

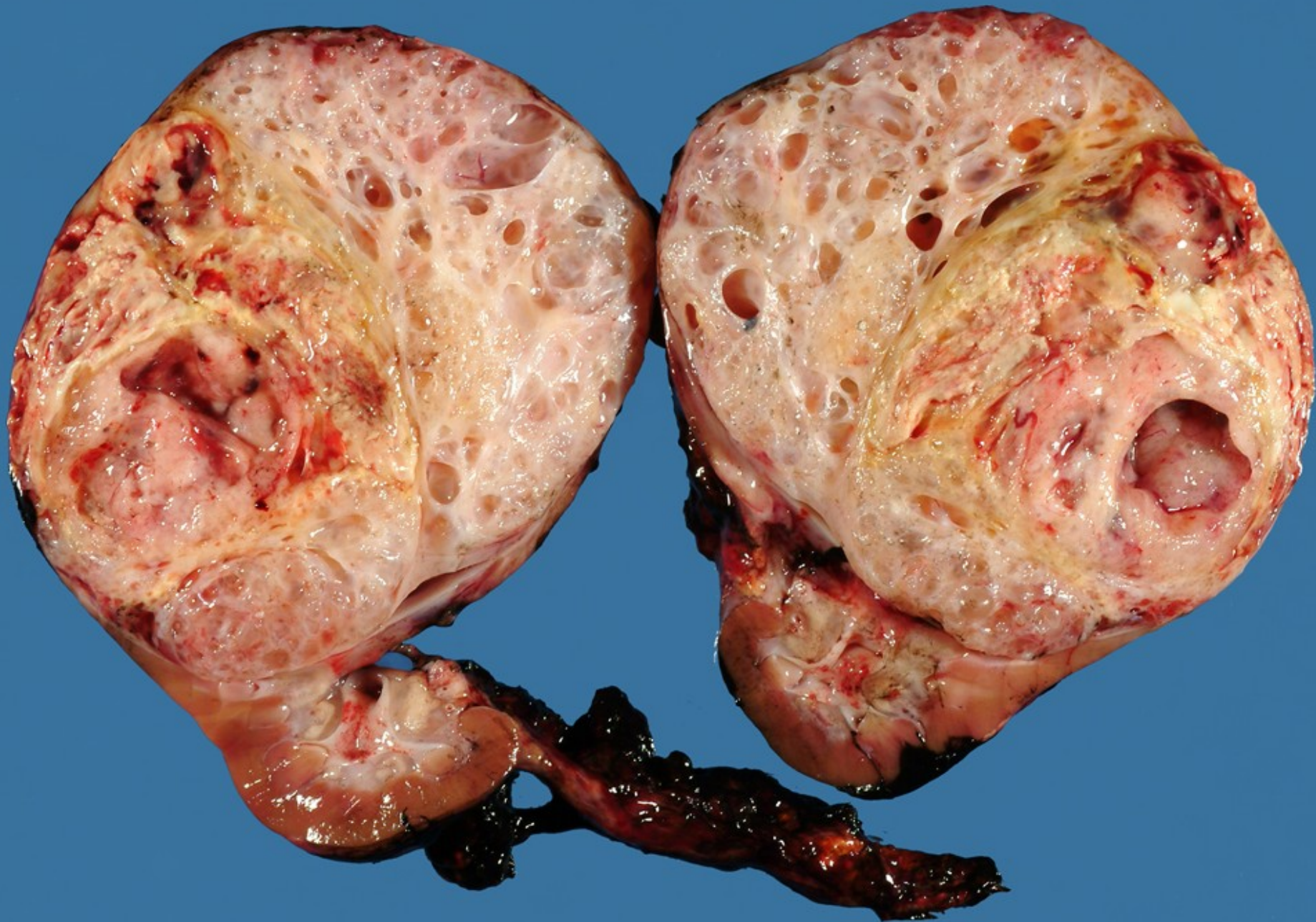
A multi-cancer gene signature associated with stromal activation

