R^{12}, R^{13}, R^{14}, R^{15}, R^{16}, R^{17}, R^{18}, R^{19}, R^{20}, R^{21}, R^{22} and R^{23} are each independently selected from among hydrogen, halogen, optionally substituted alkylthio, optionally substituted alkylamino and optionally substituted alkoxy; and

X^2 and X^3 are each independently C_1–C_{10} alkylene, optionally interrupted by a heteroatom; and

wherein greater than 90% of the conjugate is present as a main monomer component.

[0004b] In another aspect, there is provided a container comprising the composition as described herein, wherein the container protects from transmission of light having a wavelength from 500 nm to 725 nm.

[0004c] In another aspect, there is provided a packaging system for protecting a phthalocyanine dye-targeting molecule conjugate from light comprising:

a first container comprising the container as described herein; and

a second container comprising the first container, wherein the second container protects from transmission of light having a wavelength from 250 nm to 800 nm, from 250 nm to 450 nm, from 400 nm to 800 nm, from 450 nm to 650 nm, or from 600 nm to 720 nm.

[0004d] In another aspect, there is provided a kit, comprising:

the container as described herein or the packaging system as described herein;

a light-protected cover capable of covering a device capable of administering a composition comprising a phthalocyanine dye-targeting molecule conjugate; and

optionally instructions for use.

[0004e] In another aspect, there is a use of the pharmaceutical composition as described herein in the manufacture of a medicament for treating a hyperplasia or a tumor in a human subject comprising:

a) a therapeutically effective amount of the composition to be administered to the subject, wherein prior to and during the administration step the conjugate is not exposed to an intensity of environmental light greater than 500 lux; and

b) the hyperplasia or the tumor is to be irradiated at a wavelength of 600 to 800 nm at a dose of at least 1 J cm^{-2} or 1 J/cm of fiber length thereby treating the tumor in the subject.

[0004f] In another aspect, there is a pharmaceutical composition as described herein for use in therapy.

CLAIMS

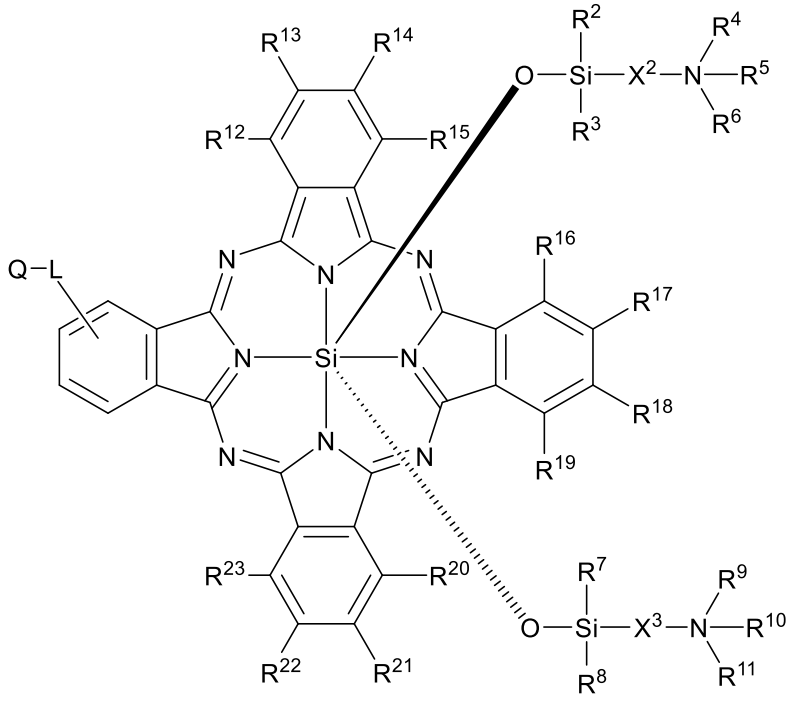
1. A pharmaceutical composition comprising:

(i) a conjugate containing a phthalocyanine dye linked to a targeting molecule; and

(ii) a pharmaceutically acceptable excipient;

wherein the targeting molecule binds to a cell surface target molecule on a surface of a cell or pathogen,

wherein the phthalocyanine dye comprises the formula:



, wherein:

L is a linker;

