VesiVax® TLR4: Conjugatable Adjuvant Lipid Vesicles

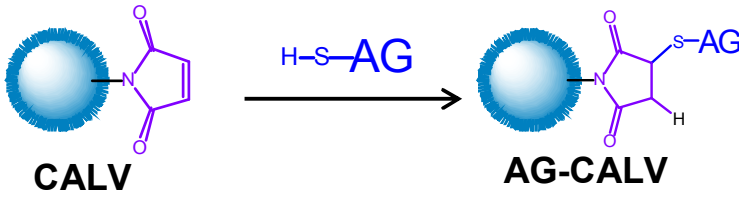
The VesiVax® TLR4 conjugatable adjuvant lipid vesicle kit

The VesiVax® TLR4 conjugatable adjuvant lipid vesicles (CALV) kit is designed to provide vaccinologists and immunologists access to the excellent immunostimulatory properties of the VesiVax® system[1,2,3]. The VesiVax® TLR4 CALV kit has recently been developed in order to provide an easy to use adjuvant/antigen delivery method that will consistently stimulate immune responses that are better than commonly used adjuvants, such as alum or Freund's adjuvant. The CALV allows the researcher to chemically couple the antigen(s) (AG) of interest to the surface of our immunogenic liposomes.

How the VesiVax® TLR4 kit works

The VesiVax® TLR4 CALV kit contains nanoparticulate liposomes produced in conformance with tight physicochemical specifications that remain stable for an extended period of time. After nearly a decade of research in which an extensive set of liposome formulations were screened to establish the most immunogenic compositions, the VesiVax® TLR4 CALV kit is now available for vaccinologists and immunologists to use in their research.

Scheme 1. Conjugation of a sulfhydryl-containing AG.



The VesiVax® TLR4 CALV have maleimide groups on the surface that are available for conjugation to any sulfhydryl-containing AG (*e.g.*, a peptide, protein or carbohydrate) of choice (see **Scheme 1**). To conjugate the AG to the VesiVax® TLR4 CALV, the researcher simply mixes the antigen of interest with VesiVax® TLR4 CALV, purifies the conjugated liposomes if desired, and then uses them as a research tool in vaccination and/or immunology studies.

Proof of concept studies

Multiple studies in different laboratories were conducted and demonstrated effectiveness. For example, the VesiVax® PGA TLR4 CALV was evaluated by Professor Zhengrong Cui using a synthetic peptide representing poly-γ-D-glutamic acid (PGA) as a model antigen. The PGA peptide was synthesized with a cysteine located at the N-terminus. The PGA antigen has been shown to play a potential role in the protective immune response against *B. anthracis*. PGA itself is not particularly immunogenic. Groups of mice (n = 5-7) were vaccinated (s.c.) with 15 µg PGA in 100 µL VesiVax® PGA TLR4 CALV on days 0, 14 and 28, and then bled by cardiac puncture on day 52. The serum was collected and assayed for antigen specific antibody titers and isotypes. As controls, mice received immunizations consisting of liposomes without PGA and/or without adjuvant, and PGA-BSA/Alum (25 µg).

Figure 1. Anti-PGA response induced by VesiVax® PGA TLR4 CALV.

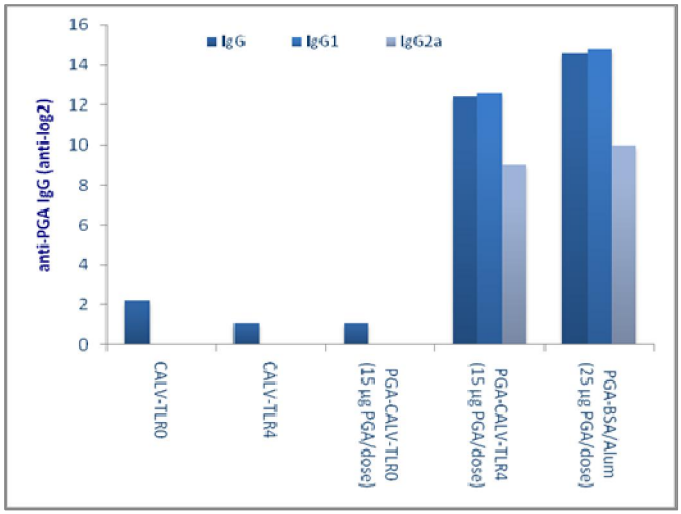


Figure 1 shows that the VesiVax® PGA TLR4 CALV induced high anti-PGA IgG antibody titers, though slightly lower than that induced by PGA-BSA/Alum presumably, due to the higher dose of PGA (25µg in the alum control vs. 15µg in the liposomal PGA) administered in the alum control. Antibody isotyping shows that the VesiVax® PGA TLR4 CALV liposomes stimulated both anti-PGA IgG1 and IgG2a antibodies with a slight bias towards IgG1.

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For laboratory use only in research animals or for tests *in vitro*; NOT for use in humans.

References

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2. Ernst W.A., *et al*. (2006). Protection against H1, H5, H6 and H9 influenza A infection with liposomal matrix 2 epitope vaccines. *Vaccine*. **24**, 5158-5168
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