Article

A one-dimensional semaglutide-GLP-1R-based mini static GIBAC: supplementary information

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Abstract: Drug-target binding is an essential parameter in drug discovery and design to ensure drug efficacy and specificity. In 2022, the concept of a general intermolecular binding affinity calculator (GIBAC) was for the first time coined: $K_d = f(molecules, envPara)$. Technically, GIBAC represents a set of in silico approaches for structural and biophysical data generation towards a paradigm shift in precise drug discovery and design, providing a comprehensive framework for intermolecular binding affinity calculation with adequate accuracy, precision and efficiency. For the first time, this study reports a prototype of GIBAC (semaGIBAC), i.e., a one-dimensional semaglutide-GLP-1R-based mini static GIBAC, based on an experimental complex structure of semaglutide and GLP-1R. Semaglutide is a potent GLP-1 receptor agonist used to treat type 2 diabetes mellitus by regulating blood glucose levels and promoting weight loss. In 2021, a structural modification involving a Val27-Arg28 exchange was manually introduced to enhance semaglutide-GLP-1R binding affinity. This study employs a comprehensive structural and biophysical analysis aimed at thoroughly exploring the sequence space of semaglutide-GLP-1R to design analogues with improved binding affinity, leading to the identification of a promising semaglutide analogue, which binds to GLP-1R with an affinity that is more than two orders of magnitude (113.3 times) higher than native semaglutide. To sum up, this article puts forward a promising structural biophysical approach for developing GLP-1 receptor agonists with enhanced efficacy, and with a GIBAC prototype (semaGIBAC), this article argues again that the time is now ripe for the construction of a real GIBAC to be listed on the agenda of the drug discovery and design community.

Keywords: GIBAC; Intermolecular binding affinity (K_d); Structural biophysics; Synthetic data; Drug discovery & design;

Intermolecular interactions are the fabrics underlying almost all processes in living organisms [1–8].

1. Supplementary information

No.	Mutation	Mean	Std	Min	Max
1	I20B_N	7.560E-07	1.686E-07	4.800E-07	1.200E-06
2	I20B_Q	7.620E-07	2.477E-07	4.100E-07	1.300E-06
3	I20B_S	8.600E-07	2.739E-07	5.700E-07	1.600E-06
4	I20B_T	8.645E-07	2.210E-07	5.700E-07	1.300E-06
5	V24B_N	1.397E-06	3.222E-07	7.300E-07	2.000E-06
6	V24B_Q	1.417E-06	4.108E-07	7.000E-07	2.400E-06
7	L23B_N	1.496E-06	3.469E-07	9.200E-07	2.100E-06
8	L23B_R	1.515E-06	2.889E-07	1.100E-06	2.100E-06
9	V24B_T	1.570E-06	4.014E-07	1.000E-06	2.400E-06
10	L23B_Q	1.605E-06	3.859E-07	1.000E-06	2.500E-06

11	A15B_N	1.605E-06	3.689E-07	7.900E-07	2.400E-06
12	S9B_C	1.610E-06	3.243E-07	1.100E-06	2.300E-06
13	L23B_S	1.625E-06	2.633E-07	1.300E-06	2.100E-06
14	A15B_Q	1.625E-06	3.932E-07	1.000E-06	2.600E-06
15	A15B_S	1.650E-06	3.818E-07	1.000E-06	2.400E-06
16	E12B_Y	1.661E-06	3.210E-07	9.200E-07	2.100E-06
17	I20B_H	1.673E-06	4.304E-07	9.700E-07	2.600E-06
18	I20B_R	1.675E-06	3.823E-07	1.000E-06	2.500E-06
19	L23B_T	1.725E-06	3.210E-07	1.100E-06	2.300E-06
20	V24B_S	1.725E-06	4.598E-07	1.100E-06	2.900E-06
21	S9B_W	1.741E-06	5.343E-07	7.300E-07	2.900E-06
22	S9B_Y	1.755E-06	4.236E-07	1.200E-06	2.900E-06
23	G26B_H	1.780E-06	3.694E-07	1.200E-06	2.600E-06
24	I20B_E	1.791E-06	3.558E-07	9.300E-07	2.500E-06
25	G26B_W	1.793E-06	5.558E-07	9.200E-07	2.900E-06
26	E12B_W	1.843E-06	7.056E-07	6.700E-07	3.600E-06
27	K17B_S	1.858E-06	6.393E-07	8.700E-07	3.100E-06
28	K17B_T	1.858E-06	4.722E-07	9.500E-07	2.800E-06
29	V24B_H	1.865E-06	4.017E-07	1.100E-06	2.700E-06
30	L23B_H	1.870E-06	3.246E-07	1.400E-06	2.500E-06
31	I20B_K	1.890E-06	3.796E-07	1.400E-06	2.700E-06
32	F19B_N	1.900E-06	5.712E-07	1.000E-06	2.900E-06
33	L23B_E	1.905E-06	3.052E-07	1.300E-06	2.600E-06
34	G26B_Y	1.915E-06	4.859E-07	1.300E-06	3.000E-06
35	L23B_D	1.915E-06	5.294E-07	1.100E-06	3.300E-06
36	V24B_K	1.919E-06	5.426E-07	8.800E-07	3.100E-06
37	E12B_C	1.938E-06	4.869E-07	9.600E-07	3.100E-06
38	L23B_K	1.945E-06	4.863E-07	7.900E-07	2.800E-06
39	K17B_N	1.970E-06	5.440E-07	1.100E-06	3.100E-06
40	F19B_Q	1.978E-06	8.295E-07	9.500E-07	4.700E-06
41	S9B_P	2.055E-06	5.643E-07	1.000E-06	3.100E-06
42	V24B_D	2.055E-06	4.729E-07	1.100E-06	2.800E-06
43	V24B_R	2.070E-06	6.705E-07	1.000E-06	3.200E-06
44	S9B_F	2.110E-06	3.726E-07	1.500E-06	2.800E-06
45	S9B_G	2.115E-06	4.534E-07	1.300E-06	3.200E-06
46	A15B_H	2.120E-06	4.456E-07	1.600E-06	3.100E-06
47	F19B_W	2.135E-06	5.613E-07	1.100E-06	3.000E-06
48	G13B_W	2.135E-06	5.133E-07	1.300E-06	3.600E-06
49	K17B_Q	2.165E-06	6.635E-07	1.100E-06	3.600E-06
50	E12B_M	2.165E-06	5.659E-07	1.200E-06	3.300E-06
51	S9B_V	2.180E-06	5.961E-07	1.300E-06	3.500E-06

