What do scientists mean when they talk about ‘environmental factors’ that cause autism?

This week’s “Got Questions?” response comes from Alycia Halladay, PhD, Autism Speaks’ director of research for environmental science.

Research has taught us that there’s no simple explanation for what causes autism. We know that genes play a role, but they aren’t the whole picture. Environment also matters. However “environment” can be a tricky term, as pediatrician Perri Klass recently noted in her New York Times column. In autism research, we use the word to refer to pretty much any influence beyond inherited genes—not just exposure to pollutants or other toxic chemicals.

In fact, the environmental factors that research most strongly links to autism are influences such as maternal infection during pregnancy (especially rubella), birth complications (especially those involving oxygen deprivation), and parental age at time of conception (dad as well as mom). Parents who wait less than one year between pregnancies may be at a slightly higher risk for having a child with autism. (Conversely, there is strong evidence that mothers who take prenatal vitamins before conceiving reduce the odds that their children will develop autism.)

Clearly, countless fetuses and babies are exposed to “environmental risk factors” such as these without ever developing autism. But if a child is genetically predisposed to autism, it appears that these influences further increase the risk. For this reason, we say that environmental factors increase the risk of autism rather than cause it.

Research has suggested that many other environmental, or nongenetic, factors may increase the risk for autism. But scientists can’t yet say whether these involve direct (versus coincidental) links. Such factors include a pregnant woman’s exposure to certain chemicals such as pesticides and phthalates (commonly found in plastics) or certain drugs such as terbutaline (used to stop premature labor), valproic acid (to control seizures), and some antipsychotics and mood stabilizers. Of course, in the case of medications, any possible increased risk of autism must be balanced against a woman’s medical needs—which can likewise affect the health of her pregnancy and children.
In addition, most environmental factors associated with autism appear to increase risk only slightly and only in combination with other factors such as genetic predisposition. So it is difficult, in most cases, to pinpoint any one environmental influence. For these reasons, Autism Speaks continues to fund research on a wide range of environmental risk factors. Importantly, the more we learn about how these influences affect brain development, the better we can help the children, adults and families who are affected by autism.

Want to learn more about the research Autism Speaks is funding? On our Science Grant Search page, you can browse studies by topic and location. Finally, if you or your child is affected by autism, please consider participating in one of our clinical studies. Thanks, and please keep sending us your questions.

Are Children Born with Autism, or Does It Develop Later?

“We hear so much about autism risk factors during pregnancy and delivery. But our kids aren’t born with autism, they develop it later. I don’t get it.”

*Today’s “Got Questions?” answer is by developmental-behavioral pediatrician Paul Wang, Autism Speaks senior vice president for medical research.*

“When does autism start?” is one of the most profound questions we face in our field. At present, autism can’t be reliably diagnosed until around 2 years of age. However, parents often notice symptoms before then. In fact, analysis of videotapes from children’s first-birthday parties shows that signs of autism are already present for many children at that age, even when parents don’t become concerned until months or years later.

Is it possible that autism starts even earlier? Research tells us
In most medical conditions, the underlying processes are triggered before their signs and symptoms become obvious. Consider arthritis. The joints are breaking down and inflammation is setting in years before the aches and pains appear. In dyslexia (reading disability), the symptoms aren’t obvious until a child starts learning how to read. But the symptoms are rooted in brain differences that are present much earlier in development.

**A similar chain of events occurs in autism.** We know that toxic exposures during pregnancy and complications associated with delivery can disrupt brain processes before birth and shortly afterwards. Mutations in the genes associated with autism can affect how the brain develops and functions, starting well before birth.

Even though the outward symptoms of autism may not be apparent immediately after birth, the underlying brain differences are accumulating. Sometimes the brain can compensate to make up for the disrupted processes. Eventually though, if the disruption was sufficiently severe, the compensatory processes are no longer enough, and symptoms emerge.

This may likewise explain many cases of autistic regression, in which a young child seems to be developing normally, only to lose abilities, or regress, into autism. Perhaps the initial disruption in brain development continued worsening. Or perhaps the compensatory processes couldn’t keep up.

Given how complex the brain is, it can be very difficult to correct differences in brain development and function that start so early in life. This is why treatment for autism needs to be so intensive, and why early diagnosis and treatment are so important.

Thank you for your question. I hope my answer provides some perspective.

