Supplemental information
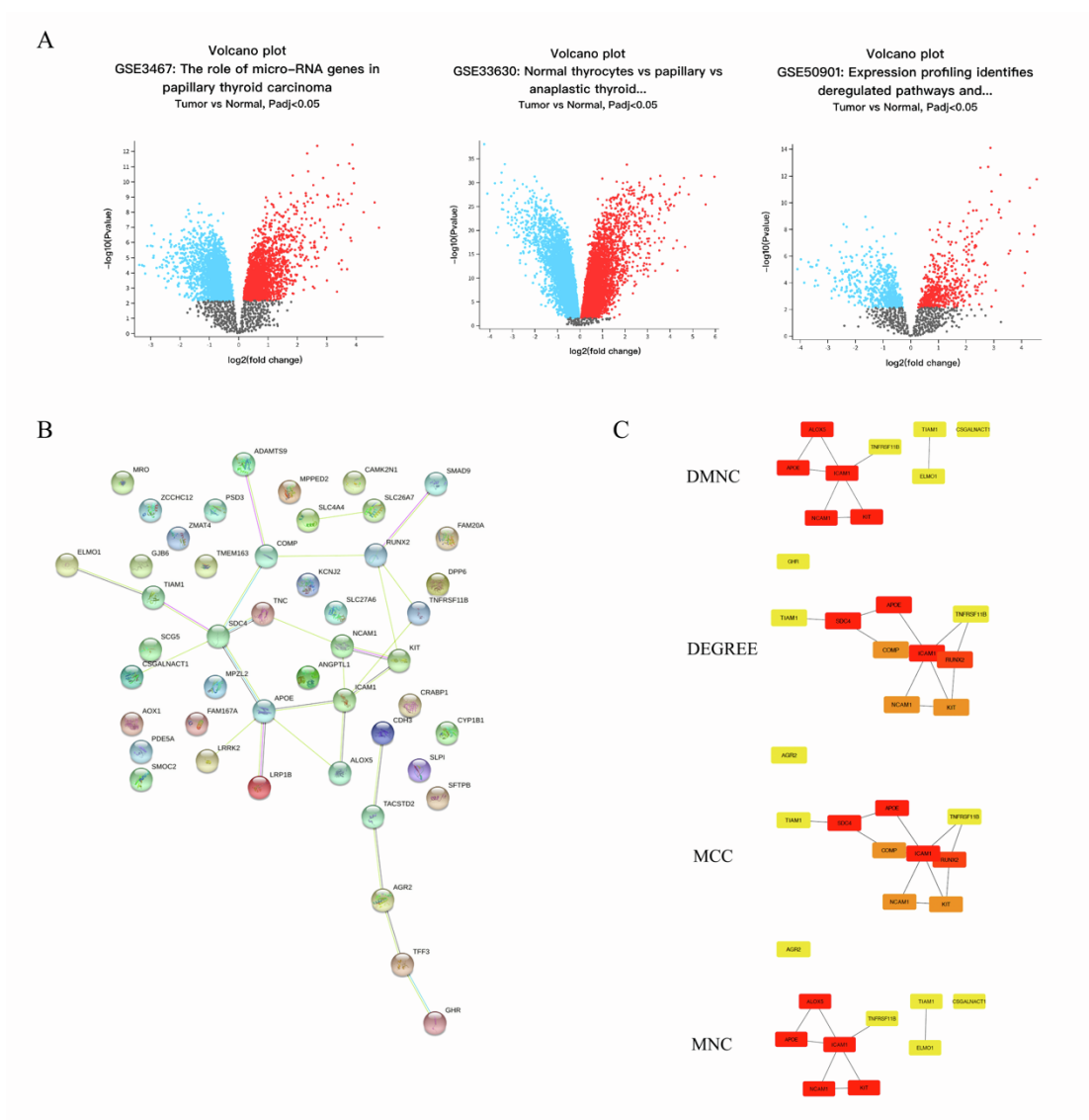
ICAM1 antibody drug conjugates exert potent antitumor
