Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Supplementary materials

In silico modelling, identification of crucial molecular fingerprints, and prediction of new possible substrates of human organic cationic transporters 1 and 2

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Supplementary Table 1. List of Compounds with SMILES along with their ratio of uptake into OCT-transfected/empty vector transfected cells for hOCT1 and hOCT2.

No	SMILES	hOCT1 ratio	hOCT2 ratio
1	COc1cc(cc(c1OC)OC)Cc1cnc(nc1N)N	1.9	1.4
2	CC(C)NCC(COc1cccc2c1cccc2)O	1.1	0.9
3	COc1cc2c(cc1OCCCN1CCOCC1)c(ncn2)Nc1ccc(c(c1)Cl)F	1.2	1.1
4	CC[N+](C)(CC)CCOC(=O)C(c1ccccc1)(C1CCCCC1)O	25.2	14.3
5	CN1CCN(CC1)C1=Nc2cc(ccc2Nc2c1cccc2)Cl	1	1.1
6	c1(c(nc(c(n1)Cl)N)N)C(=O)NC(=N)N	75.7	73.9
7	C[N+]1(CCCC(C1)OC(=O)C(c1ccccc1)(c1ccccc1)O)C	76.2	0
8	CC[C@@H]1[C@@]([C@@H]([C@H](N(C[C@@H](C[C@@]([C@@H]([C@H]([C@@H]([C@H](C(=O)O1)C)O[C@H]1C[C@@]([C@H]([C@@H](O1)C)O)(C)OC)C)O[C@H]1[C@@H]([C@H](C[C@H](O1)C)N(C)C)O)(C)O)C)C)C)O)(C)O	1.1	0.8
9	c1cc(ccc1C(=O)CCCN1CCC(CC1)(c1ccc(cc1)Cl)O)F	1.2	1.1
10	CC(C)C(CCCN(C)CCc1ccc(c(c1)OC)OC)(C#N)c1ccc(c(c1)OC)OC	1.2	1.2
11	Cc1ccc(cc1Nc1nccc(n1)c1cccnc1)NC(=O)c1ccc(cc1)CN1CCN(CC1)C	1.1	1.1
12	CCN(CC)CCNC(=O)c1cc(c(cc1OC)N)Cl	1.8	1.3
13	CC(C)N(CCC(c1ccccc1)(c1ccccn1)C(=O)N)C(C)C	1.7	0.9
14	CC(C)(C)NCC(c1ccc(c(c1)CO)O)O	6.5	14.6
15	CN(C)CCCN1c2ccccc2CCc2c1cccc2	1.1	1.2
16	c1ccc(cc1)n1c(ccn1)NS(=O)(=O)c1ccc(cc1)N	1.1	0.8
17	CCCCc1c(c2ccccc2o1)C(=O)c1cc(c(c(c1)I)OCCN(CC)CC)I	1.2	1.4
18	CC(Cc1ccc(cc1)O)NCC(c1cc(cc(c1)O)O)O	17.5	11.8
19	CC(=O)O[C@@H]1[C@@H](Sc2ccccc2N(C1=O)CCN(C)C)c1ccc(cc1)OC	1.3	1.1

20	CN(C)C(=O)C(CCN1CCC(CC1)(c1ccc(cc1)Cl)O)(c1ccccc1)c1ccccc1	1.1	0.9
21	CCN(CC)CCNC(=O)c1ccc(cc1)N	2.5	1.6
22	c1ccc(cc1)CNC(=N)NC(=O)c1c(nc(c(n1)Cl)N)N	1.8	1.3
23	C(O)(c1ccnc2c1cc(cc2)OC)C1N2CC(C(C1)CC2)C=C	1.2	1.1
24	CN/C(=C/[N+](=O)[O-])/NCCSCc1ccc(o1)CN(C)C	18.1	1.6
25	CNS(=O)(=O)Cc1ccc2c(c1)c(cn2)CCN(C)C	14.6	3.3
26	C[N+]12CCC(CC1)C(C2)OC(=O)C(c1ccccc1)(c1ccccc1)O	56.5	0
27	COc1cc2c(cc1OC)nc(nc2N)N1CCN(CC1)C(=O)C1CCCO1	1.3	1.3
28	CC(C)[C@H]1c2ccc(cc2CC[C@@]1(CCN(C)CCCc1nc2ccccc2n1)OC(=O)COC)F	1.1	1.1
29	CN(C)C(=O)COC(=O)Cc1ccc(cc1)OC(=O)c1ccc(cc1)NC(=N)N	1.7	1
30	C[C@H](Cc1ccc(cc1)OC)NC[C@@H](c1ccc(c(c1)NC=O)O)O	3	1.1
31	c1cc(cnc1)C(=O)Nc1cc(cc2c1nc1c2ccnc1)Cl	1	0
32	CCS(=O)(=O)c1ccc(cc1)c1cc(c(s1)NC(=O)N)C(=O)N	4.5	0
33	CC(=O)Nc1cc(c(cc1OC[C@](C)(CNC1CCN(CC1)Cc1ccc(cc1)Cl)O)O)Cl	1.1	0
34	c1cc(ccc1O)OC[C@@H](CNCCNC(=O)N1CCOCC1)O	38.5	1.7
35	c1cc(ccc1O)OC[C@H](CNCCNC(=O)N1CCOCC1)O	46.8	1.4
36	CC(C)NC[C@@H](COc1ccc(cc1)CC(=O)N)O	4.7	2.5
37	CN1[C@@H]2CC[C@H]1C[C@H](C2)OC(=O)C(CO)c1ccccc1	1.7	1.7
38	CN1C2CC(CC1CC2)OC(=O)C(c1ccccc1)CO	1.6	1.4
39	Cc1c(cc(c(=O)n1c1cccc(c1)C(F)(F)F)C(=O)NCc1ccc(cc1)S(=O)(=O)C)C(C)N1CCOCC1	1.2	2
40	CC(C)NC[C@H](COc1ccc(cc1)CC(=O)N)O	4.6	2.7
41	C[N+]1(CCC(C1)OC(=O)C(c1ccccc1)(C1CCCC1)O)C	59.1	93
42	CCc1cc2c(cc1CC)CC(C2)NC[C@@H](c1ccc(c2c1ccc(=O)n2)O)O	1.4	0.9
43	c1ccc(c(c1)c1cc(c(s1)NC(=O)N)C(=O)N)O[C@H]1CCNC1	25.9	1.9
44	CC1(Cc2c(cccc2O1)CN1CCC2(CC1)CCN(CC2)C(=O)c1ccnc(c1)N)C	1	0
45	CN/C(=C/[N+](=O)[O-])/NCCSCc1csc(n1)CN(C)C	3.1	1.1
46	C[N+]1([C@@H]2C[C@H](C[C@H]1[C@H]1[C@@H]2O1)OC(=O)C(c1cccs1)(c1cccs1)O)C	65.5	39.2
47	CN1[C@@H]2CC(C[C@H]1[C@H]1[C@@H]2O1)OC(=O)[C@H](CO)c1ccccc1	1.1	0
48	c1ccc(cc1)C1CCN(CC1)[C@@H]1CCCC[C@H]1O	1	0
49	CC[C@@H]([C@@H](c1ccc(c2c1ccc(=O)n2)O)O)NC(C)C	10.7	1.9
50	c1cc(c(cc1C#N)c1cc(c(s1)NC(=O)N)C(=O)N)OC1CCNC1	38.6	1.6
51	c1ccc(c(c1)c1cc(c(s1)NC(=O)N)C(=O)N)OC1CNC1	11.4	2.2
52	c1cc(c(c(c1)OCC1CC1)c1cc(c2c(n1)NC(=O)OC2)[C@@H]1CCCNC1)O	1.1	1
53	c1ccc(c(c1)c1cc(c(s1)NC(=O)N)C(=O)N)OCCN	13.9	2.7
54	c1cc(cc(c1)OC1CCNC1)c1cc(c(s1)NC(=O)N)C(=O)N	68	1.6
55	c1cc(ccc1c1cc(c(s1)NC(=O)N)C(=O)N)OCCN	69.1	1.3
56	Cc1c(nc(c(=O)n1c1cccc(c1)C(F)(F)F)CCCN)c1ccnn1c1ccc(cc1)C#N	1.3	0
57	c1ccc(c(c1)c1cc(c(s1)NC(=O)N)C(=O)N)OCC(CNCCO)O	6.5	0
58	CC(C)NCC(COc1ccccc1c1cc(c(s1)NC(=O)N)C(=O)N)O	3.1	0
59	c1ccc(c(c1)c1cc(c(s1)NC(=O)N)C(=O)N)OCC(CNC1CCC1)O	2.9	0

60	c1ccc(c(c1)c1cc(c(s1)NC(=O)N)C(=O)N)OCC(CN)O	5.3	0
61	CNCC(COc1ccccc1c1cc(c(s1)NC(=O)N)C(=O)N)O	14.6	0
62	CC1CCN(CC1)CC(=O)N[C@H]1CC[C@H](CC1)n1c(=O)n(c2ncc(cc2c1=O)F)C1CCSCC1	1.1	0
63	COc1ccc(cc1)C(NCc1ccccc1)C(=O)N[C@H]1CC[C@H](CC1)n1c(=O)n(c2ncc(cc2c1=O)F)C1CCSCC1	1.2	0
64	C[N+]1(CCC(C1)Oc1ccccc1c1cc(c(s1)NC(=O)N)C(=O)N)C	52.7	4.3
65	c1ccc(c(c1)c1nc(c(s1)NC(=O)N)C(=O)N)OC1CCNC1	21.5	0
66	C[N+](C)(C)CC(COc1ccccc1c1cc(c(s1)NC(=O)N)C(=O)N)O	23.5	0
67	CNc1nccc(n1)c1cc2cc(ccc2n1)C(=O)NC(CN(c1ccccc1)c1ccccn1)C(=O)OC	1	0
68	CC(CNC1CC1)(COc1ccccc1c1cc(c(s1)NC(=O)N)C(=O)N)O	1.4	0
69	c1ccc(c(c1)c1cc(c(s1)NC(=O)N)C(=O)N)OC[C@H](CNC1CC1)O	3.5	0
70	c1ccc(c(c1)c1nc(c(s1)NC(=O)N)C(=O)N)OCCN	12.7	1.3
71	COCCN1CC[C@@H](C1)Oc1ccccc1c1cc(c(s1)NC(=O)N)C(=O)N	1.9	0
72	CNc1nccc(n1)c1cc2cc(ccc2n1)C(=O)NC(CN(c1ccccc1)c1ccccn1)C(=O)O	1.4	0
73	c1ccc(c(c1)c1cc2c(s1)c(cnc2N)C(=O)N)OC1CCNC1	11.3	0
74	C[N+]1(CCCC(C1)c1cc(nc(c1C#N)N)c1c(cccc1OCC1CC1)O)C	12.6	5.4
75	CC(C)NC(=O)Nc1nc(c(s1)NC(=O)N)C(=O)N	10.7	0
76	c1ccc(c(c1)c1nc(c(s1)NC(=O)N)C(=O)N)OCCCN	13.9	1.5
77	Cc1c(cc(c(=O)n1c1cccc(c1)C(F)(F)F)C(=O)NCCCN(C)C)c1ccnn1c1ccc(cc1)C#N	1.3	0
78	C[N+]1(CCCC(C1)c1cc(nc2c1COC(=O)N2)c1c(cccc1OCC1CC1)O)C	3.7	1.9
79	Cc1c(cc(c(=O)n1c1cccc(c1)C(F)(F)F)C(=O)NCCCNC(C)C)c1ccnn1c1ccc(cc1)C#N	1.2	0
80	CNC1CCN(CC1)Cc1c(ccc(c1)O)c1cc(ccc1)n1c(=O)n(c(=O)c2c1ncc(c2)F)[C@H]1CC[C@H](CC1)NC(=O)c1nc2n(c1)cc(cc2)F	1.1	0
81	c1cc(cc(c1)c1c(cc(cc1)O)CN1CCNCC1)n1c(=O)n(c(=O)c2c1ncc(c2)F)[C@H]1CC[C@H](CC1)NC(=O)c1nc2n(c1)cc(cc2)F	1.1	0
82	C[N+]1(CCCC(C1)c1cc(nc(c1C#N)N)c1c(cccc1OCC1CC1)O)C	14.8	2.5
83	C[N+]1(CCCC(C1)c1cc(nc(c1C#N)N)c1c(cccc1OCC1CC1)O)C	23.4	7.2
84	c1cnc2cc3c(cc2n1)C1CC3CNC1	1.6	1.6
85	c1cc(c(cc1O)O)c1cc(c(s1)NC(=O)N)C(=O)N	13.4	0
86	c1ccc(c(c1)c1cc(c(s1)C(=O)N)NC(=O)N)O	1.4	0
87	COc1ccc(c(c1)O)c1cc(c(s1)NC(=O)N)C(=O)N	6.7	0
88	COC(=O)[C@@H]1CC(CN1)Oc1ccccc1c1cc(c(s1)NC(=O)N)C(=O)N	1.4	0
89	CC(C)(C)OC(=O)N1CC[C@@H](C1)COc1ccccc1c1cc(c(s1)NC(=O)N)C(=O)N	1.1	0
90	CCN(CC)C(=O)c1ccc(c(c1)OC)c1cc(c(s1)NC(=O)N)C(=O)N	3	0
91	c1ccc(c(c1)c1cc(c(s1)NC(=O)N)C(=O)N)OC[C@H]1CCNC1	16.7	0
92	COc1cc(ccc1c1cc(c(s1)NC(=O)N)C(=O)N)C(F)(F)F	1.1	0
93	COC(=O)c1ccc(c(c1)O)c1cc(c(s1)NC(=O)N)C(=O)N	6.6	0
94	c1c(cc(c(c1c1cc(c(s1)NC(=O)N)C(=O)N)O[C@H]1CCNC1)Br)F	3	0
95	c1ccc(c(c1)c1cc(c(s1)NC(=O)N)C(=O)N)O[C@H]1C[C@H](NC1)CO	5.2	0
96	c1cc(c(cc1Cl)c1cc(c(s1)NC(=O)N)C(=O)N)O[C@H]1CCNC1	9.1	0

97	CCNC(=O)[C@@H]1[C@H]([C@H]([C@@H](O1)N1C=N[C]2#[C]1[N]C([N]C2N)NCCc1ccc(cc1)CCN)O)O	1	0.8
98	CS(=O)(=O)N1CCC(=CC1)c1cc(c(s1)NC(=O)N)C(=O)N	6.6	0
99	CC1(CN([C@@H](CO1)C(=O)Nc1cc(cc2c1nc1c2ccnc1)Cl)CC(=O)N1CCCC1)C	1	1.1
100	Cc1c(c(on1)C)S(=O)(=O)N1CCC(=CC1)c1cc(c(s1)NC(=O)N)C(=O)N	1.2	1
101	CN(C)C(=O)[C@@H]1C[C@@H](CN1)Oc1ccccc1c1cc(c(s1)NC(=O)N)C(=O)N	2	1.4
102	Cc1cc(c(cc1)O)C(=O)N[C@H]1CC[C@H](CC1)NC(=O)c1c(ncc(c1)F)Oc1cc(ccc1)c1c(cc(cc1)CN1C[C@@H](N[C@@H](C1)C)C)CN1CCOCC1	1.1	1.2
103	c1cc(cc(c1)n1c(c(cc(c1=O)C(=O)N)c1ccnn1c1ccc(cc1)C#N)CN)C(F)(F)F	1	1.2
104	C[C@@H]1CN(C[C@@H](O1)C)C(=O)CN1CC(OC[C@H]1C(=O)Nc1cc(cc2c1nc1c2ccnc1)Cl)(C)C	1.1	0
105	Cc1ccccc1C[C@@H](CNC(=O)c1c(nc(c(n1)Cl)N)N)NC(=N)C	20.6	1.9
106	c1ccc(c(c1)c1cc(c(s1)NC(=O)N)C(=O)N)O[C@H]1C[C@H](NC1)CF	1.9	0
107	COC[C@@H]1C[C@@H](CN1)Oc1ccccc1c1cc(c(s1)NC(=O)N)C(=O)N	2.5	0
108	CCC(CC)Nc1c2c(nc(n1)NCCNC(=O)Nc1ccncc1)n(cn2)[C@H]1[C@@H]([C@@H]([C@H](O1)C(=O)NCC)O)O	1	1.3
109	CC(C)NCC(COc1ccc(cc1)CC(=O)N)O	8.1	4.9
110	c1cc(c(c(c1)Cl)N=C1NCCN1)Cl	1.2	1
111	CC(C)NCC(COc1ccccc1OCC=C)O	1.1	0
112	c1ccc(cc1)c1c(nc2c(n1)c(nc(n2)N)N)N	1.5	1.6
113	c1ccc2c(c1)N(c1cc(ccc1S2)Cl)CCCN1CCN(CC1)CCO	1.8	1.2
114	CNC1(CCCCC1=O)c1ccccc1Cl	1.1	1.1
115	CC(C)(C)NCC(c1cc(cc(c1)O)O)O	7.3	6.9
116	c1cc(ccc1c1cc(c(s1)NC(=O)N)C(=O)N)Cl	1.2	0
117	CNCCOc1ccccc1c1cc(c(s1)NC(=O)N)C(=O)N	11.3	0
118	Cc1c(ncn1)CSCC/N=C(/NC)\NC#N	4	14.7
119	CCCNCC(COc1ccccc1C(=O)CCc1ccccc1)O	1.1	1.1
120	COc1cc(c(c(c1)OC)C(=O)CCCN1CCCC1)OC	1	0
121	c1ccc(cc1)CCCCOCCCCCCNCC(c1ccc(c(c1)CO)O)O	1	0.8
122	CN(CCOc1ccccc1c1cc(c(s1)NC(=O)N)C(=O)N)CC=C	1.1	0
123	c1cc(c(c(c1)OCC1CC1)c1cc(c(c(n1)N)C#N)C1CCCNC1)O	1	0
124	CC(C)[N+]1([C@@H]2CC[C@H]1C[C@H](C2)OC(=O)C(CO)c1ccccc1)C	41.9	8.3
125	CC(C)NC[C@@H](COc1cccc2c1ccn2)O	1.2	1.3
126	C[C@H](Cc1ccccc1)N(C)CC#C	1.1	1.9
127	CC(=O)O[C@H]1[C@@H](CN[C@H]1Cc1ccc(cc1)OC)O	1	0.8
128	c1ccc(c(c1)c1cc(c(s1)NC(=O)N)C(=O)N)O[C@@H]1CCNC1	15.5	1.1
129	c1ccc(c(c1)c1cc(c(s1)NC(=O)N)C(=O)N)OC1CCNCC1	17	1.8
130	CC(C(=O)N)Oc1ccccc1c1cc(c(s1)NC(=O)N)C(=O)N	8.4	1.7
131	c1ccc(c(c1)c1cc(c(s1)NC(=O)N)C(=O)N)OCCCN	6.8	1.4
132	CCOCCNCC(COc1ccccc1c1cc(c(s1)NC(=O)N)C(=O)N)O	5.1	1.3