Q is a reactive group for attachment of the dye to the targeting molecule;

R^2, R^3, R^7, and R^8 are each independently selected from among optionally substituted alkyl and optionally substituted aryl;

R^4, R^5, R^6, R^9, R^{10}, and R^{11} are each independently selected from among hydrogen, optionally substituted alkyl, optionally substituted alkanoyl, optionally substituted alkoxycarbonyl, optionally substituted alkylcarbamoyl, and a chelating ligand, wherein at least one of R^4, R^5, R^6, R^9, R^{10}, and R^{11} comprises a water soluble group;

R^{12}, R^{13}, R^{14}, R^{15}, R^{16}, R^{17}, R^{18}, R^{19}, R^{20}, R^{21}, R^{22} and R^{23} are each independently selected from among hydrogen, halogen, optionally substituted alkylthio, optionally substituted alkylamino and optionally substituted alkoxy; and

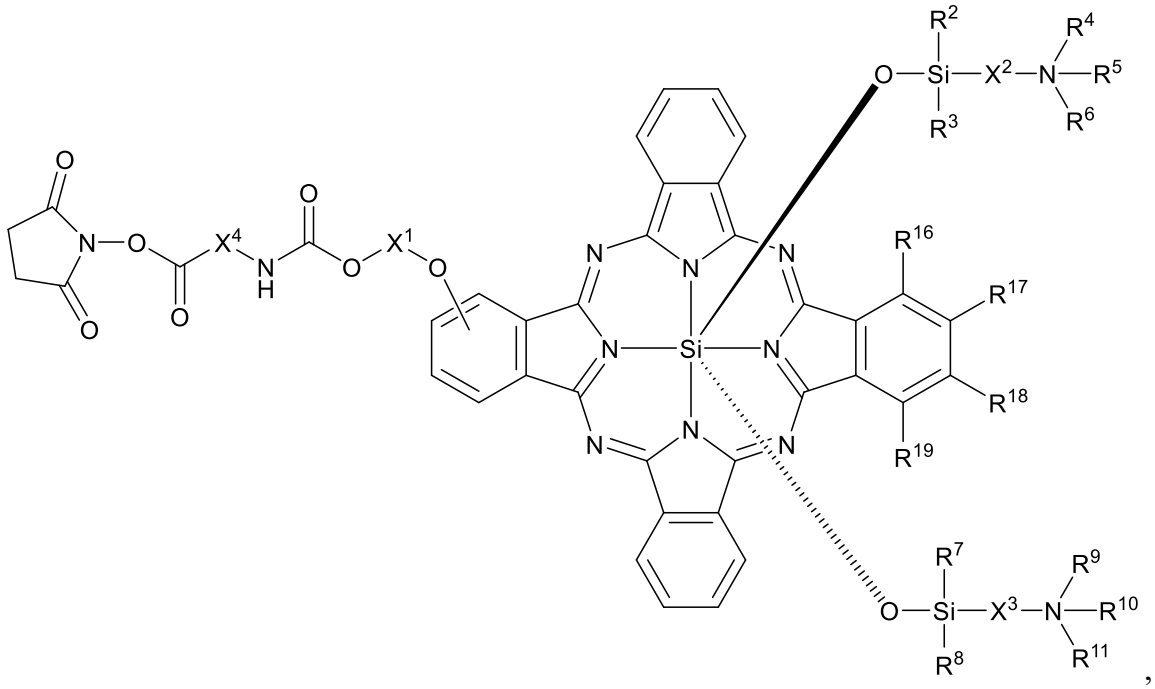
X^2 and X^3 are each independently C_1–C_{10} alkylene, optionally interrupted by a heteroatom; and

wherein greater than 90% of the conjugate is present as a main monomer component.

2. The pharmaceutical composition of claim 1, wherein greater than 95% of the conjugate is present as a main monomer component.

3. The pharmaceutical composition of claim 1 or claim 2, wherein greater than 90% or greater than 95% of the conjugate is present as a main monomer component for greater than three months.

