



## wwPDB EM Validation Summary Report ⓘ

Nov 5, 2024 – 01:25 AM EST

PDB ID : 9E18  
EMDB ID : EMD-47385  
Title : Structure of RyR1 in the primed state in the presence of pentoxifylline  
Authors : Miotto, M.C.; Marks, A.R.  
Deposited on : 2024-10-21  
Resolution : 2.68 Å (reported)  
Based on initial model : 7TZC

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

We welcome your comments at [validation@mail.wwpdb.org](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 : 2022.3.0, CSD as543be (2022)  
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

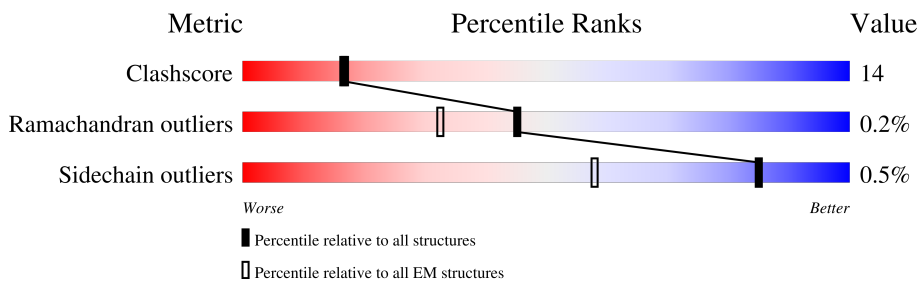
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 2.68 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	5037	
1	B	5037	
1	C	5037	
1	D	5037	
2	E	108	
2	F	108	
2	G	108	
2	H	108	

## 2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 144144 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a protein called Ryanodine receptor 1.

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

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

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

- Molecule 3 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula:  $C_{10}H_{16}N_5O_{13}P_3$ ).



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

- Molecule 4 is CALCIUM ION (three-letter code: CA) (formula: Ca).

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

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

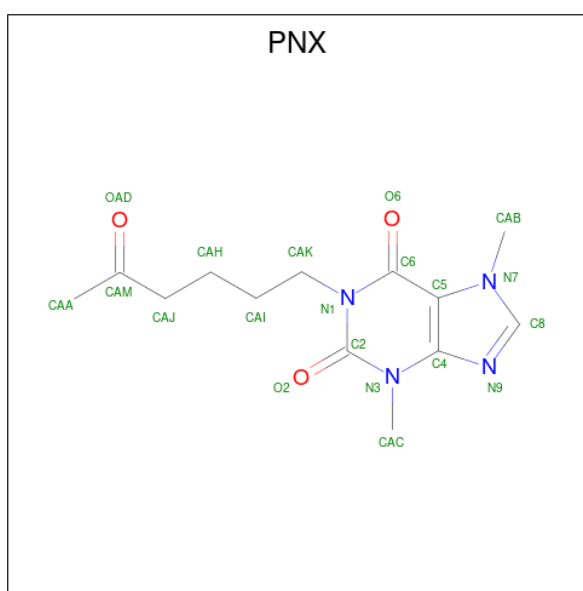
Mol	Chain	Residues	Atoms		AltConf
5	A	1	Total	Zn	0
			1	1	

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

- Molecule 6 is 3,7-DIMETHYL-1-(5-OXOHEXYL)-3,7-DIHYDRO-1H-PURINE-2,6-DIONE (three-letter code: PNX) (formula: C<sub>13</sub>H<sub>18</sub>N<sub>4</sub>O<sub>3</sub>) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				AltConf
6	A	1	Total	C	N	O	0
			20	13	4	3	
6	B	1	Total	C	N	O	0
			20	13	4	3	
6	D	1	Total	C	N	O	0
			20	13	4	3	
6	C	1	Total	C	N	O	0
			20	13	4	3	

- Molecule 7 is water.

Mol	Chain	Residues	Atoms		AltConf
7	A	2	Total	O	0
			2	2	

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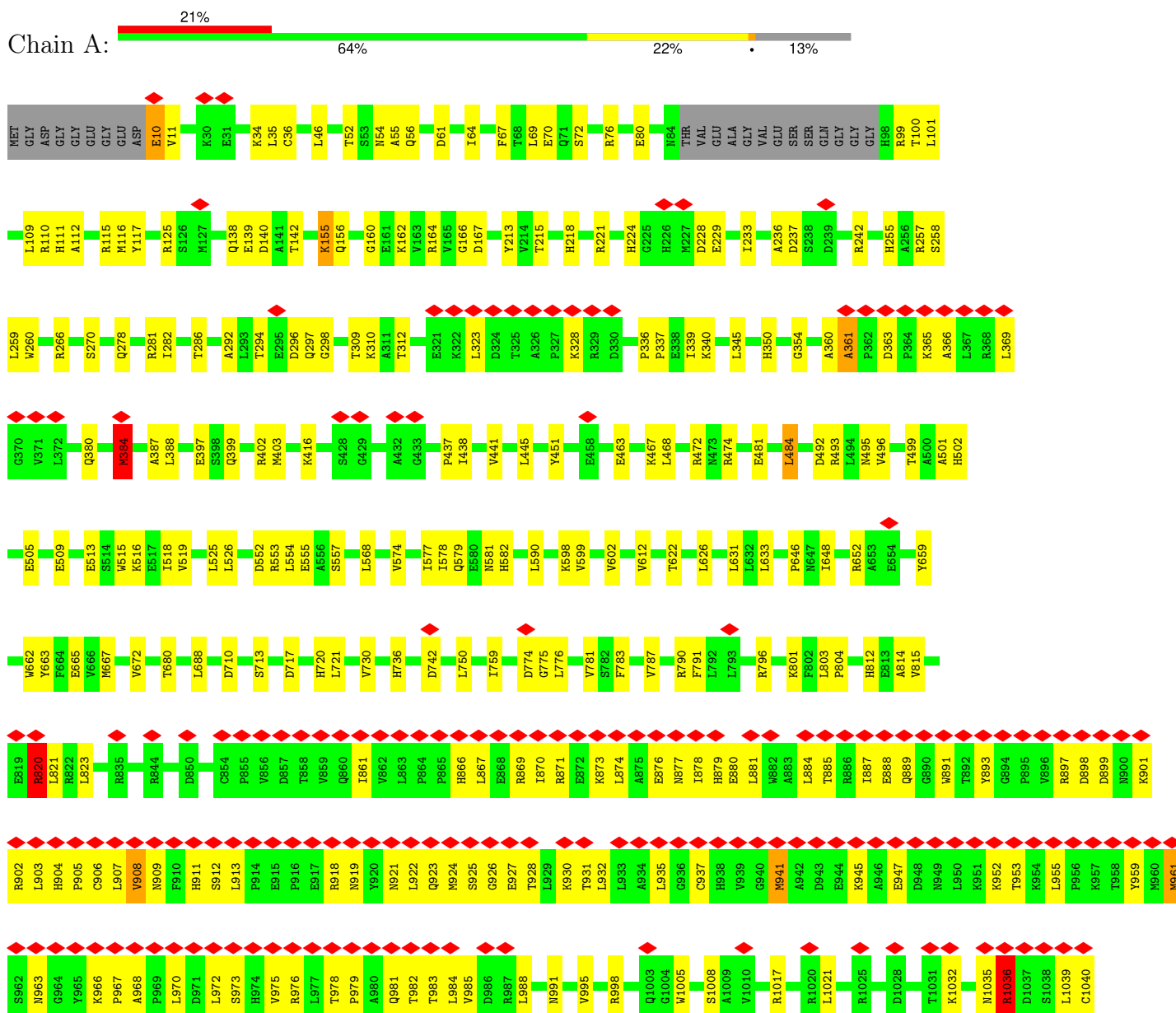
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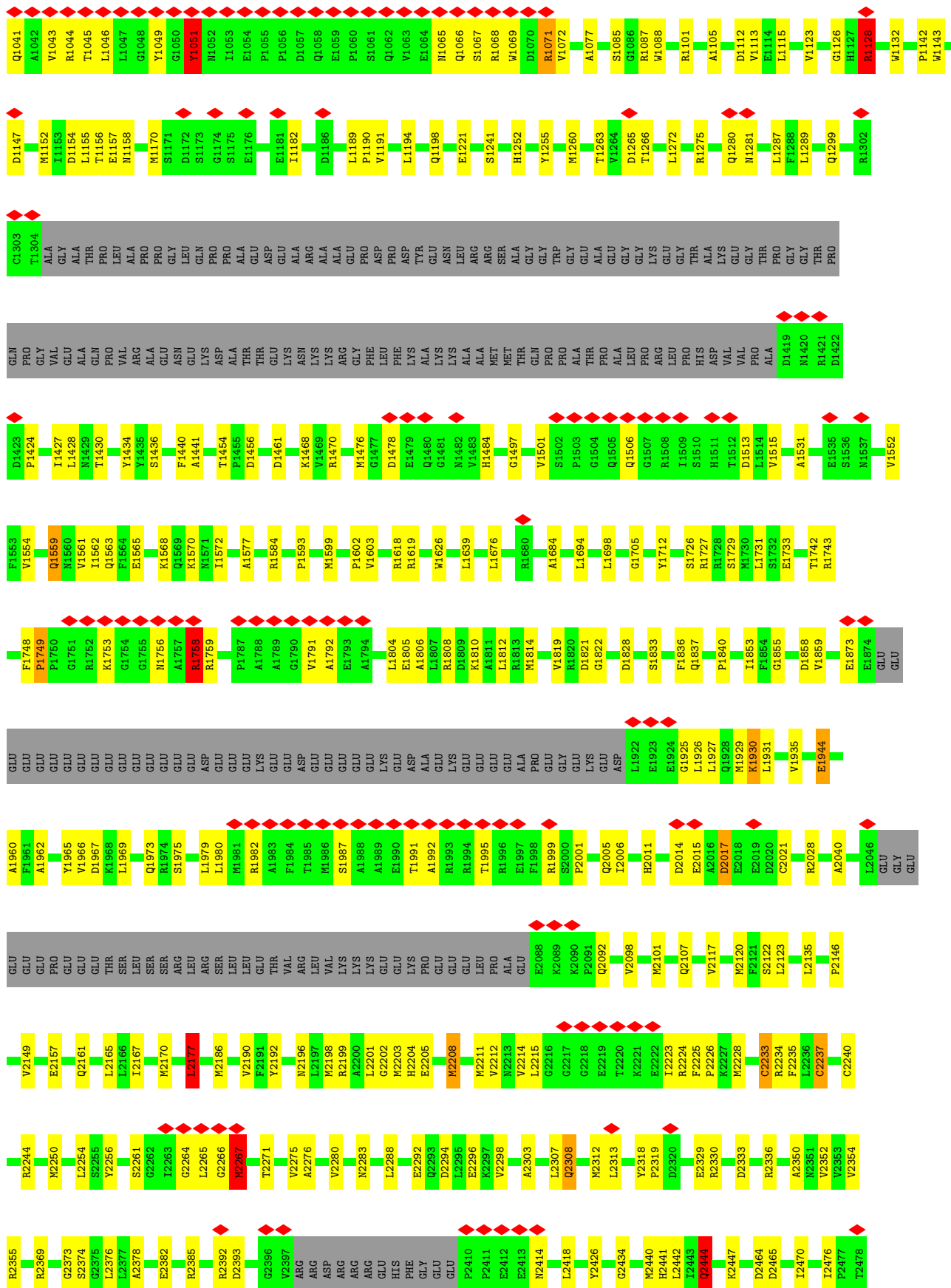
Mol	Chain	Residues	Atoms	AltConf
7	B	2	Total O 2 2	0
7	D	2	Total O 2 2	0
7	C	2	Total O 2 2	0

