Practical Considerations For Microbiome Intervention in ASD & Common Modes of Metabolic Dysfunction By Alex Zaharakis with Contributions By Dr. Christian Bogner.
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VERSION 2.0 - Updated 2026

Warning - high chance for grammatical errors

An older version of this primer can be found on www.biomesight.com in different sections of the blog. This version has been updated Spring 2026 to reflect new information.

https://www.biomesight.com/blog/the-role-of-prevotella-in-the-microbiome
https://www.biomesight.com/blog/biomesight-podcast-episode-1-the-microbiome-autism-with-alex-zaharakis
https://www.biomesight.com/blog/practical-considerations-for-microbiome-intervention-in-asd-common-modes-of-metabolic-dysfunction

You can also listen to a recent podcast with Patricia Lemer Autism Advocate which talks about microbiome balancing and other therapeutics and initiatives supporting the autism community here
https://open.spotify.com/episode/15mIzq2Xo55Aio4ePxvdUe?si=4901cf5487dc4d72

You can also listen to a video interview with Rich Karen Maurer of Resilient Biome about Microbiome Balancing
https://rumble.com/v4st8bo-improving-autism-symptoms-by-healing-the-gut-with-alex-zaharakis-resilient-.html?e9s=src_v1_upp

Some other interviews and mentions
Interview with Brian Hooker CHD
Support from Nicole Shanahan

Upload your raw FASTQ file to my pipeline for analysis
www.gutbalancing.net

https://www.autismisbiomedical.com/
https://www.autismisbiomedical.com/hearfromparents
https://drive.google.com/file/d/1FW0o3bTGPSmMy93dttsAEL76-FJStK3j/view
https://www.youtube.com/watch?v=BPmdGgXXf8c&feature=youtu.be
https://www.youtube.com/playlist?list=PLZa52sAl3TqrWIiKVsOFBfJGQy_87kOyy
https://youtu.be/eBXq36wypGg

Sometime around 2021, I offered to write a Microbiome Primer for Biomesight (which is a 16s stool testing provider for which I have an active profile and have used for years) to write a primer on how to approach dysbiosis in autism. Since then, I have received a great deal of positive feedback regarding that original primer and (currently the most rated microbiome analysis on biomesight by a factor of 6) I intend to expand upon that first edition here. This Primer has now been reworked into to incorporate some aspects of biomedical intervention related to autism with some comments on areas I think may be relevant, however a reader only looking to pull out the microbiome advice within this primer can still do so and apply it outside of autism.

For those unfamiliar with BiomeSight, it is a 16S stool testing platform that I used extensively for years before developing my own stool testing system at www.gutbalancing.com. I still utilize BiomeSight for international

situations (people outside the usa) as my pipeline allows analysis of the RAW data (it can also be used with OMBRELAB testing). However, when doing so, I specifically analyze the raw FASTQ sequencing data, which can yield different values, classifications, and conclusions than those presented in the standard BiomeSight report. For those that may not know it, Ombrelab, Biomesight do not actually sequence the data themselves (that doesn't really matter) they (just like me) get the samples analyzed in a 3rd party lab which provides the Nucleotide sequences, from there the data must be recombined (forward and reverse reads) and matched against databases for taxonomy. This process which involves programming and mathematics and tweaking is what generates the "Taxa" which identifies the microbe against databases that exist. These pipelines can be different ultimately giving different answers for the same initial raw sequences (that is normal and expected).

As a result, the raw sequencing data exists independently from the processed reports provided to consumers. The information provided by "report" of a stool testing company can differ from company to company even if the underlying data is the same because the problem is unbounded, there are many variables in performing the denoising and pairing, and there are many databases to compare against all giving slightly different answers (and relative to when the databases were conjured). It turns out none of this is really important unless you are interested in the "why", if you are just interested in being helped then just read on. I have developed my own pipeline, test and analysis with companion suggestions which is the impetus for "gutbalancing" which can be obtained through www.gutbalancing.com (suggestions released via practitioners).

For those interested, my BiomeSight practitioner profile can be viewed online.

You may become frustrated by the amount of prelude before reaching the intervention-focused sections that many readers are most interested in. Nevertheless, I believe this context is critically important.

To date, more than 500+ individuals with autism spectrum disorder (ASD) have directly participated in microbiome balancing programs with me, including detailed user feedback and survey collection. Indirectly, likely several times that number have participated through practitioners whom I have trained or who utilize my software and analytical systems.

For practitioners interested in this work, I can be contacted at pipeline@researchedelements.com (Please real practitioners only, not pseudopractitioners looking for a free ride - this means individuals that actually see patients and like to collaborate). I have developed a custom analytical pipeline that processes raw nucleotide FASTQ sequence files generated from 16S stool testing. **This pipeline integrates multiple microbial databases so that historical taxonomic classifications can be considered alongside modern nomenclature**. This is particularly important because microbial classifications have changed substantially over time as organisms have been reclassified into more accurate genera and families. The model generates customized suggestions in a 10 week plan which can be further modified by the practitioner and scaled to the patient.

When necessary, my pipeline queries five separate databases for bacterial identification. I have spent years analyzing both common and highly complex microbiome patterns to establish the microbial ranges that I believe are most representative of restoring balance and improving clinical feasibility. In order for me to figure out what was the best way to help people and intervene in dysbiosis, I needed to take everything apart and work backwards. It turns out that that level of granularity and complexity isn't always needed for practical intervention. Gut Balancing is a meld of expert practitioner knowledge on what Gut Interventions work (Biome shifting relationships from clinical experience), databases of literature on what prebiotics, probiotics, herbs, and plants can be used in various situations, and an emphasis on POSITIVE things with an emphasis on ancestral things when possible for bringing gut health back (chamomile, Triphala, codonopsis, Mastica, etc).

What is 16S testing, and why not shotgun metagenomics?

You will see certain questions or statements answered multiplied times across this primer. While shotgun metagenomic sequencing is often considered the “superior” technology, there are important limitations that deserve discussion. It is not worth the money and the complexity that it offers is often not understood or able to be used, at the expense of LOSING data and increased error and uncertainty.

Shotgun sequencing is exceptionally useful in situations where high-resolution strain identification is required, such as probiotic purity verification. In these cases, the sample may contain only a few microbial species, making reconstruction straightforward, the answer is already somewhat known, we know it should contain species XXX at 95% we just want to verify the purity. However, microbiome stool samples are fundamentally different. These samples often contain genetic material from thousands of organisms, including bacteria, fungi, parasites, and human DNA. Computationally, this creates a much more difficult reconstruction problem. As sequence assembly becomes more complex, larger portions of the data may ultimately be discarded during processing.

An analogy would be reconstructing a single book after its pages have been torn apart and thrown on the ground versus reconstructing an entire library containing pages from thousands of different books mixed together with their pages thrown on the ground. The latter is substantially more difficult. As a result, metagenomic approaches may omit significant portions of the microbiome from the final report. In my opinion, this is clinically concerning.

This issue is compounded by the fact that metagenomic databases remain substantially less mature than 16S databases. Much of the microbiome literature — including many published microbial reference ranges — is based upon 16S sequencing rather than shotgun metagenomics. Importantly, the resulting microbial ranges can differ significantly between these technologies.

In practice, I also believe that species- or strain-level precision is often overemphasized relative to our current therapeutic capabilities. At present, we generally do not possess interventions capable of acting with that level of granularity in a reliable clinical manner.

Over the years, many individuals and practitioners have approached me after obtaining advanced metagenomic tests, including platforms such as Tiny Health or GI MAP, yet still lacked practical direction regarding interventions or meaningful clinical improvement. In my view, possessing a more technologically advanced test is not inherently useful if one does not understand how to clinically interpret or act upon the information.The valuable components of a “test” are its ability to have broad but complete resolution (complete in the sense of not missing or throwing away data), reproducibility which is an issue that I and other practitioners have noticed with GI MAP, and the ability for the clinician to actually use the test.

To use an analogy: if you do not know how to drive a Porsche, owning one may not help you if you just need to get across town. And if you are trying to drive it across a desert, good luck. If it only starts once because there are some mechanical issues then you really have a pickle.

I maintain my own multi-database analytical pipeline for examining FASTQ 16S sequencing files, which is integrated into the testing system available through Gut Balancing. The system can also process third-party FASTQ files from services such as BiomeSight and Ombre after the raw data is uploaded to our servers.

I have additionally developed an ITS fungal sequencing pipeline, which has contributed substantially to my understanding of the mycobiome. However, I now use it less frequently after recognizing that it often provides

limited additional clinically actionable information beyond what is already obtainable through bacterial analysis and symptom presentation.

Conflicts of Interest and Background

I would like to disclose several potential conflicts of interest.

I am a founder of Researched Elements LLC and GutBalancing.com an dcllaser.com along with Dr. Christian Bogner, nutraceuticals, microbiome testing & Photobiomodulation devices for supporting Autism. I am also involved with Autism Is Biomedical, a foundation that has helped provide microbiome analysis for participants and supported the development of this work, as well as Thiogenics LLC.

Christian Bogner, a physician with whom I collaborate extensively, is also a co-owner and collaborator in several of these ventures. Through years of collaboration and extensive discussion, many therapeutic ideas and observations emerged from the exchange of clinical and analytical experiences. To date he is the only clinician that has rivaled me with the same energy and inquisition to figure things out in the realm of biomedical interventions for autism. We share skin in the game and ponder the complexities of autism, dysbiosis, and metabolic dysfunction daily.

Our products and technologies are designed with the goal of providing microbiome and metabolic support in a manner that is practical, feasible, and affordable. We strongly believe that improving health should not require extreme financial resources or highly specialized technical knowledge. In recent years, we also launched DCL Laser, which provides affordable photobiomodulation devices for personal and research applications. These devices are FDA safety certified, although we do not make medical treatment claims regarding them. I personally design and build these devices, and I have been surprised by the amount of positive feedback we have received from users. The impetus for creating such devices was the potential that I saw with my own son and my outrage of how expensive these devices were (not needing to be).

I believe there is substantial value in approaching biomedical problems from multiple disciplines. Throughout my career, I have worked as a quantitative analyst, physics and engineering instructor, radiation oncology physicist, and microbiome researcher. My work in microbiome research has been driven primarily by a desire to help my own child and subsequently others facing similar challenges.

Both Dr. Bogner and I strongly believe that having “skin in the game” plays an important role in developing practical and feasible solutions. I was fortunate to receive a grant from the Bia-Echo Foundation to pursue portions of this research full-time following reports of success in helping several philanthropic families.

Foundational Statements

Given two different individuals, if we could impart the same change in microbiome status (improvement) it can cause two considerably different levels of clinical improvement*, also given two individuals, if we could impart the same dysbiosis to each of them it would impart potentially two different insults to their ability to function, this is because the functional state of the individual is only partly dependent on the microbiome but also dependent on other toxicities or issues present at that moment. Furthermore, even*

small improvements in the biome (as we can measure) can provide substantial clinical improvements, there are also improvements that we can not realize or currently measure well, some in the viral, fungal, parasitic community, microbiomes of other organs, total detoxified load, and immune function . It is also apparent that the act of removing toxicity negatively affects the body and the microbiome state and defecation is a primary mode of detoxification particularly through the biliary system. We must view the microbiome as a tool for improvement whose dysfunction is negatively impacted by increased detoxification. Please reference my Pool Filter analogy later on in this document. It is very possible and often common for the microbiome to appear "worse" in some measure as the individual improves.This is best explained through the microbiome - filter analogy.

Prescriptive medications (antifungals, antivirals, antibiotics, etc) are powerhouses that disturb the balance of many microbiomes in the body without being well understood how, their mode of action is often beyond what is advertised. (Antifungals affect bacteria too and vice versa). Don't think that pharmaceuticals or even herbs / plant compounds act in a silo, pharmaceuticals are extremely potent and focused agents and should be assumed to affect balance unless otherwise proven. The continuous administration of a pharmaceutical can also tip the balance unless there is action taken to remediate that impact. Oftentime we see increases in proteobacteria as a result of using certain medications. Proteobacteria operate similarly to "Rats" in the subway.

One needs to limit as much as possible the use of antibiotics, antifungals and even antivirals for treatment, at the very least in their continued use. There may be a time for them but they are often use rigorously and beyond their potential. There are other pathways that are more sparing of the Gut Ecosystem, if these prescriptives are needed one should at least first consider the herbal alternatives which are often less focused and/or options of Pulsing and followed by alternative prebiotic / probiotic intervention to mitigate the damage caused. There are practitioners that treat for instance PANS and PANDAS with the regular use of antibiotics and other prescriptives and they advertise these as Treatment Protocols, often time chasing improvements which are followed by exacerbation of other issues. These don't work if you assess the patient over time, yes they may impart short term improvement but each time the response is like an addict requiring more and more to get the same effect until they no longer work. I completely and fundamentally disagree with this approach and if it worked then the groups wouldn't be full of messages of misery and "flaires". From the perspective of a parent who saw significant benefits with antibiotics and even antifungals- one needs to always ask what is the timescale for assessment for these particular therapeutics, if we are only evaluating the immediate gains and not the damage that appears much later then are we missing the big picture. What we gained very quickly was lost over months and created fungal states that were unimaginable. I don't like stating absolutes, but I believe Practitioners should not be using antibiotics to treat autism, Pans or Pandas in any way, certainly not as a first approach. Antibiotics are often an instigator or contribution for regression, antibiotics should be a hail mary last resort for any indication. Prescriptives need to be taken with caution, pause, and a well-thought-out strategy if needed at all. I have learned this the long and hard way, and I'm prepared to argue these points vehemently.

Another misunderstanding is the dominant "killing" action when taking a prescriptive (antibiotic, antifungal, etc). The thought is that these drugs are causing or are responsible for fighting the target pathogen, in actuality the dominant process of killing (in a healthy person) occurs from antibodies formed from antigens after the initial "kill" event. Your immune system rallies against the debris left from the initial kill. Such is the case that the same therapeutic can cause two different responses based on the state of the immune system. A healthy microbiome acts as a messenger to communicate who is the enemy to the immune system. This is similar to who society plays a role in catching the criminal (he went that way, wearing a red hat and blue pants). For instance the diflucan "Kill" in a healthy biome will be more effective than the "diflucan Kill" in a weaker biome. So my argument is not only should you try to minimize these prescriptives for their effects on the biome, but if you do consider them, they will have a better effect once the biome is in a better place,and using a pulsing

mechanism while positively supporting the biome in between, I believe, is most often a better choice if warranted at all. We know from the studies on oncologic patients that those who received immunotherapy and were initially non-responders became responders after initiating FMT and repeating the immunotherapy treatment. My argument is you must strive to harness your immune system to your side and by bringing your biome away from the extremes you can obtain this benefit.

We need to understand that the gut is a primary mode of evacuation of toxicity in the body, and that in itself might be the reason for the perpetual battle of dysbiosis in some*, as the systemic toxicity can act as a forcing function which requires that you have your finger on the button of microbial intervention for some time, months to years with gradual improvements. Toxicity exists in various forms, past exposure, present external exposures and burdens from within. Many people don't realize that the Microbes find a way to break down what is in you (for good and bad). For instance, a popular laxative that includes polyethylene glycol was thought to be safe on basis that humans do not have the enzymes to break this compound down….. However no one ever looked at whether bacteria could do so. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC187047/ and the product of the degradation is ethylene glycol (ANTIFREEZE). https://abc7chicago.com/miralax-action-news-investigaiton-wendy-saltzman/1777380/#:~:text=The%20FDA's%20own%20records%20actually,mood%20swings%2C%20aggression%20and%20seizures.*

Don't bet on one hit wonder solutions to "fix the issue" particularly in the GUT, for instance FMT - these can be very random gambles regardless of the donor quality, they can initiate or exacerbate MCAS if you have the right conditions in place*. The healing sometimes isn't meant to be quick, it is a lengthy process and even FMT when successful will almost certainly require continuous feeding / intervention because the problem isn't always in the gut, it is just that the gut takes a direct beating when detoxifying". I have witnessed enough FMT cases gone awry, and some that were "successful" fall backward. My focus is on feasible and practical solutions, FMT may be something that can fall into that category one day and I love the connections and amazing stories of improvement that have been documented. Like the following https://journals.lww.com/ajg/fulltext/2011/10002/fecal_microbiota_transplantation__fmt__in_multiple.942.aspx*

At the current moment if you were looking for the benefits of FMT, I believe that finding and screening a healthy toddler family member is better than anything practitioners can provide, cheaper, and feasibly re-doable (rectally), despite this I think Gut Balancing is a better and ultimately inevitable necessity.

Perfection is the enemy of progress*, your protocols need to be broad but flexible. Your diet needs to be broad but forgiving, abstaining from everything that is classified as bad can be impractical and knock down the entire house of cards. For instance individuals will completely cut out fruits because of the sugar content. It is the processed foods that we want to avoid, minimize things that cause strife, and broadly eat many things without binging, keeping moderation in mind. Eating fruit isn't the reason why you have inescapable fungal overgrowth, and abstaining from eating it isn't going to be the reason why it goes away either. Similarly the ideologies of removing anything related to or has been used in the same sentence with glutamate, or carving out every oxalate from your diet is a rash protocol. You might see some benefits but for the class of individual that is moderate to severe you will often sacrifice other benefits to hold these abstinences. There is also a time evolution for these ideas. For instance, excluding dairy may be an appropriate tool to reduce inflammation and prevent molecules from leaking across hyperpermeable mucosa, but as you heal, there is a place to include some dairy. In other words there is a benefit (many lactobacillus feed on dairy strong compounds) in including some dairy as you are able to tolerate it. (I recommend looking at Goat / Sheep Milk cheeses).*

Use the test to guide you, but just because you tested positive for something does not mean that is the reason for your health issues*, oftentimes it is a feature but not the origin or the place to start, this is very true with fungal overgrowths, including Mold colonization. The presence of abnormalities on tests could be features*

of other issues, and if you are only focused on normalizing a test, then you can lose sight of what may be important. I have done enough of these metabolic tests, some several in the same day to get an appreciation on their variability in part due to the inherent variation in the body at that moment. Understand that many test values can also fluctuate or require certain conditions for you to actually make comparable measurements over time.

***Reaction and reactivity do not indicate inappropriateness**, quite the opposite. I have scores of people that have told me that they can not take X,Y,or Z because they experience reactions from those items. This topic is heavily discussed in the realm of histamine and is severely misunderstood. Simply put, if you took these things in the past without issue and or if you take them and your reactions diminish with time, the reaction and reactivity you are experiencing is the product of your dysbiosis and shifting in the biome. I will touch on this more later.*

***If the protocol you are attempting is not practical or feasible or forgiving (requires perfection), then it is not a protocol worthy of trying**.*

***Don't discount genetics but don't let them rule your fate**. The number of gene encoding enzymes by the microbes in your gut is enormous. Metagenomic study of the human microbiome has demonstrated that there are 3+ million unique genes in the human gut, ~150 times more genes than our own genome. If you're using your DNA snps to corner yourself into what you should and shouldn't take - keep in mind there is a microbial voice that is just as powerful as you may be forgetting about. In my experience those that treat solely based on genetic snp-s limit themselves, if they were the cause of your issue then we wouldn't be able to explain regressions, or changes in function at later stages in life, spark events, etc. I've met practitioners that want to show me these exotic genetic tests, not realizing I've already extensively researched and performed several times over said testing…and the clinical intervention based on that produces limited results on their own. Genetics play a role much like your hand in a game of poker but rarely play the extreme limiting role that many make them out to be. There are a lot of fancy expensive Genetic tests out there, in my experience tweaking on genetics only gets you so far.*

I've been at the receiving side of dozens of practitioners or Salesmen trying to tell me about these genetic tests or implications. I've encountered cases of NON ASD adults who have become unable to hold a job at 20 to 30 years old after years of antibiotics or some infectious event or exposure to toxicity where they have spent years tracking down genetics to source their issues. Spontaneous genetic problems don't happen, similarly spontaneous food allergies or Oxalate / Histamine / Phenol Sensitivities just don't happen for no reason. What has changed - not the underlying genetics, maybe the expression somewhat through epigenetics but that implies they can change back. The microbiome is the most dynamically variable genetic factory, in terms of what it creates and expresses in us. So best to focus on getting the gut squared away and then use your human genetic SNPs to assist in the process. I've heard it too many times (I can't take this because of my genetic SNPs .. but you were able to take it years ago without issue.. Then that means something else is driving the issue)!

***Don't pin all of your problems on the dysbiosis in your gut** I do think dysfunction in the gut can be the impetus in many situations for the house of cards to fall down, I also believe it can be a slower contributor that builds up with time or even a spark like event when insulted, I believe the Gut status can be the product of some other trigger event as well. However if we only focus on the gut we lose sight of the complexity and interconnectedness of the issues that prolong, contribute, and initiate disease.*

Bacteria, Yeast, Mold, Virus, Parasites, Heavy Metals, Lyme, Autoimmunity, Malabsorption, Mitochondrial dysfunction, Pans, Pandas, Is this really what is going on?*You stumble upon an abandoned home, it appears the home had fire damage, water damage, and animal inhabitants. Which of these things happened first? Was it roof damage that caused the leaks and water damage, then creating an electrical fire in the home followed by the vacancy of the owners, termite and animal inhabitants. Could it have been the fire that started first, causing damage to the roof and so on. Is it possible that the termite problem was so bad that the owners left, leaving the house vacant and subject to the elements, leak, electrical fire ect. Could lightning have struck this ungrounded home causing a fire, etc. The point that I'm illustrating is that if you are looking at the end product of dysfunction, there are many ways to get there so it's impossible to answer the question of what was the cause.. There are certainly contributions to the current state and they superimpose and feedback perpetuating the dysfunction. You can't fix the home without fixing the roof, treating the termites and water damage, etc. What is the best order to fix the home? What we know is that the microbiome balance is tied to the state of microbes, fungi, protozoa, detoxification of toxicity including heavy metals, immune function, autoimmunity, intestinal permeability, malabsorption, inflammation, metabolism, etc etc. We shouldn't take from this that it all starts in the gut but we should understand that there are a lot of knobs that can be turned by tweaking the gut.*

For those that are looking for that specific overgrowth or undergrowth of a species as the reason for their disease state I would boldly suggest that they instead look at the overall balance *and try to connect the deeper reasoning as to why that overgrowth or undergrowth is present in the first place, don't attempt to pin the problem on 1 item. There are many that pin the problem on (take a card) klebsiella, Akkermansia, Methanobrevibacter, Clostridium, Streptococcus, etc. It must be understood that these do not exist in a vacuum and the human condition is to look for the bad guy, strike out what is wrong without analyzing the potential origins for those issues. Rats crowd the streets of NYC because there is a high density of people and trash available as food to feast on, it also happens with a cyclic nature (on the eve of garbage day). Termites infest a home because of the type of wood and sometimes the moisture content. For instance, in the case of the microbiome bifidobacterium plays a significant role in Gut PH. PH sets the climate for certain microbes to thrive much like growing conditions needed for various plants across the globe. We must understand the importance of balance in the microbiome not just targeting what is perceived bad or wrong (cut it out approach) and the relationship that this balance plays with the rest of the body, metabolism, genetics, detoxification, and neurotransmitter function.*

Take advantage of the history and knowledge of therapeutics with centuries of use in treating ailments. *Before there was testing, in the age of the healer we had remedies for various ailments. In each civilization there are holy grail herbs, Chamomile, Triphala, Codonopsis (dan sheng), Mastica, Turmeric, Fennel, Ginseng, many more than I have listed here. These have the benefit of hundreds of years of use, there is valuable information and therapeutic potential in harnessing these when appropriate.*

We must be aware of the timescale to assess improvement. *If you are expecting to take something and see benefits in the same day, that is entirely possible with components that support metabolic function, most biome interventions require weeks, and oftentimes you will feel worse upfront. If you are expecting to take something and NOT see reaction and reactivity when dysbiosis is present, then you've been lied to. I would argue that if you're not seeing these exacerbations then you're not hitting the bees nest. Don't specifically look for the probiotic you can tolerate. You should expect that the reaction and reactivity will dampen with time, and there are smart ways to support the reaction and reactivity including histamine suppressors, inflammation mitigation, pulsing treatment, antioxidants etc..*
Here are two images that can help summarize the experience and the



What is the timescale to assess change / improvement?



People ask about the role of the diet*. I have specifically worked with many individuals that actually have some of the cleanest diets, full of all the ideal things to eat with it seeming to have little representation with respect to the test results. In other cases (quite common) there are significant overgrowths like Prevotella that align with certain diets (for instance mediterranean diet), despite the child or individual eating absolutely nothing from that type of diet. The clearest example is the 8 month and 18 month biomes where these children have not even introduced solids yet but have prevotella copri occupying some 50%+ of their biomes (and they live in mold conditions). As I stated earlier there are forcing functions that exist that perpetuate the dysbiosis, this can include fungal overgrowths that feed bacteria via their metabolites to systemic toxicity that dumps into the biome disrupting balance to even complex viral relationships with phages. The diet is important, but with extreme dysbiosis it takes a backseat almost always. By the way P copri has been redefined to segatella copri.*

Along the same lines I will often hear the argument that biome balance various geographically, then how do we know what is ideal?

My counter argument is that no one has shown you can't optimize your biome to be a healthy, Japanese biome, or Chinese, biome, or Greek biome, or Russian biome, etc. The goal isn't to balance your biome based on where you lineage is from or even based on your current diet or your mom's cooking, it is to bring it away from the extremes found in the population. Regardless of the differences. There are still things each culture agrees upon (normal and extremes), it's that intersection that I argue (the guy in the middle is the safe place where you want to be) with respect to the microbiome. There will always be variation but there are clearly things that are not normal, typical. The "guy in the middle" is not necessarily the healthiest place to be but in the case of dysbiosis it's less unhealthy than in the extremes. I was at a Synchrony Meeting a few years ago where a PHD from holobiome stood up after I said to focus on the gut for health solutions - he said "we don't know enough about the microbiome yet to do that". I told him to speak for himself. This individual had a multimillion dollar biome generator and had been studying the microbiome for years with a PHD - however no practical solution for anyone, no support, no hope, making the problem entirely too complex to solve and without any respect for inherent toxicity or the other dysfunctions that need support. There are teams of academics that purport to know what they are doing or talking about but don't have the slightest clue of how to help anyone.

ASD is a broad diagnosis; the word potentially means something different for many*. ASD is touted to be both medically based, yet it isn't diagnosed as a medical disorder, often diagnosed by psychologists, psychiatrists, developmental pediatricians. There is an entire business model built around the diagnosis, insurance models to obtain and inhibit needed services. The definitions vary state to state, country to country. There are also those that align with the condition on the platform of neurodivergence. Surely this complicates anyone being able to discuss or talk about the same thing, even at the research level. This is why having only double blinded studies as the preferred study type is one of the silliest things particularly in the landscape of ASD. Somewhere we got the idea that we should let the placebo effect govern our research. I urge everyone to actually research the placebo effect, but this is besides the point. The correct way to assess clinical utility is by providing a placebo to the same individual, then giving that same individual the disguised therapeutic (blinded) and assessing outcome over time. Instead these studies are often performed giving the placebo to 25 people and the therapeutic to 25 different people and seeing which group does better. The latter assumes the people have the same dysfunctions and are a homogeneous group, this certainly is less true in ASD more so than the broad neurotypical population. Making the statement that people have Parkinson's is much more resolved, defined, and bounded than saying individuals have ASD. In ASD more than any other group we have a heterogeneous population described by a word diagnosed by someone observing behaviors tied to therapy and services with extremely blurred boundaries (and driven by reimbursements, yes we paid out of pocket for some psychologist to say my son had autism because the waitlist for insurance covered diagnostics was 18 months, it ended up being a waste of money because the services we thought he would have access to designed to help him haven't helped much of anyone). This is not to say these individuals are not autistic, but we can not pool them together and do research on them without determining commonality in their ailment. If you talk to any scientist (that does research and publishes in a physical science) you will realize that the ability to measure anything requires controlling the variables, if you can not assume the population is homogeneous then the utility of the experiment is impaired or lost, this is why if you want to correctly study a therapeutic and you are concerned about placebo you should initiate placebo then switch to therapeutic in the same group and NOT compare two different groups placebo vs therapeutic. I firmly believe this is why much of the literature published on ASD (or even outside this condition sometimes) has found conflicting data. Lastly the results of studies can be misleading and still include intended bias, studies cost money and require conformance to IRB's and extraneous rules, we lack thousands of studies on therapeutics that are known to have benefits because they are not feasible or profitable to do. The only groups that can perform studies at will are those with*

sufficient funding because of the immense expense. At the end of the day studies are nice to have, must be taken with a grain of salt because the best metrics will always be what you can do with the patient and in your clinic, the origins of medicine did not initiate with an IRB, the randomization for placebo, or the interest of pharmaceutical development and sale, the healer was integral and harmonious with the patient without disconnect, the only goal was making the patient better.

