



## wwPDB EM Validation Summary Report ⓘ

Oct 1, 2024 – 04:11 pm BST

PDB ID : 8RRU  
EMDB ID : EMD-19465  
Title : Structure of RyR1 reconstituted into lipid liposomes in primed state in complex with FKBP and Nb9657.  
Authors : Li, C.; Efremov, R.G.  
Deposited on : 2024-01-23  
Resolution : 4.70 Å(reported)

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>.

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

EMDB validation analysis : 0.0.1.dev113  
Mogul : 1.8.4, CSD as541be (2020)  
MolProbity : 4.02b-467  
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) : 2.39

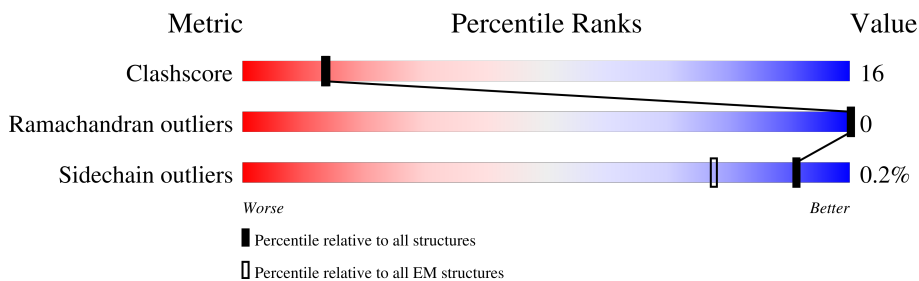
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 4.70 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  $\geq 3$ , 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  $\leq 5\%$ . 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	107	72% 28%
1	D	107	70% 30%
1	H	107	72% 28%
1	I	107	70% 30%
2	B	5027	57% 29% 14%
2	E	5027	57% 29% 14%
2	G	5027	57% 29% 14%
2	J	5027	57% 29% 14%

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Mol	Chain	Length	Quality of chain
3	C	137	 48% 43% 8%
3	F	137	 46% 45% 8%
3	K	137	 47% 44% 8%
3	M	137	 47% 44% 8%

## 2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 143907 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 Peptidyl-prolyl cis-trans isomerase FKBP1B.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	107	818	516	144	154	4	0	0
1	D	107	818	516	144	154	4	0	0
1	H	107	818	516	144	154	4	0	0
1	I	107	818	516	144	154	4	0	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	100	ASP	GLY	conflict	UNP Q8HYX6
D	100	ASP	GLY	conflict	UNP Q8HYX6
H	100	ASP	GLY	conflict	UNP Q8HYX6
I	100	ASP	GLY	conflict	UNP Q8HYX6

- Molecule 2 is a protein called Ryanodine receptor 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	4319	34143	21748	5888	6283	224	1	0
2	E	4319	34143	21748	5888	6283	224	1	0
2	G	4319	34150	21752	5888	6285	225	1	0
2	J	4319	34143	21748	5888	6283	224	1	0

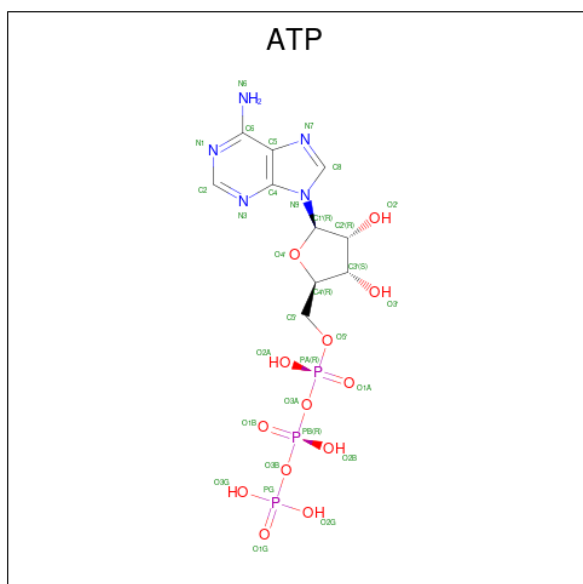
- Molecule 3 is a protein called Nanobody 9657.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	126	Total 967	C 597	N 170	O 195	S 5	0	0
3	F	126	Total 967	C 597	N 170	O 195	S 5	0	0
3	K	126	Total 967	C 597	N 170	O 195	S 5	0	0
3	M	126	Total 967	C 597	N 170	O 195	S 5	0	0

- Molecule 4 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
			Total	Zn	
4	B	1	Total 1	Zn 1	0
4	E	1	Total 1	Zn 1	0
4	G	1	Total 1	Zn 1	0
4	J	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).



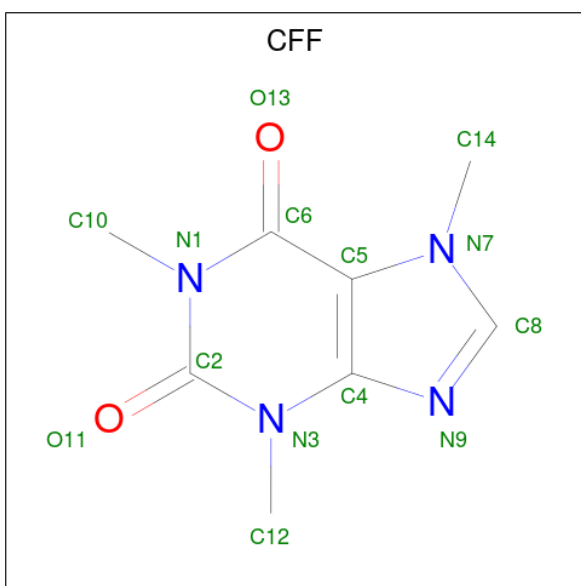
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
5	B	1	Total 31	C 10	N 5	O 13	P 3	0

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Mol	Chain	Residues	Atoms				AltConf	
			Total	C	N	O		P
5	E	1	Total 31	C 10	N 5	O 13	P 3	0
5	G	1	Total 31	C 10	N 5	O 13	P 3	0
5	J	1	Total 31	C 10	N 5	O 13	P 3	0

- Molecule 6 is CAFFEINE (three-letter code: CFF) (formula:  $C_8H_{10}N_4O_2$ ) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
6	B	1	Total 14	C 8	N 4	O 2	0
6	E	1	Total 14	C 8	N 4	O 2	0
6	G	1	Total 14	C 8	N 4	O 2	0
6	J	1	Total 14	C 8	N 4	O 2	0

- Molecule 7 is CALCIUM ION (three-letter code: CA) (formula: Ca) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
7	B	1	Total 1	Ca 1	0

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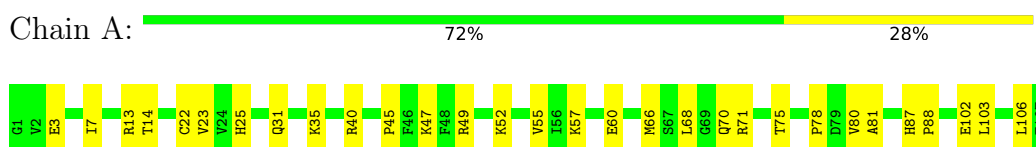
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<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>		<b>AltConf</b>
7	E	1	Total 1	Ca 1	0
7	G	1	Total 1	Ca 1	0
7	J	1	Total 1	Ca 1	0

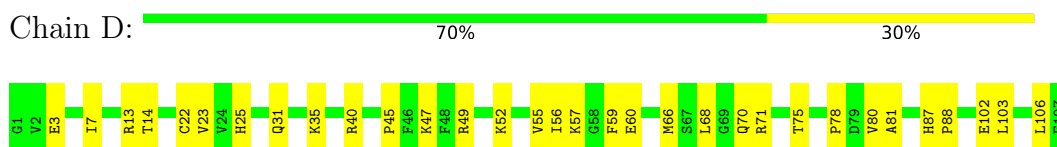
### 3 Residue-property plots [i](#)

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.

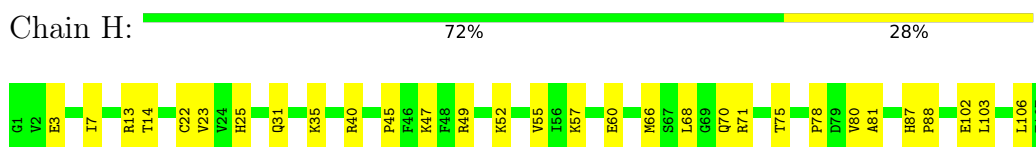
- Molecule 1: Peptidyl-prolyl cis-trans isomerase FKBP1B



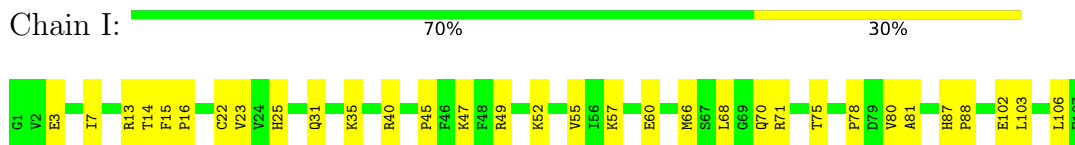
- Molecule 1: Peptidyl-prolyl cis-trans isomerase FKBP1B



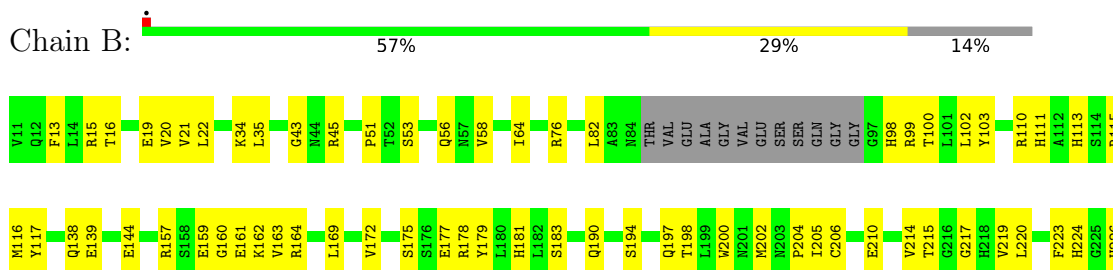
- Molecule 1: Peptidyl-prolyl cis-trans isomerase FKBP1B



- Molecule 1: Peptidyl-prolyl cis-trans isomerase FKBP1B



- Molecule 2: Ryanodine receptor 1





L1595	W1496	THR	ALA	L1272	I1161	M1065	R871	G761	W546	E396
Q1598	G1497	PRO	GLU	A1273	F1162	Q1066	E872	C762	V547	E596
M1599	G1498	ALA	GLY	H1274	T1163	S1067	K873	G766	V548	F421
P1609	D1499	LEU	GLY	L1287	L1164	R1068	L874	E769	S549	K424
F1612	F1500	PRO	LYS	L1288	V1168	W1069	A875	D774	K550	K424
V1615	V1501	ARG	GLU	F1288	V1171	D1070	E876	P779	L551	P431
E1616	S1502	LEU	GLY	L1289	S1171	R1071	M877	D774	D552	R242
T1617	P1503	PRO	THR	R1290	A1178	V1072	I878	P779	R553	L443
R1618	G1504	HIS	ALA	L1291	S1175	R1073	H879	F779	L554	L443
R1619	G1504	ASP	LYS	S1292	E1176	F1075	R886	V780	E555	I449
G1620	GLN	ASP	GLU	L1293	T1177	R1076	I887	W781	I560	GLY
G1621	VAL	VAL	GLN	P1294	A1178	A1077	W881	S782	E562	PRO
R1622	GLY	PRO	THR	F1297	F1179	E1078	I892	F783	V563	PRO
L1624	R1508	ALA	PRO	H1298	R1180	E1078	T892	S794	V574	E338
G1625	L1514	ASP	GLY	Q1299	E1181	Y1081	G894	W787	I577	I339
W1626	C1518	GLY	GLY	R1302	I1182	S1086	G894	W787	I578	K340
A1627	R1623	THR	THR	C1303	T1182	Y1086	R897	W788	R469	Y341
M1637	L1624	PRO	GLN	T1304	F1188	V1083	R901	V789	S470	H255
L1639	F1624	PRO	GLN	ALA	L1189	G1086	R902	R790	L471	A256
H1640	E1425	VAL	VAL	ALA	F1190	R1087	L903	R791	L472	R257
I1641	I1426	GLU	GLU	ALA	C1191	F1092	H904	L792	W348	S288
C1642	T1431	ALA	ALA	THR	P1196	V1095	H904	G795	R473	R261
F1643	T1432	PRO	ALA	PRO	P1199	M1100	P905	W796	R474	L262
E1644	Y1433	PRO	PRO	LEU	G1200	R1101	G966	H797	Q475	S268
E1644	Y1433	PRO	PRO	LEU	V1199	R1101	L907	G798	E480	W269
H1645	F1434	VAL	VAL	ALA	G1200	R1101	L907	E799	E481	W269
H1646	L1548	ARG	ARG	ALA	D1207	W1104	H911	F800	L357	S270
C1647	F1549	GLU	GLU	ALA	S1210	A1105	S912	W702	K358	G271
M1648	P1550	LEU	GLY	LEU	F1244	A1105	L913	F802	Y359	S272
E1652	V1551	ASN	ASN	GLN	F1245	A1105	L913	D717	A360	H273
F1662	V1552	GLU	GLU	GLN	P1247	W1132	E917	W722	A361	L274
H1663	F1553	LYS	LYS	PRO	V1248	H1133	L922	A727	P362	R275
S1664	F1554	ASP	ASP	PRO	P1249	H1133	L922	R728	P364	W276
I1665	P1556	THR	THR	ASP	H1252	P1138	L929	Y808	K365	G277
Q1666	Q1559	GLU	THR	GLU	E1256	D1147	R930	P733	A366	L260
R1666	W1560	LYS	LYS	ALA	V1257	M1152	T931	L738	L369	H284
I1667	I1561	ASN	ASN	ALA	M1260	I1153	L932	A739	G370	V285
Q1660	I1562	ASN	ASN	ARG	D1261	D1154	L932	L740	V371	V285
R1661	E1565	LYS	LYS	ALA	P1268	D1155	L934	E741	L372	T286
F1662	K1568	ARG	ARG	ALA	C1269	D1156	L934	V744	K373	A292
H1663	Q1569	PHE	PHE	ALA	L1270	T1157	L934	W744	K374	L293
S1664	Q1570	PHE	PHE	ALA	L1271	E1157	L934	V744	K375	L293
Y1670	M1571	LYS	LYS	ALA	R1271	C1269	L934	I621	A376	L299
A1672	I1572	ALA	ALA	ALA	E1271	L1270	L934	G746	I377	C305
F1673	M1573	LYS	LYS	ALA	V1271	L1270	L934	G747	L378	C305
L1674	P1574	ALA	ALA	LEU	E1271	L1270	L934	L748	G382	H308
V1675	L1575	ALA	ALA	LEU	V1271	L1270	L934	L749	A387	T312
L1676	A1578	ALA	ALA	ARG	M1260	D1154	L934	D749	L388	T312
L1677	M1579	MET	MET	SER	D1261	D1155	L934	G634	F389	S313
F1678	F1580	THR	THR	GLY	P1268	T1156	L934	G634	F389	F314
H1683	R1584	GLN	GLN	GLY	C1269	D1261	L934	L750	L390	C315
L1694	R1594	PRO	PRO	TRP	L1270	L1270	L934	L750	T391	F316
		ALA	ALA	GLU	R1271	I1160	L934	L750	R392	K320
				GLU			L934	L750	C993	L323
							L934	L750	Q394	
							L934	L750	W60	