### 3 Residue-property plots

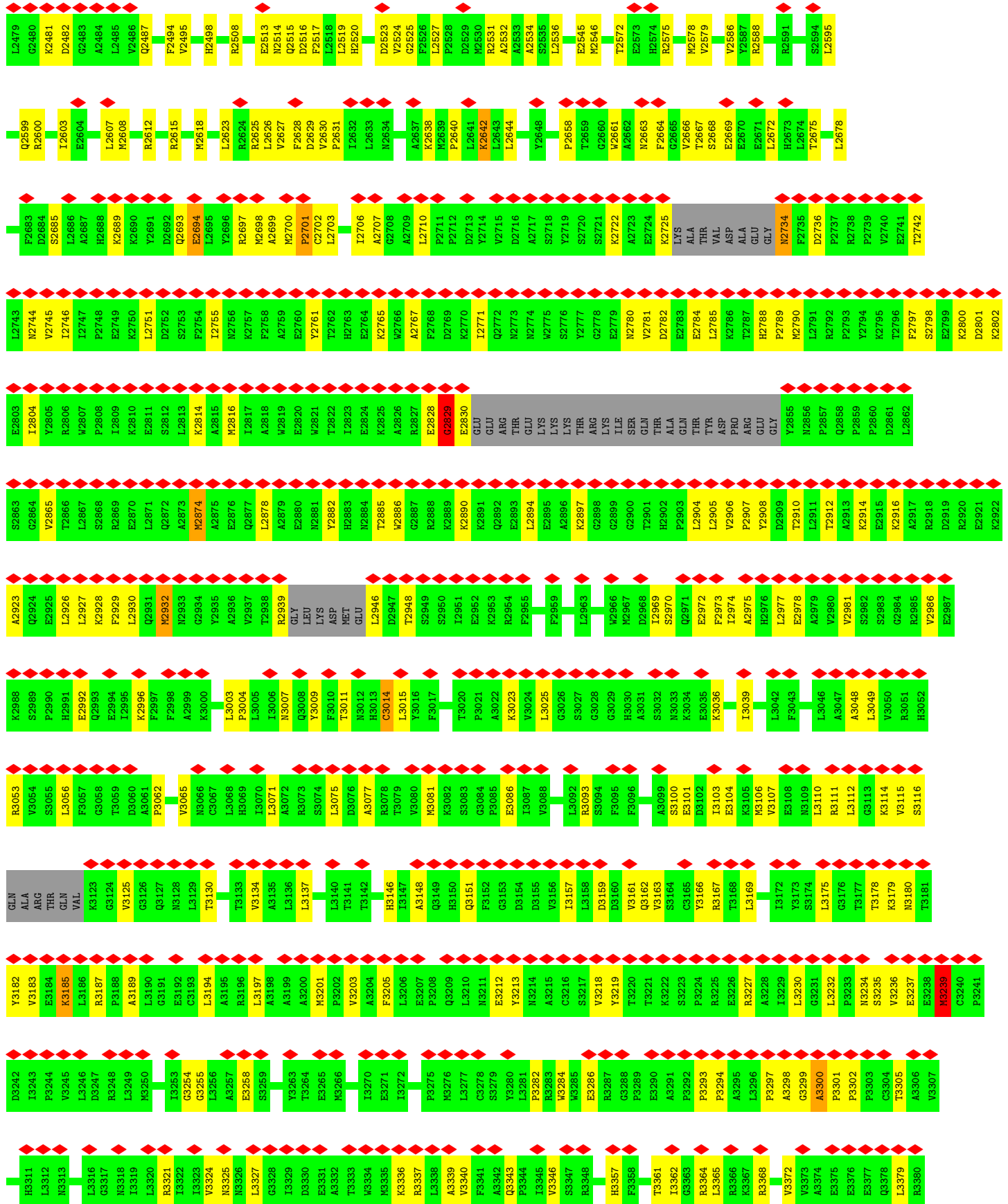
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion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

