

Tervasmäki et al.

Supporting Information Tables S1-S4

Table S1. RT-PCR primers used for confirming differentially expressed genes in RNA-Seq

Gene	Forward primer 5'3'	Reverse primer 5'3'	Amplicon size
<i>CHAF1B</i>	TCTCCGTAGACTGAGTTTCACT	TCACCAGATTCCACACATCCA	73 bp
<i>CLIC2</i>	AGAACAAACCCTGGCTCCTC	GCCCACATCAAAAGACTCCT	71 bp
<i>FN1</i>	TTGTACTIONGCTGGGAGAAG	CTTGTGTCCTGATCGTTGCA	75 bp
<i>MCAM</i>	AAGTCACCGTCCCTGTTTTTC	CTTCCTTCAGCATTCCCACG	75 bp
<i>MSLN</i>	CCCATTGGACCTGCTGCTAT	GAGAAGAAACGGGTGCAGG	72 bp
<i>SPARC</i>	CTGGACCAGCACCCCAT	CATGGGGATGAGGGGAGC	75 bp
Reference genes			
<i>CLK2</i>	ATGTGGGATTCACCTCTTC	GGACCCAAGATCCTTTCCAT	73bp
<i>GUSB</i>	ACGGTGTCAACAAGCATGAG	ACCAAGCCAGCGAAGCAG	95bp

Table S2. Differentially expressed genes (log2 fold change >0.5 or <-0.5) between the *MCPH1* mutant and control cell lines in the RNA-Seq, analyzed with DESeq2

Overexpressed in <i>MCPH1</i> mutant cells			Underexpressed in <i>MCPH1</i> mutant cells				
Gene ID	Log2FC	Adj. p-value (q)	Gene ID	Log2FC	Adj. p-value (q)		
1	<i>CLIC2</i>	3.2873	3.36E-142	1	<i>COCH</i>	-3.1402	3.73E-146
2	<i>SLC27A6</i>	2.8925	1.62E-101	2	<i>NLGN4X</i>	-2.9055	5.17E-83
3	<i>GLDC</i>	2.4649	1.31E-148	3	<i>KIF7</i>	-1.9543	3.00E-37
4	<i>MSLN</i>	2.1765	3.35E-177	4	<i>ABCA3</i>	-1.9049	3.48E-40
5	<i>FRMD3</i>	2.0816	7.98E-54	5	<i>AIF1L</i>	-1.5855	4.15E-48
6	<i>MCAM</i>	2.0702	3.01E-67	6	<i>HIST1H2BE</i>	-1.4251	1.64E-46
7	<i>EYA2</i>	2.0659	1.80E-42	7	<i>DENND2D</i>	-1.3879	3.65E-23
8	<i>DCN</i>	1.9832	4.44E-99	8	<i>CHSY3</i>	-1.3457	1.79E-35
9	<i>MFAP5</i>	1.9279	2.62E-44	9	<i>MCPH1</i>	-1.2910	2.38E-52
10	<i>LCP1</i>	1.8971	8.07E-38	10	<i>HIST1H2BB</i>	-1.2627	2.11E-74
11	<i>SPRR2D</i>	1.7681	1.93E-39	11	<i>TSPAN18</i>	-1.1667	3.14E-14
12	<i>IGFBP3</i>	1.6686	1.31E-48	12	<i>GNAZ</i>	-1.1469	1.07E-12
13	<i>ERICH5</i>	1.6547	5.47E-27	13	<i>SPARC</i>	-1.1428	6.87E-39
14	<i>DOCK10</i>	1.6489	3.62E-33	14	<i>NIPAL4</i>	-1.1260	3.59E-12
15	<i>AZGP1</i>	1.6444	4.93E-32	15	<i>CDH4</i>	-1.1145	1.49E-17
16	<i>IVL</i>	1.6219	1.07E-39	16	<i>AKR1C2</i>	-1.0661	2.31E-70
17	<i>SPRR1B</i>	1.5572	2.80E-52	17	<i>SEMA3B</i>	-1.0356	4.67E-12
18	<i>ZNF732</i>	1.5547	2.18E-23	18	<i>AP1M2</i>	-1.0319	9.01E-43
19	<i>OVOL1</i>	1.5015	3.16E-23	19	<i>ANXA6</i>	-1.0148	8.30E-27
20	<i>ABCC2</i>	1.4893	9.47E-88	20	<i>AP1S2</i>	-1.0003	2.13E-22
21	<i>CFB</i>	1.4753	5.77E-54	21	<i>KRT83</i>	-0.9556	5.16E-10
22	<i>STEAP4</i>	1.4607	4.79E-22	22	<i>KRT13</i>	-0.9431	2.56E-10
23	<i>PI3</i>	1.4565	2.88E-48	23	<i>RAB31</i>	-0.9051	1.14E-11
24	<i>GJA5</i>	1.4564	1.13E-29	24	<i>DLX1</i>	-0.8921	6.64E-08
25	<i>TNC</i>	1.4180	5.43E-65	25	<i>PLA2G16</i>	-0.8885	4.94E-09
26	<i>SAA2</i>	1.4124	2.79E-33	26	<i>CRIP2</i>	-0.8846	1.04E-19
27	<i>CFH</i>	1.4122	1.69E-84	27	<i>SAMD5</i>	-0.8687	5.39E-18
28	<i>HLA-B</i>	1.3926	2.90E-79	28	<i>RPP25</i>	-0.8578	1.10E-08
29	<i>ELF3</i>	1.3372	7.43E-30	29	<i>UCHL1</i>	-0.8206	9.03E-07
30	<i>DPYSL3</i>	1.3001	4.49E-63	30	<i>TREX1</i>	-0.8136	3.30E-09
31	<i>LPAR3</i>	1.2708	7.42E-16	31	<i>LAPTM5</i>	-0.8092	4.78E-08
32	<i>C1orf233</i>	1.2621	1.64E-35	32	<i>GPAT3</i>	-0.7938	7.02E-07
33	<i>C15orf48</i>	1.2615	7.22E-17	33	<i>HIST1H3F</i>	-0.7920	3.54E-40
34	<i>IL1B</i>	1.2239	7.12E-75	34	<i>IVD</i>	-0.7774	3.01E-16
35	<i>UBE2L6</i>	1.2172	4.86E-27	35	<i>ADD2</i>	-0.7718	2.02E-12
36	<i>C1S</i>	1.2111	4.09E-14	36	<i>IGFBP2</i>	-0.7508	6.18E-08
37	<i>IQGAP2</i>	1.1818	5.97E-18	37	<i>ZNF85</i>	-0.7506	6.03E-06

