

Supplementary Tables

Supplementary Table 1. List of transcription factors obtained from top 25 genes associated with differentially expressed modules in Class1 and Class2

Class 1		Class 2		
Module 1a	Module 11	Module 1b	Module 3	Module 9
ZNF219	FOXL2	AIF1	SNAI2	ETV7
SALL2	GATA4			
KCNIP3	PEG3			
TCF7L1	TCF21			
SOX12	GLI1			

Supplementary Table S2. Biomarker and Class Indices of normal and HGSC cases in TMA leads to Class identification

TMA cores	Biomarker Index				Class Index	
	BI _{TCF21}	BI _{CDH1}	BI _{Slug}	BI _{HA}	CI _E	CI _M
A1, B1	0.61	0.56	0.61	0.78	0.58	0.69
A2, B2	0.83	0.19	0.56	0.78	0.51	0.67
A6, B6	0.72	0.89	0.00	0.78	0.81	0.39
C1, D1	0.72	0.89	0.72	0.78	0.81	0.75
C2, D2	0.72	0.61	0.61	0.78	0.67	0.69
C5, D5	0.72	0.78	0.00	1.00	0.75	0.5
C7, D7	0.72	0.56	0.61	0.72	0.64	0.67
C8, D8	0.72	0.61	0.31	0.78	0.67	0.54
G6, H6	0.72	0.72	0.72	0.83	0.72	0.78
G13, H13	0.72	0.89	0.61	0.78	0.81	0.69
I3, J3	0.61	0.72	0.67	0.83	0.67	0.75
I4, J4	0.67	0.67	0.67	0.89	0.67	0.78
I9, J9	0.67	0.61	0.00	0.78	0.64	0.39
I11, J11	0.72	0.44	0.61	0.78	0.58	0.69
I13, J13	0.72	0.67	0.61	0.78	0.69	0.69

Normal ovary case core pairs – A1, B1 and A2, B2

HGSC case core pairs – A6, B6; C1, D1; C2, D2; C5, D5; C7, D7; C8, D8; G6, H6; G13, H13; I3, J3; I4, J4; I9, J9; I11, J11 and I13, J13

Supplementary Table S3. Tumor tissues*obtained from different sites in 96 clinical HGSC cases

	T (1)	O (1)	A# (2)	T - O (2)	T - O - FT (3)	T - FT (2)	A # (1)	FT- A # (2)
Chemo-naïve	22	2	1	17	6	1	0	0
Chemo-treated	18	1	2	16	0	1	2	1
Pre- & post-therapy pairs	3	0	3 [§]	0	0	0	0	0

* Ovarian (T), fallopian tube (FT), omental(O) tumors or ascites (A) were represented by at least one sample from the respective site; [§] Tumor tissues were available for ovarian tumors and/or ascites cell block as chemo-naïve and chemo-treated pairs; # ascites cell blocks; numbers in brackets indicate tissues from the same patient

Supplementary Table S4. CI scores for chemo-naïve cases in ovarian tumors paired with omental tumor and fallopian tumor (n=6); chemo-naïve cases in unpaired ovarian tumors (n=22) and omental tumors (n=2); chemo-naïve cases in ovarian tumors paired with omental tumor and fallopian tumor, and ovarian tumor collected with ascites, chemo-treated cases in unpaired ovarian tumors (n=18) or omental tumor (n=1) or ascites cell block (n=2); chemo-

treated cases in ovarian tumors paired with omental tumor (n=16) or ascites (n=2), fallopian tumor (n=1) and FT with ascites leading to class assignment

Ovarian-Omentum-Fallopian Tube tumors											
Case	Tissue ID	Pair	Cl _E	Cl _M	Class	Case	Tissue ID	Pair	Cl _E	Cl _M	Class
1	B/1716/09	T	0.17	0.3	DP	4	B/2774/12	T	0.33	0.3	DP
		O	0.24	0.3	DP			O	0.48	0.3	DP
		F	0	0.3	EMT			F	0.19	0.3	DP
2	B/3136/09	T	0.48	0.3	CCM	5	B/749/13	T	0.52	0.5	DP
		O	0.22	0	CCM			O	0.57	0.63	DP
		F	0.65	0.26	CCM			F	0.57	0.3	CCM
3	B/825/10	T	0.26	0.59	EMT	6	B/1627/13	T	0.46	0.26	CCM
		O	0.59	0.74	DP			O	0.19	0.26	DP
		F	0.22	0.26	DP			F	0.19	0	DP
Unpaired Ovarian tumor											
Case	Tissue ID		Cl _E	Cl _M	Class	Case	Tissue ID		Cl _E	Cl _M	Class
1	B/1102/08		0	0.22	EMT	12	B/1294/11		0.2	0.26	DP
2	B/2217/08		0.26	0	CCM	13	B/1920/11		0	0	DP
3	B/2263/08		0.22	0.26	DP	14	B/1338/13		0.26	0.7	EMT
4	B/2293/08		0	0	DP	15	B/3091/13		0.26	0	CCM
5	B/2281/09		0.69	0.64	DP	16	B/1781/14		0	0.52	EMT
6	B/3522/09		0	0.44	EMT	17	B/1519/15		0.89	0.26	CCM
7	B/22/10		0.2	0.48	EMT	18	B/2381/15		0.48	0.26	CCM
8	B/211/10		0.26	0.44	DP	19	B/2283/08		0	0	DP
9	B/799/10		0	0.3	EMT	20	HT/11/143		0	0	DP
10	B/804/10		0.48	0.3	CCM	21	HT/12/1743		0.46	0.52	DP
11	B/906/10		0	0.26	EMT	22	HT/361/13		0	0.22	EMT
Tumor in Omentum											
	Tissue ID		Cl _E	Cl _M	Class	Case	Tissue ID		Cl _E	Cl _M	Class
	HT/13/1471		0.2	0.33	DP	2	HT/13/4397		0.81	0.26	CCM
Ovarian-Omentum tumor pairs											
Case	Tissue ID	Pair	Cl _E	Cl _M	Class	Case	Tissue ID	Pair	Cl _E	Cl _M	Class
1	B/2981/09	T	0	0.26	EMT	11	B/474/15	T	0.3	0.3	DP
		O	0.3	0.3	DP			O	0.33	0.26	DP
2	B/548/10	T	0	0.8	EMT	12	B/1937/15	T	0.74	0.59	DP
		O	0.2	0.83	EMT			O	0.63	0.46	DP
3	B/580/10	T	0.22	0	CCM	13	B/2972/15	T	0.17	0.3	DP
		O	0	0.52	EMT			O	0	0	DP
4	B/320/12	T	0.65	0.19	CCM	14	B/2987/15	T	0	0.26	EMT
		O	0.22	0.26	DP			O	0	0.26	EMT
5	B/1029/12	T	0.46	0.26	CCM	15	MB/195/12	T	0	0.26	EMT
		O	0.72	0.52	CCM			O	0	0.26	EMT
6	B/3392/12	T	0.39	0.26	DP	16	1511/14	T	0.52	0.22	CCM
		O	0.44	0.44	DP			O	0	0.26	EMT

