



## wwPDB EM Validation Summary Report ⓘ

Oct 22, 2024 – 03:48 PM JST

PDB ID : 8Y40  
EMDB ID : EMD-38908  
Title : Structure of chimeric RyR-I4657M/G4819E complex with chlorantraniliprole  
Authors : Lin, L.; Wang, C.; Wang, W.; Jiang, H.; Yuchi, Z.  
Deposited on : 2024-01-29  
Resolution : 3.58 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 : 1.8.5 (274361), 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

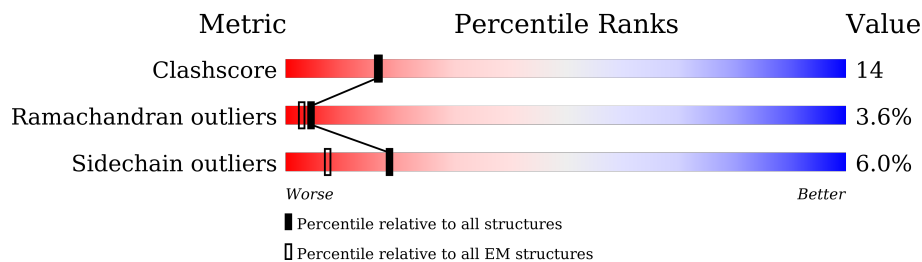
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.58 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	E	107	 84% 15% .
1	F	107	 84% 15% .
1	G	107	 84% 15% .
1	H	107	 85% 14% .
2	I	149	 11% 68% 21% 7% .
2	J	149	 10% 68% 22% 7% .
2	K	149	 9% 68% 21% 7% .
2	L	149	 7% 68% 22% 7% .

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Mol	Chain	Length	Quality of chain
3	A	5037	 59% 20% 18%
3	B	5037	 59% 20% 18%
3	C	5037	 58% 20% 18%
3	D	5037	 59% 19% 18%

## 2 Entry composition

There are 8 unique types of molecules in this entry. The entry contains 123925 atoms, of which 88 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	E	107	804	510	144	146	4	0	0
1	H	107	804	510	144	146	4	0	0
1	G	107	804	510	144	146	4	0	0
1	F	107	804	510	144	146	4	0	0

- Molecule 2 is a protein called Calmodulin-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	I	139	1023	633	172	209	9	0	0
2	L	139	1023	633	172	209	9	0	0
2	K	139	1023	633	172	209	9	0	0
2	J	139	1023	633	172	209	9	0	0

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
I	32	ALA	GLU	engineered mutation	UNP P0DP23
I	68	ALA	GLU	engineered mutation	UNP P0DP23
I	105	ALA	GLU	engineered mutation	UNP P0DP23
I	141	ALA	GLU	engineered mutation	UNP P0DP23
L	32	ALA	GLU	engineered mutation	UNP P0DP23
L	68	ALA	GLU	engineered mutation	UNP P0DP23
L	105	ALA	GLU	engineered mutation	UNP P0DP23
L	141	ALA	GLU	engineered mutation	UNP P0DP23
K	32	ALA	GLU	engineered mutation	UNP P0DP23

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Chain	Residue	Modelled	Actual	Comment	Reference
K	68	ALA	GLU	engineered mutation	UNP P0DP23
K	105	ALA	GLU	engineered mutation	UNP P0DP23
K	141	ALA	GLU	engineered mutation	UNP P0DP23
J	32	ALA	GLU	engineered mutation	UNP P0DP23
J	68	ALA	GLU	engineered mutation	UNP P0DP23
J	105	ALA	GLU	engineered mutation	UNP P0DP23
J	141	ALA	GLU	engineered mutation	UNP P0DP23

- Molecule 3 is a protein called Ryanodine receptor 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	A	4121	Total	C	N	O	S	0	0
			29056	18435	5131	5332	158		
3	B	4121	Total	C	N	O	S	0	0
			29059	18438	5131	5332	158		
3	C	4121	Total	C	N	O	S	0	0
			29059	18438	5131	5332	158		
3	D	4121	Total	C	N	O	S	0	0
			29055	18436	5131	5330	158		

There are 20 discrepancies between the modelled and reference sequences:

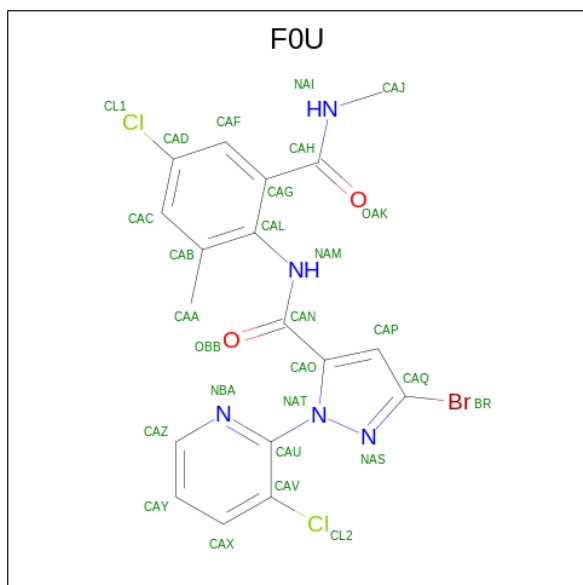
Chain	Residue	Modelled	Actual	Comment	Reference
A	4563	LYS	ARG	engineered mutation	UNP P11716
A	4564	TYR	PHE	engineered mutation	UNP P11716
A	4657	MET	CYS	engineered mutation	UNP P11716
A	4792	SER	LEU	engineered mutation	UNP P11716
A	4819	GLU	GLY	engineered mutation	UNP P11716
B	4563	LYS	ARG	engineered mutation	UNP P11716
B	4564	TYR	PHE	engineered mutation	UNP P11716
B	4657	MET	CYS	engineered mutation	UNP P11716
B	4792	SER	LEU	engineered mutation	UNP P11716
B	4819	GLU	GLY	engineered mutation	UNP P11716
C	4563	LYS	ARG	engineered mutation	UNP P11716
C	4564	TYR	PHE	engineered mutation	UNP P11716
C	4657	MET	CYS	engineered mutation	UNP P11716
C	4792	SER	LEU	engineered mutation	UNP P11716
C	4819	GLU	GLY	engineered mutation	UNP P11716
D	4563	LYS	ARG	engineered mutation	UNP P11716
D	4564	TYR	PHE	engineered mutation	UNP P11716
D	4657	MET	CYS	engineered mutation	UNP P11716
D	4792	SER	LEU	engineered mutation	UNP P11716

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Chain	Residue	Modelled	Actual	Comment	Reference
D	4819	GLU	GLY	engineered mutation	UNP P11716

- Molecule 4 is 5-bromanyl-N-[4-chloranyl-2-methyl-6-(methylcarbamoyl)phenyl]-2-(3-chloranylpyridin-2-yl)pyrazole-3-carboxamide (three-letter code: FOU) (formula: C<sub>18</sub>H<sub>14</sub>BrCl<sub>2</sub>N<sub>5</sub>O<sub>2</sub>) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf	
			Total	Br	C	Cl	N		O
4	A	1	Total	Br	C	Cl	N	O	0
			28	1	18	2	5	2	
4	B	1	Total	Br	C	Cl	N	O	0
			28	1	18	2	5	2	
4	C	1	Total	Br	C	Cl	N	O	0
			28	1	18	2	5	2	
4	D	1	Total	Br	C	Cl	N	O	0
			28	1	18	2	5	2	

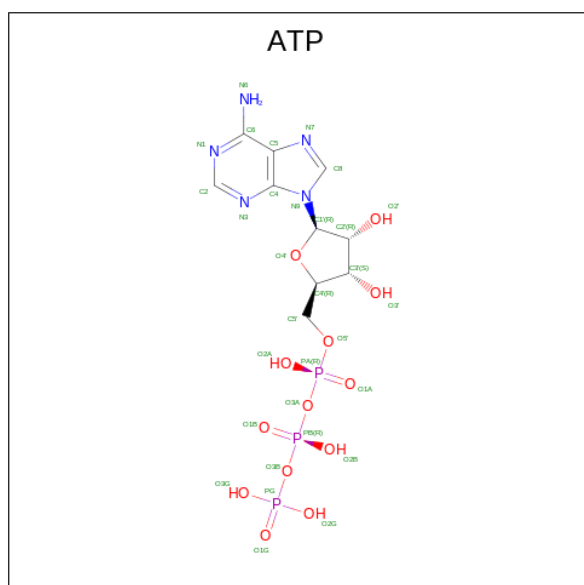
- Molecule 5 is ZINC ION (three-letter code: ZN) (formula: Zn).

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

- Molecule 6 is CALCIUM ION (three-letter code: CA) (formula: Ca).

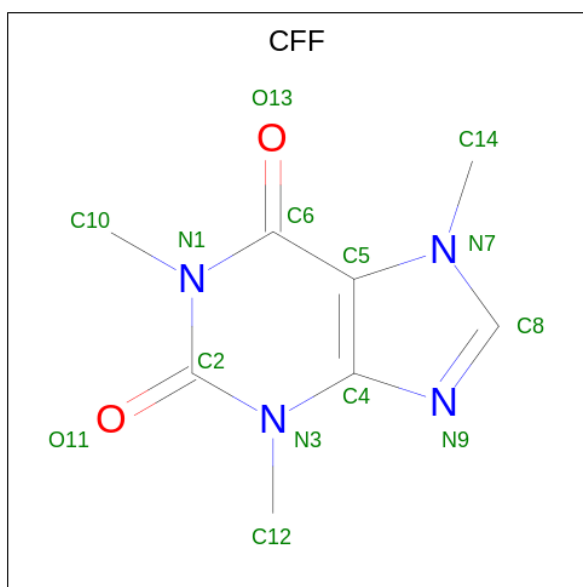
Mol	Chain	Residues	Atoms		AltConf
6	A	1	Total	Ca	0
			1	1	
6	B	1	Total	Ca	0
			1	1	
6	C	1	Total	Ca	0
			1	1	
6	D	1	Total	Ca	0
			1	1	

- Molecule 7 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>).



Mol	Chain	Residues	Atoms						AltConf
			Total	C	H	N	O	P	
7	A	1	Total	C	H	N	O	P	0
			43	10	12	5	13	3	
7	B	1	Total	C	H	N	O	P	0
			43	10	12	5	13	3	
7	C	1	Total	C	H	N	O	P	0
			43	10	12	5	13	3	
7	D	1	Total	C	H	N	O	P	0
			43	10	12	5	13	3	

- Molecule 8 is CAFFEINE (three-letter code: CFF) (formula: C<sub>8</sub>H<sub>10</sub>N<sub>4</sub>O<sub>2</sub>) (labeled as "Ligand of Interest" by depositor).



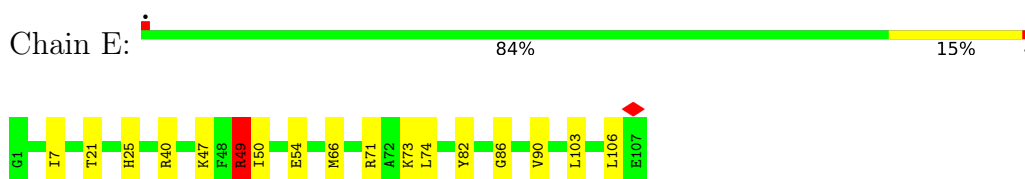
Mol	Chain	Residues	Atoms				AltConf	
			Total	C	H	N		O
8	A	1	24	8	10	4	2	0
8	B	1	24	8	10	4	2	0
8	C	1	24	8	10	4	2	0
8	D	1	24	8	10	4	2	0



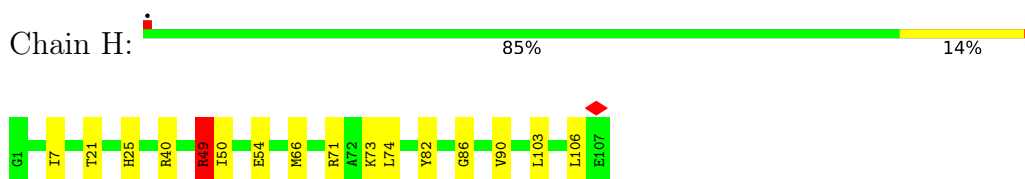
### 3 Residue-property plots [i](#)

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.

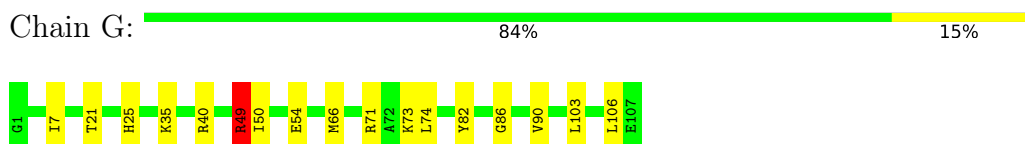
- Molecule 1: Peptidyl-prolyl cis-trans isomerase FKBP1B



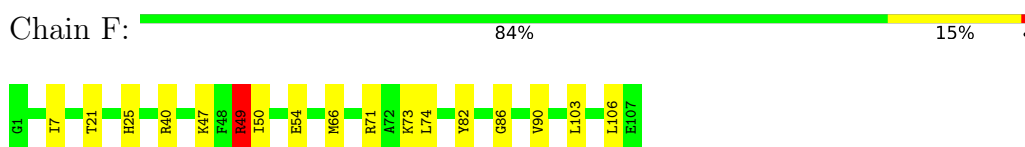
- Molecule 1: Peptidyl-prolyl cis-trans isomerase FKBP1B



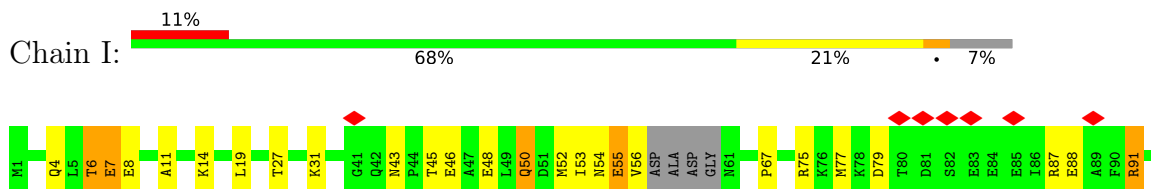
- Molecule 1: Peptidyl-prolyl cis-trans isomerase FKBP1B



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

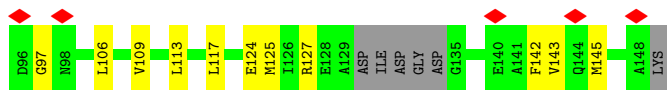
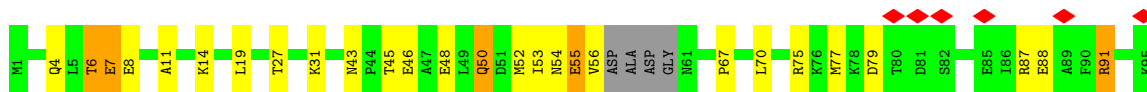


- Molecule 2: Calmodulin-1

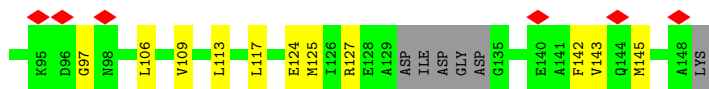
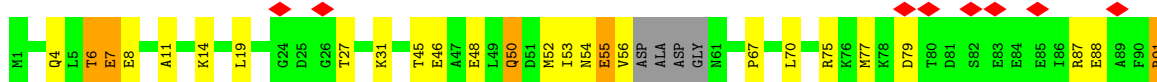




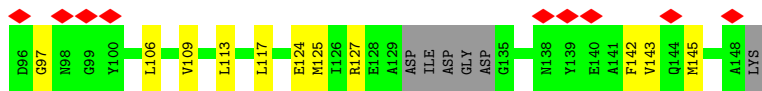
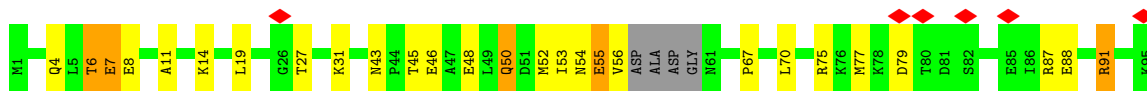
• Molecule 2: Calmodulin-1



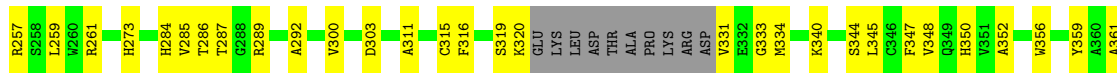
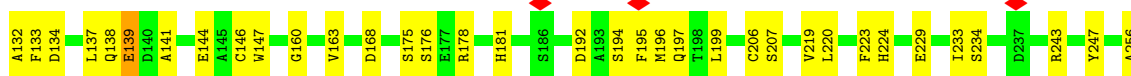
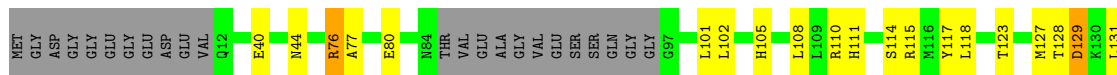
• Molecule 2: Calmodulin-1

