

6. Literaturverzeichnis

Bücherverzeichnis:

- a. Schiebler TH, Schmidt W, Zilles K, Anatomie, 7. Aufl., Springer-Verlag Berlin-Heidelberg, 1997, S.65-70.
- b. Gilbert SF, Developmental biology, 4th Edition, Sinauer Association, USA, 1994.
- c. Putz R, Pabst R, Sobotta Band 1, 20. Aufl., Urban und Schwarzenberg, 1993 S.165/168.
- d. Lippert H, Lehrbuch Anatomie, 3. Aufl., Urban und Scharzenberg, 1993, S.15-25.
- e. Leonhardt H, Histologie, Zytologie und Mikroanatomie des Menschen, 8. Auflage, Thieme Verlag, S. 140-145.
- f. Kaufmann MH, The atlas of mouse development, Academic Press, London, 1992.
- g. Pschyrembel, Klinisches Wörterbuch, 258. Auflage, Walter de Gruiter, Berlin-New York, 1998.

Journalverzeichnis:

1. Vu TH, Shipley JM, Bergers G, et al. MMP-9/gelatinase B is a key regulator of growth plate angiogenesis and apoptosis of hypertrophic chondrocytes. *Cell* 1998;93(3):411-22.
2. Karsenty G, Wagner EF. Reaching a genetic and molecular understanding of skeletal development. *Dev Cell* 2002;2(4):389-406.
3. Zou H, Wieser R, Massague J, Niswander L. Distinct roles of type I bone morphogenetic protein receptors in the formation and differentiation of cartilage. *Genes Dev* 1997;11(17):2191-203.
4. Bi W, Drake CJ, Schwarz JJ. The transcription factor MEF2C-null mouse exhibits complex vascular malformations and reduced cardiac expression of angiopoietin 1 and VEGF. *Dev Biol* 1999;211(2):255-67.
5. de Crombrugghe B, Lefebvre V, Nakashima K. Regulatory mechanisms in the pathways of cartilage and bone formation. *Curr Opin Cell Biol* 2001;13(6):721-7.
6. Fujii M, Takeda K, Imamura T, et al. Roles of bone morphogenetic protein type I receptors and Smad proteins in osteoblast and chondroblast differentiation. *Mol Biol Cell* 1999;10(11):3801-13.
7. Takeda S, Bonnamy JP, Owen MJ, Ducy P, Karsenty G. Continuous expression of Cbfa1 in nonhypertrophic chondrocytes uncovers its ability to induce hypertrophic chondrocyte differentiation and partially rescues Cbfa1-deficient mice. *Genes Dev* 2001;15(4):467-81.
8. Stricker S, Fundele R, Vortkamp A, Mundlos S. Role of Runx genes in chondrocyte differentiation. *Dev Biol* 2002;245(1):95-108.
9. Yoshida CA, Yamamoto H, Fujita T, et al. Runx2 and Runx3 are essential for chondrocyte maturation, and Runx2 regulates limb growth through induction of Indian hedgehog. *Genes Dev* 2004;18(8):952-63.
10. Hogan BL. Bone morphogenetic proteins: multifunctional regulators of vertebrate development. *Genes Dev* 1996;10(13):1580-94.
11. Shukunami C, Ohta Y, Sakuda M, Hiraki Y. Sequential progression of the differentiation program by bone morphogenetic protein-2 in chondrogenic cell line ATDC5. *Exp Cell Res* 1998;241(1):1-11.
12. St-Jacques B, Hammerschmidt M, McMahon AP. Indian hedgehog signaling regulates proliferation and differentiation of chondrocytes and is essential for bone formation. *Genes Dev* 1999;13(16):2072-86.
13. Ducy P. Cbfa1: a molecular switch in osteoblast biology. *Dev Dyn* 2000;219(4):461-71.

14. Vortkamp A, Lee K, Lanske B, Segre GV, Kronenberg HM, Tabin CJ. Regulation of rate of cartilage differentiation by Indian hedgehog and PTH-related protein. *Science* 1996;**273**(5275):613-22.
15. Nakashima K, Zhou X, Kunkel G, et al. The novel zinc finger-containing transcription factor osterix is required for osteoblast differentiation and bone formation. *Cell* 2002;**108**(1):17-29.
16. DUCY P, Zhang R, Geoffroy V, Ridall AL, Karsenty G. Osf2/Cbfa1: a transcriptional activator of osteoblast differentiation. *Cell* 1997;**89**(5):747-54.
17. Teitelbaum SL, Ross FP. Genetic regulation of osteoclast development and function. *Nat Rev Genet* 2003;**4**(8):638-49.