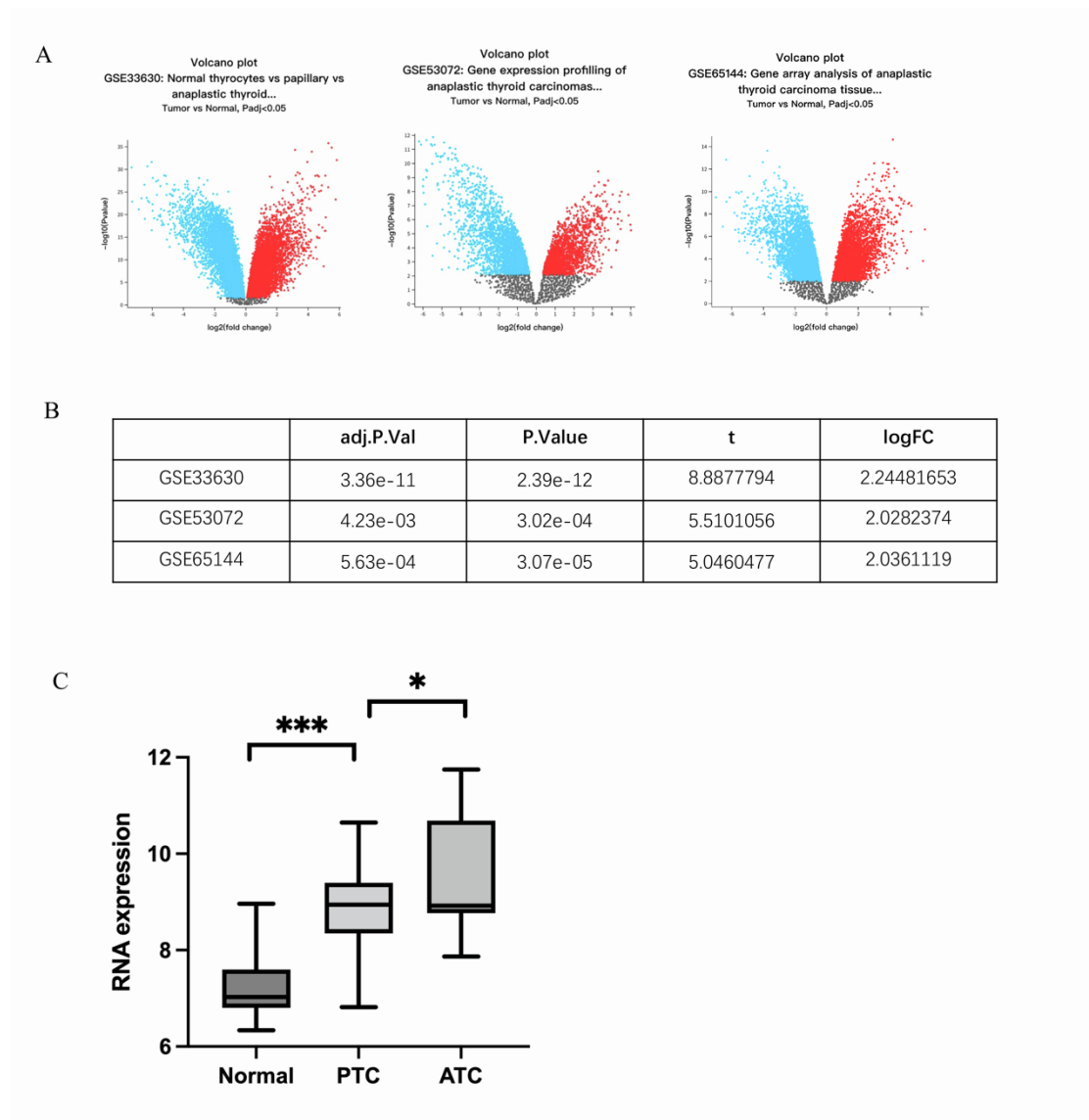
activity in papillary and anaplastic thyroid carcinoma

