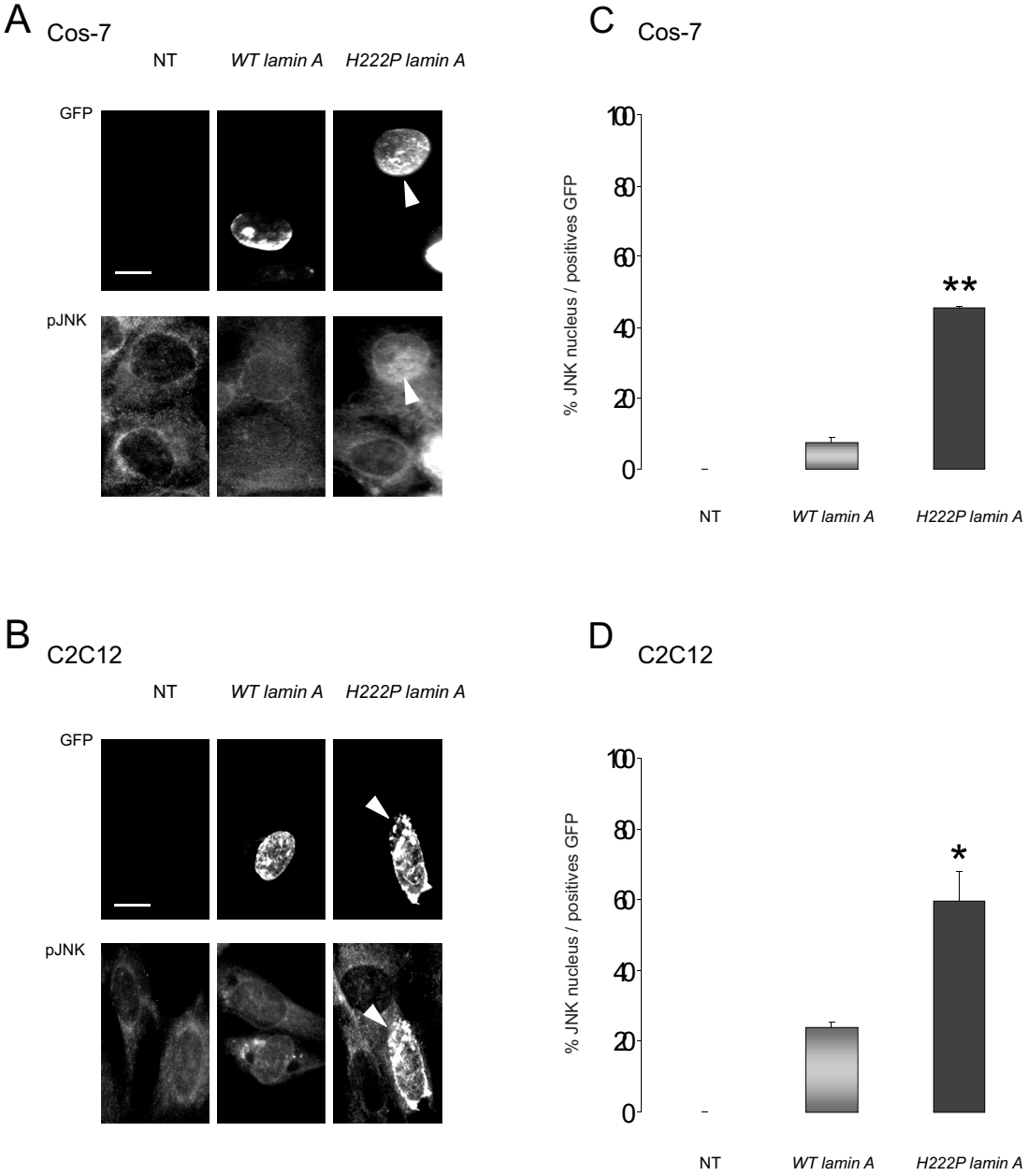
Figure S1


A
Cos-7
NT
WT lamin A
H222P lamin A
GFP
pJNK
B
C2C12
NT
WT lamin A
H222P lamin A
GFP
pJNK
C
Cos-7
% JNK nucleus / positives GFP
100
80
60
40
20
0
**
NT
WT lamin A
H222P lamin A
D
C2C12
% JNK nucleus / positives GFP
100
80
60
40
20
0
*
NT
WT lamin A
H222P lamin A

Supplemental data

Figure S1. Expression of H222P lamin A in transfected Cos-7 and C2C12 leads to enhanced nuclear translocation of phospho-JNK. (**A-B**) Effect of H222P lamin A on nuclear translocation of pJNK in transfected Cos-7 (A) and C2C12 (B) cells. Representative photomicrographs are shown for non-transfected cells (NT), transfected cells expressing a GFP fusion of wild type lamin A (WT lamin A) and transfected cells expressing a GFP fusion of lamin A with the H222P amino acid substitution (H222P lamin A). Arrowheads show enhanced nuclear localization of pJNK in cells expressing GFP-H222P lamin A. Bars: 10 m. (**C-D**) Percentages of Cos-7 (C) and C2C12 (D) cells with pJNK primarily in the nucleus. Non-transfected cells (NT), transfected cells expressing a GFP fusion of wild type lamin A (WT lamin A) and transfected cells expressing a GFP fusion of lamin A with the H222P aa substitution (H222P lamin A) were randomly counted and scored for nuclear pJNK (see arrowheads in A for example). Transfected cells were determined by presence of GFP signal. Values are means $\pm$ standard deviations for n=200 cells per group (*p<0.05, **p<0.005).

Table S1. Genes with altered expression as defined by q<0.05 and >1 $\log_2$-fold change in hearts from *Lmna*$^{H222P/+}$ mice.