18. Duong LT, Rodan GA. Regulation of osteoclast formation and function. *Rev Endocr Metab Disord* 2001;**2**(1):95-104.
19. Roodman GD. Cell biology of the osteoclast. *Exp Hematol* 1999;**27**(8):1229-41.
20. Teitelbaum SL, Tondravi MM, Ross FP. Osteoclasts, macrophages, and the molecular mechanisms of bone resorption. *J Leukoc Biol* 1997;**61**(4):381-8.
21. Teitelbaum SL. Bone resorption by osteoclasts. *Science* 2000;**289**(5484):1504-8.
22. Otto F, Thornell AP, Crompton T, et al. Cbfa1, a candidate gene for cleidocranial dysplasia syndrome, is essential for osteoblast differentiation and bone development. *Cell* 1997;**89**(5):765-71.
23. Komori T, Yagi H, Nomura S, et al. Targeted disruption of Cbfa1 results in a complete lack of bone formation owing to maturational arrest of osteoblasts. *Cell* 1997;**89**(5):755-64.
24. Quack I, Vonderstrass B, Stock M, et al. Mutation analysis of core binding factor A1 in patients with cleidocranial dysplasia. *Am J Hum Genet* 1999;**65**(5):1268-78.
25. Mundlos S, Otto F, Mundlos C, et al. Mutations involving the transcription factor CBFA1 cause cleidocranial dysplasia. *Cell* 1997;**89**(5):773-9.
26. Mundlos S. Cleidocranial dysplasia: clinical and molecular genetics. *J Med Genet* 1999;**36**(3):177-82.
27. Inada M, Yasui T, Nomura S, et al. Maturational disturbance of chondrocytes in Cbfa1-deficient mice. *Dev Dyn* 1999;**214**(4):279-90.
28. Kim IS, Otto F, Zabel B, Mundlos S. Regulation of chondrocyte differentiation by Cbfa1. *Mech Dev* 1999;**80**(2):159-70.
29. Banerjee C, McCabe LR, Choi JY, et al. Runt homology domain proteins in osteoblast differentiation: AML3/CBFA1 is a major component of a bone-specific complex. *J Cell Biochem* 1997;**66**(1):1-8.
30. Erlebacher A, Filvaroff EH, Gitelman SE, Deryck R. Toward a molecular understanding of skeletal development. *Cell* 1995;**80**(3):371-8.
31. Gerstenfeld LC, Finer MH, Boedtker H. Quantitative analysis of collagen expression in embryonic chick chondrocytes having different developmental fates. *J Biol Chem* 1989;**264**(9):5112-20.
32. Linsenmayer TF, Chen QA, Gibney E, et al. Collagen types IX and X in the developing chick tibiotarsus: analyses of mRNAs and proteins. *Development* 1991;**111**(1):191-6.
33. Ek-Rylander B, Flores M, Wendel M, Heinegard D, Andersson G. Dephosphorylation of osteopontin and bone sialoprotein by osteoclastic tartrate-resistant acid phosphatase. Modulation of osteoclast adhesion in vitro. *J Biol Chem* 1994;**269**(21):14853-6.
34. O'Driscoll SW, Fitzsimmons JS. The role of periosteum in cartilage repair. *Clin Orthop* 2001;(391 Suppl):S190-207.
35. Park BL, Han IK, Lee HS, Kim LH, Kim SJ, Shin HD. Identification of novel variants in transforming growth factor-beta 1 (TGFB1) gene and association analysis with bone mineral density. *Hum Mutat* 2003;**22**(3):257-8.
36. Marie PJ. Role of N-cadherin in bone formation. *J Cell Physiol* 2002;**190**(3):297-305.

37. Ferrari D, Kosher RA. Dlx5 is a positive regulator of chondrocyte differentiation during endochondral ossification. *Dev Biol* 2002;252(2):257-70.
38. Bendall AJ, Hu G, Levi G, Abate-Shen C. Dlx5 regulates chondrocyte differentiation at multiple stages. *Int J Dev Biol* 2003;47(5):335-44.
39. Erceg I, Tadic T, Kronenberg MS, Marijanovic I, Lichtler AC. Dlx5 regulation of mouse osteoblast differentiation mediated by avian retrovirus vector. *Croat Med J* 2003;44(4):407-11.
40. Denhardt DT, Guo X. Osteopontin: a protein with diverse functions. *Faseb J* 1993;7(15):1475-82.
41. Tian E, Zhan F, Walker R, et al. The role of the Wnt-signaling antagonist DKK1 in the development of osteolytic lesions in multiple myeloma. *N Engl J Med* 2003;349(26):2483-94.