- Molecule 1: Ryanodine receptor 1

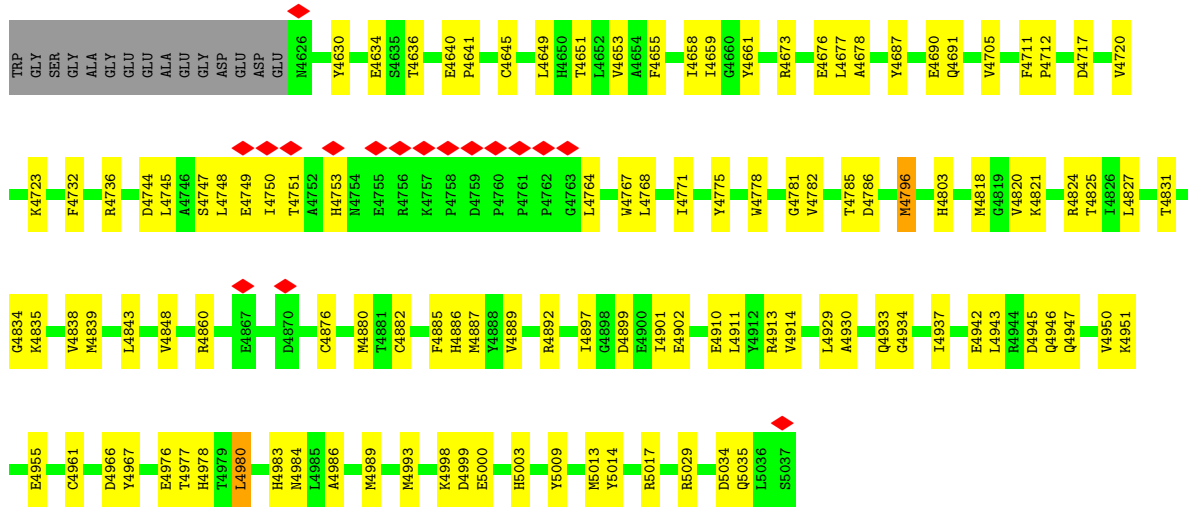




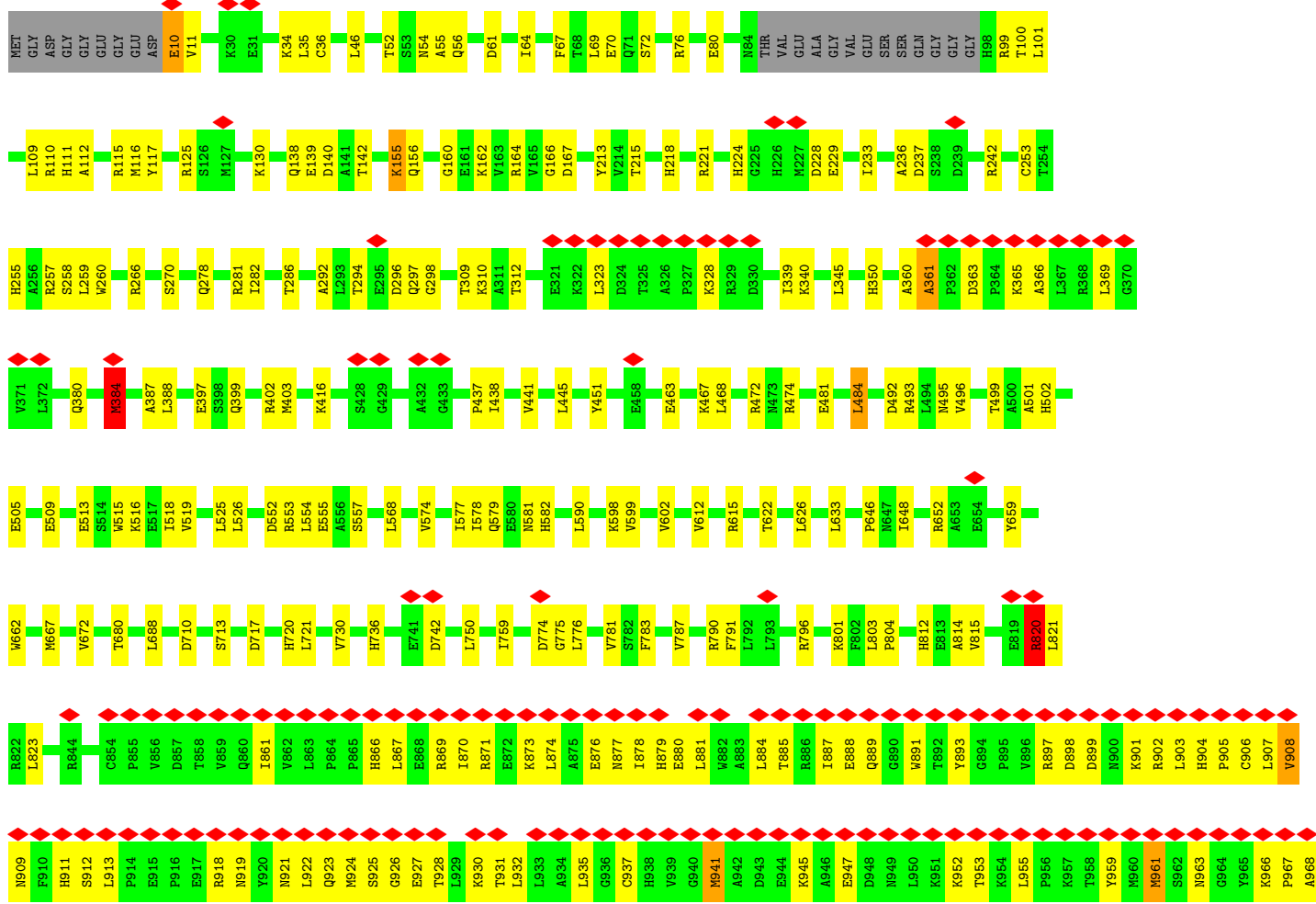


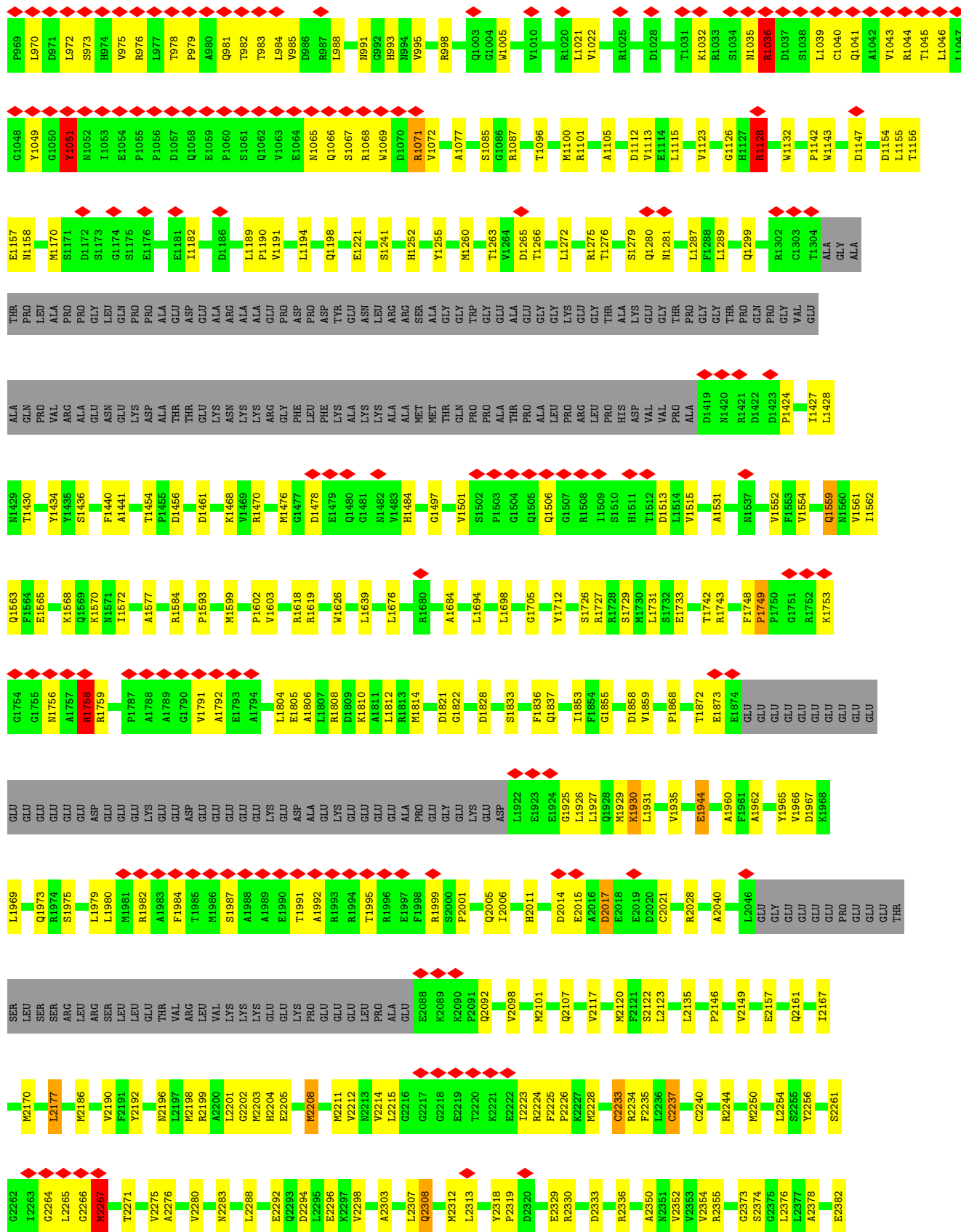


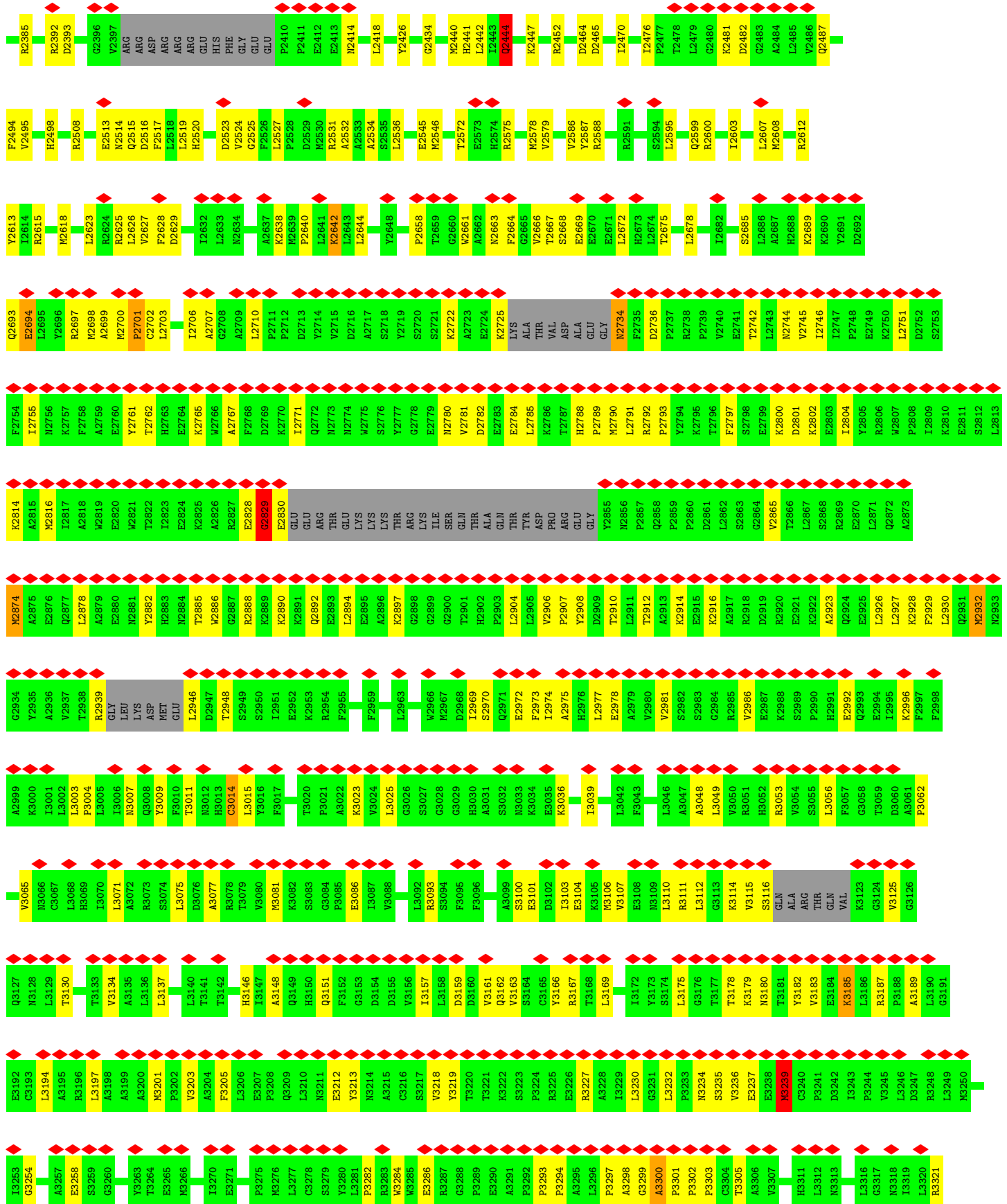




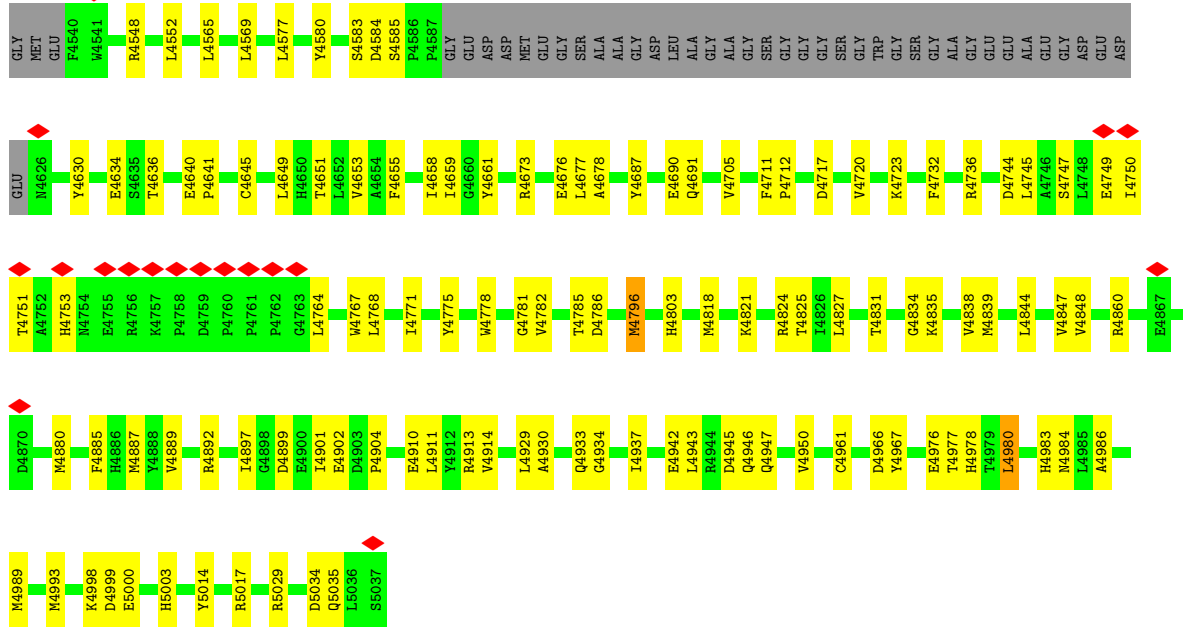
• Molecule 1: Ryanodine receptor 1



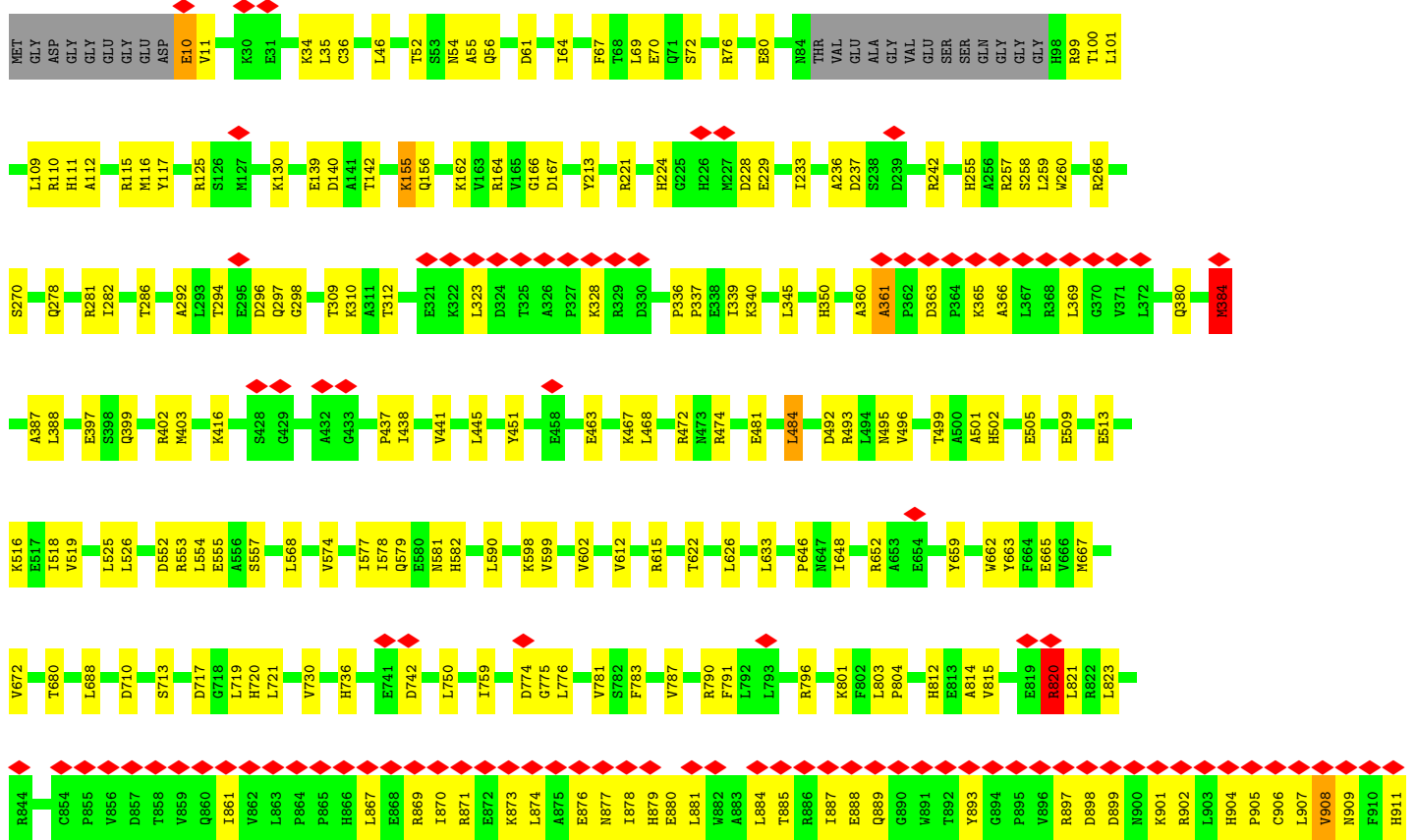


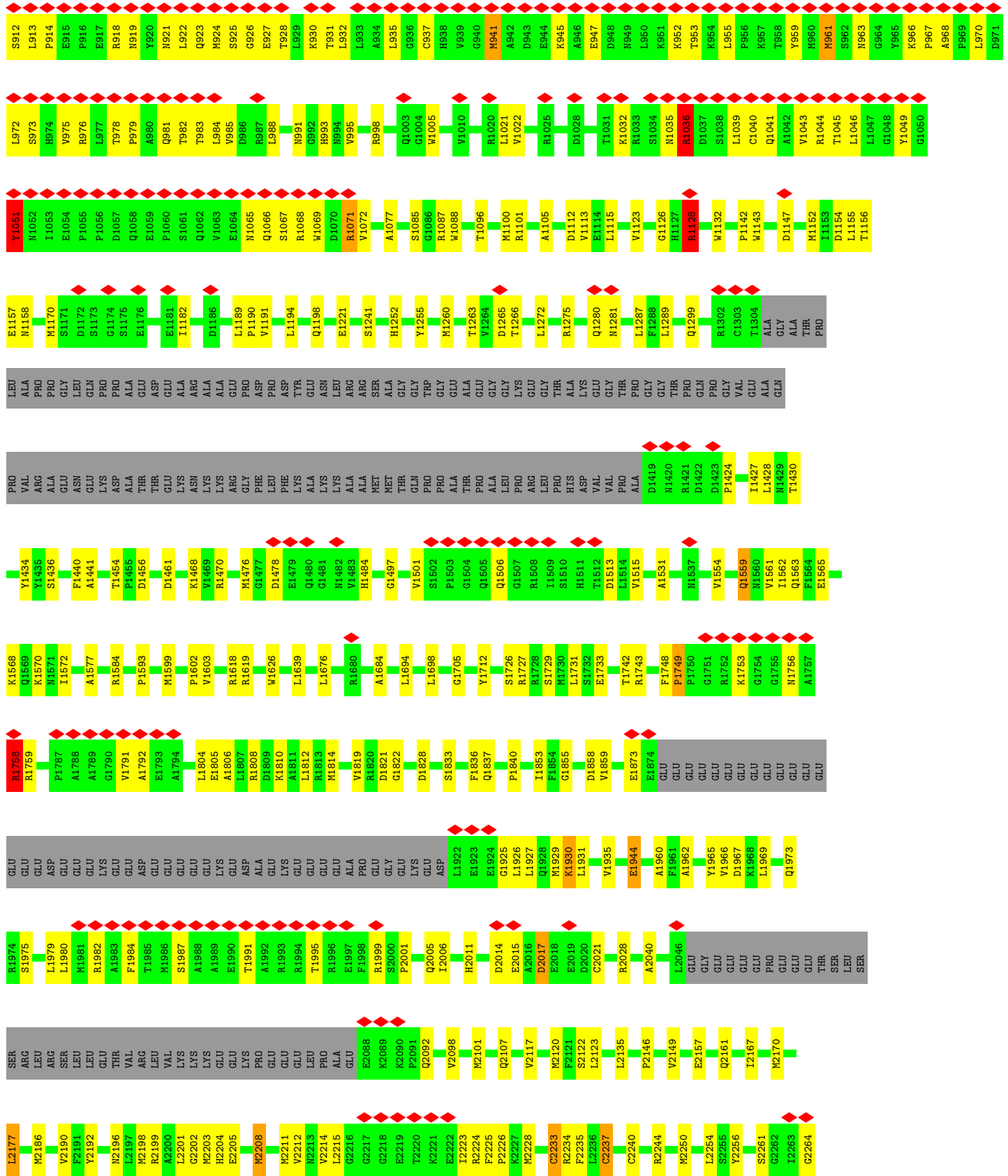




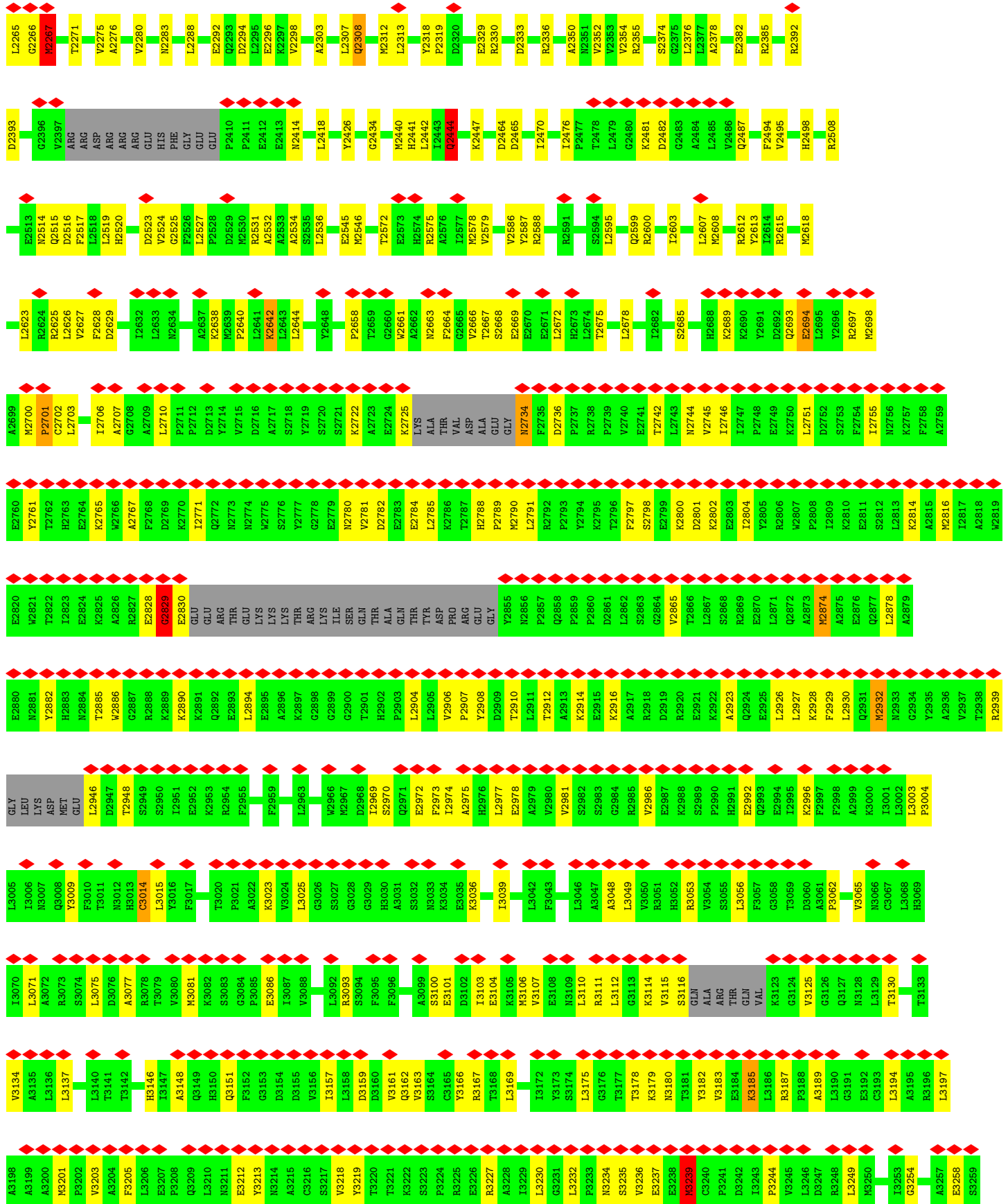


● Molecule 1: Ryanodine receptor 1

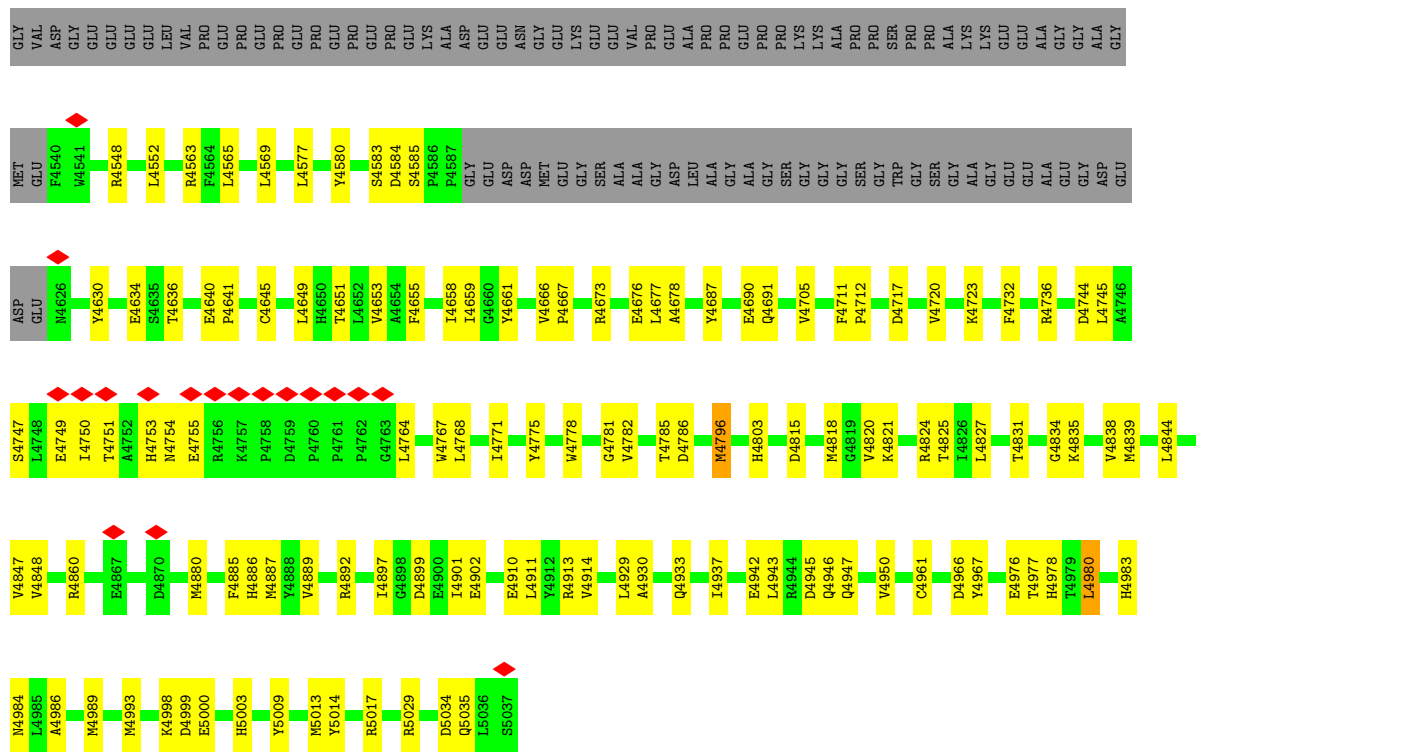




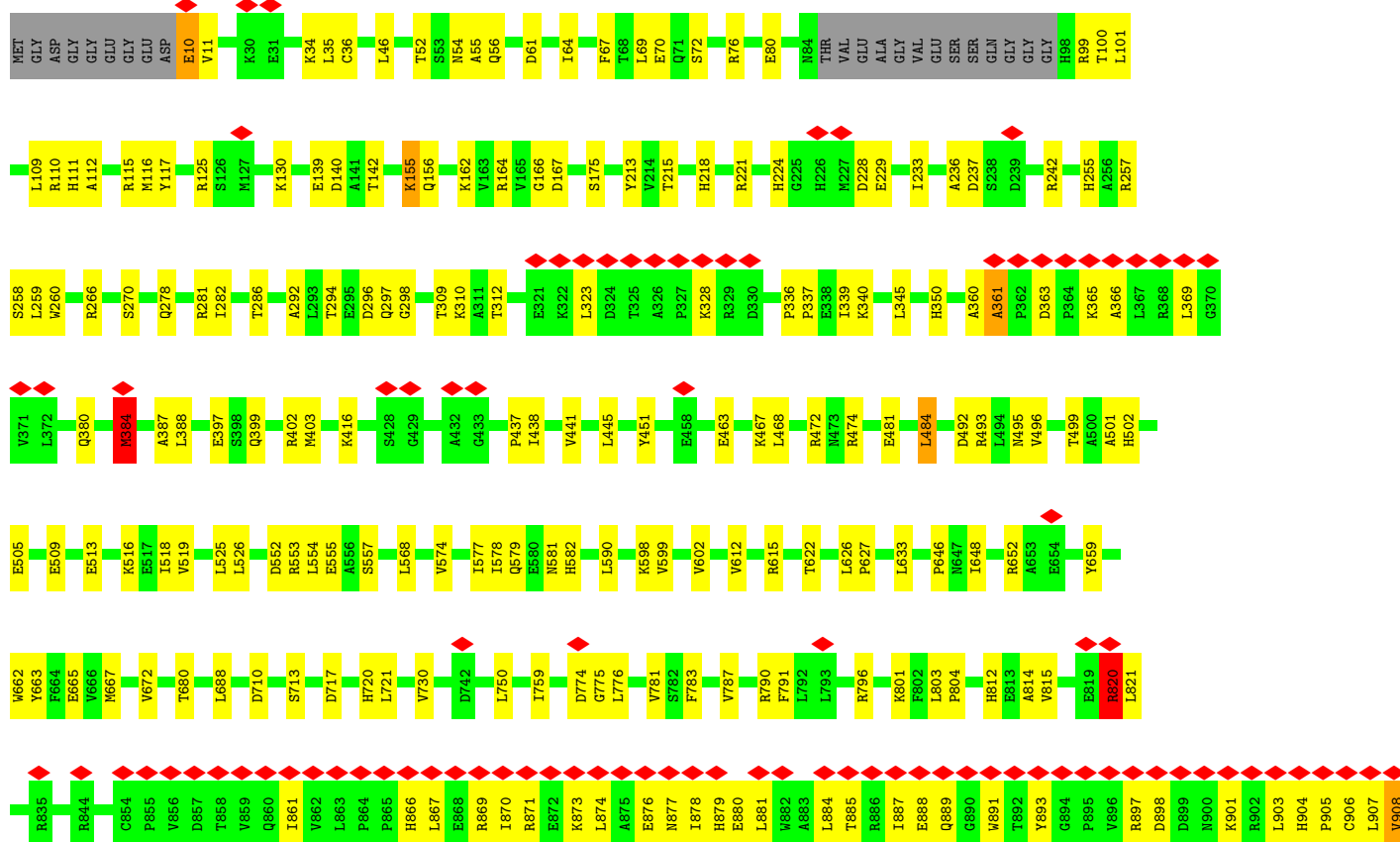


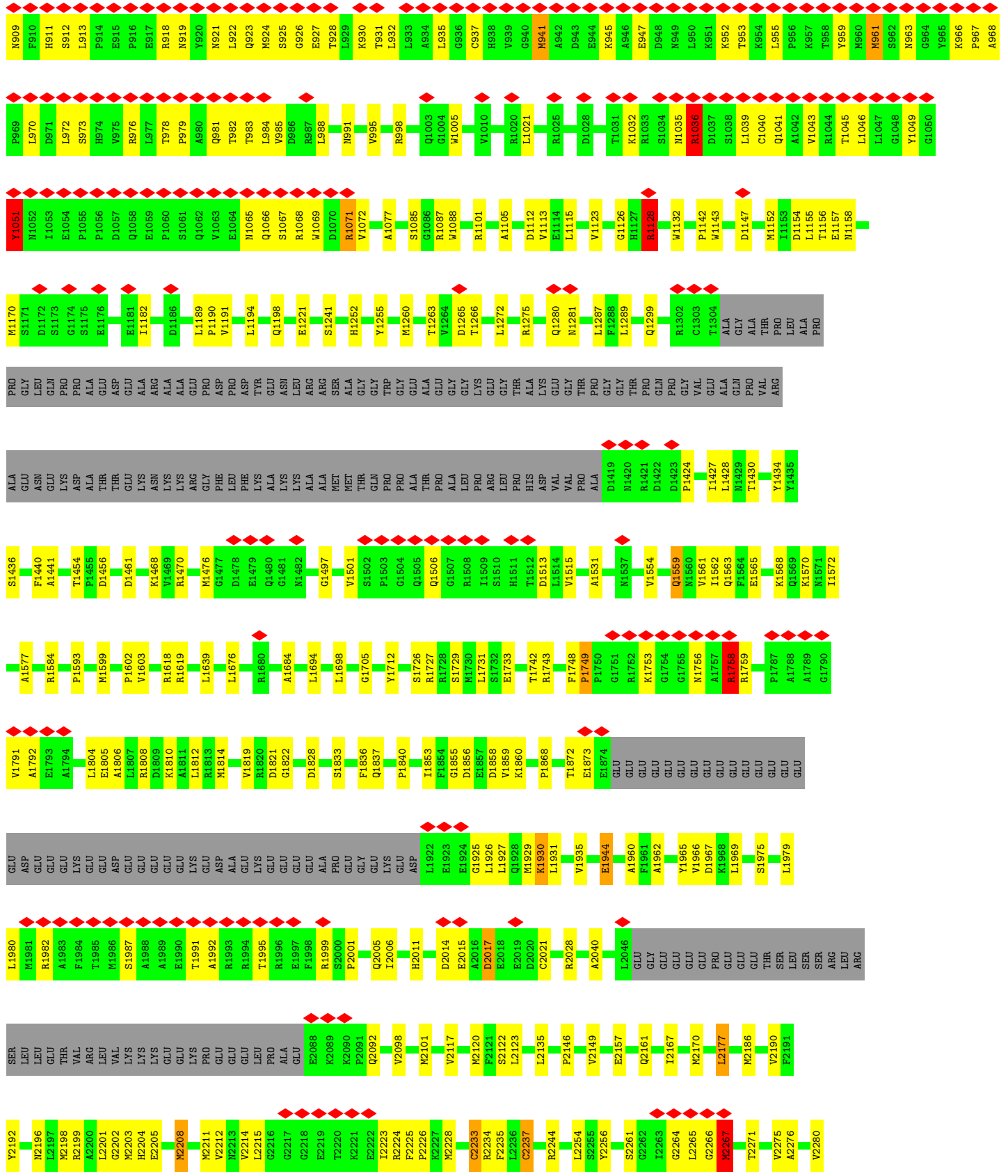


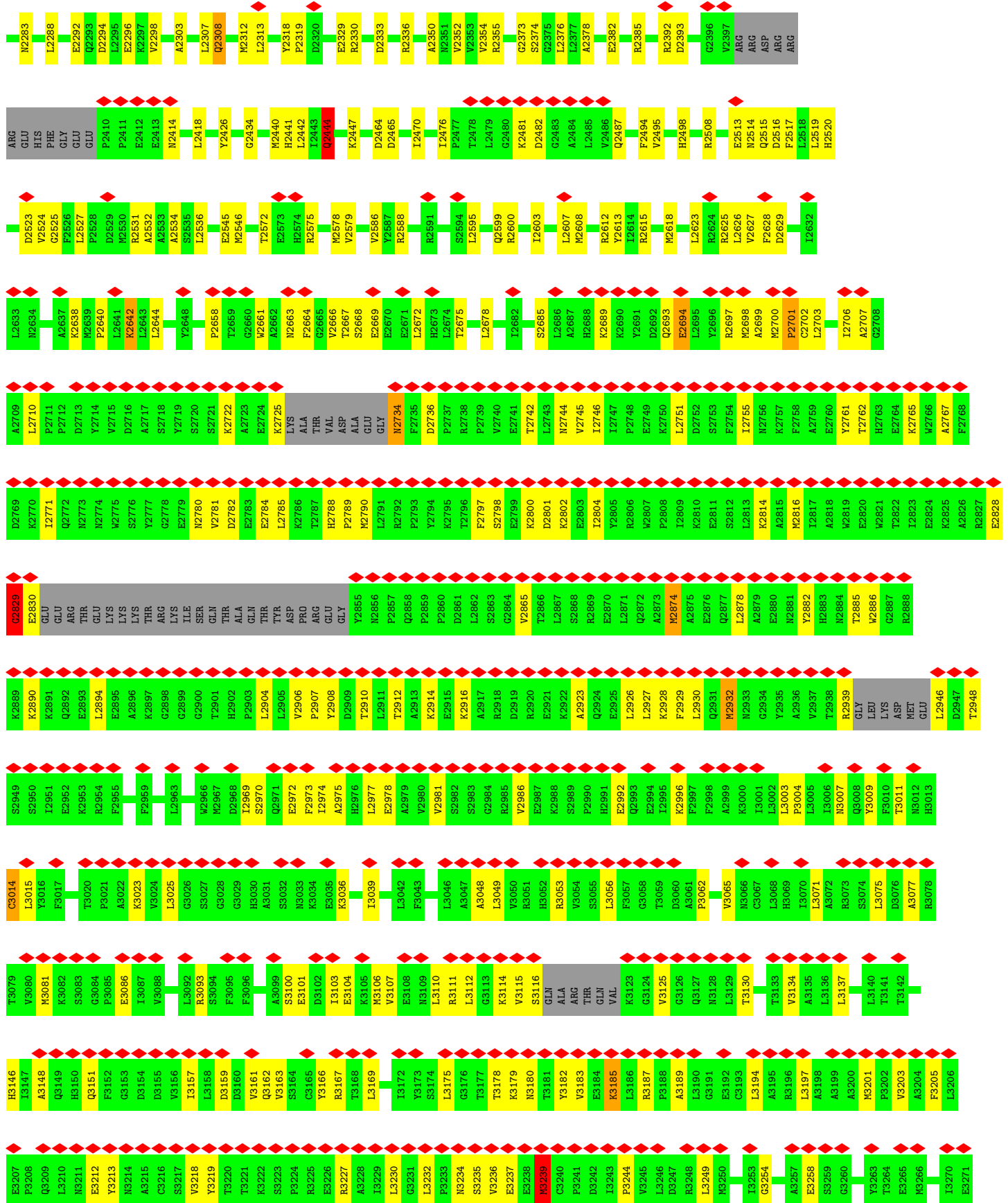




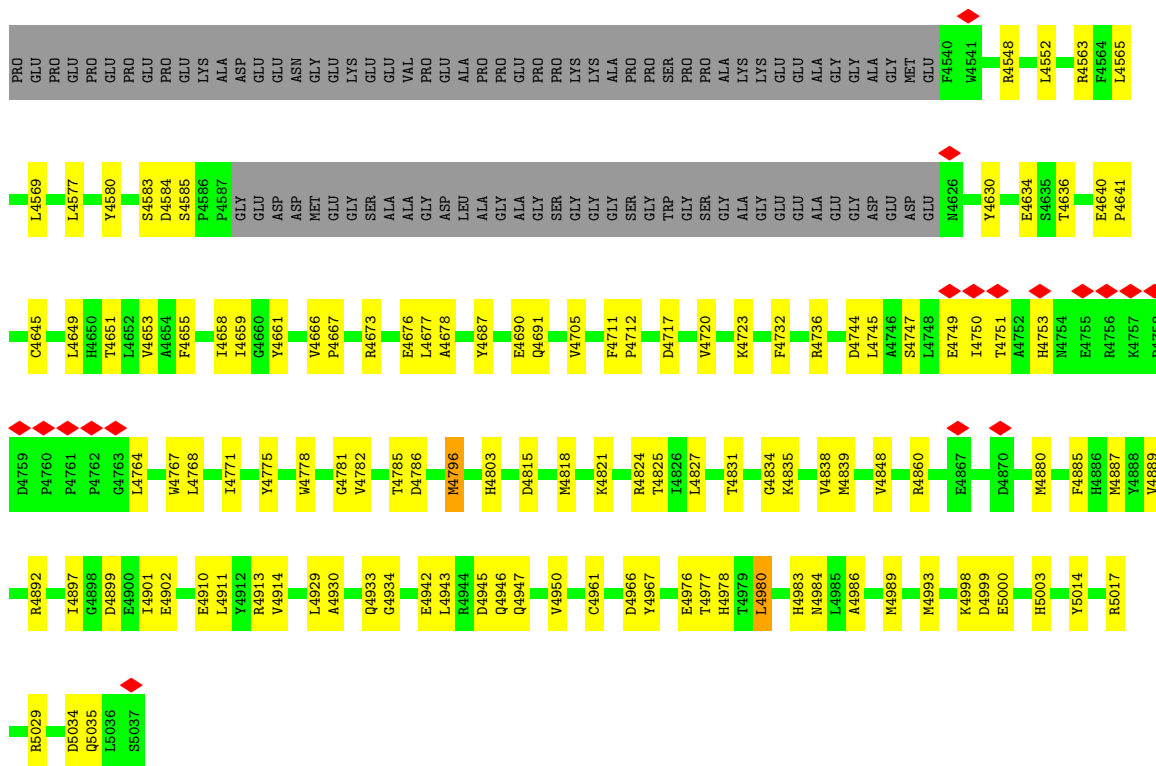
● Molecule 1: Ryanodine receptor 1



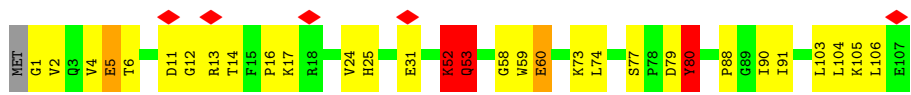




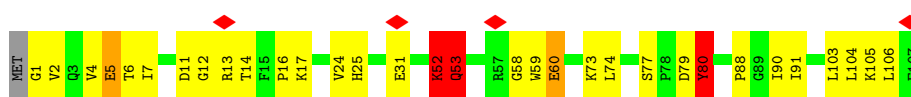
PRO	GLY	L3408	GLN	R3550	SS615	A3796	M3858	L9880	V4081	T4241	ARG	ALA
GLY	L3409	Y3409	SER	E3551	K3616	D3727	V3859	L9881	V4082	M4245	SER	LYS
GLY	P3410	M3276	GLY	F3552	K3617	I3728	M3860	L3985	F4093	M4254	ARG	LYS
VAL	P3411	L3277	GLY	R3553	A3618	M3729	E3861	L3986	K4094	G4254	ARG	VAL
VAL	L3412	C3278	SER	Q3554	A3619	A3730	D3862	V3989	K4095	G4255	ARG	THR
VAL	ASP	C3279	ASP	M3555	V3619	K3731	D3863	V3990	A4096	G4256	VAL	THR
VAL	R3413	S3279	ASP	M3556	H3621	S3732	G3864	G3991	A4097	G4257	ARG	GLU
VAL	A3342	Y3280	GLN	L3557	H3734	C3733	V3865	V3995	D4098	G4258	ARG	LEU
VAL	Q3343	Y3281	GLU	R3558	K3622	H3734	V3866	F3996	S4100	G4259	ARG	LEU
VAL	P3344	L3281	THR	H3558	L3623	L3735	I3867	A3997	A4108	G4260	ARG	ALA
VAL	L3345	P3282	LYS	H3559	L3624	E3736	R3868	M4000	I4108	G4261	ASP	GLY
