Associated vaccine based on attenuated influenza virus and chimeric pneumococcal polypeptide against mono- and mixed infections of influenza and *S. Pneumoniae*.

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Introduction. Many influenza-related deaths are attributable to secondary bacterial infection with S. pneumonia, which presents the most common cause of community-acquired pneumonia. We develop the basis for associated influenza and pneumococcal vaccine that elicit a wider breadth of protection. Previously, we demonstrated that mixed immunization using live attenuated influenza vaccine (LAIV) and recombinant peptides of Group B Streptococcus (GBS) most effectively protected mice from sequential reinfection with heterologous influenza and pneumococcal super-infection. Here we investigate a protective effect of associated vaccination based on LAIV and pneumococcal recombinant peptides against double influenza and *S. pneumoniae* infection.

Methods. CBA mice were intranasally immunized using A/17/California/09/38(H1N1)pdm LAIV in combination with chimeric protein (PSPF), composed of *S. pneumoniae* three surface protein fragments (Suvorov A., et al., 2015). The boost-vaccination was carried out twice three weeks apart. We evaluated the protective effect of mono- or combined vaccine preparations against sub-lethal challenge with a drift variant A/South Africa/3626/13 (H1N1)pdm influenza virus, under pneumococcal super-infection conditions.

Results. Combined H1N1 LAIV+ PSPF vaccination provided advantageous protection against double H1N1 and *S. pneumoniae* serotype 3 infections and significantly improved bacterial clearance from the lungs of mice compared to separate implementation of LAIV or PSPF as a mono-vaccine. The use of LAIV alone significantly reduced infectious virus in the lungs and decreased the number of CFU of pneumococci.

Conclusions. Our results in mouse model show that for successful protection against influenza complicated by pneumococcal infection, the recombinant pneumococcal polypeptides can be administered directly by mixing with LAIV. The use of LAIV decreased a manifestation of influenza infections after the boost-immunization and contributed to reduce pneumococcal contamination in the lungs.