

Autism, Environment, Subtypes, and Remissions

Webinar February 25, 2016



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“No nation is any healthier than its children.”

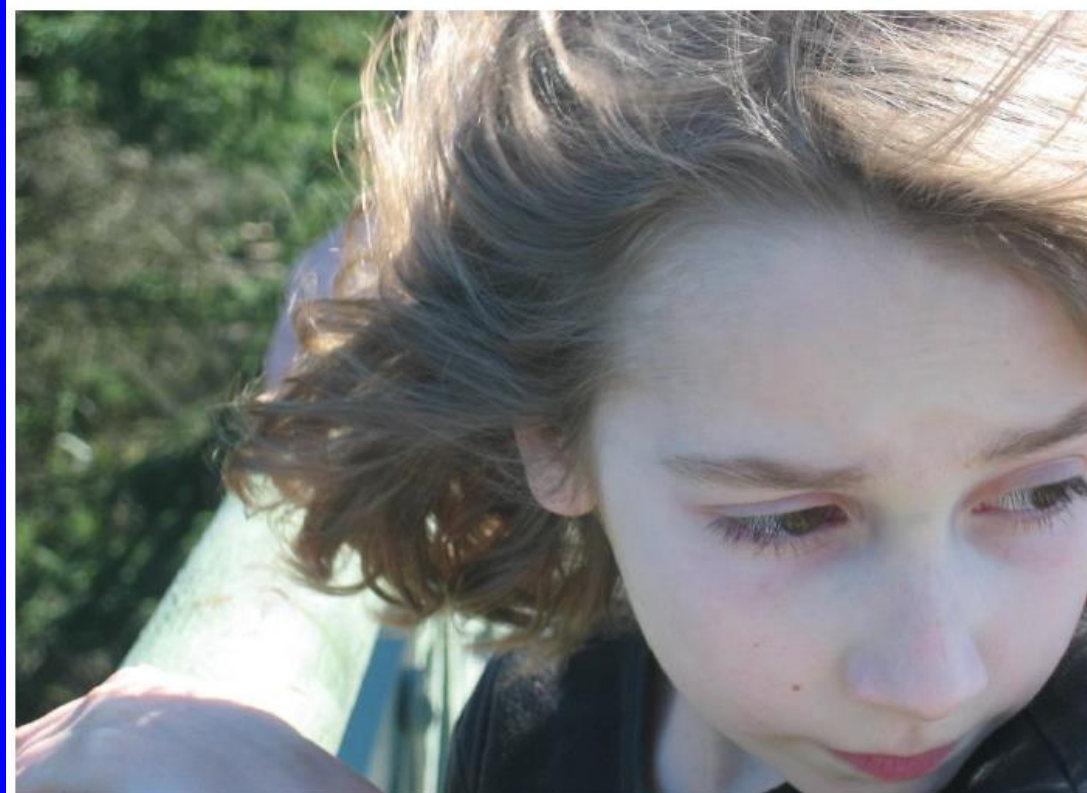
Harry Truman (1884-1972) 33rd President of USA



- 54% of Kids Chronic Illness
- Type 2 Diabetes- 12 Million
- Allergies- 7.3 Million
- Asthma- 6.7 million 300%
- ADHD- 5 Million
- Obesity 17% 2-19 yo
- 1 in 6 Neurodevelopmental disorder
- 1 in 6 public school special ed
- 1 in 7 kids antipsychotic med
- Maternal Mortality 33rd;
Maternal Health 61st in World
- Infant Mortality 28th;
Children's well being 42nd
- Autism 1 in 45

You are Your Child's Hero

Steps You Can Take to Improve Your Autistic Child's Neurological Health and Quality of Life



Norman Schwartz, M.D.

With Nancy Hovan Carpenter

Chapter 1: UNDERSTANDING AUTISM
What is Autism?.....	
Rare to Epidemic in a few decades.....	
What is Different about Today?	
The Evolution of Our Understanding of Autism Spectrum D.....	
Why is my Child Autistic?.....	
Why Doesn't My Doctor know this if it is Science-Based?.....	

Chapter 2: STEPS TO TAKE: Where Are My Tights and C
Remember Your Child's Strengths and Intelligence.....	
Reduce Toxic Exposure	
Improve Diet.....	
Support Detoxification	
Simple Steps to Enhance Drainage for Your Child and fo	
Biomedical Treatments to Support Detoxification	
GI Support and Gut/Digestive Health.....	
Support Sleep	
Healing Modalities.....	

Chapter 3: PREVENTING AUTISM SPECTRUM DISORDER
Preconception and Prenatal Steps for Mothers.....	
Preventing Autism in Babies.....	

Chapter 4: SELF CARE: Be Your Own Hero
You Come First.....	
Parental Stress	
Stress Management Techniques	
Find Your Tribe	

Chapter 5: GLOBAL CRISIS: The Clarion Call.....	
Join your voice to others within the autism community	
Join your voice to others in the environmental movement....	
Suggested Books	

Chapter 1: UNDERSTANDING AUTISM

“These children are trying so hard to show us how to live in a cleaner world. I believe these kids are here for a reason: to teach us to eat better, clean up the air, and get rid of toxins because they can’t survive.”

Jenny McCarthy

Autism What is Going On???

Rare to Pandemic

Cause, prevention, cure ?

- 1943- psych Leo Kanner first report-multiple med problems
- 2015- 72 yrs & > 18,000 peer-reviewed papers later
- Why? Initial focus-social, behavior, communication
- 3 generations of clinicians, siloed thinking
- No clear biological markers or medical criteria
- Science set back 1950-1970's Autism due to BAD PARENTING;
- Bernie Rimland- 1969. evidence of biological causes
- 1980-2016 primacy of genetics
- THINGS ARE CHANGING: Importance Environment, disruption fundamental control symptoms

Multi-system from the start?

Kanner 1943 on body symptoms

Case 1: “Eating has always been a problem” for him. He has never shown a normal appetite.”

Case 2: “...large and ragged tonsils.”

Case 3: diarrhea and fever following smallpox vaccination healthy except for large tonsils and adenoids.

Case 4: vomited a great deal during his first year... feeding formulas were changed frequently ... tonsils were removed...

Case 5: nursed very poorly ... quit taking any kind of nourishment at three months... tube-fed five times daily up to one year of age...At camp she slid into avitaminosis and malnutrition but offered almost no verbal complaints.”

Case 7: vomited all food from birth through the third month....

Case 8: feeding formula caused ...concern. ... colds, bronchitis, streptococcus infection, impetigo...

Case 9: none of the usual children’s diseases.” [? Overactive immune system?]

Case 10: frequent hospitalizations because the feeding problem ... repeated colds and otitis media

Case 11: was given anterior pituitary and thyroid preparations for 18 months

Kanner’s original paper, discussed in Jepson 2007

Autism: A Behaviorally Defined Syndrome

Biology is not part of the definition
(and neither is prognosis)

DSM-IV Criteria for Autistic Disorder (299.0)

1. Impaired social interaction
2. Impaired social communication
3. Markedly restricted repertoire of activities and interests

Secondary Features of Autism

Seizures (~30%+), cognitive deficits, sensorimotor abnormalities, savant skills, inflammation immune impairments, GI distress(50-75%), food allergies (~50+%)

No biological markers exist to identify autism at this time

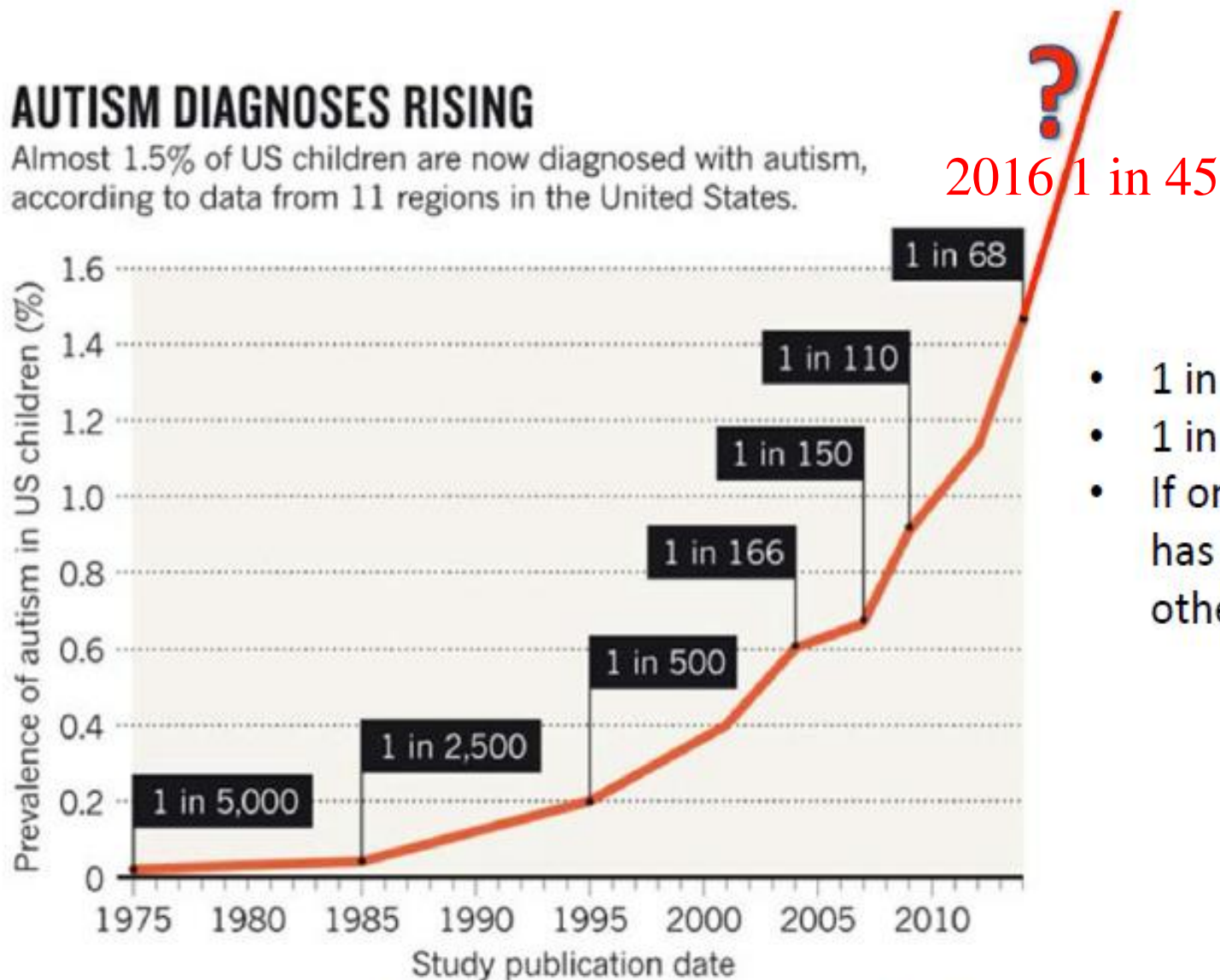
Autism is presumably Heterogeneous biologically

But autism is biological

Background: The Frightening Reality

AUTISM DIAGNOSES RISING

Almost 1.5% of US children are now diagnosed with autism, according to data from 11 regions in the United States.

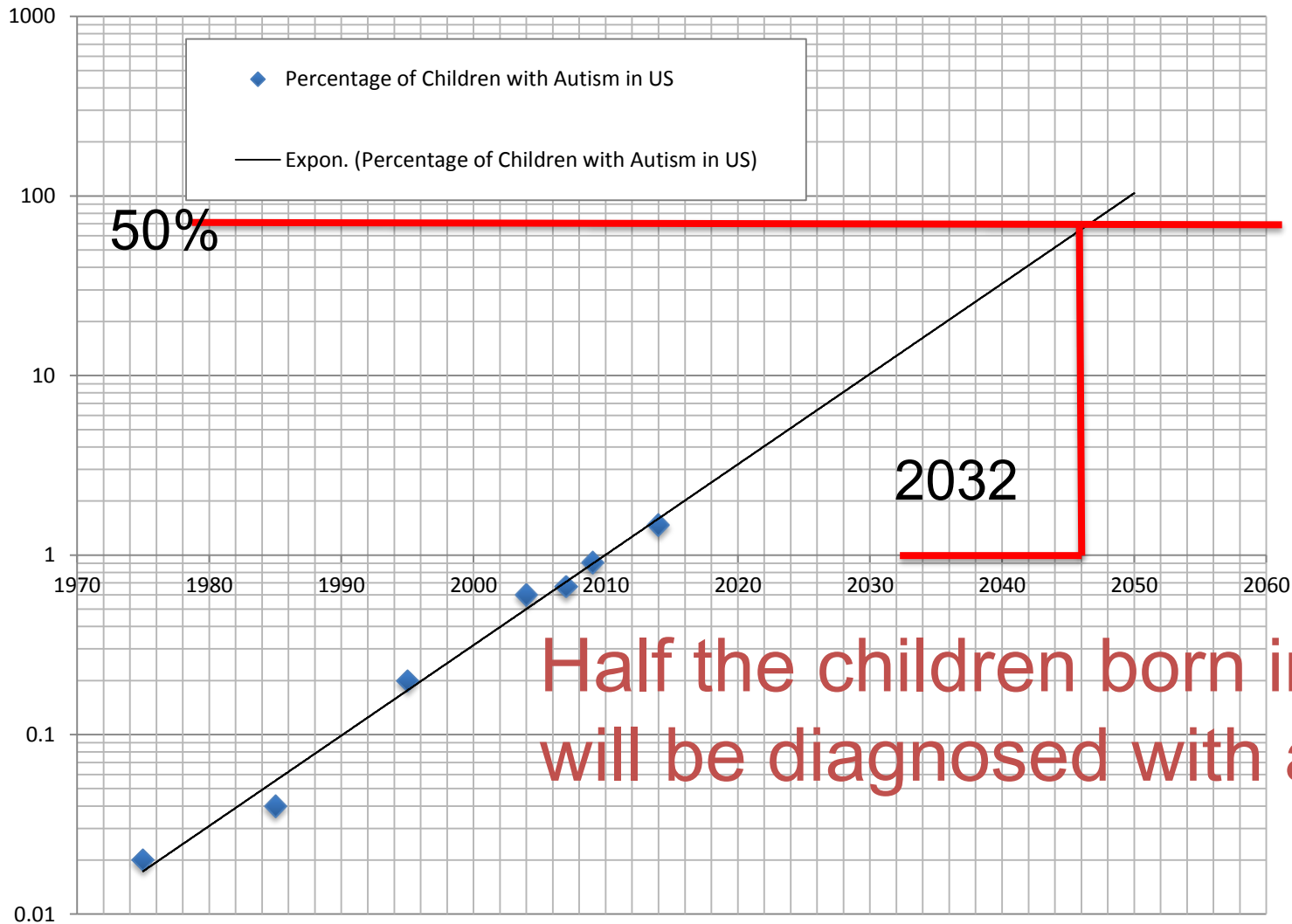


- 1 in 42 boys¹
- 1 in 189 girls¹
- If one child in a family has an ASD, odds are others will

¹CDC, "Community Report on Autism", 2014

²K. Weintraub, Nature 479, Nov. 3 2011, 22-24.

Percentage of children with Autism in the US



The Environment as an Etiologic Factor in Autism: A New Direction for Research

Eric London^{1,2} and Ruth A. Etzel³

¹The National Alliance for Autism Research, Princeton, New Jersey, USA; ²University of Medicine and Dentistry of New Jersey, New Brunswick, New Jersey, USA; ³Division of Epidemiology and Risk Assessment, Food Safety and Inspection Service, Washington, D.C., USA

Autism is one of a group of developmental disorders that have devastating lifelong effects on its victims. Despite the severity of the disease and the fact that it is relatively common (15 in 10,000), there is still little understanding of its etiology. Although believed to be highly genetic, no abnormal genes have been found. Recent findings in autism and in related disorders point to the possibility that the disease is caused by a gene-environment interaction. Epidemiologic studies indicate that the number of cases of autism is increasing dramatically each year. It is not clear whether this is due to a real increase in the disease or whether this is an artifact of ascertainment. A new theory

the developmental disorders rather than just research on pesticides.

