CLAIMS

What is claimed is:

1. Use of ^{131}I-labeled 18-(p-iodo-phenyl)octadecyl phosphocholine or a salt thereof in the manufacture of a medicament for treating a cancer in a subject, wherein the ^{131}I-labeled 18-(p-iodo-phenyl)octadecyl phosphocholine or a salt thereof is formulated as a fractionated dose for a single dosing cycle, the single dosing cycle being:

a single dose once on day 1 and a single dose once on day 4,

a single dose once on day 1 and a single dose once on day 5,

a single dose once on day 1 and a single dose once on day 6,

a single dose once on day 1 and a single dose once on day 7,

a single dose once on day 1 and a single dose once on day 8,

a single dose once on day 1 and a single dose once on day 9,

a single dose once on day 1 and a single dose once on day 10,

a single dose once on day 1 and a single dose once on day 11,

a single dose once on day 1 and a single dose once on day 12, or

a single dose once on day 1 and a single dose once on day 13.

2. The use of claim 1, wherein the ^{131}I-labeled 18-(p-iodo-phenyl)octadecyl phosphocholine or a salt thereof is selective for cancer cells in the subject.

3. The use of claim 1 or claim 2, wherein the ^{131}I-labeled 18-(p-iodo-phenyl)octadecyl phosphocholine or a salt thereof is formulated for adminstration at a dose range of from 1 mCi to 100 mCi per meter^2 (m^2).

4. The use of any one of claims 1-3, wherein the dose is 1 mCi to 100 mCi per kg body weight of the subject.

5. The use of any one of claims 1-4, wherein the cancer is a multiple myeloma, lymphoma, neuroblastoma, sarcoma, leukemia, metastatic tumor, a liver cancer, a lung cancer, a

brain cancer, a pancreas cancer, a melanoma cancer, adenocarcinoma, DIPG, pediatric lymphoma, or a breast cancer.

6. The use of any one of claims 1-5, wherein the cancer is amenable to fractionated dose radiation.

7. The use of any one of claims 1-6, wherein the subject further receives another cancer therapy selected from the group consisting of chemotherapy, immunotherapy, cell therapy, radiosensitizing therapy, radioprotective therapy, external beam radiation, tumor resection, ablative therapy, and local physical treatment on the basis of cold (cryo), heat (thermal), radiofrequency, and microwave.

8. The use of any one of claims 1-7, wherein the ^{131}I-labeled 18-(p-iodo-phenyl)octadecyl phosphocholine or a salt thereof is formulated for administration at a dose range of from 1 mCi to 100 mCi per meter^2 (m^2) on day 1 as a single dose and day 8 as a single dose (7 days after day 1).

9. The use of claim 4, wherein the dose is 1 mCi to 100 mCi per kg body weight of the subject for administration on day 1 as a single dose and day 8 as a single dose (7 days after day 1).