Safety studies of aluminum in vaccines lack immunotoxicity analysis of this immunological adjuvant: Ignorance or deception?

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Background

Vaccine safety authorities such as the US Food and Drug Administration (FDA) and the Australian National Centre for Immunisation Research & Surveillance (NCIRS) use studies such as Mitkus et al.[1] and Jefferson et al.[2] to claim that aluminum adjuvants in vaccines are safe.

Discussion

Mitkus et al.[1] provide the following description of the effect of aluminum adjuvants on the immune system.
"Aluminum adjuvants are important components of vaccines, since they stimulate the immune system to respond more effectively to protein or polysaccharide antigens that have been adsorbed to the surface of insoluble aluminum particles. Specifically, these coated particles are phagocytized by cells of the innate immune system (e.g., macrophages) and activate intracytoplasmic sensors of pathogen-associated molecular patterns located within the cells, such as the nucleotide-binding domain leucine-rich repeat-containing family of sensors ([6]; Schroder and Tschopp [30]). The functional consequence of activation of this intracellular system is the activation of certain enzymatic caspases that cleave pro-interleukin (IL)-1β to interleukin (IL)-1β. The secretion of the mature cytokine, IL-1β, leads to an inflammatory reaction and a downstream Th2-dependent antibody response [7], which amplify the immune response to the antigen. Adjuvanted aluminum, therefore, plays a vital role in facilitating the response that underlies the immunoprotection afforded by vaccines."

The rest of the Mitkus et al. review focuses on body burden of aluminum **after** it is absorbed from the muscle into the blood. They **completely ignored** any negative immunological effects that aluminum can have while it is still in the muscle (following intramuscular vaccine administration).

The quoted paragraph above assumes that the only proteins in the vaccine are viral/bacterial target proteins required for immunoprotection. In that case, as they state, the stimulation by aluminum plays a vital role in generating immunoprotection.
But obviously, vaccines contain numerous other proteins including food proteins (ovalbumin, milk, soy, yeast, oils from sesame, peanut, fish etc.)[3,4], culture medium cell proteins (Vero monkey kidney cell proteins, calf serum proteins, WI38/MRC5 fibroblast cell proteins, chick embryo cell culture proteins etc.)[3], non-target viral/bacterial proteins[5], that are also adsorbed on to the surface of insoluble aluminum particles. As they state then, aluminum adjuvants stimulate the immune system to respond more effectively to ALL these proteins as well. The result is off-target immune responses that includes synthesis of antibodies against any and all of these proteins as well as cell mediated immune responses. The result of such a response of course includes food allergy[6–9], asthma[10], autism[11,12] and autoimmune diseases[13,14].
How can they perform a safety assessment of aluminum in vaccines while **completely ignoring** this immunological effect?

Jefferson et al.[2] reviewed eight studies (listed in Table 2 of Jefferson et al.) on the effect of aluminum adjuvants. Any vaccine will need about 3-4 weeks to take effect. That's how long it takes for the immune system to develop the appropriate immune response and antibodies. For this reason, vaccine effectiveness investigators wait at least one month post vaccination to assess effectiveness.[15] Aluminum compounds are of course an immunological adjuvant in vaccines.[16] So their immunological effect (positive or negative) can only be assessed, if the follow-up period is greater than 4 weeks. Only two out of eight studies in Jefferson et al. had a follow up period of >4 weeks. So rest of the studies they included were useless to assess immunological safety of aluminum adjuvants. Even those two studies ignored immune disorders such as allergies, asthma, autism or autoimmunity. As previously described, all these immune disorders can be initiated by IgE mediated allergy[11] or the Th2 response, which aluminum adjuvants are known to produce.[1,17]So not only were the original studies flawed, Jefferson et al. made the mistake of including these flawed studies in their analysis.

To really evaluate the safety of aluminum salts in vaccines, one would have to account for all known/potential immunological mechanisms involved with aluminum adjuvants. What are the potential negative outcomes due to that mechanism? What tests are needed to check for those outcomes? Would the outcomes be overt disease or will they be sub-clinical effects for years? This would determine follow-up times and decision on serological examination. For example: to assess if aluminum may be increasing the risk of sensitization to cow's milk proteins contaminating the vaccine, one would not only have to wait for 4 weeks after vaccination, but also challenge the patient with cow's milk, pre and post vaccination, to assess the impact. Similarly, to check if aluminum induced an autoimmune disease that may only show up years later, one would have to perform autoimmune serology pre and post-vaccination checking for changes in autoantibody levels, as suggested by Wraith et al.[18] Nobody performs such studies. Why?

