**CLAIMS**

1. A recombinant factor VIII fusion protein comprising a factor VIII polypeptide fused to at least one extended recombinant polypeptide (XTEN), wherein amino acid residue R1648 corresponding to mature native human factor VIII (SEQ ID NO: 2) in the factor VIII polypeptide is deleted, and wherein the XTEN is inserted within the factor VIII polypeptide immediately downstream of an amino acid corresponding to amino acid 745 of mature native human factor VIII (SEQ ID NO:2).

2. The recombinant factor VIII fusion protein of claim 1, comprising at least two XTENs.

3. The recombinant factor VIII fusion protein of claim 2, wherein the at least two XTENs are inserted immediately downstream of one or two amino acids corresponding to an amino acid in mature native human factor VIII selected from amino acid 745 of SEQ ID NO: 2 and amino acid 1332 of SEQ ID NO: 2.

4. The recombinant factor VIII fusion protein of claim 2, comprising at least three XTENs, at least four XTENs, at least five XTENs, or at least six XTENs.

5. The recombinant factor VIII fusion protein of claim 4, wherein i. the at least three XTENs are inserted or fused immediately downstream of one or more amino acids corresponding to amino acid 745 of mature native human factor VIII (SEQ ID NO: 2) and an amino acid in mature native human factor VIII selected from amino acid 18 of SEQ ID NO: 2, amino acid 26 of SEQ ID NO: 2, amino acid 40 of SEQ ID NO: 2, amino acid 399 of SEQ ID NO: 2, amino acid 403 of SEQ ID NO: 2, amino acid 599 of SEQ ID NO: 2, amino acid 1656 of SEQ ID NO: 2, amino acid 1711 of SEQ ID NO: 2, amino acid 1720 of SEQ ID NO: 2, amino acid 1725 of SEQ ID NO: 2, amino acid 1900 of SEQ ID NO: 2, amino acid 1905 of SEQ ID NO: 2, amino acid 1910 of SEQ ID NO: 2, and amino acid 2332 of SEQ ID NO: 2; ii. the at least four XTENs are inserted or fused immediately downstream of one or more amino acids corresponding to amino acid 745 of mature native human factor VIII (SEQ ID NO: 2) and an amino acid in mature native human factor VIII selected from amino acid 18 of SEQ ID NO: 2, amino acid 26 of SEQ ID NO: 2, amino acid 40 of SEQ ID NO: 2, amino acid 403 of SEQ ID NO: 2, amino acid 409 of SEQ ID NO: 2, amino acid 1656 of SEQ ID NO: 2, amino acid 1720 of SEQ ID NO: 2, amino acid 1900 of SEQ ID NO: 2, amino acid 1905 of SEQ ID NO: 2, amino acid 1910 of SEQ ID NO: 2, and amino acid 2332 of SEQ ID NO: 2; or iii. the at least five XTENs are inserted or fused immediately downstream of one or more amino acids corresponding to amino acid 745 of mature native human factor VIII (SEQ ID NO: 2) and an amino acid in mature native human factor VIII selected from amino acid 18 of SEQ ID NO: 2, amino acid 403 of SEQ ID NO: 2, amino acid 745 of SEQ ID NO: 2, amino acid 1656 of SEQ ID NO: 2, amino acid 1720 of SEQ ID NO: 2, amino acid 1900 of SEQ ID NO: 2, and amino acid 2332 of SEQ ID NO: 2.

6. The recombinant factor VIII fusion protein of claim 1, wherein the at least one XTEN comprises at least 36 amino acids, at least 42 amino acids, at least 72 amino acids, at least 96 amino acids, at least 144 amino acids, or at least 288 amino acids.

7. The recombinant factor VIII fusion protein of claim 1, wherein the at least one XTEN

comprises at least 144 amino acids.

8. The recombinant factor VIII fusion protein of claim 1, wherein the at least one XTEN comprises at least 288 amino acids.

9. The recombinant factor VIII fusion protein of claim 1, wherein the at least one XTEN comprises an amino acid sequence having at least 90% sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NOs: 19-48 and any combination thereof.

10. The recombinant factor VIII fusion protein of claim 1, wherein the at least one XTEN comprises an amino acid sequence selected from the group consisting of SEQ ID NOs: 23, 24, 25, 26, and any combination thereof.

