

## Supplementary table for the article published in Disease Markers – 2011.

### Gene expression changes in femoral head necrosis of human bone tissue

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**Supplementary table.** The quantitative real-time RT-PCR data of the selected 117 genes.

GENE SYMBOL <sup>a</sup>	GENE NAME <sup>a</sup>	ABI ASSAY ID <sup>b</sup>	FOLD CHANGE <sup>c</sup>	P VALUES <sup>d</sup>
<i>TGFB / BMP and WNT signaling</i>				
<b>TGFB1</b>	transforming growth factor, beta 1	Hs00171257_m1	<b>0.53</b>	0.58
<b>TGFB2</b>	transforming growth factor, beta 2	Hs00234244_m1	<b>0.67</b>	0.76
<b>TGFB3</b>	transforming growth factor, beta 3	Hs00234245_m1	<b>2.48</b>	0.11
<b>TGFBR1</b>	transforming growth factor, beta receptor I	Hs00610319_m1	<b>0.33</b>	0.38
<b>TGFBR2</b>	transforming growth factor, beta receptor II	Hs00234253_m1	<b>3.07</b>	0.08
<b>SMAD2</b>	SMAD, mothers against DPP homolog 2	Hs00183425_m1	<b>0.96</b>	0.94
<b>SMAD3</b>	SMAD, mothers against DPP homolog 3	Hs00232219_m1	<b>0.90</b>	0.92
<b>SMAD4</b>	SMAD, mothers against DPP homolog 4	Hs00232068_m1	<b>0.69</b>	0.64
<b>BMP2</b>	bone morphogenetic protein 2	Hs00154192_m1	<b>0.48</b>	0.13
<b>BMP4</b>	bone morphogenetic protein 4	Hs00370078_m1	<b>1.44</b>	0.62
<b>BMP3</b>	bone morphogenetic protein 3	Hs00609638_m1	<b>3.05</b>	0.25
<b>BMP8A</b>	bone morphogenetic protein 8a	Hs01629138_s1	<b>4.61</b>	0.23
<b>BMP8B</b>	bone morphogenetic protein 8b	Hs00236942_m1	<b>1.02</b>	0.99
<b>BMPRI1A</b>	bone morphogenetic protein receptor, type IA	Hs00831730_s1	<b>1.80</b>	0.54
<b>BMPRI2</b>	bone morphogenetic protein receptor, type II	Hs00176148_m1	<b>1.22</b>	0.78
<b>SMAD1</b>	SMAD, mothers against DPP homolog 1	Hs00195432_m1	<b>1.15</b>	0.87
<b>ACVR1</b>	activin A receptor, type I	Hs00153836_m1	<b>1.06</b>	0.93
<b>ACVR2</b>	activin A receptor, type II	Hs00155658_m1	<b>0.65</b>	0.72
<b>INH1A</b>	inhibin, alpha	Hs00171410_m1	<b>8.76</b>	0.13
<b>INH1B</b>	inhibin, beta A	Hs00170103_m1	<b>0.36</b>	0.41
<b>SOST</b>	sclerostin	Hs00228830_m1	<b>3.70</b>	0.14
<b>LRP4</b>	low density lipoprotein receptor-related protein 4	Hs00391006_m1	<b>0.13</b>	0.46
<b>LRP5</b>	low density lipoprotein receptor-related protein 5	Hs00182031_m1	<b>1.41</b>	0.64
<b>CTNNA1</b>	catenin (cadherin-associated protein), beta 1	Hs00170025_m1	<b>0.93</b>	0.89
<b>NLK</b>	nemo like kinase	Hs00212076_m1	<b>1.68</b>	0.57
<b>TCF7L2</b>	transcription factor 7-like 2	Hs00181036_m1	<b>0.21</b>	0.49
<b>WIF1</b>	WNT inhibitory factor 1	Hs00183662_m1	<b>1.50</b>	0.64
<i>ECM components</i>				
<b>COL1A1</b>	collagen, type I, alpha 1	Hs00164004_m1	<b>4.39</b>	0.16