That being said, the way that I classify the type of ASD that I work with is moderate to severe dysfunction in the following areas, gross and or fine motor coordination, identifiable GI issues, receptive and expressive communication, metabolic and or mitochondrial dysfunction, autoimmunity, dysautonomia.

When dysbiosis is present, your program must have broad action, redundancy, support, but also be flexible if you leave something out or can not access it. *Typically those participating in GUT Balancing may require between 10 herbal pieces, 2 to 4 probiotics pieces, 1 to 3 antifungal pieces, 1 to 3 prebiotic pieces, and several pieces for support of various modes of dysfunction (histamine, oxalates, ammonia, adrenal, etc). This means a very complicated program. The majority of those participating in gut balancing were doing so with about 15 to 25 different supplements, this is the reason why I designed our products available at ResearchedElements.com, along with Dr. Christian Bogner; they are meant to fill the common core, make participation more feasible, affordable, and practical. These components along with emphasis in certain areas (per test results) reduce the complexity and quantity of components needed to participate. For everyone reading this now, the products at researchedelements.com came from a need to make gut balancing more feasible and affordable, gut balancing originated well before researched elements exists however the complexity and cost meant it was more difficult to implement.*

Don't take probiotics expecting them to join your biome - assume that they do not colonize. *Probiotics can shift balance in the gut, they typically act like sell swords, they go in and "police" and leave. Appropriate Prebiotics can be of the most powerful tools for shaping the gut including growth of the "good" and balancing where there is deficit, but it requires the knowledge of what is needed to be fed and how to feed it. Herbs play a similar role to probiotics in damping down sometimes with prebiotic effects too. The combination of all three are required to shape the gut when dysbiosis is present. If probiotics are the police in society, just having police will not solve the crime issues, you need stable jobs, economy, education, tourism, a legal system, etc. These are the roles filled by diet, prebiotics, herbs, etc, the tools we have to get things back in order. For instance I used Bacillus Coagulans to raise Faecalibaterium, I use L reuteri Dsm 17938 to bring down methanobrevibacter smithii, I use S boulardii to reduce clostridium and pseudoclostridium.*

Wait, I have parasites, Mold, MCAS, Phenol Sensitivity, Salicylate Sensitivity, Copper Imbalance, heavy metals, Lyme, bartonella, fungal overgrowth. I need to treat these things first before working on the gut? *No!, I would say you want to start with the gut, the sensitivities you will find will diminish with time, and you will gain a better immune function so that other treatments you pursue will have a higher chance of success. Phenolic compounds and salicylates are ubiquitous in foods such as fruits vegetables. Often times the reason for people's reactions to them is their gut status, when you properly intervene there and support your body those reactions and reactivities diminish. For almost every individual that I have encountered in the adult world with these sensitivities and intolerances, they had no problem eating them before their "event". If you have eaten these things in the past without issue.. The status of the microbiome / mucosa is very likely the culprit. No one is saying to binge on these items that are reactive, but critical abstaining when the compound has other benefits will perpetuate your feedback loop. At the end of the day practical moderation is a good rule to apply.*

I have SIBO, I have Candida, I have Mold. *These are common statements that I hear and I would say the vast majority of people have their own diagnosis wrong, I'm not disputing the existence of these situations*

however many of these catch words can funnel you down the wrong paths. I would estimate that more than half that believe they have SIBO don't seem to have the classical overgrowths that accompany them - we must not assume that when you have reaction and reactivity to taking things that you have SIBO. No one is doubting your pain or discomfort. Regardless, I find it less productive to discuss these points and just incorporate components that will address the issue even if it was there. It is important to distinguish that if you believe you have SIBO, that isn't a contraindication for probiotics - remember probiotics won't colonize, they will damp down overgrowths and are very appropriate in these cases. SIBO can actually be thought of as a deficit in some ways of beneficial microbes. Regarding the Candida and Mold statements, keep in mind that molds do naturally occur in the gut, so surely you mean you have a non ideal overgrowth of MOLD, Candida is a genus for which there are several species for, it is quite vague and likely you are inferring this from some indirect method (which is fine). There are no great tests for fungi, ITS testing can offer some ways to measure the fungal problem but we are limited with fungal libraries, the complexity that the fungal ITS gene is quite variable in basepair length (unlike the 16s gene) and even if you found the problem would you actually have more actionable information to do something different about it other than what you would do with a standard clinical approach. Remember the interventions for fungal overgrowth don't really change depending on what you may have found. Back to the MOLD quantification issue… the best way to term this entire issue is fungal overgrowth. MOLD is not the same as elevated mycotoxins, mycotoxins can also be produced from yeasts (candida) growing inside you, or you could be exposed as well. There are a lot of thin lines here and the distinctions don't necessarily make a difference. We can not pin the entirety of fungal problems on Candida and Mold solely. There are many yeasts that can actually behave like molds in different PH environments. At the end of the day I argue that the intervention to address these things looks similar, it must be feasible and practical and it must be supportive of the biome.

I need a stool test that tests for "pathogenic species" so I can know if I have them or not. *You should always ask the question, "is the test going to actually dictate how I treat the issue, will it affect my intervention?" If an individual has elevated proteobacteria or a specific identified proteobacteria I will still approach that component the same way clinically, with broad targeting and support for the beneficial microbes in the gut that will lock in defense. You might say but why would you want to limit yourself to not knowing what is really growing, and my response would be*

1) *Just because you test positive for something doesn't mean that is causing the issue.*
2) *I'm trying to not send this patient to the poor house by suggesting testing that won't change the intervention. I include a broad component to cover this and believe that work done to restore balance will further the effort.*

In the case of bacteria/archaea,The majority of pathogenic microbes can be pooled into the phylum of proteobacteria and luckily there are many tools that provide broad assistance with targeting proteobacteria. (I like Pomegranate Peel as one of them). Also know that their presence will often be a function of your GUT Climate (PH) and lack of beneficial microbes and or chronic or stored toxicity. Remember that tests that use only qPCR techniques to look for lab suggested issues, will only be able to find those and may miss items, they are also subjected to their in house ranges and you can not compute relative abundances in qpCR.

What about heavy metals where do they stand in this? *If you have listened to some experts like Dr. Chris Shade, the individuals that 'got good at working the gut' have seen progress in the heavy metal arena, that is because you can accumulate toxicity (including heavy metals) if your biome is not balanced for different reasons, 1) microbes play a role in detoxification, 2) if you gut is permeable that adds a burden to detox and can allow leaking to happen, 3) if you gut is inflamed that takes away energy and detox power to deal with the daily exposures you face, LPS etc, the biliary system is implicated heavily in detoxification, there is a feedback loop between gut / liver / brain. There is a time and place for chelative tools for some individuals .. it should come after getting some semblance of balance in the gut. Remember the act of detoxification degrades the microbiome.*

I can't take probiotics, I react to them, I can only take LOW HISTAMINE Probiotics

The concept of histamine as a contribution from probiotics is severely misunderstood and has been misinterpreted and used as a marketing tool.

Oftentimes you will hear about the histamine burden imparted by probiotics, the issue with histamine is not from probiotics or components that are assumed high in histamine. The issue with histamine as experienced from those suffering from histamine issues is the result of shifting dysbiosis and histamine release from mast cells. It turns out that the mast cell issue is a dominant generator so dampening is needed. Simply put if you are specifically looking for probiotics that don't cause you reactivity you are looking for duds that likely won't benefit you in any way.. Probiotics that cause reactivity (and are appropriate for your situation) are from shifting the microbiome to a more favorable state, shedding of bacteria will do this. One way to tell this is what is happening is when the reaction and reactivity diminishes over time and as you increase in dose. Remember reaction and reactivity do not indicate inappropriateness.

There are folks that have all of sudden at some stage in life developed histamine intolerances to everything, phenol or salicylate sensitivities, oxalate (misunderstanding) where there were none before, these are clues that the real issue is what has changed in the microbiome or in the way of intestinal permeability and nothing to due with the "human genetics" they were initially dealt. It is important to not embark on a mission of abstinence from anything and everything to satisfy these reactivities, doing so can often lead to exacerbations in other areas that perpetuate the host's problem and health issues.

In one gram of stool there are trillions of microbes, typical dosages of oral probiotics are in the billion CFU range. This is many orders of magnitude less than the amount of microbes in your stool. When you shift the microbiome (change the abundance of species) those microbes can shed, die, burst, and the processes in the body that resolve that debris causes extreme swells of histamine to be generated as part of immune processes, many of which are mounted by mast cells that line many of the tissues in the body. Simply put, the dominant release of histamine is due to the mast cell component and the immune activation, not from probiotics that are generating or carrying histamine (as you would measure in vitro). Since the relative difference in microbes of what you are ingesting to what is in your bowel are many orders of magnitude different, there is no possibility that histamine generated or carried from probiotics could be responsible for the reaction and reactivity experienced. It's not that histamine isn't the problem, it's that the source of the histamine is the immune process that follows when the biome is shifted /shed, and the mast cell's release of histamine in response to these events.

Supporting your mast cells allows you to take components that you react to - there are tools for that. The amount of histamine produced by a few billion probiotics would be akin to a grain of sand vs an entire beach of sand, the beach being what is produced by your body / or what gets released from shifting dysbiosis / changing the ecosystem. The point is that this histamine generation and release can be largely mitigated by inhibiting mast cell firing, and the amount that the biome shifts by taking said probiotics, prebiotics and herbs will also reduce with time.

Keep in mind there are about a trillion microbes in 1 gram of stool .. typically you're shedding many hundreds of grams for a bowel movement so trillions of bacteria in 1 bowel movement
taking a few billion probiotics - several orders of magnitude less than what you have in a bowel movement in terms of the quantity of microbes and it is carrying or generating the histamine, however

the immune response from shifting biome, antigens, signaling, mast cell response contribute that histamine surge, and the best way to mitigate that is with flavonoids, and supporting genetics.

We have a product called histamine halt from researchedelements.com that is specifically designed to inhibit these histamine surges. Once again, if you're looking for a low histamine product, it's like looking for a movie that can fix your car, the statement doesn't make sense because histamine generated or carried by the probiotics as measured in vitro will pale in comparison to what is created by shifting the biome. If your probiotics are not causing reaction and reactivity (what you perceive as histamine high probiotics) then your probiotics are not effective. Individuals with dysbiosis can and should expect some level of reaction and reactivity and that will diminish with time and the level of dysbiosis as each shed event becomes less. No one has fixed their gut issues with "low histamine" probiotics, you might as well just drink water alone.

Low histamine probiotics are the biggest nonsense of the century..pinning the problem on what the consumer feels first, lets sell them something that doesn't aggravate them but also doesn't fix their issue. It's the changing of the microbiome that is a complex process of immune activation / antigens / receptors which causes histamine to be produced from mast cells. If you have dysbiosis, don't look for probiotics that you are tolerable to, because they are likely doing nothing.

What about Akkermansia and Akkermansia Probiotics.
Well akkermansia is a microbe that feeds on the mucosa in a synergistic way, the lack of or underrepresentation of akkermansia is a signature for a mucosa that is not in good shape, depleted, damaged, and prime for intestinal permeability (leaky gut). You don't restore akkermansia by taking it as a probiotic - just like many probiotics their ability to join the ecosystem is in part related to the prevalence of food "prebiotic" they need to grow. Folks that take those akkermansia probiotics may see numbers increase temporarily however they drop thereafter. You can find better success in taking things to restore the mucosa, we have put together a product called Mucosa Master which includes many compounds that

1) *Stimulate goblet cells to help regenerate the mucosa*
2) *Help provide some base building blocks and emphasize glycoproteins*
3) *Help to coat the gut so the mucosa can regenerate*

What about binders? *You can get very fancy, there are dozens of binders out there and then you will find a practitioner that tells you to time the binder relative to taking a probiotic or herb. I strongly feel that your program must be feasible and practical, if you make it too complex then things start to fall apart. I prefer to use a simple good quality activated charcoal and I'd rather take it a few days per week and before bed assuming that constipation is not an issue. Activated charcoal is one of the safest binders and has an affinity for many things, it's a great endotoxin binder. There are certainly other binders, it is too complex of a subject to dissect whereas activated charcoal gives a reasonable and safe assist in many situations.*

There are many that don't believe that the Autism Gut is any different from the Neurotypical Gut*. When you have heterogeneous populations and broad definitions of the disorder I'm surprised people could come to this conclusion. Who cares… There is dysbiosis in and outside of autism, the correct position should not be comparing the ASD gut to the non ASD gut, the position should be…. there is clearly improvement seen when you intervene in the ASD Gut, it is a tool for modulating health, detoxification, metabolism, etc. There are claims that the microbial state is a product of the diet / picky eating. I have seen personally some of the cleanest diets in ASD still yield and perpetuate dysbiosis, I have also seen diets that do not reflect their stated microbial signatures like in the case of prevotella copri (the 8 month old who has a 55% abundance of this microbe who somehow has embraced the mediterranean diet). There are a lot of people ready to write off what*

is and what isn't particularly those who haven't been privy to the experience of improvements in ASD by modulation of the gut. Read on to my description of the microbiome as a Filter - if you subscribe to this understanding it means you CAN NOT fundamentally compare two microbiomes to assess the health state or status of the individual.

What about Suramin in the Context of Autism and the Cell Danger Response

So much about this therapeutic that I believe is misunderstood. I needed to write about it here so people would stop asking me. These are my opinions and views so feel free to generate your own and agree or disagree.

1) *It doesn't cross the BBB - so I don't understand how this crazy idea of cell danger response makes any sense. If the CDR is in the brain then why would suramin be acting on it?*
2) *Okay you acknowledge it doesn't act on the brain because it can't cross the BBB but other things can and it acts on the gut …. Well why don't you just focus on the gut then and do microbiome balancing.*
3) *CDR - the cell danger response, your saying it is the cause for this distress and alarm in autism .. why would you want to turn it off. It's clearly ON for a reason.. To protect us we already know there are hidden and visible infections in ASD. Wouldn't the logical approach be to settle the infections that are driving the CDR? Turning off the CDR wouldn't solve the problem, only put blinders on for the individual that's walking through a war zone.*
4) *Did anyone actually look at the trial data, it wasn't that great on the second expanded trial and the drug is pretty darn toxic. There are all these conspiracies that this drug is being covered up, the truth is this CDR theory sucks, and the results are not that impressive.*
5) *Has anyone maybe invoked occam's razor… the drug is an antiparasitic. These kids have severe dysbiosis and parasites can be a huge feature of that. Have you thought maybe the improvement was from its antiparasitic components? We see benefits with other antiparasitics too.*

What about Glutathione

It is important. There is a difference between taking glutathione, taking precursors, and taking things to help recycle your oxidized burden. When you "use" glutathione it gets oxidized and needs to be recycled. Without recycling it, too much will build up and cause inhibition of certain other cycles in the body. We developed certain tools to help MAKE and RECYCLE glutathione and we have found those to be better than taking glutathione (because most glutathione oxidizes and doesn't get to where you want it in time). That being said, the act of detoxifying negatively affects the biome - that toxicity gets conjugated and dumped into the gut via the biliary system. Too much glutathione or detoxification can be a problem, all of these knobs need to be tuned finely over time for optimal healing (impedance matching) don't go too hard or quick on a particular item. Take a peak at THIOGUARD and GLUTATHIONE GENESIS lotions - the skin is a very underutilized organ for invoking toxicity and gaining access to a large surface area for cellular potential. [Here are some messages on the thioguard lotion by itself (from years ago)]

What About Other supports Fish oils, Leucovorin Etc.

Fish oils can be helpful once you calm down the system such that your histamine bucket isn't overloaded. Some do better with some Omega 6, GLA, some don't need it. That is hard to know without trying to do some testing. We make a product called MITOMIND from researched elements that attempts to put some

unique beneficial speech bolstering components in a single formula. Many people like it, some people don't, it's something you unfortunately need to try to make that assessment.

Continuous use of Folates can cause clostridium overgrowths to be emphasized, it has been observed that individuals with high positive folate receptor antibodies have had their status REVERSED after participation in Gut Balancing. For us this makes perfect sense because this AUTO ANTIBODY dysfunction like so many other AUTO ANTIBODY dysfunctions are driven by intestinal permeability (leaky gut) created by dysbiosis. What we know is that your gut produces an amount of active folate and the amount that you absorb is also dependent on the microbiome distribution. All of these point to the same logical conclusion - stop taking the drug addicts approach to solving your problem, fix the gut and reduce the amount of Leucovorin you potentially need or need at all. There is a blurb on Leucovorin and the FRAT test towards the end of this document in the Special Topics Section.

Tell me again why don't you use these other fancy expensive tests? Tiny Health? GI Map, BiomeFx, etc

I'm somewhat biased on this because I've built my own test and pipeline (which straddles multiple databases) for exactly what I'm looking for, because those other tests failed to show me the problems and what I've found to be most helpful, for what I trust, reproducibility, feasibility, and practicality of helping people. Regardless of the test, if the practitioner you are using doesn't know how to use the test or the limitations that test has then all bets are off. I've not found GI Map to be reproducible, this has been something other practitioners have shared as well, that is my opinion. I have not found Tiny Health to be helpful or any practitioner able to help people with that test either, it's very cosmetic. Biome Fx tells me things that I don't care about and are not important for actually helping people. If they worked people would see results, go find those people .. crickets. They also cost a lot of money.

Are there any good tests for fungal or parasitic dysbiosis

No, part of the issue is the incomplete databases, part of the issue in the Protozoa testing is False Negatives. To date the best approach is using symptoms and treating in a pulsed manner with things that are most respectful of the biome as possible. I'm sure there are tests that are better than the worst ones, for my using the clinical symptoms has been the best strategy.

What about oxalates?

Oh boy …. Things that are important but severely misunderstood. See the Blurb at the tail of this document.

What are core things that folks may need to address prior to or during microbiome balancing?

Potential for constipation / motility support
Histamine Burden
Oxalate Burden
Adrenal Fatigue
Metabolic Status / Nutraceutical Support / Mineral Status
Glutathione Synthesis and Recycling Support
Ammonia / Nitrogen Burden
Viral, Fungal, Parasitic dysbiosis
Toxic Load, Chemical / Heavy Metal
Liver/Kidney/Lymph support, Bile Status, Reabsorption, Intestinal Permeability

What about stem Cells (Autism)

If you can afford them, do them if you find a reputable place that is feasible. The Cost / Benefit I think is not comparable to what you see in working the microbiome however for some people it is the only option or provides a significant leg up.

What about primitive reflexes / Brain Balance (Autism)

I think it is interesting and it is worth looking into. Ask another parent for recommendations.

What about Photobiomodulation (Autism)

I make the devices for www.dcllaser.com - you could guess why.

What about MAPS

I agree with the intent of the organization, I really do, there are some great folks there. However, I think there are some clinicians that are not so great, some protocols and advice that I don't agree with that have become echochambers (Pans / Pandas approaches), generalizations about things like Leucovorin, Super Sponsor advertisers which get the highlights and deal their spiel . There is no real demarcation for things that are effective or for clinicians who are misleading, providing bad advice, vs those with actual results. It's not MAPS fault - it's the nature of the beast, they are certainly a Bulley Pulpit for driving the biomedical awareness in special needs and I'm a big fan of that. Lets just say it out loud, there are some really bad practitioners out there and some of them wear the MAPS hat, charge a lot and dish out the same "protocols" and advice to everyone, that is not tailored medicine. There are also some great MAPS clinicians. Keep in mind the current President of MAPS has used my biome software (both old version and New) in his practice for years with great feedback and messages, I've also collaborated with Dr. Usman who is a powerhouse.

What about TACA

I think this is an organization just trying to hold on to whatever it can, I think they are playing all their cards and really sold out during their "name change" from Talking about Cure for Autism. They have had no interest in collaboration at any level; there seems to be some favoritism for sponsors that reinforce their agenda. Sorry Not a FAN

What do you think causes Autism?

Well you better be able to define it first. The diagnosis has been ripped to shreds and has little to no meaning these days. Happy to answer this question in a targeted way for the targeted audience… I'm more interested however in what can help your kid with Autism. If you're not interested in that you shouldn't be reading this.

What do you think about MERT

I've not had many people indicate this was worth the money spent, few improvements at best, that however is a generalization.

What do you think about Chelation

The word is overly and incorrectly used, technically chelation implies the therapy is chelating metals through chelate bonds .. A few things actually do that. However there are therapeutics that withdraw heavy metals via NON chelate bonds. That being said, I think this shouldn't be entertained until some level of support for the microbiome and body have been initiated.

What do you think about GLIA Plasmalogens

I honestly think that company is a scam. There have been some shady things going on (if you search the news in terms of claims and large sums of $$$ sequestered). I have had SEVERAL parents tell me similar things, feeling skeptical. I personally believe that any benefit would be rendered for those who have never used fish oils or similar products. Many years ago I personally tried this brand for several months, I noticed that I was heavily being targeted by "affiliates" trying to sell me more in some kind of pyramid setup. I Joined a FB group and saw no actual feedback or positive messages from individuals, when I asked that we setup a simple

google survey so parents could leave their feedback to get some more information (for the folks that I work with so I had more information) I was kicked out immediately from the group. I've since seen a few folks endorsing this product however I too think there is a pay to play going on. The oil smells overly rancid, it is insanely expensive, the theory how this could solely be at play doesn't make sense. The last sentence expands upon individuals pushing this saying that "this is the reason" for the issues and dysfunctions we see.

What do you think about Sporanox

There is a difference in absorbability or metabolizability of Sporanox (which as I understand is no longer made) and Itraconazole. Pulsing for those where it is appropriate and with microbiome work in between (that is a question in itself). If you want more bioavailability consider dissolving the Itraconazole pellets in MCT oil with Ascorbyl Palmitate (fat soluble vitamin C). It's not the savior that it has been made out to be.

What do you think about FMT

I'd only consider it from an infant or toddler where I was able to do the testing and administer it rectally myself and only as a means to bolster the ecosystem and then follow it with targeted
I think there are some big named clinicians doing it expensively and with some really bad results (I know this) and with some really bad bedside manners (from multiple people sharing their experiences including some who have been employed by them). I think there is a level of risk that goes beyond the reaction and reactivity. I think that even when it "works" its benefits fade and longer and more doesn't change the equation. You can't take a bad soup and always make it better by mixing it with a good soup, you need to know what ingredients are needed to fix the bad soup. I think it has powerful potential and for those that have no other option it could be a random gamble that gives you a decent leg up but more so outside of autism because for instance individuals with mold toxicity have become significantly worse in the immediate short terms following FMT . I personally think it's the tool of folks that don't know how to shift the biome, I'd consider it my very very last hail mary if one could afford it, not a practical feasible or affordable solution for the majority. I happen to know some folks that have done so many administrations and taken on new issues each time. Don't assume that your published and authored FMT Guru actually knows what they are doing, I've been privy to one recorded consult and it was pretty scary *she* didn't even know the correct bacterial names, classifications, and even median abundance levels.

Pivotal Change in Understanding - Detoxification as a Forcing Function impacting the Microbiome & Results of Gut Balancing + Nutraceutical Support.

First we must establish what autism is… that is nearly impossible for a variety of reasons. Let's assume for the argument of simplicity we are addressing autism as those affected from the moderate to severe classification requiring legitimate daily or continuous mid to high level life support. The microbiome plays a critical role in numerous physiological processes, including metabolism, short-chain fatty acid production, nutrient absorption, methylation, detoxification, and immune regulation. Notably, modulation of the microbiome—such as through fecal microbiota transplantation (FMT)—has been associated with improved immune responses in certain clinical contexts, including immunotherapy outcomes in melanoma patients. However, one area that remains

underexplored is the impact of intrinsic host toxicity on the microbiome, particularly during periods of increased detoxification activity that may be increased by therapeutic agents or modulation of the microbiome.



A simplified analogy is to view the microbiome as a filtration system in a swimming pool. In this model, the pool water represents circulating biological systems, while debris in the water and along the pool walls represents both circulating and stored toxic burden. This “toxicity” may include environmental chemicals, metabolic byproducts, or heavy metals, reflecting both accumulated exposures and ongoing inputs.

As the filtration system works to clean the pool, it temporarily accumulates debris and becomes strained. Similarly, as detoxification processes are activated in the body, the microbiome may experience increased stress or disruption. For instance there are many species within the proteobacteria phylum that break down and feed on toxicity increasing as the result of detoxification. The effectiveness of clearing this “pool” depends on both the condition of the filter (the microbiome whose efficiency changes as a result of its state and balance) and the amount of circulating and stored debris.

As detoxification progresses—particularly when deeper, stored burdens are mobilized (analogous to scrubbing the walls or floor of a pool)—the microbiome may experience increased stress and therefore require additional support. Over time, as the system approaches a cleaner and more stable equilibrium, the burden on the microbiome decreases, and less intervention is required.

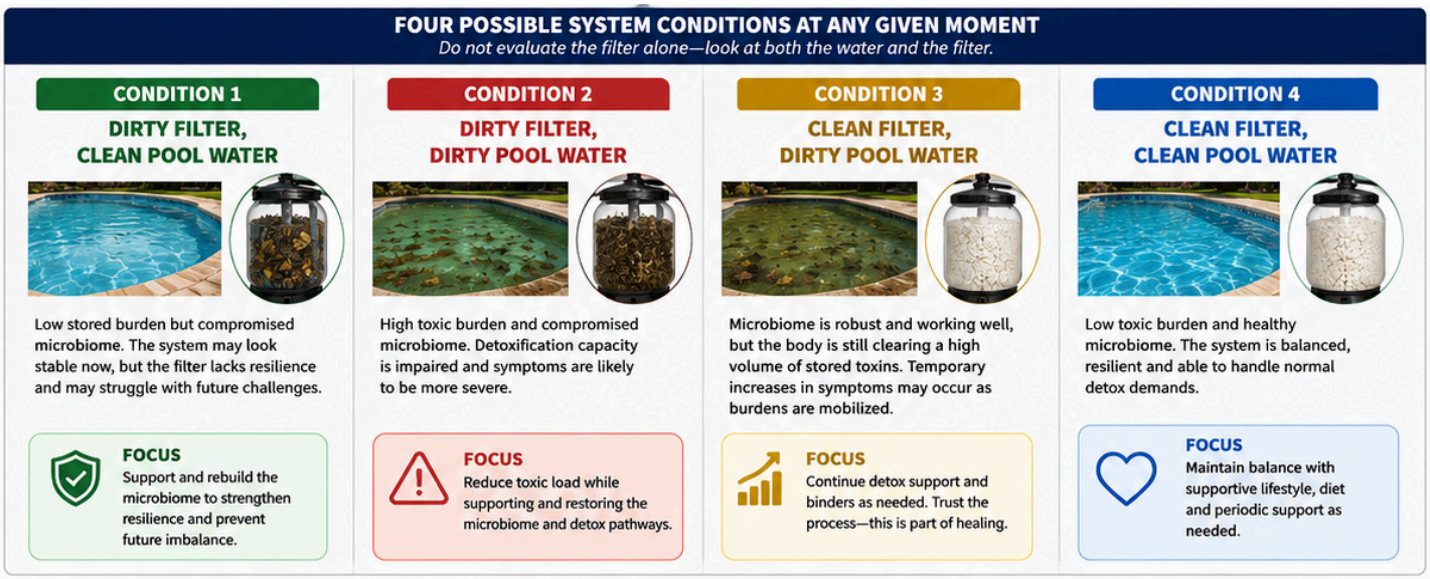
This framework highlights that microbiome-directed interventions are highly dependent on an individual’s underlying toxic burden. It also helps explain the significant fluctuations, or “dynamic responses,” often observed during the early phases of intervention. We believe these dynamics contribute to both the variability in clinical response and the difficulty in consistently characterizing microbiome patterns in individuals with ASD.