42. Tuan RS. Cellular signaling in developmental chondrogenesis: N-cadherin, Wnts, and BMP-2. *J Bone Joint Surg Am* 2003;85-A Suppl 2:137-41.
43. Tuli R, Tuli S, Nandi S, et al. Transforming growth factor-beta-mediated chondrogenesis of human mesenchymal progenitor cells involves N-cadherin and mitogen-activated protein kinase and Wnt signaling cross-talk. *J Biol Chem* 2003;278(42):41227-36.
44. Wang Q, Xie Y, Du QS, et al. Regulation of the formation of osteoclastic actin rings by proline-rich tyrosine kinase 2 interacting with gelsolin. *J Cell Biol* 2003;160(4):565-75.
45. Hayman AR, Jones SJ, Boyde A, et al. Mice lacking tartrate-resistant acid phosphatase (Acp 5) have disrupted endochondral ossification and mild osteopetrosis. *Development* 1996;122(10):3151-62.
46. Kim CS, Kawada T, Yoo H, Kwon BS, Yu R. Macrophage inflammatory protein-related protein-2, a novel CC chemokine, can regulate preadipocyte migration and adipocyte differentiation. *FEBS Lett* 2003;548(1-3):125-30.
47. Lean JM, Murphy C, Fuller K, Chambers TJ. CCL9/MIP-1gamma and its receptor CCR1 are the major chemokine ligand/receptor species expressed by osteoclasts. *J Cell Biochem* 2002;87(4):386-93.
48. Hornstra IK, Birge S, Starcher B, Bailey AJ, Mecham RP, Shapiro SD. Lysyl oxidase is required for vascular and diaphragmatic development in mice. *J Biol Chem* 2003;278(16):14387-93.
49. Hong HH, Pischon N, Santana RB, et al. A role for lysyl oxidase regulation in the control of normal collagen deposition in differentiating osteoblast cultures. *J Cell Physiol* 2004;200(1):53-62.
50. Selvamurugan N, Kwok S, Alliston T, Reiss M, Partridge NC. Transforming growth factor-beta 1 regulation of collagenase-3 expression in osteoblastic cells by cross-talk between the Smad and MAPK signaling pathways and their components, Smad2 and Runx2. *J Biol Chem* 2004;279(18):19327-34.
51. Engelkamp D. Cloning of three mouse Unc5 genes and their expression patterns at mid-gestation. *Mech Dev* 2002;118(1-2):191-7.
52. Kennedy TE. Cellular mechanisms of netrin function: long-range and short-range actions. *Biochem Cell Biol* 2000;78(5):569-75.
53. FitzPatrick DR, Carr IM, McLaren L, et al. Identification of SATB2 as the cleft palate gene on 2q32-q33. *Hum Mol Genet* 2003;12(19):2491-501.
54. Schwartzberg PL, Xing L, Hoffmann O, et al. Rescue of osteoclast function by transgenic expression of kinase-deficient Src in src-/- mutant mice. *Genes Dev* 1997;11(21):2835-44.
55. Soriano P, Montgomery C, Geske R, Bradley A. Targeted disruption of the c-src proto-oncogene leads to osteopetrosis in mice. *Cell* 1991;64(4):693-702.
56. Molkentin JD, Li L, Olson EN. Phosphorylation of the MADS-Box transcription factor MEF2C enhances its DNA binding activity. *J Biol Chem* 1996;271(29):17199-204.

57. Duarte WR, Shibata T, Takenaga K, et al. S100A4: a novel negative regulator of mineralization and osteoblast differentiation. *J Bone Miner Res* 2003;18(3):493-501.
58. Poliakov A, Cotrina M, Wilkinson DG. Diverse roles of eph receptors and ephrins in the regulation of cell migration and tissue assembly. *Dev Cell* 2004;7(4):465-80.
59. Lickliter JD, Smith FM, Olsson JE, Mackwell KL, Boyd AW. Embryonic stem cells express multiple Eph-subfamily receptor tyrosine kinases. *Proc Natl Acad Sci U S A* 1996;93(1):145-50.
60. Zeng W, Yuan W, Wang Y, et al. Expression of a novel member of sorting nexin gene family, SNX-L, in human liver development. *Biochem Biophys Res Commun* 2002;299(4):542-8.
61. Fransson LA. Glypicans. *Int J Biochem Cell Biol* 2003;35(2):125-9.
62. Litwack ED, Ivins JK, Kumbasar A, Paine-Saunders S, Stipp CS, Lander AD. Expression of the heparan sulfate proteoglycan glypican-1 in the developing rodent. *Dev Dyn* 1998;211(1):72-87.
