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### Evidence Regarding the Cause(s) of Autism

1 in 68 children. 1 in 42 boys. These are the most recent numbers for cases of Autism in our country, per AutismSpeaks.org, and they are troubling. These numbers have consistently been on the rise for the last 20 years, and are likely to continue to increase. What exactly is this disorder that is taking over our children? What is the cause? What can be done? There are many questions that need answers, and although through research new discoveries have been made, many theories continue to be debated amongst scientists, doctors, and parents alike.

Berg, Rebecca. "AUTISM—AN ENVIRONMENTAL HEALTH ISSUE AFTER ALL? (Cover Story)." *Journal of Environmental Health* 71.10 (2009): 14-18. *Academic Search Premier*. Web. 30 Mar. 2014.

In this article, Rebecca Berg, PH.D., explores the dual theory of genetics and environmental toxicity in the rise of autism. "ASDs"(Autism Spectrum Disorders), she writes, "are probably not 'one disease'", meaning that although disorders classified along the spectrum have similar attributes, they are not all likely caused by the same thing. The continual increase in diagnoses indicates the likelihood of an environmental cause, be it exposure to chemicals, mercury in vaccines, infections, and even hormones. Researchers are focusing their studies on

the prenatal/newborn period as that is when the brain is developing. There is no doubt that autism is a neurodevelopment disorder originating with some type of abnormality in the brain.

Dr. Berg presents her arguments in a forthright and convincing fashion, backing up her information with interviews conducted with epidemiologists and neurologists, and factual evidence from her own research. She discusses “autism’s new paradigm”, a hypothesis made by Michael Lerner, the president of Commonwealth, a research institute, which “proposes a complex interaction of genes and environmental exposures, possibly during a critical window in neurodevelopment”, as the most likely cause of autism. This exposure is not limited to one substance, but rather to several, at an opportune moment of vulnerability. With the evidence she provides, Dr. Berg’s argument is very convincing.

I am inclined to agree with Dr. Berg’s position regarding environmental contributors to autism diagnosis. I have found through many of the articles I came across in my research that the majority of scientists concur with this theory. It is what seems to make the most sense given the variations and extremes among the autism spectrum. It is not as much the degree of toxic exposure, but rather the *timing*, as in early trimester, combined with the element of genetic predisposition. The environmental changes of the last 20 years correlate with the increase in diagnoses, so researchers are certain they are on the right track, and that is encouraging.

Cannel, John J. “On The Aetiology of Autism.” *Acta Paediatrica* 99.8 (2010): 1128-1130.

*Academic Search Premier*. Web. 30 Mar. 2014

John Cannell is a psychiatrist who has “suggested that the primary environmental trigger for autism is not vaccinations, toxins or infections, but gestational and early childhood vitamin D deficiency.” He cites several studies that have been done, and demonstrates rather effectively how they support his theory regarding the cause of autism. It is not that the vitamin D deficiency itself is a cause of autism, but rather it allows “the genetic tendency for autism to express itself”. So, in a manner of speaking, lack of vitamin D puts the body in a weakened state making it easier for “autism to express itself.”

It is an interesting argument, and though Dr. Cannell uses studies and statistics to back his claim, he doesn't seem to have a great deal of supporters to back his theory. Until I read his paper I had not heard of vitamin D deficiency as a cause of autism. In reading to the end, Dr. Cannell “receives remuneration from Purity Products, a supplement manufacturer”. Hmm. I suppose it would be unfair for me to make any kind of judgment on that. His argument is convincing, but the last line left me wondering if he had ulterior motives for his claim.

Though I certainly cannot question the substantiated research Dr. Cannell provides in his paper, I don't agree with his hypothesis. We all know the sun is the best source of vitamin D, and when my son was little, he was out in the sun everyday in the summer, playing in water or sand in the backyard, with nothing but a diaper on. Literally until he was 10 he was outside every day. I don't know how he could have had a vitamin D deficiency. He never burned, always had a golden tan within the first few days of summer. However, Dr. Cannell also acknowledges environmental and genetic contributors, as most researchers do now.

Gorski, D. "Mercury In Vaccines As A Cause Of Autism And Autism Spectrum Disorders (ASDS): A Failed Hypothesis." *Scientific Review of Alternative Medicine* 11. (2007): 23-28. *CINAHL Complete*. Web. 30 Mar. 2014.

Dr. David H. Gorski is an MD, Ph.D. at Wayne State University School of Medicine. He writes as a citizen offended by those who argue that vaccines and the hidden poison they contain have given rise to autism. His claim, simply, is that "the scientific data, taken in totality, do not support a link between mercury in vaccines and autism." At the urgency of some parents and scientists, thimerosal was removed from vaccines beginning in March 2001, with only traces remaining. If, in fact, mercury causes autism, why have the numbers for autism continued to rise? There is clearly a much more logical explanation. "In the case of autism", he writes, "there is good evidence ... that increased awareness and diagnostic substitution account for the apparent increase in cases of autism."

As a doctor familiar with medicine and biology, Gorski is a credible source based on his own knowledge and merits. It almost seems to infuriate him, the ludicrous vaccine debate. He is offended that such a ridiculous argument has gained the support it has, even though it is riddled with flaws and inconsistencies – "the data analyzed...provide a clear and unambiguous test that shows that the expected decline in autism rates following discontinuation of thimerosal in U.S. vaccines did not occur. Vaccination is the most effective public health intervention ever developed", Gorski writes, and he cannot be convinced otherwise. He compares the vaccine debate to Jason in the Friday the 13<sup>th</sup> movies, saying it will never die. It may not, but he is willing to do what he can to make it go away, preposterous claim that it is.