VAL	V3346	R3283	LYS	L3559	SS625	GLU	R3869	M4001	D4118	G4262	THR	PRO
VAL	R3348	H3284	LYS	Q3560	K3626	GLY	Q3869	L4003	M4118	G4263	ALA	ASP
VAL	H3357	E3286	R3498	G3561	Q3627	GLY	Q3870	L4004	M4119	G4264	ARG	PRO
VAL	F3358	E3287	R3499	K3562	K3628	ASN	M3871	D4006	M4120	G4265	ARG	THR
VAL	T3361	G3288	D3501	V3563	R3628	GLY	G3872	S4007	I4139	G4266	ARG	PRO
VAL	I3362	P3289	R3502	G3564	R3629	GLU	V3874	A4008	M4140	G4267	ALA	GLY
VAL	G3363	E3290	Y3503	E3565	R3630	ALA	D3877	Q4009	M4141	G4268	ALA	VAL
VAL	R3364	E3291	S3504	P3566	A3631	GLU	D3878	Q4010	M4142	G4269	ALA	VAL
VAL	L3365	A3291	V3505	S3567	V3632	GLU	E3879	L4016	M4143	G4270	ALA	GLY
VAL	K3366	R3292	Q3506	S3568	V3633	GLU	F3880	Q4020	M4144	G4271	ALA	GLY
VAL	R3367	P3293	Q3507	L3569	A3634	GLU	V3883	K4021	M4145	G4272	ALA	GLY
VAL	R3368	P3294	S3508	M3573	G3635	GLU	D3884	V4024	M4146	G4273	ALA	GLY
VAL	V3372	A3296	L3509	A3574	F3636	GLU	L3891	V4025	M4147	G4274	ALA	GLY
VAL	V3373	P3297	I3510	R3577	R3637	GLU	C3892	S4029	M4148	G4275	ALA	GLY
VAL	R3374	A3298	V3511	G3578	T3639	GLU	M3897	E4032	M4149	G4276	ALA	GLY
VAL	A3374	G3299	L3514	C3579	P3640	GLU	D3898	M4039	M4150	G4277	ALA	GLY
VAL	E3375	A3300	M3517	L3579	L3641	GLU	F3899	I4040	M4151	G4278	ALA	GLY
VAL	E3376	P3301	K3517	P3580	T3642	GLU	Q3900	A4041	M4152	G4279	ALA	GLY
VAL	E3377	P3302	G3521	G3581	N3651	GLU	Y3901	R4042	M4153	G4280	ALA	GLY
VAL	Q3378	P3303	L3522	R3582	E3655	GLU	L3903	V4045	M4154	G4281	ALA	GLY
VAL	C3304	G3304	N3523	E3583	E3656	GLU	R3904	V4046	M4155	G4282	ALA	GLY
VAL	T3305	T3305	K3524	E3584	K3658	GLU	T3910	V4047	M4156	G4283	ALA	GLY