7	B/8/13	T	0.26	0.3	DP	17	1866/13	T	0	0.26	CCM
		O	0.3	0.3	DP			O	0.2	0.26	DP
8	B/343/13	T	0.35	0.39	DP	Ovary-Fallopian Tube tumor pair					
		O	0.3	0.19	DP	1	B/1232/13	T	0.19	0.26	DP
9	B/4/14	T	0	0.3	EMT			F	0.26	0.26	DP
		O	0	0.19	DP	Ovary tumor with Ascites					
10	B/991/14	T	0	0.26	EMT	1	HT/14/453	T	0.56	0.3	CCM
		O	0.46	0.26	DP		HT/14/153	C	0.76	0.26	CCM
Unpaired Ovarian tumors											
Case	Tissue ID		CI _E	CI _M	Class	Case	Tissue ID		CI _E	CI _M	Class
1	B/1561/12		0.22	0.22	DP	13	HT/12/34-A7		0.46	0.13	CCM
2	B/914/14		0	0	DN		HT/12/34-A8		0.35	0.26	DP
3	B/1278/14		0.85	0.2	CCM	14	HT/13/2445		0	0.3	EMT
4	B/1582/15		0.78	0.46	CCM	15	HT/12/3871		0.57	0.46	DP
5	B/1481/12		0.54	0.26	CCM	16	1205/14		0	0.2	DN
6	OT-20		0	0	DN	17	1551/14		0.63	0.2	CCM
7	OT-25		0	0.3	EMT	18	1268/15		0.46	0.3	DP
8	OT-28		0	0.22	EMT	CT omental tumor					
9	OT-31		0	0.3	EMT	1	1217/14		0.26	0.46	EMT
10	HT/13/5184-B7		0.81	0.3	CCM	CT ascites cell block					
	HT/13/5184-A31		0.19	0.44	EMT	1	CT/11/8		0.5	0.26	CCM
11	HT/12/1694-A16		0.5	0	CCM	2	CT/12/1510		0.76	0.26	CCM
	HT/12/1694-A11		0.83	0.3	CCM	3	CT/12/1004		0.43	0	CCM
12	HT/12/1491		0.22	0	CCM						
Ovarian-Omentum tumor pairs											
Case	Tissue ID	Site	CI _E	CI _M	Class	Case	Tissue ID	Site	CI _E	CI _M	Class
1	B/826/09	T	0.56	0	CCM	12	1968/14	T	0.72	0.19	CCM
	B/827/09	O	0.56	0	CCM			O	0.65	0.3	CCM
2	B/272/11	T	0	0.26	DN	13	1715/14	T	0.63	0.26	CCM
		O	0.3	0.3	DP			O	0.59	0.26	CCM
3	B/2653/12	T	0.72	0.72	DP	14	417/13	T	0.17	0.3	DP
		O	0.48	0.3	DP			O	0	0.26	EMT
4	B/2716/13	T	0.48	0.26	CCM	15	HT/13/4439	T	0.43	0.22	CCM
		O	0.37	0.26	DP		HT/13/4488	O	0.8	0.43	EMT
5	B/1076/14	T	0.69	0.65	DP	16	HT/14/0914-O3	T	0.61	0.26	CCM
		O	0.22	0.72	EMT		HT/14/914-K	O	0.72	0.56	DP
6	B/550/15	T	0.52	0.3	CCM	Ovarian tumor with ascites					
		O	0.52	0.3	CCM	1	HT/13/5065	T	0	0.46	EMT
7	MB/952/10	T	0.5	0.26	DP		HT/13/3832	T	0.5	0.3	CCM
		O	0.19	0.3	DP		CT/13/1614	C	0	0	DN
8	MB/443/11	T	0	0.26	EMT	2	HT/12/223-A23	C	0.19	0.43	EMT
		O	0.39	0.46	DP		CT/12/78	T	0.19	0.43	EMT
9	MB/591/11	T	0	0.3	EMT	Ovarian-Fallopian tube tumors					

		O	0.17	0.3	DP	1	B/3248/13	T	0	0.26	EMT
10	MB/823/11	T	0.26	0.3	DP			F	0.74	0.31	DN
		O	0.26	0.26	DP	Fallopian Tube tumors with ascites					
11	1444/14	T	0.69	0.46	CCM	1	HT/13/3418-A5	F	0.22	0	DN
		O	0	0.3	EMT		CT/13/1087	C	0	0	DN

Ovarian Tumor (T); Omental Tumor (O)
Cell block (C); Fallopian tube tumor (F)

Supplementary Table S5. CI scores for chemo-naïve and chemo-treated pair cases (n = 6)

Case	Tissue ID	Treatment	CI _E	CI _M	Class
1	HT/13/1273	Pre -	0.5	0	CCM
	HT/13/2561-A10	Post -	0.46	0	CCM
2	HT/14/2	Pre -	0.93	0.28	CCM
	HT/14/001890-B9	Post -	0.59	0.3	CCM
	CT/14/591	Post -	0.8	0	CCM
	HT/14/1890-B12	Post -	0.59	0.22	CCM
3	HT/13/2610	Pre -	0.17	0.22	DP
	HT/13/004447-A1	Post -	0.52	0.3	CCM
4	CT/12/1099	Pre -	0.39	0.2	CCM
	HT/12/2879-B2	Post -	0.48	0.2	CCM
	HT/12/2879-A10	Post	0.17	0.17	DN
5	CT/13/1081	Pre -	0.72	0.3	CCM
	HT/12/3173-A4	Post -	0.17	0	DN
	HT/12/3173-B2	Post	0.43	0.3	DP
	CT/12/1236	Post	0	0.22	EMT
6	HT/13/1296	Pre -	0.17	0.26	DP
	CT/12/401	Pre -	0.35	0	CCM
	HT/13/2513-A16	Post	0.39	0	CCM
	HT/13/2513-A20	Post -	0.22	0	CCM
	CT/13/763	Post -	0.48	0	CCM

Supplementary Table S6. Class comparison of tumors of ovary, fallopian tube, omentum and ascites cell block

	Ovarian tumors		Fallopian tube tumors*		Omental tumors*		Ascites cell block*	
	Naïve	Treated	Naïve	Treated	Naïve	Treated	Naïve	Treated
Class	n=50	n=52	n=7	n=2	n=26	n=17	n=4	n=9
CCM	15	25	2	1	5	4	3	5
EMT	15	12	1	0	5	5	0	2
DN	4	5	0	0	2	0	0	2
DP	17	10	5	1	15	8	1	0
Class Comparison CCM vs. EMT+DN+DP in ovarian tumors upon chemo-treatment								
Chi square =	3.58							
p value =	0.05							
Class Comparison CCM vs. EMT+DN+DP in combined tumor sites upon chemo-treatment								
Chi square =	22.88							
p value =	1.72E-06							