Sandra Orsulic, PhD
Professor of OB/GYN
Women's Cancer Program

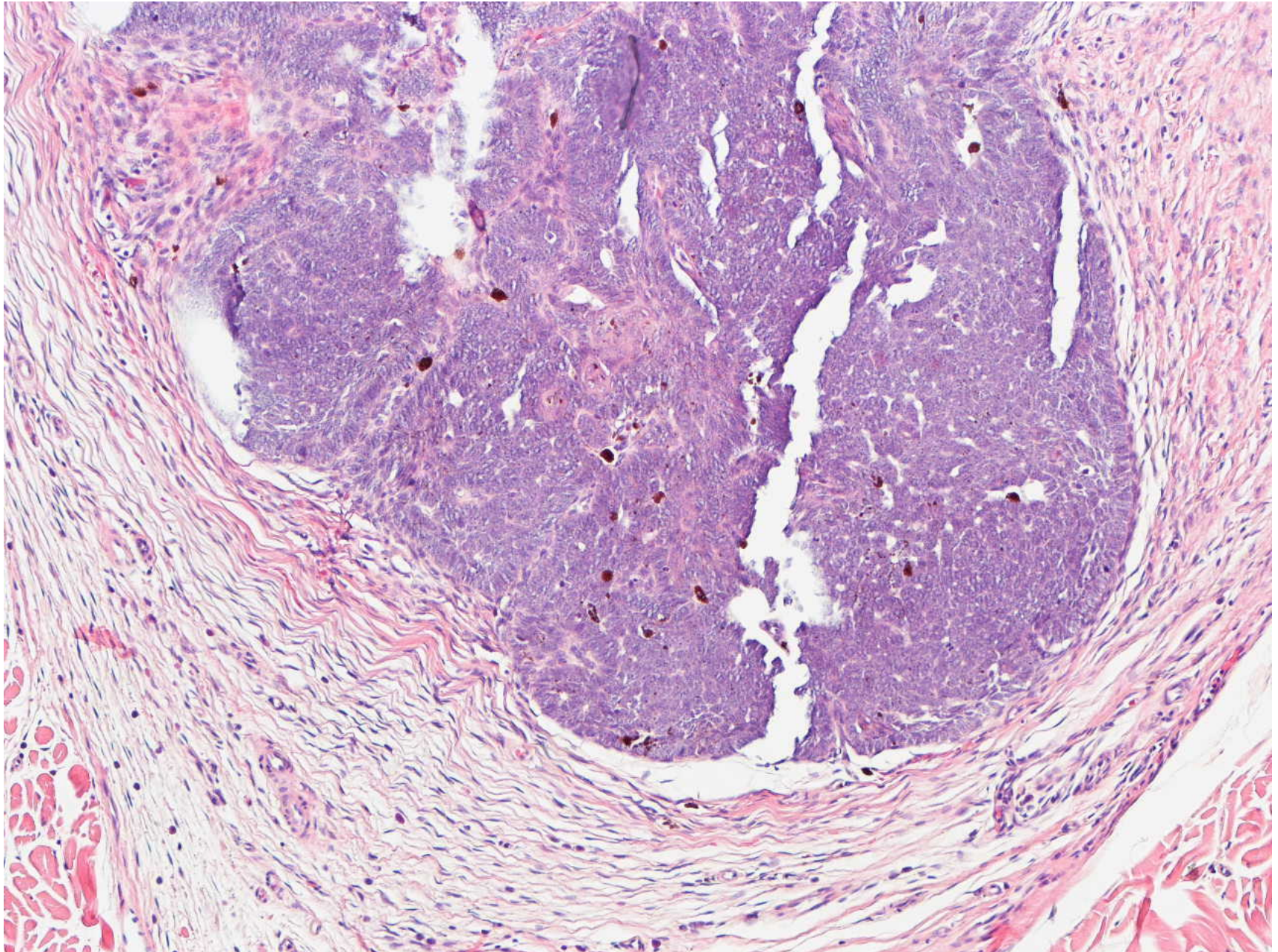




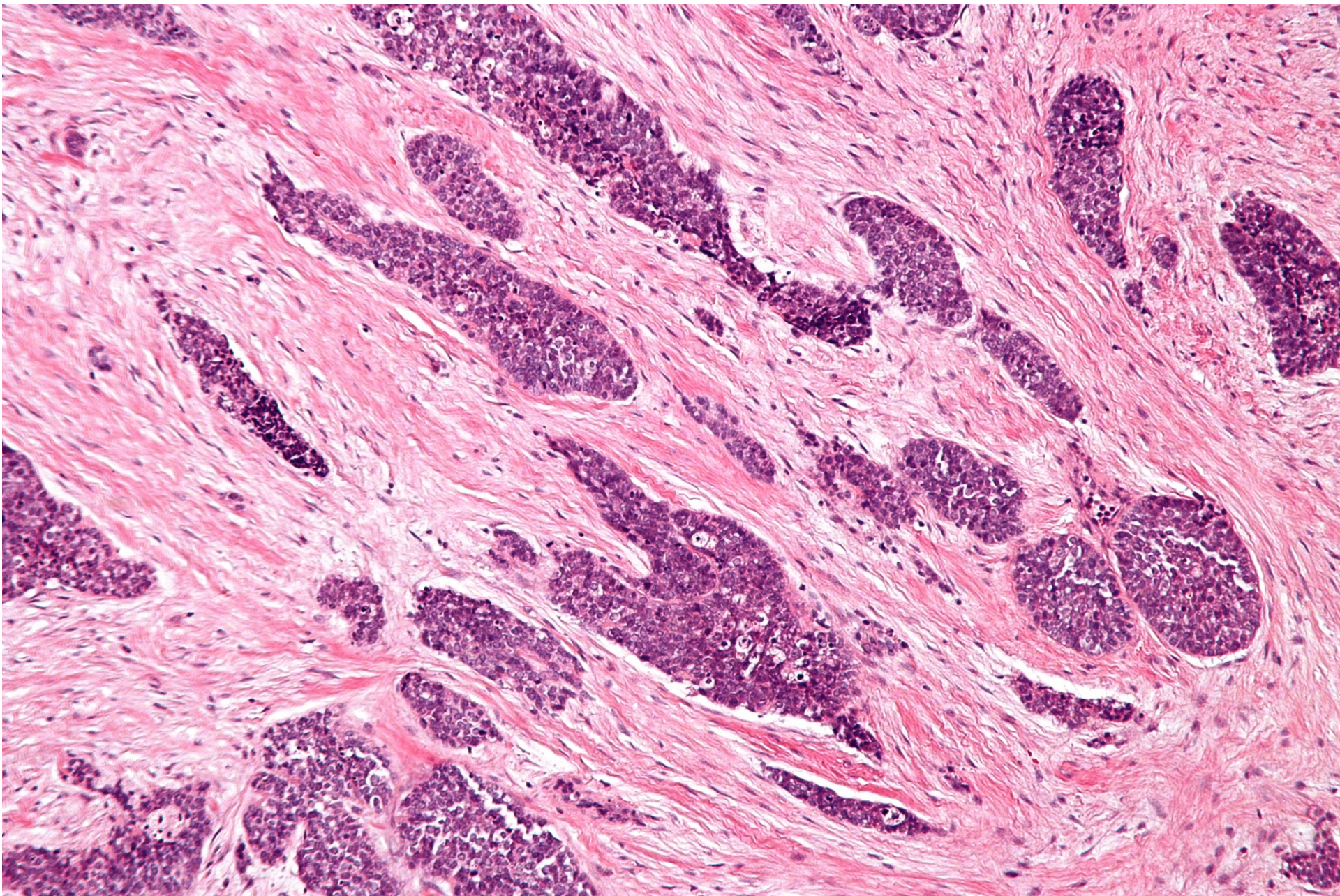
1100011010
1001000101
0101001011



Stroma/ECM *Prevents* Tumor Invasion

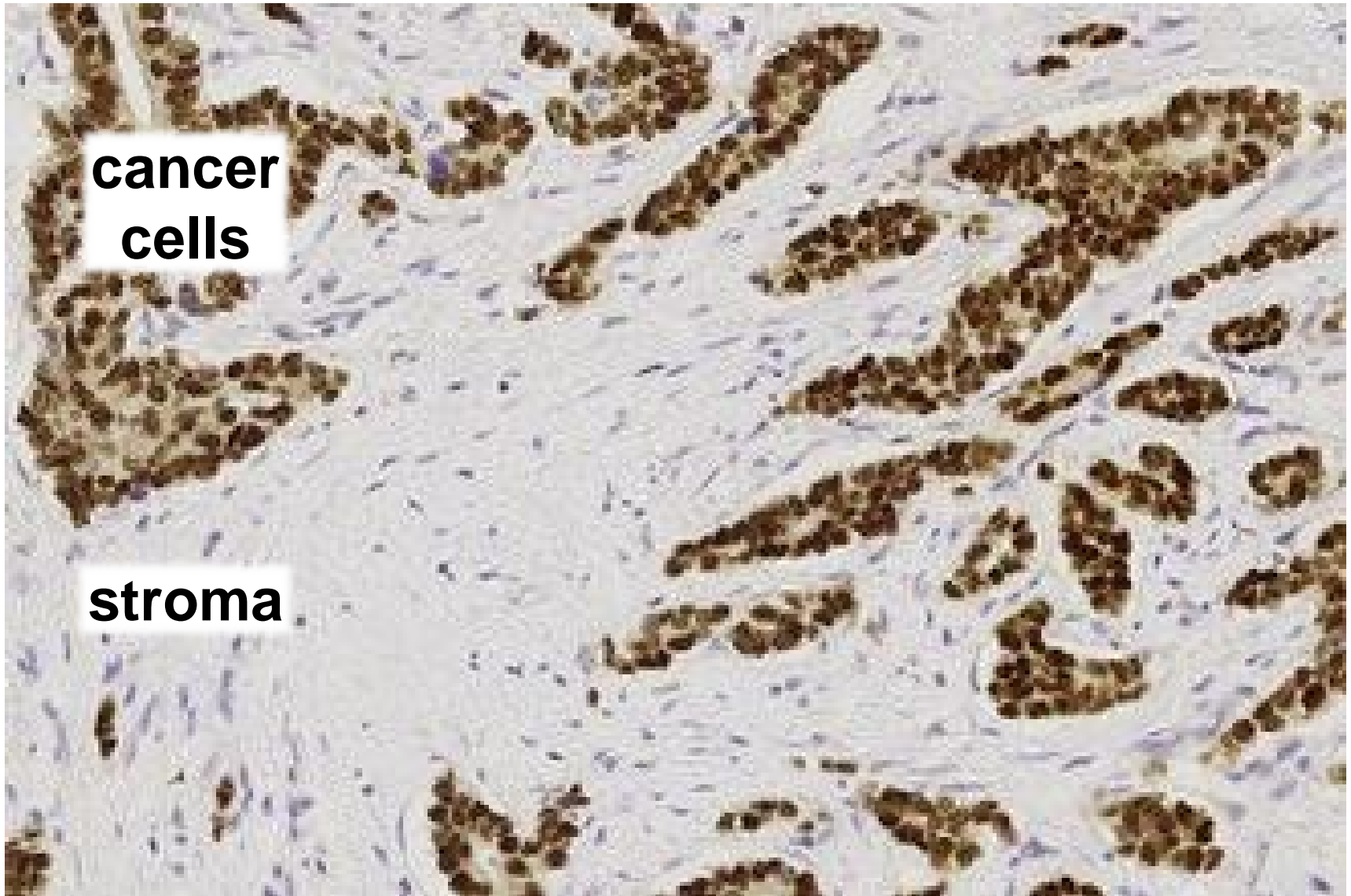


Stroma/ECM *Promotes* Tumor Invasion



Tumor Growth and Stroma Remodeling

Ki67-positive dividing cells



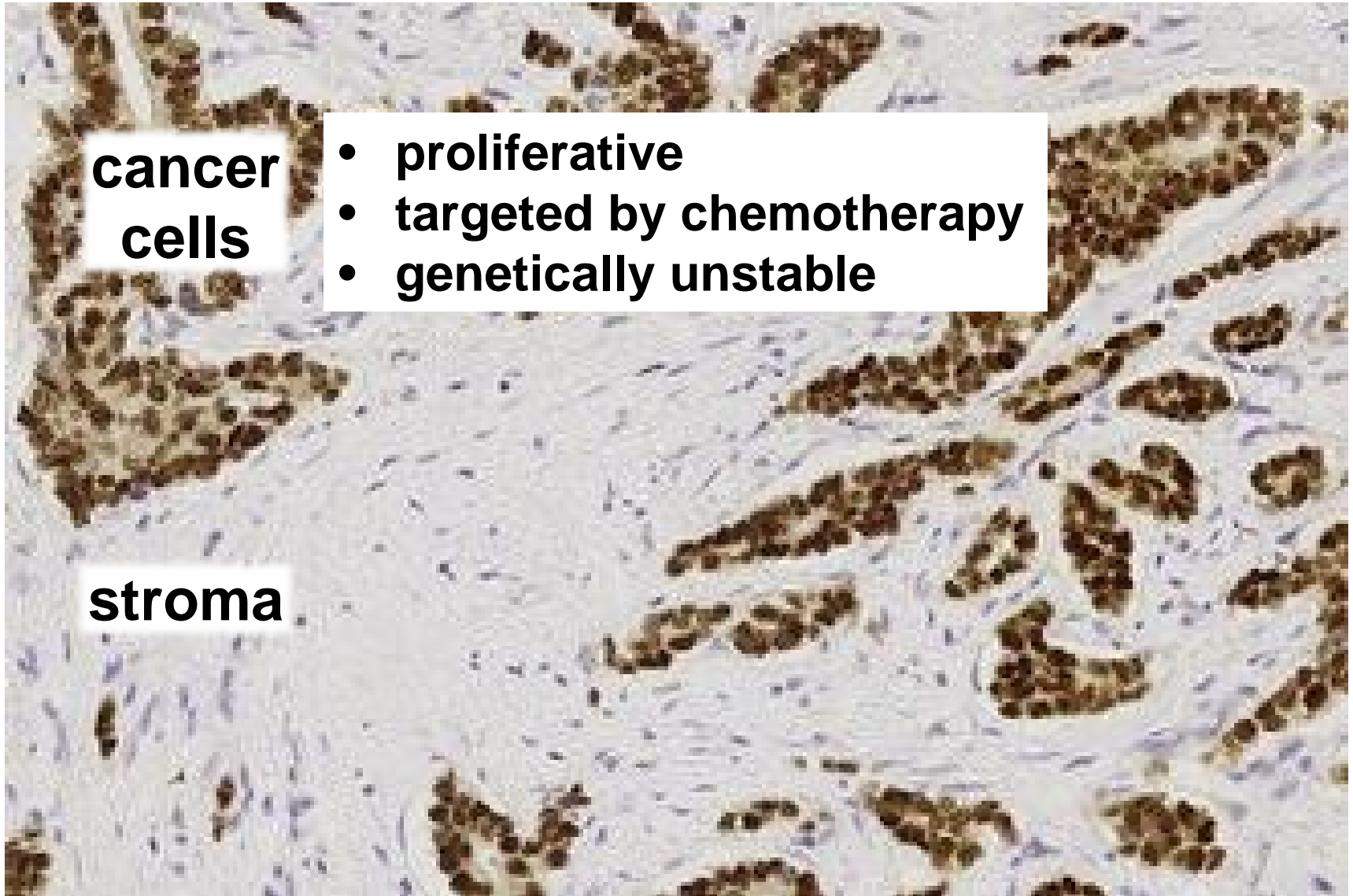
Tumor Growth and Stroma Remodeling

Ki67-positive dividing cells

**cancer
cells**

- proliferative
- targeted by chemotherapy
- genetically unstable

stroma



Tumor Growth and Stroma Remodeling

Ki67-positive dividing cells

A histological image showing a cross-section of a tumor. The image is divided into two main regions: cancer cells and stroma. The cancer cells are dark brown, indicating Ki67 positivity, and are clustered together. The stroma is a lighter, fibrous-looking tissue surrounding the cancer cells. The image is used to illustrate the relationship between cancer cells and the surrounding stroma in tumor growth and remodeling.

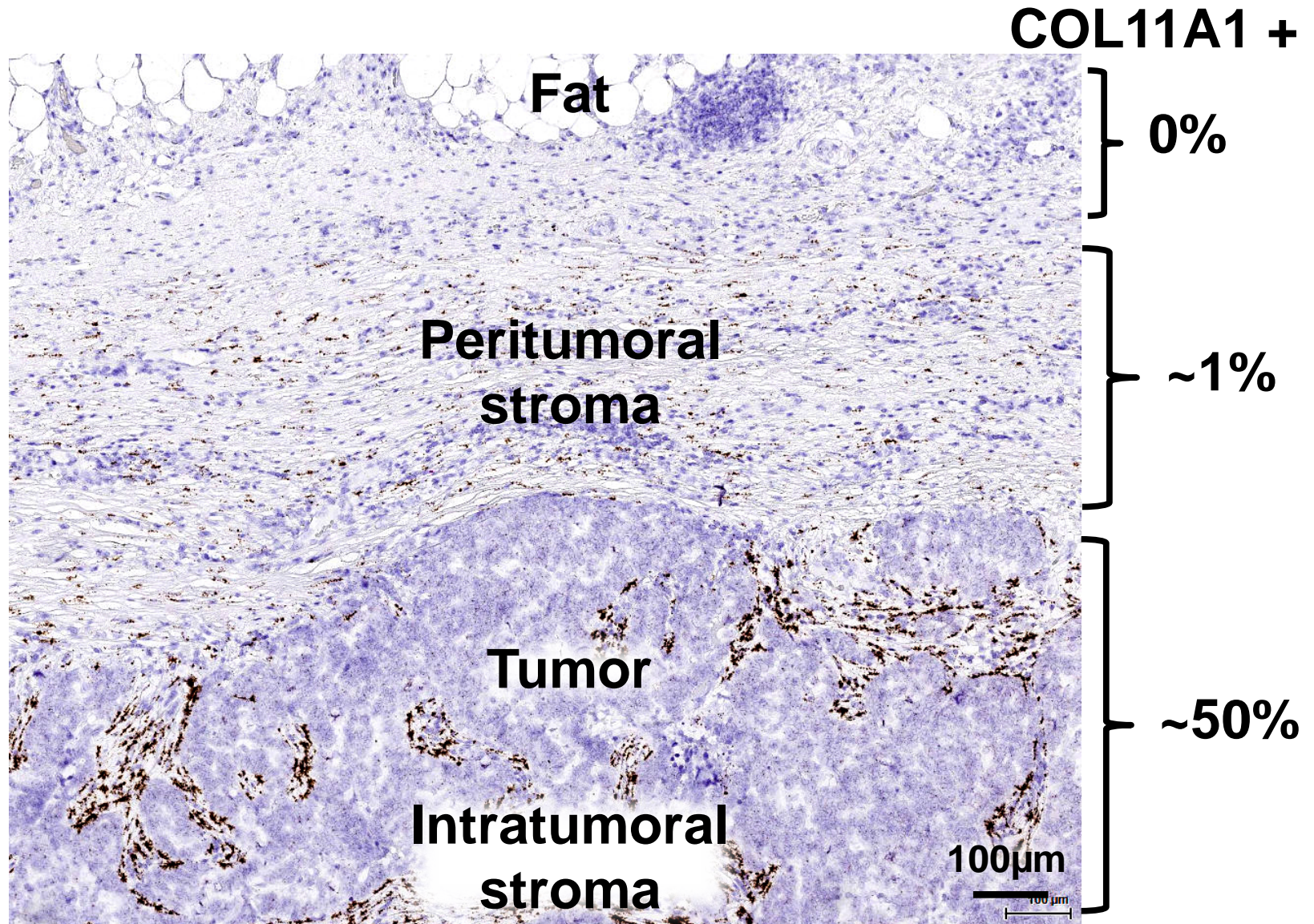
**cancer
cells**

- proliferating
- targeted by chemotherapy
- genetically unstable

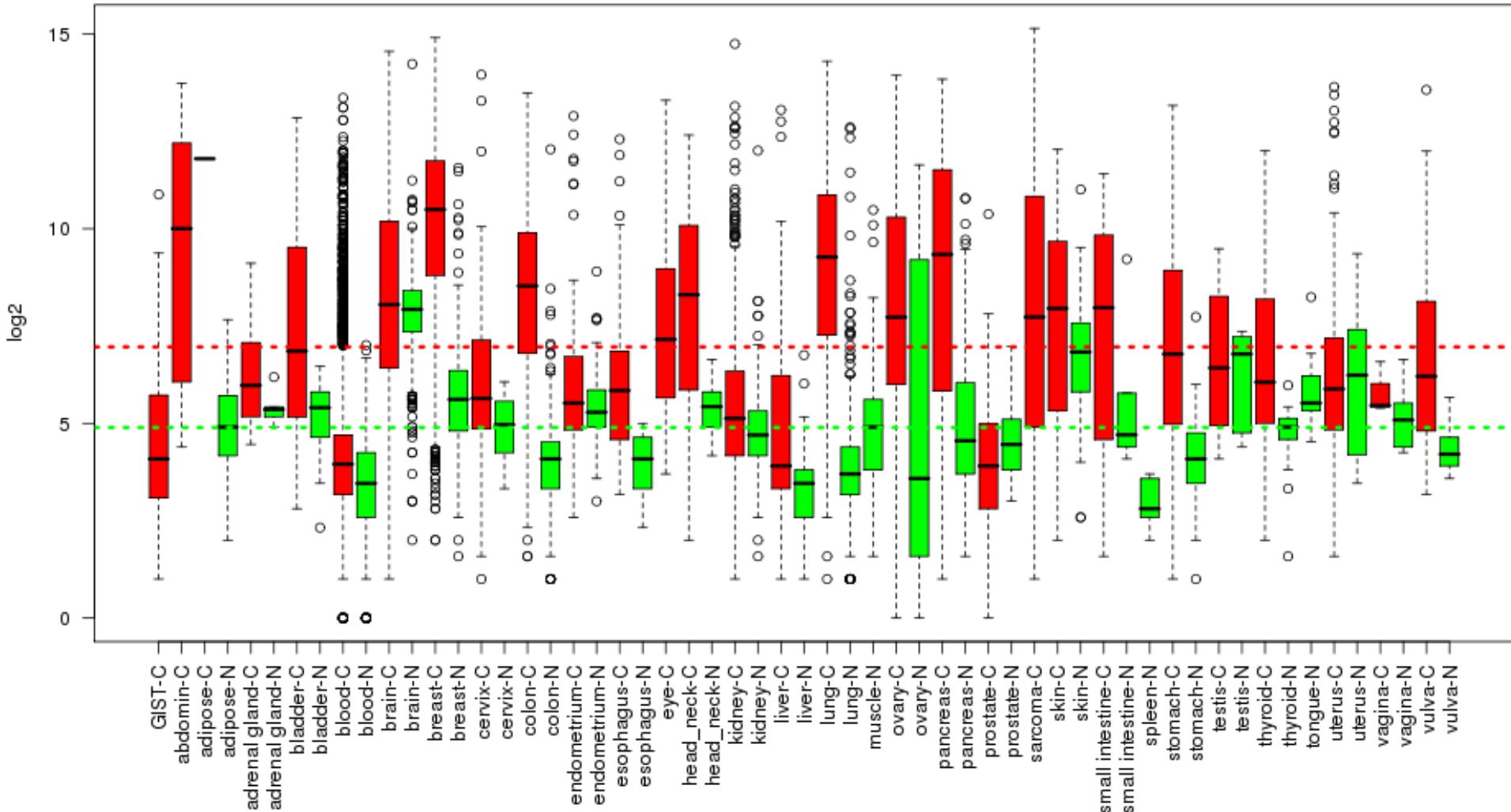
stroma

- slow proliferating
- not targeted by chemotherapy
- genetically stable
- enhanced remodeling predicts poor outcome

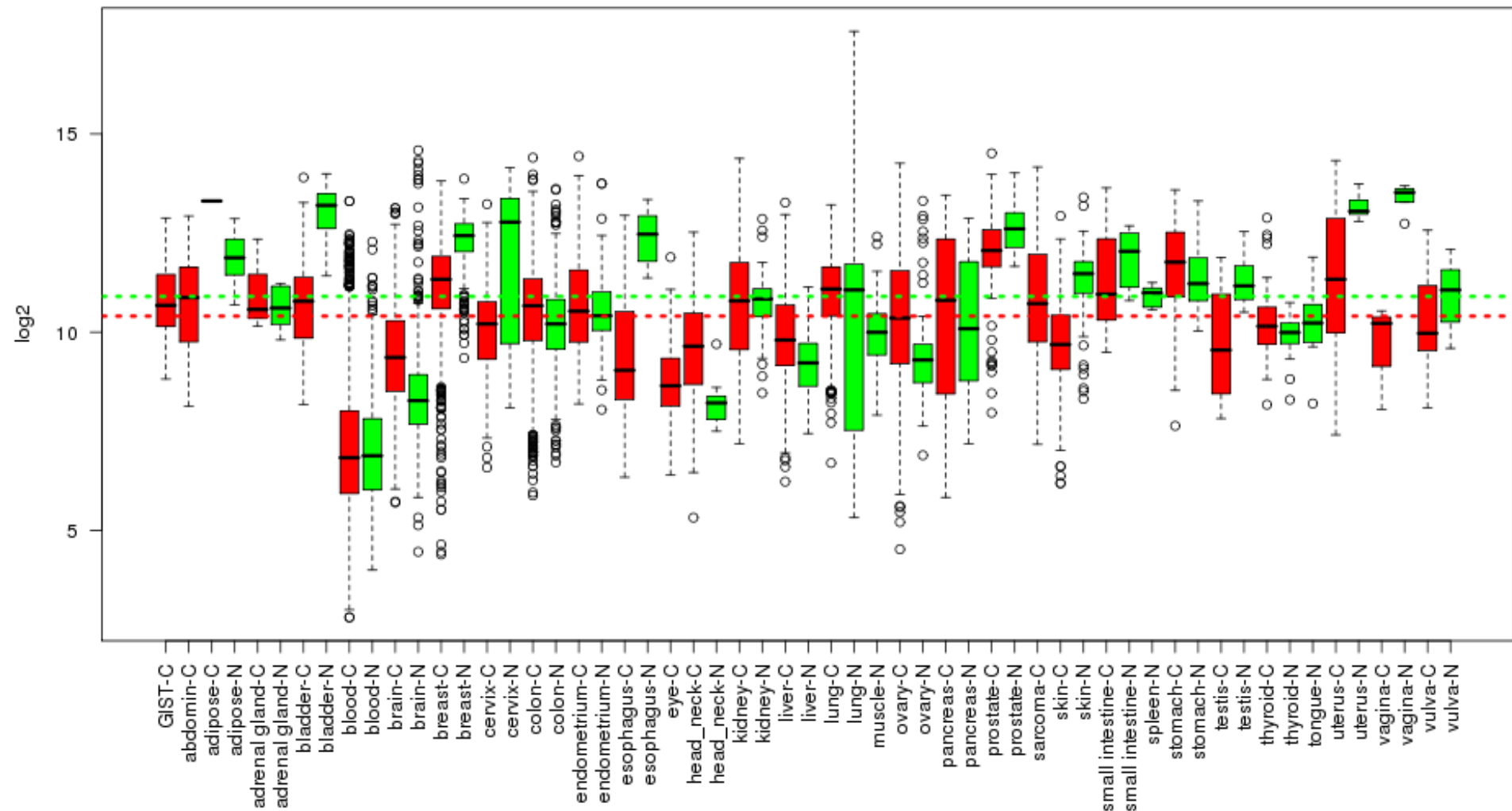
Expression of COL11A1 in Intratumoral Stroma



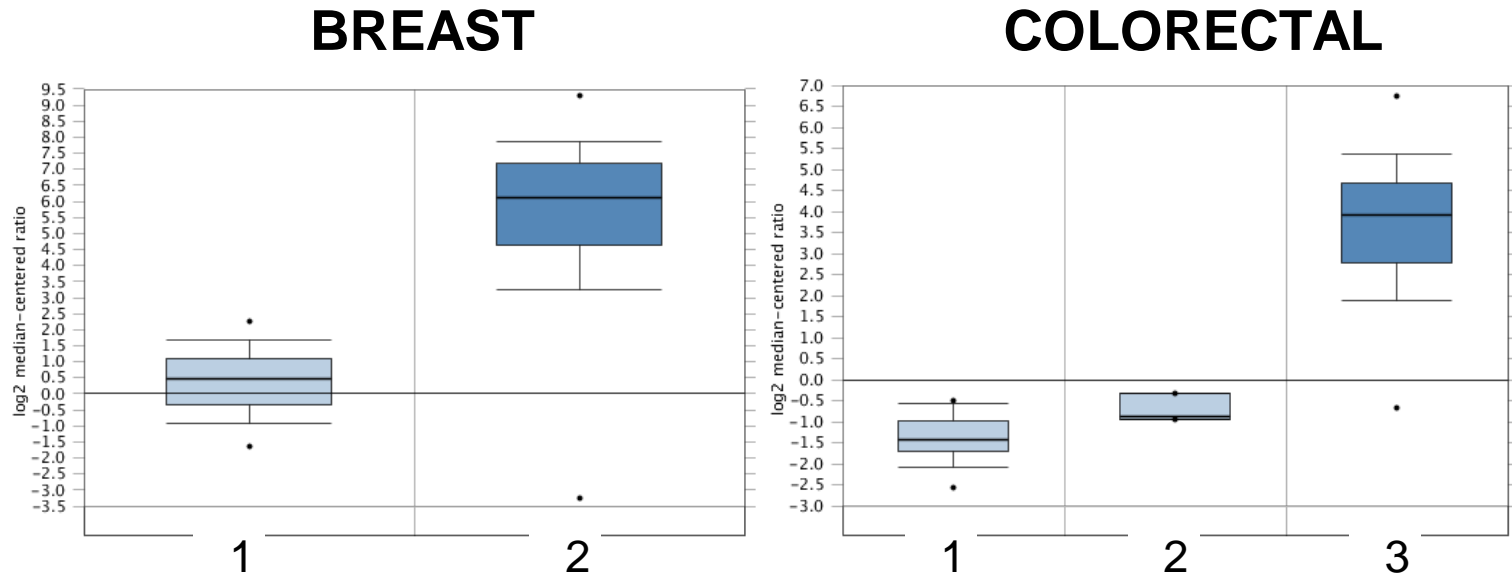
COL11A1 Expression in Cancers and Corresponding Normal Tissues



