A review on E. coli expression Polysaccharide conjugate vaccine against pneumococcal invasive diseases

Mr. Utkalendu Suvendusekhar Samantaray

Virchow Biotech Pvt. Ltd, India

Abstract

This review describes the latest advancements on polysaccharide conjugate vaccine against pneumococcal invasive diseases as well as the current vaccine recommendations in children and adults. Every year, pneumococcal infections are becoming more dangerous and specifically during this COVID-19 pandemic, the mortality rate has been increased substantially. Since 2005, WHO has been strongly warned about the infection and death rate of this invasive disease caused by the bacteria Streptococcus pneumonia. Due to the high mortality and morbidity rate, healthcare researchers and pharmaceutical giants have been working on latest technologies and platforms to reduce the pneumococcal infection since past 30 to 40 years with a best vaccine material. This review is particularly focusing on recent researches in polysaccharide conjugate vaccine, which can be expressed in E. coli expression system for bulk or mass production. The cell wall of pneumococci contains a number of immunologically distinct polysaccharides, which protects them from opsonophagocytosis, which is the main mechanism for the clearance of pneumococci from lungs. Many biopharmaceuticals have targeted these polysaccharides as major antigens and virulence factors to develop a suitable vaccine. In fact, US FDA have approved a few vaccine candidates consists of capsular polysaccharide serotypes, and PPSV23 have proved to be effective having some minor adverse side effects like swelling in injectable area, fatigue, headache etc.

There are several variants developed in order to inject the vaccine in different age groups basing on the composition of number of polysaccharide chains attached in the variant. Some of the variants include PCV7, PCV13 etc. The polysaccharides present in the vaccine are covalently attached with each other forming a glycoprotein vaccine, which are best known to be produced by an in vivo enzymatic coupling using general glycosylation pathway in campylobacter jejuni in an engineered E. coli for larger scale production. As a standard prokaryotic expression, production though engineered E. coli is time consuming, less expensive and most importantly low income countries can also scale of their production to avail the vaccines to each and every individual.

Biography:

Utkalendu Suvendusekhar Samantaray has been completed his master's in biotechnology from MITS School of biotechnology affiliated under Utkal university. He has worked on many research papers including biochemistry, anti-oxidant development, plant growth microbes, nanotechnology, etc.

Speaker Publications:

1. "Molecular mechanism of anti-inflammatory & anti-allergic phytochemicals: A Methodical Review"
2 "ACE Inhibitory activity, total phenolic and flavonoid content of Pteris and Dryopteris leaves extract"
3. "AgNPs Biosynthesis and Antimicrobial properties"
4. "Development of oral COVID-19 vaccine from attenuated plant covid-19 virus; Mini review"
5. "Green Synthesis of Copper Nanoparticles & Evaluation of Its Antioxidant Potential"

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