GLU	GLY	LYS	SER	K4721	E4900	R5017	K4721	E4900	R5017
GLY	PRO	LYS	GLY	R4722	I4901	C5018	R4722	I4901	C5018
GLY	ILE	GLU	ALA	K4723	P4904	W5019	K4723	P4904	W5019
ASP	LEU	ALA	GLU	V4724	F5021	D5020	V4724	F5021	D5020
ALA	LYS	GLY	GLU	L4725	E4910	F5021	L4725	E4910	F5021
ALA	ARG	GLY	GLU	D4726	E4913	G5025	D4726	E4913	G5025
GLU	ALA	ALA	GLU	G4733	R4913	G5025	G4733	R4913	G5025
GLU	LYS	ALA	GLY	R4736	V4914	F5028	R4736	V4914	F5028
ASP	GLY	MET	ASP	R4737	I4918	Y5032	R4737	I4918	Y5032
ASP	VAL	GLY	GLU	L4737	I4918	Y5032	L4737	I4918	Y5032
ASP	ASP	F4540	ASP	A4738	L4928	S5037	A4738	L4928	S5037
GLY	GLY	W4541	GLY	M4743	I4932	S5037	M4743	I4932	S5037
GLU	GLU	L4544	GLU	A4746	I4932	S5037	A4746	I4932	S5037
VAL	GLU	E4545	GLU	D4945	D4945	S5037	D4945	D4945	S5037
ALA	GLY	V4546	GLU	E4749	Q4949	S5037	E4749	Q4949	S5037
GLY	HIS	VAL	LEU	W4767	V4950	S5037	W4767	V4950	S5037
ALA	ALA	PRO	PRO	P4641	R4951	S5037	P4641	R4951	S5037
ALA	GLY	K4550	GLY	A4642	E4952	S5037	A4642	E4952	S5037
GLY	PRO	F4551	PRO	L4643	D4953	S5037	L4643	D4953	S5037
PRO	PRO	L4552	GLY	L4649	T4956	S5037	L4649	T4956	S5037
GLY	GLY	L4555	GLY	Y4783	K4957	S5037	Y4783	K4957	S5037
ALA	ALA	L4562	PRO	G4802	C4958	S5037	G4802	C4958	S5037
GLU	GLY	I4576	GLU	I4960	F4959	S5037	I4960	F4959	S5037
VAL	VAL	L4577	VAL	C4961	I4960	S5037	C4961	I4960	S5037
VAL	ALA	VAL	PRO	M4806	C4961	S5037	M4806	C4961	S5037
ALA	VAL	VAL	GLY	F4807	H4978	S5037	F4807	H4978	S5037
VAL	VAL	V4582	LYS	F4808	H4978	S5037	F4808	H4978	S5037
ALA	ALA	D4584	ALA	F4809	H4978	S5037	F4809	H4978	S5037
ASP	ASP	P4587	ASP	H4812	E4982	S5037	H4812	E4982	S5037
GLY	GLY	GLY	GLY	V4846	H4984	S5037	V4846	H4984	S5037
GLY	GLY	GLY	GLY	V4847	L4985	S5037	V4847	L4985	S5037
PHE	PHE	GLY	ASN	V4848	Y4988	S5037	V4848	Y4988	S5037
ARG	ARG	ASP	GLY	Y4849	M4989	S5037	Y4849	M4989	S5037
PRO	PRO	GLY	GLY	K4673	F4990	S5037	K4673	F4990	S5037
PRO	GLY	MET	LYS	K4675	F4991	S5037	K4675	F4991	S5037
GLY	GLY	GLY	GLY	Y4851	L4992	S5037	Y4851	L4992	S5037
ALA	ALA	VAL	VAL	T4852	M4993	S5037	T4852	M4993	S5037
GLY	GLY	SER	SER	V4853	Y4994	S5037	V4853	Y4994	S5037
GLY	GLY	ALA	PRO	V4854	L4995	S5037	V4854	L4995	S5037
LEU	LEU	GLY	GLY	R4860	L4996	S5037	R4860	L4996	S5037
GLY	GLY	ASP	ASP	G4685	M4997	S5037	G4685	M4997	S5037
ASP	ASP	LEU	PRO	L4686	K4998	S5037	L4686	K4998	S5037
MET	MET	ALA	ALA	D4878	H5003	S5037	D4878	H5003	S5037
GLY	GLY	GLY	GLY	Y4887	T5004	S5037	Y4887	T5004	S5037
ASP	ASP	ALA	THR	I4688	E5007	S5037	I4688	E5007	S5037
THR	THR	GLY	LYS	T4889	E5007	S5037	T4889	E5007	S5037
LYS	LYS	GLY	LYS	C4882	E5012	S5037	C4882	E5012	S5037
LYS	LYS	GLY	GLY	D4694	K5012	S5037	D4694	K5012	S5037
ALA	ALA	GLY	ALA	Y4888	H5013	S5037	Y4888	H5013	S5037
ALA	ALA	GLY	GLY	T4897	Y5014	S5037	T4897	Y5014	S5037
PRO	PRO	TRP	PRO	G4898	Q5015	S5037	G4898	Q5015	S5037
PRO	PRO	GLY	PRO	D4720	E5016	S5037	D4720	E5016	S5037
ALA	ALA	GLY	ALA	V4720	E5016	S5037	V4720	E5016	S5037

• Molecule 2: Ryanodine receptor 1



V13	Q12	F13	L14	R15	T16	E19	V20	V21	L22	K34	L35	G43	N44	R45	P51	T52	S53	W58	I64	R76	L82	A83	M84	THR	VAL	GLU	ALA	GLY	VAL	SER	GLN	L4992	M4993	Y4994	L4995	L4996	M4997	K4998	H5003	T5004	E5007	K5012	H5013	Y5014	Q5015	E5016	Y117						
Q138	E139	E144	M150	R157	S158	E159	G160	E161	K162	V163	R164	L169	V172	S175	S176	E177	R178	Y179	L180	H181	L182	S194	T198	L199	W200	M201	M202	M203	P204	I205	C206	E210	V214	T215	G216	G217	H218	V219	L220	F223	H224	G225	H226	E229	C230	L231	T232						
I233	S234	R242	V245	Y246	Y247	E248	V252	H255	A256	R261	L262	S268	W269	S270	G271	G272	H273	L274	R275	W276	G277	L280	H284	G370	V371	L372	K373	K374	K375	A376	I377	L378	G382	A387	L388	F389	L390	F391	R392	C393	Q394	Q395	E396	F421	K424								
P431	L443	K661	L554	E555	I560	L561	E562	V563	D669	A677	R469	S470	L471	R472	M473	R474	Q475	E480	L589	F599	F800	D717	W722	R595	M596	H597	K598	L600	D601	V602	L606	A501	H502	F503	A504	E505	W515	I530	R531	G532	N533	R534	M535	A535	L536	L539	F540	S541	P646	M647	W650	V548	S549
K550	L551	R553	L554	E555	I560	L561	E562	V563	D669	A677	R469	S470	L471	R472	M473	R474	Q475	E480	L589	F599	F800	D717	W722	R595	M596	H597	K598	L600	D601	V602	L606	A501	H502	F503	A504	E505	W515	I530	R531	G532	N533	R534	M535	A535	L536	L539	F540	S541	P646	M647	W650	V548	S549
T657	G660	K661	L554	E555	I560	L561	E562	V563	D669	A677	R469	S470	L471	R472	M473	R474	Q475	E480	L589	F599	F800	D717	W722	R595	M596	H597	K598	L600	D601	V602	L606	A501	H502	F503	A504	E505	W515	I530	R531	G532	N533	R534	M535	A535	L536	L539	F540	S541	P646	M647	W650	V548	S549
E769	D774	K661	L554	E555	I560	L561	E562	V563	D669	A677	R469	S470	L471	R472	M473	R474	Q475	E480	L589	F599	F800	D717	W722	R595	M596	H597	K598	L600	D601	V602	L606	A501	H502	F503	A504	E505	W515	I530	R531	G532	N533	R534	M535	A535	L536	L539	F540	S541	P646	M647	W650	V548	S549
S782	F783	S784	F779	W662	Y663	F664	E665	V668	D669	A677	R469	S470	L471	R472	M473	R474	Q475	E480	L589	F599	F800	D717	W722	R595	M596	H597	K598	L600	D601	V602	L606	A501	H502	F503	A504	E505	W515	I530	R531	G532	N533	R534	M535	A535	L536	L539	F540	S541	P646	M647	W650	V548	S549
K788	H797	F799	L792	G795	R796	H797	G798	E799	F800	K801	F802	Y808	H812	L821	R822	L823	E824	P825	L826	R835	H838	L839	W840	G841	L744	S745	G746	C747	L748	D749	L750	P753	S754	I755	S756	L867	R870	I759	R871	E872	R873	L874	A875										

V2214	H2125	V1841	M1730	G1621	R1508	ASP	LYS	R1290	D1070	L984	E876
L2215	R2126	L1849	L1731	E1622	L1514	VAL	GLU	L1291	R1071	Y985	M877
G2216	Q2127	V1850	S1732	R1623	L1514	VAL	GLY	S1292	V1072	I878	H879
GLY	Y2128	L1850	E1733	L1624	C1518	PRO	THR	L1293	R1073	H993	H879
GLY	GLY	M1851	Y1734	G1625	C1518	ALA	PRO	P1294	F1074	Y996	R886
GLY	ASP	G1852	I1735	W1626	L1519	ASP	GLY	F1297	F1075	I887	I887
I1853	L1922	I1853	P1740	A1627	L1522	N1420	THR	H1297	R1076	R1000	W891
F1854	L1927	F1854	R1743	M1637	A1523	R1421	PRO	Q1299	A1077	W1005	T892
D1858	L1927	D1858	R1743	A1638	A1523	D1422	PRO	H1299	E1078	W1006	Y893
L1862	S1934	L1862	P1749	L1639	M1527	D1423	GLN	T1304	Y1081	Y1007	G894
M1865	M1939	I1862	P1749	H1640	K1547	E1425	VAL	ALA	T1082	S1008	R897
I1866	M1939	I1866	R1758	I1641	L1548	I1426	GLU	ALA	E1083	I1013	K901
F1871	L1943	F1871	R1759	E1644	F1549	T1431	ALA	THR	G1086	R1016	R902
E1874	E1944	E1874	R1759	M1645	P1550	T1432	GLN	ALA	R1087	R1016	L903
GLU	Y1945	GLU	P1763	R1646	A1551	V1433	VAL	ALA	F1092	R1017	H904
GLU	F1946	GLU	P1763	C1647	V1552	Y1434	PRO	ALA	E1093	M1018	P905
GLU	F1946	GLU	L1771	M1648	F1553	Y1435	ARG	PRO	A1094	L1021	C906
GLU	E1950	E1874	R1772	E1652	V1554	V1439	ALA	GLY	V1095	P1022	L907
GLU	L1951	GLU	R1772	L1653	L1555	V1439	ASN	LEU	M1100	W1022	H911
GLU	E1963	GLU	H1776	L1653	P1556	Q1443	GLU	GLN	R1101	P1023	S912
GLU	Y1965	GLU	H1776	R1656	Q1559	C1447	LYS	PRO	W1104	L1026	L913
GLU	V1966	GLU	V1783	R1661	N1560	C1447	ASP	PRO	G1116	L1027	E917
GLU	L1969	GLU	L1786	F1662	V1561	V1448	ALA	ALA	F1223	K1032	L929
GLU	L1969	GLU	P1787	H1663	I1562	V1449	THR	ALA	A1227	R1036	T931
GLU	S1975	GLU	ALA	S1664	E1565	W1450	GLU	ASP	G1131	Q1041	L932
GLU	S1975	GLU	ALA	H1665	E1565	W1451	GLU	ASP	Y1122	A1042	L932
GLU	S1975	GLU	GLY	S1665	K1568	W1452	LYS	ASP	Y1122	V1043	L932
GLU	A1978	GLU	VAL	Y1670	Q1568	T1464	ASN	ARG	M1125	T1044	L932
GLU	L1979	GLU	ALA	R1671	L1570	P1465	LYS	ALA	G1131	L1046	T931
GLU	L1979	GLU	ALA	R1671	M1571	P1465	LYS	ALA	Q1244	L1047	A934
GLU	M1980	GLU	E1793	V1673	I1572	M1462	ARG	GLU	F1245	L1047	C937
GLU	M1981	GLU	R1797	L1676	P1574	M1476	PHE	PRO	E1246	G1048	H938
GLU	R1982	ASP	R1797	L1676	L1575	G1477	PHE	ASP	P1247	Y1049	V939
GLU	F1998	GLU	P1800	R1680	L1575	D1478	LYS	TYR	V1248	G1048	G940
GLU	F2012	GLU	L1804	L1680	A1578	M1482	ALA	GLU	H1249	Y1051	G940
GLU	K2013	GLU	L1694	L1694	M1579	V1483	LYS	ASN	H1252	G1050	E947
GLU	L2031	GLU	R1698	L1698	F1580	H1484	ALA	ARG	M1052	Y1051	L950
GLU	H2035	GLU	L1703	L1703	R1584	S1485	ALA	ARG	D1147	I1053	L950
GLU	Q2036	GLU	P1704	P1704	R1594	C1489	MET	SER	V1148	E1054	K951
GLU	L2039	GLU	M1814	M1814	L1596	C1489	MET	GLY	M1152	P1056	Y959
GLU	A2040	GLU	L1815	L1815	L1596	M1494	GLN	GLY	D1153	P1056	Y959
GLU	A2040	GLU	G1816	G1816	Q1598	M1494	PRO	TRP	D1154	ASP	P969
GLU	Q2045	GLU	R1827	R1827	P1609	W1496	PRO	GLY	L1155	GLN	L970
LEU	Q2045	ASP	Y1711	Y1711	P1609	W1496	ALA	GLY	T1156	PRO	D971
GLU	GLU	ALA	D1713	D1713	F1612	G1497	THR	ALA	E1157	GLN	L972
GLU	GLU	LYS	L1715	L1715	E1616	G1497	PRO	GLY	M1158	VAL	L972
GLU	GLU	GLU	E1835	E1835	E1616	V1501	ALA	LEU	L1270	GLU	R976
GLU	GLU	GLU	Q1837	Q1837	E1616	S1502	PRO	LYS	L1271	GLN	L977
GLU	GLU	GLU	F1836	F1836	T1617	P1503	ARG	GLY	R1271	VAL	L977
GLU	GLU	GLU	Q1837	Q1837	T1617	G1504	PRO	GLY	L1272	GLU	L977
GLU	GLU	GLU	F1838	F1838	R1618	G1504	LEU	GLY	L1272	GLU	L977
PRO	GLU	ALA	V1839	V1839	R1618	GLN	PRO	GLY	L1274	M1065	L977
PRO	GLU	PRO	P1840	P1840	A1620	GLY	LEU	GLY	H1274	Q1066	L977
GLU	GLU	PRO	P1840	P1840	A1620	GLY	ARG	GLY	L1287	S1068	L977
GLU	GLU	PRO	P1840	P1840	A1620	GLY	LEU	THR	F1288	R1068	L977
GLU	GLU	PRO	P1840	P1840	A1620	GLY	ALA	ALA	L1289	W1069	Q981











