WHAT IS CLAIMED IS:

1. A cell penetrating conjugate comprising a non-cell penetrating protein attached to a phosphorothioate nucleic acid, wherein the phosphorothioate nucleic acid enhances intracellular delivery of the non-cell penetrating protein.

2. The cell penetrating conjugate of claim 1, wherein the phosphorothioate nucleic acid is covalently attached to the non-cell penetrating protein.

3. The cell penetrating conjugate of claim 1, wherein the phosphorothioate nucleic acid is non-covalently attached to the non-cell penetrating protein.

4. The cell penetrating conjugate of claim 1, wherein a plurality of phosphorothioate nucleic acids are attached to the non-cell penetrating protein.

5. The cell penetrating conjugate of claim 4, wherein each of the plurality of phosphorothioate nucleic acids are covalently attached to the protein.

6. The cell penetrating conjugate of claim 4, wherein each of the plurality of phosphorothioate nucleic acids are non-covalently attached to the protein.

7. The cell penetrating conjugate of claim 4, wherein the protein comprises covalently and non-covalently attached phosphorothioate nucleic acids.

8. The cell penetrating conjugate of any one of claims 1 to 7, wherein each phosphorothioate nucleic acid is independently attached to a lysine, arginine, cysteine, or histidine of the non-cell penetrating protein.

9. The cell penetrating conjugate of claim 8, wherein each phosphorothioate nucleic acid is attached to a cysteine of the protein.

10. The cell penetrating conjugate of any one of claims 1 to 9, wherein each phosphorothioate nucleic acid is independently 10, 20, 30, 40, 50, 60, 70, 80, 90, 100 or more nucleic acid residues in length.

11. The cell penetrating conjugate of claim 10, wherein each phosphorothioate nucleic acid is independently from 10 to 30 residues in length.

12. The cell penetrating conjugate of any one of claims 1 to 11, wherein the non-cell penetrating protein has a molecular weight of greater than 25 kD.

13. The cell penetrating conjugate of any one of claims 1 to 12, wherein the non-cell penetrating protein has a molecular weight of 25 to 750 kD.

14. The cell penetrating conjugate of any one of claims 1 to 13, wherein the non-cell penetrating protein is an antibody.

15. The cell penetrating conjugate of claim 14, wherein the antibody is an IgG antibody.

16. The cell penetrating conjugate of claim 14, wherein the antibody is an IgA, IgM, IgD or IgE antibody.

17. The cell penetrating conjugate of claim 14, wherein the antibody is an Fv fragment.

18. The cell penetrating conjugate of any one of claims 14 to 17, wherein the antibody is a humanized antibody.

19. The cell penetrating conjugate of any one of claims 1 to 18, wherein the non-cell penetrating protein binds an intracellular target.

20. The cell penetrating conjugate of claim 19, wherein the intracellular target is a target of a disease selected from the group consisting of autoimmune disease, inflammatory disease, metabolic disorder, developmental disorder, cardiovascular disease, liver disease, intestinal disease, infectious disease, endocrine disease, neurological disorder, and cancer.

21. The cell penetrating conjugate of claim 19 or 20, wherein the intracellular target is a signaling molecule or transcription factor.

22. The cell penetrating conjugate of claim 21, wherein the signaling molecule is a phosphatase or kinase.

23. The cell penetrating conjugate of claim 20, wherein the intracellular target is a cancer target.

24. The cell penetrating conjugate of claim 19, wherein the intracellular target is selected from the group consisting of STAT3, exportin 7, Her2, and Src.

25. The cell penetrating conjugate of claim 19, wherein the intracellular target is phosphorylated Src.

26. The cell penetrating conjugate of any one of claims 1 to 25, wherein the non-cell penetrating protein further comprises a label, a small molecule or a functional nucleic acid attached to the protein.

27. The cell penetrating conjugate of any one of claims 1 to 26 bound to an intracellular target.

28. The cell penetrating conjugate of claim 1, made by contacting an unattached non-cell penetrating protein with an unattached phosphorothioate nucleic acid and allowing the unattached phosphorothioate nucleic acid to covalently bind to an amino acid of the unattached non-cell penetrating protein thereby attaching and forming the cell penetrating conjugate.

29. The cell penetrating conjugated of claim 28, wherein the phosphorothioate nucleic acid comprises a covalent reactive moiety.

30. The cell penetrating conjugate of claim 29, wherein the covalent reactive moiety is reactive with a lysine, arginine, cysteine or histidine of the protein.