VAL	A3306	A3306	C3525	D3585	A3659	GLU	S3803	V4048	M4157	G4284	ALA	GLY
VAL	V3307	V3307	A3526	A3586	A3660	GLU	E3825	M4057	M4158	G4285	ALA	GLY
VAL	H3311	H3311	P3527	D3587	I3662	GLU	S3831	K4060	M4159	G4286	ALA	GLY
VAL	L3312	L3312	T3528	D3588	L3663	GLU	A3834	F4061	M4160	G4287	ALA	GLY
VAL	H3313	H3313	G3529	P3589	D3672	GLU	L3835	D4063	M4161	G4288	ALA	GLY
VAL	L3316	L3316	D3531	K3591	K3671	GLU	T3836	M4064	M4162	G4289	ALA	GLY
VAL	G3317	G3317	L3532	R3592	E3682	GLU	C3838	K4067	M4163	G4290	ALA	GLY
VAL	H3318	H3318	I3533	V3593	Q3683	GLU	G3839	L4068	M4164	G4291	ALA	GLY
VAL	L3319	L3319	K3534	R3594	K3684	GLU	S3840	G4069	M4165	G4292	ALA	GLY
VAL	L3320	L3320	L3535	R3595	E3685	GLU	V3841	D4070	M4166	G4293	ALA	GLY
VAL	L3321	L3321	K3536	E3598	E3686	GLU	L3842	I4071	M4167	G4294	ALA	GLY
VAL	R3322	R3322	T3538	E3599	E3687	GLU	R3849	V4072	M4168	G4295	ALA	GLY
VAL	I3323	I3323	R3539	R3600	E3688	GLU	K3852	E4075	M4169	G4296	ALA	GLY
VAL	V3324	V3324	L3542	L3603	E3689	GLU	L3856	A4076	M4170	G4297	ALA	GLY
VAL	R3325	R3325	K3543	Y3604	S3689	GLU	G3857	F4077	M4171	G4298	ALA	GLY
VAL	H3326	H3326	R3544	H3605	V3690	GLU			M4172	G4299	ALA	GLY
VAL	L3327	L3327	D3545	E3607	E3691	GLU			M4173	G4300	ALA	GLY
VAL	G3328	G3328	T3545	T3608	K3693	GLU			M4174	G4301	ALA	GLY
VAL	D3330	D3330	E3546	T3609	K3694	GLU			M4175	G4302	ALA	GLY
VAL	E3331	E3331	R3547	E3610	L3721	GLU			M4176	G4303	ALA	GLY
VAL	A3332	A3332	E3548	H3611	Y3725	GLU			M4177	G4304	ALA	GLY
VAL	W3334	W3334	V3549	Y3612		GLU			M4178	G4305	ALA	GLY
VAL	K3335	K3335	K3614	K3614		GLU			M4179	G4306	ALA	GLY