38	<i>LINC00460</i>	1.1750	2.95E-17
39	<i>KCNK15</i>	1.1705	2.11E-14
40	<i>RARRES1</i>	1.1666	2.37E-13
41	<i>DBNDD1</i>	1.1651	4.68E-30
42	<i>AKT3</i>	1.1586	8.15E-60
43	<i>FN1</i>	1.1522	6.00E-70
44	<i>PADI2</i>	1.1503	1.33E-13
45	<i>C1R</i>	1.1331	8.99E-17
46	<i>CEACAM6</i>	1.1091	8.54E-12
47	<i>CFI</i>	1.0942	3.51E-25
48	<i>CCDC80</i>	1.0915	1.57E-53
49	<i>TRIM22</i>	1.0736	8.18E-30
50	<i>STRA6</i>	1.0707	2.63E-23
51	<i>IFIT1</i>	1.0417	3.70E-11
52	<i>CCL28</i>	1.0251	2.71E-19
53	<i>CSGALNACT1</i>	1.0048	1.53E-25
54	<i>CLCA2</i>	0.9923	1.26E-68
55	<i>SAA1</i>	0.9923	2.68E-47
56	<i>SYTL2</i>	0.9738	1.64E-11
57	<i>KRT15</i>	0.9698	3.01E-34
58	<i>S100A8</i>	0.9679	1.10E-22
59	<i>ACSL5</i>	0.9679	4.67E-09
60	<i>HES2</i>	0.9678	6.90E-39
61	<i>FBXO32</i>	0.9647	3.01E-13
62	<i>TACC2</i>	0.9627	4.17E-27
63	<i>MAFB</i>	0.9577	7.66E-16
64	<i>SERPINA1</i>	0.9495	1.52E-22
65	<i>SERPINB13</i>	0.9470	7.72E-14
66	<i>CDA</i>	0.9397	1.45E-08
67	<i>CCND2</i>	0.9379	3.69E-50
68	<i>ADAMTSL4</i>	0.9361	2.98E-12
69	<i>CLDN4</i>	0.9262	7.38E-09
70	<i>FAP</i>	0.9077	2.52E-34
71	<i>METRNL</i>	0.8990	1.84E-11
72	<i>PRR15L</i>	0.8959	2.49E-12
73	<i>FYN</i>	0.8890	6.04E-08
74	<i>S100A7</i>	0.8886	2.79E-08
75	<i>SERPINB7</i>	0.8814	3.66E-09
76	<i>KRT16</i>	0.8793	6.23E-40
77	<i>TNNT1</i>	0.8761	4.34E-09
78	<i>PNRC1</i>	0.8748	2.57E-38
79	<i>FBXO2</i>	0.8713	6.78E-13
80	<i>PCDHAC1</i>	0.8678	2.84E-09

