# A Smarter Way to Approach Vaccines in Neurodivergent Kids Transcript

(Transcripts are generated by AI and may contain errors)

## Introduction to PANS, PANDAS, and the Podcast

We've all drawn a bad card and that's not to be morbid, but we all have individual susceptibility. So some people have, you know, lifestyle, will live the same lifestyle poor lifestyle factors, But one is going to develop diabetes.

One's going have Alzheimer's, one's gonna have autoimmunity. And that trajectory is largely shaped by our individual genomic susceptibilities. I think the same thing, you know, this isn't a trigger for everybody.

And some individuals key immune susceptibilities within their genetic response, some genetic vulnerabilities in their immune response and some don't. Welcome to Demystifying Pans and Pandas, the podcast where we uncover the mysteries, breakthroughs and hope behind these life altering conditions.

I'm Dr. Nancy O'Hara, a board-certified pediatrician, educator, and advocate with over three decades of experience helping children and families navigate the challenges of neurodevelopmental and neuropsychiatric conditions, especially PANS and PANDAS.

These disorders can feel overwhelming, but here we'll break down the science, explore transformative treatments, and share stories of resilience and recovery.

If you've ever wondered what's possible for your child or how to find answers, This is the place to start. Let's dive in. Welcome back everybody to Demystifying Pan's Pandas.

I'm Dr. Nancy O'Hara and I really am honored to have Dr Ari Calhoun with us today, not just because she's originally a fellow West Virginian, but Ari is an amazing naturopathic doctor and founder of Wholesome Brain Medicine that specializes in the treatment and prevention of neurodevelopmental and pediatric neuropsychiatric conditions that includes autism, ADHD, pans-pandas, anxiety, OCD, tics, mood disorders, everything we talk about here.

Her work spans a full developmental timeline from pre-conception and she is talking about that in our advanced clinical modules at MedMaps. So if you're interested in that, join MAPS and Ari will be talking that.

But she talks about it through conception, through pregnancy, throughout childhood and adolescence with a focus on how the immune system, the metabolic systems, genetic systems and the environment all shape the brain development and mental health.

## Dr. Ari Calhounu2019s Background and Genetic Insight

She's widely known for her nuanced and science-based work in vaccine risk assessment and individual immune support, helping families navigate vaccination decisions while optimizing neurodevelopment and long-term neurologic resilience.

So Ari, thank you so much for being here and for all the work you do. Oh, well, Thank you. I'm honored to be here. I listened to Ari talk at one of our recent MAPS conferences on genetics and vaccine sensitivity and how our genetics, and our genomics influence individual vaccine decisions.

And it was such a thoughtful and well-researched and just, I mean, it, was a game changer for me. And I wanted to share the last slide in that talk, I think says so much.

And it was just genetic insight, informed immunity. The question is not whether immune activation influences neurodevelopment, but how we choose to honor that knowledge in our timing, our tools, and our trust in your child's biology.

And I just thought those words were so profound and so important in the way we frame our discussion around this. I had to have you on, Ari, so thank you.

Oh, thank. You know, it's been a passion of mine from the very beginning. As it pertains to the preconception, one of the first lectures I ever listened to on autism was related to maternal immune activation and the influence on early brain development.

And it was three months postpartum at the time. And again, it was the first time I had ever heard that concept of immune system impacting neurodevelopment during this critical window.

And at that time, again I was navigating these vaccine decisions for my own child, my very first child and wondering, okay, if there's this immune activation in pregnancy that we have a very strong association with, what does that mean as it pertains to immune activity in early childhood?

with vaccines being one of the most notable aspects of immune activation that we're kind of intentionally engaging in. And so that's what really started my own research is just, what does this look like for my child?

And as I began to go down that path, realizing, you know, this is information that I know other providers want access to and other patients want to access too.

We're all still learning. There's a lot that. Yeah. But, you know, I think along this journey I've learned that, there are steps that we can take to diminish and individualize this process, diminish risk I should say and, individualized this, process so that.

We are able to gain access to some of the benefits while not approaching this just purely from a fear-based standpoint. And I think that's so true and so important because, you know, we know that vaccines induce an immune reaction.

That's what they're supposed to do. But in children with underlying issues, sensitivities, genomically or otherwise, do you believe vaccines can trigger neuroimmune sensitities?

Yeah. And if so, why? Yeah. So I think, again, going back vaccines, what are they intended to do? They're intended create an immune response and you cannot create antibodies without releasing cytokines and creating this inflammatory response within the body.

We know that. This is why children become fatigued or they get a fever or a local response. That's an inflammatory reaction. And so that is very well documented.

Certain inflammatory cytocines are going to be released in response to a vaccination. And our vaccines all, you know, engage with the immune system in a slightly different way.

And some don't do that naturally as strongly as others. So we need things like aluminum, which is an adjuvant, to further trigger that inflammatory response.

## How Vaccines Activate the Immune System

When you look at this and you'll look these cytokines that are, again, known to be released in the state of vaccination, they mimic many of the same cytocines we think about related to autism or even pans and pandas.

I talk a lot, I think these are like one of my favorite concepts, is the concept of the microglia and the role of micro glia. Obviously, this is a much more complex conversation than that.