*Editor’s note: You may also want to read [Avoiding Toxic Exposures During Pregnancy, Risk vs. Cause in Autism](https://www.autismspeaks.org/blog/2013/10/11/are-children-born-autism-or-does-it-develop-later) and [Autism Speaks Environmental Factors in Autism Initiative](https://www.autismspeaks.org/blog/2013/10/11/are-children-born-autism-or-does-it-develop-later).*
Risk vs Cause in Autism

What’s the difference between something causing autism versus increasing risk for autism?

Dr. Martha Herbert

Today’s “Got Questions?” answer comes from Martha Herbert, Ph.D., M.D., a pediatric neurologist and neuroscientist at the Massachusetts General Hospital, Harvard Medical School, a member of the Autism Speaks Scientific Advisory Committee and the author of the recently published The Autism Revolution: Whole Body Strategies for Making Life All It Can Be.

The search for the causes of autism is challenging because many things are risk factors – and yet when examined by themselves no one of them has the power to be labeled the sole “culprit.” Asking the question a different way might help. I think we need to ask, “How is autism caused?” I want to propose that genes and environment lead to autism by an accumulation of “Total Load” – a pile-up of risk factors to the point of overflow.

A case in point is the recent information implicating maternal obesity and diabetes as risk factors for having a child with autism. Clearly many or even most mothers of children with autism were not obese or diabetic during pregnancy. So this is obviously not the sole cause of autism. But that does not erase the finding. For women with these conditions, the study suggests that the diabetes or obesity might have had something to do with the autism that their child developed.

So let’s ask the “how” question: How could diabetes or obesity contribute to autism? The study’s title – “Maternal Metabolic Conditions and Risk for Autism and Other Neurodevelopmental Disorders” – points in an important direction. To understand why this choice of words is important, we need to understand what “metabolism” is and what happens when it gets into trouble.

Everything in our bodies involves biochemistry and physiology. Every microsecond, each of our cells is buzzing with innumerable chemical reactions and processes – building things up,
breaking things down and sending messages. This is “metabolism.” Any glitches can make the operation get clumsy.

Genes can cause glitches in metabolism, and so can “environment.” Toxins can change metabolism – by blocking it, by revving it up, by confusing it. Sometimes the impact is subtle – but our bodies are dealing with lots of impacts all at the same time. The sum total of all environmental impacts – subtle and not so subtle – can be called “total load.” By “environment,” we scientists mean non-genetic influences, which can include such factors as maternal health during pregnancy and birth complications, not just toxic chemicals.

Think of it this way. We each have our own barrel that slowly fills up with noxious environmental exposures. Genes shape how much it can hold and how strong its walls are. So does the food we eat. A big barrel with strong walls can tolerate a lot, but a small barrel with thin, rusty walls is going to overflow and leak much more easily.

“Total Load” offers a good explanation of how people get diabetes or obesity – and these days so many people have both at once that it’s simpler to say “diabetes.” Diabesity is a metabolic condition, but when you dig below the surface, there’s a lot more to it than “a problem with insulin” or “too much fat.” From a “systems biology” viewpoint, diabesity can be understood as the end result of a long process of metabolic deterioration caused by an ever bigger “total load.”

Years of storing toxic exposures in our bodies gums up our metabolism. And years of nutrient-depleted processed food can produce deficiencies in the vital antioxidants and minerals we need to protect ourselves. By the time someone develops diabesity, it’s way more than eating too much. The whole metabolism handles calories differently.

In some people, “diabesity” is what happens when the Total Load overflows the barrel. In others it is autoimmune disease and in still others it is cancer. How it turns out for each of us probably depends on our genes, the toxins to which we’ve been exposed – and our diets, exercise and other lifestyle factors.

But underneath there are some commonalities. Indeed, many chronic conditions share underlying “metabolic” problems such as impaired energy production in the mitochondria, oxidative stress and inflammation. (You can read a variety of relevant research studies here.)

There is by now a large literature implicating these inflammatory, oxidative stress and mitochondrial metabolic problems in autism. This, too, implicates environment as well as genes.

The problem with metabolic compromises is that the more things go wrong, the easier it is for them to get worse. You slide downhill for a while but then you hit a tipping point, where your system gets stuck in a place we call “disease,” and it’s really hard to extricate yourself. It turns into a vicious circle. This may be what happens when someone slips from “insulin resistance” into “diabetes.”

