PHAD®, 3D-PHAD®, and 3D(6A)-PHAD® have been tested extensively in animals using a variety of antigens. In all cases, these adjuvants exhibit a similar activity and safety profile to bacterially-derived MPL. The data below demonstrate the equivalency of the three synthetic adjuvants to the bacterially-derived MPL when presented in a liposomal carrier system (DMPC/DMPG/Cholesterol).

PHAD® is a synthetic structural analog of monophosphoryl Lipid A (MPLA) that has been shown to boost the immune system through activation of the toll-like receptor 4 (TLR4) resulting in production of proinflammatory cytokines and antigen-specific effector CD4+ and memory CD8+ T cells. Also referred to as GLA, this adjuvant has been administered to well over 1000 human subjects without serious adverse events. PHAD® is available in bulk quantities for vaccine development and commercial manufacturing.

The MPLA structural analog, 3D(6-acyl)-PHAD®, is the synthetic MPLA most closely related to the reported structure of MPLA® Adjuvant used in GSK’s Adjuvant Systems AS01, AS02, and AS04. As with other synthetic MPLA analogs manufactured by Avanti, it is structurally homogeneous and highly purified, and mimics the TLR4 agonist activity of bacterial MPLA.

PHAD®-504 was designed as a synthetic structural analog of detoxified MPLA derived from E. coli lipopolysaccharide (LPS). It is structurally similar to PHAD®, differing only in the length of a single fatty acid chain. As expected, the activity of PHAD®-504 is quite similar to that of PHAD®, making the two products interchangeable as adjuvants in vaccine or immunotherapy formulations.

Avanti manufactures monophosphoryl Lipid A (MPLA) by hydrolysis of endotoxin lipopolysaccharide (LPS) isolated from Salmonella minnesota R595. MPLA is purified from the hydrolysate and contains a mixture of structural analogs containing differing numbers of fatty acids and positional isomers. The detoxified MPLA acts as a toll-like receptor 4 (TLR4) agonist, and hydrolysis of LPS to yield MPLA retains the activity of stimulating the adaptive immune response while eliminating many of the pro-inflammatory side effects experienced with LPS.

Data kindly provided by Dr. Carl R. Alving, Walter Reed Army Institute of Research.
Incorporation of the glycolipid trehalose 6,6’-dibehenate (TDB) into cationic liposomes composed of the quaternary ammonium compound dimethyldioctadecylammonium (DDA) produce an adjuvant system which induces a powerful cell-mediated immune response and a strong antibody response, desirable for a high number of disease targets.


