**Table S1.** Examples of BMP pathway modulation for orthopedic and dental applications.

| Application | Agent | Technique | Modifier | | Reference |
|---|---|---|---|---|---|
| | | | Agent | Effect of Modifier | |
| Articular Cartilage and Meniscal Repair | BMP2 | Gene Transfer | Periosteal Cells | ND | [1] |
| | | | Chondrocytes | ND | [2] |
| | | | Sox9 + Chondrocytes | ND | [3] |
| | BMP4 | Gene Transfer | None | NA | [4] |
| | | | ASCs | ND | [5] |
| | | | MDSCs | ND | [6] |
| | | | sFLT1 + PRP and MDSCs | Enhance | [7] |
| | BMP6 | Recombinant | ASCs | ND | [8] |
| | BMP7 | Recombinant | None | NA | [9, 10] |
| | | Gene Transfer | Periosteal Cells | ND | [11] |
| Bone Augmentation / Grafting / Fracture Repair | AB204 | Recombinant | None | NA | [12] |
| | caALK2 | Gene Transfer | None | NA | [13] |
| | caALK6 | Gene Transfer | Runx2 | ND | [14] |
| | BB1 | Recombinant | None | NA | [15] |
| | BMP2 | Recombinant | None | NA | [12, 15-136] |
| | | | Alendronate | Enhance | [137] |
| | | | Antibiotic | Enhance | [138] |
| | | | ASCs | ND | [139] |
| | | | | No Change | [140] |
| | | | BMP2-L51P | Enhance | [84] |
| | | | BMSCs | Enhance | [141-144] |
| | | | | ND | [145] |
| | | | | No Change | [146, 147] |
| | | | *Smurf1*-KD BMSCs | Enhance | [148] |
| | | | DBP | No Change | [149] |
| | | | EGF | Enhance | [150] |
| | | | EPO | Enhance | [151] |
| | | | bFGF | Enhance | [152, 153] |
| | | | | No Change | [150, 154] |
| | | | LIPUS | Enhance | [155] |
| | | | OPG | Enhance | [156] |
| | | | PEMF | Enhance | [157] |
| | | | PDGF | Enhance | [150] |
| | | | PRP | Enhance | [158] |
| | | | | No Change | [159] |
| | | | iPTH | Enhance | [160] |
| | | | Phenamil | Enhance | [161] |
| | | | SDF1 | Enhance | [162, 163] |
| | | | | No Change | [164] |
| | | | TGFβ2 | No Change | [165] |
| | | | VEGF | Enhance | [166-168] |
| | | | | No Change | [150, 169] |
| | | Gene Transfer | None | NA | [170-188] |
| | | | ASCs | ND | [189-192] |
| | | | ASCs + miR148b | Enhance | [193] |
| | | | BMP7 | ND | [194] |
| | | | BMP7 + BLKs | Enhance | [195] |
| | | | BMSCs | ND | [196-227] |
| | | | BMSCs + PDGF | Enhance | [228] |
| | | | BMSCs + EPCs | Enhance | [229] |
| | | | DFs | ND/Enhance | [171, 230] |
| | | | MDCs | ND | [231-233] |
| | | | OPG | Enhance | [156] |

