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Supplementary Materials for

Detection of early pancreatic ductal adenocarcinoma with thrombospondin-2 and CA19-9 blood markers

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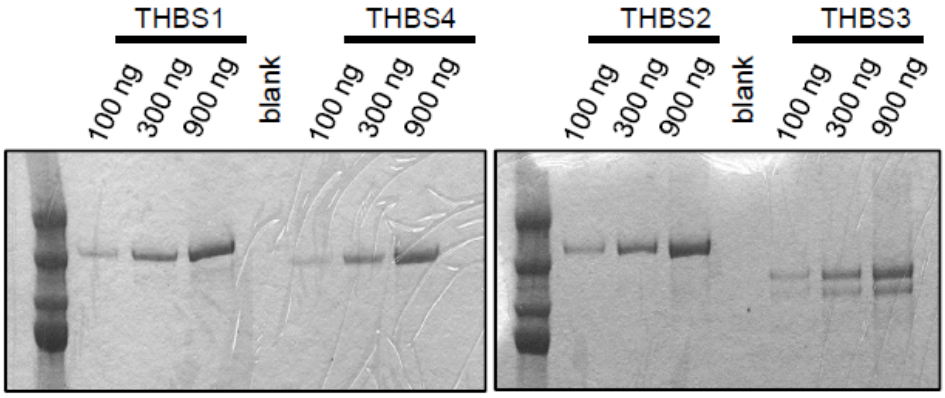
Figure S1

A. SDS-PAGE confirmation of expected relative sizes of recombinant THBS1, THBS2, THBS3, and THBS4 proteins obtained from Bio-Techne, Inc..



B. ELISA detection and capture antibodies for THBS2 are competed by THBS2, not by THBS1

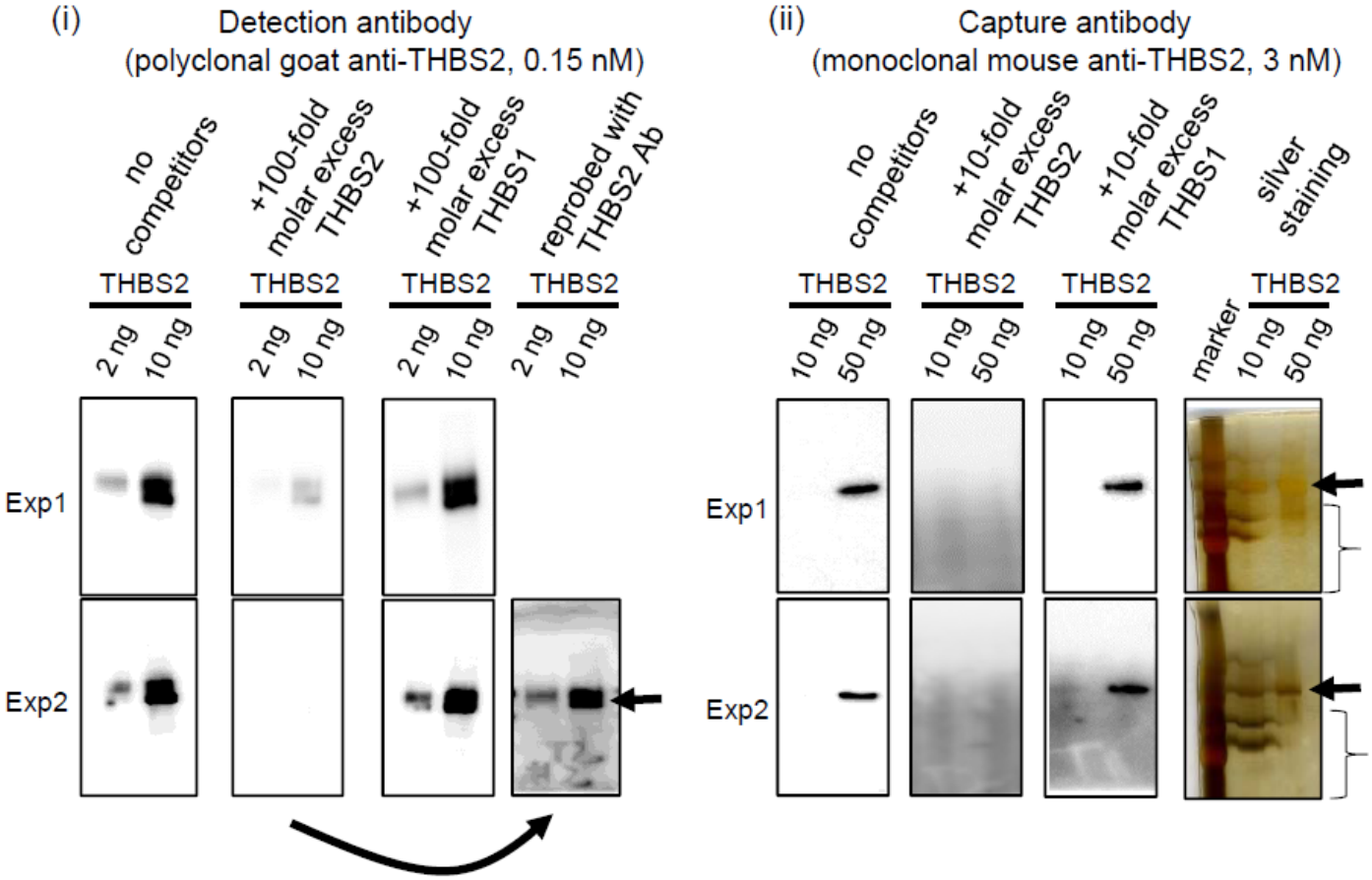


Fig. S1. Validation of cross-reactivity of antibodies enclosed in THBS2 ELISA with THBS1 by Western blot.