A Pivotal Change in Understanding - The microbiome does not correlate directly to overall severity in Autism, and changes in the microbiome do not directly indicate improvement or worsening, however the correct understanding is that the microbiome implicates and impacts real time toxicity, detoxification and metabolic function.

Where did this pivotal change in understanding occur? It started during the pursuit of understanding the therapeutic we developed - Thioguard Lotion which helps to recycle oxidized glutathione among other benefits (further described toward the end of this primer). The lotion was helped discovered by an Autistic Boy who was

being consulted by Dr. Bogner and discussing some compounds that may be beneficial. The active compound STS which was found to be helpful in various ways was first used orally. It was first noticed that this compound produced some short term constipation in some individuals. For various reasons it was decided to move forward with a topical version of this therapeutic, it was also noticed that even topically this lotion induced short term constipation. The eureka realization became apparent that the upregulation of detoxification through increased glutathione potential was pulling toxicity into the bowels (whether topically or orally). This dynamic began to explain the ODD dynamics of worsening biomes in some individuals as they undertook interventions to “stir” up toxicity or enhance detoxification (even as they reported clinical improvement).

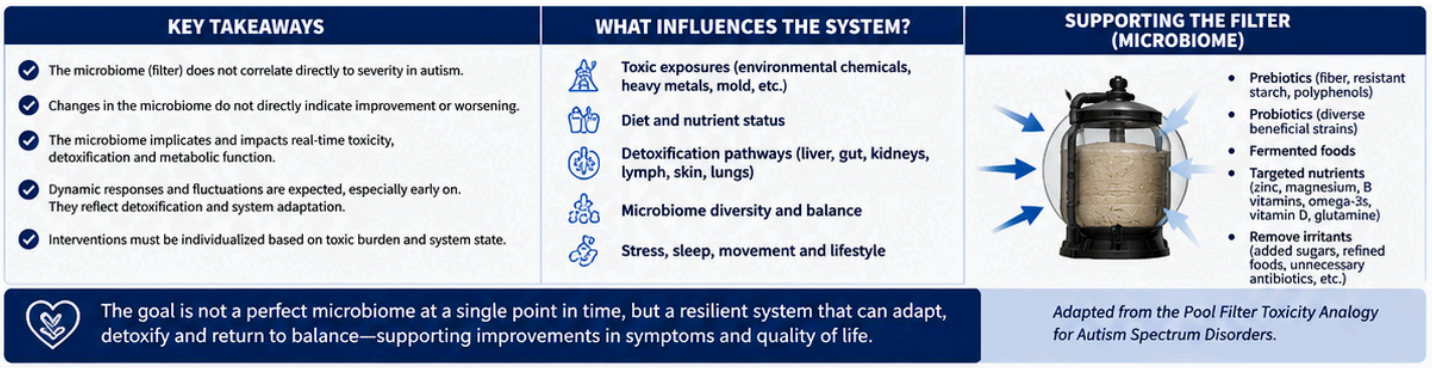
A key limitation in current microbiome research in autism is the tendency to evaluate the system at a single point in time and correlate it directly with the disease or disorder severity. In the pool system filter analogy this would be equivalent to assessing only the **condition of the filter** without considering the state of the pool water, the debris in the pool or adhered to the pool walls or floor. At any given moment four distinct system conditions can exist:



- **Condition 1: Dirty filter, clean pool water**
  Represents a system with relatively low stored toxic burden in the body but a compromised microbiome. While the overall system may appear stable, the microbiome lacks resilience and may not adequately handle future toxic or metabolic challenges. These states are tipping points for a future health crisis. Any significant toxic exposure, illness, immune reaction may project the individual into a downward spiral.
- **Condition 2: Dirty filter, dirty pool water**
  Represents a system with both high toxic burden, potentially stored toxicity in tissues (pool walls) and a compromised microbiome. This is a clearly unfavorable state, where detoxification capacity is impaired, toxicity is circulating and stored, and systemic stress is elevated.
- **Condition 3: Clean filter, clean pool water**
  Represents the optimal state, where both the microbiome and the overall system burden are well-regulated and functioning efficiently.
- **Condition 4: Clean filter, dirty pool water**
  Represents a transitional state. This may occur shortly after a positive microbiome intervention, where

the microbiome is functioning well but the system is actively mobilizing and processing stored toxicity. It may also reflect recent exposure to external toxic burden in an otherwise well-functioning system.

If we evaluate only the state of the “filter” (microbiome), we cannot accurately determine the condition of the “pool” (overall systemic burden). Similarly, assessing microbiome composition in isolation does not provide a complete picture of disease severity or progression in ASD.



We further emphasize that stored or latent toxicity in the body can be compared to grime and debris attached to the walls of a swimming pool. When this debris is scrubbed away, the pool water becomes temporarily dirtier. Similarly, in the human body, interventions that mobilize toxins—such as chelation or other detoxification strategies—can temporarily increase the body’s toxic burden. This added burden may further “tax” the body’s filtering and regulatory systems, contributing to stress on the microbiome even as the body gradually moves toward an improved state. As the system becomes cleaner, it may ultimately achieve greater stability; however, early interventions can produce significant fluctuations in microbiome composition and function.

Given these dynamics, we believe it is not possible to properly design or evaluate microbiome interventions in ASD without accounting for the effects of underlying toxicity and toxin mobilization. In our view, microbiome balancing combined with appropriate nutraceutical support represents the most effective strategy for addressing microbial instability and dynamic shifts in autism. This may help explain why single-modality treatments—such as antibiotics, antifungals, fecal microbiota transplantation (FMT), or biocidal herbal agents—often are largely unsuccessful and when they produce inconsistent or limited results. These interventions are frequently applied as “black box” approaches that fail to account for their individualized and system-wide effects on the microbiome, as well as the changing microbial dynamics that occur over time.

Once again to reiterate the points above

1) The metric for improvement for individuals balancing their biomes should be the actual clinical changes in the individual and not directly assessors based on microbiome data, the reason is because oftentimes some metrics as measured on the test can worsen due to the following reasons. We often see some elements of the test get worse as the individual improves (for instance proteobacteria spiking tends to suggest increased detoxification particularly in the wake of heavy metal excretion)

AI Overview

Yes, Proteobacteria (previously pseudomonadota) are major players in the detoxification and bioremediation of heavy metals, acting through mechanisms like biosorption, bioaccumulation, and redox transformation. They, along with other microorganisms, can change the oxidation state of metals—such as converting toxic mercury (Hg(II)) to less toxic Hg(0)—or sequester them using extracellular polymeric substances (EPS). National Institutes of Health (.gov) +1



Key Mechanisms of Heavy Metal Detoxification by Bacteria:

- **Biosorption:** Bacteria use cell wall components (carboxyl, hydroxyl, amino groups) to bind metallic ions, accumulating them on the cell surface.
- **Bioaccumulation:** Active transport of heavy metals into the cytoplasm, where they are sequestered.
- **Redox Transformation:** Alpha-, Beta-, and Gamma-proteobacteria are responsible for 60–80% of reported biotransformations of metals like arsenic and chromium, changing them into less mobile or less toxic forms.
- **Efflux Systems:** Some bacteria use molecular pumps (e.g., *mer* and *ars* operons) to export toxic metals out of the cell, reducing intracellular damage.
- **Extracellular Polymeric Substances (EPS):** These substance help trap toxic ions like cadmium (*Cd*), mercury (*Hg*), copper (*Cu*), and cobalt (*Co*) outside the cell. National Institutes of Health (.gov) +4

AI Overview

Proteobacteria do not "eat" heavy metals for energy in the traditional sense, but they are highly adept at resisting, accumulating, and transforming them, often thriving in contaminated environments. Through mechanisms like bioaccumulation, biosorption, and reducing oxidation states, specific strains can immobilize toxic metals, making them key players in environmental bioremediation. National Institutes of Health (.gov) +4

- **Resistance and Tolerance:** Proteobacteria, alongside Firmicutes and Actinobacteria, often dominate heavy metal-contaminated soils, possessing genes that allow them to survive in toxic conditions.
- **Bioaccumulation & Biosorption:** Proteobacteria (including species like *Cupriavidus metallidurans*) can bind heavy metals to their cell walls or accumulate them internally.
- **Metal Transformation:** Some Proteobacteria, such as *Pseudomonas* and *E. coli*, use transport proteins to uptake metal ions (like Hg, As) and use enzymes to reduce their toxicity or alter their solubility.
- **Metal-to-Gold Transformation:** *Cupriavidus metallidurans*, a type of Proteobacteria, can ingest toxic metal compounds and, through metabolic processes, turn them into solid 24-karat gold as a byproduct of its detoxification mechanism. National Institutes of Health (.gov) +4

While many Proteobacteria are known for these mechanisms, the highest biosorption efficiency is often found in *Firmicute* phyla, but living *Proteobacteria* are highly effective for removing metals like Cd(II), Pb(II), and Zn(II). ScienceDirect.com

A bloom of Proteobacteria following heavy metal chelation therapy is a well-documented biological phenomenon that signals acute microbial dysbiosis. This overgrowth occurs because chelation fundamentally alters the chemical and immunological landscape of the gut, removing environmental suppression and allowing highly resilient, opportunistic bacteria to multiply rapidly.

Why the Bloom Occurs

- **Vacated Heavy Metal Niches:** Proteobacteria possess high tolerance and adaptation strategies for heavy metals. When chelation removes toxic metals like lead, mercury, or arsenic, it eliminates the localized toxicity that was suppressing all bacterial growth, allowing the fast-replicating Proteobacteria to colonize the newly freed intestinal niches first.
- **Disruption of Essential Minerals:** Chemical chelators are rarely perfectly selective. In addition to toxic heavy metals, they bind essential trace minerals like iron, zinc, and manganese. Many beneficial obligate anaerobes (like *Clostridia* and *Bifidobacteria*) are highly sensitive to sudden drops in these essential micro-nutrients, leading to their decline.

Increased detoxification impacts the microbiome negatively, the best assessors until the biome starts to approach a steady state equilibrium (one that is less dynamic with perturbation) is clinical changes alone. There generalizations are emphasizing the worst case scenarios and relative to the initial “gut balancing” intervention, over time the test starts to be more representative of the clinical changes and more so for the less severe (biomedically complex and toxic situations)

Cellular debris that is released from the result of “the intervention” from bacterial, fungal, or viral shifting can impact the microbiome balance in itself oftentimes resulting in increases in Proteobacteria.

Yes, Proteobacteria increase significantly in the wake of cellular debris. This is a well-established phenomenon driven by **necrotrophic growth** (feeding on dead biomass), a shift in environmental oxygen levels, and the specific structural advantages that Proteobacteria hold over other gut microbes. National Institutes of Health (.gov) +1

When you introduce an antimicrobial agent—such as a systemic antiviral or an antifungal—the massive die-off of targeted pathogens transforms the gut lumen into an environment that perfectly caters to a Proteobacteria bloom. National Institutes of Health (.gov) +1

How Antimicrobial Debris Feeds Proteobacteria

- **Scavenging "Dead Relative" Biomass (Necrotrophic Growth):** When fungi (*like Candida*) or virus-infected cells lyse, they release a flood of intracellular components including free proteins, nucleic acids, lipids, and simple sugars. Opportunistic Proteobacteria (specifically the *Enterobacteriaceae* family, which includes *E. coli* and *Klebsiella*) possess rapid-uptake transport systems. They can immediately salvage and ferment this cellular debris as a direct, easily accessible food source.
- **Exploiting Released Host Nutrients:** Antivirals and antifungals don't just kill the pathogen; they also trigger the death of damaged or infected host epithelial cells. Recent research has demonstrated that when intestinal cells undergo apoptosis (cell death), they release specific soluble mammalian nutrients (like pyruvate and formate). Proteobacteria express unique genes (such as *pflB*) that allow them to exploit these host death-byproducts to exponentially accelerate their own colonization. National Institutes of Health (.gov) +2

Conceptual Framework and Temporal Dynamics of Dysbiosis

The conceptual limitations about the ability to “measure” the autism microbiome combined with the inherent heterogeneity of ASD—likely contributes to the inconsistent findings across studies investigating dysbiosis in this population. It also helps explain why short-term changes in the microbiome, whether improvements or transient worsening, do not consistently correlate with clinical severity.

In many cases, meaningful and sustained clinical improvements emerge only after multiple cycles of intervention and stabilization, as the system gradually progresses toward a steady state. The time required to reach this steady state varies significantly between individuals. For those with relatively low underlying toxic burden and mild dysbiosis, stabilization may occur within approximately 3 to 6 months. In more severe cases, however, achieving a stable state may require 3 to 5 years of continuous intervention, particularly as deeper layers of toxicity are mobilized through the microbiome.

Importantly, as demonstrated in this case study, clinically meaningful improvements can occur within weeks of initiating targeted microbiome therapy—even while the system itself remains in a dynamic, non-steady-state condition.

While this model of dysbiosis and intervention requires further validation, we propose that certain treatment modalities—such as fecal microbiota transplantation (FMT)—may be limited in their effectiveness. These approaches are often not tailored to an individual’s specific dysbiotic profile, are typically administered over short durations, and can be costly, endure consequences, and are less feasible for long-term use. In contrast, the Gut Balancing approach is designed as a continuous, adaptive process, using periodic microbiome testing and targeted interventions to maintain and refine system balance over time.

Perspective on Microbiome Individuality vs. Therapeutic Targeting

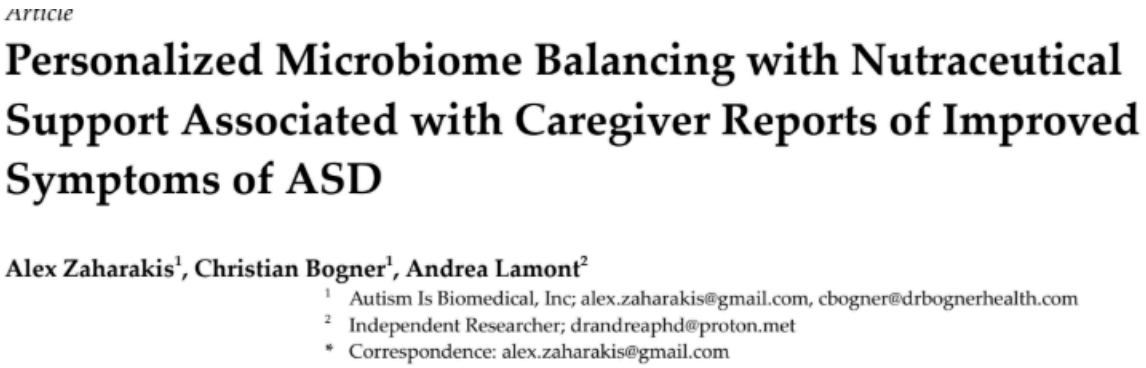
A common critique within the microbiome field is that each individual possesses a highly unique, region-specific microbial profile, making it difficult to define optimal therapeutic targets or determine the direction of intervention. This perspective suggests that without precise knowledge of an individual’s “ideal” microbiome state, attempts to shift microbial composition may introduce uncertainty.

In the context of dysbiosis, we challenge this assumption. Based on both clinical experience and applied modeling, we propose that guiding dysbiotic microbial populations toward median values observed in broader populations represents a practical and effective strategy. Shifting an individual’s microbiome toward these central tendencies appears to reduce pathological imbalance, is associated with clinical improvement, and significantly simplifies the otherwise complex task of microbiome modulation.

Furthermore, we are not aware of evidence demonstrating that such normalization—particularly when moving from one regional dysbiotic microbial profile toward a healthier or more balanced profile observed in another population—results in adverse clinical outcomes. On the contrary, this approach provides a pragmatic framework for intervention in the absence of a fully defined “ideal” microbiome for each individual.

Description of Gut Balancing & The Behavioral & Symptom Impact Results

The Gut Balancing model categorizes dysbiosis into 26 distinct modes of dysfunction. Each mode is associated with targeted nutraceutical interventions developed through years of clinical experience and supported by extensive literature on microbial modulation using plant-based compounds, herbs, probiotics, and prebiotics. A measure of the improvement from this gut balancing model is featured in the submission for publication (participants in gut balancing through www.autismisbiomedical.com supported in part by the Baia Echo Foundation).



Article

Personalized Microbiome Balancing with Nutraceutical Support Associated with Caregiver Reports of Improved Symptoms of ASD

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These interventions are further refined to ensure both efficacy and practical feasibility—particularly for individuals who may have difficulty swallowing capsules or tolerating strong tastes. As such, formulation and delivery considerations are integral to the model's design.

Microbial Categories and Dysbiosis Patterns

Examples of dysbiosis categories within this framework include overgrowths or underrepresentation of key microbial genera, such as *Faecalibacterium*, *Bifidobacterium*, *Lactobacillus*, *Akkermansia*, *Bacteroides*, *Clostridium* (including pseudo-*Clostridium* groups), *Ruminococcus*, *Desulfovibrio*, *Bilophila*, methanogenic organisms, *Lachnospira*, *Haemophilus*, *Streptococcus*, members of the *Proteobacteria* phylum, *Tyzzerella*, *Corynebacterium*, and *Fusobacterium*.

We also acknowledge the potential contribution of fungal and parasitic dysbiosis to microbial imbalance and behavioral manifestations in ASD. However, the assessment and intervention strategies required to address these factors are more complex and fall outside the scope of this paper.

Framework for Assessment

We propose that clinical changes in participants are currently best assessed through longitudinal observations reported by parents or caregivers. While widely used instruments such as the Autism Treatment Evaluation Checklist (ATEC) and the Social Responsiveness Scale (SRS-2) provide structured frameworks, they may lack the sensitivity needed to capture incremental changes over time.

Specifically, the granularity of response categories can obscure meaningful improvements. For example, an individual may demonstrate clear progress in behaviors such as eye contact, yet still fall within the same categorical response (e.g., "sometimes" rather than "always"), thereby masking real change.

To address these limitations, we developed modified assessment tools that incorporate directional changes (improvement or worsening) within response categories. In addition, we introduced a custom symptom assessment section designed to capture the prevalence and variability of specific behaviors and traits, as identified through intake questionnaires.

This integrated tool—the UASAQ (Unified Autism Symptom Assessment Questionnaire)—combines modified elements of ATEC and SRS-2 with an expanded behavioral symptom inventory, comprising approximately 200 total questions. This approach aims to provide greater sensitivity to change and a more comprehensive representation of clinical progress over time.

Returning to the Microbiome & Biomedical Primer

This question Is from an ASD Parent

I was looking into ASD linked species/genus in studies to see if there is anything in common with my younger brother (diagnosed asd). I came across the genus 'megamonas' and some specific bacteroides species like B. Plebeius. Both of these I have found in my brothers 16s test at 100 percentile. I was wondering if you recall if you see these microbes often? Or anything else you keep seeing often that cannot be by coincidence and is likely linked to asd I thought you would be one of the best people to ask as you often come across different asd 16s profiles

megamonas tends to be present in some cases of p copri overgrowth, I've seen it pop up and then go away on a next test. Some of these overgrowths appear transient - in those cases my best guess is Detox. There are reasons why rats live in the subways or places where they can scavenge - if there is food they will come. When bacteria die other than envelopment from the immune macrophages - they burst, all that shedding of bacterial guts and cell wall becomes immune instigating and in some cases food for other microbes - same is true for other inhabitants in the biome.. So you can get these dynamic transient overgrowths that come and fall on the next test… that is my best answer.

lots of different dysbiosis in ASD
think of it like there are lots of ways that a home can be bad (from a buying perspective)

water damage, fire damage, mechanical issues, bad kitchen, not enough bathrooms, bad street, etc
sometimes all of these are present, some are... some lead to others
You could have a home that is otherwise "good" but has a family of bears living inside - not something you would expect .. but still not ideal. A lot of tests are looking for the typical Bad and Good things … and they miss the family of bears living in the home.

Would you say out of all the ASD profiles you've seen that bacteroides dominant was more common than prevotella dominant?

there are certain things we see ...
The more important thing to understand is that the biome is a representation of the toxicity in the body and it is dynamic. There are people where when you detoxify the biome gets worse - and they show improvement clinically. The biome will show dysbiosis when you detoxify.. because toxins are pulled into the gut .. like rats feasting on food in a subway you will get things blooming as a result

my understanding at this point based on all my experience and thousands of tests and hundreds of cases / interactions, is that the biome is a tool to elicit improvement - but there is no utility in trying to categorize the biome in ASD solely because there can be any type of dysfunction of dysbiosis present... and it evolves with time. As I said .. if you detoxify you will make certain aspects worse ... and you kill “bad” fungi you will make certain aspects worse... virus .. etc

The way to think of the biome is a tool ... like a feedback loop.. you need to keep it well OILED and working properly and that requires a dynamic approach.. if you do that you can maximize detox and minimize inflammation .. boost metabolism etc etc.

Not sure if that makes sense .. people are trying to tackle the problem by fixing the biome
The biome will only ever tend to a state of being fixed if the body is finished detoxing .. or comes to an equilibrium of detox that is ideal .. in / out / tolerable for the human engine.. you reached a steady state.

So if you "fix the biome" momentarily and you are still pulling out toxicity from the rest of the body.. it will just revert to some dysbiosis again this is why some journeys are harder than others..

So in that case then do you believe that gut balancing sort of needs to be done permanently as if the prebiotics and such are stopped then the gut goes back to its original state?

Everyone is going to be in a different place so it's hard to make generalizations but we can look at examples There have been several FMT ers - some of which came from the XXXXX trial that have come to me - their biomes reverted and they regressed after the FMT. What’s going on here? Well if one theme is you need longer FMT intervention - that's just supporting my idea that you're helping the body to detox by oiling the biome. I’m not a fan of FMT - having been intimately involved at different levels, it's expensive, not understood, immune instigating - inappropriate for some, higher risk.. and I believe I can get better results with biome balancing which I think is inevitably needed even with FMT. FMT can assist in replenishing certain microbes however based on what I’ve seen - those microbes are most always not missing - they just need to be grown and emphasized with persistent targeted prebiotic feeding.

There are individuals that had FMT - did not regress with in any identifiable metrics - but looking at their biome well after revealed a lot of dysfunction

So you can't pin the autism on the biome (at least you're missing the whole picture if you do that)- you can however use the biome as a tool to elicit improvement because the biome is central to immune regulation / detox. What you need to draw from this is

You can have a person with a “bad” biome - not displaying the same severity as someone with a “better” biome and the better biome person having worse ASD symptoms.

You can have someone where their biome Gets worse - and they actually show clinical improvement (because they also detoxed)

You can have someone where their biome makes huge leaps of improvement with little clinical improvement and someone with small biome improvements make huge leaps of clinical improvement

All this is possible because the biome is a modulator of many things and what we see change in the (bacterial world) is just a small part of what could be changing in the whole body.

Here is a very simplified analogy - cleaning a pool
You can run the filter pump on your pool - it will clean the water
The filter will need to be tended over time - this is a side point

You could have debris that settles to the bottom of the pool and it will never be cleaned by the pool filter because it doesn't get kicked up, if you have ever owned a pool you will know what I'm talking about.

Now if you take a Pool Stick / Pole and start scrubbing the bottom of the pool - you will kick up all that dirt and debris on the bottom. The water will start to get really cloudy, dark, grey, looking awful. The same total dirtiness of the system (water + bottom debris) has converted to (dirty water through appearance + no bottom debris).

When we compare those two situations .. .the Clean looking pool water with debris on the bottom and the one with the bottom of the pool scrubbed but dirty water (what is better)??
Not an easy question.

I will tell you one of these states leads to detox.. Instigation of symptoms - impact on the biome and other systems.

When you detox it impacts the biome - the water looks worse .. .but the patient often shows some clinical improvement (and exacerbation of other symptoms)
The process to get better involves exactly this, except lots of organs are involved
Liver, bile, conjugation of toxicity / solubility of toxins .. excretion of toxins / bile / reabsorption of toxins / bile
Permeability .. motility .. immune reaction / function / MCAS.. etc etc etc.

scrub the bottom - and clean the water ..and you may have to do that A LOT depending on how much toxicity lives in the body .. the biome gets worse.. But when you support the biome (OIL the engine) the system operates more efficiently.

For some people they can get away with an FMT - and then things just ride right from there on…

For other people where they have mold / metals etc etc .. probably the result of a bad biome in the first place in some way.. need a lot of rinse and repeat .. for those people FMT is certainly not appropriate, I've seen it go bad enough times. First off you can't even trust the source / timing / quality of the FMT, it's just too risky unless you have a infant that is breastfed - non vaccinated ready to go and give you baby poop FMT (talk to Keith Bell from the gut group he is a big proponent)

So the answer to the question.. I don't think people need to do balancing forever.. Some need to keep their finger on the pulse longer.
if you do it right / ideally then in the worst case it could take years and it should get better over time - meaning that you need less and less but you may be susceptible to nudges - you have an unstable equilibrium
I think some people can get away with much less complexity

All of it depends on the stores detox.. to some degree genetics .. etc etc

In my experience ... what matters most is the improvement ... who cares if you need to do it for 3 years... and tending to take 5 things a day vs 30 things when you started
The parents don't seem to care because they keep seeing improvement..

that's the best I can offer and the best I understand at this moment
While saying all this we I have to emphasize there may be some external factors driving your dysbiosis… re exposure to mold .. parasites etc. You can still reap the benefits of microbiome gut balancing but you might need some other tools to beat back the beast.

"My son can not take these things, he is allergic to anything red and purple (fruits / veggies)." *No your son is not allergic to colors, after verifying this via email exchange, the issue is the child is reactive to polyphenols because.*

1) *He has intestinal permeability*
2) *He has dysbiosis that responds to these polyphenols and causes reaction and reactivity*

The word allergy when used in the context of food should be delineated from an intolerance, allergies produce anaphylactic reactions and are IgE-mediated meaning that IgE allergy antibodies are a cause of the allergic reaction. IgE mediated food allergies usually occur within minutes of ingestion and include hives, redness of the skin, vomiting and in more severe reactions, anaphylaxis. There are other antibodies IgA, IgM, IgG each with their distinct immune relationships, IgG tests are commonly emphasized for food reactivity / sensitivity but this kind of testing is widely variable depending on the status of intestinal permeability. In other words, IgG testing can be misleading in the presence of dysbiosis and does not reflect a true Allergy. I have seen IgG testing improve after working the microbiome, I have also seen the reaction and reactivity indicated above diminish with GUT intervention and over time. I find the "food allergy" tests to be of little to no utility, the word allergy should not be used in those tests as it is misleading.

