organ that depends on a delicate balance of excitatory and**

inhibitory systems, that is, positive and negative impulses. Disruptions of this balance can lead to anything from a minor tremor of the hands to an uncontrollable writhing motion of the body, or even the explosion of a full-blown seizure. In the living organism, a balance of positive and negative systems is all important."

Well, after endless hours of research on the internet, and then reading this I did feel like I was really onto something and not just going through some motions as a father to make me feel better since I really did feel so helpless.

Well, shutting down for tonight. Sarah is going to bed now and I can hear her laughing with her mother and a very happy girl! And that's what matters!

8/21/2021
Still clear. Sarah seemed in a shitty mood today. But I think it's because she has a concert to go to and her mother must go with her. One of us must be with her in case.

8/23/2021
Today is actually 9/10/2021. It's taking me this long to recover from Sarah's third event. Talk about getting destroyed mentally and physically. It was 19 clear days since her second event which was four days more than between her first and second (15 days).

I got a text from Sarah, "I had one arm thing, do I just go home at brunch to rest or stay?" My response, "go to nurses office now". "I'll come get you".

Sarah responded, "I can just wait till I get picked up its brunch". I said, "not worth the chance". She said, "I can't have unexcused."

I continued as I'm driving, "make sure sitting in grass and have Maelani take you to grass." Now Maelani is texting me from Sarah's phone because Sarah keeps dropping it. I told her to try and get her to Nurses office.

I got to the nurse's office and Sarah and Maelani were sitting behind a closed curtain. Sarah's arms were still having myoclonic events (arm tremors). A few minutes went by while I watched the fear in Sarah's face. And then the grand-mal happened.

I don't think I could ever do a YouTube video on this because I just start crying again. But not while she is in seizure! I layed her down on her side, her eyes rolled back and I just started talking to her calmly even though I know she can't hear me.

The nurse outside asked if I needed help, I said no. Maelani was sitting on the other bed watching not knowing what to do as she had never seen anything like this. A couple minutes went by, Sarah turned blue, but her breathing started to come back.

Sarah was coming too now but still very dazed and confused. Sheryl had just arrived and Maelani jumped up and grabbed Sheryl hugging her and they both started crying. I yelled quietly, "go cry out there!" The last thing Sarah needs to see when she wakes up is people crying around her.

Later Maelani's mother had told me that it really had an effect on her and it took time for her to process what had just happened. This was my third event that I have witnessed, and I still can't process when I see this.

Ok, I just stopped crying. We got Sarah home where she rested in bed the rest of the day. These events take a lot out of her.

Of course, I'm destroyed with all the research I have been doing trying to prevent another event before our 1st meeting with Stanford Children Medical Center which happened to be tomorrow (8/24/2021).

8/24/2021

We were all up early and exhausted. I did not sleep. Got to our appointment for our first EEG at about 8:30. Our appointment with the actual doctor wasn't until 1:30 so we spent time shopping at Stanford Mall and found a place for breakfast.

Because of Covid, only one parent could accompany Sarah and it made sense that it was me. We met the doc and he spent about 30 minutes with us listening to the history of these events.

He said that the EEG did not show any anomalies but suggested we do the 24-hour EEG where we come to Stanford to get wired up and go home. We said of course. He said, he was going to go brief the head of neurology and they will both come back to talk to us.

While we waited, I was writing down questions, so I didn't forget. I asked Sarah if she had any questions. Hers was simple, "why 6 months?" Which of course meant why do we have to wait 6 months before the doctor will sign-off on her driver reinstatement.

The decision was to put Sarah on a drug called Keppra. Although I don't like western medicine, I'm very motivated to stop the events. The plan is to stop the seizures for 6 months at a minimum, remove driver license suspension, and stay on meds for another 2 years before trying to back them down and see what happens.

Ugh! I mean I get it, but WHY is this happening! The response was basically, it just happens and can happen in adolescence, and some grow out of it, and some don't.

I presented my possible theory with the Accutane and 4 months of being on antibiotics because of the Accutane side effects and basically destroying her gut. Furthermore, I explained that the arm tremors had started 4 months into the Accutane treatment after about a month on antibiotics but never resulted in a full on grand-mal seizure.

I said, "if it looks like a duck, walks like a duck, quacks like a duck, it must be a duck!". Well, they basically rationalized it away by simply saying the Accutane/Antibiotic treatment could have just exposed an underlying condition.

Well, not good enough for me. We are still going full throttle ahead with Dr. Nicole to check out her gut. We are waiting for Sarah to get three poops in so we can get three samples needed. That in itself is a very tell-tale sign in my opinion. It's almost been a week since her last poop.

Don't get me wrong, I really do appreciate the doctor. He is just trained to do what he does which is to simply treat the problem and not look for the root cause. This is the major problem in western medicine.

As you may have surmised, I have cried a lot in private and sometimes in public when trying to describe these events. Well, this happened in the office with the doctors even though I tried so hard not too so Sarah did not see my weakness.

The doctor saw my eyes and he teared up as well in seeing my pain. I don't know if he has kids or could simply see how torn up I was, or both.

8/25/2021
Although we do not like to use western meds we were grateful because we at least had something to give us some hope that we may be able to stop these events. However, watching how this Keppra effected Sarah was not fun. It made her lethargic, like she just woke up and still trying to gather her thoughts.

It seemed it took a couple days for her to adjust to the medicine each time we increased the dosage. It was a step-up of 500mg twice a day for three days, 750mg twice a day for three days then 1000mg twice a day. Each time we increased dosage we observed the same lethargic, malaise behavior.

8/26/2021
I keep coming across Taurine as a supplement to help increase the GAD enzyme production. I should say I keep coming across the GAD enzyme as the primary enzyme that converts glutamate to GABA. I first came across GAD on August 4th as it made it to my notes for the first time. More on this later.

Let's think about this for a second. Sarah is not the only person who gets overloaded with glutamate. It's in all our foods naturally and in all our processed foods. We should all be walking around having seizures but we don't; why?

Perhaps we have plenty of the GAD enzyme to convert the excess glutamate, the excitatory, into GABA, the inhibitory.

9/3/2021
Today is a Friday and Maelani is skipping school to head to Disney in southern California. Well, Maelani is our security blanket while Sarah is at school as the is in many of her classes and with her most of the day. For the other classes, we have put plans in place if Sarah needs any help

With her early warning system, we have about 10-15 minutes before a potential event. At a minimum get her to the ground safely while trying to get her to the nurse's office to be in private.

Without Maelani in school, we decided to keep Sarah home and just because, we let her brother play hooky as well. I took the kids to breakfast that morning. It was nice but it was also obvious was not herself because of the Keppra.

Ricky was trying to tell Sarah something but she wasn't hearing him or not getting it and he got frustrated. I looked at him and I saw him realize it was the meds and he quickly change his demeaner.

I haven't talked much about Ricky, but he is also very concerned about all this and understands what is going on. He loves his sister very much!

Today we switched the magnesium glycinate to magnesium threonate. Based the research I have done, the threonate has the ability to pass through the blood, brain barrier (BBB) much easier.

When at Stanford, I asked the doctor how the Keppra works. He said, "it acts as a calcium channel blocker." I had come across this phrase many times in my research and in laymen terms it stops the glutamate from making it into the neuron preventing it from firing.

I have also read that this is how magnesium works in the brain as well so logic says a magnesium that can pass the BBB is a better form of magnesium.

I was talking to my neighbor Daryl just before he was going on a weekend camping trip over the labor day weekend. He was telling me he has been trying to control what he calls "head tremors". I'm not exactly sure what that means but it sounds neurological in nature.

He mentioned he has been trying to solve that issue with magnesium, so I mentioned the threonate I just received for Sarah. I gave him a baggie with about a 4-5 day supply to try out.

9/7/2021
Daryl got back from his camping trip today. He sent me a message, "Morning, can you send me a link for the magnesium you ordered that stuff is awesome." Wow, talk about a testimonial. He went on to say, "It seemed to really help with my head tremors and like you I just seemed to be in a better mood." I said that was so great to hear. He continued, "Yes it is, because so much of what I take seems to do nothing."

You never know about these things. Our brains are so powerful with the placebo effect but it does seem like Daryl is very in tune with his body and really noticed a difference.

9/7/2021
Today Sarah and I drove to Stanford to get wired up the a 24-hour EEG. I could tell Sarah is in a grumpy mood. Doing this just makes this condition real again. It's about a

45-minute drive and trying to have a conversation was very difficult with Sarah's one word sentences.

I started by talking about the 2 colleges we are going to visit this month in Idaho. She is interested in the College of Southern Idaho (CSI) and per my suggestion, Idaho State University (ISU). Both these colleges have rodeo programs which is a driving factor in the college she chooses.

Rodeo! This is new to me as of last month. Although Sarah has been involved with horses since she was 5 years old, she stopped riding several years ago. I'm really not sure why she stopped. She did start doing water polo in school which I hope to report in the summary of the document as the beginning of all this.

I've always been interested in flying. I have about 100 hours logged in a Cessna but never got my license because of either no money, or no time. Anyway, always been intrigued with plane crashes and why they happen. The common theme is that there is not one thing that brought the plane down but a sequence of events. And that the sequence of events could span a long period of time.

Well, I think that is going to be the case here with Sarah's story and I think the start was water polo which I hope to talk about later.

Although the college Sarah picks is her choice, I also have opinions and share those with Sarah. I asked, what is a pro of CSI. She said, "it has a large rodeo program." What is a con. She did not have one. What about ISU, what is a pro? Quickly replied, "it is a 4-year college."

Now whether she really believes that or just repeating my talking point, I'm not sure. We will be moving with Sarah whatever college she picks. We feel we have to with her recent condition that just developed in her senior year of high school. It's hard enough when he is only 4 minutes from us now.

CSI is a two-year, community college and ISU is a typical 4-year college. Our plan as of last month was to move as soon as possible to get plugged into the community, a barn with horse and a trainer. The sooner we get plugged the sooner Sarah can start training.

This of course is all dependent on Sarah's condition being solved. For the same reasons Sarah can't drive a vehicle, she can't be riding a 2000lb animal at high speeds. She wanted to start riding with her longtime friend Norah this past summer, but I had to tell her that is just not possible for the reasons stated above.

We are being very optimistic that we will be solving this problem so we are going to make this move sooner rather than later to get plugged in.