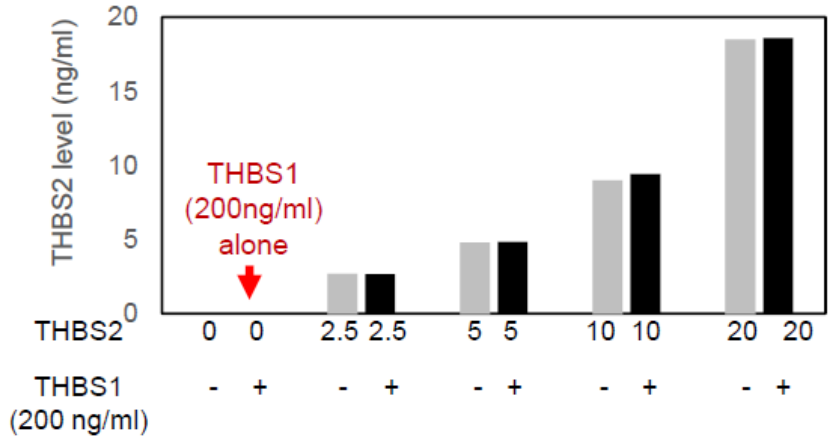
A. SDS-PAGE confirmation of expected relative sizes of recombinant THBS1, THBS2, THBS3, and THBS4 proteins obtained from Bio-Techne, Inc. The company had validated the specificity of the THBS2 ELISA kit with these recombinant proteins. Because of prior claims that THBS1 is down-regulated in PDAC (see text), we assessed the cross-reactivity of THBS1 against the detection and capture antibodies in the THBS2 ELISA kit in duplicate experiments (Exp1 and Exp2).

B. ELISA detection and capture antibodies for THBS2 are competed by THBS2, not by THBS1. (i) Samples (0.15 nM) of goat polyclonal anti-THBS2 detection antibody were used with no competitor or with a 100-fold molar excess of recombinant proteins THBS2 or THBS1 for 30 min at room temperature. The reactions were applied to Western blot membranes with 2 or 10 ng THBS2 in separate lanes. The excess THBS2 competes for the signal while the excess THBS1 does not. To demonstrate that the membrane for the THBS2 competition did have THBS2 protein, the first antibody reaction was stripped and the blot was re-probed (arrow) with the THBS2 antibody without competitor.

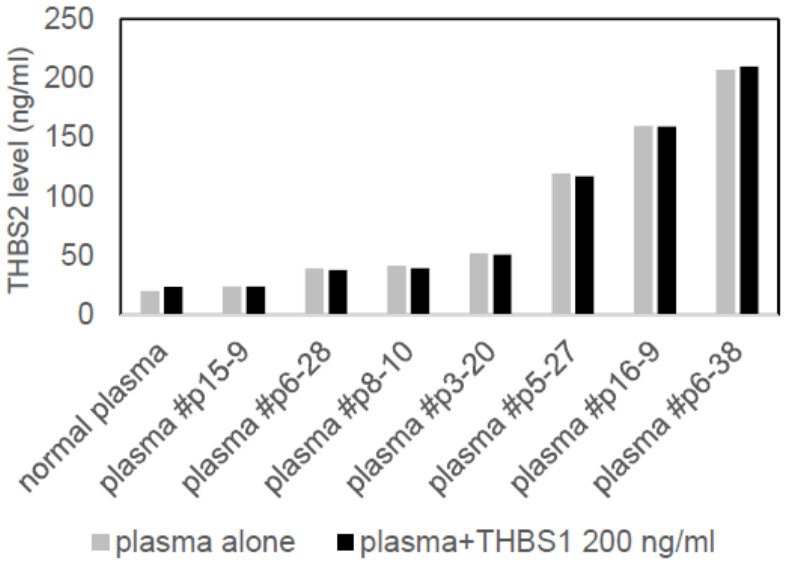
(ii) Samples (3 nM) of mouse monoclonal anti-THBS2 capture antibody were used with no competitor or with a 10-fold molar excess of recombinant proteins THBS2 or THBS1 for 30 min at room temperature. All THBS2 proteins were run in a gel and transferred into the same membrane. The membrane was blocked and divided into three pieces before applying the mixture of detection antibody and competitors. The reactions were applied to Western blot membranes with 10 or 50 ng THBS2 in separate lanes. The excess THBS2 competes for the signal while the excess THBS1 does not. To demonstrate that the membrane for the THBS2 competition did have THBS2 protein, the blot was stripped and stained with silver. Arrows point to recombinant THBS2 evident on the blot (signals were saturated at 10 ng). Brackets indicate the marker bands that spilled over from neighboring lanes. Note that the monoclonal capture antibody has less sensitivity than the polyclonal detection antibody.

Figure S2

A. Presence of excess THBS1 has no effect on ELISA detection of recombinant THBS2 proteins



B. Presence of excess THBS1 has no effect on ELISA detection of THBS2 in human plasma



THBS2 (ng/ml)	normal plasma	plasma #p15-9	plasma #p6-28	plasma #p8-10	plasma #p3-20	plasma #p5-27	plasma #p16-9	plasma #p6-38
plasma alone	20.4	24.2	39.3	41.7	51.9	119.6	159.6	207.1
plasma+THBS1 200ng/ml	23.7	24.3	38.3	39.8	51.2	117.4	159.3	210.0
CV(%)	10.7	0.3	1.9	3.3	0.9	1.3	0.1	1.0

Fig. S2. Validation of cross-reactivity and interference of THBS1 in THBS2 ELISA.