"My child has Clostridia, I can tell from his OAT test and his symptoms"*. Clostridia is a Class of Bacteria, there is a hierarchy in the phylogenetic tree, Domain kingdom phylum class order family genus species, strain. If you were to look at a sample of a thousand people, you find that the majority of people have Clostridia (a class) occupying 40 to 60% of their entire microbiome. If Clostridia is pathogenic that sounds weird that it takes up half of our biome? Well the infamous OAT test that looks for markers associated with Clostridia is a bit misleading.*

1) *They are mistakenly using the word Clostridia to mean the plural of Clostridium and causing confusion, trust me a pure microbiome analyst understands that clostridia means a Class which represents about 50% of the biome.*
2) *If you speak to their founding expert, he has admitted to me that the microbes that they have associated with elevations in organic acids are* ***SOME*** *of the microbes that produce those organic acids but they are not ALL of the microbes that produce those organic acids. Don't get me wrong, having elevated HPHPA for instance is non ideal and neurotoxic but it does not mean that you 100% have a Clostridium overgrowth.*
3) *The other complication to this discussion point is that the grouping of many Clostridium have changed over the years and labs that do not keep up with these NCBI characterizations may be incorrectly identifying the same microbes. For instance below is just a small list of [Clostridium] That have been redefined out of that Genus, they are no longer considered Clostridium. If you're not compliant with following NCBI naming then you are potentially confusing or misleading people.*

[Clostridium] aldenense → Enterocloster

[Clostridium] alkalicellulosi → Acetivibrio
[Clostridium] aminophilum → Lachnoclostridium
[Clostridium] cellulolyticum → Ruminiclostridium
[Clostridium] citroniae → Enterocloster
[Clostridium] cocleatum → Thomasclavelia
[Clostridium] colinum → Tyzzerella
[Clostridium] glycyrrhizinilyticum → Mediterraneibacter
[Clostridium] hylemonae → Lachnoclostridium
[Clostridium] innocuum → Thomasclavelia
[Clostridium] lactatifermentans → Anaerotignum
[Clostridium] leptum → Oscillospiraceae incertae sedis
[Clostridium] methylpentosum → Oscillospiraceae incertae sedis
[Clostridium] polysaccharolyticum → Lachnoclostridium
[Clostridium] scindens → Lachnoclostridium
[Clostridium] spiroforme → Thomasclavelia
[Clostridium] sporosphaeroides → Oscillospiraceae incertae sedis
[Clostridium] sporosphaeroides → Oscillospiraceae incertae sedis
[Clostridium] stercorarium → Thermoclostridium
[Clostridium] symbiosum → Lachnoclostridium
[Clostridium] viride → Oscillospiraceae incertae sedis
[Clostridium] citroniae → Enterocloster
[Clostridium] lactatifermentans → Anaerotignum
[Clostridium] histolytica → Hathewaya
[Clostridium] bolteae → Enterocloster

Don't get me wrong those OAT tests can be helpful but microbial testing like 16s will always provide more overall information whereas the OAT is more complimentary.

We have as many microbes as human cells in our body, there is about 150 times more microbial DNA than human DNA, and that doesn't even account for the Fungal or Viral DNA. There is a microbiome associated with every organ. There are over thousands of known species, we have typically between 200 to 1000 species in our gut, and about 150 to 100 in our mouth.

"The Test that I did doesn't use shotgun sequencing which is far more accurate."
Let's not confuse things. Showing you more information does not mean more accuracy, showing you a .csv file does not mean it is more accurate either. The wrong words are being used here. Shotgun Type Sequencing is a broad word in itself, (there are short and long read sequencing) it has the ability to resolve better...this means identifying a species or strain however is inherently dependent on the library you are comparing or referencing against. Please understand that the library for Shotgun is significantly less complete than 16s, this is why many Shotgun type tests may miss some 50% of your biome. Resolving means more precision... precision and accuracy are two different things.. Resolving better isn't more accurate.. a ruler could be very accurate (correct) such as a micrometer which is more precise but it can also have a systematic error that makes it inaccurate... if one test resolves to species and another to strain they are both accurate if they hit the answer right and even that statement has some ambiguity. There are also limitations imposed when you use more resolution.. your library must be more robust... For instance imagine a brand new microbe from mars.... unless you have sequenced this before, shotgun nor qpcr will be able to tell you what it is. The sequences in shotgun

are so unique between the same genera as well... on the other hand 16s which used pcr can exploit the similarity in the 16s gene to characterize and Group the microbe even when the sequence is not known because of the GoldieLocks Region of the 16s gene exploiting the similarity at the PARENT phylogenetic hierarchy.... (higher levels). At the end of the day it depends on whether your practitioner understands how to use the test... if you can't drive a porsche but you need to go to work, it's not helpful. The limitations of shotgun are the current state of library of sequences... the fact that most literature has been based off of 16s... the type of shotgun used (long read sequencing).... and what do they do with the microbes that don't match their database... are they leaving them out and reporting it as they were never there, that can be misleading.
I agree that shotgun sequencing will eventually be more helpful... I think for anyone needing to solve their problems you can do that well and the best with 16s type testing. Even if you found some new information revealed at the species level or strain level with shotgun... what you would do different clinically?... no one has any actionable information on it. Eventually that could change... finally all these tests really rely on the population you are comparing against... It's very important. You can not use necessarily 16s ranges for health on shotgun data... the ribosomal rna is variable with microbes... 1 to 10 times per cell depending on the microbe... so that means you can automatically get a difference between them... this issue doesn't matter in 16s if your ranges are based on it and you compare against people with the same test. The analogy of how the variation is irrelevant is as follows…For measuring shoe size... mine is 11 In ***US****... it could be 14 in another country.. Who is right? As long as you stay in your country/system and compare to others with the same shoe scale this isn't a problem. This is one of the reasons why you never want to compare stool tests 1:1 or their ranges. Here is something I put together that gives some background on sequencing.*
https://docs.google.com/document/d/1CVB0p_l55HUBDqPH2YshrP7EEXR1xFGITK9eDI6PwmM/edit?usp=sharing

Metagenomics Type testing is most appropriate for determining the purity of a sample where the sample is made up of few things and predominantly one thing. It is less useful when you have a mixture of many things, and they are unknown. The problem that metagenomics attempts to tackle is trying to put back together a singular book in a library where you have ripped out the pages of all the books and thrown them on the floor. All the books are different and different lengths making the task incredibly challenging. If a particular book isn't able to be stitched together - that data gets tossed. It's not only books, it's magazines, journals, etc representing the DNA from human, virus, fungi, protozoa all thrown together. The problem is even more complex because we don't even know what books are in the library to start with … meaning the library of sequences is not fully known.

16s Isolates a specific gene in bacteria that is conserved, the same length, much shorter to sequence (paragraph vs a book) and the library of sequences is very complete meaning we know what books are in the library to start with very well.

What do you think of the OAT Test
If you have it I'll look at it. I stopped recommending it because I find I can often save the individual the money they need to do it and correlate better with symptoms and the stool testing.

What do you think of the IntellxxDNA TestTest

I think it is a complete waste of money, overly suggestive with little results. I've come to situations where the test recommends something totally helpful and necessary in the gut landscape. Genes don't rule the roost in Autism, we already know that Epigenetics somewhat dictates the expression of those genes regardless, and there are more gene encoding bacteria in the gut than the human body. Remember in Autism - there is no common mutations that result in Autism 100% of the time, conditions thought of as "genetic" autism don't always result in an autism diagnosis (fragile X), and they make up a really small percentage. Genetics doesn't

explain regression particularly at 5 years old , they don't explain recovery or improvement, they can't explain identical twins where one is completely neurotypical and the other severely autistic. I can get useful genetic information out of a MAXGEN panel for ¼ of the price. Don't waste your money, you can do full exome sequencing for a few hundred dollars these days.

Core Concepts You Must Familiarize Yourself With

Remember the toxicity that is coming out of the body primarily leaves through the gut - it affects the microbiome, the gut plays a big role in recycling / processing of that garbage and as a result is also affected by how much its processing, just like bristles on your broom - we need to keep them sharp, the biome has the potential to degrade the more the toxicity that comes out. This is often why dysbiosis is perpetuated, has cyclical variation, requires persistence to beat..**Reaction and reactivity does not indicate inappropriateness but should signal you to, pulse, give breaks, and or increase support for the modes of dysfunction listed below.**

Remember, you have the option to give breaks (1 or 2 days successively or more as needed) to let the body handle the reaction / reactivity and catch up if you feel it is getting too much. You always can consider implementing every other day approaches. Most of my suggestions include a combination of these. There is no reward for pushing through; when you tax your body too much, it expends excess energy on detoxification and inflammation.. Reaction and reactivity can be expected - it is often a sign of moving in the right direction especially when starting a new intervention however there are smart ways to deal with it.. Expect ups and downs but overall improvement on average as the weeks go on. The improvements are not linear, especially when we add antifungal agents; more reaction/reactivity can be expected. For instance, those that degrade biofilm typically lead to the most reactivity and sudden response from the immune system to cloaked pathogens.
Know the common support modes that require attention, support before starting microbial intervention and be aware you might need more support during gut balancing

Oxalates - fungal issue - OCD / urination issues / grabbing privates / wetting self
Ammonia / Nitrogen - zainy behavior - teeth grinding / chewing / night waking / giddy laughter episodes

Histamine - various reaction and reactivity - can often present with flushing or similar
Adrenals - bitter / mood swings whinny / dark circles under eyes / aggravations / Sensitive to Loud sounds

Constipation (see comments previously stated)

Stimming and reactivity - liver support is helpful here, often times pantethine can assist with fungal aldehydes

Aggression consider Palmitoylethanolamide, adrenal support, checking for constipation, - cold brewed chamomile Tea

Oxidative stress: - check out glutathione recycling lotion from Thiogenics, nicotinamide riboside, antioxidants

In general Cold Brewed Chamomile Tea (4 bags brewed for 4 hours in cold water)- Very helpful for all of the above, helps with histamine, adrenal support, glucose stability, calming, and GI support. Some children have regained eye contact with this simple suggestion. This is a really cheap tool that people can use to help multiple systems, its slow but it works.

You can not expect to take 1 thing to fix your dysbiosis - you can try but the odds are not in your favor. You need a combination of several herbs, a few probiotics geared to your situation, and prebiotics appropriate for you. At the same time don't pin your issues on 1 item in your gut test.

The number of components required in your program can easily reach 15 to 25 items unless you are using a combo product, that number typically includes "supports" This is exactly what has been designed at www.researchedelements.com, Gut Guardian is a very good BASE to build off of, but it was designed to be more of a maintenance product to keep your biomes protected after you balanced it reasonably well.

Broad Guide For Intervention in Dysbiosis

1) Constipation and Motility always address first before doing any GUT or detox work.
2) Support Modes of dysfunction
   Adrenals, ammonia, histamine, Liver, oxalates, inflammation, discussed earlier.
3) Finally the Gut Stuff → Broad overview of Biome intervention
   - Tackle SIBO if present
   - Look out for high akkermansia → inflammation
   - Know what elevated Prevotella likely means
   - Use Prebiotics + Probiotics + Herbals for your specifics
   - Assume there is a fungal issue, it doesn't matter to specify it, you will treat it the same

1) Support Motility! This might actually not apply to your situation but it must always be screened for and we must always assume that motility issues can develop particularly during the initial stages of intervention. Mitochondrial dysfunction is known to play a role in ASD, the inherent toxic load affects motility and intervention can release more short term toxicity which can exacerbate constipation. One of the worst things clinically is not being able to empty the bowels as it creates a situation where toxicity can not be removed and has the potential to be somewhat reabsorbed.

There are only three ways (maybe a fourth if you are considering exhaling) to eliminate toxicity from your body, this is through defecating, urination, or sweating. Defecating (aka) pooping is a primary mode if not the primary mode of excreting toxicity. There are classes of individuals (a large number of them in the realm of ASD) where

constipation is a daily challenge and often a serious and significant issue. Some individuals in extreme situations do not have bowel movements for days, others require daily enemas and even hospitalization. Although these are the more extreme cases, I firmly believe that we learn the most at the fringes of health. Your intestines function to move fecal matter through a process called peristalsis. The intestines are driven by muscles and those are prone to the effects of brewed/fermenting toxicity, its mitochondria become affected (mitochondrial dysfunction), and motility is slowed. Obviously it is more complicated than this but the point is that before starting any intervention we must do all we can to improve and support motility. We must also realize that when starting any intervention, there is also the potential to impact motility negativity, anything that draws toxicity out of the body will likely do so by dumping into the bowels. Even a topical lotion that increases your glutathione can cause constipation and more toxicity is conjugated and drawn into the bowels. Detoxification is a triple edged sword (three phases) and affects the microbiome. This is my opinion why dysbiosis is for some more perpetual and stubborn than others, because there is a continuing war/burden of toxicity elsewhere in the body that imparts its way into the microbiome as you detoxify.

Something that isn't talked about enough is the weakness in certain muscle groups, the core, the abdomen and in ASD that also perpetuate motility issues. I would suggest taking a look at abdominal exercises, there are some simple things such as laying your child on their back and having them sit up, using a trampoline, providing appropriate posture and leg support during bowel movements, and regular exercise that can support those muscle modes and help to keep bowels moving. I have suggested these to several individuals in severe motility places and they all have said these exercises have helped in some way. You can find many on youtube for example.

It is well known that just by supporting motility in those when this is a feature, improvement in symptoms can be quite significant. Your body is designed to save water from the stool that enters the rectum as a method to prevent dehydration, this is one of many points where you can re-absorb toxicity that may be present in what your body is trying to excrete. Small intestinal overgrowth "SIBO" also has the potential to affect motility. In my experience.

The best tools that I have come across for supporting motility are listed below with some context to how they help differently, this is taken from the preliminary information section of the gut balancing suggestions that practitioners have access to on www.gutbalancing.com.

Researched Elements Optional Suggestions For Motility As Needed			
Product	Dose Amount	Dose Unit	Informaton
As indicated in the verbiage on Ancillary Infomation page 2 preceeding this page, Motility is something that may require support before and during your microbiome balancing. Constipation can worsen as toxic metabolites shed from bacteria as you rebalance your biome, these have the potential to impact mitochondria and negatively effect motility. In general, increase in detoxification can exacerbate constipation. Constipation and Motility may not be an issue for you requiring support but that can change unexpectedly. Use this section here as a toolbox of items that may help with constipation, bloating, motility as needed, these can be added indvidually or layered on for more serious cases. Always consult your practitioner for validation on dietary supplements.			
Food Based Vitamin C - Researched Elements or Any Brand	250 - 1000	mg	Can assist with constipation and battling reactive oxygen species (ROS), also helpful with histamine degredation via HNMT
Natures Way Ginger	1 - 3	capsules	Prokinetic - stimulates acetylcholine release → enhances peristalsis assists helpful with SIBO - Ginger inhibits leukotriene synthesis and helps inflammation
Natures Way Fennel Seed (Supports Motility + Gas + SIBO)	1 - 3	capsules	Reduces surface tension of gas bubbles, relaxes digestive muscles
Magnesium Citrate Pure Encapsulations	150 - 500	mg	Osmotically draws water into the intestine - can help mitochondria
Lactulose (Not a Rx in Canada, be aware US brands contain dye / added sweeteners)	1 - 5	ml	Retains water osmotically, Bacteria Ferment for SCFA, Direct stimulation of colonic smooth muscle via SCFA - Acidifies the colon Converts ammonia (NH_3) → ammonium (NH_4^+) Traps it for fecal excretion
Serene Calm Researched Elements (For Adrenal Support - Also Impacts Constipation)	See label	capsules or powder	Cortisol Sets Baseline Gut Motility Supports enteric neuron responsiveness
Natures way Senna (Not intended for long term use at regular dosing)	See label	capsules	True stimulant laxative, and its mechanism is direct, chemical activation of the colon sennosides (A & B) → rhein anthrone stimulates myenteric plexus causing forceful colonic peristalsis
3 Strain Probiotic Natures way (Supports Motility + Gas + SIBO)	1 - 3	capsules	Increases production of short-chain fatty acids (SCFAs),Stimulate colonic smooth muscle, propulsive peristalsis
Peppermint Leaf Natures way (Supports Motility + Gas + SIBO)	1 - 3	capsules	Antispasmodic and smooth muscle–modulating effects Promote coordinated peristalsis
PHGG Sunfiber	1 - 2	teaspoons	Absorbs water in the colon, forming a soft gel-like bulk SCFAs Lower colonic pH (favorable for beneficial microbiota) Minimizes gas and bloating relative to other fermentable fibers
Prune Juice	4 to 12	ounces	Osmotic, fermentable, and mild stimulant effects contain high levels of sorbitol draws water into the colon phenolic acids and other phytochemicals Stimulate colonic motility directly
Aloe Vera Juice	1- 2	ounces	Stimulant laxative, but it is milder than senna stimulating the myenteric plexus
Concord Grape Juice	4-12	ounces	Osmotic and phenolic-mediated anthocyanins and other phenolic compounds
Mega Motility Researched Elements	See label	capsules or powder	Multiple Components in one product.
Flaxseed Powder (Viva Naturals)	1/4 to 1	teaspoon	The soluble fiber in flaxseed absorbs water in the gut, preventing hard stools Flaxseed contains oil (omega-3s) SCFAs Stimulate colonic smooth muscle
TTFD Fat Soluable Thiamine	See Practitioner		Supporting nerve function and metabolic energy TTFD's high bioavailability may be particularly effective in correcting subclinical thiamine deficiency, which can cause slow transit
Natures way Cascara sagrada (Not intended for long term use at regular dosing)	See label	capsules	Similar in mechanism to Senna and Aloe vera, Cascara sagrada is less irritating that Senna but more than Aloe Vera
Triphala (Amla, Bibhitaki, Haritaki) Bulk Supplements	250 - 750	mg	Mild stimulant, osmotic, and gut-regulatory mechanisms, making it gentler than senna or cascara but more active than plain fiber
Please consult with your practitioner before deciding doses especially for children. Before making any changes to your diet, supplement regimen, or lifestyle, please consult directly with your practitioner. Individual responses may vary, and we cannot guarantee specific benefits or outcomes. By reviewing this report and suggestions, you acknowledge that responsibility for care decisions rests with you and your practitioner, and that we are not liable for any misuse or adverse effects. The suggestive information in this report is generated by the microbiome dysbiosis model. It is provided for general informational and educational purposes only and does not constitute professional medical advice, diagnosis, or treatment			

You may need to use some or all of these in the most extreme cases. We have formulated **Mega Motility** from **Researched Elements** largely based on the list above as an attempt at an all in one solution, it is not the GO TO solution I however recommend, I prefer a dialed in solution which takes trial and error. The **3 strain Probiotic** I designed from researched elements also can be used as a clean and tasteless motility tool, it contains CLONED strains of L Reuteri DSM17938, L Plantarum 299V & B Animalis Lactis HN019 and much cheaper than what you will find trying to combine these things together yourself.

Keep in mind that as you start the shift the biome - shedding of bacteria can release toxicity - LPS, cause inflammation and immune reaction, all of which can worsen motility, for those with already intermittent motility issues you will want to support your intermitted motility before shifting the biome and not expect to get by as before.

2) Support body, metabolism, and other dysfunctions that can often be inferred from symptoms.

A nutritional vitamin (there are many) that provides broad support for the body's enzyme processes, methylation, detoxification which should include support for mitochondria, the liver, and mineral replacement. We have developed **Spectrum Max** to provide the broadest and most complete formulas specific for this purpose. It is important to understand the differences between active and non vitamins and that both have utility (Not only the active forms!).

CORE VITAMINS ACTIVE & NON ACTIVE

Vitamin A
Vitamin C
Vitamin D3
Vitamin E
Vitamin K1&K2
Riboflavin (2 forms)
Niacin (THREE FORMS!)
Vitamin B6 (Two forms)
Methyl folate
Biotin
Vitamin B12 (THREE FORMS!)
Vitamin B5 (Two forms)

Urea & Nitric Oxide Cycle

AKG
L Citrulline
L Arginine
Beet Root

Inflammation

Quercetin
Boswellia
Ashwagandha
CDP Choline
Bacopa Monnieri
Perilla

MITOCHONDRIA

Nicotinamide Riboside
Acetyl L Carnitine
Taurine
AKG
Creatine Monohydrate
MSM
CoQ10
Pterostilbene
Resveratrol
Alpha Lipoic
NAC
L Arginine
Beet Root



Cognition

Lions Mane
CDP Choline
Bacopa Monnieri
Alpha GPC
Pine Bark
Phosphatidylserine
Gotu Kola

Adrenal

Ashwagandha
Quercetin
Bacopa Monnieri
Boswellia
L theanine
Phosphatidylserine

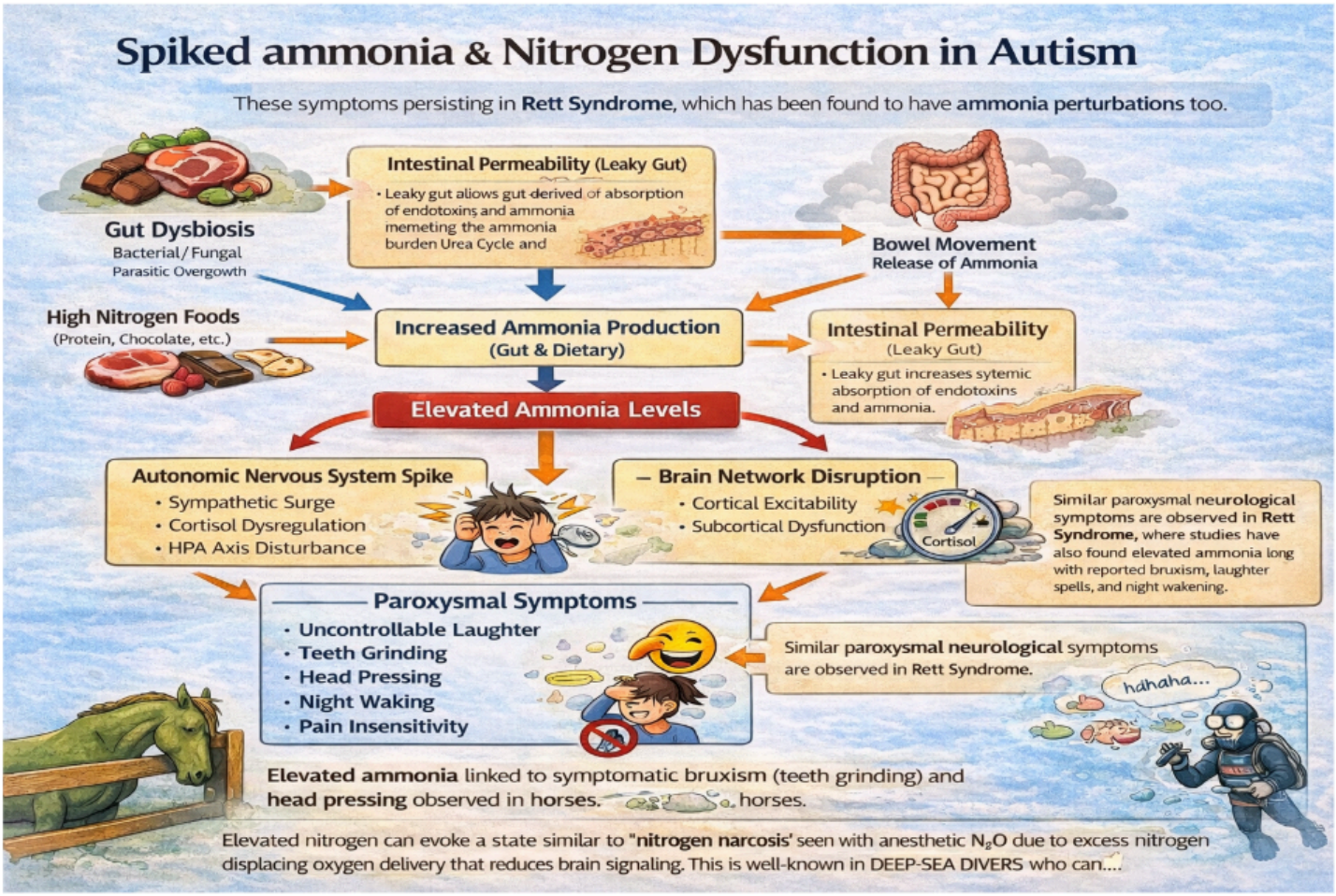
Mineral Related

Magnesium
Zinc
Manganese
Chromium
Molybdenum
Boron
Iodine
Selenium
Sunflower Seed
Pumpkin Seed
Beet Root
L Glutamine

NeuroTransmitter Support

5HTP
Pine Bark
L Theanine
Oryzanol
Gotu Kola
Lithium Orotate

Assessment for the need for Urea/Nitric Oxide Cycle support, this cycle is often taxed and exacerbated by fungal and bacterial overgrowths. Lingering Ammonia can further the dysbiosis narrative. Burden in this area follows with behavior of excessive uncontrollable laughter, night waking, teeth grinding, head pressing, we have developed a product for this called **Ammonia Away**.



Assessment for the need for oxalate support, exacerbated by fungal overgrowths. Typically associated with symptoms of urinary discomfort, poking at privates or eyes, excessive urination, wetting themselves. We have developed a product for this called **Oxalate Relief**.

Assessment for the need for MCAS - histamine quelling support, exacerbated by bacterial / fungal, and situations involving mycotoxins and mold. Can be characterized by flairs, reaction reactivity to smells / perfumes, heat intolerance, among others. We have developed a product for this called **Histamine Reprieve**.

Assessment for the need of adrenal support, typically associated with fear of places, sensitivity to sounds. Often significantly noticeable during chelative-like therapies. We formulated Serene Calm to be an adrenal support which also includes a CLONED version of the PS128 probiotic L Plantarum - most people don't realize that last point because it is a patented strain.

Assessment for liver support - components like a milk thistle and related compound or PPC can be integral for some. Reducing the ammonia burden can also be extremely helpful. We developed KLL Detox to assist the kidney, lymphatics, and Liver which are systems that tend to get stressed during detoxification and when there exists high levels of systemic toxicity.

You can certainly test for the conditions above but they can be costly and can at times even miss the issue based on the time dependent nature of these dysfunctions. For instance elevations in ammonia are not always constant, they peak and can vary with the digestive cycle and can also be the product of quorum sensing in fungal issues. Many times individuals have measured both high and normal levels in the same day. Know that some tests are better serving to rule things IN than to rule things OUT. Elevations in ammonia present with

symptoms of teeth grinding, head pressing, night waking and also carry on to disturb or overload the processing of nitrogen (nitric oxide cycle) and then display as episodes of uncontrollable giddy laughter some of which may characterize as gelastic seizures (it's actually a building up of nitric oxide in the blood which can convert to nitrous oxide → laughing gas), certain bacteria have the ability to convert nitric oxide (NO) to nitrous oxide (N_2O) through a process known as denitrification. The issues surrounding ammonia overload can be the product of, bacterial dysbiosis, fungal dysbiosis, parasitic dysbiosis, and even what we believe to be recent evidence of chronic cyanide buildup due to dysbiosis which can convert to ammonia through reaction or bacteria degradation.

Elevated oxalates are the dominant product of fungal overgrowth as we have measured their increase in the wake of antifungal therapy, where the contribution of dietary oxalates pales by **orders of magnitude** to these fungal oxalate accumulation. Symptoms often present as issues with urination, grabbing of privates, and even eye poking or eye discomfort. The increase in measured oxalic acid can be 10 to 50 times in the wake of an antifungal agent (measuring via organic acids after taking an antifungal, either herb, prescriptive, or probiotic). This has been repeated time and time again and proved that it is the fungal source that is causing the oxalate dysfunction not the diet and by fasting or keeping away foods and compounds that are slighter higher than others in oxalate content, you are robbing the benefits of those compounds and potential diversity.

Contrary to popular belief, dietary contribution of oxalates pale in comparison to what burden can be produced by fungal overgrowth. Oxalate formation is well understood in fungal communities.
https://www.sciencedirect.com/science/article/abs/pii/S1749461314000165

A misunderstanding about oxalate burden is that only certain bacterial species can degrade oxalate such as Oxalobacter formigenes. While it is true that Oxalobacter can degrade oxalate, there are many bacteria that also possess the necessary enzymatic process for degrading oxalate. The reason that oxalobacter is named as such is that it relies on oxalate as a fuel source. Oxalate decarboxylase is the enzyme that can degrade oxalate into CO_2 and is found in bacteria like Bacteroides, Lactobacillus, Ruminococcus, and Pseudomonas are some bacteria groups that can degrade oxalate.