| | | | | | |
|---|---|---|---|---|---|
| | | | PDLSCs | ND | [234] |
| | | | VEGF | ND | [235] |
| | B2A2 | Peptide | None | NA | [236] |
| | BMP4 | Recombinant | None | NA | [237-240] |
| | | Gene Transfer | None | NA | [241-243] |
| | | | BMSCs | ND | [244-246] |
| | | | MDCs | ND | [245, 247] |
| | BMP6 | Recombinant | None | NA | [248] |
| | | Gene Transfer | None | NA | [172] |
| | BMP7 | Recombinant | None | NA | [17, 110, 248-276] |
| | | | BMSCs | Enhance | [277] |
| | | | BBP | Enhance | [278] |
| | | | iPTH | Enhance | [279] |
| | | | TGFβ2 | No Change | [280] |
| | | | ZA | Enhance | [281] |
| | | Gene Transfer | None | NA | [170, 282-284] |
| | | | BMP2 + BLKs | Enhance | 154] |
| | | | BMSCs | ND | [285] |
| | | | DFs | ND | [286-290] |
| | | | PDGF | Enhance | [291] |
| | | | Periosteal Cells | ND | [292] |
| | BMP9 | Gene Transfer | None | NA | [173, 293] |
| | GDF5 | Recombinant | None | NA | [294-298] |
| | GDF5-N445T | Recombinant | None | NA | [299] |
| | GDF5-V453/V456 | Recombinant | None | NA | [298] |
| | Noggin siRNA | Gene Transfer | OBs | ND | [300] |
| | | | ASCs + BMP2 | ND | [301, 302] |
| | P1 | Recombinant | None | NA | [303] |
| | PEP7 | Peptide | None | NA | [21] |
| | Smurf1 siRNA | Gene Transfer | BMSCs + BMP2 | Enhance | [148] |
| Bone / Tooth Regeneration | BMP2 | Recombinant | None | NA | [304, 305] |
| | | | Fibrin | Enhance | [306] |
| | BMP4 | Recombinant | None | NA | [307] |
| Craniosynostosis | Noggin | Recombinant | None | NA | [308] |
| | | Gene Transfer | None | NA | [309] |
| | | | MDCs | ND | [310] |
| Heterotopic/Ectopic Ossification | caALK2 siRNA | Gene Transfer | None | NA | [311, 312] |
| | BMP2 | Recombinant | EP4A | Enhance | [313, 314] |
| | | | FGF2 | Enhance/Decrease | [315] |
| | | | Heparin | Enhance | [316] |
| | | | PDE Inhibitor | Enhance | [317-319] |
| | | | SB-431542 | No Change | [320] |
| | | | Spp24 | Decrease | [321, 322] |
| | | | TNP-470 | Decrease | [323] |
| | | | VEGF | Enhance | [169] |
| | | | Y-27632 | Enhance | [324] |
| | | Gene Transfer | BMP7 + BLKs | Enhance | [325] |
| | | | FK506 | Enhance | [326] |
| | | | Noggin + MDCs | Decrease | [327] |
| | | | Runx2 + ASCs | Enhance | [328] |
| | | | VEGF + Periosteal Cells | Enhance | [329] |
| | | | VEGF + BMSCs | Enhance | [330] |
| | Corticosteroid | Small Molecule | None | NA | [331] |
| | LDN-193189 | Small Molecule | None | NA | [331, 332] |
| | LDN-212854 | Small Molecule | None | NA | [333] |
| | Noggin | Gene Transfer | None | NA | [334] |
| | NogginΔB2 | Gene Transfer | None | NA | [334] |