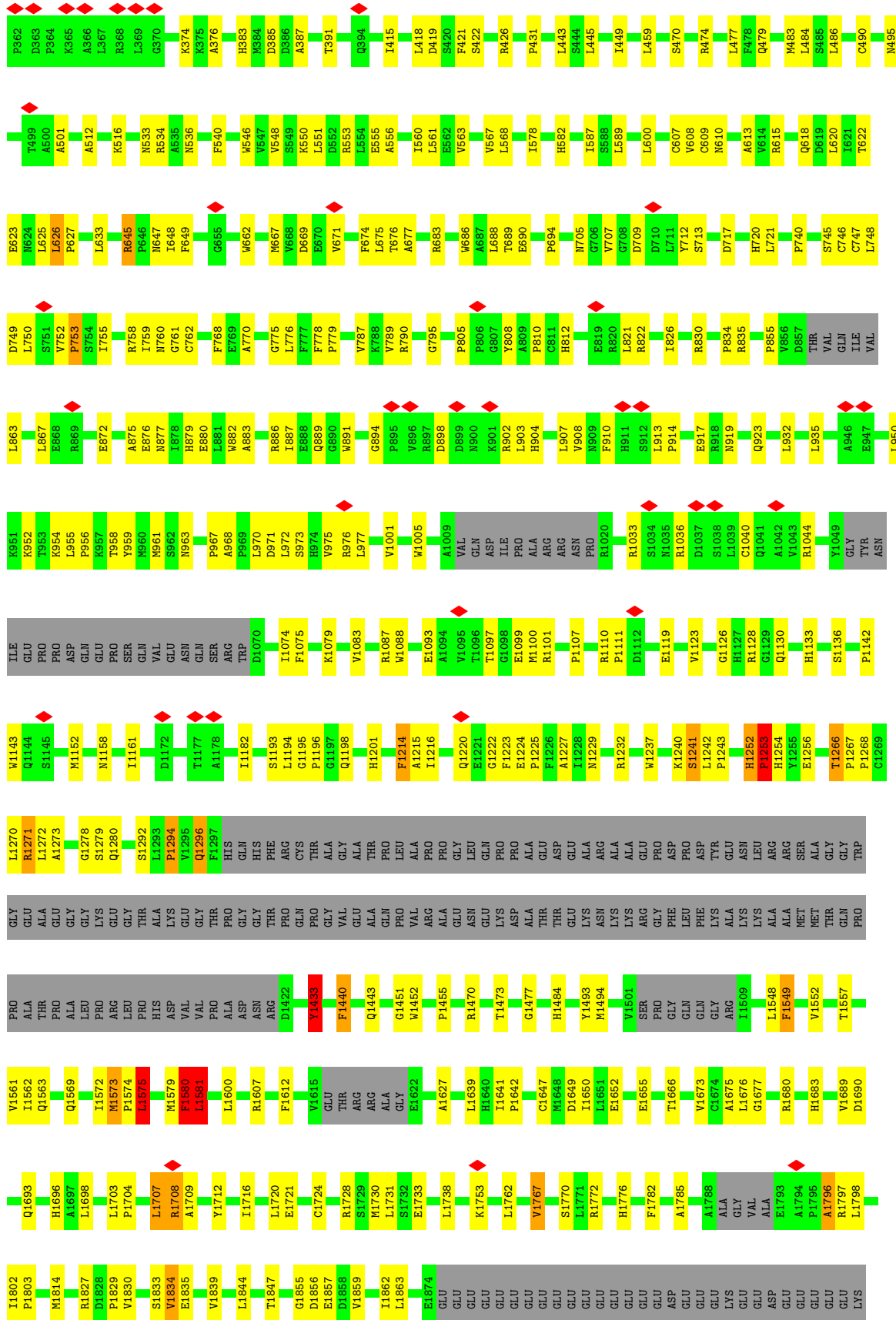


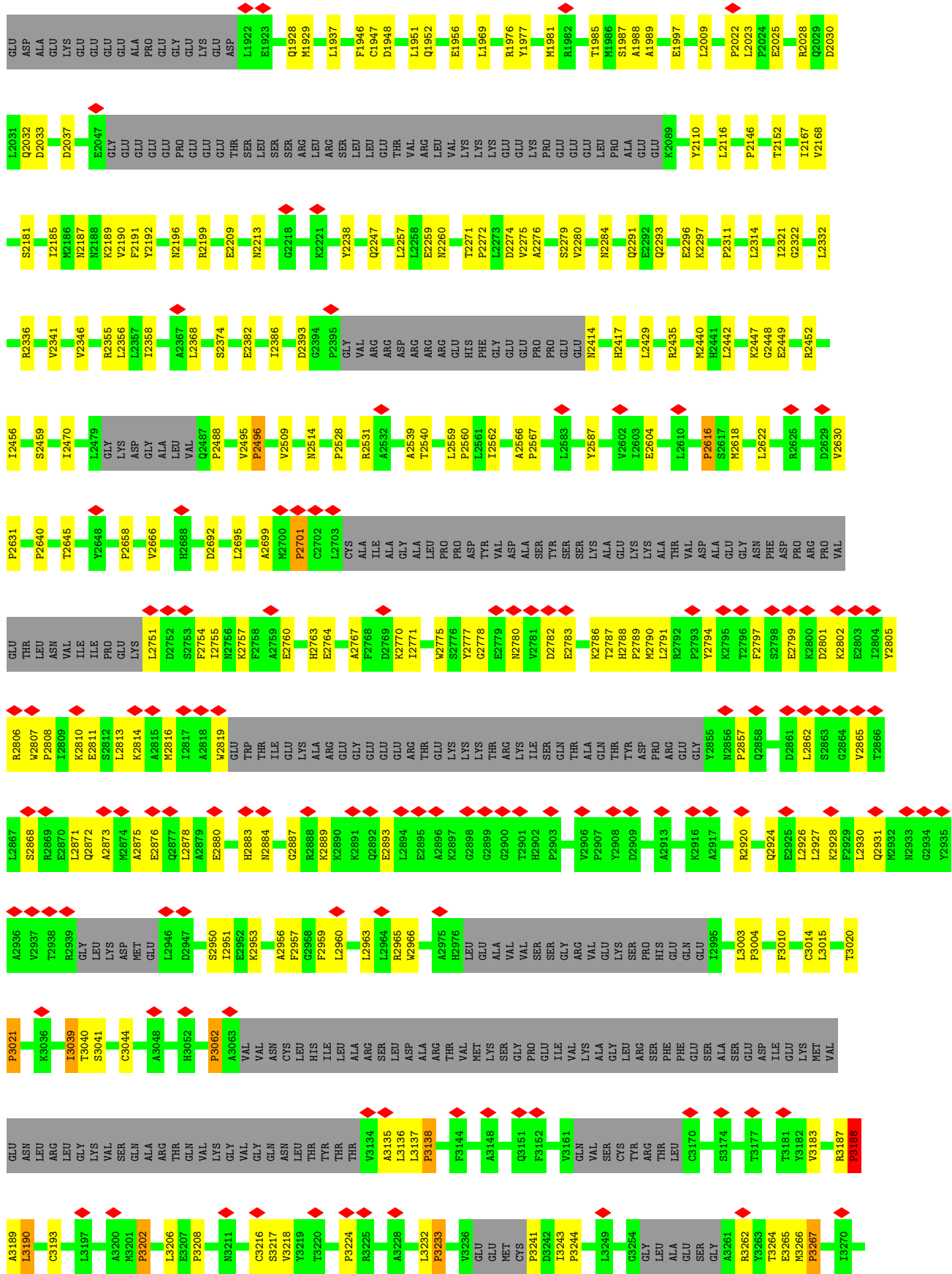
• Molecule 2: Calmodulin-1



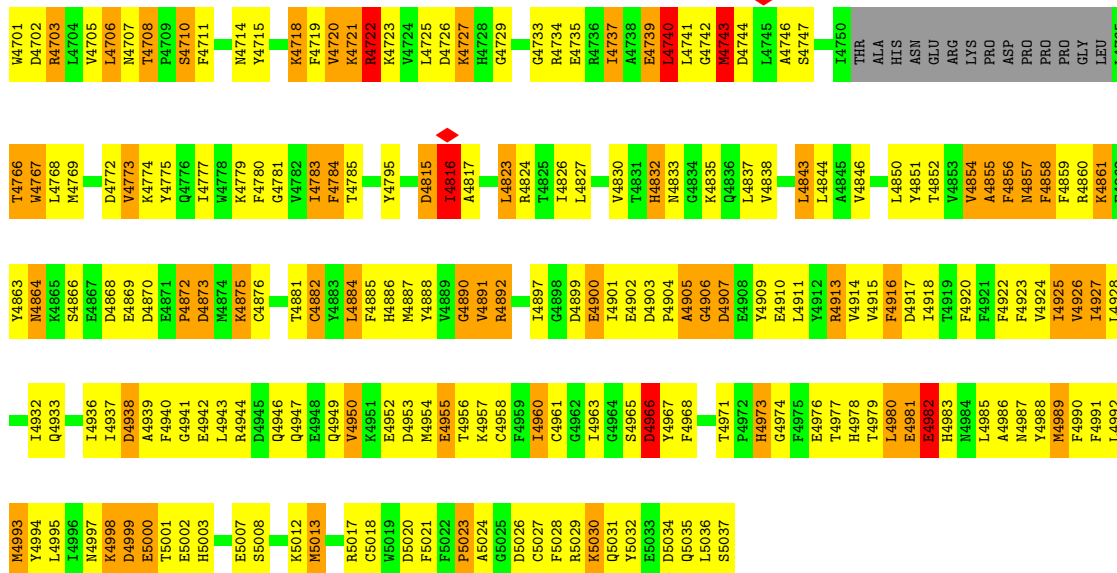
• Molecule 3: Ryanodine receptor 1



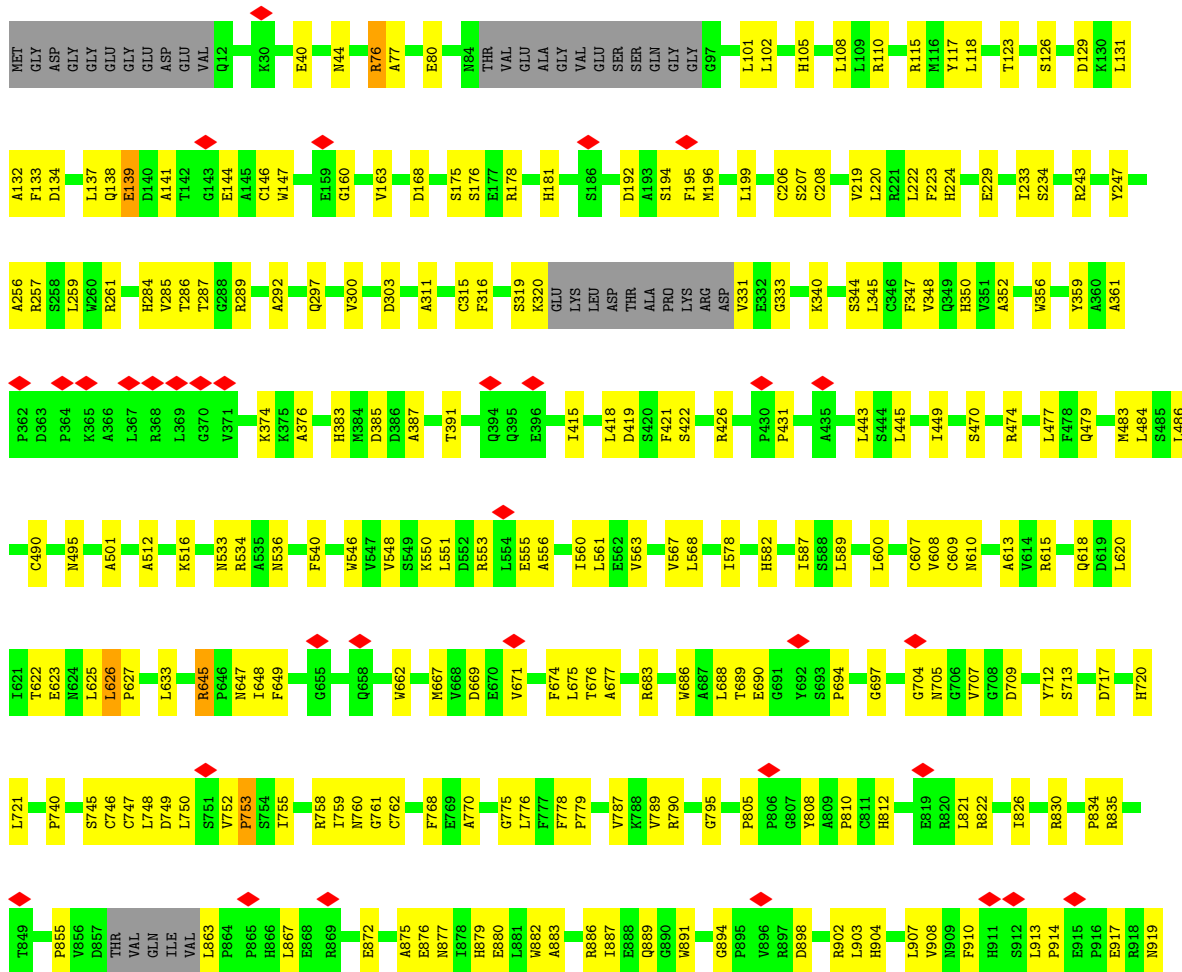


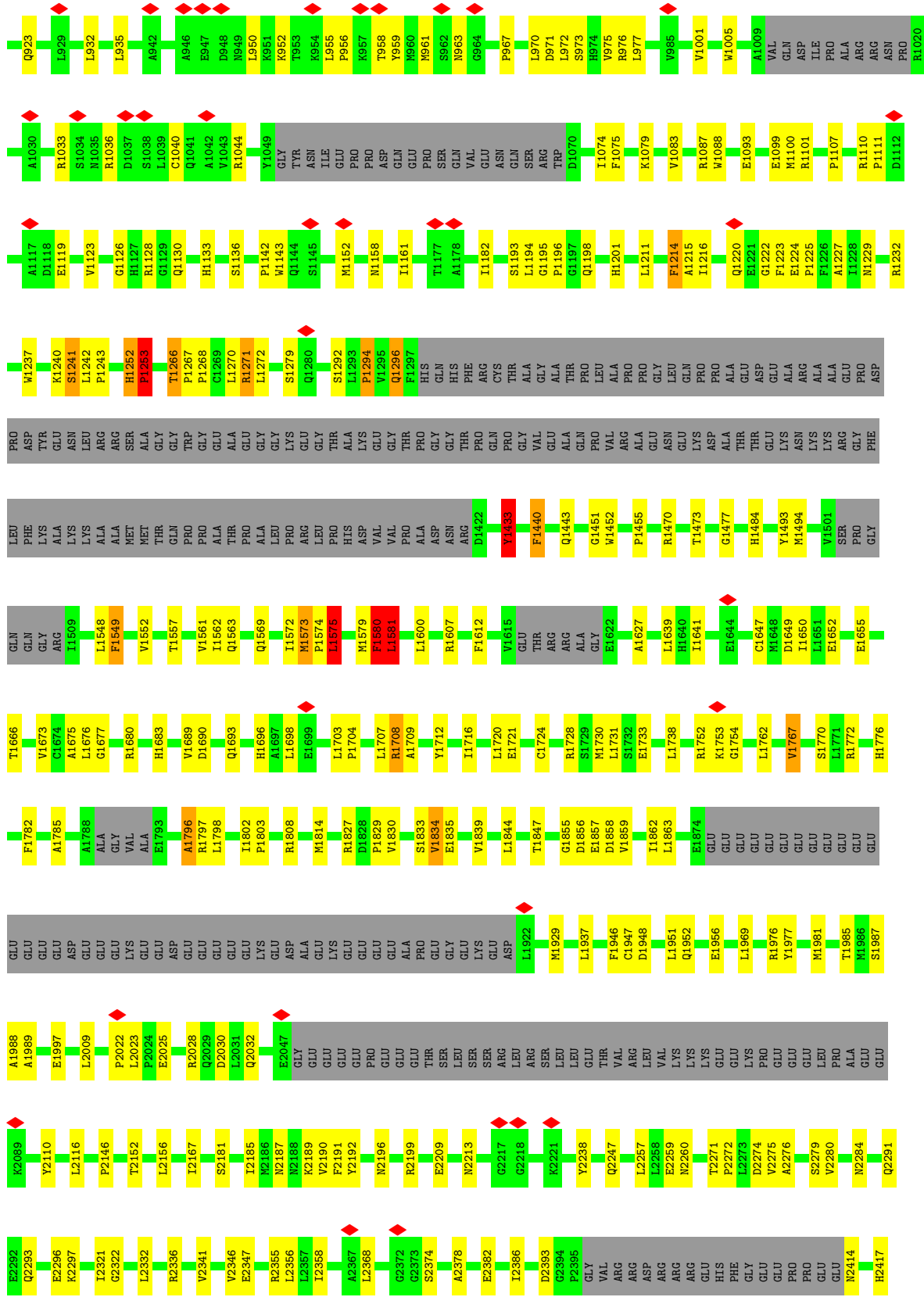


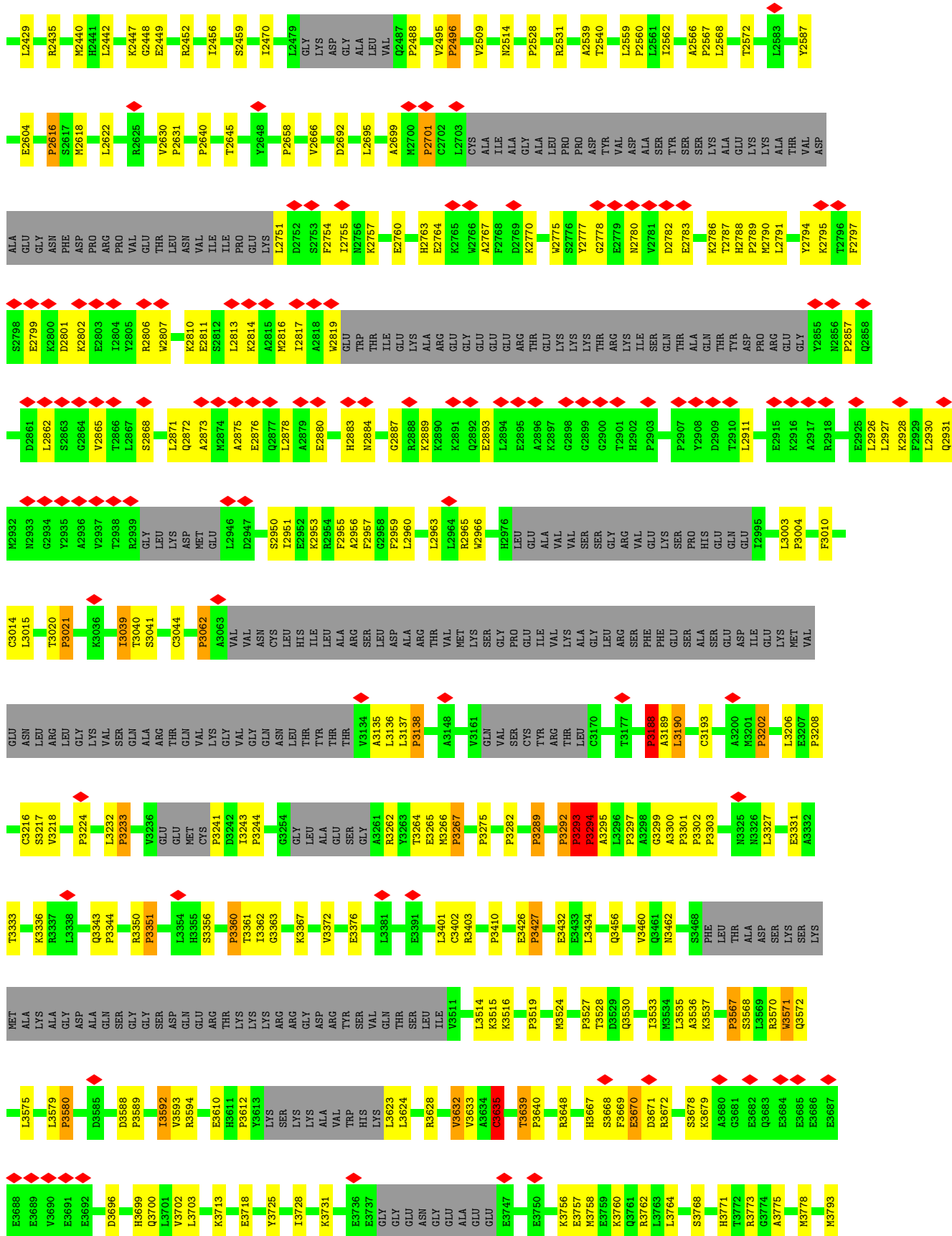




• Molecule 3: Ryanodine receptor 1





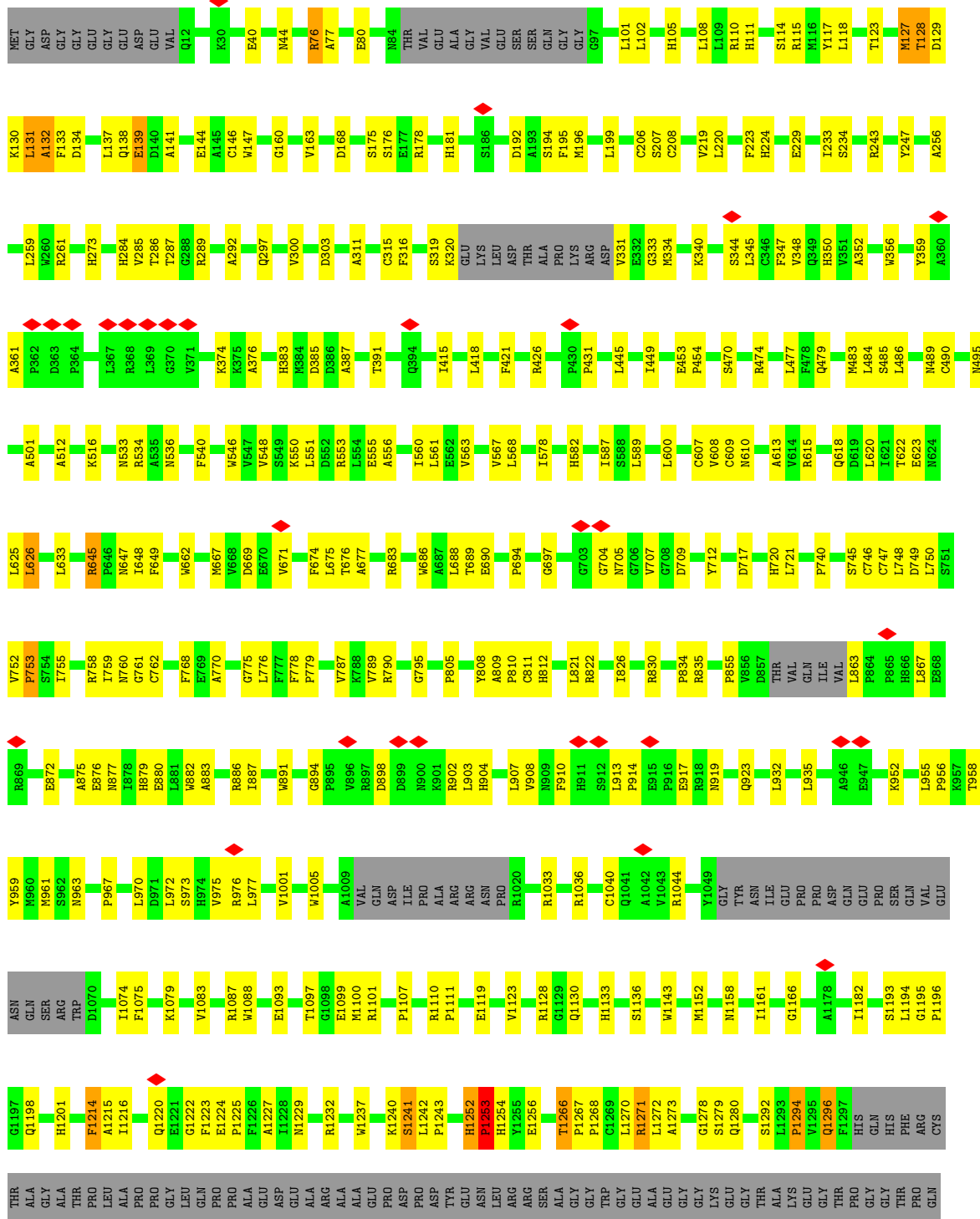


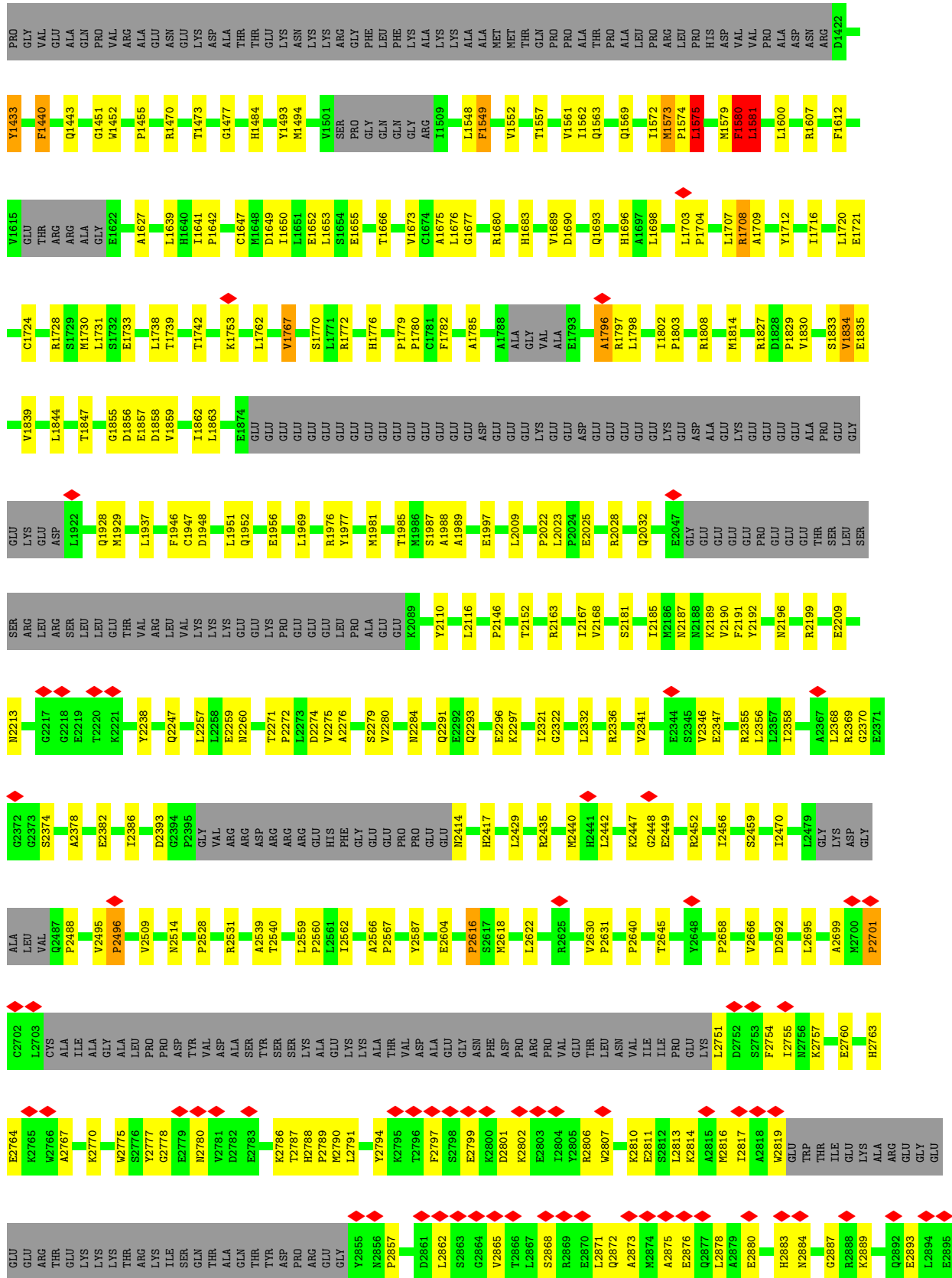


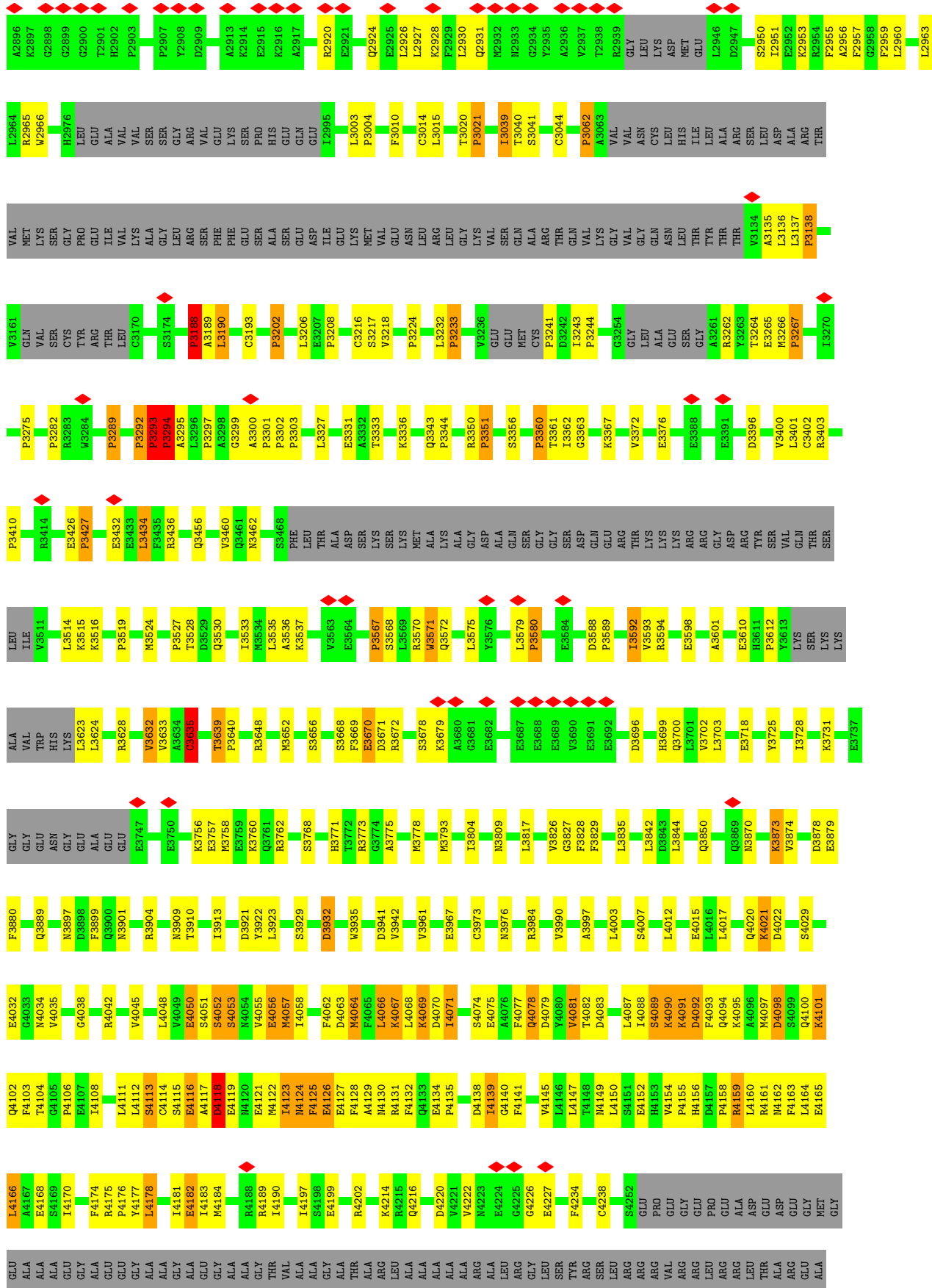
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D4966	L4071	P4135	M4223	ALA	GLY	GLY	W4641	K4675	M4743	Q4836	I4901	D4966
F4968	ARG	D4138	E4224	ALA	VAL	GLY	R4548	E4676	D4744	L4837	E4902	F4968
T4971	S4074	I4139	G4226	LEU	ALA	GLY	L4578	K4680	L4746	L4843	A4904	T4971
P4972	E4075	G4140	E4227	ARG	GLY	LEU	F4687	L4681	A4746	L4844	A4905	P4972
H4973	F4077	F4141	A4228	LEU	HIS	VAL	L4686	L4686	S4747	A4845	G4906	H4973
G4974	Q4078	V4145	C4238	VAL	GLY	PRO	L4687	L4686	I4750	V4846	D4907	G4974
F4975	D4079	N4149	V4080	GLY	GLY	GLY	I4688	I4687	THR	V4847	L4911	F4975
E4976	V4081	L4150	Y4081	ARG	PRO	GLY	A4689	I4688	ALA	V4848	Y4912	E4976
H4977	D4082	S4151	I4242	LEU	PRO	GLY	T4689	T4689	HIS	Y4849	R4913	H4977
T4979	L4083	E4152	S4252	LEU	GLY	ALA	Q4690	E4690	ASN	L4850	A4914	T4979
L4980	L4087	H4153	PRO	ARG	ALA	GLY	Q4691	Q4691	ARG	Y4851	Y4915	L4980
E4981	L4088	G4154	GLY	THR	GLY	PRO	G4692	G4692	LYS	V4852	F4916	E4981
E4982	D3843	V4154	PRO	ARG	GLY	GLY	P4693	D4693	PRO	V4853	D4917	E4982
M4983	L3844	S4007	LEU	VAL	VAL	VAL	D4694	D4694	ASP	V4854	I4918	M4983
M4984	L3844	S4007	GLY	VAL	VAL	VAL	D4695	D4695	PRO	A4855	I4919	M4984
L4885	L4012	L4012	GLY	ARG	GLY	VAL	D4696	D4696	PRO	F4856	F4920	L4885
A4986	R3849	R3849	PRO	ARG	LEU	VAL	V4697	V4697	PRO	M4857	F4921	A4986
D4987	Q3850	Q3850	GLY	LEU	LEU	VAL	K4698	K4698	GLY	F4858	F4922	D4987
M4988	D3869	D3869	GLY	ALA	ALA	LYS	L4700	L4700	LEU	R4859	F4923	M4988
D4989	I3870	I3870	ASP	THR	THR	GLY	Q4700	Q4700	LEU	R4860	V4924	D4989
D4990	K3873	K3873	ASP	ALA	ALA	GLY	D4702	D4702	ASP	K4861	I4925	D4990
D4991	V3874	V3874	GLY	ARG	ARG	ASN	R4703	R4703	SER	L4766	I4926	D4991
Y4994	D3878	D3878	GLY	ARG	ARG	GLY	L4704	L4704	GLY	L4767	I4927	Y4994