Oxalates in the GUT are best bound with Calcium Citrate. It must be the Citrate version of Calcium, Other forms of Calcium will not bind Oxalate. Outside of the Gut compounds that help to break down process Oxalate are more useful that Calcium Citrate. Oxalate Relief from Researched Elements combines multiple compounds including Calcium Citrate. Relief from Oxalates will typically take a few bowel cycles to achieve. Reducing the Fungal or Parasitic Source of Elevated Oxalates will be the longer term solution for relief, note that antifungal and antiparasitic components can worse Oxalate (Dump / Release) up front and it may take weeks to reach a lowered level after treatment, Oxalate Relief is an effective tool in mitigating this burden even during treatment as described above.

As an aide I find that sodium butyrate is the most helpful form of butyrate specifically in ASD, it has been found to assist with reducing ammonia systemically but it can improve immune function through macrophages and even assist with the burden of LPS. Likely the sodium itself plays a role we've yet to understand. The most difficult feature of sodium butyrate is its distinct unpalatable odor.

We have designed specific products at www.researchedelements.com for many of these issues, Ammonia Away, Oxalate Relief, Histamine Reprieve, Motility Max, Spectrum Max, Gut Guardian, Prebiotic Repair, Serene Calm, etc however you can also look to other products on the market to address them. Without supporting these issues, the practicality and feasibility of intervention is reduced..

3) Broad Overview of Biome Intervention.

The suggestions that I provide for those that have participated in “Gut Balancing” often fall into the categories below. The suggestions typically include a broad and redundant approach

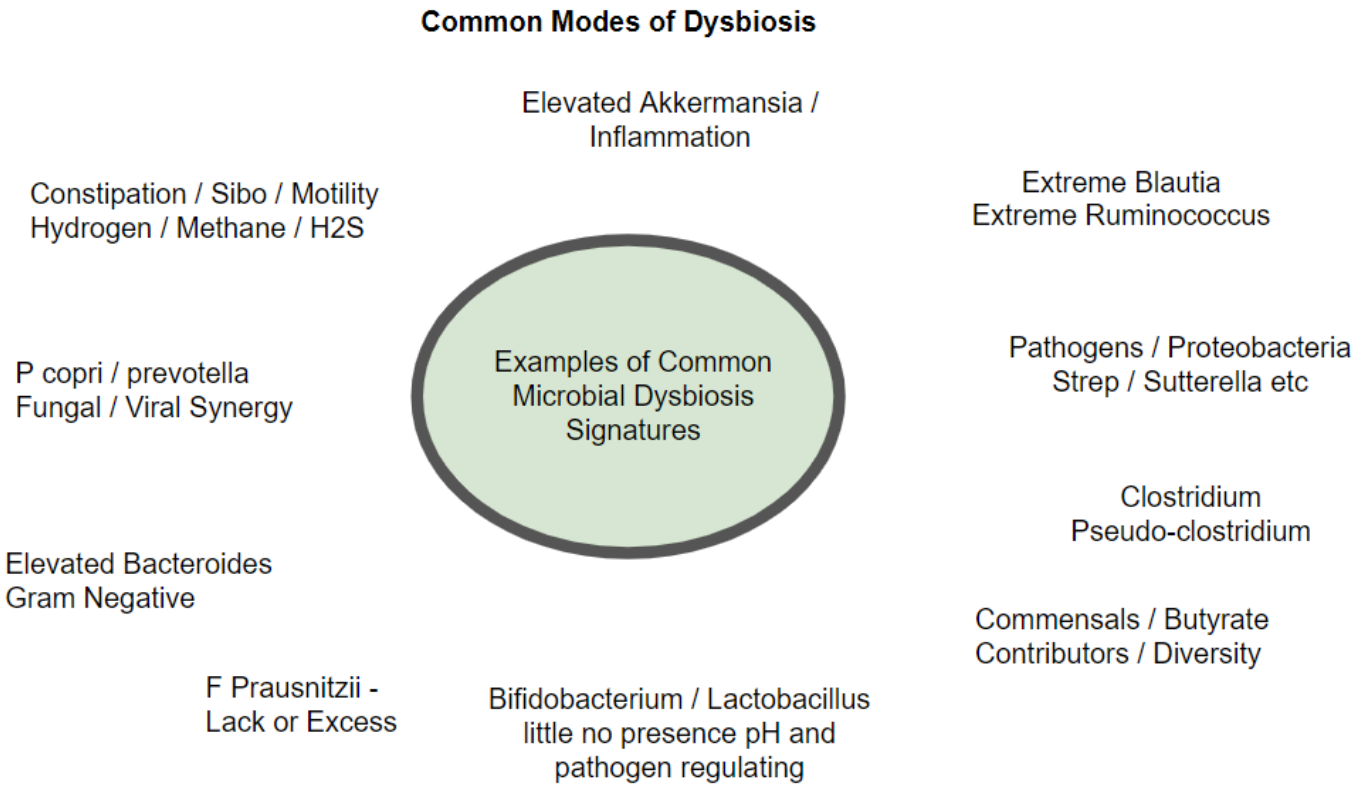
Trying to keep the total number of suggestions under 10 -15 items

1 to 3 antifungal directed components if needed that are respectful of the biomes

A gentle biofilm enzyme - like candex of our candida hunter

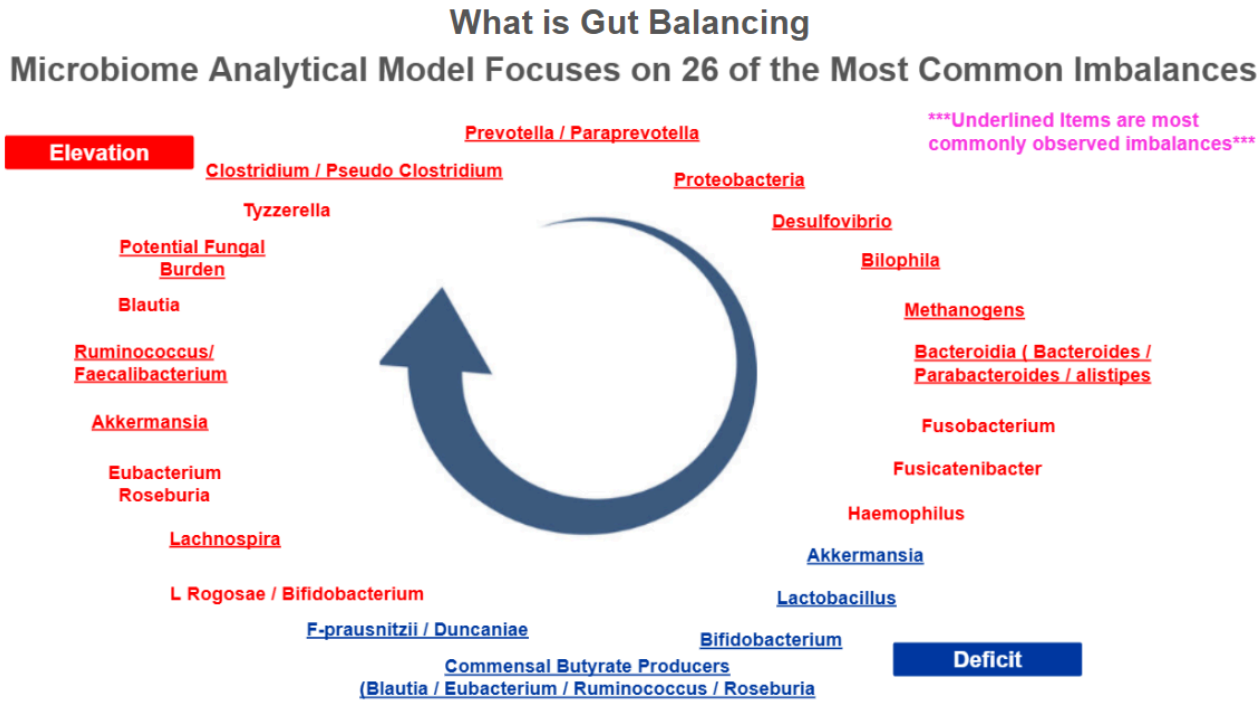
Support for the various modes listed above (histamine, Spectrum vitamine, liver, oxalates, ammonia, adrenals, etc).

There are some items that are included in every set of suggestions (like cold brewed concentrated chamomile Tea)



I have listed these common modes as I characterize them in the order that I would tackle them, in some cases it is very important that the order is followed (in terms of their importance as an issue). The way that I do this is by generating suggestions for a 6 week period that increase and change over that duration. Some general principles are and have been already stated.

The gut balancing model at www.gutbalancing.com which provides practitioners with a 10 week targeted plans that they can share with their patients (modify and scale before doing so) focuses on 26 different modes of dysbiosis that I have found to be the most typical.



ALWAYS make sure motility is moving before starting anything - you may need several weeks of pretreatment
Address any SIBO components upfront before increasing prebiotics significantly.
Address potential inflammation if observed (akkermansia significantly elevated);

Prebiotics general ramp up over the first three weeks
PHGG can be started up front and increased in the second week.
I always include PHGG in every profile unless in some unusual circumstance 1-3 tablespoons daily, it is always safer to start slower and ramp up.
PHGG is appropriate and helpful in all forms of SIBO and should be used (slowly) in conjunction with other tools.

GOS can sometimes be started upfront if needed however I delay its use in cases of certain SIBO
GOS is used for every profile that requires bolstering of bifidobacterium
GOS is particularly appropriate for overgrowth of desulfovibrio

PHGG and Bimuno GOS are essential foundations which is why we have them in so mamy of our formulas, gut guardian, colostrum fusion, bifido fusion, prebiotic repair, microbiome diversity blend.

My selection of potential prebiotic tools that I limit myself to are (Lactulose, Glucomannan, PHGG, GOS, artichoke (rarely pure inulin), apple pectin, acacia fiber). I do not use XOS, FOS and have stopped using HMO, very rarely will I resort to insulin. It is too powerful and will feed bacteriodia like no other .. This is the reason why the Nemechek protocol turns out bad eventually or bad from inception for some. Researched Elements has a prebiotic blend designed to provide the middle of the road feeding and diversity enhancement as you use

other tools like Gut Guardian in your dysbiosis regimen. Glucomannan is often a 1st tool to assist with lactobacillus (be careful of choking hazard), next apple pectin can assist here. Consider adding less reactive cheeses such as GOAT CHEESE (feta is a type of Goat / Sheep milk cheese) which can help to bolster this genus. Acacia is my second choice to bolster bifidobacteria, lactulose can be an invaluable all around tool even with the fungal territory and is especially helpful in reducing overgrowth in bacteroides, it must be used with oversight, slowly and you need to rule out SIBO components before use. Although Lactulose can be an immensely helpful tool with elevated bacteroides, I however had much success with high dose polyphenols in this area too. I specifically do not use HMO although I acknowledge its potential to help some, the reason is because it emphasizes bacteriodia which is a common enough problem already elevated in so many.

I always include a low dose of caprylic acid for antifungal support (C8), (taste is very palatable which is always a big consideration in ASD and children), and it is an efficient fuel to support mitochondria. When possible I like the use of undecylenic acid, the taste is unbearable for those that can not swallow. You might do better with mega myco balance from microbiome labs as they provide smaller capsules and include Bee Propolis but your child likely needs to swallow capsules first unless you are a master at disguising taste.

I sometimes include homeopathic antifungal components that bolster the immune response, these include pekana mucan, or polyfungal, or other homeopathics in this realm. (Caution here requires practitioner oversight). Oftentimes I may consider these during a second or third round of intervention.

I sometimes use Pau D'arco and Laterosporus BOD to assist fungal situations, or candida balance from global healing which is a hybrid of these things.
Remember you should assume there is a fungal issue and cover it with a minimum of caprylic acid and a light biofilm enzyme such as candex. Symptoms or other markers can give you insight to the extent of the fungal issue. I do not recommend using prescriptives like Nystatin or Diflucan or Itraconazole especially upfront. I reserve the possibility to entertain them only later on and after attempting microbial balancing. I don't believe they are necessary or better than most of the non prescriptive tools we have, if they are used, one should consider pulsing them. I will actually discontinue working with individuals that use these actively during balancing suggestions as it makes the balancing nearly impossible to compensate for at times.

Probiotics increase over the 6 week period specific to the profile, typically I select from my Dysbiosis AZ2, Thorne Bacillus Coagulans, SFI S Boulardii, BB536 or the strains in our Bifidofusion or BifidoBoss, our 3 strain probiotic for SIBO which includes B animalis lactis HN019, L reuteri DSM17938 and L plantarum 299V where appropriate. I typically do not like giving probiotics every day at first, and will start with every other day or some frequency less than daily unless they are indicated for SIBO in the case of the 3 strain probiotic.

Introduce a light biofilm enzyme (I prefer Candex or our Candida Hunter) in the 3rd to 4th week, be cognizant of oxalate and ammonia issues. I typically suggest this every other day.

Retest at the end of 6th week and damp down suggestions until new results are ready. Rinse and Repeat for at least three rounds.

Some more comments on the probiotics that I use

Dysbiosis AZ2 from researched elements is an updated formula meant to be a middle of the road all in one for taming proteobacteria and some fungal overgrowth.

Researched Elements 3 Strain probiotic is appropriate for any form of SIBO but must be married with the appropriate herbals for that SIBO situation. For Hydrogen you can consider adding Neem and Berberine, for Methane you can consider Peppermint leaf, Green Tea, Cinnamon, Rosemary Leaf, For Desulfovibrio Hydrogen Sulfide you can consider Codonopsis and Pomegranate Peel, Cranberry Fennel Seed and Cold Brewed Chamomile Tea for Bilophila. I actually include Fennel Seed in all forms of SIBO as well.

Klaire Labs S. boulardii (SFI) is the best S. boulardii that I have encountered and I have used it for years and in hundreds of individuals alongside the dozen or so practitioners that receive my suggestions. I use S. Boulardii when there are elevations in clostridium and pseudo clostridiums (clostridiums renamed to other genus and other bearing the clostridium postfix). There are a lot of concerns about S. Boulardii, know that there has been historical confusion between S. cerevisiae Boulardii and S. cerevisiae, a true S. Boulardii is transient and does not colonize. The only other S. Boulardii that I like and use is by Florastor. S boulardii won't cover all these clostridium / pseudo-clostridum issues but it is a great place to start, I also have used CNCM I-3799 in some situations.

I use bacillus coagulans to effectively fix deficits in underpopulation of F. prausnitzii, The strain from Thorn or AFI which is MTCC 5856 is my trusted go to for Faecalibacterium

I have recommended in the past Visbiome, I believe it to be a good product
I have used in the past laterosporus BOD to assist with certain fungal issues.
I have used Miyarsian, Clostridium Butyricum in the past and I find it helpful in some with IBS.
I have used SilverFern Brand probiotics which I find a better variant of Megaspore however I have stopped using these commonly and will only resort to them if other situations have failed. Typically I might call on them for situations of extreme proteobacteria, this is rare.

More on Biome Specific Situations - Disclaimer

> **Always speak with your practitioner before use**
> **I have only outlined some modes of imbalance**
> **Many will believe that species level scrutiny is necessary. I have found that targeting at the genus level is often sufficient.**

Elevated Akkermansia:- a sign of inflammation potentially local in the intestines and will reduce in the presence of anti-inflammatory compounds like Curcumin / Boswellia (there are others). Typically following the administration of these anti inflammatories extreme akkermansia levels will drop to near zero quickly. Mucus secretion can be driven by a local inflammation that may be artificially driving akkermansia at that specific point, giving the false impression of the health of the mucosa. I would generally say that anything over 6-8% abundance is potentially indicating pockets of local inflammation feeding akkermansia (mucus).

Depleted Akkermansia: Not high on my list of concerns. This is something that comes at the tail of healing and is a surrogate for intestinal permeability / damaged mucosa. Akkermansia is a mucin feeding microbe, restoring the mucosa takes time is key to regenerating this. Researched Elements has a product in development called **Mucosa Master** designed to support and enhance the mucosa status.

Assess for SIBO symptoms via comprehensive questionnaire, combined with evaluations of methane dominant microbes like methanobrevibacter, assess for overgrowths in dominant H2S producing microbes. Understand that hydrogen is required for CH4 and HS2, assume the potential for Hydrogen SIBO to be at play. Understand that Biophila overgrowths can mean the body is attempting to produce more bile to increase detoxification.

If both Methane & Hydrogen sulfide components are significantly elevated - assume Hydrogen SIBO is a feature. Three strain probiotic from researched elements, Goldenseal root, S boulardii, Neem, Olive leaf, HN019, Colostrum, Rosemary, Fennel Seed can be helpful.

Methane, Methanogens: - Peppermint leaf, Fennel seed, Green Tea extract, Cinnamon, Guava Leaf, L 3 strain probiotic from researched elements, rosemary leaf. I do not like to use herbals like Thyme or Oregano, I believe they are too strong and counterproductive. Colostrum.

Other tag on options for stubborn SIBO situations include sodium butyrate, colostrum, bee propolis
Always make sure to emphasize red / purple based polyphenols alongside the above, these include

Cranberry, bilberry, acai, dragon fruit, beet root, wolfberry, these polyphenols are great for sibo overgrowths of all types and helpful in iBS / IBD. I particularly stay away from herbs like oregano or thyme due to their impractical taste and their potential for knocking out beneficial microbes. I always include olive leaf because of its systemic action, broad targeting of bacteria, fungi, virus, neuroprotective components, and I have not seen it have negative effects on the biome.

H2S - Desulfovibrio - codonopsis, 3 strain probiotic researched elements, cranberry (polyphenols), GOS,
H2S - Bilophila (it's important to understand that elevations here can actually be the product of upregulated bile flow as a mechanism to bolster detoxification). Cranberry, 3 strain probiotic researched elements, Chamomile, Colostrum.

Include broad coverage for Hydrogen when other SIBO modes are present, I prefer colostrum, goldenseal, L reuteri, S boulardii, and support for motility.

Lack of F prausnitzii - if so support with Bacillus Coagulans. I typically use Thorne or AFI brand.

Elevations in L Rogosae i have found the combination of curcumin and goldenseal to be helpful.
I prefer to use GOS initially over acacia fiber for bifidobacteria as I find that acacia can further fuel an already existing overgrowth L Rogosae, at the same time I will mix GOS with curcumin / goldenseal when this is overgrown. I find that these overgrowths *sometimes* correlate with OCD type behaviors.

Lack of or diminished Bifidobacterium - Primary emphasis on GOS. I do not like using HMO. I find it to be somewhat unpredictable in its outcomes. Build in Acacia Fiber if/as needed. Other herbs have a supportive role, codonopsis, ginger.

Lack of True Lactobacillus
Hyaluronic Acid, Glucomannan, then apple pectin. Do not use it on a daily basis, be aware of overdosing on large amounts of Glucomannan there is potential for asphyxia , better to introduce small doses.

Elevations in Clostridium or Pseudo Clostridium which include assessment of the following genus Lachnochlostridium, RuminiClostridium Erysipelatoclostridium and other genus that have clostridium species names that have been reallocated to other genus, (Etnerocloster, Thomasclavelia, Anaerotignum, Anaerotignum, Hathewaya, Tyzzerella, some Mediterraneibacter.
The main tool that I use is Klaire Labs S Boulardii, and possible addition of Florastor S boulardii. Klaire has the most effective S boulardii. The therapeutic dose depends on the elevations, effectiveness is not the same for all these genus. I find you may need to reach 5 to 6 capsules daily for an extended period of time for an adult. I find that colostrum, L Rhamnosus GG to assist.

Elevations in Prevotella: - both fungal and viral implicated. Prevotella overgrowths occupying double digits certainly align with fungally fed situations. Best tools for these overgrowths.

High dose DGL, Goldenseal Root Perilla,Ginger, Vitamin A, Olive leaf Rosemary. Also Introducing antifungal components. AZ2 probiotic and support for fungal overgrowth which can include. A light biofilm enzyme given on alternative days like candex for the 6 week duration at least. undecylenic acid and potentially something like Pekana Mucan. Consider anti parasitics like Ivermectin, possible to reduce viral or inflammatory components. Consider designs for health Anaerostipes Caccae which can convert acetate to butyrate, prevotella is a propionate and acetate generator.

Elevations of Bacteroides: High dosing of red and purple polyphenols, acai, bilberry, cranberry, beetroot, raspberry, dragon fruit, Pomegranate wolf berry, green tea, codonopsis, acai. Lactulose is very effective at reducing bacteroides but must be used with caution, in general lactulose is a very helpful tool for repairing the gut but one needs to rule out motility / sibo issues before using and it must be used slowly. Green tea extract which contains EGCG.

Elevations in Proteobacteria: I find that pomegranate Peel (husk or hull) to be very effective here. I find that when needed additional bolstering can be provided by colostrum alongside Dysbiosis AZ2 probiotic, lactulose, HU58 B subtilis.

Of which some specifics include

Elevations in Specific Sutterella & Parasutterella: L Paracasei, DGL
Elevations in Streptococcus: Pomegranate Peel, Colostrum
Elevations in Typical or Odd proteobacteria: Pomegranate Peel / Guava Leaf / Colostrum
Elevations in Blautia: L paracasei, Cranberry, Red Polyphenols, Triphala (may be fungal dysbiosis)
Elevations in Ruminococcus: L paracasei, Flaxseed powder, Cinnamon, Olive leaf, Triphala
Elevations in Tyzzerella: High dose red polyphenols, Green tea, Flaxseed Powder
Elevations in F Prausnitzii: Flaxseed powder
Elevations in Fusobacterium, Rosemary , Cinnamon, Bacopa, Green Tea, Mastic Gum
Elevations in Eubacterium: Flaxseed powder, Ginger
Elevations in Lachnospira: L Paracasei, L Reuteri
Elevations in Odoribacter: Olive leaf
Elevations in Porphyromonas: Ginger Curcumin Cinnamon
Elevations in Parabacteroides - similar to bacteroides or bacteriodia

Best tools for the mucosa

High dose red/purple polyphenols
Addition of cruciferous veggies - assists with Glucosinolates and Glutathione in Colon
Keep inflammation down
Introduction of glutamine components at a later stage when it is does not cause excitability
Consider our all one Mucosa Master from Researched Elements.

Most Common Components to include that seem to provide benefits in most regardless of profile
Concentrated Cold brewed Chamomile Tea, Codonopsis. Bacopa, Olive Leaf, Beetroot, PHGG, GOS

Concerns about H Pylori

Chamomile, L Reuteri, Triphala, Codonopsis, Ginger, Fennel, Curcumin, Mastic Gum
The mastic gum needs to be sourced from CHIOS in greece. Nutricology and Allergy Research Group are good versions.

Herbs or Compounds that assist with Glutamate Regulation
Curcumin, Bacopa, Boswellia, Codonopsis, Ginger, Pterostilbene, Acetyl L Carnitine
Histamine Halt from Researched Elements is essentially a Glutamate Halt too.

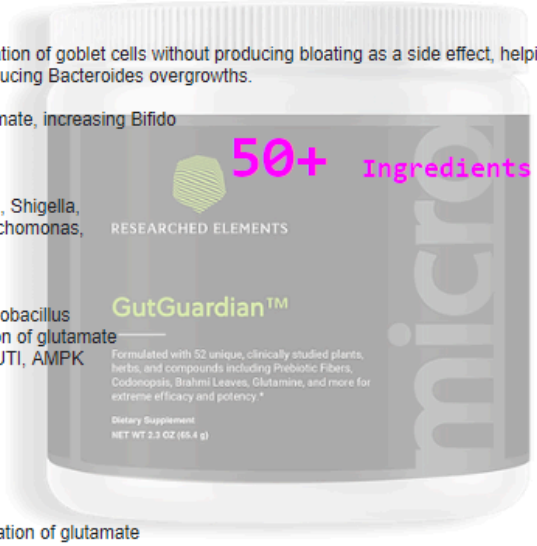
Some references you can search for the rest

https://pubmed.ncbi.nlm.nih.gov/18086456/
https://pubmed.ncbi.nlm.nih.gov/27494534/
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4478437/?fbclid=IwAR0BpvlQEOWXiame21EFX2nFGC1FeBFNHeAqYWKNUcZMPAMrrykQc8SpY0Y
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4060076/?fbclid=IwAR2XWb6wpEiZX4Qs_j_CpVZ6P4CyxaOdJ52j7U8cOEipqGxuJcEg47wyC0o
https://pubmed.ncbi.nlm.nih.gov/7739917/
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8575925/

Importance of PH and Relationship to Bifidobacterium
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5853487/

If you are having a hard time starting due to the difficulty of finding a practitioner or being overwhelmed with the complexity of your problem, please give a look at **Gut Guardian** which we designed to be a core tool to navigate dysbiosis.