(A) Presence of excess THBS1 has no effect on ELISA detection of recombinant THBS2 proteins. To determine whether presence of THBS1 interferes with the THBS2 ELISA kit, 200 ng/ml of recombinant THBS1 protein was spiked into various concentrations of recombinant THBS2 proteins (0 ng/ml to 20 ng/ml) and subjected to THBS2 ELISA assays. Grey bars indicate THBS2 protein alone and black bars indicate THBS2 proteins spiked with THBS1. The differences in THBS2 detection are negligible (less than 5% CV).

(B) Presence of excess THBS1 has no effect on ELISA detection of THBS2 in human plasma. ELISA assays were performed on Phase 2b plasma samples randomly picked to exhibit a range of THBS2 concentrations, along with human normal pooled plasma, with and without 200 ng/ml THBS1 protein. Grey bars show the plasma alone and black bars show the plasma with a 200 ng/ml of THBS1. The differences in THBS2 concentration in Phase 2b plasmas between absence and presence of THBS1 protein (200 ng/ml) were less than 5% CV, while the very low concentrations in the commercial normal pooled plasma exhibited a 10% CV). Primary data are shown at bottom.

Figure S3

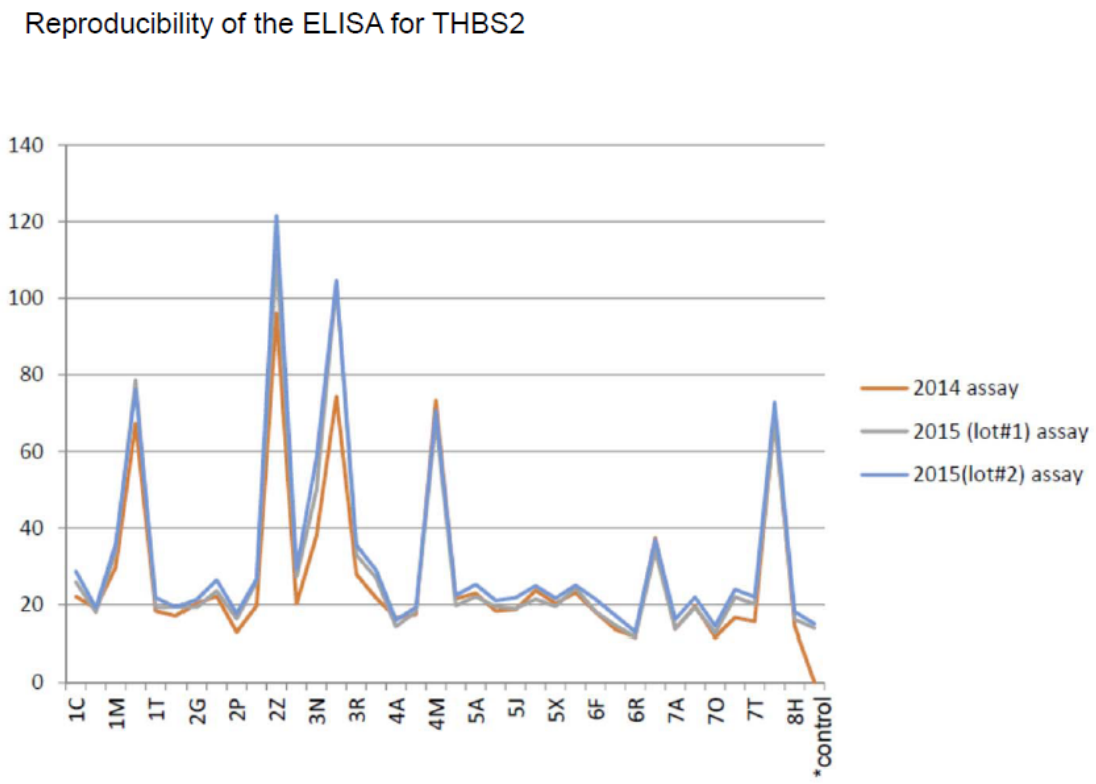


Fig. S3. Reproducibility of the ELISA for THBS2.

The plot shows primary ELISA data in nanograms THBS2 per ml of plasma for a set of Phase 2a samples. The signals were determined from a standard curve as described in the Materials and Methods. The same samples were assessed once in 2014 and twice in 2015, using different lots for each assay. The two assays in 2015 included a commercial plasma sample mixed from normal, healthy individuals (*denoted “control”).

