

**Table S1. List of human lysine deacetylases**

<b>OfficialSymbol</b>	<b>Official Full Name</b>	<b>Other Aliases</b>	<b>Gene ID</b>	<b>Gene Location</b>
HDAC1	histone deacetylase 1	HD1; RPD3; GON-10; RPD3L1	3065	1p35
HDAC2	histone deacetylase 2	HD2; RPD3; YAF1	3066	6q21
HDAC3	histone deacetylase 3	HD3; RPD3; RPD3-2	8841	5q31.3
HDAC4	histone deacetylase 4	HD4; AHO3; BDMR; HDACA; HA6116; HDAC-4; HDAC-A	9759	2q37.3
HDAC5	histone deacetylase 5	HD5; NY-CO-9	10014	17q21.31
HDAC6	histone deacetylase 6	HD6; JM21; CPBHM; PPP1R90	10013	Xp11.23
HDAC7	histone deacetylase 7	HD7; HD7A; HDAC7A	51564	12q13.11
HDAC8	histone deacetylase 8	HD8; WTS; RPD3; CDA07; CDLS5; MRXS6; HDACL1	55869	Xq13.1
HDAC9	histone deacetylase 9	HD7; HD9; HD7b; HDAC; HDRP; MITR; HDAC7; HDAC7B; HDAC9B; HDAC9FL	9734	7p21.1
HDAC10	histone deacetylase 10	HD10	83933	22q13.33
HDAC11	histone deacetylase 11	HD11	79885	3p25.1
SIRT1	sirtuin 1	SIR2; SIR2L1; SIR2alpha	23411	10q21.3
SIRT2	sirtuin 2	SIR2; SIR2L; SIR2L2	22933	19q13.2
SIRT3	sirtuin 3	SIR2L3	23410	11p15.5
SIRT4	sirtuin 4	SIR2L4	23409	12q24.31
SIRT5	sirtuin 5	SIR2L5	23408	6p23
SIRT6	sirtuin 6	SIR2L6	51548	19p13.3
SIRT7	sirtuin 7	SIR2L7	51547	17q25.3

**Table S2. Correlation between copy number and mRNA expression of HDACs in TCGA breast cancers**

<b>Gene</b>	<b>Pearson</b>	<b>Kendall</b>	<b>Spearman</b>
HDAC1	0.44	0.48	0.36
HDAC2	0.62	0.59	0.51
HDAC3	0.44	0.43	0.35
HDAC4	0.32	0.28	0.26
HDAC5	0.44	0.40	0.35
HDAC6	0.00	0.07	0.00
HDAC7	0.22	0.21	0.17
HDAC8	0.03	0.06	0.03
HDAC9	0.02	0.03	0.02
HDAC10	0.26	0.25	0.21
HDAC11	0.31	0.33	0.25
SIRT1	0.38	0.41	0.30
SIRT2	0.45	0.47	0.36
SIRT3	0.53	0.46	0.42
SIRT4	0.19	0.19	0.15
SIRT5	0.46	0.50	0.37
SIRT6	0.32	0.28	0.25
SIRT7	0.44	0.45	0.35

Table S3. Frequency (%) of HDAC genetic alterations and expression levels in five subtypes of TCGA breast cancers

Gene	DNA Alterations						mRNA Expression Levels		
	Amp	Gain	Diploid	Hetloss	Homdel	Mutation	Z Score >= 1	1 > Z Score > -1	Z Score <= -1
Normal-Like	HDAC1	0.00	13.64	86.36	0.00	0.00	4.55	63.64	31.82
	HDAC2	0.00	9.09	72.73	18.18	0.00	0.00	90.91	9.09
	HDAC3	0.00	0.00	81.82	18.18	0.00	0.00	86.36	13.64
	HDAC4	0.00	0.00	90.91	9.09	0.00	4.55	50.00	9.09
	HDAC5	0.00	0.00	77.27	18.18	4.55	0.00	4.55	9.09
	HDAC6	0.00	9.09	81.82	9.09	0.00	0.00	13.64	81.82
	HDAC7	0.00	0.00	95.45	4.55	0.00	0.00	4.55	86.36
	HDAC8	0.00	4.55	86.36	9.09	0.00	4.55	9.09	77.27
	HDAC9	4.55	9.09	81.82	4.55	0.00	0.00	9.09	90.91
	HDAC10	0.00	9.09	77.27	13.64	0.00	0.00	0.00	72.73
	HDAC11	0.00	0.00	77.27	22.73	0.00	0.00	0.00	54.55
	SIRT1	0.00	4.55	86.36	9.09	0.00	0.00	13.64	81.82
	SIRT2	0.00	18.18	77.27	4.55	0.00	0.00	27.27	68.18
	SIRT3	0.00	9.09	77.27	13.64	0.00	0.00	0.00	72.73
	SIRT4	0.00	0.00	90.91	9.09	0.00	0.00	0.00	90.91
	SIRT5	0.00	4.55	86.36	9.09	0.00	0.00	9.09	68.18
	SIRT6	0.00	9.09	81.82	9.09	0.00	0.00	4.55	86.36
SIRT7	0.00	13.64	68.18	18.18	0.00	0.00	4.55	59.09	
Luminal A	HDAC1	0.25	2.47	68.64	28.64	0.00	0.49	10.62	67.65
	HDAC2	0.99	6.42	60.74	31.36	0.49	0.25	2.72	80.25
	HDAC3	0.49	23.70	69.38	6.42	0.00	0.00	8.89	76.54
	HDAC4	0.00	2.22	77.78	20.00	0.00	0.25	9.14	76.30
	HDAC5	0.74	20.49	57.04	21.73	0.00	0.49	7.65	74.81
	HDAC6	0.49	10.12	76.79	12.59	0.00	1.48	9.38	79.51
	HDAC7	0.74	17.04	78.27	3.95	0.00	0.25	7.65	83.95
	HDAC8	0.25	9.14	77.04	13.33	0.25	0.25	9.14	81.48
	HDAC9	1.48	26.91	66.42	5.19	0.00	0.00	6.67	93.33
	HDAC10	0.00	5.43	49.14	44.94	0.49	0.00	3.21	83.21
	HDAC11	0.00	11.85	79.26	8.89	0.00	0.25	11.36	82.22
	SIRT1	0.25	7.41	77.28	15.06	0.00	0.00	19.01	76.30
	SIRT2	1.23	17.53	73.09	8.15	0.00	0.00	8.15	77.53
	SIRT3	0.25	12.35	69.14	18.02	0.25	0.25	7.90	78.27
	SIRT4	0.49	14.81	73.58	10.62	0.49	0.00	9.38	75.56
	SIRT5	1.48	14.57	73.09	10.86	0.00	0.25	13.33	70.37
	SIRT6	0.74	13.83	70.86	14.57	0.00	0.00	2.96	91.11
SIRT7	2.72	23.70	59.26	13.83	0.49	0.00	6.42	77.04	
Luminal B	HDAC1	1.08	8.65	36.22	54.05	0.00	0.00	20.00	64.86
	HDAC2	0.54	10.27	39.46	48.65	1.08	0.00	12.43	74.59
	HDAC3	0.00	27.57	53.51	18.92	0.00	0.54	11.89	64.86
	HDAC4	0.00	5.95	53.51	39.46	1.08	0.54	2.16	61.08
	HDAC5	2.70	34.59	28.65	33.51	0.54	0.54	5.95	55.14
	HDAC6	0.54	24.32	52.97	22.16	0.00	2.16	16.76	67.57
	HDAC7	0.54	36.76	54.05	8.65	0.00	0.00	0.54	73.51
	HDAC8	0.00	14.59	57.30	28.11	0.00	0.54	14.05	67.03
	HDAC9	0.54	36.22	47.57	15.68	0.00	0.54	7.57	92.43
	HDAC10	1.08	12.43	30.81	54.59	1.08	0.00	5.41	72.97
	HDAC11	1.62	31.35	49.73	17.30	0.00	0.54	20.54	70.97
	SIRT1	1.62	15.14	52.97	29.19	1.08	0.54	16.22	67.03
	SIRT2	0.00	21.08	48.11	30.27	0.54	0.54	9.19	63.24
	SIRT3	0.00	21.62	43.78	32.43	2.16	0.00	5.95	61.62
	SIRT4	0.54	31.89	52.43	15.14	0.00	0.00	8.11	69.73
	SIRT5	0.54	31.89	48.11	18.92	0.54	0.00	27.03	56.22
	SIRT6	1.62	12.43	40.54	45.41	0.00	0.00	2.70	80.54
SIRT7	9.19	48.65	27.57	14.05	0.54	0.00	20.00	63.24	
HER2	HDAC1	0.00	10.61	42.42	45.45	1.52	0.00	13.64	56.06
	HDAC2	7.58	27.27	43.94	21.21	0.00	0.00	42.42	54.55
	HDAC3	0.00	13.64	53.03	33.33	0.00	0.00	10.61	65.15
	HDAC4	0.00	16.67	46.97	36.36	0.00	0.00	6.06	74.24
	HDAC5	0.00	4.55	12.12	80.30	3.03	1.52	0.00	22.73
	HDAC6	1.52	19.70	59.09	19.70	0.00	4.55	16.67	56.06
	HDAC7	0.00	24.24	60.61	15.15	0.00	0.00	3.03	56.06
	HDAC8	0.00	21.21	57.58	21.21	0.00	0.00	13.64	65.15
	HDAC9	4.55	34.85	53.03	7.58	0.00	0.00	9.09	90.91
	HDAC10	4.55	24.24	45.45	24.24	1.52	0.00	4.55	69.70
	HDAC11	3.03	21.21	43.94	30.30	1.52	0.00	1.52	54.55
	SIRT1	0.00	31.82	46.97	21.21	0.00	0.00	10.61	72.73
	SIRT2	3.03	25.76	39.39	31.82	0.00	0.00	16.67	59.09
	SIRT3	0.00	10.61	42.42	45.45	1.52	0.00	1.52	54.55
	SIRT4	3.03	19.70	53.03	24.24	0.00	0.00	15.15	71.21
	SIRT5	4.55	28.79	54.55	12.12	0.00	0.00	16.67	68.18
	SIRT6	1.52	10.61	51.52	36.36	0.00	0.00	6.06	83.33
SIRT7	12.12	25.76	28.79	31.82	1.52	1.52	18.18	57.58	
Basal-Like	HDAC1	2.31	26.15	43.85	26.92	0.77	1.54	25.38	63.08
	HDAC2	3.08	36.92	37.69	22.31	0.00	0.77	61.54	37.69
	HDAC3	0.00	5.38	26.15	68.46	0.00	0.00	15.38	58.46
	HDAC4	0.00	14.62	40.00	42.31	3.08	0.00	24.62	66.92
	HDAC5	0.00	8.46	34.62	56.15	0.77	0.00	16.92	58.46
	HDAC6	1.54	27.69	48.46	20.77	1.54	0.77	17.69	59.23
	HDAC7	0.00	10.77	33.85	55.38	0.00	0.00	1.54	50.77
	HDAC8	0.00	30.00	48.46	20.77	0.77	0.00	28.46	56.15
	HDAC9	0.77	33.85	35.38	29.23	0.77	2.31	16.92	83.08
	HDAC10	1.54	26.92	30.00	40.00	1.54	0.00	2.31	60.00
	HDAC11	3.08	22.31	38.46	36.15	0.00	0.00	3.85	46.92
	SIRT1	1.54	21.54	43.85	33.08	0.00	0.00	11.54	56.15
	SIRT2	8.46	37.69	37.69	16.15	0.00	0.00	37.69	51.54
	SIRT3	0.00	15.38	31.54	49.23	3.85	0.00	1.54	29.23
	SIRT4	0.00	10.00	44.62	45.38	0.00	0.00	22.31	64.62
	SIRT5	7.69	46.92	33.85	10.00	1.54	0.00	46.92	41.54
	SIRT6	0.77	16.15	33.08	47.69	2.31	0.00	8.46	72.31
SIRT7	8.46	43.08	26.92	21.54	0.00	1.54	22.31	69.23	