52	E12B_I	2.185E-06	5.631E-07	1.500E-06	4.100E-06
53	G26B_K	2.185E-06	7.802E-07	1.200E-06	3.700E-06
54	S9B_L	2.200E-06	6.249E-07	1.600E-06	4.300E-06
55	G13B_H	2.210E-06	7.826E-07	1.400E-06	4.200E-06
56	V24B_E	2.210E-06	5.389E-07	1.400E-06	3.600E-06
57	V24B_W	2.225E-06	4.962E-07	1.300E-06	3.000E-06
58	G26B_E	2.225E-06	6.560E-07	1.200E-06	3.900E-06
59	G13B_Y	2.240E-06	4.935E-07	1.300E-06	3.400E-06
60	I20B_D	2.240E-06	6.541E-07	1.100E-06	3.700E-06
61	A16B_R	2.244E-06	9.937E-07	9.800E-07	5.100E-06
62	G1B_H	2.245E-06	5.934E-07	1.200E-06	3.500E-06
63	A15B_R	2.260E-06	3.979E-07	1.600E-06	3.100E-06
64	A15B_T	2.265E-06	6.923E-07	1.100E-06	3.500E-06
65	R27B_Q	2.282E-06	7.830E-07	8.400E-07	3.600E-06
66	G26B_R	2.285E-06	8.093E-07	1.300E-06	4.600E-06
67	G26B_C	2.285E-06	4.738E-07	1.800E-06	3.700E-06
68	L11B_T	2.285E-06	4.760E-07	1.400E-06	3.400E-06
69	S9B_I	2.288E-06	7.720E-07	9.600E-07	4.300E-06
70	G13B_C	2.290E-06	5.581E-07	1.300E-06	3.700E-06
71	V7B_T	2.290E-06	4.494E-07	1.800E-06	3.500E-06
72	A21B_S	2.300E-06	5.292E-07	1.300E-06	3.500E-06
73	S9B_A	2.315E-06	5.994E-07	1.600E-06	3.800E-06
74	E18B_S	2.325E-06	7.217E-07	1.200E-06	4.000E-06
75	S9B_M	2.325E-06	6.766E-07	1.400E-06	3.800E-06
76	E12B_F	2.340E-06	4.957E-07	1.500E-06	3.300E-06
77	A21B_Y	2.345E-06	3.900E-07	1.600E-06	3.000E-06
78	L11B_S	2.350E-06	4.359E-07	1.300E-06	3.100E-06
79	F19B_H	2.355E-06	6.645E-07	1.300E-06	4.500E-06
80	L11B_N	2.360E-06	4.096E-07	1.600E-06	3.000E-06
81	L11B_Q	2.360E-06	5.798E-07	1.300E-06	3.500E-06
82	A21B_T	2.360E-06	4.828E-07	1.400E-06	3.000E-06
83	E18B_W	2.360E-06	6.557E-07	1.200E-06	3.800E-06
84	V7B_S	2.365E-06	5.092E-07	1.600E-06	3.500E-06
85	E12B_L	2.370E-06	4.758E-07	1.700E-06	3.600E-06
86	E12B_P	2.370E-06	5.611E-07	1.700E-06	3.900E-06
87	F19B_Y	2.384E-06	7.571E-07	9.700E-07	4.000E-06
88	E12B_A	2.385E-06	6.020E-07	1.500E-06	3.500E-06
89	A15B_I	2.385E-06	4.913E-07	1.400E-06	3.100E-06
90	A15B_W	2.390E-06	4.447E-07	1.500E-06	3.000E-06
91	F3B_S	2.390E-06	5.839E-07	1.300E-06	4.000E-06
92	E18B_T	2.395E-06	1.047E-06	1.000E-06	5.000E-06

93	V7B_Y	2.400E-06	5.601E-07	1.300E-06	3.400E-06
94	F3B_T	2.405E-06	5.256E-07	1.100E-06	3.400E-06
95	F3B_C	2.405E-06	7.007E-07	1.500E-06	4.000E-06
96	F19B_C	2.410E-06	7.122E-07	1.600E-06	4.400E-06
97	S9B_H	2.410E-06	6.782E-07	1.100E-06	4.200E-06
98	A15B_D	2.415E-06	6.235E-07	1.200E-06	3.900E-06
99	V7B_N	2.415E-06	5.761E-07	1.300E-06	3.800E-06
100	G26B_I	2.420E-06	6.412E-07	1.500E-06	3.800E-06
101	A21B_C	2.420E-06	5.782E-07	1.500E-06	3.600E-06
102	A21B_W	2.420E-06	5.258E-07	1.100E-06	3.400E-06
103	G28B_Q	2.420E-06	4.384E-07	1.400E-06	3.000E-06
104	G1B_Y	2.425E-06	5.552E-07	1.800E-06	4.300E-06
105	F19B_T	2.425E-06	7.290E-07	1.300E-06	4.200E-06
106	G26B_Q	2.425E-06	7.468E-07	1.200E-06	3.900E-06
107	V7B_Q	2.425E-06	4.411E-07	1.900E-06	3.400E-06
108	F3B_Q	2.430E-06	6.258E-07	1.500E-06	4.000E-06
109	G28B_T	2.435E-06	7.184E-07	1.300E-06	4.300E-06
110	G28B_W	2.460E-06	4.581E-07	1.600E-06	3.600E-06
111	G1B_N	2.460E-06	5.807E-07	1.600E-06	4.000E-06
112	V7B_H	2.460E-06	5.897E-07	1.400E-06	4.000E-06
113	G1B_T	2.465E-06	4.082E-07	1.900E-06	3.500E-06
114	G28B_H	2.465E-06	4.568E-07	1.900E-06	3.500E-06
115	A15B_E	2.470E-06	5.381E-07	1.900E-06	3.700E-06
116	E12B_V	2.470E-06	6.744E-07	1.700E-06	4.800E-06
117	D6B_S	2.475E-06	5.399E-07	1.300E-06	3.300E-06
118	G26B_D	2.480E-06	7.360E-07	1.400E-06	4.600E-06
119	E12B_G	2.485E-06	4.998E-07	1.500E-06	3.300E-06
120	A21B_N	2.485E-06	7.856E-07	1.500E-06	4.300E-06
121	A15B_C	2.490E-06	5.711E-07	1.600E-06	3.400E-06
122	F19B_S	2.490E-06	6.735E-07	1.500E-06	4.100E-06
123	D6B_Y	2.495E-06	5.246E-07	1.800E-06	3.800E-06
124	G28B_Y	2.500E-06	5.758E-07	1.100E-06	3.400E-06
125	L11B_H	2.505E-06	6.786E-07	1.300E-06	4.000E-06
126	G1B_S	2.505E-06	5.266E-07	1.400E-06	3.400E-06
127	A15B_V	2.510E-06	8.996E-07	1.700E-06	5.000E-06
128	G28B_C	2.510E-06	6.138E-07	1.300E-06	3.500E-06
129	G1B_C	2.520E-06	5.074E-07	1.600E-06	3.500E-06
130	A21B_H	2.525E-06	6.735E-07	1.600E-06	4.000E-06
131	L11B_Y	2.525E-06	4.865E-07	1.800E-06	3.500E-06
132	G26B_N	2.535E-06	5.594E-07	1.500E-06	3.600E-06
133	G1B_W	2.540E-06	5.960E-07	1.300E-06	4.000E-06