Figure S4

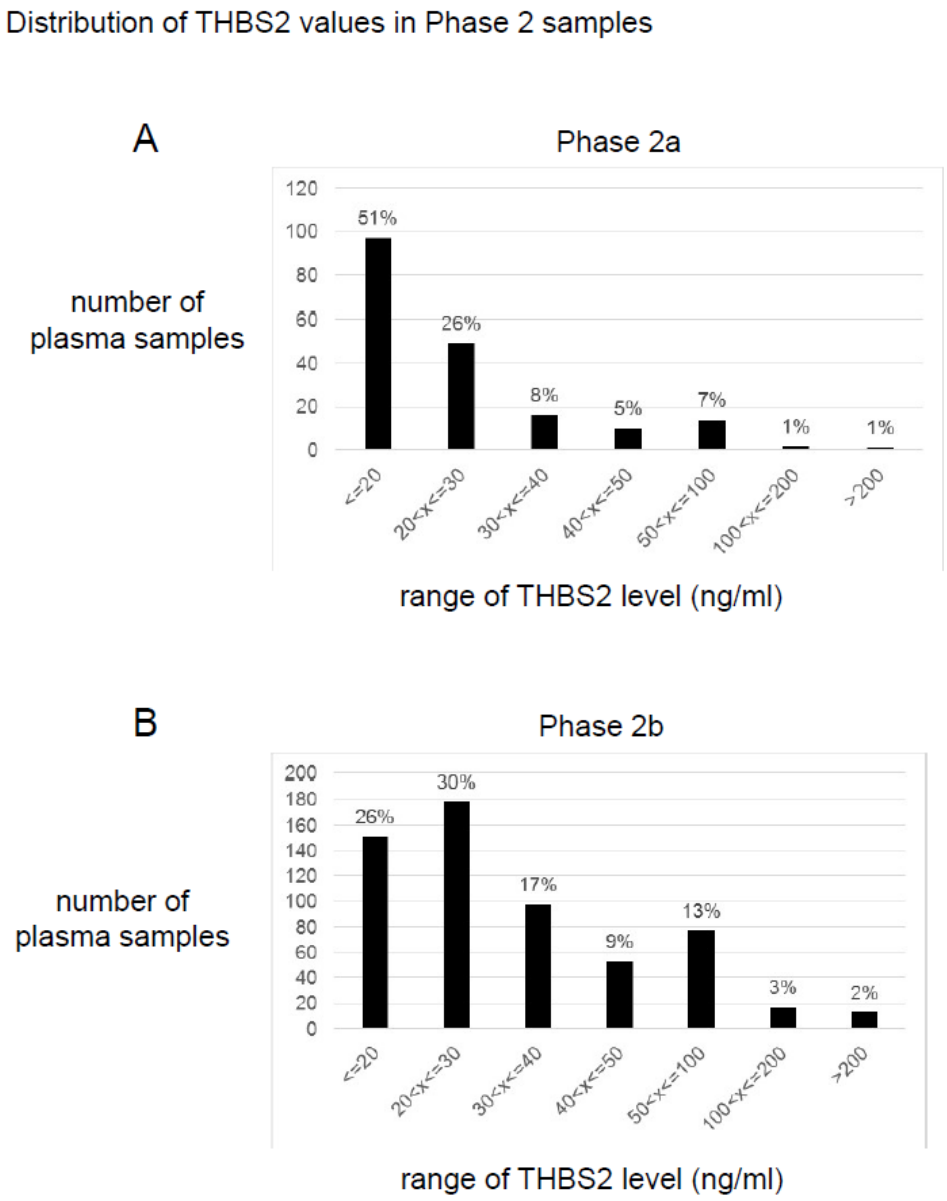


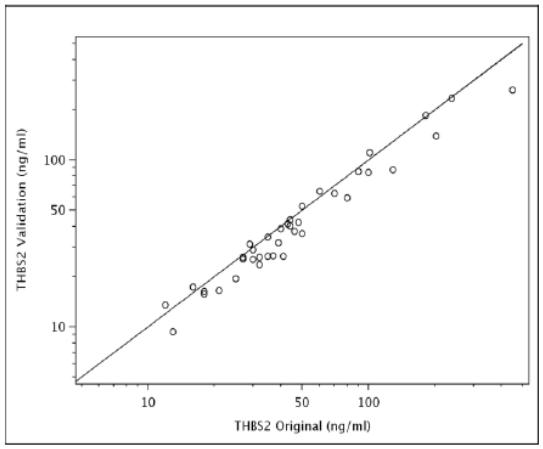
Fig. S4. Distribution of THBS2 values in phase 2 samples.

Data for Phase 2a (A) and Phase 2b (B) plasma samples in ELISA were rank-ordered and divided into 7 groups based upon THBS2 protein concentrations. The frequency of samples in each group is shown.

Figure S5

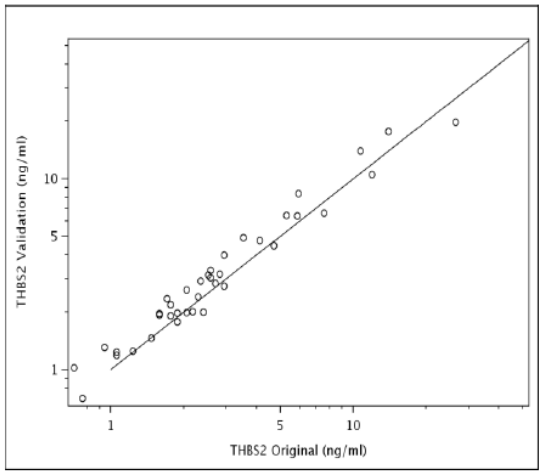
Cross-validation tests, performed one year apart, of THBS2 levels in the same set of plasmas as determined in different laboratories

A. Scatterplot of original THBS vs. validation THBS2 for N=38 samples



Correlation Coefficient, Pearson=0.950 Spearman=0.968

B. Scatterplot of original THBS vs. validation THBS2 for N=38 samples (re-scaled data)



Correlation Coefficient, Pearson=0.950 Spearman=0.968

Fig. S5. Cross-validation tests, performed 1 year apart, of THBS2 concentrations in the same set of plasmas as determined in different laboratories.

A subset of Phase 2b samples were cross-validated in a blinded fashion, in an independent lab that was provided only the relevant methods section of this paper and the manufacturer's instructions for methodology.

(A) Scatterplot of original THBS2 values versus cross-validated THBS2 values, as determined one year later with a different lot number of reagents, in subset of Phase 2b plasma samples (n=38). The X-axis indicates

the THBS2 values originally obtained in 2015 and Y-axis indicates the THBS2 values cross-validated by an independent lab in 2016. The Pearson correlation coefficient is 0.95 and the Spearman coefficient is 0.968, indicating a strong correlation between the original and validated assays.