38	<i>BCAM</i>	-0.7412	1.38E-05
39	<i>HIST2H3D</i>	-0.7365	2.46E-20
40	<i>HIST1H1A</i>	-0.7338	4.29E-23
41	<i>PTGS1</i>	-0.7303	3.05E-09
42	<i>HIST1H4B</i>	-0.7292	1.93E-47
43	<i>SYN3</i>	-0.7220	3.46E-07
44	<i>HIST1H3B</i>	-0.7186	5.56E-33
45	<i>HIST3H2BB</i>	-0.7107	1.12E-27
46	<i>IL17RE</i>	-0.7089	1.40E-05
47	<i>HIST1H1D</i>	-0.7088	9.01E-30
48	<i>HIST1H3J</i>	-0.7085	1.70E-32
49	<i>HIST1H2BJ</i>	-0.7050	4.54E-49
50	<i>MACROD1</i>	-0.7039	2.09E-06
51	<i>HIST1H3C</i>	-0.6990	9.05E-45
52	<i>HIST1H4K</i>	-0.6978	1.28E-14
53	<i>ETNK2</i>	-0.6948	1.09E-14
54	<i>HIST1H4C</i>	-0.6925	3.62E-32
55	<i>HIST1H3H</i>	-0.6920	3.25E-30
56	<i>COL16A1</i>	-0.6898	2.21E-08
57	<i>DLL3</i>	-0.6829	7.68E-05
58	<i>SCARA3</i>	-0.6801	8.67E-09
59	<i>CHAF1B</i>	-0.6723	1.22E-19
60	<i>FUOM</i>	-0.6627	8.52E-07
61	<i>HIST1H2AB</i>	-0.6412	2.78E-24
62	<i>HIST1H2AE</i>	-0.6409	1.24E-38
63	<i>HIST1H2BH</i>	-0.6356	9.17E-29
64	<i>HIST1H4H</i>	-0.6284	9.38E-32
65	<i>SULT1E1</i>	-0.6213	3.60E-10
66	<i>PRICKLE1</i>	-0.6204	2.13E-05
67	<i>RAMP1</i>	-0.6176	2.15E-04
68	<i>GLS2</i>	-0.6157	9.73E-07
69	<i>FKBP1B</i>	-0.6090	5.13E-04
70	<i>ZNF468</i>	-0.6086	1.41E-07
71	<i>MALL</i>	-0.6041	8.29E-10
72	<i>HPDL</i>	-0.6038	4.62E-06
73	<i>HIST1H2AH</i>	-0.6036	7.20E-36
74	<i>FGFR2</i>	-0.6009	6.39E-05
75	<i>LONRF3</i>	-0.5989	6.01E-04
76	<i>PEG10</i>	-0.5965	2.27E-14
77	<i>HIST3H2A</i>	-0.5938	1.13E-18
78	<i>HIST1H2BL</i>	-0.5891	4.42E-23
79	<i>EPHB2</i>	-0.5863	1.68E-10
80	<i>HIST1H2BG</i>	-0.5858	8.93E-24

81	<i>ICAM1</i>	0.8662	6.78E-23
82	<i>MAPK13</i>	0.8656	4.87E-21
83	<i>ATP6V0A4</i>	0.8632	3.54E-08
84	<i>IGFL1</i>	0.8617	2.28E-16
85	<i>TRIML2</i>	0.8552	1.93E-13
86	<i>LOC155060</i>	0.8471	1.52E-08
87	<i>GBP6</i>	0.8436	1.15E-07
88	<i>ATHL1</i>	0.8400	4.09E-10
89	<i>LHFP</i>	0.8362	2.44E-09
90	<i>PUS3</i>	0.8312	1.01E-13
91	<i>CYP1B1</i>	0.8310	3.52E-29
92	<i>GDF15</i>	0.8225	3.41E-08
93	<i>WISP2</i>	0.8224	5.99E-07
94	<i>FRG1CP</i>	0.8115	3.20E-07
95	<i>TCN2</i>	0.8078	1.69E-06
96	<i>TGM2</i>	0.8071	1.13E-17
97	<i>TP53INP1</i>	0.7982	1.54E-09
98	<i>MUC1</i>	0.7971	9.27E-12
99	<i>GBP2</i>	0.7957	1.27E-24
100	<i>CRABP2</i>	0.7945	7.90E-18
101	<i>CRYAB</i>	0.7901	1.51E-06
102	<i>LMO7</i>	0.7823	4.31E-43
103	<i>SPRR1A</i>	0.7768	3.10E-06
104	<i>TSPAN1</i>	0.7738	2.59E-28
105	<i>MACC1</i>	0.7729	1.62E-12
106	<i>LY6D</i>	0.7700	5.44E-06
107	<i>MAGEE1</i>	0.7696	2.08E-06
108	<i>F2R</i>	0.7690	2.84E-09
109	<i>ADGRF1</i>	0.7687	1.40E-07
110	<i>HSPB8</i>	0.7670	1.40E-08
111	<i>FAM127C</i>	0.7664	6.97E-06
112	<i>BTG2</i>	0.7620	4.69E-16
113	<i>CREBRF</i>	0.7580	1.41E-07
114	<i>P3H3</i>	0.7553	9.10E-06
115	<i>PLAC8</i>	0.7552	3.15E-07
116	<i>PDZK1IP1</i>	0.7537	4.21E-07
117	<i>MYEOV</i>	0.7532	9.24E-06
118	<i>IFI44</i>	0.7530	2.73E-06
119	<i>TMC4</i>	0.7347	6.97E-07
120	<i>IFI27</i>	0.7334	1.97E-05
121	<i>SPRR2A</i>	0.7302	1.69E-05
122	<i>SEPT6</i>	0.7282	1.88E-13
123	<i>GRHL3</i>	0.7256	2.01E-12