Probe set name	Gene symbol	Gene name	fold	*q*-value
1449071_at	*Myl7*	myosin, light polypeptide 7, regulatory	4.91	0.003262303
1420884_at	*Sln*	sarcolipin	4.14	0.009783776
1422580_at	*Myl4*	myosin, light polypeptide 4, alkali; atrial, embryonic	3.84	0.004778844
1425521_at	*Paip1*	polyadenylate binding protein-interacting protein 1	3.32	0.000279415
1448553_at	*Myh7*	myosin, heavy polypeptide 7, cardiac muscle, beta	2.38	0.029672983
1449824_at	*Prg4*	proteoglycan 4	2.25	0.01330861
1441679_at	*Cacna1c*	calcium channel, voltage-dependent, L type, alpha 1C subunit	2.04	0.041791634
1449434_at	*Car3*	carbonic anhydrase 3	2.03	0.019735505
1419100_at	*Serpina3n*	serine (or cysteine) proteinase inhibitor, clade A, member 3N	1.92	0.041583562
1426260_a_at	*Ugt1a6*	UDP glycosyltransferase 1 family, polypeptide A6	1.86	0.006793397
1424749_at	*Wdfy1*	WD repeat and FYVE domain containing 1	1.79	0.006916706
1449178_at	*Pdlim3*	PDZ and LIM domain 3	1.70	0.002607879
1448595_a_at	*Rex3*	reduced expression 3	1.65	0.006428347
1428484_at	*Osbpl3*	oxysterol binding protein-like 3	1.61	0.008837797
1453232_at	*Calr3*	calreticulin 3	1.58	0.007966835
1424454_at	*A930025J12RIK*	RIKEN cDNA A930025J12 gene	1.55	0.019735505
1453145_at	*4933439C20RIK*	RIKEN cDNA 4933439C20 gene	1.53	0.006361691
1417462_at	*Cap1*	CAP, adenylate cyclase-associated protein 1 (yeast)	1.50	0.020072033
1435176_a_at	*Idb2*	inhibitor of DNA binding 2	1.49	0.006407563
1430519_a_at	*Cnot7*	CCR4-NOT transcription complex, subunit 7	1.47	0.0039589
1433184_at	*6720477C19RIK*	RIKEN cDNA 6720477C19 gene	1.45	0.035675657
1454959_s_at	*Gnai1*	guanine nucleotide binding protein, alpha inhibiting 1	1.45	0.015512236
1423915_at	*4832415H08RIK*	RIKEN cDNA 4832415H08 gene	1.45	0.002607879
1417867_at	*Adn*	adipsin	1.45	0.023285335
1423954_at	*C3*	complement component 3	1.39	0.024131569
1449461_at	*Rbp7*	retinol binding protein 7, cellular	1.39	0.042288878
1455136_at	*Atp1a2*	ATPase, Na+/K+ transporting, alpha 2 polypeptide	1.38	0.006428347
1452417_x_at	*AV057155*	AV057155 Mus musculus pancreas C57BL/6J adult Mus musculus	1.35	0.040758652
1443799_at	*AV348753*	AV348753 RIKEN full-length enriched, adult male olfactory	1.35	0.029103142
1421551_s_at	*Ifi202b*	interferon activated gene 202B	1.34	0.011539146
1449514_at	*Gprk5*	G protein-coupled receptor kinase 5	1.32	0.023285335
1419527_at	*Comp*	cartilage oligomeric matrix protein	1.31	0.032455373
1432205_a_at	*C130038G02RIK*	RIKEN cDNA C130038G02 gene	1.30	0.00705383
1422651_at	*Acdc*	adipocyte, C1Q and collagen domain containing	1.27	0.028936401
1447640_s_at	*Pbx3*	pre B-cell leukemia transcription factor 3	1.27	0.027186297
1427183_at	*Efemp1*	epidermal growth factor-containing fibulin-like extracellular matrix protein 1	1.26	0.012371525
1448823_at	*Cxcl12*	chemokine (C-X-C motif) ligand 12	1.25	0.006196772
1421855_at	*Fgl2*	fibrinogen-like protein 2	1.24	0.012386508
1420731_a_at	*Csrp2*	cysteine and glycine-rich protein 2	1.24	0.011179832
1454966_at	*AK031326*	unknown	1.23	0.042632665
1427038_at	*BC049766*	unknown	1.22	0.007548482
1437123_at	*Mmrn2*	multimerin 2	1.21	0.000313227
1418674_at	*Osmr*	oncostatin M receptor	1.20	0.026645199
1415994_at	*Cyp2e1*	cytochrome P450, family 2, subfamily e, polypeptide 1	1.19	0.044394162
1428343_at	*C730034d20rik*	RIKEN cDNA C730034D20 gene	1.19	0.018171429
1420930_s_at	*Catnal1*	catenin alpha-like 1	1.19	0.03182764
1455812_x_at	*Slitl2*	Slit-like 2 (Drosophila)	1.18	0.023909901
1421163_a_at	*Nfia*	nuclear factor I/A	1.18	0.034980094
1423854_a_at	*BC008101*	unknown	1.17	0.009795877
1427660_x_at	*D6MIT97*	DNA segment, Chr 6, Massachusetts Institute of Technology 97	1.17	0.038499517
1424383_at	*BC003277*	cDNA sequence BC003277	1.16	0.009154495
1420952_at	*Son*	Son cell proliferation protein	1.16	0.046071596
1417126_a_at	*3110001N18RIK*	RIKEN cDNA 3110001N18 gene	1.15	0.009282894
1440335_at	*AV020525*	AV020525 Mus musculus 18-day embryo C57BL/6J Mus musculus	1.13	0.046559367
1416666_at	*Serpine2*	serine (or cysteine) proteinase inhibitor, clade E, member 2	1.13	0.013133867
1451447_at	*C330016O16RIK*	RIKEN cDNA C330016O16 gene	1.13	0.012386508
1426208_x_at	*Plagl1*	pleiomorphic adenoma gene-like 1	1.12	0.022034481
1448669_at	*Dkk3*	dickkopf homolog 3 (Xenopus laevis)	1.12	0.032901376
1429197_s_at	*BC038651*	unknown	1.12	0.006916706
1436672_at	*BB766329*	BB766329 RIKEN full-length enriched, B16 F10Y cells Mus	1.12	0.017740892
1448734_at	*Cp*	ceruloplasmin	1.11	0.021961097
1418021_at	*Slp*	sex-limited protein	1.11	0.034532714
1434975_x_at	*9030221M09RIK*	RIKEN cDNA 9030221M09 gene	1.11	0.019735505
1426851_a_at	*Nov*	nephroblastoma overexpressed gene	1.11	0.033160989
1450876_at	*Cfh*	complement component factor h	1.10	0.035303157

