

A protein corona-enabled blood test for early cancer detection

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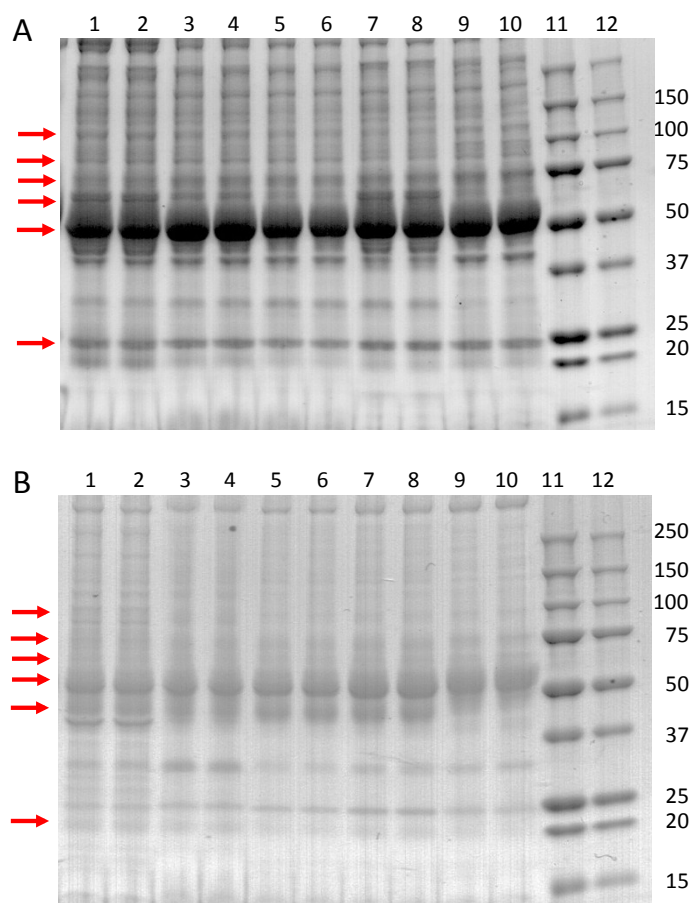


Figure S1. (A) Representative one-dimensional SDS-PAGE gel of plasma proteins obtained from lipid NPs following *in vitro* incubation with plasma of healthy subjects (lane 1-2: healthy patient “H1”; lanes 3-4: healthy patient “H2”; lanes 5-6: healthy patient “H3”; lanes 7-8: healthy patient “H4”; lanes 9-10: healthy patient “H5”). **(B)** Representative one-dimensional SDS-PAGE gel of plasma proteins obtained from lipid NPs following *in vitro* incubation with plasma of pancreatic cancer patients (lanes 1-2: pancreatic cancer patient “P10”; lanes 3-4: pancreatic cancer patient “P2”; lanes 5-6: pancreatic cancer patient “P11”; lanes 7-8: pancreatic cancer patient “P5”; lanes 9-10: pancreatic cancer patient “P6”). Numbers identifying patients refer to the list reported in Table S3. The molecular weights (kDa) of the proteins on the standard ladder are reported on lanes 11 and 12 (the amount of ladder in lane 11 is double that of lane 12). Red arrows indicate some of the most intense protein bands located at \approx 110 kDa, 90 kDa, 75 kDa, 50 kDa and 25 kDa.