For some reason Sarah is attached to CSI. I think only because she has started emailing the coach on her own. I also think she is aware she hasn't ridden in several years and really not ridden in high competition environments. She did ride in gymkhana but with a very slow horse. She knows she has a lot of work and dedication to be anything even close to good enough to be on a point team.

For some reason, Sarah thinks CSI will be more accommodating to her lack of training, I believe. In my opinion it would be more advantageous to get plugged into a 4-year school so as not to have to move again after a two-year school.

Well, we will be doing a road trip September 18th to check out both CSI and ISU. Everybody is perfectly content with moving to Idaho and sooner rather than later.

9/8/2021

We are driving back to Stanford to get her head gear removed. She was crabby both days with that on her head. This time instead of me getting frustrated trying to have any semblance of a conversation, I decided to simply do all the talking.

I talked about how I got to where I am today in life starting all the way back to kindergarten. This included successes and failures. She seemed to really enjoy just listening and hopefully there were some tidbits of information she found valuable.

I do not believe the 24-hour EEG will show anything just like the 1st one we did. But something we must do to make sure there is nothing obvious. I have not stopped researching this condition and possible causes. Since the Dr. at Stanford does not seem to be interested in root cause I must continue my journey down the rabbit hole.

Today I came across an article by Cynthia Perkins dated 12/17/2020 that was very comprehensive and was focused on all the things I had been reading about including glutamate, GABA and the GAD enzyme!

I'm going to put the link in here but also include the text in the event the link ever goes away. If you are reading this document, you will want to read this article in full several times.

https://www.holistichelp.net/blog/how-to-increase-gaba-and-balance-glutamate/

The following is the text of this article. I'm going to highlight the things that really caught my eye.

Start of Article

You can't really talk about how to increase GABA without talking about lowering glutamate because they have a complex and interconnected relationship. Both are very important neurotransmitters that have a profound impact on many different aspects of our physical, mental, and spiritual health with the former being inhibitory and the latter being excitatory. Excitatory neurotransmitters stimulate brain cells, while inhibitory ones reduce stimulation**. Like all neurotransmitters, too much or too little of either one leads to problems.**

When all is working as it should, they keep each other in balance. However, there are many factors that can easily disrupt this delicate balance and result in too much glutamate and not enough GABA, which can wreak havoc on your mental and physical health.

What is Glutamate?

Glutamate is one of your primary excitatory neurotransmitters. It has many important roles like stimulating your brain cells so you can talk, think, process information, learn new information, pay attention, and store information in short and long-term memory. As a matter of fact, studies suggest that the more glutamate receptors you have the more intelligent you are. High levels of glutamate receptors are correlated with superior abilities in learning and memory. Unfortunately, they also correlated with an increased risk of stroke and seizures.

Although glutamate is one of the most abundant neurotransmitters found in the brain, it exists in very small concentrations. If the concentration level rises, then neurons become too excited and don't fire in a normal manner. Glutamate becomes an excitotoxin when it is in excess; meaning it overstimulates brain cells and nerves and results in neurological inflammation and cell death.

An excess of glutamate can be a primary contributing factor to a wide variety of neurological disorders like autism, ALS, Parkinson's schizophrenia, migraines, restless leg syndrome, Tourette's, pandas, fibromyalgia, multiple sclerosis, Huntington's chorea, and seizures. As well as atrial fibrillation, insomnia, bedwetting, hyperactivity, OCD, bipolar disorder, anxiety disorders, and STIMS (repetitive self-stimulatory behaviors like rocking, pacing, body spinning, hand-flapping, lining up or spinning toys, echolalia, repeating rote phrases or other repetitive body movements or movement of objects that are commonly seen in autistic children), stiff person syndrome, and an increased risk of stroke.

Too much glutamate can also increase eosinophils (a particular type of white blood cell) which result in inflammation, impair blood vessels that lead to migraines and blood pressure irregularities, and impair other areas of the brain like the hypothalamus, hippocampal neurons, and Purkinje neurons which affect speech and language.

Mercury in the body becomes more toxic in the presence of high levels of glutamate. Excess glutamate also makes cancer cells proliferate and increases tumor growth and survival.

Elevated levels of glutamate trigger the brain to release higher levels of its natural opioids (endorphins/enkephalins) in order to protect the brain from damage, which can result in feelings of spaciness and eventually contribute to the depletion of your natural opioids, and it also depletes glutathione levels, which is vital for detoxification, controlling inflammation, and gut health. Additionally, glutathione also assists in protecting neurons from damage, so when it is depleted it is not available to do this job and thus contributes to more cell death. Our natural opioids are critical for moderating physical and emotional pain, happiness, feeling empowered, and much more, if they become low in supply then more problems ensue.

High levels of glutamate may increase the survival of unfriendly microbes in the gut and contribute to problems like excess acid and heartburn.

Too much glutamate can lead to too much acetylcholine, and too much acetylcholine has a stimulating effect as well and puts one into a perpetual state of sympathetic stress with high levels of anxiety, fear, insomnia, restlessness, nervousness, etc.

What is GABA?

GABA, which is short for gamma-aminobutyric acid, is your primary inhibitory neurotransmitter. **Its primary role is to calm the brain, slow things down, and relax you.** One of the ways that it assists in this process is by increasing alpha wave production. It is also vital in speech and language. GABA puts the pause or space between words when you speak. The brain uses it to support sensory integration. Without adequate GABA production, our conversations would consist of lots of run-on sentences, slurred speech, loss of speech, and we would have trouble with comprehending language.

Your gastrointestinal tract is packed with GABA receptors and it is critical for the contraction of the bowel. Insufficient levels can result in abdominal pain, constipation, and impaired transit. It also supports healthy levels of IgA, (antibodies that protect your gut and other mucous linings from harmful invaders) which means it contributes to immune health.

Insufficient levels of GABA result in nervousness, anxiety and panic disorders, tension, muscle spasms, aggressive behavior, decreased eye contact and anti-social behavior, attention deficit, problems with eye-focusing (like that seen in autistic children when both eyes are focused inward towards the nose or waver back and forth in

a horizontal or vertical movement), chronic pain syndromes, and much more. It may also contribute to GERD as it is needed to help regulate the lower part of the esophagus.

Low levels of GABA play a vital role in alcoholism, drug addiction, and cravings for sugar and carbs, as these substances will temporarily and artificially increase GABA, so one is unconsciously drawn to them. However, these substances also deplete neurotransmitters like GABA, serotonin, dopamine, and endorphins, so they will perpetuate the problem.

Gamma-aminobutyric acid is found in almost every area of the brain, but the hypothalamus contains a very high level of GABA receptors, so it is vital for its many functions like regulating sleep, body temperature, appetite, thirst, sexual arousal and desire, and action of the pituitary, HPA axis, and the autonomic nervous system. The primary role of the hypothalamus is to maintain homeostasis throughout the body, and without enough GABA production, this will not happen. GABA also binds to sub-receptors and activates secondary messengers that affect dopamine.

Like all neurotransmitters, GABA and glutamate play a vital role in regulating the autonomic nervous system (stress response system), maintaining the balance between the sympathetic and parasympathetic nervous systems. Too many excitatory neurotransmitters and we are in sympathetic nervous system mode and not enough inhibitory and we are unable to return to the parasympathetic mode. Thus, depletion of GABA can be a major contributing factor to sympathetic nervous system dominance and the many associated conditions like adrenal fatigue, insomnia, chemical sensitivities, chronic fatigue, panic attacks, anxiety disorders, etc. Maintaining sufficient levels is crucial in the recovery of these conditions.

GABA and Glutamate Balance

When GABA is low, glutamate is high and vice versa. So in order to increase GABA, it's not merely a matter of bringing it up, you must also focus on reducing the excess glutamate. The goal is to achieve balance. between the two. You might think of glutamate as the accelerator and GABA as the brakes. Both are equally important.

Glutamate (also referred to as glutamic acid) is actually the precursor to gamma-aminobutyric acid, and any excess is supposed to be converted automatically into GABA. This is the way the system maintains balance; anytime glutamate levels start to build up too high, then it is converted to GABA to calm things down. However, sometimes the body cannot regulate glutamate properly for a variety of reasons which we will now discuss, then glutamate can build up to excessively high levels.

An enzyme called glutamic acid decarboxylase (GAD) is needed for glutamate to make the conversion to GABA, but there are several factors that may interfere with this enzyme and impede the conversion process, which means a build-up of glutamate and a decrease in the formation of GABA. Response time may be delayed or the capacity to convert may be impaired. **It is believed that problems with the GAD enzyme may be the primary underlying issue that results in too much glutamate.**

For example, the rubella virus, which is found in the MMR vaccination can decrease the activity of glutamic acid decarboxylase (GAD)by as much as fifty percent. Thus, this may explain one of the reasons children begin to exhibit some of the symptoms of autism immediately after vaccination because as we mentioned earlier GABA is critical in speech and brain function.

Other chronic viral infections interfere with the GAD enzyme and some microbes like streptococcus flourish in a glutamate-rich environment, thus many children with pandas and autism carry an ongoing infection with strep.

Methylation also plays a role in the GABA and glutamate balance in a variety of ways. For one, if there is impairment in the methylation pathway, then folate doesn't get utilized and it can break down into glutamate. Additionally, if you are not methylating properly you may not be able to suppress microbes like viruses or make enough T cells to fight them off, which means they will linger around to interfere with the GAD enzyme.

Methylation may be impaired due to nutritional deficiencies, toxins, genetic mutations, Candida overgrowth, or SIBO. Methylation is also heavily influenced by the Krebs cycle and vice versa, so a problem in this cycle can also impede methylation, and consequently GABA production. The Krebs cycle can also be impaired by Candida overgrowth, as well as bacterial overgrowth.

Additionally, the syntheses of GABA itself is also dependent on the Krebs cycle, so it is vital in more ways than one that this system be working properly to have sufficient levels. The Krebs cycle can become impaired in a variety of ways like a deficiency in B vitamins or the presence of heavy metals, and toxins from bacteria or Candida.

The GAD enzyme is generated by the pancreas, so problems with the pancreas may impair production of the enzyme.

People with type 1 diabetes produce antibodies against the GAD enzyme, which may impair its response time or ability to convert.

Lead interferes with GAD activity. Lead also inhibits another enzyme involved in the heme synthesis pathway which results in an accumulation of an intermediate that competes with GABA.

Some substances like allylglycine (a derivative of glycine) are potent inhibitors of GAD.

B6 is also needed as a cofactor with GAD to convert glutamate into GABA, so if B6 levels are not sufficient, the conversion won't happen either. Much of the population is deficient in B6. However, supplementing with B6 will also increase CBS gene production, so if there is an issue here, one should proceed with caution.

