

CLAIMS

1. A composition comprising:

an extracellular vesicle comprising a cell membrane bounding an enclosed volume, wherein the extracellular vesicle comprises a fusion protein comprising a prostaglandin F2 receptor negative regulator (PTGFRN) or a fragment thereof fused to an immunomodulating component.

2. The composition of claim 1, wherein the immunomodulating component comprises a cytokine.

3. The composition of claim 2, wherein the cytokine is IL-7.

4. The composition of claim 2, wherein the cytokine is IL-12.

5. The composition of claim 2, wherein the cytokine is IL-15.

6. The composition of claim 2, wherein the cytokine is IL-2, IL-7, IL-10, IL-12, or IL-15.

7. The composition of claim 1, wherein the extracellular vesicle is an exosome.

8. The composition of claim 1, wherein the extracellular vesicle is a nanovesicle.

9. The composition of claim 1, further comprising a pharmaceutically-acceptable carrier.

10. The composition of claim 1, wherein the immunomodulating component is an activator for a positive co-stimulatory molecule or an activator for a binding partner of a positive co-stimulatory molecule.

11. The composition of claim 10, wherein the immunomodulating component comprises a TNF receptor superfamily member.

12. The composition of claim 11, wherein the TNF receptor superfamily member comprises CD120a, CD120b, CD18, OX40, CD40, Fas receptor, M68, CD27, CD30, 4-1BB, TRAILR1, TRAILR2, TRAILR3, TRAILR4, RANK, OCIF, TWEAK receptor, TACI, BAFF receptor, ATAR, CD271, CD269, GITR, TROY, CD358, TRAMP, or XEDAR.

13. The composition of claim 1, wherein the immunomodulating component comprises a TNF superfamily member.

14. The composition of claim 13, wherein the TNF superfamily member comprises TNF α , TNF-C, OX40L, CD40L, FasL, LIGHT, TL1A, CD27L, Siva, CD153, 4-1BB ligand, TRAIL, RANKL, TWEAK, APRIL, BAFF, CAMLG, NGF, BDNF, NT-3, NT-4, GITR

ligand, or EDA-2.

15. The composition of claim 14, wherein the TNF superfamily member is CD40L.
16. The composition of claim 1, wherein the immunomodulating component comprises IFN γ .
17. The composition of claim 1, wherein the fragment of the PTGFRN comprises the region before the C-terminal-most IgV domain, the transmembrane domain, and the intracellular domain of PTGFRN.
18. The composition of claim 1, wherein the PTGFRN comprises the full-length PTGFRN.
19. The composition of claim 1, wherein the immunomodulating component comprises an inhibitor of cytotoxic T-lymphocyte-associate protein 4 (CTLA-4), programmed cell death protein 1 (PD-1), programmed death-ligand 1 (PD-L1), programmed death-ligand 2 (PD-L2), lymphocyte-activated gene 3 (LAG3), T-cell immunoglobulin mucin-containing protein 3 (TIM-3), B and T lymphocyte attenuator (BTLA), T cell immunoreceptor with Ig and ITIM domains (TIGIT), V-domain Ig suppressor of T cell activation (VISTA), adenosine A2a receptor (A2aR), killer cell immunoglobulin like receptor (KIR), indoleamine 2,3-dioxygenase (IDO), CD20, CD39, or CD73.