We describe the current state of environmental research in autism to illustrate the issues faced by those interested in pursuing the etiology of developmental brain disorders. Because this work is in its infancy, we include

Believed to be highly genetic, no abnormal genes have been found. Despite the severity of the disease and the fact that it is relatively common: 15 in 10,000 [2016: 222 in 10,000]

The autism spectrum disorders (otherwise known as the pervasive developmental disorders) include autistic disorder as well as pervasive developmental disorder not otherwise specified and Asperger's syndrome. These three are all widely believed to be developmental brain disorders. It is quite likely that

would bring the total population of people with developmental brain disorders in the United States to over 20 million individuals. Except for a few types of mental retardation such as Down's syndrome and Fragile X syndrome, the etiology of the developmental brain disorders is unknown. The most common eti-

autism spectrum disorders (9,10). This has been established through twin and family studies. There is a concordance rate of approximately 2-6% in dizygotic twins as opposed to the 66% concordance rate in monozygotic twins. This 2-6% rate is also the rate estimated for family recurrence, which should be

Time to give up on a single explanation for autism

Francesca Happé, Angelica Ronald & Robert Plomin

We argue that there will be no single (genetic or cognitive) cause for the diverse symptoms defining autism. We present recent evidence of behavioral fractionation of social impairment, communication difficulties and

rigid and nonoverlapping cognitive behavioral symptoms and treatment

Autism, and the syndrome, is a triad of behavioral

communication and restricted and repetitive interests and activities¹. These core diagnostic features, which reflect Kanner's first reports of autism, are shared by the same

Recent work suggests that autistic-like traits can be measured in the general population^{7–9}. We can ask, for example, whether a child joins in playing games with other children easily, can keep a two-way conversation going or likes to do things over and over again in the same

smooth meeting situation¹⁰. Or 'hump' difficulty¹¹. impairments, strongly associated with autism? 1000 twin

We argue that there will be no single cause for the diverse symptoms defining autism.

pairs assessed between the ages of 7 and 9, we have found modest-to-low correlations between autistic-like behavioral traits in the three

ion in


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New Study: Autism Linked to Environment

Research links soaring incidence of the mysterious neurological disorder to fetal and infant exposure to pesticides, viruses, household chemicals

By [Marla Cone](#) | January 9, 2009 |  76

Epidemiology • Volume 20, Number 1, January 2009

The Rise in Autism and the Role of Age at Diagnosis

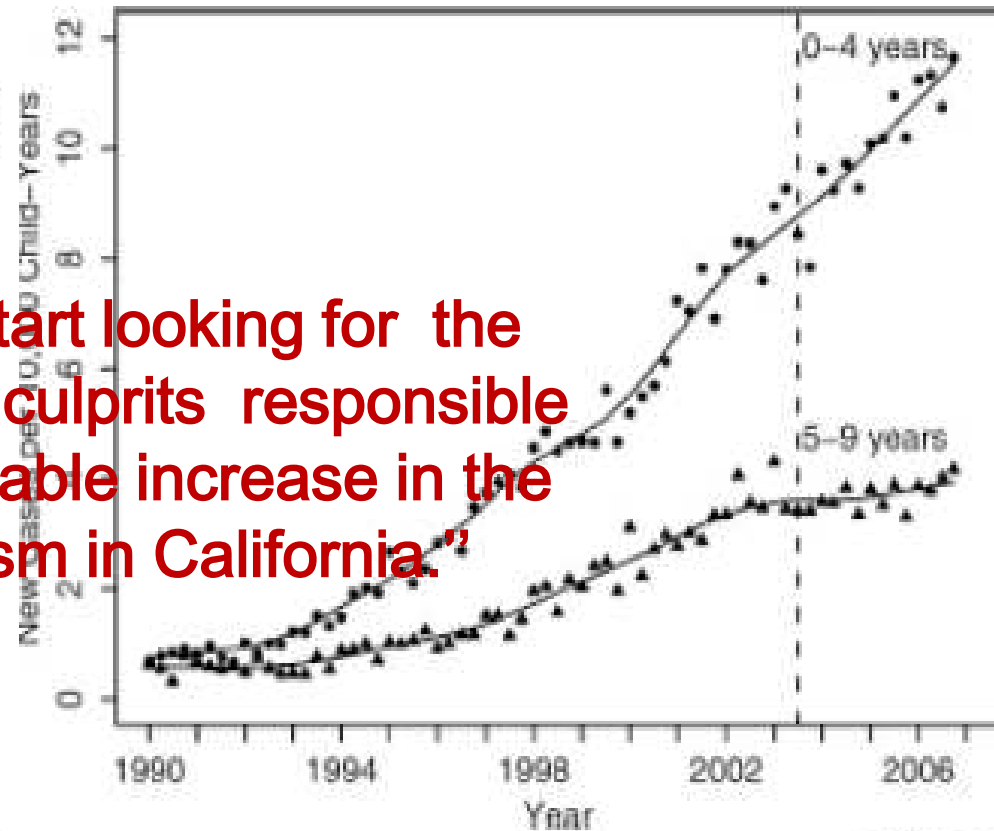
Irva Hertz-Picciotto^{a,b} and Lora Delwiche^a

TABLE 1. Annual Numbers and Rates of New Cases of Autism in the California DDS System, 1990–2006, for Children Aged Below 5 Years

Year	No.	Rate	Population Estimate 0–4 Yrs
1990	205	0.8	2,534,451
1991	213	0.8	2,664,214
1992	266	1.0	2,752,513
1993	370	1.3	2,807,471
1994	519	1.8	2,819,127
1995	662	2.4	2,797,903
1996	816	3.0	2,704,111
1997	1029	3.9	2,635,231
1998	1189	4.7	2,557,921
1999	1227	4.9	2,499,268
2000	1403	5.6	2,491,907
2001	1817	7.3	2,503,706
2002	2022	8.0	2,527,918
2003	2221	8.6	2,574,005
2004	2482	9.5	2,621,554
2005	2757	10.4	2,663,441
2006	3011	11.2	2,678,019

Rates are per 10,000 person-years.

"It's time to start looking for the environmental culprits responsible for the remarkable increase in the rate of autism in California."



Epidemiology

Annual incidence rates of autism in California



Autism
Enigma
Special
Issue

THE AUTISM ENIGMA



EDITORIALS

PARTICLE SPIN What to do if we fail to find the Higgs boson **p.6**

WORLD VIEW The cause and effect of contraceptives and HIV **p.7**

COMPUTING Pioneering John McClellan dies **p.10**



The mind's tangled web

Efforts to elucidate how genes and the environment shape the development of autism, although making progress, still fall far short of their goal.

Among psychiatric disorders, autism has received particularly strong support from government and philanthropic funders in recent years. And that investment has paid scientific dividends, above all the uncovering of genetic clues to underlying mechanisms for the disorder. But, as discussed in this special issue and in a web collection of content published this week in other Nature journals (see nature.com/autism), those developments, although pointing a way forward, have themselves revealed just how small a distance we have travelled towards a fuller mechanistic understanding.

“The growth in the prevalence of autism can be explained only partly by changes in diagnostic practice.”

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THE AUTISM ENIGMA

Autism counts



“Idea of whether the prevalence is increasing is so contentious for autism, but not for asthma, type 1 diabetes, food allergies. It is clear there is a real increase in autism, researchers need more funding and encouragement to look at environmental causes.”

ing and an acute lack of social interaction.”

physician and psychiatrist at Johns Hopk

University in Baltimore, Maryland, predicted

Thomas Insel, Director NIMH

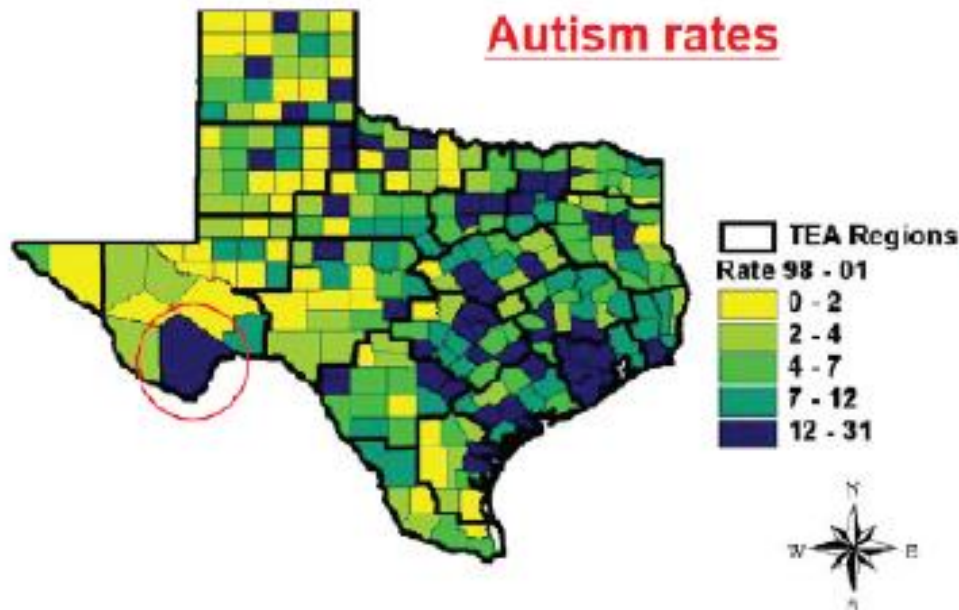
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Association between autism rates, environmental mercury, other toxins in Texas

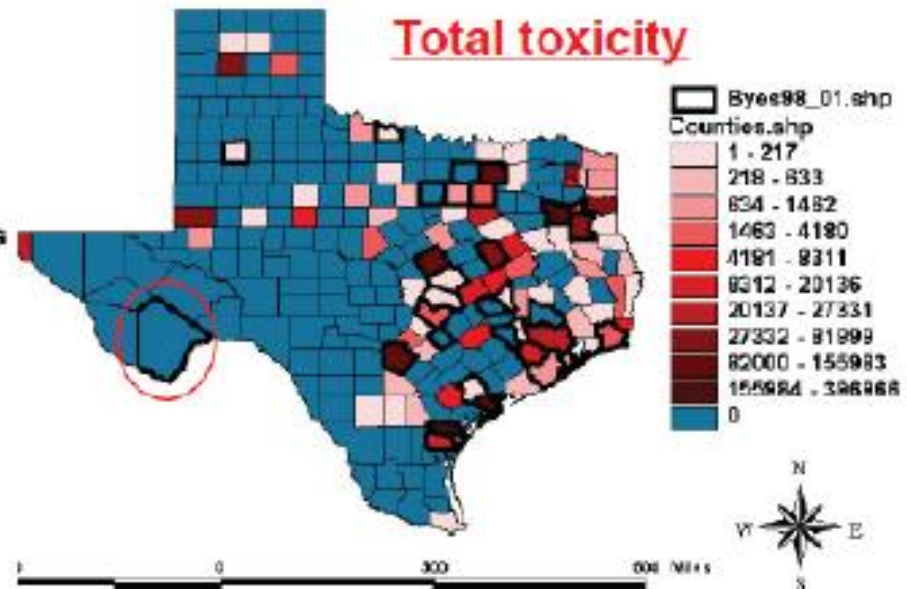
Palmer, et al., *Health and Place* 2006 Jun;12(2):203-9

For each 1000 lb of environmentally released mercury, there was a 43% increase in the rate of special education services and a 61% increase in the rate of autism.

Observed Rate of Autism 1998 - 2000 By County of Texas
Aggregated from School Districts
With Texas Education Agency Districts



Draft (21204) Levels of Total Toxicity by County for 2001
with Top Two Deciles of Bayesian Autism Rates (98 - 01)
Texas



Autism Spectrum Disorders and Identified Toxic Land Fills: Co-Occurrence Across States

Xue Ming¹, Michael Brimacombe², Joanne H. Malek³, Nisha Jani² and George C. Wagner³

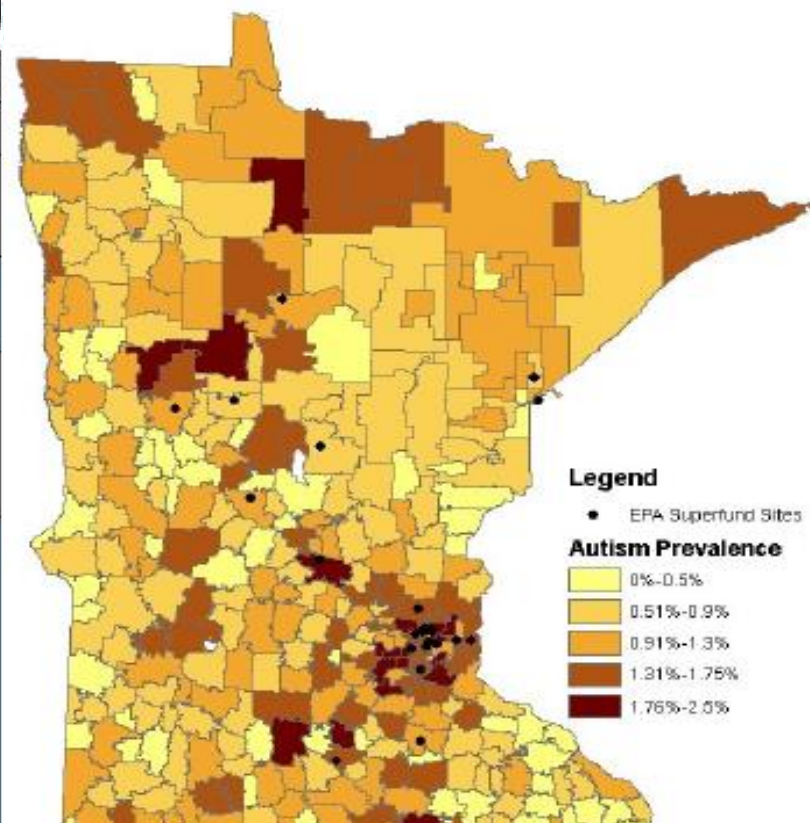
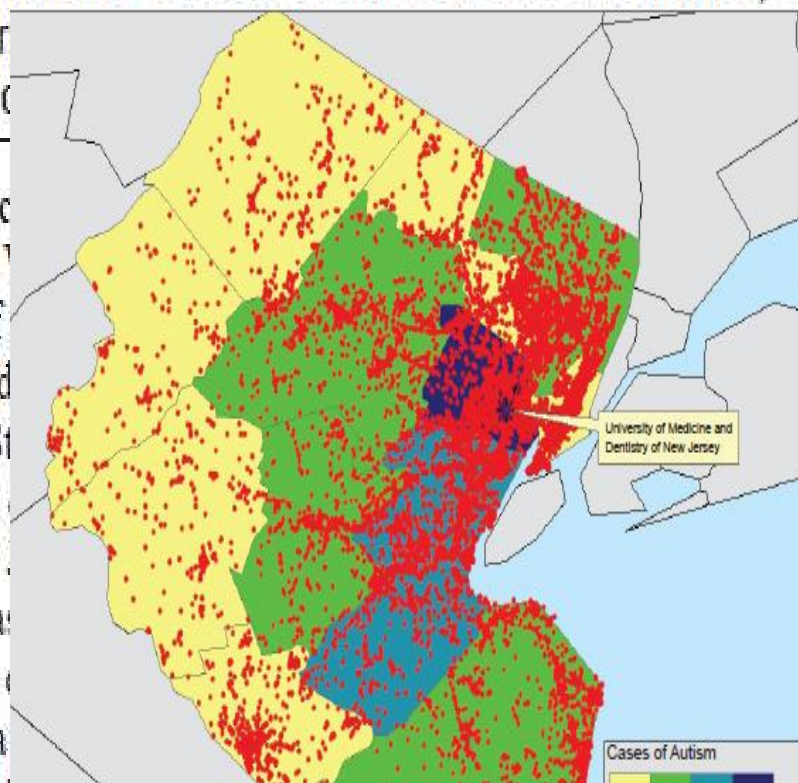
¹Departments of Neurosciences and Pediatrics, U

²Depart
of Psyc

, NJ.

artment

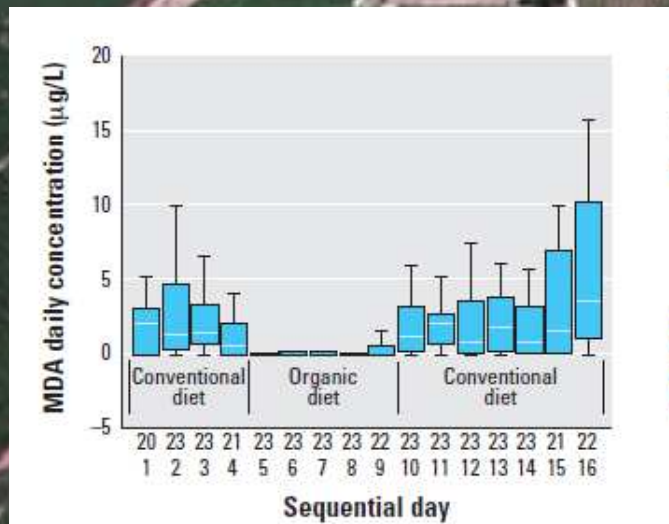
Abstract
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the lowest
50 states
of autism

Maternal Residence Near Agricultural Pesticide Applications and Autism Spectrum Disorders among Children in the California Central Valley

RESULTS: Mothers living within 1/3 mile from fields with highest poundage of pesticides had a 6x greater autism rate



Environmental Health Perspectives

115;10 (Oct., 2007), pp. 1482-1489



Breastfeeding and Autism

Saturday, May 22, 2010

Franklin Hall B Level 4 (Philadelphia Marriott Downtown)

10:00 AM

P. G. Williams , Pediatrics, University of Louisville, Louisville, KY

L. L. Sears , Pediatrics, University of Louisville, Louisville, KY

Background:

Exposure to PCB's in breast milk, environmental trigger, disrupting brain development - ASD in genetically predisposed.

