



wwPDB EM Validation Summary Report ⓘ

Jun 16, 2025 – 05:41 PM EDT

PDB ID : 9E1A / pdb_00009e1a
EMDB ID : EMD-47387
Title : Structure of RyR1 in the primed state in the presence of dyphylline
Authors : Miotto, M.C.; Marks, A.R.
Deposited on : 2024-10-21
Resolution : 3.35 Å(reported)
Based on initial model : 7TZC

This is a wwPDB EM Validation Summary Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

EMDB validation analysis : 0.0.1.dev118
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0rc1
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.44

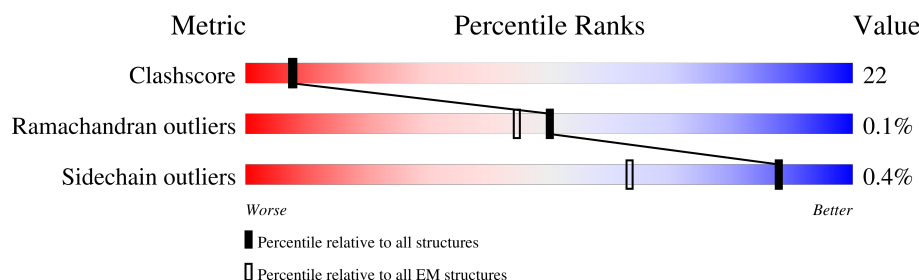
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.35 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion $< 40\%$). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	5037	
1	B	5037	
1	C	5037	
1	D	5037	
2	E	108	
2	F	108	
2	G	108	
2	H	108	

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 144128 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Ryanodine receptor 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	4404	Total	C	N	O	S	9	0
			35150	22365	6063	6485	237		
1	B	4404	Total	C	N	O	S	9	0
			35150	22365	6063	6485	237		
1	D	4404	Total	C	N	O	S	9	0
			35150	22365	6063	6485	237		
1	C	4404	Total	C	N	O	S	9	0
			35150	22365	6063	6485	237		

- Molecule 2 is a protein called Peptidyl-prolyl cis-trans isomerase FKBP1A.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	E	107	Total	C	N	O	S	0	0
			831	527	146	154	4		
2	H	107	Total	C	N	O	S	0	0
			831	527	146	154	4		
2	G	107	Total	C	N	O	S	0	0
			831	527	146	154	4		
2	F	107	Total	C	N	O	S	0	0
			831	527	146	154	4		

- Molecule 3 is ADENOSINE-5'-TRIPHOSPHATE (CCD ID: ATP) (formula: C₁₀H₁₆N₅O₁₃P₃).



Mol	Chain	Residues	Atoms					AltConf
3	A	1	Total 31	C 10	N 5	O 13	P 3	0
3	B	1	Total 31	C 10	N 5	O 13	P 3	0
3	D	1	Total 31	C 10	N 5	O 13	P 3	0
3	C	1	Total 31	C 10	N 5	O 13	P 3	0

- Molecule 4 is CALCIUM ION (CCD ID: CA) (formula: Ca).

Mol	Chain	Residues	Atoms	AltConf
4	A	1	Total Ca 1 1	0
4	B	1	Total Ca 1 1	0
4	D	1	Total Ca 1 1	0
4	C	1	Total Ca 1 1	0

- Molecule 5 is ZINC ION (CCD ID: ZN) (formula: Zn).

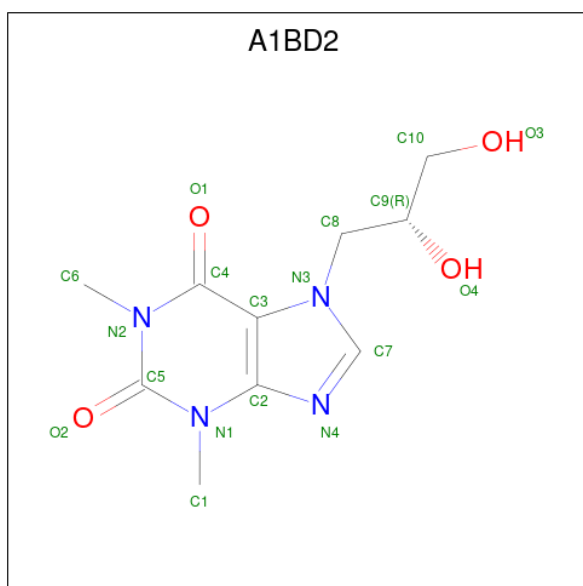
Mol	Chain	Residues	Atoms	AltConf
5	A	1	Total Zn 1 1	0

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Mol	Chain	Residues	Atoms		AltConf
5	B	1	Total	Zn	0
			1	1	
5	D	1	Total	Zn	0
			1	1	
5	C	1	Total	Zn	0
			1	1	

- Molecule 6 is dyphylline (CCD ID: A1BD2) (formula: $C_{10}H_{14}N_4O_4$) (labeled as "Ligand of Interest" by depositor).

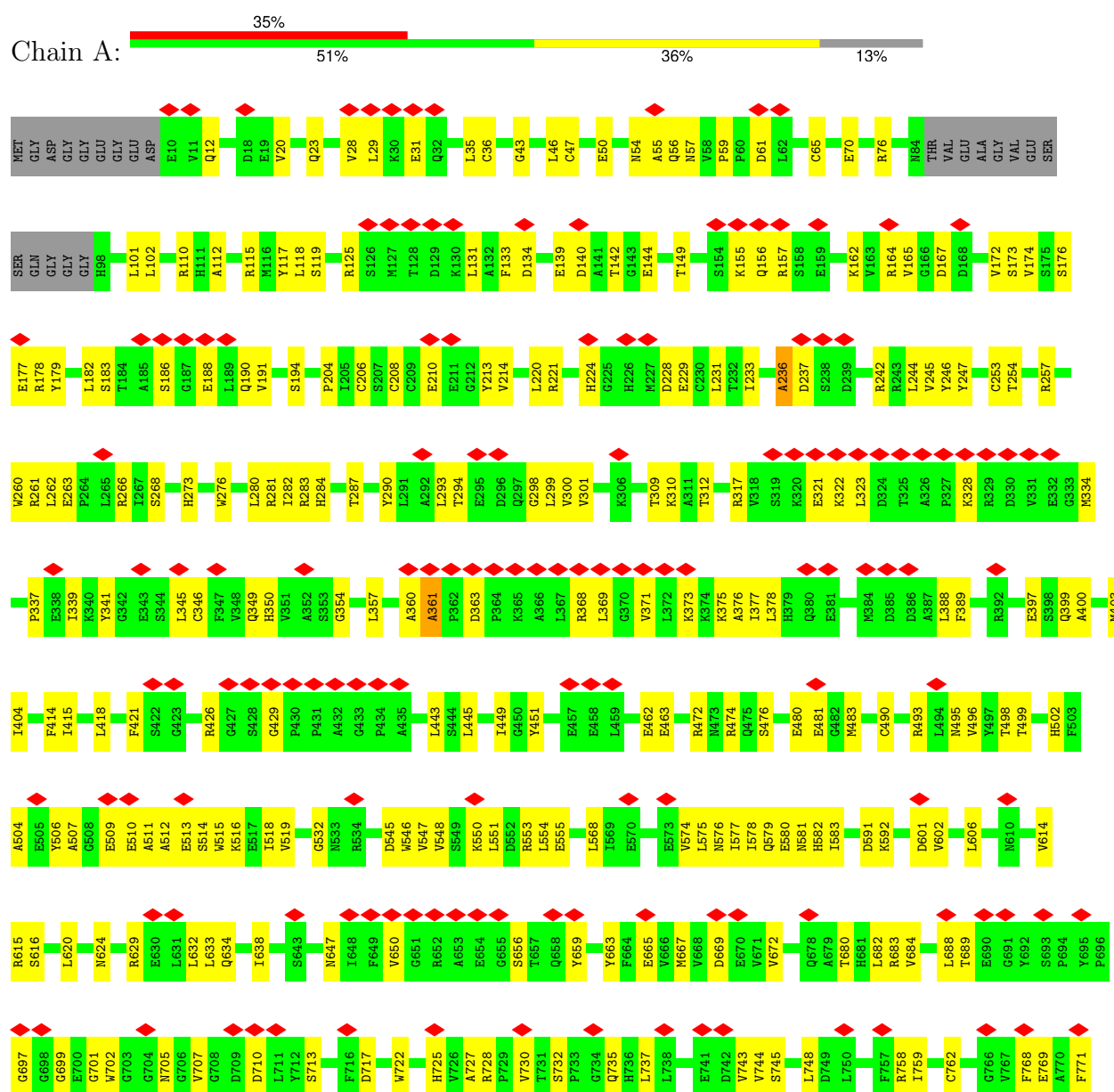


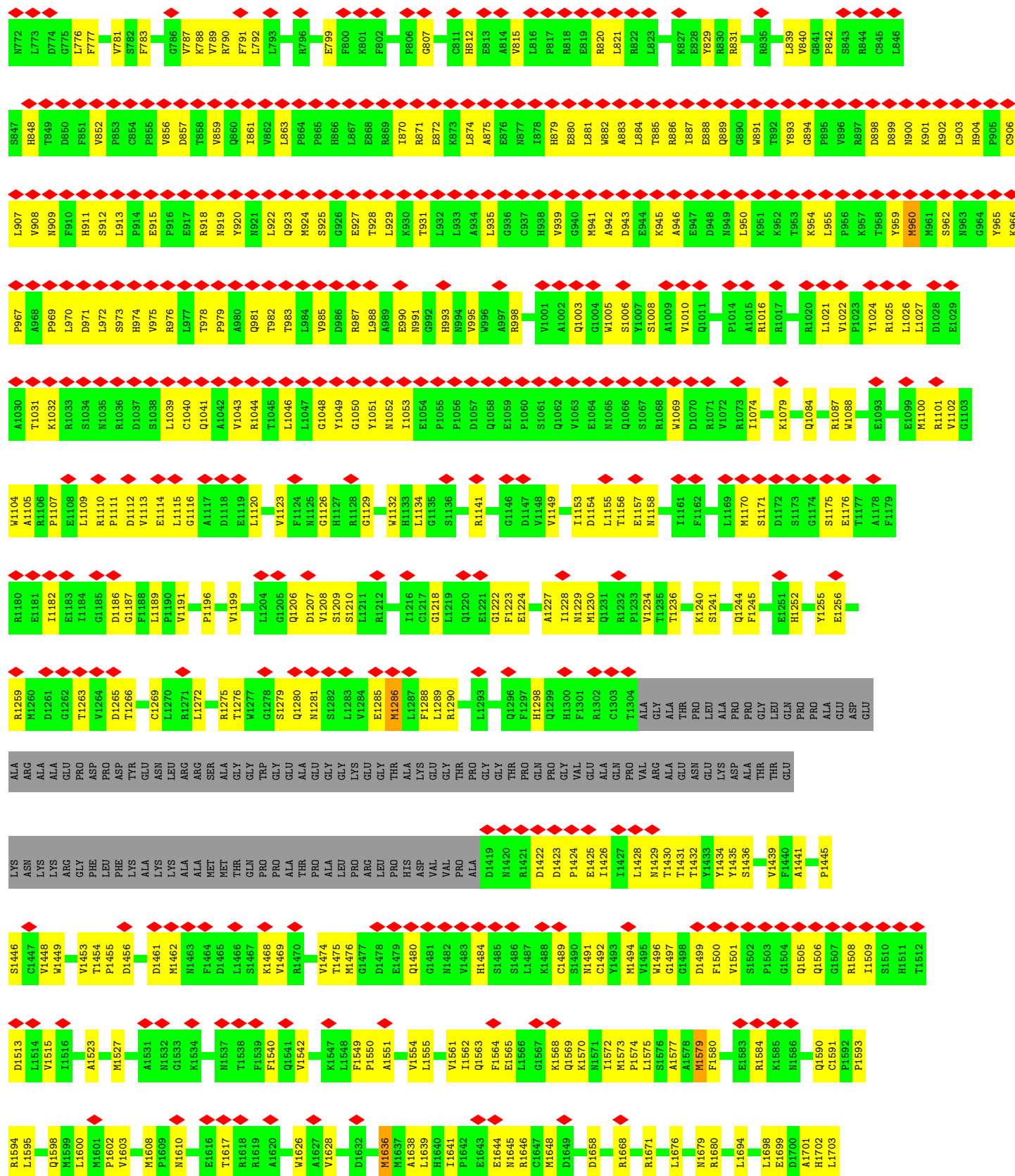
Mol	Chain	Residues	Atoms				AltConf
6	A	1	Total	C	N	O	0
			18	10	4	4	
6	B	1	Total	C	N	O	0
			18	10	4	4	
6	D	1	Total	C	N	O	0
			18	10	4	4	
6	C	1	Total	C	N	O	0
			18	10	4	4	

3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

• Molecule 1: Ryanodine receptor 1





P1704	P1705	P1706	P1707	G1710	G1711	Y1712	D1713	L1714	L1715	I1716	L1720	E1721	G1724	R1727	E1733	E1741	T1742	I1745	P1749	P1750	G1751	R1752	K1753	G1754	G1755	M1756	A1757	R1758	R1759	L1762	L1771	R1772	P1773	S1778	F1782	V1783	A1784	A1785	L1786	P1787	A1788	A1789	G1790	V1791	A1792	E1793	A1794								
P1795	P1796	R1797	L1798	L1804	E1805	A1806	R1813	M1814	L1815	G1816	E1817	A1818	V1819	R1820	D1821	G1822	Q1824	R1827	V1830	E1835	F1836	V1839	L1842	T1847	L1848	A1849	V1850	M1851	G1855	D1856	E1857	D1858	V1859	K1860	Q1861	I1862	L1863	K1864	M1865	E1869	E1873	E1874	GLU	GLU	GLU	GLU	GLU								
GLU	GLU	GLU	GLU	GLU	GLU	GLU	GLU	GLU	ASP	GLU	GLU	LYS	GLU	ASP	GLU	GLU	GLU	GLU	ASP	ALA	GLU	GLU	GLU	GLU	PRO	GLY	GLU	LYS	ASP	L1922	E1923	E1924	G1925	L1926	L1927	Q1928	M1929	K1930	L1931	V1935	K1936	L1937	Q1938	M1939	Y1945										
E1950	E1956	A1960	F1961	A1962	E1963	R1964	Y1965	V1966	L1969	M1972	Q1973	R1976	Y1977	A1978	L1979	L1980	M1981	R1982	A1983	F1984	T1985	M1986	S1987	A1988	A1989	E1990	T1991	A1992	R1993	R1994	T1995	R1996	E1997	F1998	R1999	S2000	P2001	P2002	Q2003	E2004	M2008	L2009	L2010	H2011	F2012	K2013	D2014	E2015	A2016	D2017	E2018	E2019			
D2020	L2023	P2024	E2025	D2026	L2027	R2028	Q2029	D2030	L2031	Q2032	F2034	H2035	Q2036	D2037	L2038	H2041	Q2045	L2046	GLU	GLY	GLU	GLU	GLU	GLU	GLU	THR	SER	LEU	SER	ARG	LEU	LEU	VAL	ARG	LEU	VAL	LYS	LYS	LYS	GLU	GLU	PRO	GLU	GLU	GLU	GLU	GLU	GLU							
LEU	PRO	ALA	E2088	K2089	K2090	P2091	Q2092	S2093	E2096	L2097	M2101	V2102	M2105	D2109	Y2110	V2111	Q2112	L2116	M2120	F2121	S2122	L2123	Q2127	Y2128	D2129	E2133	L2134	L2135	L2138	P2139	R2140	A2141	Y2142	P2146	V2149	E2150	D2151	T2152	M2153	S2154	L2155	Q2161	L2165	S2231	C2232	C2233	R2234								
V2168	Q2169	M2170	Q2173	E2174	E2175	N2176	L2177	M2178	I2182	G2183	L2185	M2186	N2187	N2188	F2191	P2195	N2196	L2197	M2198	A2200	L2201	G2202	M2203	H2204	E2205	T2206	V2207	M2208	E2209	V2210	M2211	V2212	N2213	V2214	L2215	G2216	G2217	G2218	E2219	T2220	K2221	E2222	I2223	R2224	F2225	M2228	V2229	T2230	S2231	C2232	C2233				
F2235	Y2238	F2239	C2240	R2241	L2242	S2243	R2244	Q2245	N2246	Q2247	R2248	S2249	D2252	H2253	L2254	Y2255	L2258	E2259	M2260	S2261	G2262	L2263	Q2264	L2265	Q2266	M2267	Q2268	G2269	S2270	D2274	V2275	S2279	D2282	E2285	L2286	A2287	L2288	A2289	L2290	Q2291	E2292	Q2293	D2294	L2295	E2296	K2297	V2298	L2302	C2305						
G2306	L2307	Q2308	S2309	C2310	L2313	L2314	A2315	K2316	L2317	Y2318	P2319	D2320	I2321	N2324	P2325	C2326	G2327	G2328	E2329	R2330	Y2331	L2332	D2333	F2334	F2340	V2341	E2347	E2348	V2349	A2350	M2351	V2352	V2353	V2354	R2355	I2358	R2359	F2364	L2368	R2369	G2370	E2371	G2372	L2376	L2377	I2380	E2381	E2382	I2384						
R2385	I2386	S2387	E2388	D2389	P2390	A2391	R2392	D2393	G2394	P2395	G2396	ARG	ARG	ASP	ARG	ARG	ARG	GLU	HIS	PHE	GLY	GLU	P2410	F2411	E2412	E2413	N2414	R2415	V2416	H2417	L2418	G2419	H2420	F2425	I2430	D2431	G2434	R2435	C2436	A2437	M2440	H2441	L2442	I2443	Q2444	K2447	G2448	E2449	A2450	L2451	R2452	I2453			
R2454	R2458	S2459	L2460	V2461	P2462	L2463	L2464	D2465	L2466	V2467	G2468	I2469	L2472	P2473	L2474	Q2475	L2476	P2477	T2478	L2479	G2480	K2481	D2482	G2483	A2484	L2485	V2486	Q2487	P2488	K2489	M2490	S2491	A2492	S2493	V2495	P2496	D2497	H2498	K2499	M2502	F2506	R2508	V2509	V2510	G2511	I2512	E2513	N2514	Q2515	D2516	F2517	L2518	L2519		
H2520	D2523	V2524	G2525	G2526	G2527	P2528	D2529	M2530	R2531	A2532	A2533	A2534	S2535	L2536	D2537	T2538	A2539	T2540	F2541	S2542	T2543	T2544	E2545	M2546	A2549	R2552	Y2553	L2554	D2555	L2556	I2562	T2563	K2564	C2565	A2566	P2567	L2568	F2569	A2570	Q2571	T2572	E2573	H2574	R2575	A2576	I2577	M2578	V2579	D2580	S2581	M2582	L2583	H2584	T2585	V2586
V2587	R2588	L2589	S2590	R2591	G2592	R2593	S2594	L2595	A2598	Q2599	D2600	D2601	V2602	L2603	E2604	L2607	M2608	A2609	L2610	C2611	R2612	L2614	R2615	P2616	S2617	M2618	L2619	Q2620	H2621	L2622	L2623	R2624	L2625	L2626	V2627	F2628	P2631	I2632	L2633	N2634	E2635	F2636	A2637	L2641	K2642	L2643	L2644	H2647	V2648	R2649	R2650	C2651			





