

S28 Table: List of *in silico* screened drugs [31] whose target genes were also enriched in the 163 genes selected by TD-based unsupervised FE.

Term	Overlap	P-value	Adjusted P-value
Drug Perturbations from GEO up			
doxycycline DB00254 human GSE2624 sample 3076	38/272	$3.93 \times 10^{-36}$	$1.32 \times 10^{-34}$
doxycycline DB00254 human GSE2624 sample 3075	28/242	$2.49 \times 10^{-24}$	$2.02 \times 10^{-23}$
doxycycline DB00254 human GSE2624 sample 3077	23/209	$1.30 \times 10^{-19}$	$6.43 \times 10^{-19}$
doxycycline DB00254 mouse GSE29848 sample 3208	25/291	$1.30 \times 10^{-18}$	$5.84 \times 10^{-18}$
doxycycline DB00254 mouse GSE29848 sample 3209	24/267	$2.35 \times 10^{-18}$	$1.03 \times 10^{-17}$
doxycycline DB00254 human GSE2624 sample 3074	16/175	$1.07 \times 10^{-12}$	$2.89 \times 10^{-12}$
doxycycline DB00254 mouse GSE29848 sample 3207	17/225	$4.54 \times 10^{-12}$	$1.16 \times 10^{-11}$
ascorbic acid 54670067 human GSE11919 sample 3190	15/313	$4.42 \times 10^{-8}$	$8.64 \times 10^{-8}$
isotretinoin DB00982 human GSE10432 sample 2772	19/308	$8.45 \times 10^{-12}$	$2.10 \times 10^{-11}$
isotretinoin 5282379 human GSE10433 sample 2498	10/245	$3.39 \times 10^{-5}$	$5.51 \times 10^{-5}$
pioglitazone DB01132 rat GSE21329 sample 2843	40/400	$3.44 \times 10^{-32}$	$7.08 \times 10^{-31}$
pioglitazone DB01132 rat GSE21329 sample 2842	20/349	$8.84 \times 10^{-12}$	$2.18 \times 10^{-11}$
pioglitazone 4829 mouse GSE1458 sample 2587	19/318	$1.47 \times 10^{-11}$	$3.55 \times 10^{-11}$
pioglitazone DB01132 rat GSE20219 sample 2794	18/292	$3.13 \times 10^{-11}$	$7.40 \times 10^{-11}$
pioglitazone DB01132 human GSE8157 sample 2796	13/331	$3.36 \times 10^{-6}$	$5.89 \times 10^{-6}$
pioglitazone DB01132 rat GSE21329 sample 2841	11/279	$1.88 \times 10^{-5}$	$3.11 \times 10^{-5}$
pioglitazone DB01132 rat GSE20219 sample 2795	9/330	$1.58 \times 10^{-3}$	$2.31 \times 10^{-3}$
Drug Perturbations from GEO down			
doxycycline DB00254 human GSE2624 sample 3077	48/391	$3.82 \times 10^{-43}$	$3.45 \times 10^{-41}$
doxycycline DB00254 human GSE2624 sample 3074	39/425	$6.14 \times 10^{-30}$	$9.09 \times 10^{-29}$
doxycycline DB00254 human GSE2624 sample 3076	30/328	$5.30 \times 10^{-23}$	$4.02 \times 10^{-22}$
doxycycline DB00254 human GSE2624 sample 3075	27/358	$1.40 \times 10^{-18}$	$6.83 \times 10^{-18}$
doxycycline DB00254 mouse GSE29848 sample 3207	21/375	$3.98 \times 10^{-12}$	$1.21 \times 10^{-11}$
doxycycline DB00254 mouse GSE29848 sample 3208	16/309	$5.14 \times 10^{-9}$	$1.21 \times 10^{-8}$
doxycycline DB00254 mouse GSE29848 sample 3209	14/333	$6.21 \times 10^{-7}$	$1.28 \times 10^{-6}$
ascorbic acid 54670067 human GSE11919 sample 3190	40/287	$5.09 \times 10^{-38}$	$1.84 \times 10^{-36}$
isotretinoin DB00982 human GSE10432 sample 2772	7/292	$1.02 \times 10^{-2}$	$1.57 \times 10^{-2}$
pioglitazone DB01132 rat GSE21329 sample 2841	43/321	$3.57 \times 10^{-40}$	$1.90 \times 10^{-38}$
pioglitazone 4829 mouse GSE1458 sample 2587	24/282	$8.34 \times 10^{-18}$	$3.77 \times 10^{-17}$
pioglitazone DB01132 rat GSE21329 sample 2842	18/251	$2.50 \times 10^{-12}$	$7.64 \times 10^{-12}$
pioglitazone DB01132 rat GSE20219 sample 2794	17/308	$6.28 \times 10^{-10}$	$1.62 \times 10^{-9}$
pioglitazone DB01132 human GSE8157 sample 2796	14/269	$4.58 \times 10^{-8}$	$1.02 \times 10^{-7}$
pioglitazone DB01132 rat GSE20219 sample 2795	12/270	$2.29 \times 10^{-6}$	$4.52 \times 10^{-6}$
pioglitazone DB01132 rat GSE21329 sample 2843	7/200	$1.29 \times 10^{-3}$	$2.14 \times 10^{-3}$
tibolone 444008 human GSE12446 sample 3204	30/313	$1.34 \times 10^{-23}$	$1.14 \times 10^{-22}$