L4996	E3879	E3879	MET	THR	THR	GLY	V4705	V4705	GLY	M4769	L4928	L4996
M4997	F3880	F3880	GLY	ALA	ALA	LYS	L4706	L4706	GLY	K4865	I4931	M4997
M4998	Q3889	Q3889	ALA	ALA	ALA	LYS	L4707	L4707	SER	S4866	I4932	M4998
D4999	E4032	E4032	ALA	ALA	ALA	GLY	N4708	N4708	SER	E4867	Q4933	D4999
E5000	G4033	G4033	ALA	ALA	ALA	VAL	P4709	P4709	TRP	E4868	Q4933	E5000
T5001	N4034	N4034	ALA	ALA	ALA	VAL	S4710	S4710	GLY	E4869	I4936	T5001
E5002	V4035	V4035	ALA	ALA	ALA	PRO	F4711	F4711	SER	D4870	I4937	E5002
E5003	G4038	G4038	GLY	GLY	GLY	PRO	N4714	N4714	GLY	E4871	G4937	E5003
E5007	R4042	R4042	GLY	GLY	GLY	PRO	F4711	F4711	GLY	L4777	I4938	E5007
S5008	V4045	V4045	GLY	GLY	GLY	PRO	N4715	N4715	GLY	M4779	A4939	S5008
K5012	L4048	L4048	ALA	ALA	ALA	PRO	K4718	K4718	ALA	D4772	G4940	K5012
H5013	L4048	L4048	ALA	ALA	ALA	PRO	F4719	F4719	ALA	K4773	G4941	H5013
R5017	V4049	V4049	ALA	ALA	ALA	PRO	F4720	F4720	LYS	K4774	E4942	R5017
C5018	E4050	E4050	ALA	ALA	ALA	PRO	K4721	K4721	LYS	K4775	D4944	C5018
N5019	S4051	S4051	ALA	ALA	ALA	PRO	R4722	R4722	ALA	Q4776	R4944	N5019
D5020	S4052	S4052	ALA	ALA	ALA	PRO	K4723	K4723	ASP	Q4776	Q4946	D5020
F5021	M4053	M4053	ALA	ALA	ALA	PRO	V4724	V4724	ASP	F4779	G4946	F5021
F5022	N4054	N4054	ALA	ALA	ALA	PRO	L4725	L4725	GLY	Y4795	E4946	F5022
G5023	V4055	V4055	ALA	ALA	ALA	PRO	D4726	D4726	GLY	F4807	Q4949	G5023
G5025	E4056	E4056	ALA	ALA	ALA	PRO	K4727	K4727	GLY	F4807	V4950	G5025
D5026	M4057	M4057	VAL	VAL	VAL	PRO	H4728	H4728	ALA	F4807	K4951	D5026
C5027	I4058	I4058	ALA	ALA	ALA	PRO	G4729	G4729	LYS	D4815	D4952	C5027
F5028	S3929	S3929	ALA	ALA	ALA	PRO	G4733	G4733	GLY	I4816	M4954	F5028
R5029	F4062	F4062	ALA	ALA	ALA	PRO	R4734	R4734	GLY	A4817	E4955	R5029
K5030	D4063	D4063	ALA	ALA	ALA	PRO	E4735	E4735	GLY	R4824	A4956	K5030
D5031	M3935	M3935	ALA	ALA	ALA	PRO	R4736	R4736	GLY	T4825	T4956	D5031
	W3935	W3935	ALA	ALA	ALA	PRO	L4668	L4668	GLY	I4826	C4958	
	L4066	L4066	ARG	ARG	ARG	PRO	A4738	A4738	GLY	A4826	F4959	
	K4067	K4067	LEU	LEU	LEU	PRO	E4739	E4739	GLY	T4831	I4960	
	L4068	L4068	LEU	LEU	LEU	PRO	K4671	K4671	GLY	H4832	I4963	
	K4069	K4069	ALA	ALA	ALA	PRO	R4673	R4673	GLY	H4833	G4964	
			ALA	ALA	ALA	PRO			GLY	G4834		

