~~WHAT IS~~ CLAIM~~ED I~~S:

~~Claim~~ 1. An adjuvant formulation comprising ~~a monophosphoryl lipid A (MPLA)-containing liposome composition and at least one saponin, wherein the liposome composition comprises i) a lipid bilayer composing phospholipids in which the hydrocarbon chains have a melting temperature in water of > 23°C and ii) cholesterol at a mole percent concentration of greater than about 50% (mol/mol).~~ unilamellar liposomes having a liposome bilayer that consists of:

(a) at least one phosphatidylcholine (PC) and/or phosphatidylglycerol (PG), as phospholipids, selected from the group consisting of: dimyristoyl phosphatidylcholine (DMPC), dipalmitoyl phosphatidylcholine (DPPC), distearyl phosphatidylcholine (DSPC), dimyristoyl phosphatidylglycerol (DMPG), dipalmitoyl phosphatidylglycerol (DPPG), and distearyl phosphatidylglycerol (DSPG);

(b) cholesterol;

(c) monophosphoryl lipid A (MPLA); and

(d) a saponin; and

wherein the mole ratio of the cholesterol (b) to the phospholipids (a) is greater than about 50:50; and wherein the unilamellar liposomes have a median diameter size in micrometer range as detected by light scattering analysis.

~~Claim~~ 2. The adjuvant formulation of claim 1, wherein the saponin is ~~selected from~~ QS-7, QS-18, QS-21, or a mixture thereof.

~~Claim~~ 3. The adjuvant formulation of ~~either~~ claim 1 ~~or claim 2~~, wherein the saponin is QS-21.

~~Claim~~ 4. The adjuvant formulation of ~~any one of~~ claim~~s~~ 1~~-3~~, wherein the mole ratio~~liposome composition comprises~~ of the cholesterol (b) to the phospholipids (a) is ~~at a mole percent concentration of~~ about 55:45 ~~%~~ to about 71:29~~% (mol/mol)~~.

~~Claim~~ 5. The adjuvant formulation of ~~any one of~~ claim~~s~~ 1~~-4~~, wherein the ~~liposome composition comprises cholesterol at a~~ mole ratio of the cholesterol (b) to the phospholipids (a) is ~~percent concentration of~~ about 55:45~~% (mol/mol)~~.

~~Claim~~ 6. The adjuvant formulation of ~~any one of~~ claim~~s~~ 1~~-5~~, wherein the ~~liposome comprises a phosphatidylcholine (PC) selected from the group consisting of:~~ dimyristoyl phosphatidylcholine (DMPC), is selected as a phospholipid~~dipalmitoyl phosphatidylcholine (DPPC), and distearyl phosphatidylcholine (DSPC)~~.

~~Claim~~ 7. The adjuvant formulation of claim 6, wherein additionally, ~~the liposome composition further comprises a phosphatidylglycerol (PG) selected from the group consisting of:~~ dimyristoyl

phosphatidylglycerol (DMPG)~~,~~ is selected as a phospholipid~~dipalmitoyl phosphatidylglycerol (DPPG), and distearyl phosphatidylglycerol (DSPG)~~.

~~Claim~~ 8. The adjuvant formulation of claim 1~~7~~, wherein both a PC and a PG are selected as phospholipids, and wherein the ratio of the PC to the PG (mol/mol) is about 0.5:1, about 1:1, about 2:1, about 3:1, about 4:1, about 5:1, about 6:1, about 7:1, about 8:1, about 9:1, about 10:1, about 11:1, about 12:1, about 13:1, about 14:1, or about 15:1.

9. ~~The adjuvant formulation of any one of claims 1-8, wherein the liposome composition comprises about 5 mg or less, about 4 mg or less, about 3 mg or less, about 2 mg or less, about 1 mg or less, about 0.9 mg or less, about 0.8 mg or less, about 0.7 mg or less, about 0.6 mg or less, about 0.5 mg or less, about 0.4 mg or less, about 0.3 mg or less, about 0.2 mg or less, about 0.1 mg or less, about 0.09 mg or less, about 0.08 mg or less, about 0.07 mg or less, about 0.06 mg or less, about 0.05 mg or less, about 0.04 mg or less, about 0.03 mg or less, about 0.02 mg or less, or about 0.01 mg or less of MPLA (total weight per ml liposome suspension).~~ A liposome suspension comprising the adjuvant formulation of claim 1 and phosphate-buffered saline (PBS), pH 7.4, wherein the liposome suspension comprises (i) 1.272 mM to 50 mM of the phospholipids (a), and (ii) about 5 mg/ml or less of the MPLA (c).