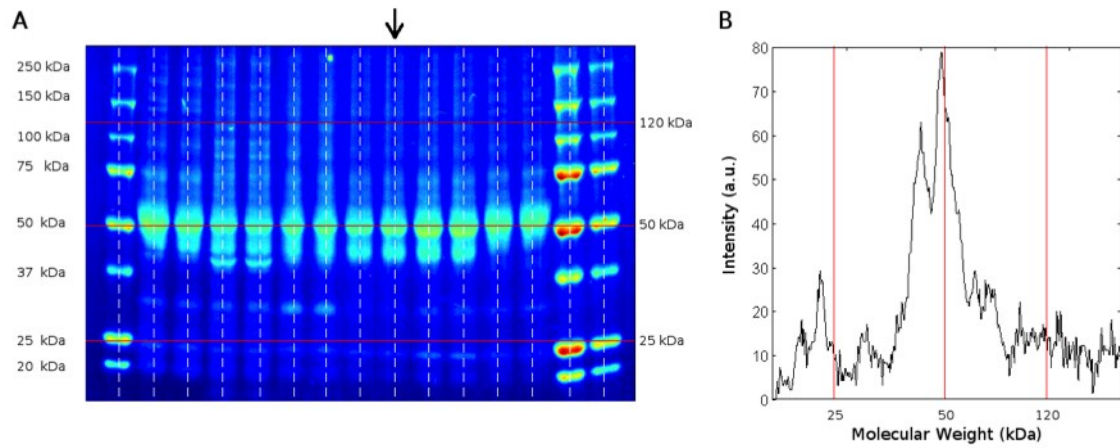


Figure S2. Procedure followed to determine the variables for the protein component analysis. (A) Representative electrophoretic gel. Red solid lines identify four regions of molecular weight: i) $MW < 25$ kDa; ii) $25 < MW < 50$; iii) $50 < MW < 120$; iv) $MW > 120$ kDa. (B) Representative total lane intensity profile obtained from the well indicated by an arrow in panel A. Solid lines identify the same four regions of molecular weight of panel A. The integral area was then calculated for each region. The same procedure was followed to calculate the four integral areas for each protein profile (i.e. for the lane intensity profiles of all healthy individuals and pancreatic cancer patients). Lastly, PCA was performed using such four integral areas as variables.

Table S1. Inclusion criteria in healthy and pancreatic cancer group.

HEALTHY GROUP
1) age \geq 18 years
2) personal medical history negative for neoplastic, renal or liver disease or blood disorders
3) adequate renal function: creatinine <1.5 mg / dl, blood urea nitrogen <1.5 times the upper limit
4) no previous chemotherapy or radiotherapy
5) absence of uncontrolled infections
6) written informed consent
PANCREATIC CANCER GROUP
1) age \geq 18 years
2) cyto-histologically proven diagnosis of pancreatic adenocarcinoma
3) personal medical history negative for neoplastic, renal or liver disease or blood disorders
4) adequate renal function: creatinine <1.5 mg / dl, blood urea nitrogen <1.5 times the upper limit
5) absence of uncontrolled infections
6) written informed consent
7) no previous chemotherapy or radiotherapy

Table S2. Nanoparticle versus blood test results.

NANOPARTICLE TEST			
	Healthy	Pathologic	% Correct
Healthy	5	0	100
Pathologic	3	17	85
Total	8	17	88

BLOOD TEST			
	Healthy	Pathologic	% Correct
Healthy	1	4	20
Pathologic	8	12	60
Total	9	16	52

Table S3. Measured concentrations of clinically relevant proteins in histologically proven pancreatic cancer patients and healthy patients.

