

Bioassay Ontology Annotations facilitate Cross-Analysis of Diverse High-throughput Screening Data Sets

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Supporting Material

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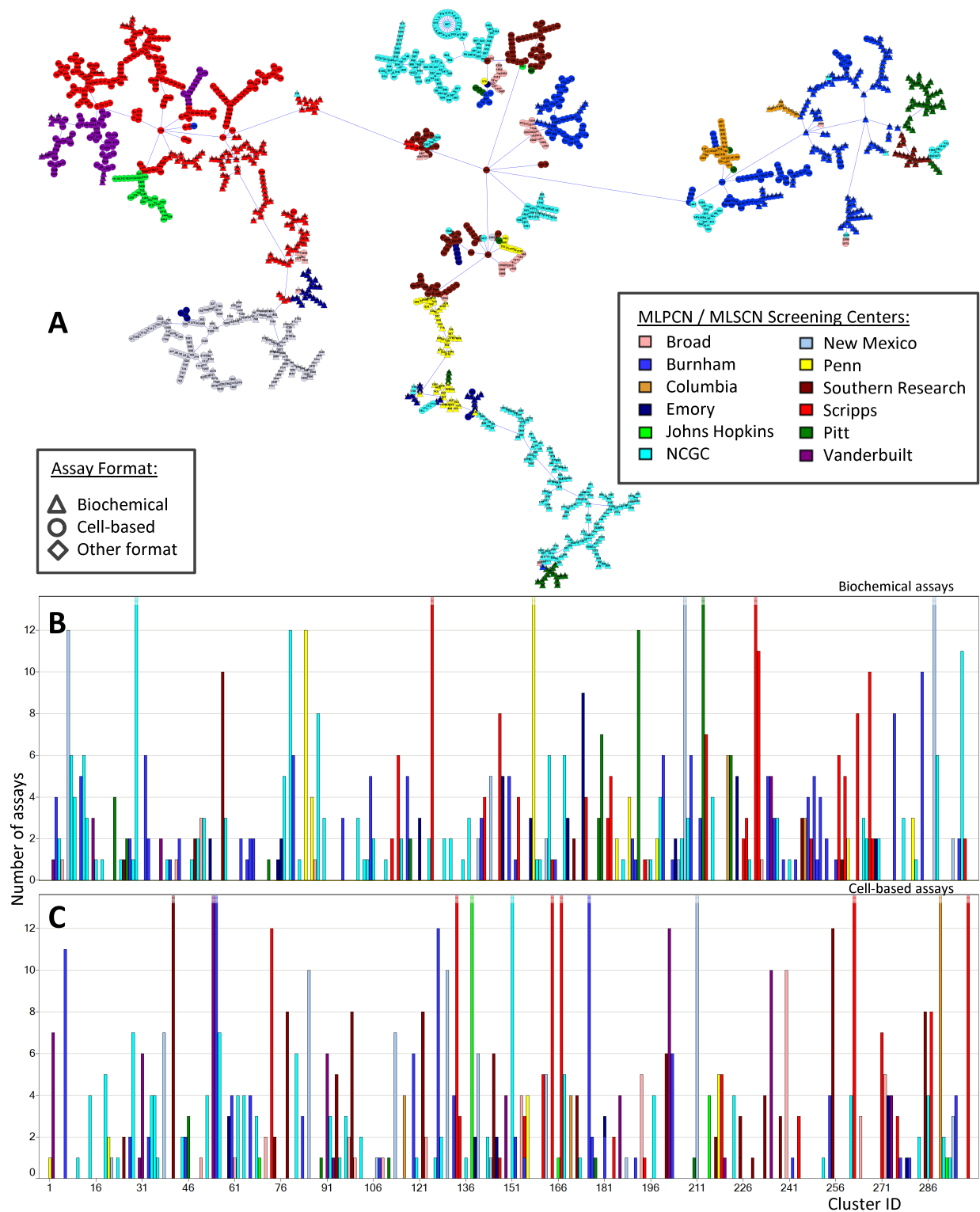


Figure S1: Clustering of 1,498 PubChem Assays deposited by the MLPCN and MLSCN screening centers (only assays with data and no summary assays as of April 2010). A) Minimum Spanning Tree (MST) visualization of the assays. The MST was generated from the similarity matrix, which was computed based on text fingerprints derived from the key textual fields of PubChem assays using the Tanimoto metric (see text). Nodes are colored by screening centers and shaped by assay format. B) and C) Assay clusters and number of assay members per cluster computed by maximum dissimilarity clustering based on text fingerprints as above (see text); note that the order of clusters is not related to how similar the clusters are to each other. B) biochemical assays, C) cell-based assays. 1,486 assays are shown. Bars are colored by screening center.

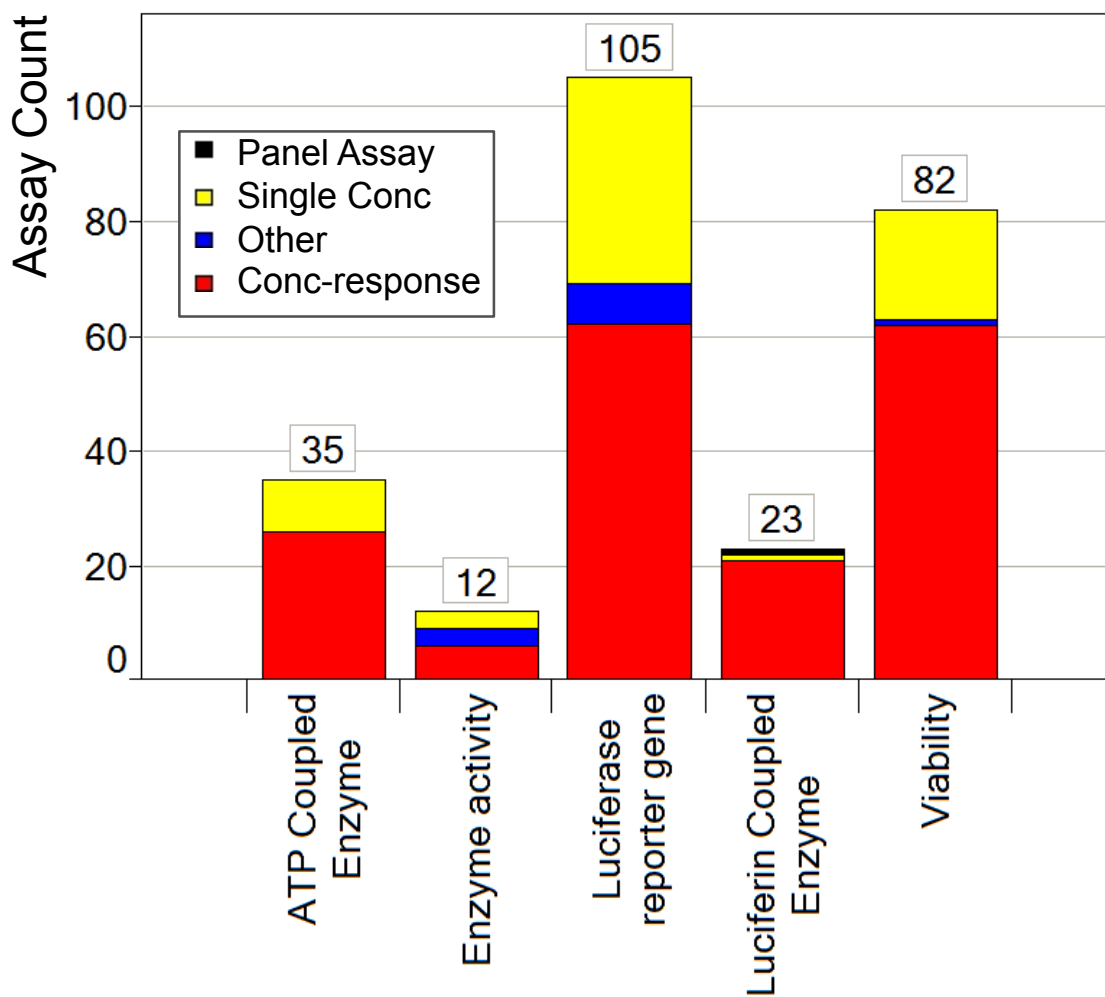


Figure S2: Major luciferase assay technologies (by assay type) as annotated in PubChem as of April 2010.

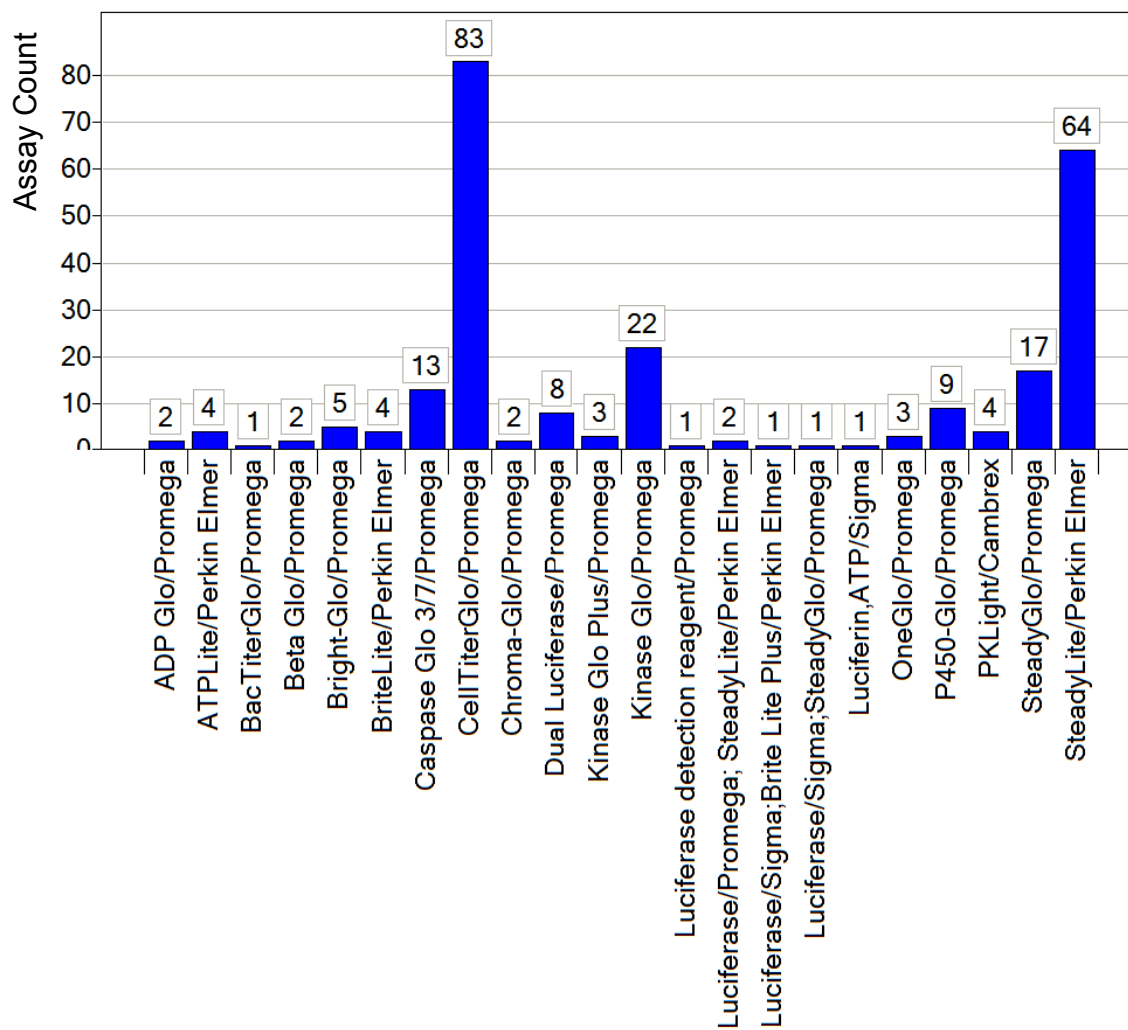


Figure S3: Luciferase assay kits (annotated from PubChem April 2010; 5 assays from the luciferase reporter gene category in Figure S2 above are not annotated).