63. Ebert-Dumig R, Seufert J, Schneider D, Kohrle J, Schutze N, Jakob F. [Expression of selenoproteins in monocytes and macrophages--implications for the immune system]. *Med Klin (Munich)* 1999;94 Suppl 3:29-34.
64. Fernando LP, Makhlof M, Fernando AN, Ashton S, Halushka PV, Cook JA. Tolerance to LPS decreases macrophage G protein content. *Shock* 1999;11(5):330-5.
65. Hertzel AV, Bernlohr DA. The mammalian fatty acid-binding protein multigene family: molecular and genetic insights into function. *Trends Endocrinol Metab* 2000;11(5):175-80.
66. Gerbens F, van Erp AJ, Harders FL, et al. Effect of genetic variants of the heart fatty acid-binding protein gene on intramuscular fat and performance traits in pigs. *J Anim Sci* 1999;77(4):846-52.
67. Yoshikawa H, Taniguchi SI, Yamamura H, et al. Mice lacking smooth muscle calponin display increased bone formation that is associated with enhancement of bone morphogenetic protein responses. *Genes Cells* 1998;3(10):685-95.
68. Michael M, Dieterich C, Vingron M. SITEBLAST-rapid and sensitive local alignment of genomic sequences employing motif anchors. *Bioinformatics* 2005;21(9):2093-2094.
69. Dieterich C, Wang H, Rateitschak K, Luz H, Vingron M. CORG: a database for Comparative Regulatory Genomics. *Nucleic Acids Res* 2003;31(1):55-7.
70. Alvarez J, Horton J, Sohn P, Serra R. The perichondrium plays an important role in mediating the effects of TGF-beta1 on endochondral bone formation. *Dev Dyn* 2001;221(3):311-21.
71. Noda M, Vogel RL, Craig AM, Prahl J, DeLuca HF, Denhardt DT. Identification of a DNA sequence responsible for binding of the 1,25-dihydroxyvitamin D₃ receptor and 1,25-dihydroxyvitamin D₃ enhancement of mouse secreted phosphoprotein 1 (SPP-1 or osteopontin) gene expression. *Proc Natl Acad Sci U S A* 1990;87(24):9995-9.
72. Selvamurugan N, Kwok S, Partridge NC. Smad3 interacts with JunB and Cbfa1/Runx2 for transforming growth factor-beta 1-stimulated collagenase-3 expression in human breast cancer cells. *J Biol Chem* 2004.
73. Partington GA, Fuller K, Chambers TJ, Pondel M. Mitf-PU.1 interactions with the tartrate-resistant acid phosphatase gene promoter during osteoclast differentiation. *Bone* 2004;34(2):237-45.
74. Alliston T, Choy L, Ducy P, Karsenty G, Deryck R. TGF-beta-induced repression of CBFA1 by Smad3 decreases cbfa1 and osteocalcin expression and inhibits osteoblast differentiation. *Embo J* 2001;20(9):2254-72.
75. Gurlek A, Pittelkow MR, Kumar R. Modulation of growth factor/cytokine synthesis and signaling by 1alpha,25-dihydroxyvitamin D(3): implications in cell growth and differentiation. *Endocr Rev* 2002;23(6):763-86.

76. Liu D, Kang JS, Derynck R. TGF-beta-activated Smad3 represses MEF2-dependent transcription in myogenic differentiation. *Embo J* 2004;23(7):1557-66.
77. DeLise AM, Tuan RS. Alterations in the spatiotemporal expression pattern and function of N-cadherin inhibit cellular condensation and chondrogenesis of limb mesenchymal cells in vitro. *J Cell Biochem* 2002;87(3):342-59.
78. Liu Q, Londraville RL, Azodi E, et al. Up-regulation of cadherin-2 and cadherin-4 in regenerating visual structures of adult zebrafish. *Exp Neurol* 2002;177(2):396-406.
79. Kang JS, Feinleib JL, Knox S, Ketteringham MA, Krauss RS. Promyogenic members of the Ig and cadherin families associate to positively regulate differentiation. *Proc Natl Acad Sci U S A* 2003;100(7):3989-94.
80. Behrens J. Control of beta-catenin signaling in tumor development. *Ann N Y Acad Sci* 2000;910:21-33; discussion 33-5.
81. Cho SH, Oh CD, Kim SJ, Kim IC, Chun JS. Retinoic acid inhibits chondrogenesis of mesenchymal cells by sustaining expression of N-cadherin and its associated proteins. *J Cell Biochem* 2003;89(4):837-47.