4. The pharmaceutical composition of any one of claims 1-3, wherein the phthalocyanine dye comprises the formula:



,

wherein:

X^1 and X^4 are each independently a C_1-C_{10} alkylene optionally interrupted by a heteroatom;

R^2, R^3, R^7, and R^8 are each independently selected from optionally substituted alkyl and optionally substituted aryl;

R^4, R^5, R^6, R^9, R^{10}, and R^{11} are each independently selected from among hydrogen, optionally substituted alkyl, optionally substituted alkanoyl, optionally substituted

alkoxycarbonyl, optionally substituted alkylcarbamoyl, and a chelating ligand, wherein at least one of R^4, R^5, R^6, R^9, R^{10}, and R^{11} comprises a water soluble group; and

R^{16}, R^{17}, R^{18} and R^{19} are each independently selected from among hydrogen, halogen, optionally substituted alkylthio, optionally substituted alkylamino and optionally substituted alkoxy.

5. The pharmaceutical composition of any one of claims 1-4, wherein the dye comprises IRDye 700DX (IR700).

6. The pharmaceutical composition of any of claims 1-5, wherein the targeting molecule is an antibody or an antibody fragment.

7. The pharmaceutical composition of any one of claims 1-6, wherein:

the cell surface target molecule is selected from among cell membrane phospholipids, prokaryotic peptidoglycans, bacterial cell envelop proteins, viral capsid proteins, ACTHR, endothelial cell Anxa-1, aminopeptidase N, IL-6R, alpha-4-integrin, alpha-5-beta-3 integrin, alpha-5-beta-5 integrin, alpha-fetoprotein (AFP), ANPA, ANPB, APA, APN, APP, 1AR, 2AR, AT1, B1, B2, BAGE1, BAGE2, B-cell receptor BB1, BB2, BB4, calcitonin receptor, cancer antigen 125 (CA 125), CCK1, CCK2, CD5, CD10, CD11a, CD13, CD14, CD19, CD20, CD22, CD25, CD30, CD33, CD38, CD45, CD52, CD56, CD68, CD90, CD133, CD7, CD15, CD34, CD44, CD206, CD271, CEA (Carcinoembryonic Antigen), CGRP, chemokine receptors, cell-surface annexin-1, cell-surface plectin-1, Cripto-1, CRLR, CXCR2, CXCR4, DCC, DLL3, E2 glycoprotein, EGFR, EGFRvIII, EMR1, Endosialin, EP2, EP4, EpCAM, EphA2, ET receptors, Fibronectin, Fibronectin ED-B, FGFR, frizzled receptors, GAGE1, GAGE2, GAGE3, GAGE4, GAGE5, GAGE6, GLP-1 receptor, G-protein coupled receptors of the Family A (Rhodopsin-like), G-protein coupled receptors of the Family B (Secretin receptor-like) like), G-protein coupled receptors of the Family C (Metabotropic Glutamate Receptor-like), GD2, GP100, GP120, Glypican-3, hemagglutinin, Heparin sulfates, HER1, HER2, HER3, HER4, HMFG, HPV 16/18 and E6/E7 antigens, hTERT, IL11-R, IL-13R, ITGAM, Kalikrien-9, Lewis Y, LH receptor, LHRH-R, LPA1, MAC-1, MAGE 1, MAGE 2, MAGE 3, MAGE 4, MART1, MC1R, Mesothelin, MUC1, MUC16, Neu (cell-surface Nucleolin), Neprilysin, Neuropilin-1, Neuropilin-2, NG2, NK1, NK2, NK3, NMB-R, Notch-1, NY-ESO-1, OT-R, mutant p53, p97 melanoma antigen, NTR2, NTR3, p32 (p32/gC1q-R/HABP1), p75, PAC1, PAR1, Patched (PTCH), PDGFR, PDFG receptors, PDT, Protease-

cleaved collagen IV, proteinase 3, prohibitin, protein tyrosine kinase 7, PSA, PSMA, purinergic P2X family, P2X1-5, mutant Ras, RAMP1, RAMP2, RAMP3 patched, RET receptor, plexins, smoothened, sst1, sst2A, sst2B, sst3, sst4, sst5, substance P, TEMs, T-cell CD3 Receptor, TAG72, TGFBR1, TGFBR2, Tie-1, Tie-2, Trk-A, Trk-B, Trk-C, TR1, TRPA, TRPC, TRPV, TRPM, TRPML, TRPP, TRPV1-6, TRPA1, TRPC1-7, TRPM1-8, TRPP1-5, TRPML1-3, TSH receptor, VEGF receptors, VEGFR1 or Flt-1, VEGFR2 or FLK-1/KDR, VEGF-3 or FLT-4, voltage-gated ion channels, VPAC1, VPAC2, Wilms tumor 1, Y1, Y2, Y4, and Y5.

