



## wwPDB EM Validation Summary Report ⓘ

Nov 23, 2022 – 01:13 AM EST

PDB ID : 7UA3  
EMDB ID : EMD-26413  
Title : Structure of PKA phosphorylated human RyR2-R2474S in the closed state in the presence of Calmodulin  
Authors : Miotto, M.C.; Marks, A.R.  
Deposited on : 2022-03-11  
Resolution : 2.97 Å(reported)  
Based on initial model : 7U9X

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

We welcome your comments at [validation@mail.wwpdb.org](mailto: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.dev43  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4.02b-467  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : **FAILED**  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.31.3

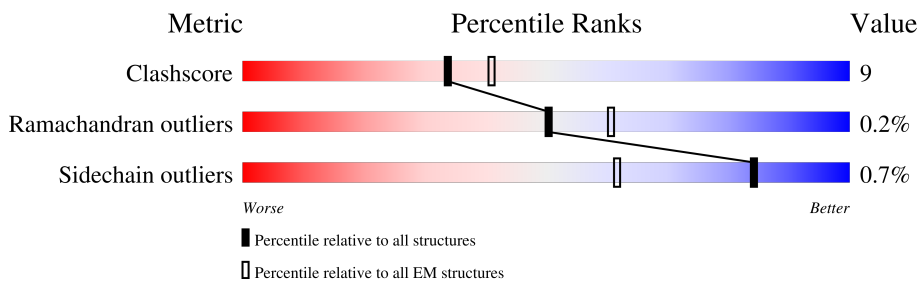
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 2.97 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	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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  $\geq 3$ , 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  $\leq 5\%$ .

Mol	Chain	Length	Quality of chain
1	A	4967	
1	B	4967	
1	C	4967	
1	D	4967	
2	E	108	
2	F	108	
2	G	108	
2	H	108	
3	I	149	

Continued on next page...

*Continued from previous page...*

Mol	Chain	Length	Quality of chain			
3	J	149				
3	K	149				
3	L	149				

## 2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 150252 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 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	4443	35570	22656	6059	6618	237	2	0
1	B	4443	35570	22656	6059	6618	237	2	0
1	C	4443	35570	22656	6059	6618	237	2	0
1	D	4443	35570	22656	6059	6618	237	2	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	2474	SER	ARG	variant	UNP Q92736
B	2474	SER	ARG	variant	UNP Q92736
C	2474	SER	ARG	variant	UNP Q92736
D	2474	SER	ARG	variant	UNP Q92736

- Molecule 2 is a protein called Peptidyl-prolyl cis-trans isomerase FKBP1B.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	E	107	818	516	144	154	4	0	0
2	F	107	818	516	144	154	4	0	0
2	G	107	818	516	144	154	4	0	0
2	H	107	818	516	144	154	4	0	0

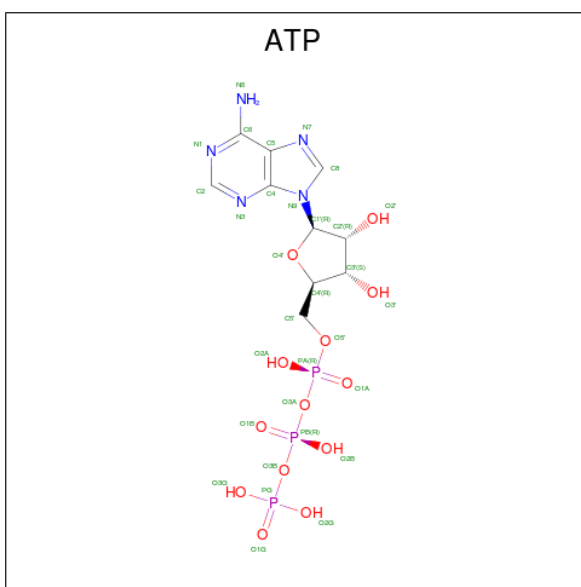
- Molecule 3 is a protein called Calmodulin-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	I	142	Total 1112	C 687	N 181	O 234	S 10	0	0
3	J	142	Total 1112	C 687	N 181	O 234	S 10	0	0
3	K	142	Total 1112	C 687	N 181	O 234	S 10	0	0
3	L	142	Total 1112	C 687	N 181	O 234	S 10	0	0

- Molecule 4 is ZINC ION (three-letter code: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

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

- Molecule 5 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula: C<sub>10</sub>H<sub>16</sub>N<sub>5</sub>O<sub>13</sub>P<sub>3</sub>) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
5	A	1	Total 62	C 20	N 10	O 26	P 6	0

*Continued on next page...*

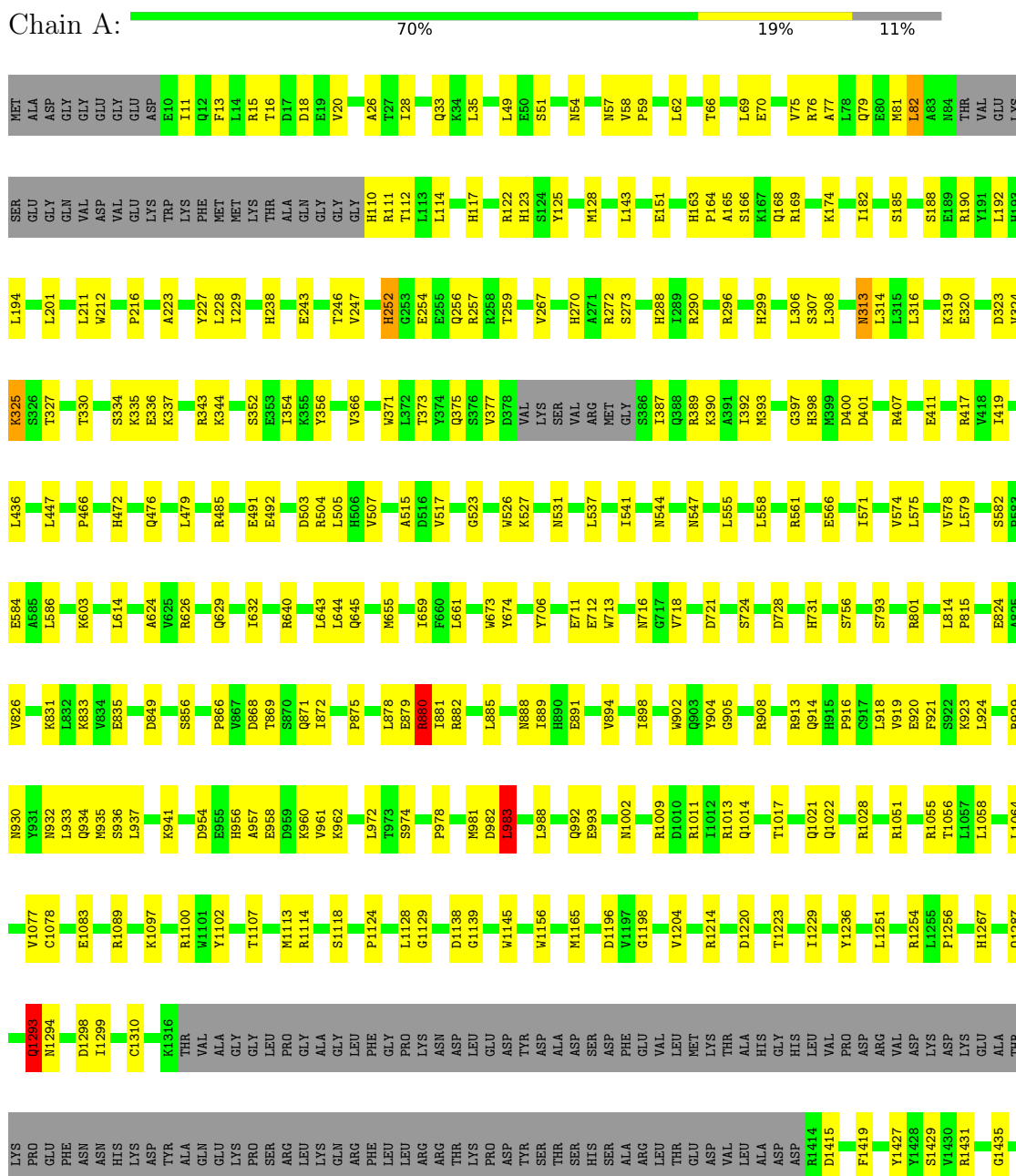
*Continued from previous page...*

Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
5	A	1	Total 62	20	10	26	6	0
5	B	1	Total 62	20	10	26	6	0
5	B	1	Total 62	20	10	26	6	0
5	C	1	Total 62	20	10	26	6	0
5	C	1	Total 62	20	10	26	6	0
5	D	1	Total 62	20	10	26	6	0
5	D	1	Total 62	20	10	26	6	0

### 3 Residue-property plots

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. 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. 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 2



