CLAIM

1. An osteoinductive bone regeneration material comprising a targetable bone morphogenetic protein-2 (tBMP-2) and a cotton-wool like structure formed of a plurality of electrospun biodegradable fibers,

   wherein the electrospun biodegradable fibers have a diameter of 10-100 μm such that the bone regeneration material has a sufficient mechanical strength and a space between the electrospun biodegradable fibers for permeation of body fluid through the bone regeneration material,

   wherein the electrospun biodegradable fibers contains 25-65 vol% of β-TCP particles, wherein the diameter of the β-TCP particles is 1-5 μm, such that a portion of the β-TCP particles is exposed on a surface of the electrospun biodegradable fibers and the remaining portion of the β-TCP particles is buried in the electrospun biodegradable fibers, and

   wherein tBMP-2 is bound to the β-TCP particles that are exposed on the surface of the electrospun biodegradable fibers by contacting the electrospun biodegradable fibers with tBMP-2 contained in an acetate buffer solution,

   upon implanting the osteoinductive bone regeneration material in a bone defect site of a patient, body fluid containing mesenchymal stem cells permeates between the electrospun biodegradable fibers and contacts with the tBMP-2 so that bone formation is induced at the bone defect site;

   wherein the tBMP-2 comprises a β-TCP binding peptide fused to BMP-2, and wherein the β-TCP binding peptide has the amino acid sequence of LLADTTHHRPWT (SEQ ID NO: 1).

2. The osteoinductive bone regeneration material of claim 1, wherein the electrospun biodegradable fiber contains 40-60 vol% of calcium compound particles.

3. The osteoinductive bone regeneration material of claim 1, wherein the biodegradable polymer is poly(lactic-co-glycolic acid) (PLGA).