| | | | | | |
|---|---|---|---|---|---|
| | Perhexiline | Small Molecule | None | NA | [335] |
| | RAR-γ agonist | Small Molecule | None | NA | [336] |
| IVD Degeneration | BMP2 | Gene Transfer | None | NA | [337, 338] |
| | BMP7 | Recombinant | None | NA | [339] |
| | | Gene Transfer | Chondrocytes | ND | [340] |
| | | | NPCs | ND | [341] |
| | GDF5 | Recombinant | None | NA | [342] |
| Joint Fusion | BMP2 | Recombinant | None | NA | [109, 343-401] |
| | | | BMP7 | Enhance | [402] |
| | | | COMP | Enhance | [403] |
| | | | iPTH | Enhance | [404] |
| | | | BMSCs | Enhance | [405-407] |
| | | | EP4A | Enhance | [408] |
| | | | bFGF + BMSCs | Enhance | [409] |
| | | Gene Transfer | None | NA | [410, 411] |
| | | | ASCs | ND | [412] |
| | | | BMSCs | ND | [412-418] |
| | | | NRKs | ND | [419] |
| | B2A | Peptide | None | NA | [420-422] |
| | BMP4 | Recombinant | None | NA | [423, 424] |
| | | Gene Transfer | None | NA | [425] |
| | BMP6 | Recombinant | None | NA | [426] |
| | | Gene Transfer | None | NA | [427] |
| | BMP7 | Recombinant | None | NA | [428-440] |
| | | | BBP | Enhance | [441] |
| | | | BMP2 | Enhance | [402] |
| | | Gene Transfer | BMSCs | ND | [442] |
| | BMP9 | Gene Transfer | None | NA | [443] |
| | | | BMSCs | ND | [444] |
| Osteopenia / Osteoporosis | ALK3-ECD | Recombinant | None | NA | [445] |
| | BMP2 | Recombinant | None | NA | [446-448] |
| | | Gene Transfer | BMSCs | ND | [449, 450] |
| | BMP4 | Gene Transfer | None | NA | [451] |
| | | | BMSCs | ND | [452] |
| | BMP6 | Recombinant | None | NA | [453] |
| | BMP7 | Recombinant | None | NA | [448] |
| Peri-implantitis | BMP2 | Gene Transfer | PDLSCs | ND | [234] |
| Peri-trabecular fibrosis | BMP7 | Recombinant | None | NA | [454] |
| Rubenstein-Tayibi defects | BMP2 + BMP7 | Recombinant | None | NA | [455] |
| Tendon / Ligament Repair, Integration, Enthesitis | BMP2 | Recombinant | None | NA | [456-458] |
| | | | Periosteal Cells | ND | [459, 460] |
| | | Gene Transfer | None | NA | [461] |
| | | | SMAD8 + BMSCs | ND | [462] |
| | | | NRKs | ND | [463] |
| | BMP4 | Gene Transfer | None | NA | [464] |
| | GDF5 | Recombinant | None | NA | [465, 466] |
| | | Gene Transfer | None | NA | [467] |
| | GDF6 | Recombinant | None | NA | [465] |
| | | Gene Transfer | None | NA | [468] |
| | GDF7 | Recombinant | None | NA | [469, 470] |
| | | Gene Transfer | MDSCs | ND | [471] |
| | Noggin | Gene Transfer | None | NA | [472] |

ASCs, adipose-derived stromal cells; BBP, BMP-binding protein; bFGF, basic fibroblast growth factor; BLKs, embryonic mouse fibroblasts; BM, bone mass; BMD, bone mineral density; BMSCs, bone marrow-derived stromal cells; ca: constitutively active; DBP, vitamin D binding protein; DFs, dermal fibroblasts; ECD, extracellular domain; EGF, epidermal growth factor; EP4A, EP4 receptor agonist; EPCs, endothelial progenitor cells; EPO, erythropoietin; iPTH, intermittent

parathyroid hormone therapy; LIPUS, low-intensity pulsed ultrasound; MDCs, muscle-derived stromal cells; NA, not applicable; ND, no data (direct comparison not reported); NPCs, nucleus polposus cells; NRKs, normal rat kidney cells; OBs, osteoblasts; OPG, osteoprotegerin; PDGF, platelet-derived growth factor; PDLSCs; periodontal ligament-derived stromal cells; PEMF, pulsed electromagnetic field; PRP, platelet rich plasma; SDF1, stromal cell-derived factor 1; siRNA, small interfering RNA; VEGF, vascular endothelial growth factor; ZA, zoledronic acid.