134	G28B_S	2.540E-06	5.443E-07	1.900E-06	4.200E-06
135	A16B_H	2.540E-06	6.484E-07	1.400E-06	3.700E-06
136	F3B_W	2.550E-06	5.735E-07	1.700E-06	4.200E-06
137	R25B_W	2.560E-06	6.707E-07	1.400E-06	3.800E-06
138	V7B_W	2.565E-06	6.158E-07	1.900E-06	3.700E-06
139	A21B_Q	2.565E-06	7.562E-07	1.600E-06	4.900E-06
140	L11B_C	2.565E-06	4.880E-07	1.600E-06	3.400E-06
141	L11B_W	2.575E-06	7.440E-07	1.400E-06	4.900E-06
142	F3B_N	2.580E-06	5.074E-07	1.400E-06	3.700E-06
143	G28B_N	2.580E-06	4.287E-07	1.800E-06	3.700E-06
144	S5B_Y	2.580E-06	5.597E-07	1.600E-06	3.400E-06
145	V24B_C	2.580E-06	5.043E-07	1.900E-06	3.500E-06
146	A15B_Y	2.580E-06	4.884E-07	1.800E-06	3.700E-06
147	F3B_H	2.590E-06	6.719E-07	1.600E-06	4.200E-06
148	R27B_N	2.610E-06	6.601E-07	1.200E-06	4.300E-06
149	V7B_C	2.630E-06	6.088E-07	1.600E-06	4.000E-06
150	A16B_M	2.630E-06	8.473E-07	1.600E-06	4.500E-06
151	G13B_F	2.630E-06	5.768E-07	1.600E-06	4.000E-06
152	E18B_Y	2.635E-06	6.596E-07	1.700E-06	4.300E-06
153	D6B_H	2.640E-06	7.625E-07	1.400E-06	4.700E-06
154	D6B_N	2.640E-06	4.999E-07	1.700E-06	3.800E-06
155	F19B_E	2.657E-06	7.389E-07	7.400E-07	4.400E-06
156	R27B_H	2.660E-06	6.411E-07	1.500E-06	3.800E-06
157	G1B_Q	2.665E-06	6.808E-07	1.400E-06	4.400E-06
158	V24B_Y	2.665E-06	9.224E-07	1.100E-06	4.900E-06
159	D6B_T	2.665E-06	5.770E-07	1.500E-06	3.600E-06
160	E18B_Q	2.680E-06	6.412E-07	1.600E-06	4.000E-06
161	E18B_H	2.690E-06	6.789E-07	1.700E-06	4.300E-06
162	A15B_K	2.700E-06	7.553E-07	1.700E-06	4.500E-06
163	G26B_T	2.705E-06	6.840E-07	1.500E-06	4.000E-06
164	G1B_L	2.715E-06	4.603E-07	2.000E-06	3.400E-06
165	G26B_F	2.720E-06	7.885E-07	1.600E-06	4.900E-06
166	E12B_H	2.720E-06	5.337E-07	1.700E-06	4.000E-06
167	D6B_W	2.725E-06	5.590E-07	1.900E-06	4.300E-06
168	K17B_H	2.725E-06	4.529E-07	2.000E-06	4.000E-06
169	R25B_H	2.730E-06	8.767E-07	1.400E-06	5.500E-06
170	R25B_N	2.750E-06	7.605E-07	1.100E-06	4.300E-06
171	F19B_R	2.765E-06	8.400E-07	1.500E-06	4.500E-06
172	F3B_Y	2.765E-06	6.923E-07	1.600E-06	4.100E-06
173	E18B_C	2.780E-06	6.654E-07	1.600E-06	4.000E-06
174	R25B_Y	2.790E-06	5.999E-07	1.600E-06	3.800E-06

175	S9B_E	2.805E-06	6.802E-07	1.800E-06	4.400E-06
176	W22B_Q	2.815E-06	5.393E-07	2.100E-06	3.800E-06
177	G26B_L	2.815E-06	5.622E-07	1.800E-06	4.300E-06
178	E18B_N	2.815E-06	8.863E-07	1.500E-06	5.100E-06
179	L11B_R	2.825E-06	7.745E-07	1.500E-06	4.600E-06
180	L11B_K	2.840E-06	5.295E-07	2.000E-06	4.300E-06
181	G28B_R	2.840E-06	6.668E-07	1.600E-06	4.300E-06
182	F19B_I	2.845E-06	7.729E-07	1.800E-06	4.700E-06
183	F19B_D	2.845E-06	5.624E-07	2.000E-06	3.900E-06
184	A21B_K	2.850E-06	7.000E-07	1.400E-06	4.400E-06
185	R25B_S	2.855E-06	5.772E-07	1.600E-06	3.800E-06
186	S9B_K	2.865E-06	7.836E-07	1.300E-06	4.200E-06
187	F3B_D	2.865E-06	7.386E-07	1.500E-06	4.200E-06
188	L11B_L	2.870E-06	4.791E-07	1.800E-06	4.000E-06
189	A16B_F	2.880E-06	9.742E-07	1.400E-06	4.500E-06
190	A21B_M	2.895E-06	7.323E-07	1.400E-06	4.700E-06
191	D6B_Q	2.905E-06	6.160E-07	1.900E-06	3.800E-06
192	L23B_M	2.915E-06	8.145E-07	1.400E-06	4.900E-06
193	R27B_T	2.915E-06	7.693E-07	1.600E-06	4.500E-06
194	D6B_C	2.920E-06	7.804E-07	1.700E-06	5.300E-06
195	E18B_R	2.920E-06	5.899E-07	1.800E-06	4.000E-06
196	A16B_K	2.920E-06	9.117E-07	2.000E-06	5.300E-06
197	S9B_R	2.920E-06	6.040E-07	1.900E-06	4.400E-06
198	Q14B_W	2.920E-06	5.307E-07	2.000E-06	4.000E-06
199	G13B_M	2.925E-06	6.290E-07	1.800E-06	4.000E-06
200	L23B_A	2.945E-06	6.211E-07	1.800E-06	3.800E-06
201	A15B_L	2.945E-06	7.089E-07	1.700E-06	4.700E-06
202	G1B_F	2.945E-06	6.083E-07	1.500E-06	4.000E-06
203	A16B_T	2.950E-06	7.381E-07	1.500E-06	4.400E-06
204	A21B_D	2.955E-06	5.414E-07	2.000E-06	3.700E-06
205	Y10B_N	2.955E-06	5.781E-07	2.200E-06	4.700E-06
206	G28B_A	2.955E-06	8.672E-07	1.700E-06	4.700E-06
207	L11B_V	2.955E-06	5.708E-07	1.500E-06	3.800E-06
208	L23B_F	2.960E-06	4.512E-07	2.100E-06	3.600E-06
209	L11B_M	2.960E-06	6.557E-07	1.800E-06	4.000E-06
210	G28B_E	2.965E-06	7.184E-07	1.600E-06	4.900E-06
211	G28B_K	2.965E-06	6.683E-07	1.600E-06	4.600E-06
212	K17B_R	2.970E-06	8.554E-07	1.700E-06	5.400E-06
213	Q14B_H	2.970E-06	6.498E-07	1.800E-06	5.000E-06
214	R25B_Q	2.970E-06	1.147E-06	1.200E-06	6.200E-06
215	F19B_K	2.980E-06	8.495E-07	1.700E-06	4.400E-06

