Supporting Information

Screening and Analysis of Potential Inhibitors of SHMT2

Bojin Chen[1,3] and John Z.H. Zhang[1-5*]

[1]*Shanghai Engineering Research Center of Molecular Therapeutics & New Drug Development, School of Chemistry and Molecular Engineering, East China Normal University, Shanghai, 200062, China*

[2]*Faculty of Synthetic Biology and Institute of Synthetic Biology, Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, Shenzhen, Guangdong, 518055, China.*

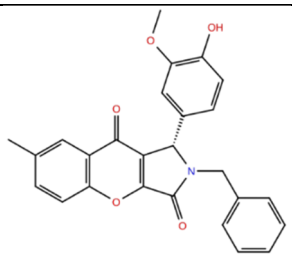
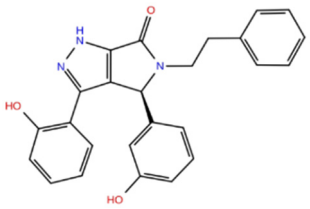
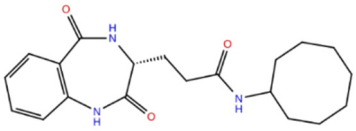
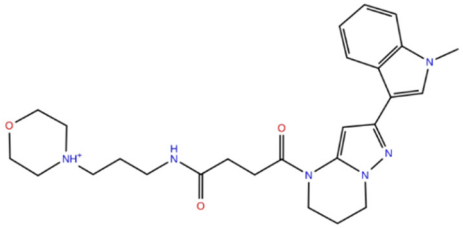
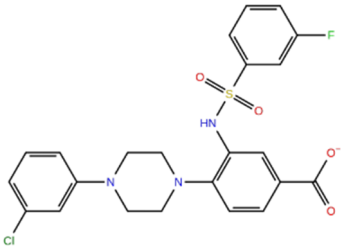
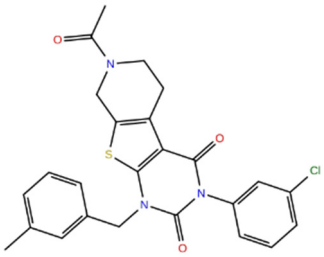
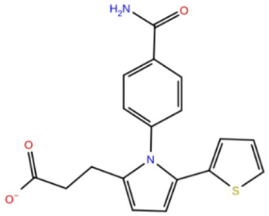
[3]*NYU-ECNU Center for Computational Chemistry at NYU Shanghai, Shanghai, 200062, China*

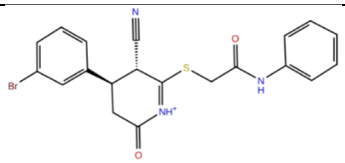
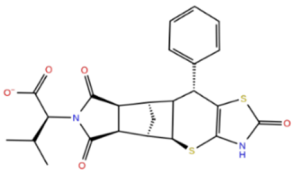
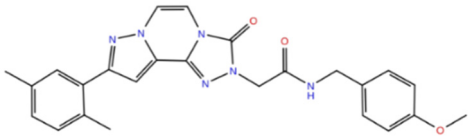
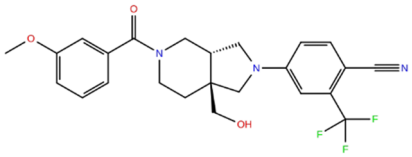
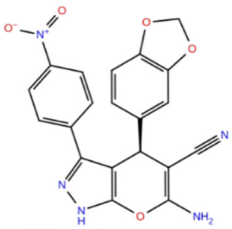
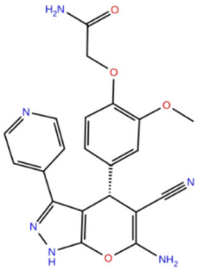
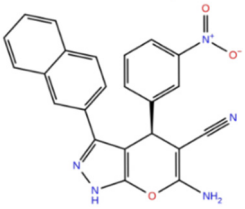
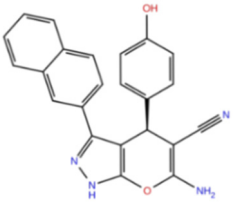
[4]*Department of Chemistry, New York University, New York 10003, United States*