But I that that is one area that's rather easy to explain and easy kind of understand and it's one that has the most profound implications on brain development as well as mood regulation.

So the microglia are our resident immune cells, and they are going to be, as they're, you know, being immune, cells are gonna be influenced by any type of immune signaling, namely a couple cytokines that are And in the early neurodevelopment period, they are, I like to refer to them as like the Early Architects of the brain.

So they really control neuronal migration and synaptic pruning, kind of like, the re-orchestration of that brain in that ages, you know, from really fetal development.

through three to five years of age. They're really central to that neurodevelopment trajectory. And when they become activated, they don't do that job as efficiently as they should, and we can get altered synaptic pruning.

So this is where my interest in autism and those associations come in. I think for pans and pandas, later on, microglia become a big mood regulator. Obviously, we certainly understand in our PANDAS cases, there's an autoimmune encephalitis component.

But I think, and what I find in my PANS cases is that this can be largely more neuroinflammatory mediated. And we know that these microglia control regulation of two key neurotransmitters that impact mood being glutamate and dopamine.

Again, coming back to this, if we know that microglia are central to the early development, the earlier architecture of the brain and their potent mood regulators, and we that they're responsive to cytokines that are released in the face of vaccination, I don't think we can, you know, not question is there some sort of potential association here, given that we are given, 57 antigen exposures by five years of age.

This is one of the most known and established immune activation kind of interventions, or in general, like even if we kind take that out and not say medical interventions just as a whole, we get way more vaccinations than we do illnesses in our first year of life.

And so it's notable, I think. Certainly, going back to that individual susceptibility, We know, I know we both use genetics in our practice, that not everyone has the same sort of response to an immune trigger.

And some individuals are going to have a high release of certain cytokines or have issues with regulating that immune response, be unable to shut off that inflammatory response.

And so when we're thinking about triggering an immune response, we want to look at that at an individual level and understand that not everyone's response is going to be the same.

Not everyone is just going have this transient blip in an inflammation and cytokine release. Some, it might be more prolonged. So that's, you know, I think certainly something that I would love to see more studies on.

I And I strongly believe this could be a trigger and a sensitizer to not only things like autism, but potentially kind of long-term neuropsychiatric conditions.

Because we see this, I mean, one of the things I'll talk about with my patients is fetal, you know, maternal immune activation. So this inflammatory response in pregnancy isn't only associated with autism but it's associated schizophrenia, which happens years down the line.

This isn t just about this acute response, it s about the sensitization of these microglia. We know that with the microglia, it's not just the first infection or the vaccination or first immune trigger that creates this neuroinflammatory response.

We're getting signals over time that make those micro glia then more sensitive to the final trigger, that then creates the more prolonged neuro inflammatory response so much to unpack there.

And everybody that's listening, go ahead, rewind, listen again to the last few minutes because Ari just gave you such a wealth of information in the past five minutes.

I really do want you to listen to it again and again. One of the things you talk about a lot is triggers, being different than a cause. This is one of triggers when we're talking about neurodevelopmental and neuropsychiatric symptoms.

There's no question about that. But why do most children seem to tolerate vaccines well while a smaller subset may have this immune or neurologic responses?

## Microglia, Cytokines, and Neurodevelopment

And I think you talked about a little bit with the genetic variability and the genomic snips and all that, but talk about it a bit more. Yeah, I mean, again, what we believe is that these inflammatory triggers should be short-lived, transient.

We know we're going to elicit an inflammatory response, but this isn't something that's necessarily going be prolonged. But there are, you know, individuality, and this is why some kids get panned with strep and then some don't, or some are prone to autoimmunity.

I used to always say, even before I got into genetics, We've all drawn a bad card and that's not to be morbid, but we all have individual susceptibility.

So some people have, you know, lifestyle, we'll live the same lifestyle poor lifestyle factors, But one is going to develop diabetes. One's going have Alzheimer's, one's gonna have autoimmunity.

And that trajectory is largely shaped by our individual genomic susceptibilities. I think the thing, this isn't a trigger for everybody and some individuals have you know, key immune susceptibilities within their genetic response, some genetic vulnerabilities in their immune response and some don't.

And so, you now, when it comes to vaccinations, I know there's been a lot of talk about toxins and detox pathways, and not to say that that's not relevant at all, but for me, that is not the pathway that I focus on.

I really look at what is the immune because we know that that's something that triggered. I think the relevance of aluminum detox is widely debated and we could get into that and, you know, discuss it and there's some thoughts I have about that.

But I, I that the, the individuals and what I find in my practice that are most vulnerable to a vaccine reaction. And this is something I see more than most because people come to me following a reaction, so individuals that're susceptible to these, vaccine reactions tend to have immune pathway dysfunction.

And it is namely in those immune pathways that are triggered in the face of vaccination. So, and I don't actually know. Is your podcast, is this mostly clinicians or mostly parents that we're speaking to?

We have both. I mean, you know, I've had a lot of practitioners reach out to me and talk about things we've brought up on the podcast. But I know the large majority are very well-informed parents.

