CLAIMS

1. A composition comprising:

(a) a therapeutically effective dose of purified, intact bacterially derived minicells comprising at least one anti-neoplastic agent, wherein the anti-neoplastic agent comprises nemorubicin, PNU-159682, idarubicin, daunorubicin, caminomycin, and/or and

(b) an interferon type I agonist, an interferon type II agonist, or a combination of an interferon type I agonist and an interferon type II agonist,

wherein the interferon type I agonist is an oligonucleotide, wherein the oligonucleotide is double stranded DNA or DNA-RNA hybrids and comprises a sequence of at least about 40 nucleotides,

and

wherein the interferon type II agonist is selected from the group consisting of C-glycosidific form of α-galactosylceramide (α-C-GalCer), α-galactosylceramide (α-GalCer), 12 carbon acyl form of galactosylceramide (β-GalCer), β-D-glucopyranosylceramide (β-GlcCer), l,2-Diacyl-3-0-galactosyl-sn-glycerol (BbGL-II), diacylglycerol containing glycolipids (Glc-DAG-s2), ganglioside (GD3), gangliotriaosylceramide (Gg3Cer), glycosylphosphatidylinositol (GPI), α-glucuronosylceramide (GSL-1 or GSL-4), isoglobotrihexosylceramide (iGb3), lipophosphoglycan(LPG), lyosphosphatidylcholine (LPC), α-galactosylceramide analog (OCH), threitolceramide, and a combination thereof.

2. The composition of claim 1, wherein element (b) of the composition comprises:

(i) a therapeutically effective dose of purified, intact bacterially derived minicells comprising an interferon type I agonist; or

(ii) a therapeutically effective dose of purified, intact bacterially derived minicells comprising an interferon type II agonist; or

(iii) a combination of:

(1) a therapeutically effective dose of purified, intact bacterially derived minicells comprising an interferon type I agonist; and

(2) a therapeutically effective dose of purified, intact bacterially derived minicells comprising an interferon type II agonist.

3. The composition of claim 1, wherein:

(a) the anti-neoplastic agent and the interferon type I agonist, the interferon type II agonist, or the combination of an interferon type I agonist and an interferon type II agonist, are packaged within two or more purified, intact bacterially derived minicells; or

(b) the anti-neoplastic agent and the interferon type I agonist, the interferon type II agonist, or the combination of an interferon type I agonist and an interferon type II agonist are packaged within three separate populations of purified, intact bacterially derived minicells.

4. The composition of claim 1 comprising the anti-neoplastic agent, the interferon type I agonist, and the interferon type II agonist, wherein:

(a) the anti-neoplastic agent, the interferon type I agonist, and the interferon type II agonist are comprised within the same minicell;

(b) the anti-neoplastic agent and the interferon type I agonist are comprised within a first minicell, and the interferon type II agonist is comprised within a second minicell;

(c) the anti-neoplastic agent and the interferon type II agonist are comprised within a first minicell, and the interferon type I agonist is comprised within a second minicell;

(d) the anti-neoplastic agent is comprised within a first minicell, and the interferon type I agonist and the interferon type II agonist are comprised within a second minicell; or

(e) the anti-neoplastic agent is comprised within a first minicell, the interferon type I agonist is comprised within a second minicell, and the interferon type II agonist is comprised within a third minicell.

5. The composition of claim 1, wherein the composition does not comprise an interferon type I agonist.

6. The composition of claim 1, wherein the anti-neoplastic agent is PNU-159682.

7. The composition of claim 1, wherein:

(a) the oligonucleotide comprises a sequence of at least about 50 nucleotides or at least about 60 nucleotides.

8. The composition of claim 1, wherein the interferon type I agonist is an oligonucleotide selected from the group consisting of double stranded Z-DNA and B-DNA.

9. The composition of claim 1, wherein: the interferon type II agonist is α-galactosylceramide (α-GalCer).

10. The composition of claim 1, further comprising:

(a) a bispecific ligand bound to the minicells comprising the anti-neoplastic agent; and/or

(b) a bispecific ligand bound to the minicells comprising the type I interferon agonist; and/or

(c) a bispecific ligand bound to the minicells comprising the type II interferon agonist.

11. The composition according to claim 10, wherein the bispecific ligand:

(a) comprises a first arm that carries specificity for a minicell surface structure and a second arm that carries specificity for a non-phagocytotic mammalian cell surface receptor; and/or

(b) comprises a first arm that carries specificity for a minicell surface structure and a second arm that carries specificity for a non-phagocytotic mammalian cell surface receptor and wherein the minicell surface structure is an O-polysaccharide component of a lipopolysaccharide on the minicell surface; and/or

(c) comprises a first arm that carries specificity for a minicell surface structure and a second arm that carries specificity for a non-phagocytotic mammalian cell surface receptor wherein the non-phagocytotic mammalian cell surface receptor is capable of activating receptor-mediated endocytosis of the minicell; and/or

(d) comprises a bispecific antibody or antibody fragment; and/or

(e) comprises a bispecific antibody or antibody fragment and wherein the antibody or antibody fragment comprises a first multivalent arm that carries specificity for a bacterially

derived minicell surface structure and a second multivalent arm that carries specificity for a cancer cell surface receptor, wherein the cancer cell surface receptor is capable of activating receptor-mediated endocytosis of the minicell.

12. The composition of claim 1, wherein the composition comprises fewer than about 1 contaminating parent bacterial cell per 10^7minicells, fewer than about 1 contaminating parent bacterial cell per 10^8minicells, fewer than about 1 contaminating parent bacterial cell per 10^9minicells, fewer than about 1 contaminating parent bacterial cell per 10^{10}minicells, or fewer than about 1 contaminating parent bacterial cell per 10^{11}minicells.

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

14. The composition of claim 1, wherein the minicells are approximately 400 nm in diameter.

15. The composition of claim 1, wherein the composition is free of parent bacterial cell contamination removable through 200 nm filtration.

16. The composition of claim 1, wherein the composition comprises the following amount of minicells or killed bacterial cells:

(a) at least about 10^9;
(b) at least about 1 x10^9;
(c) at least about 2 x 10^9;
(d) at least about 5 x 10^9;
(e) at least 8 x 10^9;
(f) no more than about 10^{11};
(g) no more than about 1 x 10^{11};
(h) no more than about 9 x 10^{10}; or
(i) no more than about 8 x 10^{10}.