CLAIMS

1. A method of targeting cell membrane phosphatidylserine (PtdS) comprising:

   (a) providing an isolated polypeptide comprising a protein S gamma-carboxyglutamic-acid (Gla) domain and lacking a protease or hormone-binding domain; and

   (b) contacting said peptide with a cell surface,

   wherein said polypeptide binds to PtdS on said cell membrane, and
   wherein said polypeptide further comprises a protein S EGF domain.

2. The method of claim 1, wherein said cell membrane is a cardiac cell membrane, a neuronal cell membrane, an endothelial cell membrane, a virus-infected cell membrane, an apoptotic cell membrane, a platelet membrane or a cancer cell membrane.

3. The method of claims 1 or 2, wherein said polypeptide further comprises a Kringle domain.

4. The method of any one of claims 1 to 3, wherein said polypeptide further comprises an aromatic amino acid stack domain.

5. The method of any one of claims 1 to 4, wherein said polypeptide further comprises a detectable label.

6. The method of claim 5, wherein said detectable label is a fluorescent label, a chemilluminescent label, a radiolabel, an enzyme, a dye or a ligand.

7. The method of any one of claims 1 to 6, wherein said polypeptide further comprises a therapeutic agent.

8. The method of claim 7, wherein said therapeutic agent is an anti-cancer agent.

9. The method of claim 8, wherein said anti-cancer agent is a chemotherapeutic, a radiotherapeutic, a cytokine, a hormone, an antibody or antibody fragment or a toxin.

10. The method of claim 7, wherein said therapeutic agent is an anti-viral agent.

11. The method of claim 10, wherein the therapeutic agent is an enzyme, such as a prodrug converting enzyme.

12. The method of claim 7, wherein the therapeutic agent is a cytokine, growth factor, clotting factor, or anti-coagulant.

13. The method of any one of claims 1 to 12, wherein said polypeptide is 300 residues or less, 200 residues or less, or 100 residues or less.

14. The method of any one of claims 1 to 13, wherein said polypeptide comprises 5-15 Gla residues.

15. The method of any one of claims 1 to 14, wherein said polypeptide comprises 9-13 Gla residues.

16. The method of any one of claims 1 to 15, wherein said polypeptide comprises more than 13 Gla residues, but less than 30% total Gla residues.

17. The method of any one of claims 1 to 16, wherein said polypeptide is between about 4.5 and 30 kD in size.

18. The method of any one of claims 1 to 17, wherein said polypeptide comprises at least one disulfide bond.

19. The method of any one of claims 1 to 18, wherein said polypeptide comprises 2-5 disulfide bonds.

20. The method of any one of claims 1 to 19, wherein said polypeptide further comprises an antibody Fc region.

21. The use of an isolated polypeptide comprising a protein S gamma-carboxyglutamic-acid (Gla) domain and lacking a protease or hormone-binding domain, wherein said polypeptide is linked to a therapeutic payload, in the manufacture of a medicament for the treatment of cancer, wherein said polypeptide binds to PtdS on cell membrane, wherein said polypeptide further comprises a protein S EGF domain; and
wherein the therapeutic payload is a chemotherapeutic, a radiotherapeutic or a toxin;
wherein the chemotherapeutic is selected from the group consisting of temozolomide, epothilones, melphalan, carmustine, busulfan, lomustine, cyclophosphamide, dacarbazine, polifeprosan, ifosfamide, chlorambucil, mechlorethamine, busulfan, cyclophosphamide, carboplatin, cisplatin, thiotepa, capecitabine, streptozocin, bicalutamide, flutamide, nilutamide, leuprolide acetate, doxorubicin hydrochloride, bleomycin sulfate, daunorubicin hydrochloride, dactinomycin, liposomal daunorubicin citrate, liposomal doxorubicin hydrochloride, epirubicin hydrochloride, idarubicin hydrochloride, mitomycin, doxorubicin, valrubicin, anastrozole, toremifene citrate, cytarabine, fluorouracil, fludarabine, floxuridine, interferon α-2b, plicamycin, mercaptopurine, methotrexate, interferon α -2a, medroxyprogersterone acetate, estramustine phosphate sodium, estradiol, leuprolide acetate, megestrol acetate, octreotide acetate, deithylstilbestrol diphosphate, testolactone, goserelin acetate, etoposide phosphate, vincristine sulfate, etoposide, vinblastine, etoposide, vincristine sulfate, teniposide, trastuzumab, gemtuzumab ozogamicin, rituximab, exemestane, irinotecan hydrocholride, asparaginase, gemcitabine hydrochloride, altretamine, topotecan hydrochloride, hydroxyurea, cladribine, mitotane, procarbazine hydrochloride, vinorelbine tartrate, pentrostatin sodium, mitoxantrone, pegaspargase, denileukin diftitix, altretinoin, porfimer, bexarotene, paclitaxel, docetaxel, arsenic trioxide and tretinoin;
wherein the radiotherapeutic is selected from the group consisting of Y-90, P-32, I-131, In-111, Sr-89, Re-186, Sm-153 and Sn-117m; and
wherein the toxin is selected from the group consisting of Pseudomonas exotoxin (PE38), ricin A chain, diphtheria toxin, Pokeweed antiviral protein (PAP), saporin and gelonin.