Smooth Muscle Actin Expression in Cancers and Corresponding Normal Tissues



COL11A1 Expression in Cancers and Corresponding Normal Tissues



1. Breast (61)
2. Invasive ductal breast carcinoma (389)

Overexpression gene rank: 1
(in top 1%)
p-value: 1.15E-73
t-test: 33.769
fold change: 40.542

1. Colon (19)
2. Rectum (3)
3. Colon adenocarcinoma (101)

Overexpression gene rank: 3
(in top 1%)
p-value: 2.19E-44
t-test: 27.871
fold change: 32.796

Increase in COL11A1 Levels During Cancer Progression

Breast Cancer



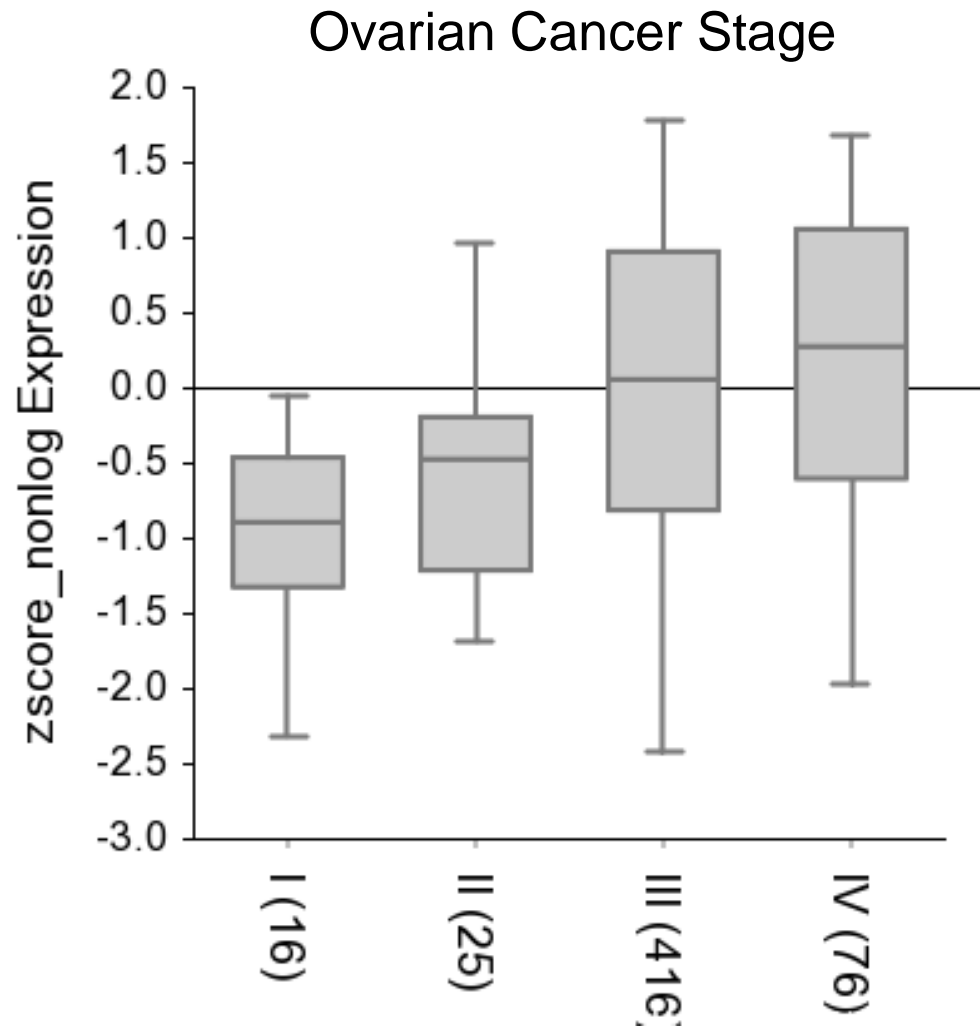
Ductal
Carcinoma
In Situ
(DCIS)



Invasive
Ductal
Carcinoma
(IDC)

Vargas		Schuetz		Sgroi		Lee	
ILMN_2392803	COL11A1	229271_x_at	COL11A1	g393318_3p_a_at	POSTN	37892_at	COL11A1
ILMN_1769388	GJB2	37892_at	COL11A1	4876385_3p_at	COL11A1	32306_g_at	COL1A2
ILMN_1789507	COL11A1	204320_at	COL11A1	g4502946_3p_a_at	COL1A2	38420_at	COL5A2
ILMN_1752843	GRM4	215446_s_at	LOX	g10946502_3p_a_at	SFRP2	39945_at	FAP
ILMN_2163873	FNDC1	213764_s_at	MFAP5	g4505046_3p_a_at	LUM	32307_s_at	COL1A2
ILMN_1773079	COL3A1	227140_at	INHBA	g8923132_3p_at	ASPN	658_at	THBS2
ILMN_1731446	COL11A1	226237_at	COL8A1	Hs.297909.0.S1_3p_s_at	COL3A1	34778_at	LRRC15
ILMN_1672776	COL10A1	229479_at	nd	Hs.179729.0.S1_3p_a_at	COL10A1	32488_at	COL3A1
ILMN_1737943	nd	217428_s_at	COL10A1	Hs.28792.0.S1_3p_at	nd	659_g_at	THBS2
ILMN_1729212	GRM8	222288_at	nd	Hs.111779.1.S1_3p_at	SPARC	38077_at	COL6A3

Increase in COL11A1 Levels During Cancer Progression



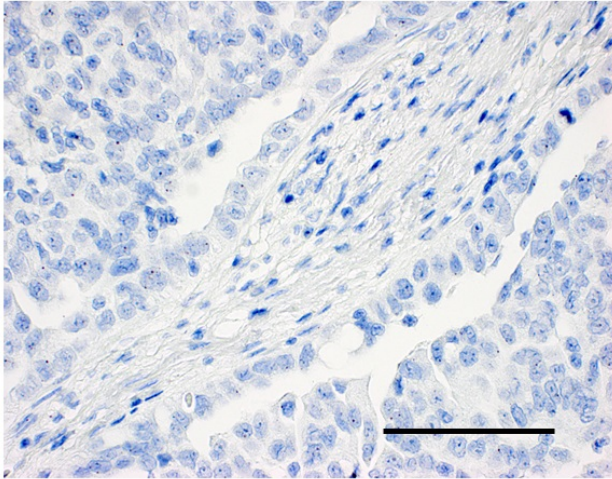
ANOVA	sum_square	df	mean_square	F	p-value
Between	28.488	3	9.496	9.977	2.1e-06
Within	503.512	529	0.952	-	-

COL11A1 Expression in Ovarian Cancer Progression

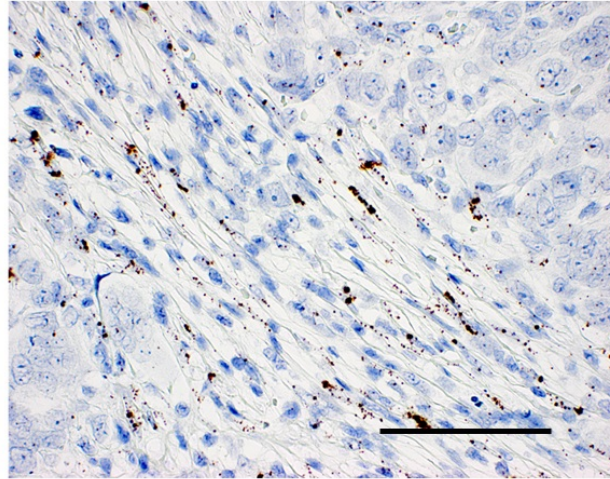
10 matched samples of:

- 1) primary ovarian cancer
- 2) concurrent metastases
- 3) recurrent metastases

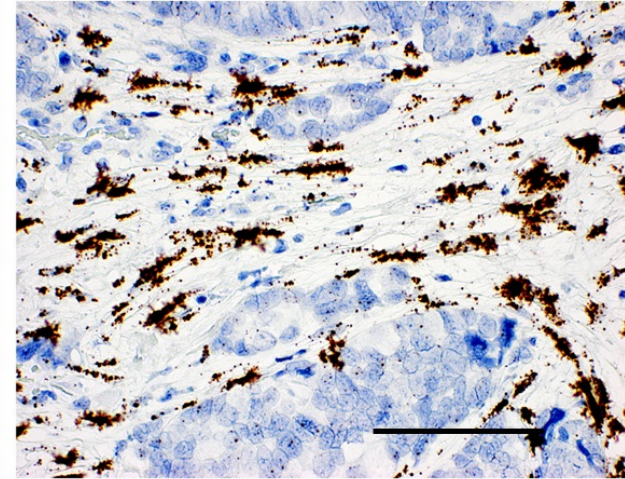
Primary



Metastasis

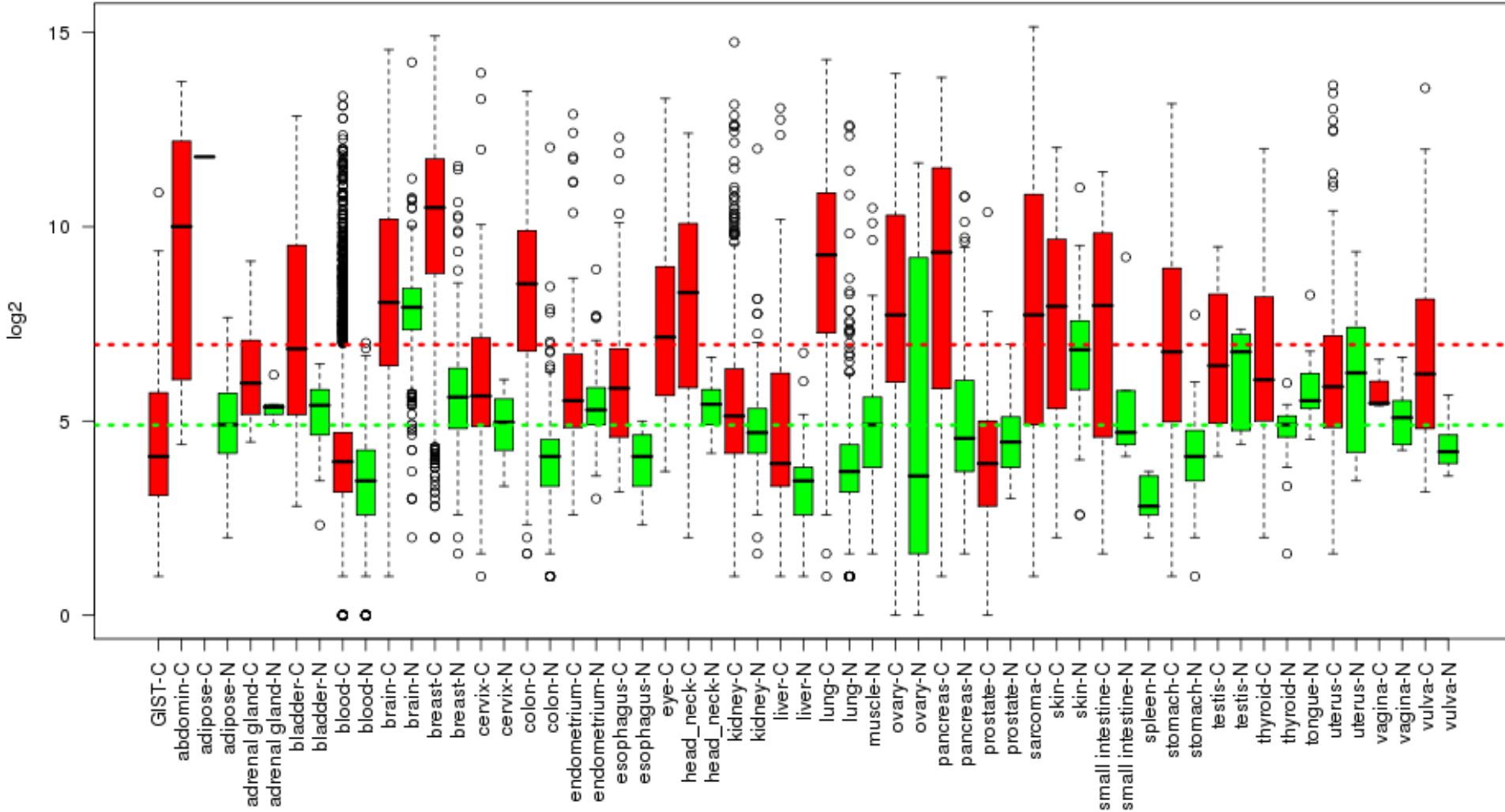


Recurrent



COL11A1 in situ hybridization

COL11A1 Co-Expressed Genes in Different Cancers



COL11A1 Co-Expressed Genes in Different Cancers

Bladder (129)

Nature, 2014
RNA SeqV2

Breast (526)

Nature, 2012
Agilent

Colorectal (244)

Nature, 2012
RNA Seq

Gene Symbol	Spearman Score	Gene Symbol	Spearman Score	Gene Symbol	Spearman Score
ASPN	0.82	FN1	0.81	VCAN	0.87
ADAM12	0.84	LRRC15	0.82	POSTN	0.86
EPYC	0.77	INHBA	0.8	COL3A1	0.88
COL5A2	0.81	GJB2	0.76	COL1A2	0.86
LRRC15	0.85	SYNDIG1	0.82	COL5A1	0.82
FIBIN	0.85	COL5A1	0.79	COL12A1	0.87
COL1A1	0.87	COL5A2	0.81	COL10A1	0.88
ADAMTS12	0.76	THBS2	0.79	RAB31	0.84
PPAPDC1A	0.83	COL1A2	0.78	COL24A1	0.72
SULF1	0.85	COL8A2	0.8	FSTL1	0.83
MXRA5	0.65	MFAP5	0.75	SPARC	0.84
OMD	0.76	COL12A1	0.78	FBN1	0.88
COL3A1	0.85	COL10A1	0.7	ANTXR1	0.88
SYNDIG1	0.75	PLAU	0.76	SPOCK1	0.83
SPARC	0.77	COL1A1	0.73	THBS2	0.88
AEBP1	0.81	NOX4	0.75	PRRX1	0.78

Ranked COL11A1 Co-Expressed Genes Across Different Cancers

GeneID	Average Correlation	Bladder (129)	Breast (526)	Cervical (207)	Colorectal (207)	Head and Neck (244)	Kidney (207)	Lung Adeno (230)	Lung Squamous (178)	Ovarian (489)	Prostate (487)	Stomach (487)	Thyroid (489)
COL11A1													
COL3A1	0.757	0.85	0.67	0.63	0.88	0.85	0.66	0.83	0.86	0.85	0.55	0.66	0.79
COL5A1	0.723	0.83	0.79	0.57	0.82	0.74	0.66	0.75	0.82	0.82	0.47	0.66	0.75
FAP	0.723	0.77	0.69	0.52	0.83	0.69	0.64	0.77	0.77	0.85	0.58	0.73	0.84
CTHRC1	0.699	0.8	0.58	0.38	0.87	0.81	0.53	0.81	0.74	0.69	0.61	0.77	0.8
VCAN	0.697	0.76	0.67	0.66	0.87	0.83	0.12	0.79	0.81	0.83	0.56	0.62	0.84
SULF1	0.697	0.85	0.7	0.63	0.88	0.79	0.5	0.84	0.75	0.62	0.49	0.76	0.55
FN1	0.678	0.74	0.81	0.68	0.69	0.78	0.48	0.66	0.78	0.82	0.43	0.61	0.66
INHBA	0.672	0.63	0.8	0.53	0.76	0.37	0.58	0.77	0.73	0.87	0.54	0.75	0.73
ASPN	0.672	0.82	0.71	0.41	0.79	0.75	0.56	0.71	0.77	0.8	0.6	0.46	0.68
SFRP2	0.671	0.82	0.57	0.56	0.73	0.79	0.51	0.81	0.79	0.81	0.36	0.46	0.84
SPARC	0.665	0.77	0.71	0.69	0.84	0.83	0.22	0.73	0.84	0.81	0.52	0.68	0.34
OLFML2B	0.663	0.78	0.59	0.6	0.7	0.79	0.6	0.74	0.71	0.77	0.46	0.56	0.66
COL6A3	0.656	0.79	0.62	0.56	0.82	0.78	0.61	0.66	0.81	0.76	0.24	0.52	0.7
ADAMTS12	0.652	0.73	0.52	0.2	0.8	0.72	0.5	0.62	0.65	0.8	0.27	0.72	0.52