* Class comparison is not applicable as sample size is less than 50

Supplementary Figs

Fig. S1

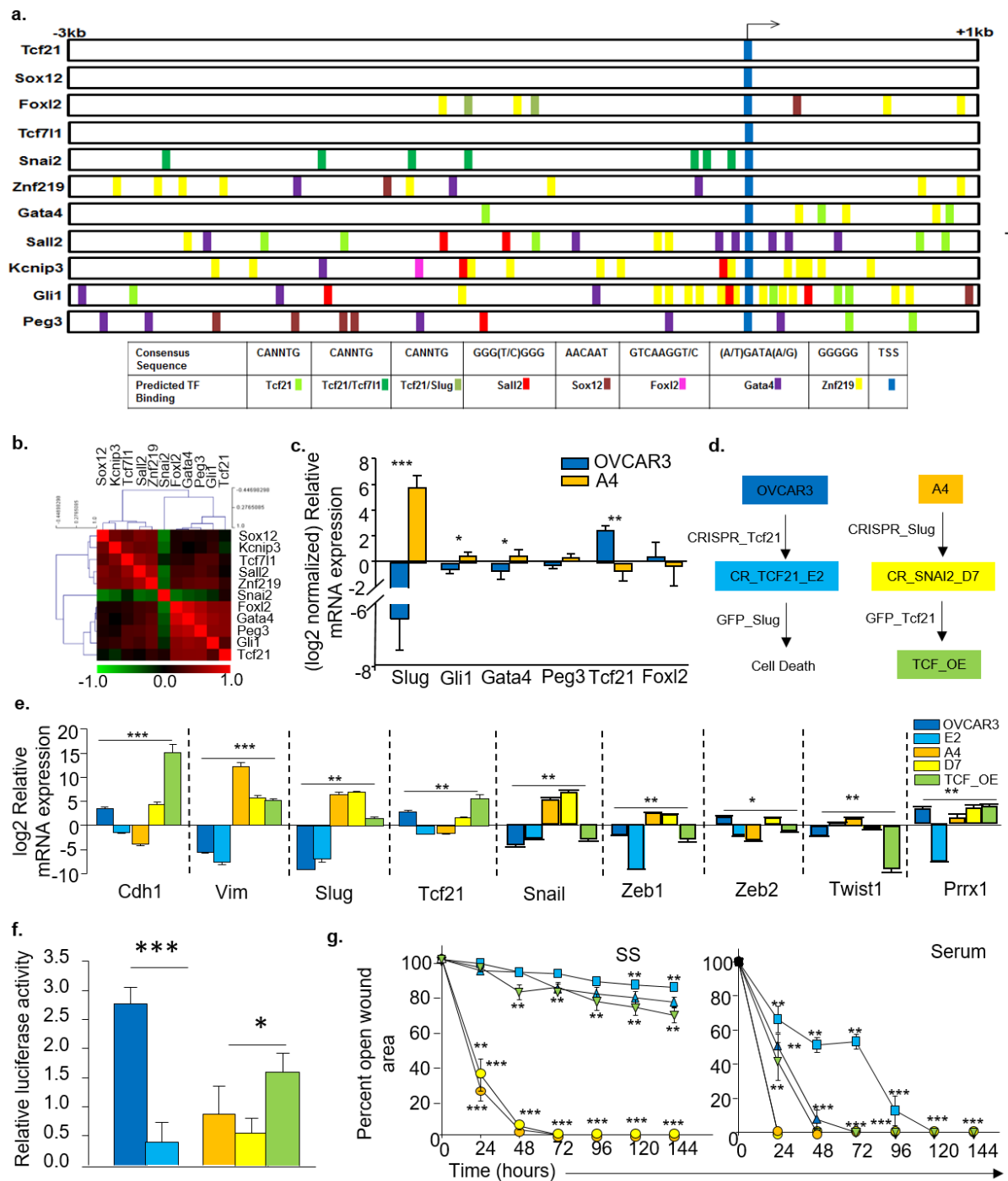


Fig.S1. Tcf21 and Slug expression govern cellular phenotypes in HGSC. a. Schematic promoter maps of TFs identified from differentially expressed modules in Class 1 and Class 2. Positions of Transcription Factor Binding Sites depicted based on consensus sequences for each TF; **b.** TF Correlation plot based on expression of *Sox12*, *Kcnip3*, *Tcf711*, *Sall2*, *Znf219*, *Snai2* (Slug), *Foxl2*, *Gata4*, *Peg3*, *Gli1*, *Tcf21* in the TCGA-HGSC data; **c.** Expression profiles of *Tcf21*, *Snai2*, *Gli1*, *Foxl2*, *Gata4* and *Peg3* in OVCAR3 and A4 cells (Class 1 and Class 2 respectively) as determined by qPCR, data normalized with Gapdh expression; **d.** Flowchart depicting stepwise generation of knockout and over-expression clones of Tcf21 and Slug in OVCAR3 and A4 cells respectively. Color scheme depicts each of the cell lines in following

Figs; e. Expression profiles of phenotypic markers (*Cdh1*, *Vim*) and TFs (*Snai2*-Slug, *Tcf21*, *Snail*, *Zeb1*, *Zeb2*, *Twist1*, *Prrx1*) in *Tcf21* (E2, TCF_OE) and *Slug* (D7) clones derived from OVCAR3 and A4 cells respectively, normalization with GAPDH; f. Reporter assays to determine the E-cadherin promoter activity in derivative clones and parental cells, luciferase activity normalized to native luciferase vector: pGL3; g. Graphical representation of wound healing efficiency of parental and derivative cells, in the absence and presence of serum (upper and lower panels respectively); All data are representative of experiments performed in triplicate and are depicted as mean \pm SEM. * $p < 0.05$, ** $p < 0.01$, * $p < 0.001$.**

Fig. S2

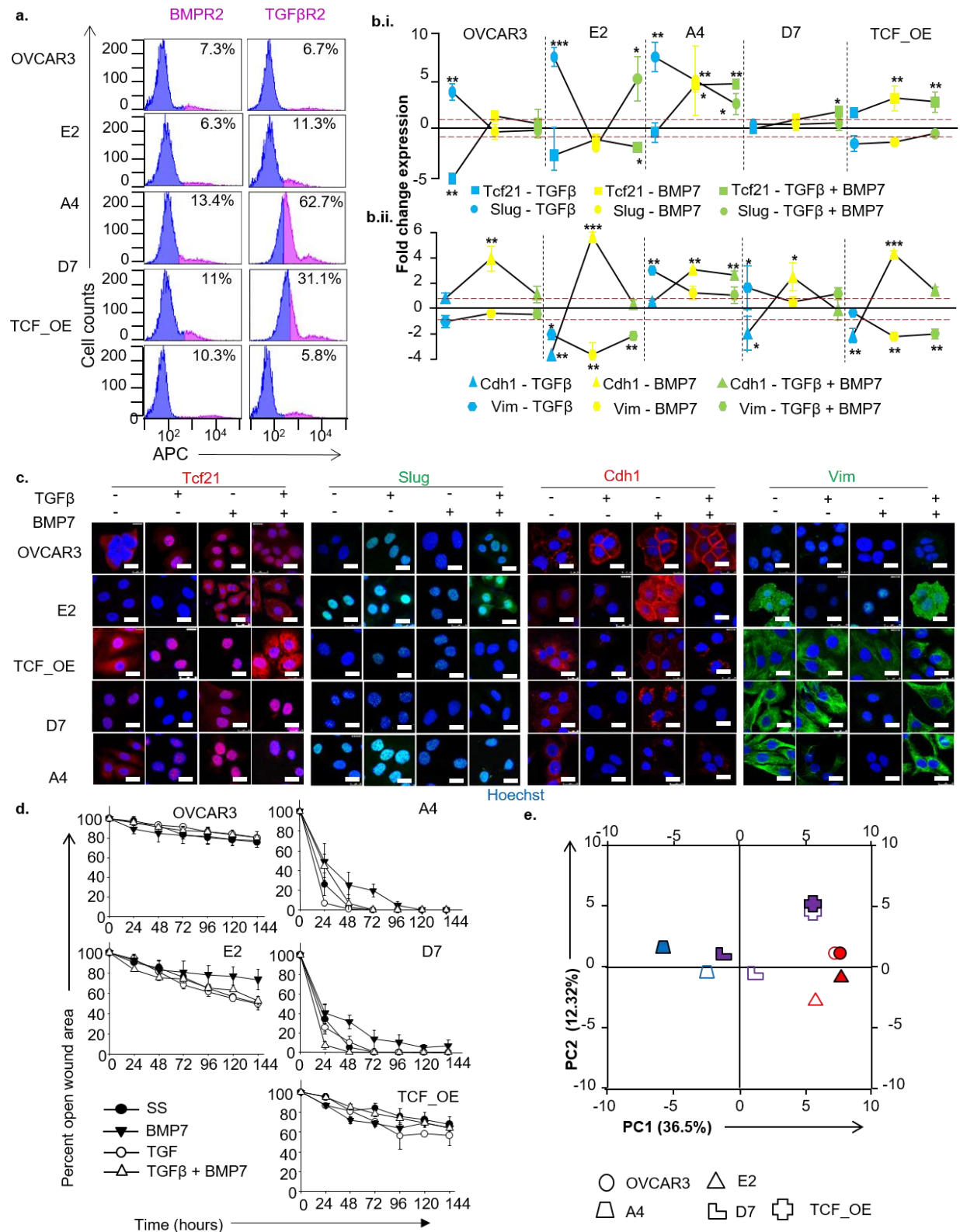


Fig.S2. Responses of parental and derivative cells following treatment with TGFβ and/or BMP7. a. Representative histograms of frequencies of TGFβR2 and BMPR2 expression as determined by flow cytometry; b. Fold change in mRNA expression profiles for (i) TFs (upper panel) and (ii) phenotypic markers (lower panel), normalization with GAPDH, serum starved cells considered as controls; c. Representative immunostaining for Tcf21, Slug, Cdh1 and Vim; d.