ASP	Y1255	S1175	R1101	D1028	Y965	P995	C845	L773	G998	R615	A504	I404	M334
GLU	E1256	E1176	V1102	E1029	K966	C906	L846	D774	G699	S616	E505	F414	G335
ALA		T1177	G1103	A1030	P967	L907	S847	G775	E700	L620	Y506	I415	P336
ALA	R1259	A1105	A1105	T1031	A968	Y908	H848	L776	G701	E223	E509	L418	E339
GLU	M1260	F1179	R1106	R1032	P969	N909	T849	F777	G702	E223	E509	L418	E339
PRO	D1261	R1180	P1107	R1033	D971	H911	F851	S782	G704	N624	E510	F421	K340
ASP	G1262	E1181	E1108	R1033	L970	S912	V852	F783	G706	R629	A512	S422	G342
PRO	V1264	I1182	R1109	R1035	L972	S912	V852	G786	G707	E300	E513	G423	E343
TYR	D1265	E1184	P1111	R1036	S973	L913	P853	G787	G708	L632	S514	R426	S344
GLY	T1266	G1185	D1112	D1037	H974	P914	P855	G788	D709	L633	W515	G427	C346
ASN				S1038	V975	E915	V856	G789	D710	Q634	E517	S428	F347
LEU	C1269	F1186	E1114	L1039	R976	P916	D857	G790	D712	I638	E518	G429	V348
ARG	L1270	G1187	L1115	L1040	L977	E917	D857	F791	S713		V519	P430	Q349
SER	R1271	F1188	L1116	Q1041	T978	R918	T858	L792				P431	H350
ALA		P1190	A1117	A1042	P979	N919	V859	L793	F716	S943	G532	P431	G354
GLY		V1191	D1118	V1043	A980	R920	Q860	G794	D717	N647	N533	A432	L357
TRP		P1196	E1119	R1044	Q981	Y921	T861	G795	W722	I648	R534	G433	
GLY		V1199	L1120	T1045	T982	L922	V862	R796				P434	
GLU			V1123	L1046	T983	Q923	L863		H725	F649	D545	A435	A360
GLU		L1204	F1124	L1047	L984	N924	P864	E799	W726	V650	W546	L443	A361
GLY	G1205	N1125	N1125	G1048	V985	S925	P865	F800	A727	G651	V547	L443	P362
GLY	Q1206	H1126	H1126	Y1049	D986	G926	H866	K801	R728	R652	S549	L445	D363
LYS	D1207	L1127	L1127	G1050	R987	E927	L867	F802	P729	A653	K550		P364
GLU	V1208	R1128	R1128	Y1051	L988	T928	E868	P806	V730	E654	D552	I449	K365
GLY	E1265	G1129	G1129	M1052	A989	N952	R869	G807	S732	G655	R553	G450	A366
THR	M1286	S1209	S1209	I055	E990	L929	L870		S733	T657	L554	Y451	L367
ALA	L1287	S1210	H1133	E1054	G992	K930	R871	C811	G734	Q858	L568	E457	R368
GLY	F1288	L1134	H1134	P1055	N991	T931	E872	H812	Q735	Y659	I569	E458	L369
GLU	L1289	G1135	G1135	P1056	H993	L932	K873	E813	L737		E570	L459	G370
THR	R1290	S1136	S1136	D1057	V995	A934	L874	A814	L738	F664	E573	E462	L372
PRO				Q1058	W996	L935	A875	V815		E665		E463	K374
GLY	Q1220		R1141	Q1059	A997	G936	E876	L816	E741		V574	R472	K374
GLY	E1221		G1146	E1060	R998	C937	N877	P817	D742	D669	L575	M473	K375
THR	F1222		D1147	S1061	H938	H938	L878	R818	V743	E670	N576	R474	A376
GLN	E1224		V1148	Q1062	V1001	V939	H879	E819	W744	V671	I577	Q475	I377
GLY			V1149	Q1063	A1002	G940	E880	R820	S745	V672	Q579	S476	L378
VAL				V1063	Q1003	G940	L881	L821	L748	Q678	E580	E480	E381
GLU	I1228		L1153	E1064	G1004	N941	R822	R822	D749	A879	N581	E481	G382
ALA	M1229		D1154	M1065	V1005	A942	W882	L823	L750	T880	H582	E481	G382
ALA	M1230		L1155	Q1066	S1006	D943	A883	E824	F757	L682	I583	M483	H383
PRO	Q1231		L1156	Q1067	S1008	E944	L884	K827	R758	R683	D591	C490	M384
VAL	R1232		E1157	S1067	Y1007	K945	T885	E828	R759	R684	K592	C490	D386
ARG	P1233		N1158	W1068	A1009	A946	R886	Y829	C762		D601	R493	A387
ALA	V1234			V1069	V1010	E947	T887	R830	G766	L688	V502	R493	L388
GLU	T1235			Q1011	Q1011	P948	E888	R831	V767	T689	L506	M495	F389
ASN				P1014	A1015	N949	Q889	E832	F768	E890		V496	
PRO	K1240			A1016	R1017	L950	K891	R635	G691	G691		T497	
ALA	S1241			R1017	R1017	L950	T892	L839	A770	Y692		T499	
ALA				Q1084	L1021	L955	H893	G841	E769	S693		H502	
GLY	Q1244			P1023	L1021	P956	C894	P842	F771	P694		F503	
LEU	F1245			Y1024	L1026	P956	H896	S843	N772	P696			
GLN				L1027	L1027	P957	R897	R844					
PRO				E1093		P959	D898						
PRO				E1099		Y959	D899						
ALA						N960	N900						
GLU						K901	N902						
GLU						L903	L904						
GLU						G964							





S4052	S4053	S4054	S4055	S4056	M4057	K4060	F4061	F4062	D4063	M4064	F4065	L4066	L4067	L4068	L4069	D4070	L4071	F4077	Q4078	D4079	F4080	V4081	T4082	D4083	F4084	R4085	G4086	S4007	S4008	Q4009	I4010	D4092	F4093	M4096	M4097	D4098	S4099	Q4100	K4101	G4105	Q4109	L4112	M4037	M4041	R4042	M4044	I4123	M4124	V4049	E4127	F4128	A4129																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
T3966	T3969	V4055	Q3970	G3971	P3972	K4060	F4061	L3980	S3983	R3984	L3985	V3986	D3987	A3988	V3989	V3990	G3991	F3992	V3995	F3996	M4000	M4001	L4002	D4083	R4085	G4086	S4007	S4008	Q4009	I4010	D4092	F4093	M4096	M4097	D4098	S4099	Q4100	K4101	G4105	Q4109	L4112	M4037	M4041	R4042	M4044	I4123	M4124	V4049	E4127	F4128	A4129																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
S3768	R3769	L3770	H3771	T3772	R3773	G3774	A3775	A3776	E3777	K3778	L3780	Q3781	N3782	C3786	G3787	G3788	M3793	T3797	T3802	N3809	V3812	Q3813	Q3814	K3815	D3818	Y3819	S3825	S3831	T3832	Q3833	K3731	A3834	Q3837	T3838	L3842	D3843	L3844	R3849	Q3850	N3851	A3852	E3854	G3855	L3856	G3857	V3961																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
N3858	V3859	N3860	E3861	D3862	G3863	T3864	V3865	L3866	N3867	R3868	N3869	N3870	G3871	E3872	K3873	V3874	N3875	A3876	D3877	D3878	R3886	D3898	F3899	R3904	T3905	Q3906	T3912	L3924	Q3927	T3930	S3931	D3932	F3933	Y3937	K3940	D3941	Q3946	R3949	N3950	F3951	S3952	K3953	M3954	S3956	V3957	V3961																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
E3685	E3686	E3687	E3688	E3689	V3690	E3691	E3692	K3693	D3696	P3697	L3698	K3699	L3700	V3702	L3703	H3704	F3705	T3708	S3714	K3715	L3716	D3717	Q3718	D3719	Y3720	M3723	A3724	T3728	K3729	A3730	K3731	C3732	H3734	L3735	E3736	GLU	GLY	GLY	ASN	GLY	ALA	ALA	G3854	G3855	L3856	G3857																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
A3618	V3619	V3620	H3621	K3622	L3623	L3624	S3625	K3626	Q3627	R3628	R3629	R3630	A3631	V3632	V3633	A3634	C3635	F3636	R3637	M3638	T3639	L3640	L3641	V3642	N3643	L3644	H3647	R3648	A3649	C3650	M3652	R3653	L3654	Y3657	K3658	A3659	A3660	V3661	I3662	E3665	D3666	H3667	S3668	D3671	R3672	G3673	E3674	G3681	E3682	Q3683	E3694																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
E3685	E3686	E3687	E3688	E3689	V3690	E3691	E3692	K3693	D3696	P3697	L3698	K3699	L3700	V3702	L3703	H3704	F3705	T3708	S3714	K3715	L3716	D3717	Q3718	D3719	Y3720	M3723	A3724	T3728	K3729	A3730	K3731	C3732	H3734	L3735	E3736	GLU	GLY	GLY	ASN	GLY	ALA	ALA	G3854	G3855	L3856	G3857																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
S3768	R3769	L3770	H3771	T3772	R3773	G3774	A3775	A3776	E3777	K3778	L3780	Q3781	N3782	C3786	G3787	G3788	M3793	T3797	T3802	N3809	V3812	Q3813	Q3814	K3815	D3818	Y3819	S3825	S3831	T3832	Q3833	K3731	A3834	Q3837	T3838	L3842	D3843	L3844	R3849	Q3850	N3851	A3852	E3854	G3855	L3856	G3857	V3961																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
N3858	V3859	N3860	E3861	D3862	G3863	T3864	V3865	L3866	N3867	R3868	N3869	N3870	G3871	E3872	K3873	V3874	N3875	A3876	D3877	D3878	R3886	D3898	F3899	R3904	T3905	Q3906	T3912	L3924	Q3927	T3930	S3931	D3932	F3933	Y3937	K3940	D3941	Q3946	R3949	N3950	F3951	S3952	K3953	M3954	S3956	V3957	V3961																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
T3966	T3969	V4055	Q3970	G3971	P3972	K4060	F4061	L3980	S3983	R3984	L3985	V3986	D3987	A3988	V3989	V3990	G3991	F3992	V3995	F3996	M4000	M4001	L4002	D4083	R4085	G4086	S4007	S4008	Q4009	I4010	D4092	F4093	M4096	M4097	D4098	S4099	Q4100	K4101	G4105	Q4109	L4112	M4037	M4041	R4042	M4044	I4123	M4124	V4049	E4127	F4128	A4129																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
G3254	G3255	L3256	A3257	E3258	S3259	G3260	A3261	R3262	Y3263	L3264	E3265	M3266	P3267	H3268	V3269	Q3209	L3210	E3271	L3272	T3273	L3274	P3275	M3276	L3277	C3278	S3279	Y3219	Y3280	L3281	P3282	R3283	W3284	W3285	E3286	R3287	G3288	P3289	E3290	A3291	P3292	L3293	P3294	A3295	L3296	P3297	A3298	E3299	H3300	P3301	P3302	G3303	C3304	R3305	A3306	V3307	T3308	S3309	D3310	H3311	M3312	N3313	T3323	T3324	T3325	N3326	L3327	G3328	I3329	D3330	E3331	A3332	T3333	W3334	K3335	K3336	K3337	L3338	A3339	V3340	F3341	A3342	Q3343	R3344	T3345	V3346	S3347	R3348	A3349	R3350	P3351	E3352	L3353	L3354	H3355	S3356	H3357	D3358	GLY	ASP	ALA	GLN	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY



