CLAIMS

What is claimed is:

1. A composition comprising a recombinant polynucleic acid encapsulated by a nanoparticle delivery vehicle, wherein the recombinant polynucleic acid comprises a sequence encoding a chimeric fusion protein (CFP), the CFP comprising: (a) an extracellular domain comprising an anti-GPC3 binding domain, and (b) a transmembrane domain operatively linked to the extracellular domain, wherein the transmembrane domain is a transmembrane domain from a protein that dimerizes with endogenous FcR-gamma receptors; wherein the CFP is expressed on the surface of myeloid cells that express the endogenous FcR-gamma receptors.
2. The composition of claim 1, wherein the transmembrane domain comprises a transmembrane domain from CD16a, CD64, CD68 or CD89.
3. The composition of claim 1 or 2, wherein the anti-GPC3 binding domain comprises a Fab fragment, an scFv domain, or an sdAb domain.
4. The composition of any one of claims 1-3, wherein the extracellular domain comprising the anti-GPC3 binding domain comprises: (i) a heavy chain comprising a heavy chain variable domain, the heavy chain variable domain comprising a heavy chain complementarity determining region 1 (HC CDR1) sequence of DYEMH (amino acid residues 31-35 of SEQ ID NO: 97), a HC CDR2 sequence of ALDPKTGDTAYSQKFKG (amino acid residues 50-66 of SEQ ID NO: 97) and a HC CDR3 (HC CDR3) sequence of FYSYTY (amino acid residues 99-104 of SEQ ID NO: 97); and (ii) a light chain comprising a light chain variable domain comprising: a light chain complementarity determining region 1 (LC CDR1) sequence of RSSQSLVHSNRNTYLH (amino acid residues 24-39 of SEQ ID NO: 98), a LC CDR2 sequence of KVSNRFS (amino acid residues 55-61 of SEQ ID NO: 98) and a LC CDR3 sequence of SQNTHVPPT (amino acid residues 94-102 of SEQ ID NO: 98).
5. The composition of any one of claims 1-4, wherein the extracellular domain further comprises an extracellular domain or fragment thereof from CD16a, CD64, CD68 or CD89.
6. The composition of claim 4, wherein the anti-GPC3 binding domain comprises a heavy chain variable domain having a sequence with at least 80% sequence identity to SEQ ID NO: 97.
7. The composition of claim 6, wherein the anti-GPC3 binding domain comprises a heavy chain variable domain having a sequence with at least 90% sequence identity to SEQ ID NO: 97.
8. The composition of claim 4, wherein the anti-GPC3 binding domain comprises a light chain variable domain having a sequence with at least 80% sequence identity to SEQ ID NO: 98.
9. The composition of claim 8, wherein the anti-GPC3 binding domain comprises a light chain variable domain having a sequence with at least 90% sequence identity to SEQ ID NO: 98.
10. The composition of claim 9, wherein the anti-GPC3 binding domain comprises a light chain variable domain having a sequence according to SEQ ID NO: 98.

11. The composition of claim 4, wherein the anti-GPC3 binding domain comprises a heavy chain variable domain having a sequence according to SEQ ID NO: 97 and a light chain variable domain having a sequence according to SEQ ID NO: 98.
12. The composition of any one of claims 1-11, wherein the extracellular domain comprises an amino acid sequence of DSIHQDYTTQN (amino acid residues 267-277 of SEQ ID NO: 58).
13. The composition of any one of claims 1-12, wherein the transmembrane domain has an amino acid sequence of LIRMAVAGLVLVALLAILV (amino acid residues 278-296 of SEQ ID NO: 58).
14. The composition of any one of claims 1-13, wherein the CFP further comprises an intracellular domain.
15. The composition of claim 14, wherein the intracellular domain comprises one or more intracellular signaling domains from CD89.
16. The composition of claim 14 or 15, wherein the intracellular domain comprises a sequence of ENWHSHTALNKEASADVAEPSWSQQMCQPGLTFARTPSVCK (amino acid residues 297-337 of SEQ ID NO: 58).
17. The composition of any one of claims 1-16, wherein the CFP comprises an amino acid sequence of
DSIHQDYTTQNLIRMAVAGLVLVALLAILVENWHSHTALNKEASADVAEPSWSQQM
CQPGLTFARTPSVCK (amino acid residues 267-337 of SEQ ID NO: 58).
18. The composition of any one of claims 1-17, wherein the CFP further comprises a GMCSF signal peptide sequence MWLQSLLLLGTVACSIS (SEQ ID NO: 7).
19. The composition of any one of claims 1-18, wherein the CFP comprises:
    (a) an extracellular domain comprising an anti-GPC3 binding domain and an extracellular domain from CD89, wherein the anti-GPC3 binding domain comprises an amino acid sequence according to SEQ ID NO: 106;
    (b) a transmembrane domain from CD89 operably linked to the extracellular domain, and
    (c) an intracellular domain from CD89 operably linked to the transmembrane domain.
20. The composition of claim 19, wherein the CFP further comprises a second intracellular signaling domain.
21. The composition of any one of claims 1-20, wherein the recombinant polynucleic acid comprises a messenger RNA (mRNA).
22. The composition of any one of claims 1-21, wherein the nanoparticle delivery vehicle is a lipid nanoparticle, wherein the lipid nanoparticle comprises a cationic lipid, a non-cationic lipid, a neutral lipid and/or a PEGylated lipid.
23. A pharmaceutical composition comprising the composition of any one of claims 1-22, and a pharmaceutically acceptable excipient.

24. Use of the composition of any one of claims 1-22 in the manufacture of a medicament for treating a subject having cancer.
25. The use of claim 24, wherein the cancer is a liver cancer.
26. The composition of any one of claims 1-22 for use as a medicament.