Breastfeeding and autism: a review of the literature. The last 10 years have seen a significant increase in the prevalence of autism spectrum disorders (ASDs). While the known breastfeeding benefits still months was similar to the general rate for Kentucky, but the rate of breastfeeding in children with autism was nearly 3 times higher. The Kenet study pointed to possible concerns associated with substances in breast milk. While PCB's were banned in the late 1970's, these substances are very slowly degraded and maintain a significant level of plasma PCB concentrations compared to those who were not breastfed. The authors hypothesized that exposure to PCB's in breast milk might act as an environmental trigger, disrupting brain development and resulting in autism for those already genetically predisposed. While the known breastfeeding benefits still

What causes autism? Exploring the environmental contribution.

Landrigan PJ.

Author information

Abstract

PURPOSE OF REVIEW: Autism is a biologically based disorder of brain development. Genetic factors—mutations, deletions, and copy number variants—are clearly implicated in causation of autism. However, they account for only a small fraction of cases, and do not easily explain key clinical and epidemiological features. This suggests that early environmental exposures also contribute. This review explores this hypothesis.

RECENT FINDINGS: Indirect evidence for an environmental contribution to autism comes from

Genetic factors account for only a small fraction of cases—early environmental exposures contributes

valproic acid; maternal rubella infection; and the organophosphate insecticide, chlorpyrifos. There is no credible evidence that vaccines cause autism.

Exposures in early pregnancy - thalidomide, misoprostol, and valproic acid; maternal rubella infection; and the organophosphate insecticide, chlorpyrifos.

suspect chemicals, which combines expanded toxicological screening, neurobiological research and prospective epidemiological studies.



Published in final edited form as:

Epidemiology. 2011 July ; 22(4): 476–485. doi:10.1097/EDE.0b013e31821d0e30.

Prenatal vitamins, one-carbon metabolism gene variants, and risk for autism

Rebecca J. Schmidt^{1,2}, Robin L. Hansen^{2,3}, Jaana Hartiala⁴, Hooman Allavee⁴, Linda C.

Sci

Periconceptional use of prenatal vitamins may reduce the risk of having children with autism, especially for genetically susceptible mothers and children

¹ D

CA

² M

Ca

³ Department of Pediatrics, University of California Davis School of Medicine, Davis, CA

⁴ Department of Preventive Medicine, Institute for Genetic Medicine, University of Southern California Keck School of Medicine, Los Angeles, CA

⁵ Department of Biochemistry and Molecular Medicine, University of California Davis School of



Short Communication

Open Access

Vitamin/Mineral Supplements for Children and Adults with Autism

James B Adams*

Director, Autism/Asperger's Research Program, President's Professor, Arizona State University, PO Box: 870106, Tempe, AZ, USA

Abstract

Vitamins and minerals are the most widely used medical treatment for autism. Many research studies have demonstrated that children and adults with autism often have nutritional and metabolic problems, including problems with methylation, glutathione, oxidative stress, sulfation, lithium, and more. This review summarizes the results of several vitamin/mineral treatment studies conducted by our group, which demonstrate that vitamin/mineral supplements are highly effective in improving many nutritional and metabolic problems, and result in significant improvements in symptoms based on a large, randomized, double-blind, placebo-controlled study. We recommend that all children and adults with autism consider a 2-3 month trial of a vitamin/mineral supplement designed for individuals with autism that is similar to the one used in our studies. By starting at a low dose, and gradually increasing it, there is minimal risk of adverse effects, and many children and adults are likely to benefit, sometimes substantially.

Vitamin/mineral supplements highly effective in improving nutritional and metabolic problems, in a large, randomized, double-blind, placebo-controlled study

In the past few years, there has been a significant increase in the use of vitamin/mineral supplements in the treatment of autism. This is due to the fact that many children and adults with autism have nutritional and metabolic problems, which can be improved by the use of these supplements. In fact, many studies have shown that vitamin/mineral supplements are one of the most widely used treatments for autism.

The definition of a "vitamin" or "essential mineral" is that the

supplements are highly effective in improving nutritional and metabolic problems, in a large, randomized, double-blind, placebo-controlled study. We recommend that all children and adults with autism consider a 2-3 month trial of a vitamin/mineral supplement designed for individuals with autism that is similar to the one used in our studies. By starting at a low dose, and gradually increasing it, there is minimal risk of adverse effects, and many children and adults are likely to benefit, sometimes substantially.

What's really behind the increase in autism rates. May 7, 2012

THE COLLABORATIVE ON HEALTH AND THE ENVIRONMENT



Face the reality- our children are sick from preventable causes **NOT** better diagnosis

1980- 200 billion pounds of chemicals/year

Now- 27 trillion pounds of chemicals/yr

1960- 400 million pounds of pesticides/yr

Now 4.5 billion pounds pesticides/yr

National Academy of Sciences 50% of pregnancies-
fetal death or less than healthy child

CHEMICAL FALLOUT | UPDATE

EPA a failure on chemicals, audit finds

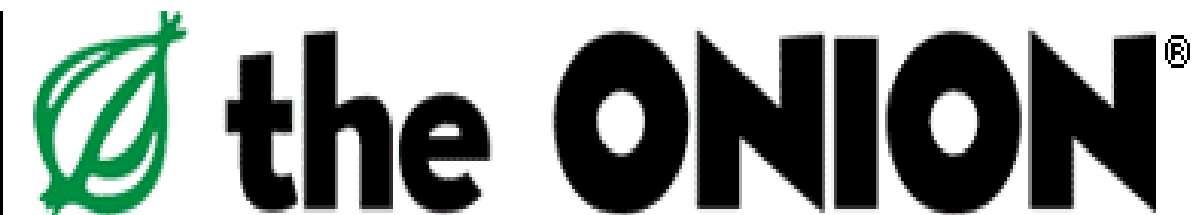
Assessment of toxic risks inadequate, says new chief

FDA relied heavily on BPA lobby

Regulators actively reached out to industry, e-mails show

By Susanne Rust and Meg Kissinger of the Journal Sentinel

Posted: May. 16, 2009



a.v. club |  store | subs

Mobile/PD.

EPA To Drop 'E,' 'P' From Name

**"We're not really environmental anymore,
and we certainly aren't protecting anything"**



THE MICROBIOME IN AUTISM SPECTRUM DISORDER

A model for the induction of autism in the ecosystem of the human body: the anatomy of a modern pandemic?

Staci D. Bilbo¹, Cynthia D. Nevison² and William Parker^{3*}

¹Department of Psychology & Neuroscience, Systems & Integrative Neuroscience Group, Duke University, Durham, NC, USA; ²Institute for Arctic and Alpine Research, University of Colorado Boulder, Boulder, CO, USA; ³Department of Surgery, Duke University Medical Center, Durham, NC, USA

Two lines of reasoning are examined which suggest that autism is indeed a pandemic of modern culture.

Unequivocal way to resolve the debate-perform an experiment: monitor the prevalence of autism after normalizing immune function in a Western population

Background: The nature of autism is debated. Some argue for genetic factors at the roots. Others are convinced that the disease is not pandemic in nature, but rather that it has been with humanity for millennia, with its biological and neurological underpinnings just now being understood.

Objective: of modern evidence reviewed

question regarding with environmen-

tal factors at the roots. Others are convinced that the disease is not pandemic in nature, but rather that it has been with humanity for millennia, with its biological and neurological underpinnings just now being understood.

ndemic culture, ence is modern

culture. In light of this reasoning, current epidemiological evidence regarding the incidence of autism,

Air Pollution and ASDs

Homing In on an Environmental Risk Factor

Although researchers have begun making significant inroads into understanding the genetic and biological basis for autism spectrum disorders (ASDs) and other neurodevelopmental disorders, it's been estimated that environmental factors could account for just over half the risk of developing ASDs.¹ In this issue of *EHP*, researchers have used data from 1,767 women in the Nurses' Health Study (NHS) II to study exposure to particulate matter (PM) as one potential environmental risk factor for ASDs.²

In one of the first reports of a relationship between air pollution and ASDs, investigators in California found associations between estimated exposures to airborne heavy metals and other pollutants and risk of ASDs.²

Later studies using the same exposure models as the California study reported links between multiple hazardous air pollutants and ASDs in North Carolina and West Virginia.³ In a study published in the *Journal of Child Psychology and Psychiatry*, researchers found that children exposed to concentrated ambient ultrafine PM showed ventriculo-

50% higher odds ASD in women with PM_{2.5} exposure during pregnancy



In this study, higher exposures to PM_{2.5} air pollution during the third trimester of pregnancy were associated with increased risk of having a child with an autism spectrum disorder.

© KidStock/Blend Images/Corbis

megaly, altered neurochemistry, and activation of glial cells in the brain.⁴ The researchers also found that children exposed to concentrated ambient ultrafine PM showed ventriculo-

What Do All These Have In Common

- Vinyl flooring
- Pesticides flea/tick sprays
- Living near power plants, landfills, incinerators

- Shorter birth interval
- Breast feeding
- June birth,
- SSRI use in pregnancy

All Associated with Autism

- Air pollution
- Toxic metals
- Antibiotics
- Increased rain fall
- Northern latitude
- Gut Ecology
- Living near freeway
- Increased cable usage
- Obesity/DM mom

- Prematurity
- First born
- Infection, meds in pregnancy
- Fetal distress, low apgar
- In vitro fertilization
- Unplanned C-section
- Vaccinations
- Older parents
- Higher Socioeconomic

Microbial Ecology in Health & Disease 2012, **23**:

Should autism be considered a canary bird telling that *Homo sapiens* may be on its way to extinction?

Olav Albert Christophersen, Cand. mag.*

Pensioned Norwegian state stipendiate

There has been a dramatic enhancement of the reported incidence of autism in different parts of the world over the last 30 years. This can apparently not be explained only as a result of improved diagnosis and reporting, but may also reflect a real change. The causes of this change are unknown, but if we shall follow T.C. Chamberlin's principle of multiple working hypotheses, we need to take into consideration the possibility that it partly may reflect an enhancement of the average frequency of responsible alleles in large populations. If this hypothesis is correct, it means that the average germline mutation rate must now be much higher in the populations concerned, compared with the natural mutation rate in hominid ancestors before the agricultural and industrial revolutions. This is compatible with the high prevalence of impaired human semen quality in several countries and also with what is known about high levels of total exposure to several different unnatural chemical mutagens, plus some natural ones at unnaturally high levels. Moreover, dietary deficiency

Chapter 2: STEPS TO TAKE: Where Are My Tights and Cape?

“...That a disease is complex or multifactorial does not imply that simple solutions cannot be found or that clinical advances following insight cannot be swift.”

JA Rees (Science, 2002;296: 698-701)

Action Steps

- Remember your child's strengths and intelligence
- Reduce toxic exposures
- Improve diet
- Support detoxification
- Heal gut/digestion
- Support sleep
- Employ healing modalities

Steps to Take

- Toxins in our bodies can be cumulative. Every single thing you do counts.
- Eat Clean Food
- Avoid processed foods
- Avoid artificial sweeteners, coloring, additives, and flavorings
- Drink Pure Water
- Breathe Clean Air
- Use Clean Personal Care Products

Steps to Take

- Reduce Hormone/Endocrine Disruptors
- Clean Clothing/Laundry Products
- Eliminate Plastics
- Eliminate Toxic Metals
- Avoid Electromagnetic Radiation
- Avoid Excitotoxins
- Eat lots of Healthy Fats

Steps to Take

- Biomedical Treatments to Support Detoxification
- GI Support and Gut/Digestive Health
- Support Sleep
- Healing Modalities
- B12 Injections

Randomized, Placebo-Controlled Trial of Methyl B12 for Children with Autism

Robert L. Hendren, DO,¹ S. Jill James, PhD,² Felicia Widjaja, MPH,¹ Brittany Lawton, BS,¹ Abram Rosenblatt, PhD,¹ and Stephen Bent, MD¹

Abstract

Objective: Children with autism spectrum disorder (ASD) have been reported to have reduced ability to methylate DNA and elevated markers of oxidative stress. We sought to determine if methyl B12, a key metabolic cofactor for cellular methylation reactions and antioxidant defense, could improve symptoms of ASD.

Methu Symptom improvement correlated with ↑methionine (kg) or
saline and ↑S-adenosylmethionine (SAM)/SAH
symp
ptoms measures of methionine methylation and antioxidant glutathione metabolism were assessed at baseline and 8 weeks.

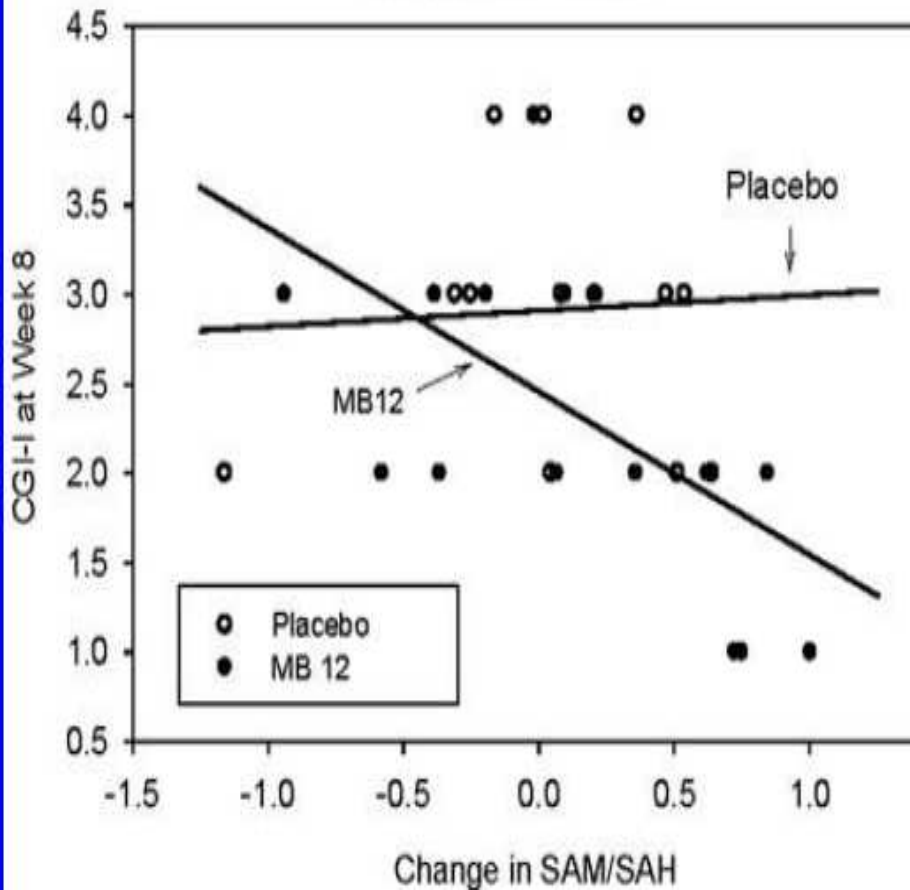
Results: A total of 50 children (mean age 5.3 years, 79% male) completed the study. The primary outcome measure – the

Improved cellular methylation capacity
homocysteine (p < 0.001) and improvements in the ratio of S-adenosylmethionine (SAM) to SAH (p < 0.001), indicating an improvement in cellular methylation capacity. No improvements were observed in the parent-rated ABC or SRS.