**Table S4. Frequency (%) of HDAC genetic alterations and expression levels in METABRIC breast cancers**

Gene	DNA Alterations					mRNA Expression Levels		
	Amp	Gain	Diploid	Hetloss	Homdel	Z Score $\geq 1$	$1 > Z$ Score $> -1$	Z Score $\leq -1$
HDAC1	0.10	1.97	93.43	4.49	0.00	15.45	67.88	16.67
HDAC2	0.15	3.43	86.92	9.39	0.10	16.67	64.34	18.99
HDAC3	0.00	4.34	93.64	2.02	0.00	16.62	67.58	15.81
HDAC4	0.76	1.26	94.49	3.18	0.30	16.01	66.67	17.32
HDAC5	0.05	5.45	89.80	4.65	0.05	14.70	73.84	11.46
HDAC6	0.10	3.18	91.11	5.56	0.05	14.95	71.62	13.43
HDAC7	0.20	4.39	94.75	0.56	0.10	10.76	78.13	11.11
HDAC8	0.05	2.53	91.26	6.16	0.00	13.89	73.33	12.78
HDAC9	0.66	8.69	88.59	1.36	0.71	14.75	71.06	14.19
HDAC10	0.05	3.79	84.55	11.57	0.05	N/A	N/A	N/A
HDAC11	0.25	3.94	94.44	1.31	0.05	16.67	66.52	16.82
SIRT1	0.25	1.41	96.36	1.97	0.00	13.69	70.91	15.40
SIRT2	0.25	5.00	93.48	1.26	0.00	15.20	72.02	12.78
SIRT3	0.45	3.48	91.16	4.90	0.00	14.70	70.61	14.70
SIRT4	0.00	3.03	94.70	2.12	0.15	15.61	68.43	15.96
SIRT5	0.25	6.16	92.07	1.52	0.00	18.74	66.46	14.80
SIRT6	0.10	3.43	92.78	3.69	0.00	13.59	72.37	14.04
SIRT7	0.51	12.47	84.65	2.32	0.05	18.94	68.23	12.83



Table S5. Frequency (%) of HDAC genetic alterations and expression levels in five subtypes of METABRIC breast cancers