8. The pharmaceutical composition of any one of claims 1-7, wherein the cell surface target molecule is selected from among PD-L1, HER1/EGFR, HER2, CD20, CD25, CD33, CD52, and prostate specific membrane antigen (PSMA).

9. The pharmaceutical composition of any one of claims 1-8, wherein the cell surface target molecule is HER1/EGFR.

10. The pharmaceutical composition of any one of claims 1-9, wherein the targeting molecule is cetuximab or an antigen-binding fragment thereof.

11. The pharmaceutical composition of any one of claims 1-10, wherein the concentration of the conjugate in the composition is from 0.01 mg/mL to 200 mg/mL.

12. The pharmaceutical composition of any one of claims 1-11, wherein the concentration of the conjugate in the composition is from 0.5 mg/mL to 10 mg/mL.

13. A container comprising the composition of any one of claims 1- 12, wherein the container protects from transmission of light having a wavelength from 500 nm to 725 nm.

14. The container of claim 13, wherein the container protects from transmission of light having a wavelength from 650 nm to 725 nm.

15. The container of claim 13 or claim 14, wherein the container protects from transmission of light such that the percentage of light transmission is less than 50%, less than 40%, less than 30%, less than 20%, less than 10% or less than 5%.

16. The container of any one of claims 13-15, wherein the container is green, blue, amber, translucent, opaque, or is covered by a material with light transmission of less than 50%, less than 40%, less than 30%, less than 20%, less than 10% or less than 5%.

17. A packaging system for protecting a phthalocyanine dye-targeting molecule conjugate from light comprising:

a first container comprising the container of any one of claims 13-16; and

a second container comprising the first container, wherein the second container protects from transmission of light having a wavelength from 250 nm to 800 nm, from 250 nm to 450 nm, from 400 nm to 800 nm, from 450 nm to 650 nm, or from 600 nm to 720 nm.

18. The packaging system of claim 17, wherein the second container protects from transmission of light such that the percentage of light transmission is less than 50%, less than 40%, less than 30%, less than 20%, less than 10% or less than 5%.

19. The packaging system of claim 17 or claim 18, wherein the second container is green, blue, amber, translucent, opaque, or is covered by a material with light transmission of less than 50%, less than 40%, less than 30%, less than 20%, less than 10% or less than 5%.

20. A kit, comprising:

the container of any one of claims 13-16 or the packaging system of any one of claims 17-19;

a light-protected cover capable of covering a device capable of administering a composition comprising a phthalocyanine dye-targeting molecule conjugate; and

optionally instructions for use.

21. Use of the pharmaceutical composition of any one of claims 1-12 in the manufacture of a medicament for treating a hyperplasia or a tumor in a human subject comprising:

a) a therapeutically effective amount of the composition to be administered to the subject, wherein prior to and during the administration step the conjugate is not exposed to an intensity of environmental light greater than 500 lux; and

b) the hyperplasia or the tumor is to be irradiated at a wavelength of 600 to 800 nm at a dose of at least 1 J cm^{-2} or 1 J/cm of fiber length thereby treating the tumor in the subject.

22. The use of claim 21, wherein the tumor is a cancer located at the head and neck, breast, liver, colon, ovary, prostate, pancreas, brain, cervix, bone, skin, eye, bladder, stomach, esophagus, peritoneum, or lung.

23. The use of claim 21 or claim 22, wherein the hyperplasia or tumor is to be irradiated at a wavelength of 690 ± 50 nm or 690 ± 20 nm.

24. The use of any one of claims 21-23, wherein the hyperplasia or tumor is to be irradiated at a dose of from 2 J cm^{-2} to 400 J cm^{-2} or from 2 J/cm fiber length to 500 J/cm fiber length.

25. The use in any one of claims 21-24, wherein the pharmaceutical composition is to be administered at a dose between 25 mg/m^2 and 2000 mg/m^2.

26. A pharmaceutical composition of any one of claims 1-12 for use in therapy.