Conclusions: Methyl B12 treatment improved clinician-rated symptoms of ASD that were correlated with improvements in

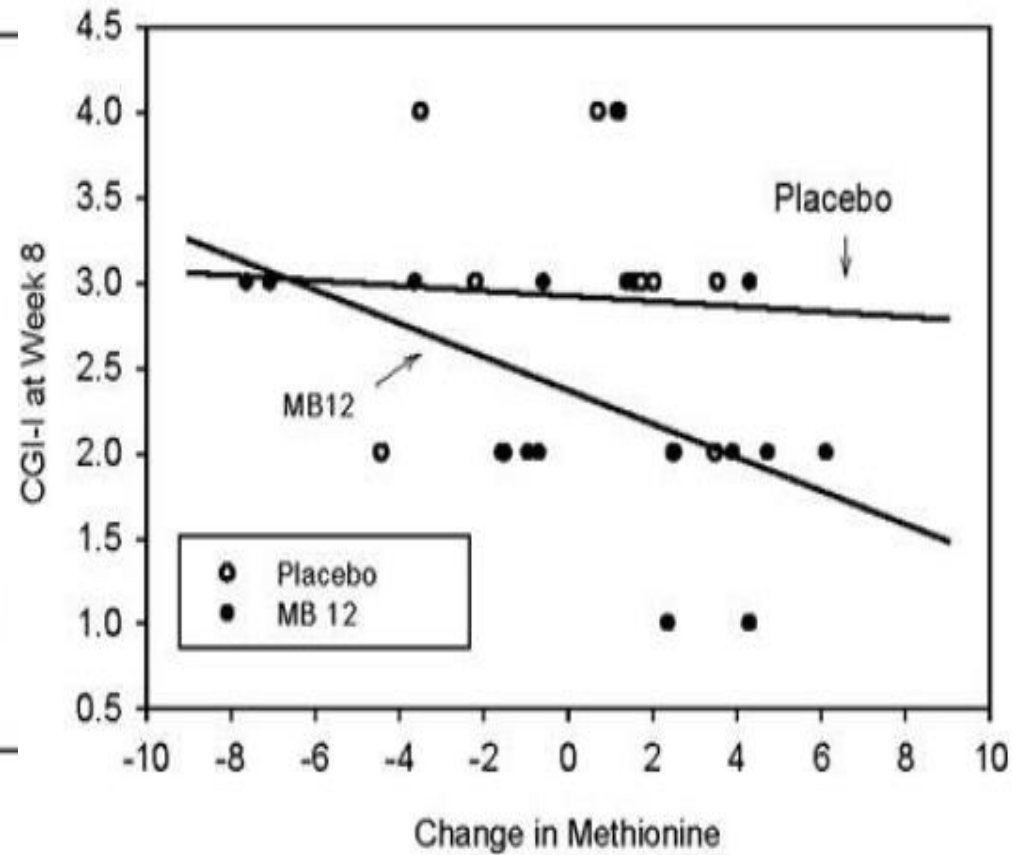
CGI-I at Week 8 vs Change in SAM/SAH

Interaction P = 0.091



CGI-I at Week 8 vs Change in Methionine

Interaction P = 0.42



Chapter 4: SELF CARE:

Be Your Own Hero

- “Do not let either the medical authorities or the politicians mislead you. Find out what the facts are, and make your own decisions about how to live a happy life and how to work for a better world.”

Linus Pauling, PhD, 1901-1994 Two- time
Nobel Laureate

Self Care

- You Come First
- Parental Stress- helpful articles:
 - Family Autism Self Care Strategies
 - Article Self Care is not Selfish
 - Article Caring for the Caregiver
 - 15 Tips for Your Family
 - Sibling Resources
 - 10 Things Parents of ASD Would Love To Hear

Self Care

- Stress Management Techniques
- Find Your Tribe
 - [Documenting Hope/Epidemic Answers](#)
 - [Generation Rescue](#)
 - [Talk About Curing Autism](#)
 - [Safe Minds](#)
 - [National Autism Association](#)
 - [Fearless Parent](#)
 - [Thinking Moms Revolution](#)
 - [The Canary Party](#)
 - [BioMed Heals](#)
 - [Moms in Charge](#)
 - [Parents Helping Parents: The Autism Education Network](#)

Almost Autism: Recovering Children from Sensory Processing Disorder

by Maria Rickert Hong

A Compromised Generation: The Epidemic of Chronic Illness in America's Children by Beth Lambert and Victoria Kobliner

Healing Without Hurting by Jennifer Kozek, LPC, NCC

Kids Beyond Limits by Anat Baniel

The Hidden Connection by Kathleen DiChiara, FDN

Nourishing Hope for Autism, Autism Diet & Nutrition Book

by Dr. Matthews

Healing the New Childhood Epidemics Kenneth Bock, M.D.
Cameron Stauth

Autism Revolution by Martha Herbert, M.D. with Karen Weintraub

Nutritional Supplement Use for Autistic Spectrum Disorder
by Jon Pangborn

Children with Starving Brains by Jaquelyn McCandless, M.D.

Autism: Effective Biomedical Treatments by Jon Pangborn, PhD and Sidney MacDonald Baker, M.D.

The Dirt Cure by Maya Shetreat-Klein, MD

Changing the Course of Autism by Bryan Jepson

Detoxification & Healing: the Key to Optimal Health by Sid Baker, MD

The Autism Book by Robert W Sears, MD, FAAP

Infantile Autism by Bernard Rimland, MD

Treating Autism: Parent Stories of Hope & Success

Edited by Stephen Edelson, PhD & Bernard Rimland, PhD

The Road to Immunity by Kenneth Bock, MD & Nellie Sabin

Healing Our Autistic Children by Julie A Buckley, MD

Born on a Blue Day by Daniel Tammet

Understanding Autism for Dummies by Steven M Shore,

Chapter 5: GLOBAL CRISIS: The Clarion Call

“A new consciousness is developing that sees the earth as a single organism, and recognizes that an organism at war with itself is doomed.”

Carl Sagan, 1934-1996

“Worldwide grassroots movement of hope and humanity. Immune System of our planet”



“I observe the physician with the same diligence as the disease.”

John Donne, 1572-1631



The specific disease doctrine is the grand refuge of weak, uncultured, unstable minds such as now rule in the medical profession.

Florence Nightingale 1820-1910



»YOU CAN KNOW the name of a bird in all the languages of the world, but when you're finished, you'll know absolutely nothing whatever about the bird. So let's look at the bird and see what it's doing — that's what counts. I learned very early the difference between knowing the name of something and knowing something.«

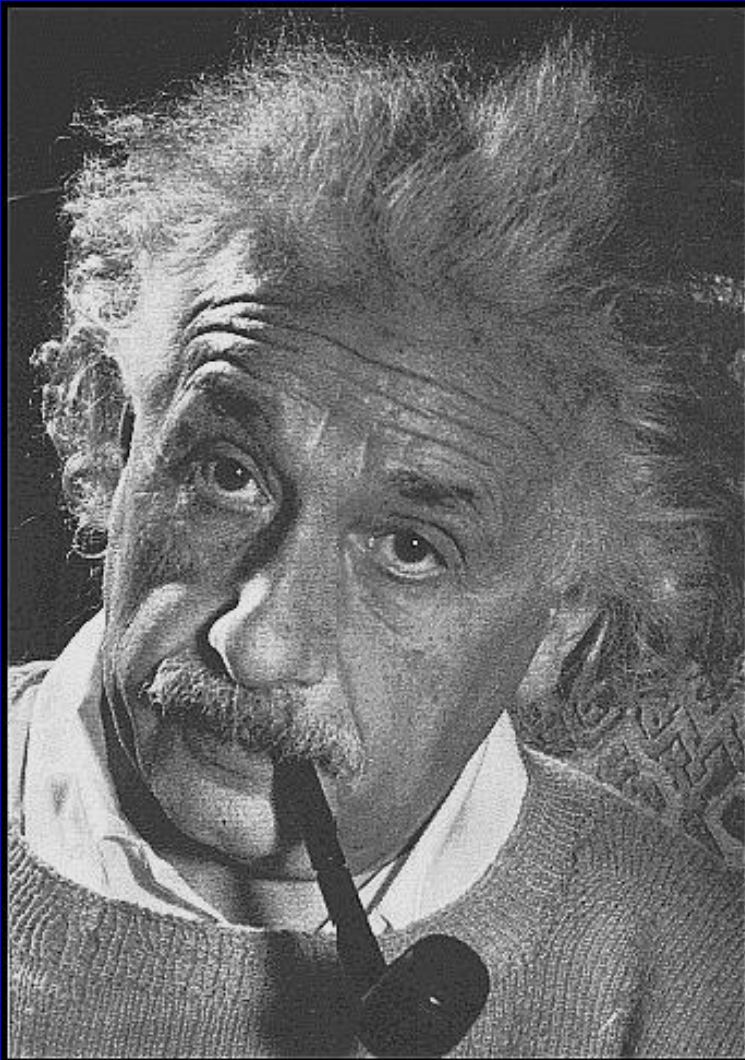
RICHARD P. FEYNMAN

Ranked as one of the ten greatest physicists of all time



Opinions about obviousness are to a certain extent a function of time.

Albert Einstein



- The earth is flat.
- Children should be seen and not heard
- Airplanes are impossible
- Women are not logical enough to vote
- Autism caused by bad parenting
- Autism is genetic.

ASD Complex Whole Body

- Oxidative Stress
- Inflammation
- Mitochondrial Disorders
- Seizure Disorder
- Calcium Dysregulation
- Gastrointestinal
- Fatty Acid Deficiencies
- Toxic Metals Burden
- Decrease Brain Blood Flow
- Brainstem Abn
- Glutathione Decrease
- Melatonin Decrease
- Oxytocin/Serotonin Abnormalities
- Low and High Cholesterol
- Nutrient, Mineral Deficiencies
- Multiple Immune Abnormalities

Subtypes

1. **Redox balance**- cell vitality, ability to prevent oxidative stress and free radical damage
2. **Digestive competence**- break down, assimilate, and eliminate, entire digestive system
3. **Anabolic/catabolic balance**- repair competences or their deficit, including unresolved inflammation.
4. **Detoxification**- ability to safely convert toxins into more easily excreted and less harmful
5. **Somatosensory**- information processing, limited reserves can lead to system overload and dysfunction
6. **Neuroimmunohormonal integration**- immune neurotransmitter, and hormonal systems function as a single, integrated control system.

Autism: Thinking the unthinkable

To cling to a purely genetic explanation of autism is a desperate attempt to maintain the illusion that one lives in a comfortable and rational world where new chemicals and technologies always mean progress, experts are always objective and thorough, corporations are honest, and authorities can be trusted. That human actions, rather than genetics, might be responsible for compromising the health of a significant proportion of a whole generation is so painful as to be, for many unthinkable.

Martha Herbert MD, PhD Pediatric Neurologist. Harvard Medical School
48

Autisms are Treatable

Observed Improvements:

- Cognitive deficits
- Sensorimotor abnormalities
- Disordered sleep
- Immune impairments
- GI distress
- Food allergies
- Systemic metabolic disturbances
- Seizures

My Approach to Treatment

- Currently most behavioral/developmental disorders are **MEDICAL** not **MENTAL Preventable & Treatable**
- Comprehensive, functional, integrative approach
- Rx based on predictive, sensitive, specific lab testing ; clinical observations for individualized therapy
- Understand biochemical imbalances to prioritize low risk, high gain treatments.
- Engage family, “Doctor Mom & Dad” as colleagues to determine what works best
- Assess and treat environmental toxicity
- Not a single cause,-complex, need to think deeply about causes and consequences in neurodevelopment.

The Autism Intensive



January 10th-18th



Martha Herbert, MD, PhD



Stephanie Seneff, PhD



Jeffrey Bland, PhD



January 10th-18th



Ben Lynch, ND



Kenneth Bock, MD



January 10th-18th



Richard Frye, MD, PhD



Sidney Baker, MD



Norm Schwartz, MD



Paul Thomas, MD



Beth Lambert, MS



Anat Baniel



Nancy H. O'Hara, MD



Julie Matthews, CNC



Erica Peirson, ND



Elizabeth Mumper, MD



January 10th-18th



Jim Adams, PhD



Richard Deth, PhD



Maya Shetreat-Klein, MD



January 10th-18th



Eve Prang Plews LNC



Donna Gates



January 10th-18th



Stu Freedenfeld, MD



Derrick MacFabe, MD



Jolene Brighten, ND



Geri Brewster RD, MPH



Dan Rossignol, MD



Tom Malterre, MS



Russ Jaffe, MD, PhD



Derrick MacFabe, MD



Kim Stagliano



Scott Theirl, DC, DACNB

Those who have the privilege to know
have the duty to act.” Albert Einstein

Together, we know enough...to mitigate,
remediate, and prevent the epidemics of
autism, chronic illness and lack of wellness. If
not now, when?

Thank you!!!

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Closely Spaced Pregnancies Are Associated With Increased Odds of Autism in California Sibling Births

Pediatrics 2011;127:246–253



WHAT'S KNOWN ON THIS SUBJECT: Autism has been associated with pregnancy and birth complications that may indicate a suboptimal prenatal environment. Although the interpregnancy interval (IPI) may affect the prenatal environment, the association between the IPI and risk for autism is not known.



WHAT THIS STUDY ADDS: Using full-sibling pairs from a large population, the authors examined the association between autism and IPIs. Second-born children conceived after an IPI of <12 months had more than threefold increased odds of autism relative to those with IPIs of ≥ 36 months.

AUTHORS: Keely Chaslack-Postava, PhD, MSPH,^a Kayuet Liu, DPhil,^b and Peter S. Bearman, PhD^b

^aRobert Wood Johnson Foundation Health and Society Scholars, Columbia University, New York, New York; and ^bPaul F. Lazarsfeld Center for the Social Sciences, Columbia University, New York, New York

KEY WORDS

autism, IPI, birth intervals, siblings, California

ABBREVIATIONS

IPI—interpregnancy interval

DOS—Department of Developmental Services

OR—odds ratio

Children born after shorter intervals between pregnancies increased risk of developing ASD; the highest risk was associated with pregnancies spaced < 1 year apart.

abs

OBJECTIVE
associat

METHODS: Pairs of first- and second-born singleton full siblings were identified from all California births that occurred from 1992 to 2002 using birth records, and autism diagnoses were identified by using linked records of the California Department of Developmental Services.

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FINANCIAL DISCLOSURE: The authors have indicated they have

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Perinatal and Neonatal Risk Factors for Autism: A Comprehensive Meta-analysis

Pediatrics 2011;128:344–355



WHAT'S KNOWN ON THIS SUBJECT: Autism etiology is unknown, although perinatal and neonatal exposures have been the focus of epidemiologic research for more than 40 years. Although

AUTHORS: Hannah Gardener, ScD,^a Donna Spiegelman, ScD,^{a,b} and Stephen L. Buka, ScD^c

^aDepartment of Epidemiology and ^bDepartment of Biostatistics

Meta analysis of 60 factors, 17 significant: abnormal presentation, umbilical-cord compl, fetal distress, birth trauma, multiple birth, maternal hemorrhage, summer birth, low birth weight, small for gestational age, congenital malformation, low 5-minute Apgar score, feeding difficulties, meconium aspiration, anemia, ABO or Rh incompatibility, and hyperbilirubinemia.



ab

BACKGROUND: The etiology of autism is unknown, although perinatal and neonatal exposures have been the focus of epidemiologic research

Spiegelman contributed to the study concept and design, analysis and interpretation of data, critical revision of the manuscript for important intellectual content, statistical

Autism rates associated with nutrition and the WIC program.

Shamberger RJ.

+ Author information

Abstract

OBJECTIVES: Autism rates in the United States are increasing at a rate of 15% per year. Autistic children are diagnosed by age 3 when they have problems communicating and interacting socially. This study uses nutritional epidemiology and an ecologic study design to link the possible cause of autism to nutrition by creating autism rates for the 50 states of America and comparing them with published measures of infant nutrition such as duration of exclusive breast-feeding and participation in the Women, Infants, and Children (WIC) program. The percentage of infants with measles, mumps, and rubella (MMR) inoculations was also compared with the autism rates. Study

DESIGN: Autism rates for each state were established. The percentage of infants who participate in the WIC program was established. The study was an ecologic study design with a cross-sectional design.

RESULTS: The states with the highest WIC participation have significantly lower ASD rates (p < 0.02). A similar pattern was observed in 21 New Jersey counties (p < 0.02) and 30 Oregon counties (p < 0.05). In contrast, there was a direct correlation with the increasing percentage of women exclusively breast-feeding from 2000-2004 (p < 0.001). Infants who were solely breast-fed had diets that contained less thiamine, riboflavin, and vitamin D than the minimal daily requirements (MDR). There was no correlation of MMR inoculations with the autism rate.