81	<i>CA9</i>	-0.5848	1.08E-03
82	<i>HTRA1</i>	-0.5825	6.59E-23
83	<i>IRS1</i>	-0.5817	6.84E-05
84	<i>HIST1H3A</i>	-0.5788	9.26E-16
85	<i>HIST1H2AL</i>	-0.5780	1.89E-24
86	<i>HIST1H4D</i>	-0.5771	3.39E-21
87	<i>IGFBP6</i>	-0.5704	9.62E-10
88	<i>CLCN2</i>	-0.5679	2.84E-06
89	<i>CDC45</i>	-0.5674	1.58E-15
90	<i>TSPAN5</i>	-0.5630	3.56E-07
91	<i>PHGDH</i>	-0.5594	9.76E-09
92	<i>HIST1H3G</i>	-0.5590	2.76E-21
93	<i>VWA5A</i>	-0.5583	9.24E-04
94	<i>HIST2H2AB</i>	-0.5554	7.18E-19
95	<i>TUB</i>	-0.5508	3.56E-08
96	<i>HIST2H2BE</i>	-0.5508	7.66E-13
97	<i>MT1F</i>	-0.5482	2.22E-03
98	<i>RPSAP52</i>	-0.5456	1.74E-06
99	<i>WTIP</i>	-0.5445	1.53E-06
100	<i>HIST1H2AM</i>	-0.5422	9.82E-26
101	<i>EPCAM</i>	-0.5420	6.93E-12
102	<i>HIST1H1E</i>	-0.5409	1.53E-25
103	<i>ARHGAP23</i>	-0.5399	4.01E-12
104	<i>HIST1H4A</i>	-0.5364	2.46E-07
105	<i>HIST1H2AI</i>	-0.5362	1.24E-27
106	<i>HIST1H2BI</i>	-0.5355	5.89E-27
107	<i>PPP2R2C</i>	-0.5348	8.17E-07
108	<i>GRK5</i>	-0.5331	1.12E-04
109	<i>FAM174B</i>	-0.5329	1.11E-03
110	<i>LARGE</i>	-0.5313	3.46E-05
111	<i>SYT12</i>	-0.5267	3.69E-04
112	<i>HIST1H2AC</i>	-0.5252	4.43E-14
113	<i>HIST1H4L</i>	-0.5227	5.86E-12
114	<i>HIST1H2BD</i>	-0.5206	2.78E-19
115	<i>CHRNA9</i>	-0.5186	1.37E-04
116	<i>ESPL1</i>	-0.5178	1.39E-10
117	<i>HIST1H3D</i>	-0.5162	1.65E-11
118	<i>LRAT</i>	-0.5136	3.31E-06
119	<i>LOC100506990</i>	-0.5125	3.25E-03
120	<i>EREG</i>	-0.5113	2.06E-09
121	<i>FAM132B</i>	-0.5103	2.38E-03
122	<i>CBR3</i>	-0.5090	1.46E-04
123	<i>HERC5</i>	-0.5079	3.69E-04