31. The cell penetrating conjugate of claim 29, wherein the covalent reactive moiety is reactive with a cysteine.

32. The cell penetrating conjugate of any one of claims 28 to 31, wherein the covalent reactive moiety is a vinyl sulfone.

33. The cell penetrating conjugate of claim 1, made by contacting an unattached non-cell penetrating protein with an unattached phosphorothioate nucleic acid and allowing the unattached phosphorothioate nucleic acid to bind to the unattached non-cell penetrating protein thereby attaching and forming the cell penetrating conjugate, wherein the unattached phosphorothioate nucleic acid comprises a substituent having the formula –S-S-(CH_2)z-OH, wherein z is an integer from 1 to 10.

34. The cell penetrating conjugated of any one of claims 28 to 33, wherein the contacting is performed under reducing conditions.

35. The cell penetrating conjugate of any one of claims 28 to 33, wherein the unattached phosphorothioate nucleic acid is present in molar excess of the unattached non-cell penetrating protein.

36. A cell comprising the cell penetrating conjugate of any one of claims 1 to 35.

37. A pharmaceutical composition comprising the cell penetrating conjugate of any one of claims 1 to 35 and a pharmaceutically acceptable carrier.

38. The pharmaceutical composition of claim 37, further comprising a second non-cell penetrating protein attached to one or more phosphorothioate nucleic acids.

39. The pharmaceutical composition of claim 38, wherein the second non-cell penetrating protein binds an intracellular target.

40. The pharmaceutical composition of claim 39, wherein the second non-cell penetrating protein binds a different epitope on the intracellular target relative to the non-cell penetrating protein of any one of claims 19 to 25.

41. The pharmaceutical composition of claim 39, wherein the second non-cell penetrating protein binds a second intracellular target.

42. The pharmaceutical composition of any one of claims 38 to 41, wherein the second non-cell penetrating protein is an antibody.

43. A kit comprising the cell penetrating conjugate of any one of claims 1 to 35 or the pharmaceutical composition of claim 37 and instructions for use.

44. The kit of claim 43, further comprising a second non-cell penetrating protein attached to one or more phosphorothioate nucleic acids.

45. The kit of claim 44, wherein the conjugate of any one of claims 1 to 27 and the second non-cell penetrating protein are in separate containers.

46 . The kit of claim 44, wherein the pharmaceutical composition of claim 37 and the second non-cell penetrating protein are in separate containers.

47. The kit of any one of claims 44 to 46, wherein the second non-cell penetrating protein binds a different epitope on the intracellular target relative to the non-cell penetrating protein of any one of claims 19 to 25.

48. The kit of any one of claims 44 to 46, wherein the second non-cell penetrating protein binds a second intracellular target.

49. The kit of any one of claims 44 to 48, wherein the second non-cell penetrating protein is formulated as a pharmaceutical composition comprising the second non-cell penetrating protein and a pharmaceutically acceptable carrier.

50. The kit of any one of claims 43 to 49, wherein the second non-cell penetrating protein is an antibody.

51. A method of delivering a non-cell penetrating protein into a cell comprising contacting the cell with the cell penetrating conjugate of any one of claims 1 to 35.

52. The method of claim 51, wherein the non-cell penetrating protein binds the nuclear protein in the cytoplasm thereby forming a non-cell penetrating protein-nuclear protein complex.

53. The method of claim 52, wherein the non-cell penetrating protein-nuclear protein complex in not capable of entering the nucleus of the cell.

54. A method of treating a disease in a subject comprising administering to the subject an effective amount of the cell penetrating conjugate of any one of claims 1 to 35 wherein administration of the conjugate treats the disease in the subject.

55. The method of claim 54, further comprising administering to the subject a second non-cell penetrating protein attached to one or more phosphorothioate nucleic acids.

56. The method of claim 55, wherein the second non-cell penetrating protein binds a different epitope on the intracellular target relative to the conjugate of any one of claims 19 to 26.

57. The method of claim 55, wherein the second non-cell penetrating protein binds a second intracellular target.

58. The method of any one of claims 55 to 57, wherein the conjugate of any one of claims 1 to 26 and the second non-cell penetrating protein are administered simultaneously.

59. The method of any one of claims 55 to 57, wherein the conjugate of any one of claims 1 to 26 and the second non-cell penetrating protein are administered sequentially.

60. The method of any one of claims 55 to 59, wherein the second non-cell penetrating protein is an antibody.

61. The method of any one of claims 54 to 60, further comprising administering a second therapeutic agent to the subject.