ME1	GLY	ASP	GLY	GLY	GLY	GLU	GLU	GLU	ASP	E10	V11	Q12	D18	E19	V20	Q23	V28	L29	K30	E31	Q32	L35	C36	G43	L46	C47	E50	N54	A55	Q56	N57	V58	P59	P60	D61	L62	C65	E70	R76	N84	THR	VAL	GLU	ALA	GLY	VAL	GLU	SER										
SER	GLN	GLY	GLY	GLY	H98	L101	L102	R110	H111	A112	R115	M116	Y117	L118	S119	R125	S126	M127	T128	D129	K130	L131	D134	E139	D140	A141	T142	G143	E144	T149	A153	S154	K155	Q156	R157	S158	E159	K162	V163	R164	V165	G166	D167	D168	V172	S173	V174	S175	S176									
E177	R178	Y179	L182	S183	T184	A185	S186	G187	E188	L189	Q190	Y191	S194	P204	T205	C206	C208	C209	E210	E211	G212	Y213	V214	L220	R221	H224	G225	H226	M227	D228	E229	C230	L231	T232	I233	A236	D237	S238	D239	R242	R243	L244	V245	Y246	Y247	C253	T254	G255	R257									
W260	R261	E263	P264	L265	R266	I267	S268	W269	H273	W276	L280	R281	T282	R283	H284	T287	Y290	L291	A292	L293	T294	E295	D296	Q297	G298	L299	V300	V301	K306	T309	K310	A311	T312	R317	V318	S319	K320	E321	K322	L323	D324	T325	A326	P327	K328	R329	D330	V331	E332	G333								
M334	P337	E338	L339	K340	Y341	G342	E343	S344	L345	C346	F347	V348	H350	G354	L357	A360	A361	P362	D363	P364	K365	A366	L367	R368	L369	G370	V371	L372	K373	K374	K375	A376	I377	L378	E381	G382	H383	M384	D385	D386	A387	L388	F389	R392	E397	S398	Q399	A400	M403	I404								
F414	I415	L418	F421	S422	G423	R426	G427	S428	G429	P430	P431	A432	G433	A435	L443	S444	L445	I449	G450	Y451	E457	E458	L459	E462	E463	R472	N473	R474	Q475	S476	E480	E481	G482	M483	C490	R493	L494	N495	V496	Y497	T498	T499	H502	F503	A504													
E505	Y506	A507	G508	E509	E510	A511	A512	E513	S514	Y515	K516	E517	V518	V519	G522	N533	R534	D545	W546	V547	V548	S549	K550	L551	R552	R553	L554	E555	L568	L569	E570	E573	V574	L575	L576	L577	L578	L579	E580	N581	H582	L583	D591	D601	V602	L606	N610	V614	R615									
S616	L620	E623	N624	R629	E630	L631	L632	L633	Q634	T638	S643	R647	T648	F649	V650	G651	R652	A653	E654	G655	S656	T657	Q658	Y659	Y663	F664	E665	V666	N667	V668	D669	E670	D678	L682	R683	V684	L688	T689	E690	G691	V692	S693	P694	V695	P696	G697	G698	E700										
G701	W702	G703	G704	W705	G706	G708	D709	D710	L711	W712	S713	F716	D717	W722	H725	Y726	A727	R728	F729	W730	T731	S732	F733	G734	Q735	H736	L737	L738	E741	D742	W743	V744	S745	L748	D749	L750	F757	R758	W759	C762	G766	V767	F768	E769	A770	F771	N772	L773	D774	G775								
L776	F777	W781	S782	F783	G786	W787	K788	W789	R790	F791	L792	L793	G794	G795	R796	E799	F800	K801	F802	P806	O807	C811	H812	E813	H814	R815	L816	P817	R818	E819	R820	L821	R822	L823	E824	R827	E828	Y829	R830	R831	E832	R835	L839	V840	G841	P842	R843	R844	C845	L846	S847							
H848	T849	D850	F851	V852	P853	C854	P855	V856	D857	T858	V859	Q860	R861	V862	L863	P864	P865	H866	L867	E868	R869	I870	R871	E872	K873	L874	A875	E876	N877	L878	H879	E880	L881	W882	A883	L884	T885	R886	L887	E888	Q889	G890	W891	T892	H893	Q894	P895	V896	R897	D898	D899	N900	K901	R902	L903	H904	C905	L907
V908	N909	F910	H911	S912	L913	F914	E915	V916	E917	R918	N919	Y920	N921	L922	Q923	N924	S925	G926	E927	T928	A929	K930	L931	L932	L933	A934	L935	G936	C937	H938	V939	G940	M941	A942	D943	E944	K945	A946	E947	D948	L950	K951	A952	T953	K954	L955	P956	K957	T958	Y959	N960	N961	S962	N963	G964	K965	C966	P967
A968	P969	L970	D971	L972	S973	H974	V975	R976	L977	T978	P979	A980	Q981	T982	T983	L984	V985	D986	R987	L988	A989	E990	N991	G992	H993	N994	V995	A996	A997	R998	V1001	A1002	Q1003	G1004	I1005	S1006	Y1007	S1008	A1009	V1010	Q1011	F1014	A1015	R1016	R1017	R1020	L1021	V1022	F1023	Y1024	R1025	L1026	L1027	D1028	E1029	A1030		



ARG	THR	GLU	LYS	LYS	LYS	THR	ARG	LYS	ILE	SER	GLN	THR	ALA	GLN	THR	TYR	ASP	PRO	ARG	GLY	Y2855	N2856	P2857	Q2858	P2859	P2860	D2861	D2862	D2863	D2864	V2865	T2866	S2867	S2868	V2869	T2870	L2871	R2872	P2873	F2874	GLY	ALA	THR	VAL	ASP	ALA	GLU	GLY	N2734	F2735	F2736	T2737	T2738	P2739	V2740	E2741	Y2742	L2743	N2744	V2745	L2746	L2747	P2748	F2749	K2750	L2751	D2752	Q2753	F2754	L2755	N2756	K2757	F2758	A2759	E2760	T2761	T2762	H2763	E2764	K2765	V2766	A2767	F2768	D2769	K2770	L2771	Q2772	GLU	GLU
N2773	N2774	N2775	S2776	Y2777	Q2778	E2779	N2780	V2781	D2782	E2783	E2784	L2785	K2786	T2787	H2788	P2789	M2790	L2791	R2792	P2793	Q2794	P2795	T2796	F2797	S2798	E2799	K2800	D2801	K2802	E2803	L2804	Y2805	R2806	N2807	P2808	L2809	K2810	E2811	S2812	L2813	K2814	A2815	N2816	L2817	A2818	N2819	E2820	N2821	T2822	L2823	E2824	K2825	A2826	R2827	E2828	Q2829	GLU	GLU																															
E2019	D2020	L2023	P2024	E2025	D2026	L2027	Q2028	Q2029	D2030	L2031	Q2032	D2033	F2034	Q2035	Q2036	D2037	L2038	H2041	Q2045	L2046	GLU	GLY	GLU	GLU	GLU	GLU	PRO	GLU	GLU	GLU	THR	SER	SER	SER	LEU	ARG	LEU	SER	LEU	LEU	GLU	THR	VAL	ARG	LEU	VAL	V2149	E2150	D2151	L2152	Y2153	M2153	S2154	L2155	Q2161	T2230	S2231																																
L2165	L2166	L2167	V2168	Q2169	M2170	E2173	E2174	P2091	Q2092	S2093	D2094	Q2095	L2096	L2097	V2098	M2101	V2102	W2105	D2109	Y2110	Y2111	Q2112	L2116	M2120	F2121	S2122	L2123	Q2127	Y2128	D2129	E2133	L2134	L2135	L2138	P2139	R2140	A2141	Y2142	P2146	V2149	E2150	D2151	Y2152	M2153	S2154	L2155	Q2161	T2230	S2231																																								
C2232	C2233	R2234	F2235	Y2238	F2239	C2240	L2241	I2242	S2243	R2244	Q2245	N2246	Q2247	S2249	D2252	H2253	L2254	S2255	Y2256	L2257	L2258	E2259	N2260	S2261	Q2262	L2263	G2264	L2265	G2266	M2267	Q2268	Q2269	S2270	D2274	V2275	D2282	E2285	L2286	A2287	L2288	A2289	L2290	Q2291	E2292	Q2293	D2294	L2295	E2296	K2297	V2298	L2302																																						
C2305	G2306	Q2307	Q2308	S2309	C2310	L2313	L2314	A2315	K2316	Q2317	Y2318	F2319	D2320	I2321	N2324	P2325	C2326	G2327	G2328	E2329	L2330	Y2331	L2332	D2333	F2334	F2340	V2341	E2347	E2348	N2349	A2350	R2351	V2352	V2353	V2354	R2355	I2358	R2359	F2364	L2368	R2369	G2370	E2371	G2372	L2376	L2377	I2380	E2381	E2382	A2383																																							
L2384	R2385	L2386	S2387	E2388	D2389	P2390	L2391	A2391	R2392	D2393	G2394	P2395	G2396	V2397	ARG	ARG	ASP	ARG	ARG	GLU	HIS	PHE	GLY	GLU	GLU	P2410	P2411	E2412	E2413	N2414	R2415	V2416	H2417	L2418	H2419	H2420	F2425	D2431	Q2434	R2435	C2436	A2437	M2440	H2441	L2442	L2443	Q2444	K2447	G2448	E2449	A2450	L2451	R2452																																				
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F2517	L2518	L2519	H2520	D2523	V2524	Q2525	F2526	L2527	P2528	D2529	M2530	R2531	A2534	E2535	L2536	D2537	T2538	A2539	T2540	F2541	S2542	T2543	T2544	E2545	M2546	A2549	R2552	V2553	L2554	C2555	L2556	T2562	T2563	K2564	C2565	A2566	P2567	L2568	F2569	A2570	Q2571	T2572	F2573	H2574	R2575	A2576	L2577	N2578	V2579	D2580	S2581	N2582	L2583	H2584																																			
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D2713	Y2714	V2715	D2716	A2717	S2718	Y2719	S2720	SER	S2721	K2722	A2723	E2724	K2725	LYS	THR	VAL	ASP	ALA	GLU	GLY	N2734	F2735	F2736	T2737	T2738	P2739	V2740	E2741	Y2742	L2743	N2744	V2745	L2746	L2747	P2748	F2749	K2750	L2751	D2752	Q2753	F2754	L2755	N2756	K2757	F2758	A2759	E2760	T2761	T2762	H2763	E2764	K2765	V2766	A2767	F2768	D2769	K2770	L2771	Q2772																														
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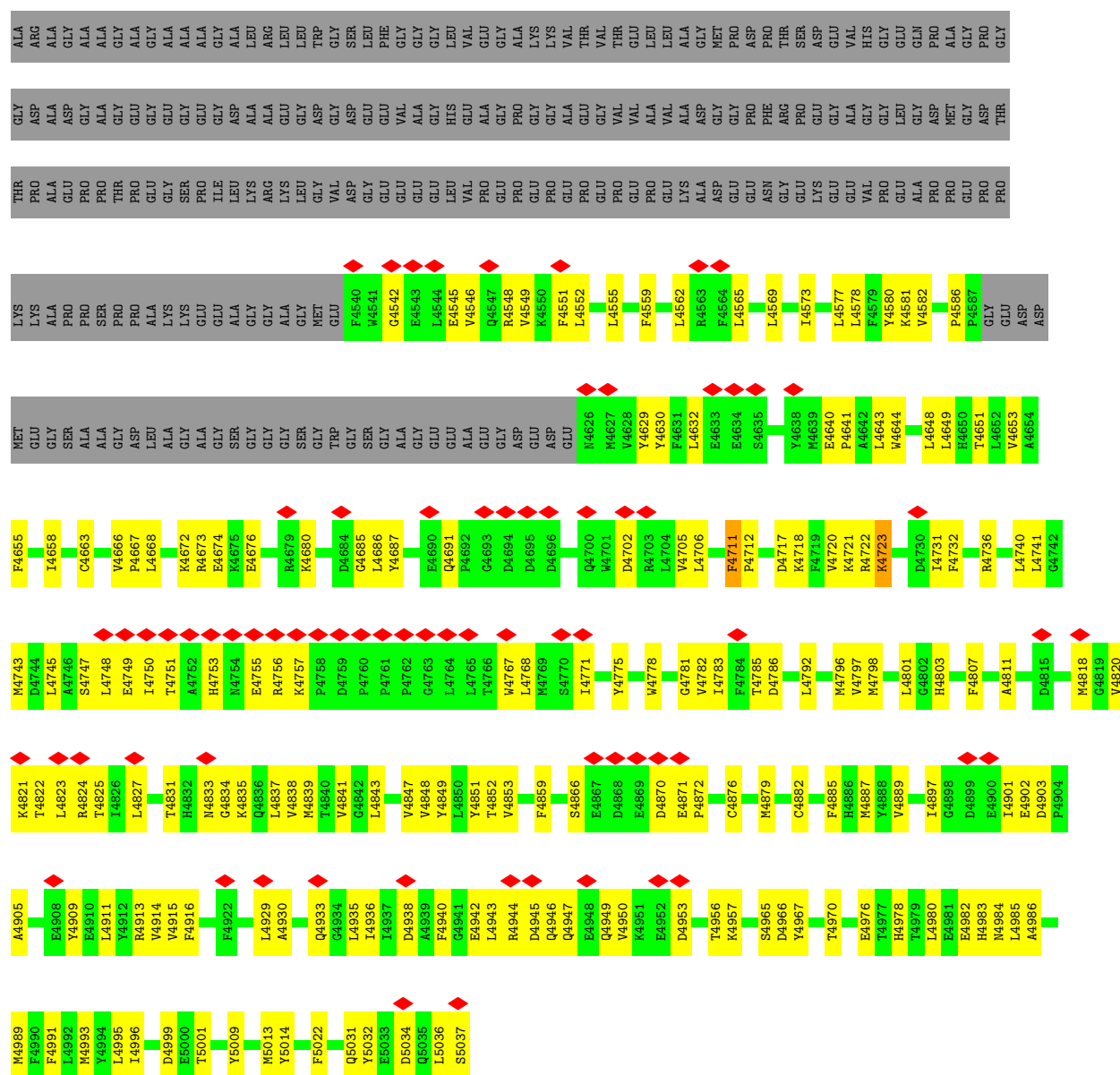




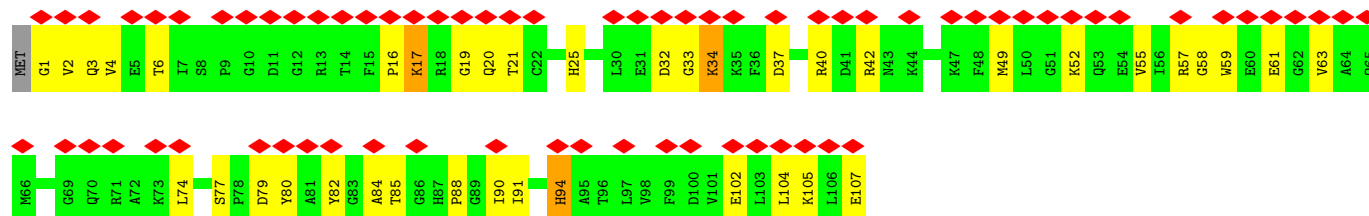




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GLY	W4205	N4120	A4041	N3950	L3944	GLY	S3668	L3606	T3545	ALA	H3422	L3362
ALA	E4206	I4123	R4042	S3951	R3849	ALA	D3671	E3607	D3546	SER	W3423	G3363
THR	Q4209	N4124	Q4043	K3953	Q3851	GLU	K3672	Q3608	E3547	GLY	L3424	G3364
VAL	V4210	E4127	M4044	M3955	K3852	GLU	M3673	E3610	V3549	SER	T3425	L3365
ALA	I4218	E4129	V4049	V3957	E3854	GLU	A3680	H3611	R3551	ASP	E3426	R3366
GLY	F4219	A4129	S4052	V3961	G3681	GLU	G3682	P3612	R3552	GLN	P3427	K3367
THR	D4220	N4130	S4053	T3966	E3682	THR	Q3683	Y3613	F3553	ARG	N3428	R3368
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LEU	N4223	P4135	V4055	Q3971	E3686	ALA	E3687	K3616	Q3554	LYS	N3430	G3370
ALA	E4224	A4136	M4057	G3972	E3688	GLU	E3688	K3617	N3555	LYS	A3431	K3371
ALA	G4225	R4137	K4060	L3980	E3689	GLU	V3690	H3621	Q3556	LYS	E3432	V3372
ALA	G4226	D4138	F4062	S3983	E3691	GLU	E3692	K3622	L3557	ALA	E3433	V3373
ALA	E4227	I4139	D4063	E3984	E3692	GLU	K3693	L3623	L3558	ALA	L3434	A3374
ARG	A4228	I4142	M4064	W3986	E3693	GLU	F3695	L3624	H3559	ALA	F3435	A3375
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LEU	V4235	N4149	K4067	W3987	E3695	GLU	E3696	K3626	Q3560	ALA	M3437	E3377
ARG	W4240	E4152	D4070	E3988	E3696	GLU	E3699	R3627	G3561	ALA	V3438	Q3378
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ARG	E4253	P4158	D4079	F3992	E3700	GLU	L3703	R3631	G3565	ALA	F3442	E3382
VAL	P4254	R4159	Q4080	V3996	E3701	GLU	L3704	A3631	G3566	ALA	I3443	A3383
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ARG	PRO	F4163	R4085	M4001	E3704	GLU	S3714	C3635	L3575	ALA	S3448	A3386
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THR	ASP	E4168	S4007	L4003	E3706	GLU	L3716	R3637	G3578	ALA	N3450	E3388
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THR	GLY	F4177	A4096	E4015	E3711	GLU	K3723	L3644	E3583	ALA	N3465	Y3400
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ALA	ALA				E3721	GLY	L3735	K3657	V3593	ALA	S3475	P3410
ALA	ALA				E3722	GLY	E3736	Y3657	R3594	ALA	K3476	L3411
ALA	ALA				E3723	GLY	GLY	K3658	R3595	ALA	M3477	L3412
ALA	ALA				E3724	GLY	GLY	A3659	R3596	ALA	K3478	R3414
ALA	ALA				E3725	GLY	GLY	W3661	Q3597	ALA	A3479	Y3415
ALA	ALA				E3726	GLY	GLY	I3662	V3599	ALA	L3542	D3417
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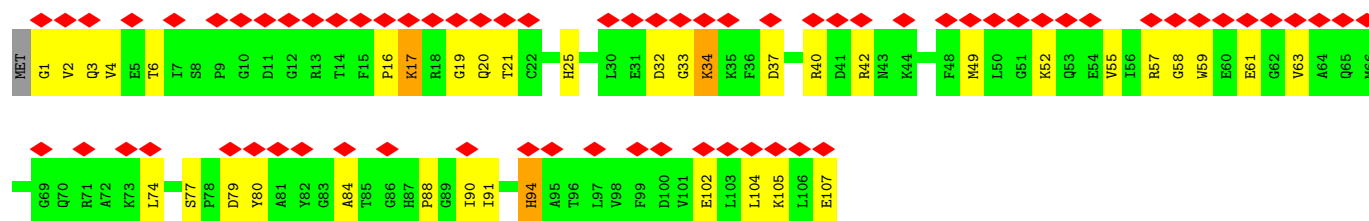


• Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1A

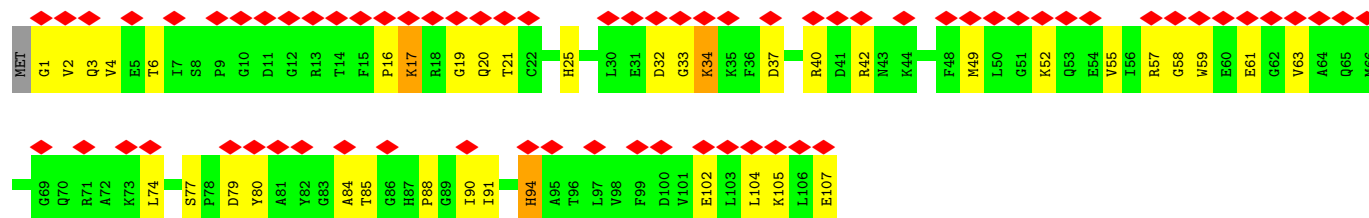


• Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1A

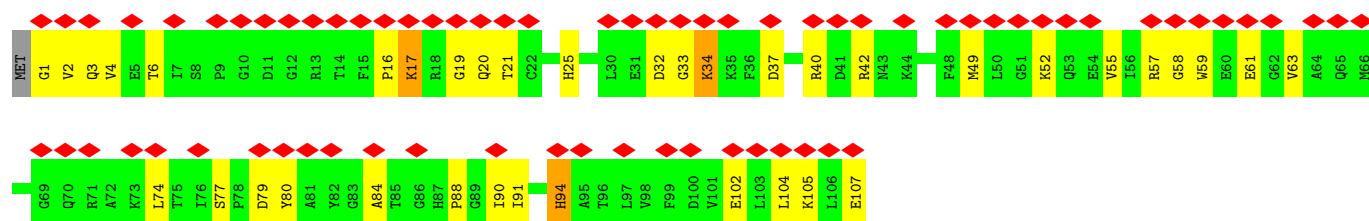




• Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1A



• Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1A



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	113183	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	58	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	1500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.268	Depositor
Minimum map value	-0.112	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.016	Depositor
Recommended contour level	0.1	Depositor
Map size (Å)	427.008, 427.008, 427.008	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.834, 0.834, 0.834	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: ATP, ZN, CA, A1BD2

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z > 5$	RMSZ	$\# Z > 5$
1	A	0.21	1/35977 (0.0%)	0.47	27/48726 (0.1%)
1	B	0.21	1/35977 (0.0%)	0.47	27/48726 (0.1%)
1	C	0.21	1/35977 (0.0%)	0.47	26/48726 (0.1%)
1	D	0.21	1/35977 (0.0%)	0.47	27/48726 (0.1%)
2	E	0.32	0/850	0.81	6/1146 (0.5%)
2	F	0.32	0/850	0.81	6/1146 (0.5%)
2	G	0.32	0/850	0.81	6/1146 (0.5%)
2	H	0.32	0/850	0.81	6/1146 (0.5%)
All	All	0.22	4/147308 (0.0%)	0.48	131/199488 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	6
1	B	0	6
1	C	0	6
1	D	0	6
All	All	0	24

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	2440	MET	SD-CE	5.18	1.92	1.79
1	C	2440	MET	SD-CE	5.18	1.92	1.79
1	A	2440	MET	SD-CE	5.17	1.92	1.79
1	D	2440	MET	SD-CE	5.17	1.92	1.79

The worst 5 of 131 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	3622	LYS	CB-CG-CD	14.01	143.52	111.30
1	B	3622	LYS	CB-CG-CD	14.00	143.51	111.30
1	C	3622	LYS	CB-CG-CD	14.00	143.51	111.30
1	D	3622	LYS	CB-CG-CD	13.98	143.46	111.30
1	A	3622	LYS	CG-CD-CE	13.35	142.01	111.30

There are no chirality outliers.

5 of 24 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1025	ARG	Sidechain
1	A	2702	CYS	Peptide
1	A	3196	ARG	Sidechain
1	A	3366	ARG	Sidechain
1	A	3436	ARG	Sidechain

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	35150	0	34795	1578	0
1	B	35150	0	34795	1574	0
1	C	35150	0	34795	1594	0
1	D	35150	0	34795	1595	0
2	E	831	0	831	45	0
2	F	831	0	831	43	0
2	G	831	0	831	44	0
2	H	831	0	831	43	0
3	A	31	0	12	0	0
3	B	31	0	12	0	0
3	C	31	0	12	0	0
3	D	31	0	12	0	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
5	A	1	0	0	0	0
5	B	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	C	1	0	0	0	0
5	D	1	0	0	0	0
6	A	18	0	0	3	0
6	B	18	0	0	3	0
6	C	18	0	0	3	0
6	D	18	0	0	3	0
All	All	144128	0	142552	6434	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 22.

The worst 5 of 6434 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:3365:LEU:HD11	1:D:3405:LEU:HD23	1.43	1.00
1:B:899:ASP:OD1	1:B:902:ARG:NH2	1.95	0.99
1:B:3308:THR:OG1	1:B:3310:ASP:OD1	1.80	0.99
1:A:899:ASP:OD1	1:A:902:ARG:NH2	1.95	0.99
1:C:899:ASP:OD1	1:C:902:ARG:NH2	1.95	0.99

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	4385/5037 (87%)	4253 (97%)	128 (3%)	4 (0%)	48	77
1	B	4385/5037 (87%)	4254 (97%)	127 (3%)	4 (0%)	48	77
1	C	4385/5037 (87%)	4253 (97%)	128 (3%)	4 (0%)	48	77
1	D	4385/5037 (87%)	4254 (97%)	127 (3%)	4 (0%)	48	77
2	E	105/108 (97%)	103 (98%)	2 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	F	105/108 (97%)	103 (98%)	2 (2%)	0	100	100
2	G	105/108 (97%)	103 (98%)	2 (2%)	0	100	100
2	H	105/108 (97%)	103 (98%)	2 (2%)	0	100	100
All	All	17960/20580 (87%)	17426 (97%)	518 (3%)	16 (0%)	50	77

5 of 16 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	3300	ALA
1	A	4711	PHE
1	B	3300	ALA
1	B	4711	PHE
1	D	3300	ALA

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	3836/4276 (90%)	3819 (100%)	17 (0%)	89	94
1	B	3836/4276 (90%)	3819 (100%)	17 (0%)	89	94
1	C	3836/4276 (90%)	3819 (100%)	17 (0%)	89	94
1	D	3836/4276 (90%)	3819 (100%)	17 (0%)	89	94
2	E	89/90 (99%)	87 (98%)	2 (2%)	47	68
2	F	89/90 (99%)	87 (98%)	2 (2%)	47	68
2	G	89/90 (99%)	87 (98%)	2 (2%)	47	68
2	H	89/90 (99%)	87 (98%)	2 (2%)	47	68
All	All	15700/17464 (90%)	15624 (100%)	76 (0%)	88	92

5 of 76 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	3622	LYS

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Mol	Chain	Res	Type
1	C	2870[B]	GLU
1	C	960	MET
1	C	2584[B]	HIS
1	C	3856	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 177 such sidechains are listed below:

Mol	Chain	Res	Type
1	D	3109	ASN
1	C	1298	HIS
1	D	3523	ASN
1	D	4547	GLN
1	C	1941	ASN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 16 ligands modelled in this entry, 8 are monoatomic - leaving 8 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
6	A1BD2	B	5304	-	16,19,19	0.82	1 (6%)	15,28,28	1.20	1 (6%)
6	A1BD2	C	5304	-	16,19,19	0.82	1 (6%)	15,28,28	1.20	1 (6%)
3	ATP	C	5301	-	28,33,33	0.87	2 (7%)	34,52,52	0.81	0
6	A1BD2	D	5304	-	16,19,19	0.82	0	15,28,28	1.20	1 (6%)
6	A1BD2	A	5304	-	16,19,19	0.82	1 (6%)	15,28,28	1.20	1 (6%)
3	ATP	B	5301	-	28,33,33	0.87	2 (7%)	34,52,52	0.81	0
3	ATP	A	5301	-	28,33,33	0.88	2 (7%)	34,52,52	0.81	0
3	ATP	D	5301	-	28,33,33	0.88	2 (7%)	34,52,52	0.82	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	A1BD2	B	5304	-	-	2/4/6/6	0/2/2/2
6	A1BD2	C	5304	-	-	2/4/6/6	0/2/2/2
3	ATP	C	5301	-	-	8/18/38/38	0/3/3/3
6	A1BD2	D	5304	-	-	2/4/6/6	0/2/2/2
6	A1BD2	A	5304	-	-	2/4/6/6	0/2/2/2
3	ATP	B	5301	-	-	8/18/38/38	0/3/3/3
3	ATP	A	5301	-	-	8/18/38/38	0/3/3/3
3	ATP	D	5301	-	-	8/18/38/38	0/3/3/3

The worst 5 of 11 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	5301	ATP	C1'-N9	-2.39	1.44	1.49
3	B	5301	ATP	C1'-N9	-2.39	1.44	1.49
3	D	5301	ATP	C1'-N9	-2.39	1.44	1.49
3	C	5301	ATP	C1'-N9	-2.39	1.44	1.49
3	A	5301	ATP	C8-N7	-2.23	1.30	1.34

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	B	5304	A1BD2	C2-N1-C5	-2.66	119.76	122.22
6	D	5304	A1BD2	C2-N1-C5	-2.66	119.76	122.22

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	C	5304	A1BD2	C2-N1-C5	-2.66	119.76	122.22
6	A	5304	A1BD2	C2-N1-C5	-2.63	119.79	122.22

There are no chirality outliers.

5 of 40 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	5301	ATP	C5'-O5'-PA-O2A
3	A	5301	ATP	C5'-O5'-PA-O3A
3	A	5301	ATP	C3'-C4'-C5'-O5'
3	B	5301	ATP	C5'-O5'-PA-O2A
3	B	5301	ATP	C5'-O5'-PA-O3A

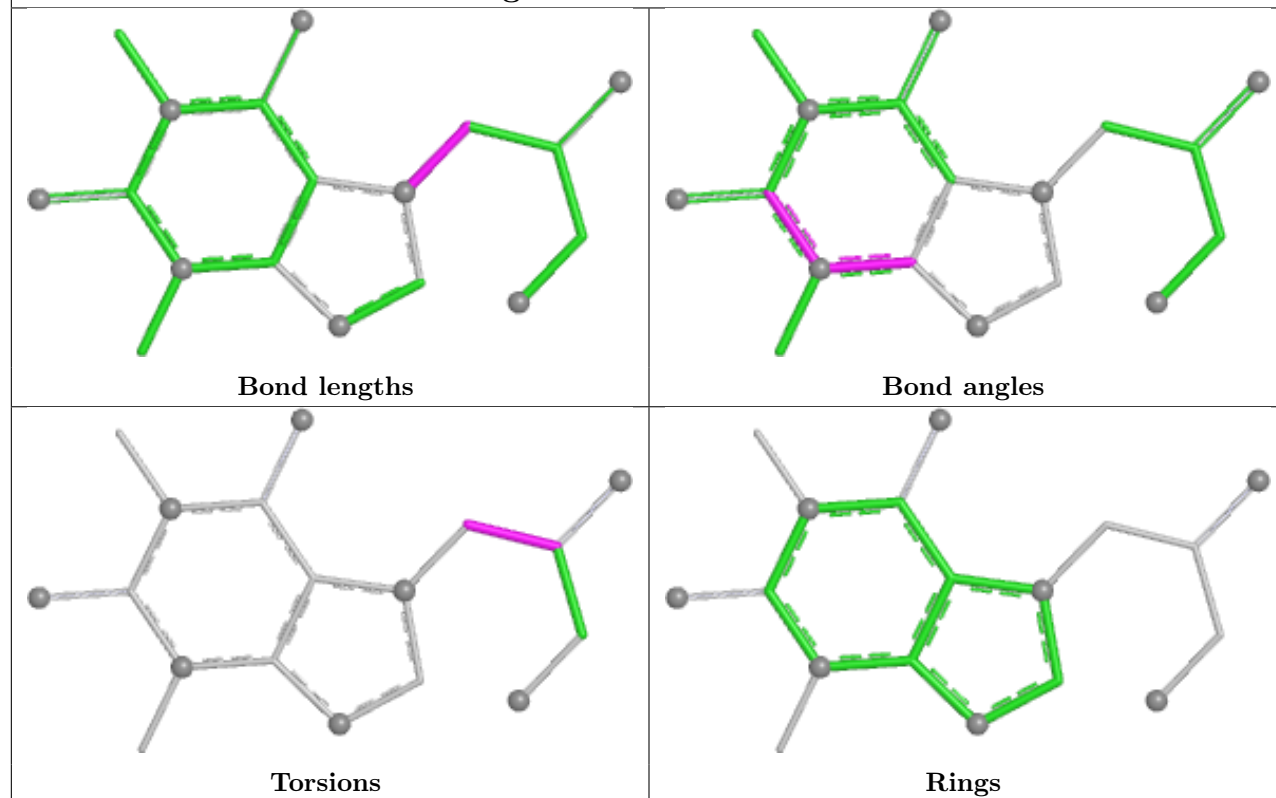
There are no ring outliers.