There are two isoforms of GAD (GAD67 and GAD 65) and they are encoded by two different genes known as (GAD1 and GAD2). Genetic defects in GAD1 or a decrease in the activity of GAD1 due to other reasons lead to a decrease in glutamate and a decrease in GABA. GAD1 SNP variation rs3828275 is associated with panic disorders, traumatic brain injury, post-traumatic seizures, and depression, while a genetic variation in SNP rs12185692 is associated with neuroticism, anxiety disorders, and major depression.

Additionally, glutamate receptors also pull in other excitatory substances into the cell beside glutamate, including all of the following:

- Aspartate (can also be converted into glutamate)
- Aspartame
- Aspartic acid
- Glutamate
- Glutamic acid
- Glutamine
- Monosodium glutamate (MSG)
- Cysteine (But not N-acetylcysteine. However, N-acetylcysteine does contain sulfur and too much sulfur can be counterproductive as well, so should be used mindfully.)
- Homocysteine

Therefore, each of these can bind with glutamate receptors, which also results in excessive stimulation and contributes to the imbalance in GABA and glutamate and the wide array of symptoms that are generated. The more glutamate receptors you have the more excitatory substances that will be pulled in.

Citrate or citric acid has the potential to be neurotoxic in the very sensitive because most citrate is derived from corn, which can result in trace amounts of glutamate or aspartate during processing. The majority of vitamin C supplements are derived from corn and should be avoided for the same reason, look for a brand derived from another source. Additionally, pretty much all corn is genetically modified, which means it is loaded with

glyphosate, which would also elevate glutamate, so another reason to avoid corn-based supplements.

To **complicate things further, glutamate has the ability to bind with six other receptors in the brain,** like the NMDA receptor, which assists in delivering calcium to the cell and plays a vital role in memory function and synaptic plasticity. Calcium is used by glutamate as the agent that actually inflicts the harm on the cell. So, if there is an excess of calcium in the body for any reason, it too will disrupt the GABA and glutamate balance.

Glutamate and calcium together cause ongoing firing of the neurons, which triggers the release of inflammatory mediators, which leads to more influx of calcium. It becomes a vicious cycle that results in neural inflammation and cell death. Glutamate has been described as the gun, while calcium should be seen as the bullet, says Dr. Mark Neveu, a former president of the National Foundation of Alternative Medicine. It's important to note that activation of the NMDA receptor also involves glycine, D-serine, or D-alanine, which means either one of these could allow for more influx of calcium as well.

Magnesium can help regulate calcium levels and so can zinc. However, higher doses of zinc (more than 40mg per day) can also activate the release of glutamate through non-NMDA glutamate receptors, so one must exercise caution with zinc. However, if calcium is excessively high, other herbs or nutrients may be used to bring it down, like lithium orotate, Boswellia, or wormwood. Lithium, as well as iodine and boron, can also assist in lowering glutamate. Calcium intake in food may need to be reduced or limited if calcium is too high. Magnesium is also able to bind to and activate GABA receptors.

If one exhibits low levels of calcium, Dr. Amy Yasko recommends using nettle or chamomile to increase calcium levels, rather than supplementation of calcium itself, if we are dealing with someone who has an imbalance in GABA and glutamate. Vitamin K2 and D would be important as well in combination with the calcium to help with absorption. If supplemental calcium is used it should be accompanied by magnesium, which will help control the excitotoxic activity.

Glycine can be inhibitory or excitatory, and in people who tend to lean towards excess glutamate it typically becomes excitatory, so it may need to be avoided.

Glutathione contains glutamate, so supplementing too heavily may contribute to excess glutamate.

Vitamin D increases calcium levels, and as we established, elevated calcium levels can increase glutamate, so caution may be necessary with vitamin D supplementation.

The amino acid taurine increases the GAD enzyme and consequently GABA levels. Additionally, taurine doubles as an inhibitory neurotransmitter and can bind directly to GABA receptors, so it can help provide balance naturally in that manner as well. Higher levels of any inhibitory neurotransmitter help lower high levels of any excitatory neurotransmitter. Taurine is found in high levels in the brain and cardiac tissue, indicating its importance in these areas. Taurine is found most abundantly in seafood and animal protein, so it is often deficient in one's diet.

If taurine is deficient, then the GAD enzyme may be low as well, therefore, supplementing with taurine can be used to manage the GABA and glutamate balance and protect from neuron death. However, there are a couple of genetic polymorphisms (particularly CBS and SUOX gene mutations) that can result in negative effects from taurine supplementation, because these mutations result in excess levels of sulfur in the body and taurine is sulfur based. If one has these gene mutations, they may also need to avoid other supplements that are high in sulfur and limit sulfur-based foods. These mutations can also impair ammonia detoxification as well. B6 and SAMe increases the activity of these gene mutations, so supplementation with these substances may compound the problem too. Because of the GABA shunt, which can convert GABA back into glutamine, which is then converted into glutamate, taurine supplementation may increase glutamate in some people.

Additionally, Candida produces a toxin called beta-alanine that competes with taurine for reabsorption in the kidney, and causes taurine to be wasted in the kidneys and excreted through the urine, and beta-alanine is absorbed instead. Therefore, taurine levels may be insufficient, which can contribute to less GABA activity. Not only that, taurine can combine with magnesium to form magnesium taurate and the two of them may be eliminated together, which can lead to magnesium deficiency. Insufficient levels of magnesium are going to result in excessive levels of calcium, which as we established earlier, will increase glutamate firing.

Serotonin, another vital inhibitory neurotransmitter is also needed in order for GABA to work properly. If one is deficient in serotonin, then even if you have sufficient levels of gamma-aminobutyric acid, it may not be able to perform its inhibiting effects adequately. Increasing GABA may require bringing up the serotonin levels.

A diet that does not contain enough of the nutrients needed to make inhibitory neurotransmitters like animal protein and fat plays a vital role in an imbalance between glutamate and GABA. Furthermore, the proper transmission of any neurotransmitters can't happen without adequate levels of fat and most people are not consuming enough fat in their diet. Additionally, many foods and substances like sugar, whole grains, legumes, any high starch food, caffeine, chocolate, artificial sweeteners and flavorings, food additives and dyes can deplete GABA levels or disrupt transmission, so they should be removed from the diet. Grains (including whole grains) can bring about an excitotoxic effect by causing excessive glutamate formation in some people.

A ketogenic diet has been found to favor GABA production and be exceptionally beneficial in the treatment of many conditions associated with excess glutamate like seizures and epilepsy. A ketogenic diet increases the GAD enzyme and neurons can use ketones produced from ketosis as a precursor to GABA. Additionally, glutamate can be turned into GABA or aspartate. Aspartate is also an excitotoxin in excess, with similar effects as elevated glutamate. A ketogenic diet encourages glutamate to become GABA, rather than aspartate. However, many people who are high in glutamate are also high in histamine. Fat is a histamine release, so if the individual is also high-histamine, they will not do well on a keto diet. **Therefore, I have found that following a low-carb Paleo diet (under 50 grams of carbs per day, high in animal protein, and moderate in fat) is the ideal diet for maintaining the balance between GABA and glutamate.** You may want to note, that some fish like mackerel have high levels of naturally occurring GABA. But seafood is high-histamine, so should be avoided if one is also high-histamine.

Glutamate and insulin have an intimate relationship. On one hand, high glutamate will trigger the release of insulin, which means insulin will then lower glucose levels; but glucose is needed to help regulate glutamate levels at the synapses, so if it goes to low, then glutamate is going to increase. This means hypoglycemia or low blood sugar will result in both triggering high levels of glutamate and impairing your ability to reduce the build-up.
Therefore, not eating foods that spike insulin and keeping blood sugar levels stable is a vital element of keeping GABA and glutamate in balance. At the same time, keeping your glutamate balanced would be a vital aspect of keeping your insulin levels healthy, which would be important if you are trying to lose weight, have insulin resistance, type 2 diabetes, compulsive overeating, obesity, and the many other insulin-related conditions. Again, demonstrating how a low-carb Paleo diet would be the most beneficial diet for this issue.

Some people have a genetic mutation (VDR/Fok gene) that impairs their ability to regulate their blood sugar levels sufficiently, Dr. Amy Yasko, says there are a variety of pancreatic supplements that may be needed to support this issue.

Environmental toxins like pesticides, herbicides, air pollution, heavy metals, and chemicals found in your common everyday household cleaning products, cosmetics, perfumes and colognes, air fresheners, personal care products, dish soap, laundry soap, and fabric softeners, **all deplete and disrupt normal production and function of all neurotransmitters.** Therefore, another critical component for maintaining sufficient levels of GABA is to reduce your exposure to these toxins by living a non-toxic and environmentally friendly lifestyle and eating organic.

Within the category of toxins, pesticides have the most profound impact on the brain. They are neurotoxins that can disrupt acetylcholine, dopamine, serotonin, endorphins, oxytocin, histamine, glutamate, norepinephrine, and GABA. Many pesticides primary

mechanism of action is inhibition of GABA, meaning the pesticide achieves its goal or its effect on the target by inhibiting GABA. It is designed specifically for this action.

The toxins created by Candida can stimulate surges of glutamate production. Hundreds of other toxins can produce this same surge in glutamate activity, including mold toxins, bacterial toxins, Lyme, and organic solvents. Dr. Rick Sponaugle, a brain expert, states that even the toxins released by bacteria in your mouth that cause gingivitis and periodontal disease can increase glutamate activity and lead to a wide array of symptoms like anxiety. I can attest to this personally, I have experienced high anxiety from gingivitis. If I do not get my teeth cleaned regularly the bacteria in my mouth will cause anxiety as well as severe fatigue and problems sleeping. So it's important to note, that many of the symptoms of Candida overgrowth can be caused by an excess of glutamate.

GABA Supplementation

Many practitioners suggest supplementing to increase GABA and lower glutamate. However, I frequently work with people who get a stimulating effect from GABA supplementation and I get a stimulating effect myself, so be sure to monitor your response. GABA itself can be converted back into glutamine, which is then converted back into glutamate through a metabolic pathway called the GABA shunt. So GABA supplementation can end up increasing glutamate in some people as well.

The GABA shunt is a closed-loop process that exists in order to produce and reserve GABA. It is a very complicated and complex process and my understanding of it is pretty limited and elementary.

