Less is more! Nanopatch is 100 times better than needle and syringe

April 22 2010

(PhysOrg.com) -- New research, led by Professor Mark Kendall, from UQ's Australian Institute for Bioengineering and Nanotechnology, demonstrates that a vaccine delivered by a Nanopatch induces a similarly protective immune response as a vaccine delivered by needle and syringe, but uses 100 times less vaccine.

This discovery has implications for many vaccination programs in both industrialised and developing nations, which must overcome issues with vaccine shortages and distribution.

Being both painless and needle-free, the nanopatch offers hope for those with needle phobia, as well as improving the vaccination experience for young children.

"The Nanopatch targeted specific antigen-presenting cells found in a narrow layer just beneath the skin surface and as a result we used less than one hundredth of the dose used by a needle while stimulating a comparable immune response," Professor Kendall said.

"Our result is ten times better than the best results achieved by other delivery methods and does not require the use of other immune stimulants, called adjuvants, or multiple vaccinations. Because the Nanopatch requires neither a trained practitioner to administer it nor refrigeration, it has enormous potential cheaply deliver vaccines in developing nations," he said.

Professor Kendall said the Nanopatch was much smaller than a postage stamp and comprised of several thousands of densely packed projections invisible to the human eye.

The influenza vaccine was dry coated onto these projections and applied to the skin of mice for two minutes. "By using far less vaccine we believe that the Nanopatch will enable the vaccination of many more people," Professor Kendall said.

"When compared to a needle and syringe a nanopatch is cheap to produce and it is easy to imagine a situation in which a government might provide vaccinations for a pandemic such as swine flu to be collected from a chemist or sent in the mail.

"This is an exciting discovery and our next step is to prove the effectiveness of Nanopatches in human clinical trials," he said.

Professor Kendall's team includes researchers from UQ's Diamantina Institute for Cancer, Immunology and Metabolic Medicine and Faculty of Health Sciences, as well as the University of Melbourne.

The work was supported by the Australian Research Council, the National Health and Medical Research Council, and the Queensland Government's Smart State Scheme.

More information: Australian Institute for Bioengineering and Nanotechnology - www.aibn.uq.edu.au/

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