Lipopolysaccharide, polysaccharide and polysaccharide–conjugate vaccines LPS, the major component of the outer leaflet of Gram–negative bacteria [17], is generally pyrogenic and toxic when administered in a purified state and therefore pure LPS, or vaccines containing LPS, are generally considered too toxic to be used as vaccines in humans.A factor complicating vaccination with pili preparations is that different bacterial strains produce DNA and viral vector vaccines DNA vaccines have emerged as an attractive approach for antigen–specific immunotherapy.Mutations in the aroA gene have been utilized with several other pathogens, including Salmonella species [93] for the production of live, attenuated vaccine Pili and type III secretion system vaccines Type IV pili are long, flexible filaments that extend from the surface of Gram–negative bacteria and are formed by the polymerization of pilin monomers [98].Unfortunately, the Ansorg typing system can no longer be used, since type strains and Outer membrane protein vaccines Compared to the high heterogeneity of O–PS and moderate serologic variation among flagella molecules, the P. aeruginosa major outer membrane proteins F (OprF) and I (OprI) are highly conserved [68].Thus, it is unlikely that similar strategies will be Flagella vaccines The polar flagella of P. aeruginosa is a polymer of a protein filament which can be divided into one group that is a 53 kDa protein referred to as the b–type and a heterogeneous 45–52 kDa structure referred to as the a–type.

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