V3377	G1444	L1667	E1964	G1U	L2241	G2434	K2604	S2751	M2840	F2954	ASN	I3284	V3377	N3418
R3381	V1445	G1668	F1965	SER	D2241	V2435	M2605	K2752	M2844	E2957	GLN	L3288	F3390	F3422
L3385	I1446	M1669	R1966	ASP	N2251	L2436	P2606	Q2753	A2845	E2957	PRD	L3292	V3401	N3423
N3389	D1454	D1681	S1967	THR	E2252	S2437	L2609	V2754	E2846	K2961	K3088	F3292	F3402	I3425
F3390	T1455	E1682	P1968	LEU	C2277	L2438	L2610	L2755	E2847	I2961	G3089	G3293	V3402	N3426
E3391	L1456	P1683	Q1972	LYS	Q2278	E2483	C2617	L2756	Y2848	V2967	P3090	G3299	V3406	N3427
A3392	F1457	Q1684	I1973	GLU	M2278	F2460	F2630	L2757	H2849	L2968	I3094	M3296	F3412	M3428
F3400	D1458	L1685	N1974	LEU	L2280	F2464	F2630	Y2780	M2850	L2968	R3095	K3297	N3428	S3429
E3401	R1461	I1689	L1976	SER	Y2285	H2464	L2640	L2763	W2852	L2970	Y3096	R3297	F3429	F3449
V3402	M1487	E1690	F1979	VAL	H2485	K2465	L2644	E2767	K2854	I2971	P3103	L3208	A3440	N3452
F3404	M1494	M1691	D1982	ASP	W2290	M2468	L2644	S2778	K2855	H2978	M3104	F3289	V3402	Q3422
Y3405	L1495	M1694	D1982	ALA	R2297	I2478	L2644	L2779	K2856	R2979	H3115	Q3304	F3402	N3423
V3406	S1496	Y1703	C1986	LYS	R2303	L2482	L2662	K2779	K2857	F2982	L3115	P3304	F3402	I3425
F3412	G1497	L1706	P1989	GLY	R2303	F2483	L2488	K2780	E2858	L2983	L3122	F3305	V3402	N3426
N3418	Q1498	L1706	P1989	ALA	E2314	F2483	L2488	L2781	E2859	S2984	E3119	I3307	V3406	N3427
F3419	L1505	Y1714	I1992	LYS	L2324	L2484	L2488	M2782	L2860	K2999	L3122	N3308	V3420	M3428
N3423	V1510	Y1714	R1993	GLY	L2324	L2484	L2488	R2788	L2860	E3000	L3122	K3309	Q3422	S3429
N3426	A1513	Y1714	L1996	ALA	F2331	L2484	L2488	G2786	L2860	K3001	E3124	F3311	V3406	F3449
M3428	A1542	Y1714	L1996	LYS	E2331	L2484	L2488	W2787	P2869	K3001	E3124	P3312	V3406	N3427
S3429	A1542	Y1714	E2010	GLY	L2335	L2484	L2488	R2788	L2869	E3003	E3124	L3314	V3420	M3428
ALA	L1542	Y1714	L2010	GLY	L2335	L2484	L2488	R2788	L2869	M3003	E3124	L3314	Q3422	S3429
VAL	E1556	I1751	L2010	GLY	L2335	L2484	L2488	R2788	L2869	V3004	E3124	L3314	Q3422	S3429
SER	R1559	M1761	L2010	GLY	L2335	L2484	L2488	R2788	L2869	V3013	E3124	L3314	Q3422	S3429
ASP	I1560	M1761	L2010	GLY	L2335	L2484	L2488	R2788	L2869	R3016	E3124	L3314	Q3422	S3429
GLN	K1561	S1764	L2010	GLY	L2335	L2484	L2488	R2788	L2869	H3017	E3124	L3314	Q3422	S3429
LEU	N1562	P1766	L2010	GLY	L2335	L2484	L2488	R2788	L2869	R3018	E3124	L3314	Q3422	S3429
ARG	P1565	G1775	L2010	GLY	L2335	L2484	L2488	R2788	L2869	H3017	E3124	L3314	Q3422	S3429
THR	S1573	P1780	L2010	GLY	L2335	L2484	L2488	R2788	L2869	R3018	E3124	L3314	Q3422	S3429
ILE	L1591	P1780	L2010	GLY	L2335	L2484	L2488	R2788	L2869	H3017	E3124	L3314	Q3422	S3429
ARG	V1594	P1783	L2010	GLY	L2335	L2484	L2488	R2788	L2869	R3018	E3124	L3314	Q3422	S3429
GLY	D1785	D1785	L2010	GLY	L2335	L2484	L2488	R2788	L2869	H3017	E3124	L3314	Q3422	S3429
R1598	L1786	L1786	L2010	GLY	L2335	L2484	L2488	R2788	L2869	H3017	E3124	L3314	Q3422	S3429
M1601	L1787	L1787	L2010	GLY	L2335	L2484	L2488	R2788	L2869	H3017	E3124	L3314	Q3422	S3429
Q1615	K1788	K1788	L2010	GLY	L2335	L2484	L2488	R2788	L2869	H3017	E3124	L3314	Q3422	S3429
L1618	F1834	F1834	L2010	GLY	L2335	L2484	L2488	R2788	L2869	H3017	E3124	L3314	Q3422	S3429
V1619	H1835	H1835	L2010	GLY	L2335	L2484	L2488	R2788	L2869	H3017	E3124	L3314	Q3422	S3429
L1630	L1839	L1839	L2010	GLY	L2335	L2484	L2488	R2788	L2869	H3017	E3124	L3314	Q3422	S3429
L1842	I1842	I1842	L2010	GLY	L2335	L2484	L2488	R2788	L2869	H3017	E3124	L3314	Q3422	S3429
L1644	A1854	A1854	L2010	GLY	L2335	L2484	L2488	R2788	L2869	H3017	E3124	L3314	Q3422	S3429
E1649	ALA	ALA	L2010	GLY	L2335	L2484	L2488	R2788	L2869	H3017	E3124	L3314	Q3422	S3429
L1650	THR	THR	L2010	GLY	L2335	L2484	L2488	R2788	L2869	H3017	E3124	L3314	Q3422	S3429
L1661	PRO	PRO	L2010	GLY	L2335	L2484	L2488	R2788	L2869	H3017	E3124	L3314	Q3422	S3429
L1661	GLU	GLU	L2010	GLY	L2335	L2484	L2488	R2788	L2869	H3017	E3124	L3314	Q3422	S3429
L1661	GLU	GLU	L2010	GLY	L2335	L2484	L2488	R2788	L2869	H3017	E3124	L3314	Q3422	S3429
L1661	GLU	GLU	L2010	GLY	L2335	L2484	L2488	R2788	L2869	H3017	E3124	L3314	Q3422	S3429









GLU	V4522	Q4620	E4830
PRD	S4523	F4621	I4831
GLY	I4524	E4622	P4634
LYS	SER	E4623	R4643
ALA	VAL	D4624	D4647
GLU	VAL	K4627	I4848
GLY	GLU	I4635	V4654
ASP	GLY	V4645	L4658
GLY	LYS	V4649	L4659
GLU	LEU	V4661	A4661
LYS	THR	R4665	SER
LYS	ARG	I4862	SER
ALA	SER	E4668	GLY
LYS	SER	L4669	ASN
GLU	GLY	L4670	ALA
ASP	LYS	K4674	LYS
LYS	LYS	R4683	THR
GLN	LYS	K4690	LEU
GLN	LEU	D4691	ASP
LYS	SER	S4718	SER
LYS	SER	V4708	SER
LYS	THR	V4712	THR
LYS	HIS	V4716	HIS
LYS	ARG	N4717	ARG
LYS	TYR	S4718	TYR
GLY	ILE	D4716	I4855
GLU	GLY	S4718	I4855
PRO	GLY	K4751	Y4559
GLY	VAL	R4754	E4563
VAL	PRD	R4754	S4564
VAL	GLU	Q4488	S4565
VAL	GLY	L4492	G4566
VAL	SER	L4492	Y4567
VAL	ALA	C4806	M4568
VAL	ALA	D4807	E4569
VAL	ALA	N4809	P4570
VAL	ALA	D4798	F4585
VAL	ALA	T4801	Q4488
VAL	ALA	C4806	G4589
VAL	ALA	D4807	Y4590
VAL	ALA	N4809	R4602
VAL	ALA	C4812	A4607
VAL	ALA	C4812	R4608
VAL	ALA	Y4818	L4517
VAL	ALA	V4819	L4518
VAL	ALA	Y4819	F4519
VAL	ALA	Y4820	Y4520
VAL	ALA	L4827	Y4521