Graphical representation of wound healing efficiency; e. PC analysis of time-lapse imaging based migration data in cell lines and derivatives following TGF β treatment. PC1, PC2 and color gradient denoted as per Fig.1e. Filled shapes indicate wound healing response to TGF β ; empty shapes indicate serum starved cells. All data are representative of experiments performed in triplicate and are depicted as mean \pm SEM. *p<0.05, **p<0.01, ***p<0.001.

Fig. S3

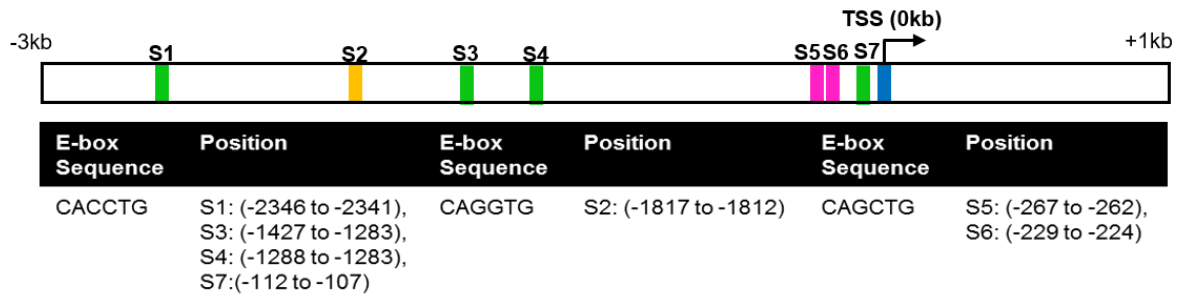


Fig.S3. Schematic representation of Slug promoter region depicting the location and sequences of E-boxes. Promoter region: -3kb to +1kb from transcription start site (TSS).

Fig.S4

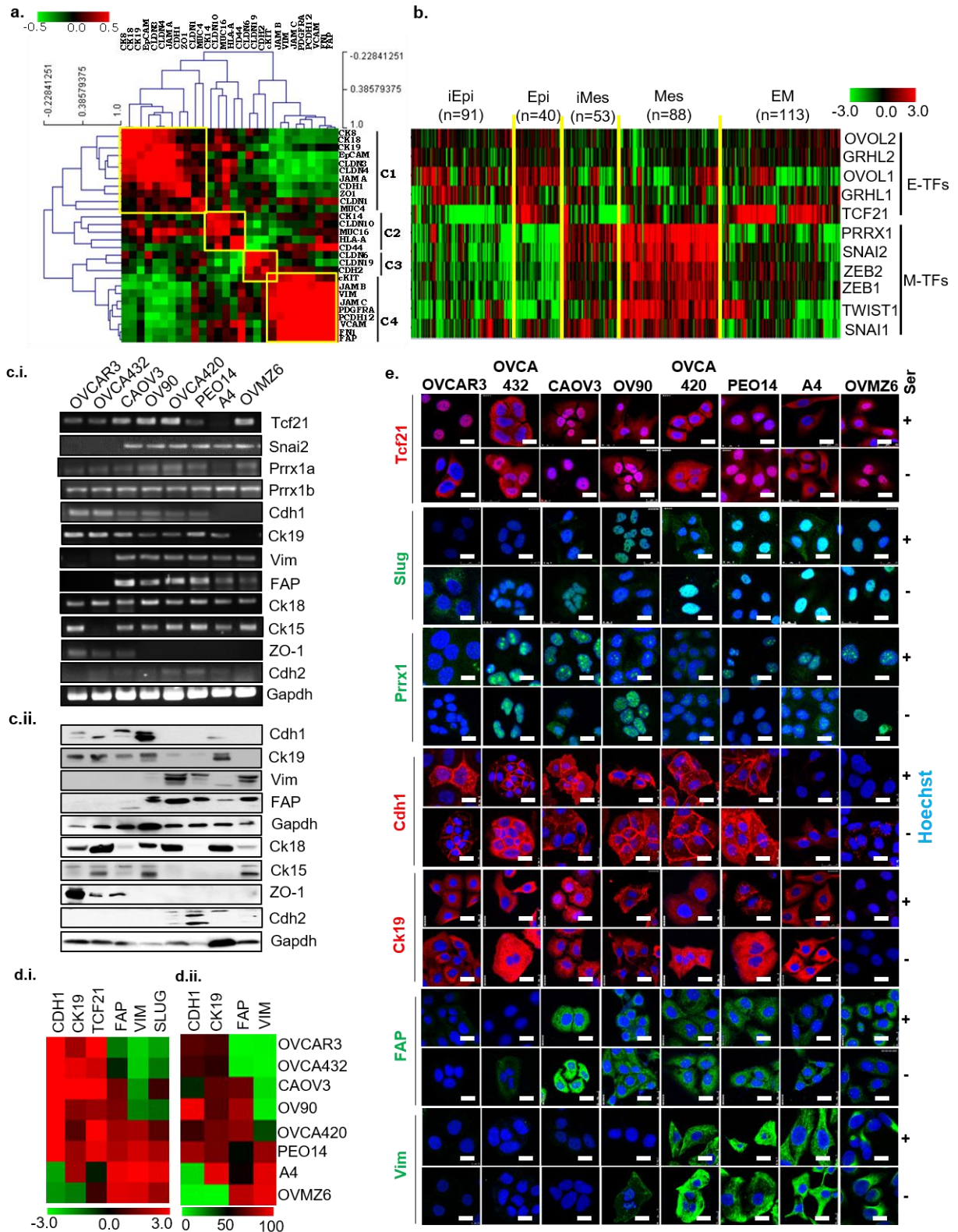


Fig.S4. Functional correlates of the five discrete phenotypes in the HGSC cell line panel. a. Correlation heat-map of epithelial and mesenchymal markers in the TCGA-HGSC gene expression dataset; b. Heat-map segregating HGSC samples into phenotypic states based on expression of epithelial and mesenchymal phenotype associated TFs; c. Expression profiles of markers across a panel of HGSC cell lines as determined by qPCR (i) and immunoblotting

(ii);GAPDH used as endogenous control. d. Heat-maps of E (Tcf21, E-cadherin: Cdh1, Cytokeratin19: CK19) and M (Slug, Fibroblast Activation Protein: FAP, Vimentin: Vim) markers depicting (i) expression profiles normalized to GAPDH and (ii) percentage positive population as profiled by flow cytometry; e. Immunostaining for E and M markers in HGSC cell lines in the presence and absence of serum. Nuclei visualized with Hoechst, Scale bar 20 μ . All data are representative of experiments performed in triplicate and are depicted as mean + SEM, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Fig.S5