$$PCIdx = \frac{N(\text{Active})}{N(\text{Tested})} \quad (N: \text{ assays count})$$

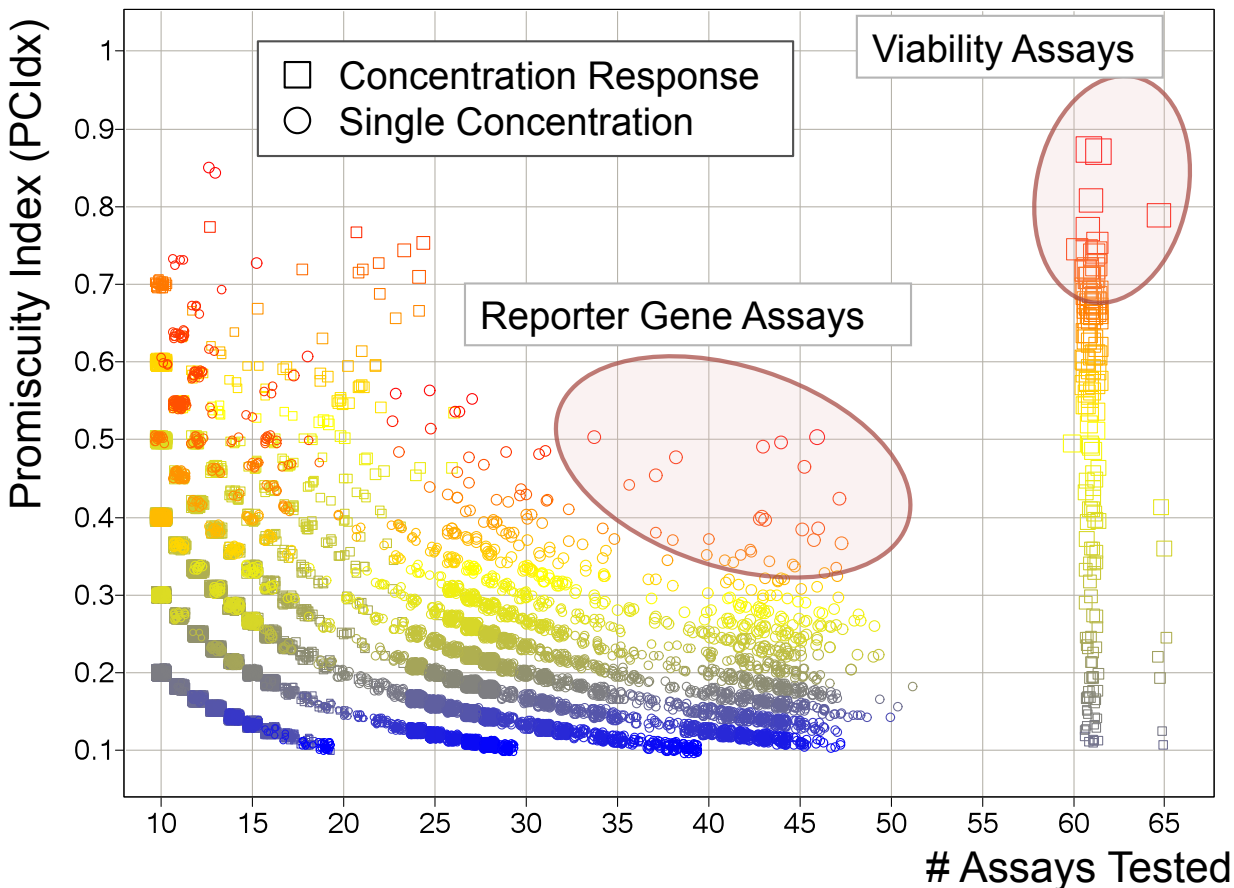


Figure S4: Scatter plot of luciferase assay promiscuity Index (PCIdx) vs. the number of luciferase assays in which each compounds was tested. PCIdx was calculated independently for concentration response and single concentration assays (based on PubChem luciferase assays as of April 2010). 15,080 data points shown: at least ten assays tested, PCIdx \geq 0.1, at least done active assay (compounds can overlap between single concentration and concentration response). The size of each circle or square is proportional to number of assays in which the compound is active. The color indicates the Pareto front computed by maximizing PCIdx and the number of active assays.

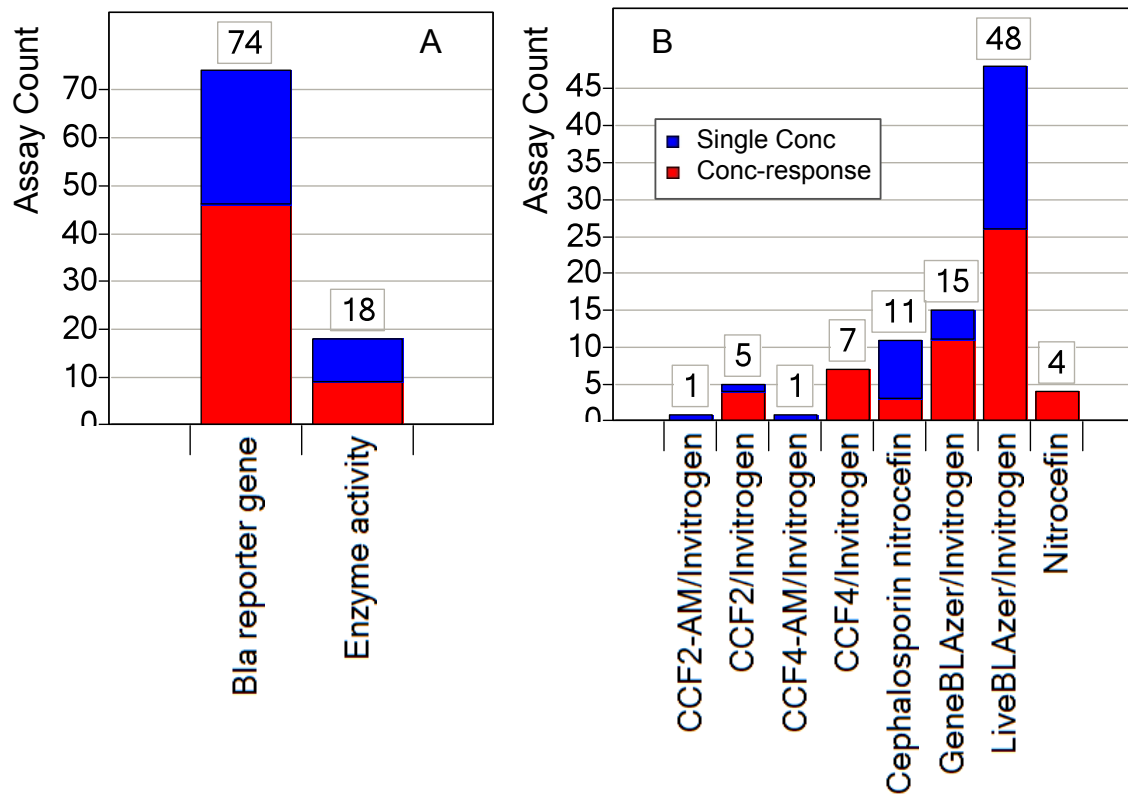


Figure S5: β -lactamase assay technology sub-categories (A) and assay kits (B) as annotated from PubChem as of April 2010. Single concentration assays are shown in blue and concentration-response assays in red.

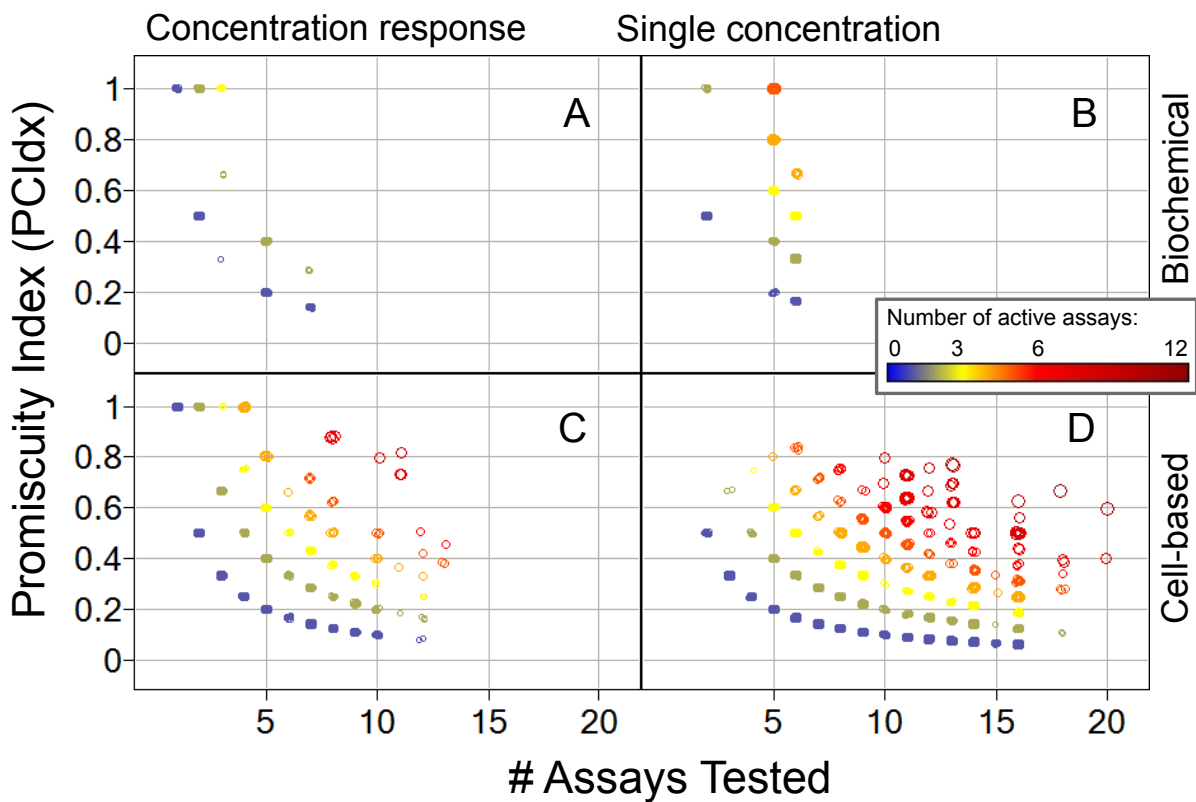


Figure S6. Compound promiscuity for β -lactamase assay technologies. Promiscuity Index vs. number of tested assays as calculated from PubChem assays. A,B: enzyme activity (biochemical format); C,D: beta-lactamase reporter gene assays (cell-based). A,C: concentration-response assays; B,D: single concentration assays. Color and size indicate the number of assays (of each format) in which a compound is active. 14,275 data points with at least one active assay shown: A: 1,408, B: 3,704, C: 9,163, D: 5,457.