Top 10% COL11A1 Correlated Genes in Each Cancer Type

GeneID	Average Correlation												
	Bladder (129)	Breast (526)	Cervical (207)	Colorectal (244)	Head and Neck (244)	Kidney (207)	Lung Adeno (230)	Lung Squamous (178)	Ovarian (489)	Prostate (487)	Stomach (265)	Thyroid (489)	
COL11A1													
COL3A1	0.757	0.85	0.67	0.63	0.88	0.85	0.66	0.83	0.86	0.85	0.55	0.66	0.79
COL5A1	0.723	0.83	0.79	0.57	0.82	0.74	0.66	0.75	0.82	0.82	0.47	0.66	0.75
FAP	0.723	0.77	0.69	0.52	0.83	0.69	0.64	0.77	0.77	0.85	0.58	0.73	0.84
CTHRC1	0.699	0.8	0.58	0.38	0.87	0.81	0.53	0.81	0.74	0.69	0.61	0.77	0.8
VCAN	0.697	0.76	0.67	0.66	0.87	0.83	0.12	0.79	0.81	0.83	0.56	0.62	0.84
SULF1	0.697	0.85	0.7	0.63	0.88	0.79	0.5	0.84	0.75	0.62	0.49	0.76	0.55
FN1	0.678	0.74	0.81	0.68	0.69	0.78	0.48	0.66	0.78	0.82	0.43	0.61	0.66
INHBA	0.672	0.63	0.8	0.53	0.76	0.37	0.58	0.77	0.73	0.87	0.54	0.75	0.73
ASPN	0.672	0.82	0.71	0.41	0.79	0.75	0.56	0.71	0.77	0.8	0.6	0.46	0.68
SFRP2	0.671	0.82	0.57	0.56	0.73	0.79	0.51	0.81	0.79	0.81	0.36	0.46	0.84
SPARC	0.665	0.77	0.71	0.69	0.84	0.83	0.22	0.73	0.84	0.81	0.52	0.68	0.34
OLFML2B	0.663	0.78	0.59	0.6	0.7	0.79	0.6	0.74	0.71	0.77	0.46	0.56	0.66
COL6A3	0.656	0.79	0.62	0.56	0.82	0.78	0.61	0.66	0.81	0.76	0.24	0.52	0.7
ADAMTS12	0.652	0.76	0.56	0.6	0.8	0.72	0.5	0.69	0.85	0.8	0.37	0.72	0.52

Multi-Cancer COL11A1 Correlated Gene Signature

GeneID	Average Correlation												
	Bladder (129)	Breast(526)	Cervical (207)	Colorectal (244)	Head and Neck (279)	Kidney (207)	Lung Adeno (230)	Lung Squamous (178)	Ovarian (489)	Prostate (487)	Stomach (265)	Thyroid (489)	
COL11A1													
COL3A1	0.757	0.85	0.67	0.63	0.88	0.85	0.66	0.83	0.86	0.85	0.55	0.66	0.79
COL5A1	0.723	0.83	0.79	0.57	0.82	0.74	0.66	0.75	0.82	0.82	0.47	0.66	0.75
FAP	0.723	0.77	0.69	0.52	0.83	0.69	0.64	0.77	0.77	0.85	0.58	0.73	0.84
CTHRC1	0.699	0.8	0.58	0.38	0.87	0.81	0.53	0.81	0.74	0.69	0.61	0.77	0.8
VCAN	0.697	0.76	0.67	0.66	0.87	0.83	0.12	0.79	0.81	0.83	0.56	0.62	0.84
SULF1	0.697	0.85	0.7	0.63	0.88	0.79	0.5	0.84	0.75	0.62	0.49	0.76	0.55
FN1	0.678	0.74	0.81	0.68	0.69	0.78	0.48	0.66	0.78	0.82	0.43	0.61	0.66
INHBA	0.672	0.63	0.8	0.53	0.76	0.37	0.58	0.77	0.73	0.87	0.54	0.75	0.73
ASPN	0.672	0.82	0.71	0.41	0.79	0.75	0.56	0.71	0.77	0.8	0.6	0.46	0.68
SFRP2	0.671	0.82	0.57	0.56	0.73	0.79	0.51	0.81	0.79	0.81	0.36	0.46	0.84
SPARC	0.665	0.77	0.71	0.69	0.84	0.83	0.22	0.73	0.84	0.81	0.52	0.68	0.34
OLFML2B	0.663	0.78	0.59	0.6	0.7	0.79	0.6	0.74	0.71	0.77	0.46	0.56	0.66
COL6A3	0.656	0.79	0.62	0.56	0.82	0.78	0.61	0.66	0.81	0.76	0.24	0.52	0.7
ADAMTS12	0.652	0.76	0.56	0.6	0.8	0.73	0.5	0.69	0.85	0.8	0.27	0.73	0.53
ITGBL1	0.652	0.67	0.66	0.65	0.71	0.65	0.64	0.51	0.67	0.77	0.71	0.42	0.76
CDH11	0.648	0.74	0.7	0.52	0.76	0.73	0.57	0.51	0.75	0.7	0.5	0.55	0.75
LUM	0.643	0.73	0.7	0.46	0.81	0.68	0.51	0.65	0.65	0.85	0.31	0.52	0.84
GREM1	0.632	0.74	0.53	0.54	0.74	0.67	0.53	0.81	0.79	0.79	0.46	0.27	0.71
MMP11	0.632	0.7	0.71	0.53	0.58	0.78	0.01	0.71	0.69	0.81	0.49	0.76	0.81
PRRX1	0.632	0.79	0.64	0.48	0.78	0.68	0.59	0.76	0.69	0.79	0.19	0.58	0.61
CTSK	0.623	0.78	0.65	0.47	0.77	0.78	0.1	0.75	0.8	0.81	0.37	0.51	0.69
WISP1	0.622	0.76	0.64	0.45	0.72	0.63	0.5	0.73	0.71	0.71	0.26	0.58	0.77
FBN1	0.62	0.74	0.73	0.6	0.88	0.72	0.36	0.67	0.85	0.82	0.36	0.45	0.26
COL8A1	0.619	0.65	0.71	0.63	0.83	0.7	0.41	0.52	0.79	0.77	0.49	0.45	0.48
SFRP4	0.614	0.8	0.41	0.27	0.75	0.74	0.43	0.7	0.65	0.64	0.68	0.53	0.77
HTRA3	0.608	0.82	0.71	0.57	0.64	0.7	0.53	0.8	0.75	0.62	0.24	0.52	0.4
EPYC	0.605	0.77	0.62	0.4	0.73	0.57	0.24	0.79	0.65	0.79	0.24	0.74	0.72
MMP2	0.602	0.73	0.59	0.5	0.79	0.68	0.38	0.65	0.83	0.8	0.24	0.41	0.62
THY1	0.599	0.72	0.71	0.65	0.73	0.8	0.4	0.75	0.81	0.44	0.49	0.59	0.1
ZNF469	0.595	0.78	0.54	0.59	0.72	0.76	0.37	0.53	0.75	0.68	0.15	0.61	0.66
COMP	0.588	0.66	0.56	0.53	0.61	0.58	0.6	0.59	0.59	0.57	0.53	0.5	0.73
PCOLCE	0.587	0.75	0.65	0.47	0.73	0.8	0.26	0.63	0.76	0.7	0.21	0.47	0.61
NOX4	0.586	0.64	0.75	0.56	0.77	0.76	-0.2	0.79	0.67	0.41	0.59	0.71	0.58
CORIN	0.581	0.55	0.74	0.56	0.75	0.73	0.2	0.67	0.82	0.67	0.13	0.51	0.64
ANTXR1	0.581	0.72	0.77	0.47	0.88	0.66	0.21	0.67	0.79	0.68	0.35	0.59	0.18
PODNL1	0.579	0.76	0.64	0.42	0.5	0.53	0.55	0.56	0.7	0.48	0.36	0.66	0.79
TNFAIP6	0.574	0.77	0.56	0.53	0.69	0.73	-0.12	0.75	0.62	0.72	0.29	0.67	0.68
MFAP5	0.573	0.75	0.75	0.55	0.72	0.5	0.38	0.81	0.67	0.52	0.24	0.22	0.77
GLT8D2	0.571	0.7	0.65	0.49	0.76	0.74	0.53	0.76	0.82	0.7	0.31	0.31	0.08
PDGFRB	0.57	0.7	0.56	0.49	0.71	0.68	0.61	0.47	0.77	0.77	0.39	0.48	0.21
COL6A2	0.562	0.75	0.64	0.52	0.59	0.78	0.44	0.64	0.77	0.71	0.05	0.27	0.58
OMD	0.557	0.76	0.57	0.29	0.58	0.72	0.46	0.67	0.79	0.68	0.27	0.17	0.72
P4HA3	0.555	0.68	0.7	0.57	0.73	0.76	0.37	0.64	0.57	0.67	0.13	0.62	0.22
TNFSF4	0.55	0.73	0.57	0.37	0.75	0.58	0.27	0.68	0.6	0.63	0.17	0.62	0.63
ISLR	0.548	0.8	0.3	0.47	0.68	0.81	0.53	0.78	0.76	0.48	0.26	0.47	0.23
LOX	0.548	0.74	0.59	0.18	0.76	0.47	0.33	0.68	0.58	0.72	0.14	0.7	0.68
ALPK2	0.547	0.62	0.63	0.61	0.7	0.62	0.03	0.7	0.68	0.78	0.15	0.31	0.73
ANGPTL2	0.546	0.67	0.58	0.49	0.75	0.65	0.24	0.7	0.76	0.67	0.25	0.34	0.45
COL5A3	0.543	0.57	0.67	0.44	0.59	0.66	0.47	0.64	0.77	0.75	0.23	0.59	0.14
RCN3	0.543	0.71	0.59	0.4	0.54	0.73	0.31	0.57	0.58	0.58	0.35	0.55	0.61
COL8A2	0.542	0.7	0.8	0.3	0.77	0.56	0.2	0.66	0.73	0.51	0.36	0.32	0.59
LOXL2	0.542	0.6	0.7	0.51	0.62	0.57	0.22	0.64	0.73	0.7	0.32	0.59	0.3