CONCLUSION: The mothers who are exclusively breast-feeding should also continue their prenatal vitamins or their equivalent and make better dietary choices. These results suggest that autism may be nutritionally related to a possible deficiency of riboflavin or the cognitive vitamins such as thiamine or vitamin D. However, due to an ecologic study design there is a potential for fallacy because individuals were not examined. The results suggest the need for a robust observational

ONLINE FIRST

Arch Gen Psychiatry. 2011;68(11):1104-1112.

Antidepressant Use During Pregnancy and Childhood Autism Spectrum Disorders

Lisa A. Croen, PhD; Judith K. Grether, PhD; Cathleen K. Yoshida, MS; Roxana Odouli, MSPH; Victoria Hendrick, MD

Context: The prevalence of autism spectrum disorders (ASDs) has increased over recent years. Use of antidepressant medications during pregnancy also shows a secular increase in recent decades, prompting concerns that prenatal exposure may contribute to increased risk of ASD.

Objective: To systematically evaluate whether prenatal exposure to antidepressant medications is associated with increased risk of ASD.

Design: Retrospective cohort study. **Setting:** The Kaiser Permanente Medical Care Program in Northern California. **Participants:** A total of 298 case children with ASD (and their mothers) and 1507 randomly selected control children (and their mothers) drawn from the membership of the Kaiser Permanente Medical Care Program in Northern California. **Measurements and Main Results:** Prenatal exposure to antidepressant medications was reported for 20 case children (6.7%) and 50 control children (3.3%). In adjusted logistic regression models, we found a 2-fold increased risk of ASD associated with treatment with selective serotonin reuptake inhibitors by the mother during the year before delivery (adjusted odds ratio, 2.2 [95% confidence interval, 1.2-4.3]), with the strongest effect associated with treatment during the first trimester (adjusted odds ratio, 3.8 [95% confidence interval, 1.2-12.0]).

Setting: The Kaiser Permanente Medical Care Program in Northern California.

Participants: A total of 298 case children with ASD (and their mothers) and 1507 randomly selected control children (and their mothers) drawn from the membership of the Kaiser Permanente Medical Care Program in Northern California.

Results: Prenatal exposure to antidepressant medications was reported for 20 case children (6.7%) and 50 control children (3.3%). In adjusted logistic regression models, we found a 2-fold increased risk of ASD associated with treatment with selective serotonin reuptake inhibitors by the mother during the year before delivery (adjusted odds ratio, 2.2 [95% confidence interval, 1.2-4.3]), with the strongest effect associated with treatment during the first trimester (adjusted odds ratio, 3.8 [95% confidence interval, 1.2-12.0]).

SSRI 2-fold increased risk ASD during the year before delivery strongest during the first trimester

Conclusion: Although the number of children exposed prenatally to selective serotonin reuptake inhibitors in this population was low, results suggest that exposure, especially during the first trimester, may modestly increase the risk of ASD. The potential risk associated with exposure must be balanced with the risk to the mother or fetus of untreated mental health disorders. Further studies are needed to replicate and extend these findings.

Arch Gen Psychiatry. 2011;68(11):1104-1112.

Association of Gestational Maternal Hypothyroxinemia and Increased Autism Risk

Gustavo C. Román, MD,^{1,2} Akhgar Ghassabian, MD, PhD,^{3,4}

Jacoba J. Bongers-Schokking, MD, PhD,^{5,6} Vincent W. V. Jaddoe, MD, PhD,^{3,5,7}

Albert Hofman, MD, PhD,^{3,5} Yolanda B. de Rijke, PhD,^{8,9}

Association between severe, early gestation maternal hypothyroxinemia and autistic symptoms in offspring

Objective:
blinding those
and autistic
Methods:

lesions resem-
al weeks 6–18)

Methods: We began prenatal enrollment between 2002 and 2006. At a mean gestational age of 13.4 weeks (standard deviation = 1.9, range = 5.9–17.9), maternal thyroid function tests (serum thyrotropin [TSH], free thyroxine [fT₄], and thyroid peroxidase [TPO] antibodies) were assessed in 5,100 women. We defined severe maternal hypothyroxinemia as fT₄ < 5th percentile with normal TSH. Six years later, parents reported behavioral and emotional symptoms in 4,039 children (79%) using the Pervasive Developmental Problems (PDP) subscale of the Child Behavior Checklist and/or the Social Responsiveness Scale (SPS). We defined a probable autistic child by a PDP score > 98th percentile and SPS score in the top 5%

Evidence that Increased Acetaminophen use in Genetically Vulnerable Children Appears to be a Major Cause of the Epidemics of Autism, Attention Deficit with Hyperactivity, and Asthma

William Shaw, PhD^a

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Journal Compilation ©2013, AARM
DOI 10.14200/jrm.2013.2.0101

Journal of Restorative Medicine 2013; 2:

ABSTRACT

It appears that the marked deficit with hyperactivity by the marked increase in metabolically susceptible

women. Toxicity of acetaminophen may cause autism by overloading the

defective sulfation leading to overproduction of the toxic metabolite N-acetyl-p-benzoquinone imine (NAPQI)

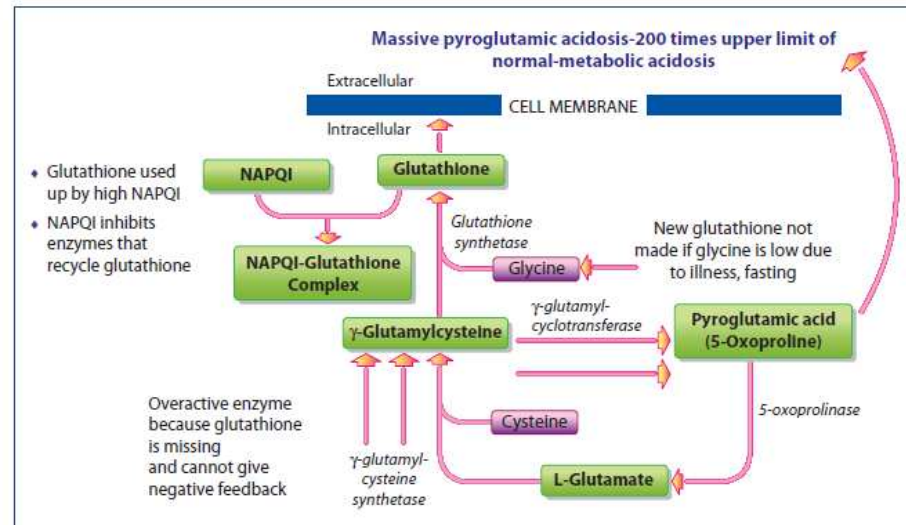


Figure 3b: Metabolism of GSH after exposure to high doses of acetaminophen.

Harmful effects of acetaminophen or its metabolites	References
Neurotoxic effects on rat brain neurons both <i>in vitro</i> and <i>in vivo</i>	13, 15
Maternal use during pregnancy is associated with teratogenic defects in testicular function and gastrointestinal tract	30, 31
Very toxic metabolites formed from or induced by acetaminophen (NAPQI and peroxynitrite) that can cause oxidative damage to proteins, nucleic acids, amino acids, and lipids, causes increased mitochondrial and cellular damage and death	15, 32–35
Severe immune abnormalities at doses that do not damage the liver, including depression of specific antibody production and reduction of specific B-cells	36
Depresses the immune response to vaccination in humans and animals	37, 38
Depletion of glutathione by acetaminophen causes severe metabolic acidosis	39, 40
The leading cause of liver failure in the United States	14, 41, 42
A major cause of side effects that lead to emergency room visits in the United States (56,000 per year in the United States)	41, 42
Associated with increased rates of certain blood cancers	43
Acetaminophen prenatally or postnatally is associated with increased asthma	14, 44–46

NAPQI, *N*-acetyl-*p*-benzoquinone imine.



1. 1977 – Warning labels recommended for acetaminophen products
2. 1980 – Warning of Reye's syndrome risk with children's aspirin use – children's acetaminophen products increase in sales
3. 1982 – First acetaminophen scare: seven murders in Chicago using cyanide-laced acetaminophen
4. 1986 – Second acetaminophen scare: woman murdered in New York using cyanide-laced acetaminophen

Editorial

Autism spectrum disorder: prevalence and cause may be bound together[†]

Emily Simonoff

**Summary**

Autism has been in the forefront of science and public concern because of reported increases in its prevalence. Changing diagnostic practice and improved identification explain some of this rise, but there may

include environmental factors to understand the causes of autism.

Declaration of interest

Research needs to include environmental factors to understand the causes of autism.

Emily Simonoff is Professor of Child and Adolescent Psychiatry, Department of Child and Adolescent Psychiatry, King's College London, Institute of Psychiatry, and National Institute for Health Research Biomedical Research Centre for Mental Health, London.

example, a UK study showed that 42% of 11- to 12-year-olds meeting consensus criteria for autism spectrum disorder (ASD) had not been so identified by services – but virtually all had at least one other diagnosis.⁶ However, the DSM-5 Working Group has been concerned about the current diagnostic criteria and is proposing significant changes. The DSM-IV criteria allow an

JAMA. 2013;309(16):1696-1703. doi:10.1001/jama.2013.2270.

Prenatal Valproate Exposure and Risk of Autism Spectrum Disorders and Childhood Autism

Jakob Christensen, PhD

Therese Koops Grønborg, MSc

Merete Juul Sørensen, PhD

Diana Schendel, PhD

Erik Thorlund Parner, PhD

Lars Henning Pedersen, PhD

Mogens Vestergaard, PhD

Importance Valproate is used for the treatment of epilepsy and other neuropsychological disorders and may be the only treatment option for women of childbearing potential. However, prenatal exposure to valproate may increase the risk of autism.

Objective To determine whether prenatal exposure to valproate is associated with an increased risk of autism in offspring.

Design, Setting, and Participants Population-based study of all children born alive in Denmark from 1996 to 2006. National registers were used to identify children exposed to valproate during pregnancy and diagnosed with autism spectrum disorders (childhood autism [autistic disorder], Asperger syndrome, atypical autism, and other

A Valproate during pregnancy associated with increased risk of autism spectrum disorder in the offspring

malformations and delayed cognitive development in the offspring,¹⁻³ but little is known about the risk of other serious neuropsychiatric disorders. Autistic symptoms have been described in case series of children exposed in utero

until the day of autism spectrum disorder diagnosis, death, emigration, or December 31, 2010, whichever came first.

Main Outcomes and Measures Absolute risk (cumulative incidence) and the hazard ratio (HR) of autism spectrum disorder and childhood autism in children after exposure to valproate in pregnancy.

Soy Formula Linked to Seizures in Autism

"There was a 2.6-fold higher rate of febrile seizures, a 2.1-fold higher rate of epilepsy comorbidity and a 4-fold higher rate of simple partial seizures in the autistic children fed soy-based formula"



Traffic-Related Air Pollution, Particulate Matter, and Autism

Heather E. Volk, PhD, MPH; Fred Lurmann; Bryan Penfold;
Irva Hertz-Picciotto, PhD; Rob McConnell, MD

Context: Autism is a heterogeneous disorder with genetic and environmental factors likely contributing to its origins. Examination of hazardous pollutants has suggested the importance of air toxics in the etiology of autism, yet little research has examined its association with local levels of air pollution using residence-specific exposure assignments.

Objective: To
related air po

Design: This study included data of 1,000 control children and 1,000 children enrolled in the CDC's Autism and the Environment (AU) study. Birth address from the birth certificate and addresses reported from a residential history questionnaire were used to estimate exposure for each trimester of pregnancy and first year of life. Traffic-related air pollution was assigned to each location using a line-source air-quality dispersion model. Regional air pollutant measures were based on the Environmental Protection Agency's Air Quality System data. Logistic regression models compared estimated and measured pollutant levels for children with autism and for control children with typical development.

Setting: Case-control study from California

Participants: A total of 279 children with autism and a total of 245 control children with typical development.

Main Outcome Measures: Crude and multivariable adjusted odds ratios (AORs) for autism.

Results: Children with autism were more likely to live at residences that had the highest quartile of exposure to traffic-related air pollution, during gestation (AOR, 1.98 [95% CI, 1.20-3.31]) and during the first year of life (AOR,

with control children: AOR, 1.81 [95% CI, 1.07-2.08]; exposure to 17-30.9 µg/m³ with autism during pregnancy: AOR, 2.08 [95% CI, 1.21-2.17]; exposure to 31-30.9 µg/m³ with autism during pregnancy: AOR, 2.08 [95% CI, 1.07-2.08].

sure to $PM_{2.5}$: AOR, 2.12 [95% CI, 1.43-3.10]; exposure to PM_{10} : AOR, 2.14 [95% CI, 1.46-3.12]). All regional pollutant estimates were scaled to twice the standard deviation of the distribution for all pregnancy estimates.

Conclusions: Exposure to traffic-related air pollution, nitrogen dioxide, PM_{2.5}, and PM₁₀ during pregnancy and during the first year of life was associated with autism. Further epidemiological and toxicological examinations of likely biological pathways will help determine whether these associations are causal.

JAMA Psychiatry. 2013;70(1):71-77.
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doi:10.1001/jamapsychiatry.2013.266

Environmental Health Perspective

April 2011



RESEARCH ARTICLE

OPEN ACCESS

Prenatal Exposure to Organophosphate Pesticides and IQ in 7-Year Old Children

RESEARCH ARTICLE

OPEN ACCESS

7-Year Neurodevelopmental Scores and Prenatal Exposure to Chlorpyrifos, a Common Agricultural Pesticide

RESEARCH ARTICLE

OPEN ACCESS

Prenatal Exposure to Organophosphates, Paraoxonase 1, and Cognitive Development in Childhood

RESEARCH ARTICLE

OPEN ACCESS

Determinants of Agricultural Pesticide Concentrations in Carpet Dust



Perinatal Air Pollutant Exposures and Autism Spectrum Disorder in the Children of Nurses' Health Study II Participants

Andrea L. Roberts,¹ Kristen Lyall,^{2,3} Jaime E. Hart,^{4,5} Francine Laden,^{4,5,6} Allan C. Just,⁵ Jennifer F. Bobb,⁷ Karestan C. Koenen,⁸ Alberto Ascherio,^{2,5,6} and Marc G. Weisskopf^{5,6}

¹Department of Social and Behavioral Sciences, and ²Department of Nutrition, Harvard School of Public Health, Boston, Massachusetts, USA; ³University of California, MIND Institute, Davis, California, USA; ⁴Channing Division of Network Medicine, Brigham and Women's Hospital and Harvard Medical School, Boston, Massachusetts, USA; ⁵Department of Environmental Health, ⁶Department of Epidemiology, and ⁷Department of Biostatistics, Harvard School of Public Health, Boston, Massachusetts, USA; ⁸Department of Epidemiology, Mailman School of Public Health, Columbia University, New York, New York, USA

OBJECTIVE: Air pollution contains many toxicants known to affect neurological function and to have effects on the fetus *in utero*. Recent studies have reported associations between perinatal exposure to air pollutants and autism spectrum disorder (ASD) in children. We tested the hypothesis that perinatal exposure to air pollutants is associated with ASD, focusing on pollutants associated with ASD.

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Associated ASD: diesel, lead, manganese, mercury, methylene chloride- highest to lowest risk

and census tract-level socioeconomic measures (e.g., tract median income and percent college educated), as well as maternal age at birth and year of birth. We also examined possible differences in the relationship between ASD and pollutant exposures by child's sex.

RESULTS: Perinatal exposures to the highest versus lowest quintile of diesel, lead, manganese, mercury, methylene chloride, and an overall measure of metals were significantly associated with ASD, with odds ratios ranging from 1.5 (for overall metals measure) to 2.0 (for diesel and mercury). In addition, linear trends were positive and statistically significant for these exposures ($p < .05$ for each). For most pollutants, associations were stronger for boys (279 cases) than for girls (46 cases) and significantly different according to sex.

CONCLUSIONS: Perinatal exposure to air pollutants may increase risk for ASD. Additionally, future studies should consider sex-specific biological pathways connecting perinatal exposure to pollutants with ASD.

KEY WORDS: air pollution, autism, diesel, heavy metals, prenatal exposure.

mutagens (Agency for Toxic Substances and Disease Registry 2011), and *de novo* DNA mutations have been implicated in ASD etiology (Kinney et al. 2010; Sebat et al. 2007; Smith et al. 2009). Therefore, we focused on

in the association of environmental toxicants with executive function (Braun et al. 2011) have been suggested by prior research. The one previous study that reported associations between exposure to pollutants and ASD according to sex did not find statistically significant differences (Kalkbrenner et al. 2010).