216	L11B_D	2.980E-06	6.756E-07	1.700E-06	4.600E-06
217	S8B_S	2.980E-06	7.696E-07	1.000E-06	4.500E-06
218	G28B_G	2.980E-06	4.162E-07	2.200E-06	3.800E-06
219	A15B_G	2.985E-06	7.645E-07	1.600E-06	4.200E-06
220	G28B_D	2.985E-06	8.002E-07	1.000E-06	4.800E-06
221	V7B_E	2.995E-06	9.923E-07	2.300E-06	6.300E-06
222	G26B_G	2.995E-06	6.832E-07	1.400E-06	4.100E-06
223	R27B_D	2.995E-06	7.207E-07	1.900E-06	4.700E-06
224	T2B_S	3.000E-06	6.657E-07	1.900E-06	4.600E-06
225	T2B_N	3.000E-06	7.108E-07	1.800E-06	4.900E-06
226	L23B_P	3.015E-06	4.452E-07	2.200E-06	3.800E-06
227	A21B_V	3.025E-06	9.244E-07	1.400E-06	5.200E-06
228	A16B_I	3.025E-06	9.613E-07	1.500E-06	5.200E-06
229	T2B_T	3.030E-06	6.490E-07	1.800E-06	4.500E-06
230	E12B_R	3.030E-06	6.666E-07	1.800E-06	4.700E-06
231	G28B_M	3.030E-06	7.875E-07	1.700E-06	4.900E-06
232	G26B_M	3.035E-06	7.989E-07	1.600E-06	4.500E-06
233	G28B_V	3.035E-06	6.393E-07	2.100E-06	4.500E-06
234	V7B_R	3.040E-06	7.803E-07	1.700E-06	4.500E-06
235	R25B_T	3.045E-06	6.468E-07	2.200E-06	4.500E-06
236	T2B_H	3.050E-06	6.203E-07	2.000E-06	4.700E-06
237	R27B_C	3.055E-06	6.613E-07	2.300E-06	4.900E-06
238	L11B_E	3.055E-06	7.674E-07	1.600E-06	4.600E-06
239	G28B_F	3.060E-06	5.614E-07	2.100E-06	4.000E-06
240	G13B_G	3.060E-06	7.465E-07	1.900E-06	5.400E-06
241	G13B_K	3.060E-06	9.949E-07	2.000E-06	6.300E-06
242	S9B_Q	3.070E-06	7.087E-07	1.700E-06	4.800E-06
243	W22B_Y	3.070E-06	6.148E-07	1.900E-06	4.000E-06
244	T4B_Y	3.080E-06	4.250E-07	2.500E-06	4.000E-06
245	T2B_C	3.080E-06	6.526E-07	1.600E-06	4.500E-06
246	I20B_I	3.080E-06	8.794E-07	1.800E-06	5.200E-06
247	L23B_W	3.085E-06	1.224E-06	1.500E-06	6.400E-06
248	G1B_E	3.085E-06	7.073E-07	1.600E-06	4.700E-06
249	E18B_D	3.085E-06	5.344E-07	2.500E-06	4.000E-06
250	T4B_C	3.090E-06	4.483E-07	2.500E-06	4.000E-06
251	G26B_P	3.090E-06	7.218E-07	1.900E-06	5.200E-06
252	S5B_C	3.090E-06	5.160E-07	2.400E-06	4.700E-06
253	R27B_S	3.090E-06	9.514E-07	1.700E-06	5.200E-06
254	L11B_F	3.095E-06	8.095E-07	1.500E-06	4.700E-06
255	Q14B_S	3.100E-06	7.685E-07	1.600E-06	4.700E-06
256	A15B_M	3.100E-06	9.125E-07	1.400E-06	4.600E-06

