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Original Research Article

Mycoplasma Fermentans and Deciliation as a Precursor to Regressive Autism.

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Autism and related spectrum disorders (ASD), once rare, are now common. Today over 100,000 schoolchildren in the UK have an autism/ASD diagnosis (1). It is forecast that this number will increase to 250,000 by the year 2023 (see graph). Recent research from Harvard University estimates the current annual cost of autism in the UK at £34 billion (and in the USA \$126 billion) (2), it therefore follows from the forecast growth in numbers that future costs will escalate. Explanations for this unwanted phenomenon (the autism epidemic) advanced by medical science, e.g., oral antibiotics introduced in the early 80s; prenatal ultrasound; acetaminophen replacing aspirin; obstetric drugs etc have all been promoted as potential causes but none appears to match the cascade of adverse physiological events witnessed by parents over time in the often gradual deterioration of their child. One possible cause, espoused by parents, is vaccination, in particular the MMR vaccine. Official focus has, however, remained on the need to maintain public confidence in MMR in order to prevent communicable diseases, rather than on a thorough investigation of parental testimony. Independent examination of veterinary vaccine history and of the cell-line technology involved reveals a growing concern regarding contamination by covert pathogenic bacteria, in particular *Mycoplasma fermentans* (3). The introduction of a triple live virus vaccine (MMR) will have increased the probability of cell line contamination. It has been suggested that potentially 50% or more of cell lines worldwide are contaminated (4). *Mycoplasma* has an affinity to the cilia, the microscopic, hair-like structures or organelles that extend from the surface of nearly all mammalian cells, cilia are vital to the function of the auditory system. For regressive autistic children the world can be a confusing, isolating and daunting place and it is their fundamental problems with communication and social interaction that are often the root cause of their difficult behaviours. The three main areas of difficulty which all people with autism share are sometimes known as the 'triad of impairments': difficulty with social communication, social interaction, and social imagination. Much of what is seen and described as autistic symptoms (communication problems, behavioural difficulties and sound sensitivity) is worth considering in the context of dysfunctional hearing. Auditory processing disorders are common in children with autism (5). The auditory canal, the brain, and the mucosa of the Gastrointestinal tract are favoured locations for mycoplasmas. Again, parents often point to these three areas as the ones most implicated in their child's regression. It is proposed that the opportunistic bacterial pathogen *Mycoplasma fermentans* may be the underlying cause of regressive autism in children. Due to the intracellular nature of the pathogen this hypothesis may be best tested using the Memory Lymphocyte Immunostimulation Assay (MELISA). Existing research using forensic Polymerase chain reaction has already found that over 58% of patients with an Autistic Spectrum Disorder diagnosis showed evidence of *Mycoplasma* infection (6).

Keywords: Auditory. Autism. Cilia. Gastrointestinal. *Mycoplasma Fermentans*. Vaccination.

HYPOTHESIS

The worldwide increase in the diagnosis of autism and autistic spectrum disorder (ASD) together with increasing reports of a regressive onset has caused many to argue that the condition should no longer be viewed as solely, or even mainly, genetic in origin, environmental factors must be implicated, particularly those of bacterial or viral genesis. Pathogenic substances entering the bodies and/or bloodstream of developing children merit consideration and investigation in the search for causation. The witness and evidence of parents may provide persuasive clues.

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INTRODUCTION/BACKGROUND

Autism (ASD) is currently regarded as a lifelong developmental disability that affects how a person communicates with, and relates to, other people. It also affects how they make sense of the world around them. It is a spectrum condition, which means that, while all people with autism share certain difficulties, their condition will affect them in different ways. Some people with autism are able to live relatively independent lives but others may have accompanying learning disabilities and need a lifetime of specialist support. People with autism may also experience over or under sensitivity to sounds, touch, tastes, smells, light or colours. Leo Kanner's seminal 1943 paper introduced the term 'autism' (7).

Recent publications have increasingly pointed to an overestimation of the role played by genetics and some authors now propose that 65% of autism is caused by an environmental factor or factors (8).

THE HYPOTHESIS

An analysis of the potential role of nano-bacteria, stealth pathogens and xenobiotics would be an interesting starting point that not only explores in depth the role of covert environmental factors but also takes many of the observations and reports made by parents into account. There has previously been speculation about the role of adjuvants etc. in vaccines, including Aluminium (9). Perhaps an additional focus on potential contamination might add to the picture? Of particular interest in the context of regressive autism following vaccination might be the role of the pathogen 'Mycoplasma fermentans'. There are a number of factors that lend at least face validity to a possible role for this pathogen. A pathogenic causal factor of this kind is: Associated (not exclusively) with vaccines. Opportunistic in nature- like a virus or bacteria.