**Table S2.** Examples of BMP pathway modulation for fibrosis-related applications

| Application | Agent | Technique | Modifier | | Reference |
|---|---|---|---|---|---|
| | | | Agent | Effect of Modifier | |
| Bone Marrow Fibrosis | BMP7 | Recombinant | None | NA | [454] |
| Corneal Fibrosis | BMP7 | Gene Transfer | None | NA | [473, 474] |
| Hepatic Fibrosis | BMP7 | Recombinant | None | NA | [475, 476] |
| | | Gene Transfer | None | NA | [477, 478] |
| Lens Fibrosis | BMP7 | Gene Transfer | None | NA | [479] |
| | ID1 | Gene Transfer | None | NA | [479] |
| | ID3 | Gene Transfer | None | NA | [479] |
| Prosthesis-related Fibrosis | BMP7 | Recombinant | None | NA | [276] |
| Pulmonary Fibrosis | BMP7 | Recombinant | None | NA | [480, 481] |
| Renal Fibrosis | BMP2 | Recombinant | None | NA | [482] |
| | BMP7 | Recombinant | None | NA | [483-489] |
| | | Gene Transfer | BMSCs | ND | [490] |
| | FK506 | Small Molecule | None | NA | [491] |
| | Gremlin siRNA | Gene Transfer | None | NA | [492] |
| | SMAD7 | Gene Transfer | None | NA | [493] |
| | THR-123 | Peptide | None | NA | [494] |
| | Trichostatin-A | Small Molecule | None | NA | [495] |

BMSCs, bone marrow-derived stromal cells; NA, not applicable; ND, no data (direct comparison not reported)

**Table S3.** Examples of BMP pathway modulation for (cardio)vascular applications.

| Application | Agent | Technique | Modifier | | Reference |
|---|---|---|---|---|---|
| | | | Agent | Effect of Modifier | |
| Angiogenesis | ALK1-Fc | Recombinant | None | NA | [496-500] |
| | Anti-BMP9 Ab | Recombinant | None | NA | [500] |
| | Anti-BMP10 Ab | Recombinant | None | NA | [500] |
| Hypertensive and/or Prediabetic Cardiac Remodeling | BMP2 | Recombinant | None | NA | [501] |
| | BMP7 | Recombinant | None | NA | [502, 503] |
| | Smad7 | Gene Transfer | None | NA | [504] |
| Myocardial Infarction | BMP2 | Recombinant | None | NA | [505] |
| | BMP10 | Recombinant | None | NA | [506] |
| | Dorsomorphin | Small Molecule | None | NA | [507] |
| | FSLT1 | Recombinant | None | NA | [508] |
| | Noggin | Recombinant | None | NA | [507] |
| | sFRP2 | Gene Transfer | BMSCs | ND | [509] |
| Pulmonary Arterial Hypertension | BMPR2 | Gene Transfer | None | NA | [510-513] |
| | BMP9 | Recombinant | None | NA | [514] |
| | Chloroquine | Small Molecule | None | NA | [515] |
| | FK506 | Small Molecule | None | NA | [516] |
| | Anti-Gremlin Ab | Recombinant | None | NA | [517] |
| | miR-20a antagomiR | Gene Transfer | None | NA | [518] |
| | Serotonin | Small Molecule | None | Na | [519] |
| | Sildenafil | Small Molecule | None | NA | [520] |
| Systemic Hypertension | Alk3 siRNA | Gene Transfer | None | NA | [521] |
| | Bmp4 siRNA | Gene Transfer | None | NA | [521] |
| | Noggin | Recombinant | None | NA | [521] |
| | Smad7 | Gene Transfer | None | NA | [493] |
| Vascular Inflammation, Atherosclerosis, and Vascular Calcification | Noggin | Recombinant | None | NA | [522] |
| | ALK3-ECD | Recombinant | None | NA | [523, 524] |
| | BMP7 | Recombinant | None | NA | [525] |
| | LDN-193189 | Small Molecule | None | NA | [523, 524, 526, 527] |
| | sFRP2 | Gene Transfer | BMSCs | ND | [509] |

Ab, antibody; BMSCs, bone marrow-derived stromal cells; ECD, extracellular domain; NA, not applicable; ND, no data (direct comparison not reported)

**Table S4.** Examples of BMP pathway modulation for reproduction-related applications.

| Application | Agent | Technique | Modifier | | Reference |
|---|---|---|---|---|---|
| | | | Agent | Effect of Modifier | |
| Oocyte Quality | BMP6 | Recombinant | None | NA | [528] |
| Ovulation Rate | BMP6 | Recombinant | None | NA | [528] |
| | BMP7 | Recombinant | None | NA | [529] |
| | Anti-BMP15 Ab | Recombinant | None | NA | [530-532] |
| | BMPR2-ECD | Recombinant | None | NA | [533] |

Ab, antibody; ECD, extracellular domain; NA, not applicable.