1449556_at	*H2-T23*	histocompatibility 2, T region locus 23	1.10	0.027018405
1422631_at	*Ahr*	aryl-hydrocarbon receptor	1.09	0.006196772
1433647_s_at	*Rhobtb3*	Rho-related BTB domain containing 3	1.09	0.017793681
1433525_at	*Ednra*	endothelin receptor type A	1.09	0.02333671
1419155_a_at	*Sox4*	SRY-box containing gene 4	1.09	0.027469092
1419130_at	*Deadc1*	deaminase domain containing 1	1.09	0.006602357
1453435_a_at	*Fmo2*	flavin containing monooxygenase 2	1.09	0.020289251
1417065_at	*Egr1*	early growth response 1	1.08	0.021448558
1449106_at	*Gpx3*	glutathione peroxidase 3	1.08	0.030677188
1448162_at	*Vcam1*	vascular cell adhesion molecule 1	1.08	0.026413922
1422715_s_at	*Acp1*	acid phosphatase 1, soluble	1.07	0.023907748
1423753_at	*Bambi*	BMP and activin membrane-bound inhibitor, homolog (Xenopus laevis)	1.06	0.011539146
1430637_at	*2210016H18RIK*	RIKEN cDNA 2210016H18 gene	1.06	0.047172391
1434990_at	*Ak122434*	unknown	1.06	0.006916706
1451240_a_at	*Glo1*	glyoxalase 1	1.05	0.042857264
1421955_a_at	*Nedd4*	neural precursor cell expressed, developmentally down-regulated gene 4	1.05	0.035645582
1436431_at	*1700025G04RIK*	RIKEN cDNA 1700025G04 gene	1.05	0.011155847
1418536_at	*H2-Q7*	histocompatibility 2, Q region locus 7	1.04	0.033908679
1451285_at	*Fus*	fusion, derived from t(12;16) malignant liposarcoma (human)	1.04	0.022761224
1435943_at	*Dpep1*	dipeptidase 1 (renal)	1.03	0.010803727
1448705_at	*Zfp297*	zinc finger protein 297	1.03	0.014276303
1438631_x_at	*BC017545*	unknown	1.03	0.021575905
1456226_x_at	*Ddr1*	discoidin domain receptor family, member 1	1.03	0.021976404
1417872_at	*Fhl1*	four and a half LIM domains 1	1.03	0.009154583
1455940_x_at	*Wdr6*	WD repeat domain 6	1.03	0.01925172
1434328_at	*Loc380747*	similar to 60S ribosomal protein L15	1.02	0.02321354
1419103_a_at	*Abhd6*	abhydrolase domain containing 6	1.02	0.00503353
1438754_at	*Av372127*	AV372127 RIKEN full-length enriched, adult male colon Mus	-1.02	0.043783361
1447802_x_at	*AV099323*	expressed sequence AV099323	-1.03	0.012371525
1452590_a_at	*BC032982*	unknown	-1.08	0.015451729
1434008_at	*Loc384934*	similar to sodium channel beta 4 subunit	-1.08	0.023285335
1451675_a_at	*Alas2*	aminolevulinic acid synthase 2, erythroid	-1.10	0.002607879
1452318_a_at	*M12573*	unknown	-1.51	0.043962944
1426607_at	*3110070M22RIK*	RIKEN cDNA 3110070M22 gene	-1.51	0.028191889
1418480_at	*Cxcl7*	chemokine (C-X-C motif) ligand 7	-1.78	0.002607879
1437721_at	*BB543398*	BB543398 RIKEN full-length enriched, 0 day neonate eyeball	-1.80	0.018132165
1422919_at	*Hrasls*	HRAS-like suppressor	-2.02	0.037734414
1438390_s_at	*Pttg1*	pituitary tumor-transforming 1	-2.05	0.049414848
1428347_at	*Cyfip2*	cytoplasmic FMR1 interacting protein 2	-2.22	0.04909376

Table S2. Genes with altered expression as defined by q<0.05 and >1 $\log_2$-fold change in hearts from *Lmna*$^{H222P/H222P}$ mice.