- Difficult to detect.
- Able to cross the blood brain barrier.
- Associated with colitis and/or bowel problems.
- Associated with problems of the auditory canal.

The Possibility of Batch Related Contamination

The vaccine manufacturing process is convoluted and frankly a potentially unclean procedure. Any vaccine can become contaminated during the process, but the prospect increases when the vaccine is a multiple vaccine. The likelihood increases further when the vaccine is a live virus vaccine, and even more so when the vaccine is a multiple live virus vaccine. MMR is more likely to become contaminated than any other vaccine on the current childhood UK vaccine schedule (not just three times more likely, but many times more likely).

One important study in California had researchers perplexed and bemused at their inability to explain clusters of children with autism. One quote: "According to the results of one study this year, children in a 20 km by 50 km zone centred on West Hollywood were at four times greater risk of autism than were children anywhere else in California" (10) Could this episode have been an example of 'batch related contamination? Contamination mainly occurs through the use of animal cell-based approaches in the making of vaccines (e.g. Measles). Antibiotics are added to the growth medium which tends to stop the more 'common' types of bacteria from replicating (such as streptococcus or staphylococcus species) but are less successful with Mycoplasmas as this genus of bacteria lack a cell wall. Without a cell wall, they are unaffected

by anti-biotics such as penicillin and other beta-lactam anti-biotics that target cell wall synthesis.

Contamination of cell lines is a major problem in cell culture technology. Two types of contamination require attention: the contamination of cell cultures with microbiological organisms and the contamination of one cell line with another. Both forms of contamination are extremely prevalent and cannot be underestimated. Mycoplasmas are a covert contamination, and extremely difficult to detect. And clearly a possible cause of vaccine contamination. Our understanding of Mycoplasmas as pathogenic causes of disease only became clearer in the 1960s by revealing a genetic economy that requires a strict dependence on the host for nutrients and refuge. (11) (12) (13)

How Do Mycoplasmas Interact in the Human Body?

- Mycoplasmas are able to hide inside the cells of the host (patient) or to attach to the outside of host cells.
- Whether they live inside or outside the host cell, they depend on host cells for nutrients such as cholesterol, amino acids, etc. They compete with the host cells for these nutrients which can interfere with host cell function without killing the host cell.
- A Mycoplasma has very little DNA of its own, but is capable of using DNA from a host cell. When a Mycoplasma takes over the DNA of the host cell, anything can happen - including causing that cell to malfunction in many different ways and/or die, or can cause DNA mutation of the host cell.
- Mycoplasmas attach to host cells with a tiny arm coated in protein, which attaches to the protein coating of host cells. For this reason, antibiotics like tetracycline, which are classified as "protein synthesis inhibitors" are often used against Mycoplasma infections. While these antibiotics may block this protein attachment and very slowly starve it from the nutrients it needs from host cells to thrive and replicate, it still takes a healthy immune system to actually kill the Mycoplasma for good.
- Mycoplasmas are highly adaptable to changing environments and can move anywhere in the body, attaching to or invading virtually any type of cell in the body.
- The Mycoplasma adhesion proteins are very similar to human proteins. Once adhered to the host cell, the Mycoplasma can completely mimic or copy the protein cell of the host cell. This can cause the immune system to begin attacking the body's own cells; an event that happens in all autoimmune diseases.
- Certain Mycoplasma species can either activate or suppress host immune systems, and they may use these activities to evade host immune responses. Mycoplasmas can turn on the chain reaction called an immune system response. This includes the stimulation of pro-inflammatory cytokines (chemical messengers of the immune system) which is generally found in most autoimmune and inflammatory diseases and disorders.
- Mycoplasma can also attach to or invade immune system cells, like the very phagocytes (natural killer cells) that are supposed to kill them. Inside these phagocytes, they can be carried to new locations of inflammation or disease - hidden away like a spy who has infiltrated the defending army.

- When a Mycoplasma attaches to a host cell, it generates and releases hydrogen peroxide and superoxide radicals which cause oxidative stress and damage to the surrounding tissues.

In short Mycoplasmas are an incredibly virulent species of bacteria and are very difficult to trace. Also it is most likely that should Mycoplasma enter the human body's bloodstream they will over time invade virtually any cell they choose, causing a "gradual deterioration" in the patient. And no doubt, like other pathogens, they will target cells (favoured locations) in the host, e.g. the auditory tract, the gut, and the CNS. In terms of the factors outlined earlier:

"Associated with Vaccines"?