133	c1ccc(c(c1)c1cc(c(s1)NC(=O)N)C(=O)N)OCC1CCCNC1	5.3	2.1
134	c1cc(ccc1c1cc(c(s1)NC(=O)N)C(=O)N)OC1CCNC1	73.1	1.4
135	c1ccc(c(c1)c1cc(c(s1)NC(=O)N)C(=O)N)OCC(CNC1CC1)O	2.7	1.2
136	c1cc(ccc1c1cc(c(s1)NC(=O)N)C(=O)N)OCC(=O)N	16.1	1
137	c1cc(cc(c1)OCC(=O)N)c1cc(c(s1)NC(=O)N)C(=O)N	6.5	0
138	CCC(C)NCC(COc1ccccc1c1cc(c(s1)NC(=O)N)C(=O)N)O	3.6	0
139	CCNCC(COc1ccccc1c1cc(c(s1)NC(=O)N)C(=O)N)O	7.2	0
140	CCOC(=O)Nc1nc(c(s1)NC(=O)N)C(=O)N	1.4	1.1
141	c1ccc(c(c1)c1cc(c(s1)NC(=O)N)C(=O)N)OC[C@H](CNCCO)O	7.8	0.9
142	CC(C)NC[C@@H](COc1ccccc1c1cc(c(s1)NC(=O)N)C(=O)N)O	4.5	1.1
143	COCCN1CC[C@H](C1)Oc1ccccc1c1cc(c(s1)NC(=O)N)C(=O)N	1.9	0.9
144	CC(C)(C)OC(=O)N1CC[C@H](C1)COc1ccccc1c1cc(c(s1)NC(=O)N)C(=O)N	1.1	0
145	c1ccc(c(c1)c1cc(c(s1)NC(=O)N)C(=O)N)OC1CCCNCC1	12.5	0
146	c1ccc(c(c1)c1cc(c(s1)NC(=O)N)C(=O)N)OC[C@@H]1CCNC1	11.3	0
147	c1ccc(cc1)COc1cc(ccc1c1cc(c(s1)NC(=O)N)C(=O)N)OCC(=O)N	3.4	0
148	CN1CCC(C1)COc1ccccc1c1cc(c(s1)NC(=O)N)C(=O)N	4.6	0
149	Cc1cccc(c1O[C@H]1CCNC1)c1cc(c(s1)NC(=O)N)C(=O)N	33.7	0
150	Cc1cccc(c1O[C@@H]1CCNC1)c1cc(c(s1)NC(=O)N)C(=O)N	37	0
151	c1cc(c(cc1F)c1cc(c(s1)NC(=O)N)C(=O)N)O[C@H]1CCNC1	10	0
152	C[C@H](COc1ccccc1c1cc(c(s1)NC(=O)N)C(=O)N)N	8.6	0
153	CC(C)NC(C)COc1ccccc1c1cc(c(s1)NC(=O)N)C(=O)N	3.4	0
154	c1cc(c(cc1)OC1CCC(CC1)N)c1sc(c(c1)C(=O)N)NC(=O)N	8	0
155	CC(C)(C)OC(=O)N1CCC(=CC1)c1cc(c(s1)NC(=O)N)C(=O)N	1.1	0
156	CCS(=O)(=O)N1CCC(=CC1)c1cc(c(s1)NC(=O)N)C(=O)N	7.1	2.4
157	CN(C)C(=N)NC(=N)N	1.7	15.5
158	c1ccc(cc1)CCNC(=N)NC(=N)N	39.3	35.1
159	C[N+]1([C@@H]2C[C@H](C[C@H]1[C@H]1[C@@H]2O1)OC(=O)C(c1cccs1)(c1cccs1)O)C	125.3	39.1
160	CN1CCN(CC1)CCCN1c2ccccc2Sc2c1cc(cc2)Cl	0.8	0.9
161	C(CN1c2ccccc2Sc2c1cccc2)(N(C)C)c1ccccc1	0.9	1
162	CNCCCN1c2ccccc2CCc2c1cccc2	0.8	1.2
163	c1ccc2c(c1)N(c1cc(ccc1S2)C(F)(F)F)CCCN1CCN(CC1)CCO	0.9	0.7
164	CC12CC3CC(C1)(CC(C3)(C2)N)C	1.1	1
165	CN(C)CCCN1c2ccccc2CCc2c1cc(cc2)Cl	0.8	1.2
166	CCCCN1CCCCC1C(=O)Nc1c(cccc1C)C	0.8	1.4
167	CN1CCc2cccc3c2C1Cc1c3c(c(cc1)O)O	0.5	1.7
168	COc1cc2c(cc1OC)nc(nc2N)N1CCN(CC1)C(=O)c1ccco1	0.9	1.3
169	CC1CN(C(=O)[N]C1=O)C1CC(C(O1)CO)N=[N+]=[N-]	0.9	0.7
170	CC(C(=O)c1cccc(c1)Cl)NC(C)(C)C	0.9	1.4
171	COc1ccccc1CNCCCCCCNCCCCCCCCNCCCCCCNCc1ccccc1OC	0.9	1.2
172	c1ccc(cc1)NC(=N)NC(=O)c1c(nc(c(n1)Cl)N)N	1	1.4
173	CCN1C[C@@]2(CCC(C34[C@@H]1C(CC23)[C@]1(C[C@@H]([C@H]2CC4[C@@]1(C2OC)O)OC)O)OC)OC(=O)c1ccccc1NC(=O)C	0.8	1.3
174	CC(C)(C(=O)N[C@H](COCc1ccccc1)C(=O)N1CCC2(CC1)CN(c1c2cccc1)S(=O)(=O)C)N	0.8	1

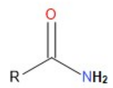
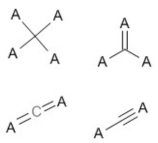
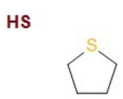
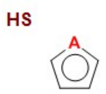
175	CN(C)c1c2c(ncn1)n(cn2)[C@H]1[C@@H]([C@@H]([C@H](O1)CO)NC(=O)[C@H](Cc1ccc(cc1)OC)N)O	1	1.1
176	CN(C)CC/C=C\1/c2ccccc2Sc2c1cc(cc2)Cl	0.3	1.7
177	CC(=O)O[C@@H]1[C@H](CN[C@@H]1Cc1ccc(cc1)OC)O	0.8	1
178	Cc1c(nc(c(=O)n1c1cccc(c1)C(F)(F)F)C(=O)NC)c1ccnn1c1ccc(cc1)C#N	0	1.1
179	CC(C)(C(=O)N[C@H](COCc1ccccc1)C(=O)N1CCC2=NN(C(=O)[C@@]2(C1)Cc1ccccc1)C)N	0.8	1.1
180	c1cc2n(cc(n2)CN[C@H]2CC[C@H](CC2)n2c(=O)n(c3ncc(cc3c2=O)F)C2CCSCC2)cc1	1	0
181	Cc1c(cc(c(=O)n1c1cccc(c1)C(F)(F)F)C(=O)NCCC[N+](C)(C)C)c1ccnn1c1ccc(cc1)C#N	0.7	1
182	Cc1scc(n1)C(=O)N[C@H]1CC[C@H](CC1)n1c(=O)n(c2ncc(cc2c1=O)F)c1cc(ccc1)c1ccc(cc1)CCCN1CCNCC1	0	0.9
183	CC(C)(c1ccccn1)C(c1ccccc1F)N	0.9	1
184	c1c(c(sc1C1=CCCCC1)NC(=O)N)C(=O)N	1	0
185	CCNC(=O)[C@@H]1[C@H]([C@H]([C@@H](O1)n1cnc2c1nc(nc2N)NCCc1ccc(cc1)CC[N+](C)(C)C)O)O	1.2	1.3
186	CC[C@@]1(C(=O)NC(=O)N1)CS(=O)(=O)N1CCC(=CC1)c1cc(c(s1)NC(=O)N)C(=O)N	0.7	0.4
187	CCNC(=O)[C@@H]1[C@H]([C@H]([C@@H](O1)n1cnc2c1nc(nc2N)C(=O)NCCNC(=O)Nc1ccncc1)O)O	0.9	0.9
188	CCNC(=O)[C@@H]1[C@H]([C@H]([C@@H](O1)n1cnc2c1nc(nc2N)NCCNC(=O)Nc1ccncc1)O)O	0.8	0.6
189	CCNC(=O)[C@@H]1[C@H]([C@H]([C@@H](O1)n1cnc2c1nc(nc2N)NCCNC(=O)Nc1cc[n+](cc1)C)O)O	1.2	1.2
190	CCNC(=O)[C@@H]1[C@H]([C@H]([C@@H](O1)n1cnc2c1nc(nc2N)C(=O)NCCNC(=O)Nc1cc[n+](cc1)C)O)O	1.6	1.3
191	Cc1n(nc(c1)C(=O)N[C@H]1CC[C@H](CC1)NC(=O)c1c(ncc(c1)F)Oc1cc(ccc1)c1ccc(cc1)CCCN1C[C@@H](N[C@@H](C1)C)C)C	1	1.1
192	c1cc(ccc1C[C@@H](C#N)NC(=O)C1(CCOCC1)N)c1ccc(cc1)C#N	0	1
193	c1cc(cc(c1)n1c(=O)ccc(c1CN)c1ccnn1c1ccc(cc1)C#N)C(F)(F)F	0.9	1.3
194	CCC(CC)Nc1c2c(nc(n1)NCCNC(=O)Nc1cc[n+](cc1)C)n(cn2)[C@H]1[C@@H]([C@@H]([C@H](O1)C(=O)NCC)O)O	0.8	0.8
195	B1(c2ccccc2[C@H](O1)CN)O	1.2	1.1
196	B1(c2c(cccc2OCCCO)[C@H](O1)CN)O	1	1.2

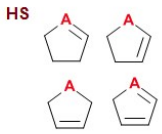
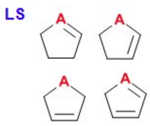
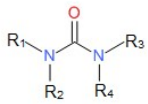
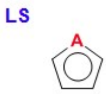
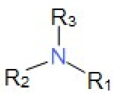
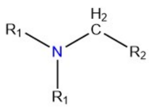
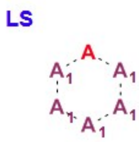
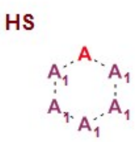
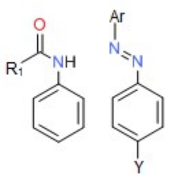
Supplementary Table 1A: Table showing total number of Substrates (S) and Non-substrates (NS) in Monte Carlo Optimization and Bayesian Classification.

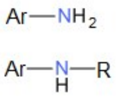
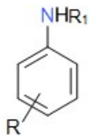
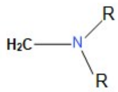
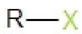
hOCT1								
	Total	**Training**	**Invisible training**	**Calibration**	**Validation**		**Training set**	**Test set**
Monte Carlo Optimization Split 1	S-104 NS-85	S-40 NS-26	S-40 NS-26	S-21 NS-8	S-3 NS-25	**Bayesian**	S-91 NS-60	S-13 NS-25
Monte Carlo Optimization Split 2		S-36 NS-30	S-38 NS-30	S-14 NS-13	S-16 NS-12			
Monte Carlo Optimization Split 3		S- 29 NS-37	S-41 NS-25	S-17 NS-11	S-17 NS-12			

Combined (hOCT1 and hOCT2)		
	Training set	**Test set**
Bayesian	S-34 NS-63	S-8 NS-16

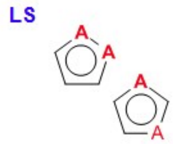
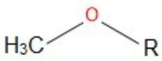
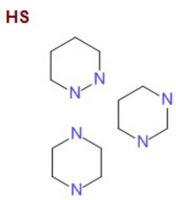
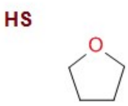
Supplementary Table 2. Occurrence (appearance count as well as *p*-values of respective distribution) of functional groups in substrate or non-substrate in case of hOCT1. Positive and negative *p*-values signify the presence of specific group (s) in substrate and non-substrate sets respectively.

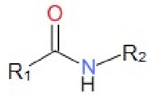
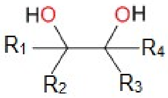
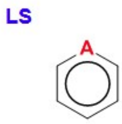
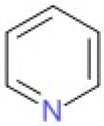
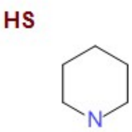
No	Structure	Substrate	Non-substrate	*p*-Value
1		59 (56.73 %)	9 (10.59 %)	1.65×10^{-13}
2		65 (62.5 %)	16 (18.82 %)	7.98×10^{-12}
3		53 (50.96 %)	8 (9.41 %)	1.06×10^{-11}
4		52 (50 %)	8 (9.411 %)	2.62×10^{-11}
5		53 (50.96 %)	9 (10.59 %)	4.83×10^{-11}

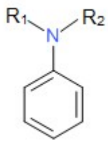
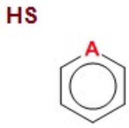
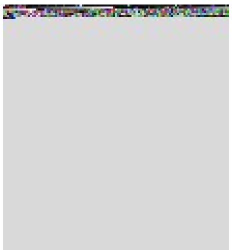
6		53 (50.96 %)	9 (10.59 %)	4.83 x 10^{-11}
7		54 (51.92 %)	10 (11.76 %)	8.35 x 10^{-11}
8		58 (55.77 %)	13 (15.29 %)	1.31 x 10^{-10}
9		59 (56.73 %)	14 (16.47 %)	1.88 x 10^{-10}
10		56 (53.85 %)	15 (17.65 %)	7.76 x 10^{-09}
11		11 (10.58 %)	41 (48.24 %)	-3.61 x 10^{-08}
12		12 (11.54 %)	41 (48.24 %)	-1.07 x 10^{-07}
13		25 (24.04 %)	55 (64.71 %)	-1.34 x 10^{-07}
14		16 (15.38 %)	45 (52.94 %)	-2.16 x 10^{-07}
15		59 (56.73 %)	21 (24.71 %)	3.05 x 10^{-07}

16		70 (67.31 %)	31 (36.47 %)	3.22 x 10^{-07}
17		70 (67.31 %)	31 (36.47 %)	3.22 x 10^{-07}
18		6 (5.77 %)	31 (36.47 %)	-3.40 x 10^{-07}
19		9 (8.65 %)	35 (41.18 %)	-5.15 x 10^{-07}
20	**Halogens** F Cl Br I At	9 (8.7%)	35 (41.2%)	-5.15 x 10^{-07}

Supplementary Table 3. Occurrence (appearance count as well as *p*-values of respective distribution) of functional groups in substrate or non-substrate in case of hOCT2. Positive and negative *p*-values signify the presence of specific group (s) in substrate and non-substrate sets respectively.

No	Structure	Substrate	Non-substrate	*p*-Value
1		2 (4 %)	20 (27.03 %)	-8.57×10^{-04}
2		3 (6 %)	22 (29.73 %)	-0.00121
3		4 (8 %)	24 (32.43 %)	-0.00151
4		1 (2 %)	15 (20.27 %)	-0.00246
5		0 (0 %)	10 (13.51 %)	-0.0055
6		0 (0 %)	10 (13.51 %)	-0.0055
7		0 (0 %)	10 (13.51 %)	-0.0055

8		4 (8 %)	21 (28.38 %)	-0.00604
9		16 (32 %)	10 (13.51 %)	0.00773
10		0 (0 %)	9 (12.16 %)	-0.00952
11		17 (34 %)	12 (16.22 %)	0.0119
12		4 (8 %)	19 (25.67 %)	-0.0142
13		4 (8 %)	19 (25.67 %)	-0.0142
14		15 (30 %)	10 (13.51 %)	0.0147
15		15 (30 %)	10 (13.51 %)	0.0147
16		2 (4 %)	14 (18.92 %)	-0.0157

17		2 (4 %)	14 (18.92 %)	-0.0157
18		2 (4 %)	14 (18.92 %)	-0.0157
19		14 (28 %)	9 (12.16 %)	0.0161
20		14 (28 %)	9 (12.16 %)	0.0161

Supplementary Table 4. Distribution of compounds in the training, invisible training, calibration and validation set in three random splits

Split number	Training(+)	Invisible training(-)	Calibration (#)	Validation (*)
Split 1	1, 2, 4, 14, 15, 16, 23, 24, 28, 29, 30, 34, 35, 36, 37, 39, 43, 49, 54, 61, 64, 66, 67, 70, 71, 76, 86, 87, 90, 93, 94, 95, 105, 113, 114, 115, 119, 120, 121, 125, 126, 127, 128, 132, 134, 135, 137, 138, 139, 140, 144, 145, 151, 152, 157, 163, 164, 166, 170, 174, 175, 183, 185, 186, 189, 195	190, 188, 187, 180, 179, 176, 173, 172, 171, 165, 161, 158, 155, 154, 153, 149, 148, 146, 142, 141, 131, 130, 129, 124, 122, 118, 116, 112, 111, 110, 108, 104, 101, 100, 96, 92, 91, 88, 85, 84, 77, 75, 73, 72, 69, 68, 58, 57, 56, 51, 45, 41, 40, 38, 33, 31, 26, 25, 22, 21, 18, 12, 9, 6, 5, 3	106, 107, 109, 117, 133, 136, 143, 147, 150, 156, 160, 162, 167, 194, 89, 9832, 42, 48, 50, 53, 55, 59,60, 65, 13, 17, 7, 8	10, 102, 103, 11, 123, 168, 169, 177, 181, 184, 19, 191, 193, 196, 20, 27, 44, 46, 47, 52, 62, 63, 74, 78, 79, 80, 81, 99
Split 2	3,7,9,10,11,16,18,19,20,27,28,29,32,34,37,38,42,47,48,49,50,55,60,64,65,69,72,75,81,86,88,91,93,99,102,103,111,114, 115,117,123, 128,132,133,136, 138,140,142,143,145,146,147,150,155, 156,160,164,172,175,176,183,185,188, 189,193,196	194,190,186,179, 174,173,169,167, 163,162,158,157, 149,148,144,134, 131,129,127,126,125,124,122,118, 116,113,112,110, 109,107,105,104, 100,98,96,95,94, 89,87,85,80,79,74, 71,68,67,66,59,58, 57,54,53,51,44,41, 39,33,31,30,21,17, 15,14,12,8,4,2,1	119,121,135,137,151,152,154,16,5,168,171,181,187,191,22,25,26, 36,43,45,46,52,56,63,70,77,84,92	101,106,108,120,13, 130,139,141,153,161,166,170,177,180,184,195,23,24,35,40, 5, 6,61,62,73,76,78,90