Gene	DNA Alterations					mRNA Expression Levels			
	Amp	Gain	Diploid	Hetloss	Homdel	Z Score >= 1	1 > Z Score >- 1	Z Score <= -1	
<b>Normal-Like</b>	HDAC1	0.00	0.50	96.98	2.51	0.00	9.05	74.37	16.58
	HDAC2	0.00	0.50	95.48	4.02	0.00	5.53	71.86	22.61
	HDAC3	0.00	1.51	96.98	1.51	0.00	17.59	70.85	11.56
	HDAC4	0.50	0.50	96.48	2.01	0.50	18.09	68.84	13.07
	HDAC5	0.00	1.01	95.98	3.02	0.00	18.59	77.89	3.52
	HDAC6	0.00	1.51	94.97	3.52	0.00	12.06	70.35	17.59
	HDAC7	0.00	2.01	96.98	1.01	0.00	8.04	81.41	10.55
	HDAC8	0.00	1.51	95.98	2.51	0.00	6.53	69.85	23.62
	HDAC9	1.01	5.53	91.46	1.51	0.50	16.58	67.84	15.58
	HDAC10	0.00	2.51	91.96	5.53	0.00	NA	NA	NA
	HDAC11	0.00	1.01	97.99	1.01	0.00	9.05	69.35	21.61
	SIRT1	0.00	1.01	96.98	2.01	0.00	11.56	73.37	15.08
	SIRT2	0.00	3.02	95.98	1.01	0.00	11.56	78.39	10.05
	SIRT3	1.01	1.01	94.47	3.52	0.00	17.09	68.34	14.57
	SIRT4	0.00	1.51	96.48	1.51	0.50	16.58	70.35	13.07
	SIRT5	0.00	3.52	95.48	1.01	0.00	9.55	74.87	15.58
	SIRT6	1.01	3.02	94.47	1.51	0.00	10.55	71.36	18.09
	SIRT7	0.50	4.02	92.46	3.02	0.00	7.54	70.85	21.61
<b>Luminal A</b>	HDAC1	0.14	1.11	95.68	3.06	0.00	13.09	75.07	11.84
	HDAC2	0.00	1.81	88.16	10.03	0.00	4.46	70.89	24.65
	HDAC3	0.00	4.87	94.15	0.97	0.00	19.08	71.31	9.61
	HDAC4	0.84	0.28	96.38	2.37	0.14	17.27	66.57	16.16
	HDAC5	0.14	5.01	91.36	3.34	0.14	12.12	80.36	7.52
	HDAC6	0.14	2.23	94.43	3.20	0.00	12.12	73.82	14.07
	HDAC7	0.14	3.48	96.10	0.00	0.28	11.56	80.64	7.80
	HDAC8	0.00	1.95	94.43	3.62	0.00	12.95	77.58	9.47
	HDAC9	0.42	8.22	90.39	0.56	0.42	12.26	73.54	14.21
	HDAC10	0.00	1.67	83.98	14.35	0.00	NA	NA	NA
	HDAC11	0.00	1.81	97.63	0.56	0.00	23.12	74.23	2.65
	SIRT1	0.14	0.84	98.33	0.70	0.00	14.35	75.21	10.45
	SIRT2	0.14	2.09	97.49	0.28	0.00	9.61	77.72	12.67
	SIRT3	0.28	3.06	93.31	3.34	0.00	15.32	68.94	15.74
	SIRT4	0.00	2.09	95.82	1.95	0.14	16.57	71.87	11.56
	SIRT5	0.14	2.51	95.82	1.53	0.00	11.14	73.40	15.46
	SIRT6	0.00	2.65	94.15	3.20	0.00	10.58	75.07	14.35
	SIRT7	0.14	7.38	90.39	1.95	0.14	11.00	75.35	13.65
<b>Luminal B</b>	HDAC1	0.20	3.48	87.09	9.22	0.00	20.08	58.61	21.31
	HDAC2	0.20	2.66	78.69	18.24	0.20	16.19	64.75	19.06
	HDAC3	0.00	7.79	91.60	0.61	0.00	14.14	69.47	16.39
	HDAC4	1.23	2.66	90.98	4.71	0.41	13.32	63.11	23.57
	HDAC5	0.00	11.07	81.76	7.17	0.00	17.83	69.88	12.30
	HDAC6	0.00	4.10	88.73	7.17	0.00	12.30	74.59	13.11
	HDAC7	0.41	7.58	91.60	0.41	0.00	6.97	82.17	10.86
	HDAC8	0.00	2.87	89.34	7.79	0.00	15.57	72.54	11.89
	HDAC9	0.82	7.79	88.52	1.64	1.23	14.96	71.52	13.52
	HDAC10	0.00	4.92	76.84	18.03	0.20	NA	NA	NA
	HDAC11	0.41	5.33	92.21	1.84	0.20	22.13	71.52	6.35
	SIRT1	0.20	0.82	95.29	3.89	0.00	19.26	70.08	10.66
	SIRT2	0.00	5.12	91.80	3.07	0.00	14.96	75.82	9.22
	SIRT3	0.41	7.58	85.86	6.15	0.00	14.14	73.98	11.89
	SIRT4	0.00	5.53	91.19	3.07	0.20	13.93	63.73	22.34
	SIRT5	0.82	5.53	91.39	2.25	0.00	24.18	61.07	14.75
	SIRT6	0.00	3.89	91.60	4.51	0.00	13.93	70.70	15.37
	SIRT7	1.23	22.54	72.54	3.69	0.00	25.82	64.14	10.04
<b>HER2</b>	HDAC1	0.00	1.25	95.42	3.33	0.00	11.25	62.92	25.83
	HDAC2	0.83	4.58	89.58	4.58	0.42	25.83	58.33	15.83
	HDAC3	0.00	2.50	95.00	2.50	0.00	15.83	60.00	24.17
	HDAC4	0.00	1.25	96.67	2.08	0.00	12.92	68.33	18.75
	HDAC5	0.00	3.33	90.42	6.25	0.00	15.00	60.42	24.58
	HDAC6	0.42	3.33	92.92	3.33	0.00	27.50	64.17	8.33
	HDAC7	0.42	5.00	93.75	0.83	0.00	20.42	70.00	9.58
	HDAC8	0.00	2.92	90.42	6.67	0.00	20.42	67.08	12.50
	HDAC9	1.25	17.50	79.58	0.83	0.83	17.92	65.42	16.67
	HDAC10	0.00	5.83	89.17	5.00	0.00	NA	NA	NA
	HDAC11	0.42	5.83	92.50	1.25	0.00	14.17	61.67	24.17
	SIRT1	0.00	2.92	96.25	0.83	0.00	8.75	67.08	24.17
	SIRT2	0.42	4.17	94.58	0.83	0.00	16.25	58.75	25.00
	SIRT3	0.42	0.83	91.67	7.08	0.00	16.67	66.67	16.67
	SIRT4	0.00	2.50	96.25	1.25	0.00	15.42	65.42	19.17
	SIRT5	0.00	7.50	91.67	0.83	0.00	17.50	62.50	20.00
	SIRT6	0.00	4.17	92.92	2.92	0.00	22.92	65.42	11.67
	SIRT7	0.42	9.58	87.92	2.08	0.00	19.58	66.67	13.75
<b>Basal-Like</b>	HDAC1	0.00	3.04	94.22	2.74	0.00	20.67	65.65	13.68
	HDAC2	0.00	9.12	89.06	1.82	0.00	44.38	48.94	6.69
	HDAC3	0.00	0.91	92.71	6.38	0.00	14.59	60.18	25.23
	HDAC4	0.61	1.82	93.01	4.26	0.30	18.54	69.00	12.46
	HDAC5	0.00	2.43	93.92	3.65	0.00	13.07	72.64	14.29
	HDAC6	0.00	4.86	83.89	10.94	0.30	16.72	69.30	13.98
	HDAC7	0.00	2.74	95.74	1.52	0.00	8.81	70.82	20.36
	HDAC8	0.30	3.65	85.11	10.94	0.00	13.07	72.04	14.89
	HDAC9	0.30	6.69	89.36	3.04	0.61	16.41	70.82	12.77
	HDAC10	0.30	6.08	89.36	4.26	0.00	NA	NA	NA
	HDAC11	0.61	6.99	89.97	2.43	0.00	0.61	44.38	55.02
	SIRT1	0.91	2.74	93.31	3.04	0.00	9.12	64.13	26.75
	SIRT2	0.91	13.07	84.80	1.22	0.00	29.48	59.57	10.94
	SIRT3	0.61	1.82	91.79	5.78	0.00	10.94	73.56	15.50
	SIRT4	0.00	2.74	95.14	2.13	0.00	15.81	68.39	15.81
	SIRT5	0.00	15.81	82.98	1.22	0.00	34.04	57.14	8.81
	SIRT6	0.00	4.26	90.27	5.47	0.00	13.98	75.08	10.94
	SIRT7	0.30	16.11	82.67	0.91	0.00	32.83	58.36	8.81