Okay. Yeah. One of the things that I talk about a lot is, again, going back to aluminum, what is its role? We know that aluminum is put in there because it needs to generate a more long-standing immune response.

And they found this out very early with the diphtheria vaccination that without the aluminum we don't sustain that antibody response, but with aluminum it conjures up a more robust immune response that provides more sustained immunity.

So this is the whole point of an adjuvant. But that doesn't happen without collateral damage. And so when you add something that stimulates a higher immune responses, you're going to get more inflammation.

That aluminum acts on the NLRP3 inflammasome complex, which is something we study in a wide variety of

different inflammatory disorders. not just brain-related disorders, but certainly we look at it in the face of autism and pans and pandas.

But it's, you know, implicated in, uh, acute respiratory distress syndromes and other things of that nature. This amazone complex releases two key cytokines, interleukin-1-beta and inter-leucin 18. Interleukein 1-Beta is something that we know is a strong microglial activator.

And so we can kind of presume that potentially if there are genetic vulnerabilities that might kind allow for someone's inflammasome complex to be activated a little bit more easily or more strongly or for them to release more of this interleukin-1 beta.

I think about this as kind like dials on a radio station. Some people have their dial way turned up. And so, when they get an immune, like some sort of immune stimulus, their immune response is 10 times greater than someone else's.

And, so again, with the intention is to activate an immunoresponse, release some interleukin-1 beta, not release tenfold of this inter-leucin 1 beta. And then those that release tenfold, it's reasonable to say that that could be a problem.

And that would create a response that's undesirable. We know this even in the face of febrile seizures. That's something that is kind of a well-known side effect of some of our vaccinations.

know, that's one of the cytokines that is implicated in that, is interleukin-1-beta. Now, not everyone who has a vaccination is going to get a febrile seizure, but some are going be more prone to that.

And so I think about this as like, we just want to look, I mean, if we have the opportunity to, and for years I operated without genetics, But now that we have genetics, I think it's a really cool tool to look at who might be susceptible, who has their knob turned up, this dial turned, up where they're releasing more of these key cytokines that could be relevant in the face of brain inflammation or other things.

You know, we could look a topic conditions or autoimmune conditions, but as you know our field, were very attuned to this neuroinflammatory response is one of the things that parents are most concerned about as they face these vaccine decisions.

Right. And just taking it back a minute for those parents who don't really understand this, you know, what we're really talking about are SNPs, single nucleotide polymorphisms, small pieces of genes that impact our susceptibility, our ability to handle different things, whether it be an infection like strep, or aluminum in a vaccine or a live viral vaccine, or mycoplasma or tick-borne disease or whatever it may be.

## Why Some Children Are More Susceptible

And so you've talked about those SNPs with microglial activation, that inflammasome complex, you know, the NLRP3 and CARD8 and others. You know the other one I really love what you call it, which is the Trojan horse.

the CCL2. Can you just talk a little bit about that one? Of course. So yes, we can have, as you mentioned, my primary interest is what are the cytokines that could create this microglial activation, which are NLRP3, CARD8, control the inflammasome complex, interleukin-1-beta, And then we can go on, and the CCl2 is another SNP that I actually think we have a lot of evidence on in terms of its potential implication in an adverse response to aluminum adjuvants in particular.

So Ccl2 essentially controls a chemokine, so it's a signaling molecule that kind of directs certain immune cells to a site of injury or a side of inflammation.

And so it is something that can amplify an inflammatory response because it can kind of bring immune cells in. But the other important role that has been identified is that it's potentially implicated in increased persistence of

aluminum.

And so when CCL2 signaling is higher, result is that we bring in more of these immune cells and some of those immune being these cells called macrophages.

And when I was in medical school, I remember my immunology teacher talking about them as little Pac-Man cells, which I just think is a great analogy. They come in and they eat up a lot of different cellular debris.

But in this process, if we're talking about it pertaining to a vaccination, If we are giving an aluminum containing vaccination what we also know is that they start to consume this aluminum.

What has always been, you know, when I was first looking into vaccinations, aluminum has been widely debated for a while. And all the pharmacokinetic studies have said that aluminum is rapidly metabolized by the kidneys, like we just don't see it in the body for prolonged period of time, which is largely true for the aluminum that gets into the bloodstream.

It's not something like aluminum behaves very differently than other heavy metals, and it's always an interesting one to kind of study. We don't know as much about it as we do lead and mercury and how to get rid of it and what to do about.

But what was left out of a lot of these pharmacokinetic studies was the fact that not all aluminum makes it into the bloodstream. Some of gets engulfed by these macrophages, and these macrofages don' have a way to just break down.

They're not just eliminated by our body. And so these microfages can retain the aluminum and then start to travel to distant sites dependent on that CCL2 signaling.

So again, if there's inflammation in a different area of the body, it might pull them to that particular area. And this retained aluminum has been implicated in other conditions like micro phagic, I'm going to butcher the name right now.

It's macrophagic myofasciitis is the name where these aluminum particles driven by CCL2 signaling get retained in muscle tissue and cause long-term inflammation in the muscle.

Now in animal studies, It has been shown that these related to the CCL2 signaling, so again CCl2 is kind of like a driver of these macrophages, can drive this aluminum or these macrofages and these aluminum-laden particles to different regions.

