Nasal spray vaccines more effective against flu

April 12 2011

Nasal vaccines that effectively protect against flu, pneumonia and even bioterrorism agents such as Yersinia pestis that causes the plague, could soon be a possibility, according to research presented at the Society for General Microbiology's Spring Conference in Harrogate. Professor Dennis Metzger describes how including a natural immune chemical with standard vaccines can boost their protective effect when delivered through the nose.

The respiratory tract is a major entry site for various viral and bacterial pathogens. However there are few approved vaccines that can provide optimal protection against them due to the low immune response at muscosal surfaces such as the nasal passage.

Combining standard vaccines for respiratory pathogens with the immune chemical, interleukin-12 (IL-12) and delivering them intranasally to mice has been shown to induce high levels of protection. Vaccines against various respiratory pathogens were tested, including influenza virus, pneumococcal bacteria and Yersinia pestis - a Category A Biothreat. IL-12 is a natural immune chemical, known as a cytokine. It is a powerful stimulator of the immune response through its interactions with other immune chemicals and the white blood cells that produce them.

Professor Metzger from Albany Medical College, New York explains the significance of the findings. "Infectious agents still account for around 25% of deaths worldwide and the major killers are acute

respiratory infections. However, it is difficult to induce immunity at the site of entry and so standard vaccines are only partially protective," he said. "Intranasal vaccination gets around this problem by inducing immunity in the pulmonary passage. This prevents initial infection as well as systemic complications". Up until now, nasal vaccination has only resulted in sufficient immune responses for very specific types of vaccine. "We now have evidence that this method could work for a wide range of vaccines when IL-12 is included in formulation," said Professor Metzger.

Nasal vaccines could have a number of other advantages over vaccines that must be injected. "Vaccination via a nasal spray is a non-invasive procedure that is easier than administering vaccines by injection. In addition our results have shown that antibodies induced by intranasal vaccination are effective not only in preventing infection but can also protect the pulmonary tract in a therapeutic manner after pathogen exposure," explained Professor Metzger. "In the case of a bioterrorism threat or an influenza pandemic, this is significant." The next step is to perform clinical trials to determine whether including IL-12 with intranasal vaccines are effective in the human population.

Provided by Society for General Microbiology