**Table S6. Expression levels of HDAC genes associated with tumor grades in METABRIC breast cancer**

Gene	Grade 1 Mean	Grade 2 Mean	Grade 3 Mean	<i>p</i> -value (ANOVA)	<i>p</i> - value (T-test:Grade 3 vs Grade 1+2 )
HDAC1	-0.025	-0.036	-0.004	8.4E-01	5.6E-01
HDAC2	-0.406	-0.330	0.256	3.0E-33	2.6E-34
HDAC3	0.036	0.085	-0.041	5.2E-02	1.8E-02
HDAC4	0.173	0.039	-0.098	7.1E-04	5.2E-04
HDAC5	0.191	0.112	-0.069	2.1E-04	5.9E-05
HDAC6	-0.119	-0.047	0.142	1.4E-04	3.5E-05
HDAC7	0.107	0.047	-0.077	9.4E-03	3.0E-03
HDAC8	0.057	0.028	0.002	7.6E-01	5.0E-01
HDAC9	-0.151	0.006	0.063	3.0E-02	6.0E-02
HDAC11	0.299	0.212	-0.227	2.7E-22	3.4E-23
SIRT1	0.305	0.110	-0.143	4.5E-10	7.4E-10
SIRT2	-0.217	-0.022	0.154	1.2E-05	2.0E-05
SIRT3	-0.061	0.017	0.012	6.5E-01	8.4E-01
SIRT4	0.385	0.020	-0.091	9.4E-08	1.6E-04
SIRT5	-0.050	-0.004	0.236	1.1E-05	1.9E-06
SIRT6	-0.191	0.024	0.039	2.5E-02	2.6E-01
SIRT7	-0.244	0.035	0.353	3.8E-13	2.6E-12

**Table S7. Expression levels of HDAC genes associated with lymph node metastases in METABRIC breast cancer**

<b>Gene</b>	<b>Lymph-Negative Mean</b>	<b>Lymph-Positive Mean</b>	<b>p - value (T-test)</b>
HDAC1	-0.01184	-0.03311	0.65862
HDAC2	-0.11201	0.00005	0.02240
HDAC3	0.04517	-0.00142	0.33410
HDAC4	0.07182	-0.11369	0.00004
HDAC5	0.15340	-0.05791	0.00001
HDAC6	0.03230	0.05356	0.66028
HDAC7	0.05589	-0.06283	0.00824
HDAC8	0.06151	-0.03234	0.04008
HDAC9	-0.00592	0.03201	0.40053
HDAC11	0.01349	0.00090	0.78261
SIRT1	0.04626	-0.04731	0.04421
SIRT2	0.02561	0.08460	0.22576
SIRT3	0.02234	-0.02951	0.25726
SIRT4	-0.02542	0.02863	0.23752
SIRT5	0.08550	0.11027	0.62606
SIRT6	0.03420	-0.02282	0.21308
SIRT7	0.12319	0.19471	0.16971

**Table S8. Expression levels of HDAC genes associated with NPI score in METABRIC breast cancer**

<b>Gene</b>	<b>Low NPI Mean</b>	<b>High NPI Mean</b>	<b><i>p</i> - value (T-test)</b>
HDAC1	-0.016	-0.025	8.5E-01
HDAC2	-0.361	0.099	2.6E-21
HDAC3	0.105	-0.019	9.8E-03
HDAC4	0.106	-0.080	1.2E-04
HDAC5	0.231	-0.039	4.0E-07
HDAC6	-0.041	0.086	1.0E-02
HDAC7	0.096	-0.051	2.1E-03
HDAC8	0.047	0.001	3.4E-01
HDAC9	-0.044	0.041	6.1E-02
HDAC11	0.212	-0.099	1.2E-11
SIRT1	0.141	-0.071	1.5E-05
SIRT2	-0.050	0.108	1.2E-03
SIRT3	-0.013	0.004	7.2E-01
SIRT4	0.106	-0.055	8.2E-04
SIRT5	-0.035	0.167	5.9E-05
SIRT6	-0.005	0.014	7.0E-01
SIRT7	-0.036	0.258	1.3E-08

Table S9. Correlation between mRNA expression of HDAC and 129 DDR genes in TCGA breast cancers