So to, different organs and even the brain. So the consideration here is if we know that we have excess CCL2 signaling and we assume that have access macrophage infiltration, we get excess aluminum phagocytosis, and now we had these immune cells that are carrying around this heavy metal.

and they're traveling dependent on where that signaling is, it's plausible that if we have this ongoing neuroinflammatory response, that they are going to be trafficked to the brain because aluminum just can't pass the blood-brain barrier.

It needs something to carry it in there. And so this is the Trojan horse mechanism whereby these macrophages get transported into the to do something helpful for the but now they carrying kind of a particle that creates oxidative stress and potential harm to Now again, we need more data on this.

We're still in the very beginning of understanding this, but we see it in animal models. And I think, you know, We certainly have seen it and other types of neuroinflammatory conditions, such as Alzheimer's, where we know that higher aluminum is in, the brain is associated with neurodegenerative conditions.

So I, think it's plausible and needs, um, further research and we need to look into it. But I certainly find that to be

relevant. And I know that you've looked at CCL2 even as it pertains to PANS and PANDAS and weakening of the blood brain barrier and how that could potentially impact antibody transport and others.

Um, but I think, you know, as a pertain to the aluminum piece, it's pretty clear that that. Could increase biopersistence of this heavy metal that would otherwise be very quickly eliminated.

Right. And I think that's such a key point that, you know, so many people don't understand. So again, go back, rewind, and listen again because it just- It's complex.

## Aluminum, Inflammasomes, and the Trojan Horse Theory

It is complex, but it's important to understand and not be fear-based, when you can understand these mechanisms a little bit more, even just a Even if you just take one pearl from the last 20 minutes, as a parent, you can start to understand how these things maybe triggers in a susceptible child and maybe looked at somewhat differently and understood better than just, Vax anti-vax.

Well, and that's what I love, right? Because I'm in California, so we have very strict requirements. If you want your child to go to school, despite your concerns or history of neurodevelopment challenges, pans, pandas, you know, I have a lot of my parents that grapple through this and, and you, even if they don't feel super comfortable, they have to kind of proceed with certain vaccinations.

And in the face of that, knowing these susceptibilities, but even outside of, that even, if we don' have the funds to put this into genetic testing or someone to interpret it appropriately, There are certain steps that we can take to modulate that immune response to diminish some of that CCL2 signaling, to diminishing some this release of interleukin-1-beta or kind of calm those inflammasome complex.

So again, outside of having that information, there's still a lot of supplemental interventions or ways that can kind arrange the schedule to kind impact of some of these vaccines, the inflammatory signaling from these vaccinations.

And that's what I focus on in my population is, okay, in the face of this vaccine, what can we do to kind of settle this immune response, regulate it, so we're less susceptible to some conditions that we're worried about.

Exactly. And I want to get to the mitigation part in a minute, but let's step back a little bit because I wanna talk about factors like timing and immune load overall and environmental stressors that influence whether symptoms can emerge.

So talk a bit about that because those are important keys too. Yeah, 100%. So again, going back to this idea of the microglia, just because I think it's the simplest one to kind of understand, this isn't a one-hip hypothesis.

So even when we know, okay, maternal immune activation, which is inflammation in pregnancy, has a strong association with autism in the offspring, or again prolonged or other mental health conditions.

Schizophrenia is most kind-of notable in terms of its being named, but PANS and PANDAS has never been studied, right? So we don't know if there's some sort of association there, you know, some sort of immune activation in pregnancy can be a factor.

And in functional medicine, we oftentimes refer to this as like antecedents versus triggers. So antecedes would be things that kind of creates susceptibility in the body and then the trigger is the thing that initiates the symptoms, right?

In terms of antecedents, we know obviously things that in pregnancy occurred that created an inflammation would make me more concerned that there could be susceptibility for a child.

So take genetics out of this. When I'm looking at with my vaccine consults, which I've been doing this for, you know, a long time again, prior to me having access to genetics, what what happened in pregnancy does mom have

an autoimmune condition did mom encounter some sort of serious illness right so we're not talking about the general colds but a prolonged fever did you need to take anything for a fever reducer were you hospitalized from this does Mom have metabolic conditions that could be raising inflammatory cytokines which is something that I think we don't talk about enough.

So gestational diabetes, obesity, preeclampsia, that's certainly an inflammatory condition. Even certain stress situations, which is kind of harder to know like which part of this created enough of an inflammatory response.

But they've found, you know, associations even, like 9-11 or certain tornadoes or storms in certain regions of the world that's created enough of a stress response where it's creating this inflammatory cytokine response in moms.

And so we're looking at things that would sensitize these microglia. Then we are looking, okay, early childhood sensitization. So, prematurity, any sort of birth trauma, impaired oxygenation at birth.

Obviously, we know that those are all inflammatory triggers. Did mom get a fever during pregnancy or during delivery, which can happen. It's not super rare.

Up to 10% of women can have a And then we're looking at, okay, was there mold? We know that mold is a huge factor. What does the microbiome look like?

So was the baby C-section versus breastfed? I mean, the micro biome, I think about this when I work with my patients. You know, there are these foundational aspects that kind of just raise that inflammatory threshold.

