Claims

1. A method of identifying an agent that promotes bone growth or increases bone density, the method comprising: a) identifying an agent that binds to a ligand-binding domain of an ActRIIa polypeptide competitively with an activin polypeptide; and b) evaluating the effect of the agent on bone tissue.

2. The method of claim 1, wherein the agent is selected from the group consisting of non-peptidyl organic molecules, peptides, polypeptides, peptidomimetics, sugars, hormones, and nucleic acid molecules.

3. The method of claim 1, wherein the agent is identified by a biochemical method.

4. The method of claim 1, wherein the agent is identified by a mechanism based assay.

5. The method of claim 1, wherein the agent is evaluated in a cell-based assay.

6. The method of claim 1, wherein the agent is evaluated in an in vivo assay.

7. The method of claim 1, wherein the ActRIIa polypeptide comprises the amino acid sequence of SEQ ID NO: 2.

8. The method of claim 1, wherein the ActRIIa polypeptide comprises the amino acid sequence of SEQ ID NO: 3.

9. The method of claim 1, wherein the ActRIIa polypeptide comprises the amino acid sequence of SEQ ID NO: 7.

10. The method of claim 1, wherein the ActRIIa polypeptide comprises the amino acid sequence of SEQ ID NO: 12.

11. The method of claim 1, wherein the N-terminus of the ActRIIa polypeptide is ILGRSETQE set forth in amino acid position 1-9 of SEQ ID NO: 7.

12. The method of claim 1, wherein the ActRIIa polypeptide consists of the amino acid sequence of SEQ ID NO: 7.