Split 3	1, 2, 8, 10, 12, 15, 18, 19, 20, 22, 23, 25, 29, 31, 35, 38, 39, 44, 45, 46, 62, 63, 67, 68, 74, 5, 78, 79, 80, 84, 86, 87, 92, 98, 100, 103, 104, 107, 110, 116, 117, 121, 122, 123, 124, 129, 132, 133, 135, 142, 143, 144, 149, 155, 157, 164, 165, 167, 168, 170, 179, 188, 193, 194, 195, 196	190, 189, 184, 180, 173, 171, 169, 166, 163, 162, 158, 156, 147, 146, 138, 130, 128, 127, 125, 115, 114, 113, 111, 109, 108, 106, 105, 101, 99, 96, 94, 93, 91, 77, 76, 73, 72, 71, 69, 60, 59, 58, 57, 52, 51, 50, 48, 47, 42, 40, 37, 36, 34, 33, 32, 27, 26, 24, 21, 17, 16, 14, 9, 7, 6, 5	11, 118, 119, 120,136,137,140,145,150,152,174,175,177,181,183,185,28, 3,30, 4,43,49,54,55,64,66,70,85	102,112,126,13,131, 134,139,141,148,151,153,154,160,161,172,176,186,187,191,41,53,56,61,65,81,88, 89,90,95

Supplementary Table 5. Structural attributes in three runs of Monte Carlo optimization [SMILES and GAO with $^{0}EC_{k}$ of split-1]

SAk	CWs Probe 1	CWs Probe 2	CWs Probe 3
Promoters of activity			
N...C.......	3.81248	3.93661	5.24514
EC0-2p2 8...	0.62723	0.00051	0.06693
c...(.......	1.18659	1.56277	0.1896
N...(.......	1.69078	1.49757	1.25226
HALO00000000	0.31309	1.30763	2.56277
NOSP11000000	3.1285	2.31249	1.3776
c...c...c...	3.75246	3.12789	3.24543
++++N---B2==	10.50486	5.37317	7.74702
c...1.......	1.75059	1.75419	0.99673
++++O---B2==	3.75059	3.18596	2.87911
EC0-2s2 3...	0.6854	1.87924	0.5002
c...c...(...	2.68389	1.62057	0.74732
EC0-2p4 3...	0.19163	2.12331	1.99591
c...1...c...	0.55758	1.43725	2.12313
EC0-1s2 10..	1.87997	1.93368	0.31105
EC0-2p2 10..	1.37752	2.62213	2.06506
O...=...(...	0.80773	0.7523	0.25207
c...c...1...	4.12076	2.62031	2.75492
EC0-2p2 6...	2.37361	0.24608	2.68676
N...(...C...	2.62506	3.55954	1.94241
c...2...c...	1.442	1.43364	1.05998
1...(.......	3.68641	3.1282	2.05759
EC0-1s2 5...	1.4417	1.31481	1.25063
EC0-2s2 5...	2.12185	1.50431	2.31082
EC0-2p3 5...	4.06169	3.75445	4.12412
EC0-1s2 4...	2.81261	4.25016	3.06364
EC0-2s2 4...	3.62576	3.00326	3.87013
(...N...(...	1.25183	3.62097	2.44168
C...(...C...	5.8764	6.12125	6.5582
EC0-2p4 4...	4.37597	3.4404	3.68762
N...C...C...	4.12334	2.50125	2.49617
++++S---B2==	1.37447	0.37687	0.62885
BOND10000000	0.62584	1.87043	1.62456
EC0-3p4 6...	0.12553	1.25351	0.6243
c...1...(...	1.74545	1.56391	3.55994
1...c...(...	4.62789	5.94182	5.93309
O...C...(...	3.68628	3.12637	4.81693
s...(.......	2.31221	0.81375	0.00164
s...........	0.74788	0.62913	0.37155
$10011000000	11.05943	4.25041	8.69155
C...O...(...	1.12726	1.18989	2.06266

s...2...(...	1.12438	0.56519	0.249
C...N...C...	6.87852	4.87663	7.05955
[...(...C...	6.74593	4.80839	6.50477
[...H...@...	1.56341	0.06074	0.05796
$10111000000	8.4382	4.94224	4.81618
c...O.......	2.68396	1.37035	1.81311
C...[...C...	2.69013	5.370252	4.75417
c...3.......	0.4396	0.37938	0.87786
n..........	1.43866	0.31133	0.62734
H...@@......	1.18717	0.12708	1.62956
O...C...C...	2.49553	1.621	2.68902
c...c...3...	3.00139	1.37906	0.44008
C...(...1...	4.37237	1.12178	3.00266
C...O...C...	4.49502	2.3118	6.12035
n...c.......	0.12864	0.24519	0.50092
C...3.......	1.62252	0.8113	2.37818
O...(...1...	6.30872	4.31234	5.19039
c...(...1...	3.12856	3.50124	2.24773
4..........	1.12213	0.62195	1.93824
C...1.......	1.12213	2.19108	1.62582
BOND00000000	9.0619	4.74858	3.25009
O...(...2...	4.81088	3.80958	4.31033
C...2...(...	0.68621	0.94176	1.31374
C...C...3...	1.00357	2.87355	0.99647
[...3.......	0.81113	1.50299	4.37549
c...(...O...	3.81126	3.31468	5.06002
N...(...N...	4.68538	5.68347	5.74728
n...c...(...	4.68307	2.81193	3.05828
4...(.......	1.24949	1.81407	0.87383
C...c...1...	5.31608	3.87328	5.00115
H...[...3...	2.43861	1.62734	1.37231
N...C...3...	5.81023	4.99921	3.06632
[...N.......	3.37951	3.18569	3.9378
[...O.......	1.44135	5.12048	2.12456
c...(...C...	12.56326	11.87646	10.9416
++++F---N===	1.62166	1.18599	1.94231
+..........	3.12567	5.68959	0.56162
3...c...(...	5.49793	6.56298	7.43351
N...1.......	2.25491	0.87787	2.12336
N...2.......	2.12956	1.93723	0.93364
O...1.......	3.37351	2.18962	4.87936
O...[...C...	6.81246	4.3107	6.80833
[...+.......	5.12216	4.81068	3.69157
[...3...C...	1.12594	0.55897	1.99689
[...O...(...	4.06593	3.99938	3.87204
c...4...c...	3.49834	1.18282	1.50168

$00011000000	3.24612	3.56336	5.37704
++++F---O===	2.43574	0.74629	2.7496
+...[...(...	2.24671	5.0673	2.93447
1...O...(...	3.68862	3.55951	2.87877
3...c...2...	3.37604	0.93667	0.1235
3...s...(...	0.37995	0.87383	0.18806
C...1...(...	3.12664	4.00307	4.75405
C...C...1...	3.05977	2.1246	1.0585
N...+.......	4.37961	3.05804	4.06677
[...+...N...	3.37701	3.87756	3.62301
[...2.......	1.50013	0.25144	0.68439
[...N...+...	4.06186	4.43748	3.37022
c...(...N...	6.99754	7.31431	6.62537
c...C...(...	3.5045	2.44009	4.75215
c...n...(...	6.37923	5.12276	6.12585
n...1.......	1.74918	1.3716	3.25281
n...[.......	3.87576	4.87848	4.12661
++++F---B2==	6.4377	6.24681	3.37572
++++CL--N===	9.75345	4.44223	3.24522
2...C...(...	2.24975	1.24712	4.56317
C...(...4...	3.37139	5.24731	8.24845
C...3...C...	4.94016	6.1856	6.43262
C...4.......	6.24686	6.99659	6.56308
C...C...4...	1.68755	0.06566	4.24749
C...N...1...	6.06479	3.55859	4.62414
EC0-2p3 12..	4.93777	5.12637	4.81212
EC0-3s2 12..	4.252	0.37449	1.93641
H...[...2...	5.06488	4.37618	3.56112
S...(.......	1.49979	1.30785	0.18992
S...(...=...	0.99978	1.68733	1.99847
[...n...H...	2.5016	3.68993	1.06567
c...n...1...	1.1219	1.24701	2.93275
n...H.......	1.31693	2.81725	3.62693
n...H...[...	3.68399	1.68381	0.00137
=...N...(...	2.99542	4.37588	3.68457
C...(...3...	1.24699	4.06476	4.80964
EC0-2p3 4...	3.37139	3.37428	3.56391
N...1...C...	1.24562	1.68426	2.6201
N...4.......	2.24747	2.62577	2.75145
N...4...C...	0.12819	1.12671	1.43254
N...=...(...	3.75224	3.99583	1.6253
N...=.......	3.55837	3.56129	3.25065
O...1...(...	1.62278	1.74684	2.68971
O...c...2...	7.81286	7.75401	7.93586
[...1...(...	5.62281	5.93928	7.00192
[...2...(...	0.69172	1.44203	1.1917

[...C...N...	15.44133	8.37107	14.37535
c...(...[...	9.1281	7.50198	10.87894
c...1...O...	8.00151	6.68759	7.37086
c...2...C...	1.8733	3.74871	4.74906
c...[.......	0.31631	1.56259	1.56344
n...1...c...	9.31714	6.5634	10.00018
n...c...2...	9.31113	11.31052	7.18733
$00010000000	13.00494	11.06253	7.56032
$10011100000	4.1226	5.1202	7.49634
$10111001000	7.00007	10.87586	8.68511
1...(...(...	14.69191	13.00401	14.7515
1...n...(...	4.75327	2.24514	4.00427
3...S...2...	4.81477	3.06418	3.25008
4...c...(...	10.37186	4.12983	11.37294
C...2...C...	8.18539	6.62275	6.30981
C...4...(...	2.74784	3.87487	3.44143
C...N...4...	1.74664	0.56344	4.19121
N...c...1...	3.50009	1.99537	3.25268
O...(...3...	5.49571	6.56076	5.8143
O...C...3...	3.93985	6.18648	5.19158
S...2...(...	0.56292	1.05806	4.2533
S...3.......	4.87644	1.37765	3.56695
S...C.......	7.5619	3.87285	9.68436
[...(...N...	4.99547	2.18844	4.93437
[...1...C...	6.81162	4.93607	4.12762
[...C...1...	6.00084	7.12307	3.37009
c...(...=...	5.68376	1.62585	5.1855
c...1...C...	3.56463	1.87979	1.56364
c...3...(...	1.12151	1.75484	4.12658
c...3...S...	8.05779	6.06431	4.99788
c...O...(...	9.3724	10.12541	10.24631
n...[...3...	1.87689	0.19239	1.00006
n...[...c...	10.49756	6.99812	8.99776
Promoters of inactivity			
EC0-1s1 3...	-0.50333	-0.6257	-0.50439
EC0-1s2 6...	-1.56228	-0.49711	-1.12477
EC0-2s2 6...	-1.2485	-0.25085	-1.24822
C...(.......	-0.69155	-1.05856	-1.49751
C..........	-0.62104	-0.74888	-1.24887
EC0-1s2 7...	-1.56137	-1.06428	-3.24543
EC0-2s2 7...	-1.93763	-1.06509	-1.12737
EC0-2s2 9...	-1.253	-0.6256	-0.74502
0	-1.62181	-2.25161	-1.06379
EC0-2s2 8...	-0.50478	-0.00266	-0.12322
O...(.......	-0.62116	-0.18555	-0.12702

2..........	-3.05843	-3.31602	-2.43841
C...C.......	-1.49835	-0.62396	-0.87007
EC0-2p3 7...	-1.68669	-1.05882	-1.62984
C...N...(...	-2.75406	-1.37538	-2.50488
EC0-2p4 6...	-0.43561	-1.62263	-1.62926
c...2.......	-0.87277	-1.12511	-1.06635
2...(.......	-3.31431	-4.00043	-2.00295
c...c...2...	-0.5002	-1.62532	-0.75487
[...C.......	-0.502	-0.49565	-0.99986
H..........	-1.12492	-0.37937	-1.31478
[...H.......	-1.49701	-0.05846	-0.44025
[...(.......	-0.37896	-0.75321	-1.12789
@..........	-0.74799	-0.87422	-1.87478
C...@.......	-2.18953	-0.50044	-2.37599
[...C...@...	-1.30832	-1.24889	-1.06698
EC0-1s2 12..	-2.99948	-2.74668	-2.25172
EC0-2s2 12..	-2.99507	-2.7506	-2.00028
@@..........	-0.93473	-0.24927	-1.81194
C...@@......	-0.12888	-0.62447	-1.62103
2...c...1...	-2.68777	-1.7463	-2.06045
c...O...C...	-1.0046	-1.75468	-1.871
3...(.......	-1.87461	-1.87567	-2.56447
O...c...1...	-2.37575	-1.37273	-1.62805
EC0-2p2 12..	-1.6855	-2.74796	-0.62025
C...2.......	-1.87611	-1.3719	-1.37065
C...C...2...	-2.69095	-2.43811	-2.87679
C...(...(...	-2.56312	-1.80924	-2.87101
[...C...C...	-1.31413	-0.93811	-0.74834
n...(.......	-2.37938	-1.37031	-2.44172
n...2.......	-2.69009	-2.05832	-1.94009
[...1.......	-1.25035	-1.25184	-0.18843
c...2...(...	-2.68822	-1.43318	-1.81659
1...C...(...	-8.87823	-5.25034	-6.25289
C...(...2...	-2.87219	-1.56216	-2.5044
C...[...(...	-0.75074	-1.37172	-2.06265
F...(.......	-2.62655	-0.87973	-2.37894
F..........	-0.75437	-1.93737	-1.68478
EC0-2p5 3...	-1.93406	-2.75149	-2.75136
[...(...O...	-4.37865	-5.30769	-3.25123
2...N...(...	-1.62303	-1.00085	-1.81012
C...3...(...	-6.62908	-5.00469	-6.18302
H...[...1...	-1.56586	-0.55942	-0.30866
N...2...C...	-1.9369	-1.62431	-2.69015
n...2...c...	-1.80762	-0.44085	-2.0593
++++F---S===	-1.31249	-2.87524	-1.93633
2...n...(...	-3.50466	-3.62345	-1.18952

C...=.......	-11.93888	-9.87308	-7.75134
Cl..........	-1.99829	-1.68899	-0.06095
N...(...1...	-8.49523	-5.18261	-7.56526
c...N.......	-1.50489	-1.7529	-1.93564
n...(...1...	-3.05753	-3.55966	-2.31232
n...2...(...	-3.81703	-2.81714	-3.55874
n...c...c...	-0.56637	-0.75383	-2.37915
(...Cl..(...	-1.81643	-3.43964	-3.31662
++++Cl--B2==	-2.99758	-2.68859	-2.37195
C...c...3...	-4.4371	-0.68906	-2.74741
F...(...C...	-2.37872	-1.62699	-3.56676
Cl..(.......	-2.9952	-2.9363	-1.81117
N...3.......	-3.06695	-2.68908	-2.68947
[...1...[...	-2.62841	-3.37703	-3.37568
c...n...c...	-2.94013	-2.18691	-2.43299
n...1...(...	-8.50107	-6.56739	-3.80886
$00111000000	-9.55904	-8.31335	-7.50258
$10011000100	-6.81736	-7.0665	-3.75431
(...F...(...	-1.80929	-2.49531	-2.18883
(...S...(...	-2.43978	-4.30893	-5.0635
1...N...(...	-3.56273	-3.62584	-3.62374
3...N...(...	-0.4993	-0.37112	-0.49804
@@..[...1...	-2.62418	-3.68406	-3.24979
C...=...(...	-5.87816	-7.00427	-6.24672
C...c...4...	-9.43679	-5.75113	-7.438
BOND00100000	-8.31416	-8.87522	-4.56219
F...(...(...	-2.1851	-3.25036	-3.75255
F...(...F...	-6.18604	-4.43592	-2.06053
EC0-2p3 11..	-2.62076	-0.18368	-1.4991
Cl..(...2...	-1.81404	-0.879	-2.31012
N...(...Cl..	-8.37225	-7.24913	-5.68985
S...2.......	-1.12348	-2.25208	-3.12332
[...(...2...	-3.1916	-1.18454	-2.93629
[...@@......	-2.87802	-0.74988	-0.87087
[...@@..C...	-0.31551	-0.56004	-2.0614
c...(...2...	-2.2482	-2.00003	-2.87898
c...3...N...	-4.74803	-2.69085	-5.50185
c...c...[...	-6.74628	-7.62265	-7.74617
n...c...3...	-2.37037	-2.93436	-2.74796

Supplementary Table 6. Statistics of the training and test set for the Bayesian classification models of hOCT2

Dataset	ROC score	ROC rating	True Positive	False Negative	False Positive	True Negative	Sensitivity	Specificity	Accuracy
Train	0.764	Fair	37	1	16	45	0.974	0.738	0.828
Test	0.571	Fail	11	1	8	5	0.917	0.385	0.640

Supplementary Table 7. Performance of various models by fivefold cross-validation for hOCT1 (BA=Balance accuracy; MCC=Matthew's correlation coefficient; SE=Sensitivity; SP=Specificity)

