Aluminum Adjuvants: Separating Fact from Fear

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Why Is This an Issue?

RFK Jr weighs review of vaccines citing aluminum use, Bloomberg News reports

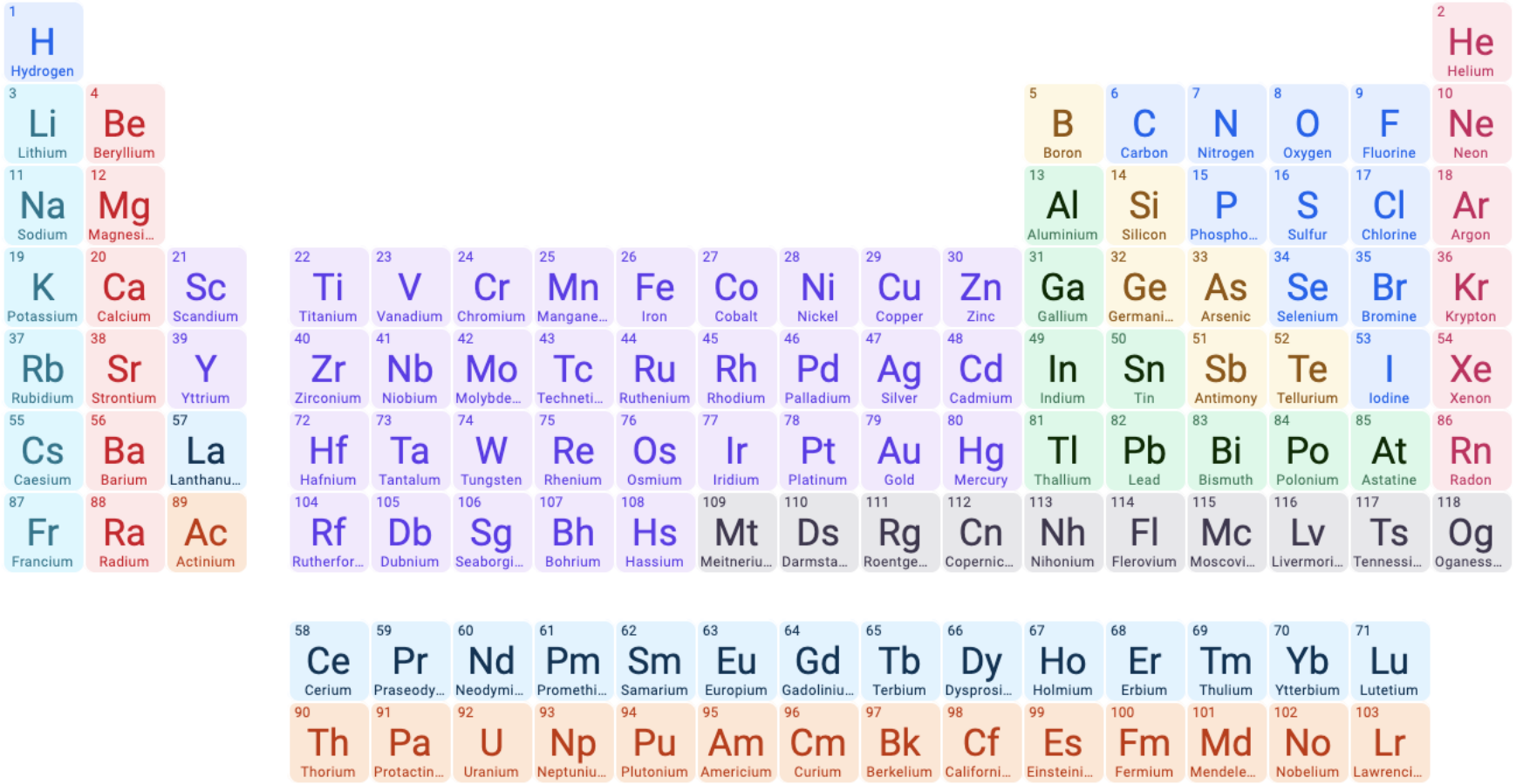
By **Reuters**

June 18, 2025 1:04 PM EDT · Updated 23 hours ago

U.S. Health and Human Services (HHS) Secretary Robert F. Kennedy Jr. testifies before a House Appropriations Labor, Health and Human Services, Education, and Related Agencies Subcommittee hearing on the Department of Health and Human Services budget, on Capitol Hill in Washington, D.C., U.S., May 14, 2025. REUTERS/Ken Cedeno Purchase Licensing Rights

Aluminum

Periodic Table



- Alkali metals
- Alkaline earth metals
- Transition metals
- Post-transition metals
- Metalloids
- Reactive nonmetals
- Noble gases
- Lanthanides
- Actinides
- Unknown properties

Aluminum

- Aluminum is the third most abundant element on the earth's crust and the most abundant light metal.
- Aluminum is found in water and anything made from water, such as breast milk and infant formula. It is also found in plants, soil, and air.
- The only way to avoid aluminum would be to move to another planet.

Is aluminum contained in vaccines?

Aluminum in vaccines

- Aluminum adjuvants have been used in vaccines since 1926.
- They can be found in routinely recommended vaccines such as the hepatitis A, hepatitis B, DTaP, *Haemophilus influenzae* type b (HiB), HPV, meningococcal B and ACWY, and pneumococcal vaccines as well as in some combination vaccines.
- Aluminum adjuvants are not used in live, attenuated viral vaccines such as MMR, varicella, and rotavirus vaccines.

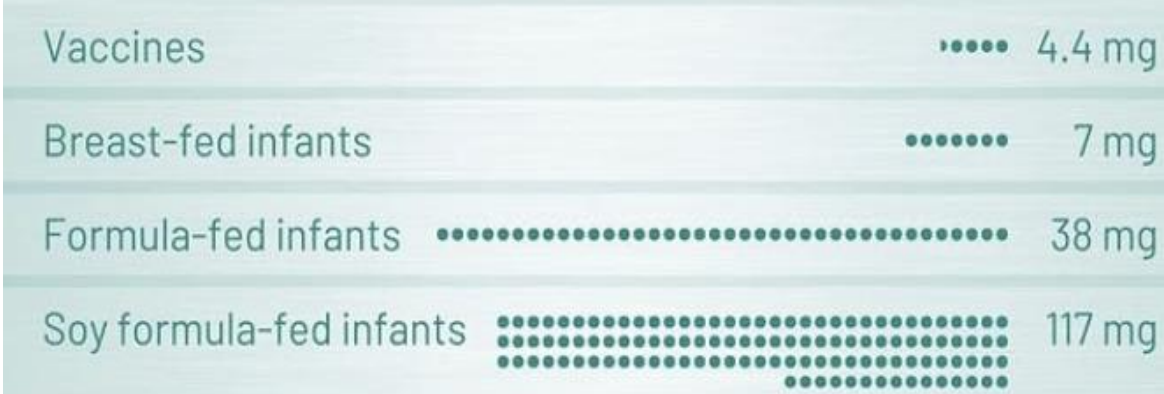
@UNBIASEDSCIPOD

THE UNBIASED SCIENCE PODCAST

The amount of aluminum contained in vaccines is similar to that found in one liter* of infant formula.

*1 liter = ~1 quart = ~32 fluid ounces

While infants receive about 4.4 milligrams (mg)* of aluminum in the first 6 months of life from vaccines, they receive more than that in their diet.



*Note: One milligram (mg) = one-thousandth (1/1,000) of a gram. One gram is the weight of one-fifth (1/5) of a teaspoon of water.

Why do vaccines contain aluminum adjuvants?