257	D6B_D	3.100E-06	7.130E-07	1.700E-06	4.900E-06
258	W22B_T	3.105E-06	7.571E-07	1.700E-06	5.200E-06
259	S5B_Q	3.105E-06	6.501E-07	1.900E-06	4.500E-06
260	F3B_I	3.105E-06	6.661E-07	1.800E-06	4.700E-06
261	A21B_L	3.105E-06	7.193E-07	1.700E-06	4.500E-06
262	G13B_N	3.110E-06	1.487E-06	1.100E-06	6.600E-06
263	Q14B_Y	3.110E-06	5.428E-07	2.200E-06	4.000E-06
264	Y10B_W	3.110E-06	6.406E-07	2.100E-06	4.000E-06
265	D6B_E	3.115E-06	7.471E-07	1.400E-06	4.700E-06
266	R25B_C	3.120E-06	7.374E-07	2.100E-06	4.500E-06
267	G13B_D	3.120E-06	8.024E-07	2.000E-06	5.100E-06
268	S5B_S	3.120E-06	5.845E-07	2.100E-06	4.000E-06
269	A16B_V	3.120E-06	5.606E-07	2.100E-06	4.500E-06
270	F3B_F	3.120E-06	8.871E-07	1.800E-06	5.000E-06
271	I20B_P	3.125E-06	7.239E-07	1.800E-06	4.700E-06
272	A21B_P	3.130E-06	7.901E-07	2.100E-06	5.700E-06
273	R27B_K	3.135E-06	8.002E-07	2.000E-06	4.700E-06
274	F3B_M	3.140E-06	7.917E-07	1.400E-06	4.700E-06
275	L23B_C	3.140E-06	1.051E-06	1.700E-06	5.700E-06
276	G1B_R	3.140E-06	8.344E-07	2.000E-06	4.900E-06
277	F3B_E	3.140E-06	8.185E-07	2.000E-06	4.400E-06
278	L11B_P	3.140E-06	7.243E-07	1.700E-06	4.700E-06
279	Q14B_N	3.145E-06	6.645E-07	1.600E-06	4.500E-06
280	A16B_L	3.145E-06	1.057E-06	2.100E-06	6.200E-06
281	L23B_Y	3.145E-06	4.979E-07	2.100E-06	4.000E-06
282	D6B_R	3.150E-06	6.909E-07	1.700E-06	4.700E-06
283	S8B_Y	3.150E-06	6.091E-07	2.200E-06	4.000E-06
284	G13B_I	3.150E-06	8.805E-07	2.100E-06	5.700E-06
285	S5B_N	3.150E-06	8.023E-07	1.800E-06	4.900E-06
286	F19B_A	3.155E-06	6.100E-07	2.100E-06	4.500E-06
287	Q14B_T	3.155E-06	5.356E-07	2.000E-06	4.000E-06
288	G13B_P	3.160E-06	4.524E-07	2.300E-06	3.800E-06
289	Y10B_S	3.160E-06	4.978E-07	2.200E-06	4.000E-06
290	V7B_G	3.160E-06	6.286E-07	2.100E-06	4.700E-06
291	E12B_D	3.160E-06	6.419E-07	2.000E-06	5.200E-06
292	Y10B_Q	3.165E-06	6.699E-07	2.000E-06	4.000E-06
293	R25B_D	3.165E-06	5.887E-07	2.200E-06	4.500E-06
294	G13B_V	3.165E-06	1.077E-06	1.400E-06	5.200E-06
295	T4B_S	3.175E-06	6.584E-07	2.100E-06	4.700E-06
296	S8B_H	3.175E-06	5.919E-07	1.700E-06	4.000E-06
297	A21B_E	3.175E-06	6.463E-07	1.900E-06	4.300E-06

298	F3B_G	3.175E-06	7.107E-07	1.700E-06	4.700E-06
299	S5B_H	3.180E-06	4.948E-07	2.100E-06	4.000E-06
300	V7B_D	3.185E-06	7.485E-07	2.200E-06	5.100E-06
301	G26B_S	3.185E-06	9.751E-07	1.700E-06	5.200E-06
302	A21B_R	3.185E-06	7.358E-07	2.200E-06	4.600E-06
303	R27B_W	3.190E-06	7.412E-07	2.300E-06	4.900E-06
304	S8B_Q	3.195E-06	8.438E-07	1.800E-06	4.900E-06
305	I20B_Y	3.195E-06	7.037E-07	2.000E-06	4.900E-06
306	V7B_I	3.195E-06	4.774E-07	2.500E-06	4.200E-06
307	A16B_Q	3.195E-06	1.295E-06	1.100E-06	6.000E-06
308	T4B_N	3.200E-06	7.595E-07	2.200E-06	5.700E-06
309	I20B_W	3.205E-06	6.057E-07	2.500E-06	4.700E-06
310	A21B_F	3.205E-06	8.325E-07	1.700E-06	4.700E-06
311	E12B_Q	3.205E-06	5.482E-07	2.400E-06	4.300E-06
312	W22B_S	3.210E-06	7.048E-07	1.700E-06	4.000E-06
313	D6B_P	3.215E-06	7.443E-07	2.300E-06	4.800E-06
314	A15B_P	3.215E-06	9.109E-07	1.700E-06	4.900E-06
315	G13B_A	3.220E-06	8.024E-07	2.200E-06	4.700E-06
316	F3B_A	3.220E-06	9.578E-07	2.000E-06	5.200E-06
317	S5B_W	3.220E-06	7.417E-07	2.000E-06	4.900E-06
318	T4B_Q	3.225E-06	8.920E-07	1.800E-06	5.500E-06
319	V7B_F	3.225E-06	1.147E-06	2.100E-06	7.600E-06
320	V7B_V	3.225E-06	6.480E-07	2.500E-06	4.700E-06
321	F3B_R	3.235E-06	1.212E-06	1.600E-06	7.100E-06
322	G13B_R	3.235E-06	7.638E-07	1.700E-06	5.100E-06
323	R27B_Y	3.235E-06	7.534E-07	2.300E-06	4.600E-06
324	S9B_D	3.240E-06	6.443E-07	2.200E-06	4.400E-06
325	A16B_E	3.240E-06	8.159E-07	1.400E-06	4.400E-06
326	A15B_F	3.245E-06	8.300E-07	1.900E-06	5.500E-06
327	Y10B_T	3.255E-06	7.037E-07	2.500E-06	4.900E-06
328	S9B_N	3.255E-06	5.052E-07	1.800E-06	4.000E-06
329	T4B_H	3.260E-06	8.255E-07	2.100E-06	5.700E-06
330	T4B_W	3.265E-06	7.199E-07	2.300E-06	4.700E-06
331	F3B_V	3.265E-06	6.141E-07	2.100E-06	4.500E-06
332	R27B_E	3.265E-06	1.091E-06	2.100E-06	6.700E-06
333	T2B_Y	3.270E-06	8.202E-07	1.800E-06	5.200E-06
334	G28B_L	3.270E-06	7.470E-07	2.200E-06	5.500E-06
335	V24B_L	3.275E-06	7.003E-07	1.700E-06	4.500E-06
336	T2B_Q	3.275E-06	6.552E-07	2.000E-06	4.500E-06
337	G28B_I	3.275E-06	6.520E-07	1.400E-06	4.400E-06
338	L11B_A	3.280E-06	5.357E-07	2.400E-06	4.600E-06