	ASNN TRAIN	ASNN TEST	KNN TRAIN	KNN TEST	WEKA RF TRAIN	WEKA RF TEST	XG BOOST TRAIN	XG BOOST TEST
E-state, ALogPS								
Accuracy	80% ± 3.0	76% ± 8.0	76% ± 3.0	68% ± 8.0	**85% ± 3.0**	**79% ± 7.0**	81% ± 3.0	74% ± 8.0
BA	80% ± 3.0	75% ± 7.0	74% ± 3.0	63% ± 7.0	**85% ± 3.0**	**78% ± 7.0**	81% ± 3.0	72% ± 7.0
MCC	0.61 ± 0.07	0.5 ± 0.1	0.52 ± 0.07	0.3 ± 0.2	**0.7 ± 0.06**	**0.6 ± 0.1**	0.63 ± 0.07	0.4 ± 0.1
AUC	0.879 ± 0.01	0.861 ± 0.01	0.808 ± 0.01	0.788 ± 0.01	**0.834 ± 0.01**	**0.735 ± 0.01**	0.897 ± 0.01	0.904 ± 0.01
SE	0.814	0.826	0.901	0.869	**0.839**	**0.826**	0.851	0.782
SP	0.791	0.666	0.582	0.4	**0.857**	**0.733**	0.771	0.666
GSFragment								
Accuracy	78% ± 3.0	79% ± 7.0	73% ± 4.0	74% ± 8.0	79% ± 3.0	71% ± 8.0	75% ± 3.0	71% ± 8.0
BA	78% ± 3.0	78% ± 7.0	72% ± 3.0	70% ± 8.0	79% ± 3.0	70% ± 8.0	75% ± 4.0	70% ± 7.0
MCC	0.56 ± 0.07	0.6 ± 0.1	0.47 ± 0.07	0.4 ± 0.2	0.57 ± 0.07	0.4 ± 0.2	0.51 ± 0.07	0.4 ± 0.1
AUC	0.804 ± 0.01	0.974 ± 0.01	0.775 ± 0.01	0.881 ± 0.01	0.742 ± 0.01	0.67 ± 0.01	0.823 ± 0.01	0.843 ± 0.01
SE	0.8024	0.826	0.888	0.869	0.802	0.739	0.777	0.739
SP	0.7571	0.7333	0.542	0.533	0.771	0.666	0.772	0.666
Dragon v. 7								
Accuracy	**85% ± 3.0**	**79% ± 7.0**	75% ± 3.0	76% ± 8.0	87% ± 3.0	74% ± 8.0	83% ± 3.0	76% ± 8.0
BA	**85% ± 3.0**	**79% ± 7.0**	74% ± 3.0	73% ± 8.0	87% ± 3.0	72% ± 8.0	83% ± 3.0	76% ± 8.0
MCC	**0.71 ± 0.06**	**0.6 ± 0.1**	0.52 ± 0.07	0.5 ± 0.2	0.75 ± 0.05	0.4 ± 0.1	0.67 ± 0.06	0.5 ± 0.2
AUC	**0.875 ± 0.01**	**0.783 ± 0.01**	0.821 ± 0.01	0.861 ± 0.01	0.84 ± 0.01	0.713 ± 0.01	0.837 ± 0.01	0.78 ± 0.01
SE	**0.888**	**0.7826**	0.888	0.869	0.876	0.782	0.826	0.782
SP	**0.8142**	**0.8**	0.6	0.6	0.871	0.666	0.785	0.733
ISIDA fragments								

Accuracy	**77% ± 3.0**	**82% ± 7.0**	74% ± 4.0	71% ± 8.0	77% ± 3.0	79% ± 5.0	74% ± 3.0	82% ± 5.0
BA	**77% ± 3.0**	**81% ± 7.0**	73% ± 4.0	68% ± 8.0	77% ± 3.0	78% ± 7.0	74% ± 3.0	81% ± 7.0
MCC	**0.54 ± 0.07**	**0.6 ± 0.1**	0.47 ± 0.07	0.4 ± 0.2	0.54 ± 0.07	0.6 ± 0.1	0.47 ± 0.07	0.6 ± 0.1
AUC	**0.858 ± 0.01**	**0.922 ± 0.01**	0.776 ± 0.01	0.799 ± 0.01	0.765 ± 0.01	0.735 ± 0.01	0.828 ± 0.01	0.948 ± 0.01
SE	**0.7283**	**0.826**	0.79	0.826	0.753	0.826	0.703	0.826
SP	**0.814**	**0.8**	0.671	0.533	0.785	0.733	0.771	0.8
CDK 2.0								
Accuracy	82% ± 3.0	73% ± 8.0	79% ± 3.0	73% ± 8.0	87% ± 3.0	76% ± 8.0	83% ± 3.0	70% ± 8.0
BA	82% ± 3.0	70% ± 8.0	78% ± 3.0	68% ± 8.0	87% ± 3.0	73% ± 8.0	83% ± 3.0	69% ± 8.0
MCC	0.64 ± 0.06	0.4 ± 0.2	0.57 ± 0.07	0.4 ± 0.2	0.74 ± 0.05	0.5 ± 0.2	0.66 ± 0.06	0.4 ± 0.2
AUC	0.904 ± 0.01	0.857 ± 0.01	0.785 ± 0.01	0.832 ± 0.01	0.826 ± 0.01	0.699 ± 0.01	0.821 ± 0.01	0.842 ± 0.01
SE	0.864	0.826	0.864	0.869	0.888	0.826	0.864	0.739
SP	0.768	0.571	0.695	0.5	0.855	0.642	0.797	0.642
Inductive								
Accuracy	77% ± 3.0	74% ± 8.0	72% ± 4.0	74% ± 8.0	83% ± 3.0	74% ± 8.0	79% ± 3.0	68% ± 7.0
BA	76% ± 3.0	71% ± 8.0	70% ± 4.0	69% ± 8.0	83% ± 3.0	71% ± 7.0	80% ± 3.0	65% ± 7.0
MCC	0.53 ± 0.07	0.4 ± 0.	0.43 ± 0.07	0.4 ± 0.2	0.66 ± 0.06	0.4 ± 0.1	0.59 ± 0.07	0.3 ± 0.2
AUC	0.815 ± 0.01	0.777 ± 0.01	0.795 ± 0.01	0.67 ± 0.01	0.779 ± 0.01	0.713 ± 0.01	0.844 ± 0.01	0.546 ± 0.01
SE	0.85	0.826	0.851	0.913	802	0.826	0.79	0.826
SP	0.671	0.6	0.557	0.466	0.857	0.6	0.8	0.466
MERA								
Accuracy	73% ± 4.0	74% ± 8.0	74% ± 4.0	71% ± 8.0	83% ± 3.0	71% ± 8.0	80% ± 3.0	74% ± 7.0
BA	73% ± 4.0	71% ± 8.0	72% ± 3.0	66% ± 7.0	82% ± 3.0	69% ± 8.0	80% ± 3.0	74% ± 8.0
MCC	0.46 ± 0.08	0.4 ± 0.2	0.51 ± 0.06	0.4 ± 0.2	0.65 ± 0.06	0.4 ± 0.2	0.6 ± 0.07	0.5 ± 0.1
AUC	0.761 ± 0.01	0.759 ± 0.01	0.744 ± 0.01	0.562 ± 0.01	0.768 ± 0.01	0.658 ± 0.01	0.784 ± 0.01	0.701 ± 0.01
SE	0.765	0.826	0.962	0.913	0.851	0.782	0.82	0.739
SP	0.695	0.6	0.478	0.4	0.797	0.6	0.797	0.733
MERSY								
Accuracy	54% ± 4.0	61% ± 8.0	52% ± 4.0	61% ± 8.0	54 ± 0.4	63 ± 8.0	52 ± 4.0	58 ± 8.0
BA	52% ± 3.0	52% ± 5.0	49% ± 3.0	52% ± 5.0	53 ± 4.0	58 ± 7.0	51 ± 4.0	55 ± 8.0
MCC	0.05 ±	0.07 ±	-0.01 ±	0.07 ±	0.06 ±	0.2 ±	0.03 ±	0.1 ±

	0.08	0.2	0.08	0.2	0.08	0.2	0.08	0.2
AUC	0.576 ± 0.01	0.675 ± 0.01	0.489 ± 0.01	0.558 ± 0.01	0.513 ± 0.01	0.57 ± 0.01	0.5 ± 0.01	0.641 ± 0.01
SE	0.827	0.913	0.802	0.913	0.604	0.826	0.543	0.695
SP	0.214	0.133	0.18	0.133	0.542	0.333	0.485	0.4
Chemaxon								
Accuracy	79% ± 3.0	76% ± 7.0	78% ± 3.0	84% ± 5.0	**87% ± 3.0**	**82% ± 5.0**	**89% ± 3.0**	**79% ± 7.0**
BA	79% ± 3.0	77% ± 7.0	78% ± 3.0	81% ± 7.0	**87% ± 3.0**	**80% ± 7.0**	**88% ± 3.0**	**78% ± 7.0**
MCC	0.57 ± 0.07	0.5 ± 0.1	0.56 ± 0.07	0.7 ± 0.1	**0.74 ± 0.05**	**0.6 ± 0.1**	**0.77 ± 0.05**	**0.6 ± 0.1**
AUC	0.852	0.878 ± 0.01	0.845 ± 0.01	0.772 ± 0.01	**0.843 ± 0.01**	**0.735 ± 0.01**	**0.929 ± 0.01**	**0.814 ± 0.01**
SE	0.79	0.739	0.851	0.956	**0.913**	**0.869**	**0.901**	**0.826**
SP	0.781	0.8	0.701	0.666	**0.823**	**0.7333**	**0.867**	**0.826**
QNPR								
Accuracy	77% ± 3.0	82% ± 5.0	81% ± 3.0	79% ± 8.0	85% ± 3.0	76% ± 7.0	79% ± 3.0	74% ± 8.0
BA	77% ± 3.0	82% ± 6.0	80% ± 3.0	77% ± 8.0	85% ± 3.0	76% ± 7.0	79% ± 3.0	72% ± 8.0
MCC	0.55 ± 0.07	0.6 ± 0.1	0.61 ± 0.07	0.6 ± 0.1	0.7 ± 0.06	0.5 ± 0.1	0.59% ± 0.07	0.4% ± 0.1
AUC	0.903 ± 0.01	0.928 ± 0.01	0.853 ± 0.01	0.852 ± 0.01	0.829 ± 0.01	0.735 ± 0.01	0.86% ± 0.01	0.823% ± 0.01
SE	0.814	0.782	0.864	0.869	0.839	0.72	0.814	0.782
SP	0.728	0.866	0.742	0.666	0.857	0.733	0.771	0.666
Spectrophores								
Accuracy	76% ± 3.0	82% ± 5.0	71% ± 4.0	71% ± 8.0	74% ± 3.0	82% ± 5.0	68% ± 4.0	82% ± 5.0
BA	76% ± 3.0	79% ± 7.0	70% ± 4.0	69% ± 8.0	74% ± 4.0	80% ± 6.0	68% ± 4.0	82% ± 6.0
MCC	0.53 ± 0.07	0.6 ± 0.1	0.41 ± 0.07	0.4 ± 0.2	0.49 ± 0.07	0.6 ± 0.1	0.35 ± 0.07	0.6 ± 0.1
AUC	0.763 ± 0.01	0.933 ± 0.01	0.724 ± 0.01	0.741 ± 0.01	0.721 ± 0.01	0.768 ± 0.01	0.71 ± 0.01	0.852 ± 0.01
SE	0.74	0.913	0.765	0.782	0.716	0.869	0.654	0.782
SP	0.785	0.666	0.642	0.6	0.771	0.733	0.7	0.866

Supplementary Table 8. Performance of various models by fivefold cross-validation for hOCT1 (BA=Balance accuracy; MCC=Matthew's correlation coefficient; SE=Sensitivity; SP=Specificity)

	ASNN TRAIN	ASNN TEST	KNN TRAIN	KNN TEST	WEKA RF TRAIN	WEKA RF TEST	XG BOOST TRAIN	XG BOOST TEST
E-state, ALogPS								
Accuracy	69% ± 5.0	60% ± 10.0	57% ± 5.0	61% ± 9.0	72% ± 4.0	61% ± 9.0	64% ± 5.0	60% ± 10.0
BA	67% ± 5.0	60% ± 10.0	55% ± 5.0	64% ± 8.0	71% ± 4.0	60% ± 10.0	61% ± 5.0	60% ± 10.0
MCC	0.34 ± 0.1	0.1 ± 0.2	0.1 ± 0.1	0.3 ± 0.2	0.42 ± 0.09	0.2 ± 0.2	0.23 ± 0.1	0.2 ± 0.2
AUC	0.783 ± 0.01	0.675 ± 0.01	0.577 ± 0.01	0.694 ± 0.01	0.691 ± 0.01	0.583 ± 0.01	0.731 ± 0.01	0.684 ± 0.01
SE	0.575	0.5	0.425	0.9	0.6	0.6	0.5	0.5
SP	0.7627	0.6	0.672	0.384	0.81	0.61	0.728	0.66
GSFragment								
Accuracy	70% ± 4.0	64% ± 8.0	57% ± 5.0	50% ± 10.0	71% ± 5.0	68% ± 8.0	62% ± 5.0	64% ± 8.0
BA	70% ± 4.0	67% ± 9.0	58% ± 5.0	53% ± 9.0	69% ± 5.0	70% ± 9.0	61% ± 5.0	60% ± 10.0
MCC	0.39 ± 0.09	0.3 ± 0.2	0.15 ± 0.1	0.08 ± 0.2	0.39 ± 0.1	0.4 ± 0.2	0.22 ± 0.1	0.3 ± 0.2
AUC	0.791 ± 0.01	0.868 ± 0.01	0.643 ± 0.01	0.627 ± 0.01	0.728 ± 0.01	0.816 ± 0.01	0.786 ± 0.01	1 ± 0.01
SE	0.7	0.8	0.625	0.8	0.6	0.8	0.6	0.7
SP	0.6949	0.533	0.525	0.266	0.779	0.6	0.627	0.6
Dragon v. 7								
Accuracy	69% ± 5.0	60% ± 8.0	66% ± 5.0	56% ± 8.0	74% ± 4.0	68% ± 8.0	67% ± 5.0	60% ± 8.0
BA	66% ± 5.0	60% ± 10.0	66% ± 5.0	60% ± 9.0	72% ± 4.0	70% ± 10.0	67% ± 5.0	60% ± 10.0
MCC	0.34 ± 0.1	0.2 ± 0.2	0.3 ± 0.1	0.2 ± 0.2	0.45 ± 0.09	0.4 ± 0.2	0.34 ± 0.09	0.2 ± 0.2
AUC	0.778 ± 0.01	0.789 ± 0.01	0.781 ± 0.01	0.667 ± 0.01	0.728 ± 0.01	0.675 ± 0.01	0.787 ± 0.01	0.737 ± 0.01
SE	0.55	0.5	0.65	0.8	0.625	0.7	0.7	0.5
SP	0.779	0.666	0.661	0.4	0.813	0.66	0.644	0.66
ISIDA fragments								
Accuracy	69% ± 5.0	72% ± 8.0	57% ± 5.0	50% ± 10.0	77% ± 4.0	72% ± 8.0	71% ± 4.0	64% ± 8.0
BA	67% ± 5.0	73% ± 9.0	58% ± 5.0	53% ± 9.0	75% ± 4.0	73% ± 9.0	69% ± 5.0	60% ± 10.0
MCC	0.34 ± 0.1	0.5 ± 0.2	0.1 ± 0.1	0.08 ± 0.2	0.51 ± 0.09	0.5 ± 0.2	0.38 ± 0.09	0.3 ± 0.2
AUC	0.657 ± 0.01	0.798 ± 0.01	0.643 ± 0.01	0.627 ± 0.01	0.728 ± 0.01	0.675 ± 0.01	0.724 ± 0.01	0.702 ± 0.01

SE	0.575	0.8	0.625	0.8	0.675	0.8	0.575	0.6
SP	0.76	0.66	0.525	0.266	0.83	0.66	0.79	0.66
CDK 2.0								
Accuracy	72% ± 5.0	74% ± 9.0	61% ± 5.0	70% ± 9.0	**73% ± 4.0**	**78% ± 9.0**	71% ± 5.0	57% ± 9.0
BA	70% ± 5.0	73% ± 9.0	59% ± 5.0	68% ± 10.0	**71% ± 5.0**	**77% ± 9.0**	70% ± 5.0	55% ± 10.0
MCC	0.4 ± 0.09	0.5 ± 0.2	0.2 ± 0.1	0.4 ± 0.2	**0.43 ± 0.1**	**0.6 ± 0.2**	0.39 ± 0.1	0.1 ± 0.2
AUC	0.747 ± 0.01	0.958 ± 0.01	0.693 ± 0.01	0.719 ± 0.01	**0.799 ± 0.01**	**0.771 ± 0.01**	0.753 ± 0.01	0.854 ± 0.01
SE	0.6	0.7	0.5	0.6	**0.625**	**0.7**	0.65	0.4
SP	0.79	0.769	0.677	0.66	**0.796**	**0.846**	0.745	0.692
Inductive								
Accuracy	70% ± 5.0	60% ± 10.0	70% ± 5.0	52% ± 10.0	72% ± 5.0	60% ± 10.0	63% ± 5.0	50% ± 10.0
BA	67% ± 5.0	60% ± 10.0	67% ± 5.0	50% ± 10.0	70% ± 5.0	60% ± 10.0	61% ± 5.0	50% ± 10.0
MCC	0.36 ± 0.1	0.1 ± 0.2	0.36 ± 0.1	0 ± 0.2	0.41 ± 0.1	0.2 ± 0.2	0.23 ± 0.1	0 ± 0.2
AUC	0.825 ± 0.01	0.737 ± 0.01	0.803 ± 0.01	0.588 ± 0.01	0.748 ± 0.01	0.618 ± 0.01	0.718 ± 0.01	0.421 ± 0.01
SE	0.55	0.6	0.55	0.4	0.625	0.5	0.55	0.4
SP	0.796	0.53	0.796	0.6	0.7796	0.66	0.677	0.6
MERA								
Accuracy	73% ± 4.0	64% ± 8.0	63% ± 5.0	56% ± 8.0	69% ± 4.0	64% ± 8.0	70% ± 4.0	60% ± 8.0
BA	73% ± 5.0	62% ± 10.0	65% ± 5.0	60% ± 10.0	68% ± 5.0	63% ± 10.0	68% ± 5.0	60% ± 10.0
MCC	0.45 ± 0.09	0.2 ± 0.2	0.29 ± 0.09	0.2 ± 0.2	0.37 ± 0.09	0.3 ± 0.2	0.38 ± 0.09	0.2 ± 0.2
AUC	0.889 ± 0.01	0.737 ± 0.01	0.747 ± 0.01	0.566 ± 0.01	0.728 ± 0.01	0.566 ± 0.01	0.792 ± 0.01	0.842 ± 0.01
SE	0.67	0.5	0.725	0.7	0.625	0.6	0.575	0.5
SP	0.775	0.733	0.568	0.466	0.741	0.66	0.793	0.66
MERSY								
Accuracy	68% ± 5.0	68% ± 8.0	64% ± 5.0	68% ± 8.0	64% ± 5.0	60% ± 10.0	62% ± 5.0	64% ± 10.0
BA	67% ± 5.0	70% ± 9.0	63% ± 5.0	70% ± 10.0	62% ± 5.0	60% ± 10.0	62% ± 5.0	65% ± 10.0
MCC	0.33 ± 0.09	0.4 ± 0.2	0.26 ± 0.1	0.3 ± 0.2	0.2 ± 0.1	0.2 ± 0.2	0.2 ± 0.1	0.3 ± 0.2
AUC	0.783 ± 0.01	0.833 ± 0.01	0.669 ± 0.01	0.921 ± 0.01	0.568 ± 0.01	0.754 ± 0.01	0.689 ± 0.01	0.833 ± 0.01
SE	0.625	0.8	0.6	0.6	0.55	0.5	0.625	0.7
SP	0.711	0.6	0.661	0.733	0.694	0.66	0.61	0.6
Chemaxon								
Accuracy	69% ± 5.0	62% ± 8.0	62% ± 5.0	50% ± 10.0	**70% ± 5.0**	**75% ± 8.0**	63% ± 5.0	40% ± 10.0

