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Review Article

# Natural Rubber Latex Precautions for Children

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**Abstract**

In immune-sensitive children, repeated exposure to natural rubber latex (hevea brasiliensis proteins) can cause severe allergic manifestations of atopy, increased expression of neurotrophins, increased immunometabolism, hypoxia, cytokine overexpression, anaphylactic shock, and atypical behavioral/cognitive development. Infant products manufactured with natural rubber latex include pacifiers, bottle nipples, teething toys, and vaccines. This review presents FDA and CDC natural rubber latex guidelines and suggests exclusionary measures to decrease the incidence of maladaptive immunity and allergy-induced regressive autism.

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- Atopy

## ABBREVIATIONS

FDA: Food & Drug Administration; CDC: U.S. Centers for Disease Control and Prevention: CDC; IgE: Immunoglobulin E

## INTRODUCTION

This review explores how an exclusionary approach to natural rubber latex (*H brasiliensis*), is a model of care intended to protect immune-sensitive children. We will disclose research that explores the complex interplay of humoral immunity and neurological development in Autism Spectrum Disorders. United States of America health and safety guidelines and a citizen petition to protect consumers from the immunological hazards of *H brasiliensis* are discussed.

Allergies in children are the result of the interaction between genetic and environmental factors on disease expression. Although there is a genetic predisposition, exposure to environmental allergens, irritants, and infection determine a patient's sensitization [1].

Repeated exposure to allergens can cause an increased incidence of sensitization, adverse allergic reactions, and even death through anaphylactic shock. Natural rubber latex (NRL) refers to the milky sap produced by more than 2000 species of plants from about 300 genera [2]. Industrial use of NRL is almost exclusively from the rubber tree *Hevea brasiliensis* which contains more than 200 polypeptides, 56 of which have been identified as allergens associated with IgE-mediated immune responses [3].

Research indicates that many allergies and inflammation of the brain may be the pathogenesis of autism spectrum disorders [4]. Furthermore, the timing, frequency, intensity, and type of exposure to the *H brasiliensis* proteins may also influence the incidence, degree of atypicality, and prevalence of autism spectrum disorders [5,6].

Allergy-induced regressive autism is an immune-response perspective that explores how allergens affect neuro-cognitive development. *H brasiliensis* allergens can trigger IgE antibodies that cross-react with structurally homologous exogenous/endogenous proteins to induce atopy and auto-immunity [7].

### FDA

Citizen Petition Docket No. FDA-2007-P-0243 states that infant products including bottle nipples and pacifiers made from *Hevea brasiliensis* (Hev-b) natural rubber latex are not required to disclose the protein content of those products. The FDA denied the Petition on July 14, 2020 stating, "The available data indicate that the risk for latex allergy is directly linked to high latex exposures in latex-rich environments like hospitals. Although some studies suggest that atopic infants or children may develop latex sensitization without a history of significant environmental exposure, there is a lack of evidence that this sensitization occurs from lower exposure scenarios, such as the use of latex-contact substances such as bottle nipples. We will continue to monitor this issue to determine what actions if any, should be taken in the future" [8].

Dry natural rubber latex, a component in some bottle nipples and pacifiers contains *H brasiliensis* allergens that may cause adverse allergic reactions and possibly behavioral regression in immune-sensitive children. If a parent is concerned about the natural rubber latex allergens in children's products, safety precautions need to be implemented e.g., The only way to avoid latex allergy is to prevent any contact with natural rubber latex products [9].

### CDC

Latex in Vaccine Packaging (Appendix B). "Immediate-type allergic reactions due to latex allergy have been described after

vaccination, but such reactions are rare. If a person reports a severe anaphylactic allergy to latex, vaccines supplied in vials or syringes that contain natural rubber latex should be avoided if possible. If not, if the decision is made to vaccinate, providers should be prepared to treat immediate allergic reactions due to latex, including anaphylaxis" [10].

Dry natural rubber latex, a component in some vaccine packaging and delivery systems, contains *H brasiliensis* allergens that can leach into the vaccine solution causing adverse allergic reactions and possibly behavioral regression in immune-sensitive children. If a parent is concerned about the natural rubber latex allergens in vaccines, safety precautions need to be implemented e.g., request vaccines that state, "Not manufactured with natural rubber latex" [11].

## CONCLUSION

Natural rubber latex (*H brasiliensis*), is a potentially hazardous substance, and immune-sensitive children are particularly vulnerable to sensitization from repeated exposure. Efforts to limit exposure is encouraged to reduce the incidence of maladaptive immunity and allergy-induced regressive autism.

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## REFERENCES

1. Chad Z. Allergies in children. Paediatr Child Health. 2001; 6: 555-566.
2. Carey AB, Cornish K, Schrank P, Ward B, Simon R. Cross-reactivity of alternate plant sources of latex in subjects with systemic IgE-mediated sensitivity to Hevea brasiliensis latex. Ann Allergy Asthma Immunol. 1995; 74: 317-320.
3. Brehler R, Kütting B. Natural rubber latex allergy: a problem of interdisciplinary concern in medicine. Arch Intern Med. 2001; 161: 1057-1064.
4. Theoharides TC, Tsilioni I, Patel AB, Doyle R. Atopic diseases and inflammation of the brain in the pathogenesis of autism spectrum disorders. Transl Psychiatry. 2016; 6: e844.
5. Dochniak MJ. Autism spectrum disorders - Exogenous protein insult. Med Hypotheses. 2007; 69: 545-549.
6. Shen C, Zhao XL, Ju W, Zou XB, Huo LR, Yan W, et al. A proteomic investigation of B lymphocytes in an autistic family: a pilot study of exposure to natural rubber latex (NRL) may lead to autism. J Mol Neurosci. 2011; 43: 443-452.
7. Dochniak MJ, Dunn HD. Allergies & Autism. Nova Science Publishers. 2010.
8. Asthma and Allergy Foundation of America. Latex Allergy.
9. Response Docket No. FDA-2007-P-0243 (formerly 2007P-0486/CP1). Office of Food Additives-Center for Food Safety and Applied Nutrition. 2020.
10. CDC. Latex in Vaccine Packaging. Appendix B.
11. FDA Nonbinding Recommendations. 2014. Recommendations for labeling Medical Products to Inform Users that the Product or Product Container is not made with Natural Rubber Latex.