<b>COL1A2</b>	collagen, type I, alpha 2	Hs00164099_m1	<b>5.50</b>	0.01
<b>COL2A1</b>	collagen, type II, alpha 1	Hs00156568_m1	<b>0.77</b>	0.82
<b>COL3A1</b>	collagen, type III, alpha 1	Hs00164103_m1	<b>2.52</b>	0.09
<b>COL4A4</b>	collagen, type IV, alpha 4	Hs00164150_m1	<b>0.91</b>	0.94
<b>COL5A1</b>	collagen, type V, alpha 1	Hs00609088_m1	<b>0.90</b>	0.87
<b>COL5A2</b>	collagen, type V, alpha 2	Hs00169768_m1	<b>9.58</b>	0.00
<b>COL7A1</b>	collagen, type VII, alpha 1	Hs00164310_m1	<b>0.67</b>	0.65
<b>COL9A1</b>	collagen, type IX, alpha 1	Hs00156680_m1	<b>0.81</b>	0.87
<b>COL10A1</b>	collagen, type X, alpha 1	Hs00166657_m1	<b>3.16</b>	0.04
<b>COL11A1</b>	collagen, type XI, alpha 1	Hs00266273_m1	<b>3.08</b>	0.38
<b>COL12A1</b>	collagen, type XII, alpha 1	Hs00189184_m1	<b>2.34</b>	0.20
<b>COL14A1</b>	collagen, type XIV, alpha 1	Hs00385388_m1	<b>2.62</b>	0.33
<b>COL15A1</b>	collagen, type XV, alpha 1	Hs00266332_m1	<b>0.41</b>	0.51
<b>FN1</b>	fibronectin 1	Hs00277509_m1	<b>0.30</b>	0.19
<b>DCN</b>	decorin	Hs00266491_m1	<b>0.37</b>	0.25
<b>BGN</b>	biglycan	Hs00156076_m1	<b>3.01</b>	0.06
<b>MGP</b>	matrix gamma-carboxyglutamate protein	Hs00179899_m1	<b>1.14</b>	0.84
<b>BGLAP</b>	osteocalcin	Hs01587813_g1	<b>5.27</b>	0.07
<b>SPARC</b>	osteonectin	Hs00234160_m1	<b>2.76</b>	0.16
<b>DSPP</b>	dentin sialophosphoprotein	Hs00171962_m1	<b>1.27</b>	0.84
<b>SPP1</b>	osteopontin	Hs00167093_m1	<b>0.93</b>	0.94
<b>TNC</b>	tenascin C (hexabrachion)	Hs00233648_m1	<b>4.89</b>	0.00
<b>ECM degrading enzymes</b>				
<b>MMP2</b>	matrix metalloproteinase 2	Hs00234422_m1	<b>1.65</b>	0.37
<b>MMP8</b>	matrix metalloproteinase 8	Hs00233972_m1	<b>0.05</b>	0.20
<b>MMP9</b>	matrix metalloproteinase 9	Hs00234579_m1	<b>1.03</b>	0.97
<b>MMP13</b>	matrix metalloproteinase 13	Hs00233992_m1	<b>3.43</b>	0.12
<b>MMP10</b>	matrix metalloproteinase 10	Hs00233987_m1	<b>0.008</b>	0.05
<b>TIMP2</b>	tissue inhibitor of metalloproteinases 2	Hs00234278_m1	<b>1.06</b>	0.95
<b>BMP1</b>	bone morphogenetic protein 1	Hs00196183_m1	<b>0.77</b>	0.79
<b>CTSK</b>	cathepsin K	Hs00166156_m1	<b>2.93</b>	0.21
<b>Growth factors</b>				
<b>EGF</b>	epidermal growth factor	Hs00153181_m1	<b>0.32</b>	0.40
<b>EGFR</b>	epidermal growth factor receptor	Hs00193306_m1	<b>0.54</b>	0.66
<b>IGF1</b>	insulin-like growth factor 1	Hs00153126_m1	<b>1.59</b>	0.57
<b>IGF1R</b>	insulin-like growth factor 1 receptor	Hs00181385_m1	<b>0.12</b>	0.42
<b>FGF1</b>	fibroblast growth factor 1 (acidic)	Hs00265254_m1	<b>1.02</b>	0.98
<b>FGF2</b>	fibroblast growth factor 2 (basic)	Hs00266645_m1	<b>1.19</b>	0.79
<b>FGFR1</b>	fibroblast growth factor receptor 1	Hs00241111_m1	<b>1.58</b>	0.48
<b>PDGFA</b>	platelet-derived growth factor alpha polypeptide	Hs00234994_m1	<b>0.65</b>	0.65
<b>VEGF</b>	vascular endothelial growth factor	Hs00173626_m1	<b>0.11</b>	0.02
<b>Cell adhesion molecules</b>				
<b>ICAM1</b>	intercellular adhesion molecule 1	Hs00164932_m1	<b>1.02</b>	0.96
<b>VCAM1</b>	vascular cell adhesion molecule 1	Hs00174239_m1	<b>0.74</b>	0.73
<b>ITGA1</b>	integrin, alpha 1	Hs00235006_m1	<b>1.37</b>	0.56
<b>ITGA2</b>	integrin, alpha 2	Hs00158127_m1	<b>3.77</b>	0.01
<b>CD36</b>	CD36 antigen	Hs00169627_m1	<b>0.90</b>	0.90
<b>Genes controlled by estrogen</b>				
<b>TNF</b>	tumor necrosis factor alpha	Hs00174128_m1	<b>2.22</b>	0.26