Probe set name	Gene symbol	Gene name	fold	*q*-value
1449071_at	*Myl7*	myosin, light polypeptide 7, regulatory	6.02	4.16256E-05
1420884_at	*Sln*	sarcolipin	5.13	0.000169726
1422580_at	*Myl4*	myosin, light polypeptide 4, alkali; atrial, embryonic	4.66	0.000256675
1448553_at	*Myh7*	myosin, heavy polypeptide 7, cardiac muscle, beta	3.49	0.001102336
1453898_at	*AK009352*	unknown	2.50	0.001402809
1449434_at	*Car3*	carbonic anhydrase 3	2.17	0.012439184
1457666_s_at	*Ifi202b*	interferon activated gene 202B	2.11	0.000846853
1448595_a_at	*Rex3*	reduced expression 3	2.10	0.000715362
1425521_at	*Paip1*	polyadenylate binding protein-interacting protein 1	1.89	0.023572154
1449824_at	*Prg4*	proteoglycan 4	1.85	0.003308574
1456062_at	*Anf*	atrial natriuretic factor	1.84	0.001119551
1418701_at	*Arvcf*	armadillo repeat gene deleted in velo-cardio-facial syndrome	1.83	0.012252465
1419100_at	*Serpina3n*	serine (or cysteine) proteinase inhibitor, clade A, member 3N	1.77	0.005743576
1454959_s_at	*Gnai1*	guanine nucleotide binding protein, alpha inhibiting 1	1.74	0.003649336
1429196_at	*BC038651*	unknown	1.73	0.003065936
1437358_at	*Wdfy1*	WD repeat and FYVE domain containing 1	1.65	0.001337287
1419155_a_at	*Sox4*	SRY-box containing gene 4	1.63	0.001102336
1448669_at	*Dkk3*	dickkopf homolog 3 (Xenopus laevis)	1.57	0.00096279
1455136_at	*Atp1a2*	ATPase, Na+/K+ transporting, alpha 2 polypeptide	1.57	0.001402809
1450857_a_at	*Col1a2*	procollagen, type I, alpha 2	1.55	0.026789241
1428484_at	*Osbpl3*	oxysterol binding protein-like 3	1.48	0.020741743
1425394_at	*BC023105*	cDNA sequence BC023105	1.45	0.006458272
1430519_a_at	*Cnot7*	CCR4-NOT transcription complex, subunit 7	1.45	0.004940192
1420731_a_at	*Csrp2*	cysteine and glycine-rich protein 2	1.44	0.000911703
1432205_a_at	*C130038G02RIK*	RIKEN cDNA C130038G02 gene	1.42	0.000671074
1424383_at	*BC003277*	cDNA sequence BC003277	1.41	0.000846853
1448823_at	*Cxcl12*	chemokine (C-X-C motif) ligand 12	1.39	0.000715362
1435290_x_at	*H2-Aa*	histocompatibility 2, class II antigen A, alpha	1.39	0.003976722
1449178_at	*Pdlim3*	PDZ and LIM domain 3	1.37	0.005362642
1429060_at	*D830013H23RIK*	RIKEN cDNA D830013H23 gene	1.37	0.004876867
1421855_at	*Fgl2*	fibrinogen-like protein 2	1.33	0.005743576
1425425_a_at	*Wif1*	Wnt inhibitory factor 1	1.33	0.040656125
1428343_at	*C730034D20RIK*	RIKEN cDNA C730034D20 gene	1.32	0.001873588
1437401_at	*Igf1*	insulin-like growth factor 1	1.32	0.001699794
1435176_a_at	*Idb2*	inhibitor of DNA binding 2	1.30	0.001735733
1417065_at	*Egr1*	early growth response 1	1.29	0.012103309
1419527_at	*Comp*	cartilage oligomeric matrix protein	1.28	0.015363433
1416666_at	*Serpine2*	serine (or cysteine) proteinase inhibitor, clade E, member 2	1.28	0.016566752
1426208_x_at	*Plagl1*	pleiomorphic adenoma gene-like 1	1.28	0.013612184
1449106_at	*Gpx3*	glutathione peroxidase 3	1.27	0.001946526
1449368_at	*Dcn*	decorin	1.25	0.012103309
1418174_at	*Dbp*	D site albumin promoter binding protein	1.25	0.005860191
1423753_at	*Bambi*	BMP and activin membrane-bound inhibitor, homolog (Xenopus laevis)	1.23	0.001119551
1425519_a_at	*Ii*	Ia-associated invariant chain	1.22	0.005689275
1453145_at	*4933439C20RIK*	RIKEN cDNA 4933439C20 gene	1.22	0.020741743
1423854_a_at	*BC008101*	unknown	1.21	0.004003416
1427038_at	*BC049766*	unknown	1.21	0.024041634
1448162_at	*Vcam1*	vascular cell adhesion molecule 1	1.19	0.017776185
1439766_x_at	*Vegfc*	vascular endothelial growth factor C	1.19	0.000846853
1451447_at	*C330016O16RIK*	RIKEN cDNA C330016O16 gene	1.18	0.017776185
1419130_at	*Deadc1*	deaminase domain containing 1	1.18	0.013925793
1437224_at	*Rtn4*	reticulon 4	1.18	0.006437433
1420952_at	*Son*	Son cell proliferation protein	1.17	0.002274827
1416454_s_at	*Acta2*	actin, alpha 2, smooth muscle, aorta	1.17	0.001385314
1437056_x_at	*1810049K24RIK*	RIKEN cDNA 1810049K24 gene	1.17	0.041776172
1448416_at	*Mglap*	matrix gamma-carboxyglutamate (gla) protein	1.16	0.004940192
1448383_at	*Mmp14*	matrix metalloproteinase 14 (membrane-inserted)	1.16	0.045912269
1447640_s_at	*Pbx3*	pre B-cell leukemia transcription factor 3	1.15	0.035771251
1415859_at	*3230401O13RIK*	RIKEN cDNA 3230401O13 gene	1.15	0.023410072
1418532_at	*Fzd2*	frizzled homolog 2 (Drosophila)	1.15	0.007687062
1460049_s_at	*1500015O10RIK*	RIKEN cDNA 1500015O10 gene	1.15	0.045369376
1449461_at	*Rbp7*	retinol binding protein 7, cellular	1.12	0.022192646
1451567_a_at	*Ifi203*	interferon activated gene 203	1.11	0.017776185
1422607_at	*Etv1*	ets variant gene 1	1.11	0.004940192
1424186_at	*2610001E17RIK*	RIKEN cDNA 2610001E17 gene	1.11	0.049669589