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Figure S1. Identification of DEGs in 3 PTC datasets according to GEO. Related to Figure 1. (A) Volcano plots of the differential expression analysis for GSE3467, GSE33630 and GSE50901; (B) protein-protein interaction (PPI) analysis of DEGs performed by STRING; (C) identified hub gene by Cytoscape with different methods.
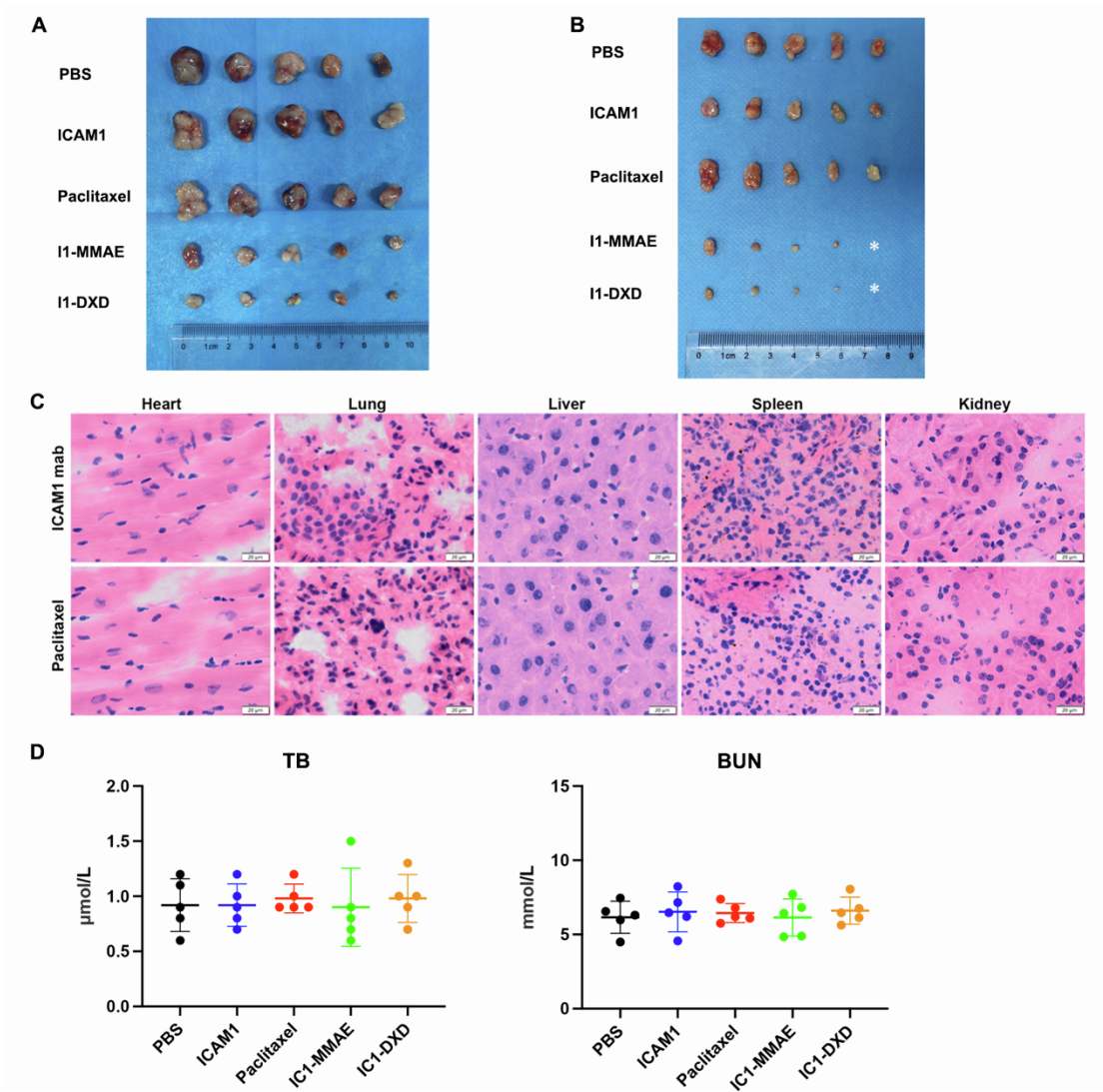
Figure S2. ICAM1 is overexpressed in ATC samples. Related to Figure 1. (A) Volcano plots of the differential expression analysis for GSE33630, GSE53072 and GSE65144; (B) mRNA level of ICAM1 in ATC compared with normal thyroid tissue; (C) ICAM1 mRNA level in ATC samples was significantly high than PTC and normal thyroid in GSE33630. Students' T test was employed in supplement figures 2C; * p <0.05; *** p <0.001.