Closer to that point where some sort of trigger could put us over the edge. And so we want to think about all of these foundation aspects, what's our background level of inflammation?

And part of our total load. total load, absolutely. So the gut is a huge one, right? So I'm looking at the state of the the Gut Microbiome. Do we have a really healthy bifidobacteria population and, you know, very few pathogenic organisms, or are we really struggling there?

And we a bunch of pathogenic organisms and really depleted biphyto bacterium. That is really crucial to how we're going to respond to some sort of immune stimulus.

And so That kind of goes into my, you know, what's the background of the immune state? And again, even without genetics, so you can do a little bit of investigation into family history.

So do we have a family story of any sort of autoimmune conditions, atopic conditions which is a creates some additional triggers outside of neuroinflammatory triggers, but a topping conditions like allergies, eczema, asthma, very relevant when it comes to the aluminum containing vaccinations.

## Antecedents, Immune Load, and Environmental Triggers

And then I actually lump in neuropsychiatric conditions into this potential susceptibility for an inflammatory response. Because my feeling, as I've been working, and this is just anxiety, depression, ADHD, behavioral issues, is that the vast majority of these have a inflammatory component.

Even if it's not the central component, it is part of that susceptibility and part that symptom aggravation for many. Right. And I think that's so important.

You know, when we're talking about pans and pandas, you know the P is pediatric and it should be abrupt onset, but there is so much more than that that can cause inflammation within the brain.

Autoimmune encephalitis, the immune system working against self to cause information in the brains that affects this whole spectrum of what we call neuropsychiatric issues, anxiety, OCD.

So whether the definite… It fits the definition of Pan's Pandas. All of these conditions fit in that sort of neuroencephalitis, neuroimmune picture.

And so I'm sure you go through this with your patient population all the time. There's certain things where it's like, well, it doesn't meet criteria perfectly.

Like there wasn't this abrupt onset, or you don't have OCD, restrictive eating behavior, tick, but there's clearly an immune trigger. And I find that so often, and that's where It comes back to me.

Mechanistically, I like to separate these. Is it an autoimmune encephalitis or is it more broad spectrum neuroinflammation? And there are gonna be overlapping treatments, but there's also going to be some key differentiators in terms of like, who's gonna to responsive to some of these things like IVIG versus who is gonna more responsive our anti-inflammatories.

Who is going be more mast cell mediated versus, you know, be a little bit different. So I think there is a defined right now. as well. There's a lot of interest in pans and pandas.

And there are a lots of families that are coming to say like, intuitively, this is inflammatory mediated. We see these ebbs and these flows, but we can't get a diagnosis and no one's going to worth, you know, no, one is treating us because it doesn't fit in the box.

Yet when we actually do that kind of underlying investigation and support treatment, a of times it still sits in Right. Right? So immune treatments still have impact.

Absolutely. And I think that's part of functional, integrative root cause medicine versus conventional medicine. In conventional medicines, it's black or white.

It's either pandas or it is not. No, you know, there's all this gray. You know, there are a lot of kids that have immune activation that of neuroimmune issues that may not fit the strict criteria of pandas, but that doesn't mean the immune modulating interventions and the preventions and all that aren't going to work.

So, so important. And I think you talk about timing, you talked about the history that you're getting. It's also the time of year. The immune load, like if a child has a vaccine that may be more elective, it doesn't have to be given today.

Looking at what time year you give it, what the rest of the immune system may exposed to, that, may want to treat before you get the vaccine. Do you want to address that a little bit?

Yeah. I think that that's really important. One of the things that I will say, and I've said for a long, things are shifting a bit with the new administration in terms of how we have this conversation, but the CDC schedule, it was created from a public health measure.

That's important for us to understand. The goal of this intervention is to decrease these disease rates as a whole. It's been effective at doing that.

And the secondary intention is And so it's doing that. But what it ignores, and it doesn't necessarily, it is not its primary intention, is to protect the individual.

Not to say that that's not part of their intention. It's it not the primary intension. And it isn't the thing that is measured. I really take this back.

To me, there shouldn't be any sort of blanket treatment. that we do across the board. This is, you know, why we came into functional medicine is because we're not interested in an algorithm and a protocol, but we want to look at the individual and figure out what's best for that person in our office.

And so vaccines should be no different than any other intervention. Right. So when we sit down and we this kind of

vaccine analysis, there's always going to be a pro and con, right?

This never a black and white situation. I'm sorry, it's not. People that make it into that are either, they're ignoring a potential benefit or again, a It's always a black and white, and we don't have a crystal ball.

I always tell my parents, like, if we had a Crystal Ball and knew your child was going to be exposed to this particular illness, yes, the vaccine is the better choice, but we do not always know that.

So sometimes it's worth kind of looking at rates, looking susceptibility based on other factors. When it comes to the vaccines, I think the first conversation I have is, what are the illnesses that we're trying to protect against?

not talked about. It's just like, this is what we do at two months, and this what do we at four months and six months. And, you know, we just kind of go along with that.

But we don't understand like exactly what this offering to my child. Like what is this protecting them again? So that has to be part of the conversation.

