Supplemental Information

The Impact of lncRNA Dysregulation on

Clinicopathology and Survival of Breast Cancer:

A Systematic Review and Meta-analysis

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Supplementary table 1. Characteristics of single studies included in the systematic review.

Author & Publication year	Country	LncRNAs	Number of patients	Expression in tumor	Method	Sample type	Survival	Follow-up (month)	Quality score
Wang OC 2017	China	SNHG12	102	up-regulated	qRT-PCR	tissue	NR	NR	7
Yang 2017	China	HOTTIP	100	NR	qRT-PCR	tissue	OS, DFS	125	8
Zhang 2015	China	CCAT1	92	up-regulated	qRT-PCR	tissue	OS, PFS	60	8
Xie 2016	China	AFAP1-AS1	76	down-regulated	qRT-PCR	tissue	OS	55	6
Huang QX 2015	China	ACTA2-AS1	47	down-regulated	qRT-PCR	tissue	NR	NR	6
Adriansens 1998	France	H19	102	up-regulated	ISH	tissue	NR	NR	6
Nie 2017	China	Z38	110	up-regulated	qRT-PCR	tissue	OS	51	9
Li 2017	China	TUNAR	63	up-regulated	qRT-PCR	tissue	OS	60	8
Shi 2015	China	SPRY4-IT1	48	up-regulated	qRT-PCR	tissue	NR	NR	6
Yang 2016	China	FGF14-AS2	64	down-regulated	qRT-PCR	tissue	OS	16.7	6
Xu 2016	China	EPB41L4A-AS2	250	down-regulated	qRT-PCR	tissue	OS	60	7
Shi 2016	China	HULC	96	up-regulated	qRT-PCR	tissue	OS	60	8
Liao 2016	China	APOC1P1-3	90	up-regulated	qRT-PCR	tissue	NR	NR	7
Lei 2016	China	MVIH	250	up-regulated	qRT-PCR	tissue	OS, DFS	60	8
Deng 2016	China	LINC00978	195	up-regulated	qRT-PCR	tissue	DFS	47.6	8
Chi 2014	China	BC040587	151	down-regulated	qRT-PCR	tissue	OS	60	8
Xu 2015	China	EGOT	250	down-regulated	qRT-PCR	tissue	OS	60	8
Vennin 2017	France	91H	41	up-regulated	qRT-PCR	tissue	NR	NR	6
Iranpour 2016	Iran	ANRASSF, SOX2OT, PTPRG-AS1, ANRIL	38	up-regulated	qRT-PCR	tissue	NR	NR	6
Liu M 2017	China	HIF1A-AS2, UCA1, ANRIL	60	up-regulated	qRT-PCR	serum	NR	NR	6

Chen 2016	China	Linc-ROR	142	up-regulated	qRT-PCR	tissue	NR	NR	7
Fang 2017	China	HOXA-AS2	38	up-regulated	qRT-PCR	tissue	NR	NR	6
Li X 2016	China	GAS6-AS1	90	down-regulated	qRT-PCR	tissue	OS, DFS	60	8
Liu 2016	China	UCA1	54	up-regulated	qRT-PCR	tissue	OS	60	6
Li WX 2017	China	linc-ITGB1	224	up-regulated	qRT-PCR	tissue	OS, DFS	60	8
Sha 2017	China	DANCR	63	up-regulated	qRT-PCR	tissue	OS	60	7
Wang Y 2017	China	PVT1	110	up-regulated	qRT-PCR	tissue	OS	60	6
Liu GX 2017	China	OR3A4	65	up-regulated	qRT-PCR	tissue	OS	60	6
Li YD 2018	China	CRALA	176	NR	qRT-PCR	tissue	NR	NR	8
Rui 2017	China	HOXB-AS5	66	up-regulated	qRT-PCR	tissue& serum	NR	NR	6
Li Y 2018	China	FENDRR	52	down-regulated	qRT-PCR	tissue	OS, PFS	60	8
Liang 2018	China	LINP1	67	NR	qRT-PCR	tissue	OS, DFS	43	7
Kong 2018	China	SNHG15	58	up-regulated	qRT-PCR	tissue	OS	60	6
Liu J 2017	China	SUMO1P3	74	up-regulated	qRT-PCR	tissue	OS	150	7
Jiang 2017	China	ARA	55	up-regulated	qRT-PCR	tissue	NR	NR	7

OS: overall survival; DFS: disease-free survival; MFS: metastasis-free survival; RFS: relapse- free survival; PFS: progression-free survival; NR: not report;

qRT-PCR: quantitative real-time polymerase chain reaction; ISH: in situ hybridization.

