Tripalmitoyl-S-glyceryl-cysteine-dependent OspA vaccination of toll-like receptor 2-deficient mice results in effective protection from Borrelia burgdorferi challenge.

Abstract:
Toll-like receptor 2 (TLR2) is a transmembrane signal transducer for tripalmitoyl-S-glyceryl-cysteine (Pam(3)Cys)-modified lipoproteins, including OspA from the Lyme disease spirochete Borrelia burgdorferi. The Pam(3)Cys modification provides adjuvant activity for inducing humoral responses, suggesting that TLR2 could function as the adjuvant receptor for the OspA vaccine. The importance of TLR2 in the humoral response to OspA was confirmed, because overall levels of immunoglobulin G (IgG) were reduced in TLR2-deficient mice, when compared with those in wild-type mice. However, the levels of production of IgG1 were similar in both mouse strains, and the levels of induction of protective immunity were comparable. Unlipidated OspA was not immunogenic in wild-type or TLR2-deficient mice, indicating the lipid modification was active in the absence of TLR2. These findings indicate that the Pam(3)Cys modification of bacterial lipoprotein has adjuvant properties independent of TLR2 signaling.