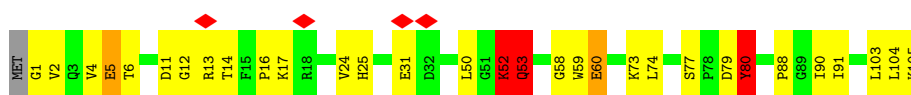
• Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1A



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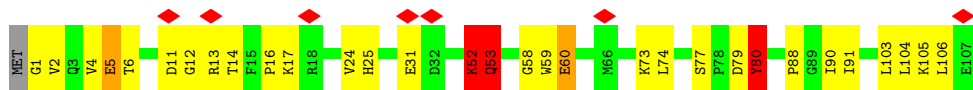


• Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1A



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







## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C4	Depositor
Number of particles used	64353	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	58	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	1500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.555	Depositor
Minimum map value	-0.247	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.022	Depositor
Recommended contour level	0.1	Depositor
Map size (Å)	428.544, 428.544, 428.544	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.837, 0.837, 0.837	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: CA, ATP, ZN, PNX

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	0.54	50/35977 (0.1%)	0.67	65/48726 (0.1%)
1	B	0.54	50/35977 (0.1%)	0.67	65/48726 (0.1%)
1	C	0.54	49/35977 (0.1%)	0.67	65/48726 (0.1%)
1	D	0.54	50/35977 (0.1%)	0.67	65/48726 (0.1%)
2	E	2.56	15/850 (1.8%)	3.24	24/1146 (2.1%)
2	F	2.56	15/850 (1.8%)	3.25	24/1146 (2.1%)
2	G	2.56	15/850 (1.8%)	3.24	24/1146 (2.1%)
2	H	2.56	15/850 (1.8%)	3.24	24/1146 (2.1%)
All	All	0.66	259/147308 (0.2%)	0.82	356/199488 (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
1	A	0	14
1	B	0	14
1	C	0	14
1	D	0	14
2	E	0	5
2	F	0	5
2	G	0	5
2	H	0	5
All	All	0	76

The worst 5 of 259 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	H	80	TYR	CD1-CE1	47.33	2.10	1.39
2	F	80	TYR	CD1-CE1	47.31	2.10	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	E	80	TYR	CD1-CE1	47.30	2.10	1.39
2	G	80	TYR	CD1-CE1	47.26	2.10	1.39
2	G	80	TYR	CD2-CE2	36.38	1.94	1.39

The worst 5 of 356 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	H	80	TYR	CE1-CZ-CE2	-55.59	30.86	119.80
2	F	80	TYR	CE1-CZ-CE2	-55.57	30.88	119.80
2	G	80	TYR	CE1-CZ-CE2	-55.57	30.89	119.80
2	E	80	TYR	CE1-CZ-CE2	-55.56	30.90	119.80
2	F	80	TYR	CB-CG-CD2	45.56	148.33	121.00

There are no chirality outliers.

5 of 76 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1035	ASN	Peptide
1	A	1036	ARG	Mainchain,Sidechain
1	A	1051	TYR	Sidechain
1	A	1128	ARG	Sidechain
1	A	820	ARG	Sidechain

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

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	35150	0	34792	993	0
1	B	35150	0	34792	985	0
1	C	35150	0	34792	973	0
1	D	35150	0	34792	984	0
2	E	831	0	831	23	0
2	F	831	0	831	23	0
2	G	831	0	831	23	0
2	H	831	0	831	23	0
3	A	31	0	12	0	0
3	B	31	0	12	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	C	31	0	12	0	0
3	D	31	0	12	0	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
5	A	1	0	0	0	0
5	B	1	0	0	0	0
5	C	1	0	0	0	0
5	D	1	0	0	0	0
6	A	20	0	18	3	0
6	B	20	0	18	3	0
6	C	20	0	18	3	0
6	D	20	0	18	3	0
7	A	2	0	0	0	0
7	B	2	0	0	0	0
7	C	2	0	0	0	0
7	D	2	0	0	0	0
All	All	144144	0	142612	3958	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 3958 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:3239:MET:CG	1:D:3239:MET:SD	2.09	1.41
1:A:3239:MET:CG	1:A:3239:MET:SD	2.09	1.41
1:B:3239:MET:SD	1:B:3239:MET:CG	2.09	1.39
1:C:3239:MET:SD	1:C:3239:MET:CG	2.09	1.39
1:A:2642:LYS:CD	1:A:2642:LYS:CG	2.05	1.34

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	4385/5037 (87%)	4268 (97%)	109 (2%)	8 (0%)	44	66
1	B	4385/5037 (87%)	4268 (97%)	109 (2%)	8 (0%)	44	66
1	C	4385/5037 (87%)	4268 (97%)	109 (2%)	8 (0%)	44	66
1	D	4385/5037 (87%)	4268 (97%)	109 (2%)	8 (0%)	44	66
2	E	105/108 (97%)	102 (97%)	3 (3%)	0	100	100
2	F	105/108 (97%)	102 (97%)	3 (3%)	0	100	100
2	G	105/108 (97%)	102 (97%)	3 (3%)	0	100	100
2	H	105/108 (97%)	102 (97%)	3 (3%)	0	100	100
All	All	17960/20580 (87%)	17480 (97%)	448 (2%)	32 (0%)	45	66

5 of 32 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	908	VAL
1	A	2829	GLY
1	A	3239	MET
1	A	3300	ALA
1	B	908	VAL

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

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	3836/4276 (90%)	3816 (100%)	20 (0%)	86	95
1	B	3836/4276 (90%)	3816 (100%)	20 (0%)	86	95
1	C	3836/4276 (90%)	3816 (100%)	20 (0%)	86	95
1	D	3836/4276 (90%)	3815 (100%)	21 (0%)	86	95
2	E	89/90 (99%)	89 (100%)	0	100	100
2	F	89/90 (99%)	89 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	G	89/90 (99%)	89 (100%)	0	100	100
2	H	89/90 (99%)	89 (100%)	0	100	100
All	All	15700/17464 (90%)	15619 (100%)	81 (0%)	85	95

5 of 81 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	3239	MET
1	C	2267	MET
1	D	3557	LEU
1	C	1036	ARG
1	C	3014	CYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 48 such sidechains are listed below:

Mol	Chain	Res	Type
1	D	1041	GLN
1	D	5003	HIS
1	D	1299	GLN
1	D	2734	ASN
1	C	879	HIS

### 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
3	ATP	B	5301	-	28,33,33	0.63	0	34,52,52	1.04	4 (11%)
3	ATP	D	5301	-	28,33,33	0.63	0	34,52,52	1.04	4 (11%)
6	PNX	C	5304	-	13,21,21	0.79	1 (7%)	13,30,30	2.92	3 (23%)
6	PNX	A	5304	-	13,21,21	0.79	1 (7%)	13,30,30	2.92	3 (23%)
3	ATP	A	5301	-	28,33,33	0.63	0	34,52,52	1.03	4 (11%)
6	PNX	B	5304	-	13,21,21	0.79	0	13,30,30	2.91	3 (23%)
6	PNX	D	5304	-	13,21,21	0.81	1 (7%)	13,30,30	2.94	3 (23%)
3	ATP	C	5301	-	28,33,33	0.63	0	34,52,52	1.03	4 (11%)

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
3	ATP	B	5301	-	-	4/18/38/38	0/3/3/3
3	ATP	D	5301	-	-	4/18/38/38	0/3/3/3
6	PNX	C	5304	-	-	5/7/7/7	0/2/2/2
6	PNX	A	5304	-	-	5/7/7/7	0/2/2/2
3	ATP	A	5301	-	-	4/18/38/38	0/3/3/3
6	PNX	B	5304	-	-	5/7/7/7	0/2/2/2
6	PNX	D	5304	-	-	5/7/7/7	0/2/2/2
3	ATP	C	5301	-	-	4/18/38/38	0/3/3/3

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	D	5304	PNX	C6-N1	2.08	1.41	1.38
6	C	5304	PNX	C6-N1	2.04	1.41	1.38
6	A	5304	PNX	C6-N1	2.02	1.41	1.38

The worst 5 of 28 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	D	5304	PNX	C5-C6-N1	-9.08	111.31	120.27
6	C	5304	PNX	C5-C6-N1	-9.03	111.36	120.27
6	B	5304	PNX	C5-C6-N1	-9.03	111.37	120.27
6	A	5304	PNX	C5-C6-N1	-9.02	111.37	120.27
6	D	5304	PNX	C4-C5-C6	4.46	123.36	119.96

There are no chirality outliers.

5 of 36 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	5301	ATP	PB-O3B-PG-O3G
3	B	5301	ATP	PB-O3B-PG-O3G
3	D	5301	ATP	PB-O3B-PG-O3G
3	C	5301	ATP	PB-O3B-PG-O3G
6	A	5304	PNX	CAH-CAI-CAK-N1

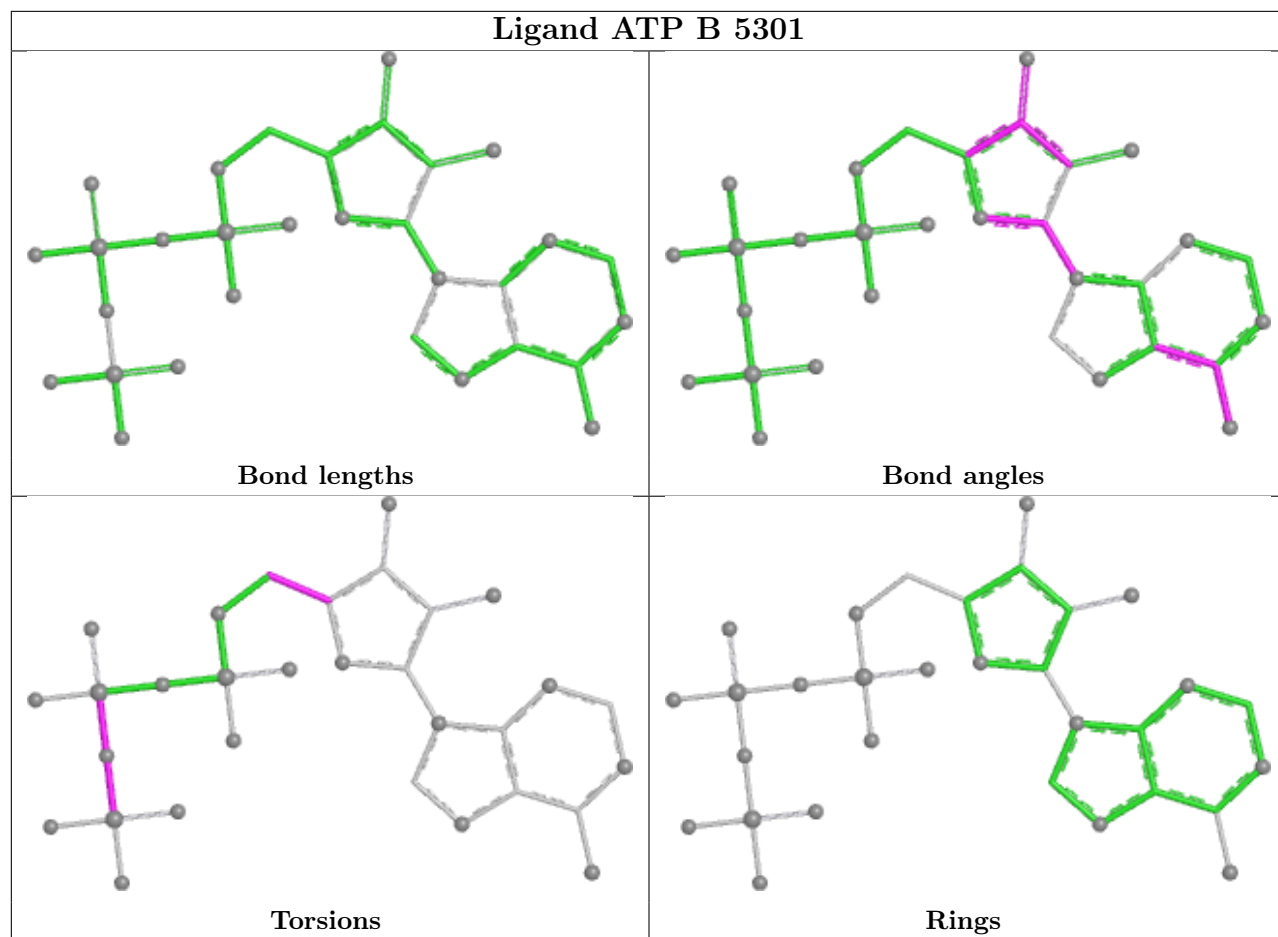
There are no ring outliers.