BA	68% ± 5.0	60% ± 10.0	60% ± 5.0	60% ± 10.0	**69% ± 5.0**	**73% ± 9.0**	62% ± 5.0	40% ± 10.0
MCC	0.37 ± 0.1	0.2 ± 0.2	0.2 ± 0.1	0.1 ± 0.2	**0.38 ± 0.1**	**0.5 ± 0.2**	0.24 ± 0.1	-0.2 ± 0.2
AUC	0.762 ± 0.01	0.577 ± 0.01	0.65 ± 0.01	0.487 ± 0.01	**0.761 ± 0.01**	**0.635 ± 0.01**	0.702 ± 0.01	0.333 ± 0.01
SE	0.625	0.6	0.5	0.6	**0.6**	**0.6**	0.55	0.4
SP	0.741	0.642	0.706	0.5	**0.775**	**0.857**	0.689	0.428
QNPR								
Accuracy	**65% ± 5.0**	**72% ± 8.0**	65% ± 5.0	56% ± 10.0	74% ± 5.0	64% ± 8.0	69% ± 5.0	48% ± 8.0
BA	**63% ± 5.0**	**70% ± 10.0**	66% ± 5.0	60% ± 9.0	72% ± 5.0	63% ± 10.0	67% ± 5.0	50% ± 10.0
MCC	**0.26 ± 0.1**	**0.4 ± 0.2**	0.32 ± 0.09	0.2 ± 0.2	0.45 ± 0.09	0.3 ± 0.2	0.34 ± 0.1	0 ± 0.2
AUC	**0.701 ± 0.01**	**0.605 ± 0.01**	0.631 ± 0.01	0.618 ± 0.01	0.674 ± 0.01	0.592 ± 0.01	0.731 ± 0.01	0.557 ± 0.01
SE	**0.55**	**0.6**	0.75	0.8	0.65	0.6	0.575	0.6
SP	**0.711**	**0.8**	0.576	0.4	0.796	0.66	0.762	0.4
Spectrophores								
Accuracy	**70% ± 5.0**	**68% ± 8.0**	57% ± 5.0	52% ± 10.0	67% ± 5.0	64% ± 8.0	60% ± 5.0	68% ± 8.0
BA	**67% ± 5.0**	**67% ± 10.0**	54% ± 5.0	50% ± 10.0	62% ± 5.0	60% ± 10.0	56% ± 5.0	68% ± 10.0
MCC	**0.4 ± 0.1**	**0.3 ± 0.2**	0.08 ± 0.1	0.03 ± 0.2	0.3 ± 0.1	0.2 ± 0.2	0.12 ± 0.1	0.4 ± 0.2
AUC	**0.792 ± 0.01**	**0.833 ± 0.01**	0.694 ± 0.01	0.478 ± 0.01	0.682 ± 0.01	0.509 ± 0.01	0.659 ± 0.01	0.596 ± 0.01
SE	**0.55**	**0.6**	0.4	0.5	0.4	0.5	0.35	0.7
SP	**0.796**	**0.733**	0.677	0.533	0.847	0.733	0.762	0.66

Supplementary Table 9. List of predicted compound from consensus modelling

NAME	hOCT2	hOCT1
Prucalopride	-	yes
Amifampridine	yes	-
Stiripentol	yes	-
Migalastat	yes	-
Palonosterone	yes	-
Secnidazole	yes	yes
Benzinidazole	yes	yes
Meropenam	yes	-
Edaravone	yes	-
Flucuclovine	yes	-
Brivaracetam	yes	yes
Tipiracil	yes	yes
Uridine Triacetate	yes	-

Supplementary Table 10. Docking score with interaction of 5 FDA drugs which may act as possible substrates for hOCT1

<table>
<tr><th>No.</th><th>Tetraethylammonium (TEA)</th><th>Mitochondrial processing peptidase (MPP+)</th></tr>
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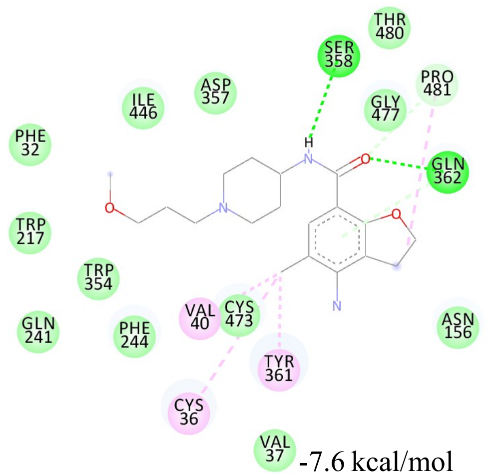
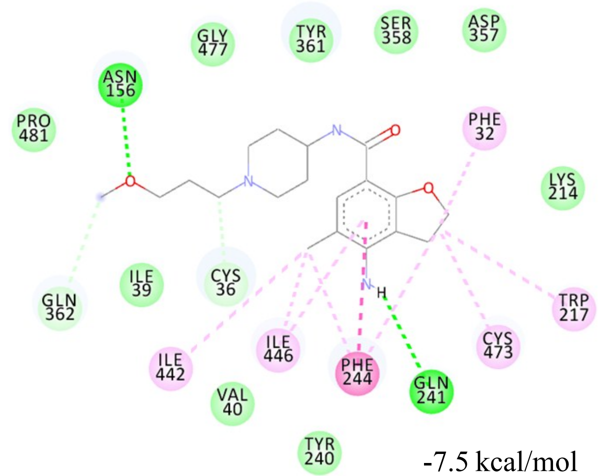
</td></tr>
<tr><td>Prucalopride</td><td>

-7.6 kcal/mol</td><td>

-7.5 kcal/mol</td></tr>
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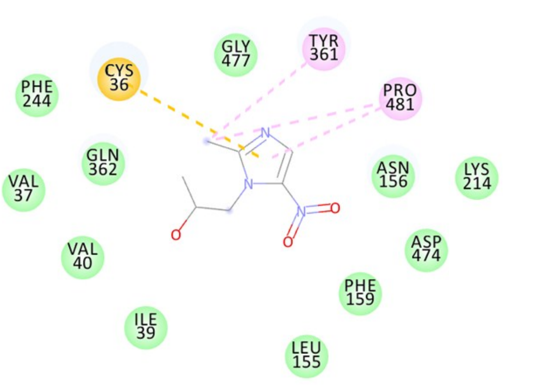
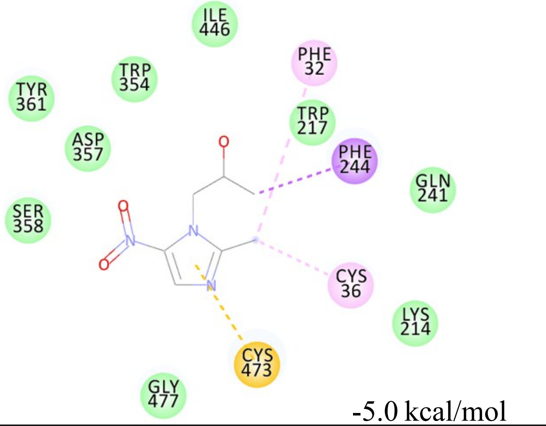
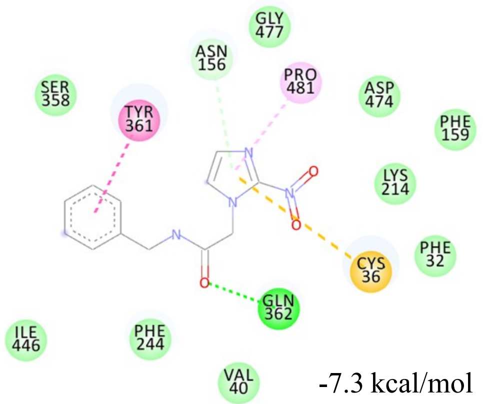
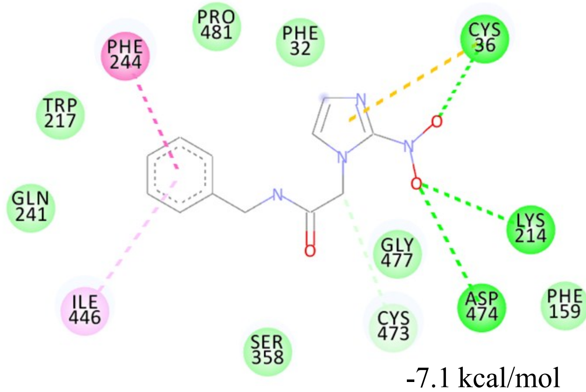
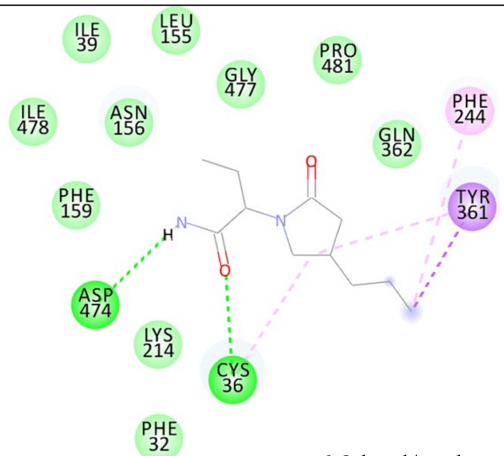
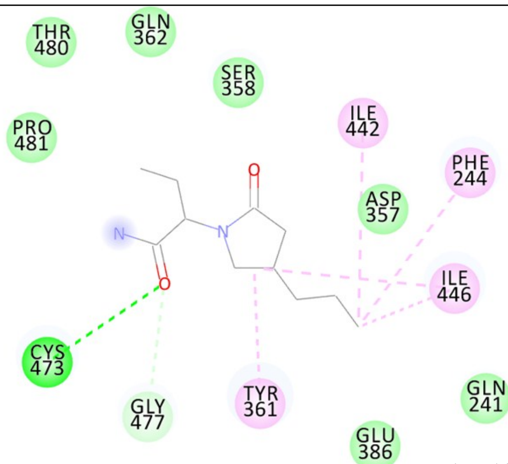
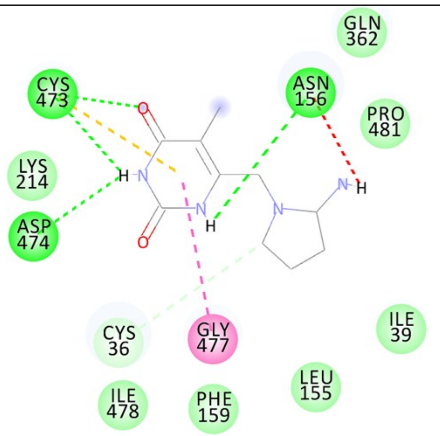
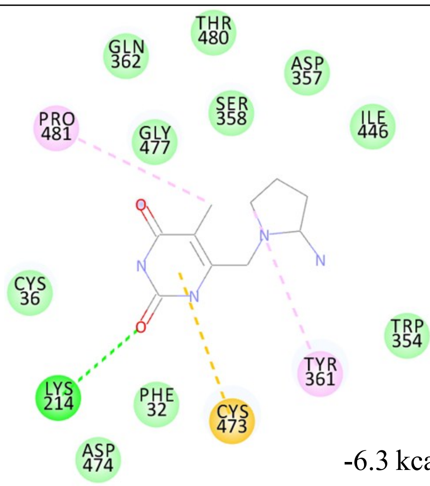
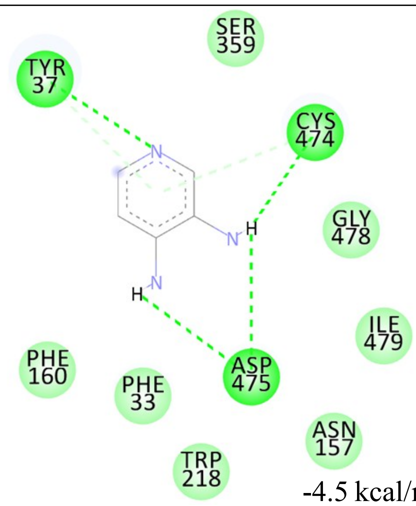
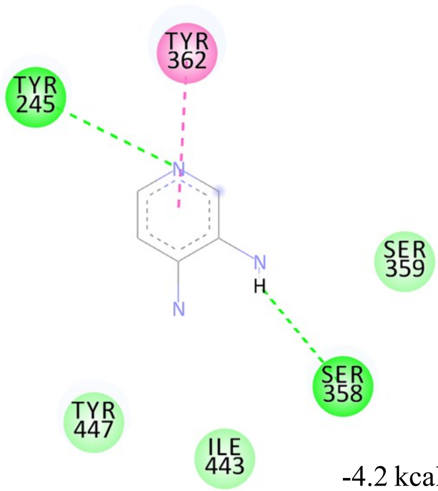
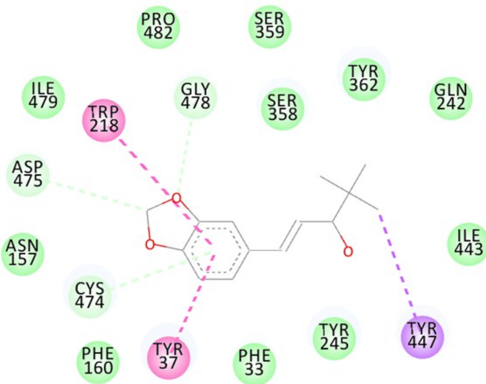
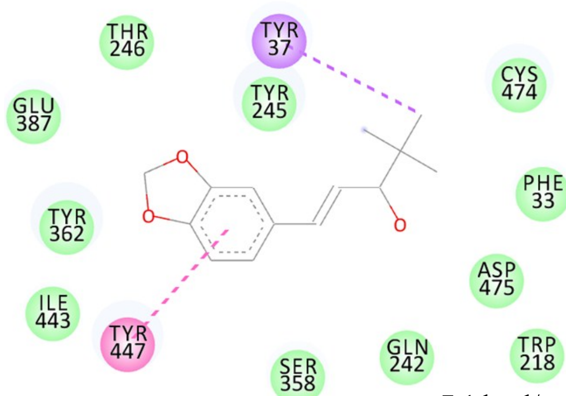
Secnidazole	 -5.0 kcal/mol	 -5.0 kcal/mol
Benzinidazole	 -7.3 kcal/mol	 -7.1 kcal/mol
Brivaracetam	 -6.2 kcal/mol	 -6.0 kcal/mol

Tipiracil	 -6.7 kcal/mol	 -6.3 kcal/mol

Supplementary Table 11. Docking score with interaction of 12 FDA drugs which may act as possible substrates for hOCT2

No.	Tetraethylammonium (TEA)	Mitochondrial processing peptidase (MPP+)
Amifampridine	 -4.5 kcal/mol	 -4.2 kcal/mol
Stiripentol	 -7.4 kcal/mol	 -7.1 kcal/mol

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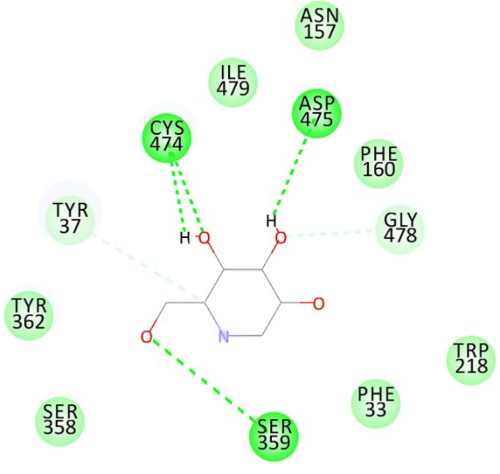
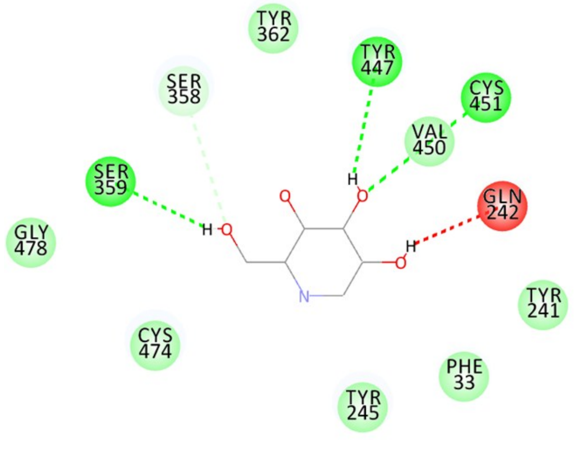
<td>

-5.2 kcal/mol</td>
<td>

-5.2 kcal/mol</td>
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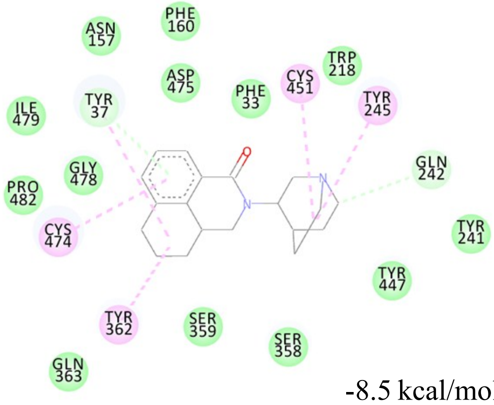
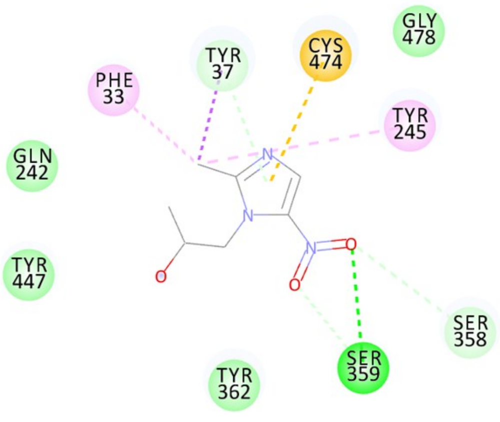
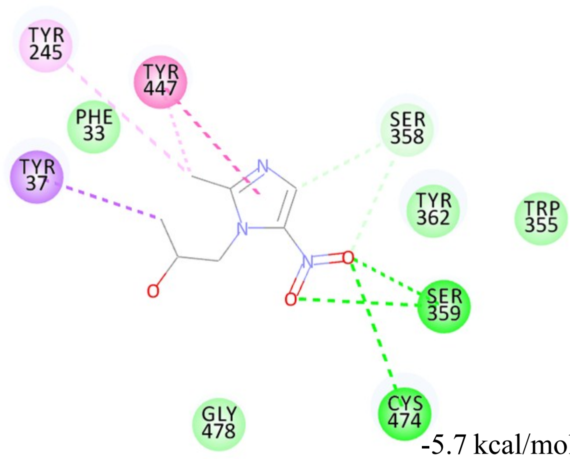
<tr>
<td>Palonosterone</td>
<td>