	adj.P.Val	P.Value	t	logFC
GSE33630	3.36e-11	2.39e-12	8.8877794	2.24481653
GSE53072	4.23e-03	3.02e-04	5.5101056	2.0282374
GSE65144	5.63e-04	3.07e-05	5.0460477	2.0361119

Figure S3. ICAM1-ADCs eradicate PTC and ATC tumors *in vivo*. Related to Figure 6. (A) Image of excised subcutaneous IHH4; (B) Image of excised subcutaneous 8505C; (C) H&E staining of main organs, including heart, lung, liver, spleen and kidney in ICAM1 antibody and paclitaxel group, scale bar equals to 20 μm; (H) blood chemistry parameters (TB and BUN) measured when treated mice were sacrificed in different groups.

Table S1. Top10 hub gene by Cytoscape with different methods. Related to Figure 1.

Genes	MCC Score	Genes	EPC Score	Genes	MNC Score	Genes	DMNC Score	Genes	Degree Score
ICAM1	5	ICAM1	7.313	ICAM1	2	ICAM1	0.31	ICAM1	5
APOE	5	APOE	7.133	NCAM1	2	KIT	0.31	APOE	5
SDC4	5	SDC4	6.941	ALOX5	2	ALOX5	0.31	SDC4	5
RUNX2	4	KIT	6.558	APOE	2	APOE	0.31	RUNX2	4
COMP	3	RUNX2	6.536	KIT	2	NCAM1	0.31	COMP	3
KIT	3	NCAM1	6.342	CSGALNACT1	1	CSGALNACT1	0	KIT	3
NCAM1	3	COMP	6.167	ELMO1	1	ELMO1	0	NCAM1	3
TIAM1	2	ALOX5	6.002	TIAM1	1	TIAM1	0	TIAM1	2
TNFRSF11B	2	TNFRSF11B	5.824	GHR	1	GHR	0	TNFRSF11B	2
AGR2	2	TNC	5.746	TNFRSF11B	1	TNFRSF11B	0	AGR2	2

Genes	EcCentricity Score	Genes	Closeness Score	Genes	Radiality Score	Genes	Stress Score	Genes	Betweenness Score
COMP	0.24	SDC4	10	SDC4	3.18	SDC4	152	SDC4	118.33
SDC4	0.24	APOE	9.75	APOE	3.098	APOE	116	APOE	87
CSGALNACT1	0.18	ICAM1	9.33	COMP	2.96	RUNX2	86	COMP	58.66
TIAM1	0.18	COMP	8.5	ICAM1	2.96	COMP	84	RUNX2	50.33
ADAMTS9	0.18	RUNX2	8.41	NCAM1	2.78	ICAM1	80	ICAM1	48.66
NCAM1	0.18	KIT	8.03	TNC	2.789	TIAM1	36	TIAM1	30
TNC	0.18	NCAM1	8	RUNX2	2.78	KIT	36	KIT	17.33
ALOX5	0.18	TNC	7.58	KIT	2.74	TNFRSF11B	24	TNC	12.66
APOE	0.18	ALOX5	7.41	ALOX5	2.70	NCAM1	20	NCAM1	11.66
ICAM1	0.18	TNFRSF11B	7.36	TNFRSF11B	2.65	TNC	20	TNFRSF11B	9.33

Table S2. Gene list of thyroid differentiation score and MAPK pathway activity score. Related to Figure 1.

Thyroid differentiation score		MAPK pathway activity score	
Gene symbol	**Gene full name**	**Gene symbol**	**Gene full name**
DIO1	iodothyronine deiodinase 1	SPRY2	sprouty RTK signaling antagonist 2
DIO2	iodothyronine deiodinase 2	SPRY4	sprouty RTK signaling antagonist 4
DUOX1	dual oxidase 1	ETV4	ETS variant transcription factor 4
DUOX2	dual oxidase 2	ETV5	ETS variant transcription factor 5
FOXE1	forkhead box E1	DUSP4	dual specificity phosphatase 4
GLIS3	GLIS family zinc finger 3	DUSP6	dual specificity phosphatase 6
NKX2-1	NK2 homeobox 1	CCND1	cyclin D1
PAX8	paired box 8	EPHA2	EPH receptor A2
SLC26A4	solute carrier family 26 member 4	EPHA4	EPH receptor A4
SLC5A5	solute carrier family 5 member 5		
SLC5A8	solute carrier family 5 member 8		
TG	thyroglobulin		
THRA	thyroid hormone receptor alpha		
THRB	thyroid hormone receptor beta		
TPO	thyroid peroxidase		
TSHR	thyroid stimulating hormone receptor		

Table S3. Top 5 most overexpressed antigens in unbiased screening of thyroid cancer-related antigens on PTC and ATC cells. Related to Figure 2.

PTC cell line		ATC cell line	
BCPAP	**IHH4**	**8505C**	**TCO1**
ICAM1	ICAM1	ICAM1	PD-L1
PD-L1	PD-L1	PD-L1	ICAM1
ROR1	MUC-1	CXCR4	TROP2
MUC-1	VEGFR2	ROR1	MUC-1
VEGFR2	TROP2	TROP2	CD66a