F3992	F3885	Q3766	PHE	R3550	K3475	K3371	H3268	T3178	P3004	T2912	THR	F2768
L3993	R3886	Q3767	ARG	E3551	SER	V3372	V3269	V3183	N3007	A2913	GLU	D2769
H5994	F3887	S3768	MET	F3552	LYS	E3375	I3270	V3183	N3007	K2914	LYS	K2770
F3996	L3888	R3769	P3640	L3553	ALA	E3378	P3275	L3196	C3014	E2915	THR	L2771
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H3998	L3890	T3772	N3651	P3567	ALA	L3379	A3189	E3104	L3018	R2920	LYS	H2773
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D4022	R3904	L3780	I3674	G3581	SER	A3387	L3296	R3197	L3025	L2931	THR	H2780
M4023	T3905	G3788	K3679	R3582	ASP	G3390	P3297	L3197	A3031	Y2935	TYR	D2781
V4024	Q3906	E3789	K3679	R3582	GLN	E3391	M3201	P3202	S3032	R2939	PRO	Y2782
V4025	Q3906	E3789	K3679	R3582	GLU	L3392	P3302	V2303	N3033	GLY	ASP	E2783
M4026	N3909	T3790	K3694	A3586	THR	L3393	P3303	V2303	N3033	LEU	ARG	E2783
L4027	N3909	I3802	K3694	P3589	THR	V3394	G3804	N3214	E3035	LYS	GLU	K2786
L4028	I3916	L3805	P3695	E3590	LYS	L3394	T3305	N3214	E3035	LYS	GLU	H2787
M4044	R3925	L3805	K3713	K3591	LYS	D3396	N3312	Y3219	E3037	ASP	GLY	H2788
V4045	I3916	L3805	K3713	K3591	LYS	D3396	N3312	Y3219	E3037	ASP	GLY	H2788
D4046	R3929	L3805	L3716	V3601	ASP	R3403	L3315	K3222	L3042	GLU	GLY	P2857
M4047	S3929	M3816	D3717	A3602	TYR	D3404	L3316	P3224	F3043	GLY	GLY	P2789
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V4049	Y3937	Q3833	Y3720	L3603	S3504	L3405	V3324	R3225	K3045	S2950	GLY	L2791
V4055	K3940	A3834	M3723	H3604	L3609	Y3409	L3327	E3226	L3049	K2953	GLY	Y2794
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K4060	R3949	M3836	Y3725	E3607	L3511	P3410	I3329	L3229	R3051	P2955	GLY	L2796
F4061	F3951	Q3837	I3728	P3612	A3512	T3414	W3334	L3230	R3051	F2957	GLY	F2797
F4062	M3955	L3842	I3728	P3612	L3514	V3415	K3336	G3231	V3054	G2958	GLY	S2798
D4063	M3955	D3843	K3731	LYS	K3515	K3423	F3341	M3239	F3057	F2959	GLY	E2799
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V4081	L3965	N3851	GLY	LYS	K3537	W3445	R3348	L3249	L3074	E2972	GLY	A2815
L4087	L3966	K3852	GLU	LEU	T3538	W3445	R3348	L3249	L3074	E2972	GLY	A2815
I4088	E3967	K3852	GLU	LEU	F3539	H3449	A3349	M3250	L3074	E2972	GLY	A2815
K4090	Y3968	L3856	GLU	LYS	R3539	H3449	A3349	M3250	L3074	E2972	GLY	A2815
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F4103	N3976	I3866	ARG	ARG	K3541	K3452	L3354	I3256	T3079	H2975	GLY	A2815
	L3984	N3867	ARG	ARG	L3542	K3452	L3354	I3256	T3079	H2975	GLY	A2815
	L3985	R3868	ALA	ALA	L3542	K3452	L3354	I3256	T3079	H2975	GLY	A2815
	W3866	G3871	ALA	ALA	T3545	E3455	I3359	A3261	V2980	H2902	GLY	A2815
	V3989	K3872	VAL	VAL	D3546	Q3456	P3360	I3172	V2981	H2902	GLY	A2815
		V3874	ALA	ALA	E3547	K3467	P3360	I3172	V2981	H2902	GLY	A2815
			M3758	CYS	E3548	K3467	P3360	I3172	V2981	H2902	GLY	A2815
					V3549	T3471	R3368	L3175	R2985	D2909	GLY	A2815
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											GLU	A2815
											ARG	A2815



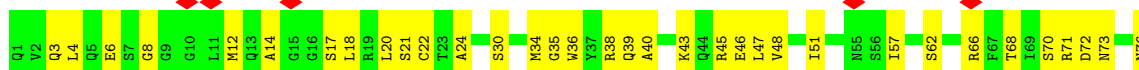
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L449	L584	K661	F783	I887	R1000	A1077	F1179	Q1299	GLY	ASP	R1623	R1727	P1940
E453	E555	E663	S784	M891	R1005	E1078	R1180	R1302	THR	R1421	L1624	M1730	V1941
Q460	I560	F664	F783	T892	W1005	Y1081	I1182	C1303	PRO	D1422	G1625	L1731	L1849
E463	L561	F665	S784	Y893	S1006	T1082	F1188	T1304	GLN	P1423	W1626	S1732	V1850
R469	L561	F665	F787	G894	Y1007	V1083	L1189	GLY	ALA	E1425	E1425	E1733	M1851
S470	L561	F665	W788	G894	S1008	G1086	L1189	ALA	VAL	I1426	I1426	I1735	G1852
L471	L561	F665	R789	R897	I1013	R1087	C1192	THR	GLU	T1431	A1638	P1740	F1854
R472	L561	F665	F791	K901	R1016	F1092	P1196	PRO	ALA	T1432	L1639	P1743	D1858
M473	L561	F665	L792	R902	R1017	V1095	A1178	LEU	GLN	Y1433	H1640	R1743	I1862
Q475	L561	F665	G795	R903	M1018	M1100	R1178	ALA	PRO	F1434	I1641	P1749	T1866
E480	L561	F665	R796	H904	R1021	R1101	G1200	PRO	ALA	Y1435	E1644	R1758	M1865
E481	L561	F665	H797	P905	L1022	R1101	G1200	PRO	ALA	W1439	E1644	R1759	I1866
G482	L561	F665	G798	C906	P1023	R1101	D1207	LEU	GLU	V1443	M1645	R1763	F1871
M483	L561	F665	E799	L907	L1026	W1104	S1210	GLN	ASN	Q1443	R1646	P1763	E1874
L486	L561	F665	F800	H911	L1027	L1115	F1223	PRO	LYS	C1447	E1652	L1771	GLU
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D492	L561	F665	H812	L929	R1036	V1123	V1234	ALA	GLU	W1451	R1656	H1776	GLU
Y497	L561	F665	L821	R931	R1036	F1124	W1234	ALA	LYS	W1452	Q1660	H1776	GLU
A501	L561	F665	R822	T931	Q1041	N1125	W1237	ALA	ASN	T1454	R1661	V1783	GLU
H502	L561	F665	L823	L932	V1043	R1128	Q1244	ALA	LYS	P1455	F1662	V1783	GLU
F503	L561	F665	E824	A934	R1044	G1129	F1246	PRO	ARG	M1462	H1663	L1786	GLU
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R534	L561	F665	V840	E947	Y1051	M1152	V1257	LEU	LYS	H1484	V1673	ALA	GLU
A535	L561	F665	P842	L950	I1053	I1153	V1257	ARG	ALA	S1485	L1676	ALA	GLU
M536	L561	F665	L849	K951	P1055	I1154	M1260	SER	MET	C1489	R1680	MET	GLU
L539	L561	F665	T849	Y959	P1056	D1154	D1261	ALA	THR	M1494	R1680	THR	GLU
F540	L561	F665	V852	P969	GLN	T1156	P1268	GLY	GLN	M1494	L1694	L1694	GLU
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D545	L561	F665	T858	D971	PRO	E1157	L1270	GLY	ALA	G1497	L1698	D1809	GLU
M546	L561	F665	L867	L972	SER	N1158	R1271	GLU	ALA	G1498	L1703	K1810	GLU
V547	L561	F665	R870	L972	VAL	I1160	H1274	ALA	THR	D1498	P1704	M1814	GLU
V548	L561	F665	I870	R976	GLU	I1161	H1274	GLY	ALA	F1500	R1708	L1814	GLU
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	L561	F665	R871	L976	GLU	T1163	L1287	LYS	LEU	S1502	Y1711	G1816	LYS
	L561	F665	G761	L976	S1066	L1164	F1288	GLU	LEU	F1503	Y1712	R1827	ASP
	L561	F665	C762	L976	R1068	L1164	F1288	GLY	ARG	G1504	Y1712	R1827	ASP
	L561	F665	G766	L976	M1069	V1168	R1290	THR	PRO	GLN	V1615	V1830	GLU
	L561	F665	E769	L976	D1070	S1171	R1290	ALA	PRO	GLN	E1616	L1714	LYS
	L561	F665	E769	L976	R1071	S1171	S1292	LYS	HIS	GLN	F1617	E1835	GLU
	L561	F665	E769	L976	L1072	S1171	L1293	GLU	VAL	R1508	L1715	F1836	GLU