124	<i>TACSTD2</i>	0.7210	1.21E-44
125	<i>SLAMF7</i>	0.7208	2.28E-05
126	<i>RHOV</i>	0.7166	1.67E-12
127	<i>C12orf54</i>	0.7163	2.83E-05
128	<i>SULF2</i>	0.7159	9.54E-13
129	<i>CLDN7</i>	0.7150	1.84E-28
130	<i>CPE</i>	0.7130	1.40E-07
131	<i>MARCO</i>	0.7117	4.04E-07
132	<i>FAM198B</i>	0.7075	1.87E-06
133	<i>C1orf115</i>	0.7053	1.05E-07
134	<i>HHAT</i>	0.7004	5.39E-07
135	<i>DAPK1</i>	0.6982	3.02E-06
136	<i>PROM2</i>	0.6900	1.25E-06
137	<i>FUT3</i>	0.6898	2.38E-05
138	<i>PLD1</i>	0.6875	1.73E-08
139	<i>VSTM2L</i>	0.6854	2.58E-10
140	<i>MAP3K7CL</i>	0.6822	5.63E-05
141	<i>LEF1</i>	0.6796	8.35E-06
142	<i>CDKN1A</i>	0.6790	1.09E-29
143	<i>SLPI</i>	0.6782	4.19E-23
144	<i>KLHL24</i>	0.6739	2.55E-10
145	<i>PCDHAC2</i>	0.6678	2.64E-05
146	<i>LIF</i>	0.6671	1.08E-10
147	<i>PCSK1N</i>	0.6666	1.01E-05
148	<i>S1PR3</i>	0.6637	6.06E-10
149	<i>AQP3</i>	0.6636	1.57E-09
150	<i>MCF2</i>	0.6544	1.09E-05
151	<i>PLCH2</i>	0.6501	1.17E-08
152	<i>SLFN5</i>	0.6498	5.73E-27
153	<i>PVRL4</i>	0.6484	3.10E-05
154	<i>INPP5D</i>	0.6475	1.16E-13
155	<i>CLDN1</i>	0.6445	7.78E-18
156	<i>IL32</i>	0.6444	1.66E-04
157	<i>DYRK1B</i>	0.6435	2.32E-05
158	<i>ARL9</i>	0.6433	9.59E-06
159	<i>TSC22D3</i>	0.6424	1.62E-10
160	<i>IFIT2</i>	0.6374	1.69E-04
161	<i>REEP6</i>	0.6313	3.06E-04
162	<i>TMEM171</i>	0.6241	4.28E-04
163	<i>ADGRL2</i>	0.6223	2.61E-20
164	<i>S100A9</i>	0.6202	1.60E-22
165	<i>SCEL</i>	0.6177	7.66E-16
166	<i>CDKN1C</i>	0.6172	2.83E-06

124	<i>ASF1B</i>	-0.5052	4.38E-13
125	<i>SLC1A4</i>	-0.5017	2.82E-04

167	<i>NINJ1</i>	0.6165	5.40E-12
168	<i>NFASC</i>	0.6165	3.85E-04
169	<i>IFITM2</i>	0.6141	1.37E-20
170	<i>BBOX1</i>	0.6046	6.49E-04
171	<i>DUSP1</i>	0.6043	1.48E-28
172	<i>IFITM3</i>	0.6039	3.01E-25
173	<i>NEAT1</i>	0.6031	7.71E-05
174	<i>GLMP</i>	0.6004	2.78E-10
175	<i>SDC3</i>	0.5997	1.02E-11
176	<i>IRF9</i>	0.5964	4.75E-05
177	<i>NUPR1</i>	0.5940	1.90E-10
178	<i>DSG3</i>	0.5903	2.81E-31
179	<i>TNFSF10</i>	0.5895	9.84E-04
180	<i>SLC16A4</i>	0.5884	4.67E-07
181	<i>ERC2</i>	0.5883	1.02E-03
182	<i>MAPRE3</i>	0.5870	1.18E-05
183	<i>CGN</i>	0.5857	2.22E-06
184	<i>ZDHHC2</i>	0.5845	6.47E-09
185	<i>SH3PXD2A-AS1</i>	0.5836	1.57E-08
186	<i>CMTM7</i>	0.5831	3.57E-05
187	<i>NOTCH1</i>	0.5795	3.81E-17
188	<i>ZDHHC8</i>	0.5791	7.89E-13
189	<i>SLC6A9</i>	0.5784	3.56E-06
190	<i>SERPINB2</i>	0.5771	1.70E-10
191	<i>ABCD1</i>	0.5736	1.14E-04
192	<i>YPEL5</i>	0.5734	6.45E-13
193	<i>GSN</i>	0.5731	1.93E-13
194	<i>TMEM63C</i>	0.5728	4.39E-05
195	<i>CD24</i>	0.5713	2.78E-29
196	<i>EHF</i>	0.5708	3.43E-09
197	<i>ZBTB22</i>	0.5687	5.61E-05
198	<i>BCL6</i>	0.5663	2.78E-06
199	<i>PDP1</i>	0.5660	1.35E-16
200	<i>NCF2</i>	0.5622	6.31E-04
201	<i>GPRC5C</i>	0.5611	6.69E-06
202	<i>MGLL</i>	0.5586	3.42E-13
203	<i>CCDC64B</i>	0.5579	1.90E-03
204	<i>SNORA74A</i>	0.5575	1.97E-03
205	<i>SLC25A18</i>	0.5570	2.01E-03
206	<i>NR1D2</i>	0.5554	7.49E-06
207	<i>ZFP36</i>	0.5551	5.98E-07
208	<i>F8A1</i>	0.5533	2.23E-03