PHGG → Safest Prebiotic and Butyrate Producer regardless of overgrowths
GOS → Clinically studied unrivaled for increasing Bifidobacterium acidifying the colon, helpful in reducing desulfovibrio and proteobacteria
Flaxseed → Omega 3 content, removal of toxins, helpful in IBS / IBD
Whey protein → assists in glutathione synthesis beneficial effect on metabolism, gut microbiota and mental health
Rice Brain → promote SCFA to maintain host health. Moreover, their metabolites stimulate the production of mucus-associated bacteria to enhance the intestinal barrier and regulate the immune system
Acacia → helpful for increasing Bifidobacterium **Glutamine** → repair of gut lining
Polyphenol rich provide essential nutrients to the gut lining, help increase Akkermansia through stimulation of goblet cells without producing bloating as a side effect, helping to establish a healthy mucosal barrier and to restore the gut terrain in individuals with SIBO, helpful in reducing Bacteroides overgrowths.
Beetroot, Cranberry, Dragon fruit, Cherry, Bilberry, Raspberry, Goji berry.
Codonopsis → assists in various overgrowths like desulfovibrio h pylori , assists in regulation of glutamate, increasing Bifido
Artichoke → helps with digestions, increasing diversity via prebiotic effects
Olive leaf → antiviral, antifungal, anti-inflammatory, helpful with prevotella overgrowth
MSM → increase diversity, improved sulfation
Pomegranate Peel → Antiparasitic, Antifungal, Anti Strep, Antiviral, E.coli, Campylobacter, Salmonella, Shigella, Pseudomonas,Klebsiella, Staphylococcus, Listeria, Antibiofilm, Antiprotozoal, Giardia, Blastocystis, Trichomonas,
Fennel Seed → helpful with bloating, gas, motility, methane overgrowths, h pylori
Prune → helps motility **Guava leaf** →reduces proteobacteria, helpful with methane overgrowths
Lysine → antiviral helps support appetite **Amylase** → biofilm degrading
FOS → prebiotic helpful to increase diversity **Glucomannan** → helpful with mycotoxins, increasing lactobacillus
Ginger → antiviral, helpful with inflammation – leukotrienes, increase bifidobacterium h pylori, regulation of glutamate
Bacopa M → antiviral, cognitive support, helpful with prevotella overgrowths, regulation of glutamate, UTI, AMPK
Goldenseal → antifungal, helpful in regulating glucose, hydrogen sibo
Perilla → histamine support, antifungal antiviral, helpful with prevotella overgrowths
Pau D'arco → Antifungal, antiparasitic, antiviral
Slippery Elm – mucosal support
Boswellia → anti inflammatory antiviral – leukotriene support, regulation of glutamate
Vitamin C → supports bowel movements, antioxidant, supporting of histamine degradation
Triphala reducing h pylori supportive helpful for overgrowths of blautia, ruminococcus, alistipes
Curcumin → anti inflammatory leukotriene support, h pylori, reducing desulfovibrio, bacteroides, regulation of glutamate
Quercetin → histamine supportive, antioxidant **Chamomile** →flavonoid rich, adrenal supporting, soothing, H pylori reducing, glucose stabilizing
Lion's Mane → diversity, cognition / oxidative stress **Green Tea** → helpful with methane overgrowths.. Polyphenol rich, reducing Fusobacterium, Haemophilus
Elderberry →immune stimulating polyphenol rich
Reishi → Diversity, H pylori, immune stimulator / modulator
Echinacea → antifungal immune stimulating
Silymarin → liver support / detox
Rosemary → anti inflammatory helpful for leukotrienes, methane sibo



Mastic Gum → H Pylori supporting, GI protective, terpene, flavonoid rich, gut barrier integrity **Astragalus** → antiviral **Black Walnut** → antiparasitic antifungal

Cinnamon →helpful with methane overgrowths, H2S sibo

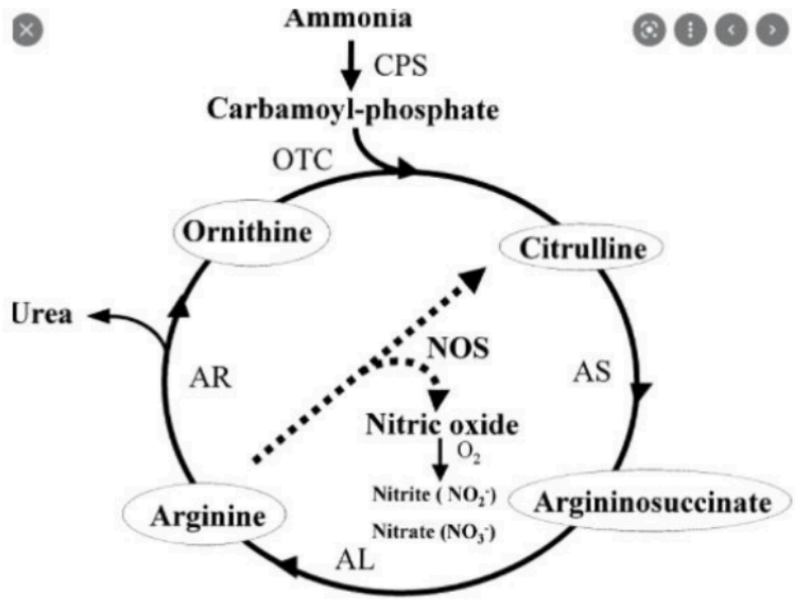
An aside on Urea/Nitric Oxide cycle disturbances

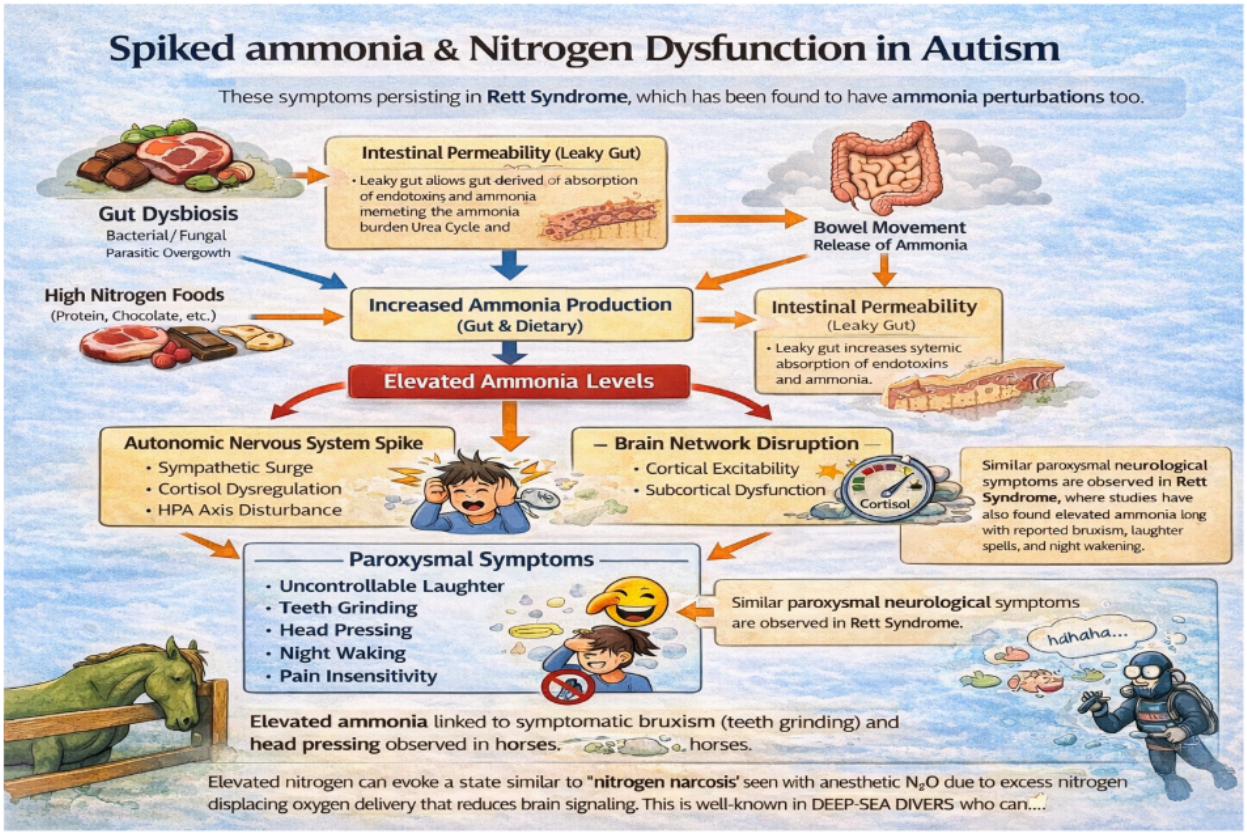
Literature and Connections on Ammonia Perturbations and their Impact on the Urea/Nitric Oxide Cycle and symptoms

Ammonia is secreted by fungi through quorum sensing as a way to communicate incoming threats, it significantly increase alkalines state of biome

Ammonia surges overload the liver's ability to process via urea cycle, this overload will present as Teeth grinding.

Ammonia burden reduces the ability of Nitric Oxide to function correctly - buildup of Nitric Oxide causes laughter (Laughing Gas)





Ammonia is also implicated in the detoxification of Cyanide - something that has recently been uncovered to be a potential player in ASD. For more information check out videos that I have with Dr. Christian Bogner on this

subject at ResearchedElements.com. Ammonia can also be a contribution from protozoa. Cyanide can be both created and degraded by microbes in the gut.

Ammonia may not be an issue for everyone but I find it commonly an issue in ASD (it is a transient issue in many which makes it hard to pinpoint on testing and tends to scale with the digestive cycle) and implicated most often with fungal entities and can be further worsened by aluminum toxicity (akg inhibition). Ammonia is also can also be a feature of protozoa,

Aluminum toxicity also impairs AKG, and potentially BH4 https://pubmed.ncbi.nlm.nih.gov/24874214/

Quorum Sensing in Fungi

(https://academic.oup.com/mmy/article/50/4/337/1178656)

(https://www.sciencedirect.com/.../pii/S0944501318300363)

We know the liver is generally taxed which also exacerbates the clearance of ammonia.

Teeth grinding and Giddy laughter are Key Symptoms in RETTS syndrome which is Clinically known as Hyperammonemia

Dimensions of Dental Hygiene
https://dimensionsofdentalhygiene.com › article › rett-...

Rett Syndrome and the Dental Office

May 13, 2009 — They have specific nighttime problems such as **laughing**, screaming, seizures, **teeth grinding**, sleep walking, sleep talking, and night terrors.

National Institutes of Health (.gov)
https://www.ncbi.nlm.nih.gov › articles › PMC2527512

Sleep problems in Rett syndrome - PMC

by D YOUNG · 2007 · Cited by 135 — Daytime napping, night-time **laughter**, **teeth grinding**, night screaming and seizures were the problems most frequently reported. Some specific ...

Mayo Clinic
https://www.mayoclinic.org › syc-20377227

Rett syndrome - Symptoms & causes

May 3, 2022 — These may include, for example, sudden, odd facial expressions and long bouts of **laughter**, hand licking, and grasping of hair or clothing.

National Organization for Rare Disorders
https://rarediseases.org › Rare Diseases

Rett Syndrome - Symptoms, Causes, Treatment | NORD

However, many issues remain including characteristic hand movements, seizures, **teeth grinding** (**bruxism**), and breathing irregularities. ... **laughter** and smiling.

Below is literature to support the Ammonia - Teeth grinding relationship

https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1939-1676.1997.tb00101.x

Teeth grinding and Hyperammonemia / Urea Cycle Connections

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5050374/?fbclid=IwAR1GOxZ42kYKU0e-0ADGyPnh0yHPk9iHkJfLMHugKCyieHWEbIVcfXyZL8o

https://www.merckvetmanual.com/special-pet-topics/poisoning/nonprotein-nitrogen-poisoning-ammonia-poisoning?fbclid=IwAR3FPSEmzd1Ena5g_zSbG8495y1mRUWelL8PSYyM9JJdffNdII19kw8k77Y

"Early signs include muscle tremors (especially of face and ears), protrusion of eyeballs, abdominal pain, drooling, passing large amounts of urine, and grinding the teeth. Tremors progress to lack of coordination and weakness. Fluid in the lungs leads to difficulty breathing and gasping. Horses may exhibit head pressing."

https://www.researchgate.net/publication/227862775_Persistent_Hyperammonemia_in_Two_Related_Morgan_Weanlings?fbclid=IwAR2Xgh5kWAjPSgoipaBPrj3nP8afTCWc57pogZ1rsMphme-3-vpyyMiX-n0

We do know that RETT syndrome (Aka Genetic Hyperammonemia) which is a genetic condition that results in a high degree of ASD diagnosis is a condition implicated by HYPERAMMONEMIA

and a key feature of this condition is Diurnal Bruxism (Teeth Grinding) and Giddy Laughter

Literature that describes that Rett Syndrome involves Giddy Laughter episodes (when too much ammonia meets too much nitrogen we get a backlog of nitric oxide - certain bacteria have the ability to convert nitric oxide (NO) to nitrous oxide (N2O) through a process known as denitrification (laughing gas) dissolved in blood). The Giddy effect is also seen with just Nitrogen Narcosis in deep see divers, affecting pain tolerance.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2527512/?fbclid=IwAR2BEWnOGtAC3T44wk3gwH7iX2ALm638xXLMZ19EDHKcx_X1T_7EtWRO6wA

> We have demonstrated the high prevalence of sleep problems in Rett syndrome (80-94% in different age groups in 2004). Sleep problems were identified most frequently in the younger age group. Daytime napping, night-time laughter, teeth grinding, night screaming and seizures were the problems most frequently reported. Some specific sleep problems did appear to vary with age with night laughing decreasing with age and daytime napping increasing with age.

> month", "Monthly" or "Twice a month"), or "Often" (recorded as "Weekly or more" or "Nightly). The data was supplemented where necessary with two items from the Rett Syndrome Behaviour Questionnaire (Mount et al., 2002): "Spells of laughter for no apparent reason during the night" (night laughing) and "Spells of screaming for no apparent reason during the night" (night

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4351186/?fbclid=IwAR303gES06BXMXKsSk_G4pRnxR9MUwqhTj1JNDTYpQPm-asPAZOAlZC8wIs

https://www.mayoclinic.org/diseases-conditions/rett-syndrome/symptoms-causes/syc-20377227?fbclid=IwAR2EQVrL9zw2cbAGWme86D5qkWLW8yXt47IPWUw5xSvCsyLEyL4GQ5sQAJM

> - **Other symptoms.** A variety of other symptoms can occur, such as a decreased response to pain; small hands and feet that are usually cold; problems with chewing and swallowing; problems with bowel function; and teeth grinding.

- **Other unusual behaviors.** These may include, for example, sudden, odd facial expressions and long bouts of laughter, hand licking, and grasping of hair or clothing.

Below is Literature to suggest the effect of Ammonia on Sleep

https://aasldpubs.onlinelibrary.wiley.com/doi/full/10.1002/hep.24741?fbclid=IwAR1rvqeoij2DjAgTlpvd4HWiFQD0QGiFvaG9f5kauJU0kltiAkhihBtDpR8

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4442851/?fbclid=IwAR05RH3AKxgI39pBj8zsIHxUxYEezyvrfKrHL06avkjQHRvD8afgcD-ggp4

https://jintensivecare.biomedcentral.com/articles/10.1186/2052-0492-2-22?fbclid=IwAR21Nx5v9tV2C5B8KHEXeK0udbmz139mqSJijtHDll_dYfTM2sum4iflWfA

If you do some more investigation you will realize the connection between sleep paralysis (a condition where you wake in extreme fear and terror suddenly) and GABA. Typically this sleep paralysis can be brought on from eating foods with MSG in neurotypical people too.

We know the connection between ammonia excess affecting the GABA - GLUTAMATE cycle.

If you do some further investigation you will find a relationship between certain Epilepsy and Bruxism and also we know that Fungal Infections can be a significant cause for seizures / epilepsy, and we know that ammonia may be the cause.

https://pubmed.ncbi.nlm.nih.gov/15210903/

We know Gelastic - Laughing Seizures have their own name but in my experience this Giddy / Laughing Phenomenon occurs when Too much nitrogen is present in the presence of high ammonia

It causes excess amounts of Nitrous Oxide to be dissolved in the blood - inducing this laughing event (Nitrous Oxide is Laughing gas). The Nitric Oxide Dump is just adjacent to the urea cycle - and this ammonia issue.

(see cycle Picture for NOS/ urea relationship)

In my experience from my own son and in recommending supplements based on these behaviors

Teeth grinding

Night Waking

Elevated Ammonia on Testing

Inappropriate / Excessive Unexplained Laughter / Giddiness (caused by nitrogen + ammonia overload)

The addition of Ammonia processing agents to help the urea cycle has helped to either stop these symptoms or help them. I have also found that activated charcoal has assisted in binding ammonia.

Helping to heal the intestinal permeability, supporting the liver, and removing aluminum toxicity may also help the issues.

Ammonia Processing Support - we have developed a great tasting formula which combines amino acids for urea cycle / nitric oxide support and includes sodium butyrate as well Ammonia Away from Researched Elements.

Remember there is no Urea Cycle in the brain - likely the ammonia buildup is exacerbated by issues in the

brain which prevent the release of ammonia. Therefore AKG may be of assistance there, and the arginine and citrulline seem to help in the liver, these are all in our formula.

Sodium Butyrate is a great tool for assisting ammonia surges that reach the brain however the issue with Sodium butyrate is that it has a very strong non ideal taste and even has a slight burning / tingling when ingested. We have managed to create a formula that is palatable which includes sodium butyrate in our Ammonia Away supplement.

Note that Nitric Oxide Issues may also be implicated in B12 status -

In particular it has been noted that Giddy laughter was mitigated with the use of Adenosylcobalamin

See literature https://www.sciencedirect.com/science/article/abs/pii/S0891584909001750

Another Supporting Argument for the role of Ammonia / Nitrogen Burden causing the Giddy Hysterical Laughing Episodes comes from the deep sea diver effect called nitrogen narcosis. Divers who re-breath their nitrogen rich exhales for too long of a duration experience this nitrogen narcosis causing uncontrollable laughter, hysteria, and drunken behavior. Re-breathing your exhaled breath increases nitric oxide levels (NO), The high levels of NO are metabolized to N20 nitrous oxide by certain bacteria in the gut creating (laughing gas). Nitrogen Narcosis

An aside on Prevotella Copri overgrowths

Absurd Prevotella (segatella) overgrowths have been observed in many “sick” individuals and there is a high correlation to the overgrowth and exposure to moldy environments, meaning they have been found to be living in conditions where mold was discovered and or elevations on urine based mycotoxin tests. There are other situations and evidence trails that you must read about below to get a better understanding. Specifically the microbe found most overgrown is Prevotella Copri in these situations.

Prevotella Copri is a bacteria with substantial supporting evidence that is Fed by fungal metabolites and it is a surrogate for invasive fungal overgrowth - with high probability of MOLD exposure or harboring a fungal overgrowth driven dysbiosis.

A collection of literature snippets can be found here

https://docs.google.com/presentation/d/1mwwTGhPpelpoZ35l7vyOekvcvkzzeHsIImKpThZgZCU/edit?usp=sharing

The rest of my argument is supported from clinical experience, situational changes, and testing. Having seen a higher than normal dysbiotic population than ASD, I would estimate this overgrowth is occurring in about 10 to 15% of individuals. Recently a paper was published recognizing this.
https://brieflands.com/articles/ijpbs-126508,

There is a lot of conflicting sources in this area, know that different eras of stools testing processed prevotella as bacteroides, in the 1990s the genus Prevotella was described by reclassifying a group of bacteroides, admittedly until recently even some stool testing has pooled prevotella into the bacteroides genus.

Thus it is impossible to know the full scope of the prevotella issue unless you are using testing that follows NCBI classifications (likely the case for newer sequence based testing).

There are some infamous Biome researchers in ASD that will not recognize this prevotella issue because it is in opposition to research they did decades ago, however I'm delighted that it is being recognized in recent publications. One famous FMT Physician Guru wrote my concerns off as it being completely from the diet despite being unable to explain why an 8 month old had it occupying 50% of their biome or the sudden changes in levels following the administration of an antifungal.

The overgrowth when present ranges from 20% to 90% of the entire microbiome (percentage abundance), certainly the distribution in the broad population looks very striking for this microbe and some other prevotella. The majority of samples in the broad population have percentage abundance well below a half percent abundance, and there is a sudden and sharp rise in the percentage abundance in the broad population somewhere around the 80th percentile.

It has been found elevated in multiple family members - all experiencing varying levels of illness.
This statement means that in a house of 3 or 4 people, often times when one individual is occupied with this excessive abundance, there is at least one other individual with the overgrowth present.

It has been found in an 8 month child - where the mother had elevated levels as well, the child is not on solids
It has been found in a 18 month old child where there were clear pictures identifiable of mold growing in the home.

There have been several situations where the microbe was NOT elevated on a first test, then the individual took some kind of intervention (probiotic, or antifungal, or FMT) and a subsequent test showed exceeding high levels (occupying 50% or more of the biome)

Most people that intervene see an increase in their percentage abundance on their next test but also report improvement.

This microbe / overgrowth does not respond in the same way that other microbes do to intervention, it appears to increase at first, giving the behavior that it is feeding on some fungal metabolites (supported by literature).

It is elevated in different diseases HIV, RA, PA, all with fungal undertones.
It has been found to significantly diminish in the presence of Montelukast only for the duration of taking it and then quickly blooming back. There is a hypothesis there may be a viral tone, recently it was discovered that a bacterial virus inhabits certain prevotella copri. Montelukast is known to have an antiviral action, there are several components which seem to have efficacy in reducing the apparent overgrowth. Vitamin A, Perilla, Bacopa, Boswellia, Codonopsis, Olive leaf, **rosemary, astragalus**. Many of these also have action counteracting leukotrienes. It has also been observed in some that Ivermectin has resolved overgrowth, it may be affecting viral or parasitic components (see virus found inside prevotella).
Prevotella is known to be a potent leukotriene producer.

https://www.ucl.ac.uk/news/2019/jan/new-giant-bacterial-virus-found-human-gut

There are certainly different species of prevotella copri, this likely plays some role.

There appears to be a feeding mechanism that may over exaggerate the overgrowth possibly in the distal colon.

It is possible that the level of the percentage abundance of prevotella copri by stool tests is not reflective of the actual value inside the body. I believe that fungal metabolites are released in the wake of killing fungi or possibly as a threat of mycotoxins in response to antifungal intervention (Look up Neil Nathan) causing artificial blooms of this microbe to feed on the metabolites just as long as they are present in the colon.

I have attempted to measure a time lag effect, taking the same stool sample and evenly dispensing it amongst two vials and sending them for processing at distinct times. The result showed that there is a high variability in the P copri percentage abundance but also seeming to indicate that older samples caused feeding in the sample on metabolites which produced larger percentage abundances.

The result of all this is simply that the value of Prevotella copri is actually not very important if you are dealing with an elevated situation as I'm describing. Instead take it as a surrogate for a challenging situation where there is likely a large fungal issue and possibly a viral issue as well.

There is a counterargument that diet reflects high values of prevotella copri consistent with certain geographical or cultural situations, certainly these high levels that I'm speaking about are not indicative of those diets (mediterranean for instance), with almost all of the individuals I have worked with not even having a diet that resembles this at all, certainly this is the cases of the infants who have not begun solids. The distinct behavior of huge increase in P copri abundance with antifungal components along with the supporting literature for this microbe feeding on fungal metabolites speaks volumes. There are also many cultures where fungal issues have recently been identified to be lurking in the dark, for instance India.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9792086/#:~:text=This%20systematic%20review%2C%20synthesizing%20data,rhinosinusitis%20affect%20over%203%20million.
One could make the argument that mycotoxins in foods and the role they play with regard to cultural diets may play a role for the metabolites driving P copri dysbiosis, a colonization in the GI tract is also possible. Yeast species such as candida are known to take on colony forming mold like behaviors when exposed to more alkaline environments and have also been known to secrete mycotoxins.

It is also useful to note that DON toxin (Deoxynivalenol) aka VOMITOXIN is one that is not readily measured on mycotoxin testing and may be the most ubiquitous mycotoxin. There is some evidence that P copri also metabolites this toxin.

One way to determine if a mold or mycotoxin generating fungal colonization exists is to perform mycotoxin testing before the administration of an antifungal and shortly thereafter in the wake of the therapeutic, rise in oxalates and mycotoxins like Gliotoxin (often orders of magnitude) occur in response to antifungal regimens. This is well described by Neil Nathan and I have witnessed this. If no appreciable rises are measured then likely the source of mycotoxins is food driven and or poor detoxification status or both. Regardless, the approach to healing should be the same as outlined above, substantial support for pathways, histamine assisting tools, and potentially binders as needed, all while seeking to rebalance the gut.

https://www.tandfonline.com/doi/full/10.1080/19490976.2023.2249152

Individuals that are battling oxidative stress and or mycotoxins can explore the lotion from thiogenics which assists in the recycling of glutathione. There have been some nice messages left by those with ASD in response to trialing this product.
https://docs.google.com/presentation/d/1N3W8iUQC8vwQ_fpo21At3inE4YIDPeJGhEkcTuj-daE/edit?usp=sharing

An aside on Active vs Inactive Vitamins

There is a lot of emphasis that active vitamins are better than non active vitamins but there are some arguments that most people or practitioners never take into account.

1) Activated phosphate forms often contain phosphate ester bonds that can be relatively susceptible to hydrolysis during digestion and absorption. As a result, a portion of the supplemented activated form may be converted to its corresponding non-phosphorylated form before reaching systemic circulation, potentially reducing the amount of the activated form that remains available.

2) your body has mechanisms to recycle the non active forms into the active forms, oftentimes these are helped with other cofactors - these are most instrumental processes in actually getting the "active" vitamin to exist where it needs to be. Do you really think your active B2 is making it across the body into your brain cell where it may be needed. More likely you get the non active form there.. and use your body's mechanisms to generate the active form.

3) The active forms, if they reach their destination, will go to work quickly and can leave you with short highs followed by lows. In the case of b6 pyridoxal 5 phosphate it can even cause neurotransmitter swings.

Having both active and non-active forms is crucial. Active forms can be helpful to assist various enzymes and cycles immediately while the non-active forms are necessary for recycling and conversions that take place inside the cell.

At Researched Elements we designed Spectrum Max to have all the forms in specific ratios to allow for the supporting the body at every point. Spectrum max provides a broad balanced multivitamin which includes the core components of every form in optimal ratios, minerals, mitochondrial supports, adrenal supports, urea cycle / NOS cycle, and Neurotransmitter supports. Lastly, if you have a hard time getting your child or loved one to swallow pills, our great tasting powder mixes well, easy to take, and made from the cleanest choices!.

Despite all that I have compiled here, there is actually quite a bit more but this at least is a good core that can hopefully lead you or your patients to some nice improvements. What I have attempted to put together is a primer on the components that I have found important and helpful for the individuals that have worked with me. Many of those parents have shared their messages, some in audio, and those that have filled out surveys on gut balancing.

https://youtu.be/BPmdGgXXf8c Youtube Audio Messages from some Individuals Participating in Gut Balancing

https://docs.google.com/presentation/d/1IjCSw2dn1f5Qcw6CQybdpHT7O6Sq93Cs2fD2JSSJ-JE/edit?usp=sharing Message Snippets from those participating in Gut Balancing

https://docs.google.com/forms/d/1iGGfhxM0Ey1xUfWc5P1Zsh43DLC8H-AwTeeFRxLxI2A/viewanalytics?fbclid=IwAR1VrYIkFVdaOiF7Zz-Vi9K9b4EgzuRLm5XsiDhOUZs9XoKBX01fQMVAZcU

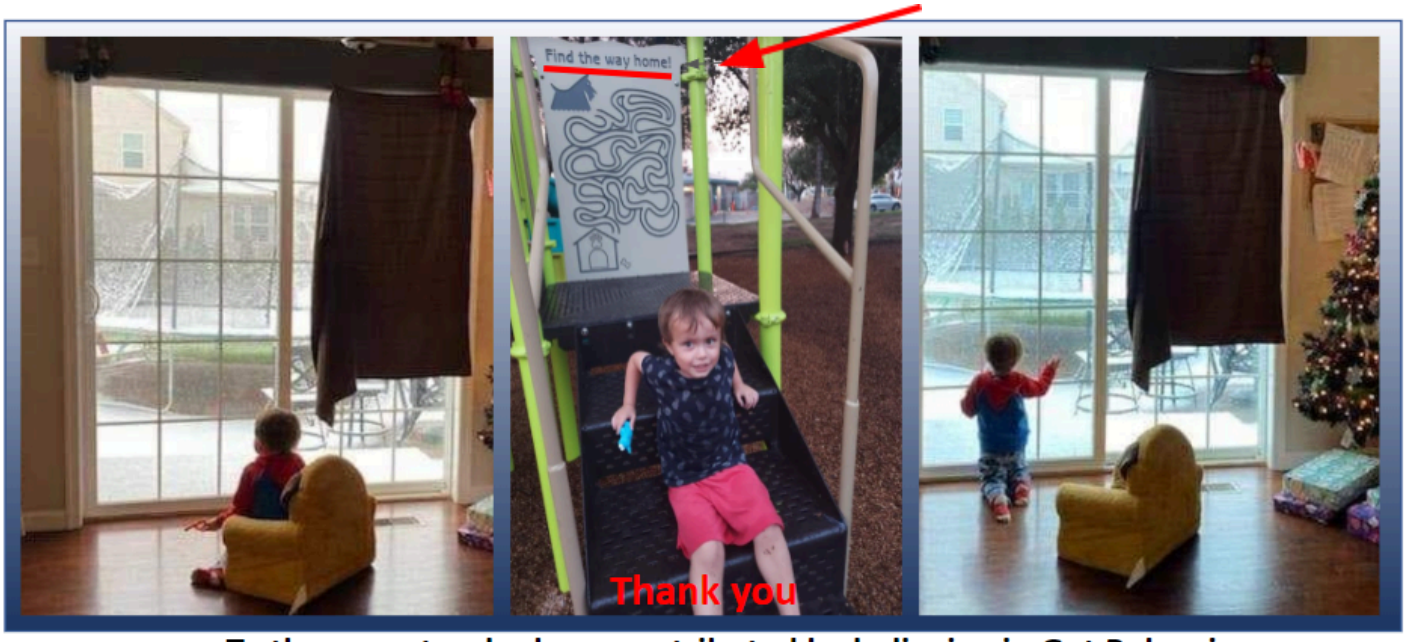
Survey responses anonymized from those completing a round of Gut Balancing in ASD

https://docs.google.com/forms/d/17V9FJD8qcwVvk90vDdQuKOdVT2JMZaKmwz5WVgDahMA/viewanalytics

Survey responses anonymized from those completing a round of Gut Balancing in NON ASD

Please always take any suggestion with a grain of salt, do your research, ask questions, demand answers, and determine what is best for you or your family. At the very least I may have caused some controversy in the statements I have formed here, I beg you to reflect on them rather than write them off. It's through argument, discussion and exchange of ideas that we push the needle forward.

