WHAT IS CLAIMED IS:

1. A single-cycle adenovirus (SC-Ad), wherein said SC-Ad comprises a genome lacking at least a portion of a nucleic acid sequence that encodes an adenovirus polypeptide, wherein said SC-Ad comprises said adenovirus polypeptide, and wherein said SC-Ad comprises a nucleic acid sequence encoding a coronavirus immunogen.

2. The SC-Ad of claim 1, wherein said adenovirus polypeptide is selected from the group consisting of a fiber polypeptide, a V polypeptide, a hexon polypeptide, a penton base polypeptide, and a pIIIa polypeptide.

3. The SC-Ad of claim 1 or 2, wherein said coronavirus immunogen comprises a coronavirus Spike polypeptide or an immunogenic fragment thereof.

4. The SC-Ad of claim 3, wherein said coronavirus immunogen consists of or consists essentially of an amino acid sequence set forth in any one of SEQ ID NOs:1-4.

5. The SC-Ad of any one of claims 1 to 4, wherein said SC-Ad further comprises a nucleic acid sequence encoding an adjuvant polypeptide.

6. The SC-Ad of claim 5, wherein said adjuvant polypeptide is selected from the group consisting of a granulocyte-macrophage colony-stimulating factor (GM-CSF) polypeptide, an interleukin 4 (IL-4) polypeptide, an interleukin 21 (IL-21) polypeptide, a CD40 ligand (CD40L) polypeptide, a 4-1BB ligand (4-1BBL) polypeptide, a transforming growth factor beta (TGF-β) polypeptide, a *Clostridium difficile* TcdA polypeptide, a *C. difficile* TcdB polypeptide, and biologically active fragments thereof.

7. The SC-Ad of claim 5 or 6, wherein said coronavirus Spike polypeptide is fused to said adjuvant polypeptide.

8. The SC-Ad of claim 7, wherein said coronavirus Spike polypeptide fused to said adjuvant polypeptide consists essentially of or consists of an amino acid sequence set forth in SEQ ID NO:5.

9. The SC-Ad of any one of claims 1 to 4, wherein said SC-Ad further comprises a nucleic acid sequence encoding a chaff polypeptide.

10. The SC-Ad of claim 9, wherein said chaff polypeptide is a fragment of an ACE2 polypeptide.

11. The SC-Ad of claim 10, wherein said fragment of an ACE2 polypeptide comprises the extracellular region of an ACE2 polypeptide and lacks a transmembrane domain.

12. The SC-Ad of claim 11, wherein said chaff polypeptide consists essentially of or consists of an amino acid sequence set forth in SEQ ID NO:8 or SEQ ID NO:9.

13. The SC-Ad of any one of claims 9 to 12, wherein said coronavirus Spike polypeptide is fused to said chaff polypeptide.

14. A composition comprising the SC-Ad of any one of claims 1 to 13.

15. A single-cycle adenovirus (SC-Ad) of any one of claims 1 to 13 for use in the prevention of a coronavirus caused disease in a mammal, wherein said SC-Ad is to be administered to said mammal under conditions where said SC-Ad infects a cell of said mammal to induce an immune response against said coronavirus.

16. The SC-Ad of claim 15, wherein said mammal is a human.

17. The SC-Ad of claim 15 or 16, wherein said coronavirus is a betacoronavirus.

18. The SC-Ad of claim 17, wherein said betacoronavirus is SARS-CoV-2.

19. The SC-Ad of any one of claims 15 to 18, wherein said SC-Ad is to be administered to said mammal via mucosal delivery.

20. Use of a single-cycle adenovirus (SC-Ad) of any one of claims 1 to 13 in the manufacture of a pharmaceutical composition for preventing a coronavirus caused disease in a mammal, wherein said pharmaceutical composition is to be administered to said mammal via

mucosal delivery under conditions where said SC-Ad infects a cell of said mammal to induce an immune response against said coronavirus.