Then we can make choices from there. Are you susceptible to this particular illness? And if so, what would be the treatment? for this, if you were to get this.

You know, how do we test for, this what are the symptoms of this? How severe might this be? And then what the potential side effects of that particular vaccine and we can kind of weigh those.

Do we want to utilize a vaccine from a prevention standpoint? Or do want kind to try to cocoon or avoid or boost up our immune system in other ways and then take our chances and know what to do in the event that we were come in contact or our child was to this particular infection.

And that has to be a choice by the parent. There is no provider that should be making this choice. The parent has make that choice and they just deserve full informed consent.

## Individualized Vaccine Decision-Making

They need to know the risks and the benefits of every intervention and every illness. So that's where we start this conversation. In early childhood, we can whittle this down a little bit in terms of not everything that is on the standard schedule is going to have that same level of priority.

And it's also going to differ greatly and dependent on, are you putting your child in daycare or are they going be at home with a single caregiver? Do they have older siblings?

Um, do they other health complications? You know, I spoke with the mom earlier this week and her child was potentially going into for a liver transplant.

Well, that's very different, right? So she might have hesitations, but. He's also someone who's going to be on immunosuppressive drugs for the rest of his life.

That's a very different scenario. So we have to weigh this kind of individually. And also I always say to my parents, I could have two sets of families that have this very same risk factors, but one might choose to do, you know, be more vaccine heavy and one my choose not to any vaccines.

and that's based on their own level of risk aversion and how comfortable they feel with dealing with the possibility that their child could get one of these illnesses.

and understanding how to appropriately care for their child in that situation. These are things that, again, it comes down to the parent has to make the decision.

But our goal is to have full informed consent and offer some feedback and true risk management. Not all vaccines are perfect. That's another thing that we have this kind of misillusioned about.

We have the idea that if we give a vaccine, we'll have a golden shield around us that our child will never come in or never get pertussis. If they have their five series of pertusis vaccines, they're just never going to get a pertustis and we know that that's not true.

So what is the vaccine actually offering? And does that benefit to me, give me more peace than the potential fear that I have for my child having a reaction?

That's what we're talking about. I think as it pertains to illness and infections, There are some things that I think about just more globally, like a live viral vaccine really requires an appropriate immune response to keep that antigen from replicating.

We are going to see more side effects if a child has some immune suppression. And this is why we don't give a life viral of vaccine to a kid who has an immune insufficiency, because they're more prone to the secondary effects, essentially the symptoms of the illness itself.

Right. So in the same light, I don't like to give live viral vaccines, particularly something like MMR, when we're in a midst of cold and flu season, if I can avoid it.

Because we have no idea if you're going to encounter RSV next week or influenza next And if your body's trying to deal with these three viruses it's just been given and bam, you get hit with influenza and RSV at the same time, well, that's a very different risk profile.

So there are some things in that nature where if we're gonna time vaccines, I try to time the live viral ones, during a period of the year where we are not as likely to encounter secondary infections.

And then again, as a whole, if were just thinking about you know, the developing brain, that first three years is critical for our neurodevelopment trajectory.

And I relate this back to anesthesia. We have this really well-known association where like anestesia under three-years-of-age has a much, you, know higher likelihood of impacting long-term neuro development outcomes versus anesthesia after three year of age.

even for like the same duration. And so again, it's just kind of this, if our brain is impacted for a chunk of time, It's going to have more significant outcomes if that chunk time the brain's developing at a much faster and expansive rate, right?

So we don't want to miss out on a month of our child's development because they're dealing with a neuroinflammatory response when they are under three.

to three, it's different. It's not going to have that same long-term impacts typically. So it doesn't mean that we don't vaccinate under three. But it does mean we're going take that time period a lot more seriously and look at it a little more critically than if we have a five-year-old who's catching up on vaccines.

I'm not as worried about that creating some sort of long term neurodevelopment harm. And I think it's also important, the other factor is I always get asked, well, grandpa is very susceptible and I want to vaccinate my child to protect my father.

Can you address, I mean, people lump all that together and just address that a little bit too. Yeah, it depends on the vaccine, right? So that's a very good argument if we're talking about measles.

Right? But grandpa probably has had measles and has very strong immunity to measle. But it's not a strong argument if we're talking about some of our other vaccinations that are not preventing transmission.

So we could go through a ton of those like Hib and strep pneumonia, the PCV vaccine and DTaP are now preventing the transmission of this illness. And so their goal is to protect the individual and decrease symptoms.

I think herd immunity has a role for some vaccines. Obviously, we see now that we are, you know, dealing with more measles outbreaks. One of the things that I used to say is, um, the really nice thing in, especially still in California is we have really good herd immunity.

So for our susceptible, they're relatively protected. And this is one where it used to be a little bit where we could just operate in this avoidance of the trigger.

We have enough of this herd immunity that it's very low likelihood that you would get exposed. So if you hear of a particular infection in your area, cocoon for maybe two weeks, kind of like stay low.

Don't go to the most popular parks or the more popular museums. And I think that's becoming a little bit more difficult depending on where you live and where that herd immunity is.