DDR gene	HDAC1		HDAC2		HDAC3		HDAC4		HDAC5		HDAC6		HDAC7		HDAC8		HDAC9		HDAC10		HDAC11	
	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman
EXO1	0.1	0.06	0.52	0.51	0.05	0	0.13	-0.05	0.11	0.13	0.06	0.06	-0.13	-0.16	0.04	0.02	0.05	0.03	0.04	0.03	-0.05	-0.1
BLM	0.13	0.19	0.42	0.49	-0.05	-0.09	0.05	-0.05	-0.1	-0.2	0.11	0.06	-0.25	-0.41	0.05	0	0.31	0.13	-0.15	-0.22	-0.14	-0.25
CHEK1	0.17	0.14	0.58	0.49	0.02	-0.04	0.08	-0.08	-0.1	-0.2	-0.02	-0.07	-0.35	-0.42	0.04	0.03	0.08	0.06	-0.21	-0.22	-0.23	-0.27
CD2CE5A	0.23	0.21	0.52	0.45	0.03	-0.06	0.01	-0.12	-0.08	-0.17	0.02	0	-0.32	-0.41	0.12	0.06	0.02	0.16	-0.18	-0.17	-0.13	-0.19
MSH2	0.22	0.22	0.58	0.46	0.01	0.05	-0.03	-0.02	0.22	0.21	0.24	0.26	0.15	0.09	0.2	0.12	0.01	-0.01	0.18	0.13	0.13	0.05
MSH6	0.1	0.06	0.54	0.46	0.02	0.01	0.16	0.03	-0.19	-0.29	0.04	-0.03	-0.42	-0.51	0.04	-0.02	0.16	0.1	-0.33	-0.4	-0.25	-0.33
RAD51	0.19	0.18	0.34	0.45	-0.01	0.03	0.06	0.14	0.21	0.22	0.19	0.21	0.33	0.36	-0.02	-0.03	-0.02	-0.09	0.28	0.26	0.26	0.35
RAD54L	0.34	0.34	0.52	0.45	0.11	0.01	0.1	0.13	0.03	-0.07	0.02	-0.08	-0.18	-0.16	0.11	-0.04	0.06	0.2	-0.03	-0.02	-0.21	-0.29
CHEK2	0.22	0.2	0.44	0.44	0.03	-0.01	-0.03	-0.08	-0.04	-0.07	-0.01	0	-0.18	-0.16	-0.02	0.01	0.04	0	-0.2	-0.21	-0.12	-0.09
NEIL3	0.19	0.18	0.42	0.43	-0.04	-0.1	-0.04	-0.16	-0.15	-0.22	0.03	0.01	-0.36	-0.42	0.04	0.03	0.08	0.04	-0.2	-0.21	-0.15	-0.19
FANCA	0.25	0.21	0.38	0.41	0.05	0.02	0.07	-0.05	0.04	-0.09	0.11	0.14	-0.26	-0.31	0.04	-0.01	0.08	0.09	-0.04	-0.06	-0.11	-0.19
PCNA	0.21	0.21	0.42	0.41	0	0.04	0.04	0.11	-0.09	-0.08	-0.09	-0.06	-0.05	0.04	-0.02	-0.01	0.02	0.06	-0.12	-0.12	-0.06	-0.01
TDG	0.07	-0.01	0.4	0.4	-0.02	-0.01	-0.06	-0.01	0.02	-0.09	-0.01	0.01	-0.05	0	0	0.02	0.02	-0.02	-0.02	-0.03	0.01	-0.02
FEN1	0.19	0.18	0.39	0.39	0.1	0.03	-0.11	-0.21	-0.04	-0.12	0.05	0	-0.23	-0.31	0.06	0.06	0.04	-0.03	-0.02	-0.01	-0.07	-0.11
XRCC2	0.14	0.05	0.41	0.39	0.14	0.17	-0.13	-0.12	-0.26	-0.27	-0.15	-0.15	-0.23	-0.19	0	0.06	-0.02	-0.01	-0.2	-0.18	-0.11	-0.14
CD2CE5C	0.28	0.24	0.34	0.38	0.2	0.13	-0.13	-0.21	-0.05	-0.14	0.1	0.04	-0.24	-0.31	0.15	0.08	0.03	-0.04	-0.05	-0.11	0.05	-0.02
FANCD2	0.11	0.12	0.37	0.01	0	-0.03	-0.03	-0.18	-0.24	0.1	0.05	0.04	-0.31	-0.39	-0.04	-0.07	0.03	0.06	-0.15	-0.22	0.02	-0.13
RNF8	0.08	0.04	0.41	0.35	0.14	0.11	-0.02	0.01	0.1	0.17	0.13	-0.04	0.01	0.09	0.08	0.01	-0.03	0.1	0.15	0.04	0.11	0.11
BRCA2	-0.01	-0.06	0.32	0.33	-0.09	-0.07	0.07	0.07	-0.27	-0.33	-0.03	-0.01	-0.35	-0.39	-0.15	-0.19	0.12	0.2	-0.26	-0.31	-0.21	-0.3
SUMO1	0.13	0.17	0.36	0.32	0.07	-0.02	0.14	0.21	0.02	0.07	0	0.03	-0.02	0.1	-0.02	-0.14	0.08	0.16	-0.08	-0.12	-0.12	-0.09
CSNK2A2	0.13	0.03	0.3	0.31	0.04	0	0.07	0.03	0	-0.05	0.01	0.02	-0.27	-0.3	0.08	0.01	0.06	0.1	-0.13	-0.19	-0.23	-0.36
TOPBP1	0.1	0.05	0.36	0.3	-0.07	-0.08	0.08	0.03	-0.11	-0.14	0.07	0.06	-0.05	-0.05	0.02	0.07	0.1	0.09	-0.03	-0.03	0.06	0.08
RAD21	0.12	0.14	0.21	0.29	0.01	-0.05	-0.08	-0.28	0.29	0.26	0.06	0.11	0.1	0.15	0.25	0.19	-0.05	-0.19	-0.33	0.38	0.2	0.22
UNG3	0.23	0.19	0.33	0.29	0.07	0.07	-0.28	0.3	0.01	-0.07	-0.04	0.04	0.25	0.2	-0.13	0.2	0.19	-0.02	-0.19	-0.23	-0.15	-0.13
MDC1	0.06	0.05	0.34	0.28	-0.03	-0.02	0.15	0.12	0.03	-0.01	0.19	0.24	-0.12	-0.09	-0.03	-0.01	0.14	0.16	-0.12	-0.14	-0.21	-0.21
POLD3	0.05	0.07	0.15	0.28	0.01	0.03	0.03	0.11	-0.06	-0.2	0.09	-0.02	-0.34	-0.4	0.13	0.1	0.01	0.14	-0.23	-0.26	-0.12	-0.3
SMC1A	-0.12	0.07	0.31	0.28	-0.06	-0.04	-0.04	0.06	-0.02	0.05	-0.04	-0.03	0.04	0.16	0	0.01	-0.08	-0.1	-0.04	-0.09	0.02	0.07
XRCC5	-0.04	-0.02	0.32	0.28	-0.08	-0.08	0.12	0.15	-0.17	-0.25	-0.06	-0.12	-0.38	-0.39	0.04	-0.02	0.15	0.17	-0.39	-0.48	-0.34	-0.44
BRIP1	0.02	0.03	0.24	0.27	-0.11	-0.12	-0.03	-0.08	-0.17	-0.24	0.02	0.04	-0.35	-0.48	-0.07	-0.1	0.18	0.14	-0.25	-0.34	-0.12	-0.18
PRKDC	0.08	0.04	0.26	0.27	-0.16	-0.16	-0.03	-0.05	-0.22	-0.15	-0.19	-0.32	-0.33	-0.19	-0.2	0.01	0.07	-0.18	-0.23	-0.15	-0.23	
XRCC6	0.12	0.11	0.27	0.27	0.07	0.02	-0.02	-0.04	-0.04	-0.06	-0.05	-0.07	-0.31	-0.33	0	0.03	0.05	0.04	0.13	0.15	-0.07	-0.15
H2AFX	0.18	0.21	0.25	0.26	0.08	0.02	-0.14	-0.25	-0.07	-0.15	-0.02	-0.05	-0.25	-0.3	0.18	0.14	0.01	-0.05	-0.04	-0.06	-0.03	-0.06
FANCG	0.18	0.17	0.3	0.24	0.08	0.06	-0.01	-0.07	0.09	0.09	0.13	0.15	-0.07	-0.04	0.13	0.11	0.02	-0.07	0	0.07	0.03	0.05
RAD1	0.08	0	0.29	0.24	0.07	-0.02	-0.02	-0.02	0.21	0.26	0.03	0.05	0.16	0.25	0.1	0.08	-0.07	-0.15	0.3	0.31	0.1	0.11
RPA1	0.09	0.07	0.34	0.24	0.05	0.07	0.02	0.05	0	-0.03	0.06	0.06	0.03	0.01	0.04	0.01	0.02	-0.01	-0.03	-0.03	0.02	0.04
PMS1	0	0	0.27	0.23	0.06	0.07	-0.19	-0.2	0.03	0.03	0.03	0.03	-0.03	-0.03	0.1	0.1	-0.09	-0.19	0.02	0.02	0.14	0.17
HUS1	0.05	-0.03	0.2	0.22	0.04	0.17	0.06	0.24	-0.08	-0.07	-0.08	0.09	0.11	0.24	0.07	-0.17	0.2	0.01	-0.04	-0.04	-0.12	-0.14
PARP1	0.04	0.05	0.21	0.22	0.07	0.08	0.06	0.06	0.11	-0.14	-0.03	-0.05	-0.19	-0.19	0.03	0.04	0.11	0.09	-0.11	-0.1	-0.1	-0.12
PARP2	0.03	0.02	0.25	0.22	-0.04	-0.04	-0.1	-0.12	0.1	0.16	0.06	0.1	0.4	0.44	0.02	0.07	0	-0.08	0.24	0.27	0.18	0.27
APEX2	0.17	0.18	0.18	0.2	0.12	0.08	-0.16	-0.26	0	-0.02	0.2	0.26	-0.05	-0.06	0.24	0.25	-0.04	-0.13	0.13	0.12	0.11	0.06
RAD18	-0.04	-0.09	0.24	0.2	-0.05	-0.02	0.03	0.04	-0.21	-0.23	-0.1	-0.13	-0.36	-0.39	0.15	0.12	0.04	0.08	-0.3	-0.38	-0.09	-0.14
RAD23B	-0.02	-0.04	0.17	0.2	0.18	0.12	0.05	0.06	-0.01	0.03	-0.02	-0.02	0.17	0.19	-0.03	-0.02	0.05	0.25	0.22	0.24	-0.1	-0.09
RNF168	0	0	0.06	0.06	0.1	0.24	-0.08	0.22	0.02	0.16	0.21	0.01	0.24	0.21	0.03	0.02	0.01	0.02	0.01	0.29	0.03	0.12
XRCC8BP1	-0.16	0.15	0.15	0.18	-0.09	-0.08	-0.2	-0.33	-0.14	-0.19	-0.07	-0.12	-0.14	-0.19	0.19	0.16	0.02	-0.06	-0.04	-0.01	0.02	0.03
MRE11A	-0.04	-0.06	0.27	0.17	0.28	0.12	0.02	0.04	0.48	0.46	0.21	0.27	0.45	0.42	0.02	0.01	-0.09	-0.18	0.53	0.48	0.35	0.4
APEX1	0.06	0.08	0.17	0.16	0.08	0.09	-0.11	-0.11	-0.03	-0.01	0.01	-0.03	-0.02	0.06	0.1	0.08	-0.04	-0.2	0.03	0.08	0.12	0.13
MBD4	0.15	0.1	0.2	0.16	0.05	0.02	-0.01	-0.01	0.03	0.02	0.04	0.04	0.02	0.01	0.03	0.01	-0.01	0.03	0.06	-0.02	0.01	-0.01
BARB1	-0.05	-0.05	0.18	0.15	-0.11	-0.08	0.21	0.21	-0.21	-0.24	-0.03	-0.03	-0.34	-0.35	-0.22	-0.24	0.14	0.22	-0.32	-0.37	-0.19	-0.2
ERCC3	0.1	0.19	0.15	-0.02	0.1	0.09	0.09	0.07	0.07	0.07	0.12	0.22	-0.23	-0.27	0.1	0.1	0.06	0.1	0.06	-0.06	-0.05	-0.05
DMC2	0.17	0.11	0.18	0.12	-0.08	-0.09	0.02	0.02	-0.07	0.05	0.01	-0.11	-0.06	-0.17	-0.19	0.05	0.04	0.21	-0.02	-0.14	-0.13	-0.13
DDB1	0.04	0.03	0.05	0.11	-0.01	0	-0.13	-0.12	-0.13	-0.16	-0.02	-0.03	-0.27	-0.3	-0.14	-0.14	-0.01	-0.06	-0.12	-0.16	-0.05	-0.07
NBN	-0.05	-0.08	0.07	0.11	-0.05	-0.05	-0.07	-0.15	-0.11	-0.13	-0.08	-0.2	-0.09	0.02	-0.05	-0.1	0.01	-0.01	0.03	0.05	-0.09	0.02
MUTYH	0.36	0.39	0.26	0.1	0	0.04	0.08	0.13	-0.02	-0.02	0.03	0.03	0.03	0.04	-0.05	-0.04	0.11	0.25	0.03	0.02	-0.1	-0.11
RAD51C	0.05	0.07	0.07	0.07	0.1	-0.08	0.01	0.04	0.07	0.09	0.1	-0.04	-0.03	-0.14	-0.12	0.04	0.08	0.05	-0.08	-0.12	-0.09	-0.05
TP53	-0.02	-0.04	0.14	0.1	-0.09	-0.05	0.11	0.17	-0.29	-0.27	0	-0.05	-0.28	-0.26	-0.15	-0.13	0.13	0.13	-0.32	-0.35	-0.17	-0.15
ATR	-0.04	-0.1	0.12	0.09	-0.12	-0.09	0.09	0.15	0.15	-0.22	-0.06	0.04	-0.33	-0.33	-0.04	-0.07	0.07	0.13	-0.34	-0.39	-0.28	-0.28
CRY1	-0.14	-0.16	0.1	0.09	-0.09	-0.07	0.2	0.2	-0.14	-0.14	-0.04	-0.02	-0.14	-0.13	-0.15	-0.16	0.04	0.15	-0.28	-0.29	-0.24	-0.27
LIG1	0.15	0.19	0.18	0.09	-0.05	-0.07	-0.1	-0.1	0.09	0.16	0.08	0.16										

