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Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
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Adjuvants for Paediatric Vaccines

Double stranded DNA/RNA as an adjuvant to upregulate and bias towards a Th1 response

Overview

Ligands for DNA/RNA sensing intracellular pathogen recognition receptors (PRRs) i.e. dsDNA/dsRNA can be used as an adjuvant to upregulate and bias towards a Th1 response. This is of particular use in vaccinations targeted towards neonates, as neonates have a diminished Th1 response to ligands targeting intracellular TLRs which are common targets for intracellular adjuvants. TLR activation mainly induces Th2/Th17 responses in neonates rather than Th1 responses. This technology engages specific signalling pathways that result in an immune response specifically designed to clear intracellular pathogens and thereby inducing a Th1 cell mediated response.

A Th1 response leads mainly to cell-mediated immunity, which is vital in the fight against intracellular pathogens, such as invasive bacteria and viruses. These are the infections to which neonates and children are highly susceptible.

Advantages

- Adjuvant specifically targeted towards neonatal and paediatric immune response, upregulating Th1 response
- Ability to improve vaccine efficacy and reduce need for boosters thereby improving compliance

- Closes 'window of vulnerability' i.e. time when infants maternal antibodies drop prior to infant immune system maturation thus preventing life-threatening disease in early life.

Applications

Neonatal and paediatric vaccine adjuvants

Activation of the juvenile immune system as potential therapy for intracellular pathogenic infection, cancer or allergy

Technology Status

Proof of concept seeking partnering or licensing to develop further.

Publications

Brennan K. et al., *"Type 1 IFN Induction by Cytosolic Nucleic Acid Is Intact in Neonatal Mononuclear Cells, Contrasting Starkly with Neonatal Hyporesponsiveness to TLR Ligation Due to Independence from Endosome-Mediated IRF3 Activation".* J Immunol. 2018 Aug 15;201(4):1131-1143. doi: 10.4049/jimmunol.1700956. Epub 2018 Jul 6. PMID: 29980613.

https://pubmed.ncbi.nlm.nih.gov/29980613/

Opportunity

Available to licence
Research collaboration

Technology Sector
Vaccine development

Patent Details
Patent applications filed at the EPO and USPTO

Assignee – Trinity & Teagasc

Link to PCT Application

WO2019229137

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