Aluminum

- Aluminum adjuvants enhance the immunogenicity of vaccines allowing for fewer doses and lesser quantities of antigen. This is particularly useful for single proteins vaccines, such as the DTaP, HPV, and hepatitis B vaccines, and conjugated polysaccharides, such as the HiB, pneumococcus, MenACWY vaccines, which, without adjuvants, are poorly immunogenic.
- Vaccines containing adjuvants are tested extensively in prospective, placebo-controlled clinical trials before licensure.

How do aluminum adjuvants enhance immune responses to vaccines?

ELSEVIER

Vaccine

Volume 20, Supplement 3, 31 May 2002, Pages S34-S39

Mechanisms of stimulation of the immune response by aluminum adjuvants

Harm HogenEsch

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https://doi.org/10.1016/S0264-410X(02)00169-X

HogenEsch, H. Vaccine (2002) 20: S34-S39

Enhancing immune responses

- Aluminum adjuvants enhance immunogenicity by slowing diffusion of antigens from the injection site (depot effect).
- Aluminum adjuvants also enhance uptake of antigen by antigen presenting cells, such as macrophages and dendritic cells, activation of complement, and stimulation of certain cytokines (i.e., IL-1$\boldsymbol{\beta}$ and IL-18).

Is injected aluminum from vaccines processed differently than ingested aluminum from food?

Injected vs. Ingested Aluminum

- Vaccines contain insoluble aluminum salts that dissolve slowly, not the soluble aluminum compounds found in food and water.
- Aluminum salts (aluminum hydroxide, aluminum phosphate) are designed to dissolve slowly at the injection site—they don't "flood" the bloodstream.
- Only small fractions of aluminum in vaccines enter the circulation at any time, allowing the body to process them safely through normal pathways.
- This slow release mimics how we are exposed to aluminum in food over time.

Injected vs. Ingested Aluminum

- The body doesn't distinguish between aluminum sources once it's in the bloodstream.
- The elimination pathway is identical whether the source is from vaccines, water, or food.
- About 90% of aluminum in the bloodstream immediately binds to the transport protein, transferrin, and is excreted through the kidneys.
- About half of the aluminum in the blood is eliminated within 24 hours. The next day, half of the remaining aluminum is eliminated.

Studies supporting the trivial contribution of vaccines to aluminum burden in infants

ELSEVIER

Vaccine 20 (2002) S13–S17

Vaccine

www.elsevier.com/locate/vaccine

Aluminum toxicokinetics regarding infant diet and vaccinations

L.S. Keith*, D.E. Jones, C.-H.S.J. Chou

Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road, NE, Mailstop E-29, Atlanta, GA 30333, USA

Received 4 June 2001; accepted 7 August 2001

Abstract

Some vaccines contain aluminum adjuvants to enhance the immunological response, and it has been postulated that this aluminum could contribute to adverse health effects, especially in children who receive a vaccination series starting at birth. The pharmacokinetic properties and end-point toxicities of aluminum are presented. In assessing the relevance of dietary and medical aluminum exposure to public health, we estimated infant body burdens during the first year of life for breast milk and formula diets and for a standard vaccination schedule. We then compared those body burdens with that expected for intake at a level considered safe for intermediate-duration exposure. The methodology blends intake values and uptake fractions with an aluminum retention function derived from a human injection study using radioactive ^{26}Al. The calculated body burden of aluminum from vaccinations exceeds that from dietary sources, however, it is below the minimal risk level equivalent curve after the brief period following injection. Published by Elsevier Science Ltd.

Keywords: Aluminum; Vaccine; Diet

Keith, L.S., Vaccine (2002) S13-S17.

Keith, et al. (2002)

- Immediately following injection with aluminum adjuvant-containing vaccines, the level of aluminum in the bloodstream is well below the minimum risk level established by the Agency for Toxic Substances and Disease Registry.

Updated aluminum pharmacokinetics following infant exposures through diet and vaccination

Author links open overlay panelRobert J. Mitkus [a], David B. King [a], Maureen A. Hess [b], Richard A. Forshee [a], Mark O. Walderhaug [a]

https://doi.org/10.1016/j.vaccine.2011.09.124Get rights and content

Abstract

Aluminum is a ubiquitous element that is released naturally into the environment via volcanic activity and the breakdown of rocks on the earth's surface. Exposure of the general population to aluminum occurs primarily through the consumption of food, antacids, and buffered analgesics. Exposure to aluminum in the general

Mitkus, R.J., et al. Vaccine (2011) 29: 9538-9543.

Mitkus et al. (2011)

- The body burden of aluminum from vaccines and diet throughout an infant's first year of life is significantly less than the safe body burden using the regulatory minimal risk levels.
- Peak blood levels from vaccines are lower than that from food. In other words, most of the aluminum in blood can be traced back to food.
- "Episodic exposures to vaccines that contain aluminum adjuvants continue to be extremely low risk to infants and the benefits of using vaccines containing aluminum adjuvants outweigh any theoretical concerns."

Blood and Hair Aluminum Levels, Vaccine History, and Early Infant Development: A Cross-Sectional Study

Mateusz P Karwowski[1], Catherine Stamoulis[2], Larissa M Wenren[3], G Mayowa Faboyede[4], Nicolle Quinn[4], Kathleen M Gura[5], David C Bellinger[6], Alan D Woolf[7]

Abstract

Objective: To evaluate relationships between whole blood (B-Al) and hair aluminum (H-Al) levels in healthy infants and their immunization history and development.

Karwowski, M.P. et al. Academic Pediatrics (2018) 18: 161-165.

Karwowski, et al. (2018)