• Molecule 1: Ryanodine receptor 2



MET	L211	P466	Y840	S936	E1083	G1283
ALA	W212	H472	D949	L937	F1088	M1294
ASP	P216	Q476	S856	K941	R1089	D1298
GLY	A223	R479	S856	K941	R1089	I1299
GLU	A224	L479	P866	D954	Y1094	C1310
GLY	Q226	R485	V867	E955	K1097	C1310
ASP	Q226	R485	R343	A956	R1100	F1316
E10	I11	E491	K344	K960	W1101	THR
I11	Q12	E492	K344	V869	S870	VAL
Q12	Q13	E492	S352	Q871	Q871	ALA
Q13	L14	E492	S352	I872	I872	GLY
L14	L15	D503	I354	R640	T1107	GLY
L15	T16	R504	K355	L644	M1113	LEU
T16	T16	L505	Y356	L644	R1114	PRO
V20	V20	H506	V366	E507	E879	PRO
A26	A26	V507	V366	V507	E879	GLY
T27	T27	F514	W371	F514	S1118	LEU
I28	I28	A515	L372	A515	P1124	PHE
Q33	Q33	D516	T373	D516	L1128	GLY
K34	K34	V517	V374	V517	G1129	PRO
L35	L35	E256	Q375	E256	G1129	LYS
L49	L49	R257	S376	R257	L988	ASN
F4898	F4898	R258	D378	R258	L988	ASP
G4904	G4904	T259	V377	T259	Q992	LEU
F4921	F4921	R267	S377	R267	E993	GLU
I4855	I4855	H270	V377	H270	M1002	ASP
Y4559	Y4559	A271	VAL	A271	M1002	ASP
E4563	E4563	R272	SER	R272	R1009	ASP
S4564	S4564	S273	LYS	S273	D1010	ASP
G4566	G4566	H288	VAL	H288	R1011	SER
Y4567	Y4567	T289	ARG	T289	I1012	ASP
M4568	M4568	R290	ARG	R290	R1013	PHE
E4569	E4569	R296	VAL	R296	G1014	GLY
P4570	P4570	H299	VAL	H299	T1017	VAL
F4585	F4585	L306	MET	L306	T1017	LEU
G4589	G4589	S307	GLY	S307	S756	MET
Y4590	Y4590	L308	GLY	L308	A391	LYS
R4602	R4602	R313	S386	R313	L392	LYS
A4607	A4607	L314	Q388	L314	P790	THR
R4608	R4608	L316	R389	L316	S793	ALA
L4615	L4615	E320	K390	E320	S793	HIS
T4618	T4618	R323	K391	R323	R801	HIS
Y4520	Y4520	V324	L392	V324	L814	LEU
E4619	E4619	R325	M393	R325	P815	VAL
Y4619	Y4619	T327	H397	T327	P815	PRD
Y4619	Y4619	T327	G397	T327	P815	PRD
Y4619	Y4619	T327	H398	T327	P815	PRD
Y4619	Y4619	T327	D401	T327	P815	PRD
Y4619	Y4619	T327	L308	T327	P815	PRD
Y4619	Y4619	T327	R407	T327	P815	PRD
Y4619	Y4619	T327	E411	T327	P815	PRD
Y4619	Y4619	T327	R417	T327	P815	PRD
Y4619	Y4619	T327	V418	T327	P815	PRD
Y4619	Y4619	T327	I419	T327	P815	PRD
Y4619	Y4619	T327	L436	T327	P815	PRD
Y4619	Y4619	T327	F883	T327	P815	PRD
Y4619	Y4619	T327	A884	T327	P815	PRD
Y4619	Y4619	T327	A885	T327	P815	PRD
Y4619	Y4619	T327	L886	T327	P815	PRD
Y4619	Y4619	T327	M935	T327	P815	PRD
Y4619	Y4619	T327	N935	T327	P815	PRD

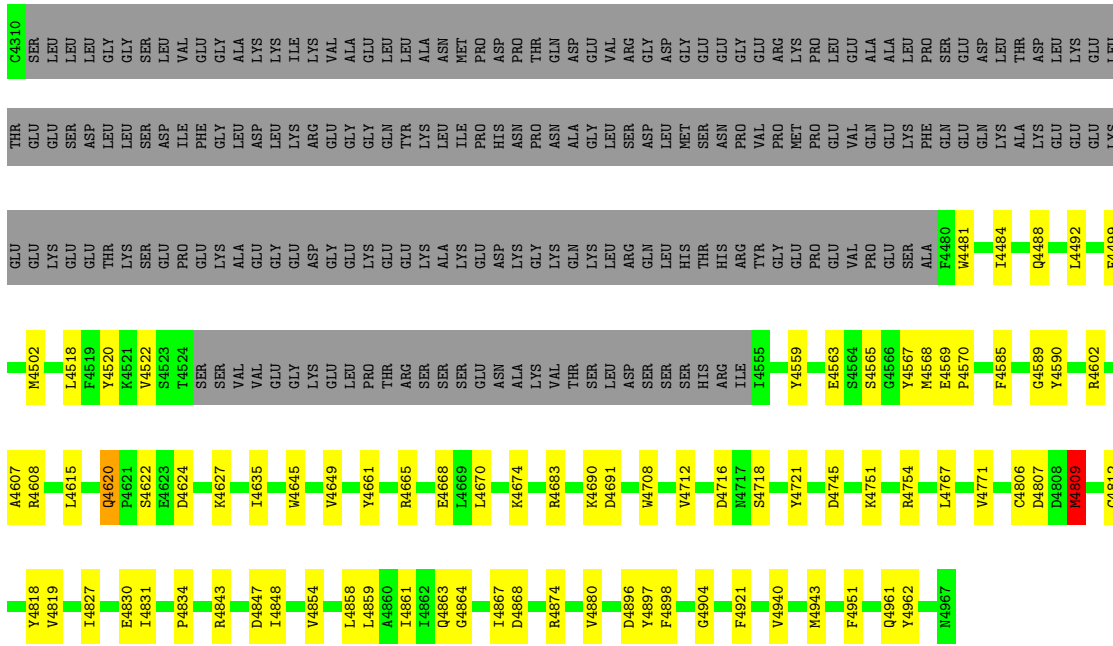
PRO	GLU	PHE	ASN	ASN	HIS	LYS	ASP	TYR	ALA	GLN	GLY	LYS	PRO	SER	ARG	LEU	LEU	LEU	ARG	GLN	ARG	PHE	LEU	LEU	ARG	THR	LYS	PRO	TYR	VAL	LEU	ALA	ASP	ASP	R1414	D1415	F1419	Y1427	S1429	L1430	R1431	P1434	G1435																																						
I1446	D1681	E1682	P1683	Q1684	L1685	I1689	R1461	L1697	E1492	M1494	S1495	G1496	Q1498	L1505	V1510	A1513	A1542	E1566	R1559	I1560	K1561	N1562	P1565	L1784	D1785	I1786	L1787	K1788	V1594	R1598	M1601	Q1615	L1618	L1630	L1644	E1649	L1650	L1651	L1667	G1668	N1669																																								
GLU	LYS	GLU	LEU	SER	VAL	ASP	ALA	LYS	LEU	GLN	GLY	ALA	GLY	GLU	GLU	ALA	LYS	GLY	ARG	P1889	L1894	L1898	L1899	V1902	L1910	Q1911	R1919	I1922	L1936	Q1937	R1941	F1942	R1943	Y1944	N1945	E1946	Q1949	S1954	L1957	L1960	E1964	S1967																																							
Q1972	I1973	M1974	M1975	L1976	F1979	D1982	I1992	R1993	L1996	E2010	LEU	ASP	GLU	ASP	GLY	SER	L1894	L1898	C1775	P1780	P1783	L1784	D1785	I1786	L1787	K1788	D1808	F1834	H1835	L1839	I1842	A1854	ALA	PRO	GLU	GLU	GLU	SER	ASP	THR	LEU																																								
SER	ASP	SER	T2057	Q2060	L2061	L2062	T2065	A2070	Q2071	E2072	I2075	L2087	R2090	L2123	R2127	L2130	M2142	N2151	M2152	K2153	V2154	Q2157	H2158	M2167	T2170	V2174	M2176	I2187	Y2202	I2206	Y2220	N2224	V2227	R2235	D2241	M2251	E2252	E2263	C2277	Q2278	S2437	T2438	E2453	F2460	H2464	K2465	R2483	L2484	L2488	F2489	Y2685	S2687	K2663	L2664	A2665	L2666	P2678	Y2685	Y2685	W2706	D2707	T2708	S2709	N2710	L2711	P2714	K2715	L2716	L2717	F2720	I2721	W2732	R2736	W2741	L2742	Y2743	G2744	E2745	L2746	V2593	Y2747
K2413	I2417	G2434	Y2435	L2436	L2438	E2453	F2460	H2464	K2465	M2468	I2478	L2488	L2496	T2510	L2520	C2521	L2525	L2545	L2548	S2556	I2569	L2574	C2577	E2377	D2379	D2380	T2381	I2382	M2585	L2388	M2389	R2589	R2591	L2592	V2593	K2604	M2606	K2609	L2610	C2617	F2630	L2640	L2644	E2658	Q2659	E2660	L2661	F2662	K2663	L2664	A2665	L2666	P2678	Y2685	Y2685	W2706	D2707	T2708	S2709	N2710	L2711	P2714	K2715	L2716	L2717	F2720	I2721	W2732	R2736	W2741	L2742	Y2743	G2744	E2745	L2746	V2593	Y2747				
S2748	S2751	K2752	V2753	Q2754	P2755	L2756	M2757	Y2760	L2763	E2767	R2772	K2776	S2778	L2779	K2780	L2781	A2782	L2783	A2784	W2785	Q2786	W2787	R2788	L2789	E2790	R2791	T2792	E2794	G2795	M2798	N2802	ARG	THR	ARG	ARG	ILE	GLN	THR	SER	GLN	VAL	SER	ASP	VAL	ASP	ALA	ALA	HIS	G2820																																
N2830	L2833	S2834	R2835	D2836	L2837	H2838	A2839	M2840	M2844	A2845	N2846	Y2848	H2849	N2850	I2851	R2852	K2853	K2854	K2855	K2856	K2857	M2858	L2860	H2868	P2869	L2870	P2873	L2877	K2880	E2881	L2892	L2893	K2894	F2895	L2896	Q2897	L2898	N2899	G2900	Y2901	A2902	L3003	S2904	R2905	G2906	F2907	T2914	P2915																																	
S2916	L2926	L2929	H2937	I2940	L2941	F2954	E2957	T2960	K2961	V2967	L2968	L2970	I2971	H2978	R2979	F2982	E2985	K2984	K2989	E3000	K3001	M3003	V3004	V3013	R3016	H3017	R3018	L3019	S3020	F3022	D3025	I3029	L3033	T3039	L3050	E3051	S3052	T3173																																											
E3069	K3070	T3071	M3072	E3073	N3074	T3081	HIS	THR	ASN	GLN	PRO	K3088	G3089	V3090	I3094	K3095	Y3096	L3102	P3103	M3104	H3115	E3119	K3123	L3124	Q3127	L3131	R3132	I3133	L3134	L3137	L3140	G3141	K3144	F3022	R3152	L3155	L3159	F3162	F3166	F3167	V3168	T3173																																							
D3176	H3178	I3183	Y3184	K3187	S3188	E3191	R3192	L3197	P3198	V3201	E3202	B3203	C3205	I3208	Q3304	P3305	I3306	E3312	K3313	L3314	M3315	E3316	E3317	E3320	L3314	L3315	A3322	E3323	T3326	R3327	Q3330	V3334	M3335	V3336	V3337	L3338	F3340	R3341	L3342	C3343	A3351	E3352	M3346	S3347	R3348	W3349	V3350																																		
E3269	R3260	M3263	N3274	T3275	L3276	I3284	L3288	E3292	G3293	M3296	K3297	R3298	L3299	F3302	Q3304	P3305	I3306	E3312	K3313	L3314	M3315	E3316	E3317	E3320	L3314	L3315	A3322	E3323	T3326	R3327	Q3330	V3334	M3335	V3336	V3337	L3338	F3340	R3341	L3342	C3343	A3351	E3352	M3346	S3347	R3348	W3349	V3350																																		



