CLAIMS

1. Use of a pharmaceutically effective amount of at least one TPP-derivative compound and a pharmaceutically acceptable carrier in the manufacture of a medicament for treating at least one of tumor recurrence and metastasis, drug resistance, and radiotherapy resistant, the at least one TPP-derivative compound comprising at least one of: 2-butene-1,4-bis-TPP; 2-chlorobenzyl-TPP; 3-methylbenzyl-TPP; 2,4-dichlorobenzyl-TPP; and 1-naphthylmethyl-TPP~~; and p-xylylenebis-TPP~~.

2. The use of claim 1, wherein the TPP-derivative compound comprises 2-butene-1,4-bis-TPP.

3. The use of claim 1, further comprising at least one therapeutic agent having an anti-mitochondrial effect.

4. The use of claim 3, wherein the at least one therapeutic agent having an anti-mitochondrial effect comprises at least one of an antibiotic, a chemotherapeutic, a nutraceutical, a mitochondrial biogenesis inhibitor, a mitoriboscin, a mitoketoscin, a mitoribocycline, a mitoribomycin, a mitoribosporin, a mitoribofloxin, an oxidative metabolism inhibitor, and a glycolytic metabolism inhibitor.

5. Use of a pharmaceutically effective amount of at least one TPP-derivative compound and a pharmaceutically acceptable carrier in the manufacture of a medicament for preventing at least one of tumor recurrence and metastasis, drug resistance, and radiotherapy resistance, the at least one TPP-derivative compound comprising at least one of: 2-butene-1,4-bis-TPP; 2-chlorobenzyl-TPP; 3-methylbenzyl-TPP; 2,4-dichlorobenzyl-TPP; and 1-naphthylmethyl-TPP~~; and p-xylylenebis-TPP~~.

6. The use of claim 5, further comprising at least one therapeutic agent having an anti-mitochondrial effect.

7. The use of claim 6, wherein the at least one therapeutic agent having an anti-mitochondrial effect comprises at least one of an antibiotic, a chemotherapeutic, a nutraceutical, a mitochondrial biogenesis inhibitor, a mitoriboscin, a mitoketoscin, a mitoribocycline, a mitoribomycin, a mitoribosporin, a mitoribofloxin, an oxidative metabolism inhibitor, and a glycolytic metabolism inhibitor.

8. Use of a pharmaceutically effective amount of at least one TPP-derivative compound and a pharmaceutically acceptable carrier in the manufacture of a medicament for treating cancer,

the at least one TPP-derivative compound comprising at least one of: 2-butene-1,4-bis-TPP; 2-chlorobenzyl-TPP; 3-methylbenzyl-TPP; 2,4-dichlorobenzyl-TPP; and 1-naphthylmethyl-TPP.

9. The use of claim 8, further comprising at least one therapeutic agent having an anti-mitochondrial effect.

10. The use of claim 8, wherein the at least one TPP-derivative compound comprises 2-butene-1,4-bis-TPP.

~~11. The use of claim 8, wherein the at least one TPP-derivative compound selectively targets at least one of bulk cancer cells, CSCs, and energetic cancer stem cells.~~

~~12~~11. The use of claim ~~11~~8, wherein the at least one TPP-derivative compound selectively targets normal senescent cells.

~~13~~12. The use of claim 8, wherein the at least one TPP-derivative compound is non-toxic to normal healthy cells.

~~14~~13. The use of claim 9, wherein the at least one therapeutic agent having an anti-mitochondrial effect comprises at least one of an antibiotic, a mitochondrial biogenesis inhibitor, a mitoriboscin, a mitoketoscin, a mitoribocycline, a mitoribomycin, a mitoribosporin, a mitoribofloxin, an oxidative metabolism inhibitor, and a glycolytic metabolism inhibitor.

~~15~~14. The use of claim ~~14~~13, wherein the glycolytic metabolism inhibitor comprises at least one of a glycolysis inhibitor, an OXPHOS inhibitor, and an autophagy inhibitor.

~~16~~15. An anti-cancer pharmaceutical composition comprising: at least one TPP-derivative compound comprising at least one of: 2-butene-1,4-bis-TPP; 2-chlorobenzyl-TPP; 3-methylbenzyl-TPP; 2,4-dichlorobenzyl-TPP; and 1-naphthylmethyl-TPP~~; and p-xylylenebis-TPP~~; and at least one therapeutic agent having an anti-mitochondrial effect.

~~17~~16. The composition of claim ~~16~~15, wherein the at least one TPP-derivative compound is 2-butene-1,4-bis-TPP.

~~18. The composition of claim 16, wherein the at least one TPP-derivative compound eradicates at least one of bulk cancer cells, cancer stem cells, energetic cancer stem cells, and normal senescent cells.~~

~~19~~17. The composition of claim ~~16~~15, wherein the TPP-derivative compound is non-toxic towards normal healthy cells.

~~20~~18. The composition of claim ~~16~~15, wherein the composition possesses at least one of radiosensitizing activity, photosensitizing activity, and activity to sensitive cancer cells to at least one of chemotherapeutic agents, natural substances, and caloric restriction.

~~21~~19. A pharmaceutical composition comprising 2-butene-1,4-bis-TPP and at least one therapeutic agent having an anti-mitochondrial effect.

~~22~~20. The pharmaceutical composition of claim ~~21~~19 wherein the at least one therapeutic agent comprises at least one of an antibiotic, a mitochondrial biogenesis inhibitor, a mitoriboscin, a mitoketoscin, a mitoribocycline, a mitoribomycin, a mitoribosporin, a mitoribofloxin, an oxidative metabolism inhibitor, and a glycolytic metabolism inhibitor.