82. Acampora D, Merlo GR, Paleari L, et al. Craniofacial, vestibular and bone defects in mice lacking the Distal-less-related gene Dlx5. *Development* 1999;126(17):3795-809.
83. Benson MD, Bargeon JL, Xiao G, et al. Identification of a homeodomain binding element in the bone sialoprotein gene promoter that is required for its osteoblast-selective expression. *J Biol Chem* 2000;275(18):13907-17.
84. Beverdam A, Merlo GR, Paleari L, et al. Jaw transformation with gain of symmetry after Dlx5/Dlx6 inactivation: mirror of the past? *Genesis* 2002;34(4):221-7.
85. Robledo RF, Rajan L, Li X, Lufkin T. The Dlx5 and Dlx6 homeobox genes are essential for craniofacial, axial, and appendicular skeletal development. *Genes Dev* 2002;16(9):1089-101.
86. Ryoo HM, Hoffmann HM, Beumer T, et al. Stage-specific expression of Dlx-5 during osteoblast differentiation: involvement in regulation of osteocalcin gene expression. *Mol Endocrinol* 1997;11(11):1681-94.
87. Kraichely DM, MacDonald PN. Transcriptional activation through the vitamin D receptor in osteoblasts. *Front Biosci* 1998;3:D821-33.
88. Yoshizawa T, Handa Y, Uematsu Y, et al. Mice lacking the vitamin D receptor exhibit impaired bone formation, uterine hypoplasia and growth retardation after weaning. *Nat Genet* 1997;16(4):391-6.
89. Drissi H, Pouliot A, Koolloos C, et al. 1,25-(OH)2-vitamin D3 suppresses the bone-related Runx2/Cbfa1 gene promoter. *Exp Cell Res* 2002;274(2):323-33.
90. Suda T, Nakamura I, Jimi E, Takahashi N. Regulation of osteoclast function. *J Bone Miner Res* 1997;12(6):869-79.
91. Riminiucci M, Corsi A, Peris K, Fisher LW, Chimenti S, Bianco P. Coexpression of Bone Sialoprotein (BSP) and the Pivotal Transcriptional Regulator of Osteogenesis, Cbfa1/Runx2, in Malignant Melanoma. *Calcif Tissue Int* 2003.
92. Sato M, Morii E, Komori T, et al. Transcriptional regulation of osteopontin gene in vivo by PEBP2alphaA/CBFA1 and ETS1 in the skeletal tissues. *Oncogene* 1998;17(12):1517-25.
93. Shibata S, Fukada K, Suzuki S, Ogawa T, Yamashita Y. In situ hybridization and immunohistochemistry of bone sialoprotein and secreted phosphoprotein 1 (osteopontin) in the developing mouse mandibular condylar cartilage compared with limb bud cartilage. *J Anat* 2002;200(Pt 3):309-20.
94. Eswarakumar VP, Monstone-Ornan E, Pines M, Antonopoulou I, Morriss-Kay GM, Lonai P. The IIIc alternative of Fgfr2 is a positive regulator of bone formation. *Development* 2002;129(16):3783-93.

95. Uchida M, Shima M, Chikazu D, et al. Transcriptional induction of matrix metalloproteinase-13 (collagenase-3) by 1alpha,25-dihydroxyvitamin D3 in mouse osteoblastic MC3T3-E1 cells. *J Bone Miner Res* 2001;16(2):221-30.
96. McKee MD, Farach-Carson MC, Butler WT, Hauschka PV, Nanci A. Ultrastructural immunolocalization of noncollagenous (osteopontin and osteocalcin) and plasma (albumin and alpha 2HS-glycoprotein) proteins in rat bone. *J Bone Miner Res* 1993;8(4):485-96.
97. Chellaiah MA, Kizer N, Biswas R, et al. Osteopontin deficiency produces osteoclast dysfunction due to reduced CD44 surface expression. *Mol Biol Cell* 2003;14(1):173-89.
98. Grotewold L, Ruther U. Bmp, Fgf and Wnt signalling in programmed cell death and chondrogenesis during vertebrate limb development: the role of Dickkopf-1. *Int J Dev Biol* 2002;46(7):943-7.
99. Mukhopadhyay M, Shtrom S, Rodriguez-Esteban C, et al. Dickkopf1 is required for embryonic head induction and limb morphogenesis in the mouse. *Dev Cell* 2001;1(3):423-34.
100. Tu Q, Yamauchi M, Pageau SC, Chen JJ. Autoregulation of bone sialoprotein gene in pre-osteoblastic and non-osteoblastic cells. *Biochem Biophys Res Commun* 2004;316(2):461-7.