**Table S5.** Examples of BMP pathway modulation for cancer-related applications.

| Application | Agent | Technique | Modifier | | Reference |
|---|---|---|---|---|---|
| | | | Agent | Effect of Modifier | |
| Breast Cancer | AB215 | Recombinant | None | NA | [534] |
| | BMP2 | Recombinant | None | NA | [535] |
| Breast Cancer Metastasis to Bone | BMP2 | Recombinant | None | NA | [536] |
| | BMP2/7 | Recombinant | None | NA | [537] |
| Breast Cancer Metastasis to Lung | DMH1 | Small Molecule | None | NA | [538] |
| Gliobastoma | BMP4 | Gene Transfer | ASCs | ND | [539] |
| Lung Cancer | BMP2 siRNA | Gene Transfer | A549 Cells | ND | [540] |
| Prostate Cancer Metastasis to Bone | Anti-BMP6 Ab | Recombinant | None | Na | [541] |
| | BMP7 | Recombinant | None | NA | [542] |
| | LDN-193189 | Small Molecule | None | NA | [543] |
| | Noggin | Gene Transfer | C42b Cells | ND | [544] |
| | | | PC-3 Cells | ND | [545, 546] |
| | Noggin siRNA | Gene Transfer | PC-3 Cells | ND | [547] |
| Tumor Angiogenesis | ALK1-ECD | Recombinant | None | NA | [496-498, 548] |

Ab, antibody; ASCs, adipose-derived stromal cells; ECD, extracellular domain; NA, not applicable; ND, no data (direct comparison not reported).

**Table S6.** Examples of BMP pathway modulation for nervous system-related applications

| Application | Agent | Technique | Modifier | | Reference |
|---|---|---|---|---|---|
| | | | Agent | Effect of Modifier | |
| Intraventricular Hemorrhage | Noggin | Recombinant | None | NA | [549] |
| CNS Ischemia | BMP7 | Recombinant | None | NA | [550-553] |
| | | Gene Transfer | None | NA | [554] |
| | Noggin | Recombinant | None | NA | [555] |
| | | Gene Transfer | BMSCs | ND | [556, 557] |
| Remyelination | Noggin | Recombinant | None | NA | [558, 559] |
| Spinal Cord Injury | Anti-Noggin Ab | Recombinant | None | NA | [560, 561] |
| | Noggin | Recombinant | None | NA | [562, 563] |
| | | Gene Transfer | NPCs | ND | [564] |

Ab, antibody; BMSCs, bone marrow-derived stromal cells; NA, not applicable; ND, no data (direct comparison not reported); NPCs, neural precursor cells