In fact, vaccine makers seem to go out of the way to obscure the adverse effects of aluminum adjuvants by injecting aluminum adjuvant into control subjects during vaccine clinical safety trials.[15]

Given this situation, the Jefferson et al. conclusion “Despite a lack of good-quality evidence we do not recommend that any further research on this topic is undertaken.” is inexplicable and raises serious questions about the manner in which vaccine safety investigations are conducted.

Evidence of aluminum adjuvant dangers

Morris et al.[19] have called for the elimination of aluminum adjuvant in vaccines.

Prof. Franco Celada, Dept. of Pathology, NYU School of Medicine, called for safety studies of aluminum adjuvant induced innate immune system activation (personal email communication, Oct 2017) in the context of low affinity self reactive (LASR) T cell mediated autoimmune diseases[13,14] caused by animal protein contaminated vaccines.

Anders et al.[20] have called for the re-evaluation of aluminum adjuvants in vaccines due to its role in boosting IgE mediated responses. In other words, a Th2-dependent antibody response as described by Mitkus et al.[1] and Terhune et al.[21]

Terhune et al.[22] further link Treg dysregulation in atopic disease to aluminum adjuvants.

Shoenfeld et al.[23] describe aluminum adjuvant induced autoimmunity.

Aluminum immunotoxicity followed by neurotoxicity in autism

Many vaccines contain casein or casamino acids of bovine milk origin and are thus contaminated with all bovine milk proteins.[3,24] One such protein is the bovine folate receptor (FR) protein.[25] Such aluminum adjuvanted, bovine FR protein contaminated vaccines can cause IgE mediated sensitization to the FR protein (aluminum adjuvant induced Th2 response[1]).[4,6,10] Since FR concentration in bovine milk is low, the patient can still consume bovine milk without developing an allergic reaction.[25,26] It has been shown that consuming milk when sensitized (via an oral immunotherapy protocol, for example) will result in the synthesis of IgG4 antibodies specific to milk proteins.[8] In this case, bovine milk consumption causes FR specific IgG4 synthesis. These IgG4 antibodies cross-react with human folate receptors. Human and bovine FR proteins have 90% amino acid sequence homology.[27] IgG4 specific to FR is the main antibody involved in binding/blocking folate receptors in the choroid plexus, blocking folate uptake to the brain.[27] This results in cerebral folate deficiency and autism.[28] Folate deficiency in turn, results in aluminum accumulation in the brain and aluminum induced neurotoxicity.[29–31] The source of the aluminum could of course be the diet, pollutant inhalation and aluminum adjuvanted vaccines. Mold et al.[32] have demonstrated such aluminum accumulation in human autistic brain tissue.

Conclusion

The FDA makes a mockery of science by comparing aluminum in vaccines to dietary aluminum.[33] In that case, we should be drinking our aluminum adjuvanted vaccines, instead of intramuscular injection.

The FDA's Mitkus et al. study is titled "Updated aluminum pharmacokinetics following infant exposures through diet and vaccination.". They studied pharmacokinetics - how aluminum moves through the body. While aluminum pharmacokinetics related safety needs to be understood, they cannot ignore aluminum adjuvant immunotoxicity, if they were really interested in vaccine aluminum adjuvant safety. If the FDA is incapable of even determining the appropriate lines of safety investigations required, how can they be in charge of vaccine safety? How can we expect vaccines approved by the FDA to be safe?

Safety needs engineering not tinkering

For decades, vaccinologists have been reluctant to understand the immunological mechanism of how vaccines work, fail or hurt the body. Pulendran et al.[34] write:
"Despite their success, one of the great iro-nies of vaccinology is that the vast majority of vaccines have been developed empirically, with little or no understanding of the immunological mechanisms by which they induce protective immunity. However, the failure to develop vaccines against global pandemics such as infection with human immunodeficiency virus (HIV) despite decades of effort has underscored the need to understand the immunological mechanisms by which vaccines confer protective immunity."

Mojsilovic[16]:
"Some of the first adjuvants discovered back then, on empirical basis of trial and error, are still in widespread use today, but only recently some light on the molecular mechanisms of their action has

been shed."

There seems to be little interest among vaccine developers and regulators in understanding the mechanisms of immunoprotection or immunotoxicity of vaccines and adjuvants. This is no way to build a safety critical product, centuries after its invention.

Since the immunological mechanisms of vaccines are not understood, one would expect that vaccine makers and regulators will be extremely cautious about making vaccine safety claims. One would expect that they will thoroughly investigate even the slightest indication of vaccine-induced adverse events. Instead, we find vaccine makers and regulators collude to hide vaccine safety problems. The Shingrix vaccine was recently approved after an inadequate safety evaluation.[35] The FDA briefing document (Sep 2017) describes serious adverse events (SAEs) including supraventricular tachycardia following Shingrix vaccination in clinical studies. The Shingrix vaccine package insert (revised 10/2017)[36] has no reference to supraventricular tachycardia at all.

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