It may also be what happens when a small child regresses into autism.
Which brings us back to the *How* question – *How is autism caused?* In *The Autism Revolution: Whole Body Strategies for Making Life All It Can Be*, I explain this in more detail through the stories of people with autism who got worse and then got better. But in brief, you can make a working model of autism as a different way of brain functioning that emerges when the Total Load exceeds the brain and body’s capacity to compensate.

Even better, this “Total Load” model can point you toward practical, everyday ways of reducing this Total Load now, while we wait for more detailed science to develop.

So then, *how* might diabetes or obesity contribute to a baby developing autism? Perhaps by accelerating the baby’s accumulation of Total Load. A mother with diabetes or obesity is short on antioxidants and has too many inflammatory factors – and these problems get passed on to the fetus. This does not in itself *cause* autism – but it may prime the baby for future trouble by making it more reactive to further stresses, and by failing to prepare it for these challenges with a good store of protective nutrients. The baby’s barrel is small, and its walls are thin.

If you look at it like this, diabetes and obesity are among the many ways that environment can create autism risk for a baby.

**Risks don’t “cause” autism.** But they may very well lay the groundwork for the tipping point when the Total Load becomes too much and the barrel starts to overflow and leak. The metabolic disturbance that started in adolescence or adulthood for the mother might start in infancy or even before birth for the baby.

Obviously this is a model. It strings together a lot of different observations into an interpretation, or story, that science can only test piece by piece. But there is no escaping models – we all use them whether we know it or not – and a big advantage of this Total Load model is that right now you can reduce the Total Load of your child by making their barrel stronger through eating a high nutrient density unprocessed plant-based diet, getting regular sleep and exercise, and eliminating as many noxious exposures as possible. You can do this for yourself too, before your next pregnancy. This won’t be a quick fix for autism, but it’s certainly a foundation for making life as good as it can get under the circumstances.

Medical EXPOSE

http://www.medicalexpose.com/
We Often Only Remember the "LAST STRAW" NOT the Accumulated Stressors that Really Caused the Diseases we have.

Proverbial "Straw That Broke the Camel's Back"

STRESS
LACK OF AWARENESS OR LACK OF EDUCATION
HEREDITY
MENTAL FACTORS (Greed, anger, delusion arrogance ETC)
ALLERGY
BAD POSTURE

TOXICITY
TRAUMA INJURY
PATHOGENS (microorganisms, bacteria, fungi, viruses, prions, worms, etc.)
PERVERSE ENERGY (heat, cold, wind, dryness, radiation, magnetic, etc.)
DEFICIENCY OR EXCESS OF NUTRIENTS

Dr Selye saw the Effect of Accumulated Stress as the Main Cause of Disease

We all have a Level of Stress that is Optimum for Life

EU Stress is the word made by Selye to describe the good well optimum stress level

NORMAL

(For everyone there is a point of too little stress making boredom and too much making anxiety)

TORTISE
(Hates Stress likes Same Old Same Old)

RACEHORSE
(Craves and Needs More Stress)

We are made to chop wood and carry water, we need stress to live a good life but too much and our systems wear down from accumulated Stress
Dr Selye found that Accumulated Stress Weakens the Immune and Nervous Systems so all Diseases become more Prevalent. Everyone in the World Knows that Accumulated Stress Causes and or Aggravates all Diseases and By Reducing the Stressors of Life we can Improve our Health and Wellness. Biofeedback thus becomes a very Integral and Important part of Medicine.

The Future of Medicine

János (Hans) Selye (Hungarian: Jan 26, 1907 – Oct 16, 1982) was a pioneering endocrinologist. He conducted the very important scientific work on the hypothetical non-specific response of an organism to stressors. He was the first to demonstrate the existence of biological stress and how accumulated stress is the major cause of disease. His Genius was inspirational and he is referred to as the Einstein of Medicine.
It is scientific fact that when a low level voltage and micro-current pulse is applied to the body osmosis, enzyme activity, and healing are increased. The SCIO will let the patient's body electric autofocus a harmonic pulse to maximize this effect. This current applied to the cranium has been shown to help autism, attention deficit, and hyperactive children. It has been shown helpful for anxiety, addictions, emotional disturbances, and insomnia.

There is published research on these therapies. The new world of energetic medicine can help you.