## Supplementary Figure Legends

Supplementary Figure S1: Expression level of HDAC2 across five subtypes of METABRIC breast cancers.

Supplementary Figure S2: mRNA expression levels from RNA-Seq (GSE48216) of HDAC1-11 in a panel of 51 breast cancer cell lines compared with 5 normal mammary epithelial cell lines. Cell lines: green indicates normal mammary epithelial cell lines; red, basal-like breast cancer cell lines; and blue, Luminal breast cancer cell lines.

Supplementary Figure S3: mRNA expression levels from RNA-Seq (GSE48216) of SIRT1-7 in a panel of 51 breast cancer cell lines compared with 5 normal mammary epithelial cell lines. Cell lines: green indicates normal mammary epithelial cell lines; red, basal-like breast cancer cell lines; and blue, Luminal breast cancer cell lines.

Supplementary Figure S4: mRNA expression level of HDAC11, measured by qRT-PCR, in a panel of 21 breast cancer cell lines. mRNA expression levels in MCF10A cells were arbitrarily set as 1. Relative expression levels are shown as fold changes compared with those of MCF10A cells.

Supplementary Figure S5: Apoptosis in HCC1937 cells treated with mocetinostat for 48 hours was assessed by AnnexinV/ propidium iodide (PI) double staining, early and late apoptosis was quantified and indicated in Q3 and Q2 gates respectively. The apoptosis rates of cells are indicated.

Supplementary Figure S6: Expression level of RAD51 across five subtypes of TCGA breast cancers

Supplementary Figure S7: Based on their expression in 144 normal breast samples compared with 1980 cancer samples in the METABRIC cohort, HDAC1 and HDAC2 were highly expressed in tumor versus normal cells.

Supplementary Figure S8: qRT-PCR analysis of HDAC11 expression after treatment with tamoxifen (TAM) in ZR75-1 Luminal breast cancer line.