Multi-Cancer COL11A1 Correlated Gene Signature

Co-Expressed

Anti-Expressed

GeneID	Average Correlation											GeneID	Average Correlation															
	Bladder (129)	Breast(526)	Cervical (207)	Colorectal (244)	Head and Neck (279)	Kidney (207)	Lung Adeno (230)	Lung Squamous (178)	Ovarian (489)	Prostate (487)	Stomach (285)		Thyroid (489)	Thyroid (489)	Bladder (129)	Breast(526)	Cervical (207)	Colorectal (244)	Head and Neck (279)	Kidney (207)	Lung Adeno (230)	Lung Squamous (178)	Ovarian (489)	Prostate (487)	Stomach (285)	Thyroid (489)		
COL11A1													CALM3	0.05	-0.19	-0.01	-0.04	-0.01	-0.07	0	-0.05	0.03	0.05	0.11	0.04	0	-0.19	
COL3A1	0.757	0.85	0.67	0.63	0.88	0.85	0.66	0.83	0.86	0.85	0.55	0.66	0.79	0.05	-0.02	-0.04	-0.02	-0.08	0.03	-0.03	0.04	-0.06	0.07	-0.01	0.04	0.16	-0.02	
COL5A1	0.723	0.83	0.79	0.57	0.82	0.74	0.66	0.75	0.82	0.82	0.47	0.66	0.75	0.05	-0.1	0.06	-0.01	0.02	-0.01	-0.02	0.09	0.07	-0.07	-0.02	0.07	0.06	-0.1	
FAP	0.723	0.77	0.69	0.52	0.83	0.69	0.64	0.77	0.77	0.85	0.58	0.73	0.84	0.05	0	0.05	-0.04	0.05	-0.03	0.01	0.14	-0.08	-0.01	-0.07	0.03	0.09	0	
CTHRC1	0.699	0.8	0.58	0.38	0.87	0.81	0.53	0.81	0.74	0.69	0.61	0.77	0.8	0.05	0	0.05	-0.04	0.05	-0.03	0.01	0.14	-0.08	-0.01	-0.07	0.03	0.09	0	
VCAN	0.697	0.76	0.67	0.66	0.87	0.83	0.12	0.79	0.81	0.83	0.56	0.62	0.84	0.05	0.08	-0.01	0.04	-0.02	-0.04	0.05	0.05	-0.01	0.03	-0.07	0.09	0.11	0.08	
SULF1	0.697	0.85	0.7	0.63	0.88	0.79	0.5	0.84	0.75	0.62	0.49	0.76	0.55	0.049	0.04	0.01	-0.19	0.03	0.03	-0.03	0.06	-0.08	0.03	-0.01	0.03	-0.05	0.04	
FN1	0.678	0.74	0.81	0.68	0.69	0.78	0.48	0.66	0.78	0.82	0.43	0.61	0.66	0.049	-0.04	0	0.05	0.05	-0.11	-0.1	-0.01	0.02	0.05	-0.1	0.04	0.02	-0.04	
INHBA	0.672	0.63	0.8	0.53	0.76	0.37	0.58	0.77	0.73	0.87	0.54	0.75	0.73	0.049	-0.07	0.05	-0.04	-0.01	-0.01	-0.02	-0.02	-0.11	-0.02	0	0.02	-0.22	-0.07	
ASPEN	0.672	0.82	0.71	0.41	0.79	0.75	0.56	0.71	0.77	0.8	0.6	0.46	0.68	0.049	0.05	-0.09	0.13	0.05	-0.03	0	0.03	-0.06	0.02	-0.04	0.03	0.06	0.05	
SFRP2	0.671	0.82	0.57	0.56	0.73	0.79	0.51	0.81	0.79	0.81	0.36	0.46	0.84	0.049	-0.06	-0.06	0	-0.05	0.01	-0.01	0	-0.03	0.16	-0.16	0.04	0.01	-0.06	
SPARC	0.665	0.77	0.71	0.69	0.84	0.83	0.22	0.73	0.84	0.81	0.52	0.68	0.34	0.049	-0.07	-0.1	-0.01	-0.02	-0.06	0.01	-0.1	0.05	0.08	0	0.06	0.03	-0.07	
OLFML2B	0.663	0.78	0.59	0.6	0.7	0.79	0.6	0.74	0.71	0.77	0.46	0.56	0.66	0.049	-0.01	0.08	0	0.01	-0.01	0.08	-0.01	0.06	0.17	-0.05	0.01	0.1	-0.01	
COL6A3	0.656	0.79	0.62	0.56	0.82	0.78	0.61	0.66	0.81	0.76	0.24	0.52	0.7	0.049	-0.01	0.01	0.1	-0.02	-0.09	-0.1	0.06	-0.05	0.07	-0.04	-0.02	0.02	-0.01	
ADAMTS12	0.652	0.76	0.56	0.6	0.8	0.73	0.5	0.69	0.85	0.8	0.27	0.73	0.53	0.049	-0.03	-0.14	0.07	0.02	0.02	0.06	-0.02	0.03	0.05	-0.07	0.02	0.06	0.03	
ITGBL1	0.652	0.67	0.66	0.65	0.71	0.65	0.64	0.51	0.67	0.77	0.71	0.42	0.76	0.049	0.06	-0.08	0.02	0.03	0.03	0.01	-0.04	-0.09	0	-0.13	0.08	0.02	0.06	
CDH11	0.648	0.74	0.7	0.52	0.76	0.73	0.57	0.51	0.75	0.7	0.5	0.55	0.75	0.049	0.01	0.1	0	-0.08	0.07	0.05	0.01	0	0.07	-0.06	0	0.14	0.01	
LUM	0.643	0.73	0.7	0.46	0.81	0.68	0.51	0.65	0.65	0.85	0.31	0.52	0.84	0.049	0.01	-0.09	0.04	0.04	-0.01	-0.04	0.1	0.09	0.01	-0.01	-0.1	0.05	0.01	
GREM1	0.632	0.74	0.53	0.54	0.74	0.67	0.53	0.81	0.79	0.79	0.46	0.27	0.71	0.049	-0.03	0	0.11	0	0	0.09	-0.08	0.09	0.09	0.06	0.04	0	-0.03	
MMP11	0.632	0.7	0.71	0.53	0.58	0.78	0.01	0.71	0.69	0.81	0.49	0.76	0.81	0.049	-0.05	0.08	-0.04	0.11	-0.03	0.05	0.11	0	-0.02	-0.09	0.01	0	-0.05	
PRRX1	0.632	0.79	0.64	0.48	0.78	0.68	0.59	0.76	0.69	0.79	0.19	0.58	0.61	0.049	0.01	0	0.03	0.08	0.06	-0.04	-0.04	-0.03	0.09	-0.08	0.13	0	0.01	
CTSK	0.623	0.78	0.65	0.47	0.77	0.78	0.1	0.75	0.8	0.81	0.37	0.51	0.69	0.049	0.05	0.06	-0.01	-0.01	0.05	-0.02	0.06	0.01	-0.01	-0.11	0.15	0.05	0.05	
WISP1	0.622	0.76	0.64	0.45	0.72	0.63	0.5	0.73	0.71	0.71	0.26	0.58	0.77	0.049	-0.03	-0.09	-0.02	-0.1	-0.02	0.04	0.01	-0.01	-0.02	-0.12	-0.11	-0.02	-0.03	
FBN1	0.62	0.74	0.73	0.6	0.88	0.72	0.36	0.67	0.85	0.82	0.36	0.45	0.26	0.049	0.01	-0.1	-0.04	0.13	-0.05	0.01	0	0.02	0.01	-0.13	0.07	0.02	0.01	
COL8A1	0.619	0.65	0.71	0.63	0.83	0.7	0.41	0.52	0.79	0.77	0.49	0.45	0.48	0.049	-0.02	-0.17	0.12	-0.02	-0.06	-0.02	0.05	0	0.01	0	0.06	0.06	-0.02	
SFRP4	0.614	0.8	0.41	0.27	0.75	0.74	0.43	0.7	0.65	0.64	0.68	0.53	0.77	0.049	0.01	-0.04	-0.1	0.03	0.01	0.01	0.07	-0.08	-0.01	-0.09	0.08	-0.06	0.01	
HTRA3	0.608	0.82	0.71	0.57	0.64	0.7	0.53	0.8	0.75	0.62	0.24	0.52	0.4	0.049	0.02	0.01	0.03	-0.01	0.03	0.03	0.23	-0.06	0.05	-0.09	0	-0.03	0.02	
EPYC	0.605	0.77	0.62	0.4	0.73	0.57	0.24	0.79	0.65	0.79	0.24	0.74	0.72	0.049	0.06	0.02	-0.03	-0.03	0	-0.16	-0.02	0.04	0.01	-0.02	-0.14	-0.06	0.06	
MMP2	0.602	0.73	0.59	0.5	0.79	0.68	0.38	0.65	0.83	0.8	0.24	0.41	0.62	0.049	-0.08	0	0.11	0.02	0.04	-0.08	-0.02	-0.09	0.06	-0.08	-0.01	0	-0.08	
THY1	0.599	0.72	0.71	0.65	0.73	0.8	0.4	0.75	0.81	0.44	0.49	0.59	0.1	0.049	-0.01	-0.07	0.06	-0.06	-0.01	0.06	-0.02	-0.02	-0.01	-0.11	0.08	0.08	0.01	
ZNF469	0.595	0.78	0.54	0.59	0.72	0.76	0.37	0.53	0.75	0.68	0.15	0.61	0.66	0.049	0	-0.03	-0.06	0.1	0	0	-0.03	0.03	0.07	-0.14	-0.05	0.08	0	
COMP	0.588	0.66	0.56	0.53	0.61	0.58	0.6	0.59	0.59	0.57	0.53	0.5	0.73	0.048	-0.05	0	0.01	-0.02	0	0.09	0	-0.12	-0.08	-0.12	0.02	0.07	-0.05	
PCOLCE	0.587	0.75	0.65	0.47	0.73	0.8	0.26	0.63	0.76	0.7	0.21	0.47	0.61	0.048	-0.11	0.16	0.06	0.05	-0.01	0.2	-0.03	0.01	0.01	0.03	-0.01	-0.04	0.02	-0.11
NOX4	0.586	0.64	0.75	0.56	0.77	0.76	-0.2	0.79	0.67	0.41	0.59	0.71	0.58	0.048	-0.04	0.12	-0.01	-0.05	0.01	-0.01	0	0.09	0.06	-0.12	-0.04	-0.03	-0.04	
CORIN	0.581	0.55	0.74	0.56	0.75	0.73	0.2	0.67	0.82	0.67	0.13	0.51	0.64	0.048	0.04	-0.05	-0.05	-0.03	0.07	0	-0.01	-0.1	-0.02	-0.11	0.06	0.04	0.04	
ANTXR1	0.581	0.72	0.77	0.47	0.88	0.66	0.21	0.67	0.79	0.68	0.35	0.59	0.18	0.048	-0.02	-0.05	0.03	-0.11	0.03	0.02	0.05	0.04	0.03	0.03	0.11	0.06	-0.02	
PODNL1	0.579	0.76	0.64	0.42	0.5	0.53	0.55	0.56	0.7	0.48	0.36	0.66	0.79	0.048	-0.04	-0.01	-0.05	-0.1	-0.05	-0.02	0.02	0.05	0.01	0.06	-0.03	-0.14	-0.04	
TNFAIP6	0.574	0.77	0.56	0.53	0.69	0.73	-0.12	0.75	0.62	0.72	0.29	0.67	0.68	0.048	-0.04	-0.04	-0.04	0.05	0.04	-0.01	0.01	0.07	-0.07	-0.08	-0.12	0.01	-0.04	
MFAP5	0.573	0.75	0.75	0.55	0.72	0.5	0.38	0.81	0.67	0.52	0.24	0.22	0.77	0.048	-0.04	0.06	0.06	0.03	-0.08	-0.06	-0.02	0.02	-0.01	-0.07	-0.07	-0.06	-0.04	
GLT8D2	0.571	0.7	0.65	0.49	0.76	0.74	0.53	0.76	0.82	0.7	0.31	0.31	0.08	0.048	-0.07	0	0.03	0	-0.03	-0.03	-0.03	0.05	0.05	-0.12	0.06	0.11	-0.07	
PDGFRB	0.57	0.7	0.56	0.49	0.71	0.68	0.61	0.47	0.77	0.77	0.39	0.48	0.21	0.048	0.03	-0.05	-0.08	0	-0.04	0.1	0.06	0	0.08	-0.05	0.01	0.08	0.03	
COL6A2	0.562	0.75	0.64	0.52	0.59	0.78	0.44	0.64	0.77	0.71	0.05	0.27	0.58	0.048	-0.03	0	0.04	0.02	-0.02	0.07	0.06	-0.1	-0.02	-0.11	0.02	0.09	0.03	
OMD	0.557	0.76	0.57	0.29	0.58	0.72	0.46	0.67	0.79	0.68	0.27	0.17	0.72	0.048	-0.04	0.05	0	-0.04	-0.12	0.02	-0.02	0	0.08	-0.08	0.01	0.12	-0.04	
P4HA3	0.555	0.68	0.7	0.57	0.73	0.76	0.37	0.64	0.57	0.67	0.13	0.62	0.22	0.048	-0.03	0	0.03	-0.11	0.02	-0.03	0	0.08	0.03	-0.15	0.01	0.09	0.03	
TNFSF4	0.55	0.73	0.57	0.37	0.75	0.58	0.27	0.68	0.6	0.63	0.17	0.62	0.63	0.048	0.02	0.05	0.03	0.08	0.05	0.06	-0.05	0.08	-0.02	0.03	-0.06	0.05	0.02	
ISLR	0.548	0.8	0.3	0.47	0.68	0.81	0.53	0.78	0.76	0.48	0.26	0.47	0.23	0.048	0	0	-0.05	0	-0.1	0	-0.06	-0.03	0.03	-0.14	0.09	0.08	0	
LOX	0.548	0.74	0.59	0.18	0.76	0.47	0.33	0.68	0.58	0.72	0.14	0.7	0.68	0.048	-0.02	-0.06	0.02	0	-0.1	-0.01	0.01	-0.08	0.17	-0.02	0.03	0.05	-0.02	

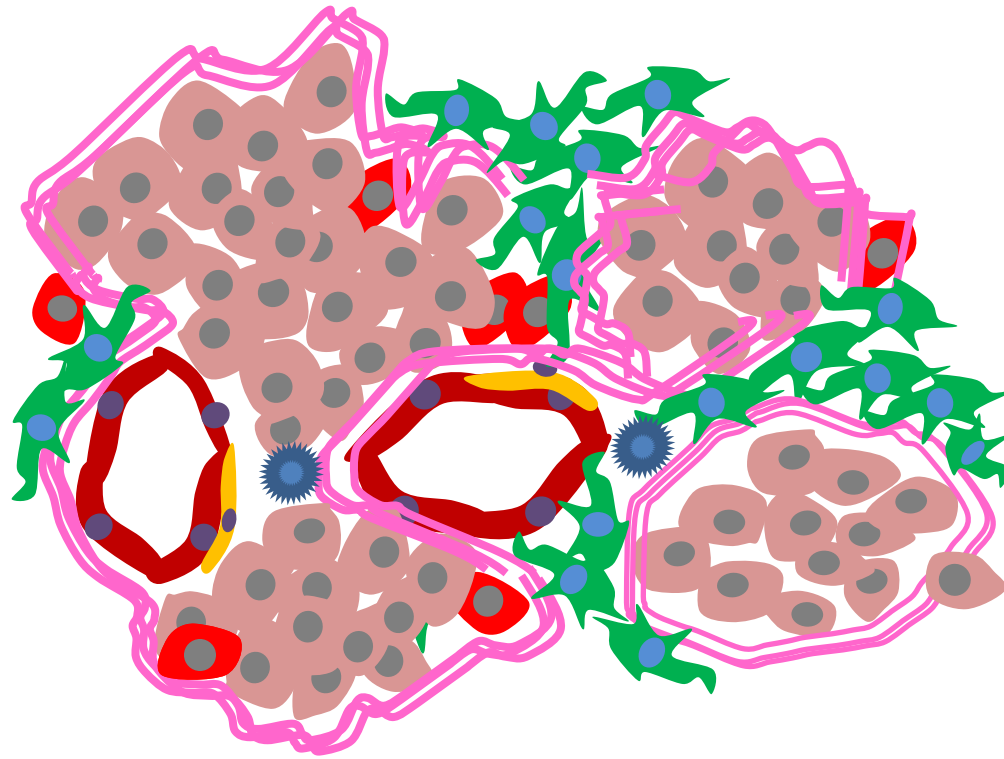
Multi-Cancer COL11A1 Correlated Gene Signature