4 monomers are involved in 12 short contacts:

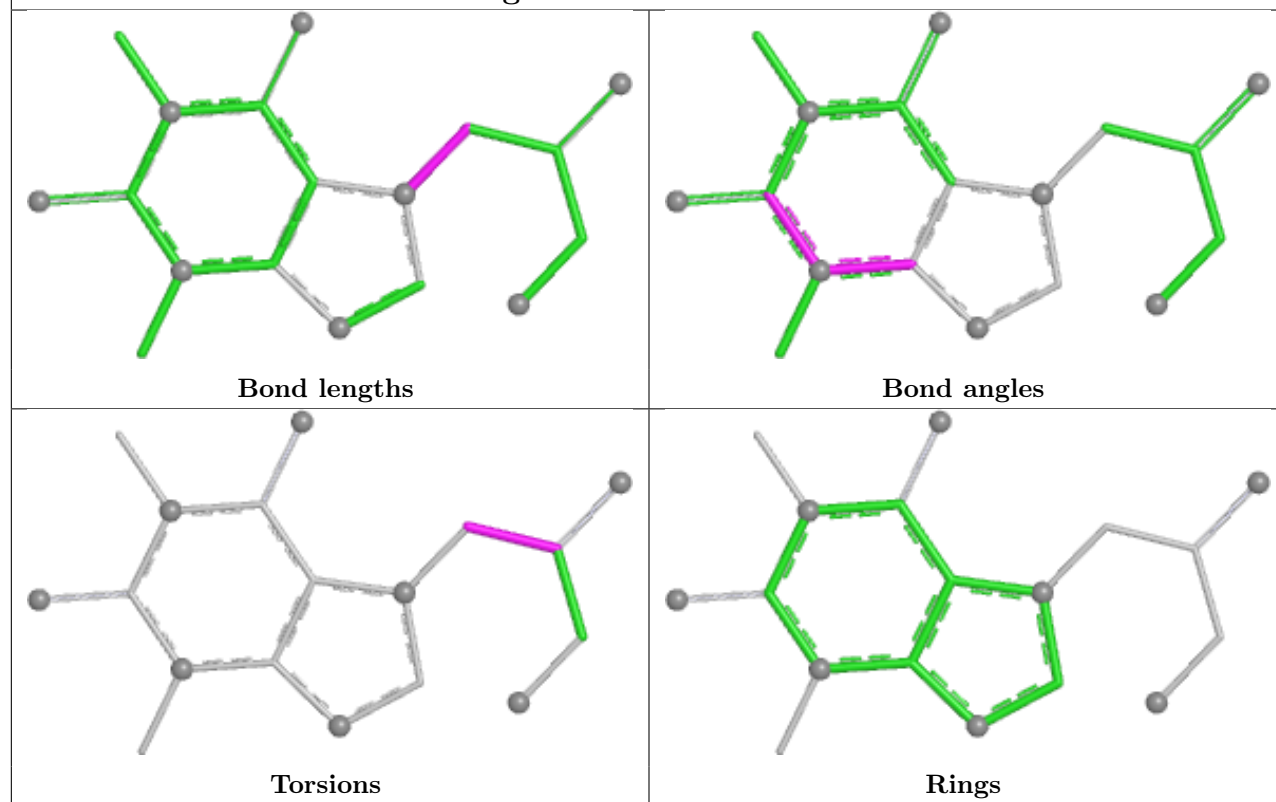
Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	B	5304	A1BD2	3	0
6	C	5304	A1BD2	3	0
6	D	5304	A1BD2	3	0
6	A	5304	A1BD2	3	0

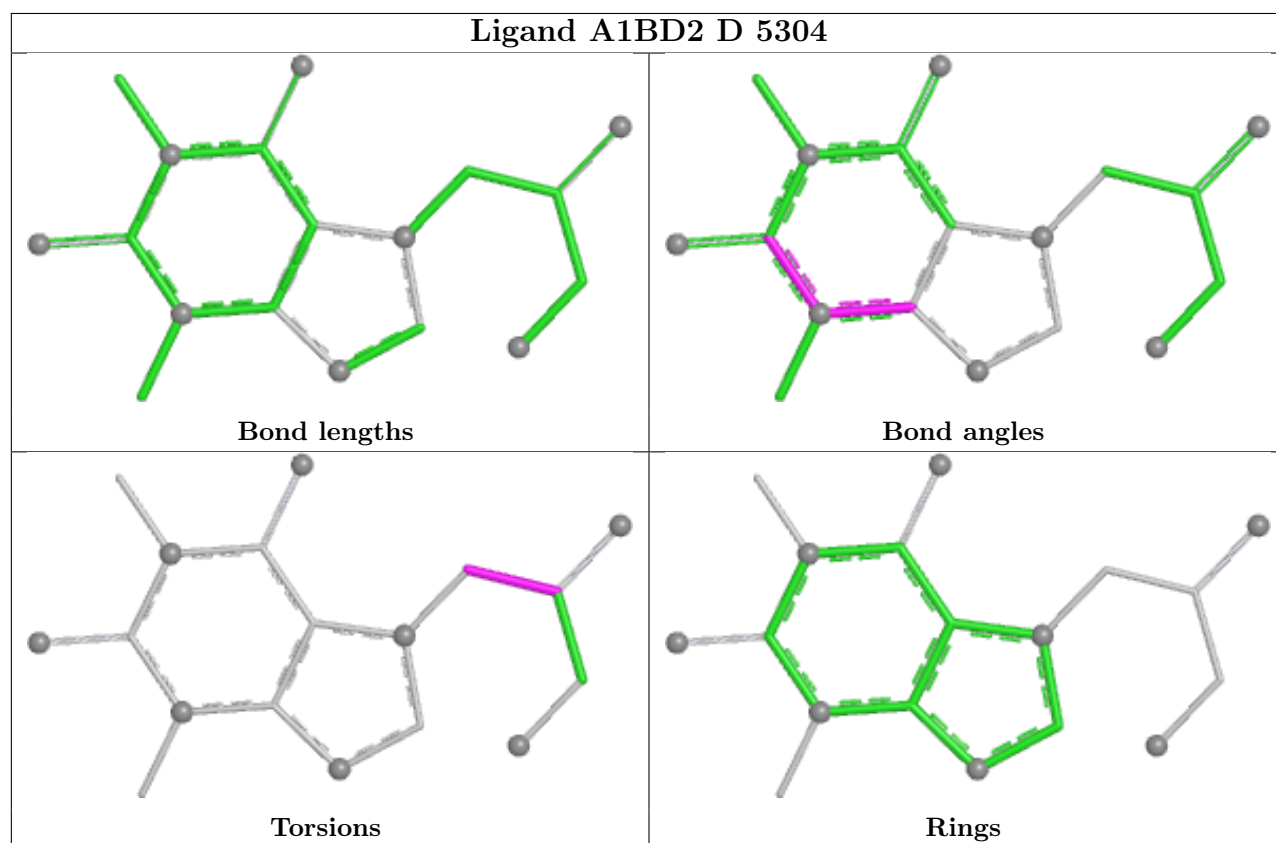
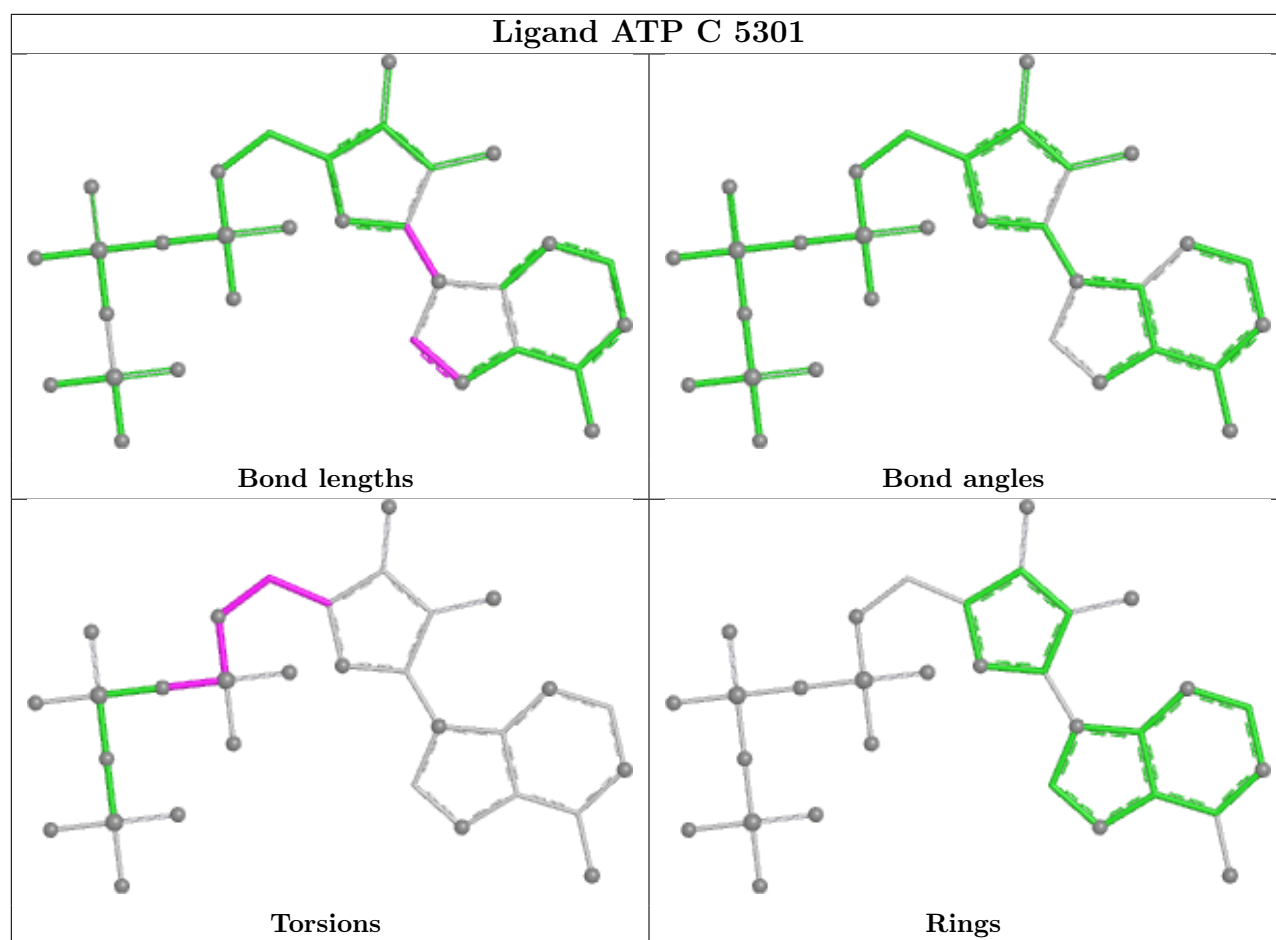
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand A1BD2 B 5304