Supplementary Table 2. Meta-analysis results of the associations between the expression of eight lncRNAs and clinicopathological features of BC.

lncRNAs		Age	Tumor size	LN metastasis	Histological grade	TNM stage	ER status	PR status	Her2 status
MALAT1	OR (95%CI)	0.98 (0.75, 1.28)	0.88 (0.67, 1.16)	1.40 (0.64, 3.06)	1.18 (0.63, 2.20)	1.64 (0.63, 4.23)	1.13 (0.66, 1.94)	**1.41 (1.08, 1.84)**	1.01 (0.75, 1.37)
	P	0.86	0.35	0.39	0.61	0.31	0.65	**0.01**	0.92
	I^2 & model	0% (fixed)	0% (fixed)	79% (random)	59% (random)	80% (random)	70% (random)	6% (fixed)	0% (fixed)
MEG3	OR (95%CI)	0.79 (0.56, 1.12)	1.12 (0.78, 1.61)	0.75 (0.22, 2.52)	**0.61 (0.41, 0.91)**	0.77 (0.20, 2.94)	0.97 (0.60, 1.58)	0.99 (0.62, 1.56)	0.83 (0.32, 2.18)
	P	0.19	0.53	0.64	**0.01**	0.70	0.91	0.95	0.71
	I^2 & model	0% (fixed)	0% (fixed)	89% (random)	36% (fixed)	91% (random)	46% (fixed)	0% (fixed)	71% (random)
CCAT2	OR (95%CI)	0.53 (0.27, 1.07)	0.93 (0.44, 1.96)	0.91 (0.05, 17.0)	1.22 (0.60, 2.48)	0.42 (0.01, 27.73)	1.38 (0.72, 2.67)	1.40 (0.72, 2.72)	0.53 (0.28, 1.03)
	P	0.08	0.85	0.95	0.58	0.68	0.33	0.32	0.06
	I^2 & model	0% (fixed)	0% (fixed)	93% (random)	0% (fixed)	93% (random)	0% (fixed)	0% (fixed)	0% (fixed)
BCAR4	OR (95%CI)	0.97 (0.71, 1.32)	1.04 (0.75, 1.44)	1.03 (0.62, 1.70)	1.52 (0.60, 3.86)	/	**0.2 (0.05, 0.82)**	1.08 (0.58, 2.01)	0.44 (0.02, 8.19)
	P	0.83	0.83	0.91	0.38	/	**0.03**	0.81	0.58
	I^2 & model	0% (fixed)	0% (fixed)	0% (fixed)	72% (random)	/	/	0% (fixed)	/
TUSC7	OR (95%CI)	1.61 (0.57, 4.51)	0.34 (0.02, 4.96)	0.97 (0.38, 2.45)	3.80 (0.67, 21.6)	1.00 (0.29, 3.39)	0.72 (0.25, 2.08)	0.64 (0.06, 7.33)	**2.75 (1.06, 7.14)**
	P	0.36	0.43	0.95	0.13	1.00	0.55	0.72	**0.04**
	I^2 & model	0% (fixed)	83% (random)	0% (fixed)	/	/	0% (fixed)	70% (random)	47% (fixed)
TP73-AS1	OR (95%CI)	2.16 (0.85, 5.50)	2.79 (0.68, 11.53)	0.53 (0.03, 10.66)	/	**5.76 (2.64, 12.6)**	0.82 (0.40, 1.67)	0.59 (0.29, 1.21)	1.33 (0.57, 3.13)
	P	0.11	0.16	0.68	/	**<0.01**	0.59	0.15	0.51
	I^2 & model	/	68% (random)	91%(random)	/	0% (fixed)	0% (fixed)	0% (fixed)	/
NEAT1	OR (95%CI)	0.85 (0.47, 1.55)	1.24 (0.67, 2.32)	**3.00 (1.09, 8.24)**	0.95 (0.34, 2.63)	**3.52 (1.84, 6.73)**	0.74 (0.41, 1.35)	1.53 (0.84, 2.79)	4.49 (0.24, 84.81)
	P	0.60	0.49	**0.03**	0.92	**<0.01**	0.32	0.16	0.32

	I² & model	0% (fixed)	0% (fixed)	/	/	0% (fixed)	14% (fixed)	0% (fixed)	85% (random)
TUG1	OR (95%CI)	1.18 (0.60, 2.32)	1.53 (0.20, 11.98)	0.27 (0.02, 3.17)	/	1.82 (0.11, 28.83)	1.03 (0.51, 2.10)	0.77 (0.40, 1.50)	1.44 (0.33, 6.29)
	P	0.63	0.68	0.29	/	0.67	0.93	0.45	0.63
	I² & model	42% (fixed)	82% (random)	91% (random)	/	93% (random)	0% (fixed)	13% (fixed)	76% (random)
HOTAIR	OR (95%CI)	1.28 (0.73, 2.26)	1.22 (0.23, 6.36)	1.07(0.30, 3.88)	1.75 (0.58, 5.26)	/	0.72 (0.39, 1.32)	/	1.46 (0.72, 2.93)
	P	0.39	0.82	0.91	0.32	/	0.28	/	0.29
	I² & model	0% (fixed)	88% (random)	76% (random)	70% (random)	/	0% (fixed)	/	0% (fixed)
CRNDE	OR (95%CI)	0.86 (0.47, 1.58)	**2.71 (1.20, 6.12)**	2.19 (0.86, 5.57)	2.08 (0.79, 5.50)	1.89 (0.74, 4.85)	1.14 (0.62, 2.11)	2.06 (1.12, 3.77)	0.98 (0.52, 1.83)
	P	0.63	**0.02**	0.10	0.14	0.19	0.67	0.02	0.94
	I² & model	0% (fixed)	/	/	/	53% (random)	0% (fixed)	0% (fixed)	0% (fixed)

LN: lymph node; ER: estrogen receptor; PR: progesterone receptor; Her2: human epidermal growth factor receptor 2; OR: odds ratio; CI: confidence interval; /: no pooling result.