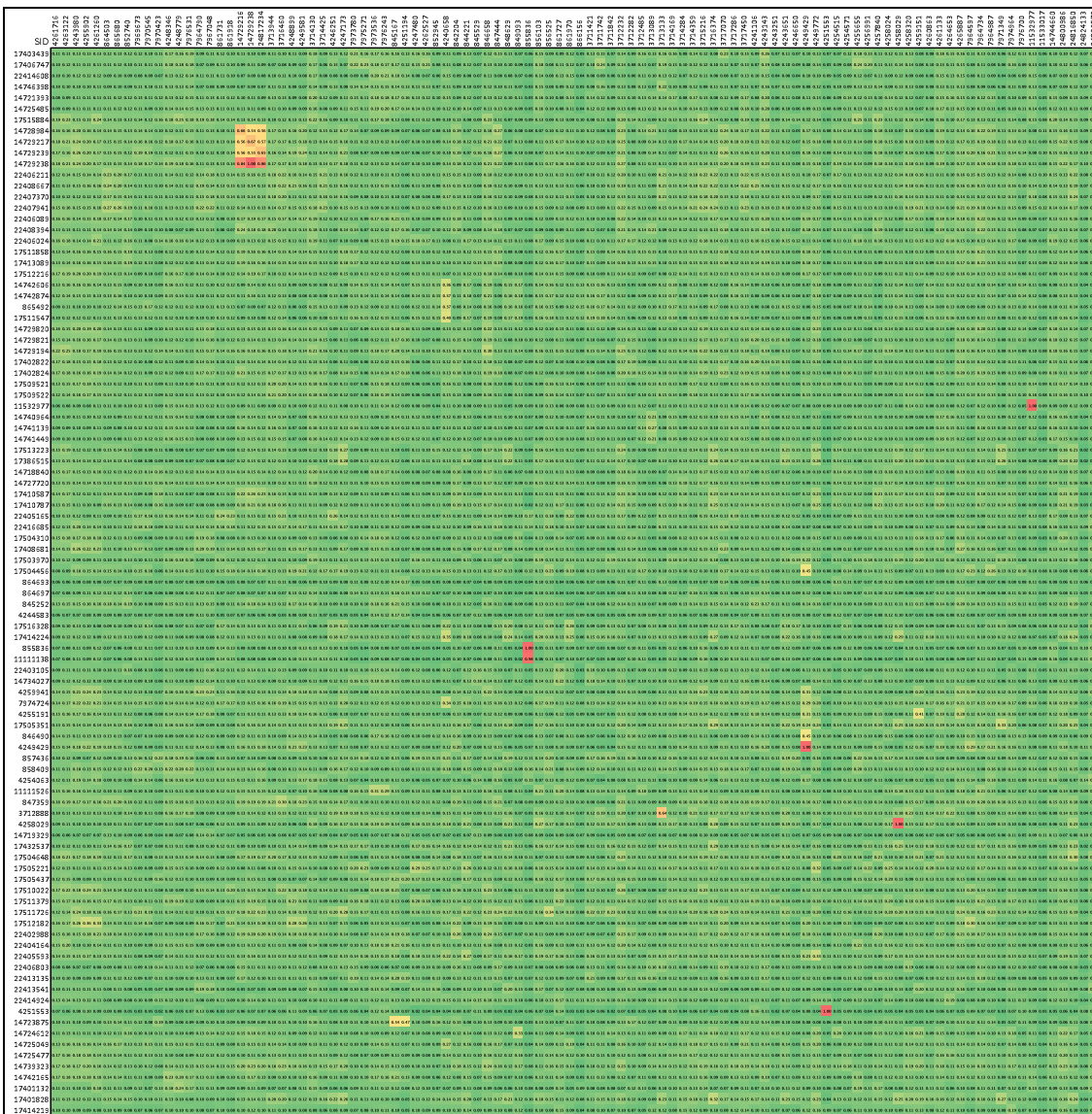


Figure S7. Full Tanimoto similarity matrix of the most promiscuous β -lactamase reporter gene compounds (97, rows) vs. most promiscuous luciferase reporter gene compounds (102, columns). Color scale from green (similarity 0) via yellow (similarity 0.5) to red (similarity 1.0). Tanimoto similarities were computed using ECFP4 fingerprints. Most promiscuous compounds were defined based on PCIdx ≥ 0.5 and a minimum of 10 assays in which they were tested.

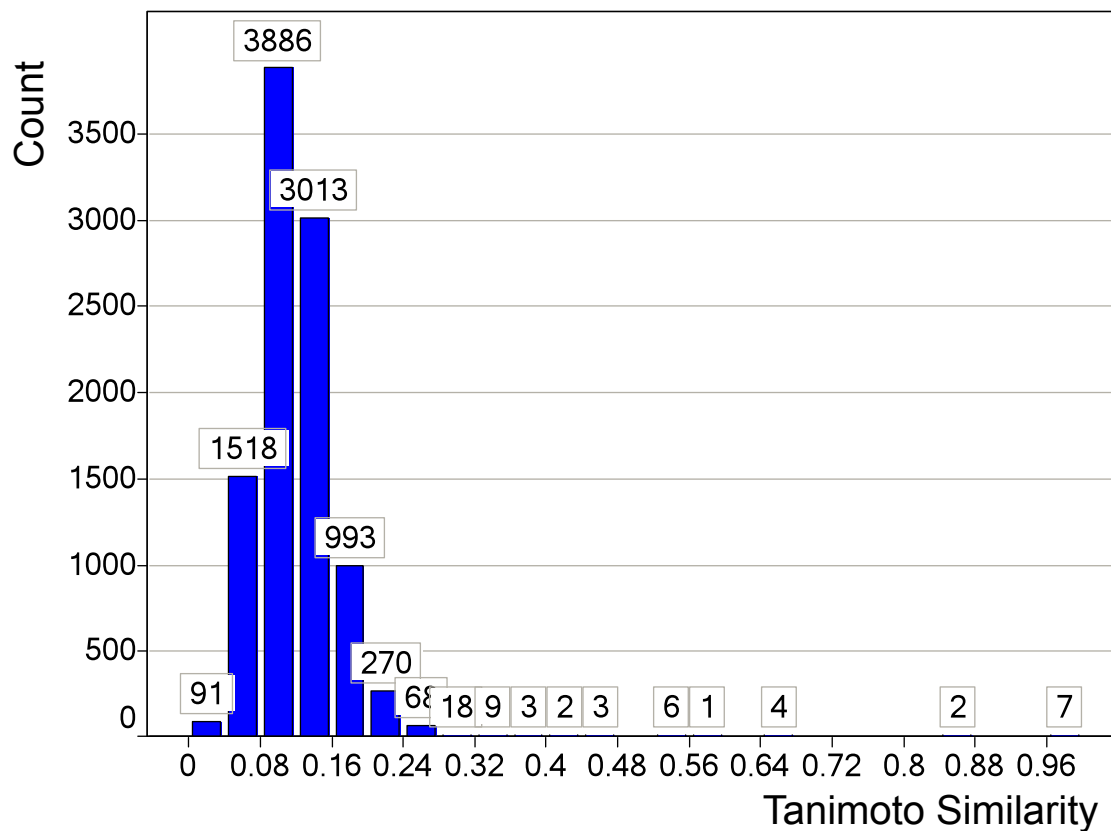
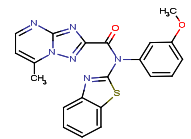
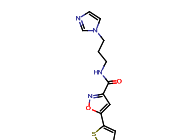
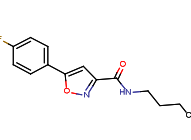
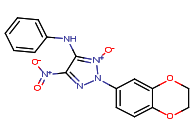
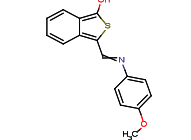
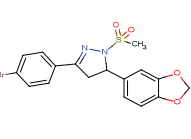
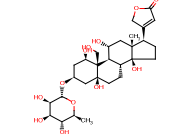
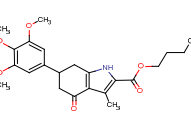
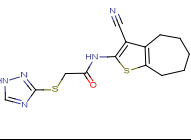
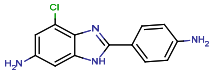
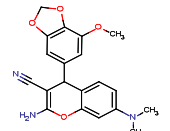
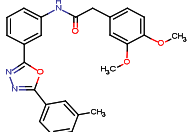
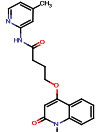

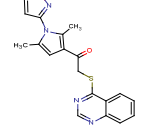
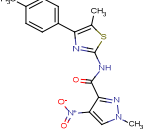
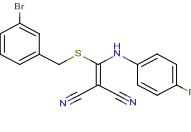
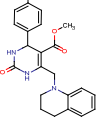
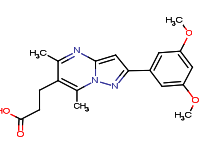
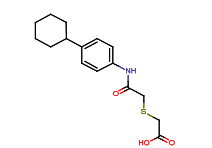
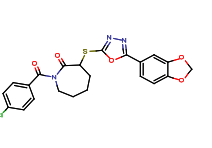
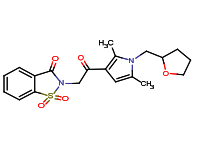
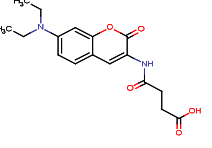
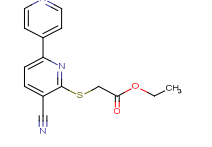
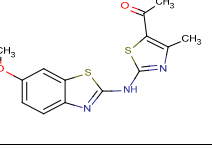
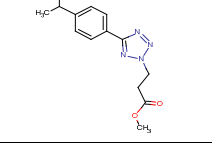
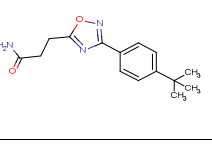
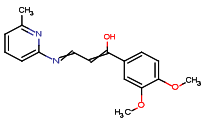
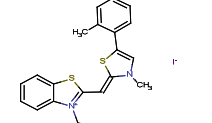
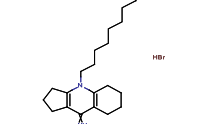
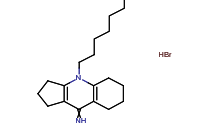
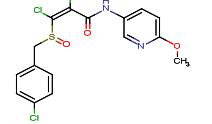
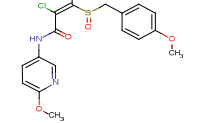
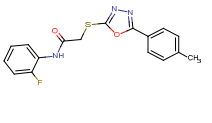
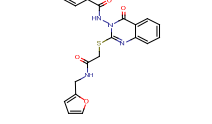
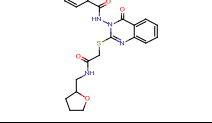


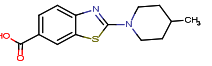
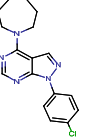
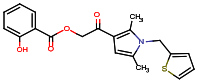
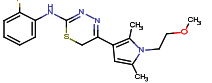
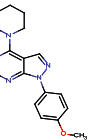
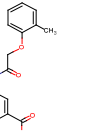
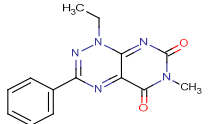
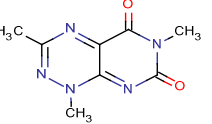
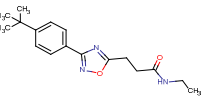
Figure S8. Histogram of all pair-wise Tanimoto similarities of the 102 most promiscuous luciferase reporter gene compounds compared against the 97 most promiscuous beta-lactamase reporter gene compounds. Tanimoto similarities were computed using ECFP4 fingerprints. Most promiscuous compounds were defined as those with $PCIdx \geq 0.5$ and which were tested in at least 10 assays. See Figure S7 for the full similarity matrix.