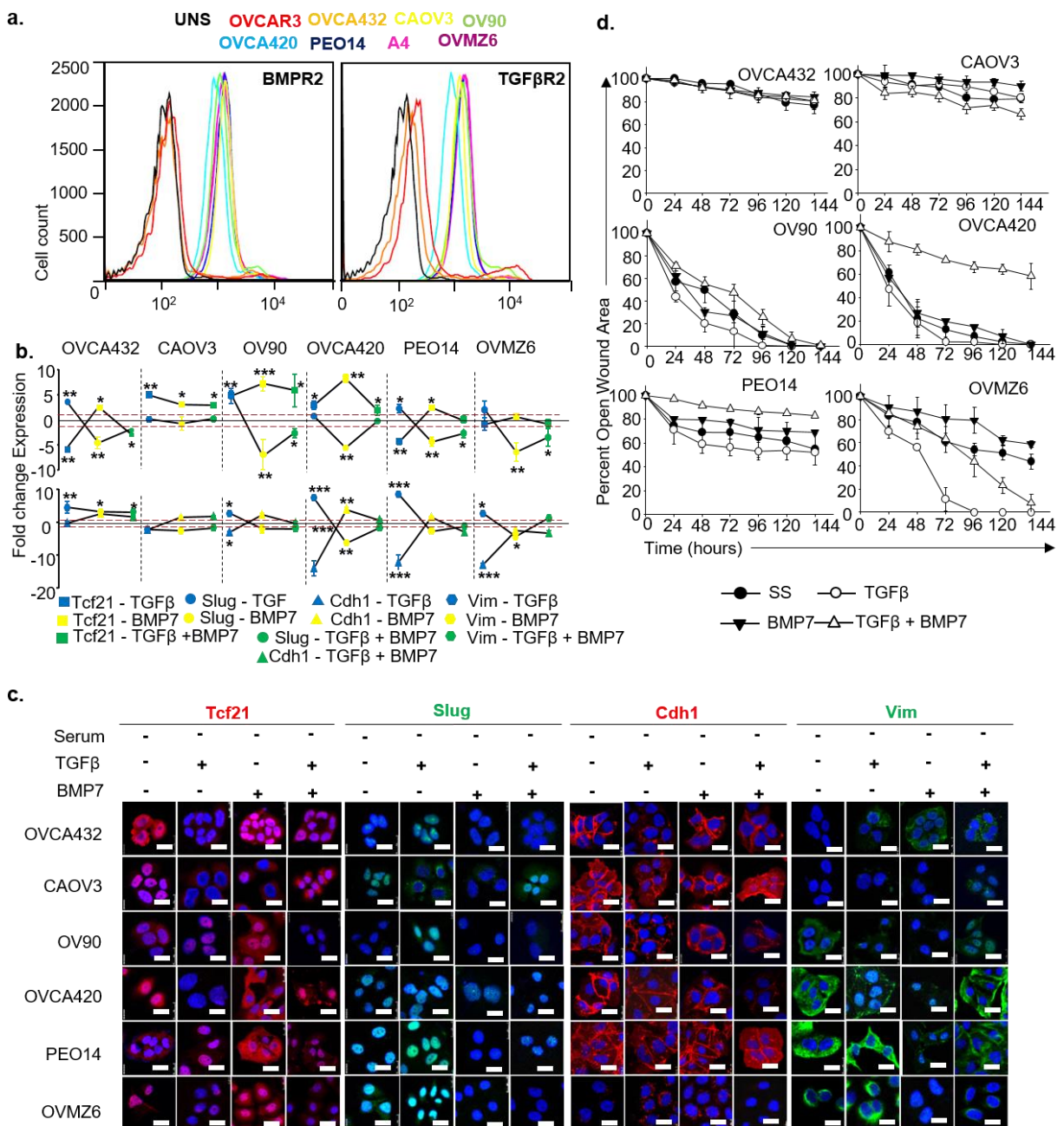


Fig.S5. Differential responsiveness of cell lines to TGFβ and/or BMP7. a. Histograms depicting percent positive TGFβR2 and Bmpr2 cell populations in HGSC cell line panel; **b.** Fold change in mRNA expression profiles, normalized with GAPDH for (i) TFs and (ii) phenotypic markers

following growth factor treatment as indicated, fold-change determined with respect to serum starved cells; c. Expression and localization of Tcf21 and Slug and phenotypic markers, serum starved cells used as a control, nuclei visualized with Hoechst, scale bars, 20µm; d. Graphical representation of wound healing efficiency of HGSC cell lines and TF-derivative clones following growth factor treatment as indicated; all data are representative of experiments performed in triplicate and are depicted as mean \pm SEM. *p<0.05, **p<0.01, ***p<0.001.

Fig.S6

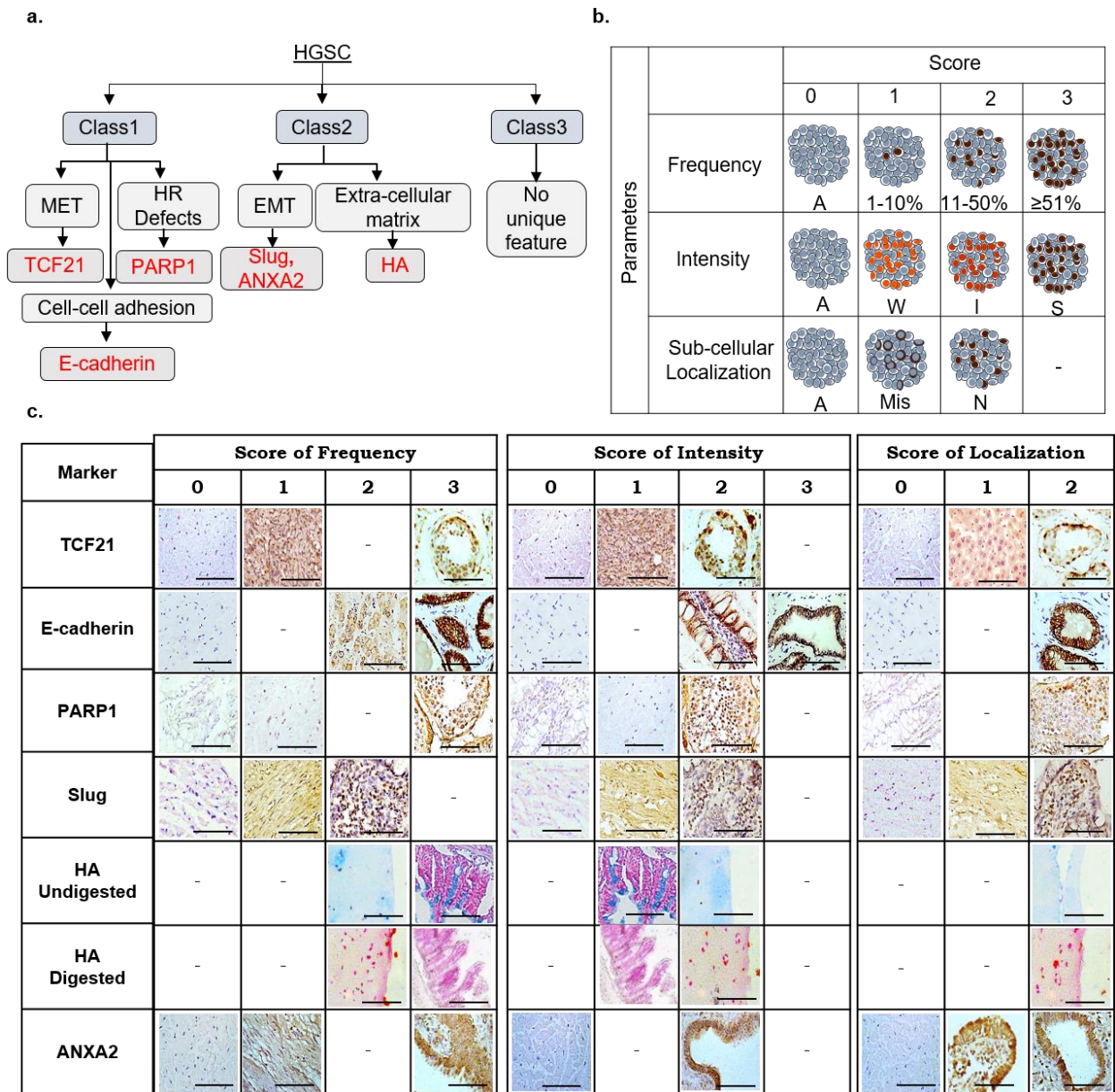


Fig. S6. Scoring of immunohistochemically and histochemically stained FFPE sections. a. Rationale for class-specific biological function based putative marker selection, MET: Mesenchymal-to-epithelial transition, HR: Homologous Recombination mediated DNA Damage Repair, EMT: Epithelial-to-mesenchymal transition; **b.** Schematic of scoring guidelines for IHC based staining of nuclear markers (TCF21, PARP1, Slug), A: Absent, W: Weak, I: Intermediate, S: Strong, Mis: Mislocalised, N: normal localization. A similar approach was used for scoring of membrane markers (E-cadherin, ANXA2) except that sub-cellular location was scored either 1 (cytoplasm) or 2 (cell membrane), while extracellular expression of hyaluronan fibers (evaluated as blue color developed by Alcian blue staining that is lost on hyaluronidase) was scored 1 in distant tumor stroma, and 2 in tumor epithelial cell nests. **c.** Visual scoring of FFPE sections using an antibody against TCF21, E-cadherin, PARP1, Slug, ANXA2 and

