New and Better Method to Test Tetanus Vaccine

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A new method that uses aptamers or chemical antibodies to detect tetanus toxoid in the tetanus vaccine is better than the conventional method to test vaccine efficacy and purity, claim scientists at the National Institute of Pharmaceutical Education and Research, Punjab in a recent study.

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Tetanus or lockjaw is caused by a soil-dwelling bacterium that causes painful tightening of the muscles of the body after infection. Tetanus is preventable by injecting tetanus vaccine that is made from the tetanus toxoid. Earlier, the process of manufacturing tetanus vaccine involved testing it on animals for its efficacy and safety. Later, testing on animals was replaced by a simple lab assay called ELISA that uses antibodies to detect the tetanus toxoid in the vaccine. However, using antibodies for testing the vaccine suffers from many drawbacks. Antibodies show batch-to-batch variation in their detection capacity, they degrade during transport, and have limited modifiability.

Researchers at National Institute of Pharmaceutical Education and Research, Punjab have synthesized new aptamers or chemical antibodies and a method that could replace conventional antibodies for testing the efficacy and purity of tetanus vaccine. Aptamers are small RNA or DNA molecules that are chemically synthesized and show high sensitivity and specificity to detect RNA, DNA or proteins, if designed and synthesized appropriately.

Scientists also replaced the conventional ELISA procedure with a modified procedure called ALISA that uses aptamers instead of antibodies. Scientists advocate replacing the existing antibody-based method with the new method by saying, "…the method developed here can measure changes in antigenicity of tetanus toxoid occurring during the production, storage and transport steps and has comparable sensitivity to conventional ELISA. Thus, it may replace the antibody in the analytical measurement".

Antibodies require cold chain transport, hence, using aptamers that remain stable at high temperatures would cut costs and reduce dependability and prove to be better alternatives for testing vaccines.

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