Co-Expressed

Anti-Expressed

GeneID	Average Correlation										GeneID	Average Correlation																	
	Bladder (129)	Breast(526)	Cervical (207)	Colorectal (244)	Head and Neck (279)	Kidney (207)	Lung Adeno (230)	Lung Squamous (178)	Ovarian (489)	Prostate (487)		Stomach (285)	Thyroid (489)	Thyroid (489)	Bladder (129)	Breast(526)	Cervical (207)	Colorectal (244)	Head and Neck (279)	Kidney (207)	Lung Adeno (230)	Lung Squamous (178)	Ovarian (489)	Prostate (487)	Stomach (285)	Thyroid (489)			
COL11A1	0.757	0.85	0.67	0.63	0.88	0.85	0.66	0.83	0.86	0.85	0.55	0.66	0.79	CALM3	0.05	-0.19	-0.01	-0.04	-0.01	-0.07	0	-0.05	0.03	0.05	0.11	0.04	0	-0.19	
COL3A1														LYZL6	0.05	-0.02	-0.04	-0.02	-0.08	0.03	-0.03	0.04	-0.06	0.07	-0.01	0.04	0.16	-0.02	
COL5A1	0.723	0.83	0.79	0.57	0.82	0.74	0.66	0.75	0.82	0.82	0.47	0.66	0.75	OOSP2	0.05	-0.1	0.06	-0.01	0.02	-0.01	-0.02	0.09	0.07	-0.07	-0.02	0.07	0.06	-0.1	
FAP	0.723	0.77	0.69	0.52	0.83	0.69	0.64	0.77	0.77	0.85	0.58	0.73	0.84	OR52B2	0.05	0	0.05	-0.04	0.05	-0.03	0.01	0.14	-0.08	-0.01	-0.07	0.03	0.09	0	
CTHRC1	0.699	0.8	0.58	0.38	0.87	0.81	0.53	0.81	0.74	0.69	0.61	0.77	0.8	TRIM48	0.05	0.08	-0.01	0.04	-0.02	-0.04	0.05	0.05	-0.01	0.03	-0.07	0.09	0.11	0.08	
VCAN	0.697	0.76	0.67	0.66	0.87	0.83	0.12	0.79	0.81	0.83	0.56	0.62	0.84	KLHL21	0.049	0.04	0.01	-0.19	0.03	0.03	-0.03	0.06	-0.08	0.03	-0.01	0.03	-0.05	0.04	
SULF1	0.697	0.85	0.7	0.63	0.88	0.79	0.5	0.84	0.75	0.62	0.49	0.76	0.55	OR2G2	0.049	-0.04	0	0.05	0.05	-0.11	-0.1	-0.01	0.02	0.05	-0.1	0.04	0.02	-0.04	
FN1	0.678	0.74	0.81	0.68	0.69	0.78	0.48	0.66	0.78	0.82	0.43	0.61	0.66	ATP13A5	0.049	-0.07	0.05	-0.04	-0.01	-0.01	-0.02	-0.02	-0.11	-0.02	0	0.02	-0.22	-0.07	
INHBA	0.672	0.63	0.8	0.53	0.76	0.37	0.58	0.77	0.73	0.87	0.54	0.75	0.73	C2CD2L	0.049	0.05	-0.09	0.13	0.05	-0.03	0	0.03	-0.06	0.02	-0.04	0.03	0.06	0.05	
ASPN	0.672	0.82	0.71	0.41	0.79	0.75	0.56	0.71	0.77	0.8	0.6	0.46	0.68	GPR128	0.049	-0.06	-0.06	0	-0.05	0.01	-0.01	0	-0.03	0.16	-0.16	0.04	0.01	-0.06	
SFRP2	0.671	0.82	0.57	0.56	0.73	0.79	0.51	0.81	0.79	0.81	0.36	0.46	0.84	GPR139	0.049	-0.07	-0.1	-0.01	-0.02	-0.06	0.01	-0.1	0.05	0.08	0	0.06	0.03	-0.07	
SPARC	0.665	0.77	0.71	0.69	0.84	0.83	0.22	0.73	0.84	0.81	0.52	0.68	0.34	HTN3	0.049	-0.01	0.08	0	0.01	-0.01	0.08	-0.01	0.06	0.17	-0.05	0.01	0.1	-0.01	
OLFML2B	0.663	0.78	0.59	0.6	0.7	0.79	0.6	0.74	0.71	0.77	0.46	0.56	0.66	LINC00032	0.049	-0.01	0.01	0.1	-0.02	-0.09	-0.1	0.06	-0.05	0.07	-0.04	-0.02	0.02	-0.03	
COL6A3	0.656	0.79	0.62	0.56	0.82	0.78	0.61	0.66	0.81	0.76	0.24	0.52	0.7	NBPF1	0.049	-0.03	-0.14	0.07	0.02	0.02	0.06	-0.02	-0.03	0.05	-0.07	0.02	0.06	0.03	
ADAMTS12	0.652	0.76	0.56	0.6	0.8	0.73	0.5	0.69	0.85	0.8	0.27	0.73	0.53	NEUROD2	0.049	0.06	-0.08	0.02	0.03	0.03	0.01	-0.04	-0.09	0	-0.13	0.08	0.02	0.06	
ITGBL1	0.652	0.67	0.66	0.65	0.71	0.65	0.64	0.51	0.67	0.77	0.71	0.42	0.76	OR1G1	0.049	0.01	0.1	0	-0.08	0.07	0.05	0.01	0	0.07	-0.06	0	0.14	0.01	
CDH11	0.648	0.74	0.7	0.52	0.76	0.73	0.57	0.51	0.75	0.7	0.5	0.55	0.75	OR4M1	0.049	0.01	-0.09	0.04	0.04	-0.01	-0.04	0.1	0.09	0.01	-0.01	-0.1	0.05	0.01	
LUM	0.643	0.73	0.7	0.46	0.81	0.68	0.51	0.65	0.65	0.85	0.31	0.52	0.84	OR52J3	0.049	-0.03	0	0.11	0	0	0.09	-0.08	0.09	0.09	0.06	0.04	0	-0.03	
GREM1	0.632	0.74	0.53	0.54	0.74	0.67	0.53	0.81	0.79	0.79	0.46	0.27	0.71	OR5M10	0.049	-0.05	0.08	-0.04	0.11	-0.03	0.05	0.11	0	-0.02	-0.09	0.01	0	-0.05	
MMP11	0.632	0.7	0.71	0.53	0.58	0.78	0.01	0.71	0.69	0.81	0.49	0.76	0.81	OR8B4	0.049	0.01	0	0.03	0.08	0.06	-0.04	-0.04	-0.03	0.09	-0.08	0.13	0	0.01	
PRRX1	0.632	0.79	0.64	0.48	0.78	0.68	0.59	0.76	0.69	0.79	0.19	0.58	0.61	OR8D2	0.049	0.05	0.06	-0.01	-0.01	0.05	-0.02	0.06	0.01	-0.01	-0.11	0.15	0.05	0.05	
CTSK	0.623	0.78	0.65	0.47	0.77	0.78	0.1	0.75	0.8	0.81	0.37	0.51	0.69	PROKR1	0.049	-0.03	-0.09	-0.02	-0.1	-0.02	0.04	0.01	-0.01	-0.02	-0.12	-0.11	-0.02	-0.03	
WISP1	0.622	0.76	0.64	0.45	0.72	0.63	0.5	0.73	0.71	0.71	0.26	0.58	0.77	SPAM1	0.049	0.01	-0.1	-0.04	0.13	-0.05	0.01	0	0.02	0.01	-0.13	0.07	0.02	0.01	
FBN1	0.62	0.74	0.73	0.6	0.88	0.72	0.36	0.67	0.85	0.82	0.36	0.45	0.26	SPPL2C	0.049	-0.02	-0.17	0.12	-0.02	-0.06	-0.02	0.05	0	0.01	0	0.06	0.06	-0.02	
COL8A1	0.619	0.65	0.71	0.63	0.83	0.7	0.41	0.52	0.79	0.77	0.49	0.45	0.48	TAS2R43	0.049	0.01	-0.04	-0.1	0.03	0.01	0.01	0.07	-0.08	-0.01	-0.09	0.08	-0.06	0.01	
SFRP4	0.614	0.8	0.41	0.27	0.75	0.74	0.43	0.7	0.65	0.64	0.68	0.53	0.77	TIRAP	0.049	0.02	0.01	0.03	-0.01	0.03	0.03	0.23	-0.06	0.05	-0.09	0	-0.03	0.02	
HTRA3	0.608	0.82	0.71	0.57	0.64	0.7	0.53	0.8	0.75	0.62	0.24	0.52	0.4	TMPPRSS11A	0.049	0.06	0.02	-0.03	-0.03	0	-0.16	-0.02	0.04	0.01	-0.02	-0.14	-0.06	0.06	
EPYC	0.605	0.77	0.62	0.4	0.73	0.57	0.24	0.79	0.65	0.79	0.24	0.74	0.72	BHLHE23	0.049	-0.08	0	0.11	0.02	0.04	-0.08	-0.02	-0.09	0.06	-0.08	-0.01	0	-0.08	
MMP2	0.602	0.73	0.59	0.5	0.79	0.68	0.38	0.65	0.83	0.8	0.24	0.41	0.62	F13B	0.049	-0.01	-0.07	0.06	-0.06	-0.01	0.06	-0.02	-0.02	-0.01	-0.11	0.08	0.08	0.01	
THY1	0.599	0.72	0.71	0.65	0.73	0.8	0.4	0.75	0.81	0.44	0.49	0.59	0.1	OR4X2	0.049	0	-0.03	-0.06	0.1	0	0	-0.03	0.03	0.07	-0.14	-0.05	0.08	0	
ZNF469	0.595	0.78	0.54	0.59	0.72	0.76	0.37	0.53	0.75	0.68	0.15	0.61	0.66	ACTRT2	0.048	-0.05	0	0.01	-0.02	0	0.09	0	-0.12	-0.08	-0.12	0.02	0.07	-0.05	
COMP	0.588	0.66	0.56	0.53	0.61	0.58	0.6	0.59	0.59	0.57	0.53	0.5	0.73	CDC37L1	0.048	-0.11	0.16	0.06	0.05	-0.01	0.2	-0.03	0.01	0.01	0.03	-0.01	-0.04	0.02	-0.11
PCOLCE	0.587	0.75	0.65	0.47	0.73	0.8	0.26	0.63	0.76	0.7	0.21	0.47	0.61	CRYG	0.048	-0.04	0.12	-0.01	-0.05	0.01	-0.01	0	0.09	0.06	-0.12	-0.04	-0.03	-0.04	
NOX4	0.586	0.64	0.75	0.56	0.77	0.76	-0.2	0.79	0.67	0.41	0.59	0.71	0.58	FIGLA	0.048	0.04	-0.05	-0.05	-0.03	0.07	0	-0.01	-0.1	-0.02	-0.11	0.06	0.04	0.04	
CORIN	0.581	0.55	0.74	0.56	0.75	0.73	0.2	0.67	0.82	0.67	0.13	0.51	0.64	HIST1H1A	0.048	-0.02	-0.05	0.03	-0.11	0.03	0.02	0.05	0.04	0.03	0.03	0.11	0.06	-0.02	
ANTXR1	0.581	0.72	0.77	0.47	0.88	0.66	0.21	0.67	0.79	0.68	0.35	0.59	0.18	HIST1H4F	0.048	-0.04	-0.01	-0.05	-0.1	-0.05	-0.02	0.02	0.05	0.01	0.06	-0.03	-0.14	-0.04	
PODNL1	0.579	0.76	0.64	0.42	0.5	0.53	0.55	0.56	0.7	0.48	0.36	0.66	0.79	LYG2	0.048	-0.04	-0.04	-0.04	0.05	0.04	-0.01	0.01	0.07	-0.07	-0.08	-0.12	0.01	-0.04	
TNFAIP6	0.574	0.77	0.56	0.53	0.69	0.73	-0.12	0.75	0.62	0.72	0.29	0.67	0.68	OR10A5	0.048	-0.04	0.06	0.06	0.03	-0.08	-0.06	-0.02	0.02	-0.01	-0.07	-0.07	-0.06	-0.04	
MFAP5	0.573	0.75	0.75	0.55	0.72	0.5	0.38	0.81	0.67	0.52	0.24	0.22	0.77	OR51D1	0.048	-0.07	0	0.03	0	-0.03	-0.03	-0.03	0.05	0.05	-0.12	0.06	0.11	-0.07	
GLT8D2	0.571	0.7	0.65	0.49	0.76	0.74	0.53	0.76	0.82	0.7	0.31	0.31	0.08	OR5D18	0.048	0.03	-0.05	-0.08	0	-0.04	0.1	0.06	0	0.08	-0.05	0.01	0.08	0.03	
PDGFRB	0.57	0.7	0.56	0.49	0.71	0.68	0.61	0.47	0.77	0.77	0.39	0.48	0.21	OR8D4	0.048	-0.03	0	0.04	0.02	-0.02	0.07	0.06	-0.1	-0.02	-0.11	0.02	0.09	0.03	
COL6A2	0.562	0.75	0.64	0.52	0.59	0.78	0.44	0.64	0.77	0.71	0.05	0.27	0.58	PRNT	0.048	-0.04	0.05	0	-0.04	-0.12	0.02	-0.02	0	0.08	-0.08	0.01	0.12	-0.04	
OMD	0.557	0.76	0.57	0.29	0.58	0.72	0.46	0.67	0.79	0.68	0.27	0.17	0.72	SHCBP1L	0.048	-0.03	0	0.03	-0.11	0.02	-0.03	0	0.08	0.03	-0.15	0.01	0.09	0.03	
P4HA3	0.555	0.68	0.7	0.57	0.73	0.76	0.37	0.64	0.57	0.67	0.13	0.62	0.22	TESK1	0.048	0.02	0.05	0.03	0.08	0.05	0.06	-0.05	0.08	-0.02	0.03	-0.06	0.05	0.02	
TNFSF4	0.55	0.73	0.57	0.37	0.75	0.58	0.27	0.68	0.6	0.63	0.17	0.62	0.63	OR5T3	0.048	0	0	-0.05	0	-0.1	0	-0.06	-0.03	0.03	-0.14	0.09	0.08	0	
ISLR	0.548	0.8	0.3	0.47	0.68	0.81	0.53	0.78	0.76	0.48	0																		

Is the COL11A1 Signature Present in a Specific Cell Type?



Tumor cell



CAF



MSC



Endothelial cell



Pericyte



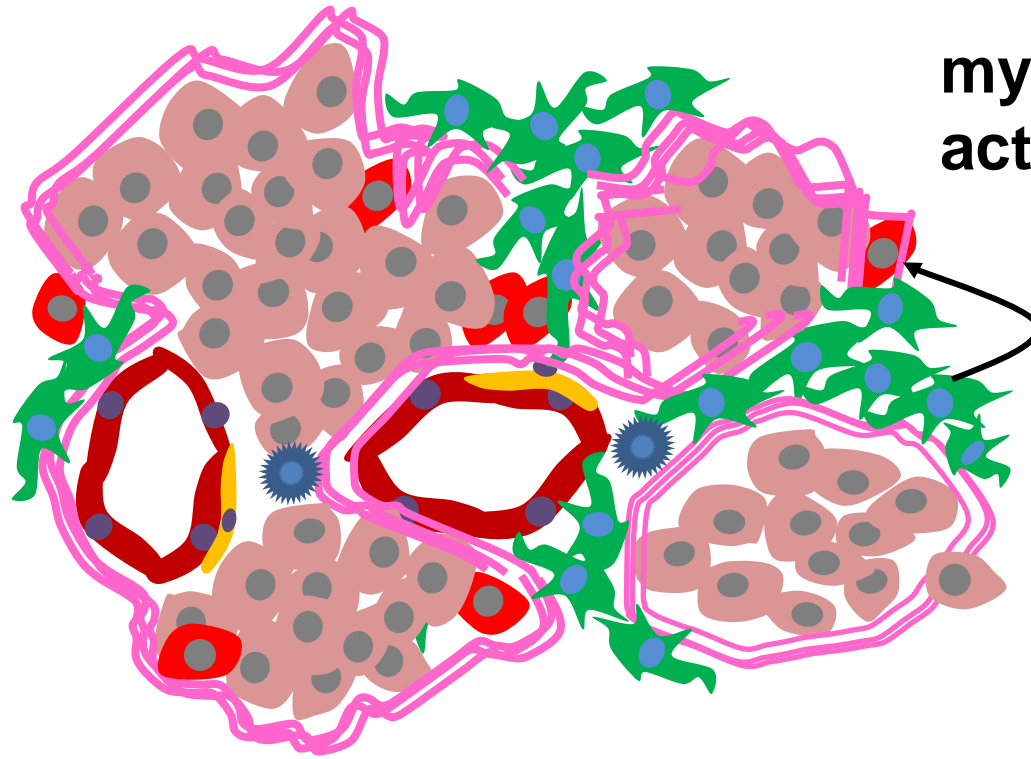
Macrophage



ECM

Is the COL11A1 Signature Present in a Specific Process?

myofibroblast
activation?