339	A21B_I	3.290E-06	1.027E-06	2.100E-06	6.400E-06
340	R27B_R	3.290E-06	8.130E-07	2.200E-06	5.500E-06
341	G26B_V	3.295E-06	9.849E-07	2.100E-06	6.200E-06
342	E12B_E	3.295E-06	7.950E-07	2.000E-06	5.200E-06
343	F19B_L	3.295E-06	6.329E-07	2.100E-06	4.500E-06
344	E12B_T	3.295E-06	6.177E-07	2.100E-06	4.300E-06
345	G1B_A	3.300E-06	8.259E-07	2.000E-06	5.700E-06
346	R25B_E	3.305E-06	7.302E-07	1.800E-06	4.500E-06
347	D6B_G	3.305E-06	8.382E-07	2.600E-06	6.100E-06
348	G1B_K	3.310E-06	7.225E-07	1.900E-06	4.900E-06
349	L11B_I	3.310E-06	6.415E-07	2.100E-06	4.200E-06
350	E12B_K	3.315E-06	7.235E-07	2.200E-06	4.900E-06
351	W22B_W	3.315E-06	7.228E-07	1.800E-06	4.700E-06
352	G13B_L	3.315E-06	1.446E-06	2.100E-06	8.900E-06
353	A16B_C	3.320E-06	5.863E-07	1.800E-06	4.500E-06
354	T2B_W	3.320E-06	1.041E-06	1.400E-06	4.900E-06
355	F19B_F	3.325E-06	5.129E-07	2.400E-06	4.200E-06
356	G1B_G	3.325E-06	6.398E-07	2.500E-06	4.800E-06
357	V24B_P	3.330E-06	9.359E-07	1.700E-06	5.200E-06
358	F3B_K	3.330E-06	9.348E-07	1.600E-06	5.300E-06
359	V7B_A	3.335E-06	7.686E-07	1.800E-06	4.700E-06
360	V7B_K	3.335E-06	1.004E-06	1.700E-06	6.000E-06
361	S8B_C	3.345E-06	7.075E-07	2.100E-06	4.900E-06
362	E12B_N	3.350E-06	7.067E-07	2.100E-06	4.800E-06
363	I20B_C	3.350E-06	1.110E-06	1.400E-06	6.700E-06
364	A16B_D	3.350E-06	8.544E-07	1.900E-06	5.100E-06
365	A16B_G	3.350E-06	9.913E-07	2.300E-06	6.700E-06
366	K17B_K	3.350E-06	7.804E-07	2.500E-06	5.500E-06
367	V7B_L	3.355E-06	6.228E-07	2.900E-06	5.500E-06
368	L11B_G	3.355E-06	7.134E-07	2.300E-06	5.200E-06
369	F3B_P	3.355E-06	6.287E-07	2.500E-06	4.900E-06
370	G13B_Q	3.355E-06	1.065E-06	1.700E-06	5.700E-06
371	S8B_T	3.360E-06	8.463E-07	2.500E-06	5.200E-06
372	F19B_V	3.365E-06	1.155E-06	2.100E-06	6.700E-06
373	R25B_V	3.365E-06	7.714E-07	1.800E-06	5.000E-06
374	V7B_P	3.365E-06	6.515E-07	1.800E-06	4.500E-06
375	Y10B_C	3.370E-06	8.099E-07	2.100E-06	4.900E-06
376	A21B_G	3.370E-06	8.183E-07	2.500E-06	5.200E-06
377	T4B_T	3.375E-06	7.933E-07	2.500E-06	5.700E-06
378	W22B_C	3.375E-06	8.515E-07	1.600E-06	5.200E-06
379	S8B_N	3.375E-06	8.045E-07	2.000E-06	4.900E-06

380	V24B_V	3.380E-06	9.435E-07	1.800E-06	5.200E-06
381	K17B_Y	3.380E-06	7.654E-07	2.300E-06	5.200E-06
382	E18B_L	3.380E-06	8.733E-07	1.800E-06	4.800E-06
383	V7B_M	3.385E-06	8.177E-07	2.500E-06	5.200E-06
384	S5B_T	3.390E-06	7.305E-07	2.400E-06	4.700E-06
385	G26B_A	3.390E-06	8.391E-07	2.100E-06	5.500E-06
386	G13B_T	3.400E-06	7.726E-07	1.700E-06	5.100E-06
387	G1B_I	3.405E-06	9.265E-07	1.800E-06	5.000E-06
388	R25B_K	3.405E-06	8.069E-07	2.100E-06	4.900E-06
389	G13B_E	3.405E-06	9.128E-07	2.400E-06	5.600E-06
390	V24B_F	3.405E-06	6.886E-07	2.300E-06	4.500E-06
391	G13B_S	3.415E-06	7.755E-07	2.200E-06	5.100E-06
392	Y10B_Y	3.425E-06	8.920E-07	1.600E-06	5.200E-06
393	V24B_I	3.425E-06	7.953E-07	1.900E-06	5.500E-06
394	E18B_K	3.430E-06	5.526E-07	2.500E-06	4.700E-06
395	G1B_V	3.440E-06	7.465E-07	2.400E-06	5.500E-06
396	E18B_I	3.440E-06	7.074E-07	2.400E-06	4.800E-06
397	E18B_E	3.445E-06	7.508E-07	2.500E-06	4.700E-06
398	F3B_L	3.450E-06	1.131E-06	2.500E-06	7.600E-06
399	S9B_S	3.450E-06	6.460E-07	2.400E-06	4.700E-06
400	R25B_L	3.455E-06	7.950E-07	2.000E-06	4.800E-06
401	D6B_I	3.460E-06	7.883E-07	2.400E-06	5.300E-06
402	E18B_P	3.465E-06	7.220E-07	2.100E-06	4.800E-06
403	V24B_A	3.475E-06	7.210E-07	2.300E-06	4.500E-06
404	R25B_A	3.480E-06	6.330E-07	2.600E-06	4.300E-06
405	Q14B_Q	3.490E-06	6.735E-07	2.000E-06	4.700E-06
406	A21B_A	3.495E-06	8.351E-07	2.300E-06	5.700E-06
407	A15B_A	3.495E-06	8.351E-07	2.300E-06	5.700E-06
408	Q14B_C	3.495E-06	7.508E-07	2.500E-06	5.200E-06
409	A16B_A	3.495E-06	8.351E-07	2.300E-06	5.700E-06
410	A16B_P	3.495E-06	9.000E-07	2.400E-06	5.500E-06
411	D6B_F	3.500E-06	8.163E-07	2.500E-06	6.100E-06
412	S9B_T	3.500E-06	7.588E-07	2.100E-06	5.700E-06
413	E12B_S	3.500E-06	6.241E-07	2.400E-06	4.800E-06
414	G1B_P	3.505E-06	9.151E-07	1.800E-06	5.700E-06
415	G1B_M	3.510E-06	1.063E-06	2.000E-06	5.700E-06
416	V24B_G	3.525E-06	7.793E-07	2.500E-06	5.200E-06
417	R25B_R	3.530E-06	6.768E-07	2.500E-06	5.200E-06
418	D6B_A	3.535E-06	7.300E-07	2.100E-06	5.000E-06
419	W22B_H	3.535E-06	1.027E-06	1.900E-06	5.800E-06
420	E18B_V	3.540E-06	7.742E-07	2.600E-06	5.900E-06