Methods

Selection of cases and controls. We used data from the Nurses' Health Study II, a cohort of 116,430 female nurses from 14 U.S. states that was established in 1989 and has been fol-

Tylenol and Autism

- Tylenol is detoxified/eliminated via sulfation
- Autistic kids are severely impaired in this process
 - Reflects reduced supply of sulfate
- Tylenol therapy further depletes sulfate stores
- This same pathway is necessary to eliminate excess adrenalin and dopamine from the brain
 - Impairment could lead to the formation of neurotoxic substances with psychedelic effects

* Alberti et al., Biol Psychiatry 46, 420–424, 1999.

Autism Epidemic

Awareness of importance of individual susceptibility to environmental pollutants.

Understanding that safe levels for an “average person” leave many individuals at risk.

Understanding biochemical individuality and susceptibility will provide the basis of stronger health policy to protect the most vulnerable.

Sulfur, Asthma and Tylenol

- Autistic kids are especially susceptible to asthma
- There has been a sharp increase in childhood asthma over the past 30 years
- Timing corresponds with aspirin scare in 1980's
- Bronchial tube epithelial cells produce cholesterol sulfate
- Cholesterol sulfate protects from asthma through its effect on profilaggrin
- Tylenol causes increased bronchial constriction and wheezing
- Tylenol depletes sulfur stores through its elimination process

• C. Aschwanden, "Studies suggest an acetaminophen-asthma link,"
• Dec. 19, 2011, NY Times

Autism spectrum disorder: interaction of air pollution with the MET receptor tyrosine kinase gene.

Volk HE¹, Kerin T, Lurmann F, Hertz-Picciotto I, McConnell R, Campbell DB.

+ Author information

Abstract

BACKGROUND: Independent studies report association of autism spectrum disorder with air pollution exposure and a functional promoter variant (rs1858830) in the MET receptor tyrosine kinase (MET) gene. Toxicological data find altered brain Met expression in mice after prenatal exposure to a model air pollutant. Our objective was to investigate whether air pollution exposure

and MET CC genotype and high air pollutants-increased risk ASD compared to heterogeneous and lower air pollutant exposures.

RESULTS: Subjects with both MET rs1858830 CC genotype and high air pollutant exposures were at increased risk of autism spectrum disorder compared with subjects who had both the CG/GG genotypes and lower air pollutant exposures. There was evidence of multiplicative interaction between NO₂ and MET CC genotype (P= 0.03).

CONCLUSIONS: MET rs1858830 CC genotype and air pollutant exposure may interact to increase the risk of autism spectrum disorder.

Prevalence of Autism is Positively Associated with the Incidence of Type 1 Diabetes, but Negatively Associated with the Incidence of Type 2 Diabetes, Implication for the Etiology of the Autism Epidemic

John B Classen*

Classen Immunotherapies, Inc., 6517 Montrose Avenue, Baltimore, MD 21212, USA

Abstract

Background: Epidemics of type 1 diabetes had been linked to inflammation. Previous reports have suggested the prevalence of autism is increased in patients with type 1 diabetes.

Background: Epidemics of type 1 diabetes had been linked to inflammation. Previous reports have suggested the prevalence of autism is increased in patients with type 1 diabetes.

Epidemic of autoimmune/inflammation mediated ASD, likely related to simultaneous epidemic of type 1 diabetes in children

Conclusion: This suggests that patients with autoimmune autism likely represent a large subset of patients with autism and that the etiology of the epidemic of autoimmune/inflammation mediated autism in children is likely to be related to the etiology of the simultaneous epidemic of type 1 diabetes in children.

Keywords: Autism; Diabetes; Cortisol

Introduction

Type 1 diabetes has been linked to an increased risk of autism [1]. Furthermore patients with autism have an increased family history of

Results

Data from two published studies of US children allowed direct correlation between the incidence of type 1 diabetes, type 2 diabetes [11] and the prevalence of autism [5] in multiple different races (Whites, Blacks, Hispanics, Asians, Native Americans). Data on the prevalence

ORIGINAL ARTICLE

Environmental toxicants and autism spectrum disorders: a systematic review

DA Rossignol¹, SJ Genuis² and RE Frye³

Although the involvement of genetic abnormalities in autism spectrum disorders (ASD) is well-accepted, recent studies point to an equal contribution by environmental factors, particularly environmental toxicants. However, these toxicant-related studies in ASD have been

Toxicants implicated: pesticides, phthalates, PCBs, solvents, toxic waste sites, air pollutants, heavy metals

A systematic review of the literature published between January 1990 and November 2013 was performed. In the first category examining ASD risk and estimated toxicant exposures in the environment, the majority of studies (34/37; 92%) reported an association. Most of these studies were

retr

Genes implicated paraoxonase PON1, glutathione S-transferase (GSTM1 and GSTP1, t, δ -aminolevulinic acid dehydratase, SLC11A3, and the metal regulatory transcription factor 1

large number was dedicated to examining heavy metals. Such studies demonstrated mixed findings, with only 19 of 40 (47%) case-control studies reporting higher concentrations of heavy metals in blood, urine, hair, brain or teeth of children with ASD,

Environmental and State-Level Regulatory Factors Affect the Incidence of Autism and Intellectual Disability

Andrey Rzhetsky^{1,2,3*}, Steven C. Bagley⁴, Kanix Wang^{2,5}, Christopher S. Lyttle⁶, Edwin H. Cook, Jr.⁷, Russ B. Altman⁸, Robert D. Gibbons⁹

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ASD incidence rates linked to rates of congenital malformations of the reproductive system in males-
283% increase for every percent increase in incidence of malformations

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congenital malformations in males (excluding those affecting the reproductive system) appeared to significantly affect both phenotypes: 31.8% ASD rate increase (CI: [12%, 52%], $p < 6 \times 10^{-5}$), and 43% ID rate increase (CI: [23%, 67%], $p < 6 \times 10^{-5}$). Furthermore, the state-mandated rigor of diagnosis of ASD by a pediatrician or clinician for consideration in the special education system was predictive of a considerable decrease in ASD and ID incidence rates (98.6%, CI: [28%, 99.99%], $p = 0.02475$ and 99% CI: [68%, 99.99%], $p = 0.00637$ respectively). Thus, the observed spatial variability of both ID and ASD rates is associated with environmental and state-level regulatory factors; the magnitude of influence of compound environmental predictors was approximately three times greater than that of state-level incentives. The estimated county-level random effects exhibited marked spatial clustering, strongly indicating existence of as yet unidentified localized factors driving apparent disease incidence. Finally, we found that the rates of ASD and ID at the county level were weakly but



Original Contribution

Advanced Parental Age and the Risk of Autism Spectrum Disorder

Maureen S. Durkin, Matthew J. Maenner, Craig J. Newschaffer, Li-Ching Lee, Christopher M. Cuniff, Julie L. Daniels, Russell S. Kirby, Lewis Leavitt, Lisa Miller, Walter Zahorodny, and Laura A. Schieve

Initially submitted March 21, 2008; accepted for publication July 16, 2008.

This study evaluated independent effects of maternal and paternal age on risk of autism spectrum disorder. A case-cohort design was implemented using data from 10 US study sites participating in the Centers for Disease Control and Prevention's Autism and Developmental Disabilities Monitoring (ADDM) network. The study included 253,347 children born between 1994 and 2003, with 1,251 children aged 3–10 years having an autism spectrum disorder (ASD) diagnosis. Maternal and paternal age were independently associated with autism risk. Firstborn offspring of older parents (maternal age ≥ 35 years vs. 25–29 years = 1.4 times more likely to develop ASD; odds ratio = 3.1, 95% confidence interval: 2.0, 4.7). The increase in autism risk with both maternal and paternal age has potential implications for public health planning and investigations of autism etiology.

autistic disorder; birth order; maternal age; paternal age

Air pollution and brain inflammation

Neurologic Pathology, 36:209-210, 2009
Copyright © 2009 by Society of Toxicologic Pathology
ISSN: 1558-0233 print / 1558-1801 online
DOI: 10.1177/1558023309353811

Long-term Air Pollution Exposure Is Associated with Neuroinflammation, an Altered Innate Immune Response, Disruption of the Blood-Brain Barrier. Ultrafine



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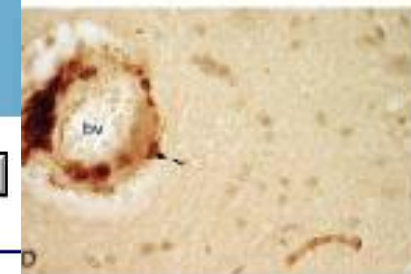
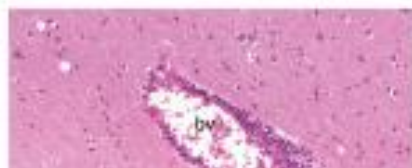


Urban air pollutants may damage IQs before baby's first breath, scientists say

Epidemiology, 2010 Jun 17. [Epub ahead of print]

Perinatal Exposure to Hazardous Air Pollutants and Autism Spectrum Disorders at Age 8.

Kalkbrenner AE, Daniels JL, Chen JC, Poole C, Emch M, Morrissey J.



Scientists find 'baffling' link between autism and vinyl flooring

Children who live in homes with vinyl floors, which can emit phthalates, are twice as likely to have autism, according to Swedish and U.S. researchers. Scientists call the discovery "intriguing and baffling." Experts suspect that genetic and

Prenatal exposure to β 2-adrenergic receptor agonists and risk of autism spectrum disorders

Lisa A. Croen • Susan L. Connors • Marilyn Matevia •
Ying Qian • Craig Newschaffer •
Andrew W. Zimmerman

Terbutaline exposure for >2 days during the third trimester was associated with more than **4X increased** risk ASDs

Re
© Springer Science+Business Media, LLC 2011

Abstract This study aims to investigate the association between prenatal exposure to terbutaline and other β 2 adrenergic receptor (B2AR) agonists and autism spectrum disorders (ASDs). The methodology used is a case–control study among children born from 1995 to 1999 at Kaiser Permanente Northern California hospitals. Cases ($n=291$) were children with an ASD diagnosis; controls ($n=284$) were children without ASDs, randomly sampled and frequency-matched to cases on sex, birth year, and delivery hospital. Exposure to B2AR agonists during 30 days prior to conception and each trimester of pregnancy was ascertained from prenatal medical records and health plan

databases. The frequency of exposure to any B2AR agonist during pregnancy was similar for mothers of children with ASD and mothers of controls (18.9% vs. 14.8%, $P=0.19$). Exposure to B2AR agonists other than terbutaline was not associated with an increased risk for ASDs. However, terbutaline exposure for >2 days during the third trimester was associated with more than a fourfold increased risk for ASDs independent of indication although the limited sample size resulted in an imprecise and nonsignificant effect estimate ($OR_{adj}=4.4$; 95% confidence interval, 0.8–24.6). This analysis does not offer evidence linking B2AR exposure in pregnancy with autism risk. However, exposure

Deficits in Bioenergetics and Impaired Immune Response in Granulocytes From Children With Autism.

[Napoli E](#)¹, [Wong S](#), [Hertz-Picciotto I](#), [Giulivi C](#).

[Author information](#)

Abstract

Despite the emerging role of mitochondria in immunity, a link between bioenergetics and the immune response in autism has not been explored. Mitochondrial outcomes and phorbol 12-myristate 13-acetate (PMA)-induced oxidative burst were evaluated in granulocytes from age-, race-, and sex-matched children with autism (n = 10) and typically developing (TD) children (n = 10). Granulocytes from children with autism exhibited defects in oxidative phosphorylation, immune response, and antioxidant defense. Mitochondrial dysfunction in children with autism was accompanied by a lower (26% of TD children) oxidative burst by PMA-stimulated reduced nicotinamide-adenine dinucleotide phosphate (NADPH) oxidase and by a lower gene expression (45% of TD children's mean values) of the nuclear factor erythroid 2-related factor 2 transcription factor involved in the antioxidant response. Given that



Proximity to point sources of environmental mercury release as a predictor of autism prevalence

Raymond F. Palmer^{a,*}, Stephen Blanchard^b, Robert Wood^a

^a*University of Texas Health Science Center, San Antonio Department of Family and Community Medicine, 7703 Floyd Curl Drive,
San Antonio Texas, Mail Code 7794, TX 78229-3900, USA*

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Environmental Health

P E R S P E C T I V E S

Published by the National Institute of
Environmental Health Sciences

Autism Spectrum Disorders in Relation to Distribution of Hazardous Air Pollutants in the San Francisco Bay Area

Gayle
Divisi
Health
Perm.

**Toxins with greatest Risk: Mercury, Cadmium,
Nickel, Trichloroethylene , Vinyl Chloride**



Published in final edited form as:

Neurotoxicology. 2009 September ; 30(5): 822–831. doi:10.1016/j.neuro.2009.01.011.

Associations between indoor environmental factors and parental-reported autistic spectrum disorders in children 6-8 years of age

Malin Larsson^a, Bernard Weiss^b, Staffan Janson^a, Jan Sundell^{c,d}, and Carl-Gustav Bornehag^{a,c,f}

Abstract

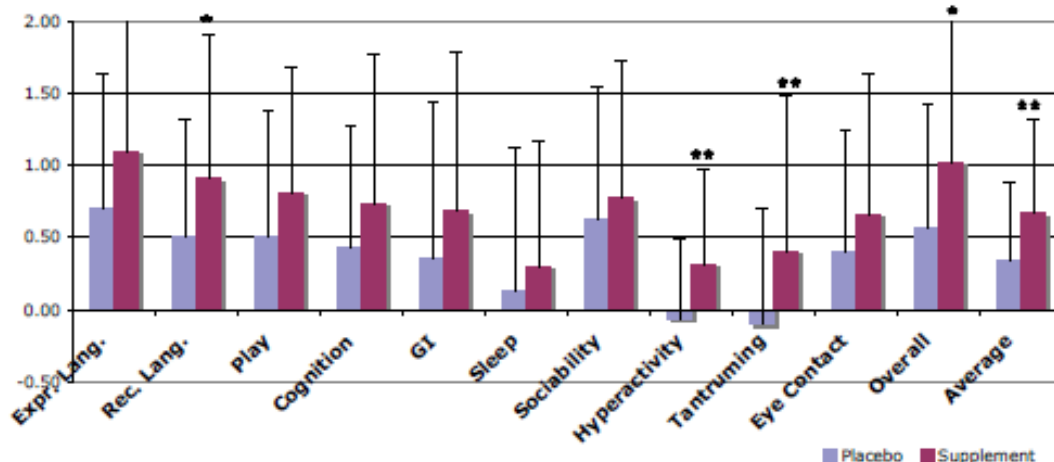
ASD significant correlations 1) maternal smoking 2) male sex 3) family financial problems 4) window condensation, proxy for low ventilation rate 5) PVC flooring, especially in the parents' bedroom. Physician-diagnosed asthma at baseline were associated with ASD five years later.

smoking, allergic symptoms, type of residence, moisture-related problems, and type of flooring material, which included polyvinyl chloride (PVC). The 2005 survey, based on the same children, now 6-8 years of age, also asked if, during the intervening period, the child had been diagnosed

Oxidative Stress, Methylation, and Glutathione:

		Neuro-typicals (n = 44)	Arizona Treatment Group (n = 18)			
	units		Pre	Post	% change	P - value
Plasma nitro-tyrosine	Ug / l	7.4 + / - 5.1	14.1 + / - 6.5	9.9 + / - 5.4	- 29%	0.004
Reduced plasma glutathione (GSH)	nmol / ml	4.09 + / - 0.79	3.27 + / - 0.59	3.84 + / - 0.61	+ 17%	0.0008
Oxidized glutathione (GSSG)	nmol / ml	0.362 + / - 0.10	0.467 + / - 0.12	0.403 + / - 0.09	- 14%	0.02
Ratio of oxidized to reduced plasma glutathione		0.093 + / - 0.04	0.150 + / - 0.05	0.109 + / - 0.03	- 27%	0.002
SAM (RBC)	umol / dl	228.4 + / - 12	218 + / - 17	230 + / - 16	+ 6%	0.003
Uridine (plasma)	10 - 6 M	7.9 + / - 2.7	16.2 + / - 9.5	10.4 + / - 4.7	- 36%	0.008

Parental Global Impressions - Revised



ANRC Essentials Formulation (recommended dosage for a 60 pound child)

8000 IU Vitamin A (as mixed carotenoids from algae)

500 mg Vitamin C (as calcium ascorbate)

1500 IU Vitamin D3

100 mg Vitamin E (as mixed tocopherols, including gamma tocopherol)

50 mcg K1, 50 mcg K2

30 mg Vitamin B1 (as thiamin hydrochloride)

40 mg Vitamin B2 (Riboflavin)

50 mg Vitamin B3 (as inositol hexanicotinate)

20 mg Pyridoxine hydrochloride, 20 mg pyridoxal 5 phosphate (P5P)

600 mcg MTHF (methyl-tetra-hydrofolate)

600 mcg for Vitamin B12 as methylcobalamin

500 mcg Biotin

30 mg Pantothenic acid (as calcium d-pantothenate)

100 mcg Iodine (as potassium iodide)

350 mcg Lithium (as lithium orotate)

250 mg Choline (as choline bitartrate)

100 mg Inositol

100 mg Calcium (calcium ascorbate, calcium pantothenate, calcium citrate)

250 mg Magnesium (as magnesium citrate)

15 mg Zinc (as zinc sulfate)

40 mcg Selenium (80% as selenomethionine, 20% as sodium selenite)

1 mg Manganese (as manganese aspartate)

70 mcg Chromium (as chromium picolinate)

100 mcg Molybdenum (as molybdenum nicotinate glycinate)

50 mg Potassium (potassium chloride)

500 mg MSM (methylsulfonylmethane)

50 mg Co-Enzyme Q10

45 mg N-acetyl-cysteine

200 mg Acetyl-L-carnitine

200 mg L-carnitine



American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™



For Release: April 25, 2011 12:01 am (ET)

AAP SAYS U.S. FAILS TO PROTECT CHILDREN FROM HAZARDOUS CHEMICALS



PEDIATRICS®

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Attention-Deficit/Hyperactivity Disorder and Urinary
Metabolites of Organophosphate Pesticides



The findings showed that children with higher urinary levels of organophosphate metabolites were more likely to meet the diagnostic criteria for ADHD.

n.