Y5032  
E9033  
D5034  
H5035  
L5036  
S5037

• Molecule 3: Ryanodine receptor 1

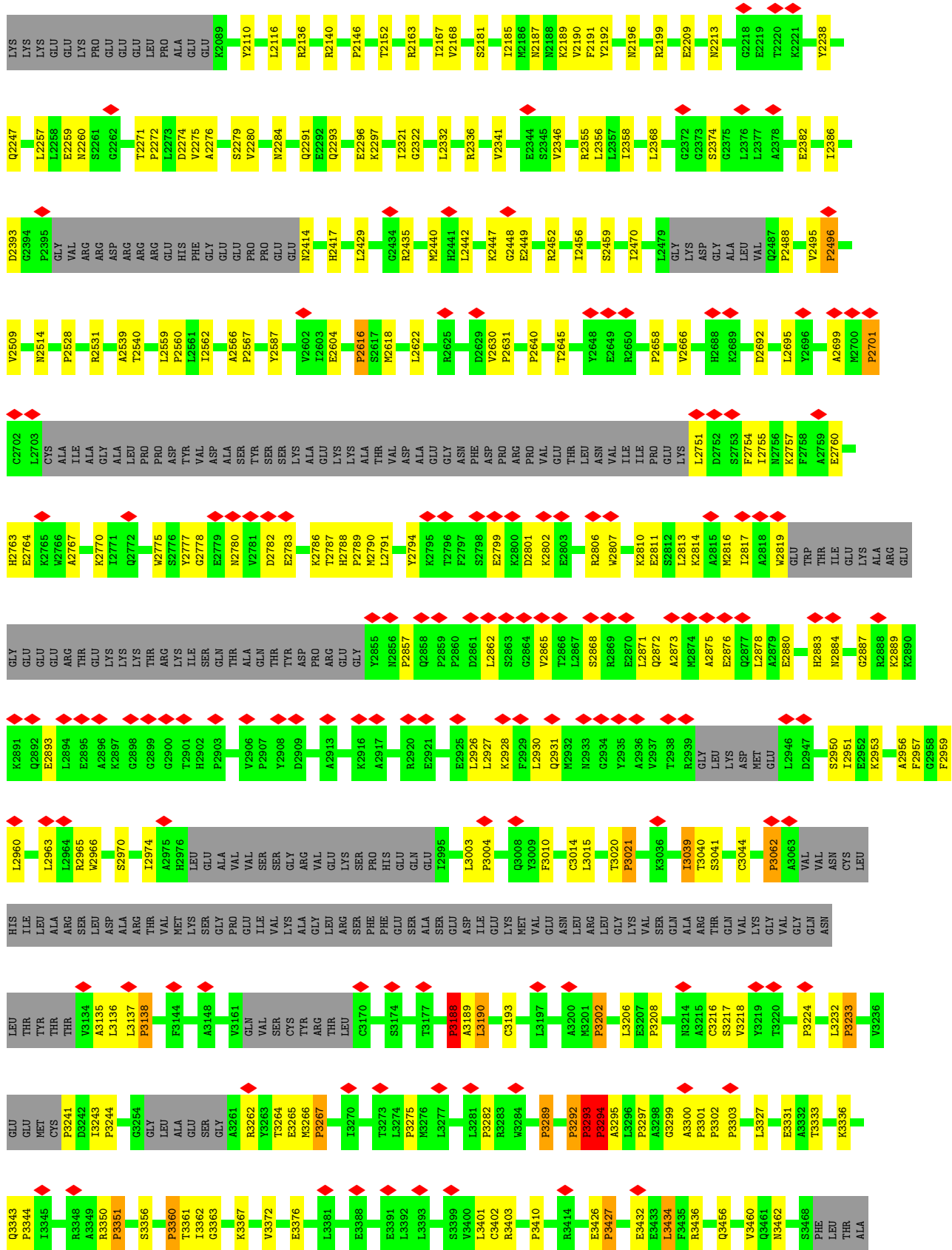


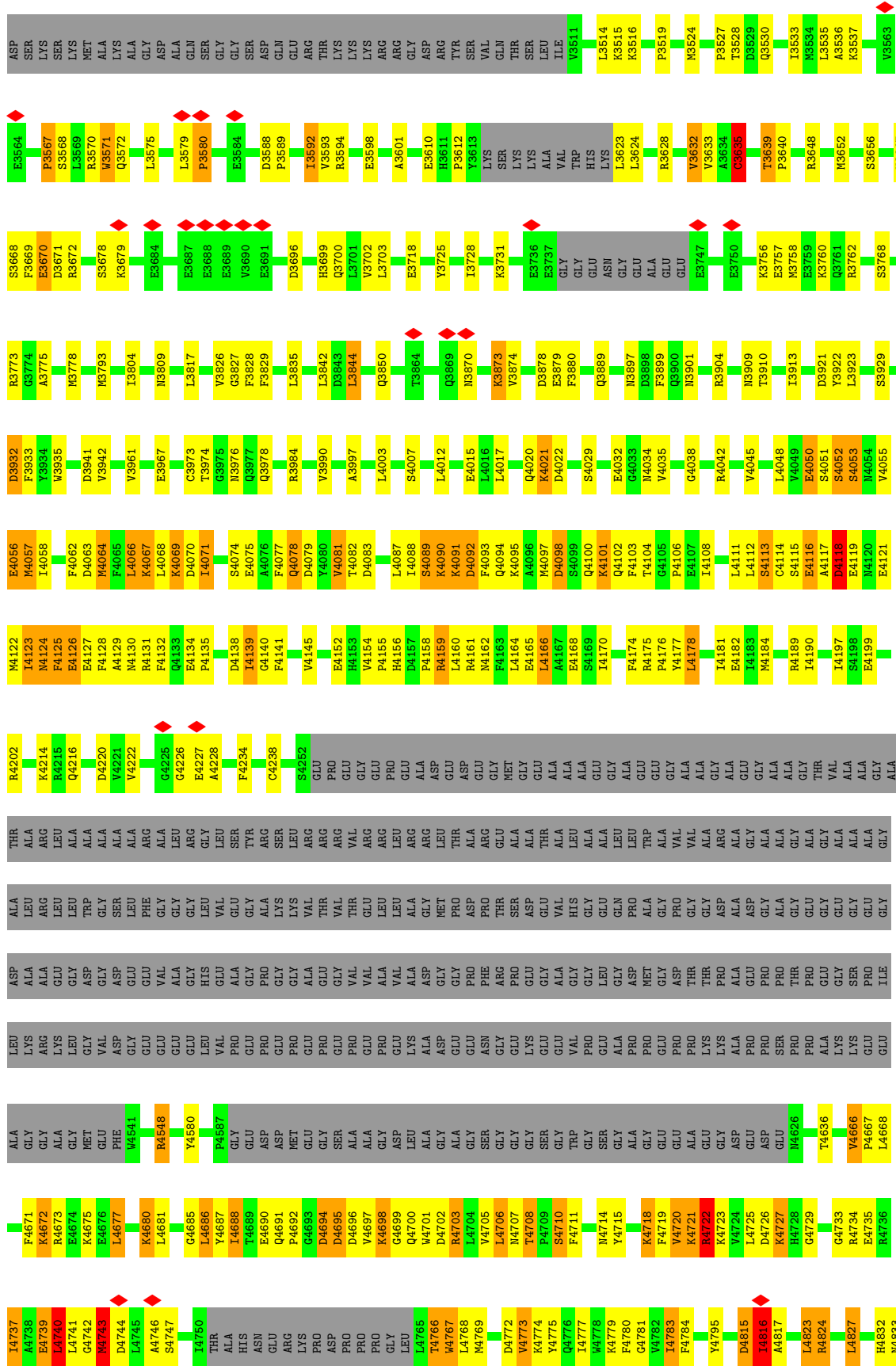














G4834	G4898	I4963	K5030
K4835	D4899	G4964	Q5031
Q4836	E4900	S4965	Y5032
L4837	I4901	D4966	E5033
W4838	E4902	Y4967	D5034
W4839	D4903	F4968	Q5035
T4840	P4904		L5036
	A4905	T4971	S5037
	G4906	F4972	
	D4907	H4973	
	E4908	G4974	
	Y4909	F4975	
	E4910	E4976	
	L4911	T4977	
	Y4912	H4978	
	R4913	T4979	
	W4914	L4980	
	W4915	E4981	
	F4916	E4982	
	D4917	H4983	
	I4918	M4984	
	I4919	L4985	
	F4920	A4986	
	F4921	M4987	
	F4922	Y4988	
	F4923	M4989	
	Y4924	F4990	
	Y4925	F4991	
	W4926	L4992	
	I4927	M4993	
	L4928	Y4994	
	Q4933	L4995	
		T4996	
		M4997	
		K4998	
		D4999	
		E5000	
		T5001	
		E5002	
		H5003	
		E5007	
		S5008	
		K5012	
		M5013	
		R5017	
		C5018	
		W5019	
		D5020	
		F5021	
		F5022	
		P5023	
		A5024	
		G5025	
		D5026	
		C5027	
		F5028	
		R4932	
		F4959	
		I4960	
		C4961	
		G4962	
		V4950	
		K4951	
		E4952	
		D4953	
		M4954	
		E4955	
		T4956	
		G4890	
		K4957	
		C4958	
		F4881	
		L4884	
		F4885	
		H4886	
		M4887	
		Y4888	
		W4889	
		T4890	
		W4891	
		G4892	
		F4895	
		I4896	
		C4896	
		L4897	
		T4881	
		C4882	
		Y4883	
		L4884	
		F4885	
		H4886	
		M4887	
		Y4888	
		W4889	
		T4890	
		W4891	
		G4892	
		F4895	
		I4896	
		C4896	
		L4897	

## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	68897	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 ( $e^-/\text{\AA}^2$ )	50	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2400	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.459	Depositor
Minimum map value	-0.261	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.012	Depositor
Recommended contour level	0.03	Depositor
Map size (Å)	547.84, 547.84, 547.84	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.07, 1.07, 1.07	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, CA, CFF, ZN, FOU

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	E	0.34	0/820	0.74	4/1105 (0.4%)
1	F	0.34	0/820	0.74	4/1105 (0.4%)
1	G	0.34	0/820	0.74	4/1105 (0.4%)
1	H	0.34	0/820	0.74	4/1105 (0.4%)
2	I	0.39	0/1032	0.82	3/1392 (0.2%)
2	J	0.39	0/1032	0.83	3/1392 (0.2%)
2	K	0.39	0/1032	0.83	3/1392 (0.2%)
2	L	0.39	0/1032	0.83	3/1392 (0.2%)
3	A	0.41	9/29618 (0.0%)	0.61	62/40398 (0.2%)
3	B	0.41	9/29621 (0.0%)	0.61	61/40402 (0.2%)
3	C	0.41	8/29621 (0.0%)	0.61	60/40402 (0.1%)
3	D	0.41	8/29617 (0.0%)	0.61	60/40397 (0.1%)
All	All	0.40	34/125885 (0.0%)	0.62	271/171587 (0.2%)

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
3	A	0	5
3	B	0	6
3	C	0	5
3	D	0	5
All	All	0	21

The worst 5 of 34 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	3932	ASP	CB-CG	-11.85	1.26	1.51
3	D	3932	ASP	CB-CG	-11.84	1.26	1.51

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	3932	ASP	CB-CG	-11.83	1.26	1.51
3	C	3932	ASP	CB-CG	-11.83	1.26	1.51
3	D	3932	ASP	CA-CB	-8.63	1.34	1.53

The worst 5 of 271 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	J	91	ARG	NE-CZ-NH1	10.89	125.75	120.30
3	B	1575	LEU	CA-CB-CG	-10.86	90.32	115.30
3	A	1575	LEU	CA-CB-CG	-10.85	90.34	115.30
3	D	1575	LEU	CA-CB-CG	-10.85	90.35	115.30
3	C	1575	LEU	CA-CB-CG	-10.84	90.38	115.30

There are no chirality outliers.

5 of 21 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	A	1292	SER	Mainchain
3	A	139	GLU	Peptide
3	A	1796	ALA	Peptide
3	A	4795	TYR	Sidechain
3	A	752	VAL	Peptide

## 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	E	804	0	812	10	0
1	F	804	0	812	10	0
1	G	804	0	812	11	0
1	H	804	0	812	9	0
2	I	1023	0	941	19	0
2	J	1023	0	941	19	0
2	K	1023	0	941	18	0
2	L	1023	0	941	19	0
3	A	29056	0	25582	807	0
3	B	29059	0	25591	821	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	C	29059	0	25591	852	0
3	D	29055	0	25587	804	0
4	A	28	0	0	0	0
4	B	28	0	0	0	0
4	C	28	0	0	2	0
4	D	28	0	0	0	0
5	A	1	0	0	0	0
5	B	1	0	0	0	0
5	C	1	0	0	0	0
5	D	1	0	0	0	0
6	A	1	0	0	0	0
6	B	1	0	0	0	0
6	C	1	0	0	0	0
6	D	1	0	0	0	0
7	A	31	12	12	3	0
7	B	31	12	12	3	0
7	C	31	12	12	4	0
7	D	31	12	12	2	0
8	A	14	10	10	2	0
8	B	14	10	10	4	0
8	C	14	10	10	0	0
8	D	14	10	10	0	0
All	All	123837	88	109451	3249	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 14.

The worst 5 of 3249 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)
3:C:4820:VAL:HB	4:C:5101:F0U:BR	1.67	1.49
3:B:1271:ARG:HB2	3:B:1271:ARG:HH11	1.22	1.03
3:A:1271:ARG:HB2	3:A:1271:ARG:HH11	1.22	1.02
3:C:4820:VAL:CB	4:C:5101:F0U:BR	2.63	1.01
3:C:1271:ARG:HH11	3:C:1271:ARG:HB2	1.22	1.01

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	E	105/107 (98%)	98 (93%)	7 (7%)	0	100	100
1	F	105/107 (98%)	98 (93%)	7 (7%)	0	100	100
1	G	105/107 (98%)	98 (93%)	7 (7%)	0	100	100
1	H	105/107 (98%)	98 (93%)	7 (7%)	0	100	100
2	I	133/149 (89%)	133 (100%)	0	0	100	100
2	J	133/149 (89%)	133 (100%)	0	0	100	100
2	K	133/149 (89%)	133 (100%)	0	0	100	100
2	L	133/149 (89%)	133 (100%)	0	0	100	100
3	A	4065/5037 (81%)	3275 (81%)	637 (16%)	153 (4%)	2	22
3	B	4065/5037 (81%)	3273 (80%)	636 (16%)	156 (4%)	2	22
3	C	4065/5037 (81%)	3259 (80%)	647 (16%)	159 (4%)	2	21
3	D	4065/5037 (81%)	3277 (81%)	637 (16%)	151 (4%)	2	22
All	All	17212/21172 (81%)	14008 (81%)	2585 (15%)	619 (4%)	4	23

5 of 619 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	A	626	LEU
3	A	1215	ALA
3	A	1241	SER
3	A	1296	GLN
3	A	1581	LEU

### 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	E	84/88 (96%)	78 (93%)	6 (7%)	12	39
1	F	84/88 (96%)	78 (93%)	6 (7%)	12	39
1	G	84/88 (96%)	78 (93%)	6 (7%)	12	39
1	H	84/88 (96%)	78 (93%)	6 (7%)	12	39
2	I	99/123 (80%)	78 (79%)	21 (21%)	1	6
2	J	99/123 (80%)	78 (79%)	21 (21%)	1	6
2	K	99/123 (80%)	78 (79%)	21 (21%)	1	6
2	L	99/123 (80%)	78 (79%)	21 (21%)	1	6
3	A	2499/4277 (58%)	2367 (95%)	132 (5%)	19	48
3	B	2500/4277 (58%)	2372 (95%)	128 (5%)	20	49
3	C	2500/4277 (58%)	2358 (94%)	142 (6%)	17	46
3	D	2499/4277 (58%)	2366 (95%)	133 (5%)	19	48
All	All	10730/17952 (60%)	10087 (94%)	643 (6%)	18	44

5 of 643 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	C	4844	LEU
3	D	4714	ASN
3	C	4892	ARG
3	C	4843	LEU
3	D	1581	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 104 such sidechains are listed below:

Mol	Chain	Res	Type
3	B	4787	ASN
3	C	1563	GLN
3	D	4946	GLN
3	B	4833	ASN
3	C	536	ASN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 20 ligands modelled in this entry, 8 are monoatomic - leaving 12 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
4	F0U	D	5101	-	29,30,30	1.43	6 (20%)	31,43,43	1.11	2 (6%)
8	CFF	D	5105	-	8,15,15	2.29	3 (37%)	8,23,23	1.33	1 (12%)
4	F0U	B	5101	-	29,30,30	1.42	6 (20%)	31,43,43	1.11	2 (6%)
7	ATP	B	5104	-	26,33,33	0.90	1 (3%)	31,52,52	1.69	5 (16%)
7	ATP	D	5104	-	26,33,33	0.90	1 (3%)	31,52,52	1.68	5 (16%)
8	CFF	A	5105	-	8,15,15	2.32	3 (37%)	8,23,23	1.32	1 (12%)
8	CFF	C	5105	-	8,15,15	2.28	3 (37%)	8,23,23	1.48	1 (12%)
7	ATP	C	5104	-	26,33,33	0.90	1 (3%)	31,52,52	1.69	5 (16%)
8	CFF	B	5105	-	8,15,15	2.30	3 (37%)	8,23,23	1.31	1 (12%)
7	ATP	A	5104	-	26,33,33	0.90	1 (3%)	31,52,52	1.69	5 (16%)
4	F0U	C	5101	-	29,30,30	1.43	6 (20%)	31,43,43	1.12	2 (6%)
4	F0U	A	5101	-	29,30,30	1.43	6 (20%)	31,43,43	1.12	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
4	F0U	D	5101	-	-	0/11/18/18	0/3/3/3
8	CFF	D	5105	-	-	-	0/2/2/2
4	F0U	B	5101	-	-	0/11/18/18	0/3/3/3
7	ATP	B	5104	-	-	2/18/38/38	0/3/3/3
7	ATP	D	5104	-	-	2/18/38/38	0/3/3/3
8	CFF	A	5105	-	-	-	0/2/2/2
8	CFF	C	5105	-	-	-	0/2/2/2
7	ATP	C	5104	-	-	2/18/38/38	0/3/3/3
8	CFF	B	5105	-	-	-	0/2/2/2
7	ATP	A	5104	-	-	2/18/38/38	0/3/3/3
4	F0U	C	5101	-	-	0/11/18/18	0/3/3/3
4	F0U	A	5101	-	-	0/11/18/18	0/3/3/3

The worst 5 of 40 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	A	5105	CFF	C5-C4	4.22	1.45	1.39
8	A	5105	CFF	C5-C6	4.20	1.48	1.41
8	B	5105	CFF	C5-C4	4.19	1.45	1.39
8	D	5105	CFF	C5-C4	4.18	1.45	1.39
8	D	5105	CFF	C5-C6	4.14	1.47	1.41

The worst 5 of 32 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	C	5104	ATP	PA-O3A-PB	-3.94	119.32	132.83
7	D	5104	ATP	PB-O3B-PG	-3.93	119.33	132.83
7	A	5104	ATP	PB-O3B-PG	-3.93	119.34	132.83
7	B	5104	ATP	PB-O3B-PG	-3.92	119.36	132.83
7	C	5104	ATP	PB-O3B-PG	-3.92	119.37	132.83

There are no chirality outliers.

5 of 8 torsion outliers are listed below:

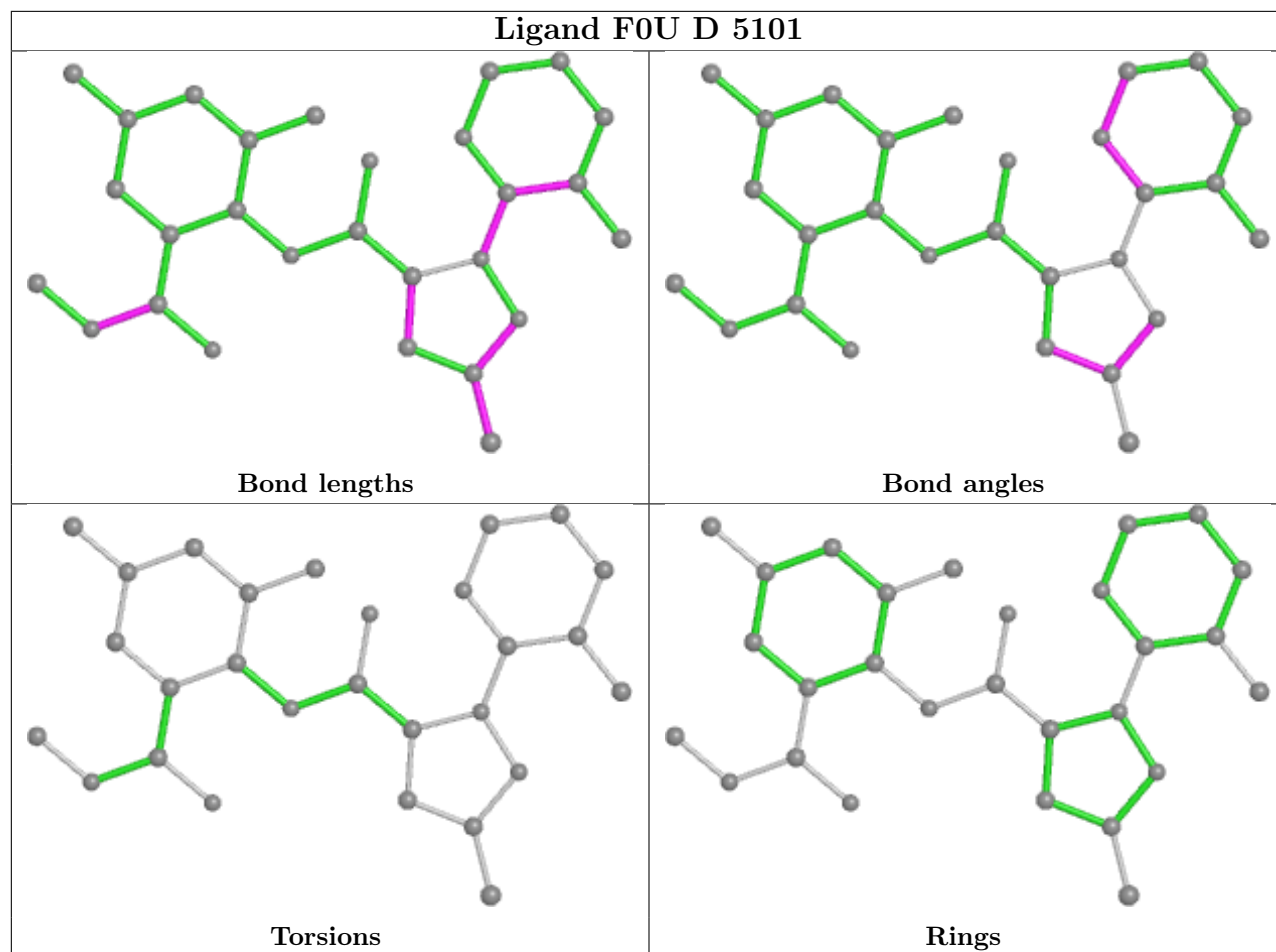
Mol	Chain	Res	Type	Atoms
7	A	5104	ATP	C5'-O5'-PA-O1A
7	B	5104	ATP	C5'-O5'-PA-O1A
7	C	5104	ATP	C5'-O5'-PA-O1A
7	D	5104	ATP	C5'-O5'-PA-O1A
7	A	5104	ATP	C5'-O5'-PA-O3A

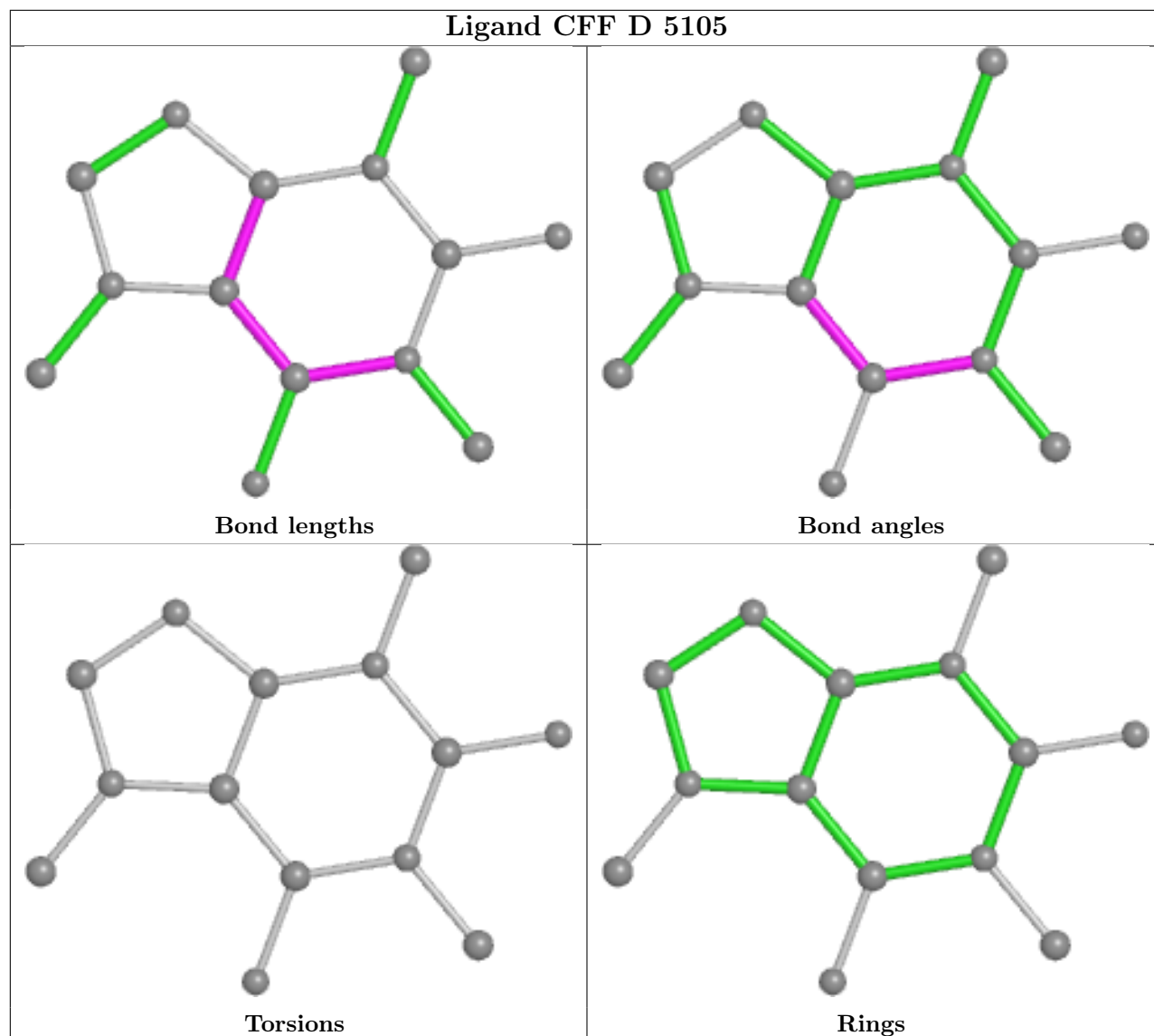
There are no ring outliers.