L3110	R3111	LEU	GLY	L3025	H3030	A3031	L3032	S3033	K3034	E3035	A3036	R3037	E3038	S3041	L3042	F3043	C3044	L3045	L3049	R3051	V3054	F3057	D3060	L3143	F3144	Q3145	H3146	I3147	D3155	V3156	A3157	L3158	V3161	Y3166	L3169	I3172	Y3173	S3174	L3175	T3176	V3183	E3101	D3102	I3103	F3104	K3105	R3106	V3107	L3194	L3195	L3196	L3197	L3198	L3199	L3200	L3201	L3202	L3203	L3204	L3205	L3206	L3207	L3208	L3209	L3210	L3211	L3212	L3213	L3214	L3215	L3216	L3217	L3218	L3219	L3220	L3221	L3222	L3223	L3224	L3225	L3226	L3227	L3228	L3229	L3230	L3231	L3232	L3233	L3234	L3235	L3236	L3237	L3238	L3239	L3240	L3241	L3242	L3243	L3244	L3245	L3246	L3247	L3248	L3249	L3250	L3251	L3252	L3253	L3254	L3255	L3256	L3257	L3258	L3259	L3260	L3261	L3262	L3263	L3264	L3265	L3266	L3267	L3268	L3269	L3270	L3271	L3272	L3273	L3274	L3275	L3276	L3277	L3278	L3279	L3280	L3281	L3282	L3283	L3284	L3285	L3286	L3287	L3288	L3289	L3290	L3291	L3292	L3293	L3294	L3295	L3296	L3297	L3298	L3299	L3300	L3301	L3302	L3303	L3304	L3305	L3306	L3307	L3308	L3309	L3310	L3311	L3312	L3313	L3314	L3315	L3316	L3317	L3318	L3319	L3320	L3321	L3322	L3323	L3324	L3325	L3326	L3327	L3328	L3329	L3330	L3331	L3332	L3333	L3334	L3335	L3336	L3337	L3338	L3339	L3340	L3341	L3342	L3343	L3344	L3345	L3346	L3347	L3348	L3349	L3350	L3351	L3352	L3353	L3354	L3355	L3356	L3357	L3358	L3359	L3360	L3361	L3362	L3363	L3364	L3365	L3366	L3367	L3368	L3369	L3370	L3371	L3372	L3373	L3374	L3375	L3376	L3377	L3378	L3379	L3380	L3381	L3382	L3383	L3384	L3385	L3386	L3387	L3388	L3389	L3390	L3391	L3392	L3393	L3394	L3395	L3396	L3397	L3398	L3399	L3400	L3401	L3402	L3403	L3404	L3405	L3406	L3407	L3408	L3409	L3410	L3411	L3412	L3413	L3414	L3415	L3416	L3417	L3418	L3419	L3420	L3421	L3422	L3423	L3424	L3425	L3426	L3427	L3428	L3429	L3430	L3431	L3432	L3433	L3434	L3435	L3436	L3437	L3438	L3439	L3440	L3441	L3442	L3443	L3444	L3445	L3446	L3447	L3448	L3449	L3450	L3451	L3452	L3453	L3454	L3455	L3456	L3457	L3458	L3459	L3460	L3461	L3462	L3463	L3464	L3465	L3466	L3467	L3468	L3469	L3470	L3471	L3472	L3473	L3474	L3475	L3476	L3477	L3478	L3479	L3480	L3481	L3482	L3483	L3484	L3485	L3486	L3487	L3488	L3489	L3490	L3491	L3492	L3493	L3494	L3495	L3496	L3497	L3498	L3499	L3500	L3501	L3502	L3503	L3504	L3505	L3506	L3507	L3508	L3509	L3510	L3511	L3512	L3513	L3514	L3515	L3516	L3517	L3518	L3519	L3520	L3521	L3522	L3523	L3524	L3525	L3526	L3527	L3528	L3529	L3530	L3531	L3532	L3533	L3534	L3535	L3536	L3537	L3538	L3539	L3540	L3541	L3542	L3543	L3544	L3545	L3546	L3547	L3548	L3549	L3550	L3551	L3552	L3553	L3554	L3555	L3556	L3557	L3558	L3559	L3560	L3561	L3562	L3563	L3564	L3565	L3566	L3567	L3568	L3569	L3570	L3571	L3572	L3573	L3574	L3575	L3576	L3577	L3578	L3579	L3580	L3581	L3582	L3583	L3584	L3585	L3586	L3587	L3588	L3589	L3590	L3591	L3592	L3593	L3594	L3595	L3596	L3597	L3598	L3599	L3600	L3601	L3602	L3603	L3604	L3605	L3606	L3607	L3608	L3609	L3610	L3611	L3612	L3613	L3614	L3615	L3616	L3617	L3618	L3619	L3620	L3621	L3622	L3623	L3624	L3625	L3626	L3627	L3628	L3629	L3630	L3631	L3632	L3633	L3634	L3635	L3636	L3637	L3638	L3639	L3640	L3641	L3642	L3643	L3644	L3645	L3646	L3647	L3648	L3649	L3650	L3651	L3652	L3653	L3654	L3655	L3656	L3657	L3658	L3659	L3660	L3661	L3662	L3663	L3664	L3665	L3666	L3667	L3668	L3669	L3670	L3671	L3672	L3673	L3674	L3675	L3676	L3677	L3678	L3679	L3680	L3681	L3682	L3683	L3684	L3685	L3686	L3687	L3688	L3689	L3690	L3691	L3692	L3693	L3694	L3695	L3696	L3697	L3698	L3699	L3700	L3701	L3702	L3703	L3704	L3705	L3706	L3707	L3708	L3709	L3710	L3711	L3712	L3713	L3714	L3715	L3716	L3717	L3718	L3719	L3720	L3721	L3722	L3723	L3724	L3725	L3726	L3727	L3728	L3729	L3730	L3731	L3732	L3733	L3734	L3735	L3736	L3737	L3738	L3739	L3740	L3741	L3742	L3743	L3744	L3745	L3746	L3747	L3748	L3749	L3750	L3751	L3752	L3753	L3754	L3755	L3756	L3757	L3758	L3759	L3760	L3761	L3762	L3763	L3764	L3765	L3766	L3767	L3768	L3769	L3770	L3771	L3772	L3773	L3774	L3775	L3776	L3777	L3778	L3779	L3780	L3781	L3782	L3783	L3784	L3785	L3786	L3787	L3788	L3789	L3790	L3791	L3792	L3793	L3794	L3795	L3796	L3797	L3798	L3799	L3800	L3801	L3802	L3803	L3804	L3805	L3806	L3807	L3808	L3809	L3810	L3811	L3812	L3813	L3814	L3815	L3816	L3817	L3818	L3819	L3820	L3821	L3822	L3823	L3824	L3825	L3826	L3827	L3828	L3829	L3830	L3831	L3832	L3833	L3834	L3835	L3836	L3837	L3838	L3839	L3840	L3841	L3842	L3843	L3844	L3845	L3846	L3847	L3848	L3849	L3850	L3851	L3852	L3853	L3854	L3855	L3856	L3857	L3858	L3859	L3860	L3861	L3862	L3863	L3864	L3865	L3866	L3867	L3868	L3869	L3870	L3871	L3872	L3873	L3874	L3875	L3876	L3877	L3878	L3879	L3880	L3881	L3882	L3883	L3884	L3885	L3886	L3887	L3888	L3889	L3890	L3891	L3892	L3893	L3894	L3895	L3896	L3897	L3898	L3899	L3900	L3901	L3902	L3903	L3904	L3905	L3906	L3907	L3908	L3909	L3910	L3911	L3912	L3913	L3914	L3915	L3916	L3917	L3918	L3919	L3920	L3921	L3922	L3923	L3924	L3925	L3926	L3927	L3928	L3929	L3930	L3931	L3932	L3933	L3934	L3935	L3936	L3937	L3938	L3939	L3940	L3941	L3942	L3943	L3944	L3945	L3946	L3947	L3948	L3949	L3950	L3951	L3952	L3953	L3954	L3955	L3956	L3957	L3958	L3959	L3960	L3961	L3962	L3963	L3964	L3965	L3966	L3967	L3968	L3969	L3970	L3971	L3972	L3973	L3974	L3975	L3976	L3977	L3978	L3979	L3980	L3981	L3982	L3983	L3984	L3985	L3986	L3987	L3988	L3989	L3990	L3991	L3992	L3993	L3994	L3995	L3996	L3997	L3998	L3999	L4000	L4001	L4002	L4003	L4004	L4005	L4006	L4007	L4008	L4009	L4010	L4011	L4012	L4013	L4014	L4015	L4016	L4017	L4018	L4019	L4020	L4021	L4022	L4023	L4024	L4025	L4026	L4027	L4028	L4029	L4030	L4031	L4032	L4033	L4034	L4035	L4036	L4037	L4038	L4039	L4040	L4041	L4042	L4043	L4044	L4045	L4046	L4047	L4048	L4049	L4050	L4051	L4052	L4053	L4054	L4055	L4056	L4057	L4058	L4059	L4060	L4061	L4062	L4063	L4064	L4065	L4066	L4067	L4068	L4069	L4070	L4071	L4072	L4073	L4074	L4075	L4076	L4077	L4078	L4079	L4080	L4081	L4082	L4083	L4084	L4085	L4086	L4087	L4088	L4089	L4090	L4091	L4092	L4093	L4094	L4095	L4096	L4097	L4098	L4099	L4100	L4101	L4102	L4103	L4104	L4105	L4106	L4107	L4108	L4109	L4110	L4111	L4112	L4113	L4114	L4115	L4116	L4117	L4118	L4119	L4120	L4121	L4122	L4123	L4124	L4125	L4126	L4127	L4128	L4129	L4130	L4131	L4132	L4133	L4134	L4135	L4136	L4137	L4138	L4139	L4140	L4141	L4142	L4143	L4144	L4145	L4146	L4147	L4148	L4149	L4150	L4151	L4152	L4153	L4154	L4155	L4156	L4157	L4158	L4159	L4160	L4161	L4162	L4163	L4164	L4165	L4166	L4167	L4168	L4169	L4170	L4171	L4172	L4173	L4174	L4175	L4176	L4177	L4178	L4179	L4180	L4181	L4182	L4183	L4184	L4185	L4186	L4187	L4188	L4189	L4190	L4191	L4192	L4193	L4194	L4195	L4196	L4197	L4198	L4199	L4200	L4201	L4202	L4203	L4204	L4205	L4206	L4207	L4208	L4209	L4210	L4211	L4212	L4213	L4214	L4215	L4216	L4217	L4218	L4219	L4220	L4221	L4222	L4223	L4224	L4225	L4226	L4227	L4228	L4229	L4230	L4231	L4232	L4233	L4234	L4235	L4236	L4237	L4238	L4239	L4240	L4241	L4242	L4243	L4244	L4245	L4246	L4247	L4248	L4249	L4250	L4251	L4252	L4253	L4254	L4255	L4256	L4257	L4258	L4259	L4260	L4261	L4262	L4263	L4264	L4265	L4266	L4267	L4268	L4269	L4270	L4271	L4272	L4273	L4274	L4275	L4276	L4277	L4278	L4279	L4280	L4281	L4282	L4283	L4284	L4285	L4286	L4287	L4288	L4289	L4290	L4291	L4292	L4293	L4294	L4295	L4296	L4297	L4298	L4299	L4300	L4301	L4302	L4303	L4304	L4305	L4306	L4307	L4308	L4309	L4310	L4311	L4312	L4313	L4314	L4315	L4316	L4317	L4318	L4319	L4320	L4321	L4322	L4323	L4324	L4325	L4326	L4327	L4328	L4329	L4330	L4331	L4332	L4333	L4334	L4335	L4336	L4337	L4338	L4339	L4340	L4341	L4342	L4343	L4344	L4345	L4346	L4347	L4348	L4349	L4350	L4351	L4352	L4353	L4354	L4355	L4356	L4357	L4358	L4359	L4360	L4361	L4362	L4363	L4364	L4365	L4366	L4367	L4368	L4369	L4370	L4371	L4372	L4373	L4374	L4375	L4376	L4377	L4378	L4379	L4380	L4381	L4382	L4383	L4384	L4385	L4386	L4387	L4388	L4389	L4390	L4391	L4392	L4393	L4394	L4395	L4396	L4397	L4398	L4399	L4400	L4401	L4402	L4403	L4404	L4405	L4406	L4407	L4408	L4409	L4410	L4411	L4412	L4413	L4414	L4415	L4416	L4417	L4418	L4419	L4420	L4421	L4422	L4423	L4424	L4425	L4426	L4427	L4428	L4429	L4430	L4431	L4432	L4433	L4434	L4435	L4436	L4437	L4438	L4439	L4440	L4441	L4442	L4443	L4444	L4445	L4446	L4447	L4448	L4449	L4450	L4451	L4452	L4453	L4454	L4455	L4456	L4457	L4458	L4459	L4460	L4461	L4462	L4463	L4464	L4465	L4466	L4467	L4468	L4469	L4470	L4471	L4472	L4473	L4474	L4475	L4476	L4477	L4478	L4479	L4480	L4481	L4482	L4483	L4484	L4485	L4486	L4487	L4488	L4489	L4490	L4491	L4492	L4493	L4494	L4495	L4496	L4497	L4498	L4499	L4500	L4501	L4502
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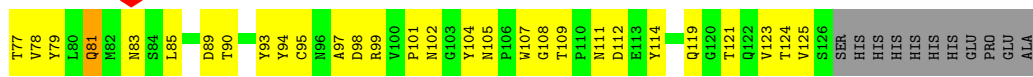
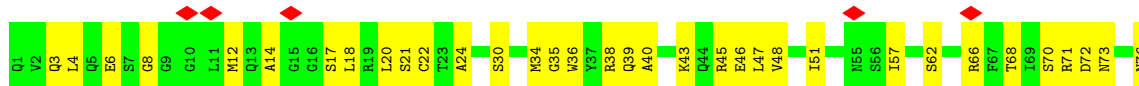




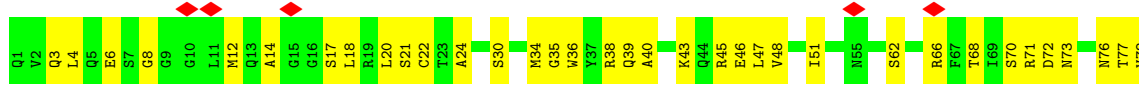
• Molecule 3: Nanobody 9657



• Molecule 3: Nanobody 9657

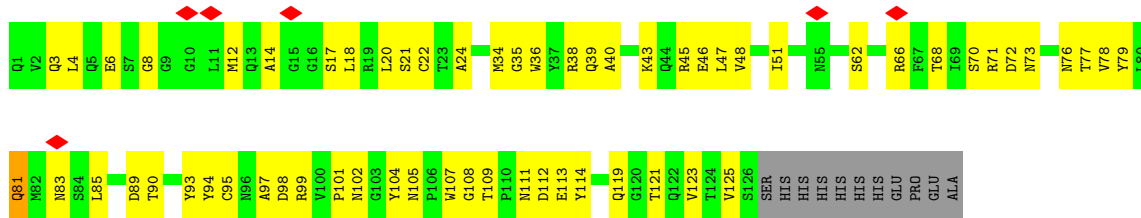


• Molecule 3: Nanobody 9657



• Molecule 3: Nanobody 9657







## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	16530	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	JEOL CRYO ARM 300	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	60	Depositor
Minimum defocus (nm)	1500	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	3.003	Depositor
Minimum map value	-0.117	Depositor
Average map value	0.044	Depositor
Map value standard deviation	0.094	Depositor
Recommended contour level	0.2	Depositor
Map size (Å)	504.0, 504.0, 504.0	wwPDB
Map dimensions	336, 336, 336	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.5, 1.5, 1.5	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: ZN, CFF, CA, ATP

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	0.25	0/834	0.54	0/1123
1	D	0.25	0/834	0.54	0/1123
1	H	0.25	0/834	0.54	0/1123
1	I	0.25	0/834	0.54	0/1123
2	B	0.25	0/34916	0.51	1/47328 (0.0%)
2	E	0.25	0/34916	0.51	1/47328 (0.0%)
2	G	0.25	0/34923	0.51	1/47336 (0.0%)
2	J	0.25	0/34916	0.51	1/47328 (0.0%)
3	C	0.26	0/987	0.56	0/1340
3	F	0.26	0/987	0.56	0/1340
3	K	0.26	0/987	0.56	0/1340
3	M	0.26	0/987	0.56	0/1340
All	All	0.25	0/146955	0.51	4/199172 (0.0%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	1503	PRO	N-CA-CB	5.77	110.23	103.30
2	E	1503	PRO	N-CA-CB	5.77	110.23	103.30
2	G	1503	PRO	N-CA-CB	5.77	110.23	103.30
2	J	1503	PRO	N-CA-CB	5.77	110.23	103.30

There are no chirality outliers.

There are no planarity outliers.

## 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	818	0	824	26	0
1	D	818	0	824	28	0
1	H	818	0	824	29	0
1	I	818	0	824	28	0
2	B	34143	0	33531	1049	0
2	E	34143	0	33531	1047	0
2	G	34150	0	33542	1050	0
2	J	34143	0	33531	1042	0
3	C	967	0	916	58	0
3	F	967	0	916	59	0
3	K	967	0	916	58	0
3	M	967	0	916	57	0
4	B	1	0	0	0	0
4	E	1	0	0	0	0
4	G	1	0	0	0	0
4	J	1	0	0	0	0
5	B	31	0	12	1	0
5	E	31	0	12	1	0
5	G	31	0	12	1	0
5	J	31	0	12	1	0
6	B	14	0	10	0	0
6	E	14	0	10	0	0
6	G	14	0	10	0	0
6	J	14	0	10	0	0
7	B	1	0	0	0	0
7	E	1	0	0	0	0
7	G	1	0	0	0	0
7	J	1	0	0	0	0
All	All	143907	0	141183	4467	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 16.

The worst 5 of 4467 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)
2:E:3416:VAL:HG11	2:E:3516:LYS:HD3	1.51	0.93
2:E:248:GLU:HB2	2:E:373:LYS:HD2	1.51	0.92
2:B:248:GLU:HB2	2:B:373:LYS:HD2	1.52	0.91
2:J:3416:VAL:HG11	2:J:3516:LYS:HD3	1.51	0.91
2:B:3416:VAL:HG11	2:B:3516:LYS:HD3	1.51	0.91

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	105/107 (98%)	101 (96%)	4 (4%)	0	100	100
1	D	105/107 (98%)	100 (95%)	5 (5%)	0	100	100
1	H	105/107 (98%)	100 (95%)	5 (5%)	0	100	100
1	I	105/107 (98%)	101 (96%)	4 (4%)	0	100	100
2	B	4280/5027 (85%)	4144 (97%)	136 (3%)	0	100	100
2	E	4280/5027 (85%)	4142 (97%)	138 (3%)	0	100	100
2	G	4280/5027 (85%)	4142 (97%)	138 (3%)	0	100	100
2	J	4280/5027 (85%)	4140 (97%)	140 (3%)	0	100	100
3	C	124/137 (90%)	116 (94%)	8 (6%)	0	100	100
3	F	124/137 (90%)	116 (94%)	8 (6%)	0	100	100
3	K	124/137 (90%)	116 (94%)	8 (6%)	0	100	100
3	M	124/137 (90%)	116 (94%)	8 (6%)	0	100	100
All	All	18036/21084 (86%)	17434 (97%)	602 (3%)	0	100	100

There are no Ramachandran outliers to report.

### 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	88/88 (100%)	88 (100%)	0	100	100
1	D	88/88 (100%)	88 (100%)	0	100	100
1	H	88/88 (100%)	88 (100%)	0	100	100
1	I	88/88 (100%)	88 (100%)	0	100	100
2	B	3672/4270 (86%)	3665 (100%)	7 (0%)	92	94
2	E	3672/4270 (86%)	3665 (100%)	7 (0%)	92	94
2	G	3674/4270 (86%)	3667 (100%)	7 (0%)	92	94
2	J	3672/4270 (86%)	3665 (100%)	7 (0%)	92	94
3	C	104/114 (91%)	103 (99%)	1 (1%)	73	82
3	F	104/114 (91%)	103 (99%)	1 (1%)	73	82
3	K	104/114 (91%)	103 (99%)	1 (1%)	73	82
3	M	104/114 (91%)	103 (99%)	1 (1%)	73	82
All	All	15458/17888 (86%)	15426 (100%)	32 (0%)	91	94

5 of 32 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	C	81	GLN
3	F	81	GLN
2	E	3262	ARG
2	E	2914	LYS
3	K	81	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 79 such sidechains are listed below:

Mol	Chain	Res	Type
2	J	3889	GLN
3	K	3	GLN
2	J	3970	GLN
3	C	73	ASN

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
3	M	3	GLN

### 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$
5	ATP	E	5102	-	26,33,33	0.60	0	31,52,52	0.79	2 (6%)
6	CFF	B	5103	-	8,15,15	1.02	0	8,23,23	2.44	2 (25%)
5	ATP	J	5102	-	26,33,33	0.60	0	31,52,52	0.80	2 (6%)
6	CFF	J	5103	-	8,15,15	1.01	0	8,23,23	2.43	2 (25%)
5	ATP	G	5102	-	26,33,33	0.60	0	31,52,52	0.79	2 (6%)
5	ATP	B	5102	-	26,33,33	0.60	0	31,52,52	0.79	2 (6%)
6	CFF	G	5103	-	8,15,15	1.03	0	8,23,23	2.43	2 (25%)
6	CFF	E	5103	-	8,15,15	1.03	0	8,23,23	2.42	2 (25%)

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	E	5102	-	-	5/18/38/38	0/3/3/3
6	CFF	B	5103	-	-	-	0/2/2/2
5	ATP	J	5102	-	-	5/18/38/38	0/3/3/3
6	CFF	J	5103	-	-	-	0/2/2/2
5	ATP	G	5102	-	-	5/18/38/38	0/3/3/3
5	ATP	B	5102	-	-	5/18/38/38	0/3/3/3
6	CFF	G	5103	-	-	-	0/2/2/2
6	CFF	E	5103	-	-	-	0/2/2/2

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(°)
6	G	5103	CFF	C5-C6-N1	-5.77	112.05	118.20
6	B	5103	CFF	C5-C6-N1	-5.76	112.06	118.20
6	J	5103	CFF	C5-C6-N1	-5.76	112.06	118.20
6	E	5103	CFF	C5-C6-N1	-5.75	112.07	118.20
6	B	5103	CFF	C4-C5-C6	3.53	122.22	119.96

There are no chirality outliers.