1426851_a_at	*Nov*	nephroblastoma overexpressed gene	1.11	0.023572154
1417462_at	*Cap1*	CAP, adenylate cyclase-associated protein 1 (yeast)	1.10	0.033983868
1426510_at	*C330023F11RIK*	RIKEN cDNA C330023F11 gene	1.10	0.036018704
1419042_at	*AW111922*	expressed sequence AW111922	1.10	0.000756273
1437123_at	*Mmrn2*	multimerin 2	1.10	0.000871383
1455346_at	*Masp1*	mannan-binding lectin serine protease 1	1.10	0.007687062
1448288_at	*E030026I10RIK*	RIKEN cDNA E030026I10 gene	1.09	0.004940192
1422631_at	*Ahr*	aryl-hydrocarbon receptor	1.09	0.018968038
1433924_at	*Peg3*	paternally expressed 3	1.08	0.035287641
1421917_at	*Pdgfra*	platelet derived growth factor receptor, alpha polypeptide	1.08	0.012633389
1422476_at	*Ifi30*	interferon gamma inducible protein 30	1.08	0.022192646
1450648_s_at	*H2-Ab1*	histocompatibility 2, class II antigen A, beta 1	1.08	0.001119551
1441137_at	*AK015956*	unknown	1.08	0.035122609
1449514_at	*Gprk5*	G protein-coupled receptor kinase 5	1.05	0.049669589
1417872_at	*Fhl1*	four and a half LIM domains 1	1.05	0.001337287
1417025_at	*H2-Eb1*	histocompatibility 2, class II antigen E beta	1.05	0.004603993
1443621_at	*BG092359*	mac09f12.x1 Soares mouse 3NbMS Mus musculus cDNA clone	1.04	0.001224434
1426083_a_at	*Btg1*	B-cell translocation gene 1, anti-proliferative	1.04	0.016940974
1449556_at	*H2-T23*	histocompatibility 2, T region locus 23	1.03	0.02194224
1454696_at	*BC003294*	unknown	1.02	0.023314255
1456226_x_at	*Ddr1*	discoidin domain receptor family, member 1	1.02	0.024041634
1454764_s_at	*Slc38a1*	solute carrier family 38, member 1	1.02	0.04708546
1418929_at	*Esrrbl1*	estrogen-related receptor beta like 1	1.02	0.011056089
1455393_at	*Cp*	ceruloplasmin	1.02	0.019001003
1448754_at	*Rbp1*	retinol binding protein 1, cellular	1.02	0.041776172
1439381_x_at	*Mrvldc1*	MARVEL (membrane-associating) domain containing 1	1.01	0.020452219
1447903_x_at	*Ap1s2*	adaptor-related protein complex 1, sigma 2 subunit	1.01	0.031364482
1434141_at	*Gucy1a3*	guanylate cyclase 1, soluble, alpha 3	1.01	0.046340908
1417253_at	*Frg1*	FSHD region gene 1	1.01	0.013925793
1424505_at	*0610042C05RIK*	RIKEN cDNA 0610042C05 gene	-1.02	0.018968038
1434008_at	*Loc384934*	similar to sodium channel beta 4 subunit	-1.07	0.017776185
1456397_at	*BB210819*	BB210819 RIKEN full-length enriched, 0 day neonate thymus	-1.08	0.013489859
1434893_at	*AI845177*	UI-M-BG0-aht-a-04-0-UI.s1 NIH_BMAP_MSC Mus musculus cDNA	-1.09	0.023572154
1451371_at	*1110025G12RIK*	RIKEN cDNA 1110025G12 gene	-1.10	0.027434576
1452590_a_at	*BC032982*	unknown	-1.11	0.005944427
1421278_s_at	*Spna1*	spectrin alpha 1	-1.12	0.033541643
1455208_at	*Pex19*	peroxisome biogenesis factor 19	-1.14	0.008107383
1452388_at	*BC054782*	unknown	-1.15	0.035755727
1424077_at	*2610020H15RIK*	RIKEN cDNA 2610020H15 gene	-1.23	0.002678732
1417680_at	*Kcna5*	potassium voltage-gated channel, shaker-related subfamily, member 5	-1.24	0.040656125
1438511_a_at	*1190002H23RIK*	RIKEN cDNA 1190002H23 gene	-1.25	0.000463385
1447802_x_at	*AV099323*	expressed sequence AV099323	-1.31	0.004421495
1457282_x_at	*Tubgcp5*	tubulin, gamma complex associated protein 5	-1.45	0.007899515
1427126_at	*M12573*	unknown	-1.91	0.046946097
1428991_at	*Hrasls*	HRAS-like suppressor	-2.07	0.003308574
1437721_at	*BB543398*	BB543398 RIKEN full-length enriched, 0 day neonate eyeball	-2.08	0.036438465
1424105_a_at	*Pttg1*	pituitary tumor-transforming 1	-2.69	0.013852722
1428347_at	*Cyfip2*	cytoplasmic FMR1 interacting protein 2	-2.84	0.007687062
1432198_at	*6330414G02RIK*	RIKEN cDNA 6330414G02 gene	-4.12	0.015578517

Table S3. Genes commonly affected as defined by q<0.05 and >1 $\log_2$-fold change in hearts from *Lmna*$^{H222P/H222P}$ and *Lmna*$^{H222P/+}$ mice.

