

The qualitative experiments indicated that LS174T human adenocarcinoma tumors and B16F10 melanoma tumors preferentially take up cationic liposomes, compared with past experiments with anionic and electrostatically neutral liposomes, and greater vascular targeting of B16F10 vessels (n=3) was observed at higher cationic lipid ratios (>30% DOTAP). Furthermore, vascular targeting of PEGylated cationic liposomes appeared to be a random process with some vessels targeted to a greater extent than others.

Other Embodiments

It is to be understood that while the invention has been described in conjunction with the detailed description thereof, the foregoing description is intended to illustrate and not limit the scope of the invention, which is defined by the scope of the appended claims. Other aspects, advantages, and modifications are within the scope of the following claims.

What is claimed is:

1. A formulation comprising:

cationic liposomes comprising a first therapeutic agent, and

electrostatically neutral liposomes comprising a second therapeutic agent,

wherein the first and second therapeutic agents can be the same or different.

2. The formulation of claim 1, wherein the ratio of cationic liposomes to neutral liposomes is between 1:9 and 9:1.

3. The formulation of claim 1, wherein the ratio of cationic liposomes to neutral liposomes is between 1:3 and 3:1.

4. The formulation of claim 1, wherein the ratio of cationic liposomes to neutral liposomes is between 2:3 and 3:2.

5. The formulation of claim 1, wherein at least one of the first and second therapeutic agents is an anti-tumor drug.

6. The formulation of claim 1, wherein at least one of the first and second therapeutic agents is a nucleic acid.

7. The formulation of claim 1, wherein the cationic liposomes comprise one or more lipids selected from the group consisting of dioleoyltrimethyl-ammonium propane (DOTAP), N-[1-(2,3-dioleoyloxy)-propyl]-N,N,N-

triethylammonium chloride (DOTMA), dimethyldioctadecylammonium bromide (DDAB), 1,2-dimyristyloxypropyl-3-dimethylhydroxyethyl (DMRIE), dioleoyl-3-dimethylammonium propane (DODAP), N,N-dioleoyl-N,N-dimethylammonium chloride (DODAC), and N-(1-(2,3-dioleoyloxy)-propyl)-N-(2-(sperminecarboxamido)ethyl)-N,N-dimethyl ammonium trifluoroacetate (DOSPA).

8. The formulation of claim 1, wherein at least one of the first and second therapeutic agents is selected from the group consisting of alkylating agents, plant alkaloids, antimetabolites, and antibiotic.

9. The formulation of claim 1, wherein the neutral liposomes comprise one or more lipids selected from the group consisting of dioleoylphosphatidyl-choline (DOPC), dipalmitoylphosphatidylcholine (DPPC), distearylphosphatidylcholine (DSPC), dimyristoylphosphatidylcholine (DMPC), and 1,2-sn-dioleoylphosphatidylcholine (DOPE).

10. The formulation of claim 1, wherein at least one of the first and second therapeutic agents is selected from the group consisting of mechlorethamine hydrochloride, cyclophosphamide, ifosfamide, chlorambucil, melphalan, busulfan, thiotepa, carmustine, lomustine, and streptozocin.

11. The formulation of claim 1, wherein at least one of the first and second therapeutic agents is selected from the group consisting of vincristine, paclitaxel, vinblastine, vinorelbine, and docetaxel.

12. A The formulation of claim 1, wherein at least one of the first and second therapeutic agents is selected from the group consisting of methotrexate, mercaptopurine, thioguanine, fluorouracil, cytarabine, azacitidine, fludarabine, cladribine, and pentostatin.

13. The formulation of claim 1, wherein at least one of the first and second therapeutic agents is selected from the group consisting of dactinomycin, daunorubicin, doxorubicin, idarubicin, mitoxantrone, bleomycin, plicamycin, and mitomycin.

14. The formulation of claim 1, wherein at least one of the first and second therapeutic agents is selected from the group consisting of hydroxyurea, procarbazine, dacarbazine, cisplatin, carboplatin, asparaginase, etoposide, amsacrine, mitotane, topotecan, and tretinoin.

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