What I do understand is this. In the Gaba shunt, GABA is converted into glutamic acid, which is converted to glutamate, which is then converted to Gaba again. The process is in place to produce more Gaba. But in people who have the issue with the conversion process, it doesn't get converted to Gaba and ends up remaining as glutamate. The problem occurs because some people have problems with the conversion. Therefore, this is one of the reasons that taking a supplement of Gaba can be counterproductive. All that Gaba in the Gaba shunt can become glutamate and not converted back to Gaba. This is true of any supplement that increases GABA, when GABA is elevated than it can convert back to glutamate.

Gaba in glial cells (non-neuronal cells in the brain, spinal cord, and peripheral nervous system) is converted into glutamine, and glutamine is converted to more glutamate and reenters the Gaba shunt to be turned into more Gaba. But, again the conversion may not be happening properly.

The Krebs cycle is also involved in the Gaba shunt, so any impairment there can affect how the shunt is working.

According to Dr. Datis Kharazzian, a brain expert, if you have any effect from GABA, (positive or negative) that means you have a leaky brain. In his book, *Why Isn't My Brain Working*, he explains that in a healthy brain, the junctions in the blood-brain barrier only permit nanoparticles to pass through. GABA "exceeds the nanoparticle size and does not have a blood-brain barrier transport protein." It should not be able to cross the blood-brain barrier. If it does, then this suggests there is a leaky brain.

As a matter of fact, Dr. Kharrazian uses GABA supplementation as a screening tool to determine whether one has a leaky brain or not, calling it the GABA Challenge Test. He also states you shouldn't take GABA supplementation, even if you have a positive effect, "because you risk shutting down your GABA receptor sites." This is evidenced by the fact that many people experience withdrawal when they come off a GABA supplement. The fact that withdrawal is occurring tells us that the brain is downregulating responsiveness to GABA in response to the GABA supplementation. I do not encourage the use of GABA supplements unless one is coming off a benzo and uses it temporarily to get from point A to point B in recovery. If you have no effect from GABA, this is a good sign, you most likely to do not have a leaky brain. If a leaky brain is present, then many other harmful substances can be crossing the blood-brain barrier and causing additional problems.

N-acetylcysteine (NAC) is supposed to be a glutamate scavenger and may be suggested to increase GABA, however, it also increases glutathione, and excess glutathione can increase glutamate, so this may or may not provide relief.

You have most likely seen the substance called phenibut for increasing GABA. I am not in favor of using it because it is an artificial means of stimulating gamma-aminobutyric acid, and remember any artificial stimulation leads to depletion. Many people report that they get addicted to phenibut, thus demonstrating that it is indeed too stimulating which will perpetuate depletion. As I see it, phenibut is an addictive mind-altering drug.

Another popular choice to increase GABA is l-theanine. L-theanine is a glutamate analog. This means if you fall into the category of people who are having problems converting your glutamate to GABA, this could lead to excess glutamate rather than GABA. Additionally, l-theanine is derived from tea or mushrooms, it is an artificial means of supplementing glutamate, not natural. Furthermore, it could have traces of caffeine or fungi from its original source, which could be problematic as well. Therefore, l-theanine may work for some but have the opposite effect for others. I prefer to avoid it, unless I am working with someone who is detoxing from drugs and alcohol, in which case the need may outweigh the risks until the individual is fully detoxed, but lithium may be a better choice.

Many manufacturers of nutritional supplements and health care practitioners have no knowledge or are not fully educated on the topic of glutamate. Therefore, it is very common for nutritional supplements, even some of the more respected brands, to contain excitotoxins. **If you tend to lean towards excess glutamate, you must be very careful with your nutritional supplements.**

Drugs and Medications that Affect GABA

There are many drugs (e.g. benzodiazepines and nonbenzodiazepine sedatives) that target your GABA receptors like Ativan, Xanax, Klonopin, Valium, and Neurontin (Gabapentin), Depakote, and others. Some of these drugs, like benzos, look similar in chemical structure as gamma-aminobutyric acid so they can fit in your GABA receptors, which artificially stimulates them, but they do not actually increase production. Therefore they do not address the underlying problem of not producing enough because there must be some level of GABA present in order for these drugs to have an effect. Others like Gabapentin mimic GABA in some other way. Furthermore, anytime an exogenous (from outside the body) substance is used to artificially stimulate a neurotransmitter the brain responds by reducing production or responsiveness, which results in more depletion of the neurotransmitter, which in this case is GABA. Therefore, any drugs that target GABA receptors or mimics them, or manipulate GABA or glutamate in any way, will inhibit your ability to acquire and maintain balance and cause even bigger problems.

Benzodiazepine use can cause long-term and even permanent damage to GABA receptors. In all cases, it is difficult to reverse and often a life-long recovery process. The longer they are used and the higher the dose the more damage that is done and the harder it is to reverse. However, with the proper changes in diet and lifestyle, the damage can be managed and a high level of comfort can be achieved. I am a recovered alcoholic and benzo addict; used them for nearly ten years and I have been clean for more than 30 years. So my knowledge, experience, and passion for this topic are both personal and professional. The effects of nonbenzodiazepine sedatives like Ambien and others would be similar.

This is also true of herbs that are used to increase GABA levels such as Valerian Root, Kava Kava, or any other herb used for this purpose. The brain responds to herbs that manipulate neurotransmitter levels in the same manner as a pharmaceutical – it will downregulate responsiveness or production of GABA, thus making the problem worse.

There are various other pharmaceuticals that can harm Gaba receptors and contribute to the imbalance, such as products taken for hair loss that contain finasteride like Propecia and the antibiotic Cipro.

Finasteride prevents the formation of neurosteroids, which are needed to activate GABA(a) receptors, so it inhibits GABA activity. These inhibited neurosteroids (steroids

formed in the brain) are also needed to modulate neuronal excitability. There is a serious condition called Post-Finasteride Syndrome that is likely the result of this impact on Gaba.

Cipro and other fluoroquinolone antibiotics are antagonists to GABA(a) receptors meaning they bind to GABA(a) receptors and block GABA from being able to bind to the receptors, resulting in stimulation to the central nervous system. Many people report a wide array of neurological and psychological symptoms even after discontinuing the use of Cipro that suggests possible long-term damage to Gaba receptors that is not easily reversed.

In the benzo addicted individual, Cipro can also block benzos (benzodiazepines) from binding to the GABA(a) receptors and thrust the individual into sudden withdrawal.

Excitotoxins in the Diet

One of the biggest contributors to an imbalance in GABA and glutamate is the presence of excitotoxins in the diet. Many foods and nutritional supplements contain the excitotoxins (glutamate, glutamic acid, glutamine, aspartate/aspartic acid, and cysteine) or they contain substances that can prompt the body to produce them. These foods and substances should be avoided by anyone trying to balance their GABA and glutamate levels and anyone who tends to generally lean towards excess glutamate.

Dr. Amy Yasko explains that "**excitotoxins in food overexcite neurons to the point where they become inflamed and begin firing so rapidly they become exhausted or die**." This results in a wide array of neurological symptoms that are found in autism, OCD, anxiety disorders, insomnia, hyperactivity, attention deficit, nervousness, aggressive behavior, restless leg syndromes, Tourette's, migraines, seizures, and more. Excitotoxins increase other excitatory neurotransmitters as well like norepinephrine, which compounds these symptoms.

Dr. Amy Yasko, an expert in autism, tells parents with children who have autism that if they take only one step in her recovery program that the most important element is to eliminate excitotoxic foods that increase glutamate levels. This one step alone can provide dramatic improvements in STIMS. Thus, demonstrating the profound impact that excitotoxins have on brain function.

Most Common Sources of Excitotoxins

Monosodium glutamate. Keep in mind that MSG is found in numerous places you may not be aware of like most processed food, fast food restaurants, and it may be a binder in medications, supplements, prescription drugs, over the counter drugs, IV fluids,

vaccines, and as a growth enhancer sprayed on crops of food and produce called Auxigrow.

Aspartame (Nutrasweet)

Glutamate and aspartate are naturally occurring in wheat gluten, hydrolyzed yeast, and milk casein (which means any dairy product that contains casein has the potential for problems, but particularly cheese, which is a concentrated form of casein).

Other common food sources that contain excitotoxins include, hydrolyzed protein, hydrolyzed oat flour, or anything hydrolyzed, sodium caseinate, calcium caseinate, disodium caseinate, autolyzed yeast, yeast extract or anything else autolyzed, gelatin, glutamic acid, carrageenan or vegetable gum, guar gum, bouillon, kombu extract, anything malted, maltodextrin, many seasonings and spices, soy extract, soy protein or soy protein concentrate, or soy protein isolate, and soy sauce, textured protein, whey protein, whey protein concentrate or isolate.

The words natural flavor or natural flavoring on a package typically means it contains MSG or some other excitotoxin because they are used to stimulate your taste buds and artificially intensify the flavor.

Other foods or substances that contain excitotoxins and can damage nerves include anything fermented, protein fortified, or ultra-pasteurized or vitamin-enriched, corn syrup, bodybuilder formulas or protein formulas, caramel flavoring or coloring, flowing agents, dry milk, L-cysteine, egg substitutes, cornstarch, corn chips, citric acid if it is processed from corn, certain brands of cold cuts, hot dogs and sausages (even the ones in health food stores), many canned foods, pectin, pickles, any processed food, meats in the mainstream grocery store are often injected with them, tofu or other fermented soy products, xanthan gum or other gums.

Any nutritional supplement that contains glutamine. Glutamine is often recommended to heal the gut and increase GABA, but it first increases glutamate, and if you aren't converting your glutamate to GABA for any of the many reasons we listed above, then you end up with nothing but a bunch of excess glutamate. Anyone who has an issue with excess glutamate should typically avoid supplementation with glutamine. Glutamine and glutamate convert back and for into one another.

Furthermore, some bacteria in the gut convert glutamine into glutamate. If one has an excess of these types of bacteria, which could be the case in SIBO, then glutamine supplementation may contribute to excess glutamate. Additionally, some gut bacteria eat glutamine, so in people who have SIBO, glutamine can cause proliferation of SIBO, and toxins from SIBO can lead to excess glutamate.

It can also be a matter of potency. For example, I can consume yogurt every once in a while with no glutamate problems, but if I consume whey protein then I have immediate excess glutamate. This is because the level of glutamate in whey protein is much more concentrated than it is in yogurt. Anything that has a concentrated level of glutamate is going to be more problematic than something that has less potency.

