terminal end. Thus, differently sized oligomers ranging in size from a dimer of 500,000 daltons to large multimers of up to 20 million daltons may form. In addition to the proteolytic procedures, vWF is subject to other post-translational modifications, including glycosylation and sulfation.

SUMMARY OF THE INVENTION

In one aspect, the present invention provides a polypeptide comprising a first amino acid sequence present in a von willebrand factor (vWF) polypeptide and a second amino acid sequence heterologous to the first, wherein the polypeptide is capable of binding a Factor VIII (FVIII), with the proviso that the polypeptide lacks von willebrand factor (vWF) domains D4, B1, B2, B3, C1, C2 and CK, wherein the second amino acid sequence is C-terminus to the first amino acid sequence, , wherein the first amino acid sequence is as set forth in SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:14 or SEQ ID NO:15, and wherein the second amino acid sequence corresponds to an immunoglobulin Fc.

In one aspect, the present invention provides a composition comprising the polypeptide as defined above.

In one aspect, the present invention provides a protein complex comprising the polypeptide as defined above, and a Factor VIII (FVIII) polypeptide.

In one aspect, the present invention provides a composition comprising the protein complex as defined above.

In one aspect, the present invention provides a nucleotide sequence encoding the polypeptide as defined above.

In one aspect, the present invention provides an expression vector comprising the nucleotide sequence as defined above.

In one aspect, the present invention provides a cell expressing the polypeptide as defined above.

In one aspect, the present invention provides a cell expressing the protein complex as defined above.

In one aspect, the present invention provides an in vitro method for preparing the protein complex as defined above, the method comprising contacting the polypeptide with the Factor VIII (FVIII).

In one aspect, the present invention provides an in vitro method for binding a Factor VIII (FVIII), the method comprising: contacting a Factor VIII (FVIII) polypeptide with a polypeptide as defined above to form a protein complex comprising the polypeptide as defined above and the Factor VIII (FVIII).

In one aspect, the present invention provides the use of a composition comprising the protein complex as defined above, in the manufacture of a medicament for enhancing a plasma pharmacokinetic property of a Factor VIII (FVIII).

In one aspect, the present invention provides a composition comprising the protein complex as defined above, and a pharmaceutically acceptable carrier.

In one aspect, the present invention provides the use of the composition as defined above in the manufacture of a medicament for treating hemophilia.

In one aspect, the present invention provides a polypeptide comprising a first amino acid sequence present in a vWF polypeptide and a second amino acid sequence heterologous to the first, wherein the polypeptide is capable of binding a FVIII.

In another aspect, the present invention provides a composition comprising the polypeptide comprising the first and the second amino acid sequence.

In some aspects, the present invention provides a protein complex comprising the polypeptide and the FVIII.

In other aspects, the present invention provides a composition comprising the protein complex.

In still further aspects, the present invention provides a nucleotide sequence encoding the polypeptide comprising the first and the second amino acid sequence.

In one aspect, the present invention provides an expression vector comprising the nucleotide sequence.

In another aspect, the present invention provides a cell expressing the polypeptide comprising the first and the second amino acid sequence.

In some aspects, the present invention provides a cell expressing the protein complex comprising the polypeptide and the FVIII.

In other aspects, the present invention provides a method for preparing the protein complex, the method comprising contacting the polypeptide with the FVIII.

In one aspect, the present invention provides a method for preparing a FVIII, the method comprising: contacting the FVIII with the polypeptide comprising the first and the second amino acid sequence to form a protein complex comprising the polypeptide and the FVIII.

In another aspect, the present invention provides a method for enhancing a plasma pharmacokinetic property of a FVIII, the method comprising administering to a subject a composition comprising the protein complex comprising the polypeptide and the FVIII.

We claim:

1. A polypeptide comprising a first amino acid sequence present in a von willebrand factor (vWF) polypeptide and a second amino acid sequence heterologous to the first, wherein the polypeptide is capable of binding a Factor VIII (FVIII), with the proviso that the polypeptide lacks von willebrand factor (vWF) domains D4, B1, B2, B3, C1, C2 and CK, wherein the second amino acid sequence is C-terminus to the first amino acid sequence, , wherein the first amino acid sequence is as set forth in SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:14 or SEQ ID NO:15, and wherein the second amino acid sequence corresponds to an immunoglobulin Fc.

2. The polypeptide of claim 1, wherein the polypeptide comprises the sequence set forth in SEQ ID NO:17, SEQ ID NO:18, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:21 or SEQ ID NO:22.

3. The polypeptide of claim 1, wherein the polypeptide is capable of forming a dimer.

4. The polypeptide of claim 1, wherein the second amino acid sequence has the sequence set forth in SEQ ID NO:16.

5. A composition comprising the polypeptide of claim 1.

6. A protein complex comprising the polypeptide of claim 1, and a Factor VIII (FVIII) polypeptide.

7. A composition comprising the protein complex of claim 6.

8. A nucleotide sequence encoding the polypeptide of claim 1.

9. The nucleotide sequence of claim 8, wherein the nucleotide sequence is set forth in SEQ ID NO:23, SEQ ID NO:24, SEQ ID NO:25, SEQ ID NO:26, SEQ ID NO:27 or SEQ ID NO:28.

10. An expression vector comprising the nucleotide sequence of claim 8.

11. A cell expressing the polypeptide of claim 1.

12. A cell expressing the protein complex of claim 6.

13. An *in vitro* method for preparing the protein complex of claim 6, the method comprising contacting the polypeptide with the Factor VIII (FVIII).

14. The method of claim 13, wherein the contacting comprises recombinantly expressing the polypeptide in a cell that expresses the Factor VIII (FVIII).

15. An *in vitro* method for binding a Factor VIII (FVIII), the method comprising: contacting a Factor VIII (FVIII) polypeptide with a polypeptide of claim 1 to form a protein complex comprising the polypeptide of claim 1 and the Factor VIII (FVIII).

16. The method of claim 15 further comprising selectively adhering the complex to a resin comprising a binding partner having affinity for a domain defined by the second amino acid sequence.

17. The method of claim 16, wherein the binding partner is a protein A or a protein G.

18. Use of a composition comprising the protein complex of claim 6, in the manufacture of a medicament for enhancing a plasma pharmacokinetic property of a Factor VIII (FVIII).

19. The use of claim 18, wherein the property is extended plasma half-life.

20. A composition comprising the protein complex of claim 6, and a pharmaceutically acceptable carrier.

21. Use of the composition of claim 20 in the manufacture of a medicament for treating hemophilia.