101. Kim RH, Li JJ, Ogata Y, Yamauchi M, Freedman LP, Sodek J. Identification of a vitamin D3-response element that overlaps a unique inverted TATA box in the rat bone sialoprotein gene. *Biochem J* 1996;318 (Pt 1):219-26.
102. Tu Q, Pi M, Quarles LD. Calcyclin mediates serum response element (SRE) activation by an osteoblastic extracellular cation-sensing mechanism. *J Bone Miner Res* 2003;18(10):1825-33.
103. Staal FJ, Meeldijk J, Moerer P, et al. Wnt signaling is required for thymocyte development and activates Tcf-1 mediated transcription. *Eur J Immunol* 2001;31(1):285-93.
104. Behrens J. Cross-regulation of the Wnt signalling pathway: a role of MAP kinases. *J Cell Sci* 2000;113 (Pt 6):911-9.
105. Church V, Nohno T, Linker C, Marcelle C, Francis-West P. Wnt regulation of chondrocyte differentiation. *J Cell Sci* 2002;115(Pt 24):4809-18.
106. Yang Y, Topol L, Lee H, Wu J. Wnt5a and Wnt5b exhibit distinct activities in coordinating chondrocyte proliferation and differentiation. *Development* 2003;130(5):1003-15.
107. Westendorf JJ, Kahler RA, Schroeder TM. Wnt signaling in osteoblasts and bone diseases. *Gene* 2004;341:19-39.
108. Verbeek S, Izon D, Hofhuis F, et al. An HMG-box-containing T-cell factor required for thymocyte differentiation. *Nature* 1995;374(6517):70-4.
109. Roose J, Huls G, van Beest M, et al. Synergy between tumor suppressor APC and the beta-catenin-Tcf4 target Tcf1. *Science* 1999;285(5435):1923-6.
110. Lanske B, Karaplis AC, Lee K, et al. PTH/PTHrP receptor in early development and Indian hedgehog-regulated bone growth. *Science* 1996;273(5275):663-6.
111. Lanske B, Amling M, Neff L, Guiducci J, Baron R, Kronenberg HM. Ablation of the PTHrP gene or the PTH/PTHrP receptor gene leads to distinct abnormalities in bone development. *J Clin Invest* 1999;104(4):399-407.
112. Chung UI, Schipani E, McMahon AP, Kronenberg HM. Indian hedgehog couples chondrogenesis to osteogenesis in endochondral bone development. *J Clin Invest* 2001;107(3):295-304.
113. Yoshida CA, Furuichi T, Fujita T, et al. Core-binding factor beta interacts with Runx2 and is required for skeletal development. *Nat Genet* 2002;32(4):633-8.
114. Kobayashi T, Chung UI, Schipani E, et al. PTHrP and Indian hedgehog control differentiation of growth plate chondrocytes at multiple steps. *Development* 2002;129(12):2977-86.

115. Biswas RS, Baker de A, Hruska KA, Chellaiah MA. Polyphosphoinositides-dependent regulation of the osteoclast actin cytoskeleton and bone resorption. *BMC Cell Biol* 2004;5(1):19.
116. Chellaiah MA, Biswas RS, Yuen D, Alvarez UM, Hruska KA. Phosphatidylinositol 3,4,5-trisphosphate directs association of Src homology 2-containing signaling proteins with gelsolin. *J Biol Chem* 2001;276(50):47434-44.
117. Chellaiah M, Kizer N, Silva M, Alvarez U, Kwiatkowski D, Hruska KA. Gelsolin deficiency blocks podosome assembly and produces increased bone mass and strength. *J Cell Biol* 2000;148(4):665-78.
118. Arai M, Kwiatkowski DJ. Differential developmentally regulated expression of gelsolin family members in the mouse. *Dev Dyn* 1999;215(4):297-307.
119. Grimes R, Reddy SV, Leach RJ, et al. Assignment of the mouse tartrate-resistant acid phosphatase gene (Acp5) to chromosome 9. *Genomics* 1993;15(2):421-2.
120. Liu Y, Shi Z, Silveira A, et al. Involvement of upstream stimulatory factors 1 and 2 in RANKL-induced transcription of tartrate-resistant acid phosphatase gene during osteoclast differentiation. *J Biol Chem* 2003;278(23):20603-11.
121. Rice DP, Kim HJ, Thesleff I. Detection of gelatinase B expression reveals osteoclastic bone resorption as a feature of early calvarial bone development. *Bone* 1997;21(6):479-86.
122. Youn BS, Jang IK, Broxmeyer HE, et al. A novel chemokine, macrophage inflammatory protein-related protein-2, inhibits colony formation of bone marrow myeloid progenitors. *J Immunol* 1995;155(5):2661-7.