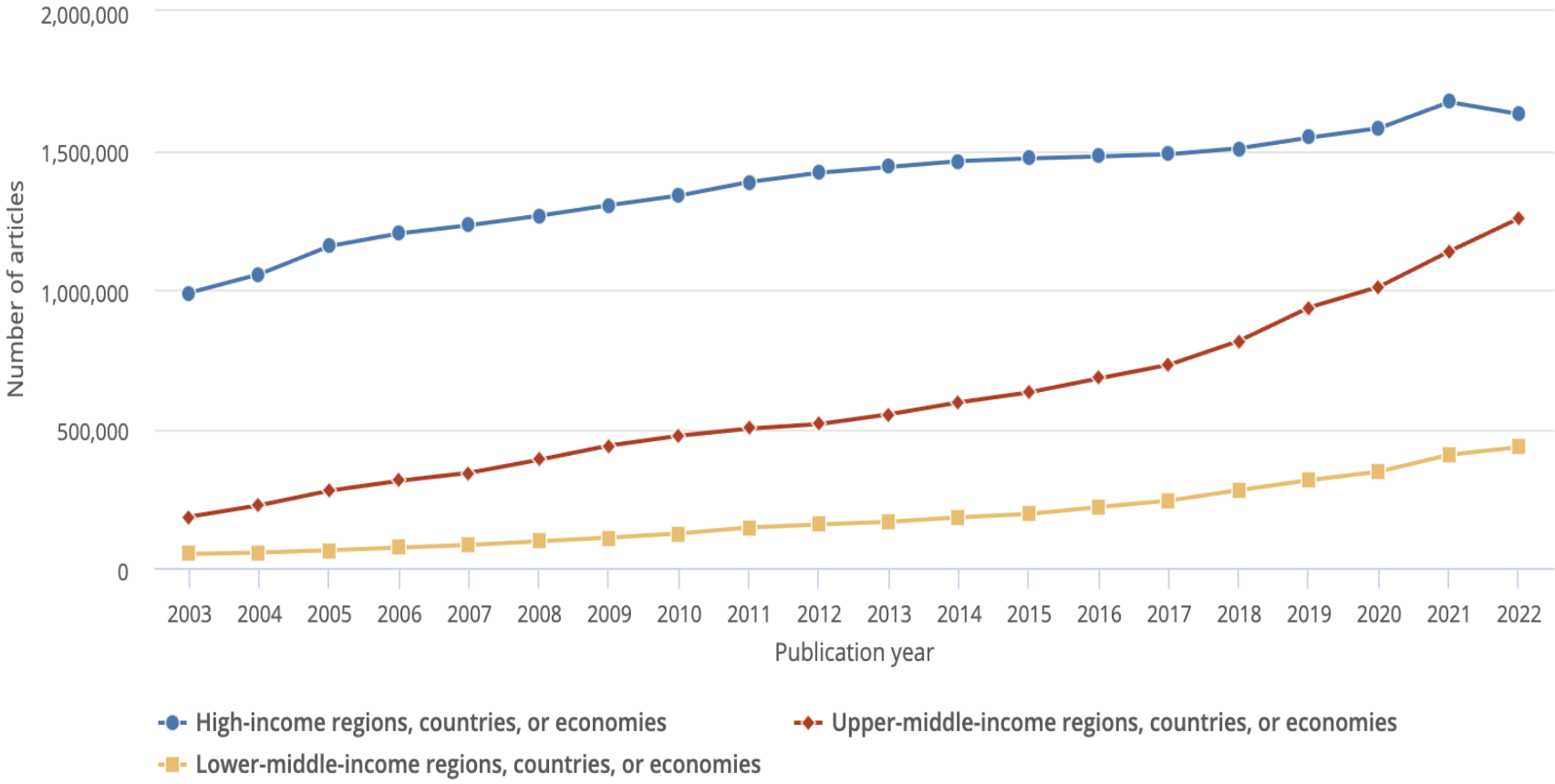
- Cross-sectional study of 9-13-month olds.
- Authors found no significant correlation between blood and hair aluminum levels and aluminum load from vaccines.
- Authors concluded that "infant blood and hair aluminum levels did not correlate with immunization history. Similarly, there was no correlation between blood aluminum and infant development or between hair aluminum and language and cognitive development."
- Vaccines do not meaningfully add to total aluminum burden.

Studies evaluating the safety of aluminum adjuvants in vaccines

About 3M articles published in the world's literature every year

Figure PBS-1

S&E publications, by income group: 2003–22



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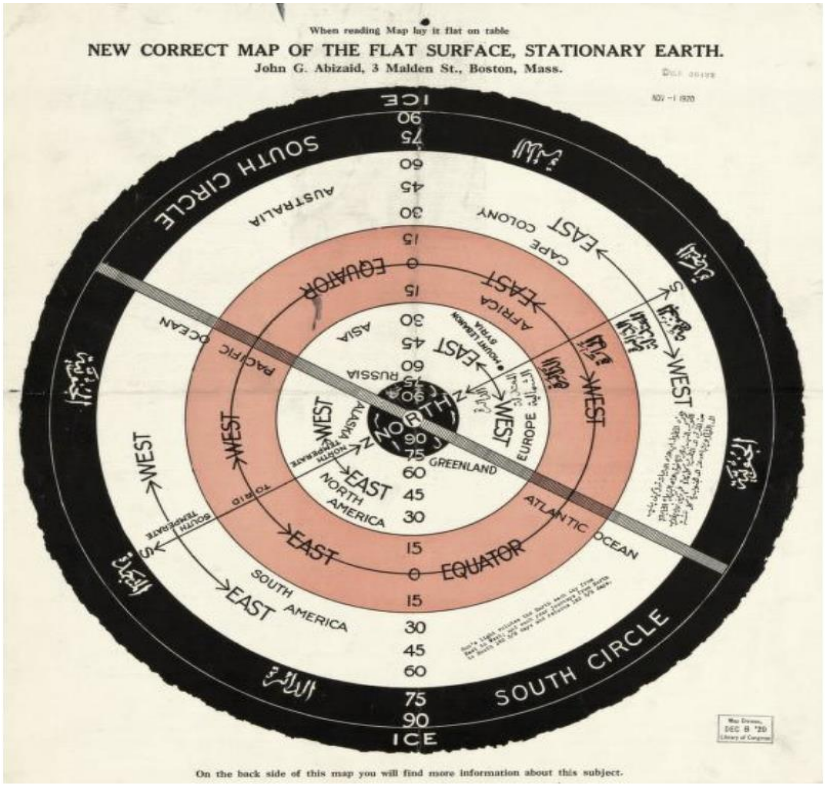
The Flat Earth and its Advocates: A List of References

For thousands of years people have known the earth is a sphere, yet, periodically, doubters come forward to challenge the fact. This guide provides links to books and journal articles on the pseudoscientific theory that the earth is a flat disc.



Andrew Wakefield

Early report

Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children

A J Wakefield, S H Murch, A Anthony, J Linnell, D M Casson, M Malik, M Berelowitz, A P Dhillon, M A Thomson, P Harvey, A Valentine, S E Davies, J A Walker-Smith

Summary

Background We investigated a consecutive series of children with chronic enterocolitis and regressive developmental disorder.

Introduction

We saw several children who, after a period of apparent normality, lost acquired skills, including communication. They all had gastrointestinal symptoms, including abdominal pain, diarrhoea, and bloating and, in some

Wakefield, A.J., et al. *Lancet* 351: 637-641, 1998

March 19, 2025

UNBIASEDSCIENCE

A Comprehensive Review of the MMR Vaccine Studies: Many Years and Millions of People Reveal NO Link to Autism

Time to Move Forward: What Decades of Consistent Evidence Should Tell Us

DR. JESS STEIER, AIMEE PUGH BERNARD, PHD, DAVID HIGGINS, MD, MPH, AND IZZY BRANDSTETTER FIGUEROA,MPH

MAR 19, 2025

Early report

Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children

A J Wakefield, S H Murch, A Anthony, J Linnell, D M Casson, M Malik, M Berelowitz, A P Dhillon, M A Thomson, P Harvey, A Valentine, S E Davies, J A Walker-Smith

Summary

Background We investigated a consecutive series of children with chronic enterocolitis and regressive developmental disorder.

Methods 12 children (mean age 6 years [range 3–10], 11 boys) were referred to a paediatric gastroenterology unit with a history of normal development followed by loss of acquired skills, including language, together with diarrhoea and abdominal pain. Children underwent gastroenterological, neurological, and developmental assessment and review of developmental records. Ileocolonoscopy and biopsy sampling, magnetic-resonance imaging (MRI), electroencephalography (EEG), and lumbar puncture were done under sedation. Barium follow-through radiography was done where possible. Biochemical, haematological, and immunological profiles were examined.

Findings Onset of behavioural symptoms was associated by the parents, with measles, mumps, and rubella vaccination in eight of the 12 children, with measles infection in one child, and otitis media in another. All 12 children had intestinal abnormalities ranging from lymphoid nodular hyperplasia to aphthoid ulceration. Histology showed patchy chronic inflammation in 11 children and reactive ileal lymphoid hyperplasia in seven, but no granulomas. Behavioural disorders included autism (nine), disintegrative psychosis (one), and possible postviral or vaccinal encephalitis (two). There were no focal neurological abnormalities and MRI and EEG tests were normal. Abnormal laboratory results were significantly raised urinary methylmalonic acid compared with age-matched controls ($p=0.003$), low haemoglobin in four children, and low serum IgA in four children.

Interpretation We identified associated gastrointestinal disease and developmental regression in a group of previously normal children, which was generally associated in time with possible environmental triggers.