-8.5 kcal/mol</td>
<td>-</td>
</tr>
<tr>
<td>Secnidazole</td>
<td>

-5.6 kcal/mol</td>
<td>

-5.7 kcal/mol</td>
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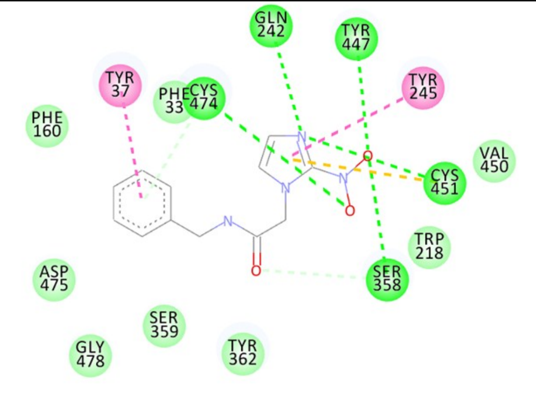
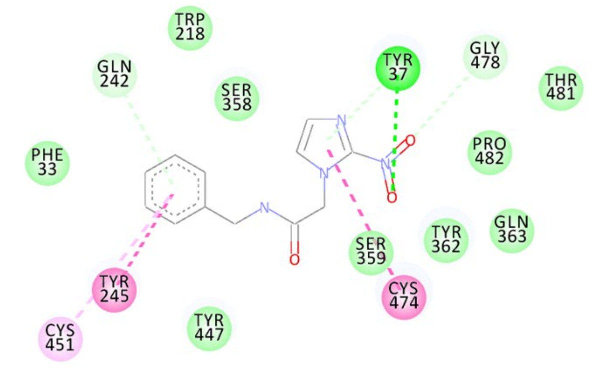
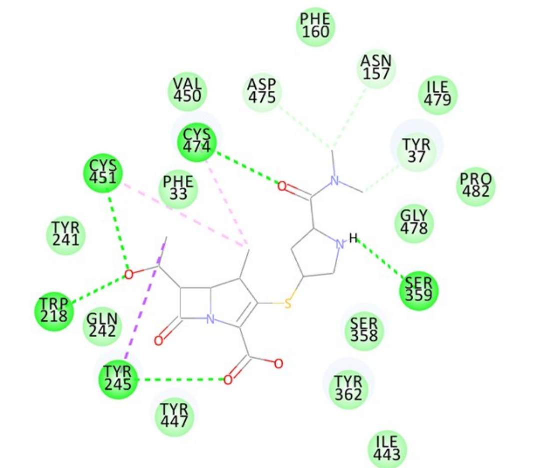
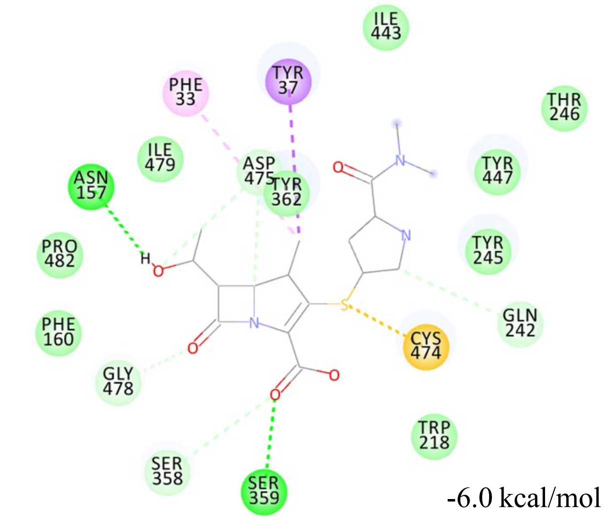
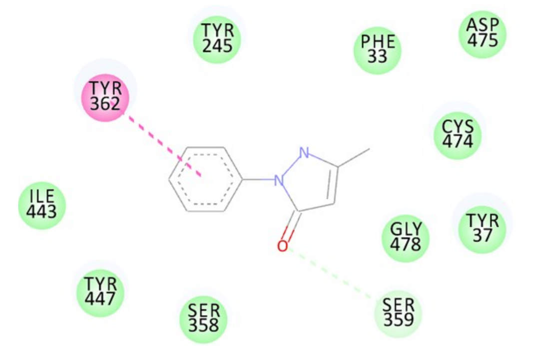
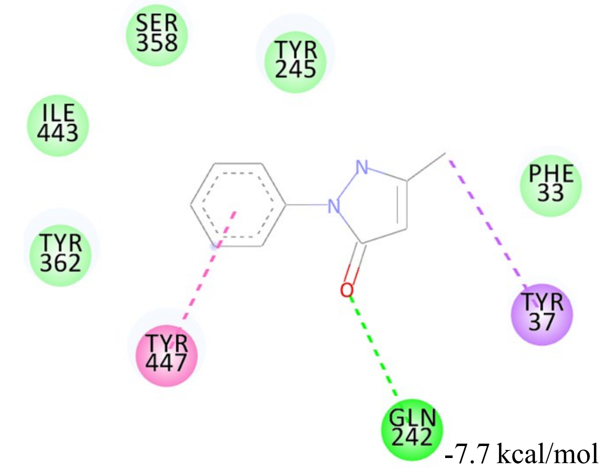
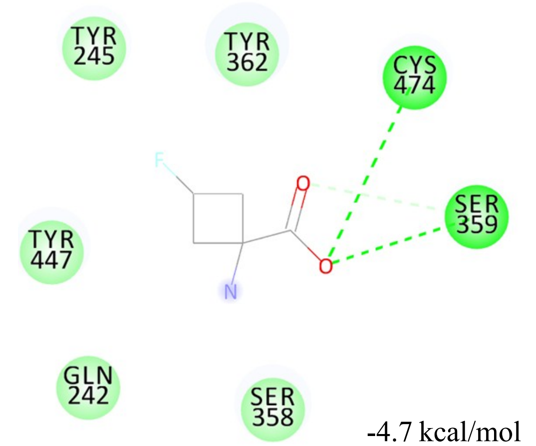
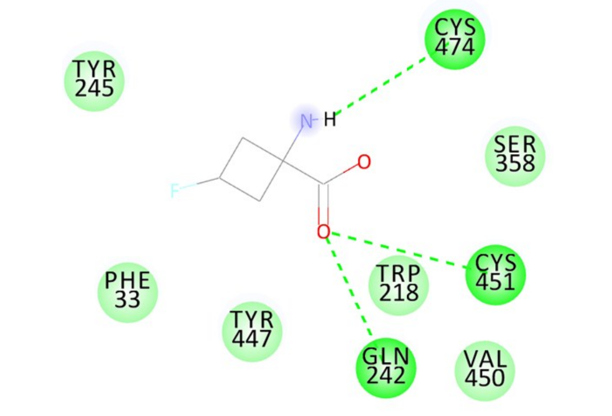
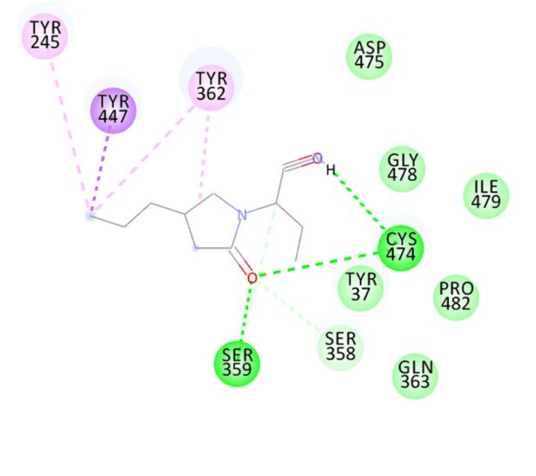
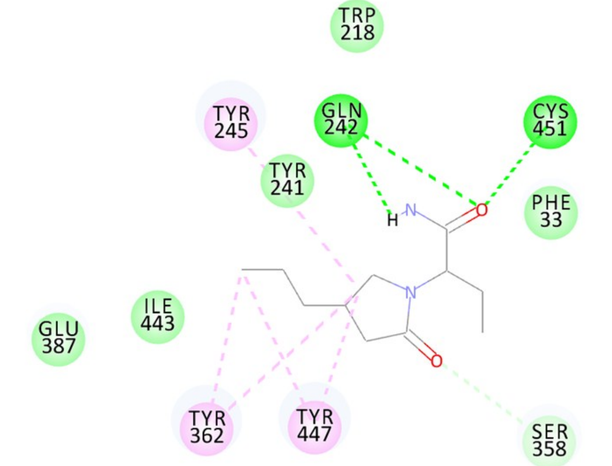
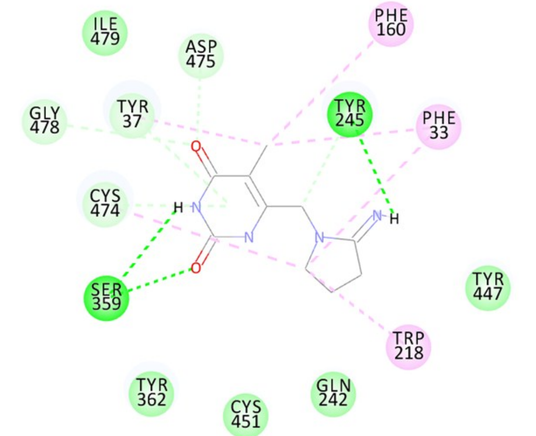
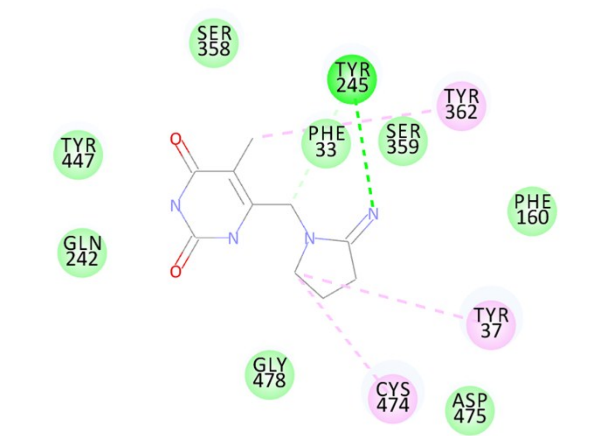
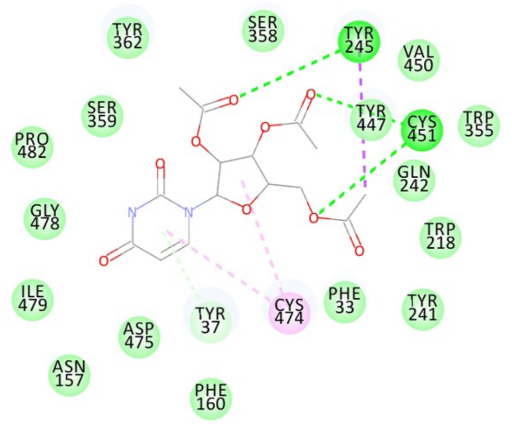
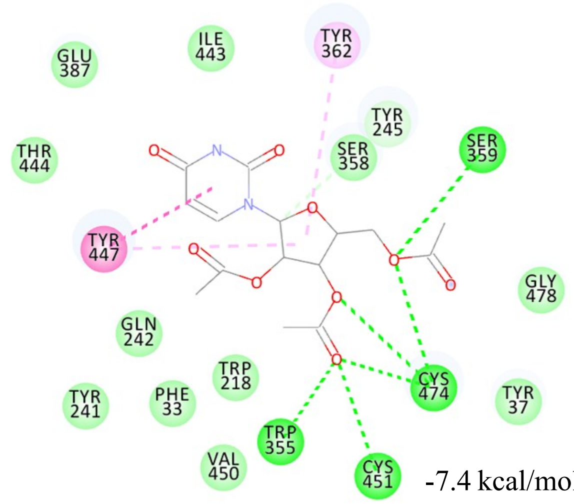
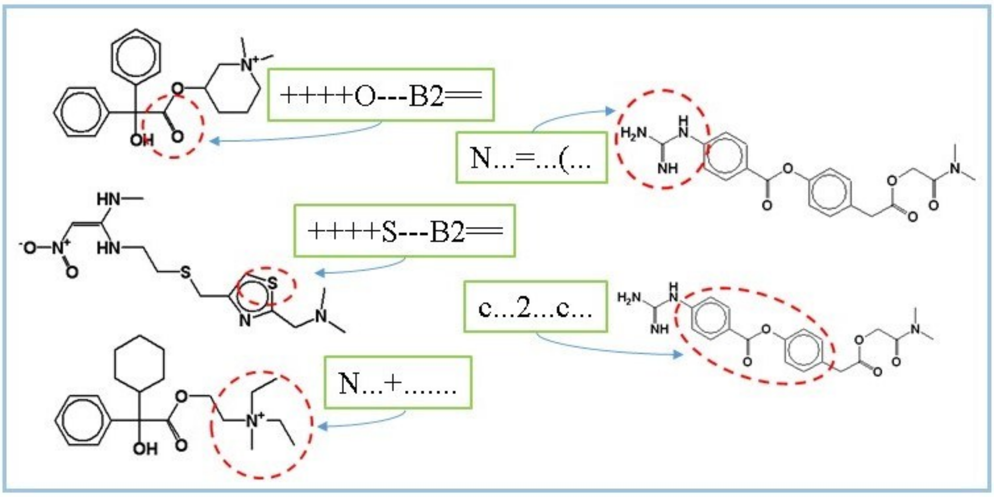
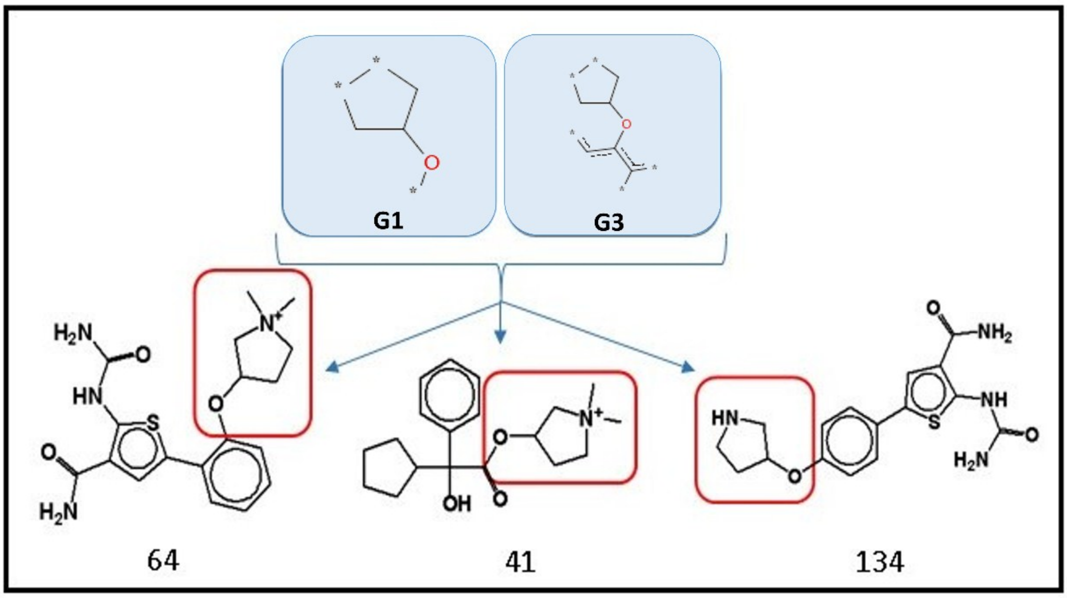
Benzinidazole	 -8.0 kcal/mol	 -7.7 kcal/mol
Meropenam	 -6.8 kcal/mol	 -6.0 kcal/mol
Edaravone	 -6.9 kcal/mol	 -7.7 kcal/mol

Flucuclovine	 -4.7 kcal/mol	 -4.6 kcal/mol
Brivaracetam	 -6.9 kcal/mol	 -6.9 kcal/mol
Tipiracil	 -6.9 kcal/mol	 -6.7 kcal/mol

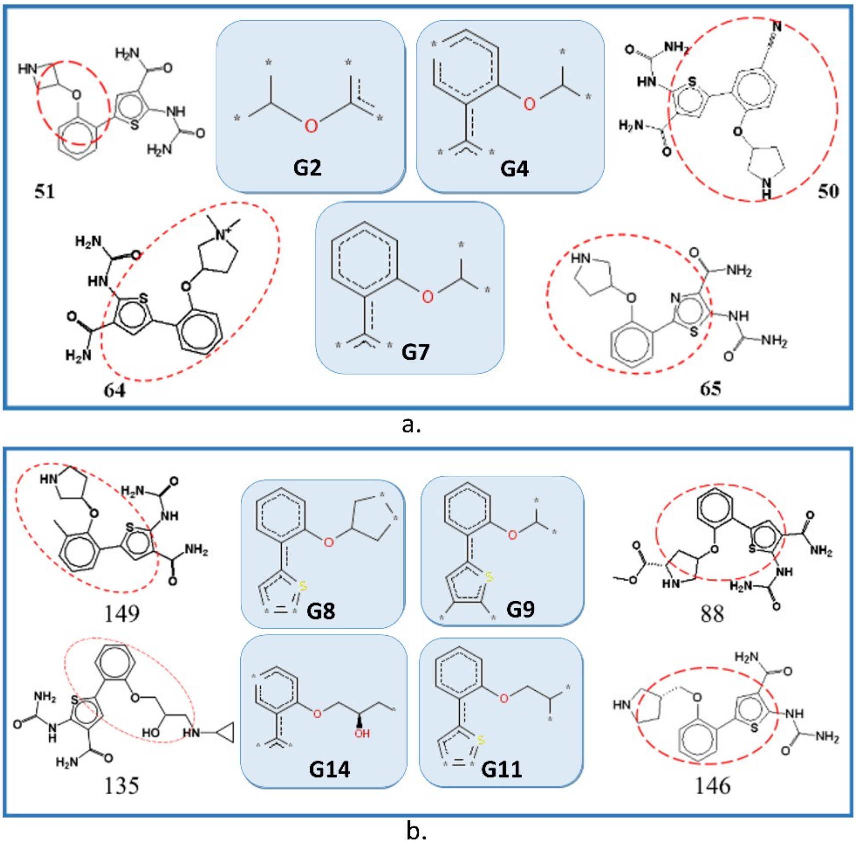
Uridine Triacetate	 -7.2 kcal/mol	 -7.4 kcal/mol