123. Pischon N, Darbois LM, Palamakumbura AH, Kessler E, Trackman PC. Regulation of collagen deposition and lysyl oxidase by tumor necrosis factor- α in osteoblasts. *J Biol Chem* 2004.
124. Tsuda T, Pan TC, Evangelisti L, Chu ML. Prominent expression of lysyl oxidase during mouse embryonic cardiovascular development. *Anat Rec* 2003;270A(2):93-6.
125. Hess J, Porte D, Munz C, Angel P. AP-1 and Cbfa/runt physically interact and regulate parathyroid hormone-dependent MMP13 expression in osteoblasts through a new osteoblast-specific element 2/AP-1 composite element. *J Biol Chem* 2001;276(23):20029-38.
126. Kevorkian L, Young DA, Darrah C, et al. Expression profiling of metalloproteinases and their inhibitors in cartilage. *Arthritis Rheum* 2004;50(1):131-41.
127. D'Alonzo RC, Selvamurugan N, Karsenty G, Partridge NC. Physical interaction of the activator protein-1 factors c-Fos and c-Jun with Cbfa1 for collagenase-3 promoter activation. *J Biol Chem* 2002;277(1):816-22.
128. Togari A, Mogi M, Arai M, Yamamoto S, Koshihara Y. Expression of mRNA for axon guidance molecules, such as semaphorin-III, netrins and neurotrophins, in human osteoblasts and osteoclasts. *Brain Res* 2000;878(1-2):204-9.
129. Dalvin S, Anselmo MA, Prodhan P, Komatsuzaki K, Schnitzer JJ, Kinane TB. Expression of Netrin-1 and its two receptors DCC and UNC5H2 in the developing mouse lung. *Gene Expr Patterns* 2003;3(3):279-83.
130. Dobreva G, Dambacher J, Grosschedl R. SUMO modification of a novel MAR-binding protein, SATB2, modulates immunoglobulin mu gene expression. *Genes Dev* 2003;17(24):3048-61.
131. Quintrell N, Lebo R, Varmus H, et al. Identification of a human gene (HCK) that encodes a protein-tyrosine kinase and is expressed in hemopoietic cells. *Mol Cell Biol* 1987;7(6):2267-75.
132. Jeschke M, Brandi ML, Susa M. Expression of Src family kinases and their putative substrates in the human preosteoclastic cell line FLG 29.1. *J Bone Miner Res* 1998;13(12):1880-9.

133. Black BL, Olson EN. Transcriptional control of muscle development by myocyte enhancer factor-2 (MEF2) proteins. *Annu Rev Cell Dev Biol* 1998;14:167-96.
134. Wang DZ, Valdez MR, McAnally J, Richardson J, Olson EN. The Mef2c gene is a direct transcriptional target of myogenic bHLH and MEF2 proteins during skeletal muscle development. *Development* 2001;128(22):4623-33.
135. Dodou E, Xu SM, Black BL. mef2c is activated directly by myogenic basic helix-loop-helix proteins during skeletal muscle development in vivo. *Mech Dev* 2003;120(9):1021-32.
136. Ito Y, Zhang YW. A RUNX2/PEBP2alphaA/CBFA1 mutation in cleidocranial dysplasia revealing the link between the gene and Smad. *J Bone Miner Metab* 2001;19(3):188-94.
137. Bjornland K, Winberg JO, Odegaard OT, et al. S100A4 involvement in metastasis: deregulation of matrix metalloproteinases and tissue inhibitors of matrix metalloproteinases in osteosarcoma cells transfected with an anti-S100A4 ribozyme. *Cancer Res* 1999;59(18):4702-8.
138. Varelias A, Koblar SA, Cowled PA, Carter CD, Clayer M. Human osteosarcoma expresses specific ephrin profiles: implications for tumorigenicity and prognosis. *Cancer* 2002;95(4):862-9.
139. Burr PB, Morris BJ. Involvement of NMDA receptors and a p21Ras-like guanosine triphosphatase in the constitutive activation of nuclear factor-kappa-B in cortical neurons. *Exp Brain Res* 2002;147(3):273-9.
140. Parks WT, Frank DB, Huff C, et al. Sorting nexin 6, a novel SNX, interacts with the transforming growth factor-beta family of receptor serine-threonine kinases. *J Biol Chem* 2001;276(22):19332-9.
141. Otsuki T, Kajigaya S, Ozawa K, Liu JM. SNX5, a new member of the sorting nexin family, binds to the Fanconi anemia complementation group A protein. *Biochem Biophys Res Commun* 1999;265(3):630-5.