11. The recombinant factor VIII fusion protein of claim 1, wherein the at least one XTEN comprises an amino acid sequence at least 90% identical to an amino acid sequence selected from the group consisting of SEQ ID NOs: 49, 50, 51, 52, 57, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 78, 79, 279, 281, 283, 285, 287, 289, 291, 293, 295, 297, 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 319, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 343, 345, 347, 349, 351, and any combination thereof.

12. The recombinant factor VIII fusion protein of claim 1, wherein the at least one XTEN comprises one or more XTEN sequence motifs, wherein the one or more XTEN sequence motifs comprise the amino acid sequence set forth in SEQ ID NO: 25.

13. The recombinant factor VIII fusion protein of claim 1, wherein the at least one XTEN comprises an amino acid sequence at least 95% identical to an amino acid sequence selected from the group consisting of SEQ ID NOs: 49, 50, 51, 52, 57, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 78, 79, 279, 281, 283, 285, 287, 289, 291, 293, 295, 297, 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 319, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 343, 345, 347, 349, 351, and any combination thereof.

14. The recombinant factor VIII fusion protein of claim 1, wherein the at least one XTEN comprises an amino acid sequence selected from the group consisting of SEQ ID NOs: 49, 50, 51, 52, 57, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 78, 79, 279, 281, 283, 285, 287, 289, 291, 293, 295, 297, 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 319, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 343, 345, 347, 349, 351, and any combination thereof.

15. The recombinant factor VIII fusion protein of claim 1, wherein the at least one XTEN comprises an amino acid sequence at least 90% identical to an amino acid sequence selected from the group consisting of SEQ ID NOs: 50, 52, 67, and 78.

16. The recombinant factor VIII fusion protein of claim 1, wherein the at least one XTEN comprises an amino acid sequence at least 95% identical to an amino acid sequence selected from the group consisting of SEQ ID NOs: 50, 52, 67, and 78.

17. The recombinant factor VIII fusion protein of claim 1, wherein the at least one XTEN comprises an amino acid sequence selected from the group consisting of SEQ ID NOs: 50, 52, 67, and 78.

18. The recombinant factor VIII fusion protein of claim 1, wherein the at least one XTEN comprises the amino acid sequence set forth in SEQ ID NO: 50.

19. The recombinant factor VIII fusion protein of claim 1, wherein the at least one XTEN comprises the amino acid sequence set forth in SEQ ID NO: 52.

20. The recombinant factor VIII fusion protein of claim 1, wherein the at least one XTEN comprises an amino acid sequence at least 95% identical to SEQ ID NO: 67.

21. The recombinant factor VIII fusion protein of claim 1, wherein the at least one XTEN comprises the amino acid sequence set forth in SEQ ID NO: 67.

22. The recombinant factor VIII fusion protein of claim 1, wherein the at least one XTEN comprises an amino acid sequence at least 95% identical to SEQ ID NO:78.

23. The recombinant factor VIII fusion protein of claim 1, wherein the at least one XTEN comprises the amino acid sequence set forth in SEQ ID NO:78.

24. The recombinant factor VIII fusion protein of claim 1, wherein the recombinant factor VIII fusion protein exhibits a prolonged terminal half-life when administered to a subject as compared to a corresponding factor VIII polypeptide lacking the one or more XTEN.

25. A pharmaceutical composition comprising the recombinant factor VIII fusion protein of claim 1 and a pharmaceutically acceptable carrier.

26. A recombinant factor VIII fusion protein comprising a factor VIII polypeptide comprising at least one extended recombinant polypeptide (XTEN), wherein the XTEN comprises at least 36 amino acids and an amino acid sequence having at least 80% sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NOs: 19-48, and any combination thereof, wherein the at least one XTEN is inserted into the factor VIII polypeptide immediately downstream of an amino acid corresponding to amino acid 745 of mature native human factor VIII (SEQ ID NO:2), and wherein the amino acid residue R1648 corresponding to mature native human factor VIII (SEQ ID NO:2) in the factor VIII polypeptide is deleted.

27. The recombinant factor VIII fusion protein of claim 26, wherein the factor VIII polypeptide comprises only one XTEN.

28. The recombinant factor VIII fusion protein of claim 26, wherein the at least one XTEN comprises an amino acid sequence having at least 80% sequence identity to an amino acid sequence selected from the group consisting of SEQ ID NOs: 19-48 and any combination thereof.