Supplementary Figure 1. Promoters for increase of hOCT1 substrate activity

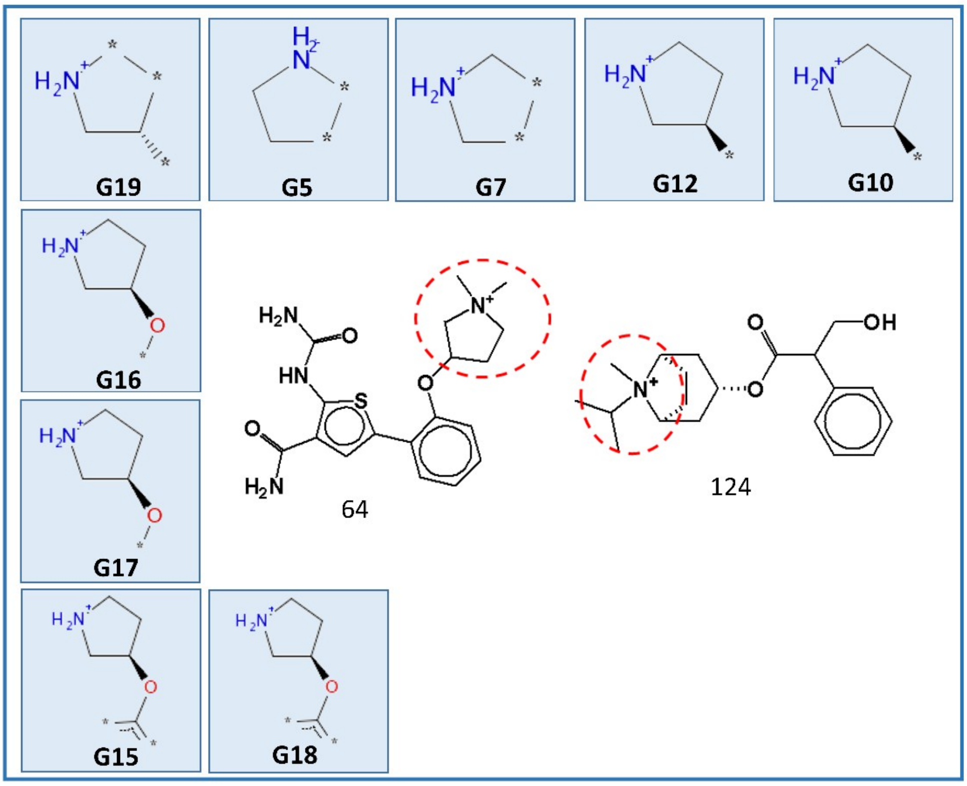


Supplementary Figure 2. Good fingerprint G1 and G3 for hOCT1

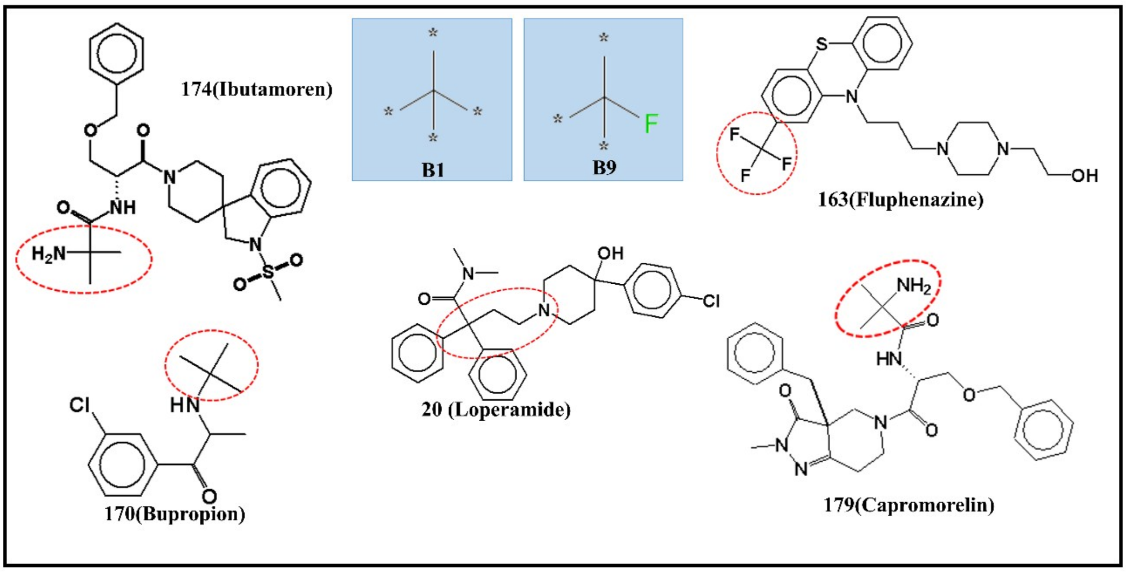


Supplementary Figure 3. a) Good fingerprint G2,G4 and G7 for hOCT1

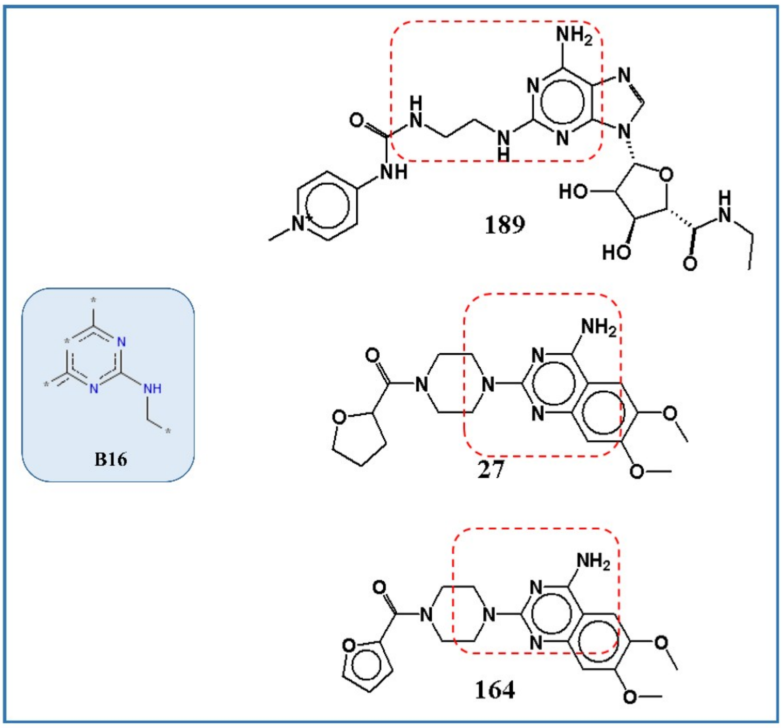
b) Examples representing fingerprint G8, G9, G11 and G14 for hOCT1



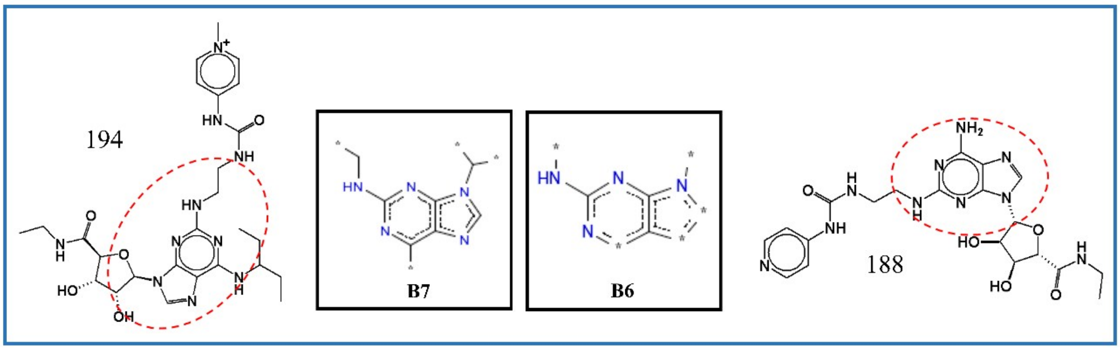
Supplementary Figure 4. Good fingerprint G5, G7, G10, G12, G15, G16, G17, G18, and G19 for hOCT1



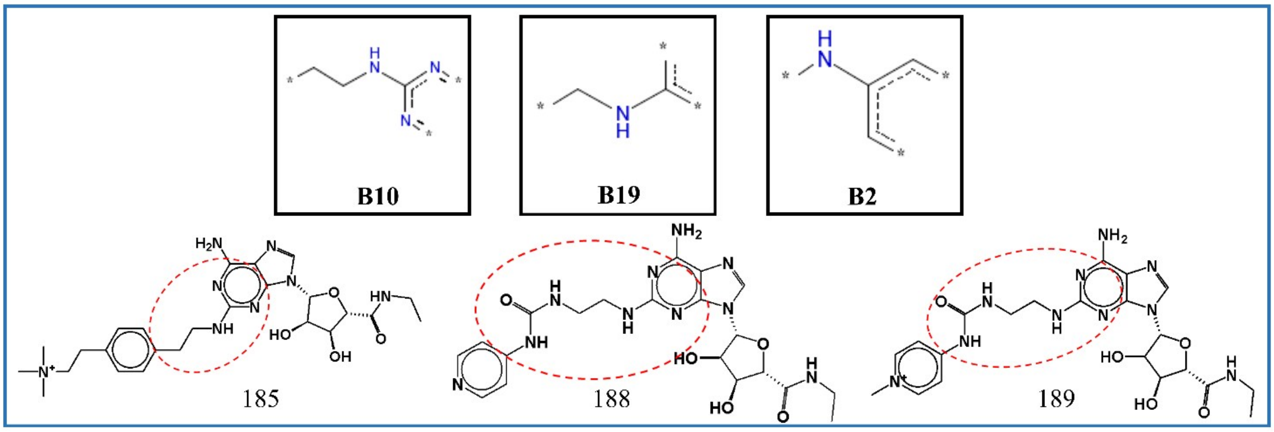
Supplementary Figure 5. Bad fingerprint B1 and B9 for hOCT1



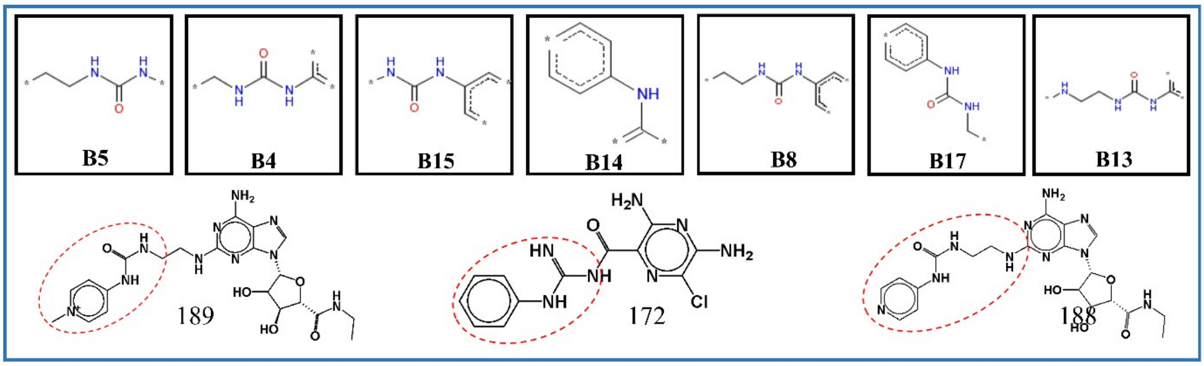
Supplementary Figure 6. Bad fingerprint B16 for hOCT1



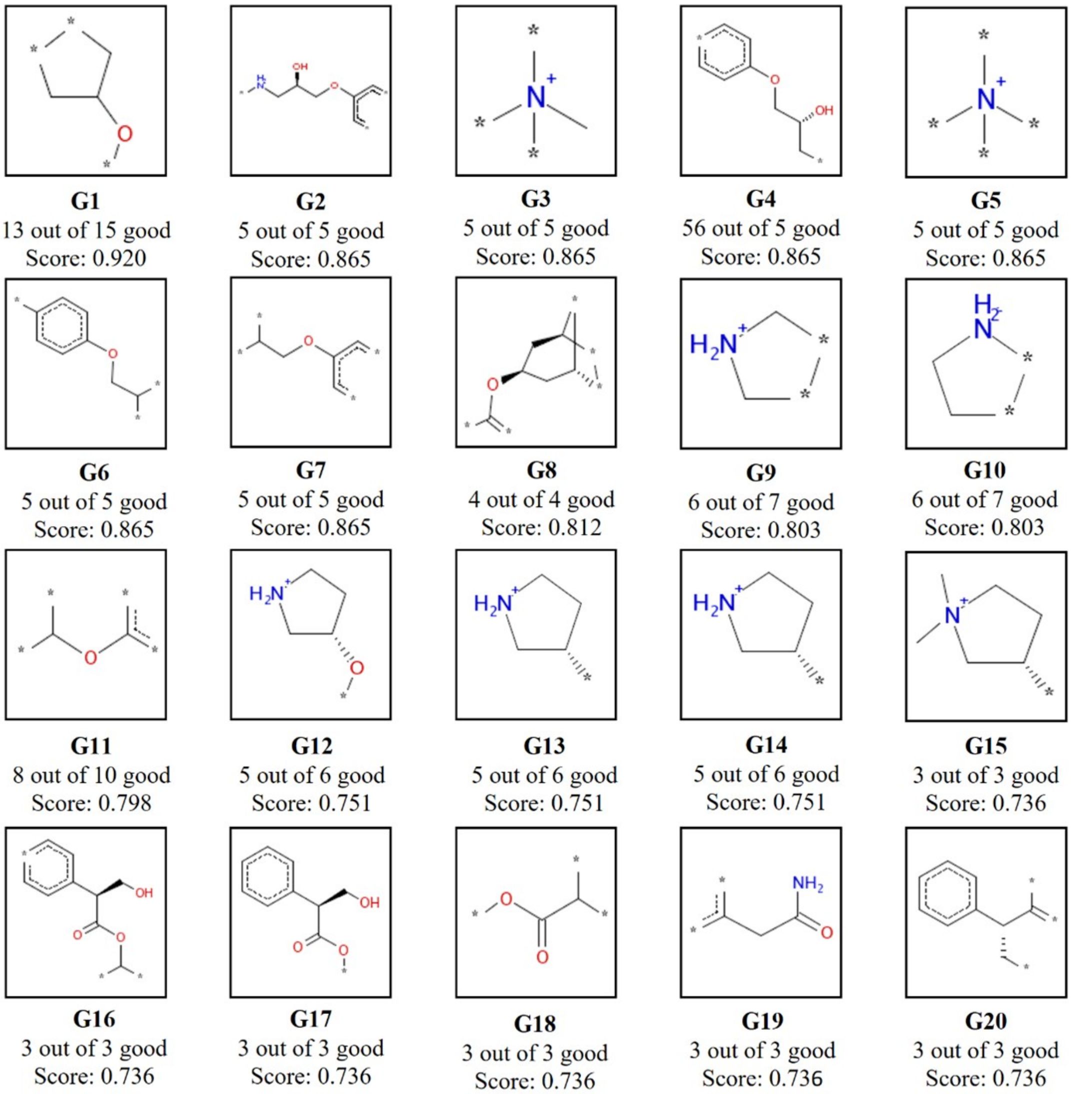
Supplementary Figure 7. Bad fingerprint B6 and B7 for hOCT1



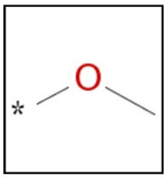
Supplementary Figure 8. Bad fingerprint B2, B10, and B19 for hOCT1



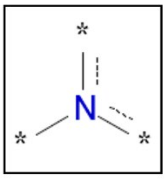
Supplementary Figure 9. Bad fingerprint B4, B5, B8, B13, B14, B15, and B17 for hOCT1



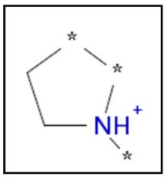
Supplementary Figure 10. Good molecular fingerprints for substrate of hOCT1 and hOCT2 from Bayesian classification