histochemically stained HA in normal human tissues. The marker staining intensities were evaluated by visual scoring for frequency, intensity and localization. TCF21: S_{Freq} – Score 0 (cardiac myocytes), 1 (stromal cells of ovary), 3 (germinal basal cells of testis); S_{Int} – Score 0 (cardiac myocytes), 1 (stromal cells of ovary), 2 (germinal basal cells of testis); S_{Loc} – Score 0 (cardiac myocytes), 1 (hepatocytes of liver), 2 (germinal basal cells of testis). E-cadherin: S_{Freq} – Score 0 (cardiac myocytes), 2 (liver hepatocytes), 3 (epithelial cells of prostate); S_{Int} – Score 0 (cardiac myocytes), 2 (epithelial cells of small intestine), 3 (epithelial cells of prostate); S_{Loc} – Score 0 (cardiac myocytes) and 2 (epithelial cells of prostate). PARP1: S_{Freq} – Score 0 (mucosa of small intestine), 1 (cardiac myocytes), 3 (germinal basal cells of testis); S_{Int} – Score 0 (mucosa of small intestine), 1 (cardiac myocytes), 2 (germinal basal cells of testis); and S_{Loc} – Score 0 (mucosa of small intestine), 2 (germinal basal cells of testis). Slug: S_{Freq} – Score 0 (cardiac myocytes), 1 (smooth muscle of appendix), 2 (lymphocytes of small intestine); S_{Int} – Score 0 (cardiac myocytes), 1 (smooth muscle of appendix), 2 (lymphocytes of small intestine); and S_{Loc} – Score 0 (cardiac myocytes), 1 (somatic muscles of appendix), 2 (lymphocytes of small intestine). HA: S_{Freq} – Score 2 (cartilage), 3 (sub-mucosa of small intestine); S_{Int} – Score 1 (sub-mucosa of small intestine), 2 (cartilage); and S_{Loc} – Score 2 (cartilage). ANXA2: S_{Freq} – Score 0 (cardiac myocytes), 1 (somatic muscle of small intestine), 3 (epithelial cells of gall bladder); S_{Int} – Score 0 (cardiac myocytes), 2 (epithelial cells of gall bladder); and S_{Loc} – Score 0 (cardiac myocytes), 1 (stromal cells of gall bladder), 2 (epithelial cells of gall bladder). Scale bar, 100 μm .

Supplementary Movies

1. Live cell imaging of *in vitro* wound healing assay for parental and derivative cell lines in the absence of serum. Mitomycin 'C' added as proliferation inhibitor.
2. Live cell imaging for parental and derivative cell lines in the presence of serum.
3. Live cell imaging for parental and derivative cell lines in the presence of TGF β . Mitomycin 'C' added as a proliferation inhibitor
4. Live cell imaging for HGSC cell lines in the absence of serum. Mitomycin 'C' added as a proliferation inhibitor.
5. Live cell imaging for HGSC cell lines in the presence of serum
6. Live cell imaging for HGSC cell lines following 0.1% DMSO treatment in the absence of serum. Mitomycin 'C' added as a proliferation inhibitor.
7. Live cell imaging for HGSC cell lines following Paclitaxel treatment in the absence of serum. Mitomycin 'C' added as a proliferation inhibitor.

Supplementary Table 7. Patient Samples: Clinical information of chemo-naïve (CN) and chemo-treated (CT) tumors collected from multiple centers

Chemo-naïve (CN) ovarian tumor									
Cas e	Tissue ID	Age (Yrs)	Se x	Stage	Cas e	Tissue ID	Age (Yrs)	Se x	Stage
1	B/1102/08	51	F	NA	12	B/1294/11	65	F	pT1aNx
2	B/2217/08	58	F	NA	13	B/1920/11	40	F	NA
3	B/2263/08	55	F	T1cN0Mx	14	B/1338/13	68	F	pT1cNx
4	B/2293/08	50	F	TxNxMx	15	B/3091/13	42	F	NA
5	B/2281/09	56	F	pT3NxMx	16	B/1781/14	55	F	T1cNxMx
6	B/3522/09	59	F	pT1c	17	B/1519/2015	63	F	T1
7	B/22/10	48	F	NA	18	B/2381/15	63	F	IIIc
8	B/211/10	57	F	pT2bNxMx	19	B/2283/08	64	F	T3aN0Mx
9	B/799/10	46	F	NA	20	HT/11/143	61	F	NA
10	B/804/10	46	F	pT3bNx	21	HT/12/1743	45	F	pT3bN0Mx
11	B/906/10	41	F	T1XCNO Mx	22	361/13	45	F	NA
CN omental tumor									
1	HT/13/001471	74	F	NA	2	HT/13/004397	70	F	NA
CN ovarian tumor with metastases in omentum									
1	B/2981/09	56	F	NA	10	B/991/14	42	F	T2cN0Mx
2	B/548/10	22	F	pT3bNx	11	B/474/15	51	F	pT3cN1Mx
3	B/580/10	52	F	T3cN1Mx	12	B/1937/15	56	F	pT3c
4	B/320/12	54	F	pT3cN0	13	B/2972/15	63	F	NA
5	B/1029/12	72	F	pT3cNx	14	B/2987/15	50	F	pT3a (III)
6	B/3392/12	55	F	T3aN0	15	MB/195/12	51	F	NA
7	B/8/13	74	F	pT3cNx	16	1511/14	38	F	NA
8	B/343/13	40	F	pT3bpN0	17	1866/13	60	F	NA
9	B/4/14	54	F	NA					
CN ovarian tumor with ascites									
1	HT/14/453	73	F	NA					
CN Ovarian tumors with Fallopian Tube tumors									
1	B/1232/13	52	F	T3aN0					
CN tumors collected from Ovary, Fallopian Tube and Omental sites									
1	B/1716/09	50	F	pT3aN1Mx	4	B/2774/12	55	F	pT3cN0M0
2	B/3136/09	43	F	pT3bN0Mx	5	B/749/13	55	F	pT3cNx
3	B/825/10	50	F	pT3bNx	6	B/1627/13	62	F	NA
Chemo-treated (CT) ovarian tumor									
Cas e	Tissue ID	Ag e (Y)	Se x	Stage	Case	Tissue ID	Ag e (Yr)	Sex	Stage

		rs)					s)		
1	B/1561/12	40	F	NA	10	HT/13/51 84	40	F	pT2aN1
2	B/914/14	54	F	NA	11	HT/12/16 94	40	F	yPT3cN1
3	B/1278/14	69	F	ypT3bNxMx	12	HT/12/34- A7	61	F	ypT2bN0 Mx
4	B/1582/15	45	F	ypT1bN0	13	HT/12/14 91	42	F	ypT2aN1 Mx
5	B/1481/12	55	F	T1cNx	14	HT/13/24 45	61	F	ypT3cN0
6	OT-20	45	F	NA	15	HT/12/38 71	62	F	ypT3cN1
7	OT-25	61	F	NA	16	1205/14	44	F	ypT1bN1 Mx
8	OT-28	50	F	NA	17	1551/14	60	F	NA
9	OT-31	55	F	NA	18	1268/15	64	F	pT1CN0 Mx
CT omental tumor									
1	1217/14	41	F	ypT3N0Mx					
CT ascites cell block									
1	CT/11/8	61	F	NA	2	CT/12/15 10	62	F	NA
CT ovarian tumor with metastases in omentum									
1	B/826/09	N A	F	NA	9	MB/591/1 1	70	F	NA
2	B/272/11	56	F	pT3aN0M0	10	MB/823/1 1	58	F	ypT3bNx M1
3	B/2653/12	46	F	pT3NxMx	11	1444/14	49	F	NA
4	B/2716/13	39	F	NA	12	1968/14	72	F	NA
5	B/1076/14	74	F	T1	13	1715/14	51	F	NA
6	B/550/15	N A	F	yP2cNxMx	14	417/13	57	F	NA
7	MB/952/10	60	F	ypT3bN1	15	HT/13/44 39	78	F	NA
8	MB/443/11	37	F	ypT3cN1Mx	16	HT/14/91 4	57	F	ypT3bN1
CT ovarian tumor with ascites									
1	HT/13/5065- A12	27	F	ypT3bN1	2	HT/12/22 3-A23	61	F	NA
CT Ovarian tumors with Fallopian Tube tumors									
1	B/3248/13	30	F	T1					
CT Fallopian Tube tumors with ascites									
1	HT/13/3418- A5	60	F	NA					