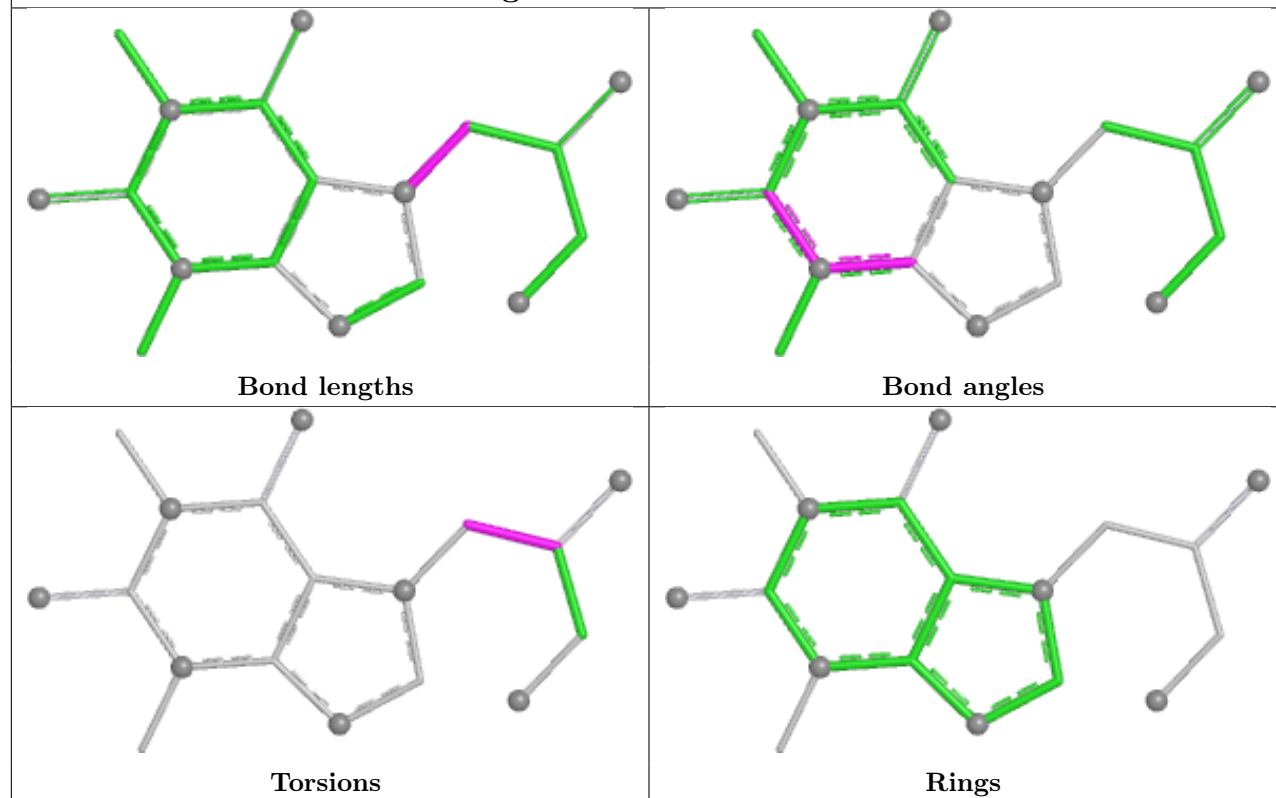


Ligand A1BD2 C 5304

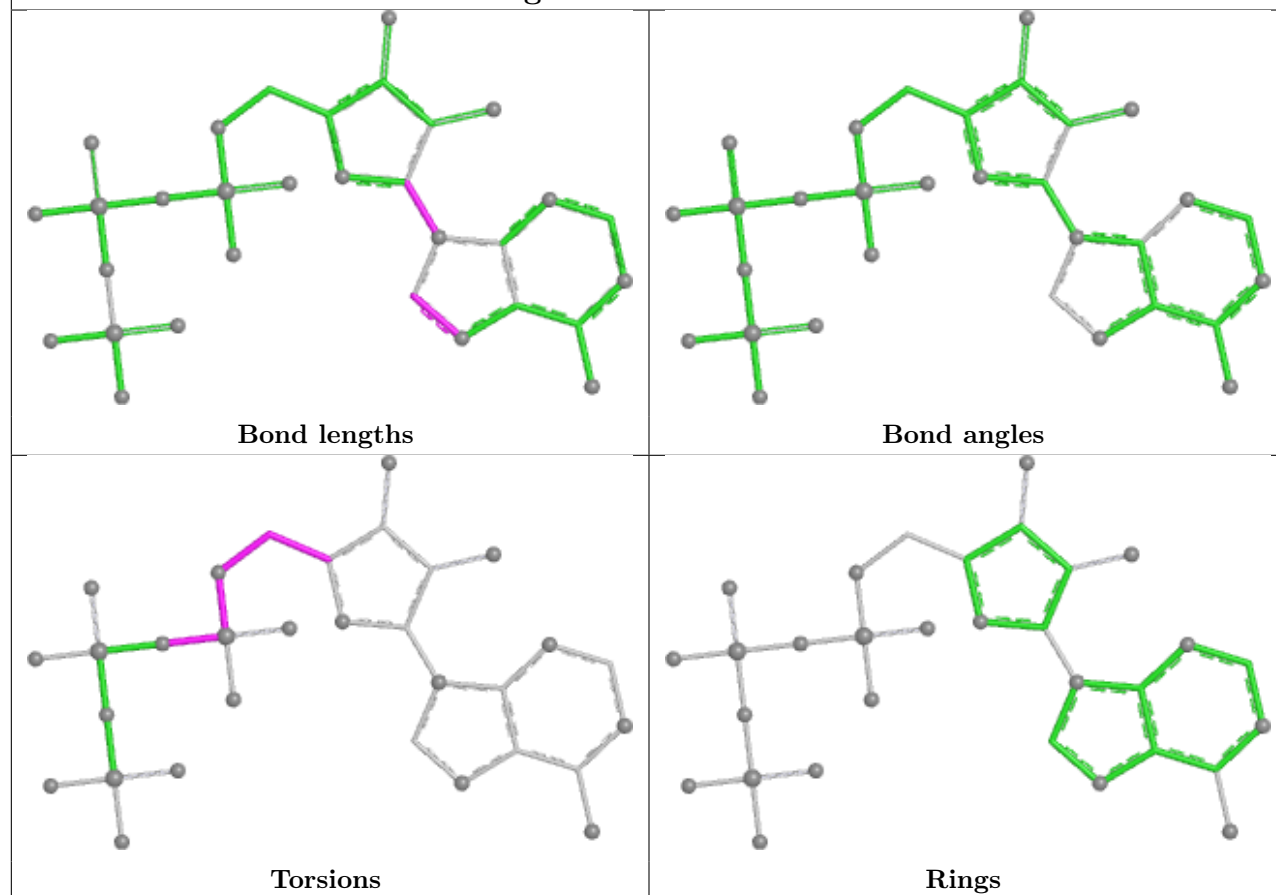


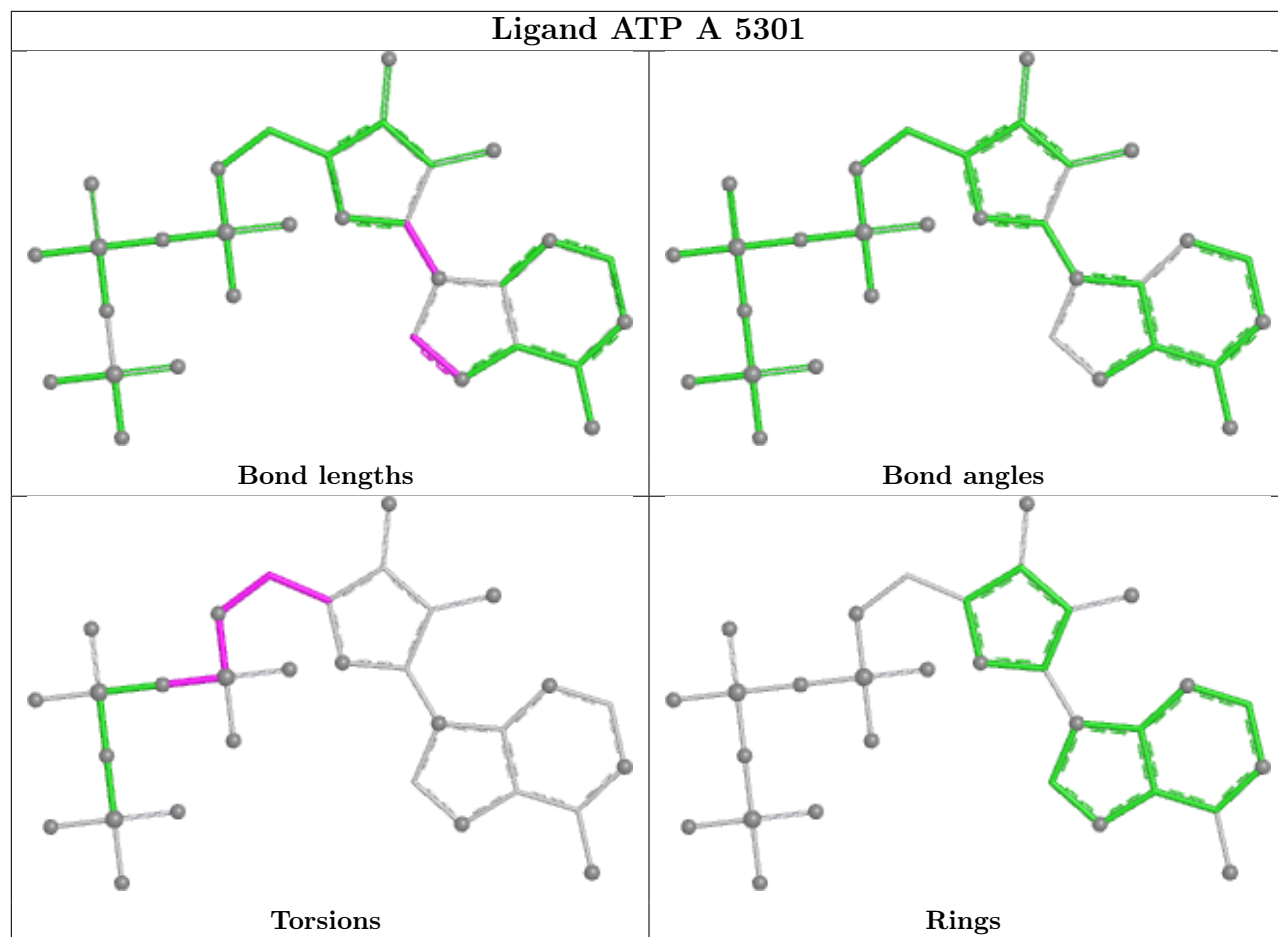


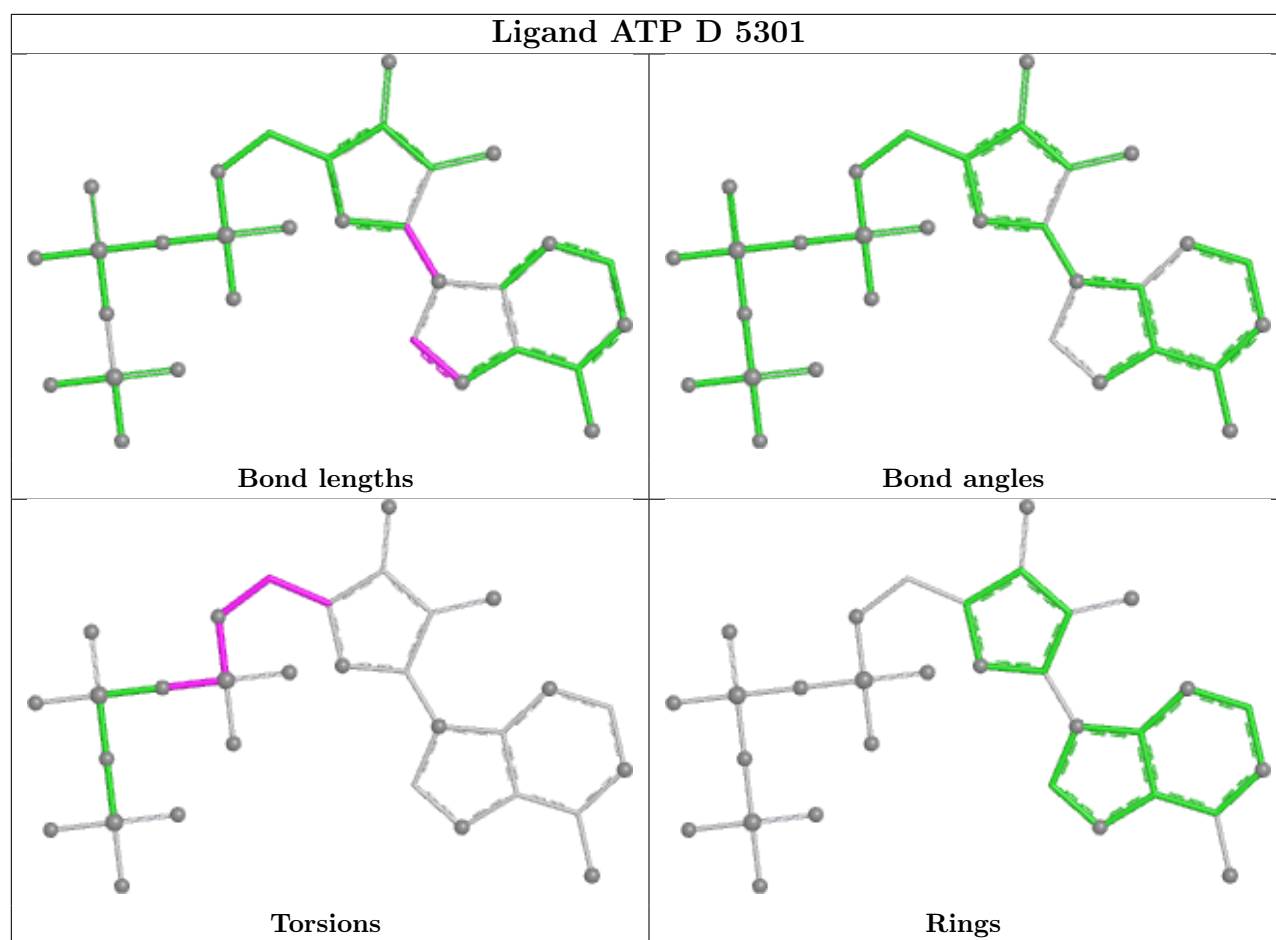
Ligand A1BD2 A 5304



Ligand ATP B 5301







5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

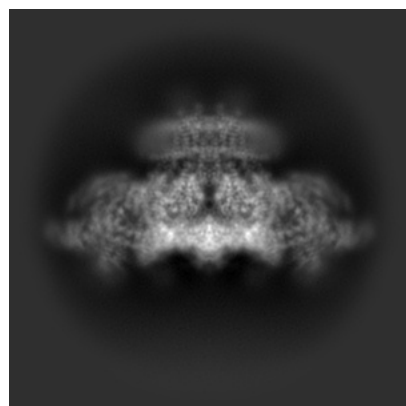
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-47387. These allow visual inspection of the internal detail of the map and identification of artifacts.

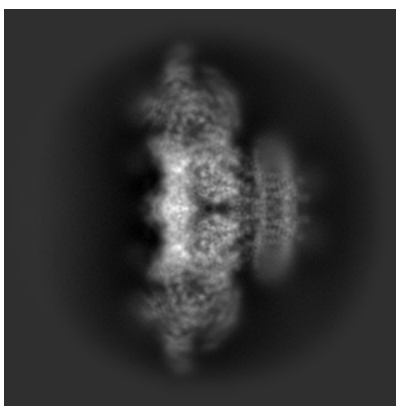
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

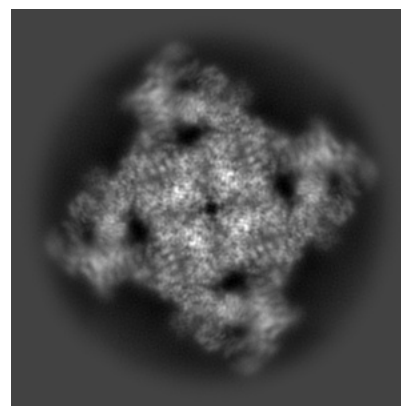
6.1.1 Primary map



X

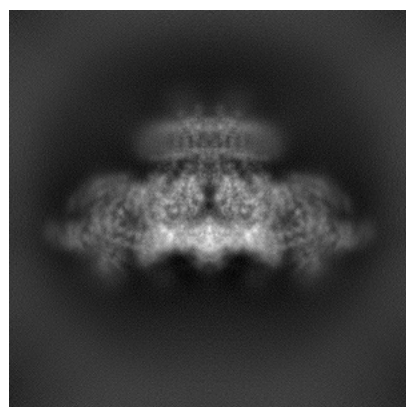


Y

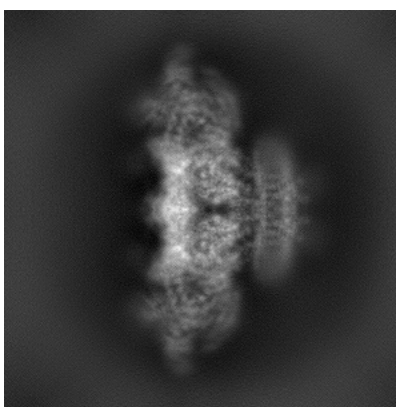


Z

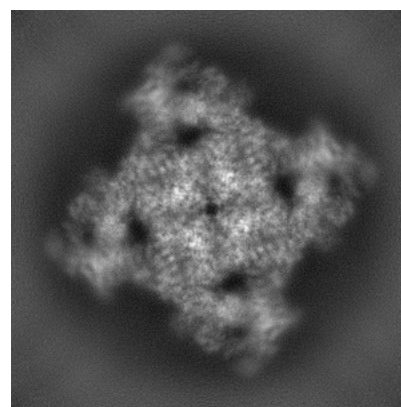
6.1.2 Raw map



X



Y

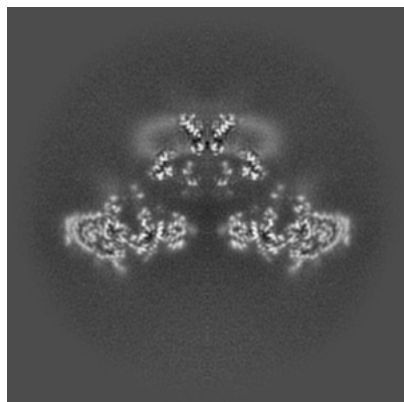


Z

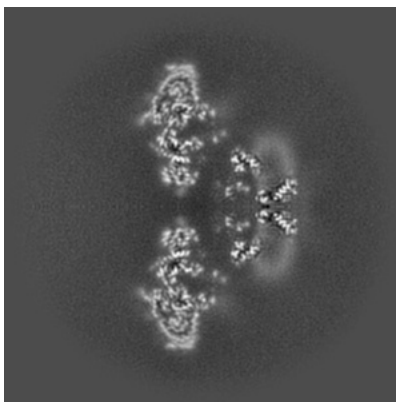
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

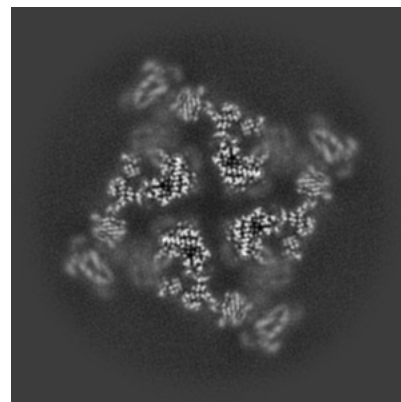
6.2.1 Primary map



X Index: 256

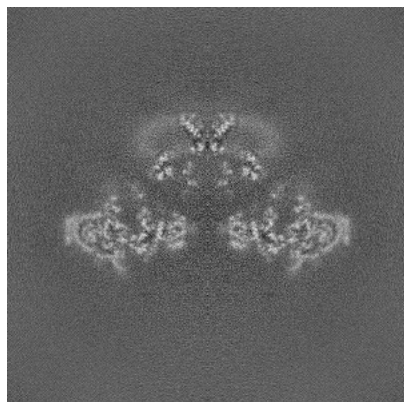


Y Index: 256

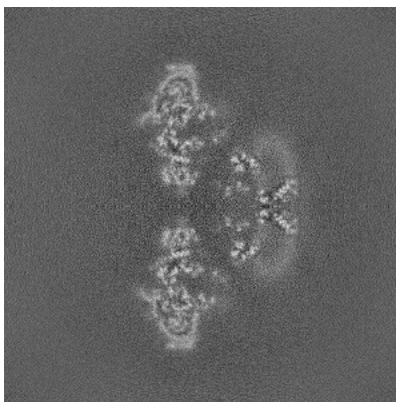


Z Index: 256

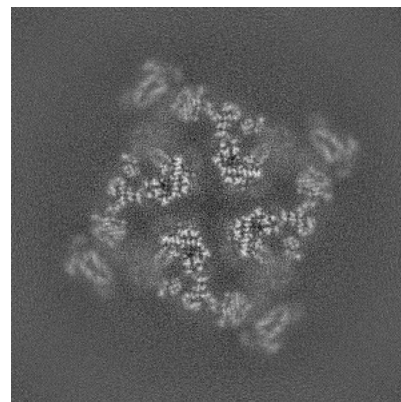
6.2.2 Raw map



X Index: 256



Y Index: 256

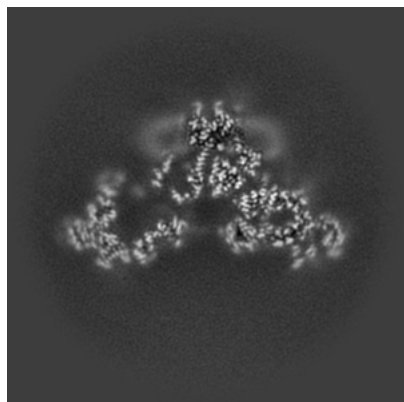


Z Index: 256

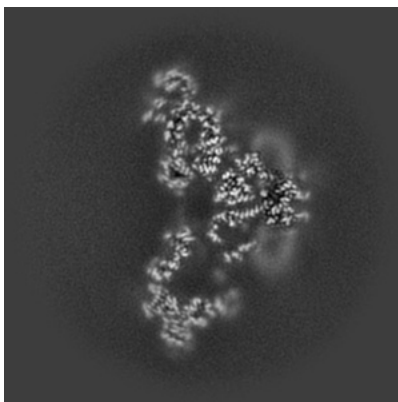
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