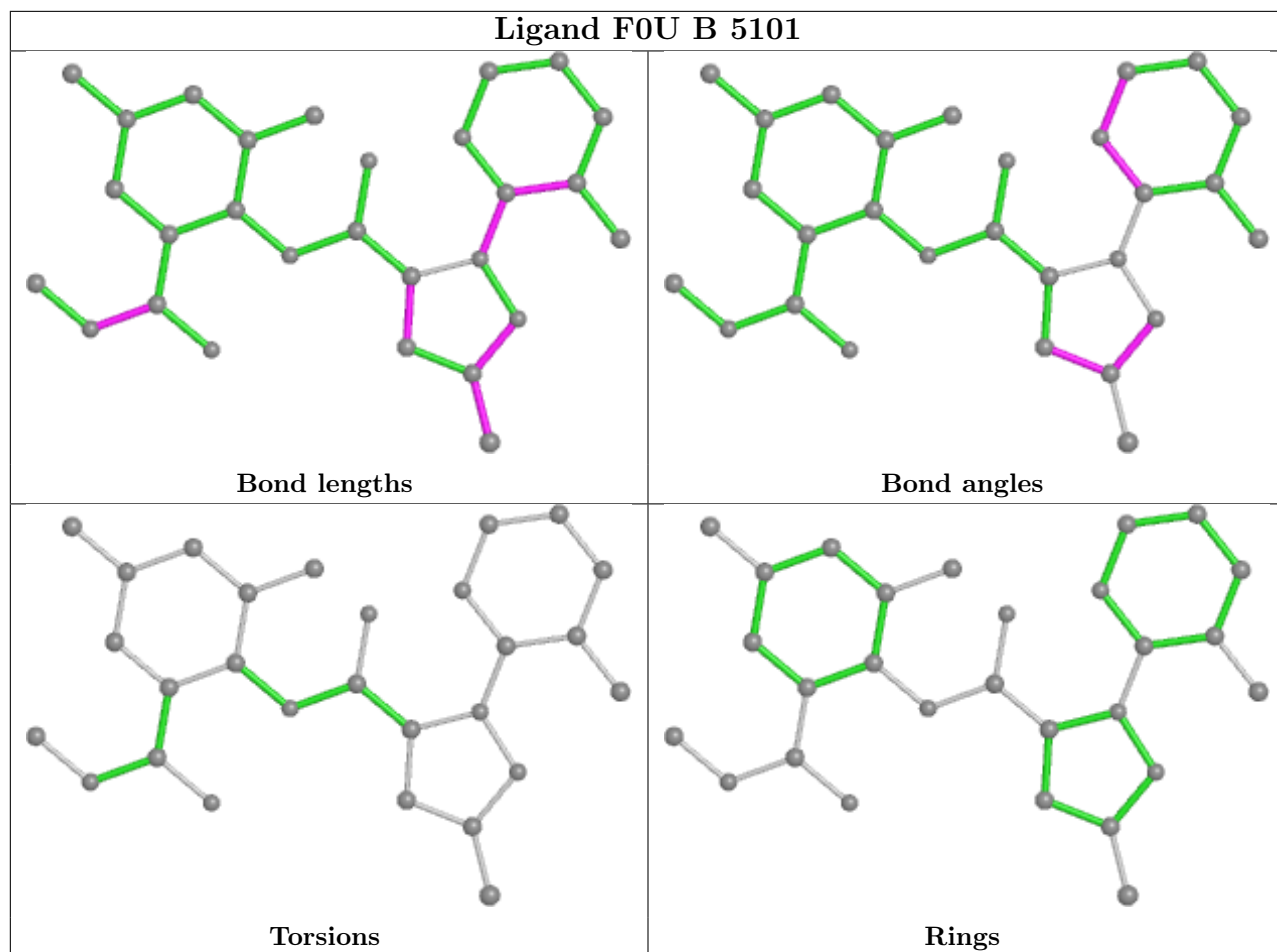
7 monomers are involved in 20 short contacts:

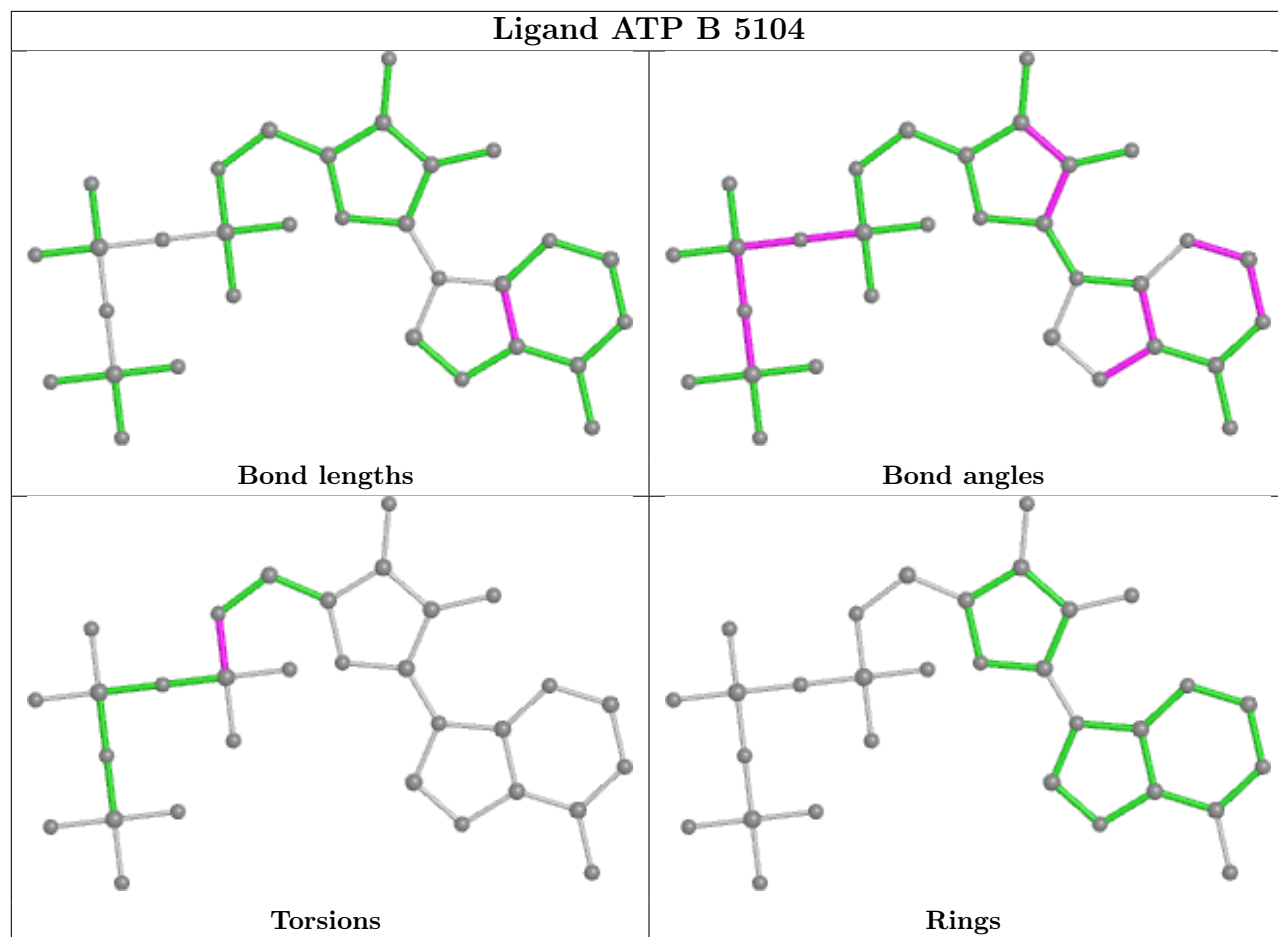
Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	B	5104	ATP	3	0
7	D	5104	ATP	2	0
8	A	5105	CFE	2	0
7	C	5104	ATP	4	0
8	B	5105	CFE	4	0
7	A	5104	ATP	3	0
4	C	5101	F0U	2	0

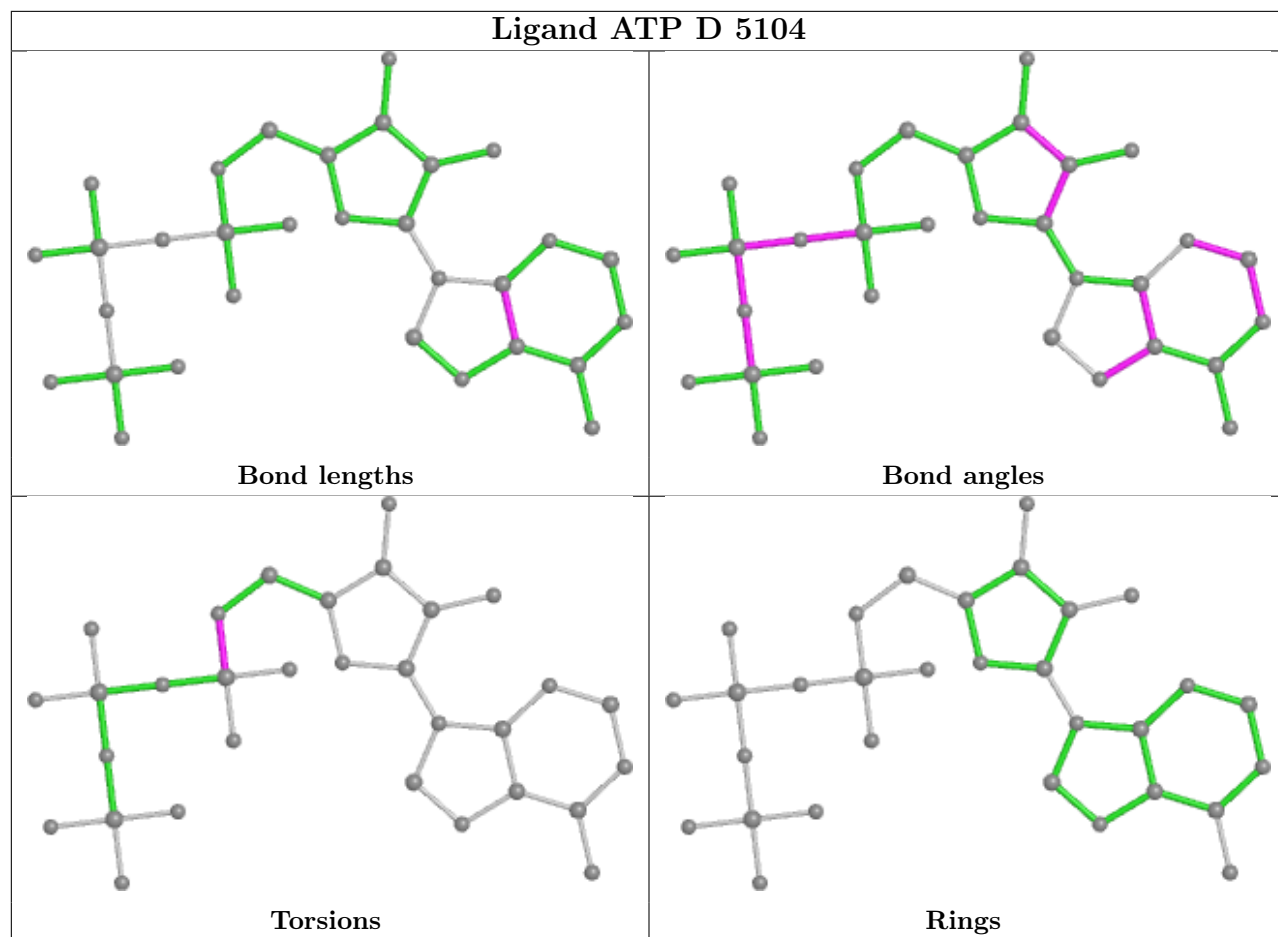
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

