Supplementary Table 3 – List of perturbagens positively correlated with the biological state represented by a gene expression signature, comprised of the top 20 genes positively correlated and the top 20 genes negatively correlated with *HOXA9* expression in the primary glioblastomas from UCSF and MDA. A perturbagen can be a specific pharmacological or genetic treatment. The results suggest that PI3K inhibition in some cancer cell lines, either by LY294002 treatment (MCF7 and SKMEL cell lines) or wortmannin treatment (MCF7), produces a gene expression state similar to that observed in the primary glioblastomas. Genes positively and negatively correlated with *HOXA9* expression in the primary tumors were used as the "down tag" and the "up tag" for the query signature, respectively, because our findings in A172 cells indicated that expression of *HOXA* genes can be inhibited by LY294002-mediated PI3K inhibition. The results were obtained by using the "Connectivity Map" online resource (1).

Rank	instance id [(A)]	cmap name (perturbagen)	dose	cell line	connectivity score [(B)]	up score [(B)]	down score [(B)]
1	449	monorden	100 nM	PC3	1.0	0.313	-0.371
2	1019	**LY294002**	10 µM	MCF7	0.99	0.414	-0.263
3	1078	valproic acid	500 µM	MCF7	0.988	0.457	-0.219
4	890	5149715	10 µM	MCF7	0.931	0.274	-0.363
5	629	valproic acid	1 mM	SKMEL5	0.882	0.222	-0.381
6	839	5224221	12 µM	MCF7	0.876	0.283	-0.316
7	379	cobalt chloride	100 µM	MCF7	0.861	0.426	-0.163
8	900	5186324	2 µM	MCF7	0.851	0.394	-0.188
9	834	5211181	12 µM	MCF7	0.851	0.356	-0.226
10	1121	DL-PPMP	2 µM	MCF7	0.849	0.387	-0.194
11	1060	valproic acid	50 µM	MCF7	0.846	0.371	-0.208
12	1135	minocycline	11 µM	MCF7	0.845	0.397	-0.181
13	848	felodipine	10 µM	MCF7	0.833	0.292	-0.278
14	644	colchicine	100 nM	MCF7	0.819	0.257	-0.303
15	996	**LY294002**	100 nM	MCF7	0.811	0.431	-0.124
16	1115	phenanthridinone	51 µM	MCF7	0.798	0.241	-0.305
17	869	**wortmannin**	1 µM	MCF7	0.788	0.396	-0.143
18	578	4,5-dianilinophthalimide	10 µM	PC3	0.776	0.289	-0.242
19	344	2-deoxy-D-glucose	10 mM	MCF7	0.775	0.26	-0.27
20	201	15-delta prostaglandin J2	10 µM	MCF7	0.772	0.327	-0.201
21	596	monastrol	100 µM	MCF7	0.763	0.168	-0.354
22	915	topiramate	3 µM	MCF7	0.762	0.215	-0.306
23	446	15-delta prostaglandin J2	10 µM	PC3	0.76	0.246	-0.274
24	445	diclofenac	10 µM	PC3	0.759	0.22	-0.299
25	1082	haloperidol	10 µM	MCF7	0.754	0.303	-0.213
26	370	troglitazone	10 µM	HL60	0.751	0.36	-0.154
27	1024	haloperidol	10 µM	MCF7	0.751	0.264	-0.25
28	842	bucladesine	2 µM	MCF7	0.737	0.311	-0.193
29	1071	rosiglitazone	10 µM	MCF7	0.722	0.377	-0.117
30	484	monorden	100 nM	PC3	0.719	0.176	-0.316
31	502	sodium phenylbutyrate	200 µM	SKMEL5	0.713	0.222	-0.266