	Alb	Prot tot	Alb %	Alfa1%	Alfa2%	Beta 1%	Beta 2%	Gamma %	Creat	Az	Glic	Bil tot	Bil dir	GOT	GPT	FosfAlc	GGT	Coolest	Trigli	Fibrin	INR	PTT	PT	CEA	CA 19.9
P1	1.6	6.6	42.6	8.7	18	5.7	8.1	16.9	0.66	24	84	1.03	0.7	20	22	243	66	163	207	508	0.96	22.3	12	16.9	2
P2	3.29	6.3	49.4	6.7	12.3	7.4	8	16.2	0.62	35	127	0.77	0.2	14	35	84	31	146	78	410	1	26.6	11.8	3.9	143.6
P3	3.38	6.1	60.1	5.1	11	5.6	5.1	13.1	0.92	36	110	0.53	0.2	14	18	74	21	138	92	308	0.96	30.4	11.4	1.9	20.3
P4	2.42	5.4	60.3	5.2	14.3	5.9	4.8	9.5	0.57	29	164	13.4	11.5	216	315	635	1331	103	113	524	1.14	29.3	13.2	1.5	1478
P5	3.57	6.1	59.1	5.5	12.1	6	5.2	12.1	0.95	29	193	1.21	1.1	8	33	172	284	152	72	509	1.19	27.8	12.8	4.3	775.4
P6	2.85	6.6	52.4	4.5	12.4	6.4	7.5	16.8	0.64	50	115	10.8	7.6	107	141	582	605	123	253	512	1	24.4	10.8	2.7	139
P7	2.86	6.7	54.1	5	14.3	5.4	8.2	13	0.86	46	99	12.02	9.1	161	258	947	1656	247	313	643	1.05	26.9	11.4	2	6615
P8	3.33	6.5	59.6	6.4	14.2	6.1	4.8	8.9	0.79	25	149	1.68	1.4	21	40	404	314	227	175	384	0.93	24.7	10.1	10	70.7
P9	2.02	6.5	42	9.3	15	6.2	7.6	19.9	1.01	70	123	0.84	0.3	29	44	109	145	208	194	313	1.11	31.4	12	2.7	1760.5
P10	2.61	5.4	41.2	6.5	17.1	4.8	8	13.7	0.8	35	121	1	1.8	18	44	120	959	265	228	350	12.1	15.1	15.1	10	1200
P11	3.45	6.4	57.8	5.7	13	6.5	6.6	10.4	0.94	23	162	0.61	0.2	16	32	131	88	148	126	519	0.87	26.1	10.9	6.6	30.1
P12	3.88	6.5	61	5.6	8.9	6.4	5	12.3	0.81	30	90	0.68	0.2	16	21	90	8	104	110	200	0.98	24.3	11.9	3	11.1
P13	3.55	7.2	60.4	4.6	10	5.7	7.2	12.1	0.95	23	123	10.55	8	88	334	217	771	274	472	467	1.15	25.9	13.8	2.4	567.3
P14	2.12	6.8	55.9	4.1	12.6	6.2	5.9	15.3	1.08	52	210	4.07	3.4	33	52	284	428	190	178	337	1.09	26.6	11.9	0.7	404.8
P15	2.7	6.7	58.9	5.2	12	6.1	5.5	12.3	0.62	25	103	0.53	0.2	17	35	135	46	197	64	405	1	23.1	11	1.7	227.3
P16	3	7.6	48.1	5	11.5	6.4	6.5	22.5	0.82	18	98	4.98	3.9	119	108	1472	665	224	122	420	2.04	34	21.9	5.3	114
P17	3.1	7	61	4	12.1	5	6	12.1	0.77	30	85	0.34	0.3	14	36	95	70	100	65	320	0.95	22.6	10.4	0.8	100
P18	3.9	6.7	52	4.9	11.5	4.9	5.1	13.4	0.84	27	94	0.28	0.1	11	48	102	104	102	74	400	1	24	9.8	0.9	148
P19	4.1	7.9	60	4.2	9.4	5.5	4.4	16.5	0.82	42	102	1.1	0.2	9	22	71	52	140	124	190	0.86	21.5	11	1.1	79
P20	2.02	6.5	42	9.3	15	6.2	7.6	19.9	1.01	70	123	0.84	0.3	29	44	109	145	208	194	313	1.11	31.4	12	2.7	1760.5
H1	3.35	7.9	51.9	4.7	11	6.7	5.7	20	0.88	34	77	0.37	0.1	47	67	82	25	216	119	360	0.89	23.3	9.6	1	55.6
H2	3.2	6.3	56.4	4.8	11	5.8	6.1	15.9	0.95	35	102	0.4	0.1	11	21	107	27	195	213	282	0.83	29.4	10.6	0.9	113.1
H3	3.8	7	55.9	4.6	13.9	5.5	4.8	15.3	0.84	18	102	0.6	0.3	36	57	105	75	210	114	330	1.05	22.6	11.7	0.8	116.2
H4	1.31	5.5	33.3	7.8	12	4.3	2.9	39.7	1	24	80	0.24	0.2	14	11	100	35	93	56	310	0.96	22.4	10.3	1.2	122.1
H5	3.1	8	58.9	4.1	11.3	6	4.8	14.9	0.65	31	96	0.52	0.1	16	34	89	11	183	125	360	0.97	25.1	10.4	1.3	200.2

Table S4. Demographic characteristics of the cohort employed in the study.

	Pancreatic cancer group (20)	Healthy group (5)	Tot (15)
Median age (years)	72	66	71
Male	9	2	11
Female	11	3	14

Table S5. Clinical/pathological stage in pancreatic cancer patients group.

Stage of pancreatic cancer	N.
cT2N+M0	1
cT3N+M0	2
cT4N+M0	1
cT2N+M+	1
cT3N+M+	2
cT4N+M+	1
pT3N1MxG2	2

Table S6. Diagnosis in healthy group.

Healthy group	N.
Cholelithiasis	3
Colonic diverticular disease	2