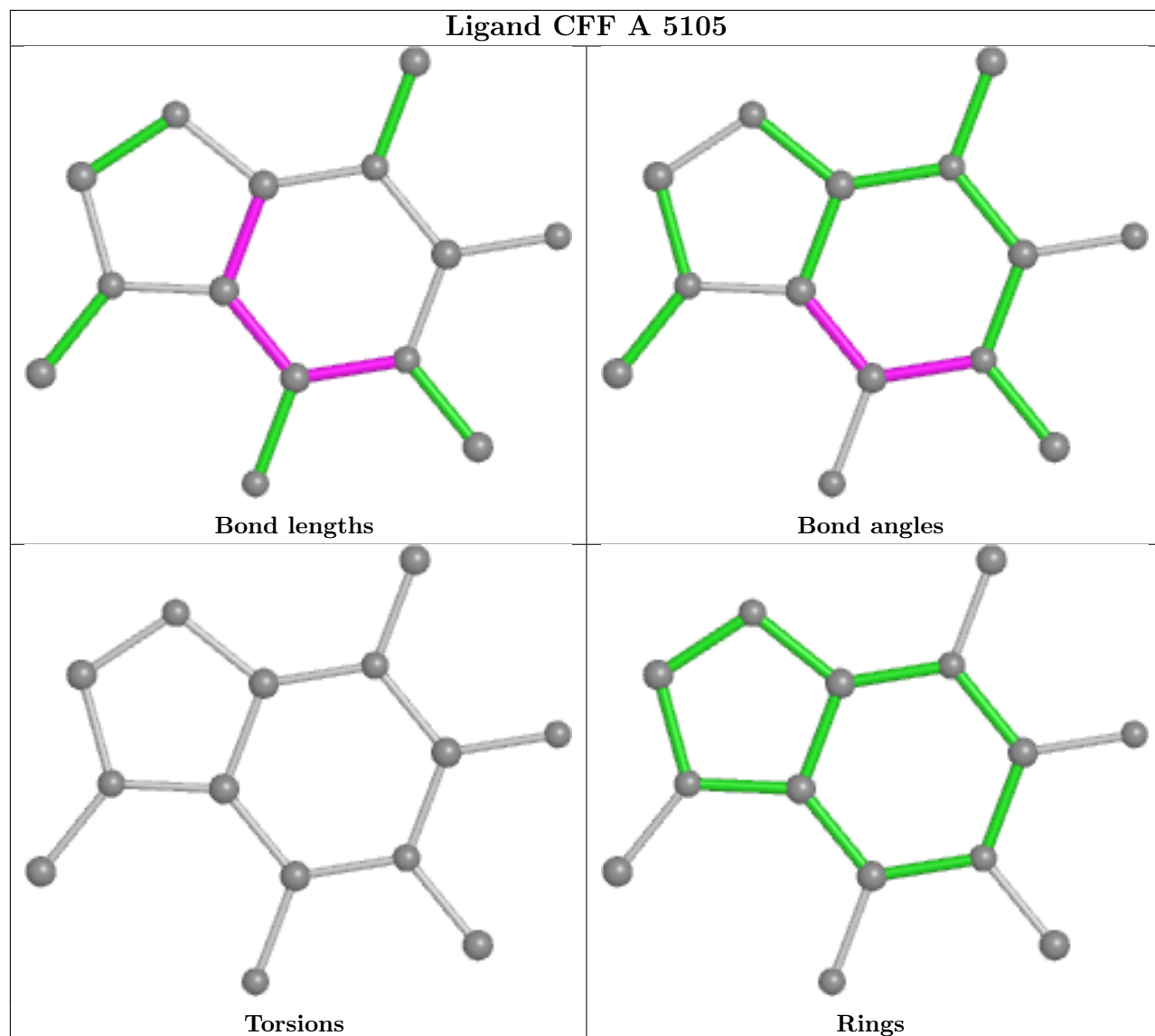




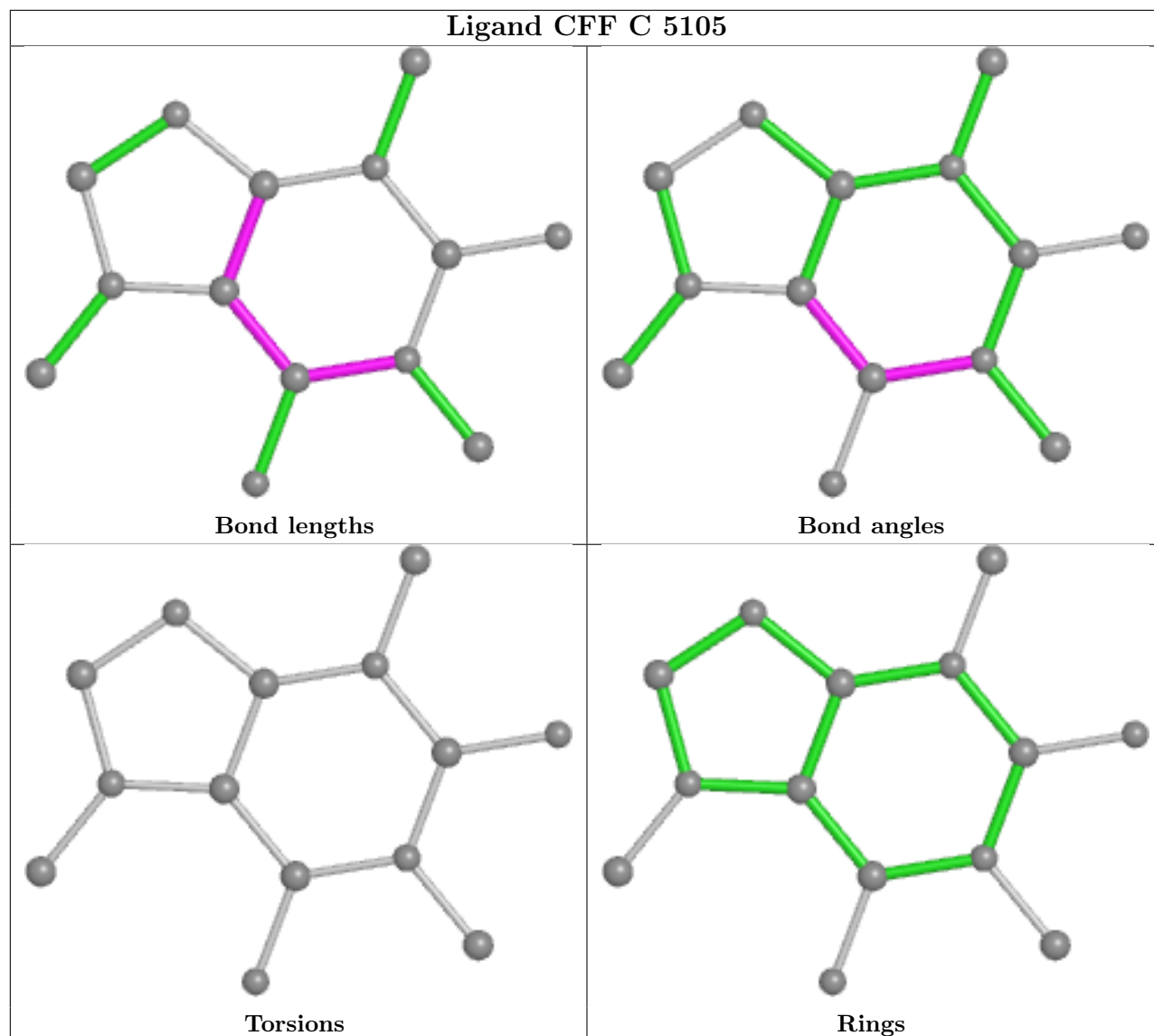


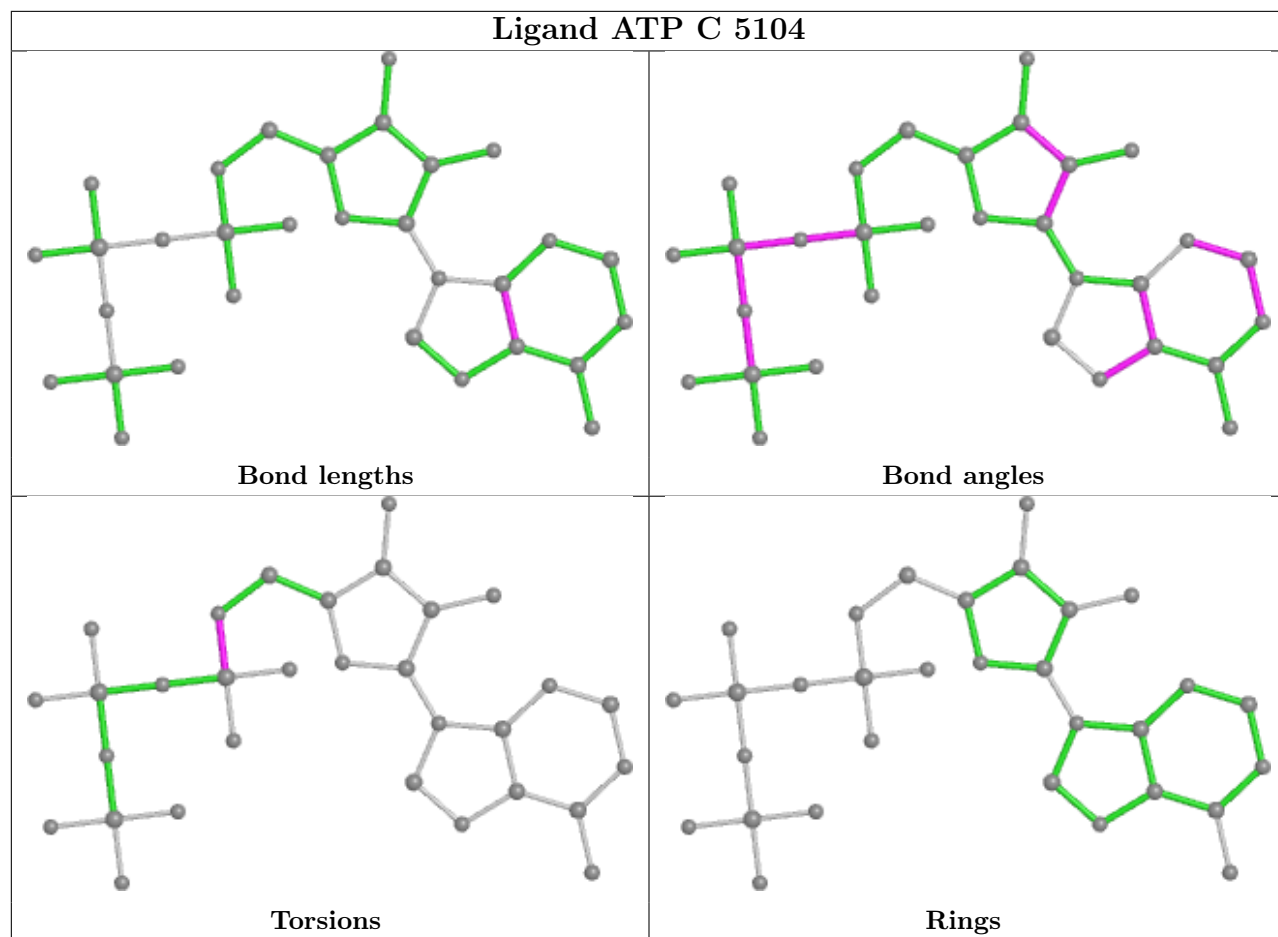


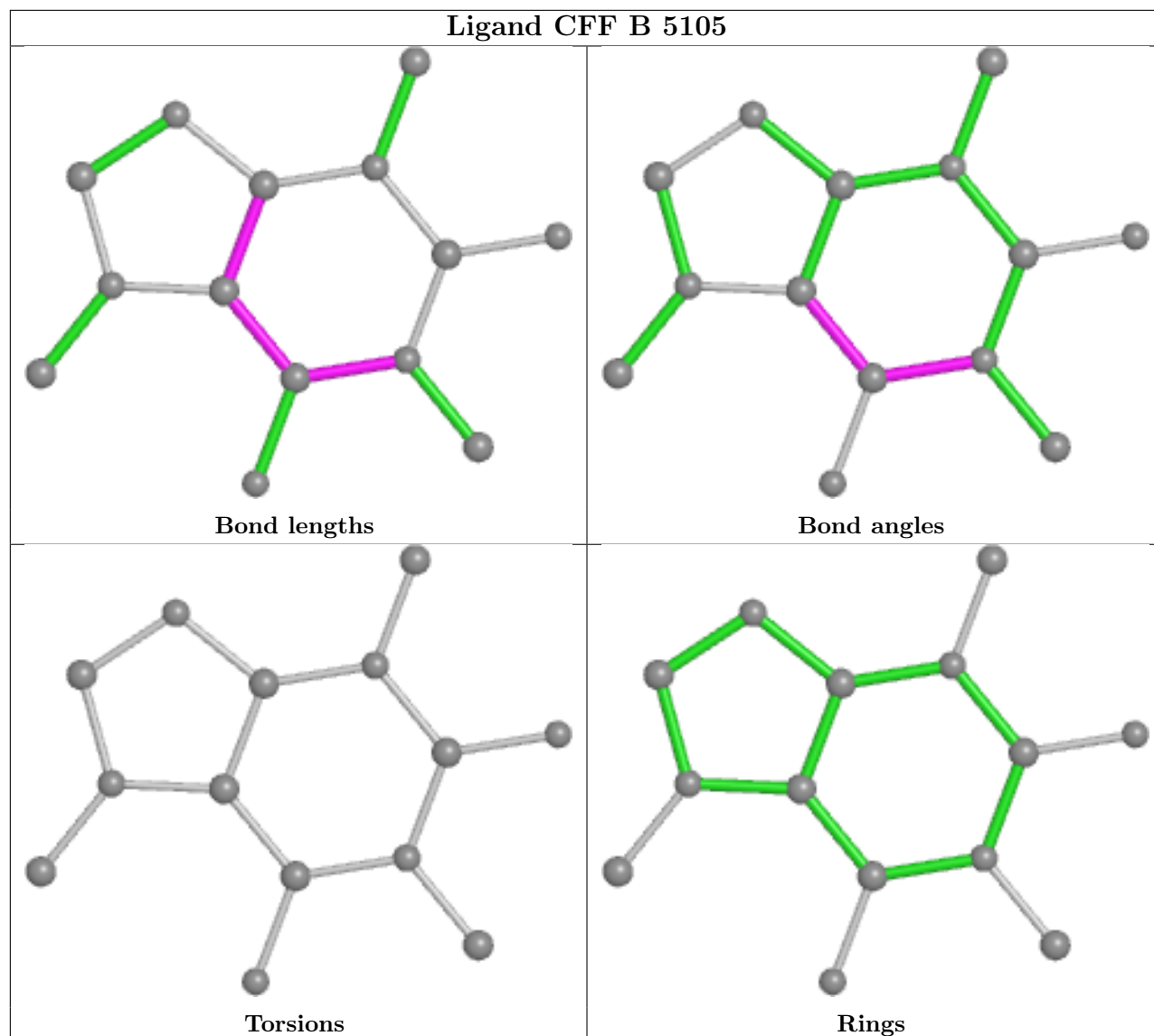


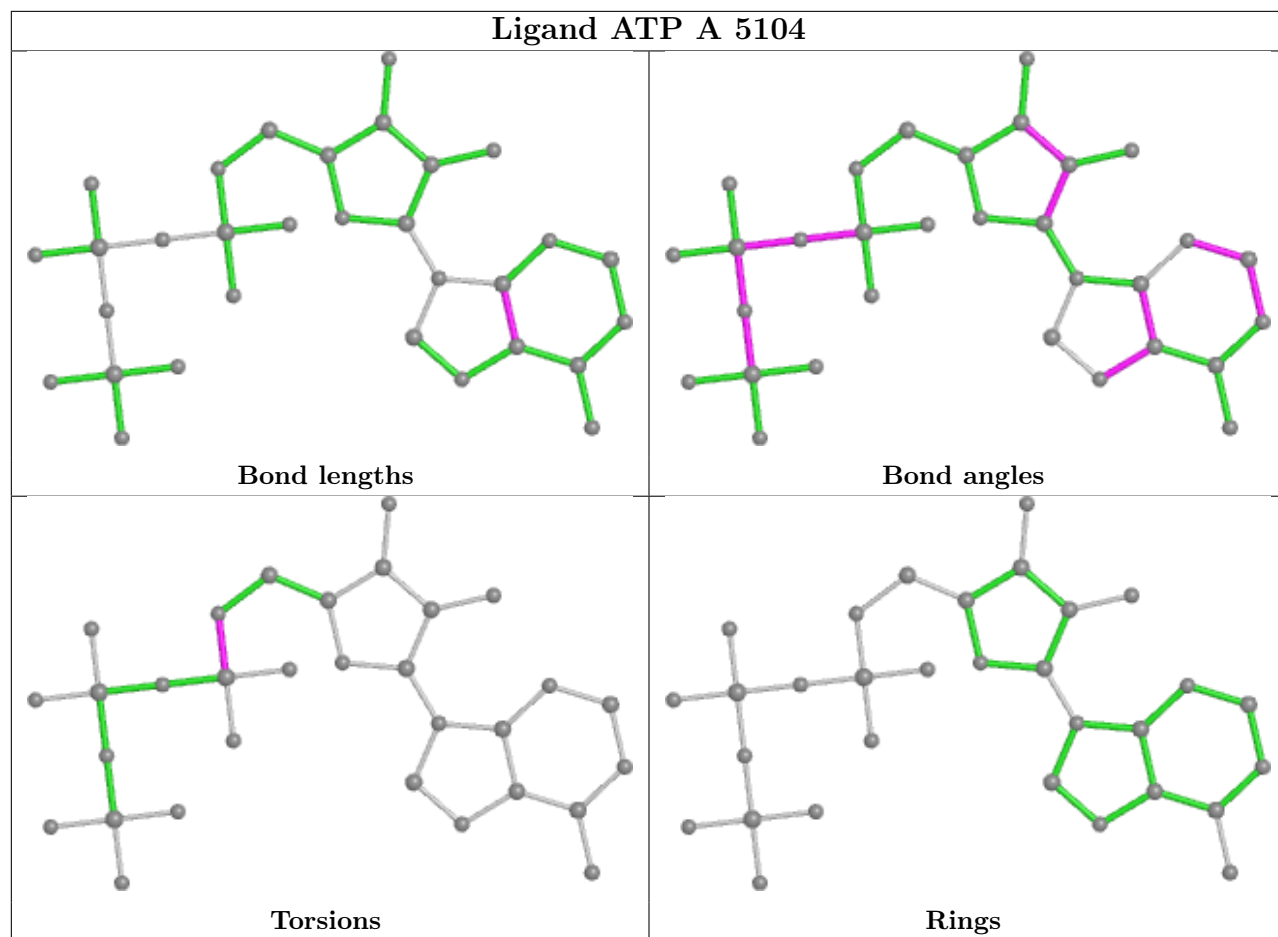


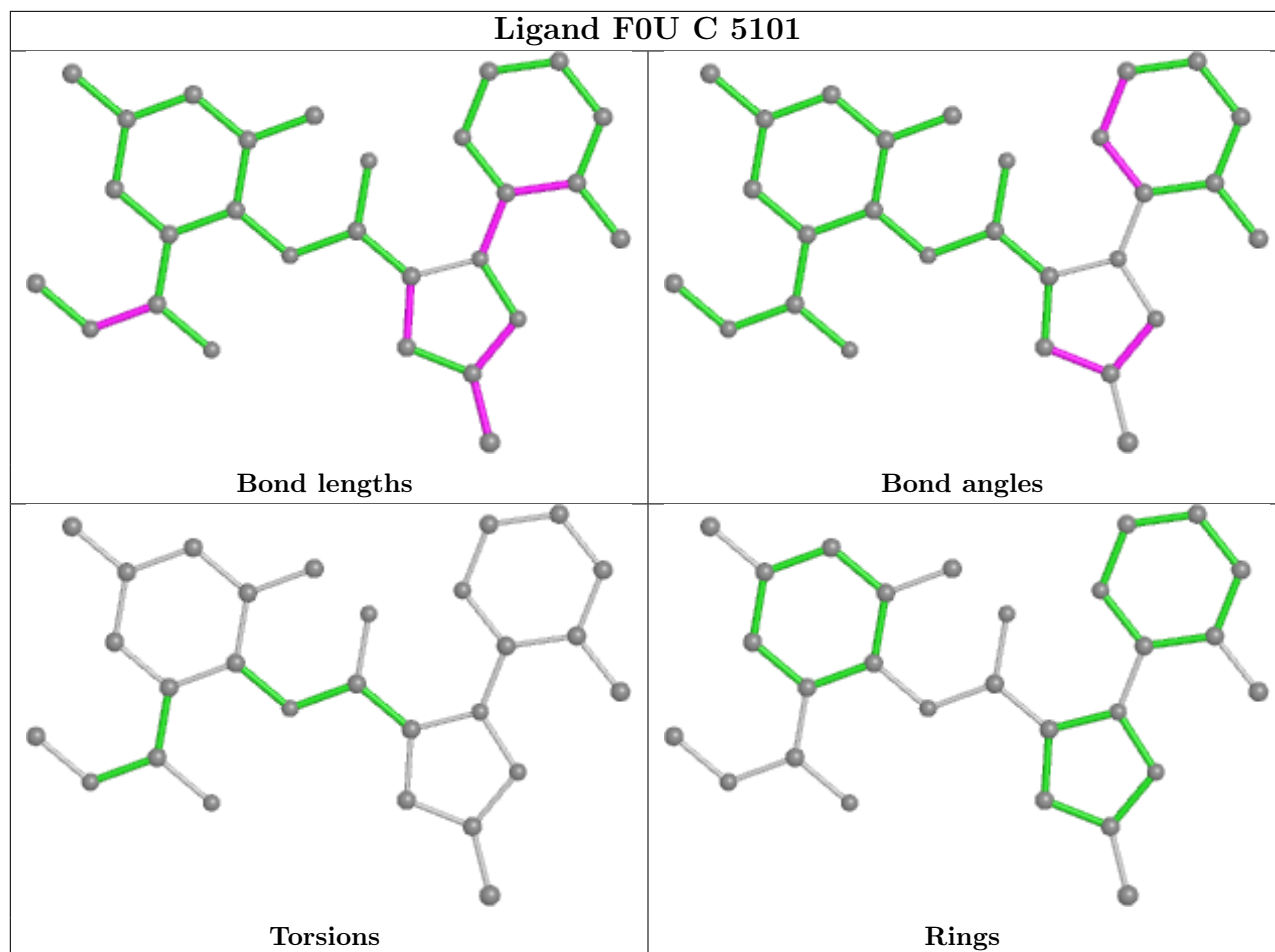


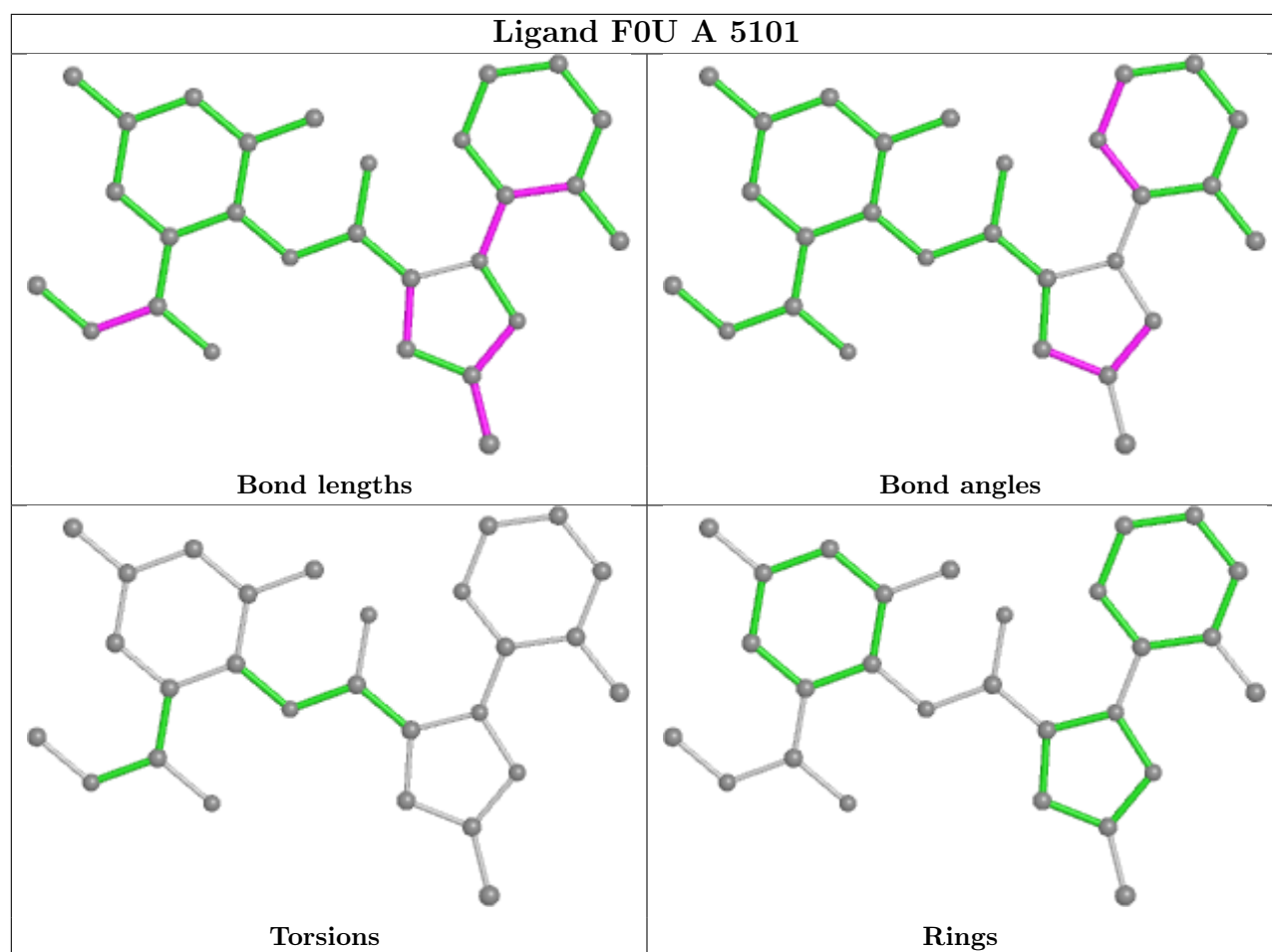












## 5.7 Other polymers [i](#)

There are no such residues in this entry.

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

There are no chain breaks in this entry.

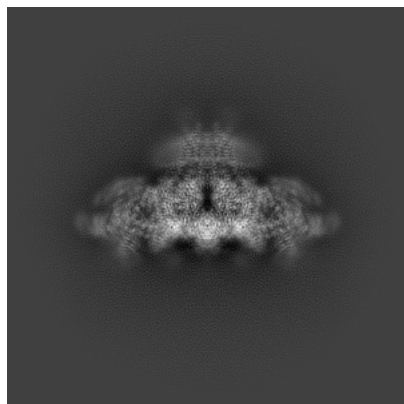
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-38908. These allow visual inspection of the internal detail of the map and identification of artifacts.