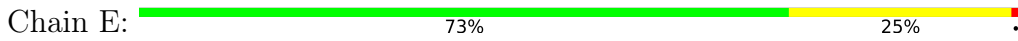








- Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1B



- Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1B



- Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1B

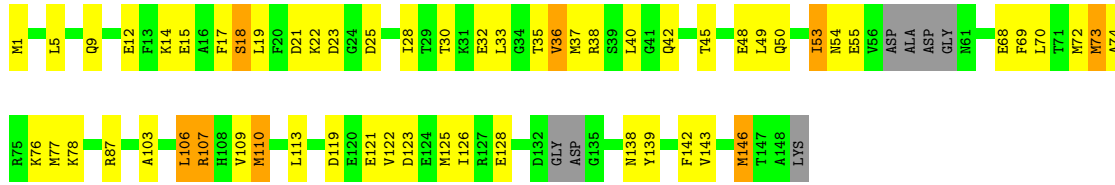


- Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1B

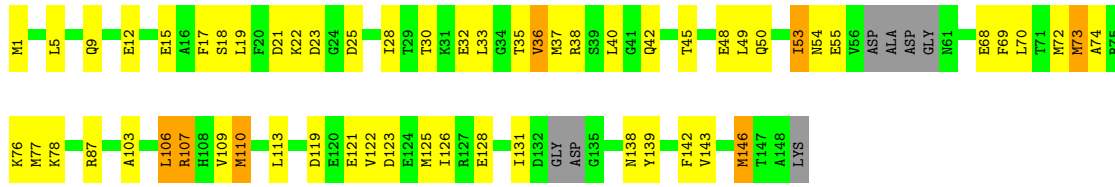


- Molecule 3: Calmodulin-1

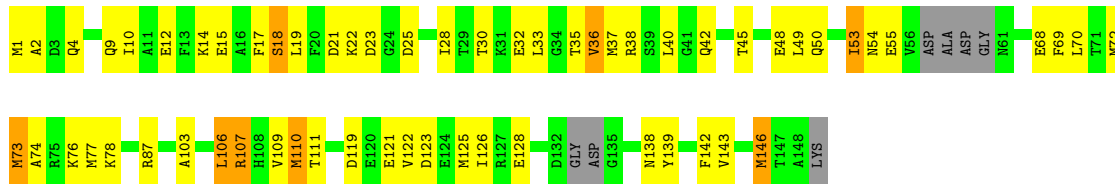




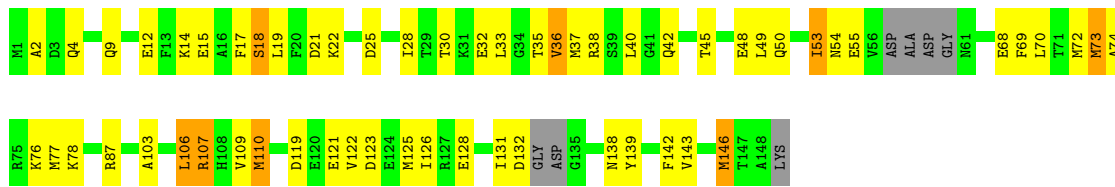
• Molecule 3: Calmodulin-1



• Molecule 3: Calmodulin-1



• Molecule 3: Calmodulin-1



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	73052	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	58	Depositor
Minimum defocus (nm)	400	Depositor
Maximum defocus (nm)	1200	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

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

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	0.26	0/36343	0.50	10/49085 (0.0%)
1	B	0.26	0/36343	0.50	10/49085 (0.0%)
1	C	0.26	0/36343	0.50	10/49085 (0.0%)
1	D	0.26	0/36343	0.50	10/49085 (0.0%)
2	E	0.29	0/834	0.55	0/1123
2	F	0.29	0/834	0.55	0/1123
2	G	0.29	0/834	0.55	0/1123
2	H	0.29	0/834	0.55	0/1123
3	I	0.33	0/1122	0.82	5/1504 (0.3%)
3	J	0.33	0/1122	0.82	5/1504 (0.3%)
3	K	0.33	0/1122	0.82	5/1504 (0.3%)
3	L	0.33	0/1122	0.82	5/1504 (0.3%)
All	All	0.26	0/153196	0.51	60/206848 (0.0%)

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	1
1	B	0	1
1	C	0	1
1	D	0	1
3	I	0	1
3	J	0	1
3	K	0	1
3	L	0	1
All	All	0	8

There are no bond length outliers.

The worst 5 of 60 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	1293	GLN	CA-CB-CG	7.56	130.02	113.40
1	A	1293	GLN	CA-CB-CG	7.54	129.98	113.40
1	B	1293	GLN	CA-CB-CG	7.53	129.96	113.40
1	C	1293	GLN	CA-CB-CG	7.52	129.94	113.40
1	B	983	LEU	CA-CB-CG	7.18	131.81	115.30

There are no chirality outliers.

5 of 8 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	3520	GLU	Peptide
3	I	107	ARG	Sidechain
3	J	107	ARG	Sidechain
3	K	107	ARG	Sidechain
3	L	107	ARG	Sidechain

## 5.2 Too-close contacts [i](#)

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	35570	0	35258	638	0
1	B	35570	0	35258	632	0
1	C	35570	0	35258	647	0
1	D	35570	0	35258	639	0
2	E	818	0	821	19	0
2	F	818	0	821	21	0
2	G	818	0	821	19	0
2	H	818	0	821	19	0
3	I	1112	0	1053	31	0
3	J	1112	0	1053	32	0
3	K	1112	0	1053	39	0
3	L	1112	0	1053	31	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

*Continued on next page...*

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	A	62	0	24	0	0
5	B	62	0	24	0	0
5	C	62	0	24	0	0
5	D	62	0	24	0	0
All	All	150252	0	148624	2702	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 9.