209	<i>CD99L2</i>	0.5526	6.93E-13
210	<i>L1CAM</i>	0.5496	1.85E-07
211	<i>CXADR</i>	0.5494	6.13E-08
212	<i>RALGDS</i>	0.5489	1.09E-08
213	<i>STC1</i>	0.5487	6.00E-04
214	<i>PSCA</i>	0.5473	9.39E-08
215	<i>VSNL1</i>	0.5471	2.02E-06
216	<i>BIRC3</i>	0.5467	1.18E-13
217	<i>SPOCD1</i>	0.5444	1.90E-03
218	<i>TYMP</i>	0.5425	6.34E-08
219	<i>ZFP57</i>	0.5415	2.98E-03
220	<i>FOSB</i>	0.5399	5.12E-04
221	<i>TNFRSF10C</i>	0.5379	3.16E-03
222	<i>PYGO1</i>	0.5365	5.40E-05
223	<i>SOCS3</i>	0.5361	1.50E-03
224	<i>HLA-F</i>	0.5353	2.18E-06
225	<i>ITGB6</i>	0.5353	5.75E-24
226	<i>FAM214B</i>	0.5323	9.36E-09
227	<i>PBXIP1</i>	0.5318	1.60E-08
228	<i>CALCOCO1</i>	0.5314	8.72E-08
229	<i>MAOA</i>	0.5311	6.80E-13
230	<i>LIPH</i>	0.5311	3.72E-03
231	<i>HSH2D</i>	0.5310	1.26E-03
232	<i>NTN4</i>	0.5293	4.75E-11
233	<i>MEF2D</i>	0.5293	2.93E-07
234	<i>PLEKHH3</i>	0.5286	1.95E-06
235	<i>SIRPB2</i>	0.5280	2.34E-03
236	<i>GAMT</i>	0.5233	1.51E-03
237	<i>ADAM21</i>	0.5231	2.37E-03
238	<i>LMX1B</i>	0.5209	4.33E-03
239	<i>PROS1</i>	0.5190	6.82E-08
240	<i>GPRC5A</i>	0.5187	8.38E-21
241	<i>VNN1</i>	0.5187	3.74E-03
242	<i>GREB1</i>	0.5182	2.59E-03
243	<i>MED24</i>	0.5169	1.42E-18
244	<i>NCKAP5L</i>	0.5168	1.53E-06
245	<i>CYP2J2</i>	0.5165	4.78E-03
246	<i>PIK3CD</i>	0.5162	1.36E-04
247	<i>CSF1R</i>	0.5159	2.65E-06
248	<i>TTC9</i>	0.5145	5.62E-04
249	<i>SERPINI1</i>	0.5145	4.51E-03
250	<i>LAMA3</i>	0.5130	4.39E-32
251	<i>PHLDB3</i>	0.5128	2.04E-03

252	<i>C11orf70</i>	0.5120	3.39E-03
253	<i>SEC14L1</i>	0.5077	9.95E-09
254	<i>GRN</i>	0.5074	5.79E-15
255	<i>GDPD3</i>	0.5074	5.23E-03
256	<i>CSF1</i>	0.5070	1.50E-04
257	<i>PML</i>	0.5063	1.46E-06
258	<i>PIK3R3</i>	0.5059	2.92E-07
259	<i>ERBB3</i>	0.5049	1.42E-05
260	<i>MVP</i>	0.5044	8.21E-18
261	<i>CYB5R1</i>	0.5042	3.93E-14
262	<i>LZTS2</i>	0.5034	5.54E-06
263	<i>TMEM63B</i>	0.5024	1.86E-11
264	<i>SLC44A5</i>	0.5014	2.82E-07
265	<i>MYL9</i>	0.5009	9.38E-05
266	<i>MROH6</i>	0.5007	2.12E-06

Log2FC: log2 fold change, adj: adjusted.

Table S3. The expanded list of molecules enriched in cancer and invasion-related pathways in IPA