I certainly don't ever want to believe that something I'm encouraged to do to protect my child actually harmed him, and for that reason, I almost find comfort in Gorski's article. He makes statements that I am able to understand and that seem logical. Why do autism numbers keep rising, even though mercury has been removed? It seems like a no-brainer, unless, as Gorski alluded to (in a mocking fashion) in his paper, it's all a government conspiracy, and the mercury dose has been doubled for...what reason? His argument made sense to me, the vaccine debate does not.

Courchesne, Eric. "Brain Development in Autism: Early Overgrowth Followed By Premature Arrest of Growth." *Mental Retardation & Developmental Disabilities Research Reviews* 10.2 (2004): 106-111. Academic Search Premier. Web. 6 Apr. 2014.

This article investigates abnormal brain overgrowth as a possible cause for autism. The argument is that it is during the first few years of life that this occurs in a child later diagnosed with this disorder, only to be immediately followed by slow or arrest of growth. "Deviant brain growth in autism occurs at the very time when the formation of cerebral circuitry is at its most exuberant and vulnerable stage," Courchesne writes. The time of development not only during gestation but in the immediate years following are crucial.

Dr. Courchesne is a Professor of Neurosciences at the University of California, San Diego and Director of its Autism Center. He has written many papers on autism and research into the disorder. What he presents in his article is something I have heard before. He presents his information logically with evidence and facts, generated both from his own studies and those conducted by others. He presents statistics from several longitudinal studies showing that

abnormally large head circumference, an indicator of large brain growth, is a common trait among autistic children when compared to normal, healthy ones. It is also important to learn where in the brain this overgrowth is occurring, if it is “uniformly enlarged” or only in “specific regions, in gray matter, white matter, or both.”

Though I am, of course, no scientist or doctor, and have no credentials on which to base my opinion, really, I agree with Dr. Courchesne’s thesis. I think it’s very logical and it makes sense to me, although many words in his article I could not understand. It was very thick with medical terminology and brain anatomy with which I am not familiar. However, I do think based on his years of practice and his knowledge on the subject he is a very credible source, and I learned a great deal from his article. There are many others I found in looking for resources for this paper that offer the same argument.

Pardo, Carlos A., Diana L. Vargas, and Andrew W. Zimmerman. “Immunity, Neuroglia And Neuroinflammation In Autism.” *International Review of Psychiatry* 17.6 (2005): 485-195. Academic Search Premier. Web. 6 Apr. 2014.

The three authors of this article present evidence that immunological factors contribute to the development of autism, along with genetic, environmental, and neurological components, based on their clinical studies and “different types of pathological abnormalities” in the cerebellum and CNS. They present a hypothesis that during gestation exposure via the mother to viral infections may somehow “damage the immature immune system”. What is more important

than the viral exposure itself is the “location of the pathology and the neural networks affected”, which can impact fetal brain development.

Dr. Carlos Pardo is an Assistant Professor of Neurology at Johns Hopkins University School of Medicine and Pathology, also with many years of experience conducting autism research. He presents the results of several studies in his article, and, similar to Dr. Courchesne, articulates everything using medical terminology that is a bit over the average reader’s head, but nevertheless substantiates his intelligence and knowledge of the matter. His argument is that, in addition to genetic and environmental causes, autism may also be caused from early in utero immunological damage. He writes “autoimmunity against brain antigens may contribute to the neuropathology of autism”, and that the presence of “auto-antibodies in serum from patients with autism...might imply that autism is an autoimmune disorder.”

I had not heard this argument before, but have no reason to question its validity because I just don’t know enough. I’m sure this is a real possibility, though it troubles me that the antibodies he so often refers to in his article are “maternal”. I think his argument chimes well with the others regarding genetic and environmental causes. I think given the fact that autism is classified as a “spectrum” disorder that there is not just one tangible thing that causes it, but rather a precise cocktail of many factors. He does a good job of tying them together here.

Cowley, Geoffrey Underwood, Anne Murr, Andrew Springen, Karen Sennott, Sarah. “Girls, Boys, And Autism.” Newsweek (Pacific Edition) 142.10 (2003): 40. MasterFILE Premier.

Web. 6 Apr. 2014

This article begins with Cambridge University psychologist Simon Baron-Cohen's definition of autism: "an imbalance between two kinds of intelligence: the kind used to understand people (he calls it 'empathizing') and the kind used to understand things ('systemizing')." He goes on to say that "autism is just an exaggerated version of the male profile", so I suppose that is why boys are diagnosed at a much higher rate than girls, by a ratio of 5:1. The authors of the article claim that autism is more demonstrative of the differences in personality and behavior between male and females rather than an actual disorder.

Geoffrey Cowley is a writer for Newsweek magazine, and although I'm sure quite brilliant in his own right, hardly an expert on the subject of autism. However, he does bring reality to his argument, and does provide evidence to support it. In my humble opinion, however, there is just much more to autism than just a difference in personality. I think it oversimplifies the disorder that 1 in 68 children are now diagnosed with each year. I always appreciate the opportunity to see a different perspective on things, but in this case, for my own peace of mind, I have to believe there is something more to this than what he suggests.