So I don't want to discount the role of herd immune altogether. I still think it has a place in the conversation for certain vaccinations, such as the MMR vaccine for measles and maybe rubella.

Not so much for moms because it's not a great one for mums. But for other vaccines, you know, we know that it is not preventing transmission. So over 80% of our cases of protestors each year are kids that have had the vaccination.

So we know that potentially they're less likely to transmit it because they are less symptomatic, so that does work.

## Timing, Herd Immunity, and Live Vaccines

But obviously COVID was a big kind of game changer in terms of this conversation. We know these vaccines are not all, you know, providing the herd immunity that we once thought or kind had been communicated.

Right. And I think all of those factors are so important. You know, what's the child's susceptibility? What's a child environment? And what is the vaccine?

Because we tend to lump everything together and just talk about vaccines. Well, there are many, many different ones. Unfortunately, our kids are getting 57 of them.

We need to understand each individual piece. And as somebody who did their master's in public health, I understand the public… Oh, you did. I did, and I, understand, the Public Health perspective.

100%. I do understand what we're trying to do, but as an individual provider taking care of some of the most vulnerable of our children, we have to look at their individual vulnerabilities, their family vulnerabilities and then what makes the So you talk also a lot about practical strategies to mitigate potential neuroimmune impacts in these vulnerable interventions while still supporting immune health.

So what are those? What do you from a podcast standpoint, it's like dosing and then which ones to use. But generally speaking, a lot of our anti-inflammatories are going to be helpful in forming a more kind of responsible immune response.

So a basic one that you can give to babies is omegas, right? So we know that omagas are gonna help to regulate that NLRP3, inflammasome complex, decrease that interleukin-1 beta release, dampen a number of different cytokine releases.

omegas are not immunosuppressive. It's not like we're giving them steroids or NSAIDs that's going to diminish the potential benefits of a vaccination and generation of antibodies.

But we do see that this can offset some of that extreme inflammatory response. So that one is something that I obviously love to give. There are other things in that realm.

For those that have that CCL2 signaling, then I focus a lot on palmitale ethanolamide, which is one that we see decreasing that activation of the microglia, but also down regulating that kind of CCL2 activity.

So we don't give it as much of that macrophage infiltration. It's all around so beneficial for lots of different things. But I think for those CCl2 cases, I really love it.

Same with luteolin. Lutein is an herb that can, you know, decrease things like IL-6, But also some of those ccl2 signaling. I use sulforaphane a lot. Because a lot of, especially within the live viral vaccines, this inflammatory response is initiated through that kind of NF kappa beta signaling.

And so sulforaphine, which comes from broccoli sprouts, is wonderful. I mean, almost, you know this. Every single cytokine has some sort of response from something like sulforaphane, and this is a food.

If you didn't want to do a supplement, you could do it through broccoli sprouts, which is wonderful. And so that not only has this anti-inflammatory signaling, but it also upregulates the production of glutathione.

I do use glutothione with my injections, with This is kind of a more, you know, secondary effect, but anytime we get this kind, of inflammatory response, we can see oxidative stress.

And so we want to dampen that oxidate of stress and we know that low glutathione has been associated with, with autism. So, adding a little bit of glutothione in the mix can be helpful and potentially relevant in case of aluminum as well.

Those are some of the key things that I focus on and then just regular kind fatty or fat soluble nutrients that are really important for that immune regulation.

So vitamin D, we know is like the importance of vitamin B. so ensuring that the child is on vitamin d. And then vitamin A, especially as it pertains to these live viral vaccines, and especially with the MMR, because we no dissociation between replication of measles, mumps and rubella in the face of Vitamin A deficiency.

We just want to make sure that that child does not deficient there. Those are the things, you know, And some families, you know, feel more comfortable loading their kids up.

Some don't feel as comfortable. And I always come back to like, even outside of the supplements, there's a lot you can do just with schedule modification.

So we can take this and, um, spread this out so we're not giving multiple aluminum-containing vaccines at once. We can choose certain brands that have lower levels of aluminum or lower additional ingredients like polysorbate-80 that can influence the immune system or neomycin, certain antibiotics.

So we can kind of look at vaccine brands and choose better vaccine And one thing I just will say, as it pertains to kind of like doing this yourself, the one error I see when parents come in with their vaccine schedule that they've created is that, they'll spread it out, but they're going back to get a vaccine like every two weeks.

And that is something that I do try to avoid at all costs. I would rather see someone do two vaccines at once or even three vaccines that once than be getting a vaccine every two weeks because then what happens is we never get full immune resolution.

we're vaccinating right at the tail end of that immune response starting to kind of settle down. And so we get the sustained immune activation. So my general rule is I like to separate vaccinations by at least six weeks so that we can hit full resolution before we activate an immune Sometimes we'll make adjustments to that rule depending on is the child going into daycare at, you know, three months and they need certain number of vaccinations.

But by and large, at least six weeks, trying to spread out these aluminum containing vaccinations, taking some of these aluminium containing vaccination that may not be as relevant during this early infancy time and pushing those off until later on.

And then choosing brands that have overall kind of lower levels of aluminum or some other ingredients that could be further activating to the immunosomal.