The worst 5 of 2702 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:C:2905:ARG:NH1	1:C:2907:PHE:O	1.97	0.98
1:D:2905:ARG:NH1	1:D:2907:PHE:O	1.97	0.97
1:B:2905:ARG:NH1	1:B:2907:PHE:O	1.97	0.97
1:A:2905:ARG:NH1	1:A:2907:PHE:O	1.97	0.97
3:I:138:ASN:O	3:I:142:PHE:HB2	1.64	0.96

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	4415/4967 (89%)	4241 (96%)	168 (4%)	6 (0%)	51	83
1	B	4415/4967 (89%)	4240 (96%)	169 (4%)	6 (0%)	51	83
1	C	4415/4967 (89%)	4241 (96%)	168 (4%)	6 (0%)	51	83
1	D	4415/4967 (89%)	4241 (96%)	168 (4%)	6 (0%)	51	83
2	E	105/108 (97%)	101 (96%)	3 (3%)	1 (1%)	15	50
2	F	105/108 (97%)	100 (95%)	4 (4%)	1 (1%)	15	50

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	G	105/108 (97%)	99 (94%)	5 (5%)	1 (1%)	15	50
2	H	105/108 (97%)	100 (95%)	4 (4%)	1 (1%)	15	50
3	I	136/149 (91%)	126 (93%)	10 (7%)	0	100	100
3	J	136/149 (91%)	126 (93%)	10 (7%)	0	100	100
3	K	136/149 (91%)	126 (93%)	10 (7%)	0	100	100
3	L	136/149 (91%)	126 (93%)	10 (7%)	0	100	100
All	All	18624/20896 (89%)	17867 (96%)	729 (4%)	28 (0%)	50	80

5 of 28 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	324	VAL
1	A	1495	SER
2	E	3	VAL
2	F	3	VAL
2	G	3	VAL

### 5.3.2 Protein sidechains [i](#)

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	3905/4358 (90%)	3889 (100%)	16 (0%)	91	97
1	B	3905/4358 (90%)	3887 (100%)	18 (0%)	88	95
1	C	3905/4358 (90%)	3887 (100%)	18 (0%)	88	95
1	D	3905/4358 (90%)	3887 (100%)	18 (0%)	88	95
2	E	88/89 (99%)	85 (97%)	3 (3%)	37	70
2	F	88/89 (99%)	85 (97%)	3 (3%)	37	70
2	G	88/89 (99%)	85 (97%)	3 (3%)	37	70
2	H	88/89 (99%)	85 (97%)	3 (3%)	37	70
3	I	119/127 (94%)	109 (92%)	10 (8%)	11	36
3	J	119/127 (94%)	109 (92%)	10 (8%)	11	36

Continued on next page...

*Continued from previous page...*

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
3	K	119/127 (94%)	109 (92%)	10 (8%)	11	36
3	L	119/127 (94%)	109 (92%)	10 (8%)	11	36
All	All	16448/18296 (90%)	16326 (99%)	122 (1%)	84	93

5 of 122 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	K	146	MET
1	D	2279	MET
1	B	983	LEU
1	D	1293	GLN
1	D	3260	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 32 such sidechains are listed below:

Mol	Chain	Res	Type
1	D	2868	HIS
1	D	3178	HIS
1	B	2868	HIS
1	B	1691	ASN
1	D	3274	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 monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 12 ligands modelled in this entry, 4 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
5	ATP	C	5002	-	26,33,33	0.59	0	31,52,52	0.75	2 (6%)
5	ATP	C	5003	-	26,33,33	0.60	0	31,52,52	0.74	2 (6%)
5	ATP	A	5003	-	26,33,33	0.61	0	31,52,52	0.74	2 (6%)
5	ATP	A	5002	-	26,33,33	0.59	0	31,52,52	0.75	2 (6%)
5	ATP	B	5002	-	26,33,33	0.60	0	31,52,52	0.75	2 (6%)
5	ATP	D	5003	-	26,33,33	0.59	0	31,52,52	0.75	2 (6%)
5	ATP	D	5002	-	26,33,33	0.59	0	31,52,52	0.75	2 (6%)
5	ATP	B	5003	-	26,33,33	0.60	0	31,52,52	0.75	2 (6%)

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
5	ATP	C	5002	-	-	7/18/38/38	0/3/3/3
5	ATP	C	5003	-	-	5/18/38/38	0/3/3/3
5	ATP	A	5003	-	-	5/18/38/38	0/3/3/3
5	ATP	A	5002	-	-	7/18/38/38	0/3/3/3
5	ATP	B	5002	-	-	6/18/38/38	0/3/3/3
5	ATP	D	5003	-	-	5/18/38/38	0/3/3/3
5	ATP	D	5002	-	-	7/18/38/38	0/3/3/3
5	ATP	B	5003	-	-	5/18/38/38	0/3/3/3

There are no bond length outliers.

The worst 5 of 16 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	5003	ATP	C5-C6-N6	2.33	123.89	120.35
5	D	5003	ATP	C5-C6-N6	2.32	123.88	120.35

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	C	5003	ATP	C5-C6-N6	2.30	123.84	120.35
5	D	5002	ATP	C5-C6-N6	2.29	123.84	120.35
5	C	5002	ATP	C5-C6-N6	2.28	123.81	120.35

There are no chirality outliers.

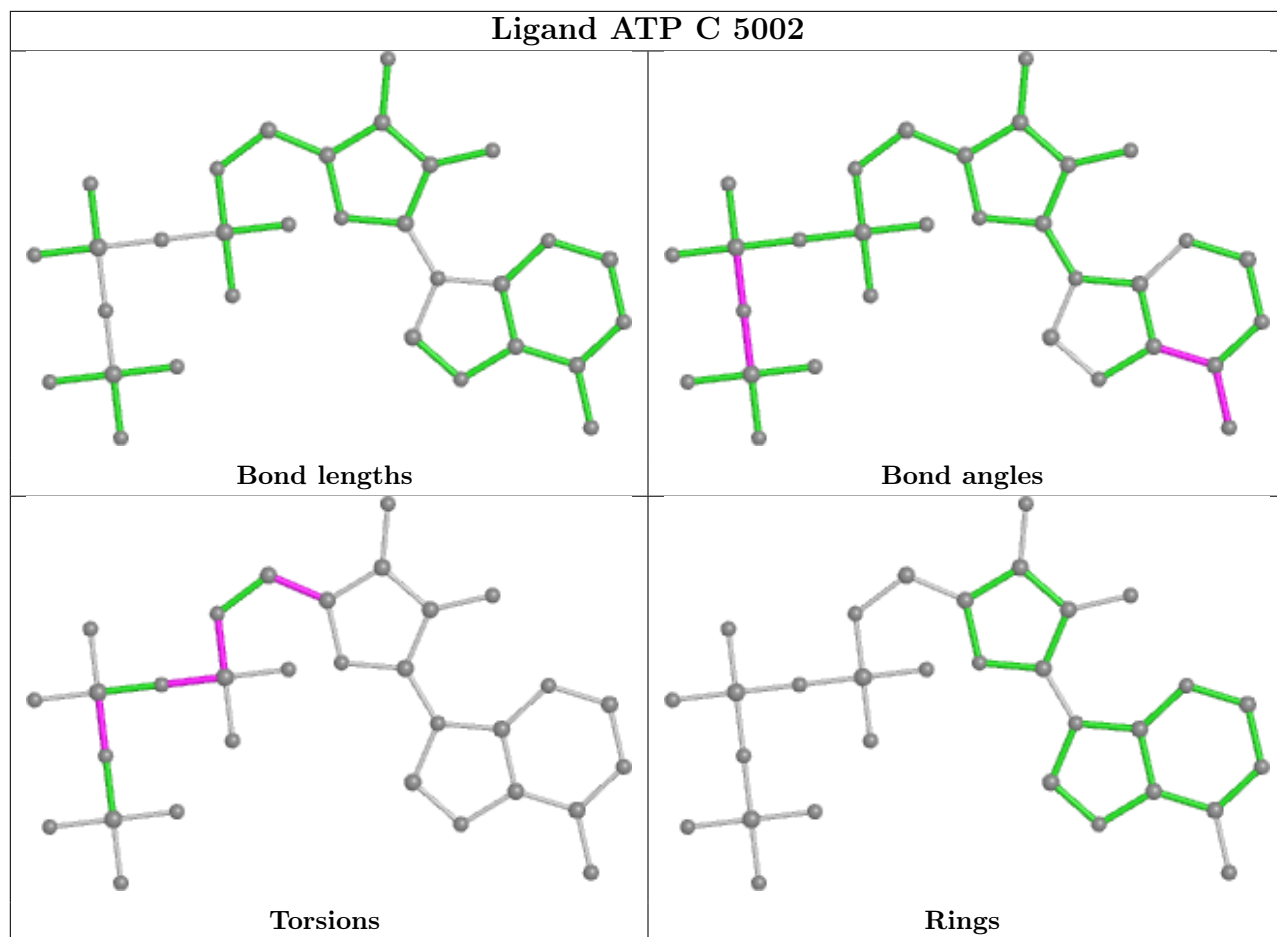
5 of 47 torsion outliers are listed below:

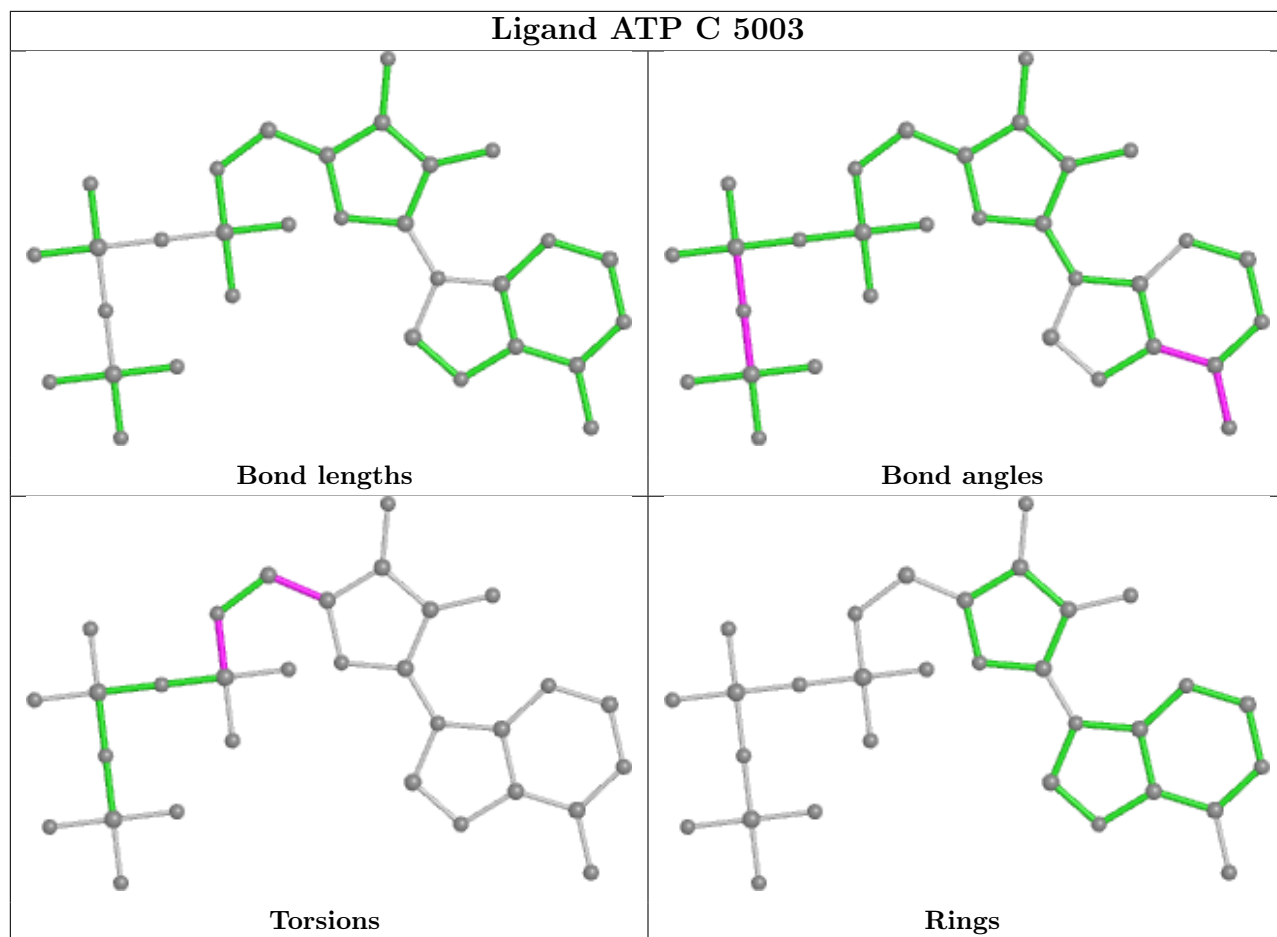
Mol	Chain	Res	Type	Atoms
5	A	5002	ATP	C5'-O5'-PA-O1A
5	A	5002	ATP	C5'-O5'-PA-O2A
5	A	5003	ATP	C5'-O5'-PA-O1A
5	A	5003	ATP	C5'-O5'-PA-O2A
5	B	5002	ATP	C5'-O5'-PA-O1A

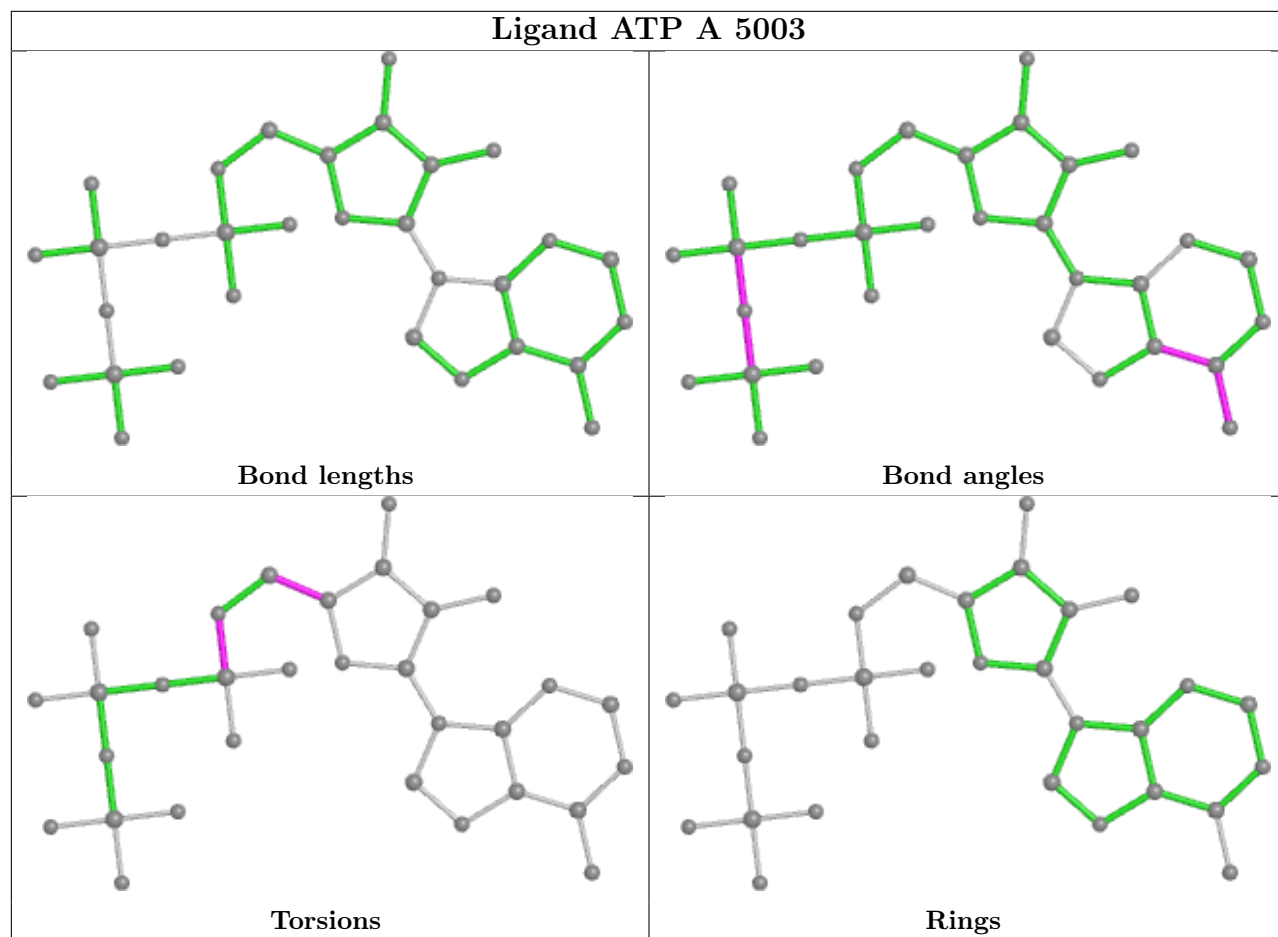
There are no ring outliers.

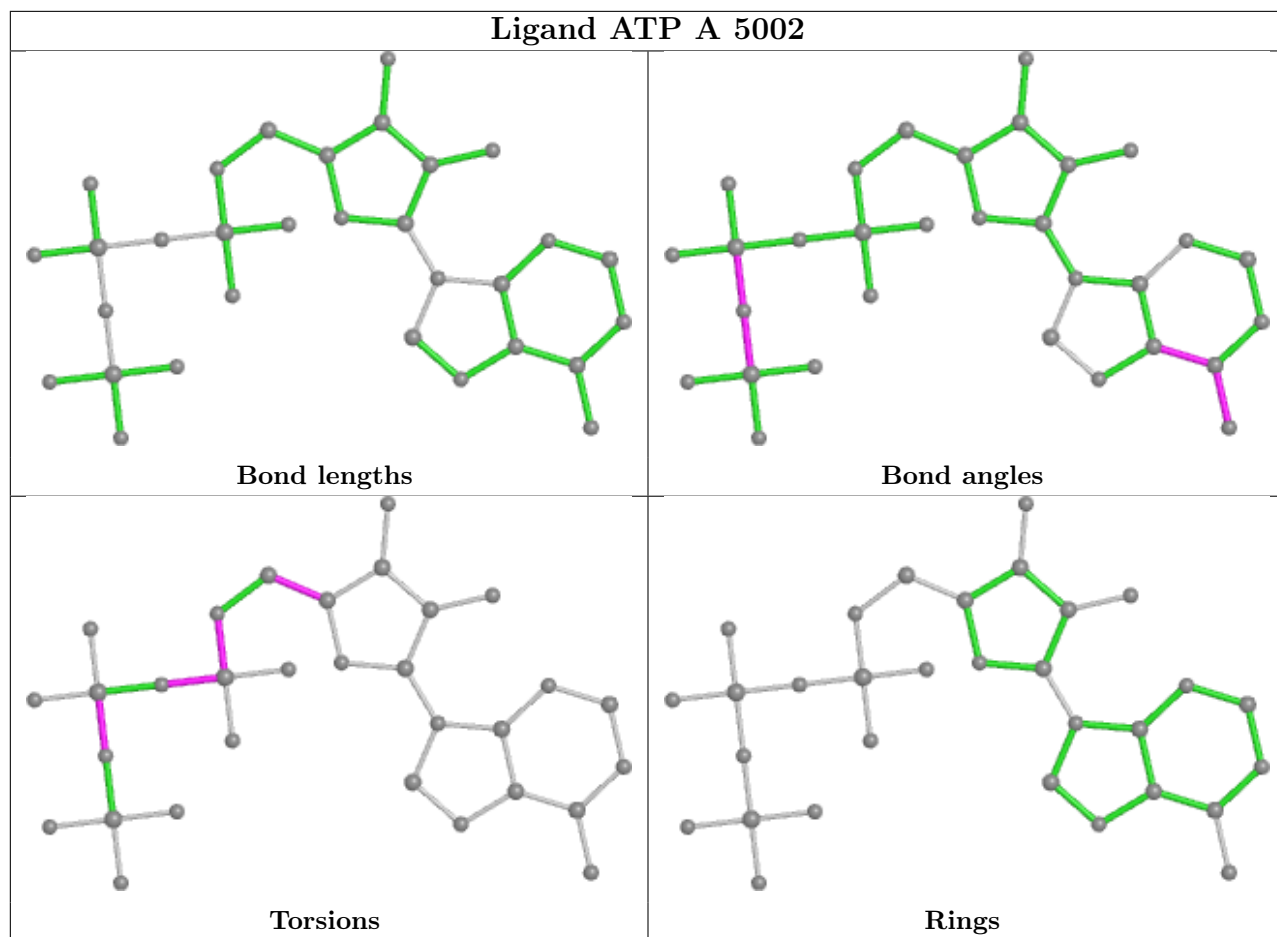
No monomer is involved in short contacts.