Supplementary Table 8. Clinical information of chemo-naïve and chemo-treated tumors collected from same patient

CN-CT pair tumors						
Case	Tissue ID	Age	Sex	Stage	Therapy	Site

		(Yrs)				
1	HT/13/1273	52	F	NA	No	T
	HT/13/2561-A10	52	F	NA	Yes	T
2	HT/14/2	70	F	NA	No	O
	HT/14/1890-B9	70	F	ypT3cN1	Yes	T
	HT/14/1890-B12	70	F	ypT3cN1	Yes	T
	CT/14/591	70	F	NA	Yes	C
3	HT/13/2610	64	F	NA	No	T
	HT/13/4447-A1	65	F	ypT2cN0	Yes	T
4	CT/12/1099	65	F	NA	No	C
	HT/12/2879-B2	65	F	pT1cNx	Yes	T
	HT/12/2879-A10	65	F	pT1cNx	Yes	T
5	CT/13/1081	53	F	NA	No	C
	HT/12/3173-A4	54	F	ypT3bN1	Yes	T
	HT/12/3173-B2	54	F	ypT3bN1	Yes	T
	CT/12/1236	54	F	ypT3bN1	Yes	C
6	HT/13/1296	61	F	NA	No	O
	CT/12/401	61	F	NA	No	C
	HT/13/2513-A16	61	F	ypT3aN0	Yes	T
	HT/13/2513-A20	61	F	ypT3aN0	Yes	T
	CT/13/763	61	F	NA	Yes	C

Where Ovarian tumor (T), Ascites cell block (C), Omental tumor (O) and Female (F).

Supplementary Table 9. Patient Samples: Clinical information of commercial TMA

No.	Histology	Age (Years)	Sex	Grade	Stage	Array Position
1	Normal	40	F	-	-	A1,B1
2	Normal	40	F	-	-	A2,B2
3	SC	53	F	III	T1N0M0	A6,B6
4	SC	47	F	III	T1N0M0	C1,D1
5	SC	53	F	III	T1N0M0	C2,D2
6	SC	43	F	III	T1N0M0	C7,D7
7	SC	45	F	III	T1N0M0	C8,D8
8	SC	74	F	III	T2N0M0	I9,J9
9	SC	45	F	III	T2N0M0	G6,H6
10	SC	51	F	III	T2N0M0	G13,H13
11	SC	44	F	III	T2N0M0	I3,J3
12	SC	54	F	III	T2N0M0	I4,J4
13	SC	56	F	III	T2N0M0	I11,J11
14	SC	54	F	III	T2N0M0	I13,J13
15	SC	51	F	III	T3N1M0	C5,D5
16	SC	58	F	-	T1N0M0	A9,B9
17	SC	65	F	-	T1N0M0	A11,B11
18	SC	51	F	-	T2N0M0	A14,B14
19	SC	56	F	I	T1N0M0	C14,D14
20	SC	33	F	I	T1N0M0	E9,F9
21	SC	34	F	I	T2N0M0	C15,D15
22	SC	18	F	II	T1N0M0	G1,H1

No.	Histology	Age (Years)	Sex	Grade	Stage	Array Position
23	SC	48	F	II	T2N0M0	G8,H8
24	SC	20	F	II	T2N0M0	A15,B15
25	SC	42	F	II~III	T1N0M0	G3,H3
26	SC	42	F	II~III	T1N0M0	G4,H4
27	SC	56	F	II~III	T2N1M0	A7,B7
28	Mucinous cystadenoma	19	F	-	-	A3,B3
29	Thecoma	35	F	-	-	A4,B4
30	Borderline serous cystadenoma	42	F	-	-	A5,B5
31	Metastatic cancer from colon	40	F	-	-	A8B8
32	Sarcoma	36	F	-	T1N0M0	G2,H2
33	Dysgerminoma	17	F	-	-	I1,J1
34	Granulosa cell tumor	43	F	-	T1N0M0	G12,H12
35	Endodermal sinus tumor	23	F	-	-	G5,H5
36	Undifferentiated carcinoma	42	F	-	T2N0M0	A12,B12
37	Undifferentiated carcinoma	48	F	-	T2N0M0	C3,D3
38	Undifferentiated adenocarcinoma	54	F	-	T2N0M0	C13,D13
39	MC	25	F	I	T1N0M0	E5,F5
40	MC	24	F	I	T1N0M0	E1,F1
41	MC	47	F	I	T1N0M0	C10,D10
42	MC	38	F	I	T1N0M0	E14,F14
43	MC	18	F	I	T2N0M0	G7,H7
44	MC	48	F	I	T2N0M0	G11,H11
45	MC	39	F	I	T2N0M0	I5,J5
46	MC	48	F	I~II	T1N0M0	I14,J14
47	MC	62	F	II	T2N0M0	I15,J15
48	MC	53	F	II	T2N0M0	I7,J7
49	MC	48	F	III	T1N0M0	E15,F15
50	MC	43	F	III	T2N0M0	C11,D11
51	EC	40	F	-	T1N0M0	E7,F7
52	EC	34	F	-	T1N0M0	E8,F8
53	EC	51	F	I	T1N0M0	E4,F4
54	EC	82	F	I	T1N0M0	C9,D9
55	EC	42	F	I	T1N0M0	E11,F11
56	EC	17	F	I	T1N0M0	E13,F13
57	EC	50	F	I	T2N0M0	E6,F6
58	EC	43	F	I	T2N0M0	I8,J8
59	EC	52	F	II	T1N0M0	I10,J10
60	EC	44	F	II	T1N0M0	C4,D4

No.	Histology	Age (Years)	Sex	Grade	Stage	Array Position
61	EC	9	F	II	T1N0M0	A13,B13
62	EC	50	F	II~III	T2N1M0	A10,B10
63	EC	25	F	II	T2N0M0	E3,F3
64	EC	63	F	III	T1N0M0	C12,D12
65	EC	68	F	III	T1N0M0	E12,F12
66	EC	54	F	III	T1N0M0	I12,J12
67	EC	65	F	III	T2N0M0	C6,D6
68	EC	58	F	III	T2N0M0	E2,F2
69	EC	52	F	III	T2N0M0	E10,F10
70	EC	49	F	III	T2N0M0	G9,H9
71	EC	51	F	III	T2N0M0	G10,H10
72	EC	58	F	III	T2N0M0	G15,H15
73	EC	50	F	III	T2N0M0	I2,J2
74	EC	39	F	III	T2N0M0	I6,J6
75	EC	71	F	III	T3N0M0	G14,H14

Where Serous adenocarcinoma (SC), Mucinous adenocarcinoma (MC), Endometrioid adenocarcinoma (EC), Female (F)

Supplementary Table 10. List of oligonucleotides used in the study.

