New and innovative approach for successful vaccination against chlamydia infections

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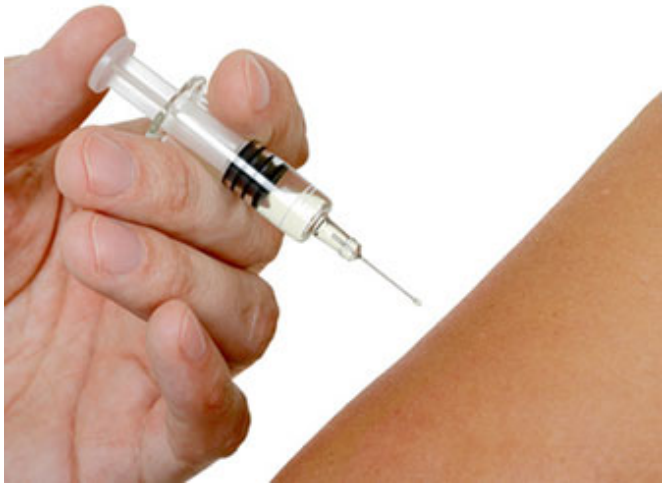

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chlamydiae are the most common sexually transmitted bacterial pathogens in the world. Every year, around 100 million people contract chlamydia infections, which are one of the main causes of female infertility and ectopic pregnancies and can also lead to blindness – especially in developing countries. Now, for the first time in the world, an international research team including Georg Stary from the University Clinic of Dermatology at MedUni Vienna has discovered how to stimulate the immune response to chlamydiae both efficiently and preventively. The research results have now been published in the leading *Science* journal.

A chlamydia infection causes inflammation of mucous membranes. In the first stage of the disease, sufferers hardly notice anything. Stary says, "In every second person, the disease produces no symptoms. If it is discovered at an early stage, it is, in principle, easily treated with antibiotics. However, if the infection is not picked up in the early stages, it can progress into a chronic form and then antibiotics are mostly ineffective."

Stary: "All previous attempts to immunise humans against chlamydia infections have not only failed but, in some cases, even made them more susceptible to infection with chlamydiae." Now the international working group at Harvard Medical School Boston, where Stary has been working for the last four years, has successfully managed to mimic a chlamydia infection in a mouse model using nanotechnology and then to develop a protective vaccine, which activates two waves of immune cells, and which is administered directly to the mucosa – in the nose, for example.

Turbo-charged immune response

The procedure involved binding inactive chlamydiae to immune stimulants as an adjuvant by means of special nanoparticles. Administration of this complex of pathogen and adjuvant via a mucosal surface (e.g. in the nose) serves to inform memory cells in lymph nodes about the nature and location of the supposed infection. In addition to the memory cells circulating in the blood, this also generates immune cells, which migrate directly into the mucosa, where they form a reservoir of tissue-specific memory cells. "The combination of these two waves of memory cells is required to guarantee optimum immunological protection in the event of infection," explains Stary. "That is why the vaccination must be administered via the mucous membrane. The antigen must carry this adjuvant, which acts like a turbocharger for the human immune response. Both the antigen and the adjuvant are completely useless on their own."

According to MedUni Vienna-Dermatology, this finding could also lead to the successful development of an effective strategy for vaccinating against other types of mucosal infection.

More information: "A mucosal vaccine against

Chlamydia trachomatis generatest two waves of protective memory T cells."
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Provided by Medical University of Vienna

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