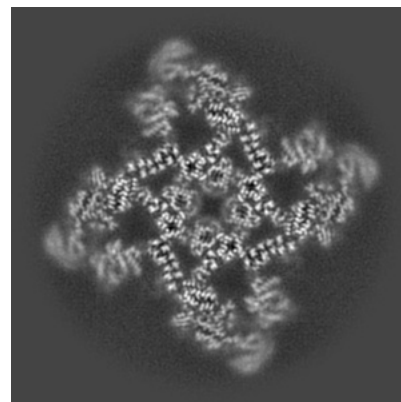
6.3.1 Primary map



X Index: 268

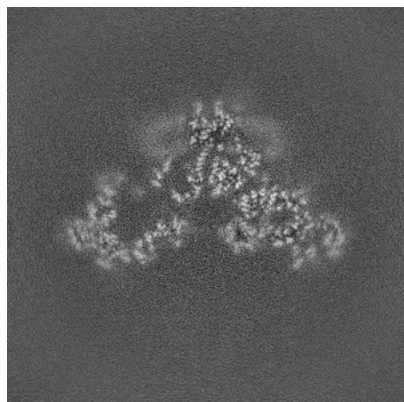


Y Index: 244

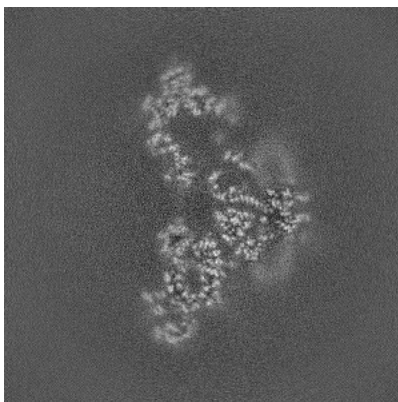


Z Index: 229

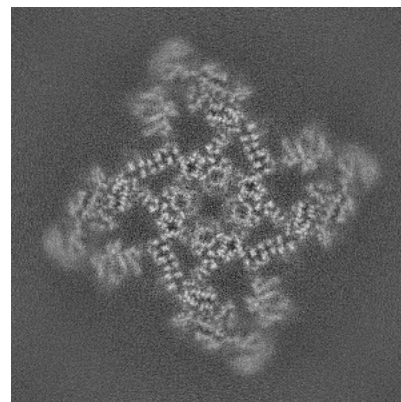
6.3.2 Raw map



X Index: 268



Y Index: 268

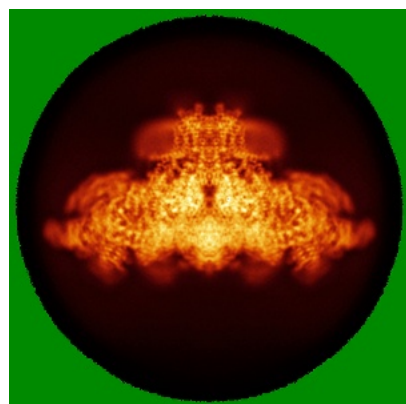


Z Index: 229

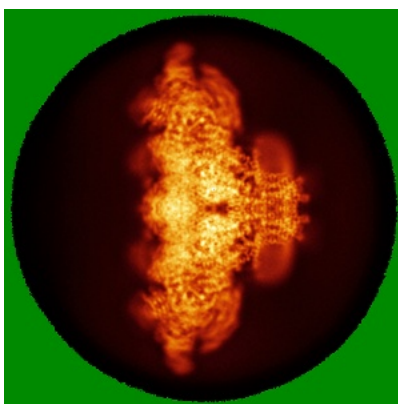
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) [i](#)

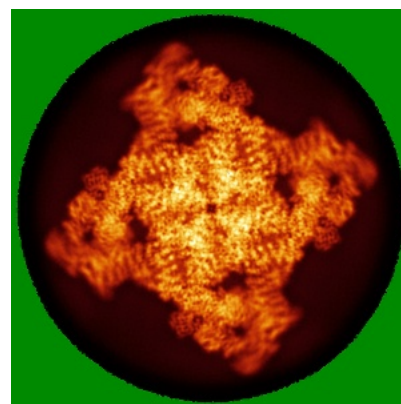
6.4.1 Primary map



X

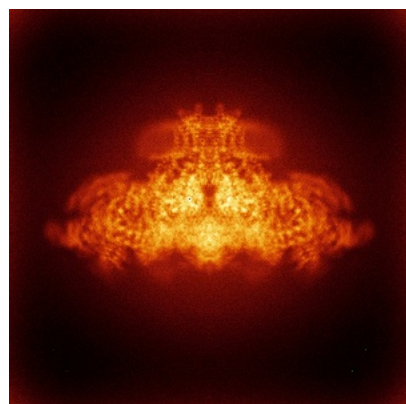


Y

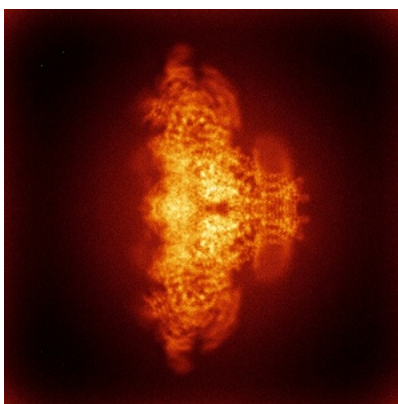


Z

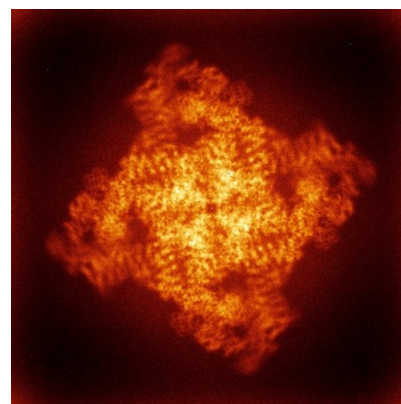
6.4.2 Raw map



X



Y

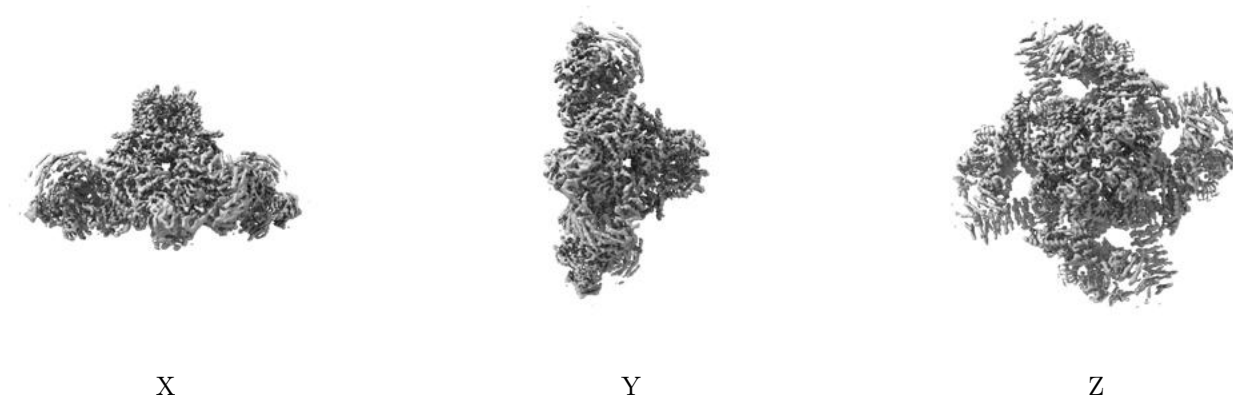


Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

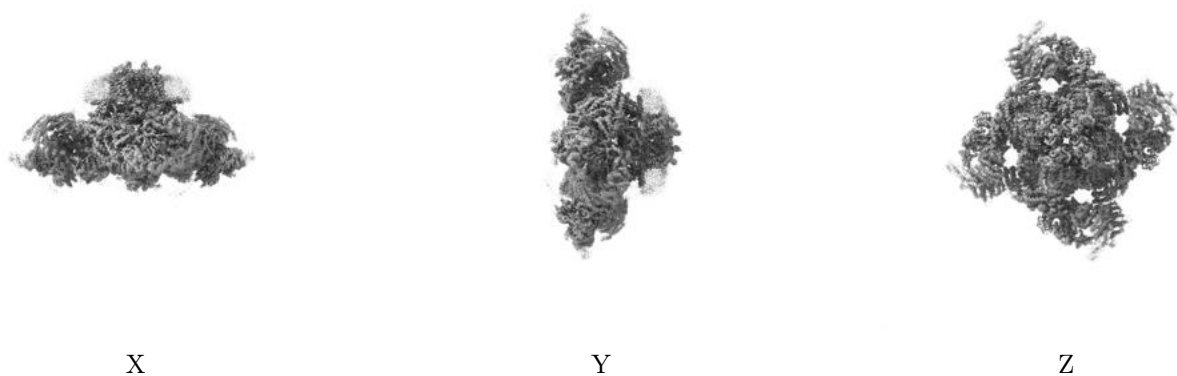
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.1. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

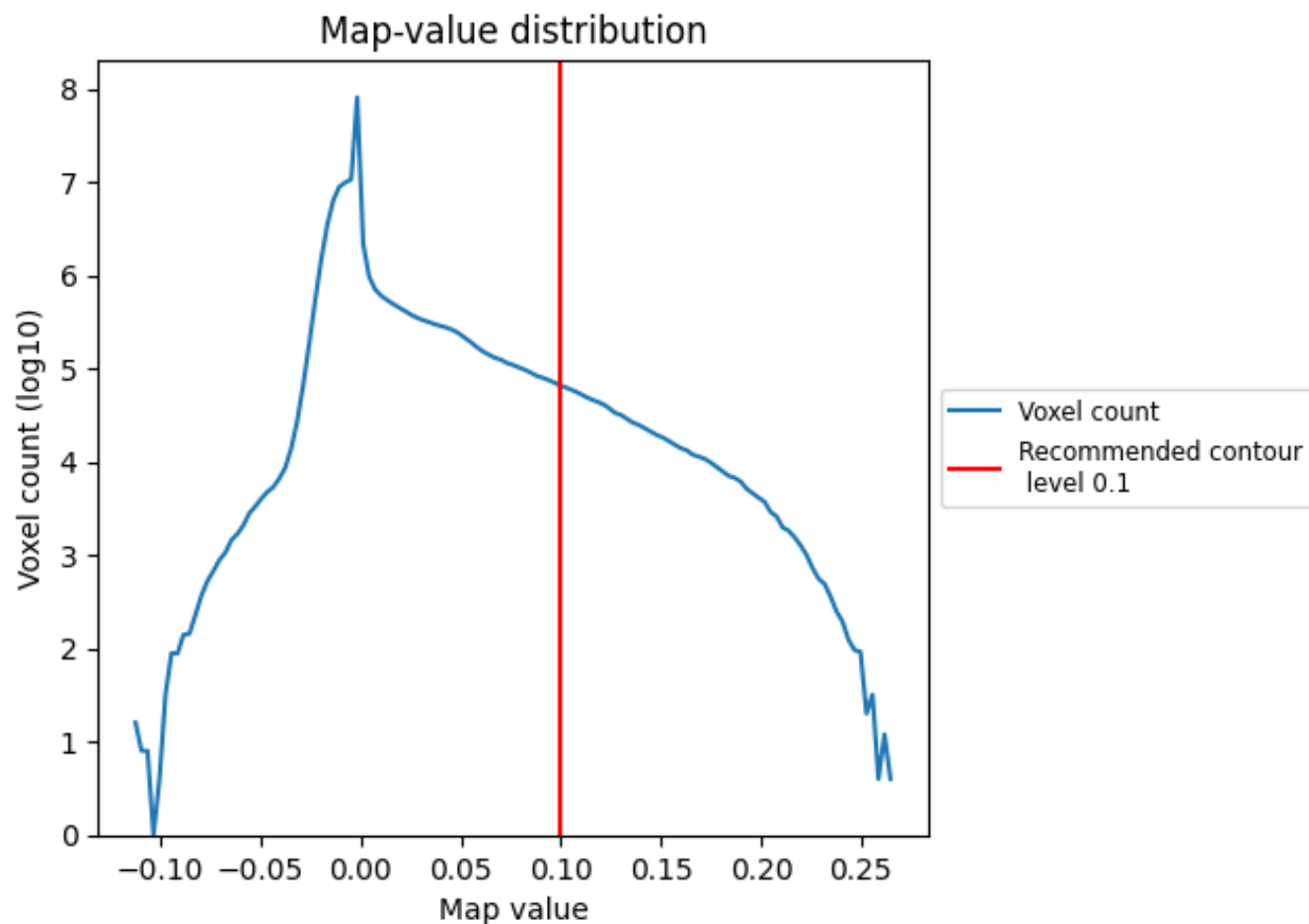
6.6 Mask visualisation [i](#)

This section was not generated. No masks/segmentation were deposited.

7 Map analysis [i](#)

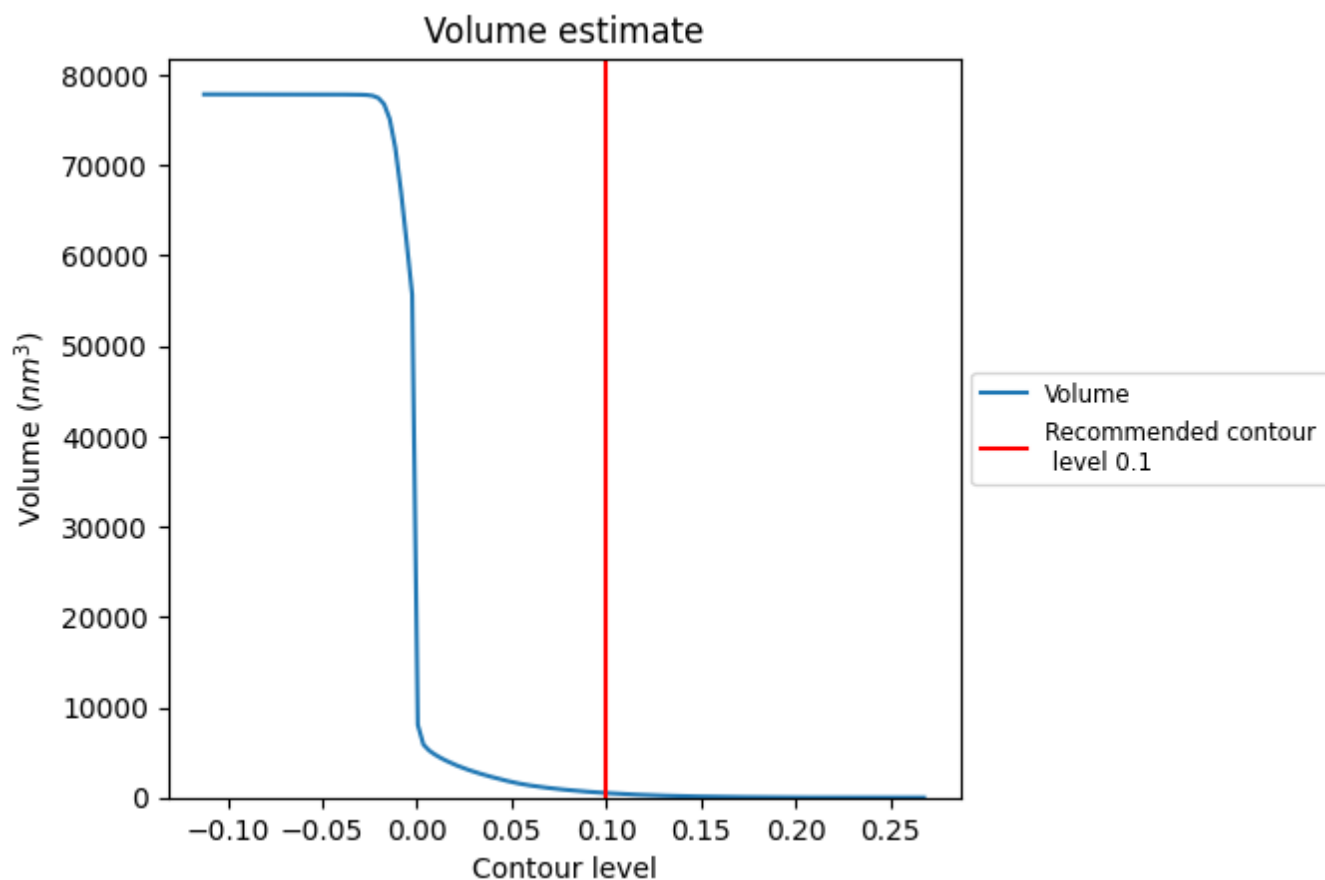
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