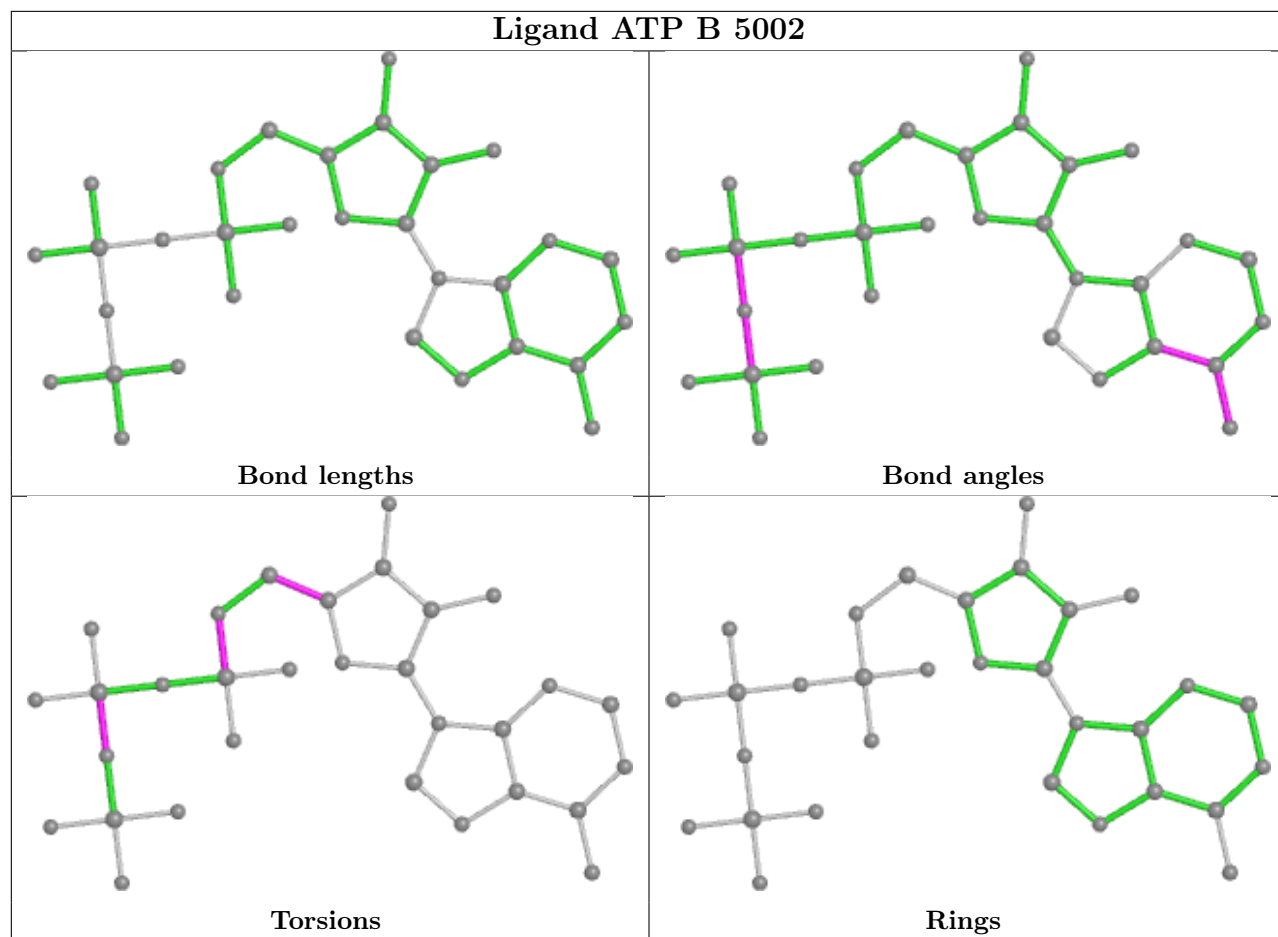
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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.