Bone broth, which is commonly recommended for healing the gut is very high in glutamate, especially chicken bones. For example, I get an instant migraine from taking a little sip of bone broth from the glutamate content. I can't even cook chicken or beef with the bone, or the meat will absorb the glutamate and give me a migraine. I can sometimes eat beef or buffalo cooked with the bone, but it varies. I do best if the bone is removed. So you should experiment to see if your meat cooked with bone is contributing to your glutamate imbalance and be aware that bone broth will increase your glutamate levels. Just slow cooking meat for a long time, particularly braising, can increase glutamate.

Some common foods that are particularly high in glutamate are parmesan cheese, Roquefort cheese, tomato juice, grape juice, and peas. Walnuts, mushrooms, broccoli, tomatoes, and oysters are moderately high as well. Chicken and potatoes to a much lesser degree. If you eliminate all the other high glutamate substances, then you may not have a need to reduce some of these health-enhancing foods like broccoli, walnuts, and chicken. However, if your glutamate levels are really elevated, then these foods may be problematic as well, at least until you get levels reduced to some degree.

Protein powders, amino acid formulas, and collagen are high in glutamate. Branch chained aminos (leucine, isoleucine, and valine) taken in high concentrations can be excitotoxic.

Other Contributing Factors to GABA and Glutamate Imbalance

There are other genetic polymorphisms that may inhibit your ability to synthesize GABA itself, besides those we discussed that involve the GAD1 gene.

Up-regulation of the CBS gene, which increases alpha-ketoglutarate production can lead to excess glutamate.

Conversion of glutamate to GABA by glutamate decarboxylase (GAD) is inhibited by copper, so make sure copper levels are not elevated.

Pyroluria is a genetic problem in hemoglobin synthesis that can result in deficiencies in B6 and zinc, both of which are critical for the production of GABA and the management of excess glutamate. Therefore, if you have pyroluria it can indirectly contribute to impairing GABA and glutamate balance.

Chronic stress is a major contributing factor to depletion of GABA and other inhibitory neurotransmitters. High levels of inhibitory neurotransmitters like gamma-aminobutyric acid and serotonin are needed to modulate the stress response system. They help the mind and body return to the parasympathetic state when the stressful event is over. If the stressful event is never over, then they are called upon repeatedly and over time this will drain their levels. Therefore, managing chronic stress is a vital element to increase GABA and lower glutamate and maintaining that balance.

Childhood abuse or trauma alters GABA receptors, resulting in less GABA function, and this is carried with the survivor into adulthood. Survivors of abuse also have lower levels of serotonin and dopamine.

Vitamin K is very important for GABA and glutamate balance as well, as it is needed for healthy calcium metabolism where it reacts with glutamate and calcium to deliver calcium to the bones and teeth, and it prevents the accumulation of excess calcium which would contribute to cell death. Vitamin K is a fat-soluble vitamin; however, unlike other fat-soluble vitamins, it is not stored in the body and must be consumed on a daily basis. Vitamin K1 is found in leafy greens. Typically, vitamin K2 is produced when the friendly flora in our gut process leafy greens, but if dysbiosis is present or you're not eating leafy greens, then vitamin K may be insufficient. But vitamin K2 is also found in a variety of food sources like dairy and animal protein. Grass-fed butter is a good source of Vitamin K2.

The pancreas uses Vitamin K abundantly for sugar regulation. In addition to the brain, the pancreas is also very vulnerable to the accumulation of excessive glutamate or other excitotoxins, which will further impair the regulation of sugar. As we discussed previously, too much or too little insulin or glucose can both contribute to excess glutamate, therefore, keeping glutamate and GABA in balance is critical for the health of the pancreas and all its functions and the health of the pancreas is vital for maintaining the balance.

Some people may have a genetic predisposition to have more glutamate receptors than others, and the more glutamate receptors you have, the more you will take in. In this case, you will likely be someone who always tends to lean toward excess glutamate activity and will need to engage in life-long ongoing monitoring and maintenance to prevent overstimulation, cell death, and neurological symptoms. However, if there is excess glutamate in the system due to genetic mutations, methylation problems, etc., then more glutamate receptors will be generated as well.

As is true for all neurotransmitters, ensuring that you get adequate sleep is vital for normal function because sleep deprivation causes neurons to lose sensitivity to neurotransmitters, thus impairing communication.

It's also important to take note that it is not possible to eliminate every single source of glutamate or other excitotoxins, nor do you want to. Remember that glutamate is vital for proper brain function in small concentrations; the goal is to prevent excess. Preventing overstimulation, cell death, and neurological symptoms may sometimes be a matter of moderating accumulation. The more foods or substances that one consumes that are excitotoxic the more it builds up. You may get away with a little consumption, but if consumption is high then it pushes you over the edge of the cliff and symptoms present.

One of the greatest aspects of GABA is that it also opposes norepinephrine, your other primary excitatory neurotransmitter which is also important for stimulation, but it sets off the stress response system. Like glutamate, norepinephrine is also toxic to the brain when it is in excess. Excess norepinephrine can produce many of the same kinds of symptoms that excess glutamate produces and it can sometimes be hard to tell the difference between the two. Fortunately, when you focus on increasing your gamma-aminobutyric acid then you help reduce excess norepinephrine in addition to excess glutamate.

In Summary

So, to summarize the steps that should be taken to increase GABA and lower glutamate, it is vital to be eating the right diet, avoiding excitotoxins, managing stress, avoiding environmental toxins, addressing nutritional deficiencies and/or genetic polymorphisms, getting adequate sleep, supporting a healthy gut, and possible supplementation. We must consistently eat and live in a manner that encourages balance on an ongoing and lifelong basis.

It's very important that you don't just start supplementing with everything you've read will be helpful, as this usually backfires and you get the exact opposite effect. The sicker you are the slower you need to go with supplementation. Only take one thing at a time and monitor your response before trying something else. Some people must start with very minute doses. In many cases, staying away from supplementation is one of the best things one can do for balancing GABA and glutamate.

Working with neurotransmitters is a complex and difficult process that is best done with a practitioner who has expertise in this area. However, finding someone who has enough expertise to cover all the bases we have presented on this page is very difficult as well, so you serve yourself better by being very well informed before

beginning the journey. Please note that although I know a great deal, I do not know everything either. I'm always in the learning process and this page is updated periodically as new knowledge comes to light. However, if you need help lowering your glutamate and increasing GABA, contact me today for a comprehensive consultation and get on the right road to building a strong self-care plan that will help you achieve your goals.

References

Abshire VM1, Hankins KD, Roehr KE, DiMicco JA. Injection of L-allylglycine into the posterior hypothalamus in rats causes decreases in local GABA which correlate with increases in heart rate. Neuropharmacology. 1988 Nov;27(11):1171-7.

L. Amoreaux WJ, Marsillo A, El Idrissi A. Pharmacological characterization of GABA receptors in taurine-fed mice. J Biomed Sci. 2010;17 Suppl 1:S14

El Idrissi A, L?Amoreaux WJ. Selective resistance of taurine-fed mice to isoniazide-potentiated seizures: in vivo functional test for the activity of glutamic acid decarboxylase. Neuroscience.2008 Oct 15;156(3):693-9.

Richard W Olsen and Timothy M DeLorey. GABA Synthesis, Uptake and Release – Basic Neurochemistry. 1999 https://www.ncbi.nlm.nih.gov/books/NBK27979/

Todd D. Prickett and Yardena Samuels. Molecular Pathways: Dysregulated Glutamatergic Signaling Pathways in Cancer. Clinical Cancer Research August 15, 2012 18; 4240

Dr. Amy Yasko, *Autism: Pathways to Recovery*. Neurological Research Institute, LLC 2004, 2007, 2009

Dr. Rick Sponaugle. Anxiety Disorder Causes https://sponauglewellness.com/wellness-programs/anxiety/anxiety-panic-disorder-causes/

Datis Kharrazian. *Why Isn't My Brain Working?: A revolutionary understanding of brain decline and effective strategies to recover your brain's health*. Carlsbad California. Elephant Press (2013)

Möykkynen, Uusi-Oukari M, Heikkilä J, et.al. Magnesium potentiation of the function of native and recombinant GABA(A) receptors. Neuroreport. 2001 Jul 20;12(10):2175-9.

Contrusciere, Paradisi S, Matteucci A, Malchiodi-Albedi F. Neurotox Res. 2010 May;17(4):392-8. doi: 10.1007/s12640-009-9115-0. Epub 2009 Sep 15. Branched-chain

amino acids induce neurotoxicity in rat cortical cultures.https://www.ncbi.nlm.nih.gov/pubmed/19763733

Christopher Lane. Brain Damage from Benzodiazepines. Nov 18, 2010 https://www.psychologytoday.com/us/blog/side-effects/201011/brain-damage-benzodiazepines
H. Ashton. Protracted withdrawal syndromes from benzodiazepines.Journal of Substance Abuse Treatment. 1991;8(1-2):19-28. https://www.ncbi.nlm.nih.gov/pubmed/1675688

Yaffe Kristine, Boustani Malaz. Benzodiazepines and risk of Alzheimer's disease. BMJ 2014; 349 :g531 https://www.bmj.com/content/349/bmj.g5312/rr/775731

Karen Kurtak, LAc. Adventures in Glutamine: How Side Effects to Glutamine can Help You Identify the Root of Gut Issues. https://karenkurtak.com/adventures-in-glutamine-how-side-effects-to-glutamine-can-help-you-identify-the-root-of-the-problem/

Comments:

Hi Martin,
I advocate a (low-carb) Paleo diet. Preferably under 50 grams of carbs per day. That means fruit will not be part of the diet, except as an occasional treat now and then. Yes, fruit is acceptable on the Paleo diet for the average person, but we are not dealing with the average person in this situation. We are dealing with someone who has high glutamate. The Paleo diet must be individualized for each person depending on the conditions they are dealing with. For someone dealing with glutamate it has been shown that low-carb (preferably under 50 grams per day) is most beneficial, as it supports more GABA production. You can read more about individualizing the diet on the following page: https://www.holistichelp.net/blog/designing-your-individualized-paleo-plan/

END OF ARTICLE

This article was very exciting to me because it tied everything together for me and reinforces my belief that Candida is the root cause. Well, the Antibiotics Sarah was on for 4 months would be actual root cause.

