The mucosal adjuvant macrophage-activating lipopeptide-2 directly stimulates B lymphocytes via the TLR2 without the need of accessory cells.

The macrophage-activating lipopeptide-2 (MALP-2) is an agonist of the TLR heterodimer 2/6, which exhibits potent activity as mucosal adjuvant, promoting strong humoral and cellular responses. Although B cells expressing TLR2/6 are potential targets, very little is known about the effect of MALP-2 on B cells. Studies were performed using total spleen cells or purified B cells from WT mice or animals deficient in TLR2, T cells, B cells, or specific subpopulations of B cells. They demonstrated that MALP-2 promotes a T cell-independent activation and maturation of B cells (mainly follicular but also B-1a and marginal zone B cells) via TLR2. MALP-2 also increased the frequency of IgM- and IgG-secreting cells, but bystander cells were required for IgA secretion. Activated B cells exhibited increased expression of activation markers and ligands that are critical for cross-talk with T cells (CD19, CD25, CD80, CD86, MHC I, MHC II, and CD40). Immunization of mice lacking T cells showed that MALP-2-mediated stimulation of TLR2/6 was unable to circumvent the need of T cell help for efficient Ag-specific B cell activation. Immunization of mice lacking B cells demonstrated that B cells are critical for MALP-2-dependent improvement of T cell responses. The knowledge emerging from this work suggests that MALP-2-mediated activation of B cells
through TLR2/6 is critical for adjuvanticity. B cell stimulation by pattern recognition receptors seems to be a basic mechanism that can be exploited to improve the immunogenicity of vaccine formulations.