			Lmna$^{H222P/H222P}$		*Lmna*$^{H222P/+}$	
Probe set name	**Gene symbol**	**Gene name**	**fold**	***q*-value**	**fold**	***q*-value**
1449071_at	*Myl7*	myosin, light polypeptide 7, regulatory	6.02	4.16256E-05	4.91	0.003262303
1420884_at	*Sln*	sarcolipin	5.13	0.000169726	4.14	0.009783776
1422580_at	*Myl4*	myosin, light polypeptide 4, alkali; atrial, embryonic	4.66	0.000256675	3.84	0.004778844
1448553_at	*Myh7*	myosin, heavy polypeptide 7, cardiac muscle, beta	3.49	0.001102336	2.38	0.029672983
1449434_at	*Car3*	carbonic anhydrase 3	2.17	0.012439184	2.03	0.019735505
1457666_s_at	*Ifi202b*	interferon activated gene 202B	2.11	0.000846853	1.34	0.011539146
1448595_a_at	*Rex3*	reduced expression 3	2.10	0.000715362	1.65	0.006428347
1425521_at	*Paip1*	polyadenylate binding protein-interacting protein 1	1.89	0.023572154	3.32	0.000279415
1449824_at	*Prg4*	proteoglycan 4	1.85	0.003308574	2.25	0.01330861
1454959_s_at	*Gnai1*	guanine nucleotide binding protein, alpha inhibiting 1	1.74	0.003649336	1.45	0.015512236
1429196_at	*BC038651*	unknown	1.73	0.003065936	1.12	0.006916706
1437358_at	*Wdfy1*	WD repeat and FYVE domain containing 1	1.65	0.001337287	1.79	0.006916706
1419155_a_at	*Sox4*	SRY-box containing gene 4	1.63	0.001102336	1.09	0.027469092
1448669_at	*Dkk3*	dickkopf homolog 3 (Xenopus laevis)	1.57	0.00096279	1.12	0.032901376
1455136_at	*Atp1a2*	ATPase, Na+/K+ transporting, alpha 2 polypeptide	1.57	0.001402809	1.38	0.006428347
1428484_at	*Osbpl3*	oxysterol binding protein-like 3	1.48	0.020741743	1.61	0.008837797
1430519_a_at	*Cnot7*	CCR4-NOT transcription complex, subunit 7	1.45	0.004940192	1.47	0.0039589
1420731_a_at	*Csrp2*	cysteine and glycine-rich protein 2	1.44	0.000911703	1.24	0.011179832
1432205_a_at	*C130038G02RIK*	RIKEN cDNA C130038G02 gene	1.42	0.000671074	1.30	0.00705383
1424383_at	*BC003277*	cDNA sequence BC003277	1.41	0.000846853	1.16	0.009154495
1448823_at	*Cxcl12*	chemokine (C-X-C motif) ligand 12	1.39	0.000715362	1.25	0.006196772
1449178_at	*Pdlim3*	PDZ and LIM domain 3	1.37	0.005362642	1.70	0.002607879
1421855_at	*Fgl2*	fibrinogen-like protein 2	1.33	0.005743576	1.24	0.012386508
1428343_at	*C730034D20RIK*	RIKEN cDNA C730034D20 gene	1.32	0.001873588	1.19	0.018171429
1435176_a_at	*Idb2*	inhibitor of DNA binding 2	1.30	0.001735733	1.49	0.006407563
1417065_at	*Egr1*	early growth response 1	1.29	0.012103309	1.08	0.021448558
1419527_at	*Comp*	cartilage oligomeric matrix protein	1.28	0.015363433	1.31	0.032455373
1416666_at	*Serpine2*	serine (or cysteine) proteinase inhibitor, clade E, member 2	1.28	0.016566752	1.13	0.013133867
1426208_x_at	*Plagl1*	pleiomorphic adenoma gene-like 1	1.28	0.013612184	1.12	0.022034481
1449106_at	*Gpx3*	glutathione peroxidase 3	1.27	0.001946526	1.08	0.030677188
1423753_at	*Bambi*	BMP and activin membrane-bound inhibitor, homolog (Xenopus laevis)	1.23	0.001119551	1.06	0.011539146
1453145_at	*4933439C20RIK*	RIKEN cDNA 4933439C20 gene	1.22	0.020741743	1.53	0.006361691
1423854_a_at	*BC008101*	unknown	1.21	0.004003416	1.17	0.009795877
1427038_at	*BC049766*	unknown	1.21	0.024041634	1.22	0.007548482
1448162_at	*Vcam1*	vascular cell adhesion molecule 1	1.19	0.017776185	1.08	0.026413922
1451447_at	*C330016O16RIK*	RIKEN cDNA C330016O16 gene	1.18	0.017776185	1.13	0.012386508
1419130_at	*Deadc1*	deaminase domain containing 1	1.18	0.013925793	1.09	0.006602357
1420952_at	*Son*	Son cell proliferation protein	1.17	0.002274827	1.16	0.046071596
1447640_s_at	*Pbx3*	pre B-cell leukemia transcription factor 3	1.15	0.035771251	1.27	0.027186297
1449461_at	*Rbp7*	retinol binding protein 7, cellular	1.12	0.022192646	1.39	0.042288878
1426851_a_at	*Nov*	nephroblastoma overexpressed gene	1.11	0.023572154	1.11	0.033160989
1417462_at	*Cap1*	CAP, adenylate cyclase-associated protein 1 (yeast)	1.10	0.033983868	1.50	0.020072033
1437123_at	*Mmrn2*	multimerin 2	1.10	0.000871383	1.21	0.000313227
1422631_at	*Ahr*	aryl-hydrocarbon receptor	1.09	0.018968038	1.09	0.006196772
1449514_at	*Gprk5*	G protein-coupled receptor kinase 5	1.05	0.049669589	1.32	0.023285335
1417872_at	*Fhl1*	four and a half LIM domains 1	1.05	0.001337287	1.03	0.009154583
1449556_at	*H2-T23*	histocompatibility 2, T region locus 23	1.03	0.02194224	1.10	0.027018405
1456226_x_at	*Ddr1*	discoidin domain receptor family, member 1	1.02	0.024041634	1.03	0.021976404
1455393_at	*Cp*	ceruloplasmin	1.02	0.019001003	1.11	0.021961097
1434008_at	*Loc384934*	similar to sodium channel beta 4 subunit	-1.07	0.017776185	-1.08	0.023285335
1452590_a_at	*BC032982*	unknown	-1.11	0.005944427	-1.08	0.015451729
1447802_x_at	*AV099323*	expressed sequence AV099323	-1.31	0.004421495	-1.03	0.012371525
1427126_at	*M12573*	unknown	-1.91	0.046946097	-1.51	0.043962944
1428991_at	*Hrasls*	HRAS-like suppressor	-2.07	0.003308574	-2.02	0.037734414
1437721_at	*BB543398*	BB543398 RIKEN full-length enriched, 0 day neonate eyeball	-2.08	0.036438465	-1.80	0.018132165
1424105_a_at	*Pttg1*	pituitary tumor-transforming 1	-2.69	0.013852722	-2.05	0.049414848
1428347_at	*Cyfip2*	cytoplasmic FMR1 interacting protein 2	-2.84	0.007687062	-2.22	0.04909376

Table S4. Genes from MAPK pathways affected as defined by $q<0.05$ in hearts from *Lmna*$^{H222P/H222P}$ mice.