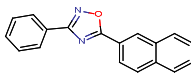
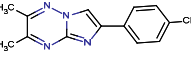
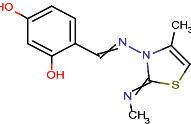
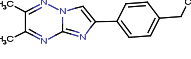
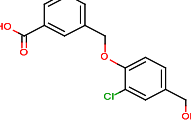
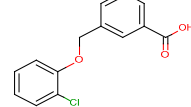
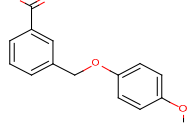
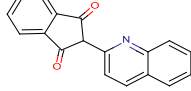
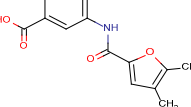
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	4240859	0.56	5	9	0.27	6	22					0.00	0	10	0.00	0	1	0.00	0	2	0.00	0	5	0.00	0	7	0.00	0	5	0.00	0	7
	4241106	0.50	5	10	0.23	5	22					0.00	0	11	0.00	0	2	0.00	0	2	0.00	0	6	0.00	0	5	0.00	0	6	0.00	0	5
	17510448	0.83	5	6	0.38	6	16					0.00	0	6	0.00	0	1	0.00	0	2	0.00	0	5	0.00	0	3	0.00	0	5	0.00	0	3
	17411011	0.71	5	7	0.33	6	18					0.00	0	6	0.00	0	1	0.00	0	2	0.00	0	5	0.00	0	5	0.00	0	5	0.00	0	5
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	11533037	0.78	7	9	0.33	6	18	0.00	0	1	0.00	0	6	0.00	0	1	0.00	0	2	0.00	0	5	0.00	0	3	0.00	0	5	0.00	0	3	
	7969004	0.63	5	8	0.29	7	24	0.00	0	1	0.08	1	13	0.00	0	2	0.00	0	2	0.00	0	5	0.00	0	7	0.00	0	5	0.00	0	7	
	4254515	0.80	8	10	0.38	9	24					0.10	1	10	0.00	0	2	0.00	0	2	0.00	0	6	0.00	0	7	0.00	0	6	0.00	0	7

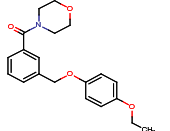
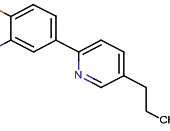
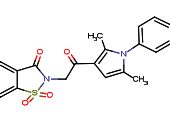
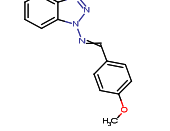
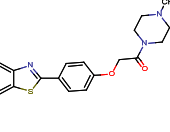
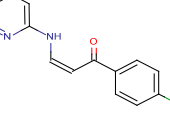
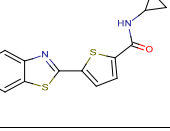
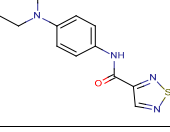
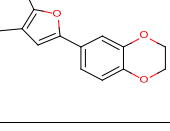
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	857677	0.38	5	13	0.23	5	22				0.10	1	10	0.00	0	3	0.00	0	2	0.00	0	6	0.00	0	7	0.00	0	6	0.00	0	7
	4257844	0.43	6	14	0.24	6	25	0.00	0	1	0.10	1	10	0.00	0	2	0.00	0	2	0.00	0	6	0.00	0	7	0.00	0	6	0.00	0	7
	4243143	0.50	5	10	0.26	6	23	0.00	0	3	0.14	1	7	0.00	0	2	0.00	0	2	0.00	0	6	0.00	0	7	0.00	0	6	0.00	0	7
	862811	0.42	5	12	0.29	6	21	0.00	0	1	0.20	2	10	0.00	0	2	0.00	0	2	0.00	0	6	0.00	0	7	0.00	0	6	0.00	0	7
	3714359	0.50	5	10	0.32	8	25				0.22	2	9	0.00	0	2	0.00	0	2	0.00	0	6	0.00	0	6	0.00	0	6	0.00	0	6
	17387416	0.86	6	7	0.28	5	18				0.33	2	6	0.00	0	1	0.00	0	2	0.00	0	5	0.00	0	5	0.00	0	5	0.00	0	5
	17504263	0.83	5	6	0.32	6	19				0.43	3	7	0.00	0	1	0.00	0	2	0.00	0	5	0.00	0	3	0.00	0	5	0.00	0	3
	3712992	0.47	7	15	0.41	9	22	0.00	0	1	0.00	0	10	0.00	0	3	0.00	0	3	0.00	0	6	0.13	1	8	0.00	0	6	0.13	1	8

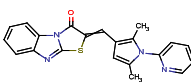
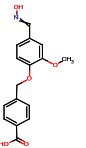
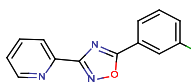
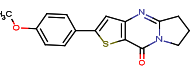
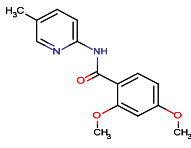
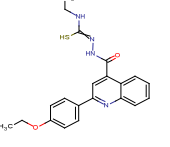
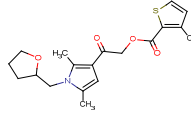
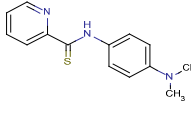
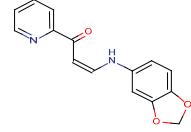
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	14722725	0.75	6	8	0.44	7	16	0.00	0	1	0.00	0	9	0.00	0	2	0.00	0	3	0.00	0	6	0.33	2	6	0.00	0	6	0.33	2	6
	3712282	0.64	7	11	0.38	9	24				0.00	0	12	0.33	1	3	0.00	0	2	0.00	0	6	0.20	1	5	0.00	0	6	0.20	1	5
	3714130	0.73	8	11	0.41	9	22	0.00	0	1	0.00	0	9	0.33	1	3	0.00	0	3	0.00	0	6	0.25	2	8	0.00	0	6	0.25	2	8
	4249429	0.75	9	12	0.42	10	24				0.08	1	13	0.33	1	3	0.00	0	3	0.00	0	7	0.25	2	8	0.00	0	7	0.25	2	8
	856604	0.42	5	12	0.28	7	25	0.00	0	1	0.00	0	10	0.50	1	2	0.00	0	2	0.00	0	6	0.00	0	7	0.00	0	6	0.00	0	7
	4247173	0.50	5	10	0.20	5	25				0.00	0	10	0.50	1	2	0.00	0	2	0.00	0	6	0.00	0	7	0.00	0	6	0.00	0	7
	842526	0.75	6	8	0.24	5	21				0.00	0	10	0.50	1	2	0.00	0	2	0.00	0	6	0.00	0	7	0.00	0	6	0.00	0	7
	865680	0.81	13	16	0.36	8	22	0.00	0	1	0.00	0	10	0.33	1	3	0.00	0	2	0.00	0	6	0.00	0	7	0.00	0	6	0.00	0	7

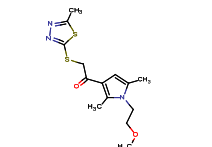
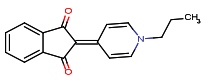
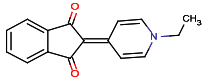
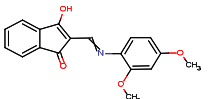
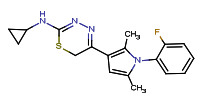
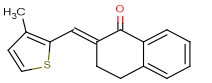
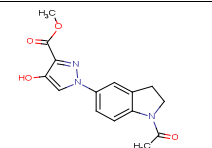
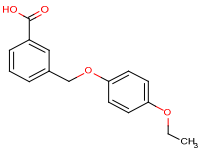
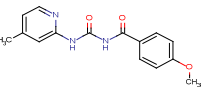
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	24785323	0.83	5	6	0.32	6	19			0.67	4	6	0.00	0	1	0.00	0	2	0.00	0	5	0.00	0	3	0.00	0	5	0.00	0	3	
	24802966	1.00	5	5	0.35	6	17			0.83	5	6	0.00	0	1	0.00	0	2	0.00	0	5	0.00	0	3	0.00	0	5	0.00	0	3	
	24803318	1.00	5	5	0.37	7	19			0.83	5	6	0.00	0	1	0.00	0	2	0.00	0	5	0.00	0	3	0.00	0	5	0.00	0	3	
	24817414	0.71	5	7	0.43	6	14	0.00	0	1	0.80	4	5	0.00	0	1	0.00	0	2	0.00	0	5	0.50	1	2	0.00	0	5	0.50	1	2
	24817234	0.71	5	7	0.53	8	15	0.50	1	2	0.83	5	6	0.00	0	1	0.00	0	2	0.00	0	5	0.50	1	2	0.00	0	5	0.50	1	2
	7964734	0.55	6	11	0.24	6	25	0.00	0	1	0.08	1	12	0.00	0	2	0.33	1	3	0.00	0	5	0.25	2	8	0.00	0	5	0.25	2	8
	4265887	0.58	7	12	0.29	7	24			0.00	0	10	0.00	0	2	0.67	2	3	0.00	0	6	0.25	2	8	0.00	0	6	0.25	2	8	
	4258189	0.63	5	8	0.33	7	21			0.00	0	13	0.00	0	2	0.67	2	3	0.00	0	6	0.25	2	8	0.00	0	6	0.25	2	8	