32	410	valproic acid	10 mM	HL60	0.712	0.253	-0.234
33	1119	yohimbine	23 µM	MCF7	0.708	0.331	-0.153
34	956	5224221	12 µM	MCF7	0.702	0.23	-0.25
35	378	tacrolimus	1 µM	MCF7	0.699	0.217	-0.261
36	4	metformin	1 mM	MCF7	0.694	0.225	-0.25
37	376	raloxifene	100 nM	ssMCF7	0.69	0.273	-0.199
38	309	exisulind	50 µM	MCF7	0.687	0.217	-0.253
39	1103	demecolcine	12 µM	MCF7	0.684	0.309	-0.159
40	142	tolbutamide	100 µM	MCF7	0.677	0.185	-0.278
41	169	tacrolimus	1 µM	MCF7	0.67	0.259	-0.199
42	308	sulindac sulfide	50 µM	MCF7	0.668	0.268	-0.189
43	325	monorden	100 nM	MCF7	0.668	0.215	-0.242
44	441	arachidonic acid	10 µM	MCF7	0.668	0.186	-0.271
45	499	novobiocin	100 µM	ssMCF7	0.667	0.233	-0.223
46	564	15-delta prostaglandin J2	10 µM	SKMEL5	0.667	0.23	-0.226
47	595	resveratrol	50 µM	MCF7	0.667	0.15	-0.306
48	948	Y-27632	3 µM	MCF7	0.662	0.271	-0.182
49	311	monastrol	100 µM	MCF7	0.659	0.279	-0.172
50	632	novobiocin	100 µM	SKMEL5	0.659	0.201	-0.25
51	919	carbamazepine	100 nM	MCF7	0.658	0.288	-0.162
52	908	5140203	15 µM	MCF7	0.658	0.207	-0.243
53	501	**LY294002**	10 µM	SKMEL5	0.656	0.274	-0.175
54	1141	tyrphostin AG-1478	32 µM	MCF7	0.655	0.281	-0.167
55	258	**LY294002**	10 µM	MCF7	0.654	0.247	-0.2
56	542	SC-58125	10 µM	HL60	0.645	0.223	-0.218
57	268	genistein	1 µM	MCF7	0.643	0.222	-0.218
58	442	oligomycin	1 µM	MCF7	0.642	0.211	-0.228
59	205	rofecoxib	10 µM	MCF7	0.633	0.233	-0.2
60	488	iloprost	1 µM	MCF7	0.633	0.206	-0.227
61	492	haloperidol	10 µM	MCF7	0.627	0.183	-0.246
62	920	decitabine	100 nM	MCF7	0.626	0.194	-0.234
63	584	dimethyloxalylglycine	1 mM	PC3	0.623	0.172	-0.254
64	284	tacrolimus	1 µM	MCF7	0.62	0.19	-0.234
65	862	5230742	17 µM	MCF7	0.608	0.19	-0.226
66	256	rofecoxib	10 µM	MCF7	0.595	0.221	-0.186
67	425	staurosporine	10 nM	MCF7	0.58	0.19	-0.207
68	483	imatinib	10 µM	PC3	0.579	0.192	-0.204
69	267	genistein	1 µM	MCF7	0.579	0.151	-0.245
70	503	indometacin	100 µM	SKMEL5	0.576	0.225	-0.169
71	341	sodium phenylbutyrate	100 µM	MCF7	0.575	0.193	-0.2
72	366	imatinib	10 µM	MCF7	0.569	0.251	-0.138
73	143	tamoxifen	1 µM	MCF7	0.566	0.268	-0.119
74	594	arachidonyltrifluoromethane	10 µM	MCF7	0.564	0.18	-0.206
75	447	tretinoin	1 µM	PC3	0.563	0.162	-0.223