**Table S7.** Examples of BMP pathway modulation for miscellaneous applications.

| Application | Agent | Technique | Modifier | | Reference |
|---|---|---|---|---|---|
| | | | Agent | Effect of Modifier | |
| Airway inflammation | BMP4 | Recombinant | None | NA | [565] |
| Inflammatory Bowel Disease | Anti-BMP6 Ab | Recombinant | None | NA | [566] |
| | BMP7 | Recombinant | None | NA | [567, 568] |
| | HJV-ECD | Recombinant | None | NA | [566] |
| | LDN-193189 | Small Molecule | None | NA | [566, 569] |
| Iron Deficiency Anemia | ALK3-ECD | Recombinant | None | NA | [569] |
| | Anti-BMP6 Ab | Recombinant | None | NA | [566, 570, 571] |
| | Dorsomorphin | Small Molecule | None | NA | [572] |
| | Heparin | Small Molecule | None | NA | [573] |
| | HJV-ECD | Recombinant | None | NA | [566, 570, 574, 575] |
| | LDN-193189 | Small Molecule | None | NA | [566, 569, 574] |
| Liver Regeneration | DMH2 | Small Molecule | None | NA | [576] |
| | LDN-193189 | | | | |
| | VU5350 | | | | |
| Lung Injury (Acute) | LDN-193189 | Small Molecule | None | NA | [577] |
| Muscular Dystrophy | Noggin | Gene Transfer | None | NA | [578] |
| Obesity (Diet-induced) | BMP7 | Recombinant | None | NA | [579] |
| Pancreatitis (Acute) | Noggin | Recombinant | None | NA | [580] |
| Retinal Injury | BMP4 | Recombinant | None | NA | [581] |
| Rhytid | ALK3-ECD | Recombinant | None | NA | [582] |
| Strabismus | BMP4 | Recombinant | None | NA | [583] |

Ab, antibody; ECD, extracellular domain; NA, not applicable.

**Table S8.** Agents shown to increase expression of BMP pathway components, enhance BMP signaling, and/or act synergistically with BMP signaling in a therapeutic context.

| Modifier | Effect | Reference |
|---|---|---|
| Acerogenin A | Increases BMP2, BMP4, and BMP7 expression | [584] |
| 2-Acetyldibenzothiophene | Increases BMP2 expression | [585] |
| AST-II | Increases BMP2 expression | [586] |
| BBP | Enhances BMP signaling | [278, 587, 588] |
| Chloroquine | Stabilizes BMPR2; enhances BMP signaling | [515, 589] |
| Cilomilast | Enhances BMP signaling | [590] |
| Compound 1 | Increases BMP2 expression | [591] |
| Compound 5 | Increases BMP2 expression | [592] |
| Compound 8a | Increases BMP2 expression | [591] |
| Compound 11 | Increases BMP2 expression | [593] |
| Coumarin | Increases BMP2 expression | [594] |
| Diadzein | Increases BMP2 expression | [585] |
| DSP | Synergy | [595] |
| EGF | Synergy | [150] |
| Epinephrine | Enhances BMP signaling | [596] |
| Estradiol | Enhances BMP signaling | [597] |
| ESW | Increases BMP2 expression | [598] |
| Fasudil | Increases BMP2 expression and enhances BMP signaling | [599, 600] |
| bFGF | Synergy | [152, 315, 409] |
| Formononetin | Increases BMP2 expression | [585] |
| FSAP | Increases BMP signaling by activating BMP2 | [601] |
| Genistein | Increases expression of several BMPs | [602] |
| Harmine | Increases BMP2, BMP4, BMP6, and BMP7 expression | [603] |
| HDAC Inhibitor | Enhances BMP signaling | [604] |
| Heparin sulfate | Enhances BMP signaling | [316, 605] |
| HGF | Increases BMP receptor expression | [606] |
| HSE | Increases BMP7 expression | [607] |
| HSP70 | Enhances BMP signaling by binding MGP | [608] |
| Icariin | Increases BMP2 expression | [609] |
| IGF-1 | Synergy | [610] |
| IGF-2 | Enhances BMP signaling | [611] |
| Iron | Increases BMP6 expression | [612] |
| Lactoferrin | Increases BMP signaling by downregulating Noggin and/or increasing BMP7 expression | [613, 614] |
| Licochalcone A | Enhances BMP signaling | [615] |
| LIPUS | Increases BMP2, BMP4, BMP6 and BMP7 expression; enhances activity | [155, 616-619] |
| LLLI | Increases BMP2 expression and enhances activity | [620] |
| Lovastatin | Increases BMP2 expression | [621] |
| Mechanical Stress | Increases BMP2, BMP6 and BMP7 expression and enhances signaling | [622-624] |
| Melatonin | Increases BMP2 and BMP4 expression | [625] |
| miR-148b | Synergy | [193] |
| Myricetin | Increases BMP2 expression | [626] |
| NMP | Enhances BMP signaling | [627] |
| NOV | Increases BMP4 expression | [628] |
| ONO-4819 | Enhances BMP activity and BMP2 expression | [313, 314, 408, 629, 630] |
| PTH | Synergy; enhances BMP signaling and increases BMP2 expression | [160, 631-633] |
| PDGF-BB | Synergy | [228, 291] |
| Phenamil | Enhances BMP signaling by promoting SMURF1 degradation | [634] |
| Phosphoserine | Increases BMP2 expression | [635] |
| PEMF | Synergy; increases BMP2 and BMP7 expression | [636-638] |
| Pentoxifylline | Enhances BMP activity | [318] |
| Resveratrol | Increases BMP2 and BMP7 expression and BMP signaling | [639, 640] |
| 9-cis Retinoic acid | Increases BMP7 expression | [641, 642] |