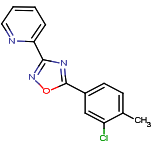
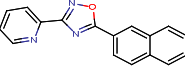
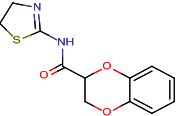
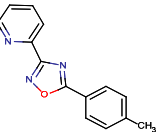
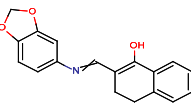
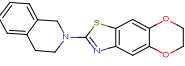
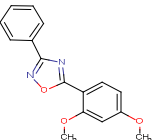
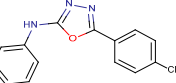
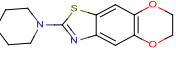
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	7970423	0.80	8	10	0.38	9	24						0.00	0	10	0.00	0	2	0.67	2	3	0.00	0	5	0.25	2	8	0.00	0	5	0.25	2	8
	16953064	0.86	6	7	0.38	6	16	0.00	0	1	0.00	0	0	7	0.00	0	1	0.67	2	3	0.00	0	5	0.33	2	6	0.00	0	5	0.33	2	6	
	14743694	0.86	6	7	0.38	6	16						0.00	0	9	0.00	0	1	0.67	2	3	0.00	0	5	0.33	2	6	0.00	0	5	0.33	2	6
	7969673	0.75	9	12	0.45	10	22	0.00	0	1	0.09	1	11	0.00	0	1	0.67	2	3	0.20	1	5	0.33	2	6	0.20	1	5	0.33	2	6		
	24795161	0.63	5	8	0.47	7	15	0.00	0	1	0.00	0	5	0.00	0	1	0.67	2	3	0.00	0	5	0.50	2	4	0.00	0	5	0.50	2	4		
	845167	0.64	7	11	0.39	9	23						0.33	4	12	0.00	0	2	0.00	0	2	0.25	2	8	0.67	4	6	0.25	2	8	0.67	4	6
	14726526	0.71	5	7	0.35	6	17						0.67	6	9	0.00	0	1	0.33	1	3	0.11	1	9	0.80	4	5	0.11	1	9	0.80	4	5
	864503	0.50	5	10	0.22	5	23						0.00	0	11	0.50	1	2	0.50	1	2	0.00	0	6	0.00	0	7	0.00	0	6	0.00	0	7

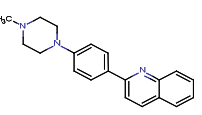
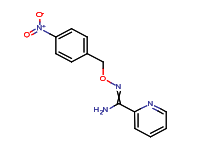
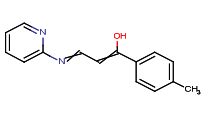
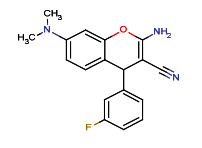
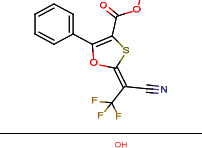
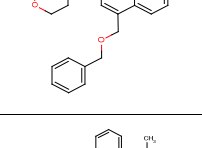
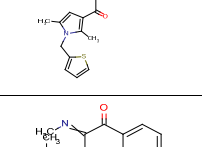
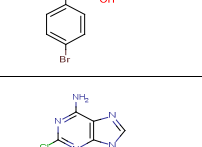
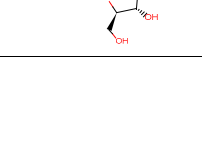
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	857381	0.56	5	9	0.23	5	22				0.00	0	13	0.50	1	2	0.50	1	2	0.17	1	6	0.00	0	7	0.17	1	6	0.00	0	7
	3714857	0.56	5	9	0.27	6	22	0.00	0	1	0.00	0	7	0.50	1	2	0.50	1	2	0.17	1	6	0.00	0	7	0.17	1	6	0.00	0	7
	860618	0.75	6	8	0.25	5	20	0.00	0	1	0.00	0	8	0.50	1	2	0.50	1	2	0.17	1	6	0.00	0	5	0.17	1	6	0.00	0	5
	4261716	0.77	10	13	0.46	6	13				0.00	0	5	0.50	1	2	0.50	1	2	0.17	1	6	0.00	0	5	0.17	1	6	0.00	0	5
	4263122	0.73	8	11	0.54	7	13				0.00	0	4	0.50	1	2	0.50	1	2	0.33	2	6	0.00	0	4	0.33	2	6	0.00	0	4
	4243980	0.86	12	14	0.54	7	13				0.00	0	8	0.50	1	2	0.50	1	2	0.33	2	6	0.00	0	5	0.33	2	6	0.00	0	5
	856103	0.73	8	11	0.22	5	23	0.00	0	1	0.20	2	10	0.50	1	2	0.50	1	2	0.33	2	6	0.00	0	7	0.33	2	6	0.00	0	7
	4261133	0.70	7	10	0.38	8	21				0.00	0	10	0.50	1	2	0.33	1	3	0.00	0	6	0.25	2	8	0.00	0	6	0.25	2	8

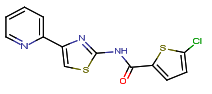
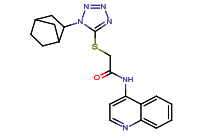
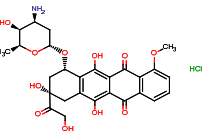
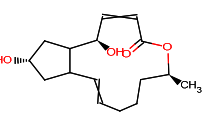
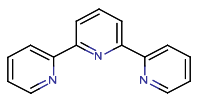
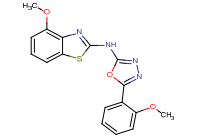
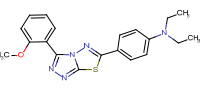
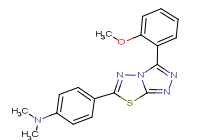
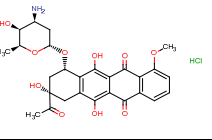
	4261260	0.50	5	10	0.43	9	21				0.00	0	12	0.50	1	2	0.67	2	3	0.17	1	6	0.25	2	8	0.17	1	6	0.25	2	8
	7976700	0.60	6	10	0.38	8	21	0.00	0	1	0.11	1	9	0.67	2	3	0.67	2	3	0.25	1	4	0.25	2	8	0.25	1	4	0.25	2	8
	3716724	0.75	6	8	0.24	6	25				0.00	0	10	0.50	1	2	0.50	1	2	0.00	0	6	0.14	1	7	0.00	0	6	0.14	1	7
	4248060	0.67	6	9	0.32	8	25				0.00	0	8	0.50	1	2	0.50	1	2	0.17	1	6	0.14	1	7	0.17	1	6	0.14	1	7
	3715947	0.67	6	9	0.32	7	22				0.00	0	10	0.50	1	2	0.67	2	3	0.17	1	6	0.29	2	7	0.17	1	6	0.29	2	7
	7973184	0.67	6	9	0.35	6	17				0.00	0	11	0.50	1	2	0.67	2	3	0.20	1	5	0.29	2	7	0.20	1	5	0.29	2	7
	3716374	0.75	9	12	0.27	6	22				0.00	0	7	0.50	1	2	0.67	2	3	0.17	1	6	0.25	2	8	0.17	1	6	0.25	2	8
	4257840	0.85	11	13	0.32	7	22				0.00	0	10	0.50	1	2	0.67	2	3	0.17	1	6	0.25	2	8	0.17	1	6	0.25	2	8
	4262950	0.78	7	9	0.38	9	24				0.00	0	7	0.50	1	2	0.67	2	3	0.17	1	6	0.25	2	8	0.17	1	6	0.25	2	8

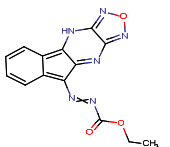
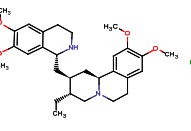
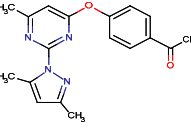
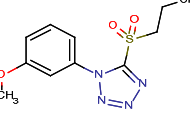
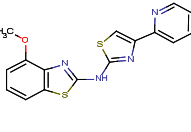
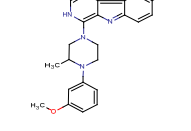
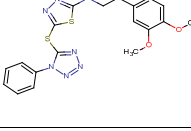
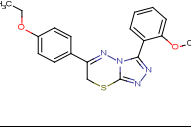
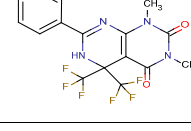
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	858166	0.89	8	9	0.48	10	21	0.00	0	2	0.00	0	8	0.50	1	2	0.67	2	3	0.17	1	6	0.33	2	6	0.17	1	6	0.33	2	6
	848269	0.56	5	9	0.27	6	22				0.00	0	8	0.50	1	2	0.67	2	3	0.33	2	6	0.29	2	7	0.33	2	6	0.29	2	7
	4260301	0.63	5	8	0.27	6	22				0.00	0	13	0.50	1	2	0.67	2	3	0.33	2	6	0.25	2	8	0.33	2	6	0.25	2	8
	847444	0.67	8	12	0.27	6	22				0.00	0	11	0.50	1	2	0.67	2	3	0.33	2	6	0.29	2	7	0.33	2	6	0.29	2	7
	17407079	0.56	5	9	0.31	5	16	0.00	0	1	0.29	2	7	1.00	2	2	0.67	2	3	0.00	0	4	0.50	3	6	0.00	0	4	0.50	3	6
	3714425	0.69	9	13	0.32	7	22				0.00	0	9	1.00	2	2	0.67	2	3	0.17	1	6	0.25	2	8	0.17	1	6	0.25	2	8
	7972883	0.67	6	9	0.29	6	21				0.00	0	8	1.00	2	2	0.67	2	3	0.25	1	4	0.33	2	6	0.25	1	4	0.33	2	6
	7974964	0.64	9	14	0.38	8	21				0.00	0	9	1.00	3	3	0.67	2	3	0.20	1	5	0.38	3	8	0.20	1	5	0.38	3	8

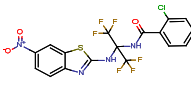
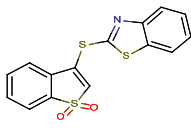
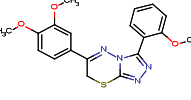
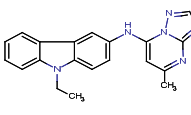
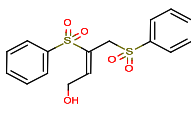
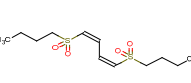
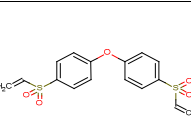
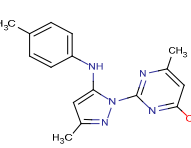
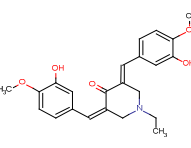
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	7976243	0.73	11	15	0.50	11	22				0.15	2	13	1.00	4	4	0.67	2	3	0.20	1	5	0.38	3	8	0.20	1	5	0.38	3	8
	7973536	0.93	14	15	0.50	11	22	0.00	0	1	0.10	1	10	1.00	3	3	0.67	2	3	0.20	1	5	0.38	3	8	0.20	1	5	0.38	3	8
	14731454	0.63	5	8	0.33	5	15				0.00	0	8	1.00	2	2	0.50	1	2	0.00	0	5	0.40	2	5	0.00	0	5	0.40	2	5
	22408172	0.83	5	6	0.33	5	15				0.00	0	5	1.00	1	1	0.67	2	3	0.00	0	5	0.50	2	4	0.00	0	5	0.50	2	4
	14732860	0.71	5	7	0.32	6	19				0.00	0	6	1.00	2	2	0.67	2	3	0.20	1	5	0.50	3	6	0.20	1	5	0.50	3	6
	14744660	0.73	8	11	0.32	6	19	0.00	0	1	0.00	0	9	1.00	2	2	0.67	2	3	0.20	1	5	0.50	3	6	0.20	1	5	0.50	3	6
	4255902	0.86	12	14	0.54	7	13				0.00	0	8	1.00	2	2	0.50	1	2	0.33	2	6	0.00	0	5	0.33	2	6	0.00	0	5
	3717070	0.75	9	12	0.36	8	22				0.10	1	10	1.00	1	1	0.50	1	2	0.17	1	6	0.14	1	7	0.17	1	6	0.14	1	7