(B) Scatterplot of original THBS2 versus cross-validated THBS2 values rescaled by commercial human normal pooled plasma. The average THBS2 value in the normal pooled plasma control in the original assay, where our set point was derived, was 17 ng/ml and the average THBS2 value in the normal pooled plasma control in the cross-validated samples was 13.25. Thus we re-plotted the data, as shown, by dividing the cross-validation samples by the scaling factor as described in the text. The re-scaled THBS2 values in cross-validation had a negilable effect on the correlation coefficiency, indicating a robust assay.

Figure S6

Representative immunohistochemistry (IHC) images of THBS2 in human normal pancreas, pancreatitis, and PDAC tissue

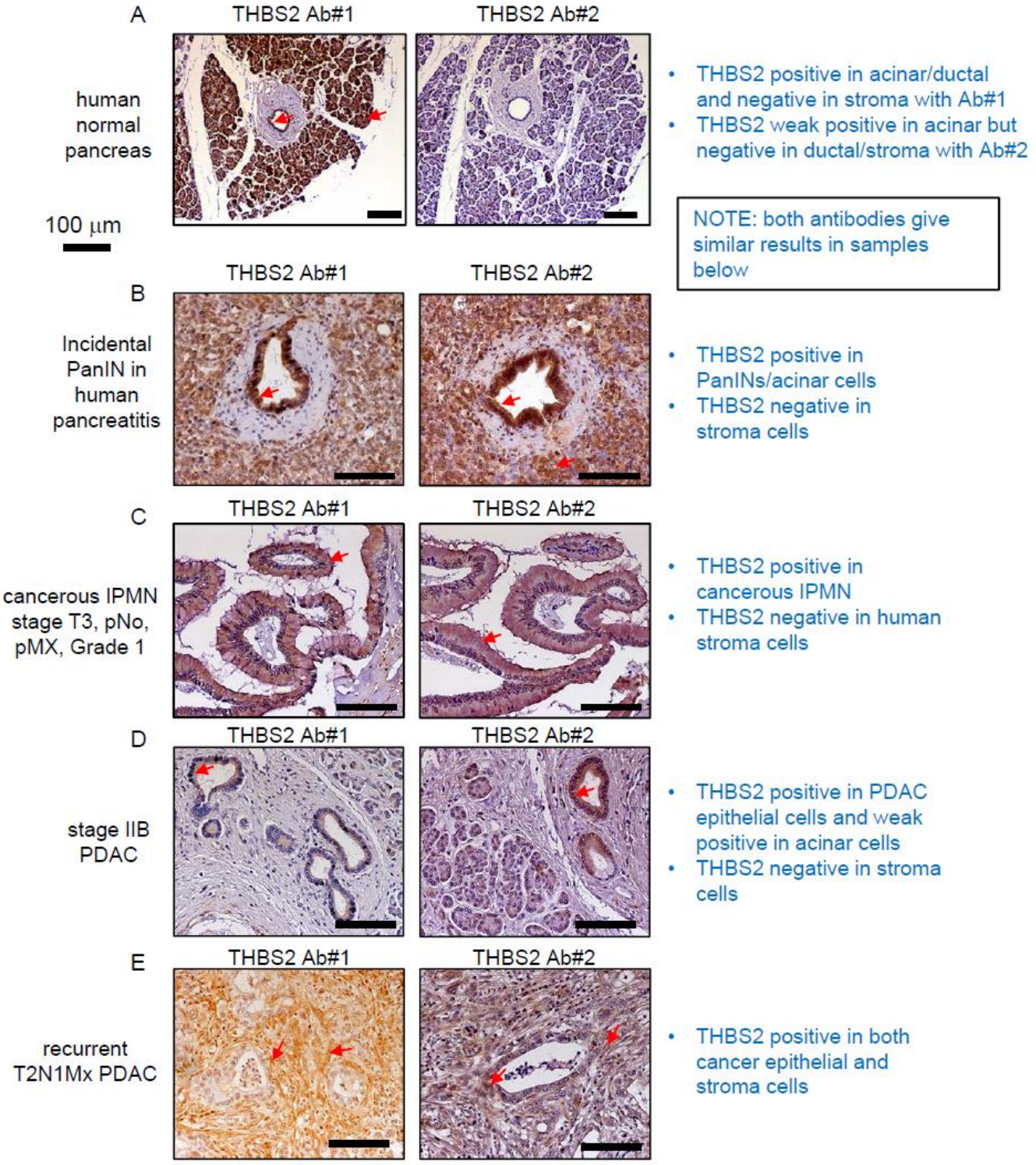


Fig. S6. Representative immunohistochemistry images of THBS2 in human normal pancreas, pancreatitis, and PDAC tissue.

Two “IHC quality” THBS2 antibodies were tested: Ab#1 (rabbit polyclonal THBS2 antibody, dilution 1:100, TA590658, Origene) and Ab#2 (Goat polyclonal THBS2 antibody, dilution 1:25, sc-7655, Santa Cruz). Red arrows designate positive cells. Scale bar equals 100 microns in each image.

(A) IHC in human normal pancreas. THBS2 was detected in acinar and ductal compartment but not in stroma with Ab#1. However, THBS2 was barely detected in the acinar compartment and not in ducts or stroma with Ab#2.

(B) IHC in human pancreatitis. THBS2 was detected in incidental PanINs in pancreatitis and acinar cells but not in stroma cells with both antibodies.

(C) IHC in cancerous IPMN stage T3, pNo, pMX, Grade 1. THBS2 was detected in cancerous IPMN but not in stromal cells with both antibodies.

(D) IHC in PDAC stage 2b. THBS2 was detected in PDAC epithelial cells and weakly labeled in acinar cells, but not in stroma cells with both antibodies.

(E) IHC in recurrent T2N1Mx PDAC. THBS2 was detected in both cancer epithelial and stroma cells with both antibodies. Brown colors indicate the compartments labeled with THBS2 in the left panel.