A search of the literature on veterinary vaccines reveals the serious concern that Mycoplasmas have generated over many years which may highlight poor 'quality control' and a lack of sufficient care in the manufacturing process. (14) (15) (16) (17) (18)

"Opportunistic in Nature, Like a Virus or Bacteria"?

Mycoplasma is a unique species of bacteria and is certainly opportunistic. It can invade virtually any cell in the body. (19) (20) (21) (22) (23) (24).

"Difficult to Detect"?

Mycoplasma detection is difficult, sometimes impossible when using traditional microbiological techniques. Qualitative Polymerase Chain Reaction (PCR) is necessary to identify the presence of Mycoplasma. (25) (26)

"Able to Cross the Blood/Brain Barrier"?

Yes. (27) (28)

"Associated with Colitis"?

Yes. (29) (30)

"Associated with Problems of the Auditory Canal"?

Yes. Again, we have to visit the veterinary literature. (31) (32) And in humans Mycoplasma infection often results in middle ear infections. (33) (34).

Mitochondrial Disorder

In the United States, in a landmark judgement, it was decreed that a child (Hannah Poling) had developed autistic symptoms following multiple vaccinations, including MMR.

"What's unique about Hannah's case is that for the first time federal authorities conceded a connection between her autistic symptoms and the vaccines she received, though the connection is by no means simple. A panel of medical evaluators at the Department of Health and Human Services concluded that Hannah had been injured by vaccines — and recommended that her family be compensated for the injuries. The panel said that Hannah had an underlying cellular disorder that was aggravated by the vaccines, causing brain damage with features of autism spectrum disorder (ASD).

In Hannah's case, the vaccine court determined that the underlying dysfunction of her mitochondria puts her at an increased risk of injury from vaccines". (35)

Interestingly, there is scientific information available to show that Mitochondrial disease is common in autistic patients and that Mycoplasmas affect the function of mitochondria. In fact Mycoplasma infection competes with the mitochondria and infects the cells containing mitochondria and the mitochondria themselves. (36) (37)

Mitochondrial malfunction can be a symptom of Mycoplasma infection!

Cilia and the Auditory Tract

Much of what is seen and described as autistic symptoms (sound sensitivity, communication problems, language development, etc) have a clear auditory component while it is highly likely that others (behavioural difficulties, social functioning etc) might have. Parents frequently describe their child as one who appears to hear 'discriminately'. In fact auditory processing disorders are common in children with autism(38). Superficial hearing tests offered to parents are limited and often reveal only that the child can hear but do not attempt to identify hidden irregularities.

Auditory processing is, in fact, a poorly researched area in the context of 'regressive' autism but some studies do exist. (38) (39) (Limited veterinary research suggests that Mycoplasmas may favour the auditory tract) (31) (32)). This would not be surprising as Mycoplasmas have an affinity for the cilia*. Cilia* are slender, microscopic, hair-like structures or organelles that extend from the surface of nearly all mammalian cells. They are vital to the function of the auditory system. The auditory system is the sensory system in the sense of hearing.

