We claim:

1. A recombinant heteromultimer comprising an ALK4 polypeptide and an ActRIIB polypeptide.

2. The heteromultimer of claim 1, wherein the ALK4 polypeptide comprises an amino acid sequence that is at least 70%, 75%, 80%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99%, or 100% identical to a polypeptide that:

a) begins at any one of amino acids of 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, or 34 SEQ ID NO: 9, and

b) ends at any one of amino acids 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, or 126 of SEQ ID NO: 9.

3. The heteromultimer of claim 1, wherein the ALK4 polypeptide comprises an amino acid sequence that is at least 70%, 75%, 80%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99%, or 100% identical to SEQ ID NO: 10.

4. The heteromultimer of any one of claims 1-3, wherein the ActRIIB polypeptide comprises an amino acid sequence that is at least 70%, 75%, 80%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99%, or 100% identical to a polypeptide that:

a) begins at any one of amino acids of 20, 21, 22, 23, 24, 25, 26, 27, 28, or 29 SEQ ID NO: 1, and

b) ends at any one of amino acids 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, or 134 of SEQ ID NO: 1.

5. The heteromultimer of any one of claims 1-4, wherein the ActRIIB polypeptide comprises an amino acid sequence that is at least 70%, 75%, 80%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99%, or 100% identical to SEQ ID NO: 2.

6. The heteromultimer of any one of claims 1-5, wherein the ALK4 polypeptide is a fusion protein further comprises a heterologous domain.

7. The heteromultimer of claim 6, wherein the heterologous domain comprises an Fc immunoglobulin domain.

8. The heteromultimer of claim 7, wherein the Fc immunoglobulin domain comprises one or more amino acid modifications that promotes heterodimer formation.

9. The heteromultimer of claim 7 or 8, wherein the immunoglobulin Fc domain comprises one or more amino acid modifications that inhibit homodimer formation.

10. The heteromultimer of any one of 7-9, wherein the heterologous domain comprises an Fc immunoglobulin domain from an IgG immunoglobulin.

11. The heteromultimer of any one of claims 6-10, wherein the fusion protein further comprises a linker domain positioned between the ALK4 domain and the heterologous domain.

12. The heteromultimer of any one of claims 1-6, wherein the ALK4 polypeptide comprises an amino acid sequence that is at least 70%, 75%, 80%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99%, or 100% identical to SEQ ID NO: 44.

13. The heteromultimer of any one of claims 1-6, wherein the ActRIIB polypeptide comprises an amino acid sequence that is at least 70%, 75%, 80%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99%, or 100% identical to SEQ ID NO: 46.

14. A recombinant heteromultimer comprising an ALK4 polypeptide and an ActRIIB polypeptide; wherein the ALK4 polypeptide comprises an amino acid sequence that is at least 70%, 75%, 80%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99%, or 100% identical to SEQ ID NO: 10; and wherein the ActRIIB polypeptide comprises an amino acid sequence that is at least 70%, 75%, 80%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99%, or 100% identical to SEQ ID NO: 2.

15. The heteromultimer of claim 14, wherein the ALK4 polypeptide comprises the amino acid sequence of SEQ ID NO: 10; and wherein the ActRIIB polypeptide comprises the amino acid sequence of SEQ ID NO: 2.

16. A recombinant heteromultimer comprising an ALK4 polypeptide and an ActRIIB polypeptide; wherein the ALK4 polypeptide comprises an amino acid sequence that is at least 70%, 75%, 80%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99%, or 100% identical to SEQ ID NO: 44; and wherein the ActRIIB polypeptide comprises an amino acid sequence that is at least 70%, 75%, 80%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99%, or 100% identical to SEQ ID NO: 46.

17. The heteromultimer of claim 16; wherein the ALK4 polypeptide comprises an amino acid sequence that is at least 97% identical to SEQ ID NO: 44; and wherein the ActRIIB polypeptide comprises an amino acid sequence that is at least 99% identical to SEQ ID NO: 46.

18. The heteromultimer of any one of claims 1-17, wherein the ALK4 polypeptide comprises one or modified amino acid residues selected from the group consisting of: a glycosylated amino acid, a PEGylated amino acid, a farnesylated amino acid, an acetylated amino acid, a biotinylated amino acid, and an amino acid conjugated to a lipid moiety.

19. The heteromultimer of any one of claims 1-18, wherein the ALK4 polypeptide is glycosylated and has a glycosylation pattern obtainable from a Chinese hamster ovary cell line.

20. The heteromultimer of any one of claims 1-19, wherein the heteromultimer binds to activin.

21. The heteromultimer of any one of claims 1-20, wherein the heteromultimer inhibits activin signaling in a cell-based assay.

22. A pharmaceutical preparation comprising the heteromultimer of any one of claims 1-21 and a pharmaceutically acceptable carrier.

23. The pharmaceutical preparation of claim 22, wherein the pharmaceutical preparation is substantially pyrogen-free.

24. The pharmaceutical preparation of claim 22 or 23, wherein the pharmaceutical preparation further comprises an additional active agent.

25. The pharmaceutical preparation of any one of claims 22-24, wherein the pharmaceutical preparation comprises less than about 10%, 9%, 8%, 7%, 6%, 5%, 4%, 3%, 2%, or less than about 1% ALK4 homomultimers.

26. The pharmaceutical preparation of claim 22-25, wherein the pharmaceutical preparation comprises less than about 10%, 9%, 8%, 7%, 6%, 5%, 4%, 3%, 2%, or less than about 1% ActRIIB homomultimers.