Autism Will Afflict Half Of The American Children By 2025, And Glyphosate Is To Blame, MIT Doctor Says

“

“Is there a toxic substance that is currently in our environment on the rise in step with increasing rates of Autism that could explain this?... The answer is yes, I'm quite sure that I'm right, and the answer is glyphosate.”





Etiology of autism spectrum disorders: Genes, environment, or both?

C A Shaw¹, S Sheth¹, D Li¹, L Tomljenovic¹

Abstract

Introduction

Thus far, most of the research on both neurodevelopmental and neurodegenerative disorders has been focus

Heritability factors cannot adequately explain all reported cases nor their drastic increase over the last few decades.

some forms of autism are clearly genetic, the fact remains that

Evidence shows autism may in part result from early-life immune insults induced by environmental xenobiotics.

twins have now shown that common environmental factors account for 55% of their risk for developing autism while genetic susceptibility explains only 37% of cases. Because

may provide important clues of AI's putative role in autism. Because of the tight connection between the development of the immune and the central nervous system, the possibility

Conclusion

There is now sufficient evidence from

vaccines are the only medical intervention that we attempt to deliver to every living human on earth and that by far the largest target population for vaccination are healthy

several decades) rules out a purely genetic origin.

In ALS, for example, much of the literature of the last 20 years has

period. These include a number of variations on the so-called "toxic gain of

protein TDP-43, FUS, or VEGF, or the newest player, C9orf72, and all have added to the complexity of the polygenic picture without necessarily increasing the total percentage of all

Clues to Autistic Behaviors

Exploring the Role of Endocrine Disruptors

Two lines of evidence suggest that endocrine disruption may be a factor in autism spectrum disorders (ASDs). First, the observation that males may be four times as likely to be diagnosed with ASDs as females suggests hormonal involvement.¹ Second, adrenal, gonadal, and thyroid hormones play an important role in fetal

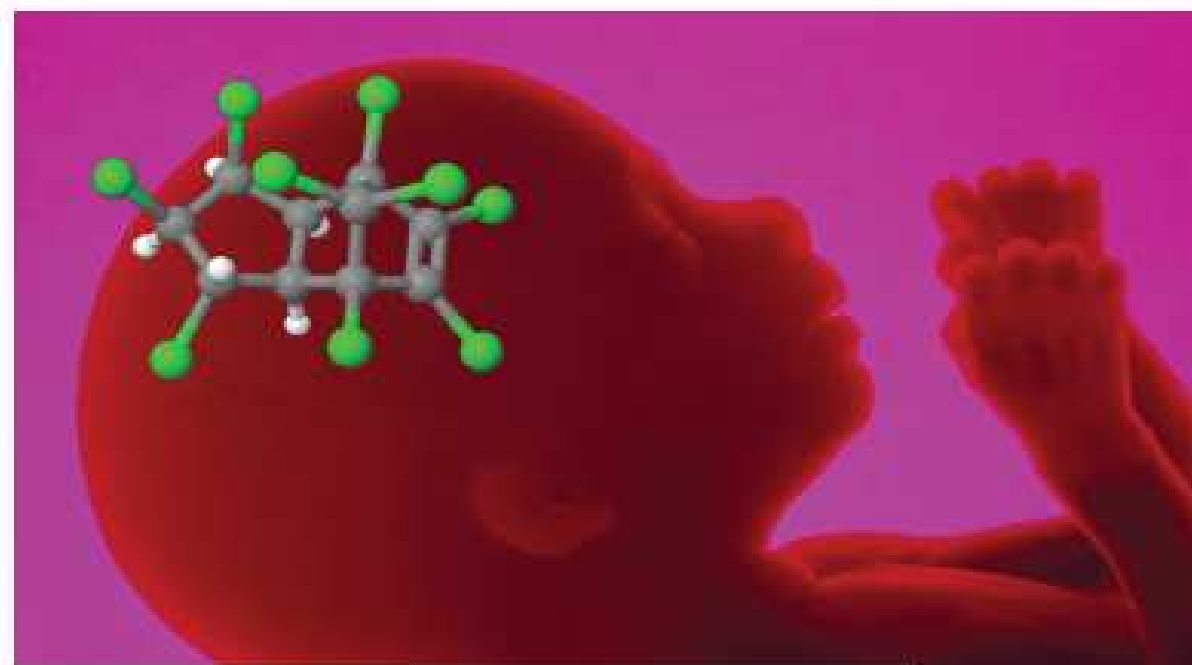
Examination Survey. After the researchers adjusted for potential confounding variables, they found that higher maternal exposures to *trans*-nonachlor and PBDE-28 were associated with higher average SRS scores. *Trans*-nonachlor is a component of the highly persistent banned pesticide chlordane, and PBDE-28 is one of the polybrominated diphenyl ether compounds used as flame retardants in commercial goods containing polyurethane foam (including furniture and mattresses) made before 2005.

The study also found negative associations between four

Endocrine disruptors (ED) factor in ASD: 1) males 4 X as likely to be diagnosed 2) ED impact adrenal, gonadal, and thyroid hormones role in fetal neurodevelopment causing abnormal brain development

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is innovative and mirrors the real world, where we are all exposed to a mixture of chemicals, and where the neurotoxicants may have different effects that may even depend on the time of exposure,” says Philippe Grandjean, an adjunct professor of environmental health at the Harvard School of Public Health, who was not involved with the study.

But Grandjean also cautions against comparing apples and oranges. “Those substances that have been measured with large imprecision, e.g., because of common short-term variability, are likely to be underestimated as possible contributors to autism-like behaviors,” he explains. On the other hand, “persistent substances will have less imprecision and could therefore erroneously appear as if they are more important.”

Although the study measured only

Biomarkers for Autism Stephanie Seneff PhD

people.csail.mit.edu/seneff/

- Disrupted gut bacteria; inflammatory bowel
- Low serum sulfate
- Methionine deficiency
- Serotonin and melatonin deficiency
- Defective aromatase
- Zinc and cobalamin deficiency
- Urinary p-cresol
- Mitochondrial disorder
- Seizures; Glutamate toxicity in the brain

These can all be explained as potential effects of glyphosate on biological systems

Review

Empirical Data Confirm Autism Symptoms Related to Aluminum and Acetaminophen Exposure

Stephanie Seneff ^{1,*}, Robert M. Davidson ² and Jingjing Liu ¹

Glyphosate enhances aluminum toxicity

Glyphosate interferes with acetaminophen metabolism



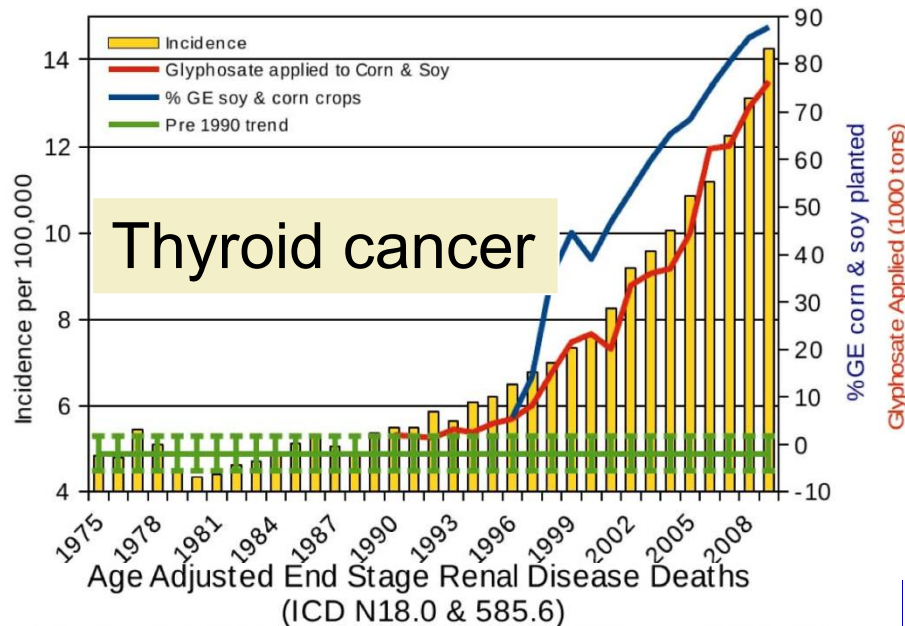
Roundup and GMO and the Rise of Modern Disease

Stephanie Seneff MIT CSAIL

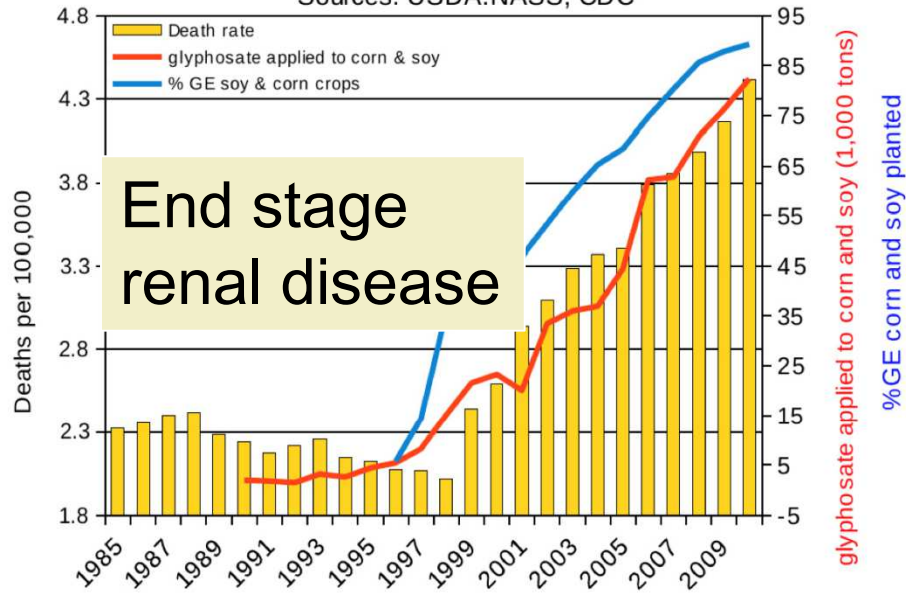
people.csail.mit.edu/seneff/Oahu2015.pdf

Thyroid Cancer Incidence Rate (age adjusted)

plotted against glyphosate applied to U.S. corn & soy ($R = 0.988$, $p \leq 7.612e-09$)
 along with %GE corn & soy crops $R = 0.9377$, $p \leq 2.152e-05$
 sources: USDA:NASS; SEER

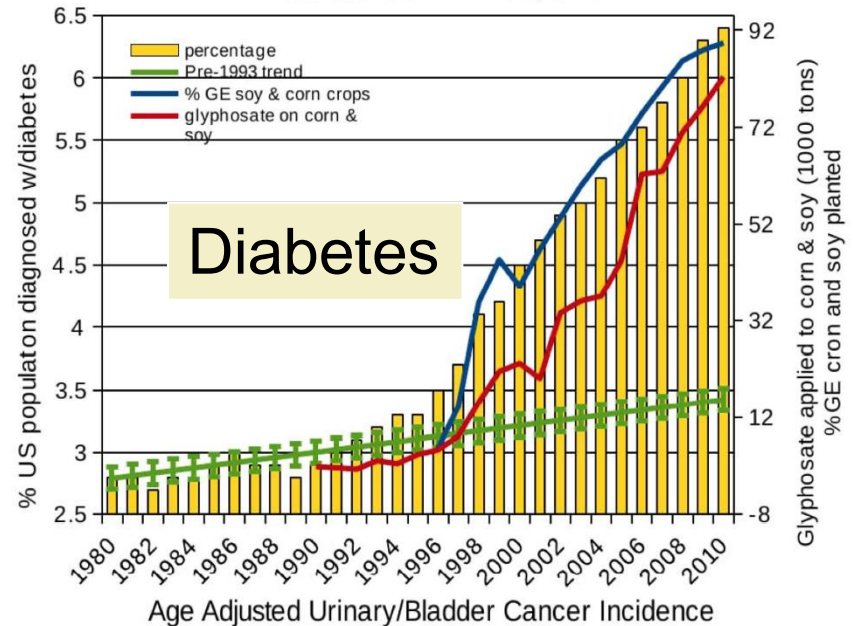


plotted against %GE corn & soy planted ($R = 0.9578$, $p \leq 4.165e-06$)
 and glyphosate applied to corn & soy ($R = 0.9746$, $p \leq 7.244e-09$)
 Sources: USDA:NASS; CDC

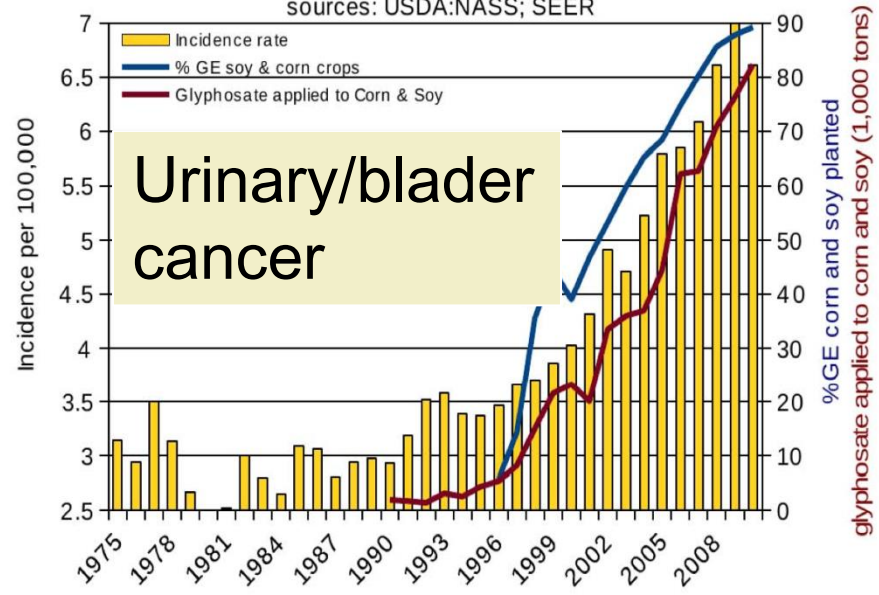


Prevalence of Diabetes in US (age adjusted)

plotted against glyphosate applied to corn & soy ($R = 0.971$, $p \leq 9.24e-09$)
 along with %GE corn & soy grown in US ($R = 0.9826$, $p \leq 5.169e-07$)
 sources: USDA:NASS; CDC



Plotted against % GE corn and soy ($R = 0.9449$, $p \leq 7.1e-06$)
 and glyphosate applied to corn and soy ($R = 0.981$, $p \leq 4.702e-09$)
 sources: USDA:NASS; SEER





THE MICROBIOME IN AUTISM SPECTRUM DISORDER

Gut bacteria in children with autism spectrum disorders: challenges and promise of studying how a complex community influences a complex disease

Rosa Krajmalnik-Brown^{1,2*}, Catherine Lozupone³, Dae-Wook Kang¹ and James B. Adams⁴

¹Swette Center for Environmental Biotechnology, Biodesign Institute, Arizona State University, Tempe, AZ, USA; ²Arizona Research Laboratories Division of Child Neurodevelopment, University of Arizona, Tucson, AZ, USA; ³Department of Microbiology, University of Arizona, Tucson, AZ, USA; ⁴Department of Maternal and Child Health, University of Arizona, Tucson, AZ, USA

Shifted microbiota from westernization could be framing an altered immune system

Recent studies suggest a role for the microbiota in autism spectrum disorders (ASD), potentially arising from their role in the immune system. This role depends on the composition of the microbiota, which is shaped by environmental factors. We summarize the role of the microbiota in ASD and provide some evidence that the shifted microbiota can be a result of westernization and that this shift could also be framing an altered immune system. Third, we explore the possibility that gut-brain interactions could also be a direct result of the microbiota.