Supplementary Table 3. *P* values of the correlations between lncRNAs expression and BC clinicopathological features in single studies.

lncRNAs	Age	Tumor size	LN metastasis	Histological grade	TNM stage	ER status	PR status	Her2 status	Reference
SNHG12	0.692	**0.012**	**0.041**	0.739	0.053	NR	NR	NR	49
HOTTIP	0.161	**0.025**	**0.009**	0.685	**<0.001**	0.161	0.422	0.135	51
CCAT1	0.919	0.510	**0.004**	**0.003**	**<0.001**	0.492	0.537	0.224	52
AFAP1-AS1	0.435	0.694	**0.002**	0.231	**0.013**	NR	NR	NR	56
ACTA2-AS1	0.454	0.665	0.172	0.943	**0.029**	0.543	0.665	0.891	57
H19	0.430	**0.005**	0.231	0.39	NR	**0.005**	**0.016**	NR	50
Z38	0.182	NR	**0.013**	0. 795	**0.002**	0.972	0. 455	0. 807	53
TUNAR	0.732	NR	**0.004**	**0.004**	0.071	0.436	0.785	0.061	54
SPRY4-IT1	0.241	**0.015**	NR	0.272	**0.017**	**0.005**	NR	NR	58
FGF14-AS2	0.071	**0.005**	**0.047**	NR	**0.036**	0.491	0.684	NR	59
APOC1P1-3	NR	**0.014**	0.205	0.592	NR	0.827	0.832	0.516	64
EPB41L4A-AS2	0.357	**0.026**	NR	**0.034**	**0.016**	**0.013**	**0.021**	0.871	60
HULC	0.127	0.059	**<0.001**	**0.020**	**<0.001**	NR	NR	NR	55
MVIH	0.206	0.236	0.054	0.233	NR	0.699	0.612	0.897	47
LINC00978	0.240	1.000	0.623	NR	0.145	**0.033**		0.489	63
BC040587	0.675	0.356	0.489	**0.035**	0.964	0.828	0.900	0.559	61
EGOT	0.368	**0.022**	**0.020**	NR	NR	0.240	0.199	0.625	62
91H	0.174	**<0.001**	**0.038**	0.104	NR	0.983	0.273	**0.027**	65
ANRASSF1	0.346	0.109	0.496	0.517	0.472	0.193	0.635	**0.004**	48
SOX2OT	0.092	0.977	0.437	0.981	0.932	0.437	0.495	0.332	48
PTPRG-AS1	0.631	0.687	0.217	0.603	0.993	0.067	0.403	0.252	48

ANRIL	0.085	0.766	0.381	0.422	0.981	0.619	0.305	0.209	48 67
HIF1A-AS2	0.190	0.304	**0.012**	0.301	NR	NR	NR	NR	67
UCA1	0.331	0.172	**0.037**	0.105	NR	NR	NR	NR	67
Linc-ROR	0.701	0.649	**<0.001**	NR	0.209	NR	NR	NR	68
HOXA-AS2	0.885	**<0.001**	**<0.001**	NR	**<0.001**	NR	NR	NR	70
GAS6-AS1	0.209	0.180	**0.030**	**0.010**	0.109	0.527	0.509	0.576	66
linc-ITGB1	0.375	0.600	**0.002**	NR	**0.013**	0.342	0.301	NR	69
DANCR	0.378	0.433	**0.021**	**0.014**	**0.017**	NR	NR	NR	71
PVT1	0.578	**0.02**	**0.023**	NR	**0.002**	NR	NR	NR	72
OR3A4	0.620	0.801	**0.026**	**0.048**	**0.013**	0.213	0.218	**0.013**	73
CRALA	0.063	**<0.001**	**<0.001**	NR	**0.001**	**0.005**	**<0.001**	0.098	74
HOXB-AS5	0.760	NR	0.730	NR	**0.048**	NR	NR	NR	75
FENDRR	0.794	0.071	**0.006**	0.064	NR	0.179	**0.016**	**0.008**	87
LINP1	0.396	0.494	0.901	NR	**0.035**	0.111	**0.590**	**0.537**	76
SNHG15	0.592	**0.007**	**0.038**	NR	**0.028**	NR	NR	NR	77
SUMO1P3	0.746	**0.014**	**0.032**	NR	**0.037**	0.103	0.242	0.330	78
ARA	0.624	**0.034**	0.180	0.786	0.278	NR	NR	NR	79

LN: lymph node; ER: estrogen receptor; PR: progesterone receptor; Her2: human epidermal growth factor receptor 2; NR: not report.

Figure S1 Begg's funnel plot for publication bias on the associations between the expression of lncRNAs and breast cancer overall survival.

Each point represents a single study for the indicated association.