Lancet 1998; **351**: 637–41
See Commentary page

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Correspondence to: Dr A J Wakefield

Introduction

We saw several children who, after a period of apparent normality, lost acquired skills, including communication. They all had gastrointestinal symptoms, including abdominal pain, diarrhoea, and bloating and, in some cases, food intolerance. We describe the clinical findings, and gastrointestinal features of these children.

Patients and methods

12 children, consecutively referred to the department of paediatric gastroenterology with a history of a pervasive developmental disorder with loss of acquired skills and intestinal symptoms (diarrhoea, abdominal pain, bloating and food intolerance), were investigated. All children were admitted to the ward for 1 week, accompanied by their parents.

Clinical investigations

We took histories, including details of immunisations and exposure to infectious diseases, and assessed the children. In 11 cases the history was obtained by the senior clinician (JW-S). Neurological and psychiatric assessments were done by consultant staff (PH, MB) with HMS-4 criteria.[1] Developmental data included a review of prospective developmental records from parents, health visitors, and general practitioners. Four children did not undergo psychiatric assessment in hospital; all had been assessed professionally elsewhere, so these assessments were used as the basis for their behavioural diagnosis.

After bowel preparation, ileocolonoscopy was performed by SHM or MAT under sedation with midazolam and pethidine. Paired frozen and formalin-fixed mucosal biopsy samples were taken from the terminal ileum; ascending, transverse, descending, and sigmoid colons, and from the rectum. The procedure was recorded by video or still images, and were compared with images of the previous seven consecutive paediatric colonoscopies (four normal colonoscopies and three on children with ulcerative colitis), in which the physician reported normal appearances in the terminal ileum. Barium follow-through radiography was possible in some cases.

Also under sedation, cerebral magnetic-resonance imaging (MRI), electroencephalography (EEG) including visual, brain stem auditory, and sensory evoked potentials (where compliance made these possible), and lumbar puncture were done.

Laboratory investigations

Thyroid function, serum long-chain fatty acids, and cerebrospinal-fluid lactate were measured to exclude known causes of childhood neurodegenerative disease. Urinary methylmalonic acid was measured in random urine samples from eight of the 12 children and 14 age-matched and sex-matched normal controls, by a modification of a technique described previously.[2] Chromatograms were scanned digitally on computer, to analyse the methylmalonic-acid zones from cases and controls. Urinary methylmalonic-acid concentrations in patients and controls were compared by a two-sample *t* test. Urinary creatinine was estimated by routine spectrophotometric assay.

Children were screened for antiendomyseal antibodies and boys were screened for fragile-X if this had not been done

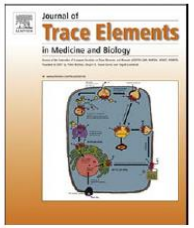
Studies evaluating the safety of aluminum adjuvants

Autism

Contents lists available at ScienceDirect

Journal of Trace Elements in Medicine and Biology

journal homepage: www.elsevier.com/locate/jtemb



Aluminium in brain tissue in autism

Matthew Mold[a], Dorcas Umar[b], Andrew King[c], Christopher Exley[a,*]

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ARTICLE INFO

Keywords:
Human exposure to aluminium
Human brain tissue
Autism spectrum disorder
Transversely heated atomic absorption spectrometry
Aluminium-selective fluorescence microscopy

ABSTRACT

Autism spectrum disorder is a neurodevelopmental disorder of unknown aetiology. It is suggested to involve both genetic susceptibility and environmental factors including in the latter environmental toxins. Human exposure to the environmental toxin aluminium has been linked, if tentatively, to autism spectrum disorder. Herein we have used transversely heated graphite furnace atomic absorption spectrometry to measure, for the first time, the aluminium content of brain tissue from donors with a diagnosis of autism. We have also used an aluminium-selective fluor to identify aluminium in brain tissue using fluorescence microscopy. The aluminium content of brain tissue in autism was consistently high. The mean (standard deviation) aluminium content across all 5 individuals for each lobe were 3.82(5.42), 2.30(2.00), 2.79(4.05) and 3.82(5.17) μg/g dry wt. for the occipital, frontal, temporal and parietal lobes respectively. These are some of the highest values for aluminium in human brain tissue yet recorded and one has to question why, for example, the aluminium content of the occipital lobe of a 15 year old boy would be 8.74 (11.59) μg/g dry wt.? Aluminium-selective fluorescence microscopy was used to identify aluminium in brain tissue in 10 donors. While aluminium was imaged associated with neurones it appeared to be present intracellularly in microglia-like cells and other inflammatory non-neuronal cells in the meninges, vasculature, grey and white matter. The pre-eminence of intracellular aluminium associated with non-neuronal cells was a standout observation in autism brain tissue and may offer clues as to both the origin of the brain aluminium as well as a putative role in autism spectrum disorder.

Mold, M., *Journal of Trace Elements in Medicine and Biology* (2018) 46: 76-82

Mold, et al. (2004)

- Identified the aluminum content in brain tissue in 10 children with autism using fluorescence microscopy.
- The mean content of aluminum for the occipital, frontal, temporal and parietal lobes were “some of the highest values for aluminum content in human brain tissue yet recorded.”
- No control group.

Asthma

Association Between Aluminum Exposure From Vaccines Before Age 24 Months and Persistent Asthma at Age 24 to 59 Months

Matthew F. Daley, MD; Liza M. Reifler, MPH; Jason M. Glanz, PhD; Simon J. Hambidge, MD, PhD; Darios Getahun, MD, PhD; Stephanie A. Irving, MHS; James D. Nordin, MD, MPH; David L. McClure, PhD; Nicola P. Klein, MD, PhD; Michael L. Jackson, PhD, MPH; Satoshi Kamidani, MD; Jonathan Duffy, MD, MPH; Frank DeStefano, MD

From the Institute for Health Research, Kaiser Permanente Colorado (MF Daley, LM Reifler, and JM Glanz), Aurora, Colo; Department of Pediatrics, University of Colorado School of Medicine (MF Daley and SJ Hambidge), Aurora, Colo; Colorado School of Public Health (JM Glanz), Aurora, Colo; Community Health Services, Denver Health (SJ Hambidge), Denver, Colo; Department of Research and Evaluation, Kaiser Permanente Southern California (D Getahun), Pasadena, Calif; Department of Health Systems Science, Kaiser Permanente Bernard J. Tyson School of Medicine (D Getahun), Pasadena, Calif; Center for Health Research, Kaiser Permanente Northwest (SA Irving), Portland, Ore; HealthPartners Institute (JD Nordin), Minneapolis, Minn; Marshfield Clinic Research Institute (DL McClure), Marshfield, Wis; Kaiser Permanente Vaccine Study Center, Kaiser Permanente Northern California (NP Klein), Oakland, Calif; Kaiser Permanente Washington Health Research Institute (ML Jackson), Seattle, Wash; Center for Childhood Infections and Vaccines of Children's Healthcare of Atlanta and Department of Pediatrics, Emory University School of Medicine (S Kamidani), Atlanta, Ga; and Immunization Safety Office, Centers for Disease Control and Prevention (S Kamidani, J Duffy, and F DeStefano), Atlanta, Ga

The authors have no conflicts of interest relevant to this article to disclose.

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Received for publication May 20, 2022; accepted August 13, 2022.

Daley, M.F., et al. *Academic Pediatrics* (2023) 23: 37-46.