76	985	fulvestrant	1 µM	MCF7	0.558	0.207	-0.175
77	864	geldanamycin	1 µM	MCF7	0.547	0.253	-0.121
78	452	indometacin	100 µM	PC3	0.544	0.194	-0.178
79	1101	(-)-catechin	11 µM	MCF7	0.538	0.234	-0.134
80	603	nifedipine	10 µM	MCF7	0.538	0.116	-0.252
81	369	rosiglitazone	10 µM	HL60	0.532	0.168	-0.196
82	222	tomelukast	1 µM	MCF7	0.528	0.154	-0.207
83	409	valproic acid	1 mM	HL60	0.525	0.258	-0.101
84	437	novobiocin	100 µM	MCF7	0.525	0.221	-0.138
85	591	bucladesine	20 µM	MCF7	0.525	0.182	-0.177
86	21	phenformin	10 µM	MCF7	0.523	0.111	-0.247
87	970	5230742	17 µM	MCF7	0.52	0.254	-0.102
88	283	quercetin	1 µM	MCF7	0.518	0.173	-0.181
89	493	monorden	100 nM	SKMEL5	0.518	0.116	-0.238
90	252	celecoxib	10 µM	MCF7	0.516	0.197	-0.156
91	464	pirinixic acid	100 µM	PC3	0.513	0.207	-0.144
92	343	fasudil	10 µM	MCF7	0.51	0.183	-0.166
93	592	probucol	10 µM	MCF7	0.506	0.143	-0.203
94	203	nordihydroguaiaretic acid	1 µM	MCF7	0.5	0.148	-0.194
95	1113	doxycycline	14 µM	MCF7	0.493	0.175	-0.162
96	448	trichostatin A	100 nM	PC3	0.478	0.129	-0.198
97	202	raloxifene	100 nM	MCF7	0.477	0.113	-0.213
98	482	celecoxib	10 µM	PC3	0.475	0.098	-0.227
99	454	cobalt chloride	100 µM	MCF7	0.463	0.155	-0.162
100	440	W-13	10 µM	MCF7	0.458	0.146	-0.167
101	326	sirolimus	100 nM	MCF7	0.456	0.148	-0.164
102	490	fluphenazine	10 µM	MCF7	0.45	0.124	-0.184
103	123	dexamethasone	1 µM	MCF7	0.447	0.149	-0.157
104	327	arachidonyltrifluoromethane	10 µM	MCF7	0.417	0.124	-0.161
105	314	exisulind	50 µM	MCF7	0.412	0.116	-0.166
106	438	copper sulfate	100 µM	MCF7	0.411	0.148	-0.133
107	348	valproic acid	50 µM	MCF7	0.409	0.151	-0.129
108	1	metformin	10 µM	MCF7	0.398	0.105	-0.167
109	430	rosiglitazone	10 µM	PC3	0.373	0.145	-0.11
110	495	pirinixic acid	100 µM	SKMEL5	0.368	0.151	-0.101
111	608	NU-1025	100 µM	MCF7	0.354	0.133	-0.109
112	606	thalidomide	100 µM	MCF7	0.351	0.12	-0.12

[(A)] An instance is a treatment and control pair and the list of probe sets ordered by their extent of differential expression between this treatment and control pair. The instance is the basic unit of data and metadata in cmap. Each instance is uniquely identified by an “instance id”.

[B] A value between +1 and -1 representing the relative strength of a given signature in an instance from a set of active instances calculated upon execution of a query. A high positive connectivity score indicates that the corresponding perturbagen induced the expression of the query signature. The top ranked instance (i.e. "score" = +1) is said to be the most positively connected with the query signature. Note that the connectivity score is a relative value, and is a function of the composition of the set of active instances upon which the query is executed. The connectivity score differs in this regard from the up scores and down scores, which are absolute values. The absolute strength of a given signature in a given instance can be gauged by the magnitude of the corresponding up score and down score. The connectivity score is a combination of the up score and down score.

References:

(1) Lamb J, Crawford ED, Peck D, Modell JW, Blat IC, Wrobel MJ, Lerner J, Brunet JP, Subramanian A, Ross KN, et al. (2006). The Connectivity Map: using gene-expression signatures to connect small molecules, genes, and disease. Science 313(5795):1929-35. (Connectivity Map website: http://www.broad.mit.edu/cmap/)