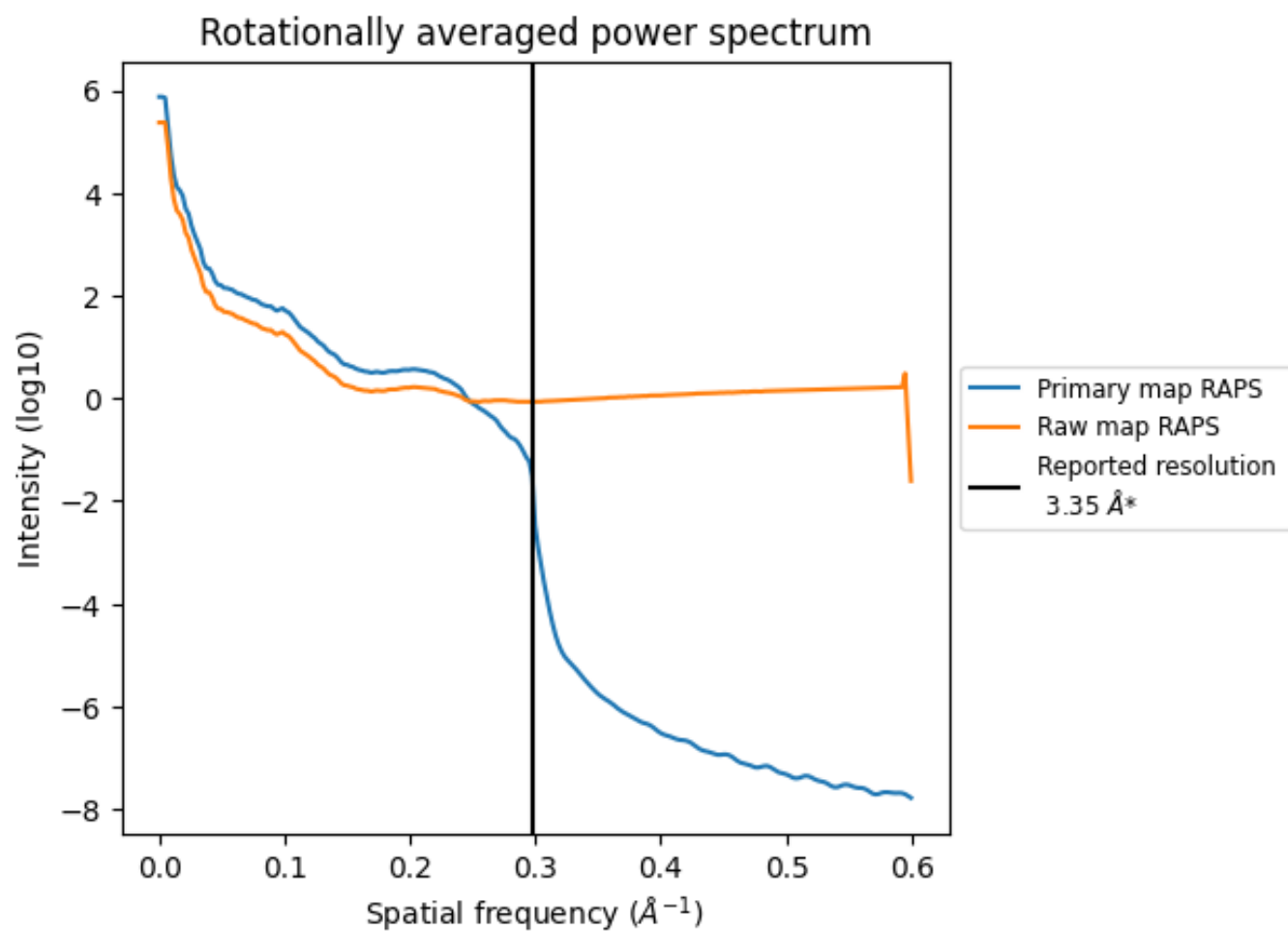
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 502 nm³; this corresponds to an approximate mass of 453 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum ⓘ

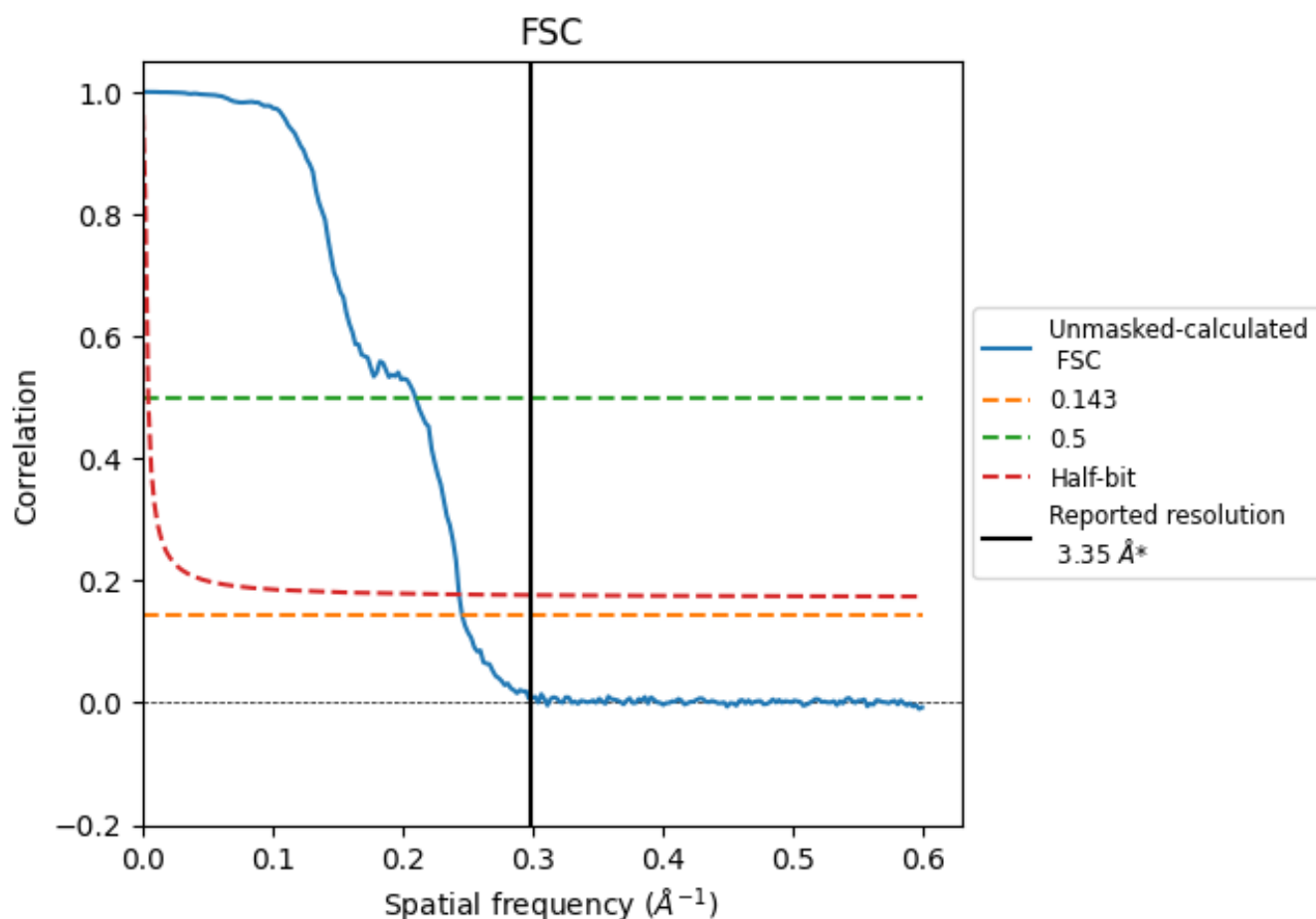


*Reported resolution corresponds to spatial frequency of 0.299 Å⁻¹

8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.299 Å⁻¹

8.2 Resolution estimates [i](#)

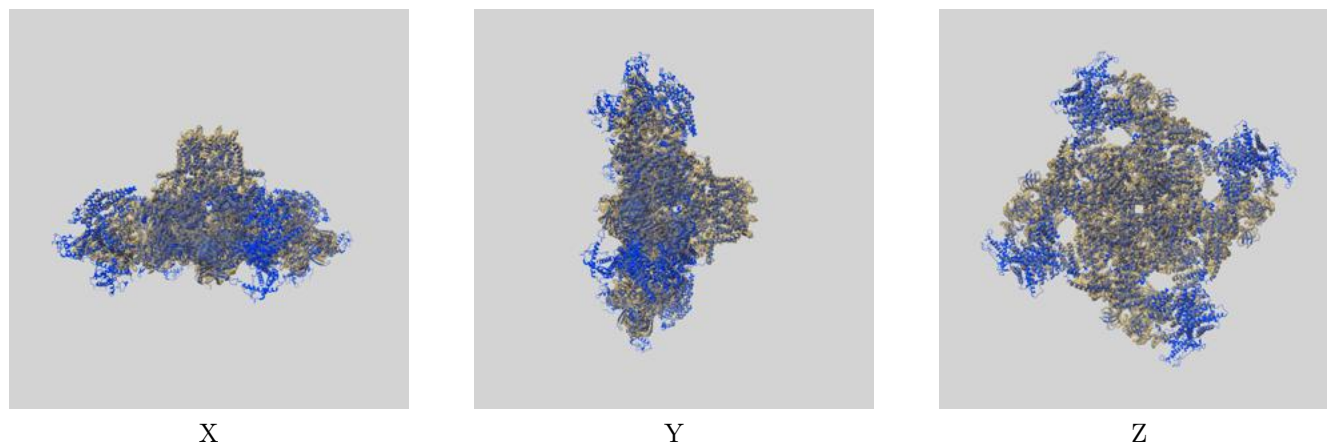
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.35	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	4.07	4.76	4.11

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 4.07 differs from the reported value 3.35 by more than 10 %

9 Map-model fit [i](#)

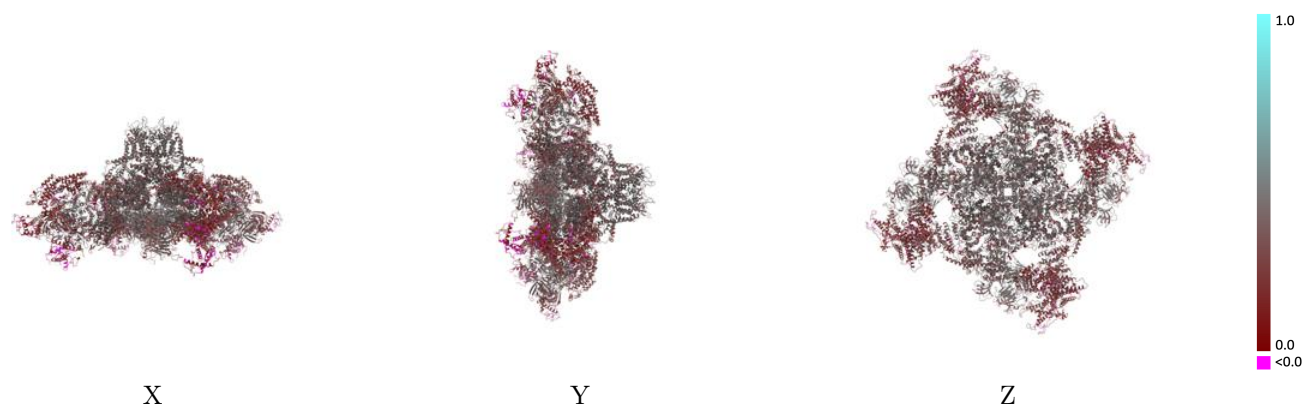
This section contains information regarding the fit between EMDB map EMD-47387 and PDB model 9E1A. Per-residue inclusion information can be found in [section 3](#) on [page 6](#).

9.1 Map-model overlay [i](#)



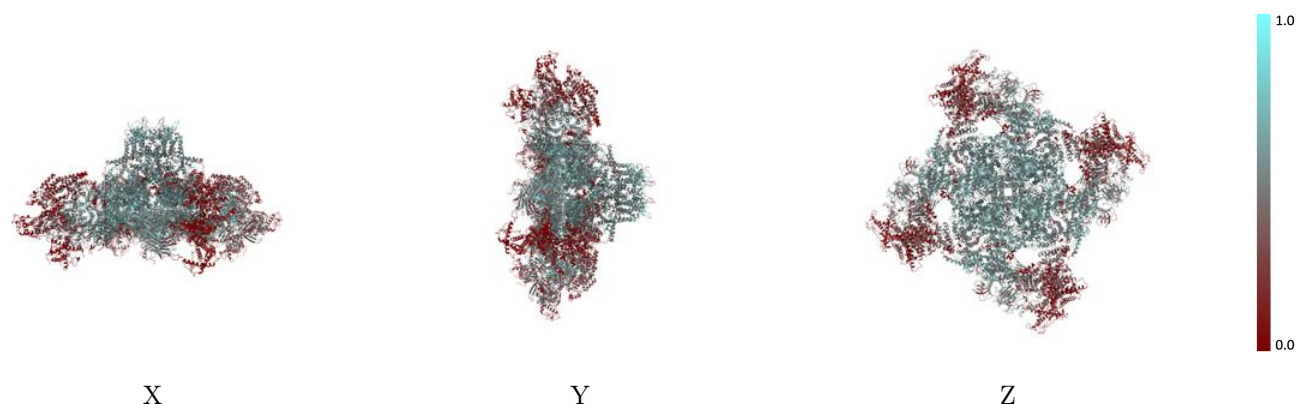
The images above show the 3D surface view of the map at the recommended contour level 0.1 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model [i](#)



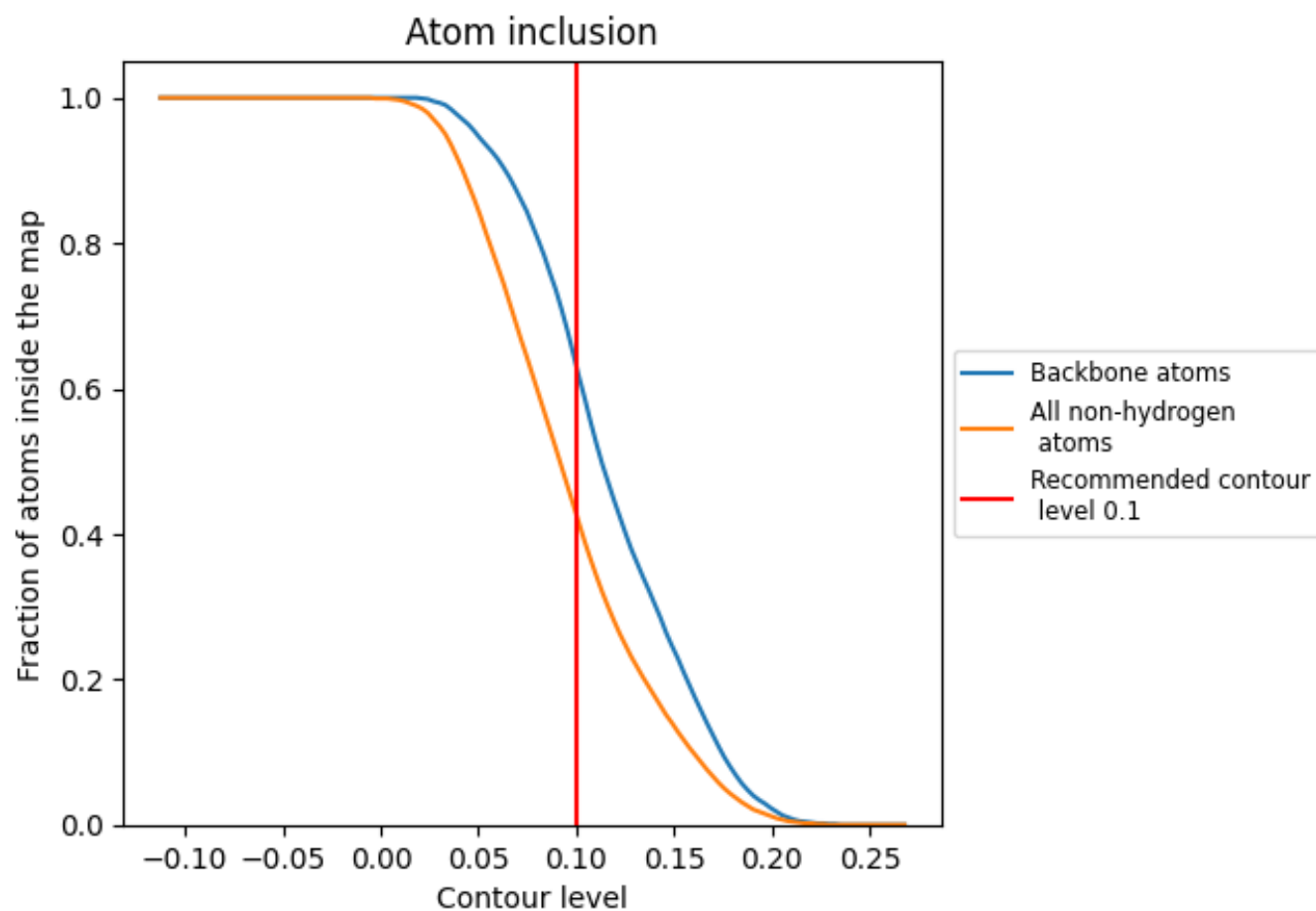
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.1).

9.4 Atom inclusion [i](#)



At the recommended contour level, 63% of all backbone atoms, 43% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.1) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.4260	0.3280
A	0.4280	0.3280
B	0.4280	0.3270
C	0.4280	0.3270
D	0.4280	0.3270
E	0.3290	0.3760
F	0.3310	0.3770
G	0.3340	0.3760
H	0.3300	0.3750

1.0

0.0

<0.0