Daley, et al. (2023)

- Evaluated a cohort of 327,000 children in the Vaccine Safety DataLink.
- The authors concluded, “In a large observational study, a positive association was found between vaccine-related aluminum exposure and persistent asthma.”
- The authors offered the following caveats: 1) “The findings do not provide strong evidence for questioning the safety of aluminum in vaccines.” 2) “While recognizing the small effect sizes identified and the potential for residual confounding, additional investigation of the hypothesis is warranted.”

Caution Urged on Study Linking Aluminum in Vaccines and Childhood Asthma

News, Vaccines

Published: November 2, 2022

Revised: May 27th, 2025

Doctors are urging caution on a recent study that suggested a possible link between aluminum in vaccines and persistent childhood asthma. The study had some key limitations that did not consider the full picture of asthma. And it ultimately **did not prove the link**, although study authors say further research was warranted.

Criticisms of Daley Study

- Did not control for confounding variables such as family history of asthma, exposure to second-hand smoke, environmental pollution, dietary sources of aluminum, and breastfeeding.
- When the authors restricted their analysis to only those children who had been fully immunized, the effect of aluminum exposure on the sub-sample of children with asthma was no longer significant.
- The authors also could not demonstrate an aluminum dose response.

Autoimmunity

JOURNAL ARTICLE

Macrophagic myofasciitis lesions assess long-term persistence of vaccine-derived aluminium hydroxide in muscle

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R. K. Gherardi ✉ , M. Coquet , P. Cherin , L. Belec , P. Moretto , P. A. Dreyfus , J.-F. Pellissier , P. Chariot , F.-J. Authier

Brain, Volume 124, Issue 9, September 2001, Pages 1821–1831,
https://doi.org/10.1093/brain/124.9.1821
Published: 01 September 2001 **Article history** ▾

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Abstract

Macrophagic myofasciitis (MMF) is an emerging condition of unknown cause, detected in patients with diffuse arthromyalgias and fatigue, and characterized by muscle infiltration by granular periodic acid–Schiff's reagent-positive macrophages and lymphocytes. Intracytoplasmic inclusions have been observed in macrophages of some patients. To assess their significance, electron microscopy was performed in 40 consecutive cases and chemical analysis was done by microanalysis and atomic absorption spectrometry. Inclusions were constantly detected and corresponded to aluminium hydroxide, an

Gherardi, R.K., et al. *Brain* (2001) 124: 1821-1831

Aluminum hydroxide injections lead to motor deficits and motor neuron degeneration

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Abstract

Gulf War Syndrome is a multi-system disorder afflicting many veterans of Western armies in the 1990–1991 Gulf War. A number of those afflicted may show neurological deficits including various cognitive dysfunctions and motor neuron disease, the latter expression virtually indistinguishable from classical amyotrophic lateral sclerosis (ALS) except for the age of onset. This ALS "cluster" represents the second such ALS cluster described in the literature to date. Possible causes of GWS

Shaw, C.A., *Journal of Inorganic Biochemistry* (2009) 103:1555.

ELSEVIER

Journal of Autoimmunity
Volume 36, Issue 1, February 2011, Pages 4-8

Review

'ASIA' – Autoimmune/inflammatory syndrome induced by adjuvants

Yehuda Shoenfeld [a b], Nancy Agmon-Levin [a]

https://doi.org/10.1016/j.jaut.2010.07.003

Abstract

The role of various environmental factors in the pathogenesis of immune mediated diseases is well established. Of which, factors entailing an immune adjuvant activity such as infectious agents, silicone, aluminium salts and others were associated with defined and non-defined immune mediated diseases both in animal models and in humans. In recent years, four conditions: siliconosis, the Gulf war syndrome (GWS), the macrophagic myofasciitis syndrome (MMF) and post-vaccination phenomena were linked with previous exposure to an adjuvant. Furthermore, these four diseases share a similar complex of signs andsymptoms which further support a common denominator.Thus, we review herein the current data regarding the role of adjuvants in the pathogenesis of immune mediated diseases as well as the amassed data regarding each of these four conditions. Relating to the current knowledge we would like to suggest to include these comparable conditions under a common syndrome entitled ASIA, "Autoimmune (Auto-inflammatory) Syndrome Induced by Adjuvants".

Schoenfeld, Y. N., *Journal of Autoimmunity* (2011) 36: 4-8.

IMAGINE YOU ARE AN ALUMINUM ATOM

DISCUSSIONS WITH MR. ALUMINUM

CHRISTOPHER EXLEY, PhD, FRSB

Christopher Exley (Mr. Aluminum)

- In his book, Exley claims that aluminum also causes multiple sclerosis, epilepsy, arthritis, anemia, asthma, chronic obstructive pulmonary disease, cancer, diabetes, sarcoidosis, Down's Syndrome, muscular dystrophy, obesity, hyperactivity, chronic fatigue syndrome, Gulf War illness, Crohn's Diseases, stroke, infertility, and breast cancer, among others.
- Exley claims that the reason we don't know about this is because of a government cover-up that centered on a small Cornish town named Camelford.
- "Recently, I was very pleased to receive a donation from Robert F. Kennedy, Jr…I felt honored to receive such a donation."

Rostrum

Evidence Refuting the Existence of Autoimmune/Autoinflammatory Syndrome Induced by Adjuvants (ASIA)

Rohan Ameratunga, MBChB, PhD, FRACP, FRCPA, FFSc, ABMLI, FRCP, FRCPATH[a], David Gillis, MBBS, FRACP, FRCPA[b], Michael Gold, MBChB, DCH, MD, FRACP, FCP[c], Allan Linneberg, MD, PhD[d,e,f], and J. Mark Elwood, MD, DSc, FRCPC[g]

Auckland, New Zealand; Brisbane, Queensland, Australia; Adelaide, South Australia, Australia; and Copenhagen, Denmark

Autoimmune/autoinflammatory syndrome induced by adjuvants (ASIA) was described in 2011. Over time the condition and its triggers have broadened to include several autoimmune disorders, the macrophagic myofasciitis syndrome, the Gulf war syndrome, the sick building syndrome, siliconosis, and the chronic fatigue syndrome. The aluminum-containing adjuvants in the hepatitis B vaccine and the human papillomavirus vaccine in particular have been stated to be the major causes of the disorder. Here, we review the specificity of the diagnostic criteria for ASIA. We also examine relevant human data, pertaining to causation, particularly from patients undergoing allergen-specific immunotherapy (IT). autoimmune disease. In another clinical trial, there were no increases in exacerbations in a cohort of patients with systemic lupus erythematosus immunized with the hepatitis B vaccine. Current data do not support the causation of ASIA by vaccine adjuvants containing aluminum, which should be of reassurance to patients undergoing routine immunizations as well as to those undergoing allergen-specific IT. (J Allergy Clin Immunol Pract 2017;5:1551-5)

Key words: *ASIA; SLE; Autoimmunity; Vaccines*

Ameratunga, R., J. *Allergy Clin Immunol Pract* (2017) 5: 1551-1555.

Ameratunga, et al. (2017)

- Autoimmune/autoinflammatory syndrome induced by adjuvants (ASIA) includes Gulf War syndrome, macrophagic myofasciitis syndrome, sick building syndrome, siliconosis, and chronic fatigue syndrome.
- Patients receiving allergen-specific immunotherapy receive 100-500 times more injected aluminum over 3-5 years than that contained in aluminum adjuvant-containing vaccines.
- Nonetheless, patients receiving immunotherapy have a *lower* incidence of autoimmune diseases.
- Patients with SLE do not have clinical exacerbations when receiving aluminum adjuvanted vaccines, like the hepatitis B vaccine.