<b>TNFAIP6</b>	tumor necrosis factor, alpha-induced protein 6	Hs00200178_m1	<b>0.30</b>	0.11
<b>IL1A</b>	interleukin 1, alpha	Hs00174092_m1	<b>ND</b>	
<b>IL1B</b>	interleukin 1, beta	Hs00174097_m1	<b>0.18</b>	0.08
<b>IL1RAP</b>	interleukin 1 receptor accessory protein	Hs00158057_m1	<b>0.39</b>	0.15
<b>IL6</b>	interleukin 6 (interferon, beta 2)	Hs00174131_m1	<b>0.04</b>	0.10
<b>TNFSFR11/OPG</b>	osteoprotegerin	Hs00171068_m1	<b>0.53</b>	0.29
<b>TNFSF11/RANKL</b>	receptor activator of nuclear factor kappa B ligand	Hs00243519_m1	<b>0.81</b>	0.78
<b>CSF2</b>	colony stimulating factor 2	Hs00171266_m1	<b>0.51</b>	0.60
<b>CSF3</b>	colony stimulating factor 3	Hs00236884_m1	<b>ND</b>	
<b>ESR1</b>	estrogen receptor 1 (alpha)	Hs00174860_m1	<b>0.13</b>	0.46
<b>ESR2</b>	estrogen receptor 2 (beta)	Hs00230957_m1	<b>2.28</b>	0.40
<i>Other candidate genes</i>				
<b>CASR</b>	calcium-sensing receptor	Hs00173436_m1	<b>ND</b>	
<b>KL</b>	klotho	Hs00183100_m1	<b>4.00</b>	0.05
<b>ALPL</b>	alkaline phosphatase, liver/bone/kidney	Hs00758162_m1	<b>2.26</b>	0.10
<b>APOE</b>	apolipoprotein E	Hs00171168_m1	<b>4.92</b>	0.18
<b>APOD</b>	apolipoprotein D	Hs00155794_m1	<b>0.86</b>	0.83
<b>ALOX15</b>	arachidonate 15-lipoxygenase	Hs00609608_m1	<b>ND</b>	
<b>ANXA1</b>	annexin A1	Hs00167549_m1	<b>0.17</b>	0.25
<b>ANXA2</b>	annexin A2	Hs00743063_s1	<b>1.72</b>	0.44
<b>VDR</b>	vitamin D receptor	Hs00172113_m1	<b>1.69</b>	0.42
<b>FABP3</b>	fatty acid binding protein 3	Hs00269758_m1	<b>0.60</b>	0.53
<b>FABP4</b>	fatty acid binding protein 4	Hs00609791_m1	<b>1.95</b>	0.35
<b>OSTF1</b>	osteoclast stimulating factor 1	Hs00273458_m1	<b>0.80</b>	0.73
<b>ATP2A2</b>	ATPase, Ca <sup>++</sup> transporting	Hs00155939_m1	<b>1.09</b>	0.89
<b>CKB</b>	creatine kinase, brain	Hs00176484_m1	<b>1.71</b>	0.53
<b>EIF3S4</b>	eukaryotic translation initiation factor 3	Hs00186772_m1	<b>0.83</b>	0.86
<b>ENO1</b>	enolase 1	Hs00361415_m1	<b>0.77</b>	0.58
