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Protein Carriers for Vaccines

Inactivated bacterial toxins are widely used as protein carriers in licensed vaccines. Typically oligosaccharides are chemically conjugated to these carriers to induce a more robust immune response against the carbohydrate. For example, capsular polysaccharides from *Neisseria meningitidis* are conjugated to DT, CRM₁₉₇ or TT (Pace *et al* 2009, Dbaiibo *et al* 2013); these carriers are adept at engaging T cells to react to the conjugated polysaccharides. Tetanus toxoid has been shown to add much greater efficacy to carbohydrate vaccines such as from *Streptococcus pneumoniae* (Harding *et al*, 2012). Preparation of conjugate vaccines is reviewed in Costantino *et al*, 2011 and Bröker M *et al*, 2009.

References

Use of protein carriers in vaccines:

Dbaiibo G, El-Ayoubi N, Ghanem S, Hajar F, Bianco V, Miller JM, Mesaros N. (2013) Immunogenicity and safety of a quadrivalent meningococcal serogroups A, C, W-135 and Y tetanus toxoid conjugate vaccine administered to adults... *Drugs Aging* 30(5):309-19.

Harding SE, Abdelhameed AS, Morris GA, Adams G, Laloux O, Cerny L, et al (2012) Solution properties of capsular polysaccharides from *Streptococcus pneumoniae*. *Carbohydrate Polymers* 90: 237–242.

Pace D, Pollard AJ, Messonier NE (2009) Quadrivalent meningococcal conjugate vaccines. *Vaccine* 27(Suppl.):B30–41.

Chemistry used for conjugation of oligosaccharides to vaccine carriers:

Costantino P, Rappuoli R, Berti F (2011) The design of semi-synthetic and synthetic glycoconjugate vaccines. *Expert Opinion on Drug Discovery* 6:1045–66

Bröker M, Dull PM, Rappuoli R, Costantino P (2009) Chemistry of a new investigational quadrivalent meningococcal conjugate vaccine that is immunogenic at all ages. *Vaccine* 27:5574–80.