

State of post-vaccination immunity to infections potentially controlled using immune prophylaxis in children exposed to chemical air pollution

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Abstract

According to WHO vaccine prophylaxis covering 90% of the amenable population is the most effective and economically sound way to manage the epidemic process. At the same time among patients suffered from measles, pertussis and diphtheria, the number of vaccinated exceeds 20.0%. The issue is most relevant for polluted regions. Immunological profile was studied in comparison with the post-vaccination immunity to measles, diphtheria, tetanus and pertussis in 276 children aged 4-7 years, vaccinated according to "National vaccination calendar". The observation group consisted of 219 people living in the area polluted with manganese, lead, chromium, O-cresol and phenol in concentrations up to 1.5-4.0 times higher than MAC day ($p=0.0001$); comparison group (57 children) lived in recreation area. The groups were comparable in terms of age, gender and socio-economic criteria. Chemical-analytical studies were performed using FAAS, GH. Post-vaccination immunity study was carried out by enzyme-linked immune-sorbent assay (ELISA) with test systems to determine the circulating post-vaccination antibodies. Laboratory diagnostics included immune status study. It was found that the content of chemicals in blood of people in observation group is 1.4-4.0 times higher than background levels and 1.2-4.9 times the corresponding values in the comparison group ($p=0.01$ and 0.0001). Besides, there was observed imbalance of antibody-producing and regulatory lymphocyte subsets. The mean levels of post-vaccination antibodies to diphtheria, tetanus, pertussis and measles were 1.3-10.4 times lower than in comparison group ($p=0.0001-0.025$). There was found a connection between the lower level of IgG to the diphtheria toxoid with increasing blood concentration of lead and O-cresol ($R^2=0.09-0.48$; $p\leq 0.0001$); reduction of IgG to the hemophilus pertussis with an increase in chromium and manganese ($R^2=0.76-0.80$; $p\leq 0.0001$). Thus, there is a change in immunological reactivity and a decrease in the immune response to the vaccine antigen in the children living under chronic aerogenic chemical exposure with immunosuppressive effect.

Biography

Nina Zaitseva, by 1996 created and headed 'Perm Science and Research Clinical Institute of Paediatric Eco pathology' which is at present 'Federal Scientific Centre for Medical and Preventive Health Risk Management Technologies'. She is working over development of modern methods of health risk assessment associated with the impact of heterogeneous environmental and occupational factors as well as medical and preventive technologies to minimize the health risk. More than 30 research works are carried out annually. More than 100 normative and methodical documents have been developed for practical implementation. She has over 600 publications that have been cited over 2000 times, and her publication H-index (RSCI) is 24 and has been serving as an editorial board member of reputed Journals.

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