What is claimed:

1. A method of inducing or enhancing an adaptive immune response to a cancer in a subject, the method comprising:

administering an effective amount of (i) a Toll-Like Receptor (TLR) ligand; (ii) a non-canonical inflammasome-activating lipid; and (iii) a cancer immunogen to the subject.

2. A method of treating cancer in a subject, the method comprising:

administering an effective amount of (i) a Toll-Like Receptor (TLR) ligand; (ii) a non-canonical inflammasome-activating lipid and (iii) a cancer immunogen to the subject.

3. The method of claim 1 or claim 2, wherein the cancer immunogen is an infectious agent immunogen, wherein an infection with the infectious agent is associated with development of cancer.

4. The method of claim 1 or 2, wherein the cancer immunogen is from a cancer cell.

5. The method of claim 4, wherein the cancer immunogen is or comprises whole tumor cell lysate.

6. The method of any one of claims 1–5, wherein the TLR ligand is selected from a TLR1 ligand, a TLR2 ligand, a TLR3 ligand, a TLR4 ligand, a TLR5 ligand, a TLR6 ligand, a TLR7 ligand, a TLR8 ligand, a TLR9 ligand, a TLR10 ligand, a TLR11 ligand, a TLR12 ligand, a TLR13 ligand, and combinations thereof.

7. The method of any one of claims 1–5, wherein the TLR ligand is a TLR4 ligand.

8. The method of claim 7, wherein the TLR4 ligand is selected from monophosphoryl lipid A (MPLA), lipopolysaccharide (LPS), or combinations thereof.

9. The method of any one of claims 1–8, wherein the non-canonical inflammasome-activating lipid comprises a species of oxidized 1-palmitoyl-2-arachidonoyl-*sn*-glycero-3-phosphorylcholine (oxPAPC).

10. The method of any one of claims 1–8, wherein the non-canonical inflammasome-activating lipid comprises 2-[[(2R)-2-[(E)-7-carboxy-5-hydroxyhept-6-enoyl]oxy-3-hexadecanoyloxypropoxy]-hydroxyphosphoryl]oxyethyl-trimethylazanium (**HOdiA-PC**), [(2R)-2-[(E)-7-carboxy-5-oxohept-6-enoyl]oxy-3-hexadecanoyloxypropyl] 2-(trimethylazaniumyl)ethyl phosphate (**KOdiA-PC**), 1-palmitoyl-2-(5-hydroxy-8-oxo-octenoyl)-*sn*-glycero-3-phosphorylcholine (**HOOA-PC**), 2-[[(2R)-2-[(E)-5,8-dioxooct-6-enoyl]oxy-3-hexadecanoyloxypropoxy]-hydroxyphosphoryl]oxyethyl-trimethylazanium (**KOOA-PC**), [(2R)-3-hexadecanoyloxy-2-(5-oxopentanoyloxy)propyl] 2-(trimethylazaniumyl)ethyl phosphate (**POVPC**), [(2R)-2-(4-carboxybutanoyloxy)-3-hexadecanoyloxypropyl] 2-(trimethylazaniumyl)ethyl phosphate (**PGPC**), [(2R)-3-hexadecanoyloxy-2-[4-[3-[(E)-[2-[(Z)-oct-2-enyl]-5-oxocyclopent-3-en-1-ylidene]methyl]oxiran-2-yl]butanoyloxy]propyl] 2-(trimethylazaniumyl)ethyl phosphate (**PECPC**), [(2R)-3-hexadecanoyloxy-2-[4-[3-[(E)-[3-hydroxy-2-[(Z)-oct-2-enyl]-5-oxocyclopentylidene]methyl]oxiran-2-yl]butanoyloxy]propyl] 2-(trimethylazaniumyl)ethyl phosphate (**PEIPC**), or a combination thereof.

11. The method of any one of claims 1–8, wherein the non-canonical inflammasome-activating lipid comprises [(2R)-2-(4-carboxybutanoyloxy)-3-hexadecanoyloxypropyl] 2-(trimethylazaniumyl)ethyl phosphate (**PGPC**).

12. The method of any one of claims 1–11, wherein the subject is a mammal.

13. The method of claim 12, wherein the subject is a human.

14. The method of any one of claims 1–13, wherein the TLR ligand, oxPAPC species, and cancer immunogen are administered as part of a pharmaceutical composition.

15. The method of any one of claims 1–14, wherein the immune response is a prophylactic immune response.

16. The method of any one of claims 1–15, wherein the immune response is a therapeutic immune response.

17. The method of any one of claims 1–16, wherein the adaptive immune response comprises T-cell activation.

18. The method of any one of claims 1–17 further comprising treating the subject with one or more therapeutic interventions.

19. The method of any one of claims 1–18, wherein the TLR ligand, oxPAPC species, and cancer immunogen, and one or more therapeutic interventions are co-administered or sequentially administered.

20. The method of claim 18 or claim 19, wherein the one or more therapeutic interventions comprises: radiation, chemotherapy, surgery, therapeutic antibodies, immunomodulatory agents, proteasome inhibitors, pan-deacetylase (DAC) inhibitors, histone deacetylase (HDAC) inhibitors, checkpoint inhibitors, adoptive cell therapies, vaccines or combinations thereof.

21. The method of claim 21, wherein the adoptive cell therapies comprise: CAR-T cell therapy, CAR- NK cell therapy, T cells, dendritic cells or combinations thereof.