Gene symbol	Gene name	*q*-value
Tgfb2	transforming growth factor, beta 2	2.86E-07
Fgf9	fibroblast growth factor 9	5.67E-06
Mapk8	mitogen activated protein kinase 8	1.49E-05
Evi1	ecotropic viral integration site 1	3.05E-05
Pdgfra	platelet derived growth factor receptor, alpha polypeptide	4.59E-05
Ddit3	DNA-damage inducible transcript 3	4.63E-05
Pdgfa	platelet derived growth factor, alpha	1.61E-04
Ikbkg	inhibitor of kappaB kinase gamma	5.91E-04
Rap1b	RAS related protein 1b	6.48E-04
Tgfbr2	transforming growth factor, beta receptor II	6.56E-04
Rasa1	RAS p21 protein activator 1	7.32E-04
Map3k7	mitogen activated protein kinase kinase kinase 7	8.20E-04
Fgf12	fibroblast growth factor 12	8.94E-04
Flnb	filamin, beta	0.001165294
Tgfbr1	transforming growth factor, beta receptor I	0.001166535
Rasa2	RAS p21 protein activator 2	0.001215545
Ppp3ca	protein phosphatase 3, catalytic subunit, alpha isoform	0.001246963
Stk4	serine/threonine kinase 4	0.001354133
Tgfb3	transforming growth factor, beta 3	0.002364518
Il1b	interleukin 1 beta	0.002765324
Stmn1	stathmin 1	0.002968037
Dusp9	dual specificity phosphatase 9	0.003646724
Mapk7	mitogen activated protein kinase 7	0.003757431
Tnfrsf1a	tumor necrosis factor receptor superfamily, member 1a	0.00415812
Prkx	protein kinase, X-linked	0.004502912
Nfkb2	nuclear factor of kappa light polypeptide gene enhancer in B-cells 2, p49/p100	0.004526246
Pla2g12b	phospholipase A2, group XIIB	0.005008582
Mapk14	mitogen activated protein kinase 14	0.005486382
Arrb2	arrestin, beta 2	0.005499632
Map3k7ip2	mitogen-activated protein kinase kinase kinase 7 interacting protein 2	0.005572035
Fgf14	fibroblast growth factor 14	0.005893794
Map2k4	mitogen activated protein kinase kinase 4	0.006352425
Map3k4	mitogen activated protein kinase kinase kinase 4	0.006428794
Rapgef4	Rap guanine nucleotide exchange factor (GEF) 4	0.00646519
B230120H23Rik	RIKEN cDNA B230120H23 gene	0.007287265
Fgfr1	fibroblast growth factor receptor 1	0.008101899
Nfatc2	nuclear factor of activated T-cells, cytoplasmic, calcineurin-dependent 2	0.008135684
Mapk1	mitogen activated protein kinase 1	0.009114735
Casp3	caspase 3	0.01030442
Atf2	activating transcription factor 2	0.010609392
Pdgfrb	platelet derived growth factor receptor, beta polypeptide	0.011061486
Rasgrp1	RAS guanyl releasing protein 1	0.01152764
Pla2g2f	phospholipase A2, group IIF	0.011765433
Map3k5	mitogen activated protein kinase kinase kinase 5	0.013138994
Map4k4	mitogen-activated protein kinase kinase kinase kinase 4	0.013794331
Ntf3	neurotrophin 3	0.015551899
Prkacb	protein kinase, cAMP dependent, catalytic, beta	0.015732516
Fgf13	fibroblast growth factor 13	0.016029769
Nras	neuroblastoma ras oncogene	0.01603981
Crk	v-crk sarcoma virus CT10 oncogene homolog (avian)	0.016282
Cdc42	cell division cycle 42 homolog (S. cerevisiae)	0.016346284
Mapk9	mitogen activated protein kinase 9	0.016360449
Mef2c	myocyte enhancer factor 2C	0.016628602
Ikbkb	inhibitor of kappaB kinase beta	0.017489001
Pak1	p21 (CDKN1A)-activated kinase 1	0.019850033
Stk3	serine/threonine kinase 3 (Ste20, yeast homolog)	0.020054912
Pla2g4a	phospholipase A2, group IVA (cytosolic, calcium-dependent)	0.020689473
Mapk8ip3	mitogen-activated protein kinase 8 interacting protein 3	0.021525545
Ntrk2	neurotrophic tyrosine kinase, receptor, type 2	0.023029898
Map2k1	mitogen activated protein kinase kinase 1	0.023250303
Elk4	ELK4, member of ETS oncogene family	0.023453863
Il1r2	interleukin 1 receptor, type II	0.024099017
Ppm1a	protein phosphatase 1A, magnesium dependent, alpha isoform	0.02798708

Elk1	ELK1, member of ETS oncogene family	0.028133111
Map3k12	mitogen activated protein kinase kinase kinase 12	0.028611936
Grb2	growth factor receptor bound protein 2	0.030613258
Dusp4	dual specificity phosphatase 4	0.031594265
Atf4	activating transcription factor 4	0.032840296
Ptprr	protein tyrosine phosphatase, receptor type, R	0.034302631
Map3k14	mitogen-activated protein kinase kinase kinase 14	0.034493988
Ppp3cb	protein phosphatase 3, catalytic subunit, beta isoform	0.035522355
Map4k3	mitogen-activated protein kinase kinase kinase kinase 3	0.036013688
Map4k1	mitogen activated protein kinase kinase kinase kinase 1	0.037140547
Mapkapk5	MAP kinase-activated protein kinase 5	0.038864042
Tmem37	transmembrane protein 37	0.039176243
Tnik	TRAF2 and NCK interacting kinase	0.040413687
Prkca	protein kinase C, alpha	0.04096107
Sos1	Son of sevenless homolog 1 (Drosophila)	0.041150981
Hspa5	heat shock 70kD protein 5 (glucose-regulated protein)	0.043896851
Ntrk1	neurotrophic tyrosine kinase, receptor, type 1	0.044662799
Rps6ka4	ribosomal protein S6 kinase, polypeptide 4	0.045486593
Srf	serum response factor	0.048518972
Pdgfb	platelet derived growth factor, B polypeptide	0.049732811

Table S5. Genes from MAPK pathways affected as defined by $q<0.05$ in hearts from *Lmna*$^{H222P/+}$ mice.