	858954	0.67	6	9	0.39	9	23				0.00	0	11	1.00	2	2	0.50	1	2	0.33	2	6	0.14	1	7	0.33	2	6	0.14	1	7
	4262527	0.73	8	11	0.48	11	23	0.00	0	1	0.00	0	11	1.00	2	2	0.67	2	3	0.33	2	6	0.25	2	8	0.33	2	6	0.25	2	8
	3714284	0.79	11	14	0.43	10	23	0.00	0	1	0.00	0	10	1.00	2	2	0.67	2	3	0.33	2	6	0.25	2	8	0.33	2	6	0.25	2	8
	7973780	0.90	9	10	0.45	10	22	0.00	0	1	0.20	2	10	1.00	2	2	0.67	2	3	0.40	2	5	0.38	3	8	0.40	2	5	0.38	3	8
	7976305	0.38	5	13	0.33	7	21				0.00	0	9	1.00	3	3	0.67	2	3	0.40	2	5	0.25	2	8	0.40	2	5	0.25	2	8
	4250396	0.63	5	8	0.32	7	22				0.00	0	8	1.00	1	1	0.67	2	3	0.33	2	6	0.25	2	8	0.33	2	6	0.25	2	8
	4254716	0.67	6	9	0.36	8	22				0.00	0	10	1.00	2	2	0.67	2	3	0.33	2	6	0.25	2	8	0.33	2	6	0.25	2	8
	3716902	0.56	5	9	0.23	5	22				0.00	0	7	1.00	2	2	0.67	2	3	0.33	2	6	0.25	2	8	0.33	2	6	0.25	2	8
	4246650	0.58	7	12	0.32	7	22				0.00	0	12	1.00	2	2	0.67	2	3	0.40	2	5	0.33	2	6	0.40	2	5	0.33	2	6

	24821749	0.88	7	8	0.44	7	16	0.00	0	1	0.00	0	5	0.50	1	2	0.50	1	2	0.00	0	5	0.67	2	3	0.00	0	5	0.67	2	3
	24818354	0.88	7	8	0.31	5	16	0.00	0	1	0.00	0	5	1.00	2	2	0.67	2	3	0.00	0	5	0.75	3	4	0.00	0	5	0.75	3	4
	858305	0.78	7	9	0.33	6	18	0.00	0	1	0.00	0	7	1.00	2	2	1.00	1	1	1.00	1	1	0.50	3	6	1.00	1	1	0.50	3	6
	7977601	0.45	5	11	0.32	8	25	1.00	1	1	0.25	3	12	0.00	0	2	0.00	0	2	0.00	0	5	0.00	0	7	0.00	0	5	0.00	0	7
	14743125	0.56	5	9	0.29	5	17	1.00	2	2	0.13	1	8	0.00	0	1	0.00	0	2	0.00	0	5	0.00	0	5	0.00	0	5	0.00	0	5
	4248779	0.62	8	13	0.32	7	22	1.00	1	1	0.17	1	6	0.00	0	2	0.00	0	2	0.00	0	6	0.00	0	5	0.00	0	6	0.00	0	5
	3716460	0.50	5	10	0.29	7	24	1.00	1	1	0.31	4	13	0.00	0	3	0.00	0	3	0.14	1	7	0.25	2	8	0.14	1	7	0.25	2	8
	22412622	0.71	5	7	0.42	8	19	1.00	1	1	0.33	2	6	0.00	0	1	0.00	0	3	0.00	0	4	0.25	1	4	0.00	0	4	0.25	1	4
	866156	0.55	6	11	0.25	5	20	1.00	1	1	0.31	4	13	0.00	0	2	0.00	0	2	0.00	0	6	0.00	0	5	0.00	0	6	0.00	0	5

	7970468	0.56	5	9	0.25	5	20	1.00	1	1	0.36	4	11	0.00	0	2	0.00	0	2	0.00	0	5	0.00	0	7	0.00	0	5	0.00	0	7
	4258320	0.60	6	10	0.33	7	21	1.00	1	1	0.36	4	11	0.00	0	2	0.00	0	2	0.00	0	6	0.00	0	6	0.00	0	6	0.00	0	6
	855944	0.63	5	8	0.38	6	16	1.00	1	1	0.40	4	10	0.00	0	2	0.00	0	2	0.00	0	5	0.00	0	4	0.00	0	5	0.00	0	4
	855810	0.63	5	8	0.38	8	21	1.00	2	2	0.50	7	14	0.00	0	2	0.00	0	2	0.00	0	6	0.00	0	5	0.00	0	6	0.00	0	5
	3711742	0.54	7	13	0.27	6	22	1.00	2	2	0.55	6	11	0.00	0	2	0.00	0	2	0.00	0	6	0.00	0	7	0.00	0	6	0.00	0	7
	4240727	0.45	5	11	0.31	8	26	1.00	2	2	0.56	5	9	0.00	0	2	0.00	0	2	0.00	0	6	0.00	0	5	0.00	0	6	0.00	0	5
	861129	0.45	5	11	0.30	7	23	1.00	1	1	0.58	7	12	0.00	0	2	0.00	0	2	0.00	0	6	0.00	0	7	0.00	0	6	0.00	0	7
	861970	0.50	6	12	0.35	8	23	1.00	1	1	0.58	7	12	0.00	0	1	0.00	0	2	0.00	0	6	0.00	0	5	0.00	0	6	0.00	0	5
	855543	0.75	6	8	0.38	6	16	1.00	1	1	0.40	4	10	0.00	0	2	0.00	0	2	0.00	0	5	0.00	0	4	0.00	0	5	0.00	0	4

	24781162	0.83	5	6	0.33	5	15	1.00	1	1	0.40	2	5	0.00	0	1	0.00	0	2	0.00	0	3	0.00	0	3	0.00	0	3	0.00	0	3
	855836	0.91	10	11	0.43	9	21	1.00	2	2	0.50	6	12	0.00	0	2	0.00	0	2	0.00	0	6	0.00	0	5	0.00	0	6	0.00	0	5
	856308	0.63	5	8	0.22	5	23	1.00	1	1	0.53	8	15	0.00	0	2	0.00	0	2	0.00	0	6	0.00	0	7	0.00	0	6	0.00	0	7
	4265676	0.78	7	9	0.28	7	25	1.00	1	1	0.54	7	13	0.00	0	2	0.00	0	2	0.00	0	6	0.00	0	7	0.00	0	6	0.00	0	7
	4246251	0.83	10	12	0.23	5	22	1.00	2	2	0.56	5	9	0.00	0	1	0.00	0	2	0.00	0	6	0.00	0	7	0.00	0	6	0.00	0	7
	858637	0.88	7	8	0.29	6	21	1.00	1	1	0.54	7	13	0.00	0	2	0.00	0	2	0.00	0	6	0.00	0	7	0.00	0	6	0.00	0	7
	3717286	0.64	9	14	0.35	8	23	1.00	2	2	0.64	7	11	0.00	0	2	0.00	0	2	0.00	0	6	0.00	0	7	0.00	0	6	0.00	0	7
	861918	0.73	8	11	0.36	8	22	1.00	1	1	0.60	6	10	0.00	0	2	0.00	0	2	0.00	0	6	0.00	0	7	0.00	0	6	0.00	0	7
	17416287	0.83	5	6	0.38	6	16	1.00	1	1	0.63	5	8	0.00	0	1	0.00	0	2	0.00	0	5	0.00	0	5	0.00	0	5	0.00	0	5

	17513223	0.83	5	6	0.38	6	16	1.00	1	1	0.71	5	7	0.00	0	1	0.00	0	2	0.00	0	5	0.00	0	3	0.00	0	5	0.00	0	3
	4258029	0.60	6	10	0.36	8	22	1.00	1	1	0.46	6	13	0.50	1	2	0.00	0	2	0.00	0	6	0.00	0	7	0.00	0	6	0.00	0	7
	861731	0.50	6	12	0.28	7	25	0.33	1	3	0.56	5	9	0.00	0	2	0.00	0	2	0.00	0	6	0.00	0	7	0.00	0	6	0.00	0	7
	7965596	0.45	5	11	0.41	9	22	0.33	1	3	0.53	8	15	0.00	0	2	0.00	0	2	0.00	0	5	0.00	0	7	0.00	0	5	0.00	0	7
	861727	0.50	5	10	0.43	10	23	0.67	2	3	0.50	4	8	0.00	0	2	0.00	0	2	0.00	0	6	0.00	0	7	0.00	0	6	0.00	0	7
	4251553	0.50	6	12	0.48	13	27	0.67	2	3	0.58	7	12	0.00	0	2	0.00	0	2	0.00	0	6	0.00	0	6	0.00	0	6	0.00	0	6
	845529	0.71	10	14	0.56	15	27	0.50	2	4	0.55	6	11	0.00	0	2	0.00	0	2	0.00	0	6	0.00	0	5	0.00	0	6	0.00	0	5
	3713089	0.67	8	12	0.42	11	26	0.60	3	5	0.55	6	11	0.00	0	2	0.00	0	2	0.00	0	5	0.00	0	7	0.00	0	5	0.00	0	7
	24836573	0.80	8	10	0.39	7	18	0.67	2	3	0.57	4	7	0.00	0	1	0.00	0	2	0.00	0	5	0.00	0	3	0.00	0	5	0.00	0	3

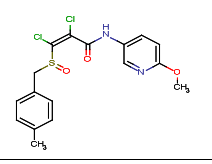
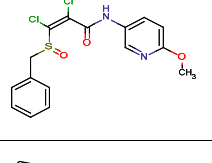
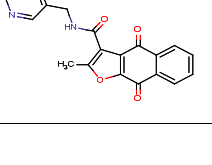
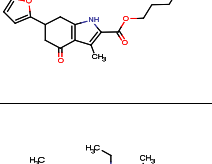
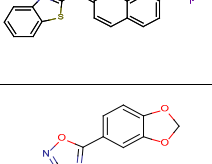
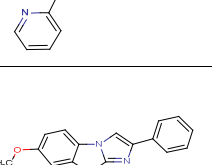
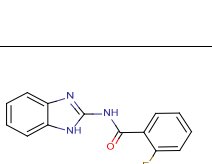
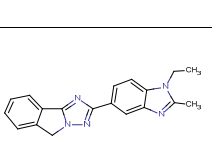