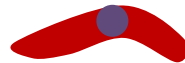
Tumor
cell



CAF



MSC



Endothelial
cell



Pericyte



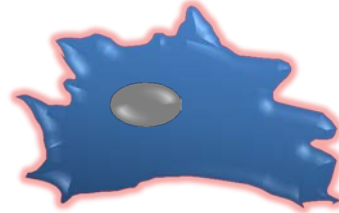
Macrophage



ECM

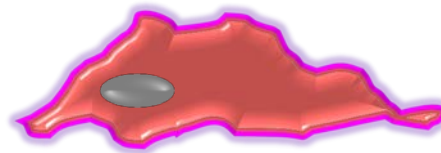
Myofibroblast Activation

fibroblast



active TGF- β 1

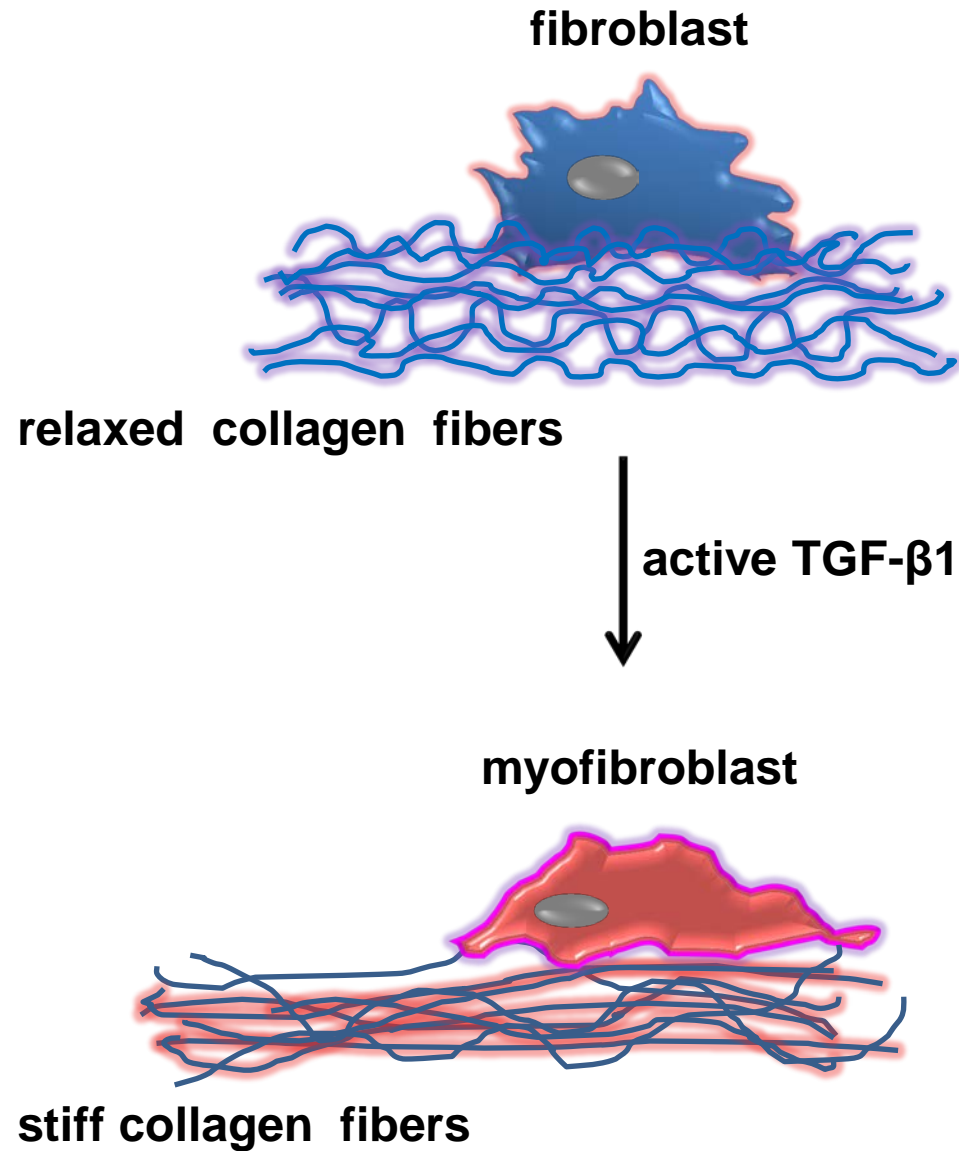
myofibroblast



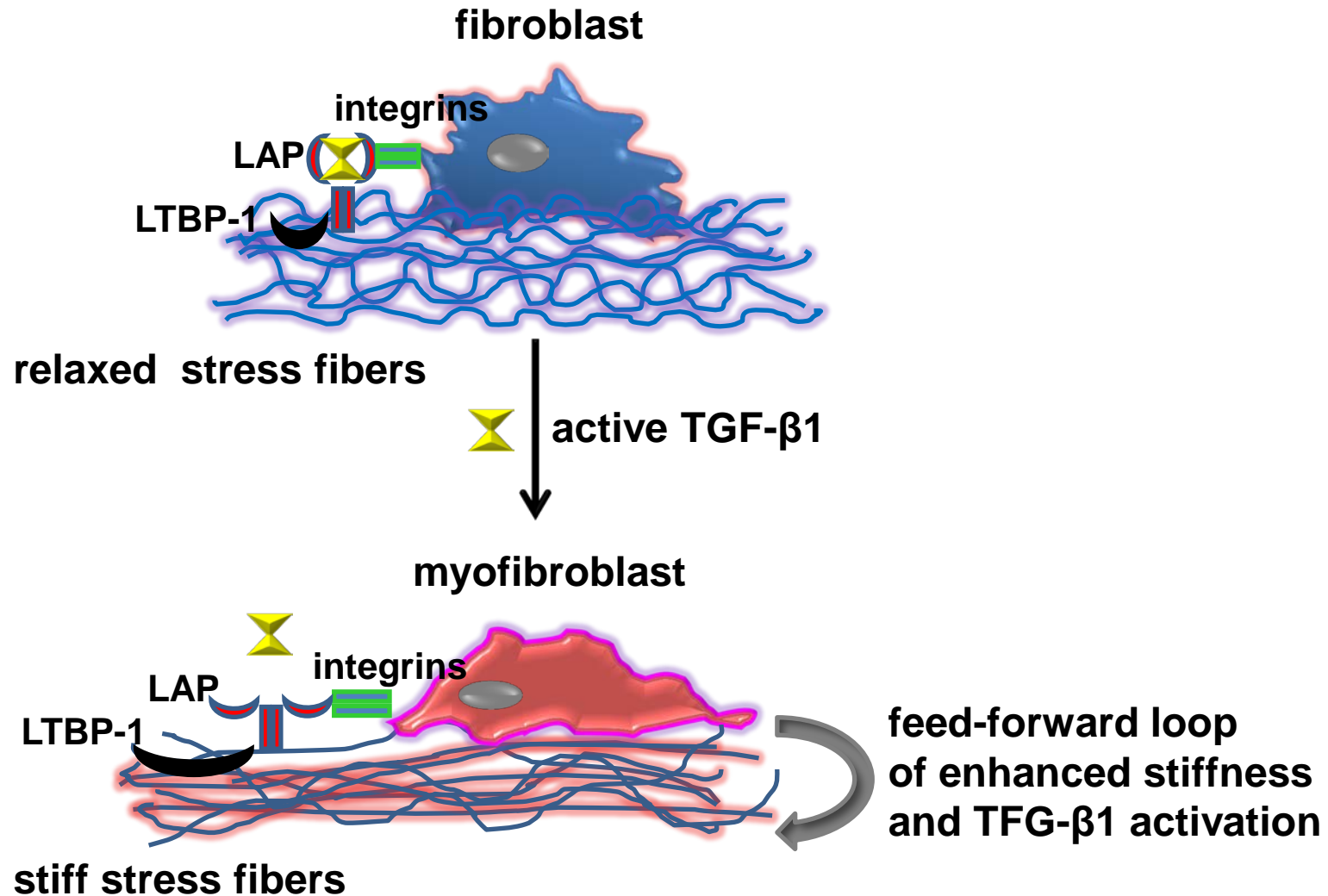
Upstream Regulators of the COL11A1 Co-Expressed Genes

Upstream Regulator	Molecule Type	p-value of overlap
TGFB1	growth factor	4.43E-40
ERBB2	kinase	1.55E-29
AHR	ligand-dependent nuclear receptor	1.66E-23
Alpha catenin	group	3.87E-23
WNT3A	cytokine	1.27E-19
Tgf beta	group	1.57E-19
dexamethasone	chemical drug	1.03E-16
HRAS	enzyme	2.05E-16
FGF2	growth factor	2.65E-16
TGFB3	growth factor	3.81E-16
CD44	enzyme	3.74E-15
EGFR	kinase	6.82E-15
SMAD7	transcription regulator	8.80E-15
TWIST1	transcription regulator	1.25E-14
RHOA	enzyme	2.02E-11
Pdgf (complex)	complex	7.98E-10
miR-29b	mature microRNA	9.28E-10

Myofibroblast Activation



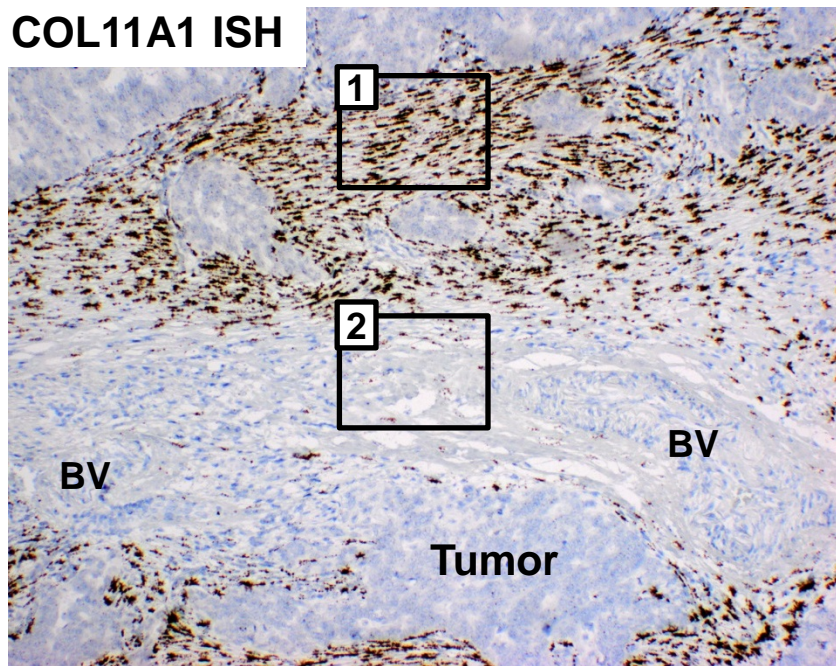
Stress Fibers Determine the Efficacy of TGF- β 1 Activation



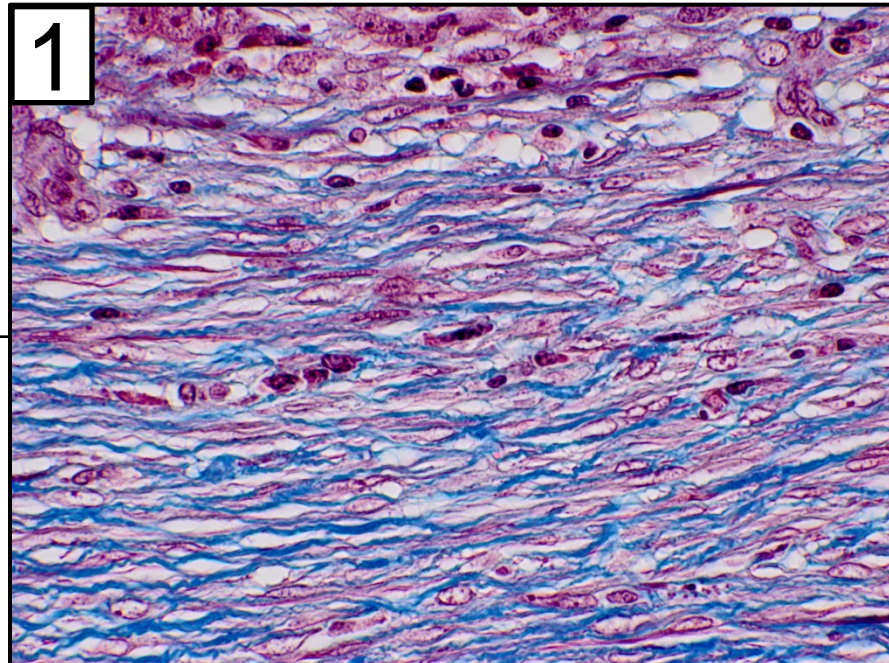
LTBP-1 = latent TGF β -binding protein 1

LAP = latency-associated peptide

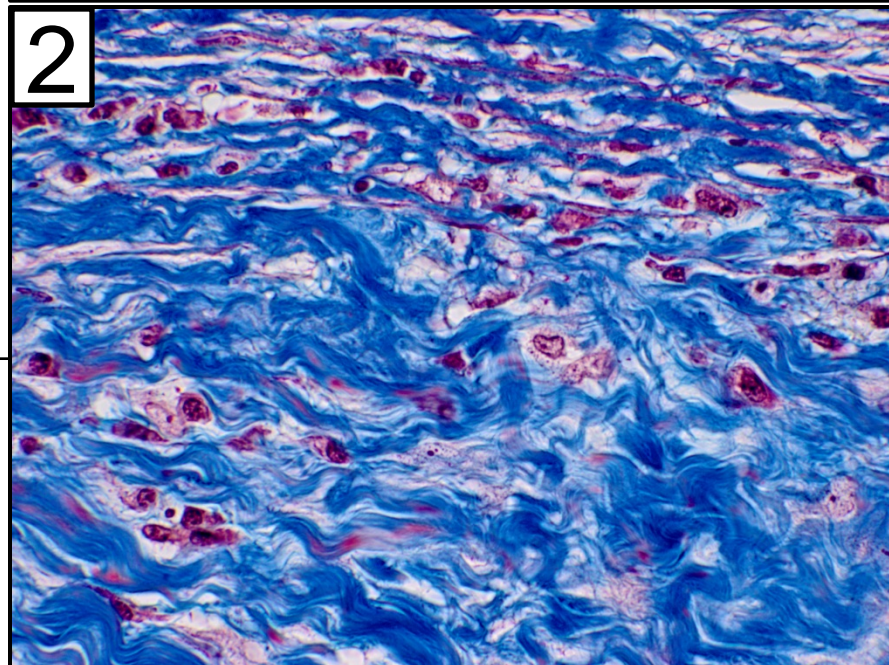
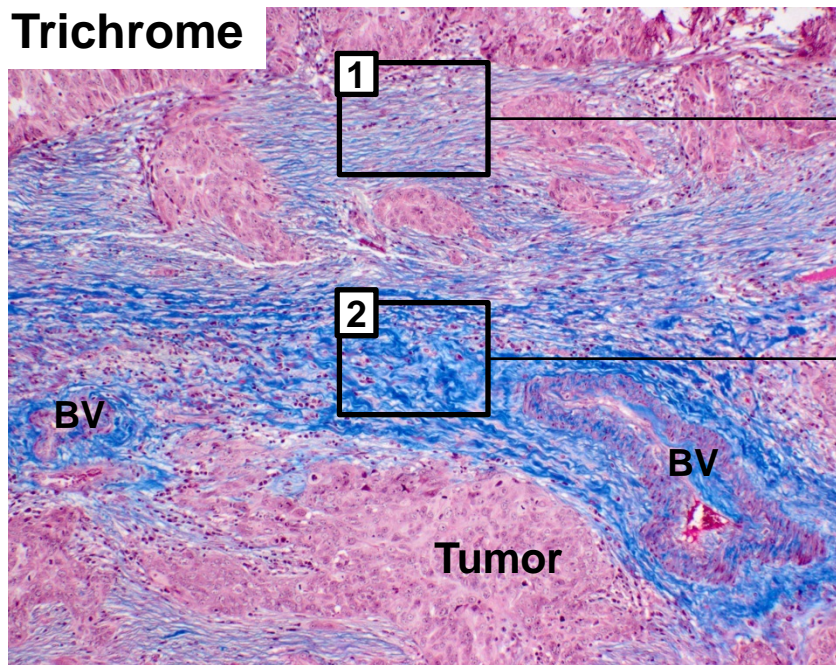
COL11A1 ISH



Trichrome

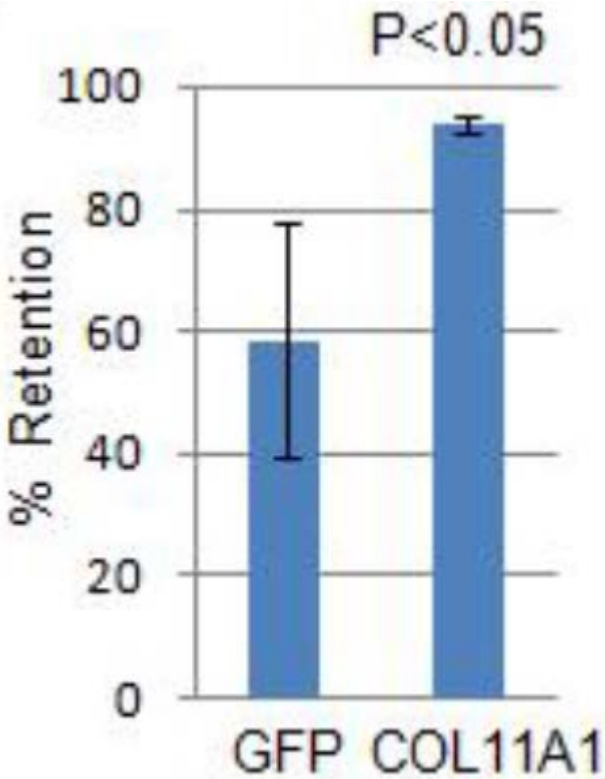
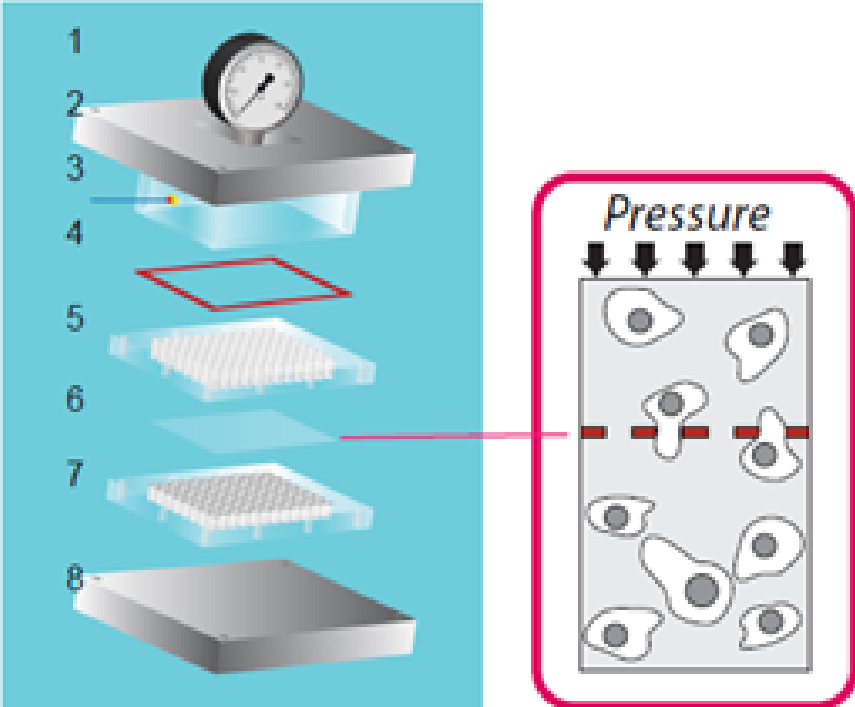