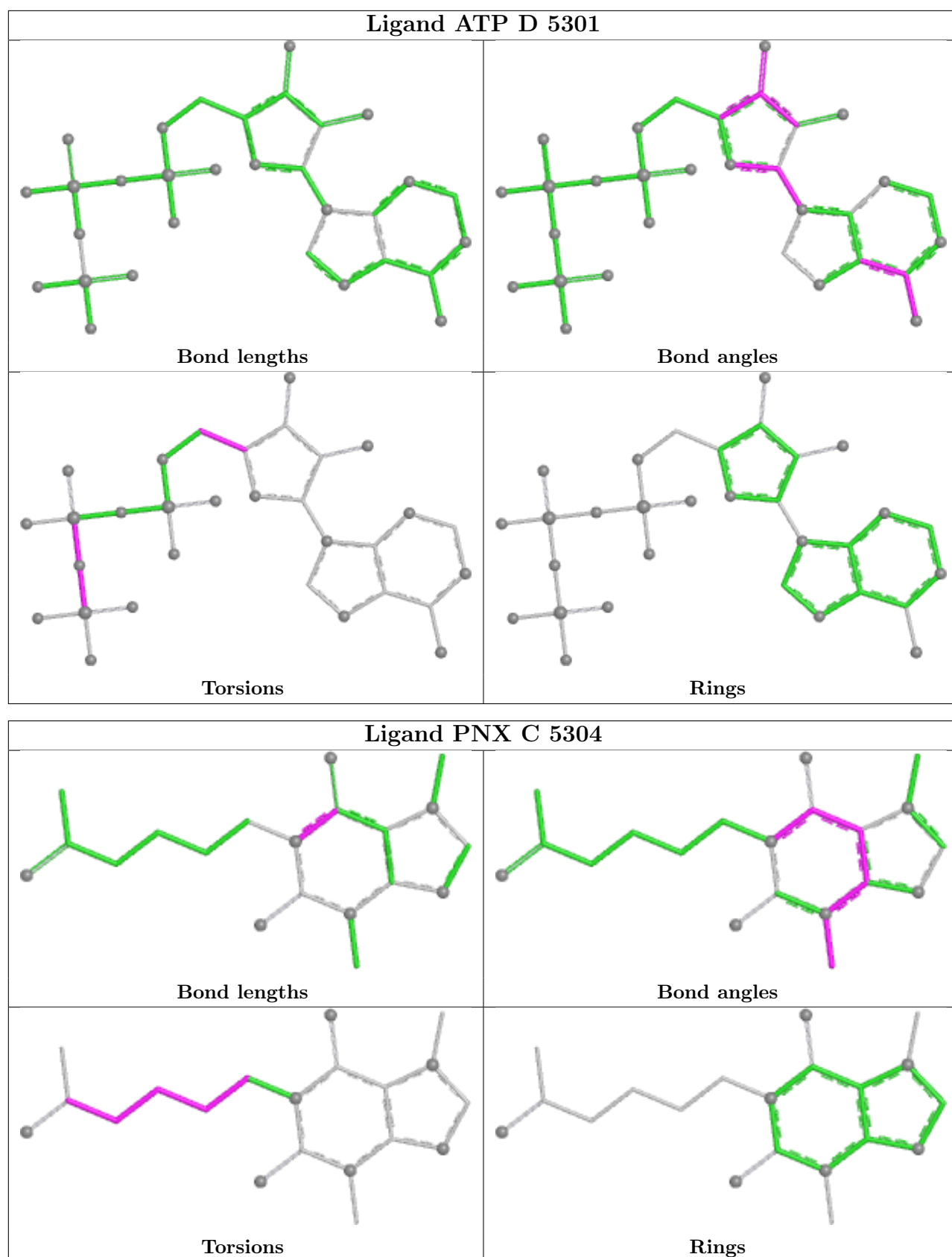
4 monomers are involved in 12 short contacts:

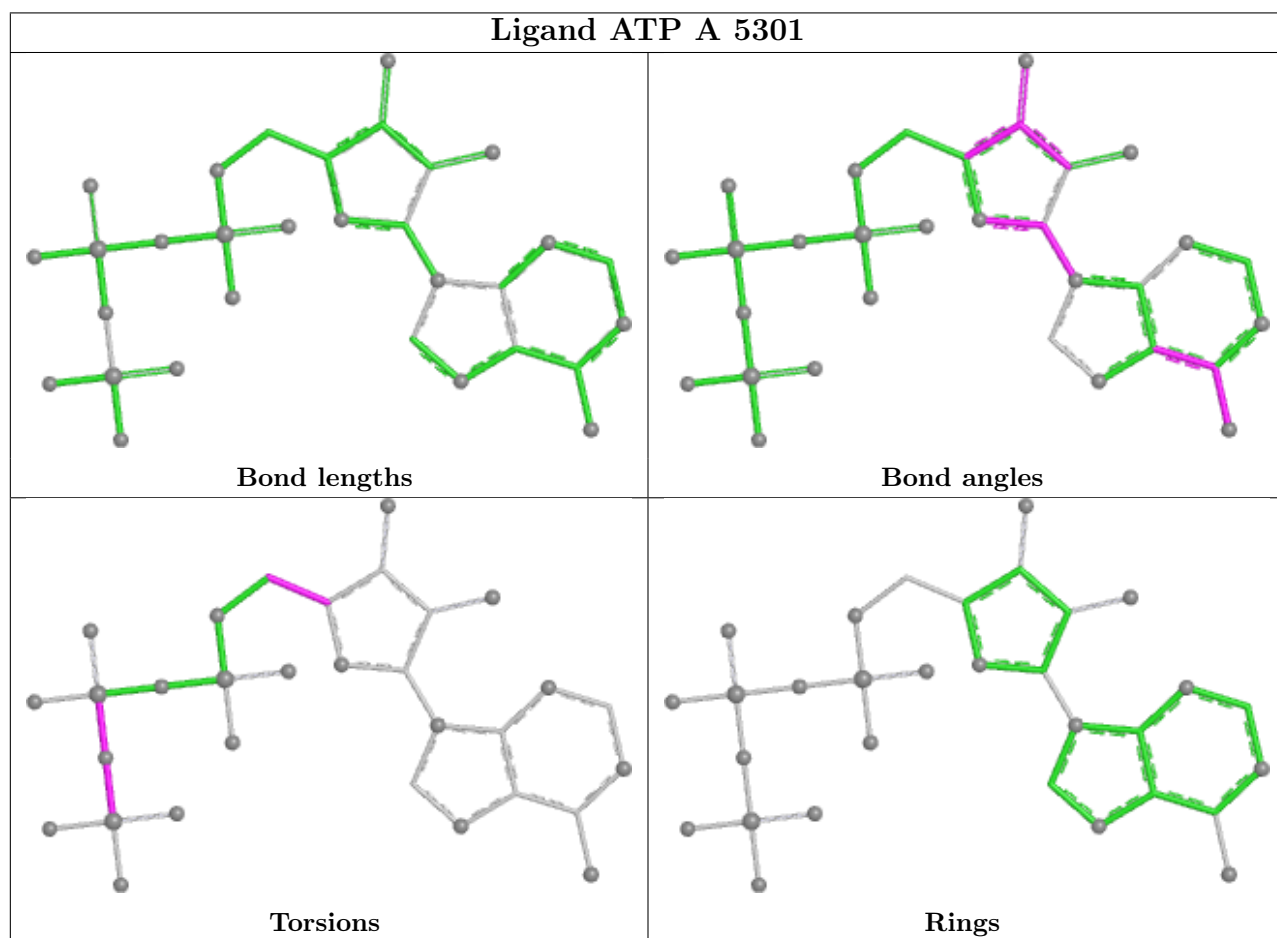
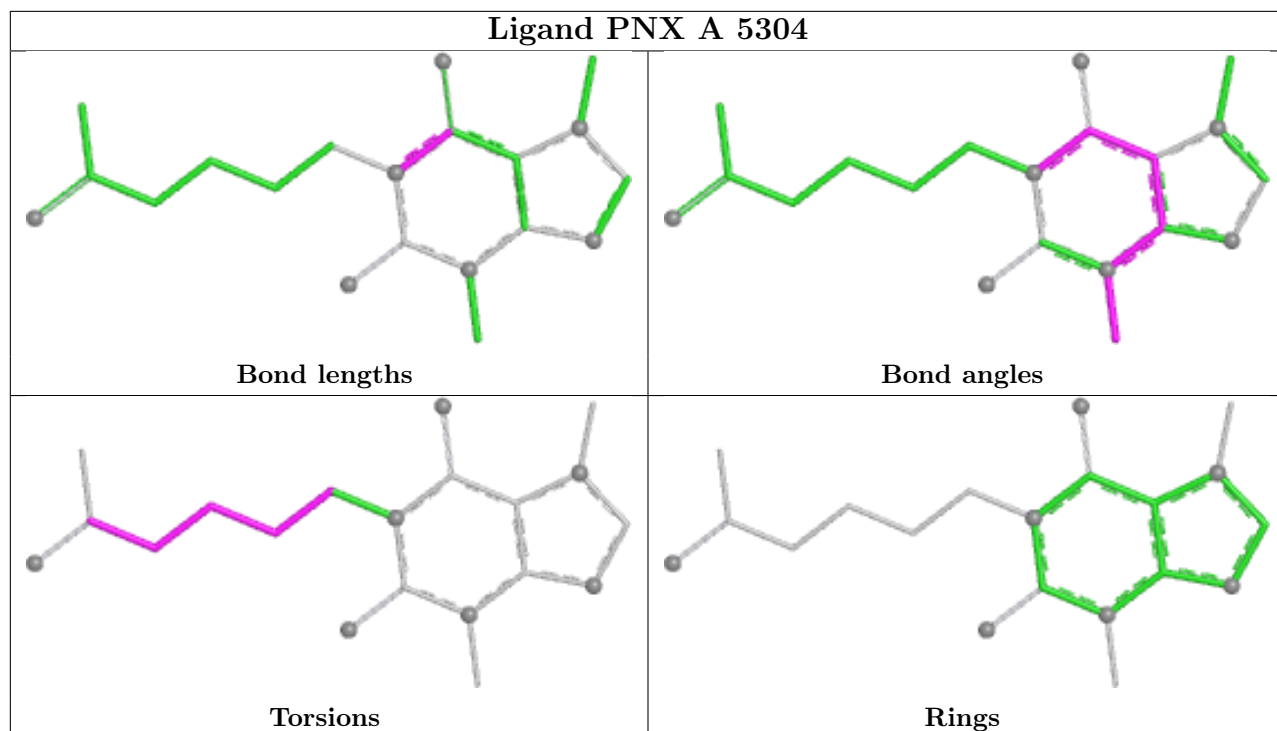
Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	C	5304	PNX	3	0
6	A	5304	PNX	3	0
6	B	5304	PNX	3	0
6	D	5304	PNX	3	0