5 of 20 torsion outliers are listed below:

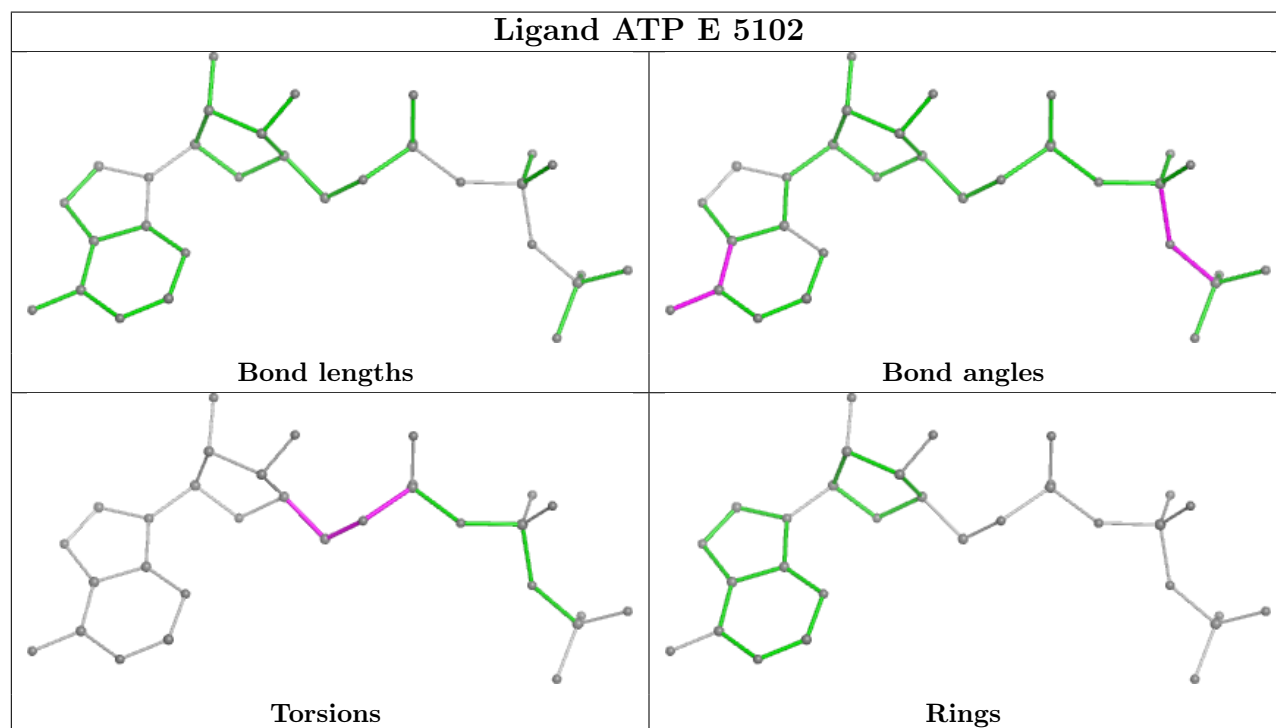
Mol	Chain	Res	Type	Atoms
5	B	5102	ATP	C5'-O5'-PA-O1A
5	B	5102	ATP	C5'-O5'-PA-O2A
5	E	5102	ATP	C5'-O5'-PA-O1A
5	E	5102	ATP	C5'-O5'-PA-O2A
5	G	5102	ATP	C5'-O5'-PA-O1A

There are no ring outliers.

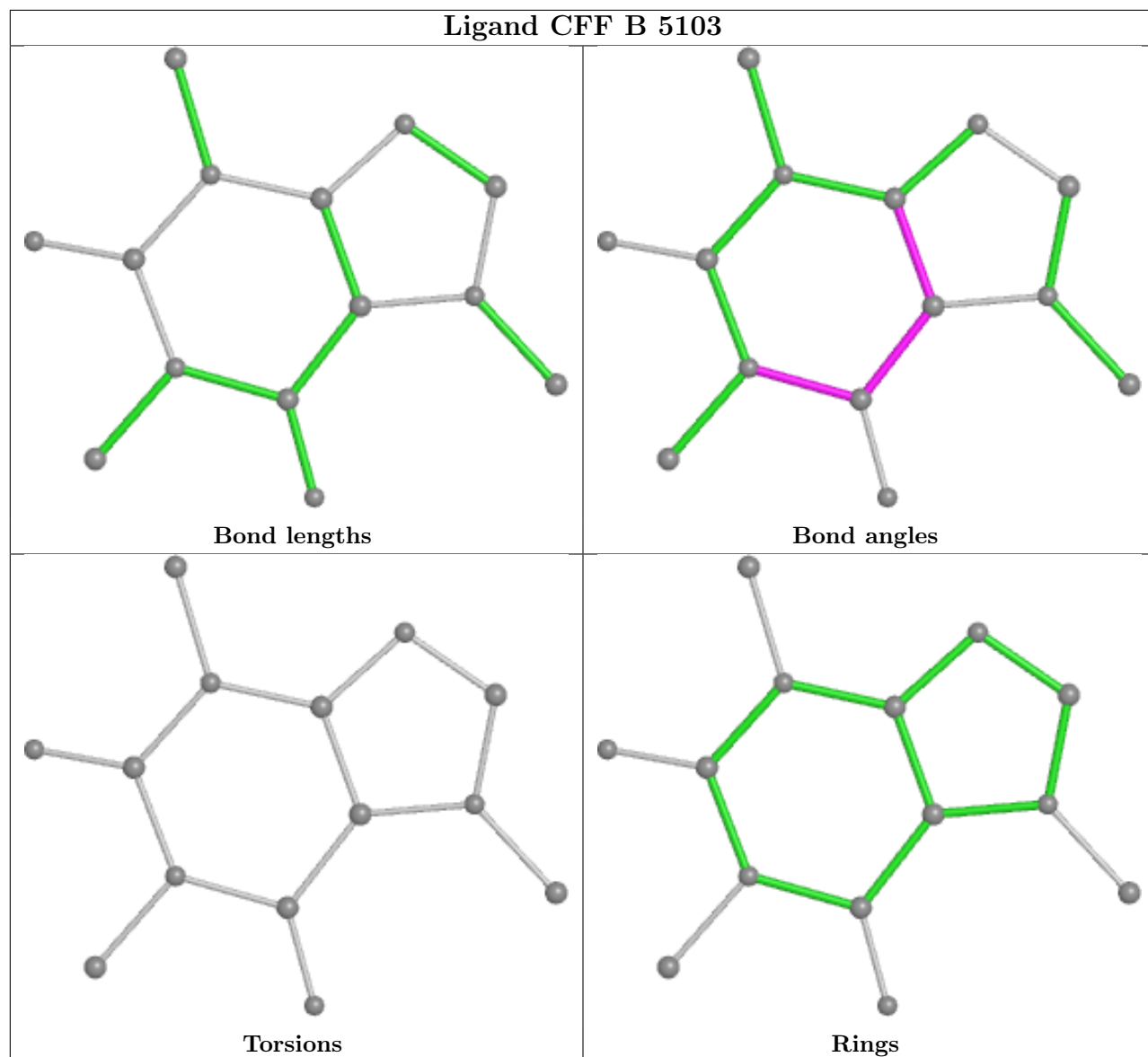
4 monomers are involved in 4 short contacts:

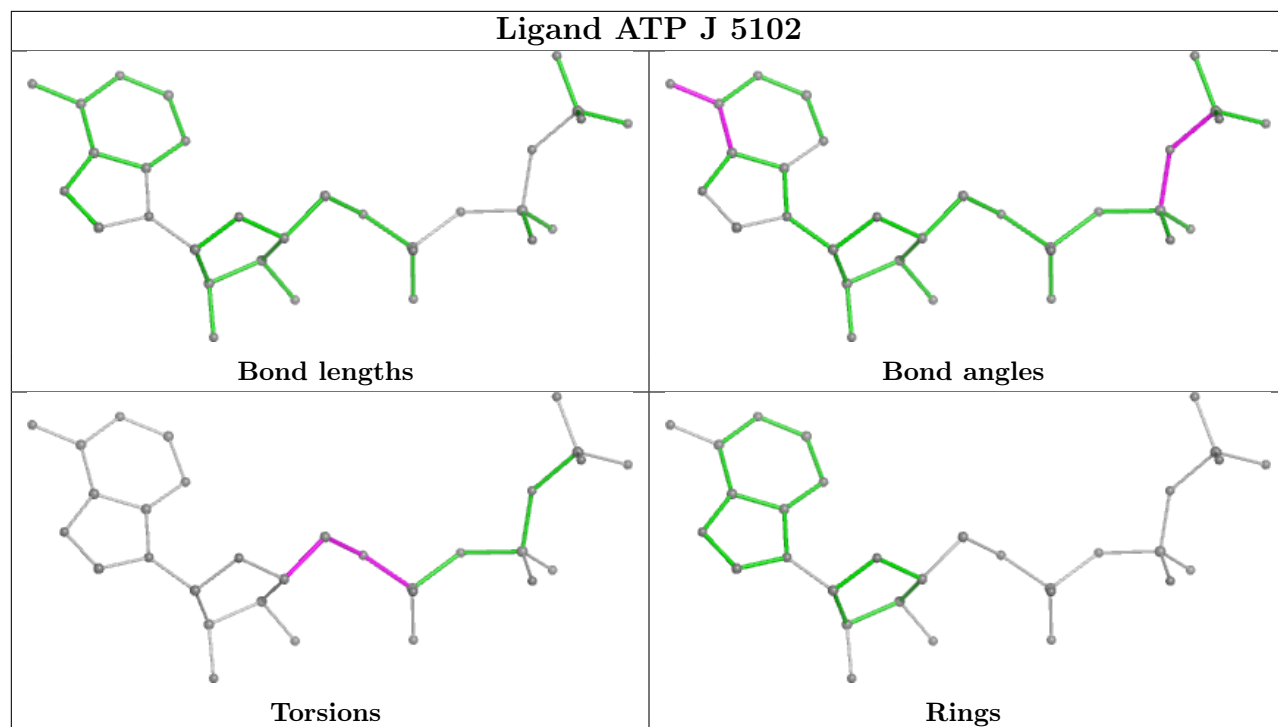
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	E	5102	ATP	1	0
5	J	5102	ATP	1	0
5	G	5102	ATP	1	0
5	B	5102	ATP	1	0

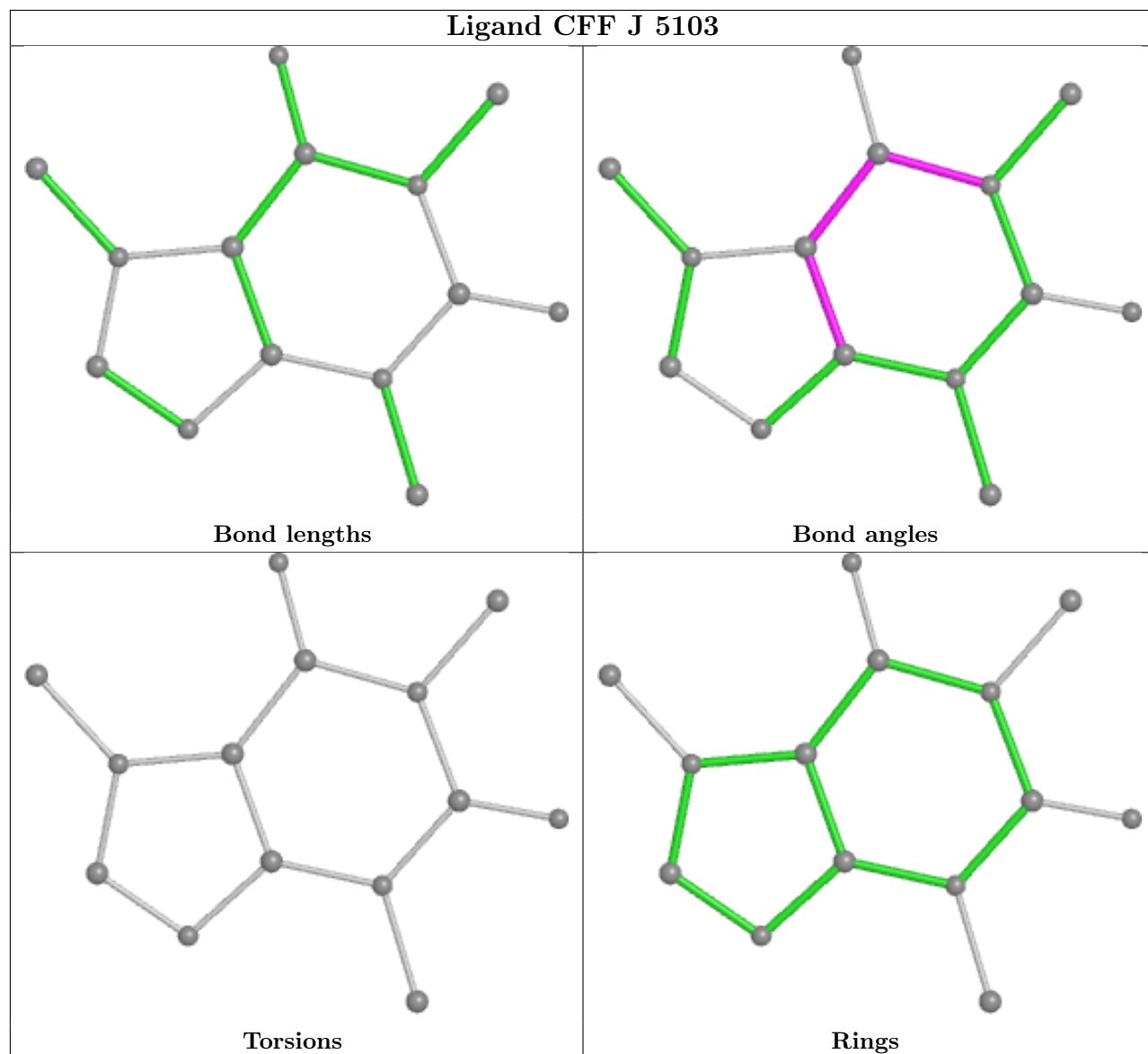
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