22. The use of claim 21, where said cancer is breast cancer, brain cancer, stomach cancer, lung cancer, prostate cancer, ovarian cancer, testicular cancer, colon cancer, skin cancer, rectal cancer, cervical cancer, uterine cancer, liver cancer, pancreatic cancer, head & neck cancer or esophageal cancer.

23. The use of an isolated polypeptide comprising a protein S gamma-carboxyglutamic-acid (Gla) domain and lacking a protease or hormone-binding domain, wherein said polypeptide is linked to an anti-viral agent, in the manufacture of a medicament for the treatment of a viral disease, wherein said polypeptide binds to PtdS on cell membrane, wherein said polypeptide further comprises a protein S EGF domain.

24. The use of claim 23, wherein said viral disease is influenza, human immunodeficiency virus, dengue virus, West Nilevirus, smallpox virus, respiratory syncytial virus, Korean hemorrhagic fever virus, chickenpox, varicella zoster virus, herpes simplex virus 1 or 2, Epstein-Barr virus, Marburg virus, hantavirus, yellow fever virus, hepatitis A, B, C or E, Ebola virus, human papilloma virus, rhinovirus, Coxsackie virus, polio virus, measles virus, rubella virus, rabies virus, Newcastle disease virus, rotavirus, HTLV-1 and -2.

25. The use of claims 23 or 24, wherein the anti-viral agent is selected from the group consisting of Abacavir, Aciclovir, Acyclovir, Adefovir, Amantadine, Amprenavir, Ampligen, Arbidol, Atazanavir, Atripla, Boceprevirertet, Cidofovir, Combivir, Darunavir, Delavirdine, Didanosine, Docosanol, Edoxudine, Efavirenz, Emtricitabine, Enfuvirtide, Entecavir, Entry inhibitors, Famciclovir, Fomivirsen, Fosamprenavir, Foscarnet, Fosfonet, Ganciclovir, Ibacitabine, Imunovir, Idoxuridine, Imiquimod, Indinavir, Inosine, Integrase inhibitor, Interferon type III, Interferon type II, Interferon type I, Interferon, Lamivudine, Lopinavir, Loviride, Maraviroc, Moroxydine, Methisazone, Nelfinavir, Nevirapine, Nexavir, Nucleoside analogues, Oseltamivir, Peginterferon alfa-2a, Penciclovir, Peramivir, Pleconaril, Podophyllotoxin, Protease inhibitor, Raltegravir, Reverse transcriptase inhibitor, Ribavirin, Rimantadine, Ritonavir, Pyramidine, Saquinavir, Stavudine, Synergistic enhancer (antiretroviral), Tea tree oil, Telaprevir, Tenofovir, Tenofovir disoproxil, Tipranavir, Trifluridine,

Trizivir, Tromantadine, Truvada, Valaciclovir, Valganciclovir, Vicriviroc, Vidarabine, Viramidine, Zalcitabine, Zanamivir and Zidovudine.