Sugarcoating can provide extra power to pneumonia vaccine

By Dr Swati Subodh

New Delhi, April 24 (India Science Wire): We all know about sugar-coated pills but what about sugar-coated vaccines?

Sugars, for scientists, are fascinating since these are also found as protective sheaths on the surface of many bacteria and can induce protection against future bacterial infections when used as vaccines.

A group of scientists from Indian Institute of Technology at Tirupati, IIT Madras and Max Planck Institute for Colloids and Interfaces in Potsdam, Germany, have developed a semi-synthetic vaccine against pneumonia causing bacteria using a combination of three different sugar molecules.

They have shown that when used in combination with the existing vaccine, Prevnar 13, the new concoction offers broader protection against more variants of the pneumonia causing bacteria, including the dangerous ST8 bacteria which causes severe lung infection and is resistant against common antibiotics. “Synthetic carbohydrate (sugar) vaccines represent a paradigm shift within vaccine research; they are more precise, effective and easier to manufacture than conventional vaccines,” pointed out lead researcher Peter Seeberger.

For a long time scientists have faced various challenges in preparing vaccines directly from infecting bacteria. The preparations invariably have contamination from other surface sugars thereby lowering the vaccine’s overall effectiveness. In addition, preparing vaccines by conventional methods is tedious, expensive and often less efficacious against all circulating variants of the infecting bacteria.

It is for this reason that the synthesis of the ST8-effective sugar vaccine is a milestone on the way to a new generation of tailor-made vaccines. These synthetic vaccines resemble the bacteria’s surface structure which actually induces body’s protective response. Identification of this surface sugar component is the biggest bottleneck, however once it is overcome the design, synthesis and testing in the laboratory is fairly fast paced. This approach is therefore being viewed as a big medical advancement in vaccine research.

The semi-synthetic vaccine has had a successful round of evaluations in laboratory animals like mice and rabbit. It is now being developed for human use at Max-Planck Institute’s spin off company, Vaxxilon AG.

The multi-institutional team included B.Schumann, H.S.Hahm, S.G.Parameswarappa, K.Reppe, A.Wahlbrink, S.Govindan, P.Kaplonek, L.A.Pirofski, M.Witzenrath, C.Anish and C.L.Pereira. The research results were published recently in journal *Science Translational Medicine*.

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