Figure S1

### HDAC2 (METABRIC)

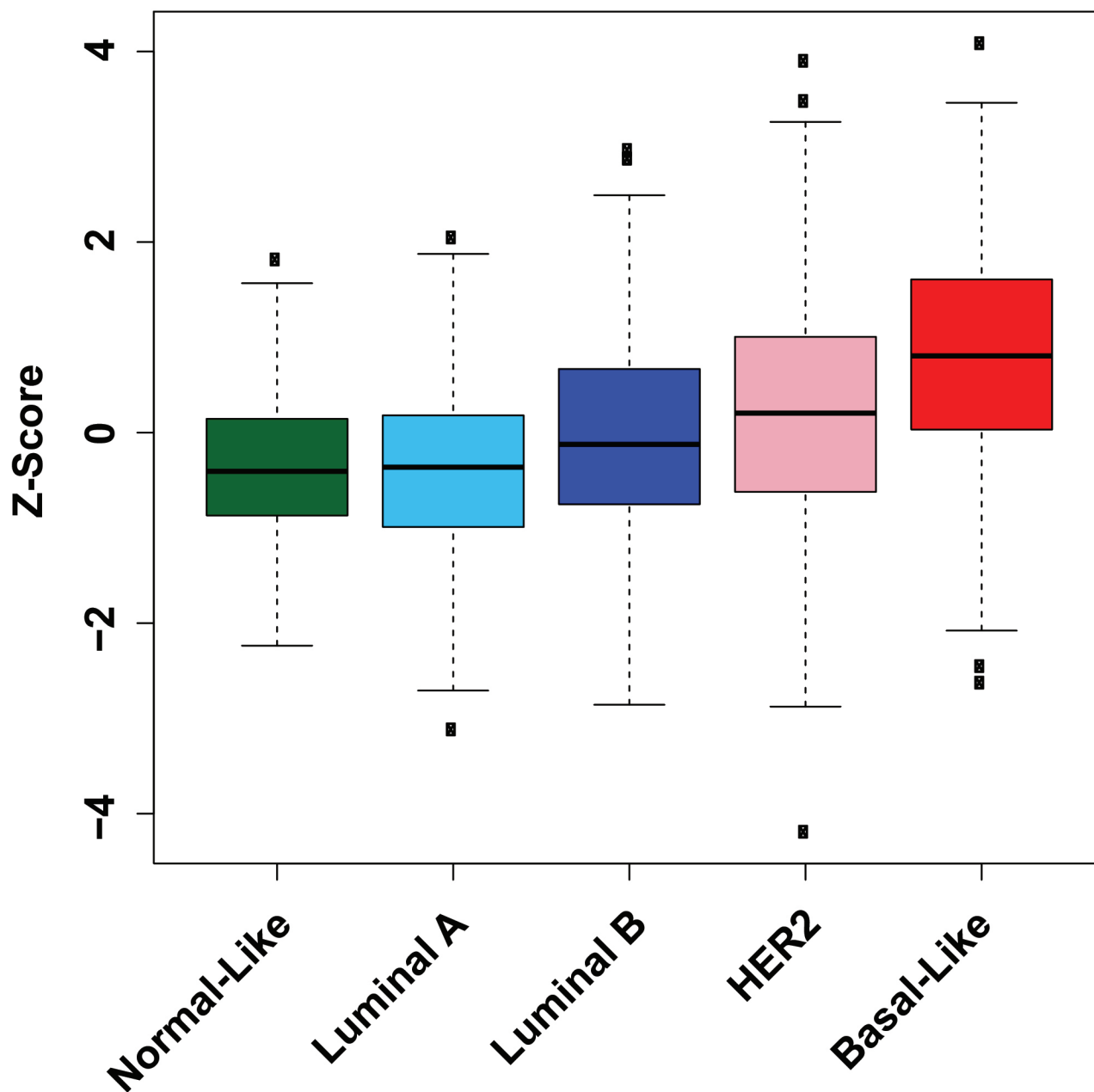






Figure S3

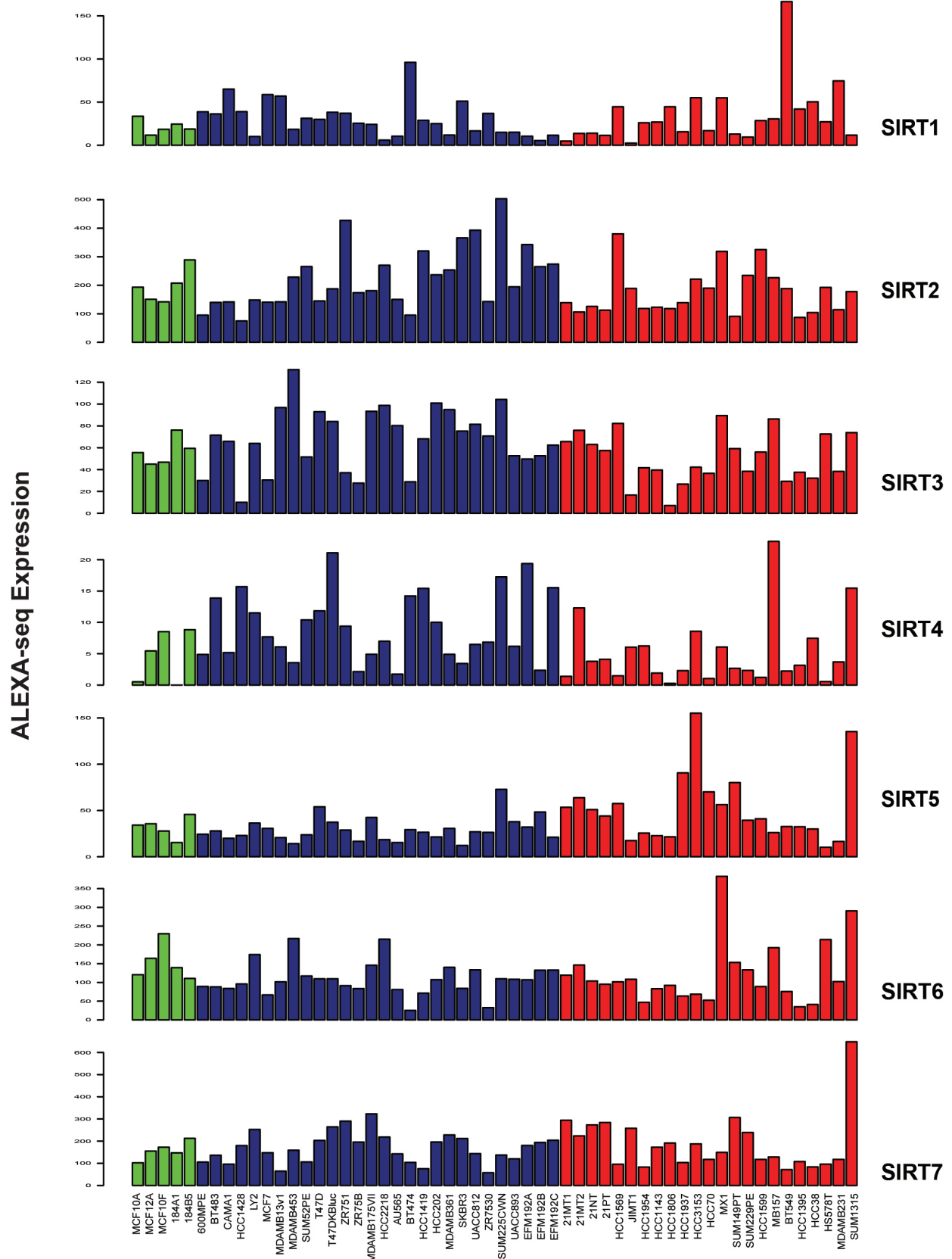


Figure S4

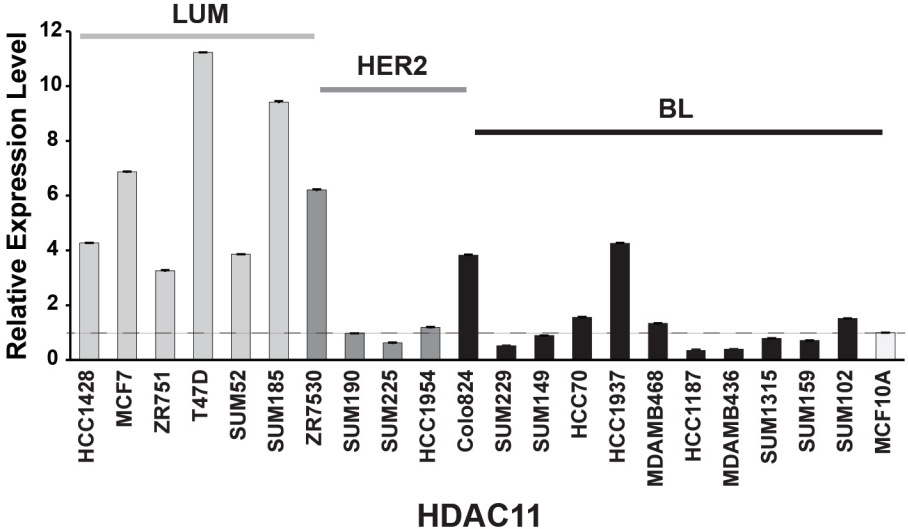


Figure S5