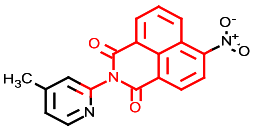
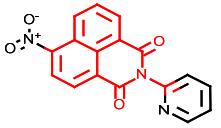
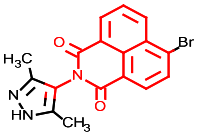
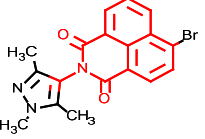
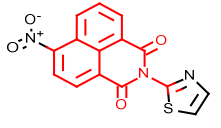
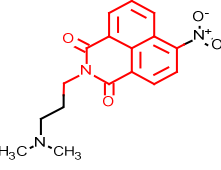
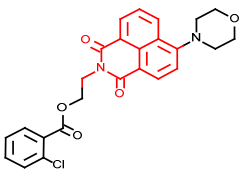
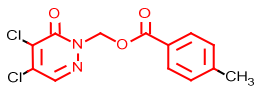
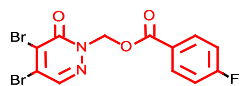
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	14729238	0.70	7	10	0.47	9	19	0.75	3	4	0.60	6	10	0.00	0	2	0.00	0	2	0.00	0	5	0.20	1	5	0.00	0	5	0.20	1	5
	17514622	1.00	5	5	0.44	7	16	1.00	1	1	0.80	4	5			0.00	0	2	0.00	0	5	0.33	1	3	0.00	0	5	0.33	1	3	
	7964790	0.50	6	12	0.29	6	21	0.50	2	4	0.67	6	9	0.00	0	2	0.00	0	2	0.25	1	4	0.00	0	5	0.25	1	4	0.00	0	5
	24807744	0.71	5	7	0.42	8	19	1.00	1	1	0.83	5	6	0.00	0	1	0.00	0	2	0.20	1	5	0.00	0	3	0.20	1	5	0.00	0	3
	4256991	0.73	8	11	0.32	7	22	1.00	1	1	0.40	4	10	1.00	3	3	0.50	1	2	0.50	3	6	0.29	2	7	0.50	3	6	0.29	2	7
	856525	0.79	11	14	0.48	11	23	1.00	1	1	0.58	7	12	1.00	3	3	0.67	2	3	0.33	2	6	0.38	3	8	0.33	2	6	0.38	3	8
	4249772	0.73	8	11	0.43	10	23	1.00	1	1	0.67	6	9	1.00	3	3	0.67	2	3	0.50	3	6	0.38	3	8	0.50	3	6	0.38	3	8
	3714169	0.82	9	11	0.45	10	22	1.00	1	1	0.64	7	11	1.00	3	3	0.67	2	3	0.50	3	6	0.38	3	8	0.50	3	6	0.38	3	8

Table S2. 97 compounds identified as most promiscuous in β -lactamase cell-based assays.

Compounds were clustered by maximum common substructure (compare to Figure 5).

Structure	Cluster Info			Single Concentration			Concentration-Response		
	SID	Cluster ID	Cluster Size	PCIdx	Active	Tested	PCIdx	Active	Tested
	17403439	1	7	0.77	10	13	1.00	2	2
	17406747	1	7	0.77	10	13	1.00	2	2
	14725485	1	7	0.69	9	13	0.50	1	2
	14721393	1	7	0.62	8	13			
	14746398	1	7	0.73	8	11			
	22414608	1	7	0.73	8	11			
	17515884	1	7	0.60	6	10			
	17402824	7	5	0.69	9	13	0.75	3	4



14729821

7

5

0.64

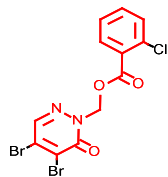
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11

0.50

1

2



14729194

7

5

0.55

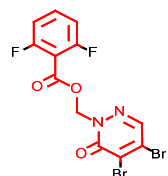
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11

0.50

1

2



14729820

7

5

0.55

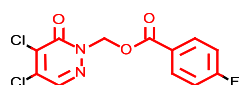
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11

1.00

2

2



17402822

7

5

0.55

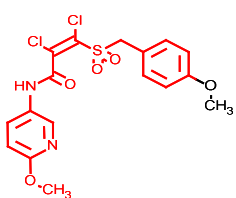
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11

1.00

2

2



14729239

2

4

0.62

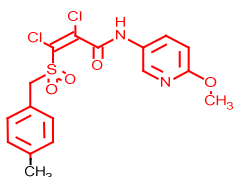
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13

1.00

4

4



14728984

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0.64

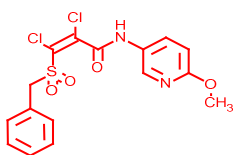
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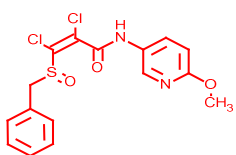
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4



14729238

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4

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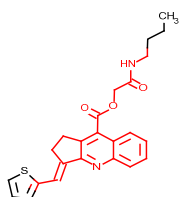
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1.00

2

2



22408667

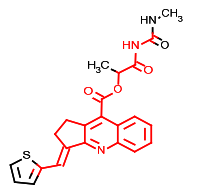
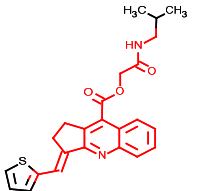
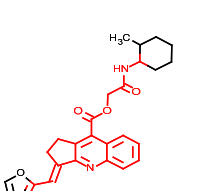
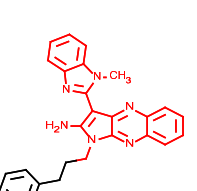
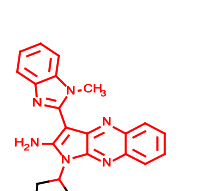
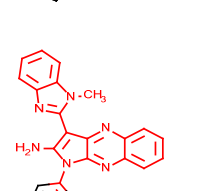
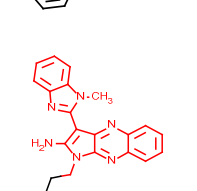
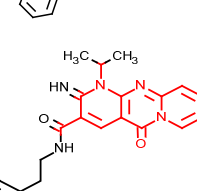
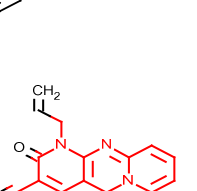
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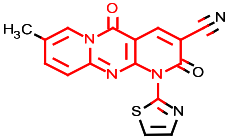
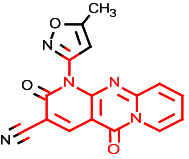
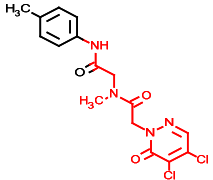
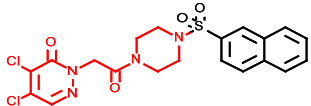
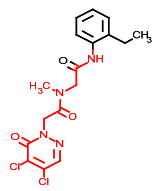
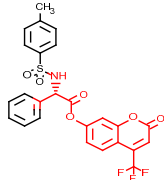
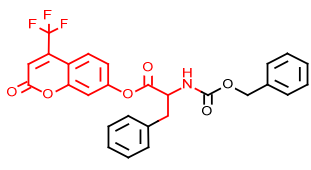
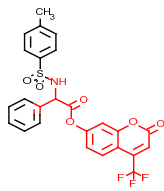
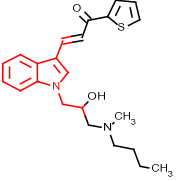
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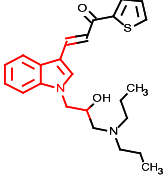
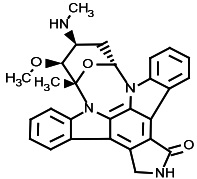
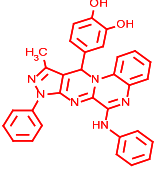
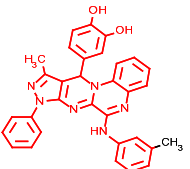
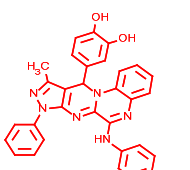
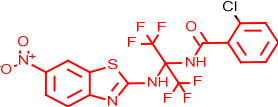

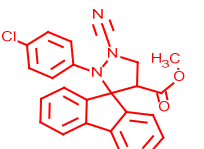
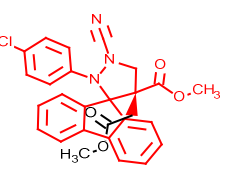
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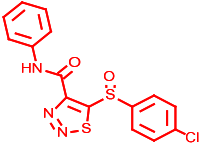
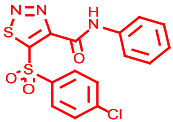
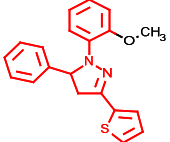
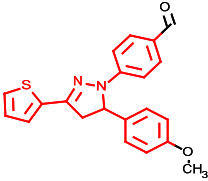
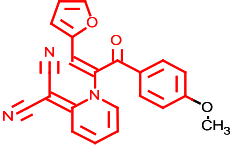
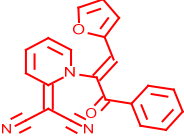
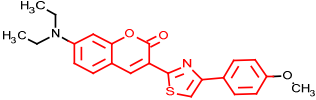
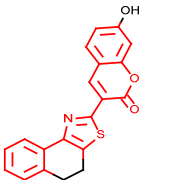
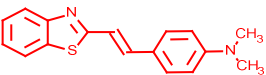
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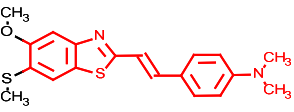
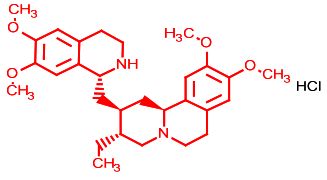
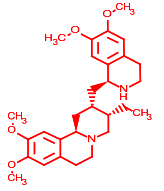
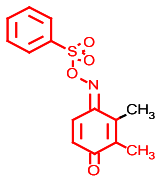
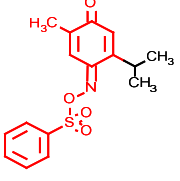
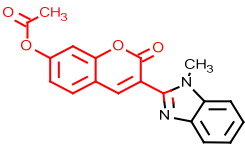
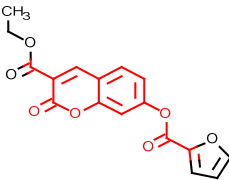
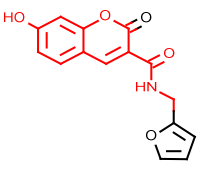
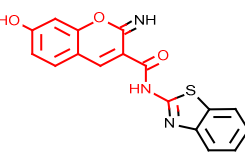
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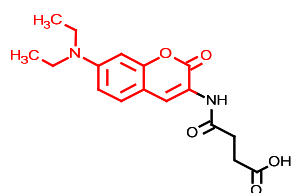
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	14742606	6	4	0.77	10	13	0.50	1	2
	865492	6	4	0.50	8	16	0.73	8	11
	17511547	6	4	0.73	8	11			
	14742874	6	4	0.64	7	11			
	845252	16	4	0.50	8	16	0.38	3	8
	4244583	16	4	0.50	8	16	0.13	1	8

	864693	16	4	0.50	7	14	0.17	1	6
	864697	16	4	0.50	7	14	0.33	2	6
	22408394	4	3	0.58	7	12			
	22406024	4	3	0.50	5	10	0.75	3	4
	22406089	4	3	0.50	5	10	0.50	2	4
	17413089	5	3	0.64	7	11			
	17512216	5	3	0.50	6	12			
	17511858	5	3	0.50	5	10			
	17509521	8	3	0.77	10	13			