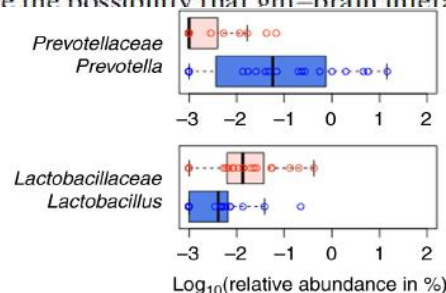
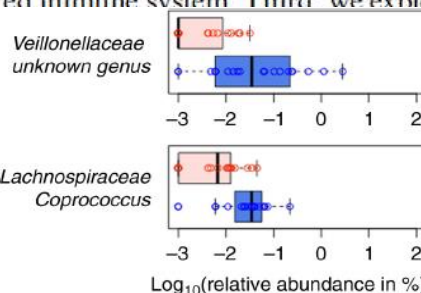
Gut brain interactions could be a direct result of microbially produced metabolites.

we provide some evidence that the shifted microbiota can be a result of westernization and that this shift could also be framing an altered immune system. Third, we explore the possibility that gut-brain interactions could also be a direct result of the microbiota.

Keywords: autism; GI problems; gut-brain interaction

Responsible Editor: Richard L. Medical Sciences, USA.

*Correspondence to: Rosa Krajmalnik-Brown, AZ 85287-5701, USA,



meta-analysis;

Arkansas for
, Tempe,



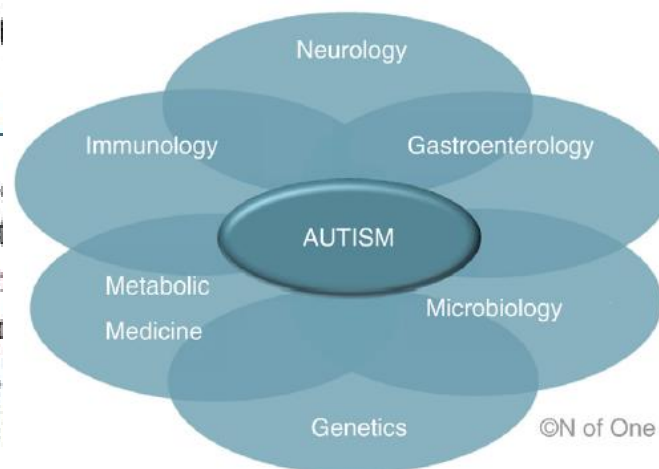
THE MICROBIOME IN AUTISM SPECTRUM DISORDER

An $n=1$ case report of a child with autism improving on antibiotics and a father's quest to understand what it may mean

John Rodakis*

N of One: A Case Report of a Child with Autism, Dallas, TX, 1

The author, John Rodakis, describes a case of a child with autism who dramatically improved after administration of antibiotics. This finding is presented as a case report, not a population-based study, and the author acknowledges the limitations of this type of research, stating that the results are likely to be anecdotal and that a thorough evaluation and further examination are needed.



ism symptoms or asserts that recent medical lausible, but in ig for a more uestions to be

Keywords: *autism; microbiome; antibiotic; n = 1; N of One; vancomycin; amoxicillin*

Responsible Editor: Richard E. Frye, Arkansas Children's Hospital Research Institute and University of Arkansas for Medical Sciences, USA.

*Correspondence
Email: jrodakis@ Microbial Ecology in Health & Disease 2015, **26**: 26382

Commentary

Life Imprints: Living in a Contaminated World

David Crews^{1,2} and Andrea C. Gore^{2,3}

¹Section of Integrative Biology, ²Institute for Cellular and Molecular Biology, and ³Division of Population and Quantitative Science, The University of Texas at Austin, Austin, Texas, USA

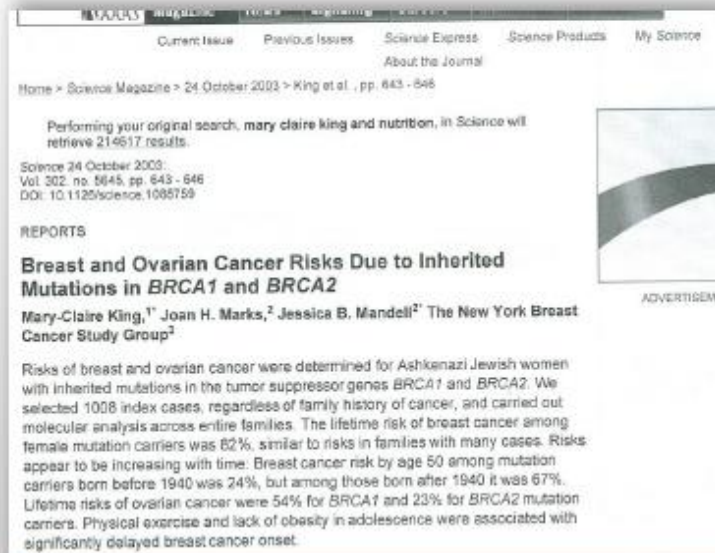
BACKGROUND: The links between nature and nurture need to be redefined to accommodate anthropogenic chemical contamination. Although some local remediation of contamination has occurred, the contamination is pervasive and has been increasing. By its very nature, endocrine disruption influences all levels of biological organization. To understand the future, we must study what is likely to happen and less to what has happened..

OBJECTIVES: We propose a paradigm shift in the field that integrates various disciplines involved in

To understand the future, we must study what is likely to happen and less to what has happened..

illuminate how the causal mechanisms and functional outcomes of related processes operate at each level of biological organization while at the same time revealing the relations among the levels.

Mary Claire King and BRCA 1 and 2



“The lifetime risk of breast cancer among female mutation carriers is presently 82%. Risks appear to be increasing with time. Before 1940 it was 24%. Lack of physical exercise and obesity in adolescence may be important modulating factors for risk in carriers”. [Science 2003; 302: 643-50.](#)

Original Investigation

The Familial Risk of Autism

RESULTS In the sample, 14 516 children were diagnosed with ASD, of whom 5689 had autistic disorder. The RRR and rate per 100 000 person-years for ASD among monozygotic twins was

estir Environmental factors as important as genes in or
dizy; understanding ASD
sibli half

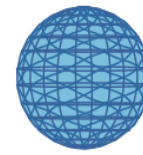
siblings, 3.3 (95% CI, 2.6-4.2; rate, 492 for exposed vs 94 for unexposed); for paternal half

sil We were surprised by our findings as we did not expect
(c importance of environmental factors in ASD to be so strong.
at

including only additive genetic and nonshared environmental effects. The ASD heritability

wa Factors which are unique to the individual, or 'non-shared
est environments' were the major source of environmental risk.

CONCLUSIONS AND RELEVANCE Among children born in Sweden, the individual risk of ASD and autistic disorder increased with increasing genetic relatedness. Heritability of ASD and autistic disorder were estimated to be approximately 50%. These findings may inform the



RESEARCH

Open Access

A comparison of temporal trends in United States autism prevalence to trends in suspected environmental factors

Cynthia D Nevison

- Data suggest ~75-80% of the tracked increase in autism since 1988 is due to *an actual increase* in the disorder rather than to changing diagnostic criteria
- Polybrominated diphenyl ethers (fire retardants), *aluminum* adjuvants, and the herbicide *glyphosate* have increasing trends that correlate positively to the rise in autism.

C. Nevison *Environmental Health* 2014;13:73.



Autism and the Environment Workshop Agenda

<http://www.iom.edu/CMS/3740/35684/39826/42257.aspx>

CANDIDATE FACTORS I

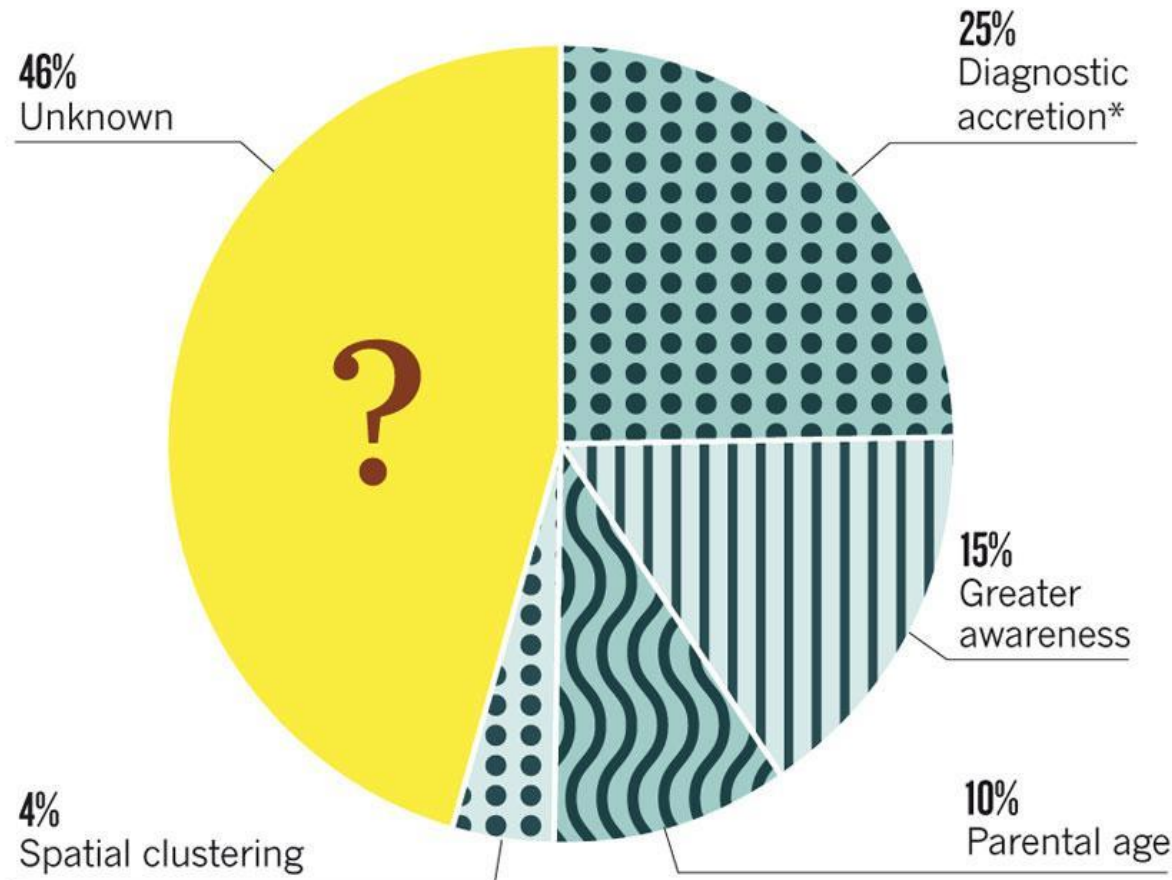
- Childhood vaccines
- Thimerosal
- Prenatal ultrasound, Pasko Rakic
- Antenatal steroids
- Epidural anesthesia
- Magnesium sulfate
- Maternal/paternal age

CANDIDATE FACTORS II

- Tocolysis for preterm labor
 - Terbutaline toxicity in rats
- ART/ICSI & cryopreservation of embryos; ICSI and imprinting defects causing AS and BWS
- Chemical exposures
- Folate, vitamins, diet

“If it is an environmental cause contributing to an increase, we certainly want to find it.”

Reasons: unclear



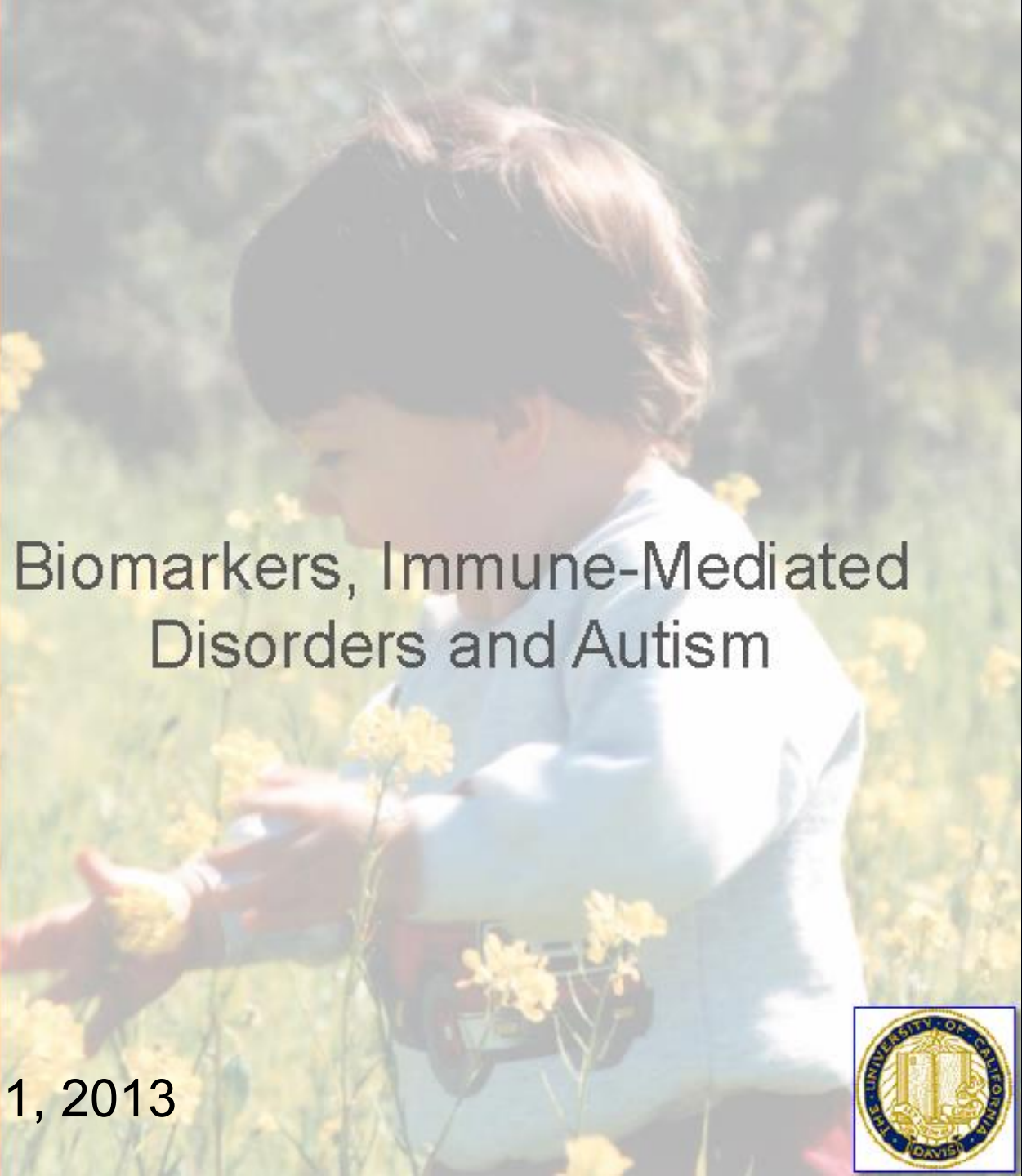
*Children who formerly would have been diagnosed solely with mental retardation

K. Weintraub, Nature 479, Nov. 3 2011, 22-24.

Autism and the Environment



“It is increasingly clear that environmental exposures also contribute to autism”



Biomarkers, Immune-Mediated Disorders and Autism

By Judy Van de Water, Ph.D.

Professor, Internal Medicine
Director, NIEHS Center for Children's
Environmental Health
University of California, Davis
UC Davis M.I.N.D. Institute

javandewater@ucdavis.edu



June 1, 2013



ASDs: Need New Model

- Looks to molecular causes:
 - Complexity theory
 - Systems biology
 - Network theory
- Defines subtypes
- Family as colleagues
- Biology before pharmacology