

Bone morphogenetic protein-Smad pathway as drug targets for osteoporosis and cancer therapy.**Li B.**

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Bone morphogenetic proteins (BMPs) are members of the TGF-beta superfamily. Engaging of BMPs to BMP receptors on the cell surface leads to activation of the receptor kinase activity, which phosphorylates Smad1/5/8. Smad1, 5, or 8, with Smad4, forms a complex, which is translocated to the nucleus, where it binds to the consensus DNA sequence to regulate the transcription of BMP target genes. BMP-Smad signaling regulates stem cell renewal, cell proliferation, differentiation, migration, and apoptosis, and controls embryo development and postnatal tissue homeostasis. Both human and mouse genetic studies have demonstrated that BMPs play positive roles in postnatal bone homeostasis including osteoblast expansion, differentiation, and bone formation. Defects in BMP-Smad signaling cause bone-related disorders such as osteoporosis, a disease that affects hundreds of millions of people. In addition, BMP-Smad signaling has been shown to play an important role in tumorigenesis. Mounting evidence indicates that in many tissues, BMP-Smad signaling has a tumor-suppressing activity and that BMPs can repress tumor growth. These findings suggest that BMP-Smad pathway can be a potential target not only for osteoporosis therapy but also for cancer therapy.