29. The recombinant factor VIII fusion protein of claim 26, wherein the at least one XTEN comprises an amino acid sequence at least 95% identical to SEQ ID NO:67.

30. The recombinant factor VIII fusion protein of claim 26, wherein the at least one XTEN comprises the amino acid sequence set forth in SEQ ID NO:67.

31. A recombinant factor VIII fusion protein comprising a factor VIII polypeptide fused to at least one extended recombinant polypeptide (XTEN), wherein the at least one XTEN is inserted within the factor VIII polypeptide immediately downstream of an amino acid corresponding to amino acid 745 of mature native human factor VIII (SEQ ID NO:2); wherein the amino acid residue R1648 corresponding to mature native human factor VIII (SEQ ID NO:2) in the factor VIII polypeptide is deleted; and wherein the at least one XTEN comprises an amino acid sequence at least 90% identical to an amino acid sequence selected from the group consisting of SEQ ID NOs: 50, 52, 67, 78, and any combination thereof.

32. The recombinant factor VIII fusion protein of claim 31, wherein the at least one XTEN comprises an amino acid sequence at least 95% identical to an amino acid sequence selected from the group consisting of SEQ ID NOs: 50, 52, 67, 78, and any combination thereof.

33. The recombinant factor VIII fusion protein of claim 31, wherein the at least one XTEN comprises an amino acid sequence selected from the group consisting of SEQ ID NOs: 50, 52, 67, 78, and any combination thereof.

34. The recombinant factor VIII fusion protein of claim 31, wherein the at least one XTEN comprises the amino acid sequence set forth in SEQ ID NO:50.

35. The recombinant factor VIII fusion protein of claim 31, wherein the at least one XTEN comprises the amino acid sequence set forth in SEQ ID NO:52.

36. The recombinant factor VIII fusion protein of claim 31, wherein the at least one XTEN comprises an amino acid sequence at least 95% identical to SEQ ID NO:67.

37. The recombinant factor VIII fusion protein of claim 31, wherein the at least one XTEN comprises the amino acid sequence set forth in SEQ ID NO:67.

38. The recombinant factor VIII fusion protein of claim 31, wherein the at least one XTEN comprises an amino acid sequence at least 95% identical to SEQ ID NO:78.

39. The recombinant factor VIII fusion protein of claim 31, wherein the at least one XTEN comprises the amino acid sequence set forth in SEQ ID NO:78.

40. The recombinant factor VIII fusion protein of claim 31, wherein the recombinant factor VIII fusion protein exhibits a prolonged terminal half-life when administered to a subject as compared to a corresponding factor VIII polypeptide lacking the one or more XTEN.

41. A recombinant factor VIII fusion protein comprising a factor VIII polypeptide fused to an

extended recombinant polypeptide (XTEN), wherein amino acid residue R1648 corresponding to mature native human factor VIII (SEQ ID NO: 2) in the factor VIII polypeptide is deleted, wherein the XTEN comprises the amino acid sequence set forth in SEQ ID NO: 25, 50, 52, 67, or 78; and wherein the XTEN is inserted within the factor VIII polypeptide immediately downstream of an amino acid corresponding to amino acid 745 of mature native human factor VIII (SEQ ID NO:2).

42. The recombinant factor VIII fusion protein of claim 41, wherein the factor VIII polypeptide comprises amino acids 1-745 of mature native human factor VIII (SEQ ID NO: 2).

43. The recombinant factor VIII fusion protein of claim 42, wherein the factor VIII polypeptide comprises amino acids 1649-2332 of mature native human factor VIII (SEQ ID NO: 2).

44. A recombinant factor VIII fusion protein comprising a factor VIII polypeptide fused to an extended recombinant polypeptide (XTEN), wherein the factor VIII polypeptide comprises amino acids 1-745 and 1649-2332 of mature native human factor VIII (SEQ ID NO: 2); wherein the XTEN 15 inserted within the factor VIII polypeptide immediately downstream of an amino acid corresponding to amino acid 745 of mature native human factor VIII (SEQ ID NO:2); wherein the XTEN comprises the amino acid sequence set forth in SEQ ID NO: 78; and wherein amino acid residue R1648 corresponding to mature native human factor VIII (SEQ ID NO: 2) is deleted in the factor VIII polypeptide.