~~Claim~~ 10. The adjuvant formulation of ~~any one of~~ claim~~s~~ 1~~-9~~, wherein the ~~liposome composition has a MPLA:phospholipid~~ mole ratio of the MPLA (c) to the phospholipids (a) is ~~of~~ about 1:5.6 to about 1:880~~, or about 1:88 to about 1:220~~.

~~Claim~~ 11. ~~The adjuvant formulation of any one of claims 1-10, wherein the content of saponin (total weight per ml liposome suspension) is about 1 mg or less, about 0.9 mg or less, about 0.8 mg or less, about 0.7 mg or less, about 0.6 mg or less, about 0.5 mg or less, about 0.4 mg or less, about 0.3 mg or less, about 0.2 mg or less, about 0.1 mg or less, about 0.09 mg or less, about 0.08 mg or less, about 0.07 mg or less, about 0.06 mg or less, about 0.05 mg or less, about 0.04 mg or less, about 0.03 mg or less, about 0.02 rng or less, or about 0.01 mg or less.~~ A liposome suspension comprising the adjuvant formulation of claim 1 and phosphate-buffered saline (PBS), pH 7.4, wherein the liposome suspension comprises (i) 1.272 mM to 50 mM of the phospholipids (a), and (ii) about 1 mg/ml or less of the saponin (d).

~~Claim 12. The adjuvant formulation of any one of claim 1-11, wherein the liposome composition comprises multi-lamellar vesicles (MLV) or small uni-lamellar vesicles (SUV), wherein small uni-lamellar vesicles are about 50 to about 100 mn in diameter, and wherein multi-lamellar vesicles are about 1 to about 4µm in diameter.~~

~~Claim~~ 12~~3~~. An immunogenic composition comprising an immunogen and the adjuvant formulation of ~~any one of~~ claim~~s~~ 1~~-12~~.

~~Claim~~ 134~~4~~. The immunogenic composition of claim 123~~3~~, further comprising a physiologically acceptable vehicle.

~~Claim~~ 145~~5~~. The immunogenic composition of ~~either~~ claim 123~~3 or claim 14~~, wherein the immunogen is selected from the group consisting of a naturally-occurring or artificially-created protein, a recombinant protein, a glycoprotein, a peptide, a carbohydrate, a hapten, a whole virus, a bacterium, a protozoan, and a virus-like particle.

~~Claim~~ 156~~6~~. The immunogenic composition of claim 145~~5~~, wherein the immunogen is an HIV-1 envelop protein.

~~Claim 17. A method of immunizing an animal comprising administering the immunogenic composition of any one of claims 13-16.~~

~~Claim 18. A method of reducing toxicity of a saponin as an adjuvant or preparing an adjuvant formulation comprising adding a monophosphoiyl lipid A (MPLA)-containing liposome composition to the saponin, wherein the liposome composition comprises i) a lipid bilayer comprising phospholipids in which the hydrocarbon chains have a melting temperature in water of > 23°C and ii) cholesterol at a mole percent concentration of greater than about 50% (mol/mol).~~

~~Claim 19. The method of claim 18, wherein the saponin is selected from the group consisting of QS-7, QS-18, QS-21, and a mixture thereof.~~

~~Claim 20. The method of either claim 18 or claim 19, wherein the saponin is QS-21.~~

~~Claim 21. The method of any one of claims 18-20, wherein the liposome composition comprises cholesterol at a mole percent concentration of about 55% to about 71% (mol/mol).~~

~~Claim 22. The method of any one of claims 18-21, wherein the liposome composition comprises cholesterol at a mole percent concentration of about 55% (mol/mol).~~

16. The adjuvant formulation of claim 10, wherein the mole ratio of the MPLA (c) to the phospholipids (a) is about 1:88 to about 1:220.