| | | |
|---|---|---|
| all-trans Retinoic acid | Synergy | [643] |
| RGD peptide | Synergy | [644] |
| Rolipram | Enhances BMP signaling | [317, 319, 590] |
| Runx2 | Synergy | [328] |
| Salidroside | Increases BMP2, BMP6, and BMP7 expression | [645] |
| Serotonin | Possibly activates BMP signaling | [519] |
| Sildenafil | Enhances BMP signaling | [520, 646-648] |
| Silibinin | Increases BMP2 expression | [649] |
| Simvastatin | Increases BMP2 expression | [621, 650-654] |
| SMURF1 Inhibitors | Enhances BMP signaling | [655-657] |
| Sox9 | Synergy | [3] |
| Syringetin | Increases BMP2 expression | [658] |
| TGFβ | Synergy | [659, 660] |
| Titanium Particles | Synergy | [661] |
| U0126 | Increases BMP signaling and possibly BMP2 expression | [662] |
| VEGF | Synergy | [166, 167, 329, 330] |
| Y-27632 | Enhances BMP signaling and BMP4 expression | [324] |
| Zoledronic acid | Synergy | [281] |

AST-II, astragaloside II; BBP, BMP-binding protein; DSP, dentin sialoprotein; EGF, epidermal growth factor; ESW, extracorporeal shock wave; HDAC, histone deacetylase; HGF, hepatocyte growth factor; HSE, Hwanggeumchal sorghum extract; HSP70, heat shock protein 70; IGF, insulin-like growth factor; LIPUS, low-intensity pulsed ultrasound; LLLI, low-level laser irradiation; MGP, matrix-GLA protein; NMP, N-methyl pyrrolidone; PEMF, pulsed electromagnetic field; PTH, parathyroid hormone; VEGF, vascular endothelial growth factor.

**Table S9.** Agents shown to decrease expression of BMP pathway components, reduce BMP signaling, and/or act antagonistically with BMP signaling in a therapeutic context.

| Modifier | Effect | Reference |
|---|---|---|
| COX-2 inhibitor | Reduces BMP6 expression | [663] |
| FGF2 | Reduces BMP signaling | [664] |
| IGF-1 | Reduces BMP signaling | [665] |
| IL-6 | Reduces BMPR2 expression | [666] |
| LPS | Reduces BMP signaling | [667] |
| Perhexiline | Reduces BMP signaling | [335] |
| NF-κB | Reduces BMP signaling | [667] |
| Progesterone | Reduces BMP7 expression | [668] |
| PTHrP | Reduces BMP6 expression | [669] |
| Rapamycin | Reduces BMP signaling | [670] |
| Retinoic acid | Reduces BMP signaling | [671] |
| RAR-γ agonist | Reduces BMP signaling | [336] |
| TNP-470 | Reduces BMP activity | [323] |

COX, cyclooxygenase; FGF, fibroblast growth factor; IL, interleukin; LPS, lipopolysaccharide; NF-κB, nuclear factor kapp-light-chain-enhance of activated B cells; PTHrP, parathyroid hormone-related peptide; RAR, retinoic acid receptor.

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