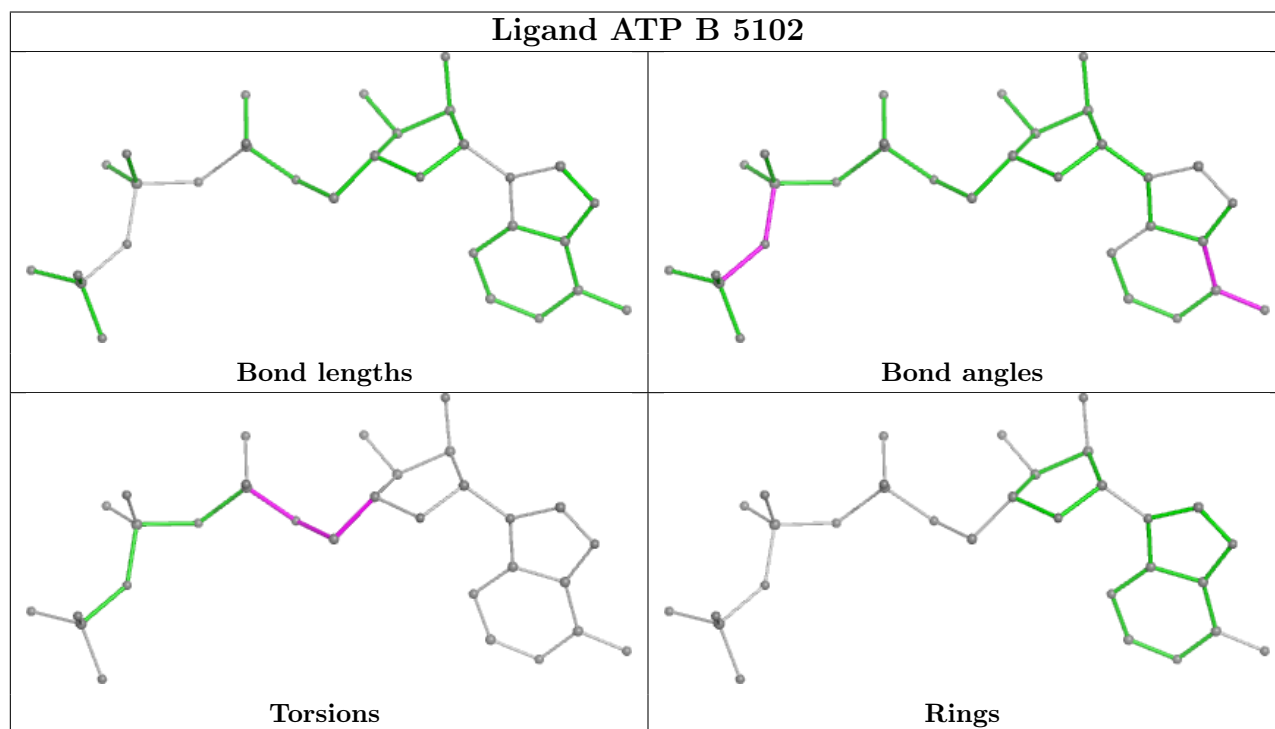
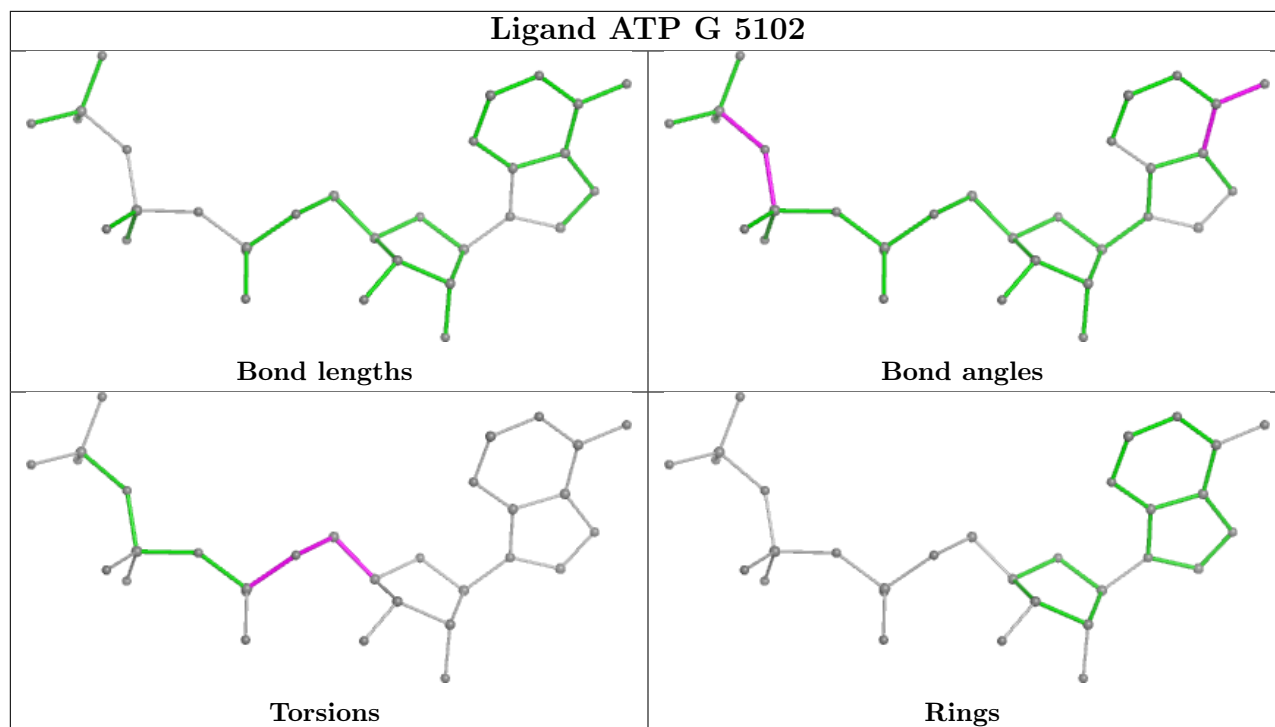


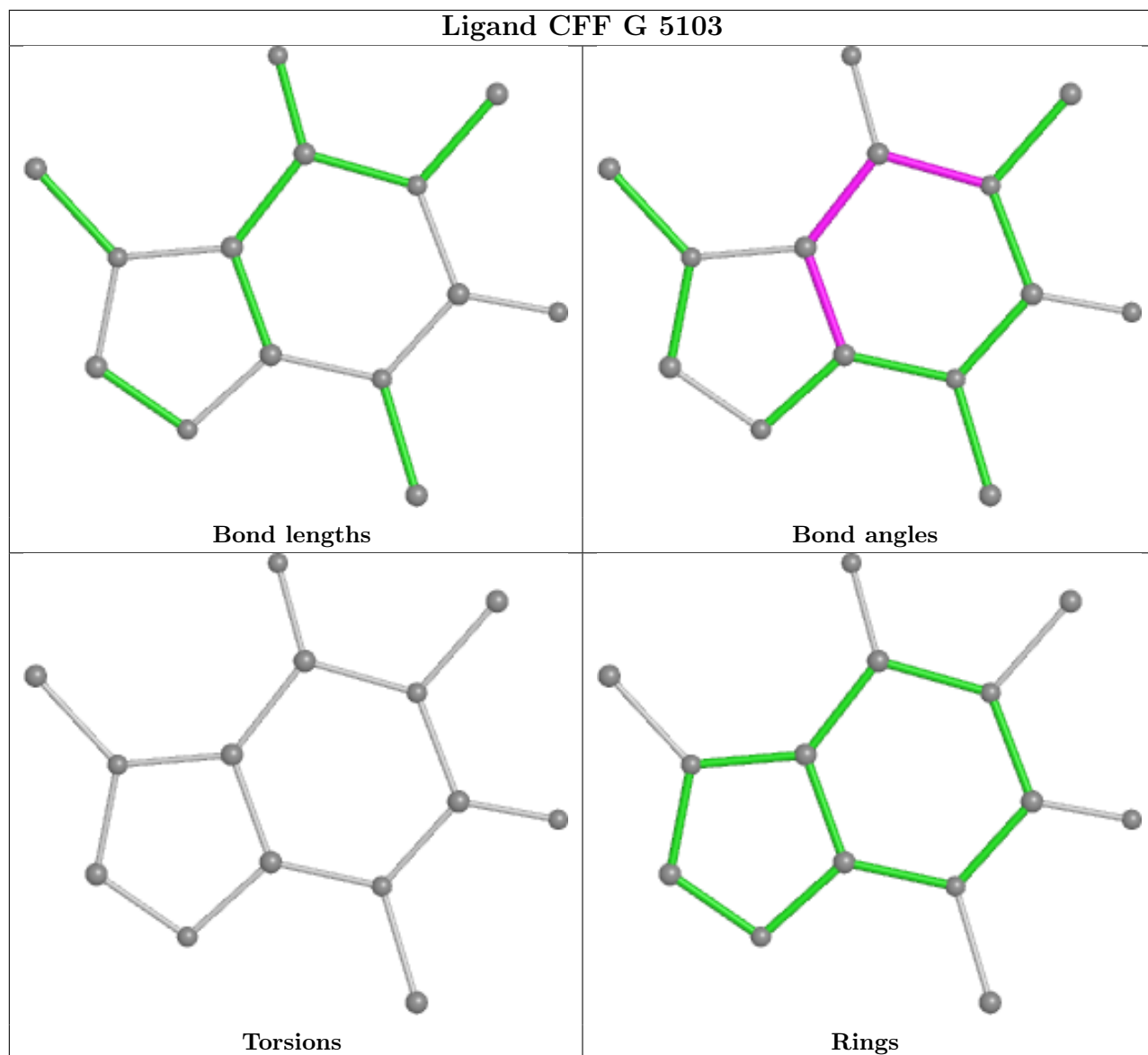


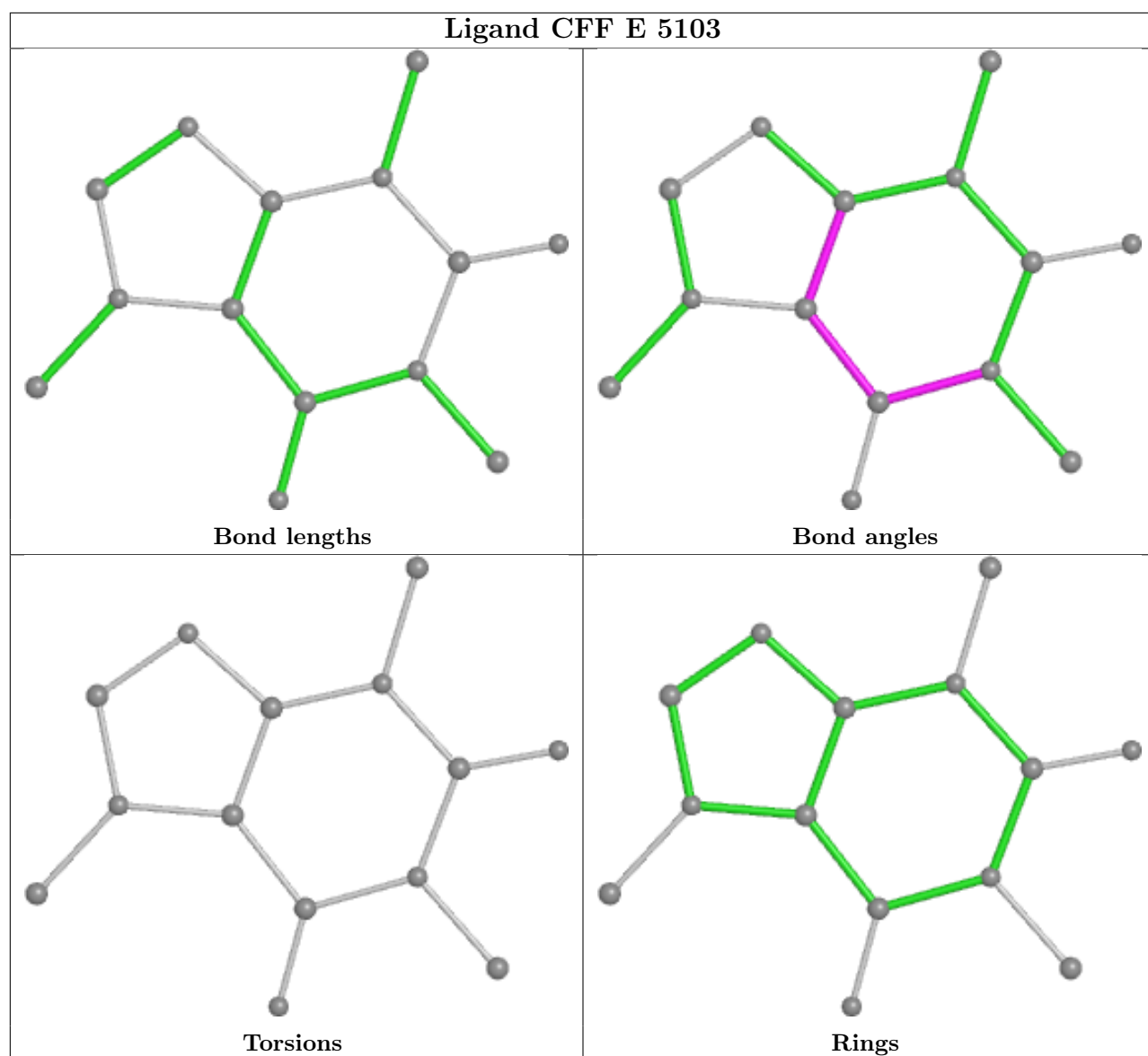












## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

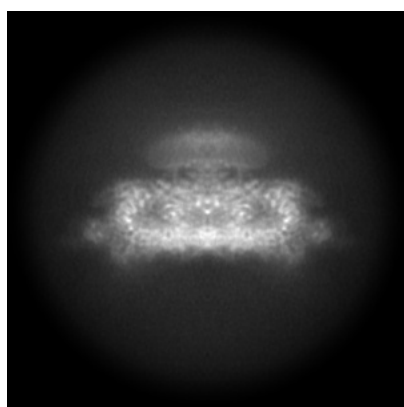
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-19465. These allow visual inspection of the internal detail of the map and identification of artifacts.

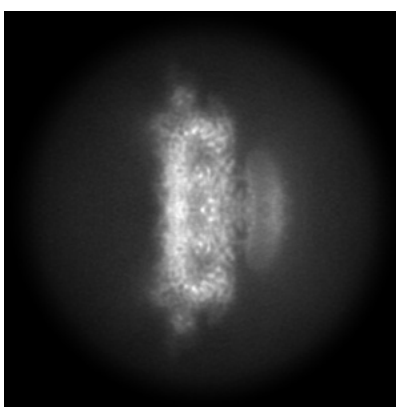
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

### 6.1 Orthogonal projections [i](#)

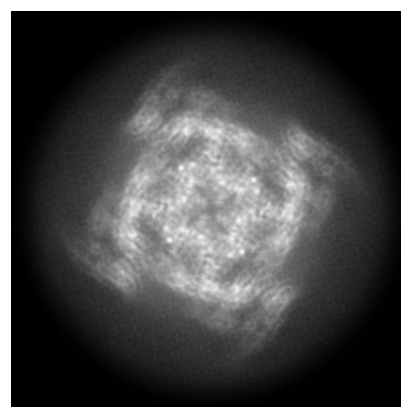
#### 6.1.1 Primary map



X



Y

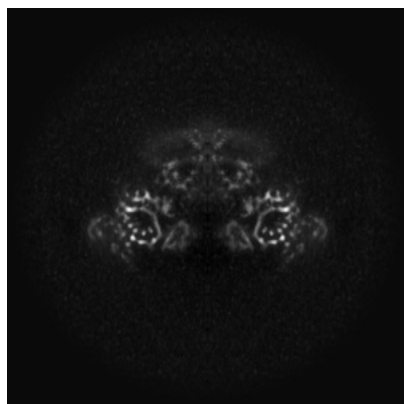


Z

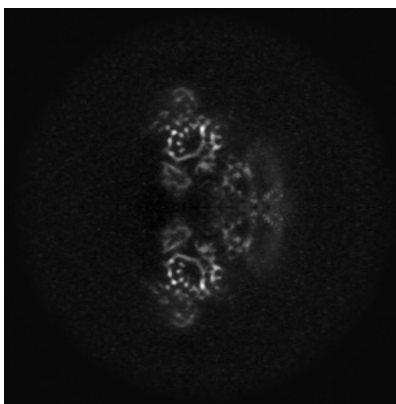
The images above show the map projected in three orthogonal directions.