Trichrome

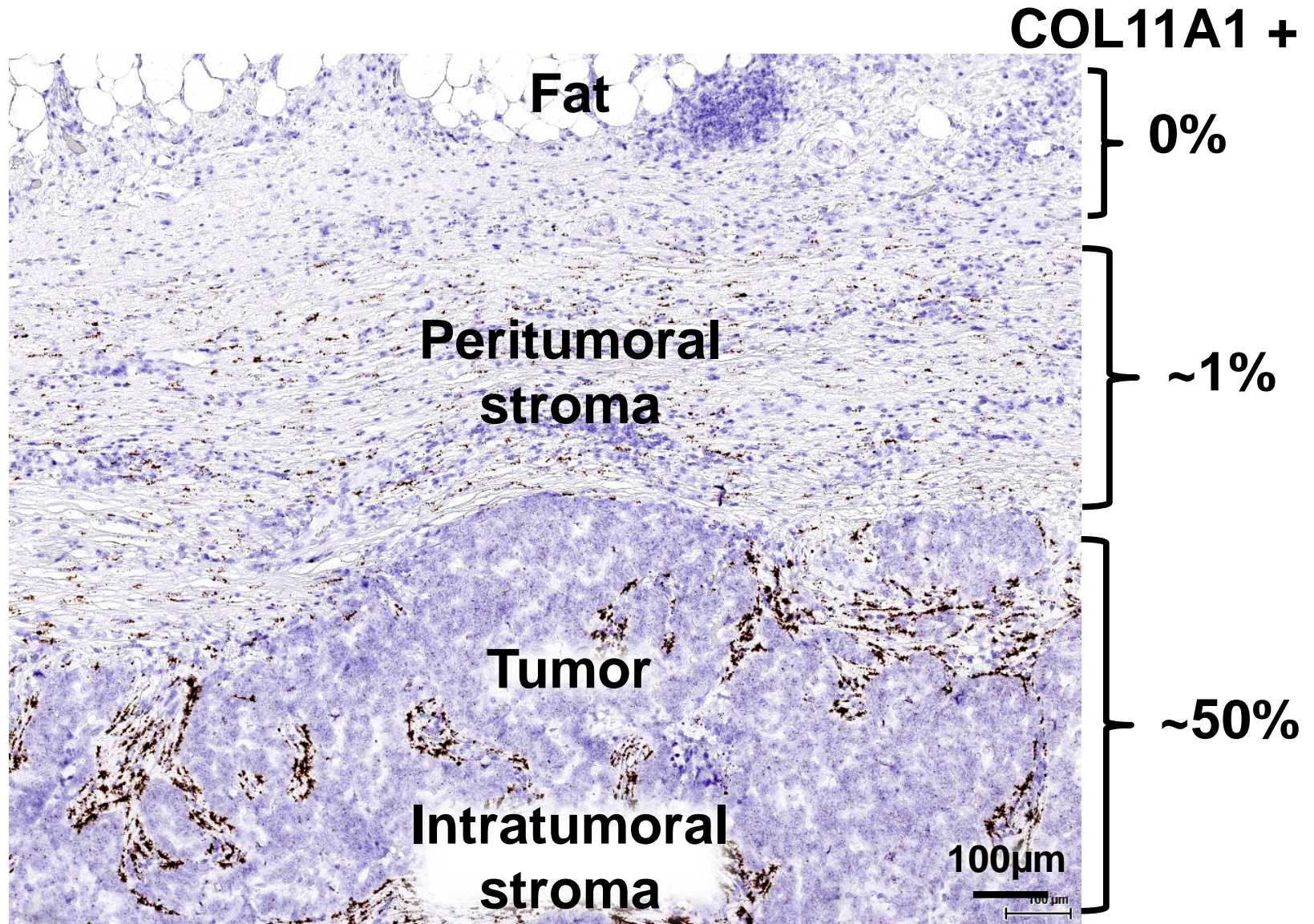


COL11A1 Expression Confers Cell Stiffness

Parallel Microfiltration

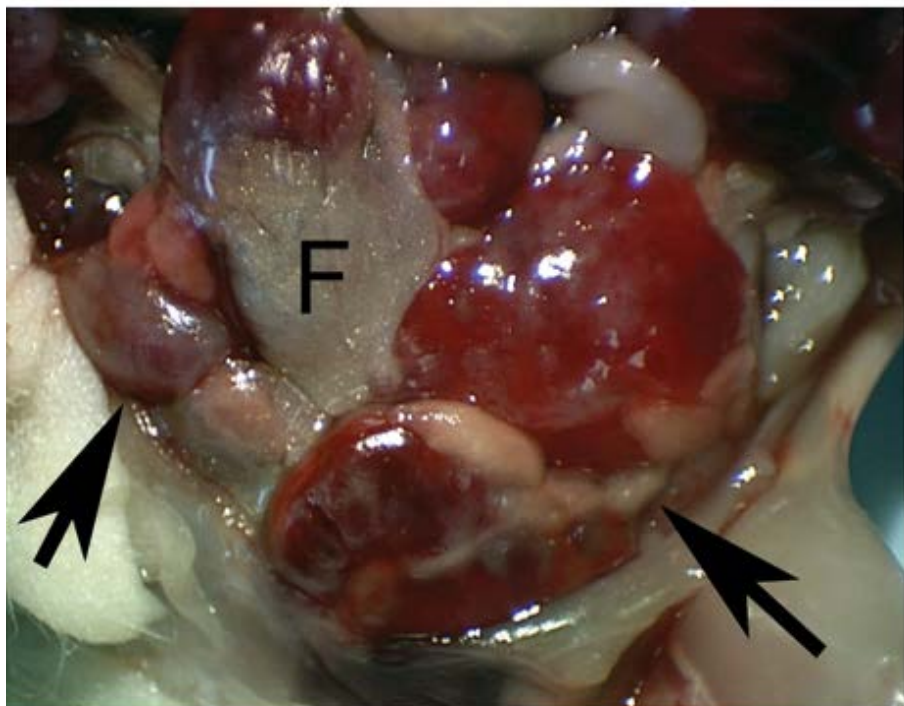


Expression of COL11A1 in Intratumoral Stroma

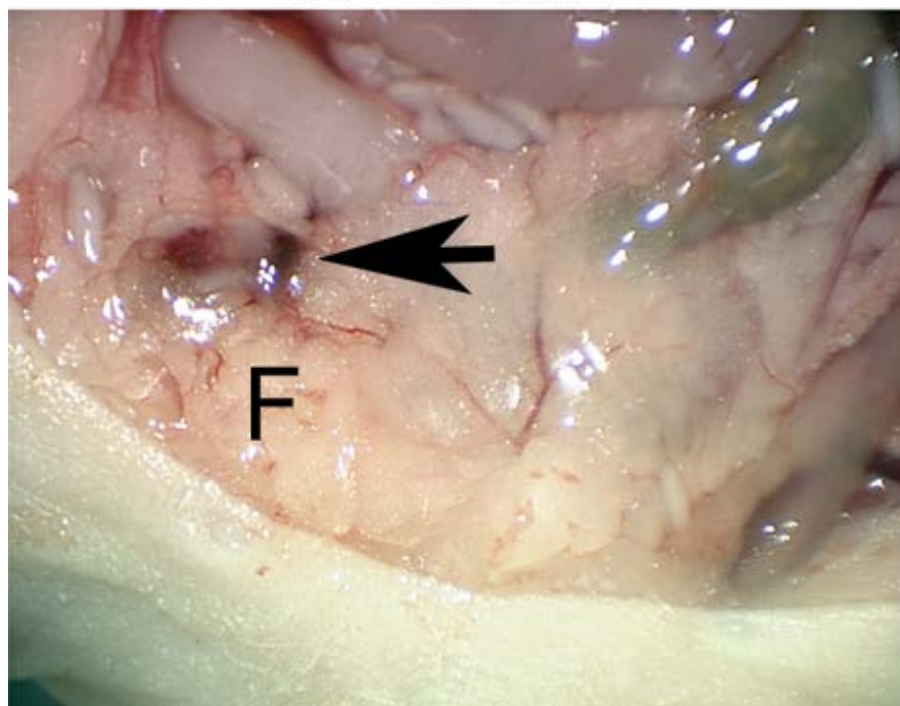


Knockdown of COL11A1 Decreases Tumor Progression

sh-scr

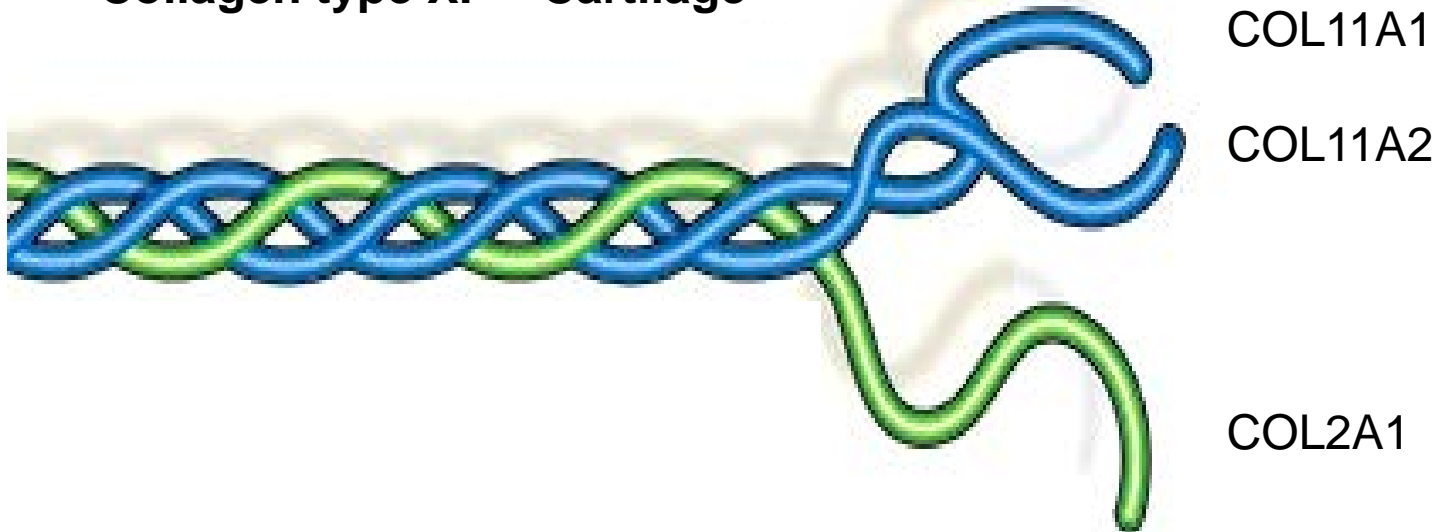


sh-COL11A1



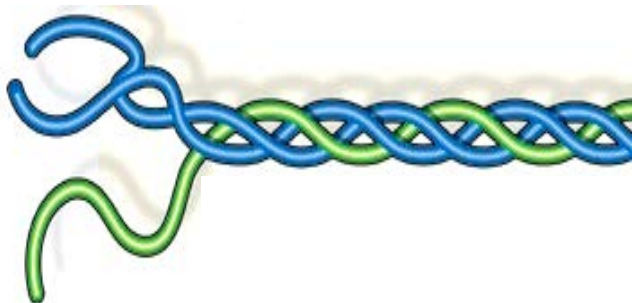
COL11A1 Tumor Specificity?

Collagen type XI - Cartilage

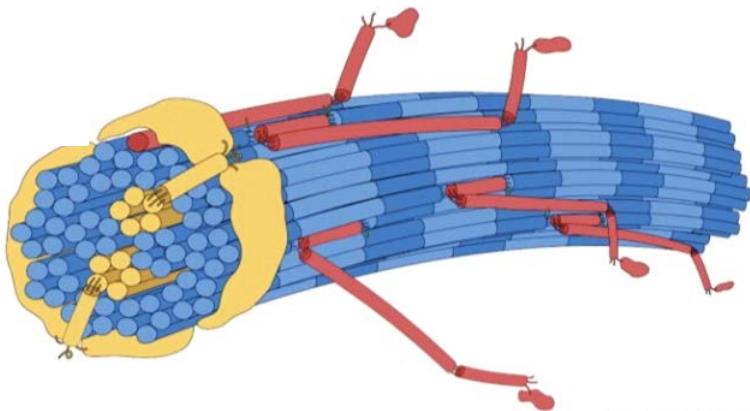


Expression in Tumor Stroma

Collagen type XI

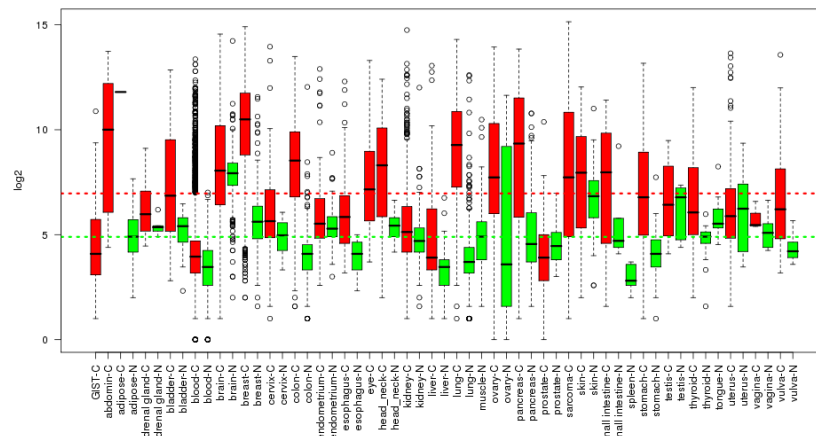


COL11A1
COL5A1
COL5A2
COL3A1

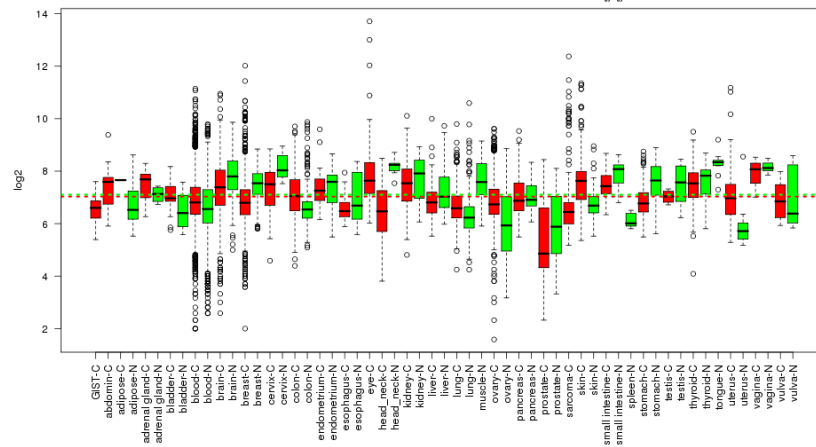


Current Opinion in Cell Biology

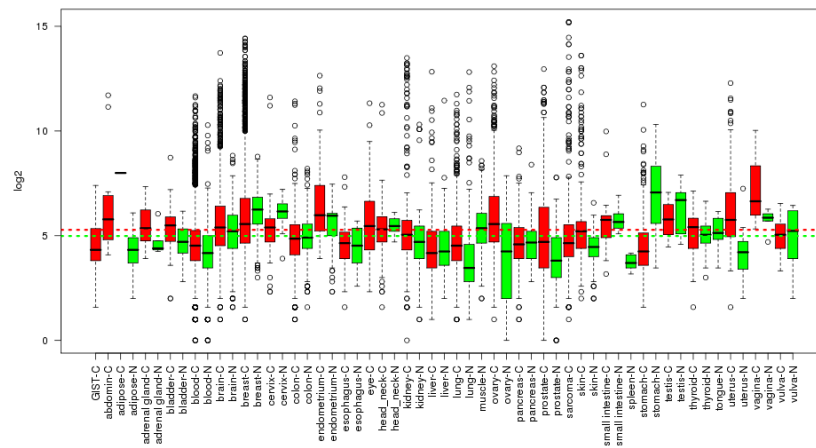
COL11A1



COL11A2



COL2A1



Conclusions

COL11A1 is upregulated in tumors relative to normal tissues; levels increase during tumor progression

Conclusions

COL11A1 is upregulated in tumors relative to normal tissues; levels increase during tumor progression

COL11A1 co-expressed gene signature:

- present in multiple solid cancers regardless of cancer origin and genetic alterations
- represents fibroblast to myofibroblasts differentiation
- represents a subset of activated SMA+ stromal cells
- enriched in cancer invasion, metastasis, therapy resistance, and recurrence
- genes activated by TGF β signaling

Conclusions

COL11A1 is upregulated in tumors relative to normal tissues; levels increase during tumor progression

COL11A1 co-expressed gene signature:

- present in multiple solid cancers regardless of cancer origin and genetic alterations
- represents fibroblast to myofibroblasts differentiation
- represents a subset of activated SMA+ stromal cells
- enriched in cancer invasion, metastasis, therapy resistance, and recurrence
- genes activated by TGF β signaling

Fibers in COL11A1-expressing ECM are stiff, thin and stretched out which can activate TGF β signaling and trigger myofibroblast differentiation

Conclusions

COL11A1 is upregulated in tumors relative to normal tissues; levels increase during tumor progression

COL11A1 co-expressed gene signature:

- present in multiple solid cancers regardless of cancer origin and genetic alterations
- represents fibroblast to myofibroblasts differentiation
- represents a subset of activated SMA+ stromal cells
- enriched in cancer invasion, metastasis, therapy resistance, and recurrence
- genes activated by TGF β signaling

Fibers in COL11A1-expressing ECM are stiff, thin and stretched out which can activate TGF β signaling and trigger myofibroblast differentiation

Unique composition and conformation of collagen fibers in myofibroblasts
- opportunities for targeted therapy?

Acknowledgments

Orsulic Lab:

Dong-Joo (Ellen) Cheon
Paul-Joseph (PJ) Aspuria
Jessica Beach
Dongyu Jia

Collaborators:

Beth Karlan
Amy Rowat

Informatics:

Zhenqiu Liu

Pathology:

Ann Walts

Funding:

- Department of Defense
- National Cancer Institute
- American Cancer Society
- Clinical & Translational Science Institute
- Ovarian Cancer Research Fund
- Alex's Lemonade Stand Foundation