421	R25B_M	3.540E-06	1.021E-06	2.200E-06	5.600E-06
422	G1B_D	3.545E-06	1.100E-06	1.800E-06	6.200E-06
423	I20B_L	3.550E-06	1.081E-06	2.100E-06	5.500E-06
424	L23B_I	3.550E-06	5.916E-07	2.600E-06	4.900E-06
425	E18B_M	3.560E-06	7.728E-07	1.800E-06	4.800E-06
426	L23B_L	3.560E-06	7.823E-07	2.500E-06	5.200E-06
427	A16B_S	3.570E-06	1.249E-06	2.200E-06	7.500E-06
428	R27B_P	3.570E-06	5.832E-07	2.600E-06	4.700E-06
429	R25B_G	3.575E-06	5.830E-07	2.600E-06	4.800E-06
430	K17B_E	3.585E-06	1.298E-06	2.000E-06	7.900E-06
431	V24B_M	3.585E-06	1.026E-06	2.100E-06	6.700E-06
432	E18B_G	3.590E-06	7.107E-07	2.100E-06	5.000E-06
433	G28B_P	3.605E-06	7.937E-07	2.200E-06	5.500E-06
434	D6B_K	3.610E-06	9.210E-07	2.500E-06	6.400E-06
435	W22B_N	3.620E-06	6.518E-07	2.500E-06	4.900E-06
436	Y10B_D	3.620E-06	7.811E-07	2.400E-06	5.500E-06
437	R25B_I	3.635E-06	8.061E-07	2.600E-06	5.200E-06
438	E18B_A	3.640E-06	1.166E-06	1.600E-06	5.900E-06
439	K17B_D	3.640E-06	9.259E-07	2.000E-06	5.700E-06
440	A16B_W	3.650E-06	2.090E-06	1.500E-06	9.400E-06
441	D6B_L	3.665E-06	8.768E-07	2.100E-06	5.600E-06
442	K17B_W	3.665E-06	8.677E-07	2.100E-06	5.200E-06
443	L23B_V	3.670E-06	9.948E-07	2.400E-06	6.400E-06
444	R27B_I	3.690E-06	7.779E-07	2.600E-06	5.600E-06
445	K17B_C	3.710E-06	6.905E-07	2.800E-06	5.500E-06
446	A16B_N	3.713E-06	1.591E-06	8.700E-07	7.100E-06
447	Q14B_K	3.720E-06	8.758E-07	2.200E-06	5.700E-06
448	Y10B_A	3.725E-06	9.124E-07	2.500E-06	6.200E-06
449	S8B_W	3.730E-06	1.140E-06	1.700E-06	6.700E-06
450	F19B_M	3.735E-06	1.143E-06	2.500E-06	7.600E-06
451	R27B_A	3.745E-06	7.857E-07	2.200E-06	5.200E-06
452	D6B_M	3.745E-06	6.809E-07	2.600E-06	5.000E-06
453	T4B_R	3.755E-06	6.786E-07	2.600E-06	4.900E-06
454	D6B_V	3.770E-06	8.945E-07	2.100E-06	5.900E-06
455	Y10B_H	3.775E-06	9.536E-07	2.500E-06	6.700E-06
456	E18B_F	3.800E-06	9.857E-07	1.800E-06	6.100E-06
457	S5B_K	3.830E-06	8.814E-07	2.600E-06	5.700E-06
458	R25B_P	3.845E-06	8.344E-07	2.600E-06	6.100E-06
459	W22B_E	3.850E-06	7.178E-07	3.000E-06	5.700E-06
460	L23B_G	3.850E-06	1.111E-06	2.700E-06	7.300E-06
461	R27B_L	3.855E-06	1.060E-06	2.600E-06	6.900E-06

462	S5B_D	3.860E-06	8.774E-07	2.300E-06	5.700E-06
463	T2B_V	3.885E-06	6.667E-07	3.200E-06	5.200E-06
464	Y10B_R	3.895E-06	1.332E-06	2.600E-06	7.900E-06
465	S8B_K	3.910E-06	6.943E-07	2.300E-06	5.100E-06
466	S8B_D	3.910E-06	1.018E-06	2.100E-06	5.700E-06
467	R25B_F	3.915E-06	7.673E-07	2.500E-06	5.600E-06
468	Y10B_P	3.930E-06	9.515E-07	2.600E-06	5.900E-06
469	T2B_D	3.935E-06	8.450E-07	2.600E-06	5.500E-06
470	Q14B_D	3.940E-06	1.060E-06	2.800E-06	5.700E-06
471	R27B_V	3.965E-06	1.097E-06	2.500E-06	6.500E-06
472	T4B_M	3.965E-06	7.329E-07	2.700E-06	5.200E-06
473	A16B_Y	3.980E-06	1.563E-06	2.000E-06	7.600E-06
474	Q14B_V	4.010E-06	7.383E-07	2.400E-06	5.000E-06
475	Q14B_F	4.010E-06	6.820E-07	2.700E-06	5.500E-06
476	Q14B_R	4.010E-06	9.078E-07	2.300E-06	5.500E-06
477	T4B_A	4.015E-06	1.022E-06	2.200E-06	6.400E-06
478	Q14B_P	4.015E-06	8.586E-07	2.800E-06	5.900E-06
479	T2B_E	4.040E-06	9.265E-07	3.000E-06	6.400E-06
480	T2B_M	4.040E-06	1.068E-06	2.400E-06	7.300E-06
481	S5B_P	4.045E-06	1.165E-06	2.200E-06	7.500E-06
482	T2B_R	4.050E-06	1.245E-06	1.800E-06	6.000E-06
483	Y10B_L	4.055E-06	6.581E-07	3.200E-06	5.200E-06
484	W22B_R	4.060E-06	1.115E-06	2.200E-06	5.700E-06
485	S8B_L	4.060E-06	6.369E-07	3.200E-06	5.200E-06
486	S8B_F	4.070E-06	6.258E-07	3.200E-06	5.200E-06
487	Q14B_E	4.070E-06	8.480E-07	3.000E-06	6.000E-06
488	W22B_F	4.075E-06	7.738E-07	3.200E-06	6.500E-06
489	S8B_E	4.095E-06	9.583E-07	2.400E-06	6.000E-06
490	W22B_D	4.095E-06	9.886E-07	2.600E-06	7.000E-06
491	W22B_K	4.100E-06	7.650E-07	2.900E-06	5.700E-06
492	R27B_G	4.100E-06	9.061E-07	2.300E-06	5.600E-06
493	T2B_A	4.115E-06	9.144E-07	2.600E-06	5.900E-06
494	Y10B_M	4.120E-06	7.831E-07	2.800E-06	6.100E-06
495	T4B_G	4.120E-06	7.367E-07	2.800E-06	5.900E-06
496	S8B_R	4.125E-06	7.261E-07	3.000E-06	5.500E-06
497	Y10B_K	4.130E-06	1.117E-06	2.600E-06	7.000E-06
498	Q14B_G	4.140E-06	6.286E-07	3.200E-06	5.500E-06
499	I20B_M	4.155E-06	1.410E-06	2.400E-06	7.600E-06
500	T2B_K	4.160E-06	1.014E-06	2.600E-06	7.000E-06
501	T2B_I	4.165E-06	9.309E-07	2.100E-06	5.900E-06
502	W22B_G	4.170E-06	8.517E-07	3.100E-06	6.100E-06