	17509522	8	3	0.75	9	12			
	11532977	8	3	0.73	8	11	1.00	2	2
	14741449	9	3	0.77	10	13	0.50	1	2
	14740964	9	3	0.64	7	11	1.00	2	2
	14741139	9	3	0.64	7	11	1.00	2	2
	17513223	10	2	0.64	7	11			
	17386515	10	2	0.55	6	11	1.00	2	2
	14727720	11	2	0.64	7	11	1.00	4	4
	14718840	11	2	0.55	6	11	1.00	2	2

	17410587	12	2	0.55	6	11	0.50	1	2
	17410787	12	2	0.55	6	11	0.50	1	2
	22405165	13	2	0.58	7	12			
	22416685	13	2	0.60	6	10	0.50	1	2
	17408681	14	2	0.55	6	11	1.00	2	2
	17504310	14	2	0.60	6	10			
	17504456	15	2	0.73	8	11			
	17503970	15	2	0.58	7	12			
	17414224	17	2	0.69	9	13			

	17516328	17	2	0.80	8	10			
	855836	18	2	0.63	10	16	0.60	3	5
	11111138	18	2				0.50	6	12
	14734027	19	2	0.55	6	11	1.00	2	2
	22403105	19	2	0.50	5	10	0.00	0	2
	7974724	20	2	0.60	12	20	0.33	2	6
	4259941	20	2	0.50	8	16	0.73	8	11
	4255191	21	2	0.50	8	16	0.50	4	8
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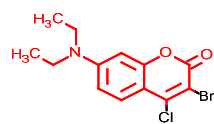
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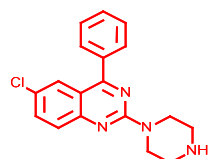
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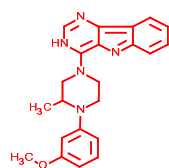
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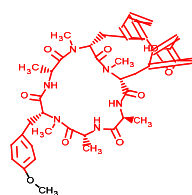
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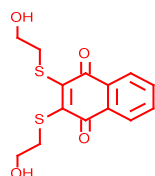
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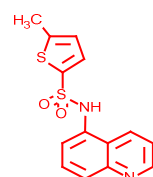
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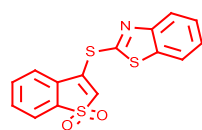
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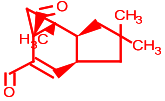
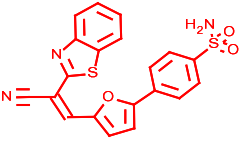
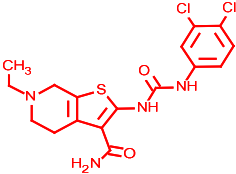
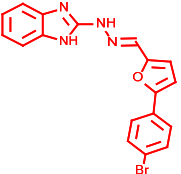

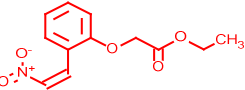
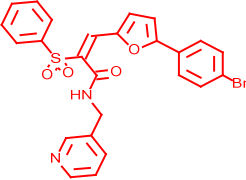
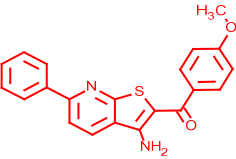
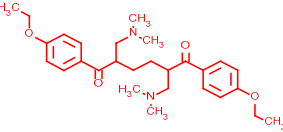
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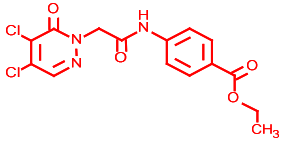
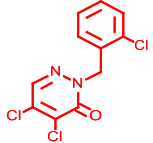
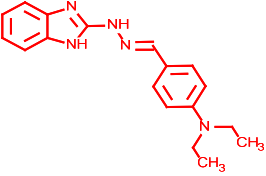
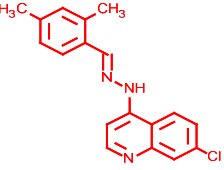
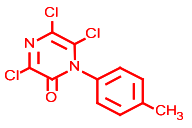
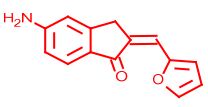
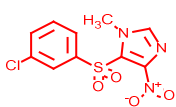
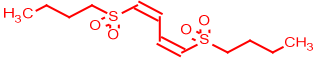
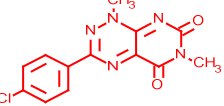
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7

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	17505221	33	1	0.50	6	12			
	17505437	34	1	0.60	6	10	1.00	2	2
	17510022	35	1	0.60	6	10	1.00	2	2
	17511379	36	1	0.60	6	10			
	17511726	37	1	0.60	6	10			
	17512182	38	1	0.60	6	10			

	22402988	39	1	0.67	8	12	1.00	2	2
	22404164	40	1	0.60	6	10			
	22405593	41	1	0.50	5	10			
	22406803	42	1	0.60	6	10			
	22413135	43	1	0.50	5	10			
	22413541	44	1	0.60	6	10			
	22414924	45	1	0.50	5	10			
	4251553	46	1	0.54	7	13	0.50	3	6
	14723875	47	1	0.64	7	11	1.00	4	4

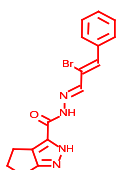
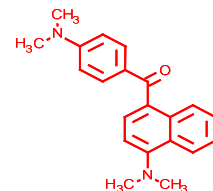
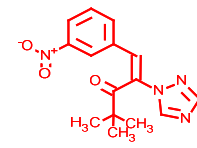
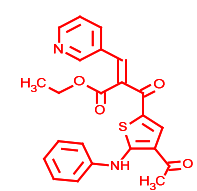
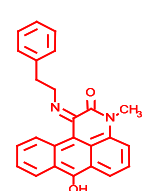
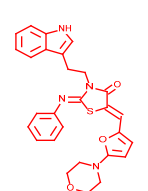
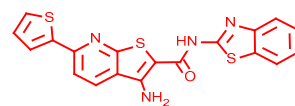
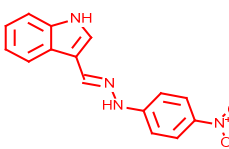
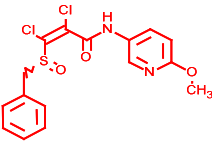
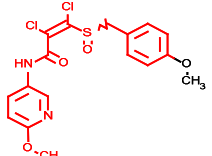
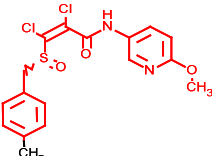
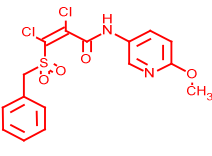
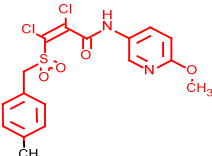
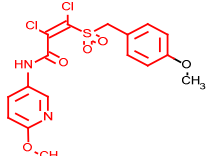
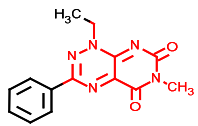
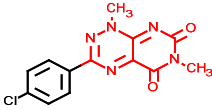
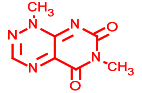
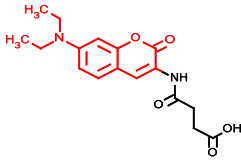
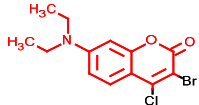
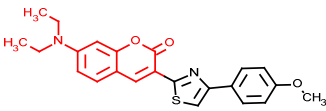
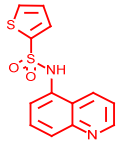
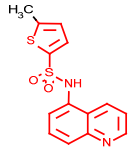
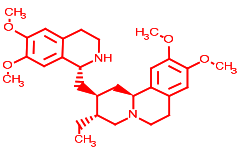
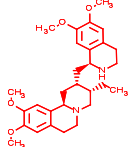
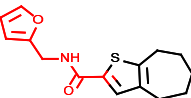
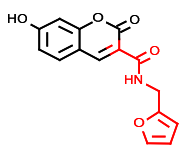
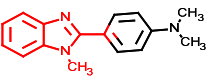

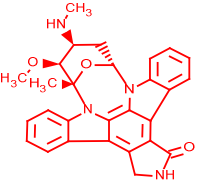
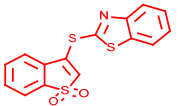
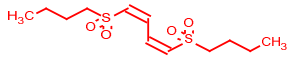
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	14725477	50	1	0.64	7	11	0.75	3
	14739323	51	1	0.73	8	11		
	14742165	52	1	0.55	6	11		
	17401132	53	1	0.64	7	11		
	17401828	54	1	0.64	7	11		
	17414219	55	1	0.62	8	13		

Table S3. MCS Clusters of compounds that were found promiscuous in both luciferase and β -lactamase reporter gene assays.

Structure	SID	Cluster ID	Cluster Size	beta-Lactamase reporter				Luciferase reporter				Luciferase viability			
				conc-response		single conc		conc-response		single conc		conc-response		single conc	
				PCIdx	Num Tested	PCIdx	Num Tested	PCIdx	Num Tested	PCIdx	Num Tested	PCIdx	Num Tested	PCIdx	Num Tested
	14729238	1	6	1	2	0.64	11	0.70	10	0.47	19	0.75	4	0.60	10
	24817234	1	6			0.50	4	0.71	7	0.53	15	0.50	2	0.83	6
	14729216	1	6	1	4	0.56	9	0.70	10	0.52	21	0.50	4	0.60	10
	14729217	1	6	1	4	0.64	11	0.75	4	0.26	19			0.56	9
	14728984	1	6	1	4	0.64	11	0.75	4	0.13	15			0.45	11
	14729239	1	6	1	4	0.62	13	0.75	4	0.06	16			0.55	11

	845167	2	3	0.625	8	0.42	12	0.64	11	0.39	23			0.33	12
	14723875	2	3	1	4	0.64	11	0.14	7	0.35	17			0.60	10
	4251194	2	3	0.6	5	0.57	7	0.50	8	0.60	10	1.00	1	1.00	2
	4249429	5	3	0.6	5	0.56	16	0.75	12	0.42	24			0.08	13
	846490	5	3	0.7143	7	0.50	16	0.00	5	0.05	22			0.27	11
	17504456	5	3			0.73	11	0.00	3	0.00	11			0.00	5
	3713133	3	2	0	2	0.36	14	0.80	10	0.05	22	0.00	1	0.36	11
	3712888	3	2	0.5	10	0.31	16	0.78	9	0.19	21	0.00	1	0.29	7

	855836	4	2	0.6	5	0.63	16	0.91	11	0.43	21	1.00	2	0.50	12
	11111138	4	2	0.5	12			0.33	3						
	4259151	6	2	0	2	0.00	14	0.50	10	0.09	22			0.00	10
	4255191	6	2	0.5	8	0.50	16	0.17	6	0.00	22			0.00	10
	4240658	7	2	0	2	0.00	14	0.58	12	0.16	25			0.25	8
	17511547	7	2			0.73	11	0.00	3	0.00	15	1.00	1	0.20	5
	11532977	8	1	1	2	0.73	11	0.33	6	0.50	18			0.71	7
	4258029	9	1	0.4286	7	0.50	16	0.60	10	0.36	22	1.00	1	0.46	13
	4251553	10	1	0.5	6	0.54	13	0.50	12	0.48	27	0.67	3	0.58	12