Gene symbol	Gene name	*q*-value
Fgf12	fibroblast growth factor 12	3.60E-06
Evi1	ecotropic viral integration site 1	1.08E-04
Raf1	v-raf-leukemia viral oncogene 1	1.11E-04
Tgfbr2	transforming growth factor, beta receptor II	2.29E-04
B230120H23Rik	RIKEN cDNA B230120H23 gene	2.45E-04
Ppm1a	protein phosphatase 1A, magnesium dependent, alpha isoform	2.59E-04
Stmn1	stathmin 1	2.64E-04
Mapk8	mitogen activated protein kinase 8	2.69E-04
Fgf10	fibroblast growth factor 10	4.00E-04
Rasgrp1	RAS guanyl releasing protein 1	4.05E-04
Map3k7ip2	mitogen-activated protein kinase kinase kinase 7 interacting protein 2	4.59E-04
Pdgfra	platelet derived growth factor receptor, alpha polypeptide	4.98E-04
Rap1b	RAS related protein 1b	6.48E-04
Dusp9	dual specificity phosphatase 9	6.53E-04
Srf	serum response factor	7.34E-04
Flnb	filamin, beta	8.02E-04
Map3k5	mitogen activated protein kinase kinase kinase 5	0.00121393
Pak1	p21 (CDKN1A)-activated kinase 1	0.001274338
Tgfb2	transforming growth factor, beta 2	0.001350584
Rasa2	RAS p21 protein activator 2	0.001385751
Rasgrf1	RAS protein-specific guanine nucleotide-releasing factor 1	0.001568889
Fgfr1	fibroblast growth factor receptor 1	0.001913437
Mapk1	mitogen activated protein kinase 1	0.001942955
Tnfrsf1a	tumor necrosis factor receptor superfamily, member 1a	0.002375645
Rasa1	RAS p21 protein activator 1	0.002487897
Pdgfa	platelet derived growth factor, alpha	0.002639407
Stk4	serine/threonine kinase 4	0.002681895
Map4k3	mitogen-activated protein kinase kinase kinase kinase 3	0.002754704
Traf6	Tnf receptor-associated factor 6	0.003022471
Map2k1	mitogen activated protein kinase kinase 1	0.003068013
Ntrk2	neurotrophic tyrosine kinase, receptor, type 2	0.003238241
Arrb2	arrestin, beta 2	0.003281171
Map3k12	mitogen activated protein kinase kinase kinase 12	0.003364804
Ppp3ca	protein phosphatase 3, catalytic subunit, alpha isoform	0.0043393
Ikbkb	inhibitor of kappaB kinase beta	0.004378057
Fgf9	fibroblast growth factor 9	0.004713371
Tgfbr1	transforming growth factor, beta receptor I	0.004829289
Nf1	neurofibromatosis 1	0.004963115
Il1r2	interleukin 1 receptor, type II	0.005098257
Tmem37	transmembrane protein 37	0.005264078
Fgfr4	fibroblast growth factor receptor 4	0.005404511
Elk4	ELK4, member of ETS oncogene family	0.005409921
Pla2g4a	phospholipase A2, group IVA (cytosolic, calcium-dependent)	0.005475986
Prkaca	protein kinase, cAMP dependent, catalytic, alpha	0.005507381
Dusp7	dual specificity phosphatase 7	0.00564084
Map2k7	mitogen activated protein kinase kinase 7	0.006080179
Atf4	activating transcription factor 4	0.006608756
Stk3	serine/threonine kinase 3 (Ste20, yeast homolog)	0.006703101
Casp4	caspase 4, apoptosis-related cysteine peptidase	0.00719374
Map3k7	mitogen activated protein kinase kinase kinase 7	0.007929567
Ptpn5	protein tyrosine phosphatase, non-receptor type 5	0.008807588
Map3k14	mitogen-activated protein kinase kinase kinase 14	0.008979205
Il1b	interleukin 1 beta	0.009114094
Egf	epidermal growth factor	0.009371844
Ikbkg	inhibitor of kappaB kinase gamma	0.009464352
Map2k6	mitogen activated protein kinase kinase 6	0.009745366
Map2k1ip1	mitogen-activated protein kinase kinase 1 interacting protein 1	0.010073412
Acvr1b	activin A receptor, type 1B	0.010415173
Map4k4	mitogen-activated protein kinase kinase kinase kinase 4	0.010658562
Rap1a	RAS-related protein-1a	0.01069035
Mapk9	mitogen activated protein kinase 9	0.010733895
Map3k7ip1	mitogen-activated protein kinase kinase kinase 7 interacting protein 1	0.011029738

Map3k4	mitogen activated protein kinase kinase kinase 4	0.011082817
Kras	v-Ki-ras2 Kirsten rat sarcoma viral oncogene homolog	0.011178974
Casp14	caspase 14	0.011191381
Dusp4	dual specificity phosphatase 4	0.011423174
Casp1	caspase 1	0.01143588
Nfatc2	nuclear factor of activated T-cells, cytoplasmic, calcineurin-dependent 2	0.013223984
Rapgef4	Rap guanine nucleotide exchange factor (GEF) 4	0.01378897
Nr4a1	nuclear receptor subfamily 4, group A, member 1	0.014080154
Map3k3	mitogen activated protein kinase kinase kinase 3	0.014893574
Hspa1l	heat shock protein 1-like	0.015984548
Ntf3	neurotrophin 3	0.016139683
Fgf14	fibroblast growth factor 14	0.017407472
Fasl	Fas ligand (TNF superfamily, member 6)	0.018752911
Mef2c	myocyte enhancer factor 2C	0.019680604
Ppp3cb	protein phosphatase 3, catalytic subunit, beta isoform	0.020361974
Fgf22	fibroblast growth factor 22	0.021250778
Casp6	caspase 6	0.022509927
Mknk1	MAP kinase-interacting serine/threonine kinase 1	0.023706562
Sitpec	signaling intermediate in Toll pathway-evolutionarily conserved	0.02385116
Mapk13	mitogen activated protein kinase 13	0.024399541
Fgfr2	fibroblast growth factor receptor 2	0.024557857
Chuk	conserved helix-loop-helix ubiquitous kinase	0.025051891
Casp9	caspase 9	0.025852039
Mknk2	MAP kinase-interacting serine/threonine kinase 2	0.026408231
Fgf1	fibroblast growth factor 1	0.027300185
Atf2	activating transcription factor 2	0.027981699
Ikbke	inhibitor of kappaB kinase epsilon	0.028390773
Akt3	thymoma viral proto-oncogene 3	0.029365859
Pla2g12b	phospholipase A2, group XIIB	0.029772852
Prkcb1	protein kinase C, beta 1	0.030051395
Nlk	nemo like kinase	0.032550417
Nfkb1	nuclear factor of kappa light chain gene enhancer in B-cells 1, p105	0.03400866
Ntf5	neurotrophin 5	0.035237338
Ppm1b	protein phosphatase 1B, magnesium dependent, beta isoform	0.035547733
Pak2	p21 (CDKN1A)-activated kinase 2	0.03714335
Ppp3r2	protein phosphatase 3, regulatory subunit B, alpha isoform (calcineurin B, type II)	0.038363453
Ntrk1	neurotrophic tyrosine kinase, receptor, type 1	0.039271939
Mapk8ip3	mitogen-activated protein kinase 8 interacting protein 3	0.039579867
Daxx	Fas death domain-associated protein	0.0396163
Prkcc	protein kinase C, gamma	0.039729139
Mapkapk2	MAP kinase-activated protein kinase 2	0.040014548
Crk	v-crk sarcoma virus CT10 oncogene homolog (avian)	0.040886872
Nras	neuroblastoma ras oncogene	0.042562889
Pla2g6	phospholipase A2, group VI	0.042567554
Nfatc4	nuclear factor of activated T-cells, cytoplasmic, calcineurin-dependent 4	0.044083907
Fgf5	fibroblast growth factor 5	0.044422804
Map4k2	mitogen activated protein kinase kinase kinase kinase 2	0.045341238
Hspb1	heat shock protein 1	0.045691236
Ptprr	protein tyrosine phosphatase, receptor type, R	0.049859977