### 6.2 Central slices [i](#)

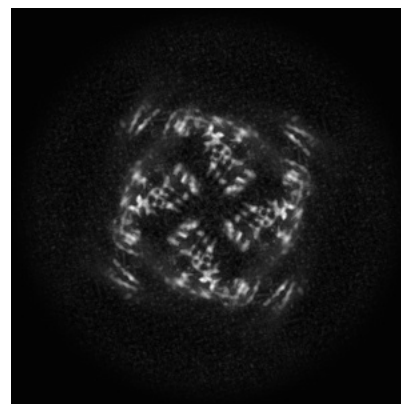
#### 6.2.1 Primary map



X Index: 168



Y Index: 168

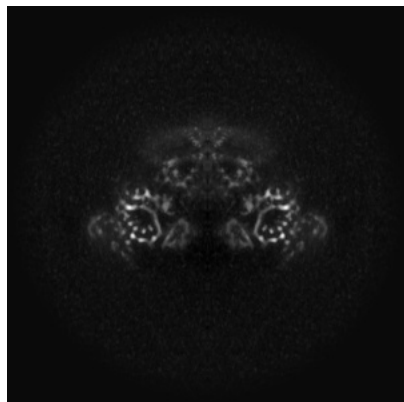


Z Index: 168

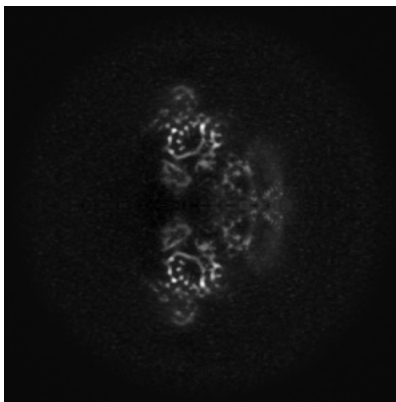
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [\(i\)](#)

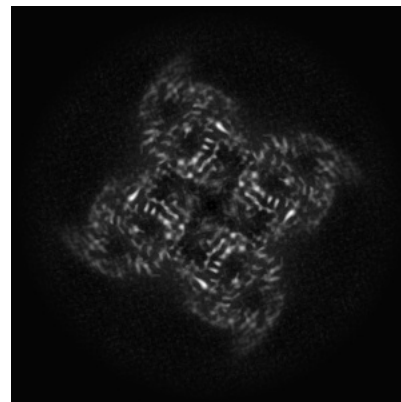
### 6.3.1 Primary map



X Index: 168



Y Index: 168

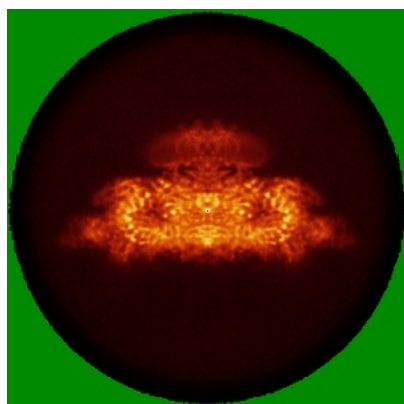


Z Index: 145

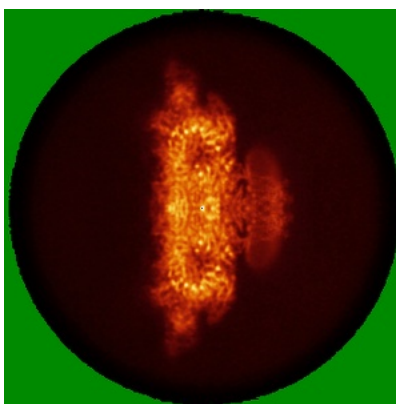
The images above show the largest variance slices of the map in three orthogonal directions.

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

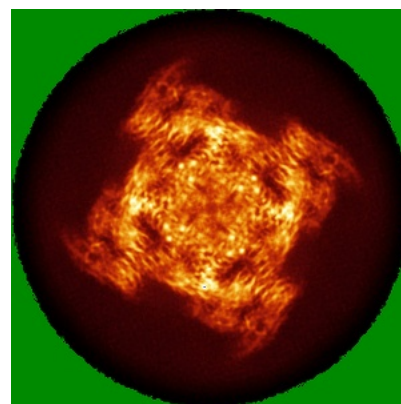
### 6.4.1 Primary map



X



Y



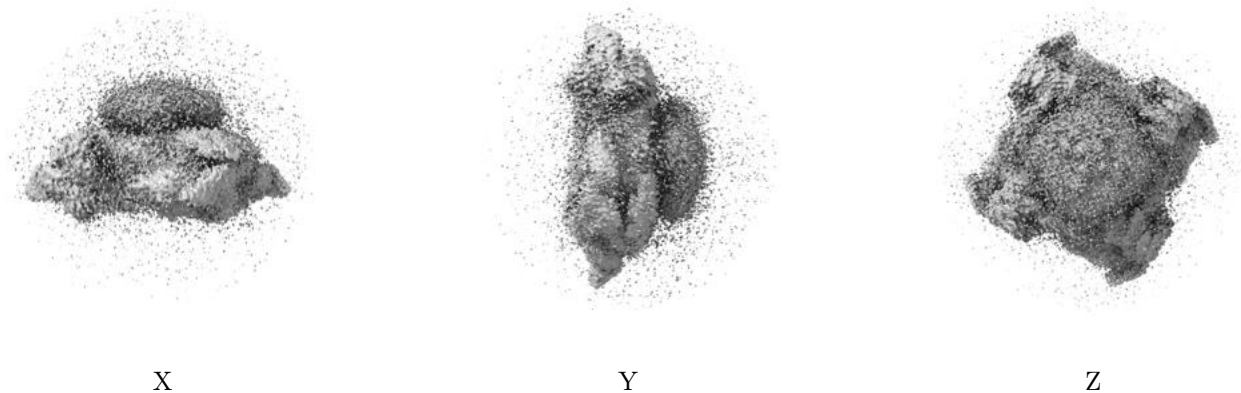
Z

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 0.2. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

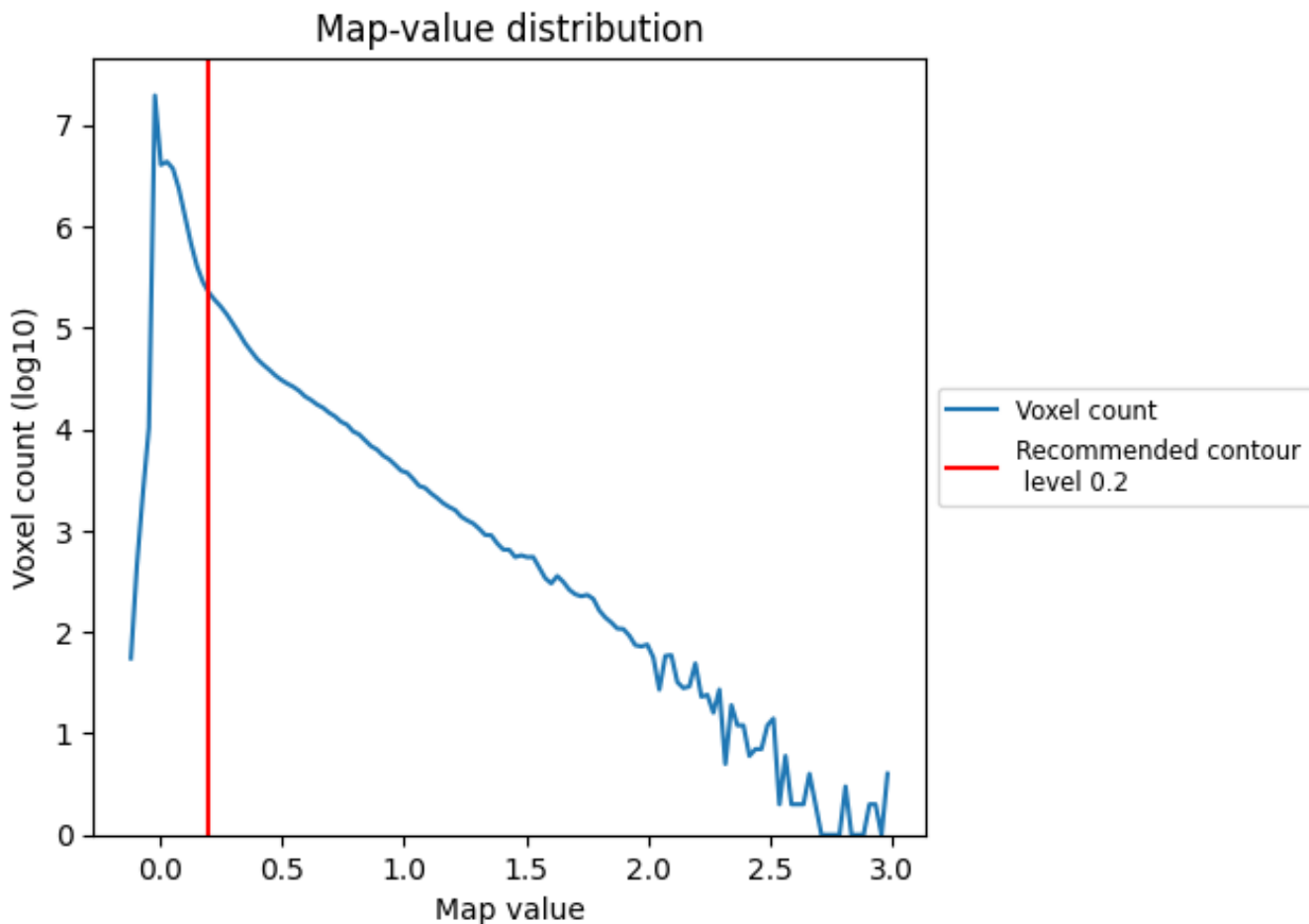
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

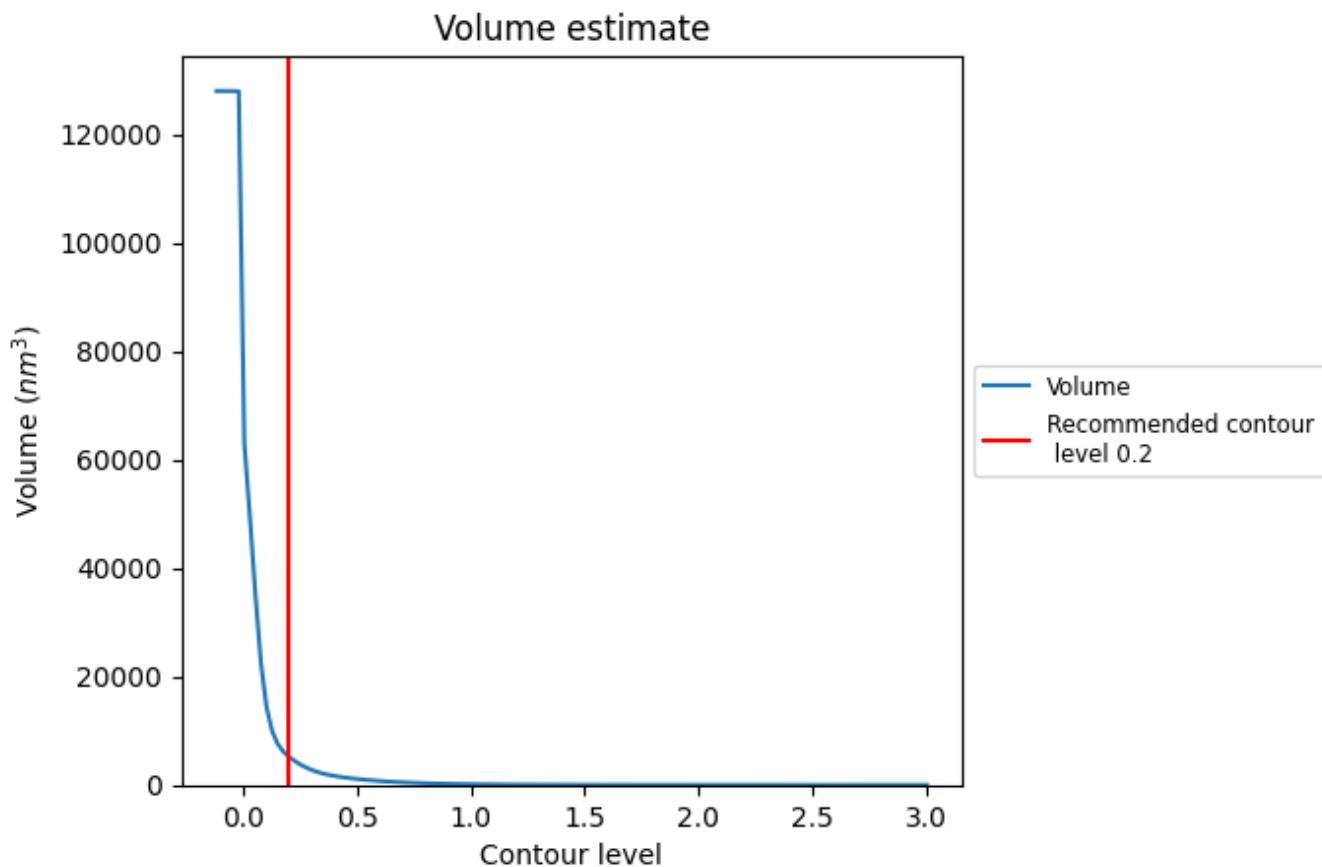
This section contains the results of statistical analysis of the map.

### 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.

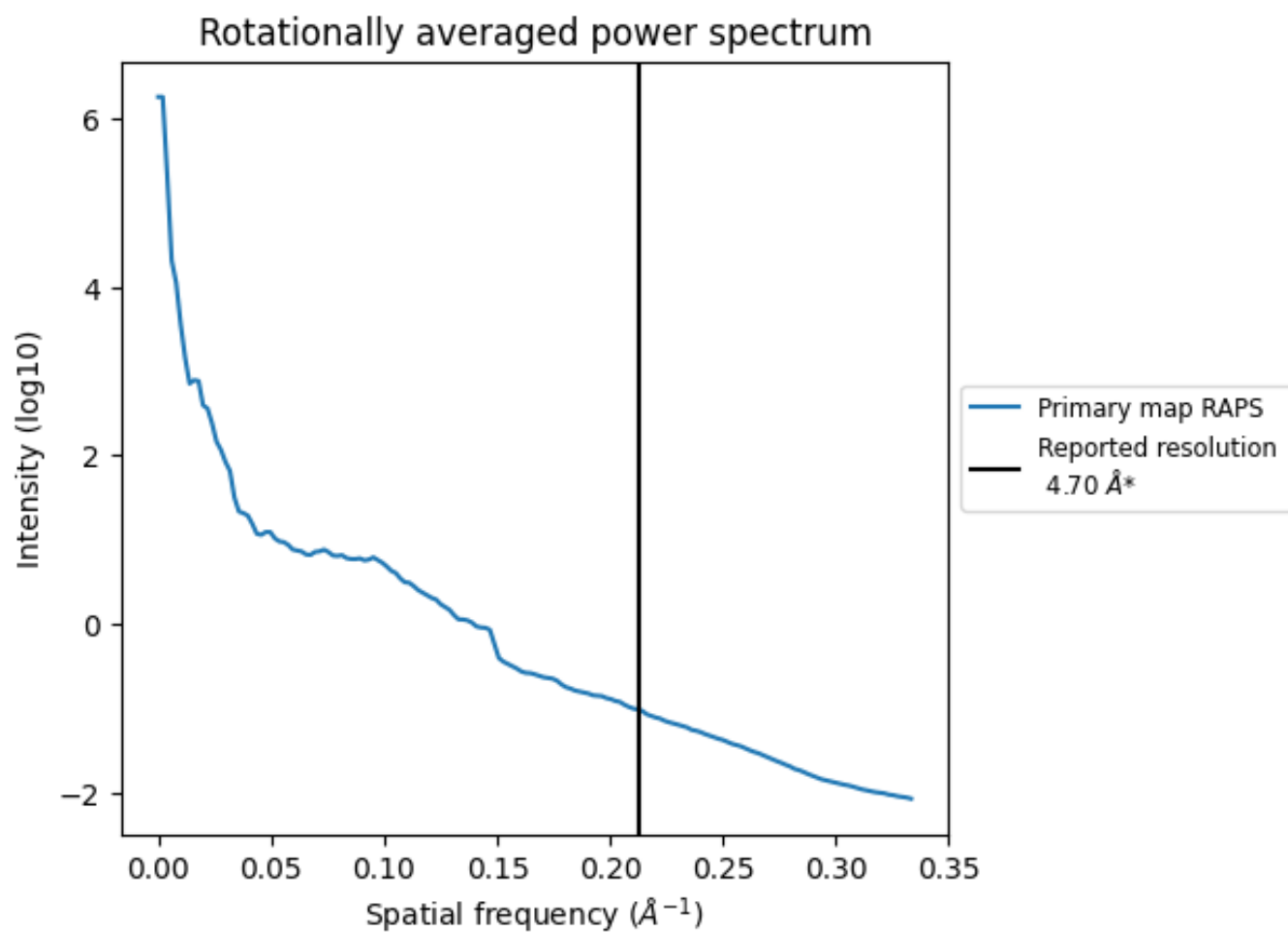
## 7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 5220  $\text{nm}^3$ ; this corresponds to an approximate mass of 4715 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 i