Metastasis			Advanced malignant tumor			Invasion of mammary tumor cells		
Molecule	Prediction ^a	Log2FC	Molecule	Prediction	Log2FC	Molecule	Prediction	Log2FC
MCAM	Increased	2.07	MSLN	Affected	2.176	MCAM	Increased	2.07
TNC	Increased	1.418	MCAM	Increased	2.07	FN1	Increased	1.152
DPYSL3	Decreased	1.3	MFAP5	Affected	1.928	S100A8	Increased	0.968
IL1B	Increased	1.224	TNC	Increased	1.418	S100A7	Increased	0.889
AKT3	Increased	1.159	CFH	Affected	1.412	F2R	Increased	0.769
FN1	Increased	1.152	DPYSL3	Decreased	1.3	NOTCH1	Increased	0.579
C1R	Affected	1.133	IL1B	Increased	1.224	CSF1	Increased	0.507
CCDC80	Decreased	1.091	AKT3	Increased	1.159			
MAFB	Affected	0.958	FN1	Increased	1.152			
SERPINA1	Affected	0.949	C1R	Affected	1.133			
CCND2	Affected	0.938	CCDC80	Decreased	1.091			
CLDN4	Affected	0.926	MAFB	Affected	0.958			
FYN	Increased	0.889	SERPINA1	Affected	0.949			
ICAM1	Affected	0.866	CCND2	Affected	0.938			
CYP1B1	Affected	0.831	CLDN4	Affected	0.926			
GDF15	Affected	0.823	FYN	Increased	0.889			
TGM2	Increased	0.807	ICAM1	Affected	0.866			
MUC1	Increased	0.797	CYP1B1	Affected	0.831			
CRABP2	Affected	0.794	GDF15	Affected	0.823			
F2R	Increased	0.769	TGM2	Increased	0.807			
TACSTD2	Increased	0.721	MUC1	Increased	0.797			
DAPK1	Decreased	0.698	CRABP2	Affected	0.794			
PLD1	Increased	0.687	F2R	Increased	0.769			
CDKN1A	Decreased	0.679	TACSTD2	Increased	0.721			
SLPI	Affected	0.678	DAPK1	Decreased	0.698			
IFITM3	Increased	0.604	PLD1	Increased	0.687			
NOTCH1	Increased	0.579	CDKN1A	Decreased	0.679			
SERPINB2	Decreased	0.577	SLPI	Affected	0.678			
CD24	Increased	0.571	IFITM2	Affected	0.614			
ZFP36	Affected	0.555	IFITM3	Increased	0.604			
L1CAM	Increased	0.55	NOTCH1	Increased	0.579			
PSCA	Increased	0.547	SERPINB2	Decreased	0.577			
SOCS3	Increased	0.536	CD24	Increased	0.571			
NTN4	Increased	0.529	ZFP36	Affected	0.555			
MEF2D	Increased	0.529	L1CAM	Increased	0.55			
GREB1	Affected	0.518	PSCA	Increased	0.547			
PIK3CD	Decreased	0.516	SOCS3	Increased	0.536			
CSF1R	Affected	0.516	NTN4	Increased	0.529			
LAMA3	Affected	0.513	MEF2D	Increased	0.529			
CSF1	Increased	0.507	GREB1	Affected	0.518			
PIK3R3	Increased	0.506	PIK3CD	Decreased	0.516			
ERBB3	Increased	0.505	CSF1R	Affected	0.516			
SYT12	Affected	-0.527	LAMA3	Affected	0.513			
PPP2R2C	Affected	-0.535	CSF1	Increased	0.507			
EPCAM	Decreased	-0.542	PIK3R3	Increased	0.506			

IRS1	Affected	-0.582	ERBB3	Increased	0.505
HTRA1	Affected	-0.582	SYT12	Affected	-0.527
CA9	Affected	-0.585	PPP2R2C	Affected	-0.535
FGFR2	Increased	-0.601	EPCAM	Decreased	-0.542
SULT1E1	Affected	-0.621	IRS1	Affected	-0.582
PTGS1	Affected	-0.73	HTRA1	Affected	-0.582
IGFBP2	Decreased	-0.751	CA9	Affected	-0.585
RAB31	Affected	-0.905	FGFR2	Increased	-0.601
AKR1C2	Affected	-1.066	SULT1E1	Affected	-0.621
			PTGS1	Affected	-0.73
			IGFBP2	Decreased	-0.751
			RAB31	Affected	-0.905
			AKR1C2	Affected	-1.066