Annals of Internal Medicine

ORIGINAL RESEARCH

Aluminum-Adsorbed Vaccines and Chronic Diseases in Childhood

A Nationwide Cohort Study

Niklas Worm Andersson, MD, PhD; Ingrid Bech Svalgaard, MSc; Stine Skovbo Hoffmann, MD, PhD; and Anders Hviid, MSc, DMSc

Background: Aluminum is used as an adjuvant in nonlive vaccines administered in early childhood. Concerns persist about potential associations between vaccination with aluminum-adsorbed vaccines and increased risk for chronic autoimmunity, atopy or allergy, and neurodevelopmental disorders. Large-scale safety data remain limited.

Objective: To assess the association between cumulative aluminum exposure from early childhood vaccination and risk for autoimmune, atopic or allergic, and neurodevelopmental disorders.

(autism spectrum disorder and attention deficit-hyperactivity disorder).

Results: Cumulative aluminum exposure from vaccination during the first 2 years of life was not associated with increased rates of any of the 50 disorders assessed. For groups of combined outcomes, adjusted hazard ratios per 1-mg increase in aluminum exposure were 0.98 (95% CI, 0.94 to 1.02) for any autoimmune disorder, 0.99 (CI, 0.98 to 1.01) for any atopic or allergic disorder, and 0.93 (CI, 0.90 to 0.97) for any neurodevelopmental disorder.

Hviid study (2025)

- Study of 1,224,176 children in Denmark between 1997 and 2020 during which time varying quantities of aluminum adjuvants were introduced. Examined the development of autoimmune, allergic, and neurodevelopmental disorders.
- The authors determined the hazard ratios for each additional milligram of aluminum salts encountered in vaccines over time.

Figure 2. Early childhood vaccination with aluminum-adsorbed vaccines in Denmark from 1997 through 2020.

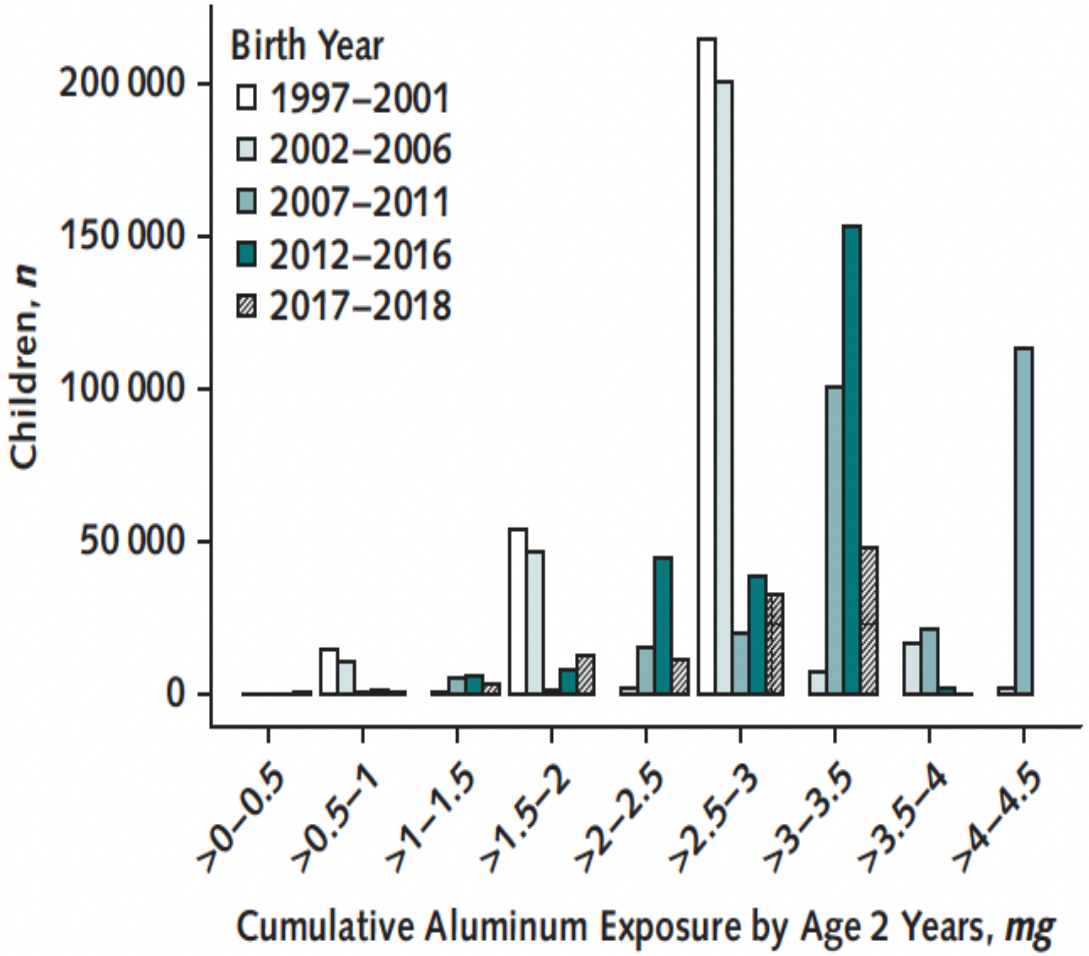
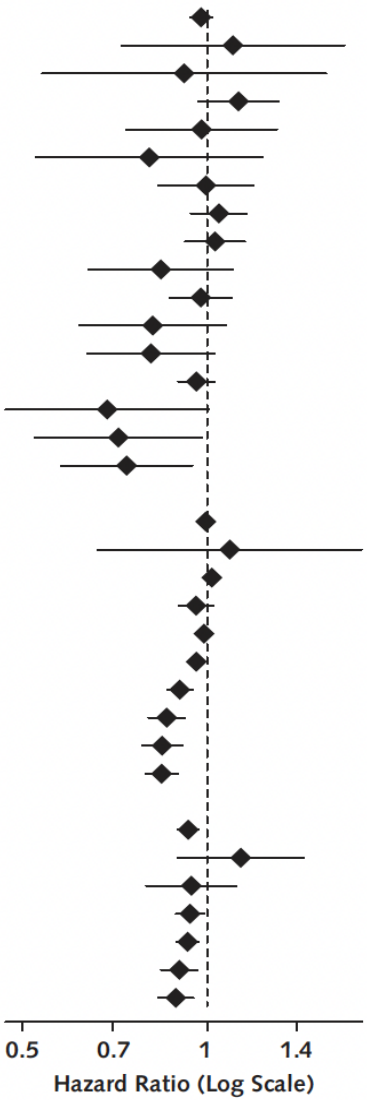


Figure 3. Association between cumulative aluminum exposure through early childhood vaccination and chronic disease in children.