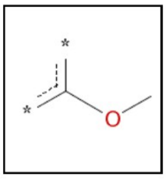
B1
0 out of 13 good
Score: -1.603



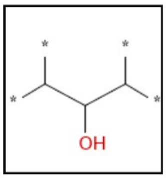
B2
0 out of 10 good
Score: -1.399



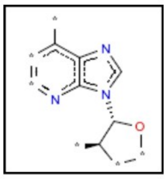
B3
0 out of 9 good
Score: -1.321



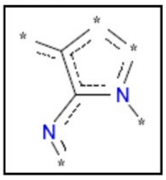
B4
0 out of 9 good
Score: -1.321



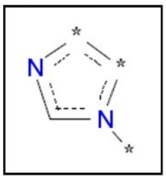
B5
0 out of 9 good
Score: -1.321



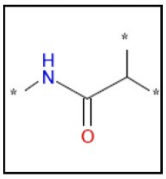
B6
0 out of 8 good
Score: -1.236



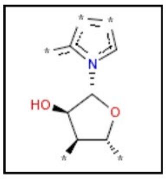
B7
0 out of 8 good
Score: -1.236



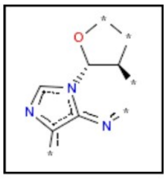
B8
0 out of 8 good
Score: -1.236



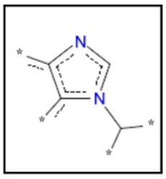
B9
0 out of 8 good
Score: -1.236



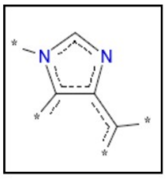
B10
0 out of 8 good
Score: -1.236



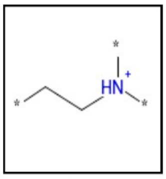
B11
0 out of 8 good
Score: -1.236



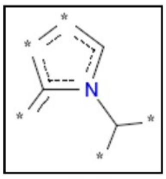
B12
0 out of 8 good
Score: -1.236



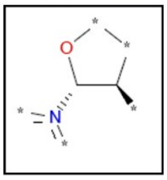
B13
0 out of 8 good
Score: -1.236



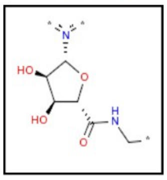
B14
0 out of 8 good
Score: -1.236



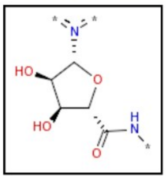
B15
0 out of 8 good
Score: -1.236



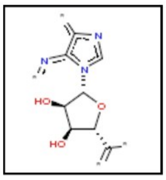
B16
0 out of 8 good
Score: -1.236



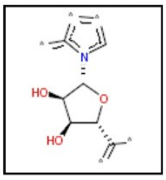
B17
0 out of 7 good
Score: -1.143



B18
0 out of 7 good
Score: -1.143

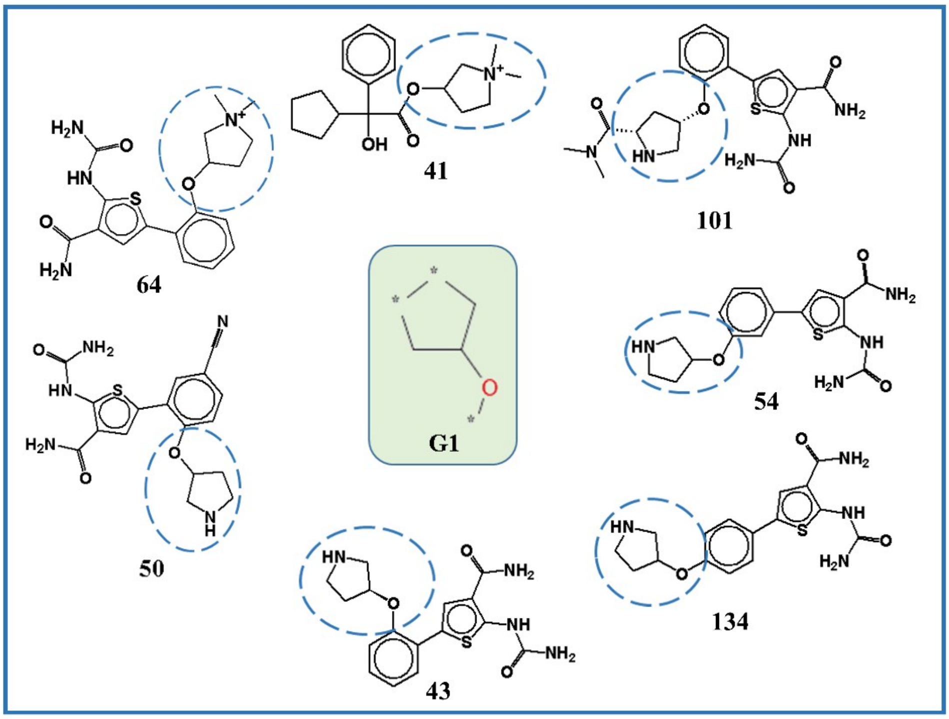


B19
0 out of 7 good
Score: -1.143

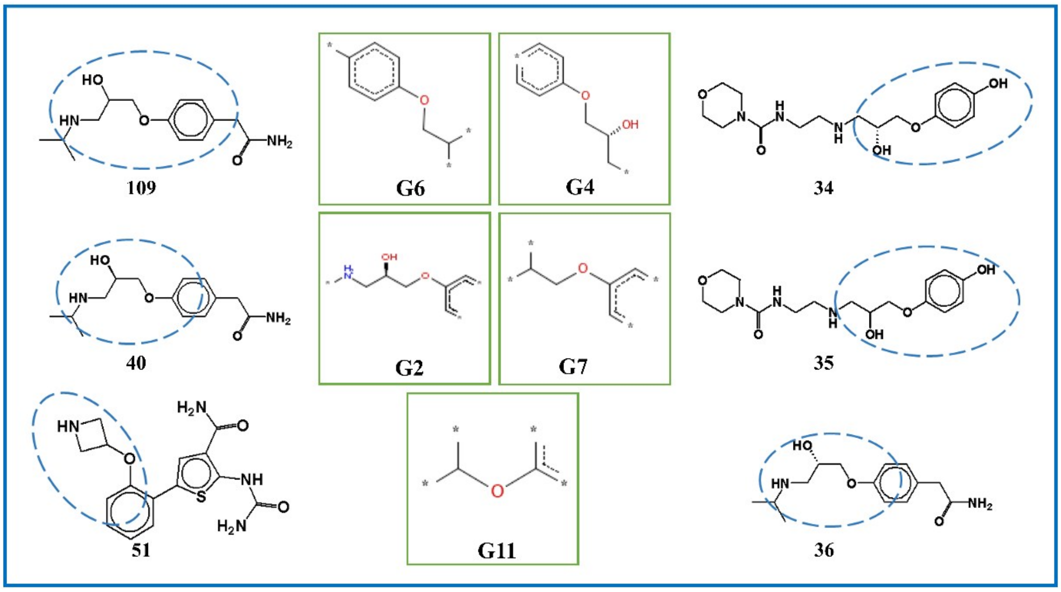


B20
0 out of 7 good
Score: -1.143

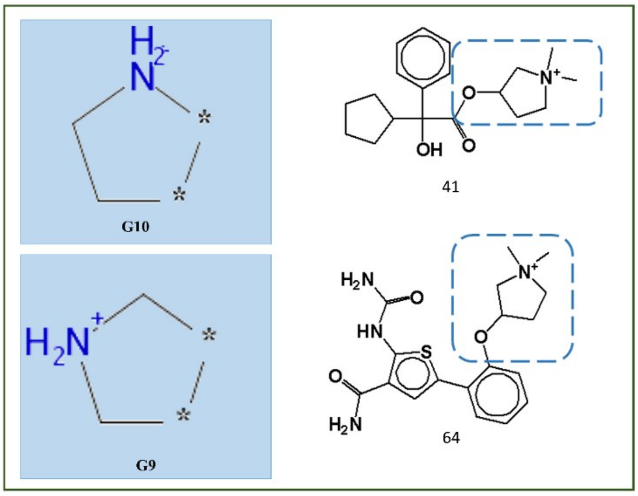
Supplementary Figure 11. Bad molecular fingerprints for non-substrate of hOCT1 and hOCT2 from Bayesian classification



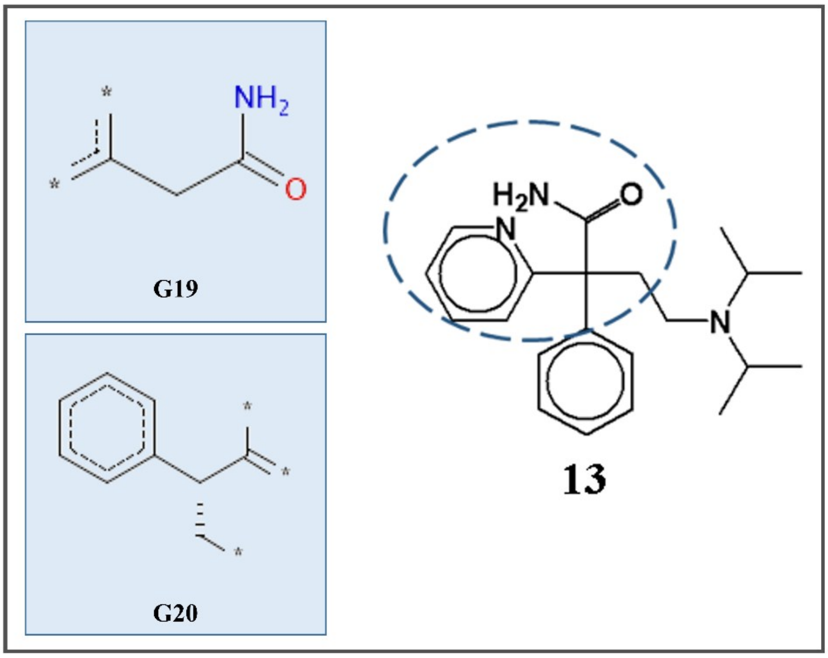
Supplementary Figure 12. Good fingerprint G1 for combined hOCT1 and hOCT2



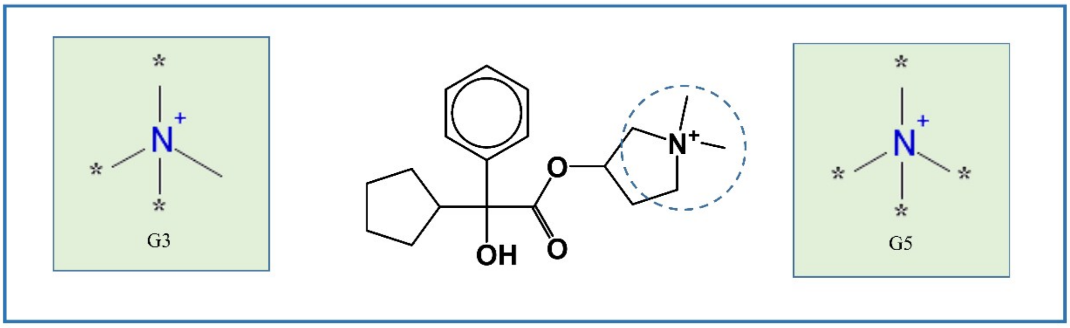
Supplementary Figure 13. Good fingerprint G2, G4, G6, G7, and G11 for combined hOCT1 and hOCT2



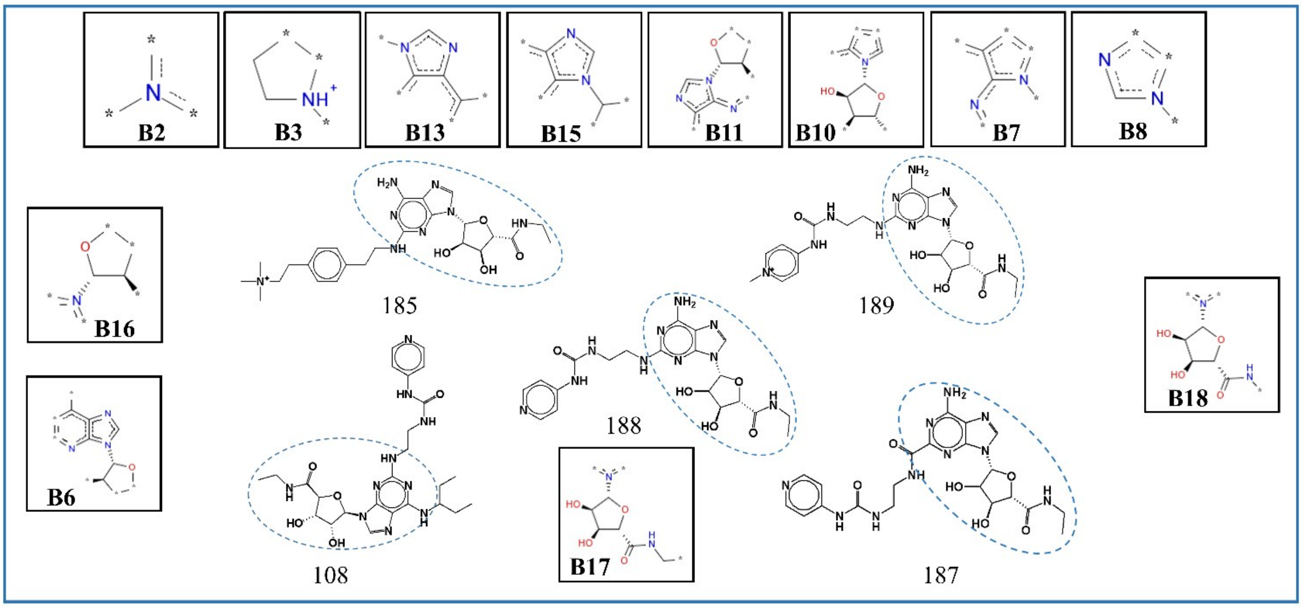
Supplementary Figure 14. Good fingerprint G9 and G10 for combined hOCT1 and hOCT2



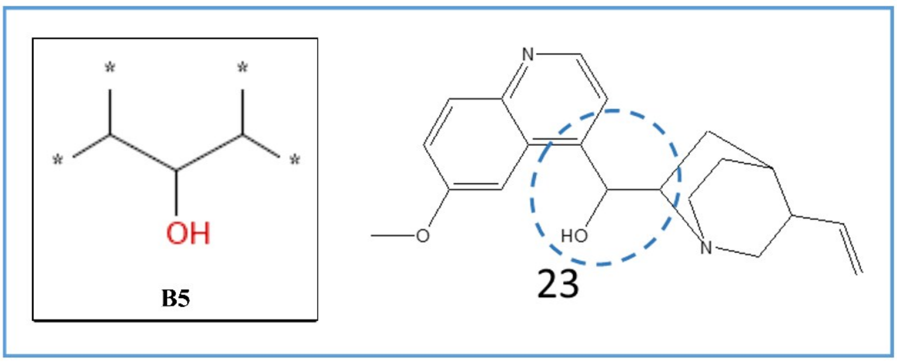
Supplementary Figure 15. Good fingerprint G19, and G20 for combined hOCT1 and hOCT2



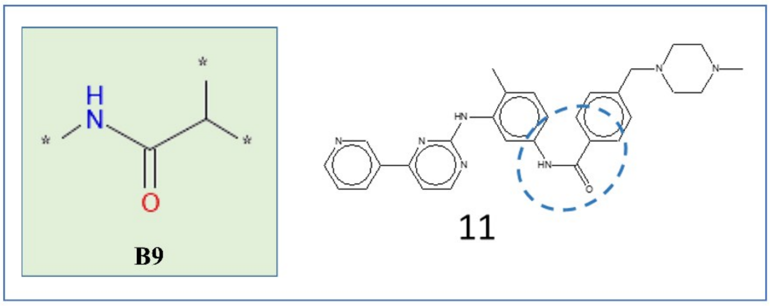
Supplementary Figure 16. Good fingerprint G3 and G5 for combined hOCT1 and hOCT2



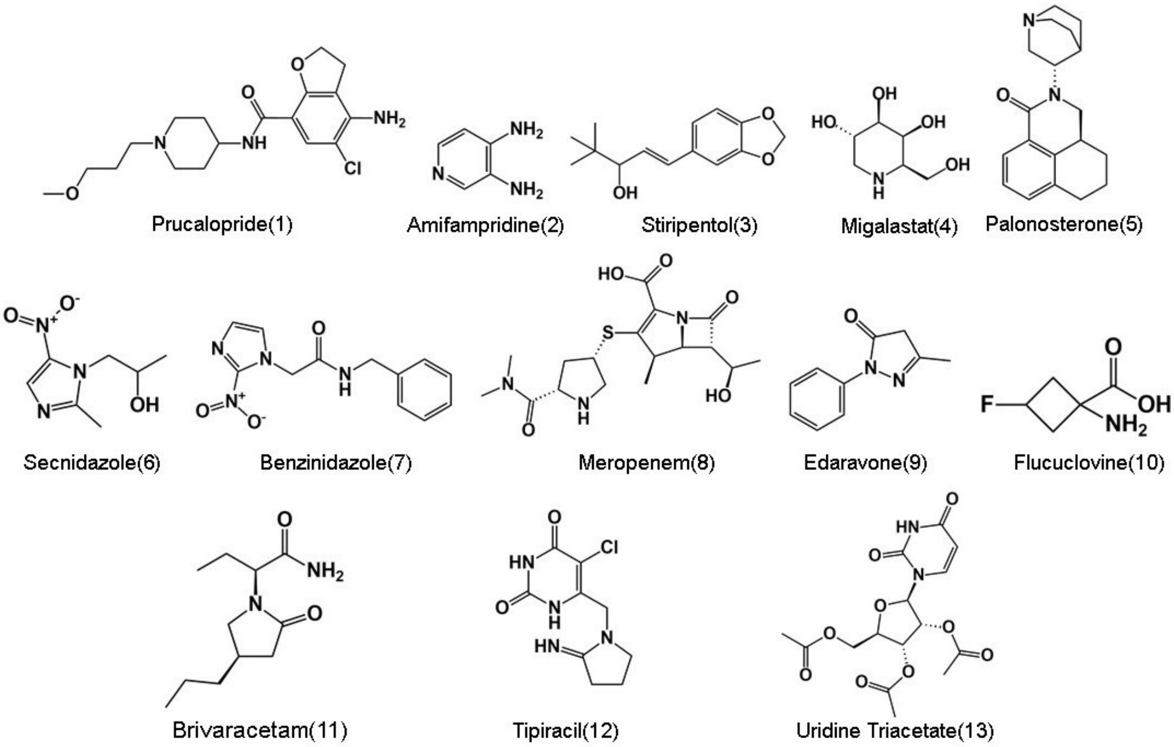
Supplementary Figure 17. Bad fingerprint B2, B3, B6, B7, B8, B10, B11, B13, B15, B16, B17, and B18 for combined hOCT1 and hOCT2



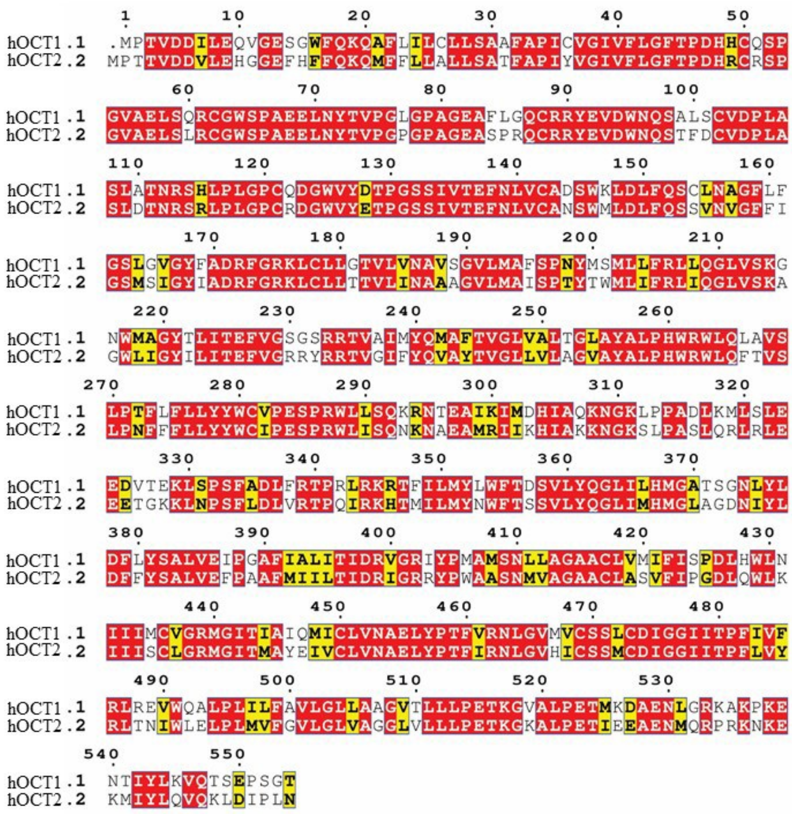
Supplementary Figure 18. Bad fingerprint B5 for combined hOCT1 and hOCT2



Supplementary Figure 19. Bad fingerprint B9 for combined hOCT1 and hOCT2



Supplementary Figure 20. Structure of possible hOCT substrates.



Supplementary Figure 21. Sequence alignment for hOCT1 and hOCT2