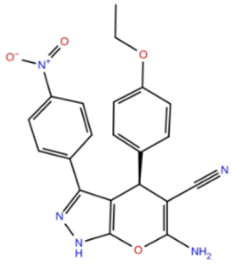
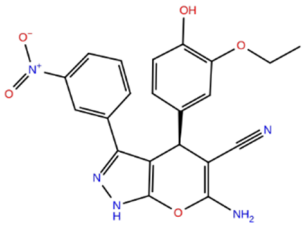
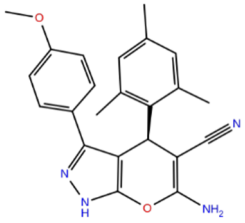
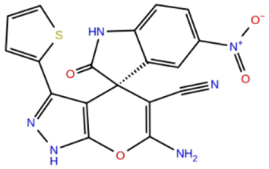
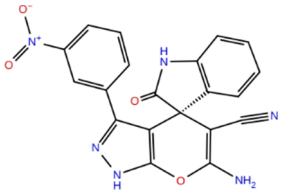
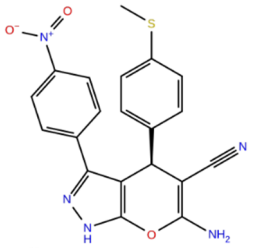
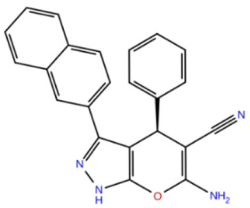
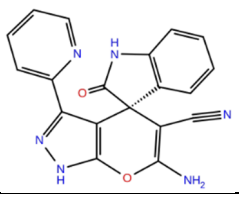
[5]*Collaborative Innovation Center of Extreme Optics, Shanxi University, Taiyuan, Shanxi, 030006,*

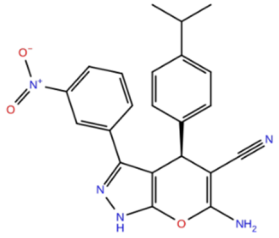
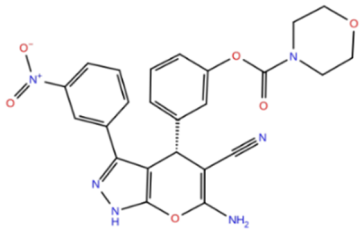
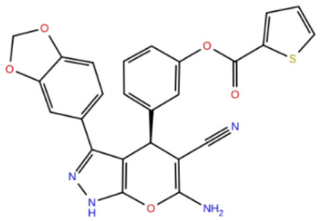
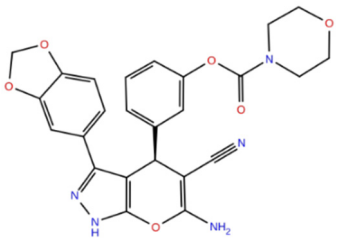
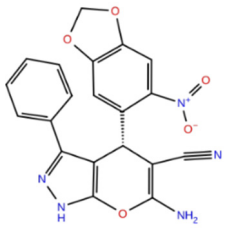
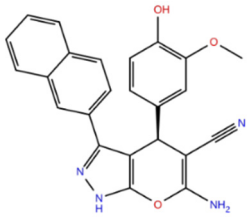
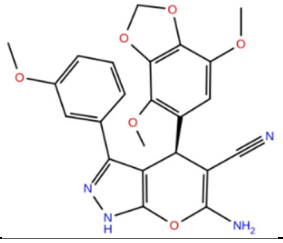
Email: john.zhang@nyu.edu

Table S1. The structures of 38 compounds screened

Name	ChemDiv ID	Structure	Ranking
C1_1	6959-0433		1941
C2_1	D074-0258		2179
C3_1	Y040-5749		3125
C4_1	E989-1016		1962
C5_1	F292-0008		2495
C6_1	C728-0759		860
C7_1	D135-0017		2602