Outcome	Cases, *n*	Person-Years	Adjusted Hazard Ratio (95% CI) per 1-mg Increase in Aluminum Received Through Vaccines by Age 2 y
Autoimmune outcomes	5174	3 400 369	0.98 (0.94–1.02)
Rheumatoid arthritis	51	3 415 683	1.10 (0.72–1.68)
Hashimoto thyroiditis	26	3 415 737	0.92 (0.54–1.56)
Idiopathic thrombocytopenic purpura	422	3 414 006	1.13 (0.97–1.31)
Hypothyroidism	104	3 414 265	0.98 (0.74–1.30)
Vitiligo	39	3 415 724	0.80 (0.53–1.23)
Kawasaki disease	266	3 414 864	1.00 (0.83–1.19)
Juvenile arthritis	809	3 413 561	1.05 (0.94–1.16)
Type 1 diabetes	669	3 414 203	1.03 (0.92–1.15)
Vasculitis unspecified	97	3 415 308	0.84 (0.64–1.10)
Celiac disease	652	3 414 085	0.98 (0.87–1.10)
Crohn disease	85	3 415 496	0.82 (0.62–1.07)
Psoriasis	114	3 415 456	0.81 (0.64–1.03)
Henoch–Schönlein purpura	1722	3 412 356	0.96 (0.90–1.03)
Myositis	40	3 415 678	0.69 (0.47–1.01)
Ulcerative colitis	68	3 415 469	0.72 (0.52–0.98)
Erythema nodosum	112	3 415 477	0.74 (0.58–0.95)
Atopic and allergic outcomes	39 465	1 562 490	0.99 (0.98–1.01)
Insect sting allergy	33	3 415 745	1.09 (0.66–1.79)
Atopic dermatitis	22 978	2 703 626	1.02 (1.00–1.04)
Drug allergy	2275	3 405 358	0.96 (0.90–1.02)
Allergic rhinoconjunctivitis	22 841	3 174 495	0.99 (0.97–1.01)
Asthma	28 346	2 032 343	0.96 (0.94–0.98)
Angioedema and urticaria	3435	3 399 403	0.90 (0.86–0.95)
Allergy unspecified	1621	3 409 018	0.86 (0.80–0.92)
Anaphylaxis or epinephrine autoinjector	1372	3 411 576	0.84 (0.78–0.91)
Food allergy	2288	3 399 832	0.84 (0.79–0.89)
Neurodevelopmental outcomes	5200	3 409 893	0.93 (0.90–0.97)
Asperger syndrome	175	3 415 664	1.13 (0.89–1.44)
Atypical autism	276	3 415 524	0.94 (0.79–1.12)
Autistic disorder	2686	3 412 494	0.94 (0.89–0.99)
Autism spectrum disorder composite	4806	3 414 259	0.93 (0.89–0.97)
Attention deficit–hyperactivity disorder	1580	3 414 493	0.90 (0.84–0.96)
Other pervasive developmental disorders	1702	3 413 647	0.89 (0.83–0.95)



The war against aluminum adjuvants isn’t new


Barbara Loe Fisher
Vicki Debold Pebsworth
Lucija Tomljenovic
Christopher Shaw
Andrew Wakefield
Romain Gherardi
EXIT
neurone
glia
brain interstitial fluid
Soluble Pool of Al-L
Aluminium
Soluble/Particulate
Cell Cytosol
Extracellular Surfaces
Endoplasmic Reticulum
Nucleus
Blood Brain Barrier
Where might aluminium 'go' in the brain?
Play (k)

2011

Rosemary’s Baby (1968)

What’s at Stake?

RFK Jr.'s War on Vaccines

- RFK Jr. is the driving force behind hundreds of lawsuits against vaccine makers.
- During the past two years, in association with the law firm of Wisner Baum, he has made about $2.5 million suing vaccine makers.
- He could further enrich himself and his personal injury lawyer friends by altering the VICP's list of compensable injuries or by removing certain vaccines from the program.
- When asked during his confirmation hearing in front of the Senate HELP committee to refuse to take a financial stake in this lawsuits while Secretary of HHS, RFK Jr. refused to say yes.

HEALTH & SCIENCE

HHS Award Indicates Changes May Be Coming for Vaccine Injury Compensation Program

Health Secretary Robert F. Kennedy Jr. has criticized the program in the past.

(John McDonnell/AP)

The Pertussis Vaccine, 1982

Aired April 19, 1982


Lea Thompson
NewsCenter 4

DPT: Vaccine Roulette, April 19, 1982

The pertussis vaccine

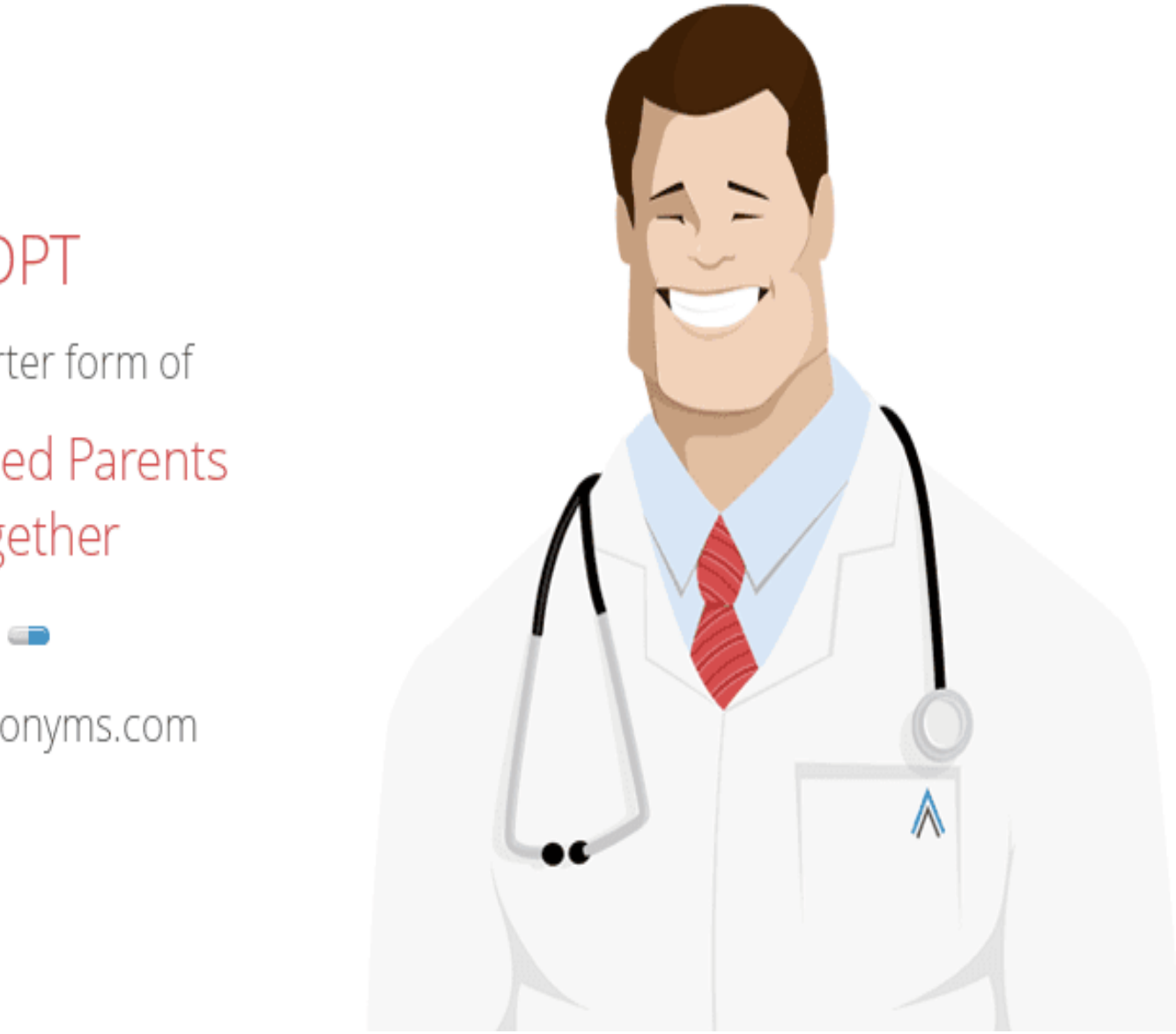
- Within months, *DPT: Vaccine Roulette* was shown in brief segments on many local and national news outlets.

- Barbara Loe Fisher, Kathi Williams, and Jeff Schwartz formed Dissatisfied Parents Together (DPT).