503	W22B_A	4.175E-06	1.322E-06	2.600E-06	8.100E-06
504	T4B_K	4.190E-06	7.504E-07	2.600E-06	5.700E-06
505	T4B_E	4.190E-06	8.296E-07	3.000E-06	5.700E-06
506	Y10B_E	4.200E-06	1.080E-06	2.600E-06	6.000E-06
507	S8B_P	4.205E-06	1.045E-06	2.400E-06	6.100E-06
508	T2B_G	4.210E-06	1.108E-06	2.600E-06	6.900E-06
509	T2B_L	4.215E-06	9.794E-07	3.100E-06	6.900E-06
510	S5B_G	4.215E-06	8.671E-07	2.700E-06	6.200E-06
511	T4B_D	4.220E-06	1.013E-06	2.500E-06	6.000E-06
512	S5B_E	4.225E-06	7.348E-07	3.000E-06	5.500E-06
513	S8B_A	4.245E-06	1.324E-06	2.600E-06	8.900E-06
514	S5B_F	4.255E-06	1.014E-06	2.000E-06	6.100E-06
515	W22B_I	4.275E-06	1.157E-06	2.600E-06	6.900E-06
516	S5B_L	4.275E-06	1.027E-06	2.300E-06	6.200E-06
517	S8B_G	4.290E-06	7.779E-07	3.200E-06	6.500E-06
518	T4B_F	4.290E-06	1.203E-06	2.600E-06	7.500E-06
519	W22B_L	4.290E-06	9.458E-07	2.600E-06	6.100E-06
520	W22B_P	4.300E-06	9.492E-07	2.600E-06	6.100E-06
521	F19B_P	4.320E-06	7.702E-07	3.300E-06	5.500E-06
522	Q14B_A	4.325E-06	1.246E-06	2.700E-06	7.500E-06
523	W22B_V	4.340E-06	1.417E-06	2.000E-06	7.200E-06
524	R27B_F	4.345E-06	1.309E-06	2.600E-06	7.200E-06
525	S8B_V	4.375E-06	7.656E-07	3.100E-06	5.900E-06
526	T4B_I	4.375E-06	1.096E-06	2.500E-06	6.100E-06
527	R27B_M	4.375E-06	1.028E-06	2.600E-06	7.200E-06
528	Y10B_G	4.385E-06	1.507E-06	2.400E-06	7.500E-06
529	Q14B_I	4.390E-06	1.324E-06	2.000E-06	7.500E-06
530	T4B_L	4.395E-06	8.660E-07	2.700E-06	5.900E-06
531	T4B_V	4.400E-06	1.226E-06	2.500E-06	7.500E-06
532	Y10B_V	4.405E-06	1.140E-06	2.200E-06	6.600E-06
533	S5B_R	4.410E-06	1.581E-06	2.800E-06	9.300E-06
534	Y10B_I	4.425E-06	7.986E-07	3.200E-06	5.900E-06
535	Q14B_L	4.435E-06	1.081E-06	3.200E-06	6.900E-06
536	S5B_V	4.470E-06	9.498E-07	3.200E-06	6.100E-06
537	S5B_M	4.485E-06	1.158E-06	2.800E-06	7.500E-06
538	Y10B_F	4.490E-06	8.723E-07	3.200E-06	6.100E-06
539	T4B_P	4.490E-06	1.074E-06	2.700E-06	7.500E-06
540	T2B_P	4.495E-06	8.888E-07	2.600E-06	6.100E-06
541	T2B_F	4.500E-06	8.189E-07	3.200E-06	5.900E-06
542	S5B_A	4.510E-06	9.170E-07	2.700E-06	6.400E-06
543	K17B_V	4.555E-06	7.423E-07	3.600E-06	6.200E-06

544	S8B_M	4.575E-06	1.346E-06	2.000E-06	7.500E-06
545	W22B_M	4.590E-06	8.194E-07	3.200E-06	6.500E-06
546	S8B_I	4.605E-06	1.587E-06	2.600E-06	7.500E-06
547	Q14B_M	4.685E-06	1.271E-06	3.200E-06	8.900E-06
548	S5B_I	4.690E-06	1.296E-06	2.600E-06	7.500E-06
549	F19B_G	4.750E-06	1.169E-06	3.200E-06	7.300E-06
550	K17B_F	4.785E-06	1.208E-06	3.000E-06	7.700E-06
551	I20B_G	4.805E-06	8.395E-07	3.000E-06	6.400E-06
552	I20B_V	4.825E-06	1.136E-06	2.900E-06	6.500E-06
553	I20B_F	4.910E-06	1.225E-06	3.400E-06	7.600E-06
554	K17B_I	4.980E-06	9.817E-07	3.000E-06	6.900E-06
555	K17B_A	5.135E-06	1.418E-06	3.400E-06	9.100E-06
556	K17B_M	5.180E-06	1.070E-06	3.600E-06	7.700E-06
557	K17B_L	5.180E-06	9.606E-07	3.200E-06	6.900E-06
558	K17B_P	5.215E-06	8.267E-07	3.600E-06	6.900E-06
559	I20B_A	5.320E-06	1.202E-06	4.000E-06	7.600E-06
560	K17B_G	5.665E-06	1.526E-06	2.900E-06	8.100E-06

Table 1. A one-dimensional semaglutide-GLP-1R-based mini static GIBAC. In this table, the site-specific mutation naming scheme is **residue name-residue number-Chain ID_new residue name**, the binding affinities of semaglutide analogues to GLP-1R are calculated with Prodigy at 37 $^\circ C$, while **Mutation** represents the one site-specific missense mutation introduced into the backbone of semaglutide, **Mean**, **Std**, **Min** and **Max** represent the average, the standard deviation, the minimum and the maximum of the K_d values calculated using Prodigy for the 11200 ($\frac{28!}{1!(27)!} \times 20^1 \times 20$) structural models of semaglutide analogues and GLP-1R. Of all 560 ($\frac{28!}{1!(27)!} \times 20^1$) semaglutide analogues with one site-specific missense mutation introduced into its backbone, they are ranked and numbered (the first column of this table) according to the average K_d values calculated using Prodigy.

2. Ethical statement

No ethical approval is required.

3. Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the author used OpenAI's ChatGPT in order to improve the readability of the manuscript, and to make it as concise and short as possible. After using this tool, the author reviewed and edited the content as needed and takes full responsibility for the content of the publication.

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