Name	ChemDiv ID	Structure	Ranking
C8_1	4552-4287		2779
C9_1	D008-0182		1525
C10_1	F833-1062		3205
C11_1	S948-5040		1553
C12_1	8010-8303		1949
C12_2	8012-5183		2416
C12_3	3629-0287		920
C12_4	3629-0311		1361

Name	ChemDiv ID	Structure	Ranking
C12_5	3448-5845		1590
C12_6	8010-8305		2746
C12_7	3543-0016		1582
C12_8	8012-3540		1812
C12_9	8010-8306		1413
C12_10	3448-6597		2644
C12_11	3629-0271		1757
C12_12	8012-4430		1947

Name	ChemDiv ID	Structure	Ranking
C12_13	3394-0195		3287
C12_14	4333-3946		1268
C12_15	3394-0367		1017
C12_16	3394-0352		1218
C12_17	8015-0700		2544
C12_18	3629-0318		1784
C12_19	8019-9096		2844

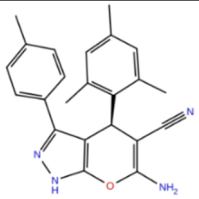
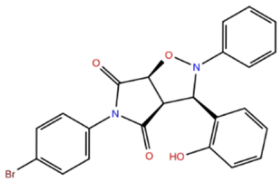
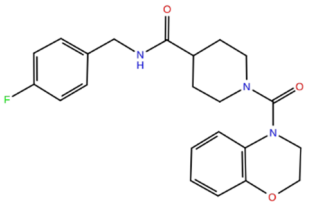
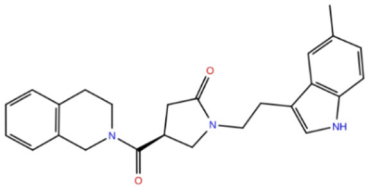
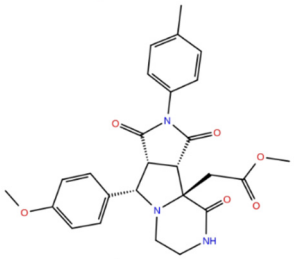
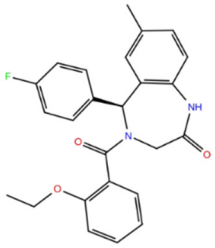
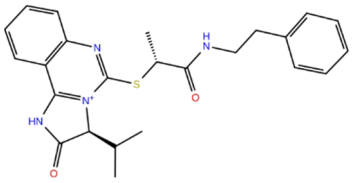
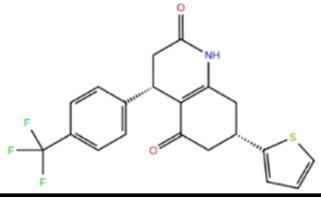
Name	ChemDiv ID	Structure	Ranking
C12_20	4036-0469		2898
C13_1	7210-1772		1830
C14_1	E216-0908		3592
C15_1	D294-4253		1370
C16_1	Y020-6497		1091
C17_1	C076-0017		1937
C18_1	G568-0078		3095
C19_1	C276-1306		2961

Table S2. Compound rankings among the seven scoring functions.