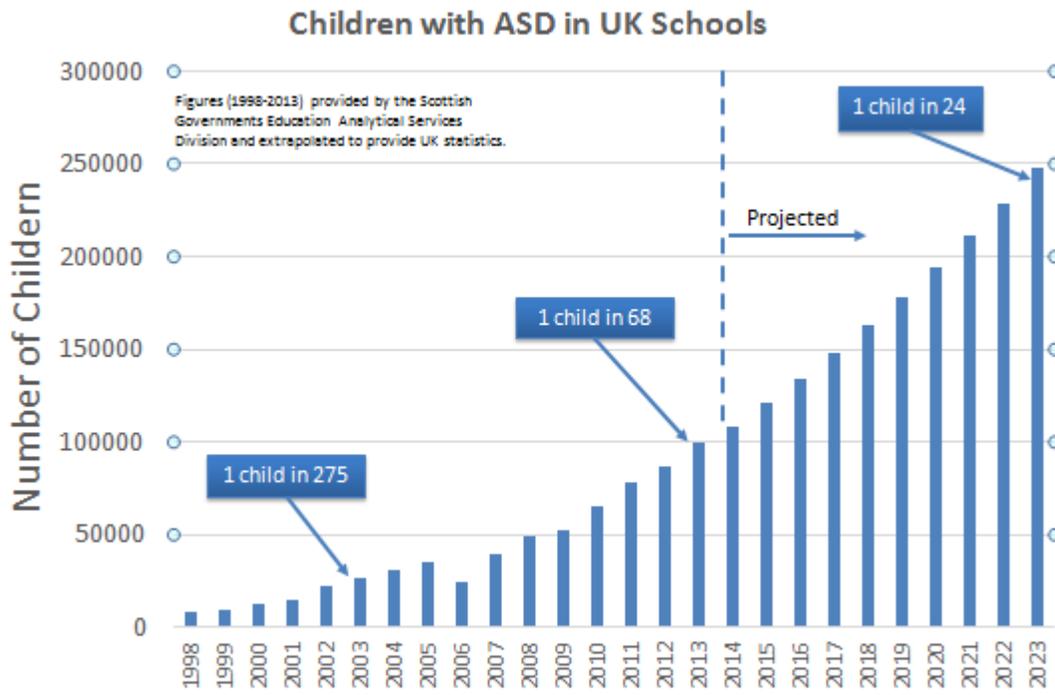
Note: Cilia are also found in the eye inside the light-sensitive cells (photoreceptors) of the retina. There has been very limited study of the deciliation process caused by Mycoplasma infection, but what has been may be revealing in the exploration of the gradual series of changes observed in the regression of a sub-set of autistic children (40). "The most concise way to think about the Mycoplasmas is that they are bacteria that specialise in infecting cilia and ciliary like bodies in the host"- Stephen Harrod Buhner (37).

Cilia and the Brain

Cilia are increasingly appreciated regulators of brain homeostasis. Several recent studies have examined the cellular and molecular mechanisms of their biogenesis and orientation in ependymal cells. (41) (42) (43) (44) (45) Mycoplasma Fermentans is associated with brain inflammation. (46)

Bowel Disease

Gastrointestinal disorders are among the most common medical conditions associated with autism. These issues range from chronic constipation or diarrhoea to irritable and inflammatory bowel conditions. They can affect persons of any age. But in the context of autism, they have been most studied in children (47) (48) (49) (50) (51) (52). Mycoplasma pneumonia, a respiratory pathogen, has been the subject of research in the area of bowel disease in humans, (as previously listed (24)) A search of the literature reveals similar research into the role of Mycoplasma in Crohn's Disease and also into 'Reflux', a frequently reported problem for regressive autistic children. (53) (54) (55) (56) (57) (58)



Tryptophan

Recent research in the United States has revealed that decreased tryptophan metabolism which may alter brain development, neuroimmune activity and mitochondrial function, was found in patients with ASD.(59)

Tryptophan is one of the amino acids that Mycoplasmas scavenge from their host's tissues.

EVALUATION OF THIS HYPOTHESIS

The very nature of the manufacturing process for a triple live virus vaccine can lead to a greatly increased (synergistic) probability of contamination and the need for increased vigilance in quality control. A search of the literature suggests that veterinary vaccination procedures have generated greater interest in quality control and awareness of Mycoplasma contamination than human vaccinations. One such study revealed that 6% of commercial vaccines are infected. (60)

There has only been limited research into the evidence of Mycoplasma in the blood of patients with autistic spectrum disorders, but some research does exist. (61)

The hypothesis that covert contamination is responsible for the adverse reactions children experienced following MMR injection does not appear to have been explored.

Evidence against this hypothesis

Until a properly conducted clinical study of the ASD children who regressed following MMR vaccination is carried out there is no evidence against this hypothesis.

CONCLUSION

This hypothesis outlines the possible involvement of the pathogen Mycoplasma fermentans as a potential aetiological agent and that vaccination is one likely conduit for this covert

pathogen and a cause of the symptoms commonly seen in regressive autistic children.

Laboratory tests which recognise the intracellular nature of this pathogen exist to confirm the presence, or otherwise, of Mycoplasma in regressive autistic children.

A properly conducted controlled study should now be carried out, this could result in:

- Treatment protocols for regressive autistic children.
- Improved safety and quality control in vaccine manufacturing procedures.
- Confirmation of Mycoplasma as one cause of regressive autism.
- Innovative research into the role of deciliation in the onset of regressive autism.
- A considerable annual reduction in Autism's costs to governments.

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Essential reading:

Mycoplasmas: Sophisticated, Re-emerging, and Burdened by Their Notoriety. Joel B. Baseman and Joseph G. Tully. *Emerging Infectious Diseases.* Vol 3. No 1.

Healing Lyme Disease Co-infections. Stephen Harrod Buhner ISBN 978-1-62055-008-3