62. The method of any one of claims 54 to 61, wherein the disease is selected from the group consisting of autoimmune disease, developmental disorder, inflammatory disease, metabolic disorder, cardiovascular disease, liver disease, intestinal disease, infectious disease, endocrine disease, neurological disorder, and cancer.

63. The method of claim 62, wherein the disease is cancer.

64. The method of claim 63, wherein the non-cell penetrating protein of the conjugate binds an intracellular target and the intracellular target is STAT3, exportin 7, Her2 or Src.

65. The method of claim 63, wherein the non-cell penetrating protein of the conjugate binds an intracellular target and the intracellular target is phosphorylated Src.

66. The method of claim 60, wherein the non-cell penetrating protein of the conjugate is an antibody that specifically binds STAT3 and the second non-cell penetrating protein is an antibody that specifically binds exportin 7.

67. The method of claim 60, wherein the non-cell penetrating protein of the conjugate is an antibody that specifically binds STAT3 and the second non-cell penetrating protein is an antibody that specifically binds another epitope of STAT3.

CLAIMS:

1. A cell penetrating conjugate comprising a non-cell penetrating protein attached to a phosphorothioate nucleic acid, wherein the phosphorothioate nucleic acid enhances intracellular delivery of the non-cell penetrating protein.

2. The cell penetrating conjugate of claim 1, wherein the phosphorothioate nucleic acid is covalently attached to the non-cell penetrating protein.

3. The cell penetrating conjugate of claim 1, wherein a plurality of phosphorothioate nucleic acids are attached to the non-cell penetrating protein.

4. The cell penetrating conjugate of claim 3, wherein the protein comprises covalently and non-covalently attached phosphorothioate nucleic acids.

5. The cell penetrating conjugate of claim 1, wherein each phosphorothioate nucleic acid is independently attached to a lysine, arginine, cysteine, or histidine of the non-cell penetrating protein.

6. The cell penetrating conjugate of claim 4, wherein each phosphorothioate nucleic acid is independently from 10 to 30 residues in length.

7. The cell penetrating conjugate of claim 1, wherein the non-cell penetrating protein is an antibody.

8. The cell penetrating conjugate of claim 1, wherein the non-cell penetrating protein binds an intracellular target.

9. The cell penetrating conjugate of claim 8, wherein the intracellular target is a target of a disease selected from the group consisting of autoimmune disease, inflammatory disease, metabolic disorder, developmental disorder, cardiovascular disease, liver disease, intestinal disease, infectious disease, endocrine disease, neurological disorder, and cancer.

10. The cell penetrating conjugate of claim 9, wherein the intracellular target is a cancer target.

11. The cell penetrating conjugate of claim 8, wherein the intracellular target is selected from the group consisting of STAT3, exportin 7, and Src.

12. The cell penetrating conjugate of claim 1, made by contacting an unattached non-cell penetrating protein with an unattached phosphorothioate nucleic acid and allowing the unattached phosphorothioate nucleic acid to covalently bind to an amino acid of the unattached non-cell penetrating protein thereby attaching and forming the cell penetrating conjugate.

13. The cell penetrating conjugated of claim 12, wherein the phosphorothioate nucleic acid comprises a covalent reactive moiety.

14. The cell penetrating conjugate of claim 13, wherein the covalent reactive moiety is reactive with a lysine, arginine, cysteine or histidine of the protein.

15. The cell penetrating conjugate of claim 1, made by contacting an unattached non-cell penetrating protein with an unattached phosphorothioate nucleic acid and allowing the unattached phosphorothioate nucleic acid to bind to the unattached non-cell penetrating protein thereby attaching and forming the cell penetrating conjugate, wherein the unattached phosphorothioate nucleic acid comprises a substituent having the formula –S-S-(CH_2)z-OH, wherein z is an integer from 1 to 10.

16. A cell comprising the cell penetrating conjugate of claim 1.

17. A pharmaceutical composition comprising the cell penetrating conjugate of claim 1 and a pharmaceutically acceptable carrier.

18. A kit comprising the cell penetrating conjugate of claim 1 or the pharmaceutical composition of claim 17 and instructions for use.

19. The use of a cell penetrating conjugate of claim 1 in the manufacture of a medicament for the treatment of a disease, wherein the disease is selected from the group consisting of autoimmune disease, developmental disorder, inflammatory disease, metabolic disorder, cardiovascular disease, liver disease, intestinal disease, infectious disease, endocrine disease, neurological disorder, and cancer.

20. The use of claim 19, wherein the disease is cancer.