I want to thank my wife and now three children James, Isabel, and Antonia specifically James for everything that I have learned from his life events and situations. James doesn't realize it, but his healing has been paramount in the healing of hundreds of other children, I could not have learned these connections without him and he has given me a unique purpose, just like the hundreds of other parents before me that have led the way in realm of biomedical intervention for ASD. I would like to thank the hundreds of parents that have participated and helped to further my understanding. I would also like to thank Dr. Christian Bogner for his dedication, help, and collaboration. He spends his evenings hunting for answers and is never prepared to stop at making connections to help out his patients. We are all on the journey to **find the way home!**



To the parents who have contributed by believing in Gut Balancing

Special Topics - Leucovorin / Folinic Acid

I'm a staunch advocate against that kind of recommendation to remove dairy from the diet. Unfortunately the Leucovorin craze has over the years gone off the rails.

1) FRAA don't imply CFD - that is just a fact, that test has never been clinically validated to show that. CFD is only verified with a spinal tap.

2) Across all folks taking the FRAT practitioners have seen all of these permutations occur.

A) Positive FRAT and improvement with leucovorin

B) Positive FRAT and no improvement with leucovorin or worsening

C) Negative FRAT and improvement with leucovorin

D) Negative FRAT and no improvement with leucovorin

that means the test is not specific... and then they just dose with leucovorin regardless. What is the point of the test?

3) There are actually genetic mutations that make taking Folinic Acid a contraindication like MTHF(S) (not MTHF(R)

4) A child on the Flight study that participated in "Gut Balancing" had their Positive and HIGH FRAT results reversed in a very short period of time.. (2 months about). Folate Receptor Antibodies are not genetic, they are autoimmune - mediated by the GUT - when you heal the gut you can clearly reverse the situation as it has been shown with many autoimmune issues.

5) The absorption of Folinic acid and active folates is both increased when the gut is in a better state, and produced by the bacteria in the gut when the gut is in a better state.

6) The problem with "dairy" is the fact that those compounds are more likely to startle the immune system by "leaking" across the gut barrier (intestinal permeability) and exacerbating FRA. However this doesn't happen to the same degree in everyone and it isn't caused by all the things in something called "dairy" we know that casein is one of these compounds. Dairy is a broad word encompassing the "soup" of things inside that mixture. The positive part of dairy on the gut are the saccharides that FEED and heal your gut. Abstaining from dairy will drive dysbiosis - there is smart dairy that you can use in moderation, when you cut it out completely you are asking for problems.

7) The dairy part of Bimuno GOS which is the most beneficial compound I have come across in restoring bifidobacterium (In several of our products and used for years on thousands with autism) is the sugar molecule called Galacto Oligosaccharide. In the supplement the sugar is isolated from the dairy to only include that - but it is required to say contains milk.

8- the doses of Leucovorin have insanely increased by practitioners over the years.. in 2018, 25mg was considered high and now I've seen people dosing at 200mg. If you look at the absorption limits for this drug which are well understood from cancer patients - you start to max out at about 25mg .. meaning anything higher than that dose just goes down the poop shoot. To me all logic has left the window with dosing higher than 50mg (25mg twice per day) particularly because those prescribing leave all the other points out above like the gut and how it could reduce the amount even needed for those that see a benefit

9) A point that no one brings up and that I see as a microbiome researcher for years. There is literature to support dosing of folate increase clostridium. Although this was specific to folate it doesn't distinguish active folates I have seen folks taking higher doses correlate to some pretty gnarly clostridium overgrowths. I'm pretty sure this is real. Whats so ironic about this is that years ago a parent was telling everyone to stop taking L carnitine because they said Dr. Frye said it feeds clostridium in the gut. When I contacted Dr. Frye about his evidence he said it was theoretical, i've never seen him talk about the real literature that exists showing folate increases clostridium (three papers exist). So if your kid's behaviors

are worse it COULD be that your feeding and already existent clostridium or pseudo clostridium overgrowth. I'd wager that 99% of Clinicians don't even know what pseudoclostridium is either.

10) Specifically increasing Bifidobacterium can increase folate production in the gut.. bifidobacterium and lactobacillus are known to be large folate producers. Not talking about the synthetic folate here, active folates. This product does exactly that.

This is the classic example of clinicians finding an anomaly in a subset of kids with autism through testing, and a compound that assists with that, and driving the dose higher and higher without any consideration for the root cause or impact of that dose.

Yes Bimuno GOS and colostrum must say (comes from dairy) however every person that has fought me on this for years has only seen improvement in their kid or adult when it was indicated for low bifidobacterium.

I'm not against leucovorin or Folinic acid.. we have offered it in two supplements. I'm just against in general the "craze" that comes over clinicians that beat something good to death ... meaning they don't consider the root cause, the implications of infinite dosing, the balance.. the strive to get off infinite supplementation.. the simple logic.

I can't fathom why Clinicians order FRAT tests when they dose with Folinic acid regardless of the result? That means you're buying a test regardless of the result.. Or maybe I actually can fathom why..... I don't understand why the other points above rarely get talked about at all. Sorry to go off on a rant.

I believe cutting out dairy can be helpful for some initially, I think there is smart dairy - certain cheeses that have nice inoculations of probiotics. I think healing the gut is the most important and then that dairy reactivity starts to fade. I think abstaining completely will cause you bigger problems eventually. I certainly believe that even people that are any level of dairy adverse will have no problems and only benefit from this formulation if they have little to no bifidobacterium.

Special Topics - Oxalate Burden

Oxalate burden is a commonly seen dysfunction in autism and other conditions where dysbiosis—particularly fungal dysbiosis—becomes significant. Fungi produce oxalates as part of their metabolism. When oxalates combine with calcium, they form crystals that can place a significant burden on the body and contribute to symptoms such as:

- Bladder irritation
- Irritation of the urethra
- Eye pain in more severe cases
- Headaches

Behavioral signs can also occur, including grabbing of the genital area, eye poking, and spontaneous loss of bladder control in individuals who are either toilet trained or not.

Oxalates are often released when the underlying fungal issue is targeted, creating a temporary “dumping” effect that can worsen symptoms before the overall burden improves. This may show up as increased bladder issues or discomfort after introducing antifungal interventions, whether prescription medications, herbs, plant compounds, or even probiotics with antifungal activity.

The primary way to reduce oxalate burden is by addressing the fungal overgrowth itself (sometimes protozoa imbalance), which can be a long and complex process. Supporting and restoring the microbiome is a key part of making progress in this area.

In the meantime, symptoms associated with oxalate burden may be supported with certain cofactors. One commonly used tool is calcium citrate, typically dosed between 750 mg and 1500 mg per day in children and adolescents.

Calcium citrate may help because the citrate component dissociates oxalate crystals into their ionic form, oxalic acid. Calcium then binds strongly to the oxalic acid, forming calcium oxalate, which is relatively insoluble. Since much of the oxalate burden is thought to occur in the gut, this process helps keep the oxalates in the gastrointestinal tract, where they can be excreted through the bowels more easily. Symptomatic improvements are often seen after approximately three bowel cycles.

Without calcium citrate, oxalic acid levels may remain elevated in the gut, become absorbed into the bloodstream, and form crystals elsewhere in the body. This may contribute to symptoms such as eye pain or discomfort during excretion through the kidneys, bladder, and urethra.

My colleague Dr. Bogner and I through years of clinical experience researched these mechanisms and developed a compound called Oxalate Relief by Researched Elements , it combines calcium citrate with several additional supportive compounds aimed at reducing oxalate burden.

It is important to remember that this is a tool—not a cure. It may help reduce the burden of oxalates, but it does not address the underlying source, which is fungal dysbiosis. However, it can be very helpful, and sometimes necessary, during microbiome shifts, especially because oxalate dumping can become quite significant in some individuals.

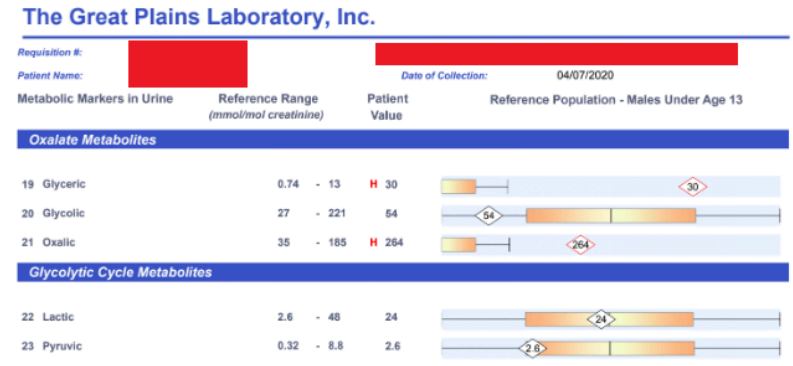
If these symptoms occur even without the use of antifungal medications, herbs, plants, or probiotics with antifungal action, that may be a clue pointing toward oxalate burden.

You can also measure oxalic acid levels using an organic acids test. Ideally, testing can be done in two settings:

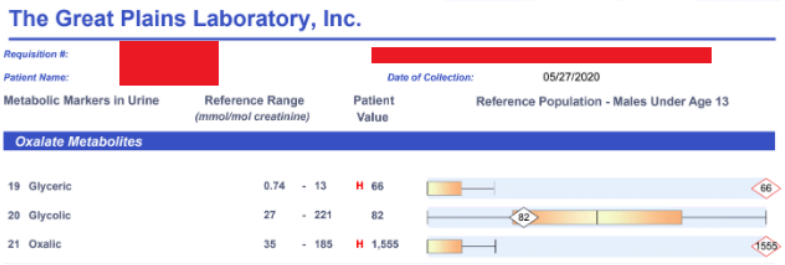
- Unprovoked
- Provoked — meaning after exposure to an agent with antifungal activity, typically measured the following day.

You don't need to measure it both ways but you might and understanding the provoking mechanism may explain extremely high elevations. We have measured oxalate burdens exceeding the normal ranges a factor of 10

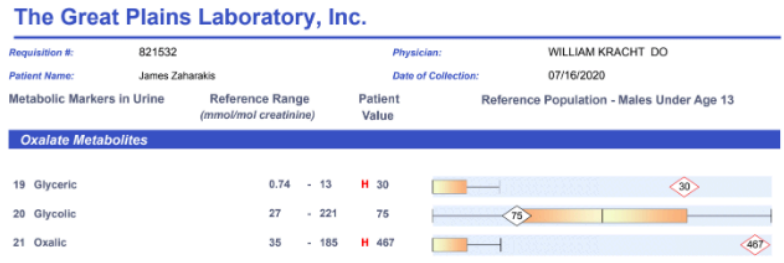
Below is a graphic showing Oxalate Baseline in An Autistic child with Known Fungal issues at various points.



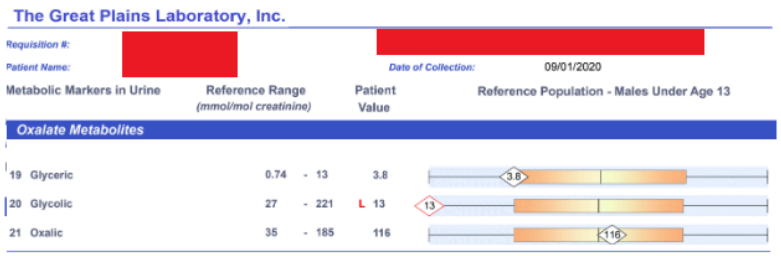
Base Line



Post Antifungal next day



Baseline During Probioitic / Herbal Treatment



Baseline During Probiotic / Herbal with Calcium Citrate

What about Oxalates from Dietary contribution, well it turns out that fungal dysbiosis dominates the oxalate burden picture significantly. Unless you are binging on foods high in oxalates, the dietary contribution from oxalates is dwarfed as compared to what is produced from fungal overgrowth. We don't recommend excluding foods if they are balanced health and nutritious based on their oxalate value, just don't binge on them.

A misunderstanding about oxalate burden is that only certain bacterial species can degrade oxalate such as Oxalobacter formigenes and that not having these microbes in your gut is the root of your oxalate burden. This is not correct. While it is true that Oxalobacter can degrade oxalate, there are many other bacteria that also possesses the necessary enzymatic process for degrading oxalate. The reason that **oxalobacter** is named as such is that **it relies on oxalate as a fuel source for its metabolism NOT because it is the only microbe that degrades oxalates**. Oxalate decarboxylase is the enzyme that can degrade oxalate into carbon dioxide and is found in bacteria like Bacteroides, Lactobacillus, Ruminococcus, and Pseudomonas are examples of some bacteria groups that can degrade oxalate.

It is also important to note that certain parasites, particularly specific types of fungi and mold, can produce and secrete oxalic acid as well, so the burden may not always be dominated by yeast or candida alone.

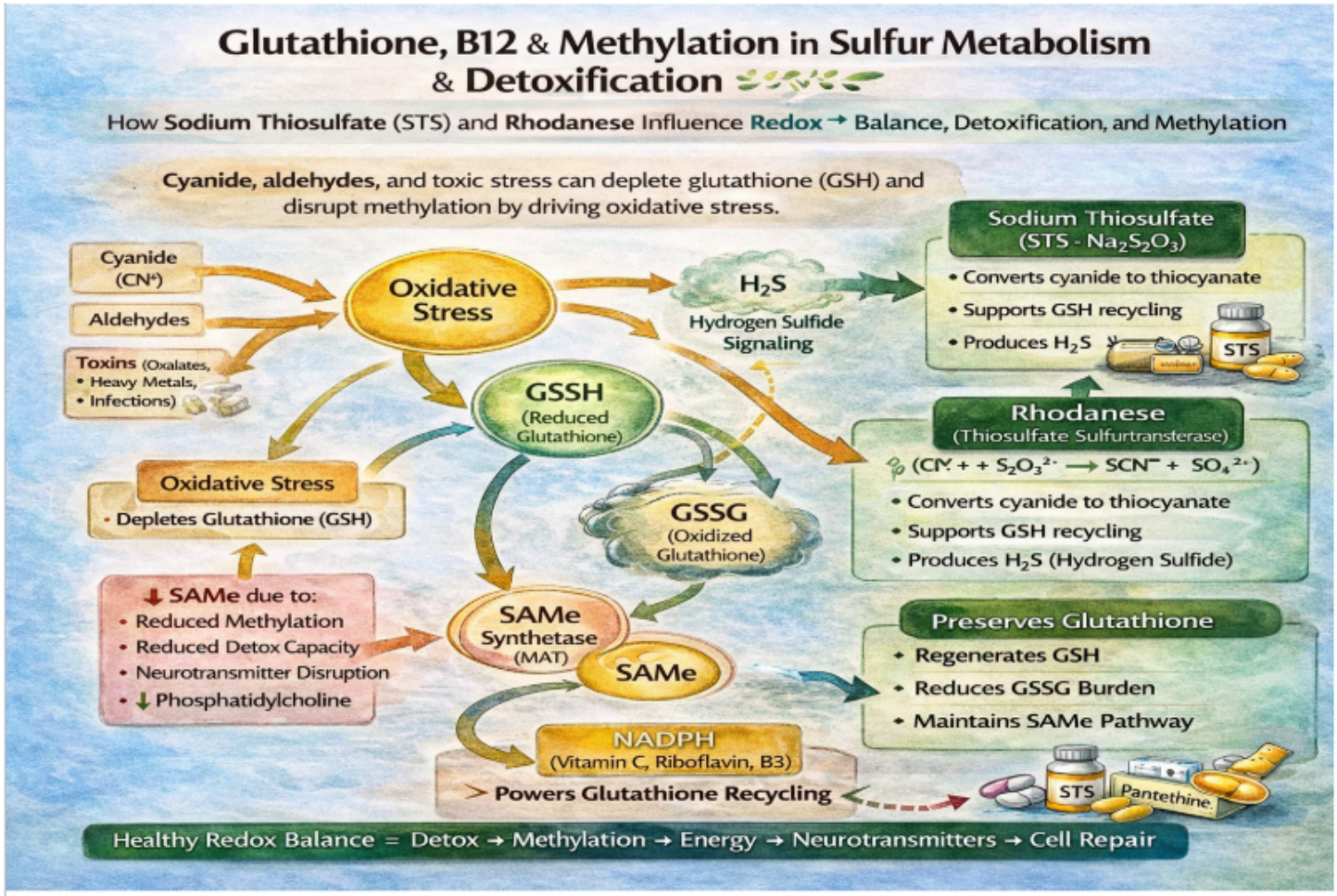
It is important to support motility during oxalate binding / burden as binding oxalates can exacerbate constipation in the short term. The time it takes for oxalate relief to lower the load of oxalate burden to see relief is typically 2 to 3 bowel movements.

Another key component is that Oxalates are potent chelating agents that bind with heavy metals (such as lead, mercury, and cadmium). Chronic Elevated oxalates can sequester toxic metals, trapping them within body tissues.

Special Topics - Thioguard Lotion

Interestingly children on the spectrum have measured positive for levels of cyanide burden with cyanide strip testing. There is a disease called KONZO disease which affects areas of saharan africa where cassava plants are the primary part of the diet (high in cyanide). The disease bears resemblance to autism sharing, toe walking, ataxia, speech impairment, motor coordination issues, etc. The active ingredient in thioguard is a detoxification tool for cyanide, we believe that elevated B12 in the blood (cyano cobalamin) is a feature of this issue often seen in Autism. Elevated cyanides (produced by dysbiosis, bacteria, fungi and parasites) rob the body of STS causing low thiocyanate (measured in ASD), as a result the body uses HydroxyB12 to convert Cyanide to CB12, causing high serum B12 and low HB12 → reduced methylation and ADB12. Further more the lack of STS reduces the glutathione recycling potential of the body causing more oxidative stress to impact the Sam E pathway and bottleneck methylation further. There are also some implications on how buildup of Carbon monoxide in the blood (found to be correlated to severity of autism) can result from increased cyanide, Oxidative stress and inflammation can induce Heme Oxygenase-1 (HO-1). HO-1 breaks down heme into, Biliverdin, Iron, Carbon monoxide (CO).

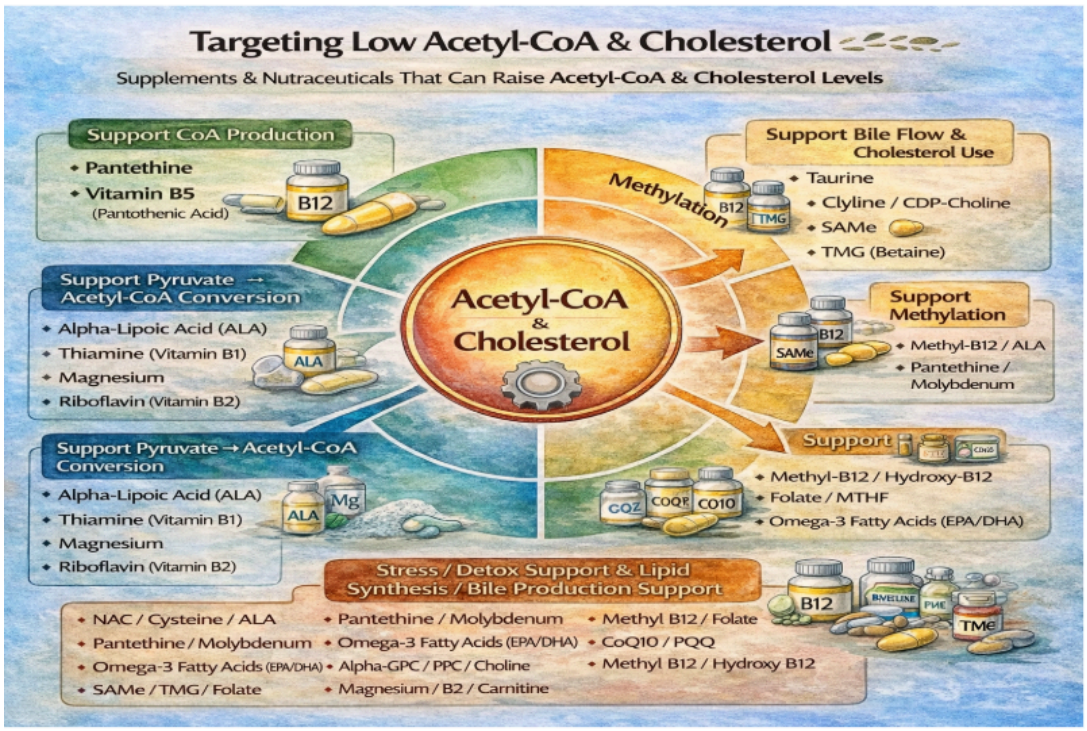
Low sulfur transferase activity → impaired cyanide detoxification.Cyanide accumulates.Mitochondrial stress increases. HO-1 induction increases. Endogenous CO production may increase. Increased CO further worsens oxygen delivery and cellular energy production.

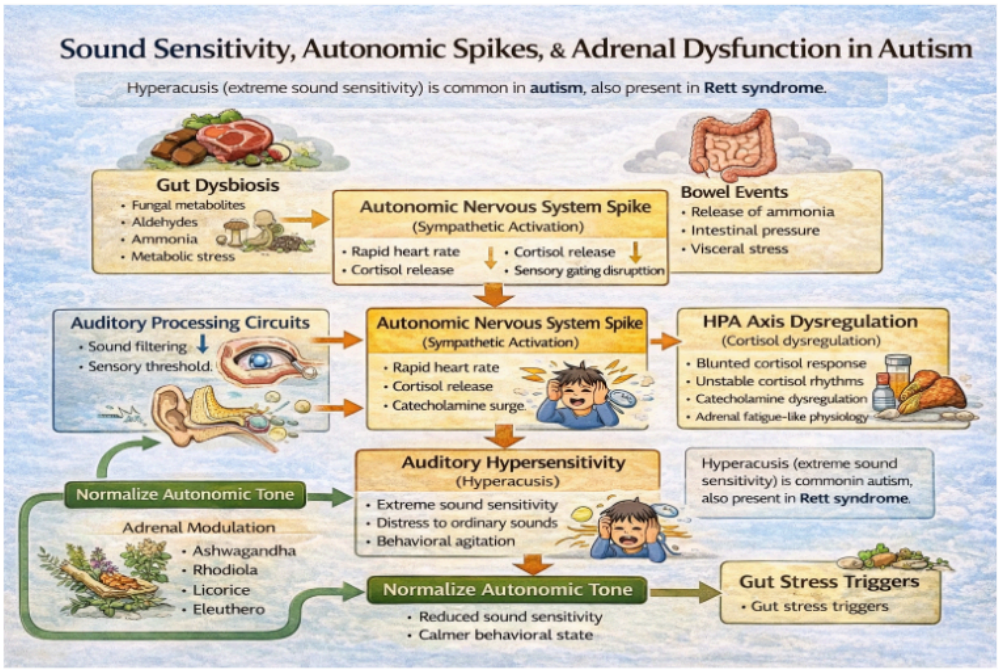


STS has been used to reduce mycotoxins in animals (PIGS) and has chelative abilities such as Cu, Hg, Cd, Pb, Pd, Pt. [Learn more by watching Rumble Videos]

Special Topics - Other Support Situations

Check the Ears	Olive Oil, MCT Oil, Mineral Oil drops in ears
Check For (UTI)	Pomegranate Peel, Fu Pen Zi, Nettle Leaf, HU58 Jarrow Fem Dophilus Rosemary Leaf Natures way Garlic Gummies Uva Ursi (sparingly) Hyaluronic Acid Fucoidan
Check for Ulcers	DGL / Slippery Elm / similar (DGL tablets Natural Factors 3- 5 daily)
Check for Teeth issues	Cinnamon, Olive Oil, Oral STS
Check for Constipation	(see constipation page)
Gout	Fucoidan / Tart Cherry
Inflammatory Bowel	Boswellia, Fu Pen Zi, Curcumin, Olive leaf, Peppermin Leaf, Rosemary leaf Flaxseed Powder, Fennel Seed, Ginger
Detox Burden	DGL Tablets Natural Factors (3 - 5 daily) KLL detox Researched Elements Ammonie Away Researched Elements Glutathione Genesis Researched Elements Thioguard Lotion Researched Elements Vitamin C (ascorbic & ascorbyl palmitate) Activate Charcoal
Fungal Aldehydes	Boost Acetyl - COA Magnesium, B3 (active and inactive), Pantethine (active B5), Riboflavin Thiamine, ALA, Acetyl Carnitine, NAC, CDP Choline





Consider Serene Calm Adrenal Support (Researched Elements)
Consider Homepathics - consult Chamomila, Phosphorus, Nux Vomica, Silica, Zincum Met, Asarum europaeum

Brain Health

Bacopa Monnieri, Gotu Kola, Mushrooms, MitoMind researched elements

Focus - phenylethylamine

Citicholine / AGPC / Uridine.

Special Topics - Copper

Free & Bound copper Elevations in Free copper can be tied to inflammation.
Zinc / Copper Ratios may give insight (0.8 - 1.2) , low ratio implies high copper or low zinc
Too much free copper → oxidative damage

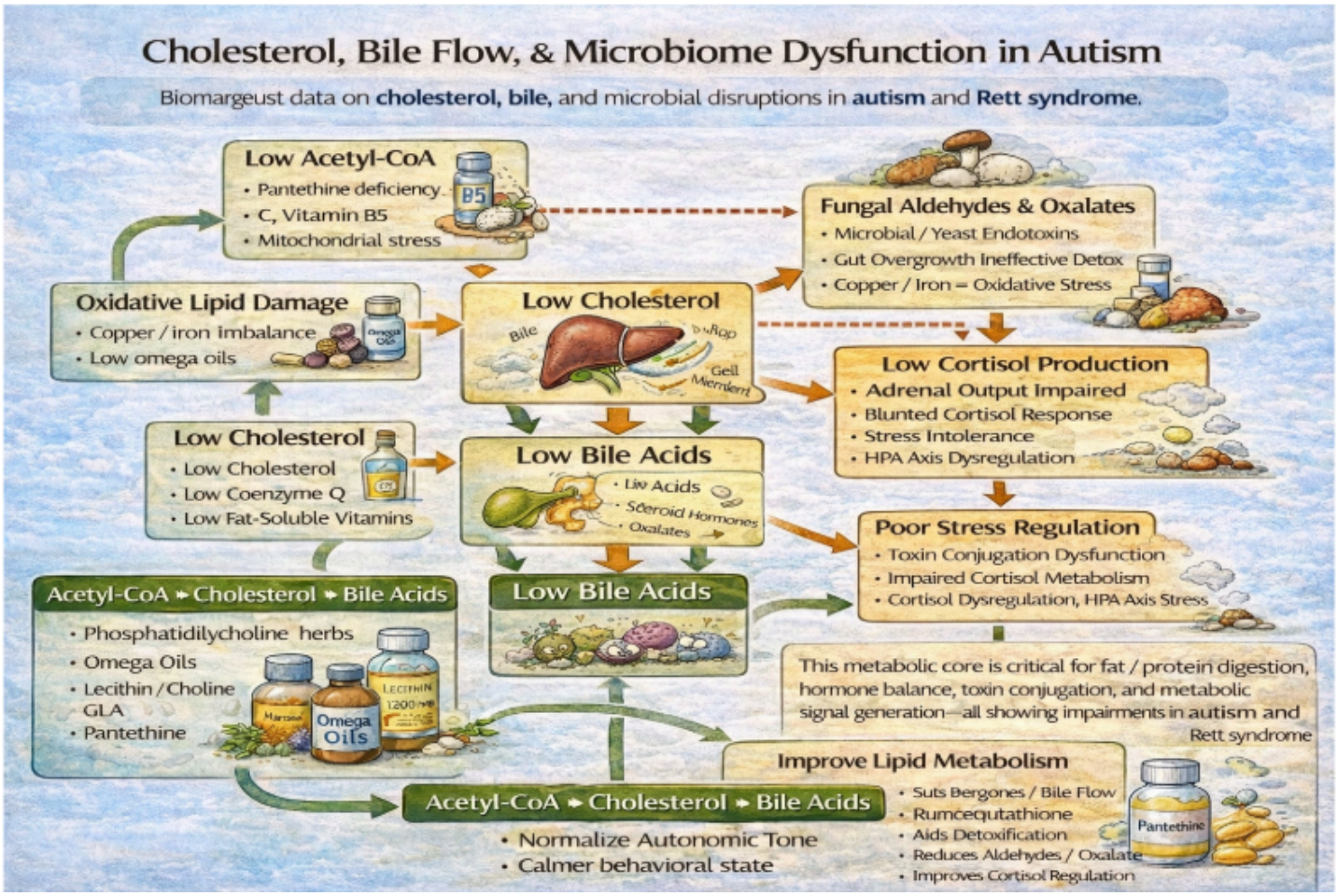
Deficiencies in Selenium / Molybdenum may exacerbate copper elevations.