Name	Glide Score	AA-Score	ΔvinaXGB	ad4 _scoring	vina	vinardo	dkoes _scoring	Overall ranking
C6_1	1336	919	603	1364	768	487	545	860
C12_3	1072	1714	411	1775	233	416	822	920
C12_15	3548	114	919	707	649	640	541	1017
C16_1	103	98	1355	678	886	3140	1375	1091
C12_16	4087	335	157	639	88	1694	1527	1218
C12_14	3409	434	1349	759	1481	420	1021	1268
C12_4	1442	2640	274	3179	98	120	1774	1361
C15_1	3301	1126	915	1082	487	1721	956	1370
C12_9	2513	1901	457	3164	600	170	1087	1413
C9_1	3400	1012	1071	2906	1372	606	307	1525
C11_1	842	99	2462	2035	2811	1651	969	1553
C12_7	2126	2851	364	1905	215	2261	1354	1582
C12_5	1556	473	1785	3026	1099	1231	1962	1590
C12_11	3116	1758	1112	3546	688	472	1607	1757
C12_18	4255	2640	173	2037	151	36	3193	1784
C12_8	2331	1785	1185	4101	1838	438	1004	1812
C13_1	524	3764	1353	2111	805	1046	3204	1830
C17_1	4443	2390	568	342	446	3008	2363	1937
C1_1	3602	4323	931	313	751	91	3576	1941
C12_12	3145	3252	180	4048	273	237	2492	1947
C12_1	428	1621	1142	3928	647	2784	3094	1949
C4_1	4382	1	4011	951	3508	546	333	1962
C2_1	4041	3834	1421	1750	601	1744	1861	2179
C12_2	781	1248	4586	3198	3009	756	3337	2416
C5_1	2518	746	3170	2793	3872	3375	988	2495
C12_17	4101	3007	742	3904	706	1187	4159	2544
C7_1	1	1656	4669	4654	3671	531	3034	2602
C12_10	2948	3322	1714	4142	1163	3180	2040	2644
C12_6	2117	1912	3572	4741	2462	1243	3172	2746
C8_1	4617	2191	1615	2243	3284	2932	2573	2779
C12_19	4373	2140	1944	2005	1679	2985	4784	2844
C12_20	4453	2559	2495	4146	1659	3532	1442	2898
C19_1	2940	4181	765	3860	1028	3024	4928	2961
C18_1	3643	2619	3175	6001	3274	488	2465	3095
C3_1	3478	4273	1277	4343	1524	4304	2677	3125
C10_1	4288	1769	2729	1897	3387	4451	3913	3205
C12_13	3197	4958	314	3656	2986	4472	3424	3287
C14_1	4975	1346	4386	2583	4346	3501	4007	3592

Table S3. Specific values of binding free energy for 38 compounds and 8Z1 to SHMT2.

Name	ΔH(kcal/mol)	IE(kcal/mol)	ΔG(kcal/mol)
C14_1	-35.86	3.59	-32.27
C12_14	-29.11	3.89	-25.22
C4_1	-29.71	5.03	-24.68
8Z1	-29.22	4.61	-24.61
C12_19	-28.13	5.88	-22.26
C12_15	-27.21	5.53	-21.69
C1_1	-25.72	4.23	-21.49
C11_1	-26.79	5.65	-21.14
C6_1	-25.51	4.51	-21.01
C10_1	-27.20	6.36	-20.83
C12_17	-25.59	4.84	-20.75
C12_16	-25.01	4.38	-20.63
C16_1	-27.03	6.41	-20.62
C12_1	-26.37	6.06	-20.31
C12_2	-25.31	5.18	-20.13
C19_1	-24.87	4.78	-20.09
C12_5	-24.39	5.03	-19.36
C12_3	-22.71	3.53	-19.17
C15_1	-24.28	5.87	-18.41
C8_1	-21.70	3.51	-18.19
C12_10	-23.35	5.17	-18.18
C12_8	-22.91	5.14	-17.77
C5_1	-23.30	5.60	-17.70
C2_1	-22.95	5.30	-17.65
C17_1	-21.27	3.68	-17.59
C18_1	-21.69	4.64	-17.05
C12_20	-22.13	5.32	-16.80
C12_9	-20.69	4.06	-16.63
C12_11	-19.01	2.68	-16.33
C9_1	-22.11	5.85	-16.26
C12_12	-21.16	5.14	-16.02
C3_1	-21.82	5.95	-15.87
C13_1	-18.22	2.88	-15.34
C12_7	-18.52	3.43	-15.09
C12_13	-21.19	6.62	-14.57
C12_4	-20.50	6.22	-14.28

Name	ΔH(kcal/mol)	IE(kcal/mol)	ΔG(kcal/mol)
C12_6	-20.02	6.91	-13.11
C12_18	-19.55	6.80	-12.75
C7_1	-20.81	11.76	-9.05