9/9/2021
Today I sent Dr. Nicole and email:

---- On Thu, 09 Sep 2021 07:10:02 AM -0700 <Sarah Pansegrau > wrote ---

Hi Dr. Nicole,

A little update on Sarah. We had out 1st appointment at Stanford Children Center August 24th. Sarah had her 3rd Grand-Man on August 23rd. But as I write this today we have not had a fourth. But anxiety for parents getting high because it was 15 and 19 days in between the first two events and we are getting to that point again. As suspected, not much discussion about root cause with Dr, although I understand the need to try and stop the events first.

We are currently giving 1TBSP MCT oil, the B Complex and probiotics you prescribed last time, 100 MG of Magnesium Threonate, 5000iu D3+K2, fish oil... all twice a day.

If we make an assumption that Sarah's Candida never got under control and potentially caused leaky gut, what can we do while we are waiting for Sarah to complete her poop tests and our appointment with you?

She responded with a foods list basically to help eliminate candida and leaky gut which I will put here.

Instructions

NUTRITION
anti-inflammatory and healing foods to incorporate more of

Bone broth: 1 cup per day for the next 2-4 weeks. I recommend Epic brand bone broth which you can buy at whole foods. You can also order Kettle and Fire bone broth online or make it yourself. This is very soothing and healing
Turmeric fresh root or ground spice: 1/8-1/4 tsp per day. You can cook with this, add it to your bone broth or make a tea with the fresh root simply by stealing the sliced root in hot water. This tastes great with fresh ginger and a cinnamon stick.

Ginger fresh root or group spice: 1/8-12/ tsp per day. See above for recommendations to incorporate. Organic aloe vera juice (inner fillet only): 1 ounce twice per day.

Foods to eat freely:

Meat and poultry: Organic and free-range is always preferable Organ meat: Organic is preferredBone-broth soup: The broth is rich in amino acids that maintain a healthy gut lining
Fish: Especially fatty fish like salmon, sardines, mackerel, anchovies, and herring. Wild is preferable.
Starchy Plants: Such as root vegetables, plantains, yucca, beets, etc.

Non-starchy vegetables: dark leafy greens, cruciferous veggies,
Fermented fruits and vegetables: Sauerkraut, kimchi, beet kvass, coconut kefir, etc.
Healthy oils: coconut oil, ghee, avocado, macadamia, olive
Sea salt and spices: Vinegar such as apple cider is great for salad dressing. Avoid sugar and

artificial flavoring Eggs: pasture-raised. May need to be avoided for psoriasis or other autoimmune conditions.

Eat in moderation:

Whole fruit: up to 2 servings per day. Raw is okay. Berries are best.
Nuts and seeds: a small handful per day. Soaking nuts and seeds makes them easier to digest Coffee and tea: one cup per day black or with non dairy milk

Avoid Completely:

Dairy: except for ghee. Goat milk kefir is okay
Grains: rice, wheat, cereal, oats, quinoa, etc.
Sweeteners: sugar, high-fructose corn syrup, artificial sweetener, sugar, Chocolate: milk contains sugar and dairy. You can have 75% cocoa Processed and refined foods: if it comes in a bag or box don't eat it Soda
Alcohol
Processed meat: sausage, bacon, etc

I had been making soups with bone broth but had stopped because I learned it was high in glutamate so I repsponed to Dr. Nicole:

---- On Thu, 09 Sep 2021 12:45:17 PM -0700 <Sarah Pansegrau > wrote ---

Hi Dr. Nicole,

Thank you for this! We have been doing some of this but avoiding certain things like fruit while we were on keto. However, we are more of a paleo diet now so we will get some berries and such back into her diet. And we have been avoiding your "avoid list".

We were using kettle & fire bone broth for soups but just learned it is very high in glutamate. The proverbial rock and a hard place I suppose. Perhaps i can make soups 25% bone broth and 75% water as i was using all bone broth perviously Or just have her drink one cup per day. I'm sure you can imagine we are so very paranoid now.

Is a Turmeric supplement ok?

fyi, we have shipped back the heavy metal test stool sample which only required one sample.

I love how now a days we can email our doctors directly for simple questions. Dr. Nicole responded same day and her response in conjunction with the above article was very exciting.

Her response:

Ah good point on the bone broth and glutamate. It's probably best to avoid it for now.

And yes, a turmeric supplements is okay.

I reached out to my colleagues to see if anyone has expertise in this area and I heard back from Dr. Camile

"Yes, I've had good success with grand mal. Acupuncture and especially herbs. Needles are done briefly and I stay the room as we don't want a grand mal with needles in. Another option is supplements to support her neurochemistry. I recommend the Labrix neurotransmitter test. They also need to adjust diet to eliminate neurochemical triggers. Another possibility is 23andme genetic testing to see what's going on with neurotransmitters. A GAD enzyme deficiency is common"

I can order the Labrix test she mentions if you'd like or do you want to wait and see what the stool testing says? I'm sure it's been a little overwhelming with all the testing and doctors visits.

Best,
Nicole

I highlighted what was so exciting to me. Finally, a doctor willing to talk about neurochemistry and telling me about the GAD enzyme as a possibility. As you can see in my emails I did not say anything about GAD!

And of course I requested he Labrix test. It looks like this test measures all the things I've been reading about as it relates to neurochemistry which is a new word for me.

While very excited and optimistic again I'm now very tempered with expressing so as to not create any false hope or expectations. I have now started down a rabbit hole on Candida because it was confirmed on October 2020 Sarah had an overgrowth.

I'm tempered because I have learned how difficult it can be to get rid of a candida overgrowth and how it takes very strict dietary changes and no cheating. People go years trying to heal their gut from Candida. But now we have something really focus on whether it is the cause or not.

But the facts are facts:

- Candida overgrowth is bad.
- Candida overgrowth can impede nutritional absorption causing deficiency's no matter how well you eat.
- Candida releases the toxin acetaldehyde which impedes the methylation process that inhibits enzyme production including the GAD enzyme which is REQUIRED to convert excess glutamate into GABA.
- Vitamin B critical in the methylation process of which Sarah was low on back in October 2020 as show in her bloodwork.
- Candida can create a Vitamin B6 deficiency which is critical for the GAD enzyme to convert excess glutamate into GABA
- Sarah had/has a Candida overgrowth

If it looks like a duck, quacks like a duck, walks like duck, it must be a $%^^& duck!

9/10/2021

Today I'm still very excited about the last couple days of discovering and confirmation from a licenses Dr. Yet I'm also very anxious because we are getting in that range of 15-20 days in between events.

It feels like glutamate accumulates in the body and if it is not being converted into GABA via the GAD enzyme is when it causes a problem over a given timeframe. And maybe it takes Sarah 15-20 days for Sarah to get so much glutamate in her body that she pops. Again, this is just a feeling, but it is also fact that her events have been spaced 15-19 days apart. Today is day number 17 in the clear.

BUT, and yes, this is a big BUT; We are also 17 days into a very strict diet with strict nutritional supplementation including the B's and a magnesium that appears to have better ability to pass the BBB. We are also well into the Keppra medication which is designed to block the glutamate via the calcium channel blocker.

I try not to talk to Sarah about my research because the last thing I want to do is create false hope. I simply instruct her in what she needs to be doing. However, this time was different for a couple of reasons.

The connection of the GAD enzyme with the conversion process from glutamate to GABA and a confirmation by the Dr. that a GAD deficiency is a common reason for this is something I had to share.

I asked Sarah if she had a few minutes to talk after she finished her homework. I got that look. I said it is up to you but I want you to know where I'm at with everything we have learned from the doctors and my research.

I showed her all my notes and explained the GAD connection with glutamate to GABA conversion and what can cause a GAD deficiency. I drew out a nice diagram on paper showing the flow using the gas pedal and breaks as a visual.

This diagram depicted how the Keppra is working to block a glutamate excitatory event vs how the GAD is supposed to work naturally by converting the excess glutamate to GABA.

This also allowed me to explain that candida is a very difficult thing to cure, and it takes times and discipline and that *we are not out of the woods yet*. I wanted her to understand it is possible she may have another event without saying it so it won't be as destructive to her if that's even possible.

Later Sarah and Sheryl went to the bank or something. When they got back, I asked Sheryl how was Sarah? Did she say anything? Sheryl said, "yes, she says does this mean I won't have to take Keppra for 2 years?" Sheryl told her that is our plan if we can find and solve the root cause which we think we are getting very close to. Sarah was very happy to hear this!"

And to top off a great day, Sarah pooped her 2nd sample. Only 1 more to go before we can mail them in and get the results. I just wonder if it will show anything or could we have been making progress these last weeks with our eating habits and supplementation. Either way, it will be good to see some real data.

The only baseline I have is the poop and blood samples from October 2020 with Dr. Nicole. And that showed candida overgrowth, low vitamin D (almost deficient), low B6 and B12. I can only assume the condition got much worse as time went on since the first event didn't happen until July 18th 2021.

I do have some data from the ER visit that day, but it really doesn't have much. However, it did show moderate bacteria in her urine test which could be another sign of Candida overgrowth as urine should come back clean. They tested for Sodium, Potassium and Chloride but not magnesium.

I just realized today that I have 4 doctors involved and soon to be 5 when we go to the other neurologist on September 30th. One of Sarah's friends, Adam, plays football and had a game in Monterey last Friday. Adam is aware of Sarah's condition. Adam's parents came to pick up Sarah and take her to the game.

I chatted with them for about 10 minutes reviewing Sarah's events and to make sure they were ok with taking her. Susie, Adam's mom, told me about a friend who had similar issues and the doctor that treated her found the root cause.

I called them the next business day to set the appointment. Sounds like a neurologist who is willing to look for the root cause. GOD is guiding me through this!

Not the number of doctors matter but rather a doctor or doctors that are willing to actually try and find the root cause. I don't like hearing from doctors that 70% of seizure fall into the "unknown" category.

9/11/2021
I am finally caught up with my notes today. The morning is going very well. Everybody is in a good mood. Day 18 and I'm a nervous wreck.

Next Saturday we will be going on our road trip to Idaho which everybody is looking forward too.

Today is a good day to review the supplementation Sarah is taking. Everything listed below are taken twice a day. Just before bed around 10pm and first thing in the morning between 8am – 10am depending on if school day.