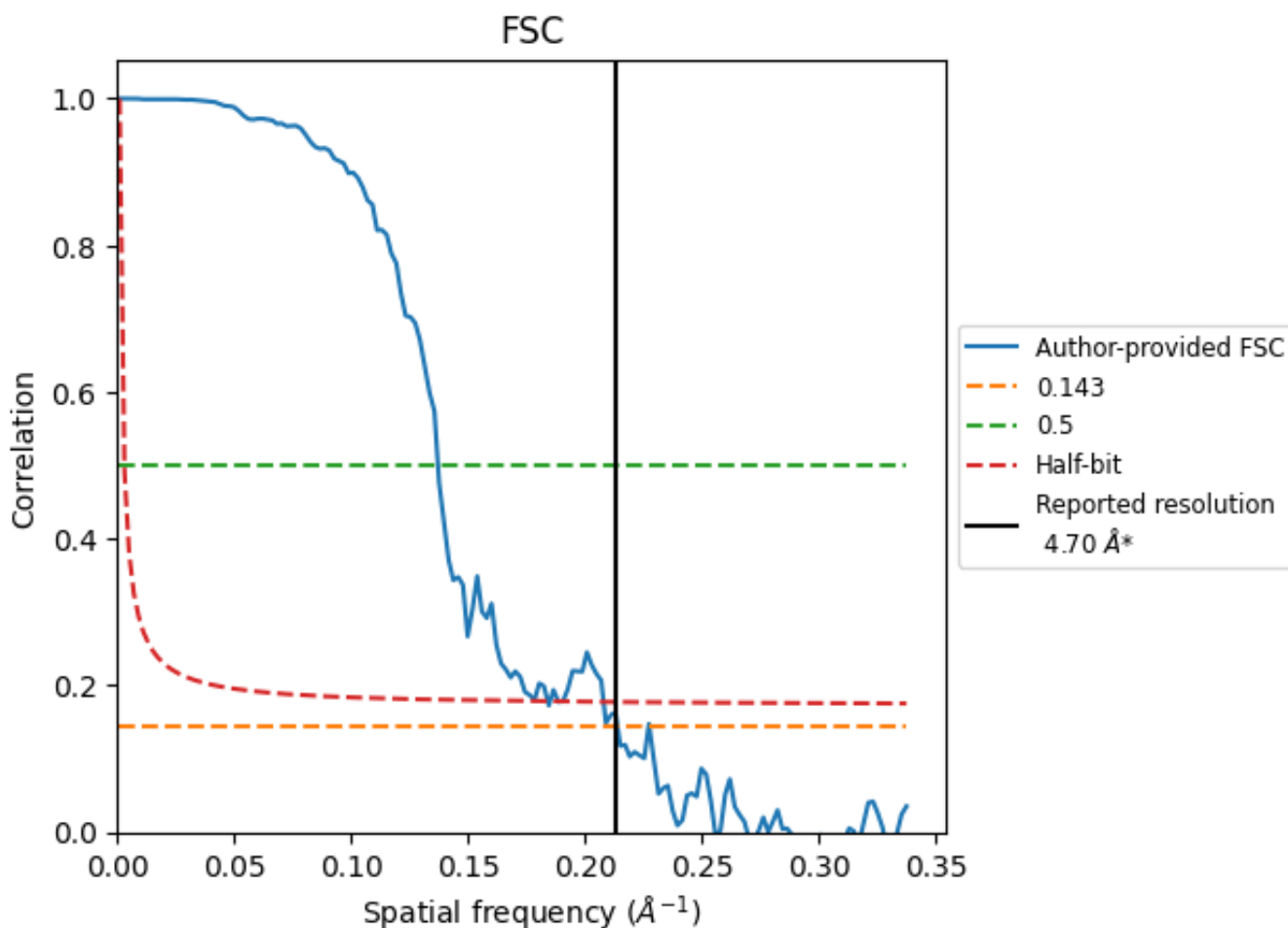


\*Reported resolution corresponds to spatial frequency of 0.213 Å<sup>-1</sup>

## 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 0.213 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

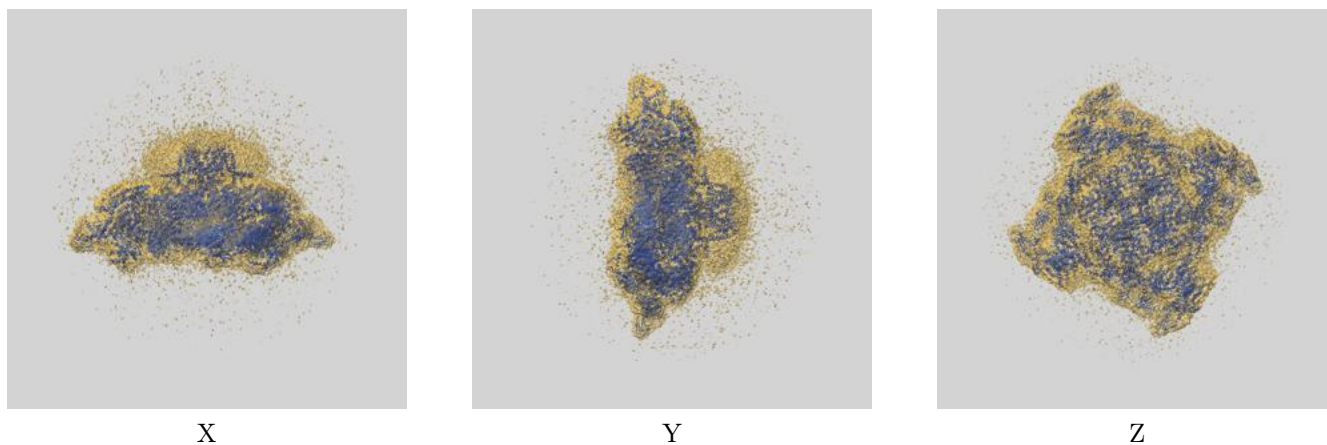
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.70	-	-
Author-provided FSC curve	4.68	7.29	5.43
Unmasked-calculated*	-	-	-

\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

## 9 Map-model fit [i](#)

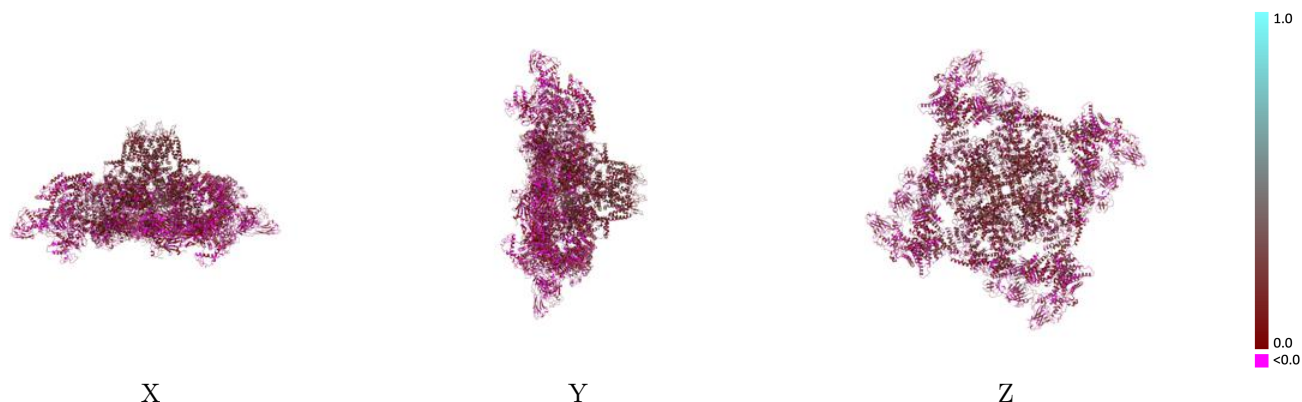
This section contains information regarding the fit between EMDB map EMD-19465 and PDB model 8RRU. Per-residue inclusion information can be found in section 3 on page 8.

### 9.1 Map-model overlay [i](#)



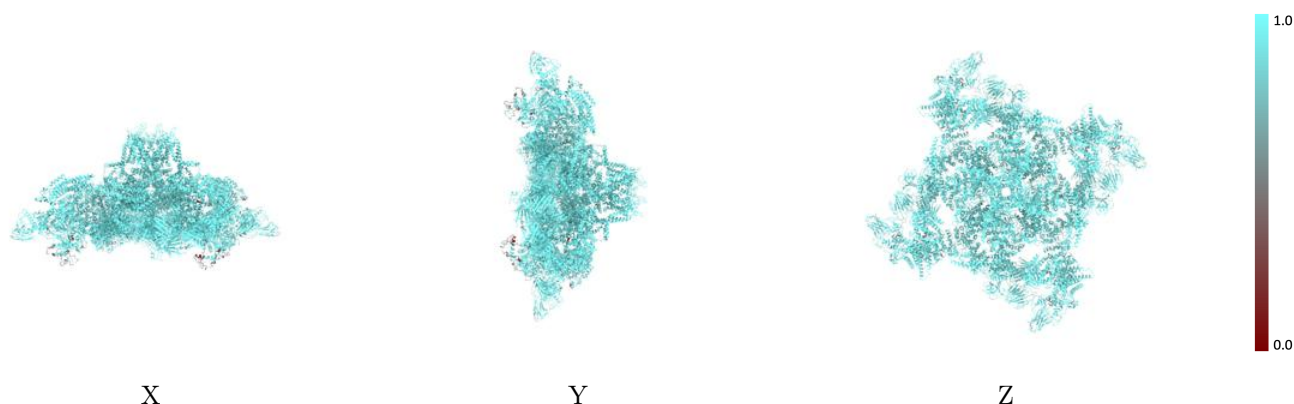
The images above show the 3D surface view of the map at the recommended contour level 0.2 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



The images above show the model with each residue coloured according to 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.

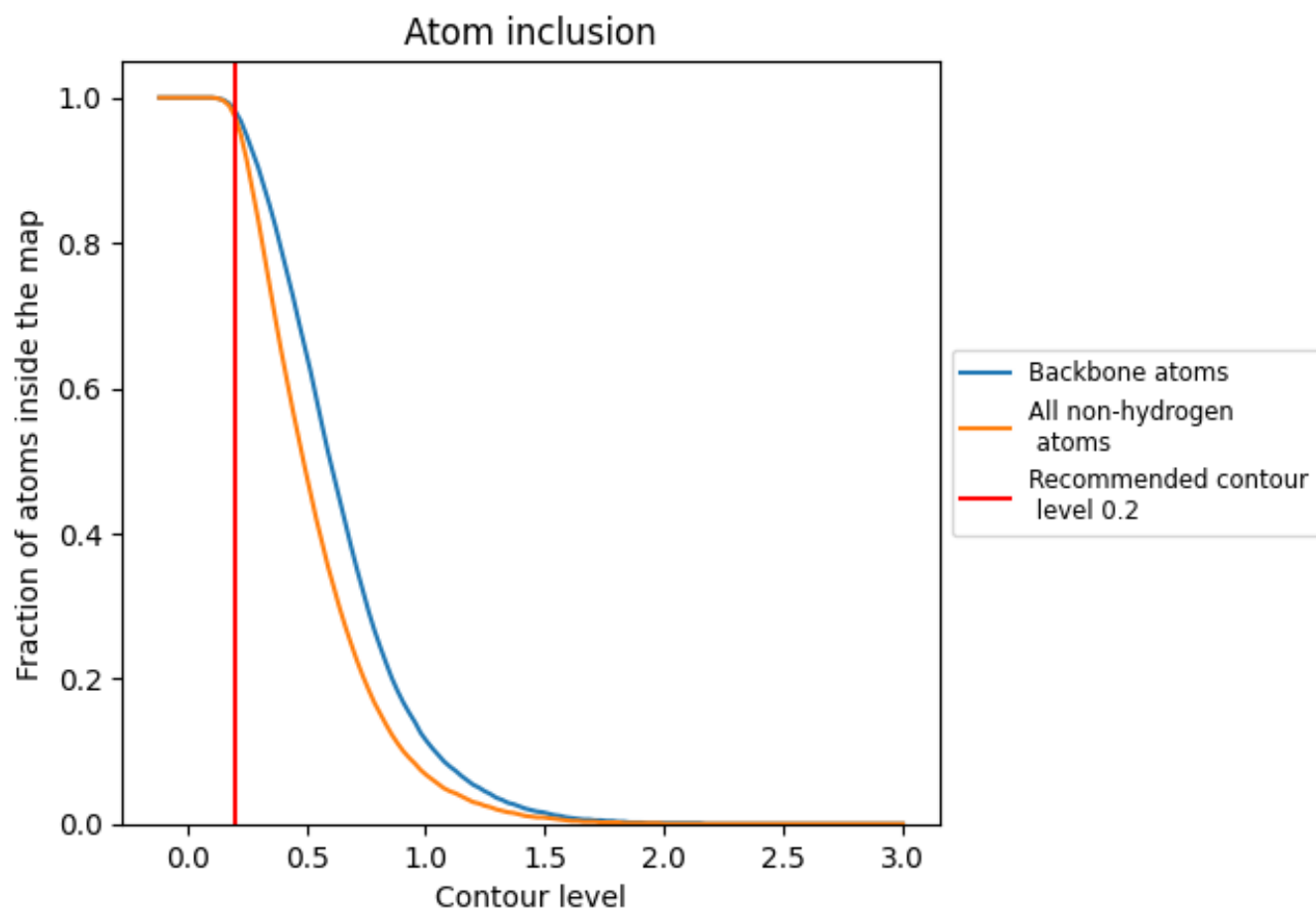
## 9.3 Atom inclusion mapped to coordinate model [i](#)



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 (0.2).





























## 9.4 Atom inclusion [i](#)



At the recommended contour level, 98% of all backbone atoms, 97% 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 (0.2) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9740	 0.1100
A	 0.9860	 0.0460
B	 0.9760	 0.1140
C	 0.9180	 0.0580
D	 0.9860	 0.0440
E	 0.9760	 0.1130
F	 0.9190	 0.0590
G	 0.9760	 0.1140
H	 0.9880	 0.0460
I	 0.9850	 0.0440
J	 0.9760	 0.1140
K	 0.9160	 0.0570
M	 0.9270	 0.0610