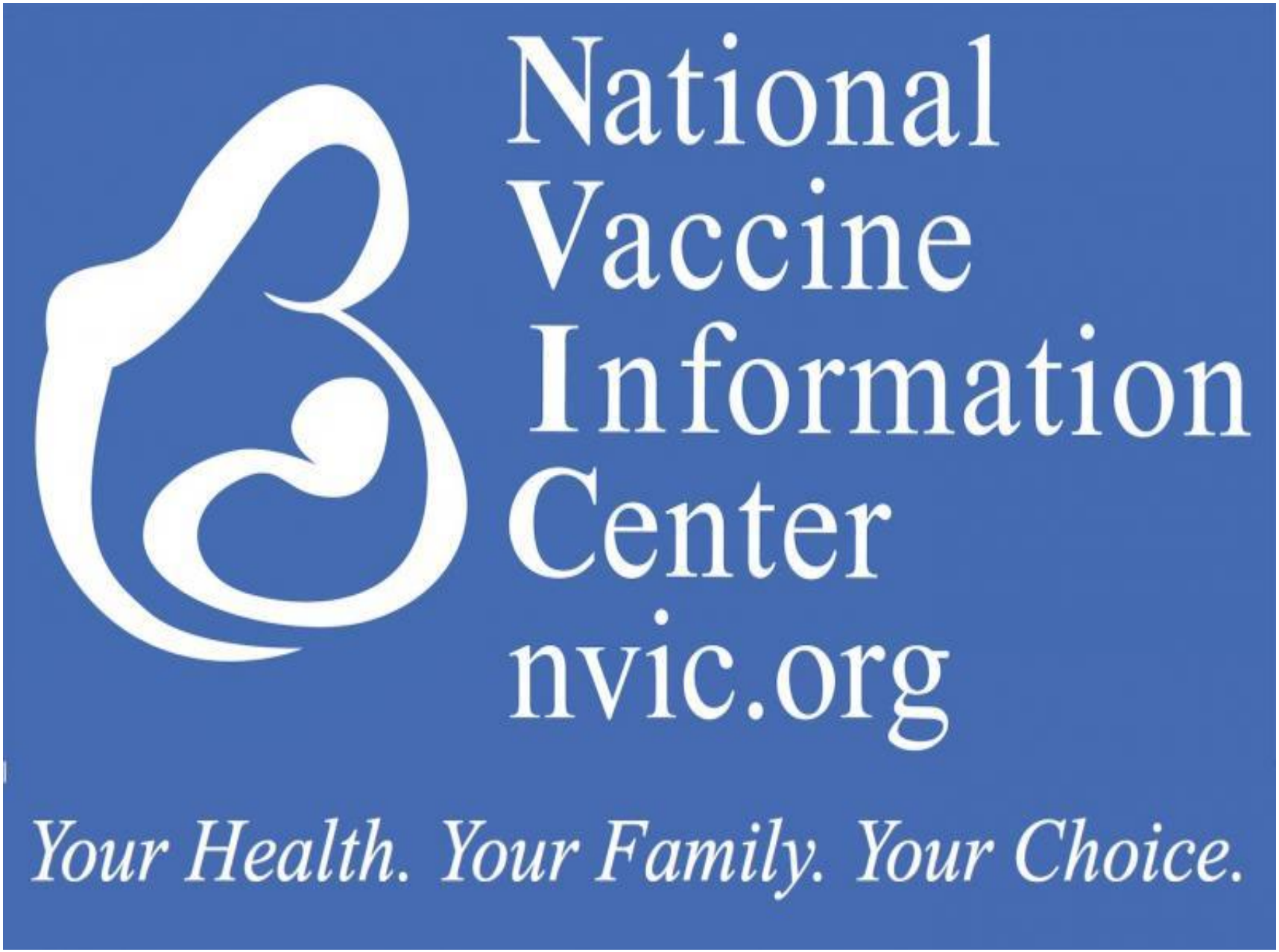
DPT

is a shorter form of

Dissatisfied Parents Together



by allacronyms.com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nvic.org
Your Health. Your Family. Your Choice.

Paula Hawkins (R, FL)

The pertussis vaccine

- Media covered the story as fact: pertussis vaccine was causing permanent harm.

- Flood of lawsuits successfully claimed that pertussis vaccine caused SIDS, Reye's Syndrome, coma, "mental retardation," epilepsy, and transverse myelitis.

Pertussis science matures, but too late

- Epidemiological studies during the following 10 years showed no increased risk for epilepsy or developmental delays following pertussis vaccine.

- These studies came far too late to stem the fear of the pertussis vaccine.

- Genetic studies performed 25 years later found the real cause of the seizures and developmental delay in many of these children.

Effects of vaccination on onset and outcome of Dravet syndrome: a retrospective study

Anne M McIntosh, Jacinta McMahon*, Leanne M Dibbens, Xenia Iona, John C Mulley, Ingrid E Scheffer, Samuel F Berkovic*

Summary

Background Pertussis vaccination has been alleged to cause an encephalopathy that involves seizures and subsequent intellectual disability. In a previous retrospective study, 11 of 14 patients with so-called vaccine encephalopathy had Dravet syndrome that was associated with de-novo mutations of the sodium channel gene *SCN1A*. In this study, we aimed to establish whether the apparent association of Dravet syndrome with vaccination was caused by recall bias and, if not, whether vaccination affected the onset or outcome of the disorder.

Methods We retrospectively studied patients with Dravet syndrome who had mutations in *SCN1A*, whose first seizure was a convulsion, and for whom validated source data were available. We analysed medical and vaccination records to investigate whether there was an association between vaccination and onset of seizures in these patients. Patients were separated into two groups according to whether seizure onset occurred shortly after vaccination (vaccination-proximate group) or not (vaccination-distant group). We compared clinical features, intellectual outcome, and type of *SCN1A* mutation between the groups.

McIntosh, A.M., et al. *Lancet Neurology* (2010) 9: 592-598.

Berkovic et al (2011)

- Sam Berkovic and colleagues in Australia found that 11 of 14 patients with so-called "vaccine encephalopathy" was a *de-novo* mutation in the sodium channel gene SCN1a (Dravet syndrome).

- "Although vaccination might trigger earlier onset of Dravet syndrome, children with this SCN1a mutation are destined to develop the disease. Vaccination should not be withheld from children with SCN1a mutations because we found no evidence that vaccination before or after disease onset affect outcome."

Toner v. Lederle Laboratories

- The number of pertussis vaccine makers dropped from 8 to 1. The last company left was Lederle Laboratories.
- In the mid-1980s, parents of Kevin Toner claimed that Lederle's pertussis vaccine had caused their son's transverse myelitis.
- Jury awarded the Toners $1.13 million.
- At the time of the verdict, the entire pertussis vaccine business in the the U.S. was about $3 million.

Impact of civil litigation

- Lederle threatened to stop making pertussis vaccine for American children.
- Other vaccines were also affected by the verdict. The number of companies making measles vaccine dropped from 6 to 1 and of polio vaccine from 3 to 1.

National Childhood Vaccine Injury Act

In 1986, NCVIA was born:

- Act included the Vaccine Injury Compensation Program (VICP), which centered on a vaccine injury table and was funded by a $0.75 federal excise tax on every dose of vaccine.
- The number of vaccine makers in the United States decreased from 26 (in 1955) to 18 (in 1980) to 4 (in 1990).
- The VICP successfully protected companies from completely leaving the vaccine business. Weaken it, and we will be right back to where we were in the 1980s.

“The only thing that we learn from history is that we learn nothing from history.”

--Georg Wilhelm Friedrich Hegel, 1830

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vaccinemakers.org

Game and info for children
vaxpackhero.org