

CLAIMS

1. The use of one or more antibody-IR700 molecules in the manufacture of a medicament for killing a suppressor cell to treat a tumor, wherein a suppressor cell comprising a suppressor cell surface protein is contacted with a therapeutically effective amount of one or more antibody-IR700 molecules, wherein the antibody specifically binds to the suppressor cell surface protein, wherein the antibody does not include a functional Fc region;
wherein the suppressor cell surface protein is one or more of cluster of differentiation 4 (CD4), C-X-C chemokine receptor type 4 (CXCR4), C-C chemokine receptor type 4 (CCR4), cytotoxic T-lymphocyte-associated protein 4 (CTLA4), glucocorticoid induced TNF receptor (GITR), OX40, folate receptor 4 (FR4), CD16, CD56, CD8, CD122, CD23, CD163, CD206, CD11b, Gr-1, CD14, interleukin 4 receptor alpha chain (IL-4Ra), interleukin-1 receptor alpha (IL-1Ra), interleukin-1 decoy receptor, fibroblast activation protein (FAP), CD103, CXCR2, CD33, and CD66b;
and/or
wherein the suppressor cell surface protein comprises CD25;
wherein irradiation of the suppressor cell is at a wavelength of 660 to 740 nm and at a dose of at least 4 J cm^{-2} .
2. The use of claim 1, wherein the suppressor cell is a CD4+CD25+Foxp3+ regulatory T cell (Treg), type II natural killer T (NKT) cell, CD8+CD122+Treg, M2 macrophage, tumor infiltrating fibroblast, myeloid-derived suppressor cell, or combinations thereof.
3. The use of claim 1 or claim 2, wherein the suppressor cell surface protein is not CD25.
4. The use of any one of claims 1 to 3, wherein:
the suppressor cell is a CD4+CD25+Foxp3+ Treg, and the suppressor cell surface protein is one or more of CD25, CD4, GITR, OX40, FR4, CXCR4, CCL4, CTLA4, and CD103;
the suppressor cell is a type II NKT cell, and the suppressor cell surface protein is one or more of CD16 and CD56,
the suppressor cell is a CD8+CD122+ Treg, and the suppressor cell surface protein is one or more of CD8 and CD122;
the suppressor cell is a M2 macrophage, and the suppressor cell surface protein is one or more of CD23, CD163, CD206, CD11b, Gr-1, CD14, IL-4Ra, IL-1Ra, and interleukin-1 decoy receptor;

the suppressor cell is a tumor infiltrating fibroblast, and the suppressor cell surface protein is fibroblast activation protein (FAP); or

the suppressor cell is a myeloid-derived suppressor cell, and the suppressor cell surface protein is one or more of CXCR2, CD33, CD14, CD66b and CD11b.

5. The use of any one of claims 1 to 4, wherein the antibody is one or more Fab' and/or F(ab')₂ fragments.

6. The use of any one of claims 1 to 5, wherein the antibody-IR700 molecule comprises an anti-CD25-F(ab')₂-IR700 molecule.

7. The use of any one of claims 1 to 6, wherein the suppressor cell is irradiated at a wavelength of 680 nm.

8. The use of any one of claims 1 to 7, wherein the one or more antibody-IR700 molecules comprises at least two different antibody-IR700 molecules, wherein a first antibody-IR700 molecule is specific for a first suppressor cell surface protein, and a second antibody-IR700 molecule is specific for a different epitope of the first suppressor cell surface protein or is specific for a second suppressor cell surface protein.

9. The use of any one of claims 1 to 8, wherein the suppressor cell is in a subject, and the medicament is to be administered in a therapeutically effective amount to the subject.

10. The use of claim 9, wherein a therapeutically effective amount of one or more additional chemotherapeutic, biologic, or radiological agents is to be administered to the subject.

11. The use of any one of claims 1 to 10, wherein the tumor is a cancer.

12. The use of claim 11, wherein the cancer is a cancer of the breast, liver, colon, ovary, prostate, pancreas, brain, cervix, bone, skin, head and neck, or lung.

13. The use of claim 11, wherein the cancer is a cancer of the blood.

14. The use of claim 11, wherein the cancer is a metastatic cancer.

15. The use of any one of claims 1 to 14, wherein the suppressor cell is in a subject, and irradiation of the suppressor cell comprises:
irradiation of the subject;
and/or
irradiation of a tumor in the subject.
16. The use of any one of claims 9 to 15, wherein the use reduces the weight, volume, or size of the tumor by at least 25% relative to the absence of treatment.
17. The use of any one of claims 9 to 16, wherein the use reduces the weight, volume, or size of a metastasis not irradiated at a wavelength of 660 to 740 nm by at least 25%.
18. The use of any one of claims 9 to 17, wherein the use increases survival time of the subject relative to an absence of use of the antibody-IR700 molecule and irradiation.
19. The use of any one of claims 1 to 18, wherein irradiation of the suppressor cell comprises irradiation of the blood by a device worn by the subject, wherein the device comprises a near infrared (NIR) light emitting diode (LED).
20. An antibody-IR700 molecule, wherein the antibody specifically binds to a suppressor cell surface protein,
wherein the antibody does not include a functional Fc region;
wherein the suppressor cell surface protein is one or more of CD4, glucocorticoid induced TNF receptor (GITR), OX40, folate receptor 4 (FR4), C-X-C chemokine receptor type 4 (CXCR4), chemokine (C-C motif) ligand 4 (CCL4), cytotoxic Tlymphocyte-associated protein 4 (CTLA4), CD16, CD56, CD8, CD122, CD23, CD163, CD206, CD11b, Gr-1, CD14, interleukin 4 receptor alpha chain (IL-4Ra), interleukin-1 receptor alpha (IL-1Ra), interleukin-1 decoy receptor, fibroblast activation protein (FAP), CXCR2, CD33, and CD66b; and/or
wherein the suppressor cell surface protein comprises CD25.
21. The antibody-IR700 molecule of claim 20, wherein the suppressor cell surface protein is not CD25.
22. The antibody-IR700 molecule of claim 20 or claim 21, wherein the antibody is one or more Fab' and/or F(ab')₂ fragments.

23. The antibody-IR700 molecule of any one of claims 20 to 22, wherein the ratio of antibody to IR700 is about 1:3.