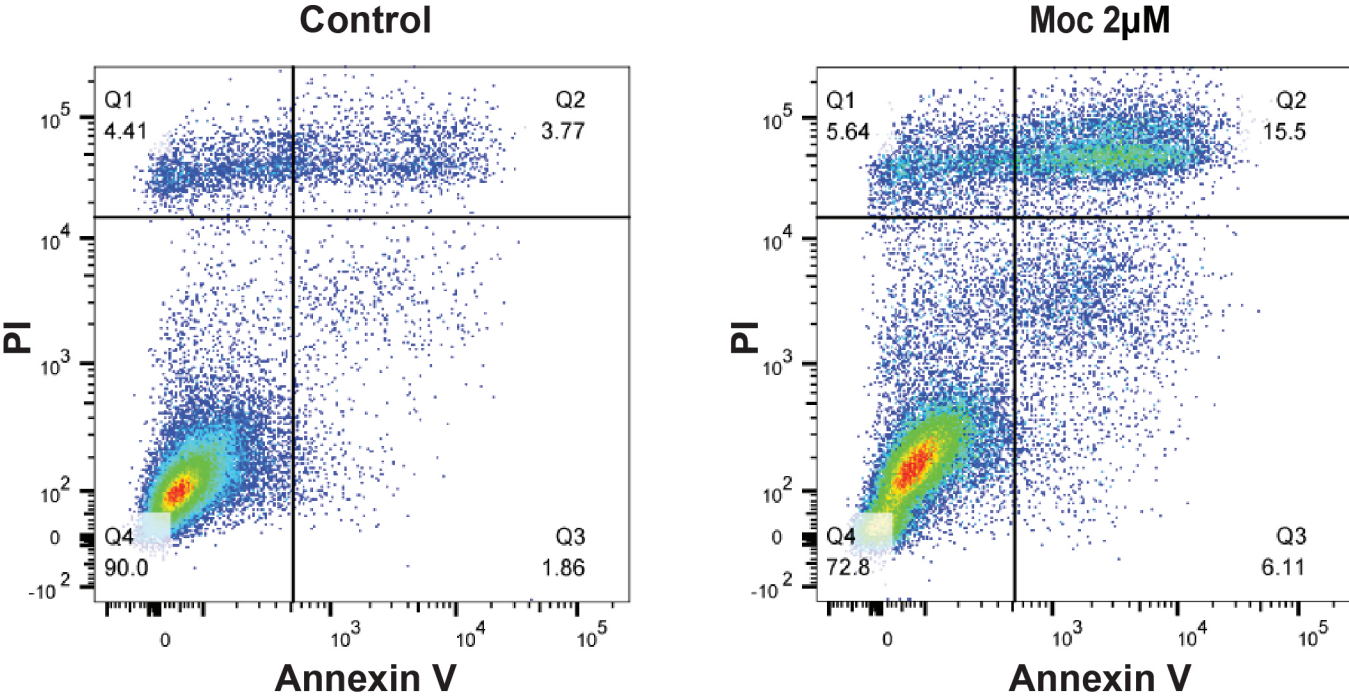


Figure S6

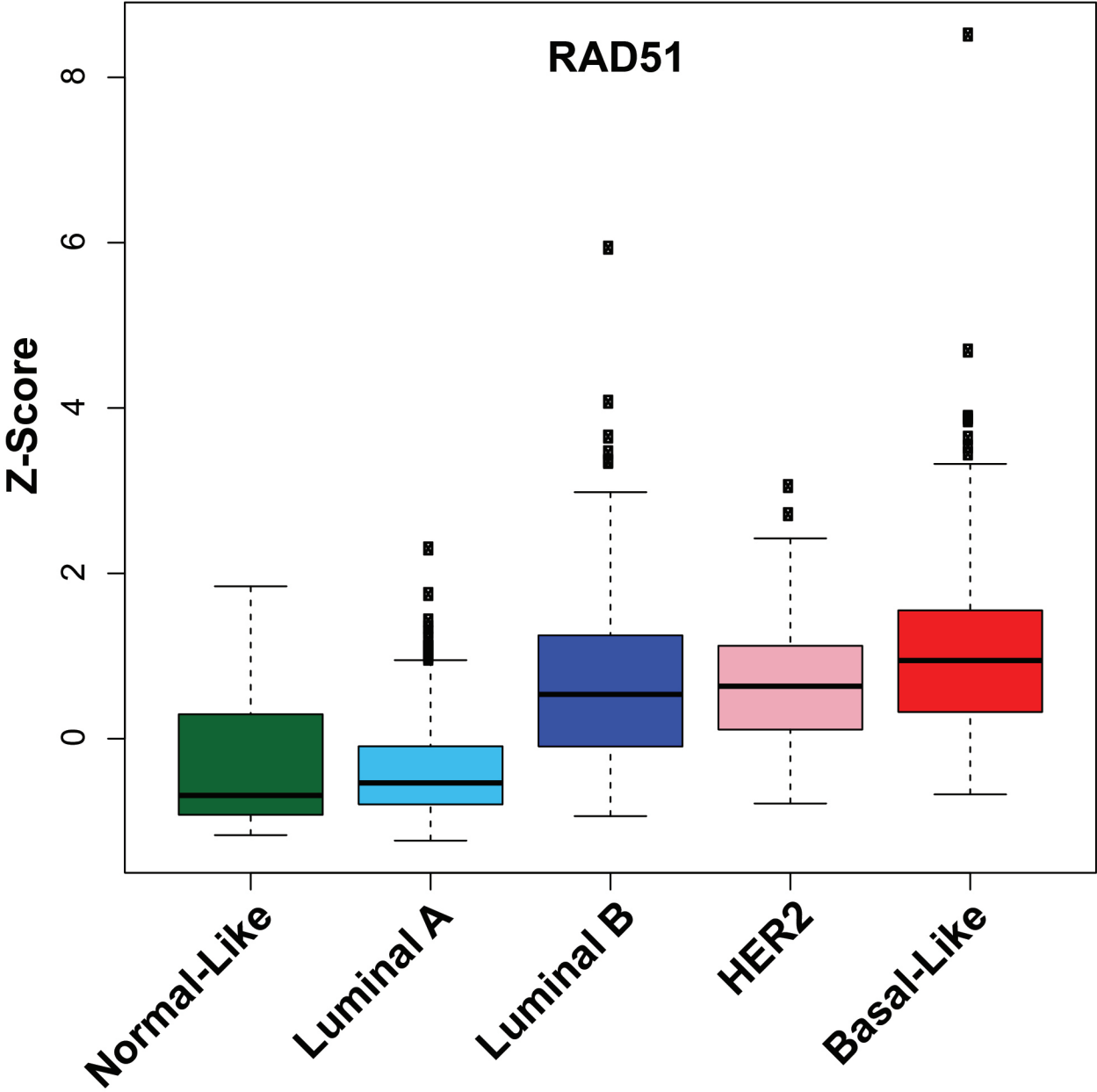


Figure S7

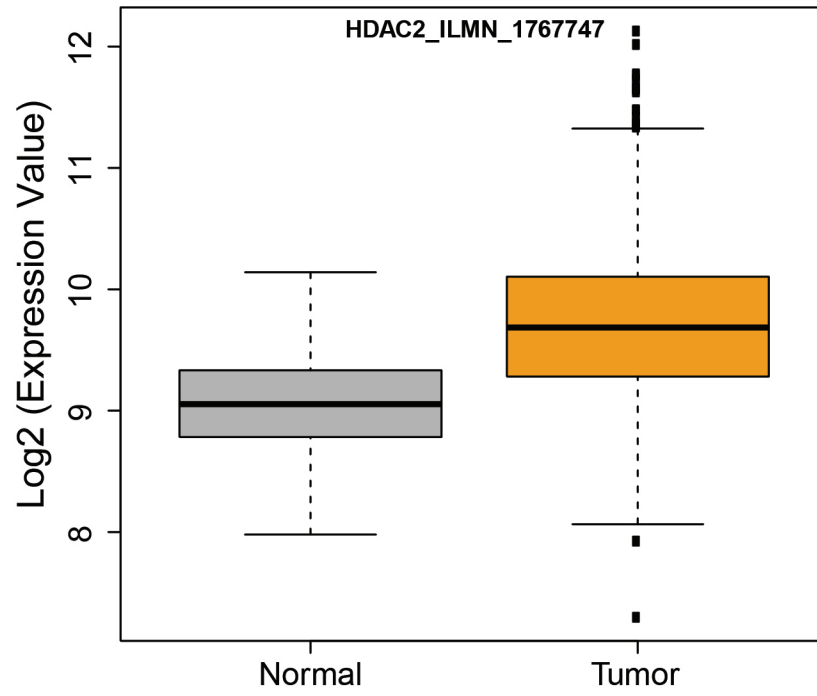
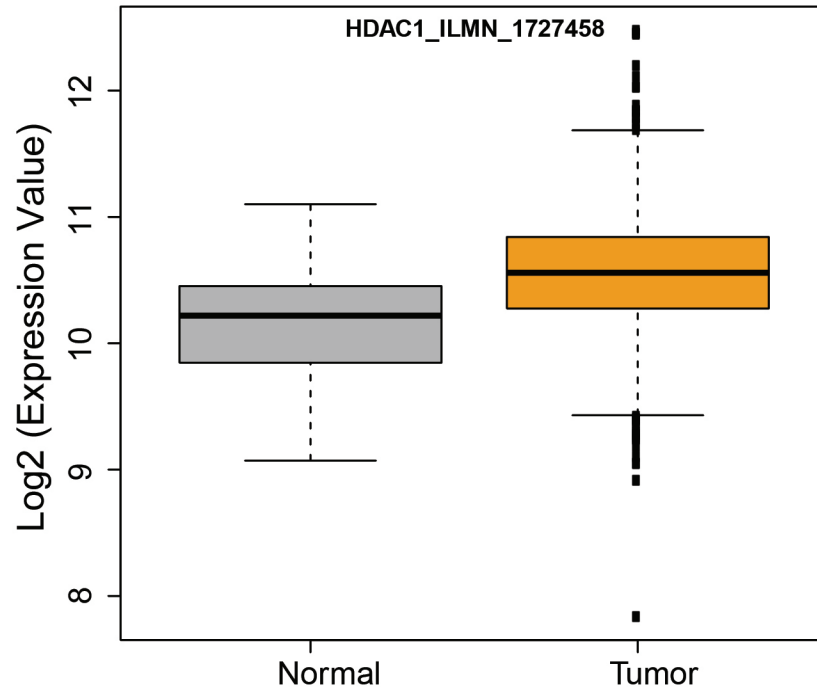


Figure S8