Table S1. List of 53 proteins secreted or released from 10-22 cell, PanIN-stage lesions that are at low abundance in healthy human plasma proteome and RNA-seq databases.

IPI number	Protein	PDAC Network from Kim et al. 2013 Cell Reports	Identified in plasma protein DB (as of 2014)	Identified in plasma MOPED database As of 2014	ELISA kits available
IPI00152881	SHROOM3	TGFb/Integrin	yes	0.1 nmol	no
IPI00215893	HMOX1	TGFb/Integrin	yes	0 nmol	no
IPI00007960	*PERIOSTIN	TGFb/Integrin	yes	no information	yes
IPI00013405	MMP10	TGF/Integrin	no	0 nmol	yes
IPI00027780	MMP-2	TGF/Integrin	no	2 nmol	yes
IPI00018769	THBS2	TGF/Integrin	yes	no information	yes
IPI00009841	EWSR1	TGFb/Integin	yes	no information	no
IPI00005776	NOD1	TGF/Integrin	yes	1 nmol	no
IPI00220986	ADAMTS9	TGF/Integrin	yes	1 nmol	no
IPI00022443	*AFP	TGF/Integrin	yes	1 nmol	yes
IPI00247295	SYNE1	TGF/Integrin	yes	0.2 nmol	no
IPI00239405	SYNE2	TGFb/Integrin	yes	no information	no
IPI00008315	EPHB1	TGFb/Integrin	yes	0 nmol	no
IPI00218292	UFD1L	TGFb/Integrin	no	0 nmol	no
IPI00002901	TEAD1	TGFb/Integrin	no	0 nmol	no
IPI00027280	TOP2B	TGFb/Integrin	yes	0.1-1 nmol	no
IPI00217185	RYR3	TGF/Integrin	yes	0.8 nmol	no
IPI00166612	CMYA5	TGF/Integrin	yes	0 nmol	no
IPI00221255	MYLK	TGF/Integrin	yes	0.2 nmol	no
IPI00251161	KIAA1109	RAS/p53/JUN/ CTNB1	yes	0.1 nmol	no
IPI00398020	ODZ3	RAS/p53/JUN/ CTNB1	yes	no information	no
IPI00235481	PMFBP1	RAS/p53/JUN/ CTNB1	yes	0.1 nmol	no
IPI00289329	EPHB3	RAS/p53/JUN/ CTNB1	yes	no information	no
IPI00177498	LIMCH1	RAS/p53/JUN/ CTNB1	yes	no information	no
IPI00159322	TCF20	RAS/p53/JUN/ CTNB1	yes	0.1 nmol	no
IPI00847609	SVEP1	no network	yes	0.1 nmol	no
IPI00396634	KIAA1671	no network	no	0 nmol	no
IPI00292836	KIAA1529	no network	yes	0 nmol	no
IPI00896378	GNN	no network	no	no information	no
IPI00420019	DOS	no network	no	0.5 nmol	no
IPI00293887	STARD8 (DLC3)	no network	yes	0 nmol	no
IPI00183041	SCN8A	no network	yes	0.5 nmol	no
IPI00143753	U2SURP	no network	no	0 nmol	no
IPI00031104	TCHP	no network	yes	1 nmol	no
IPI00012829	RAD51C	no network	yes	no information	no
IPI00024804	ATP2A1	no network	yes	0 nmol	no
IPI00377214	NLRX1	no network	no	0 nmol	no
IPI00028833	ZNF160	no network	yes	1 nmol	no
IPI00645947	RTTN	no network	no	0 nmol	no
IPI00328762	ABCA13	no network	yes	0 nmol	no

IPI00288940	OBSCN	HNF4a	yes	0.1 nmol	no
IPI00011385	LOXL3	HNF4a	yes	0 nmol	no
IPI00029046	MLEC	HNF4a	yes	0 nmol	no
IPI00002127	DNAH1	HNF4a	yes	0 nmol	no
IPI00152653	DNAH5	HNF4a	yes	1 nmol	no
IPI00412106	DNAH12	HNF4a	yes	1 nmol	no
IPI00888430	DNAH17	HNF4a	no	0 nmol	no
IPI00396218	SCYL2	HNF4a	yes	0 nmol	no
IPI00303300	FKBP10	HNF4a	no	0 nmol	no
IPI00002320	FLRT3	HNF4a	yes	0 nmol	no
IPI00007256	ZHX2(AFR1)	HNF4a	yes	0 nmol	no
IPI00375560	ZNF804A	HNF4a	no	0.1 nmol	no
IPI00019884	ACTN2	HNF4a	yes	0.1 nmol	no

* AFP and PERIOSTIN were not chosen because of their indication in hepatocellular carcinoma and breast cancer, respectively.

Table S2. Mass spectrometry assessment of THBS2 concentrations in phase 1 plasma samples.

Table S2A. Peptides searched with pFind 2.8 at 5% FDR

Table S2A	sequence	presence of peptides by search engine pFind 2.8		area under the curve of THBS2 spectrum from original ms1/ms2 window		THBS2 ratio, cancer/normal	*adjusted ratio of THBS2 by total PSM	FDR
		Pooled normal controls (n=10)	Pooled PDAC patients (n=10)	Pooled normal controls (n=10)	Pooled PDAC patients (n=10)			
peptide 1 (THBS2 specific)	TRNMSACWQDGR	presence	n.d (not-determined)	55814	261090	4.68	3.04	FDR 5%
peptide 2 (THBS2 specific)	VCNSPEPQYGGK	n.d	presence	0	792162	n.d.	n.d.	FDR 5%
peptide 3 (THBS1/THBS2 shared)	FYVVMWK	presence	n.d	4599455	13383548	2.9	1.88	FDR 5%
peptide4 (THBS1/THBS2 shared)	NALWHTGNTPGQVR	n.d	presence	8373610	21837763	2.6	1.69	FDR 5%
Total number of PSM (peptide spectrum matches)				22330	34402	1.54		FDR 5%

* Adjusted ratio of THBS2 was calculated from the original ratio THBS2 dividing by a normalization factor (1.54) acquired by dividing the total number of peptide spectrum matches (PSM) in cancer by the total PSM number in the normal sample. The ratio for peptide 2 and the overall average ratio of THBS2 was not computed because peptide 2 was only observed in the PDAC pooled sample.