- Probiotic 100B by Aylish Herbs Inc.
- Magnesium Threonate, 48mg by Jigsaw Health (labeled Brain Boost)
- Active B-Complex by Integrative Therapeutics
    - B1 (Thiamine), 25mg
    - B2 (Riboflavin), 25mg
    - B3 (Niacin), 50mg
    - B5 (Pantothenic Acid), 50mg

    - B6 (Pyridoxine), 25mg
    - B7 (Biotin), 150mcg
    - B9 (Folate), 400mcg (DFE)
    - B12 (Methyl Cobalamin), 500mcg
    - Choline, 125mg
    - Inositol, 125mg
- Wild Alaskan Fish Oil, 900mg
- D3 + K2 by SR
    - D3, 5000iu
    - K2, 100mcg
- Turmeric, 1000mg mid-day only (just added per Dr. Nicole)
- MCT Oil, 1TBSP (fight candida)

Hopefully we have been making progress with healing her gut and she is actually absorbing these nutrients.

Some interesting research:

What is the Role of GAD?

GAD is an enzyme found in the pancreas that is necessary for the synthesis of a neurotransmitter called gamma-aminobutyric acid or GABA. Neurotransmitters are essential structures in the process of nerve messaging. GABA is an amino acid that reduces nerve transmission in beta pancreatic cells.

9/12/2021

Today is a Sunday. Coffee and continued research. Today's focus is to assume the glutamate is still building up and what can be done to reduce/release excess. The good news is the research continues to point to many nutrients we should all be getting in our diets.

Unless there is some underlying problem prohibiting absorption like candida overgrowth caused by heavy antibiotic use! I really am becoming ever so certain this is Sarah's root cause. Only time will tell. Without proper absorption, many problems can occur including seizures.

I feel better this morning, more cautiously optimistic, because I feel we are supplementing with the needed nutrients. The question is how well they are being absorbed.

But she is also on probiotics which should be helping repair her cut and absorption rate. How fast it that happening, or not happening? We won't know until Sarah completes her 3rd poop sample and we can mail back.

But I'm still keeping it simple for me and assuming these conditions continue to exist. With my new word I learned from Dr. Camile, neurochemistry, I'm focused on supporting and repairing in Sarah's body.

I just learned Sarah completed her 3rd poop! That is only 1 day since her last one which is very encouraging that we may be making progress in her gut. It's hard to really say but it seemed like she was pooping every 1-14 days prior. The goal is get to a bowel movement every day.

When I hear people tell me they don't poop for weeks I think something is really wrong with their digestive system. I can't imagine how miserable I'd feel if I had to wait 1-2 weeks. Hell, if I miss a day, I'm grumpy!

9/16/2021

Today we are heading to LabCorp for the blood work. Sarah is not happy about this at all but knows it must be done. The last time we drew blood for these tests she passed out twice. Once at LabCorp then on the way home.

This time we are more prepared as we have hydrated a lot on the way there and brought orange juice to drink right after. I suggested she lay down this time but she said, "no, I will be fine!" well, half way into the blood draw she started drooping over. I got to her just in time to lean her head on my shoulder while I head her.

The nurse asked if I wanted her to stop. I asked how close are were. The nurse said, "almost there". I said, "just keep going." I know Sarah would have wanted to just get this finished.

I was a little nervous when I saw her head start to fall as I wasn't sure if she is passing out or having an event. Just paranoid, I guess.

Once she came to started feeding her the orange juice. It took about 10 minutes before we could leave. We then went and had a big breakfast.

On the way there this morning I had learned that Sarah pooped again a couple days prior (9/14/2021). It now seems pretty consistent that Sarah is having a movement every other day. This is very encouraging!

9/17/2021
Today is day 25. We made it past that 15-19 day threshold in between events. Still nervous as well with much anxiety but very encouraged. Is it the Keppra or is it that we are actually starting to heal Sarah's gut or a combination of both.

It will be very interesting to start seeing some of the data coming back in regards to Sarah's blood work and the poop tests. Will show normal? Will it show better than October when we had the 1st round of tests done? What will we be able to conclude from these tests?

In the back of my mind I'm already planning on when we can start backing down on the Keppra. Obviously I would consult the neurologist and I can't imagine this happening until we can get 2-3 months with no events. Just blue skying here.

Tomorrow we are starting our road trip to Idaho to look at a couple colleges. Everyone is very excited about this trip.

9/24/2021
Yesterday was a big day for a couple reasons. Yesterday was Ricky's 16th birthday and it was day 30 that Sarah has been clear!

She is also pooping more regularly now. To me this is a big deal. Regular pooping is an indication of an improving digestive system.

Sarah has been in a real good mood these past few weeks and I think it's because she also knows the number of days she has been clear as well.

We still have not gotten any of the results back from her blood work or poop samples. We have also received the pee and saliva test which will test neurotransmitters and her methylation process. We will do those tests this Sunday as it requires a couple days of not eating certain foods.

9/27/2021
Today we FedEx'ed the neurotransmitter and methylation test to the labs. We hope to here results soon.

We did get the blood work back today. Some of the stuff in there I have no idea and will have to wait for the consultation from Dr. Nicole. But I was able to look at certain nutrients. Here are a few of them:

B12 was 383 now it is 1011 Range: 232-1245
Folate was 12 now it is >20
B6 was 9.9 now it is 118.9 Range:2.0 - 32.8 (this one is critical for glutamate to be converted to GABA)
D was 35.2 now it is 83.3 Range: 30 - 100
Magnesium was 5.8 now it is 6.3 Range: 4.2-6.8

no bacteria in her pee as well!

Very nice numbers but the B6 seems high. Is this because she is absorbing more from her foods now plus the supplementation? Is it because the supplement is not a good quality one and not being absorbed by the cells and simply flowing around in her blood? Or is there a problem with her ability to process B6. The latter would indicate a methylation issue.

I've already got a note to Dr. Nicole asking if she recommends a different B-Complex.

Today is day 35 of being clear of any events. Sarah is definitely feeling happier because she has been clear for over a month. Although I'm also very pleased to date, I'm still cautiously optimistic because we can't yet say definitively, "this is what caused the problem."

We do meet our local neurologist this Thursday. His name is Dr. H. I will of course bring all my labs plus the most recent one so I will be able to talk about the high B6.

My daily anxiety is finally starting to improve and gets better as each clear day goes by. Sarah told me I need to start walking again! I'm sure I've put a few pounds on the last couple months plus I use to walk 2 miles twice day.

I stopped because I was having anxiety being too far away from my car in case I would get another dreaded text from Sarah at school. I think I will start again tomorrow. Also, time to get back on my keto diet which simply does wonders for me.

I'm really anxious to get the results of the poop tests. I need to know if she still has a candida issue or leaky gut. Hopefully soon.

9/29/2021

Dr. Nicole suggested cutting out the B-Complex completely since her B6 was so high. I suggested we just stop the evening dose basically cutting the B-Complex in half.

Excerpt of the email exchange

Go ahead and decrease to 1 in the morning. Her levels should reduce by cutting the dose in half.

---- On Tue, 28 Sep 2021 02:27:04 PM -0700 <Sarah> wrote ---

Hi Dr. Nicole,

ok, should we completely stop the B-Complex? She was taking one in AM and one before bed. Should we stop just one of those? I'm only concerned because B6 is a critical co-factor for the GAD enzyme to function properly and convert excess glutamate into GABA. We've been 35 days clear now so just very cautious. But also concerned why she has so much B6 in her blood. I guess it's also possible we have been making good progress with her candida overgrowth and gut healing, therefore better absorption but won't know until the poop tests come back which looks like by October 7th.

Thanks,
Eric

---- On Sep 28, 2021 02:06 PM (-07:00) <Dr. Nicole> wrote ---

Perfect thank you. This is a good one that has all the active B's however she's getting too much B6. Have her stop the b-complex for now. All her other B's look great. We can discuss if she should take any individual B vitamins at our follow-up.

Best,
Nicole

Some of Sarah's poop test just came in today! We now have a meeting schedule with Dr. Nicole tomorrow morning after our appointment with our local neurologist. Hopefully we gain some insight tomorrow with some of these tests coming back.

I have a copy of the poop test but I really don't know what I'm looking at. I can see there are certain things that seem to high, especially the "fecal secretory IgA" at a level of 4025 when the high end of the range is 2040. Can't wait to learn about this one.

10/3/2021
40 days clear!

We had our meeting with Dr. Nicole to go over her test results. With the exception of high levels of B6 all her nutrients looked great! Her B6 is high either because we are supplementing or there is a gene defect (MTHFR) which causes a problem with B6 absorption. By reducing her B-Complex we are hoping the B6 will come in line.

If not, we will probably do a gene test to look for this problem.

Here is a little information: https://mthfrsupport.com.au/2018/11/vitamin-b6-mthfr/

The more and more I learn about the vitamins Bs and D and how it relates to proper functioning from anything to seizures to fighting the common cold is just so important for proper health.

Because of the COVID 19 coverage in the last 18 months, it has become very obvious that much of the world's population is deficient in vitamin D. We have been taught to fear the sun and put poisonous chemicals on our skin with SPF 5000. Well, the sun is one of the best sources of vitamin D.

I tell my kids not to use that crap and if they need some protection so as not to burn, I have them use SPF 8 or just cover up. I tell them 15-20 minutes of sun exposure every day would be great.

My son, Ricky, just woke the other day with the sniffles and a sore throat. Well, with my newfound appreciation for vitamins, I immediately started him on vitamins D, Bs, Zinc and Turmeric supplementation. Boom! Next day symptoms gone!

By the way, since I finally brought up covid 19, you may be wondering if we are vaccinated. WE ARE NOT AND NEVER WILL BE! I will not even allow any of us to get tested.

Sarah's heavy metal test came with a couple areas to address. Her mercury level was slight elevated. Dr. Nicole asked about fish consumption and I told her we have been eating fish at least once a week but sometime twice a week.

We have been eating wild caught salmon and halibut. She said Salmon is ok but no more halibut as it can have high levels of mercury. Doing some research on halibut does indicate that it can contain low to moderate levels of mercury.

The other metal was nickel. This was strange to me but I come to find out that Sarah has been wearing jewelry made from nickel and that it leaches into the skin causing discoloration. Are you kidding me! Why in the world would we make jewelry out of a metal that can leach into our skin.

She was wearing this jewelry as recent as a couple days ago. Well, no more halibut and no more nickel jewelry! Hopefully, problem solved.

If you recall, Sarah had moderate levels of bacteria in her urine when we took her to the ER after her 1st event. This can be an indication of candida still in her body which is why I started treating as if she still had the candida overgrowth.

Her recent urine test came back negative for bacteria and her stool sample came back negative for candida! This was very exciting news! Remember, this is the theory I have been working on. The candida overgrowth, due to 5 months of antibiotic use, inhibited her nutrient absorption leading to the seizures.

