CLAIMS

1. A genetically modified monocyte comprising:

a first vector comprising a nucleic acid encoding a protein that induces T-cell proliferation, wherein the protein is a soluble immune mediator selected from the group consisting of IL-1, IL-6, IL-7, IL-15, IL-12, IL-18, and IL-21, an interferon, HMGB1, and a chemokine;

a second vector comprising a nucleic acid encoding a Cas9 endonuclease; and

a nucleic acid encoding a CRISPR guide RNA, wherein the CRISPR guide RNA is complementary to at least one target gene in the monocyte is selected from the group consisting of a TGF-beta gene, an IL-10 gene, and an EGF gene, and wherein said nucleic acid encoding a CRISPR guide RNA can be present on the second vector or a third vector;

a fourth vector comprising a nucleic acid encoding a Cas9 VP64 fusion protein to activate transcription and translation of a second protein comprising a soluble immune mediator protein; and

a fifth vector comprising a nucleic acid encoding a CRISPR guide RNA complementary to at least one additional target gene in the monocyte.

2. The genetically modified monocyte of claim 1, wherein the genetically modified monocyte is a macrophage.

3. The genetically modified monocyte of claim 1, wherein the genetically modified monocyte is genetically modified to express a chimeric antigen receptor (CAR) or T-cell receptor (Tcr).

4. The genetically modified monocyte of claim 1, wherein the protein that induces T-cell proliferation comprises IL-1, IL-6, IL-7, IL-15, IL12, IL-18, IL21, interferon alpha, interferon beta, or interferon gamma.

5. The genetically modified monocyte of claim 1, wherein the protein that induces T-cell proliferation is a chemokine.

6. The genetically modified monocyte of claim 1,

wherein the target gene is an EGF gene.

7. The genetically modified monocyte of claim 1, wherein the target gene is a TGF-beta gene, or an IL-10 gene.

8. The genetically modified monocyte of claim 1, wherein the second protein is a soluble immune mediator selected from the group consisting of IL-12p40, IL-15, IL-6, IL-1 beta, TNF-alpha, IFNa, IFNP, IFN7, IL-12, IL-18, IL-23, and GM-CSF.

9. The genetically modified monocyte of claim 1, wherein the first vector further comprises a nucleic acid encoding a suicide gene system.

10. The genetically modified monocyte of claim 1, wherein the nucleic acid encoding said protein that induces T-cell proliferation is under the control of a regulatory element comprising a promoter that is inducible by a drug.

11. The genetically modified monocyte of claim 1, further comprising:

an additional nucleic acid encoding a CRISPR guide RNA, wherein the CRISPR guide RNA is complementary to at least one target gene in the monocyte selected from the group consisting of a TGF-beta gene, an IL-10 gene, an Arginase gene, a HIF-1alpha gene, a RAGE gene, a CD206 gene, an IL-4 gene, a CCL22 gene, a CCL17 gene, a VEGF gene, an EGF gene, a WNT7beta gene, and a PGE gene, and wherein said additional nucleic acid can be present on the second vector or the third vector.