Table S2B. Peptides searched with pFind3.0 at 5% FDR

Table S2B	sequence	presence of peptides by search engine pFind 3.		FDR
		Pooled normal controls (n=10)	Pooled PDAC patients (n=10)	
peptide 1 (THBS2 specific)	TRNMSACWQDGR	n.d	n.d	FDR 5%
peptide 2 (THBS2 specific)	VCNSPEPQYGGK	n.d	presence	FDR 5%
peptide 3 (THBS1/THBS2 shared)	FYVVMWK	presence	n.d	FDR 5%
peptide4 (THBS1/THBS2 shared)	NALWHTGNTPGQVR	presence	presence	FDR 5%

Table S2C. Peptides searched with pFind3.0 at 1% FDR

Table S2C	sequence	presence of peptides by search engine pFind 3.0		FDR
		Pooled normal controls (n=10)	Pooled PDAC patients (n=10)	
peptide 1 (THBS2 specific)	TRNMSACWQDGR	n.d	n.d	FDR 1%
peptide 2 (THBS2 specific)	VCNSPEPQYGGK	n.d	presence	FDR 1%
peptide 3 (THBS1/THBS2 shared)	FYVVMWK	n.d	n.d	FDR 1%
peptide4 (THBS1/THBS2 shared)	NALWHTGNTPGQVR	presence	presence	FDR 1%

Table S3. Range and median values of THBS2 and CA19-9 in this study.

THBS2	n	median	min	P_25	P_75	max
Adenocarcinoma	288	37.171	11.590	25.6620	60.80	451.40
Stage I/II	152	35.291	11.590	25.582	55.41	451.40
Stage III/IV	136	40.797	11.699	26.621	67.10	269.71
Controls	230	19.298	6.425	16.521	24.10	73.39
IPMN, no Adeno	115	24.666	10.142	19.426	32.55	72.52
Islet Cell	30	30.033	13.872	22.212	45.67	433.46
Pancreatitis	83	24.094	6.458	17.949	31.74	209.12

Ca19-9	n	median	min	P_25	P_75	max
Adenocarcinoma	288	219.500	0.599	55.9000	1137.00	10000.00
Stage I/II	152	141.000	0.599	31.800	442.00	10000.00
Stage III/IV	136	615.500	0.600	103.000	3973.00	10000.00
Controls	230	8.650	0.599	5.400	14.00	136.00
IPMN, no Adeno	115	12.200	0.600	6.700	21.30	56.20
Islet Cell	30	11.200	0.599	5.100	29.10	461.00
Pancreatitis	83	14.700	0.600	8.500	32.20	833.00

Table S4. Impact of excluding stage IIB (and unspecified stage II) subjects.

PDAC vs. Healthy Controls	N	CA19-9(≥ 55) AUC	CA19-9(≥ 55) 95% CI		THBS2 AUC	THBS2 95% CI		CA19-9(≥ 55) + THBS2 AUC	CA19-9(≥ 55) + THBS2 95% CI		p-value
Validation Phase 2a											
Stage I/IIA/II/IIB	58/80	0.845	0.80	0.89	0.832	0.78	0.89	0.946	0.92	0.98	0.0067
Stage I/IIA/II	37/80	0.851	0.80	0.91	0.810	0.74	0.89	0.937	0.90	0.98	0.0767
Stage I/IIA	21/80	0.905	0.85	0.97	0.819	0.73	0.91	0.919	0.85	1.00	0.7058
Validation Phase 2b											
Stage I/IIA/II/IIB	88/140	0.834	0.79	0.87	0.887	0.85	0.92	0.960	0.94	0.98	<0.0001
Stage I/IIA/II	62/140	0.824	0.78	0.87	0.861	0.82	0.90	0.950	0.93	0.97	0.0002
Stage I/IIA	25/140	0.773	0.70	0.86	0.905	0.86	0.95	0.958	0.93	0.98	0.0005

Table S5A. THBS2 values by sex and diabetes mellitus status.