Strategies to Balance Copper include

Appropriate Zinc Supplementation (Consider Zinc Citrate)
Molybdenum glycinate - very important for SUOX mutations
Selenium - selenomethionine

Low levels of Bile may also cause elevations in Copper
Bile stimulants may be a at the heart of Copper imbalance

Bile stimulants can also feed bilophila - a hydrogen sulfide producer
Taurine may be a middle of the road bile assist
PPC is needed to construct Bile - those with PEMT mutations require more PPC, consider Uridine / AGPC / CDP choline



Special Topics - Gut Balancing Test

www.gutbalancing.com

RESEARCHED ELEMENTS

GUT BALANCING

RESEARCHED ELEMENTS

This Page 2 gives a quick overview of the main dysfunctions and their severity score (1-3), Meant to help the patient understand some of the underlying imbalances.

Page 2: Dysbiosis Descriptions

Sample MB100470

Dysbiosis code: `33332221111-CJYZADXFIW-175`

Category	score	Notes
Potential Fungal Burden	2	While this test does not directly measure fungal constituents, correlations have been observed between fungal burdens, their metabolites, and their potential to support overgrowths in the Blautia and Prevotella/Paraprevotella genera. Additionally, deficiencies in Bifidobacterium can create a gut pH environment conducive to pathogenic overgrowths. However, it's important to note that these are only correlations, and greater focus should be placed on evaluating symptoms and responses to antifungal treatments. Based on your results, we have included recommendations for implementing broad antifungal strategies. Agents such as C8 Caprylic Acid, Undecylenic Acid, or Coconut Oil, Black Walnut, Olive Leaf, Pau D'arco may be helpful including high dose of Ginger, Perilla, and probiotic combinations like Dysbiosis AZ2 (L johnsonii) & Laterosporus exhibit antifungal properties, some literature has show that Vitamin A dosing is beneficial with prevotella overgrowths. Perilla Oil, Goldenseal Root. Homepathic approaches like Polyfungal are also options to consider in difficult situations.
Prevotella / Paraprevotella (Elevated)	3	Overgrowths in these Genus of Prevotella and Paraprevotella have been correlated to fungal, viral, and potentially parasitic burdens. Prevotella and Paraprevotella are significant producers of propionate a short chain fatty acid that has been found to be elevated in ASD Proprionate can trigger neuroinflammation in the brain, which is a process involving the activation of immune cells and the release of inflammatory molecule. There is clinical and researched based evidence connecting certain overgrowths of Prevotella copri (Recently Remapped to Segatella copri) to mycotoxin levels - mold exposure, fungal overgrowths etc. Combinations that appear helpful in this area include, Fucoidan, Olive Leaf, Bacoppa, Boswellia, DGL, Ginger, Visbiome, Dysbiosis AZ2, Lactobacillis Johnsonii, CodeAge Mimosa Pudica, Black Walnut Hull, Vitamin A, Perilla, Rosemary and Green Tea Extract.
Bacteroidia (Elevated)	3	Bacteroidia are gram negative and contributors to LPS burden as their cell walls are composed of LPS, they typically correlate with carnivorous diets or lack of plant based foods in the diet however these are not the only reasons for elevated bacteroidia. Having no Bacteroides is likely not ideal and there is literature supporting protective bacteroides, overgrowth of this genus is more common than deficit. In particular components like Beet Root, Curcumin, Pomegranite, Codonopsis, Green Tea, and Plant fibers can reduce bacteroides and similar bacteroida. Lactulose prebioitc sugar that is very effective at reducing bacteroides and bacteroidia. In many countries Lactulose is over the counter, it can be purchased from Canada

RESEARCHED ELEMENTS

GUT BALANCING

RESEARCHED ELEMENTS

This Page 3 Provides Clinical Ranges For Important Microbes predominantly at the genus level. The microbes have been grouped into different colored coded sections to help bucket them into certain categories.

Page 3: Clinical Microbe Ranges

Broad Health Measures

SampleID: MB100470 contains 175 unique ASVs

Search:

TaxonID	Microbe Name	MIN	MAX	percent	distinct_ASVs	LCA_ids
216851	Faecalibacterium*	10.00%	17.50%	6.98%	9	411483, 853, 2935520, 1851428, 1851427
239934	Akkermansia *	0.50%	4.00%	0.00%	0	
1678	Bifidobacterium *	4.00%	7.00%	0.93%	5	1678
33958	Lactobacillaceae*	0.02%	0.50%	0.01%	1	1587
706562	Lactobacillus rogosae	0.00%	0.20%	0.75%	4	706562
200643	Bacteroidia*	0.00%	35.00%	72.64%	44	537011, 821, 46503, 204516, 470145, 454154, 47678, 816, 449673, 357276, 375288, 820, 28116, 328814, 823, 487174, 338188, 214856, 171549, 2585118, 28118, 1211813, 574697, 470565, 818
815	Bacteroidaceae (new)*	5.00%	17.50%	12.11%	21	821, 204516, 470145, 47678, 816, 449673, 357276, 820, 28116, 338188, 818
816	Bacteroides	5.00%	17.50%	2.67%	11	47678, 816, 449673, 820, 28116, 338188, 818
909656	Phocaeicola (new)	5.00%	17.50%	9.44%	10	821, 204516, 470145, 357276
375288	Parabacteroides*	0.00%	4.00%	2.53%	4	46503, 375288, 823
572511	Blautia*	2.50%	7.50%	0.98%	7	572511, 411459, 89014
841	Roseburia*	2.50%	10.00%	0.74%	6	622312, 2763061, 585394, 841

Page 4 Provides the Complete Microbiome Ordering (Highest to lowest Abundance) as well as the Database Hits / Hierarchy. The Last Column Represents the BLAST (Basic Local Alignment Search Tool) Hit % from the NCBI Database. It is important to recognize that bacterial naming has changed over time (and relative to database origin).

Page 4 Microbe Ordering

Sequenced Microbes sorted by Percentage Abundance and Referenced against Specified Database Below

SampleID **MB100470**: 175 unique ASVs after processing

Search:

Samples		Reference Database Hierarchy, Qiime2 Naive Bayes classifier				Blast+ LCA: Top database hit(s)			
MB100470	ASV_id	Greengenes1	Greengenes2	Silva	RDP	Matched %	Matched IDs	LCA_names	LCA_IDs
34.69%	4fba6fe	k__Bacteria; p__Bacteroidetes; c__Bacteroidia; o__Bacteroidales; f__Prevotellaceae; g__Prevotella; s__copri	d__Bacteria; p__Bacteroidota; c__Bacteroidia; o__Bacteroidales; f__Bacteroidaceae; g__Prevotella; s__Prevotella copri	d__Bacteria; p__Bacteroidota; c__Bacteroidia; o__Bacteroidales; f__Prevotellaceae; g__Prevotella_9; s__	d__Bacteria; p__Bacteroidota; c__Bacteroidia; o__Bacteroidales; f__Prevotellaceae; g__Prevotella_9; s__	98.81%	537011	Pseudomonadati; FCB group; Bacteroidota/Chlorobiota group; Bacteroidota; Bacteroidia; Bacteroidales; Prevotellaceae; Segatella; Segatella copri; Segatella copri DSM 18205	131567; 2; 3379134; 1783270; 68336; 976; 200643; 171549; 171552; 2974251; 165179; 537011
21.14%	675c847	k__Bacteria; p__Bacteroidetes; c__Bacteroidia; o__Bacteroidales; f__Prevotellaceae; g__Prevotella; s__copri	d__Bacteria; p__Bacteroidota; c__Bacteroidia; o__Bacteroidales; f__Bacteroidaceae; g__Prevotella; s__Prevotella copri	d__Bacteria; p__Bacteroidota; c__Bacteroidia; o__Bacteroidales; f__Prevotellaceae; g__Prevotella_9; s__	d__Bacteria; p__Bacteroidota; c__Bacteroidia; o__Bacteroidales; f__Prevotellaceae; g__Prevotella_9; s__	100.00%	537011	Pseudomonadati; FCB group; Bacteroidota/Chlorobiota group; Bacteroidota; Bacteroidia; Bacteroidales; Prevotellaceae; Segatella; Segatella copri; Segatella copri DSM 18205	131567; 2; 3379134; 1783270; 68336; 976; 200643; 171549; 171552; 2974251; 165179; 537011
5.00%	f5f5e0d	k__Bacteria; p__Firmicutes; c__Clostridia; o__Clostridiales; f__Ruminococcaceae; g__Faecalibacterium; s__prausnitzii	d__Bacteria; p__Firmicutes_A; c__Clostridia_258483; o__Oscillospirales; f__Ruminococcaceae; g__Faecalibacterium	d__Bacteria; p__Firmicutes; c__Clostridia; o__Oscillospirales; f__Ruminococcaceae; g__Faecalibacterium; s__	d__Bacteria; p__Firmicutes; c__Clostridia; o__Oscillospirales; f__Ruminococcaceae; g__Faecalibacterium; s__	100.00%	411483	Bacillati; Bacillota; Clostridia; Eubacteriales; Oscillospiraceae; Faecalibacterium; Faecalibacterium duncaniae	131567; 2; 1783272; 1239; 186801; 186802; 216572; 216851; 411483

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GUT BALANCING

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Microbiome Balancing Basics

1) Motility Must!!! Always be supported first before doing any biome interventions, there are different tools for this, some individuals will need some tools and others might need the entire kitchen sink to assist with motility. Some tools are more feasible than others. The word constipation itself bears a broad meaning, an individual could be having daily bowel movements but have a motility cycle or transit time that is days to a week. This means that even at 1 bowel movement per day, it could take several days for something ingested to leave the body. An easy way to assess for this would be to ingest something like BEETS which are very distinct in their color and to wait for they to appear in the stool. The point of this paragraph is to highlight that constipation may be present in your patient even if they are having bowel movements. This will not apply to everyone - but it's something to keep in the back of your mind.

2) Support for the Major Modes of dysfunction is the next item to consider & this includes items like

   Ammonia Burden - Symptoms can include head pressing / banging, excessive giddy laughter, teeth grinding, sudden waking in the night, need to invert head to relieve pressures in the head

   Histamine Burden - can present with various symptoms such as dark circles under the eyes, skin issues, reactivity to foods, perfumes, dyes, probiotics. Can be assumed to be a definite issue with cases of MOLD burden.

   Oxalate Burden - Presents as urinary issues, sudden urine accidents, grabbing of privates, can lead to eye pain or aberrations in the vision. Sometimes swelling of the kidney area when looking at individual from the rear profile the silhouette will appear to bulge around the kidneys often before or after a bowel movement.

   Adrenal Fatigue - sound sensitivity, emotional swings including easily angered

   Detox Organ Support - No specific symptoms however supporting the Kidneys, Liver & Lymph are integral when shifting the microbiome and when conjugating toxicity.

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Important Concepts to Understand

The Microbiome assists in many aspects of the body's function, including detoxification.

If we increase detoxification for instance by assisting the LIVER, or giving a Prescriptive like a Chelator to bind some Heavy Metal - that toxicity will be excreted primarily through the kidneys or the Gut. In general toxicity exits the body through the Gut, Sweat, and Urine.

The more toxicity that exits the body through the gut, the more the microbiome is negatively impacted. An analogy would be the damage that an apartment undergoes when tenants move out. For instance we have seen that utilizing sodium thiosulphate which helps to bind toxicity had a slight constipating effect in individuals initially but one that diminished typically after the 1st week of use. Sodium Thiosulphate recycles oxidized glutathione, and individuals with high oxidative stress who have never used sodium thiosulphate will typically have large large pools of oxidized glutathione - this is a large reservoir for recycling and thus after used of (STS) will cause a large increase in detoxification in a short period of time.

The same effects of STS in a topical lotion have been experience (short term constipating) - we have also witnessed that individuals who use PBM lasers without any other supports can over time tend to a more constipated stated unless other supports or biome work are emphasized.

The main point of this paragraph is to emphasize that depending on the individual's inherent toxic load (chemical, metal, etc) Balancing the microbiome can be dynamic with time. We see some individuals who after participating in microbiome balancing for 6-10 weeks see significant improvements, however the bacterial retesting of their microbiomes sometimes don't correlated to that clinical improvement. However after continued pursuit with additional clinical improvements it tends toward a state where the testing aligns with that improvement.

The best way to explain this with the following points

1) Some items may change at the parasitic / Fungal level the debris of which also acts as food and fuel for bacterial microbiome which the test measures
2) Increased detoxification can feedback to impact the microbiome negatively
3) Using the patients clinical improvement is the best way to judge the intervention until the microbiome approaches a more stable less dynamic state.

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GUT BALANCING

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Important Concepts to Understand

Prebiotics Feed Bacteria, there are specific prebiotics that feed certain microbes more effectively which allows preferential growth of beneficial microbes.

Probiotics typically do Not Colonize well - The best role for probiotics to play is the Police - they act to damp down certain overgrowths and contribute some other functions, they can also help to increase other Genera through the compounds they create.

For instance Faecalibacterium can be emphasized or increase with the use of bacillus coagulans. Strains that do this well are MTCC 5856 found in Thorne, AFI, or BIOTE Brands. Other strains that do this are SNZ 1969 formerly in the Seeking Health Brand now discontinued and very difficult to find.

Herbs & Plants play the role of damping down overgrowths. Some plants or herbs are more feasible than others from the perspective of what can be administered without swallowing capsules. Some plants / herbs are more sparing of the rest of the microbiome (Beneficial Microbes). For instance oregano / thyme and other compounds are very effective for certain situations but also can cause degradation to beneficial genus like bifidobacterium. Having a plan in place to counteract this or use other herbs that are more sparing can make the difference in your patient's program.

For a better understanding of the microbiome please read the primer ← Click Here

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Motility Supports

Be Aware - Oxy Powder or Magnesium Hydroxide is effective for constipation however at larger or consistent doses will skew the microbiome as the oxygen content has a biocidal effect on anaerobic microbes.

Motility supports act different, some help draw water into the colon, others help the muscles that drive peristalsis to function better. Bifidobacterium Lactis Animalis HN019 is a specific strain that we use in our Mega Motility and our 3 Strain Probiotic, it is very helpful in decreasing transit time and very useful for all forms of SIBO. Our 3 strain Probiotic from Researched Elements is actually designed specifically to assist with all forms of SIBO as it contains cloned versions of Bifidobacterium Lactis Animalis HN019, L Reuteri DSM17938, L Plantarum 299V. Below is a blurb on the HN019 strain - which is tolerated extremely well, in general these strains are less likely to induce herxheimer reactions in even the most reactive patients.

Yes, the probiotic strain *Bifidobacterium lactis* HN019 stimulates motility in the digestive tract. This effect is particularly noted in people who experience functional constipation or infrequent bowel movements.

Scientific studies suggest the following mechanisms for how HN019 promotes motility:

- **Modulation of the gut-brain axis:** HN019 influences the communication pathway between the gut and the brain, primarily through the serotonin signaling pathway.
- **Increased short-chain fatty acids (SCFAs):** The fermentation of carbohydrates by HN019 in the colon leads to the production of SCFAs. Studies suggest these SCFAs can influence motility by interacting with receptors on the cells lining the gut.
- **Enhanced propulsive contractions:** A study using isolated rat colonic tissue demonstrated that an extract of HN019 increased the amplitude of propagating, or propulsive, contractions. This indicates a direct promotility effect on the colon's muscular activity, which helps move contents through the gut.

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General Overview

1) Constipation and Motility
2) Support Modes
3) Tackling SIBO if present (methane / hydrogen sulfide)
4) Look out for high akkermansia → inflammation

Microbiome Balancing Focuses on 26 different Common contributions to dysbiosis. The items carved out on the left are more commonly and seen and important among the 26 different considerations

Questions that govern the next steps

Is there Faecalibacterium? (how low)
Is there bifidobacterium? (how low)
Is there any measure of Lactobacillus
Is there elevation in Ruminococcus - IBS / IBD
Is there elevated Prevotella or Segatella (Fungally Driven) - Complex Cases
Is there high bacteroidia? Gram Negative
Are there elevations in Proteobacteria
Are there elevations in Clostridium or Pseudo-clostridium
Watch for L rogosae & Lachnospira - often correlates to OCD

Assess symptoms for fungal / viral potential

Fungal:	Oxalate Behaviors / Testing
Fungal / Parasitic:	Ammonia Behaviors / Testing
Fungal:	Climbing / Jumping Behaviors
Parasitic:	Spitting / ODD Ocds, Excessive Water Fascination / Play

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Methane SIBO:

Impacts Motility, Uncomfortable.
Dominant contribution of all significant methane comes from Methanobrevibacter.

Most Useful Treatments

Biogaia DSM 17938 - treats
Fennel Extract - treats and helps with gas / motility
PHGG - Prebiotic
Ginger - motility support to push gas
HN019 daily bowel regularity - motility to push gas
Green Tea Extract - treats
Cinnamon - treats
Peppermint Leaf
Pomegranate Peel / Husk

TaxonID	Microbe Name	MIN	MAX	percent	distinct_ASVs	LCA_ids
872	Desulfovibrio*	0.00%	0.15%	**0.00%**	0	
89342	Desulfocella	0.00%	0.02%	**0.00%**	0	
35832	Bilophila*	0.00%	0.20%	**0.02%**	1	35833
1501224	Hydrogenispora	0.00%	0.40%	**0.00%**	0	
2172	Methanobrevibacter*	0.00%	0.01%	**0.00%**	0	
2158	Methanobacteriales	0.00%	0.00%	**0.00%**	0	
2316	Methanosphaera	0.00%	0.50%	**0.00%**	0	
906	megasphaera**	0.00%	0.00%	**0.00%**	0	

Colostrum - Treats
Guava Leaf - Treats
Cold Brew Chamomile Tea - Treats / Soothes
Activated Charcoal Can Help symptoms but need to offset with motility support as can increase constipation.

(Tier 2) L rhamnosus GG Treats (Better to administer after 1-2 weeks of some of above)

(Special / Difficult cases)
(Allicin - Allimax drops) Treats but very reactive - only recommended for bad profiles and after the above
(Oreganol) Treats but very reactive - only recommended for bad profiles and after the above
Additional Options: Bee Propolis, Thyme, Clove (I don't think they are necessary)

Almost all of the cases I've encountered can sequestered with the first 7 items in Red. Researched Elements 3 strain Probiotic contains 500 Million CFU of L reuteri Dsm 17938 along with 15 Billion B Animalis Lactis HN019 & 5 Billion L Plantarum 299V. These are cloned strains which allow us to keep the cost very low. For comparison Biogaia L Reuteri Dsm 17938 (Patented) is only 100 Million CFU per tablet ~ $22. The CFU for L reuteri desm17939 required to treat methane sibo is relatively low - studies and clinical experience show efficacy in the 100 million - 300 million CFU.

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Methane SIBO:

Impacts Motility, Uncomfortable. Dominant contribution of all significant methane comes from Methanobrevibacter.

Note that Megasphaera - can sometimes participate in exacerbation of reduction of methane.

TaxonID	Microbe Name	MIN	MAX	percent	distinct_ASVs	LCA_ids
872	Desulfovibrio*	0.00%	0.15%	**0.00%**	0	
89342	Desulfocella	0.00%	0.02%	**0.00%**	0	
35832	Bilophila*	0.00%	0.20%	**0.02%**	1	35833
1501224	Hydrogenispora	0.00%	0.40%	**0.00%**	0	
2172	Methanobrevibacter*	0.00%	0.01%	**0.00%**	0	
2158	Methanobacteriales	0.00%	0.00%	**0.00%**	0	
2316	Methanosphaera	0.00%	0.50%	**0.00%**	0	
906	megasphaera**	0.00%	0.00%	**0.00%**	0	

Pomegranate Peel / Husk
Pomegranate compounds can inhibit the growth of various harmful bacteria, including *Staphylococcus*, *E. coli*, and *H. pylori*, as well as methane-producing archaea associated with Intestinal Methanogen Overgrowth (IMO). Pomegranate peel is especially rich in beneficial compounds called ellagitannins

Partially Hydrolyzed Guar Gum (PHGG): This is his preferred prebiotic for SIBO treatment. Research shows that PHGG increases the effectiveness of antibiotics like rifaximin and is well-tolerated by SIBO patients. PHGG also stimulates butyrate production, which is important for gut health. Feeding the bacteria: A key strategy involves feeding the bacteria with these targeted prebiotics while simultaneously killing them with antimicrobials. This ensures the antimicrobials are more effective.



Colostrum Fusion Powder (Grass Fed)
$49.00
Add to Cart



Pomegranate Peel & Codonopsis
$35.00

GUT BALANCING

Hydrogen Sulfide Desulfovibrio:

Codonopsis - Treats - very effective
Bimuno GOS - treats effective
Fennel Extract motility to push gas
HN019 daily bowel regularity - motility to push gas
L plantarum 299V - treats

Cinnamon - treats
Colostrum - Treats
Cold Brew Chamomile Tea - Treats / Soothes

TaxonID	Microbe Name	MIN	MAX	percent	distinct_ASVs	LCA_ids
872	Desulfovibrio*	0.00%	0.15%	**0.00%**	0	
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2316	Methanosphaera	0.00%	0.50%	**0.00%**	0	
906	megasphaera**	0.00%	0.00%	**0.00%**	0	

1) **Hydrogen Sulfide Bilophila**
2) **Stop or reduce excessive Bile stimulants (Tudca et**
3) Fennel Extract motility to push gas
4) Cranberry - Treats
5) HN019 daily bowel regularity - motility to push gas
6) Cold Brew Chamomile Tea - Treats / Soothes
7) L plantarum 299V - treats
8) L paracasei strains- treat
9) Cinnamon - treats
10) Green tea - treats
11) Ginger - motility support to push gas
12) Colostrum - Treats
13) Activated Charcoal - Need to offset with motility support
14) Codonopsis - Partially Helpful
15) Polyphenols (quercetin / grape) - treats



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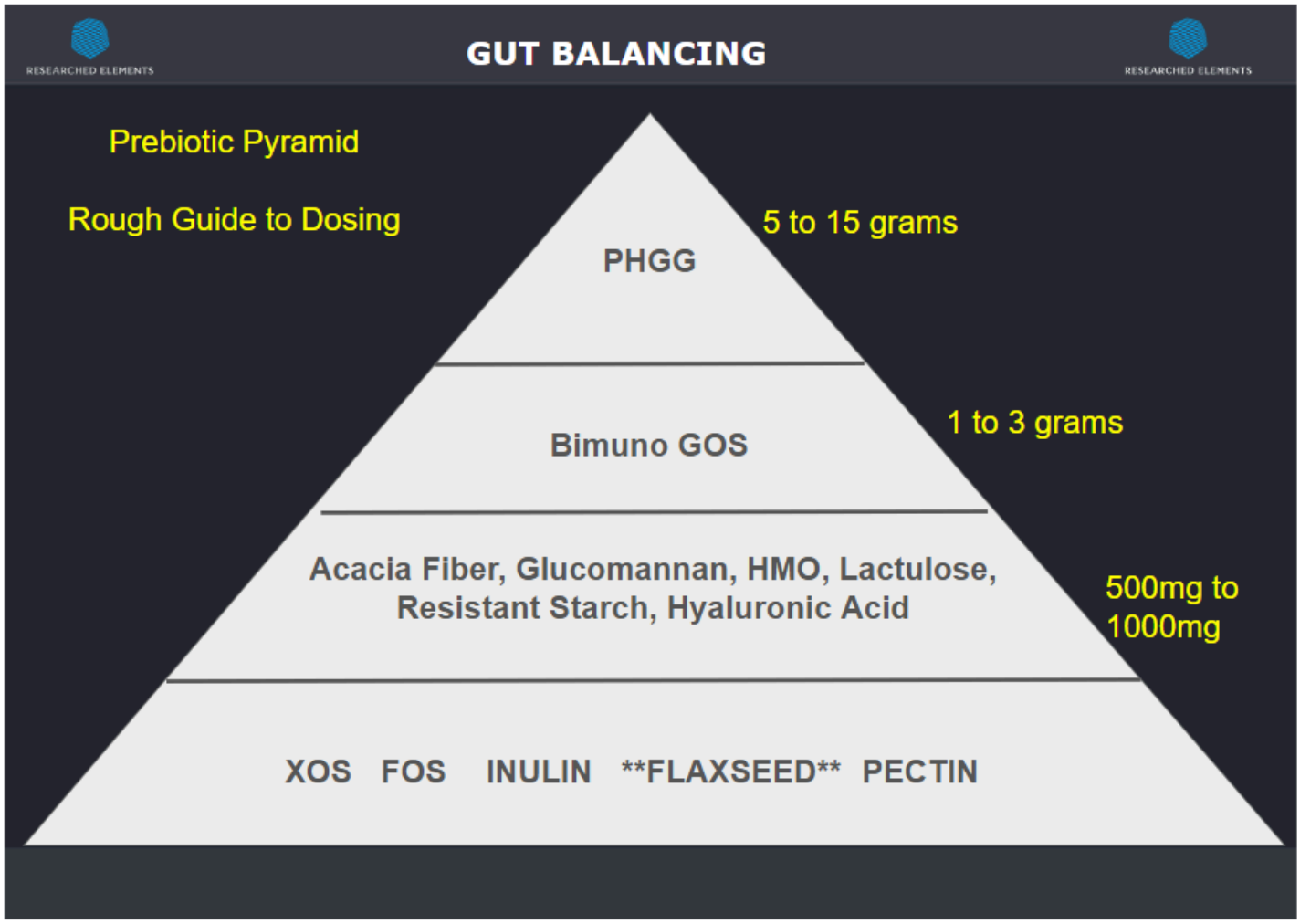
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Hydrogen SIBO - Not easily segmented on stool dna testing as Many Microbes can contribute depending in their Locations in GI Tract. Elevated Hydrogen Sulfide + Elevated Methane Generating Microbes can suggest a Hydrogen issue along with bloating / breath tests.

Biogaia DSM 17938 - treats
Berberine Treats - less reactive but eventually affects bifido
PHGG - helps to change ecosystem and improve motility
Berberine or Goldenseal (same active compound)
Colostrum - treats
Fennel - assists motility
Neem Treats - will degrade lactobacillus with long term use otherwise a good choice for few weeks or with bolstering of lactobacillus
Oreganol Treats - very reactive
S. Boulardii has been shown to reduce hydrogen levels in breath tests, which is a key marker for hydrogen-positive SIBO.
S. Boulardii can sometimes slow transit time upon initial use - it can also be very reactive for some initially, best to consider only with stubborn cases. The most successful strains of S. Boulardii are

Klaire Labs / SFI Strain - Unpublished
Florastor aka CNMC i-745
CNCM 3799
CNMC 1079



[Collection of Zoom Sessions - Real Time On the Fly Biome Analysis]

Participation In Gut Balancing.

Due to overwhelming demand and limited bandwidth participation through Autismisbiomedical.com is severely waitlisted. For those interested in participating from the ASD community please email pipleline@researchedelements.com and be patient.

Practitioners are encouraged to train on the Model by contacting pipleline@researchedelements.com so you can incorporate this into your practice. Microbiome testing is performed through Gutbalancing.com or other 16s compatible testing, raw FASTQ File data is all that is needed to generate the model suggestions, however training is required to interpret the results for clinical use