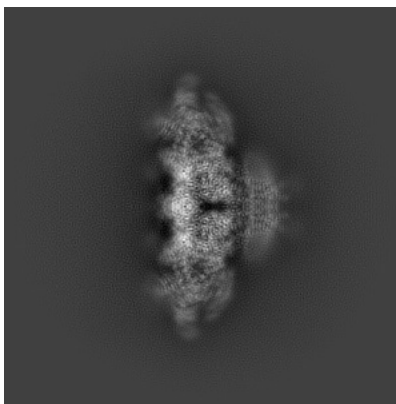
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

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

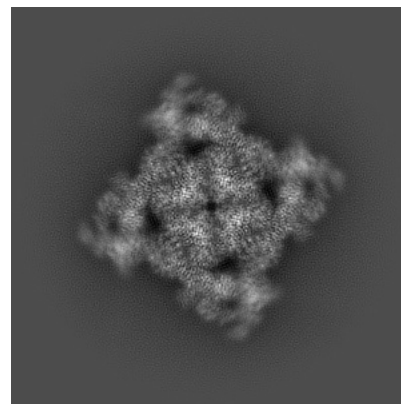
#### 6.1.1 Primary map



X

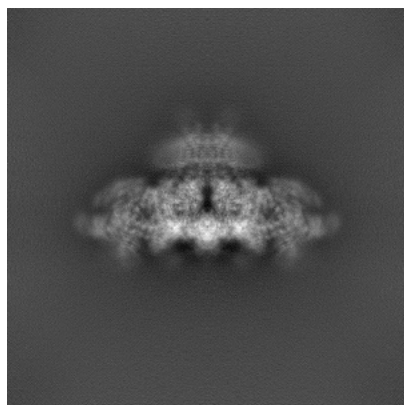


Y

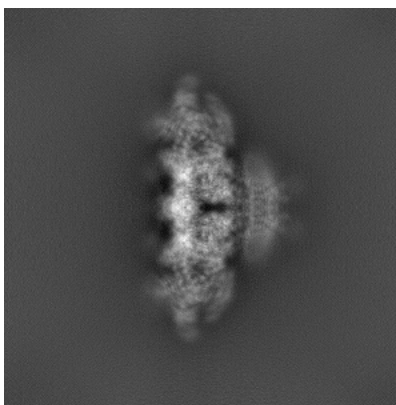


Z

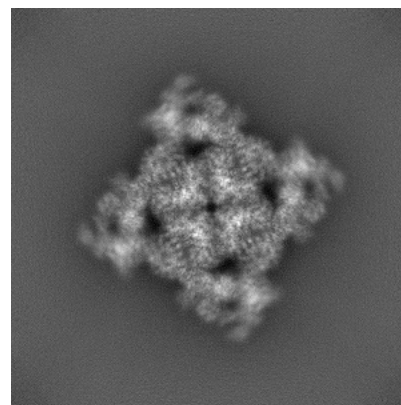
#### 6.1.2 Raw map



X



Y

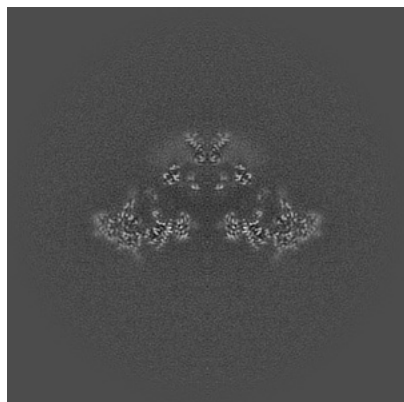


Z

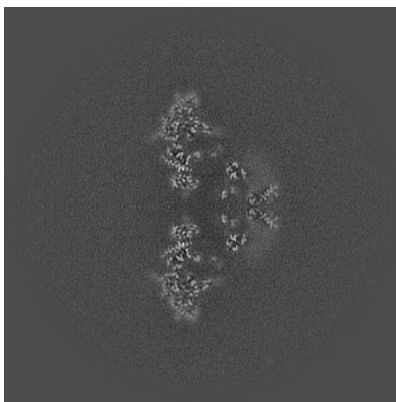
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

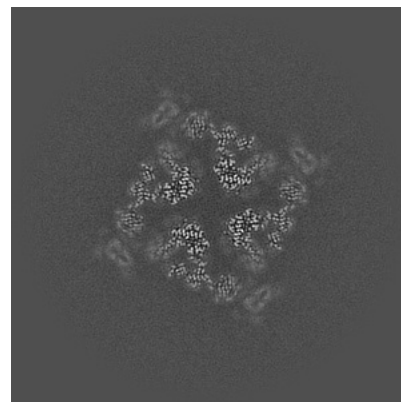
### 6.2.1 Primary map



X Index: 256

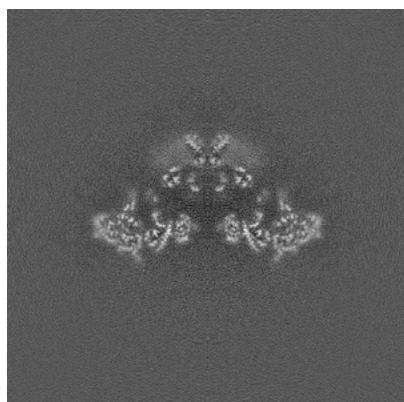


Y Index: 256

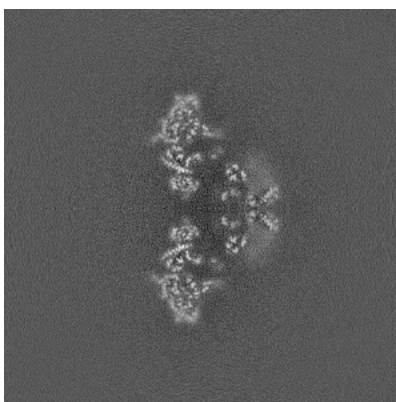


Z Index: 256

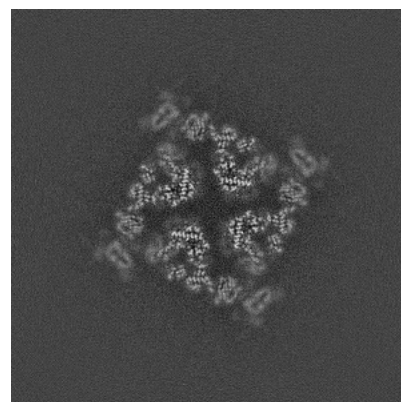
### 6.2.2 Raw map



X Index: 256



Y Index: 256



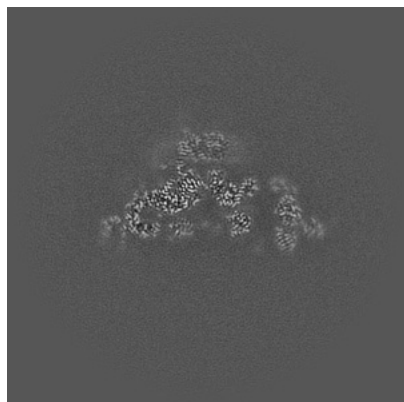
Z Index: 256

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

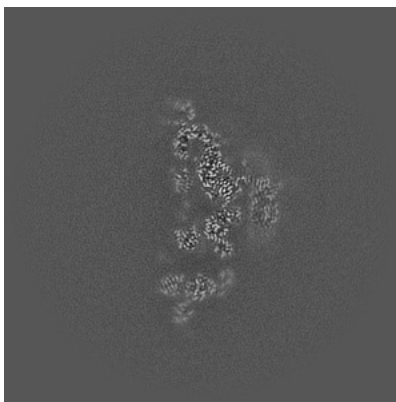


## 6.3 Largest variance slices [i](#)

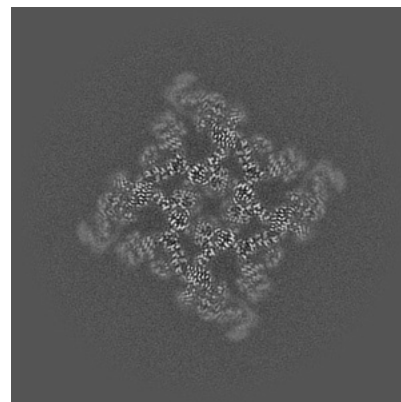
### 6.3.1 Primary map



X Index: 239

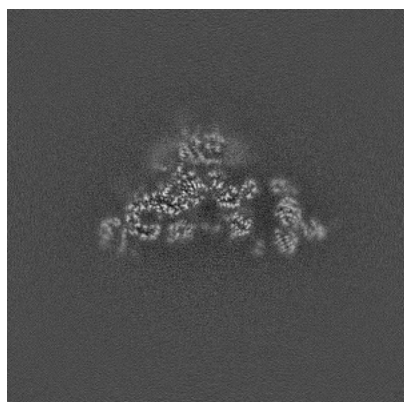


Y Index: 239

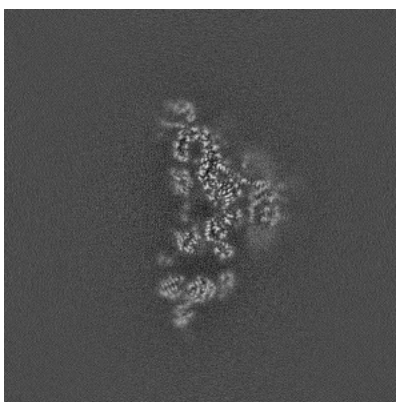


Z Index: 234

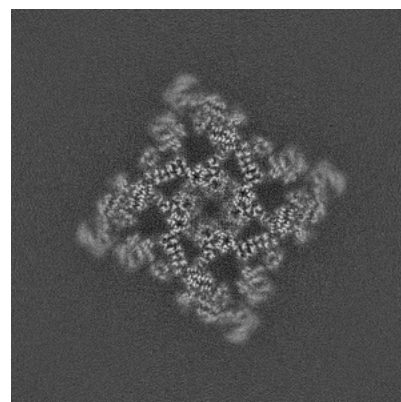
### 6.3.2 Raw map



X Index: 240



Y Index: 240

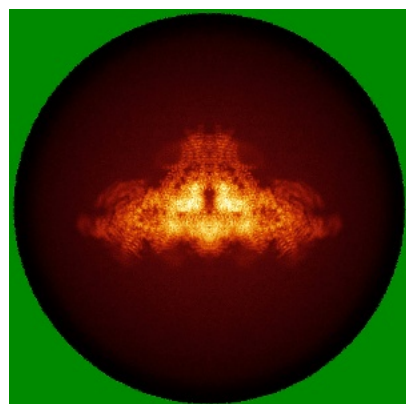


Z Index: 235

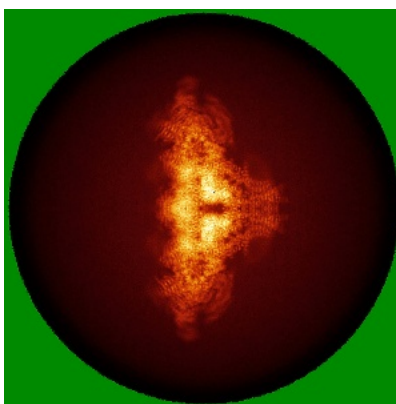
The images above show the largest variance slices of the map in three orthogonal directions.

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

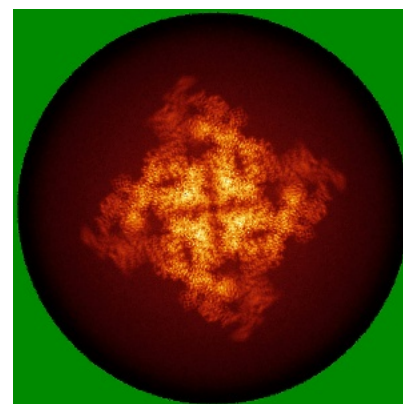
### 6.4.1 Primary map



X

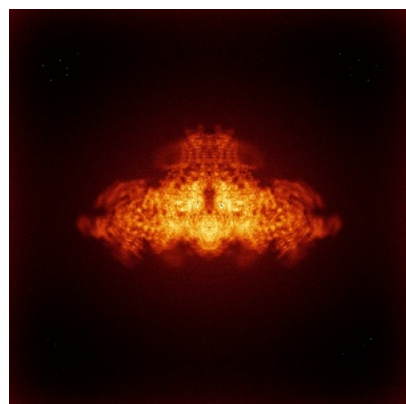


Y

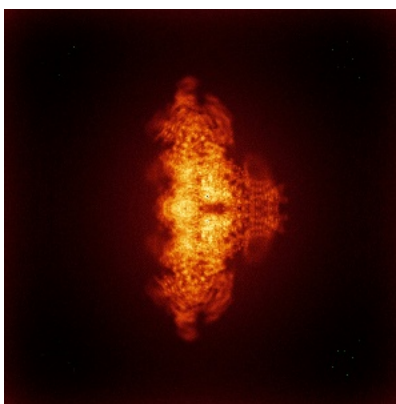


Z

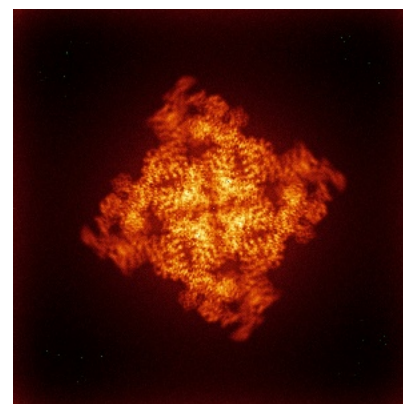
### 6.4.2 Raw map



X



Y

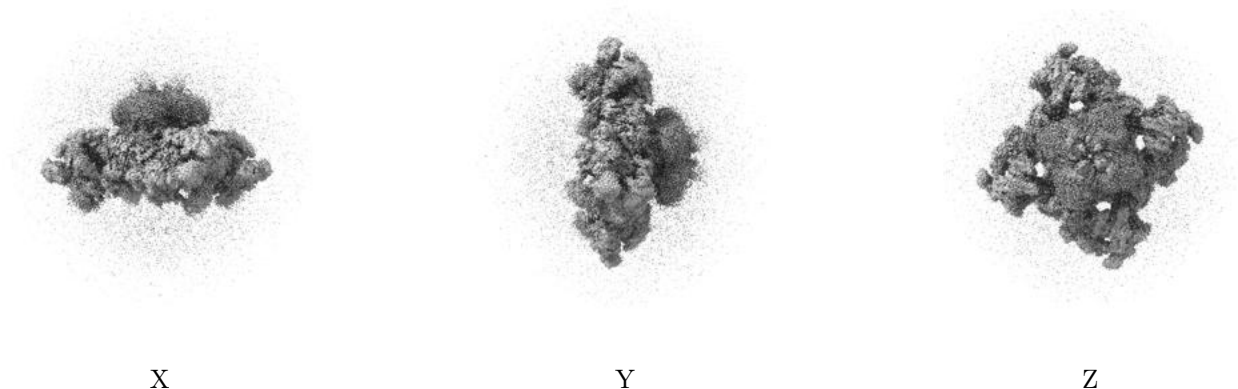


Z

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

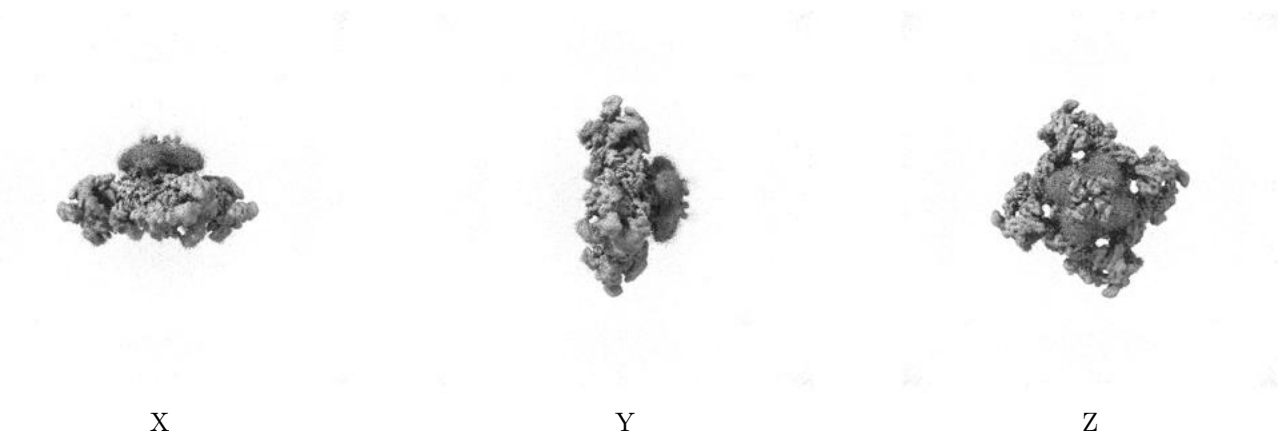
## 6.5 Orthogonal surface views [i](#)

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.03. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.5.2 Raw map



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

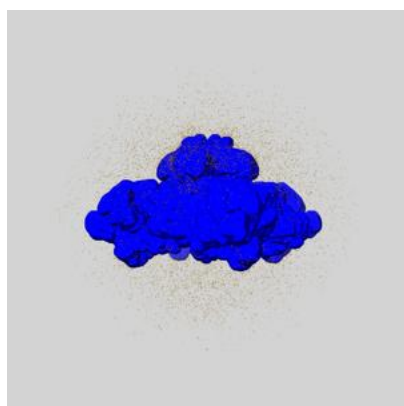
## 6.6 Mask visualisation [i](#)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

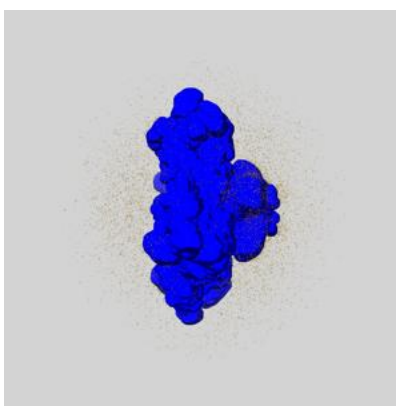
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

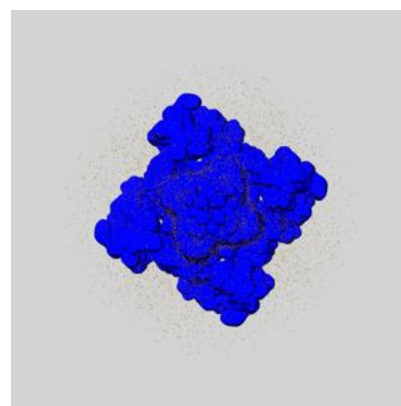
### 6.6.1 emd\_38908\_msk\_1.map [i](#)



X



Y

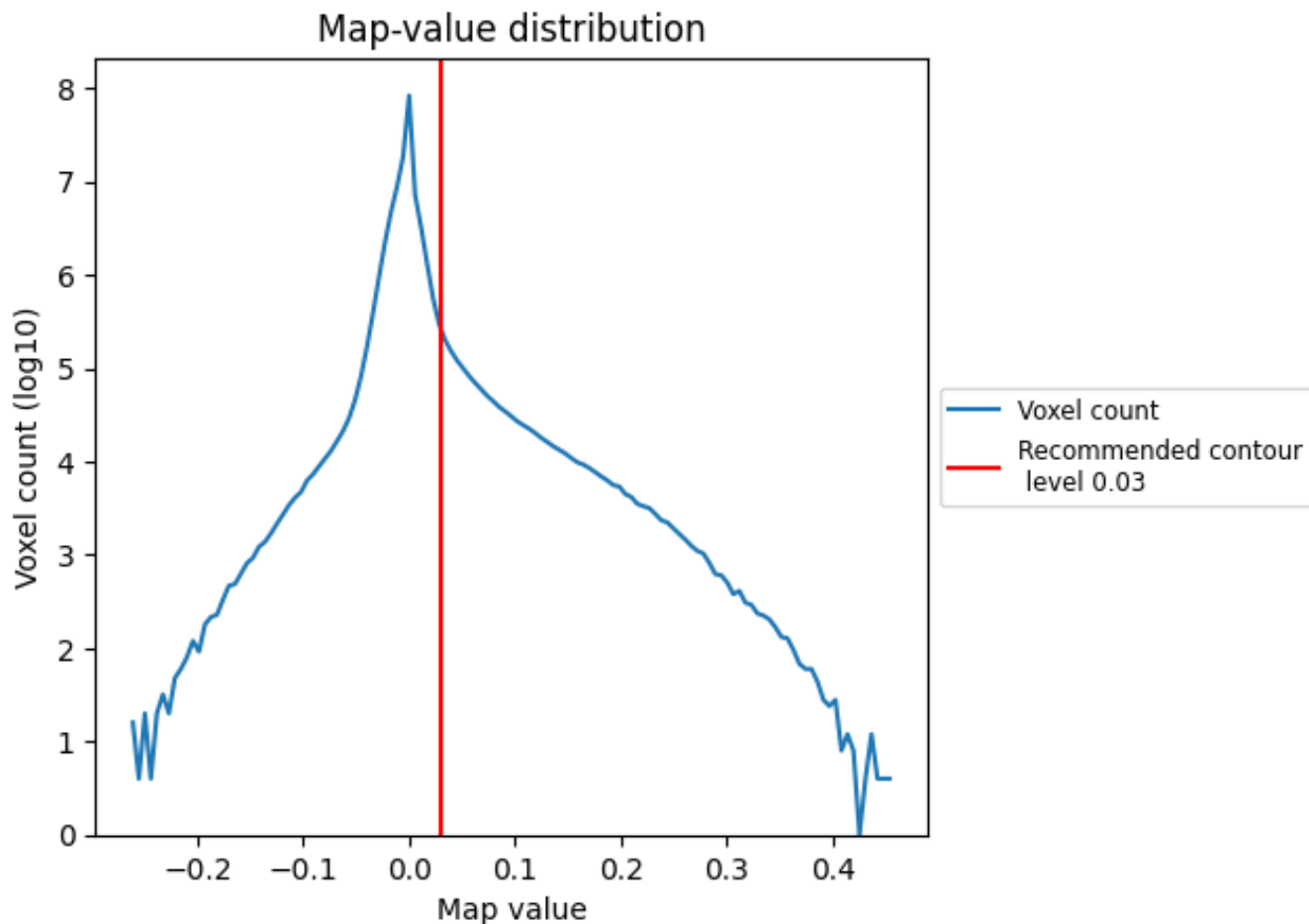


Z

## 7 Map analysis [i](#)

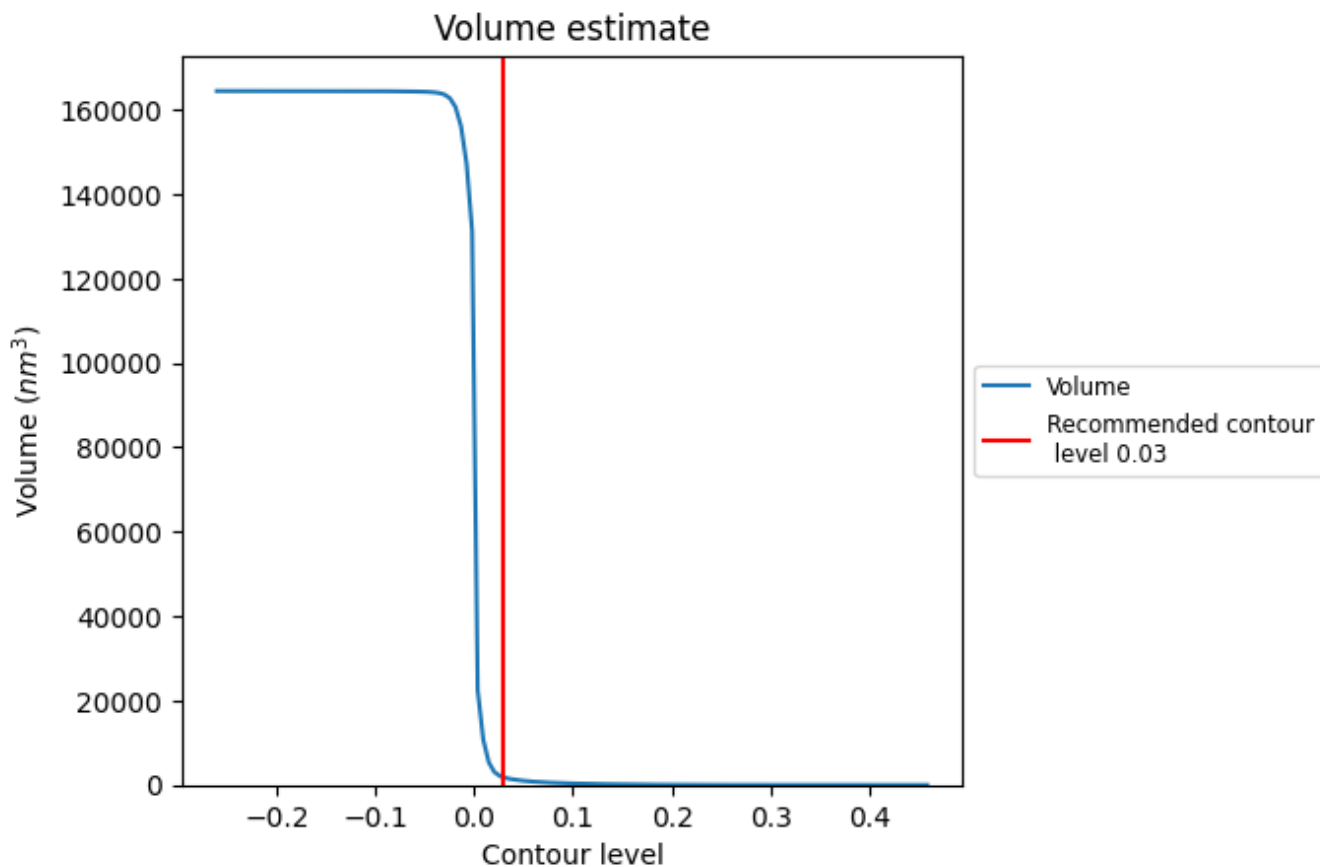
This section contains the results of statistical analysis of the map.