group		n	median	min	P_25	P_75	max
IPMN	Female	57	25.8860	12.096	20.7010	32.2340	70.881
IPMN	Male	58	24.1590	10.142	18.5610	33.2390	72.515
PNET	Female	8	29.3040	21.391	24.1965	45.8290	100.724
PNET	Male	22	32.7955	13.872	19.1610	45.6740	433.460
Pancreatitis	Female	36	21.0220	6.458	17.6355	30.4205	67.388
Pancreatitis	Male	46	25.2530	11.409	19.0730	36.3010	209.117
Adenocarcinoma Stage I/II	Female	60	38.0070	15.182	30.2070	61.8390	216.687
Adenocarcinoma Stage I/II	Male	92	31.8888	11.590	22.5440	51.6485	451.397
Adenocarcinoma Stage III/IV	Female	60	40.5035	15.698	26.2460	67.0990	218.449
Adenocarcinoma Stage III/IV	Male	76	40.8955	11.699	27.1895	67.2140	269.711
Controls	Female	101	20.7900	12.012	17.2330	26.2680	65.573
Controls	Male	129	18.1210	6.425	15.4790	22.3270	73.392
IPMN	No DM	95	23.8800	10.142	19.3670	29.9620	60.287
IPMN	DM	20	34.1695	13.764	24.6135	51.5630	72.515
PNET	No DM	20	28.6720	13.872	20.2760	62.8445	433.460
PNET	DM	10	39.3765	13.967	23.1640	44.9590	111.390
Pancreatitis	No DM	72	24.5510	6.458	18.1123	30.4205	209.117
Pancreatitis	DM	10	26.1715	11.637	18.4470	42.5880	77.424
Adenocarcinoma Stage I/II	No DM	102	35.0490	11.590	25.5830	57.6440	248.952
Adenocarcinoma Stage I/II	DM	50	37.2575	15.599	23.2920	53.7950	451.397
Adenocarcinoma Stage III/IV	No DM	108	38.7715	11.699	27.7875	68.5970	269.711
Adenocarcinoma Stage III/IV	DM	28	43.7983	15.698	23.8990	65.1340	238.642
Controls	No DM	201	19.2820	6.425	16.5060	23.6850	65.573
Controls	DM	29	19.3320	9.654	17.0210	24.4930	73.392

Table S5B. Spearman correlation analysis of age and THBS2 values.

group	Spearman Correlation
IPMN	-0.00401
PNET	-0.15872
Pancreatitis	-0.02588
Adenocarcinoma Stage I/II	-0.08581
Adenocarcinoma Stage III/IV	-0.11019
Controls	0.06188

Table S6A. Obstructive jaundice cases in the PDAC cohorts.

	Obstructive Jaundice (Total Bilirubin ≥ 3.5)					
	Unknown	No		Yes		Total
Stage	N	N	%	N	%	N
I	0	4	80.0	1	20.0	5
IA	0	0	0.0	3	100.0	3
IB	0	8	80.0	2	20.0	10
II	2	42	80.77	10	19.23	52
IIA	1	16	57.14	12	42.86	28
IIB	2	36	73.47	13	26.53	49
III	3	35	71.43	14	28.57	49
IV	1	68	81.93	15	18.07	83
Total	9	209		70		279

Table S6B. THBS2 and CA19-9 values and obstructive jaundice status.

Obstructive Jaundice	Ca19-9 (U/ml)	THBS2 (ng/ml)					
		<42		≥ 42		Total	
		N	%	N	%	N	%
Unknown	< 55	1	100	0	0	1	11
Unknown	≥ 55	6	75	2	25	8	89
No	< 55	41	75	14	25	55	25
No	≥ 55	96	62	58	38	154	74
Yes	< 55	5	38	8	62	13	19
Yes	≥ 55	13	23	44	77	57	81

Table S6C. AUC values for CA19-9, THBS2, and combined markers by jaundice status in phases 2a and 2b of PDAC cases versus controls.

		Ca19-9		**THBS2**		**CA19-9+THBS2**	
	N	**AUC**	**95% CI**	**AUC**	**95% CI**	**AUC**	**95% CI**
Phase 2a PDAC	81/80	0.846	0.81, 0.88	0.843	0.80, 0.89	0.955	0.93, 0.98
Phase 2a PDAC - Jaundice	13/80	0.923	0.83, 1.00	0.931	0.87, 0.99	0.977	0.94, 1.00
Phase 2a PDAC – No Jaundice	65/80	0.831	0.78, 0.88	0.819	0.76, 0.88	0.950	0.92, 0.98
Phase 2b PDAC	197/140	0.881	0.86, 0.90	0.875	0.85, 0.90	0.970	0.96, 0.98
Phase 2b PDAC - Jaundice	54/140	0.891	0.85, 0.94	0.974	0.96, 0.99	0.991	0.98, 1.00
Phase 2b PDAC – No Jaundice	138/140	0.873	0.84, 0.90	0.837	0.80, 0.87	0.962	0.95, 0.98

Table S7A. Cross-tabulation of normal versus elevated THBS2 values, given a cutoff of 42 ng/ml, for the original cross-validation THBS2 assays (κ = 0.786).

	THBS2 Validation		
THBS2 (ng/ml)	< 42	≥ 42	Total
< 42	20	0	20
≥ 42	4	14	18
Total	24	14	38

Table S7B. Cross-tabulation of normal versus elevated scaled THBS2 values, given a cutoff of 2.47, for the original and cross-validation THBS2 assays (κ = 0.895).

	THBS2 Validation		
THBS2 (ng/ml)	< 2.47	≥ 2.47	Total
< 2.47	18	2	20
≥ 2.47	0	18	18
Total	18	20	38

Table S8. Summary of THBS2 immunohistochemistry in a total of 42 human PDAC and 4 cases of incidental PanIN and intraductal papillary mucinous neoplasm by immunohistochemistry.

	PDAC	PanINs/IPMN	% THBS2 positive in PDAC	% THBS2 positive in PanINs/IPMN
total (N)	42 (tissue array n=38, FCCC n= 4)	4 (FCCC)	100	100
THBS2 positive sections	42 (tissue array n=38, FCCC n=4)	4 (FCCC)	100	100
the number of sections THBS2 positive in epithelial cells of PDAC or PanINs/IPMN	32 (tissue array n=30, FCCC n=2)	4 (FCCC)	76	100
the number of sections THBS2 positive in both epithelial and fibroblast cells	21 (tissue array n=19, FCCC n=2)	0 (FCCC)	50	0
THBS2 positive in only poorly differentiated PDAC or fibroblast cells	8 (tissue array n=8, FCCC n=0)	0 (FCCC)	19	0

FCCC = samples from the repository at the Fox Chase Cancer Center