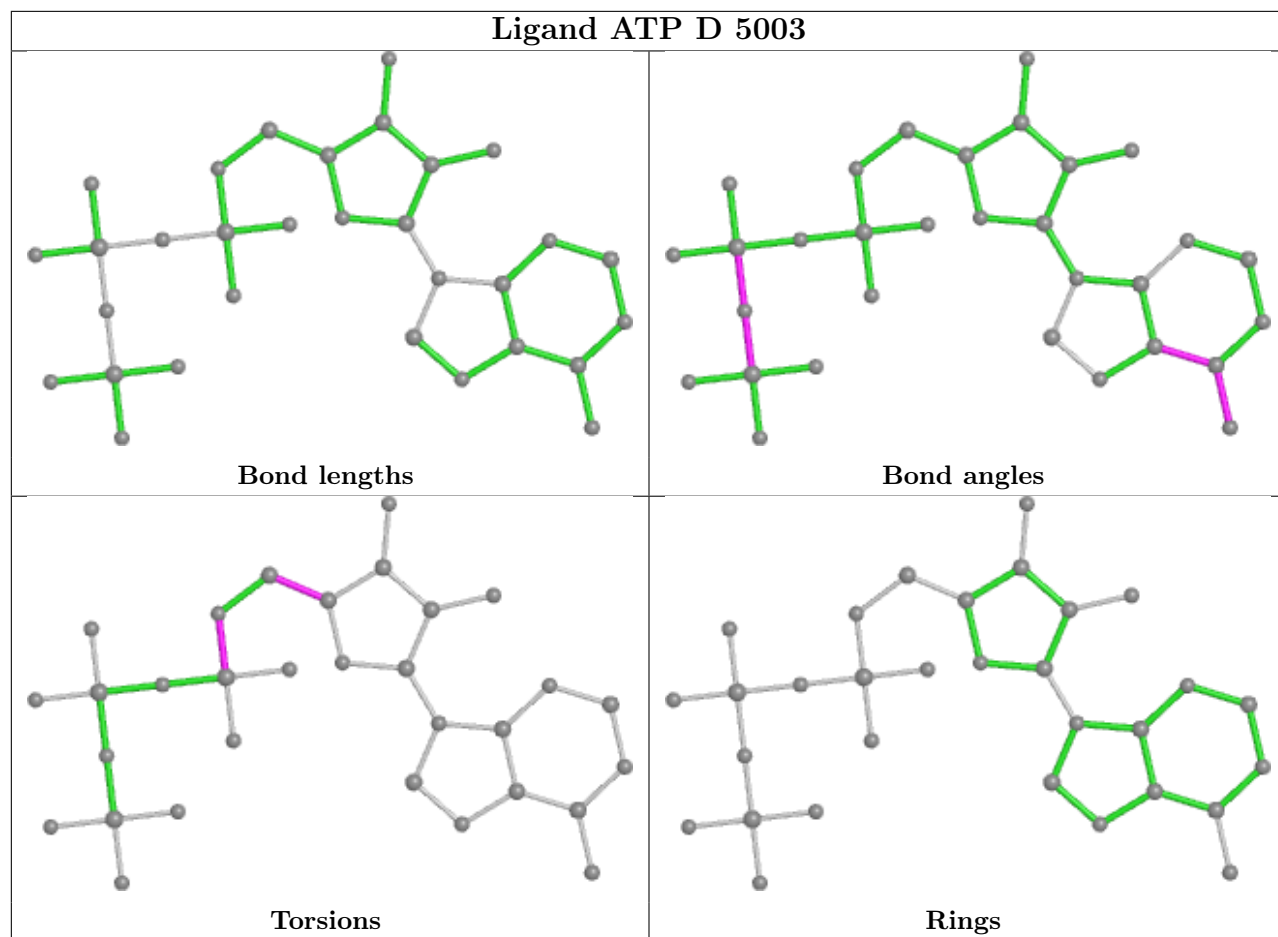




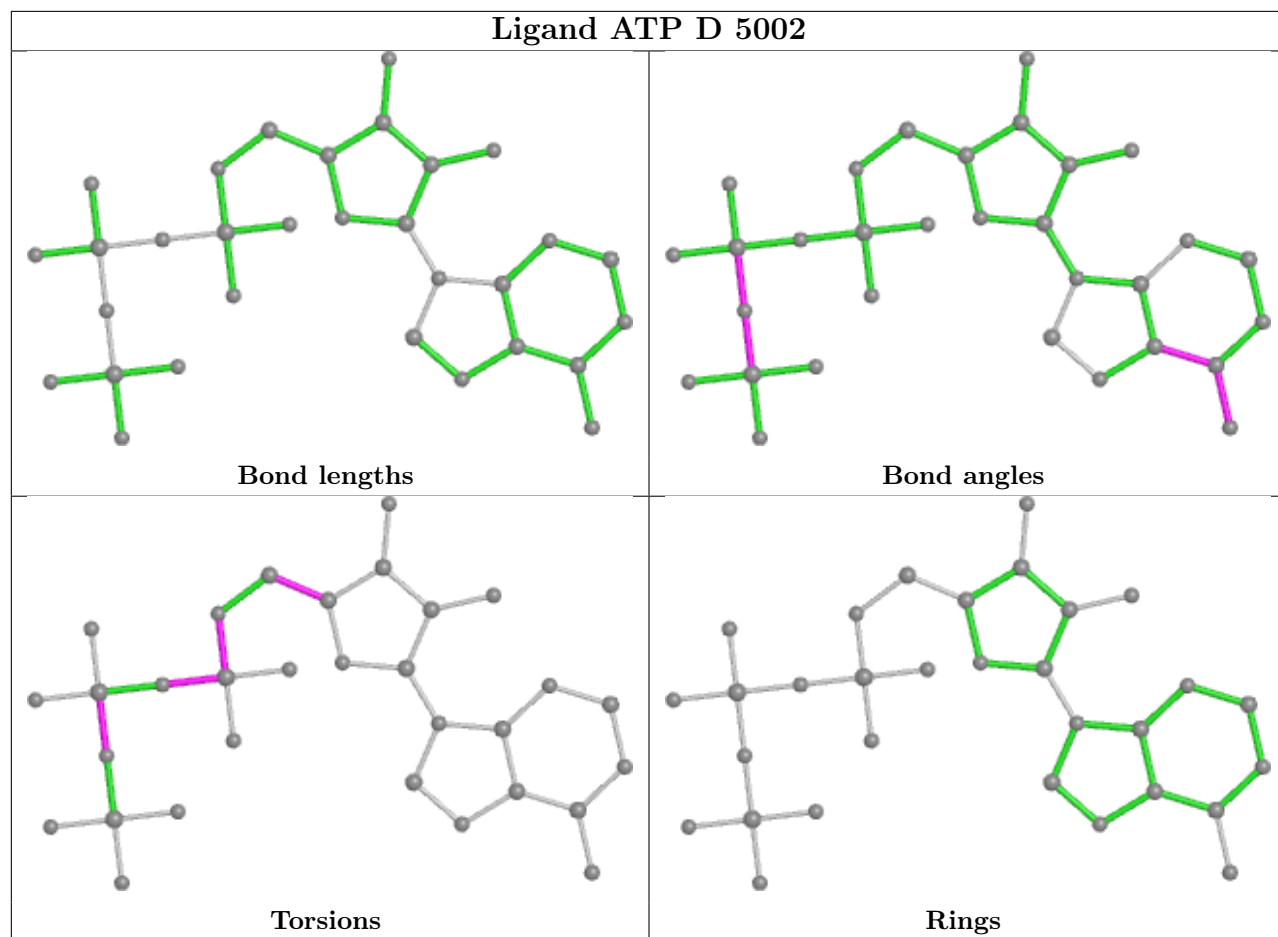


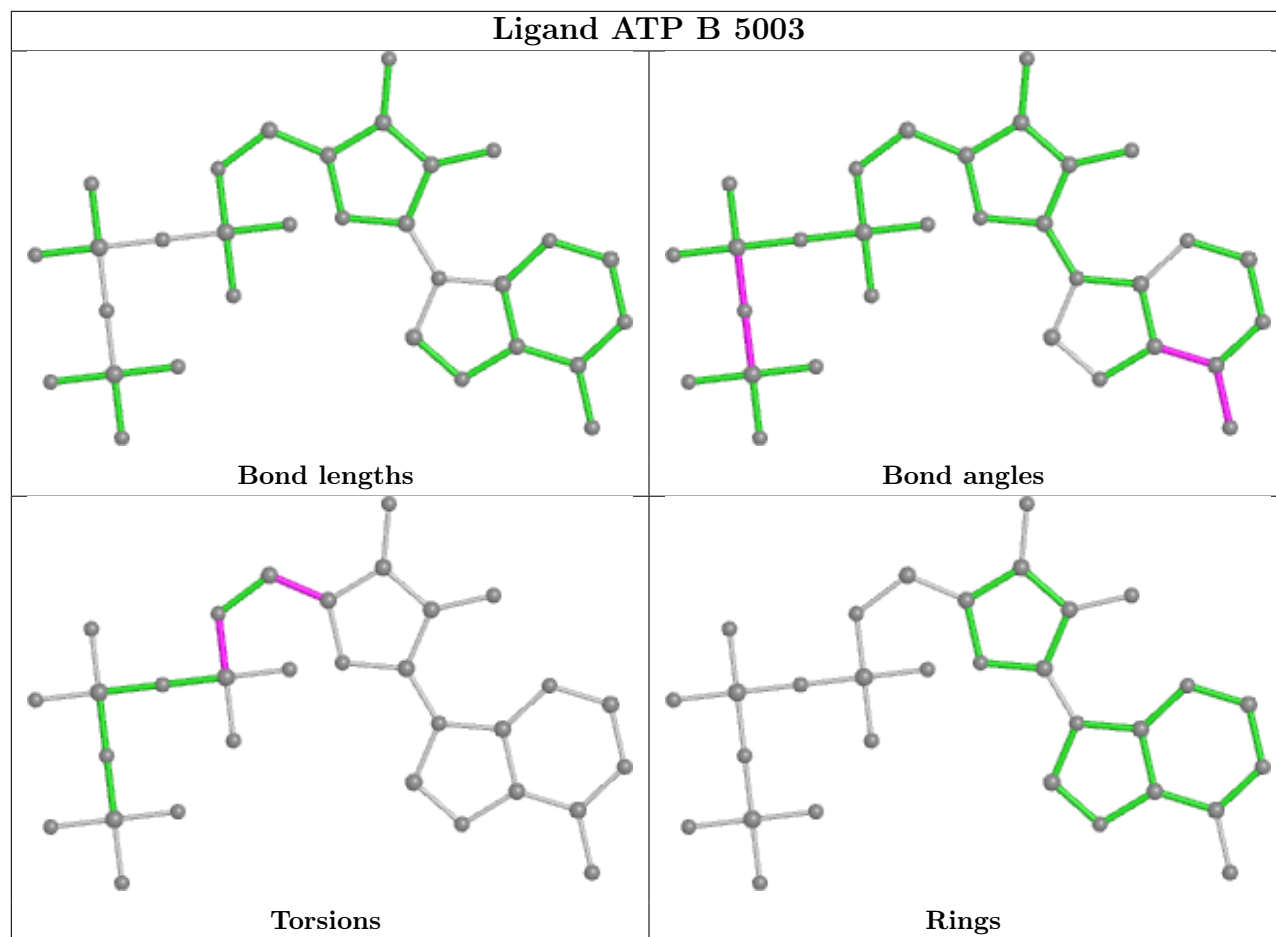












## 5.7 Other polymers [i](#)

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

This section contains visualisations of the EMDB entry EMD-26413. These allow visual inspection of the internal detail of the map and identification of artifacts.

No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

### 6.1 Orthogonal projections

This section was not generated.

### 6.2 Central slices

This section was not generated.

### 6.3 Largest variance slices

This section was not generated.

### 6.4 Orthogonal surface views

This section was not generated.

### 6.5 Mask visualisation

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

## 7 Map analysis

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

### 7.1 Map-value distribution

This section was not generated.

### 7.2 Volume estimate versus contour level

This section was not generated.

### 7.3 Rotationally averaged power spectrum

This section was not generated. The rotationally averaged power spectrum had issues being displayed.

## 8 Fourier-Shell correlation

This section was not generated. No FSC curve or half-maps provided.

## 9 Map-model fit

This section was not generated.