### 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.

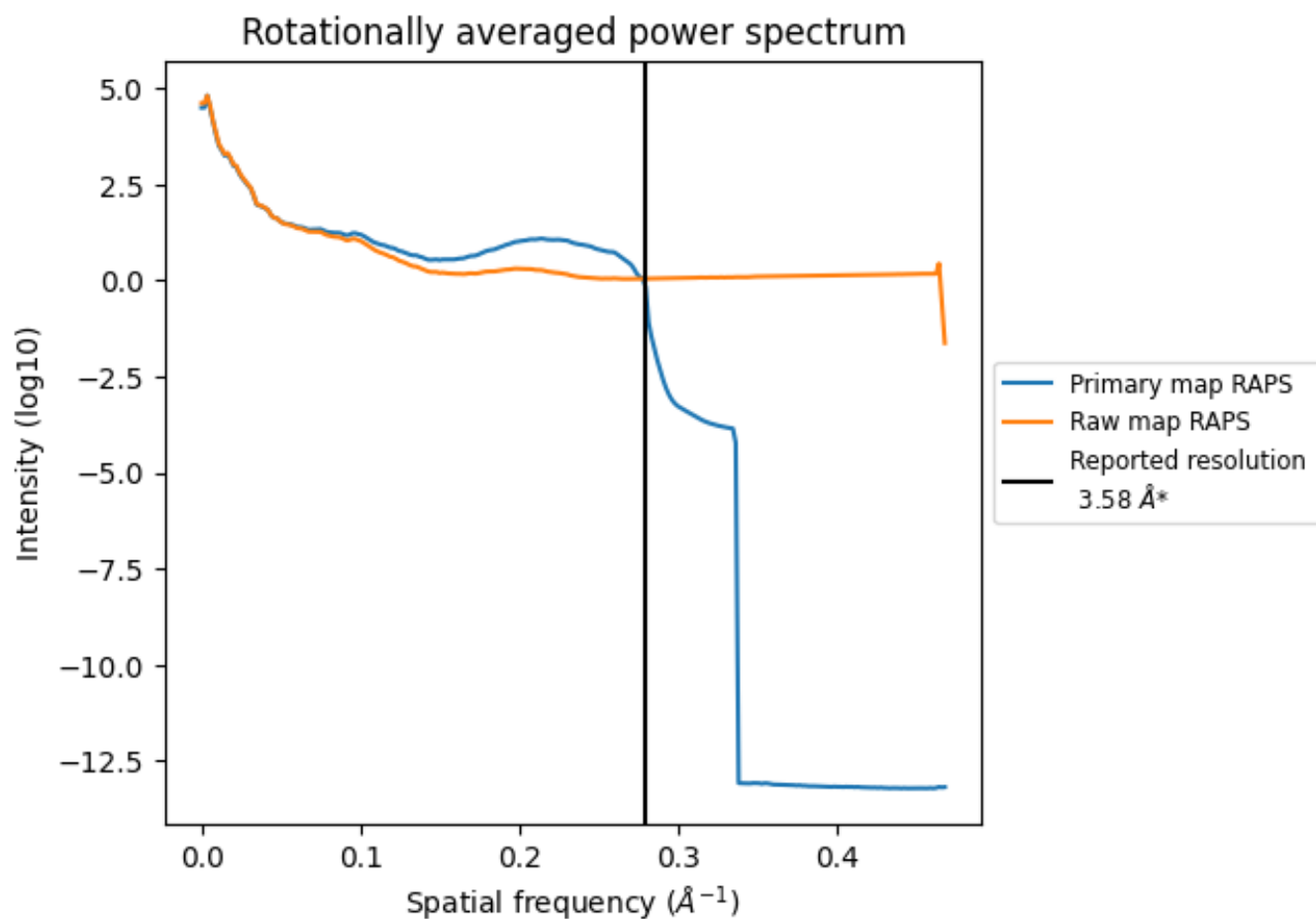
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 1805  $\text{nm}^3$ ; this corresponds to an approximate mass of 1630 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](#)

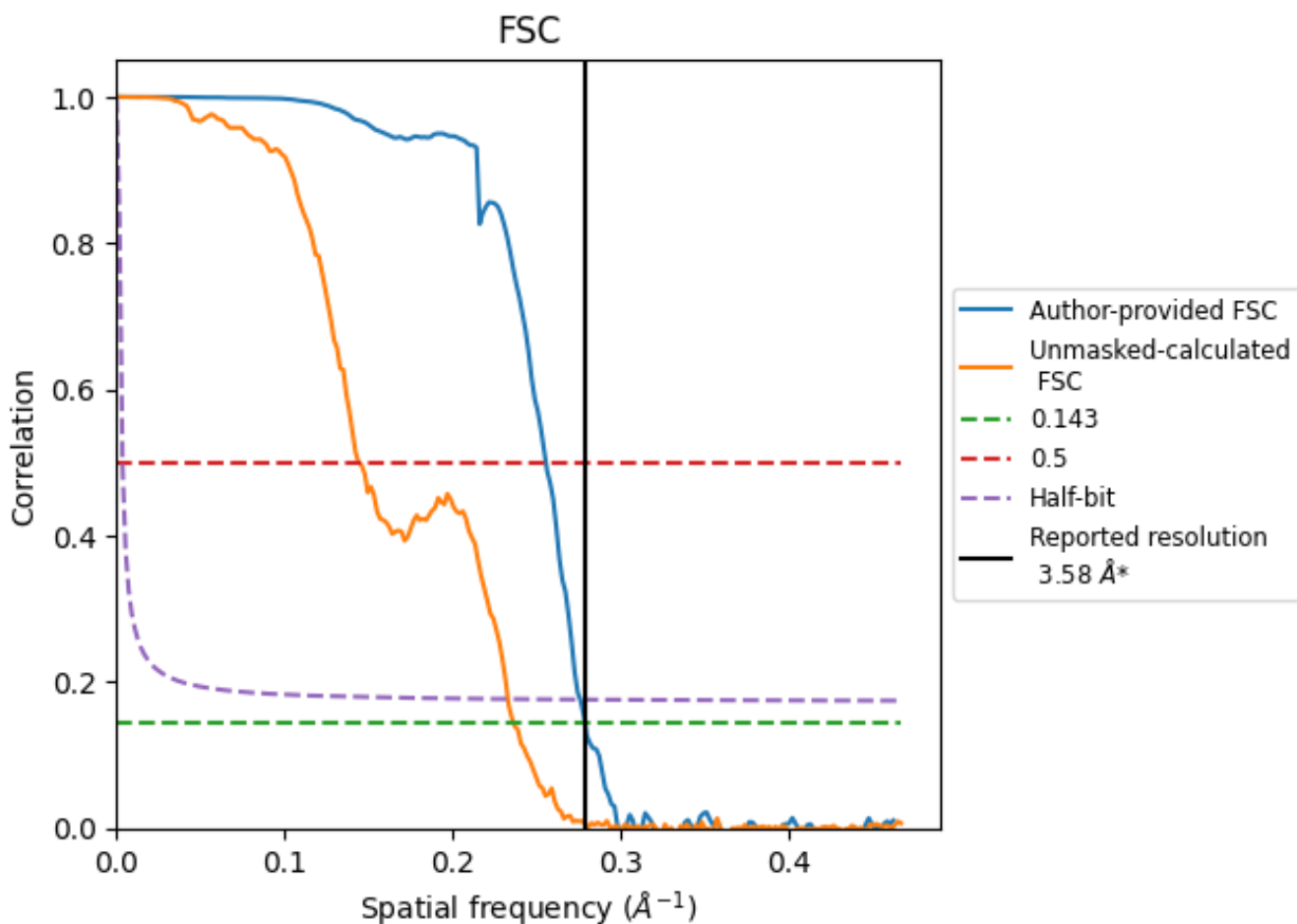


\*Reported resolution corresponds to spatial frequency of 0.279 Å<sup>-1</sup>

## 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 0.279 Å<sup>-1</sup>



## 8.2 Resolution estimates [i](#)

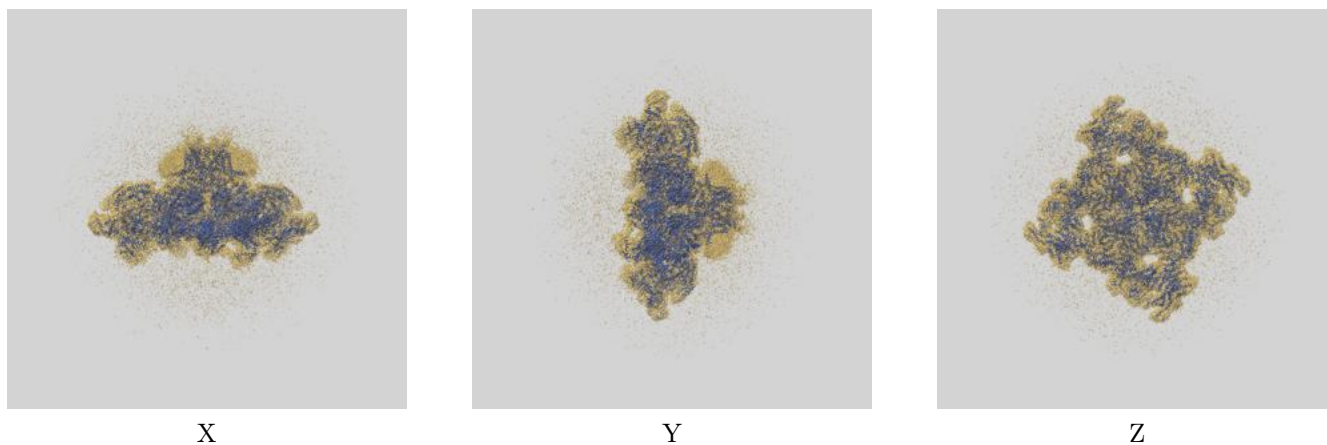
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.58	-	-
Author-provided FSC curve	3.58	3.91	3.62
Unmasked-calculated*	4.23	6.93	4.29

\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 4.23 differs from the reported value 3.58 by more than 10 %

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

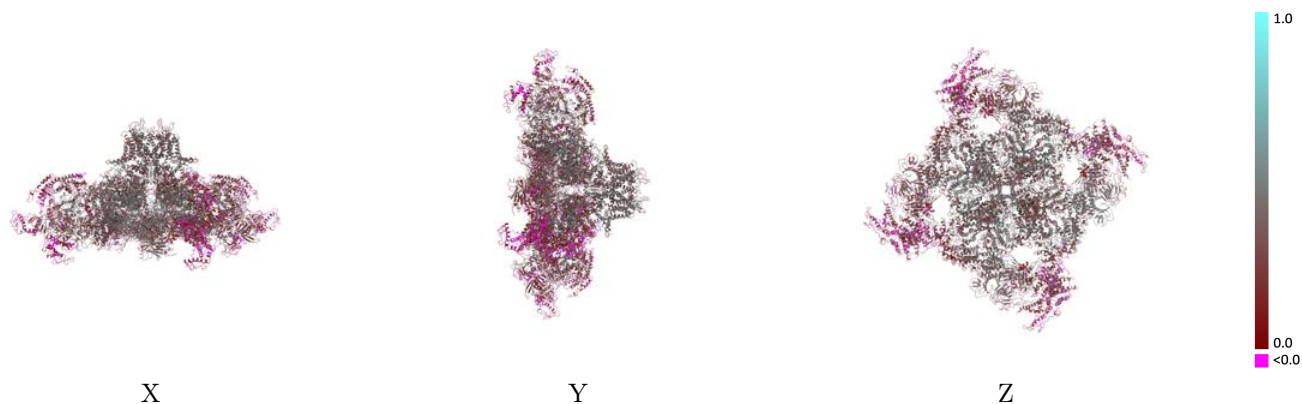
This section contains information regarding the fit between EMDB map EMD-38908 and PDB model 8Y40. Per-residue inclusion information can be found in section [3](#) on page [9](#).

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



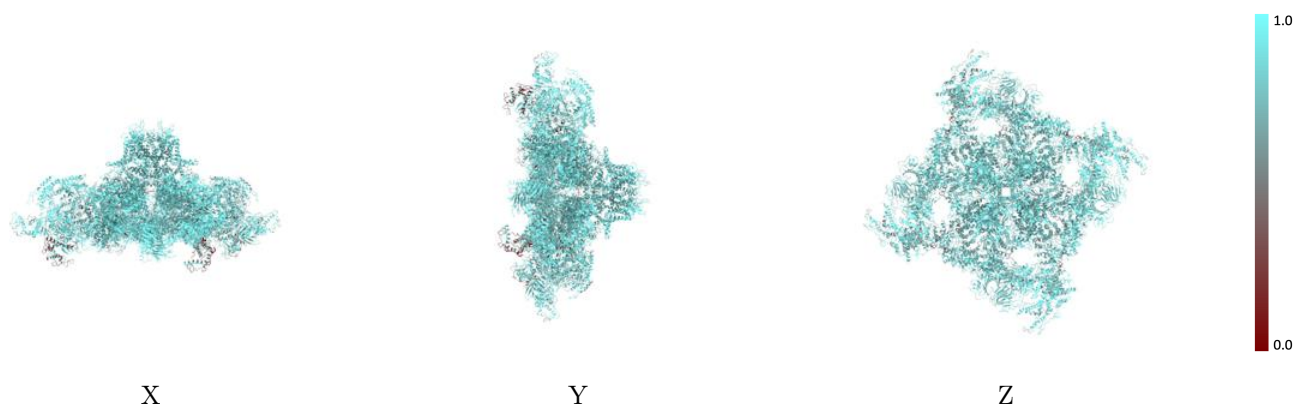
The images above show the 3D surface view of the map at the recommended contour level 0.03 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



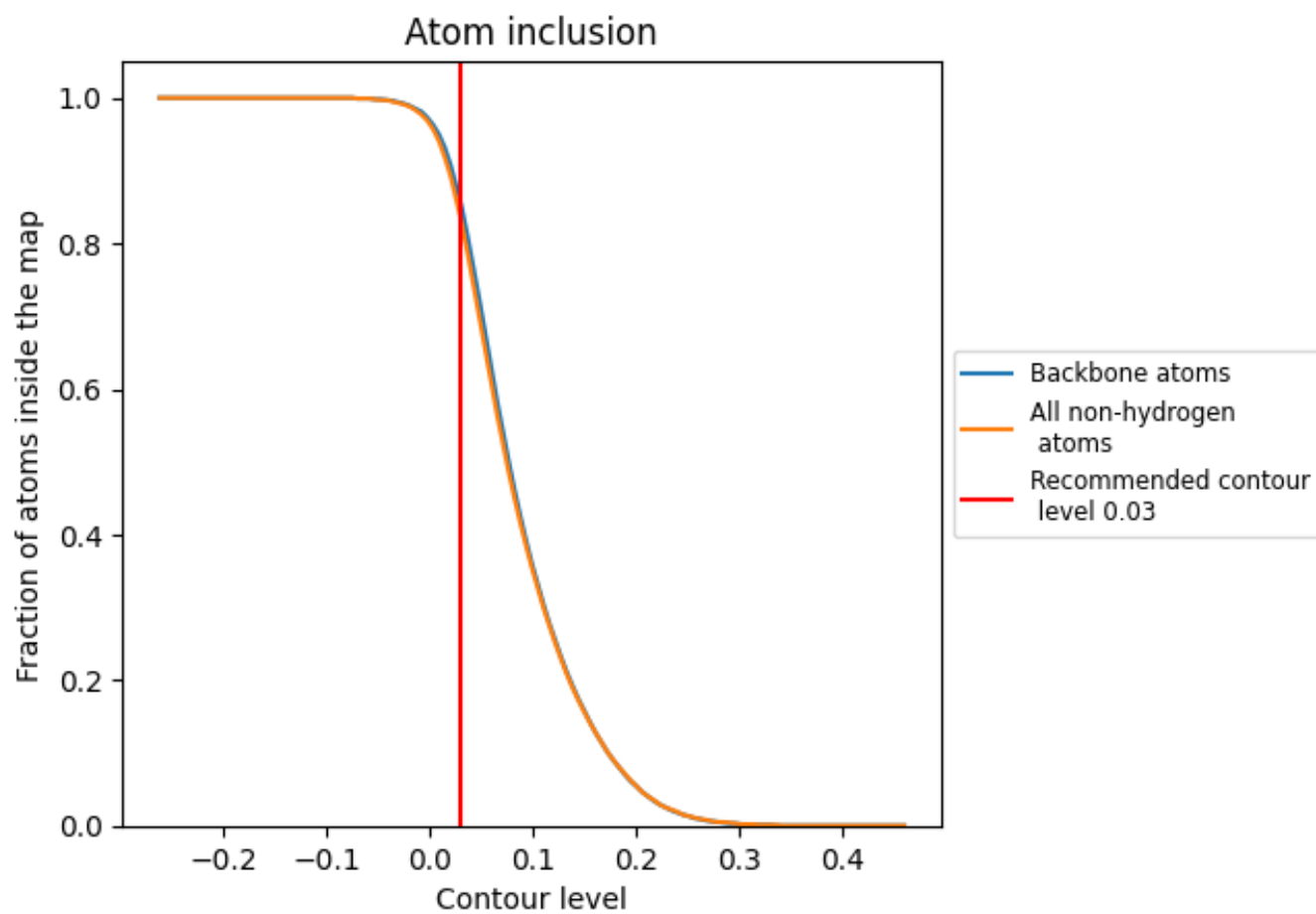
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.03).



























## 9.4 Atom inclusion [i](#)



At the recommended contour level, 86% of all backbone atoms, 84% of all non-hydrogen atoms, are inside the map.

## 9.5 Map-model fit summary [i](#)

The table lists the average atom inclusion at the recommended contour level (0.03) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8360	 0.3060
A	 0.8410	 0.3060
B	 0.8390	 0.3020
C	 0.8420	 0.3140
D	 0.8400	 0.3120
E	 0.8270	 0.2460
F	 0.8610	 0.3230
G	 0.9170	 0.4220
H	 0.8590	 0.3010
I	 0.7300	 0.1900
J	 0.7150	 0.1800
K	 0.7770	 0.2500
L	 0.7780	 0.2510