Homing of cells			Invasion of cells			Chemotaxis		
Molecule	Prediction	Log2FC	Molecule	Prediction	Log2FC	Molecule	Prediction	Log2FC
LCP1	Increased	1.897	MCAM	Increased	2.07	LCP1	Increased	1.897
IGFBP3	Increased	1.669	EYA2	Increased	2.066	LPAR3	Increased	1.271
LPAR3	Increased	1.271	DCN	Decreased	1.983	IL1B	Increased	1.224
IL1B	Increased	1.224	LCP1	Increased	1.897	FN1	Increased	1.152
FN1	Increased	1.152	AZGP1	Decreased	1.644	CCL28	Increased	1.025
CCL28	Increased	1.025	TNC	Increased	1.418	SAA1	Affected	0.992
SAA1	Affected	0.992	CFH	Increased	1.412	S100A8	Increased	0.968
S100A8	Increased	0.968	ELF3	Increased	1.337	SERPINA1	Increased	0.949
SERPINA1	Increased	0.949	DPYSL3	Decreased	1.3	FYN	Increased	0.889
FYN	Increased	0.889	IL1B	Increased	1.224	S100A7	Increased	0.889
S100A7	Increased	0.889	UBE2L6	Increased	1.217	ICAM1	Increased	0.866
ICAM1	Increased	0.866	AKT3	Increased	1.159	MUC1	Increased	0.797
MUC1	Increased	0.797	FN1	Increased	1.152	F2R	Increased	0.769
F2R	Increased	0.769	CEACAM6	Increased	1.109	MARCO	Affected	0.712
MARCO	Affected	0.712	CLCA2	Decreased	0.992	PLD1	Increased	0.687
PLD1	Increased	0.687	SAA1	Increased	0.992	LEF1	Affected	0.68
LEF1	Affected	0.68	S100A8	Increased	0.968	CDKN1A	Affected	0.679
CDKN1A	Affected	0.679	SERPINA1	Increased	0.949	SLPI	Increased	0.678
SLPI	Increased	0.678	CLDN4	Affected	0.926	LIF	Increased	0.667
LIF	Increased	0.667	FAP	Increased	0.908	S1PR3	Increased	0.664
S1PR3	Increased	0.664	FYN	Increased	0.889	INPP5D	Increased	0.647
INPP5D	Increased	0.647	S100A7	Increased	0.889	S100A9	Increased	0.62
S100A9	Increased	0.62	ATP6V0A4	Increased	0.863	NINJ1	Affected	0.616
NINJ1	Affected	0.616	CYP1B1	Increased	0.831	GSN	Increased	0.573
GSN	Increased	0.573	GDF15	Increased	0.823	L1CAM	Affected	0.55
L1CAM	Increased	0.55	WISP2	Decreased	0.822	CXADR	Affected	0.549
CXADR	Affected	0.549	MUC1	Increased	0.797	TYMP	Affected	0.542
TYMP	Affected	0.542	F2R	Increased	0.769	SOCS3	Decreased	0.536
SOCS3	Decreased	0.536	BTG2	Decreased	0.762	PIK3CD	Increased	0.516
PIK3CD	Increased	0.516	CLDN7	Increased	0.715	CSF1R	Increased	0.516
CSF1R	Increased	0.516	PLD1	Affected	0.687	GRN	Decreased	0.507
GRN	Decreased	0.507	LEF1	Increased	0.68	CSF1	Increased	0.507

CSF1	Increased	0.507	CDKN1A	Increased	0.679	ERBB3	Increased	0.505
ERBB3	Increased	0.505	S1PR3	Increased	0.664	EPHB2	Increased	-0.586
EPHB2	Increased	-0.59	MCF2	Increased	0.654	SEMA3B	Decreased	-1.036
SEMA3B	Decreased	-1.04	SLFN5	Decreased	0.65	GNAZ	Decreased	-1.147
GNAZ	Decreased	-1.15	CLDN1	Affected	0.644			
			IL32	Increased	0.644			
			DYRK1B	Decreased	0.644			
			IFIT2	Decreased	0.637			
			S100A9	Affected	0.62			
			DUSP1	Increased	0.604			
			IFITM3	Affected	0.604			
			TNFSF10	Increased	0.589			
			NOTCH1	Increased	0.579			
			GSN	Increased	0.573			
			CD24	Increased	0.571			
			ZFP36	Decreased	0.555			
			L1CAM	Increased	0.55			
			RALGDS	Affected	0.549			
			ITGB6	Affected	0.535			
			MEF2D	Increased	0.529			
			ADAM21	Increased	0.523			
			CYP2J2	Increased	0.516			
			PIK3CD	Increased	0.516			
			LAMA3	Affected	0.513			
			GRN	Increased	0.507			
			CSF1	Increased	0.507			
			PML	Increased	0.506			
			ERBB3	Increased	0.505			
			EREK	Decreased	-0.51			
			EPCAM	Decreased	-0.54			
			HTRA1	Increased	-0.58			
			CA9	Decreased	-0.59			
			EPHB2	Decreased	-0.59			
			FGFR2	Increased	-0.6			
			IGFBP2	Decreased	-0.75			
			PLA2G16	Decreased	-0.89			
			CDH4	Increased	-1.12			
			SPARC	Decreased	-1.14			

^aPrediction based on measurement direction. IPA: Ingenuity Pathway Analysis, Log2FC: log2 fold change.

Table S4. *TP53* mutation frequency in *MCPH1*-altered and non-altered breast tumors

Dataset	Samples	<i>TP53</i> mutation frequency	p-value ^a	OR	95% CI
Breast invasive carcinoma (TCGA)	n=963	297/963 (31%)			
<i>MCPH1</i> -altered	n=54	31/54 (57%)			
Non-altered	n=909	266/909 (29%)	0.000029	3.3	1.865–5.692
Breast cancer (METABRIC)	n=2051	741/2051 (36%)			
<i>MCPH1</i> -altered	n=26	19/26 (73%)			
Non-altered	n=2025	722/2025 (36%)	0.000127	4.9	2.049–11.708

^a χ^2 -test, *MCPH1*-altered vs. non-altered. CI: confidence interval, OR: odds ratio