Primer Sequences		
CDH1_RT_F	Sigma	GTCTCCTCTTGGCTCTGC
CDH1_RT_R	Sigma	TTATGAAACCGTAGAGGC
VIMENTIN_RT_F	Sigma	GGGCCATCTTAACATTGAGCAG
VIMENTIN_RT_R	Sigma	AGTGGATGCCCTTAAAGGAAC C
CK19_RT_F	Sigma	CTGGCTTTTATGGCTGGTCT
CK19_RT_R	Sigma	CCAGCCTCGGAAACCTAAGT
FAP_RT_F	Sigma	TGAGTAATAGAACCATGCTTTG
FAP_RT_R	Sigma	ACAGGCGACCAGCATAAAT
Slug_qPCR_F	Sigma	CACATTAGAACTCACACGG
Slug_qPCR_R	Sigma	CTACACAGCAGCCAGATT
TCF21_qPCR_F	Sigma	CTCCAGACTCAAGACCACC
TCF21_qPCR_R	Sigma	CAGACTCGCACCTCCAAG
GLI1_RT_F	Sigma	CAGACAGAGGCCCACTC

GLI1_RT_R	Sigma	CAATGGAGAGATGACCGTAG
GATA4_RT_F	Sigma	CTCATCAAGCCTCAGCG
GATA4_RT_R	Sigma	AGGCTCCGTCTTGATG
PEG3_RT_F	Sigma	CCAAGAGAAGTGCCTACC
PEG3_RT_R	Sigma	CTTGACTCCCTTGCTCTT
FOXL2_RT_F	Sigma	GGTCGCACAGTCAAGGAG
FOXL2_RT_R	Sigma	AGCCCTTCTTATTCTTCTCG
PRRX1a_qPCR_F	Bioserve	CCGCAGGAATGAGAGAGCCA
PRRX1a_qPCR_R	Bioserve	AACATCTTGGGAGGGACGAGG
PRRX1b_qPCR_F	Bioserve	AGAGCCAAGTTCCGCAGG
PRRX1b_qPCR_R	Bioserve	GCAGGGCTATTGTTGGCAC
GAPDH_RT_F	Bioserve	CCATCACCATCTTCCAGG
GAPDH_RT_R	Bioserve	GGCTGTTGTCATACTTCTCA
TGFb1_qPCR_F	Sigma	TTGAGCCGTGGAGGGGAAAT
TGFb1_qPCR_R	Sigma	ATGAGAAGCAGGAAAGGC
BMP7_qPCR_F	Sigma	CGTCAACCTCGTGGAACA
BMP7_qPCR_R	Sigma	GCACCTGATAAACGCTGA
Twist1_qPCR_F	Sigma	GAGCAACAGCGAGGAAGA
Twist1_qPCR_R	Sigma	GCTCCTCGTAAGACTGCG
ZEB1_qPCR_F	Sigma	TGGGAGGATGACAAGGA
ZEB1_qPCR_R	Sigma	ACTGGCTTCTGGTGTGC
ZEB2_qPCR_F	Sigma	ACACACAGGAAAAAGACCA
ZEB2_qPCR_R	Sigma	TACGAGCCCGAGTGTGA
SlugS1Ebox_ChIP_F	Sigma	TGGCAGAAGGAAAGGAAA
SlugS1Ebox_ChIP_R	Sigma	TCACAGAGGCATAATCCAG
SlugS2Ebox_ChIP_F	Sigma	CCAGCAAATAAATACCAA
SlugS2Ebox_ChIP_R	Sigma	CTGGAACCTGGAGTAAAA

SlugS3Ebox_ChIP_F	Sigma	GTGACTGTTGGAAGAAATAA
SlugS3Ebox_ChIP_R	Sigma	AAGCATCTCTGTCCATTG
SlugS4Ebox_ChIP_F	Sigma	TTTGTTCTTTCCTTATTCTT
SlugS4Ebox_ChIP_R	Sigma	TGCTTTTATGTGGTGCTA
SlugS5Ebox_ChIP_F	Sigma	AGATGCCACTTCCAAATA
SlugS5Ebox_ChIP_R	Sigma	AGAGGTTTCAGATTTTCAGC
SlugS6Ebox_ChIP_F	Sigma	GCTGAAATCTGAACCTCT
SlugS6Ebox_ChIP_R	Sigma	AATGCTTCTTGACCAGGA
SlugS7Ebox_ChIP_F	Sigma	GGCTCAGTTCGTAAAGGA
SlugS7Ebox_ChIP_R	Sigma	ATGTGTGTCCAGTTCGCT
S1Ebox_EMSA_Sense	Sigma	GTCTGAGCAGAGCACCTGTTTC GTCTGACT
S1Ebox_EMSA_AntiSense	Sigma	AGTCAGACGAAACAGGTGCT CTGCTCAGAC
S2Ebox_EMSA_Sense	Sigma	CTCTCATAAACCCAGGTGCCTA CATCCGAA
S2Ebox_EMSA_AntiSense	Sigma	TTCGGATGTAGGCACCTGGGT TTATGAGAG
S3Ebox_EMSA_Sense	Sigma	TTTTTCCTCCAGCACCTGTT AGAAACAAGA
S3Ebox_EMSA_AntiSense	Sigma	TCTTGTTTCTAACAGGTGCT GGAGGAAAAA
S4Ebox_EMSA_Sense	Sigma	TTTAAAATAAACACCTGAAA GTATTTTTA
S4Ebox_EMSA_AntiSense	Sigma	TAAAAATACTTTCAGGTGGT TTATTTTTAA
S5Ebox_EMSA_Sense	Sigma	TTCCTCTGTTACAGCTGTC CCAGAGGGAG
S5Ebox_EMSA_AntiSense	Sigma	CTCCCTCTGGGACAGCTGT GAACAGAGGAA
S6Ebox_EMSA_Sense	Sigma	ATCTGAACCTCTCAGCTGTG ATTGGATCTT
S6Ebox_EMSA_AntiSense	Sigma	AAGATCCAATCACAGCTGAG AGGTTTCAGAT
S7Ebox_EMSA_Sense	Sigma	GTCCGTCTGCCGCACCTGA GCACGGCCCCT
S7Ebox_EMSA_Antisense	Sigma	AGGGGCCGTGCTCAGGTGC GGCAGACGGAC

Supplementary Table 11. List of antibodies and IHC chemicals used in the study

Antibodies		
Mouse anti- Slug	SCBT*	Cat#sc-166476
Rabbit anti-Slug	Abcam	Cat#ab27568
Rabbit anti-TCF21	Abcam	Cat#ab32981
Mouse anti-E-cadherin	BD Pharmingen	Cat#610181
Mouse anti-E-cadherin	Biogenex	Cat#AM390-5M
Rabbit anti - ZO1	SCBT	Cat#sc-10804
Rabbit anti - N-cadherin	Cell Signalling	Cat#13116
Mouse anti - CK15	SCBT	Cat#sc-47697
Mouse anti-CK19	Sigma	Cat#SAB3300019
Mouse anti-Vimentin	Sigma	Cat#V6630
Mouse anti-FAP	Abcam	Cat#ab54651
Rabbit anti-GAPDH	Sigma	Cat#G9545
Rabbit anti- TGFbR2	Abcam	Cat#ab186838
Rabbit anti- BMPR2	Abcam	Cat#ab56023
Rabbit anti-PARP1 (H-300)	SCBT	Cat#sc-25780
Rabbit anti-ANXA2	In-house	
Alexa fluor 488 donkey anti- rabbit	Invitrogen	Cat#R37118
Alexa fluor 488 donkey anti- mouse	Invitrogen	Cat#A-21202
Alexa Fluor 647 donkey anti rabbit	Invitrogen	Cat#A-31573
Alexa Fluor 647 goat anti mouse	Invitrogen	Cat#A-21242
Goat anti-mouse HRP	Jackson Immunoresearch	Cat#115035150
Goat anti-rabbit HRP	Jackson Immunoresearch	Cat#111035144
Immunohistochemistry Chemicals Used		
TBS pH 7.2-7.4	Himedia	Cat#ML029

Hydrogen peroxide	Qualigens	Cat#18755
Protein block	Biogenex	Cat#HK085-5KE
Antigen retrieval buffer, Citrate Buffer, pH 6.1	Himedia	Cat#ML089
Antigen retrieval buffer, Tris-EDTA Buffer, pH 9.0	Himedia	Cat#ML087
Harris's hematoxylin	In-house preparation	
DAB	Thermo Pierce	Cat#34065
DPX	Qualigens	Cat#18404
Poly-L-Lysine	Sigma-Aldrich	Cat#P8920
Hyaluronidase enzyme	Sigma-Aldrich	Cat#H-3504
Alcian blue 8GX	Fluka	Cat#5500
Nuclear Fast Red Solution	Sigma-Aldrich	Cat#N3020