And I know people are feeling right about now, oh my God, I'm overwhelmed. I can't. But it's about being informed.

## Mitigation Strategies and Practical Support

being with someone as a practitioner who will listen, who we'll see the individuality of your child, and who help provide a framework for you where we can move away from fear, but also toward an individualized, informed decision-making process.

And I just so hear that in every word that comes out of your mouth. And, I think that framework is so important for families in moving forward. Yeah. You know, the one thing I will say, your standard pediatrician is much more willing to engage in this conversation if you come in informed than if we come and our defenses are up and we're unwilling to engaged in a conversation, right?

So I always share with my patients that, again, if just change a little bit of our terminology and talk about immune activation versus toxicity, that's something that even that alone can kind of like allow for a conversation to happen where it may not have otherwise.

And so that to me is helpful. Your pediatrician, even if they don't know all of this, they could certainly at least say there are certain vaccines that are truly more relevant than others.

I've had this even in pans and pandas where we want to give the PCV vaccine to be able to then justify IVIG. And the kid's in the midst of a flare. And I push back on it a little bit and say, but yeah, not to say that it couldn't help justify, we have enough evidence to at least pursue this first before we go through with a vaccination to, you know, some sort of immune stimulus.

So there's ways to again, just kind of have this conversation and where information, even if you don't have all the tools and all of the knowledge, a can help provide a more productive conversation with a provider, even if they're not aware of, you know, every single aspect of vaccinations or every possible pathway that might be triggered.

They understand this is an immune stimulus, they understand that there's inflammation, and they understands which vaccines are going to be more relevant, that they should should have a good grasp on.

And everybody can't be as well informed as Dr. Ari Calhoun, but, you know, making it topical, right, and talkable. I think that's one of the things that I try to help so many of our families do, just try and have conversation.

Just try open your mind to different ways of thinking about things. It's choosing to honor the knowledge of the timing, the tools, and the trusting in our child's biology that we started this conversation with that I think is so important.

Ari, I could talk to you for hours, but if somebody wants to get in touch with you or wants Sure. So I mean, I run Holzenberg Medicine, so you can visit holzenbreedmedicine.com if you wanted a individual consultation or further information there.

I also have a program that I ran alongside a colleague of mine called the Vaccine Empowerment Program. And so that's another route that even if, you know, obviously this is still requires a patient provider relationship and eventually you're going to have to go back to your pediatrician or your primary care provider.

But it allows you to. Have all of these, this, background information on each and every vaccination and even sort of

our thoughts as it pertains to neurodevelopment conditions and such brands pre and post support.

So that's a great resource for those that want additional support in this area and you know, can't necessarily access an individualized consultation. That's great.

And I love that. I loved your website, by the way, the Amazon favorites. There's so many good little things in there. Ari, you're such a wealth of information and experience and talking about this in a way for me that's understandable and I hope for many of our listeners, just reframe things a little bit.

Do you have any last words of wisdom or hope or anything you want to leave families? I think that I just so strongly believe that there's a way to navigate these decisions without it being from a place of fear.

And I find that many parents just like, they just want to be heard and they want their concerns to not speaking and listening goes a long way and just that acknowledgement that their concerns are valid.

Like that is super important if we're standing in the conventional medicine side. Because if were going to make any movement on this conversation, we have to acknowledge that there are two sides to this.

And then from the other piece of this, you know, again as a California provider and as someone who has My pans and pans patients have to be vaccinated.

My autism patients, by and large, there's a little bit of a loophole there, but have be to vaccinated, There are ways that I've gained a lot of confidence in proceeding with protection and utilizing these vaccines for benefit.

without it necessarily triggering a regression or further aggravation in their symptoms.

## Resources, Final Advice, and Closing Remarks

And it's always a lot more, you know, we handhold them a little bit tighter and we utilize a bit of extra support and there's certainly a more nerves going into this and that's understandable.

But I guess from my perspective, I've gained a a confidence in how to approach this in a way where the immune system can tolerate these vaccines. So I just come into this believing that it does not have to be an all or none.

And if you have options, amazing. If you don't, and you know that you to get these vaccines and have apprehension because your child has a neurodevelopment condition or they have this neuroinflammatory response, just know there are tools out there that can help them go through this process without a substantial flare.

And I believe that. Yeah. And trust Ari, because she knows what she's talking about. But I really appreciate all of your wisdom and the hope you give families to make this talkable and make it something that we can help our kids to not be further injured, but to be able to live freely and without fear and with hope.

So thank you. Yeah, thank you for having me. Really appreciate it. And we'll see you next time on Demystifying Pan's Pandas. That's it for today's episode of Demystifying pan's pandas I hope you're walking away with insights, tools and hope to help you and your child on this journey.

If you found today's conversation valuable, be sure to subscribe so you never miss an episode. Share this podcast with anyone who might need it. It could be the lifeline they're searching for.

And if you have a moment, leaving a review helps us reach even more families who deserve answers. Also, for more information, training, and community, check out our website, drohara.com and join our annual membership.

And remember, every step forward, no matter how small, brings us closer to healing and understanding. Until next time, be present, Be hopeful, And we look forward to seeing you next on Demystifying Pan's Pandas.