<b>FKBP2</b>	FK506 binding protein 2,	Hs00234404_m1	<b>1.72</b>	0.54
<b>IGSF4</b>	immunoglobulin superfamily, member 4	Hs00204937_m1	<b>0.49</b>	0.51
<b>SFRS7</b>	splicing factor, arginine/serine-rich 7	Hs00196708_m1	<b>0.19</b>	0.27
<b>SOX4</b>	SRY (sex determining region Y)-box 4	Hs00268388_s1	<b>0.94</b>	0.95
<b>SOX9</b>	SRY (sex determining region Y)-box 9	Hs00165814_m1	<b>0.18</b>	0.45
<b>TMSB10</b>	thymosin, beta 10	Hs00363670_m1	<b>1.56</b>	0.56
<b>TMSB4X</b>	thymosin, beta 4	Hs00864161_g1	<b>1.16</b>	0.88
<b>TRIB2</b>	tribbles homolog 2 (Drosophila)	Hs00222224_m1	<b>0.92</b>	0.88
<b>DUSP9</b>	dual specificity phosphatase 9	Hs00154830_m1	<b>0.04</b>	0.39
<b>SERF2</b>	small EDRK-rich factor 2	Hs00428481_m1	<b>0.56</b>	0.63
<i>Transcriptional factors</i>				
<b>TWIST1</b>	twist homolog 1	Hs00361186_m1	<b>1.40</b>	0.67
<b>TWIST2</b>	twist homolog 2	Hs02379973_s1	<b>2.09</b>	0.26
<b>MSX1</b>	msh homeo box homolog 1	Hs00427183_m1	<b>0.79</b>	0.80
<b>MSX2</b>	msh homeo box homolog 2	Hs00751239_s1	<b>0.06</b>	0.40
<b>SP7</b>	Sp7 transcription factor	Hs00541729_m1	<b>28.55</b>	0.00
<b>NFKB1</b>	nuclear factor of kappa light polypeptide gene	Hs00165814_m1	<b>0.73</b>	0.65
<b>RUNX2</b>	runt-related transcription factor 2	Hs00231692_m1	<b>1.74</b>	0.57
<i>Endogenous controls</i>				
<b>ACTB</b>	actin, beta	Hs99999903_m1		
<b>GAPDH</b>	glyceraldehyde-3-phosphate dehydrogenase	Hs99999905_m1		

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s are used according to the standard “Gene Cards” ([www.genecards.org](http://www.genecards.org)).

<sup>b</sup>, Applied Biosystem TaqMan Gene Expression Assays Identification / Ordering Numbers.

<sup>c</sup>, Fold changes (RQ ONFH / RQ non-ONFH). Changes of relative gene expression in ONFH male patients compared to non-ONFH controls. (ND: PCR signal was not detected).

<sup>d</sup>, *p* values of the Student’s t-test.