It's not just theory; I have data from October 2020 that she was deficient in many of the Bs and vitamin D. Yes, her B6 is now too high but this could be because of supplementation along with her gut health improving, therefor absorbing nutrients as she should be.

There are still some things we need to do to address her gut health. I think the best way is to simply paste here Dr. Nicole's treatment plan.

Supplements

Supplement	Directions	Details
DGL Plus 180 capsules [PUR Pure Encapsulations]	2 cap(s) twice per day	
Caprylic Acid 120 capsules [PUR Pure Encapsulations]	2 cap(s) twice per day	
Biocidin® Capsules - Potent Broad Spectrum 90 capsules [BI2 Bio-Botanical Research]	1 cap(s) twice per day	
Enterogenic Intensive 100 30 capsules [ITI Integrative Therapeutics]	1 cap(s) once per day	
Acacia Fiber Powder Organic 12 Ounces [PROT Protocol for Life Balance]	1 tablespoon once per day	

Lab Tests

Lab Name	Test Name
Doctor's Data	Comprehensive Parasitology x3

Instructions

TESTING

LabCorp blood work

- Elevated B6. This is from supplementing. Reduce her dose to 1 capsules of B complex per day and retest in 2-3 months
- Vitamin D level is perfect in the 80s. Reduce her dose to 5,000 IU once per day and retest in 2-3 months
- Everything else looks great! Sarah's nutrients have all improved significantly in the last year.

Gut microbiome

- Klebsiella dysbiosis
- Low levels of Akkermansia probiotics
- High levels of SIgA

Metals

- High levels of nickel. She the DD metals reports on page two for foods to avoid that contain higher levels of nickel. See below for detox support

TREATMENT

For detox

- 500mg of cholorella one per day
- Activated charcoal 500-600 mg (the dose tends to be 250+ per capsule) around 2 hours after chlorella. This can't be

- this could be replaced by apple pectin, zeolite clay or bentonite clay if it's hard to avoid meds/foods
- Detoxifying foods
  - Cilantro
  - Parsley
  - Bitter foods: arugula, radicchio, kale, artichokes, lemon, apple cider vinegar

To address klebsiella

- Caprylic acid for 2 months: 2 capsules 2 x per day with or w/o food
- Biocidin for 2 months: 1 capsule 2 x per day with caprylic acid

To reduce inflammation

- DGL plus for 4 months: 2 capsules twice per day with or without food. She can take this with caprylic acid and biocidin

To improve Akkermansia

- Once she finishes probiotic 100B then switch to
  - Pre & probiotic Enterogenic intensive: 1 per day
    - if she's consistent with taking the acacia fiber (see below for akkermansia) she doesn't need extra prebiotics and can stay on the old probiotic.
- The biggest focus here is foods that are rich in antioxidants
  - Green tea
  - Berries
  - Dark leafy greens
  - Dark chocolate
  - Rosemary
  - Turmeric
- Akkermansia Gut Repair Shake
  - 1 TBSP acacia fiber (a prebiotic)
  - 1 tablespoon pomegranate concentrate (such as the brand Lakewood organic)
  - 1 tablespoon cranberry concentrate (such as the brand Lakewood organic)
  - 1 teaspoon matcha green tea powder (such as Navitas)
  - 1 scoop collagen powder (Vital Proteins) * if this has glutamate you can skip the protein or use a whey or pea protein

Further testing:

Consider 23andMe genetic testing

Follow-up

1) Repeat stool test in 3 months

2) Repeat B6 blood work around the same time

So as you can see we still have some work to do but this is very manageable. We will retest in 3 months to see if we've made more improvements in gut health and Sarah's B6 levels have come back down.

We are still waiting for the neurotransmitter and methylation tests we mailed in last Monday. Hopefully this week. Remember, these tests came from Dr. Nicole's college who was confirming my hunch of the GAD enzyme not being able to do its job converting excess glutamate to GABA.

10/15/2021

The good news is my entries are getting less and less. Today we are 54 days clear! There really hasn't been much to update. Sarah has been in a great mood these past few weeks and I think part of it is because she is interested in a new boy whose name is Ashton. I'm sure the other part is she is feeling confident that we may have solved her issue.

Still, my problem with this is it because we are on the Keppra and just masking the issue or have we really solved the fundamental issues that was causing the seizures to begin with. I want to believe that we have made major progress with her gut health and bloodwork (related).

As I have stated many times, only time will tell and we just have to take this one day at a time. Sarah is pooping very regular now.

We are still waiting for the those last two tests to come back which I also hope will show all normal with the neurotransmitters and methylation.

I sent an email to our doctor at Stanford asking if it is ok to be giving Sarah Chlorella and charcoal as part of detoxing her for the elevated nickel and mercury. Still nothing. Ugh. Pray you never have to rely on western medicine.

However, we are confident that her jewelry was the cause of the elevated nickel and the amount of fish we were eating was the cause for elevated mercury. I'm really looking forward to doing the poop and blood tests again to see these things improve. I think I will ask for the test again during the beginning of December to get them out of the way before the holidays.

There was so much information overload these last 3 months that when I think back at the beginning and what I know now is night and day. I was so desperate to stop these events from ever happening again.

This may change of course but I think the main takeaways to date are fairly simple and all people need to know this whether they have brain disorders, gut disorders or just general health issues.

- If you ever take antibiotics, make sure you restore the good gut bacteria.
- Avoid MSG at all costs.
- Stay away from processed foods that come in packages. By default, you will be eating healthier.
- Stay away from fast foods and sugar. This includes limiting your carbohydrate intake since it turns into sugar. And for God's sake, DO NOT DRINK SODA!
- Take a good supplement. At a minimum, Vitamin D and a good B-Complex. Additional supplements include, magnesium, zinc, pre and probiotics and turmeric.
- Do your best to eat clean, whole foods. Just because it says organic does not mean it's clean.

We are by no means done with this story but I just have also say, you need to question everything western medicine tells you. Western Medicine has its place of course but they do not have a vested interest in determining root causes of health issues. They simply want to treat the symptoms, which is fine, but you must take responsibility in finding the root casue(s) if they won't. If you don't, who will.

10/22/2021
Yesterday we had our follow-up meeting with Dr. S from Stanford Children's Center. We did it tele-health to avoid the long drive. We basically gave an update that Sarah is feeling good, sleeping good and no other events including the arm tremors.

I proceeded to give my update in terms of her test results from Dr. Nicole. Basically, candida is gone, urine clear, vitamin levels back in the normal range. I explained the high B6 levels but he was not concerned and I told him we also reduced her B-Complex to just once a day.

As I was giving this update Dr. S was patient while I know I can be long winded sometimes. He did wait for a moment of pause from me before interjecting. He basically was saying that these issues, candida and low nutrient levels, and Sarah's seizures are not related.

Well, I probably got a little defensive and responded, “well, whether related or not it is something that needed to be addresses and we have done that and thought I’d update you.”

I then asked if I could read something to him from Dr. Nicole’s college, Dr. V, to get his thoughts. Remember, Dr. V is the first doctor who was talking about neurochemistry and the GAD enzyme which is what I have been trying to discuss with the neurologists. I quoted Dr. V, “A GAD enzyme deficiency is common in these cases.”

It was at this point he asked if he could go get his senior neurologist on staff today. We waited about 10 minutes and he came back with Dr. Val.

Dr. Val explained that after reviewing Sarah’s chart that they believe with high confidence that her diagnosis is “GCT upon wakening”. This stands for General Clonic Tonic seizures or Grand-Mal seizures. I guess this is because Sarah’s grand-mals have happened shortly after waking.

He talked for a while and I waited to hear what this thoughts were on the GAD enzyme which never came. I then proceeded to brief him on the this with the detail tying in candida, mal-absorption of nutrients and that the B’s, specifically B6 as it is a major co-factor for the GAD enzyme to function properly converting excess glutamate to GABA.

His response was very enlightening. He asked, “GAD enzyme in the gut?” I was surprised by the question. I responded, “well, yes as I believe that is where it is lives but also in the brain.” He stated, paraphrasing of course, there are new areas of research in this area as it relates to a healthy gut and brain functionality.

Holy shit! I was so shocked and taken back by his candor. This is what all my research has led me too and I finally got a neurologist indicate same. I know I’m not a doctor but when you spend over 2 months learning as much as you can about a certain subject you can learn a lot with the internet.

So, what does this really mean. Is our medical industry so stuck in their ways in treating brain abnormalities from decades ago? Is this gut/brain relationship really new areas of research? How could this be when I learned so much about it on the internet?

Are they embarrassed that a desperate father who spent two months researching might have found the root cause against their years of education by our archaic medical industry and big pharma?

This just reinforces that we the people must take charge of our own health and medical issues. It has never been so clear to me.

His response was very encouraging to me as I wasn't dismissed as just another parent who thinks he knows everything from reading a few articles on the internet. It was more like hundreds of articles by the way!

Maybe I'm being too harsh but after being dismissed several times it gets very frustrating, and it was refreshing again to hear that it is plausible. These were his words that gut health is a plausible root cause.

10/23/2021
Although my optimism is increasing that we really may be on to the root cause, I'm still a realist and accept that it may not be the reasons for Sarah's seizures. However, my hope increases day by day.

Today is two months since her last event, or 60 days. This is very exciting to report! The doctors do not want to discuss the prospect of reducing her Keppra dosage. I get it. Why ruin a good thing at this point. Hopefully when we get to 3 or 4 months, we can talk about it and I'll feel much more comfortable.

Dr. S said that they normally don't taper off, they just stop. That doesn't seem like a good approach with any medications you've been on long term.

My current thinking (which can change on a dime), is that we will approach the subject after we re-test Sarah's blood and gut health again in December.

I'm still looking forward to the results from Sarah's neurotransmitters tests and Dr. V's interpretation. Remember, she is the 1st one who came back and said a deficiency in the GAD enzyme is common finally confirming that I may have been onto something.

10/25/2021
Just got a note from Dr. Nicole. She has reviewed Sarah's neurotransmitter and melatonin tests along with Dr. V. We are trying to setup an appointment now but

she did say in her note that we need to address Sarah's low level of Serotonin. I did a quick search and found this:

Serotonin is an inhibitory neurotransmitter…adequate amounts of serotonin are necessary for a stable mood and to balance any excessive excitatory neurotransmitter firing in the brain…serotonin also regulates many other processes such as carbohydrate cravings, sleep cycle, pain control and appropriate digestion. Low serotonin levels are also associated with decreases immune system function. – Neurogistics.com

Well now, that is interesting!