142. Fransson LA, Belting M, Cheng F, Jonsson M, Mani K, Sandgren S. Novel aspects of glypcan glycobiology. *Cell Mol Life Sci* 2004;61(9):1016-24.
143. Filmus J, Selleck SB. Glypcans: proteoglycans with a surprise. *J Clin Invest* 2001;108(4):497-501.
144. Dreher I, Schutze N, Baur A, et al. Selenoproteins are expressed in fetal human osteoblast-like cells. *Biochem Biophys Res Commun* 1998;245(1):101-7.
145. Jin JP, Wu D, Gao J, Nigam R, Kwong S. Expression and purification of the h1 and h2 isoforms of calponin. *Protein Expr Purif* 2003;31(2):231-9.
146. Lee KS, Kim HJ, Li QL, et al. Runx2 is a common target of transforming growth factor beta1 and bone morphogenetic protein 2, and cooperation between Runx2 and Smad5 induces osteoblast-specific gene expression in the pluripotent mesenchymal precursor cell line C2C12. *Mol Cell Biol* 2000;20(23):8783-92.
147. Xiao G, Jiang D, Thomas P, et al. MAPK pathways activate and phosphorylate the osteoblast-specific transcription factor, Cbfa1. *J Biol Chem* 2000;275(6):4453-9.
148. Li TF, Dong Y, Ionescu AM, et al. Parathyroid hormone-related peptide (PTHrP) inhibits Runx2 expression through the PKA signaling pathway. *Exp Cell Res* 2004;299(1):128-36.
149. Schinke T, Karsenty G. Characterization of Osf1, an osteoblast-specific transcription factor binding to a critical cis-acting element in the mouse Osteocalcin promoters. *J Biol Chem* 1999;274(42):30182-9.
150. Thirunavukkarasu K, Halladay DL, Miles RR, et al. The osteoblast-specific transcription factor Cbfa1 contributes to the expression of osteoprotegerin, a potent inhibitor of osteoclast differentiation and function. *J Biol Chem* 2000;275(33):25163-72.
151. Bidwell JP, Alvarez M, Feister H, Onyia J, Hock J. Nuclear matrix proteins and osteoblast gene expression. *J Bone Miner Res* 1998;13(2):155-67.

152. Ji C, Casinghino S, Chang DJ, et al. CBFa(AML/PEBP2)-related elements in the TGF-beta type I receptor promoter and expression with osteoblast differentiation. *J Cell Biochem* 1998;69(3):353-63.
153. McCarthy TL, Ji C, Centrella M. Links among growth factors, hormones, and nuclear factors with essential roles in bone formation. *Crit Rev Oral Biol Med* 2000;11(4):409-22.
154. Chang DJ, Ji C, Kim KK, Casinghino S, McCarthy TL, Centrella M. Reduction in transforming growth factor beta receptor I expression and transcription factor CBFa1 on bone cells by glucocorticoid. *J Biol Chem* 1998;273(9):4892-6.
155. Benson MD, Aubin JE, Xiao G, Thomas PE, Franceschi RT. Cloning of a 2.5 kb murine bone sialoprotein promoter fragment and functional analysis of putative Osf2 binding sites. *J Bone Miner Res* 1999;14(3):396-405.
156. Ducy P, Starbuck M, Priemel M, et al. A Cbfa1-dependent genetic pathway controls bone formation beyond embryonic development. *Genes Dev* 1999;13(8):1025-36.
157. Drissi H, Luc Q, Shakoori R, et al. Transcriptional autoregulation of the bone related CBFA1/RUNX2 gene. *J Cell Physiol* 2000;184(3):341-50.
158. Selvamurugan N, Pulumati MR, Tyson DR, Partridge NC. Parathyroid hormone regulation of the rat collagenase-3 promoter by protein kinase A-dependent transactivation of core binding factor alpha1. *J Biol Chem* 2000;275(7):5037-42.
159. Tintut Y, Parhami F, Le V, Karsenty G, Demer LL. Inhibition of osteoblast-specific transcription factor Cbfa1 by the cAMP pathway in osteoblastic cells. Ubiquitin/proteasome-dependent regulation. *J Biol Chem* 1999;274(41):28875-9.
160. Shirakabe K, Terasawa K, Miyama K, Shibuya H, Nishida E. Regulation of the activity of the transcription factor Runx2 by two homeobox proteins, Msx2 and Dlx5. *Genes Cells* 2001;6(10):851-6.
161. Kahler RA, Westendorf JJ. Lymphoid enhancer factor-1 and beta-catenin inhibit Runx2-dependent transcriptional activation of the osteocalcin promoter. *J Biol Chem* 2003;278(14):11937-44.