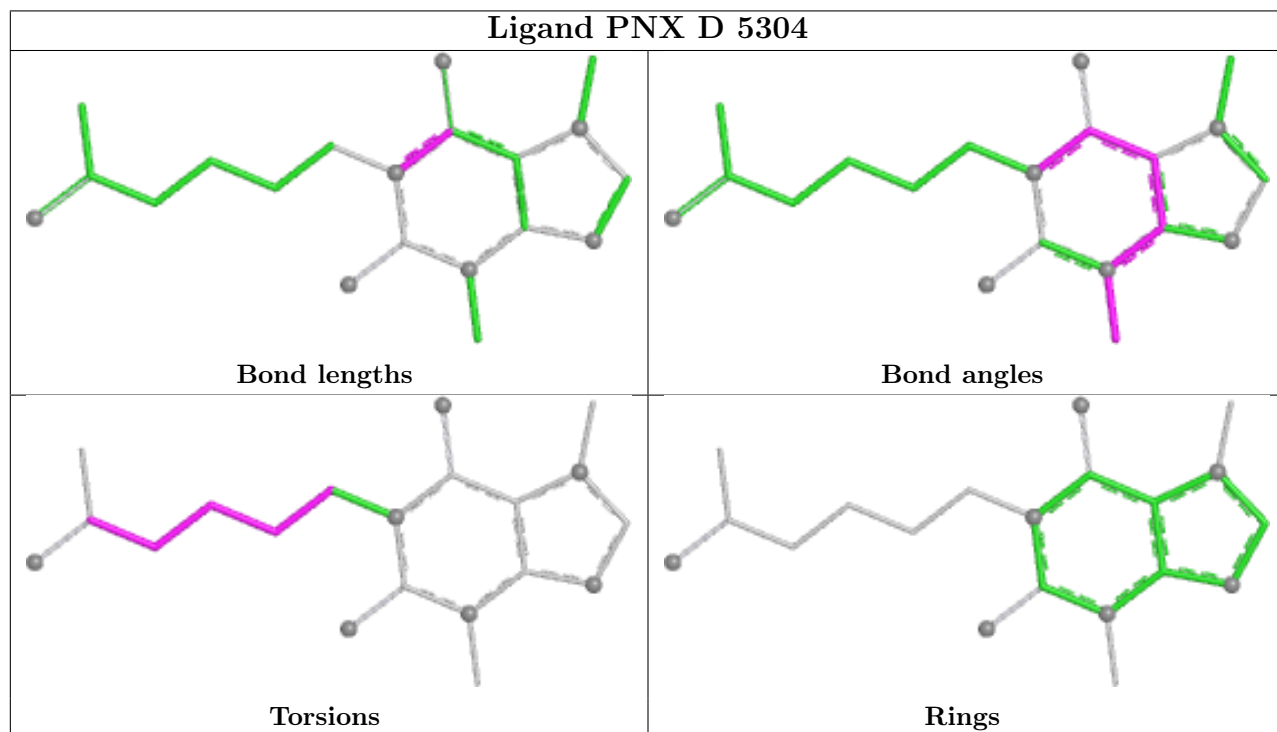
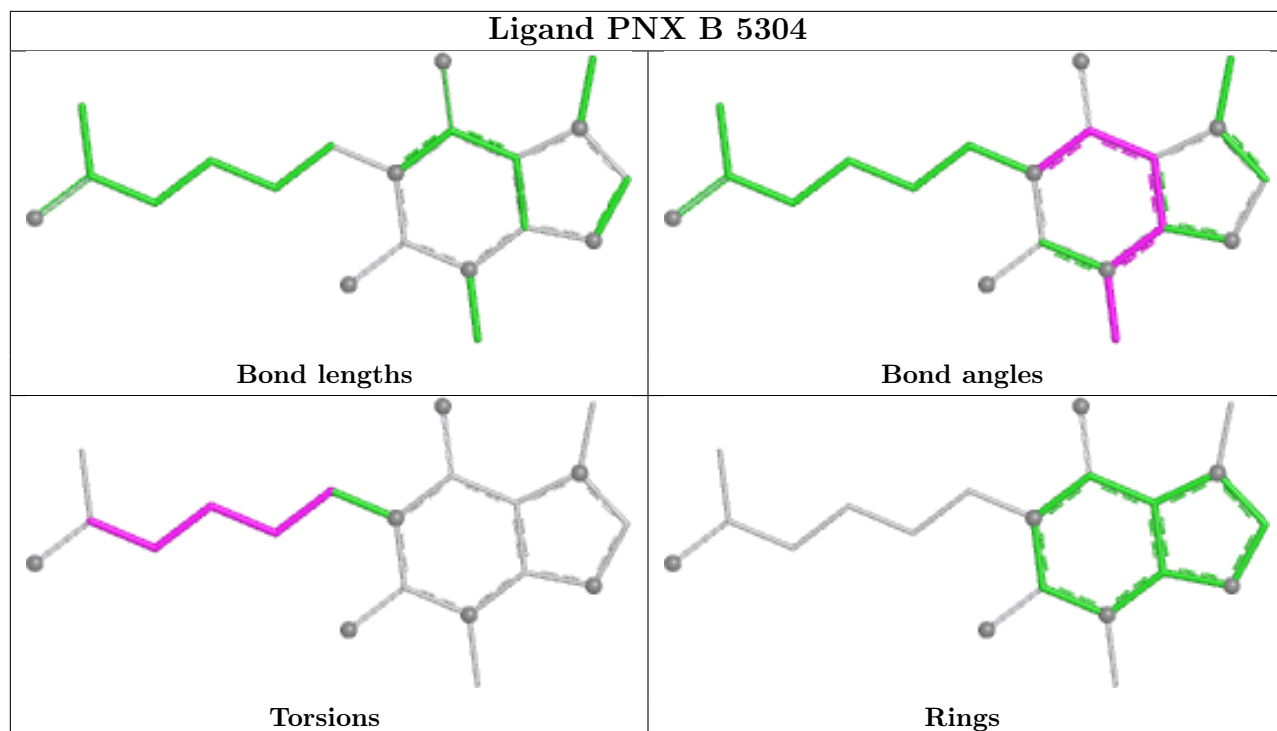
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

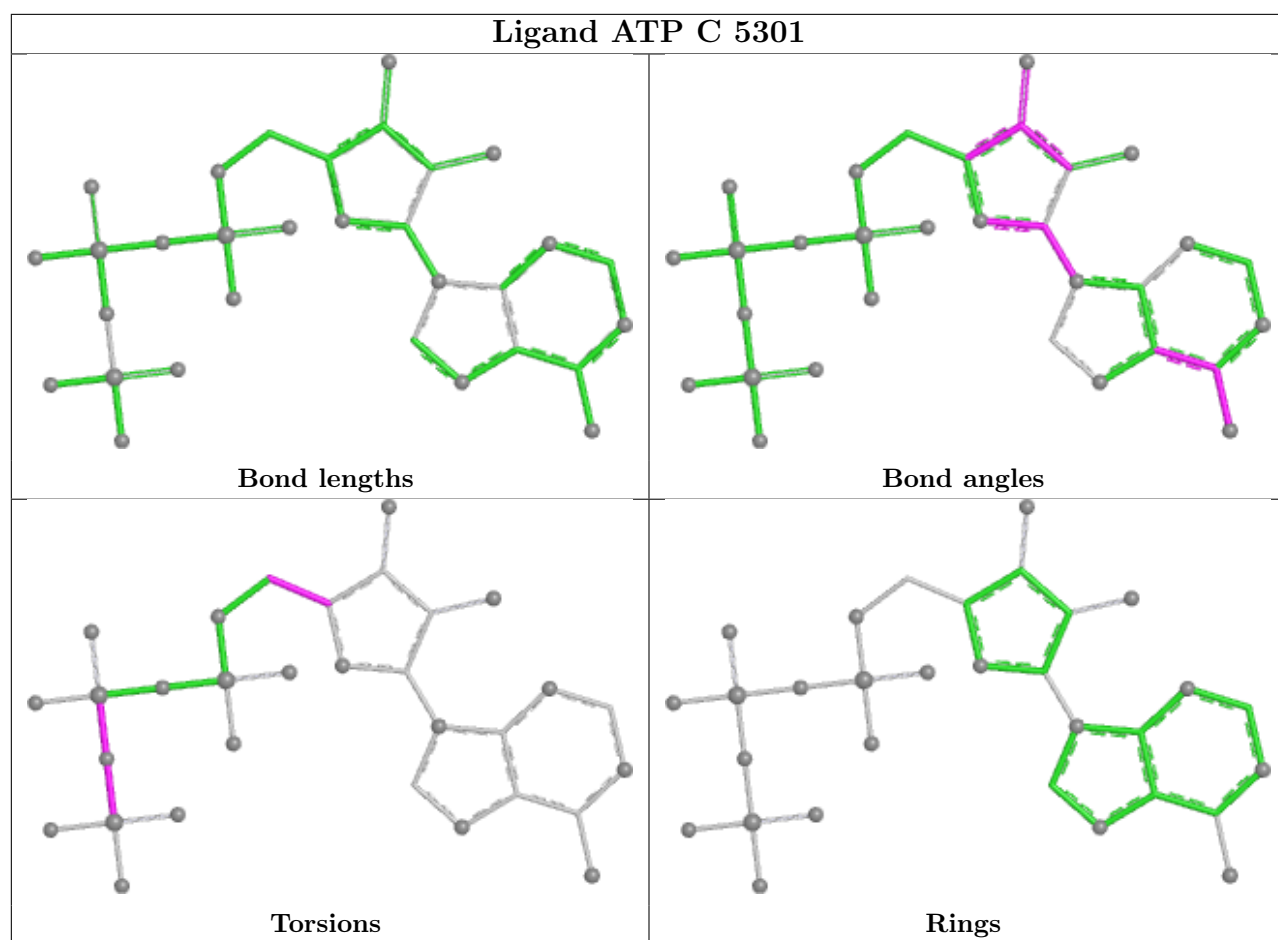












## 5.7 Other polymers [i](#)

There are no such residues in this entry.

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

There are no chain breaks in this entry.

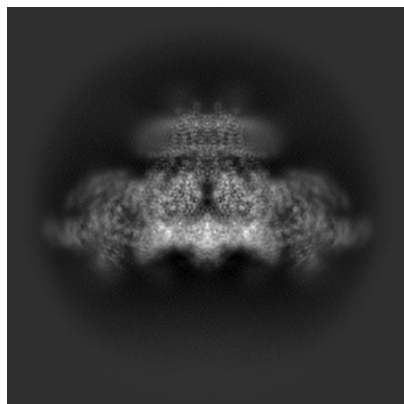
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-47385. These allow visual inspection of the internal detail of the map and identification of artifacts.

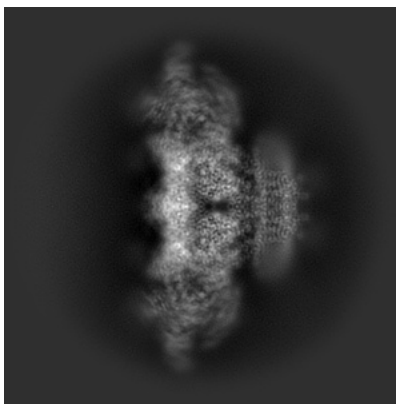
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

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

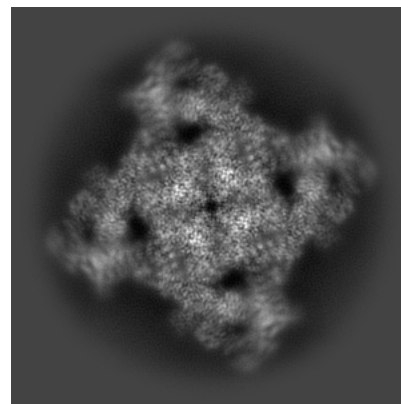
#### 6.1.1 Primary map



X

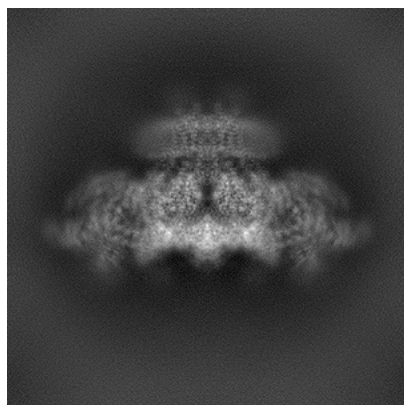


Y

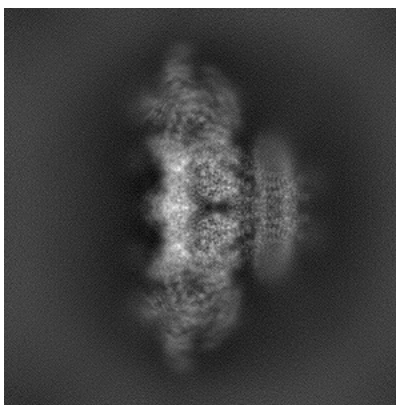


Z

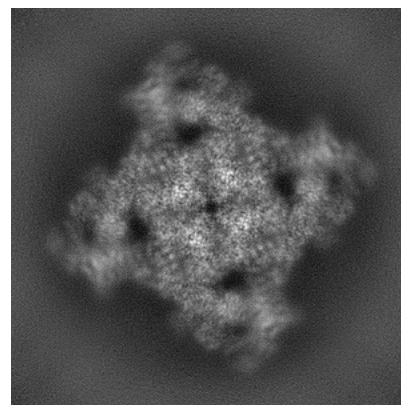
#### 6.1.2 Raw map



X



Y

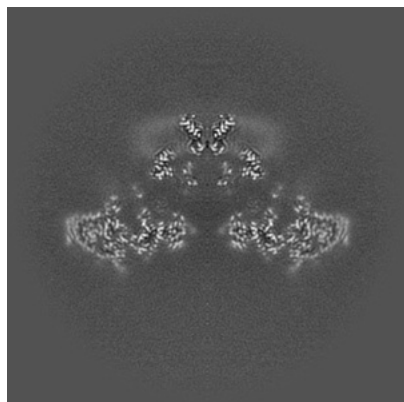


Z

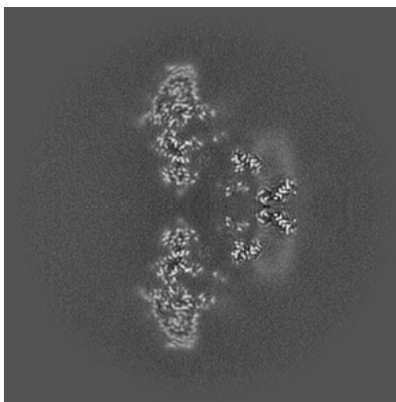
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

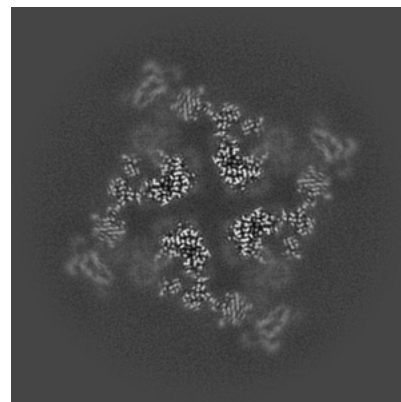
### 6.2.1 Primary map



X Index: 256

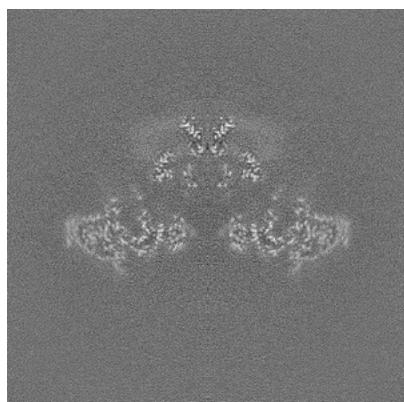


Y Index: 256

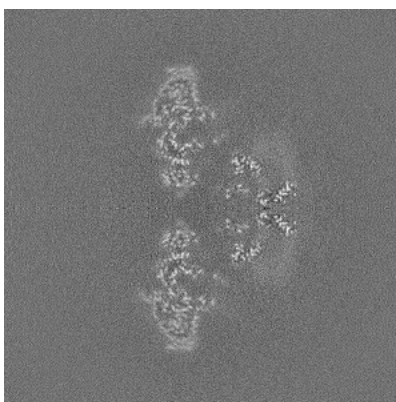


Z Index: 256

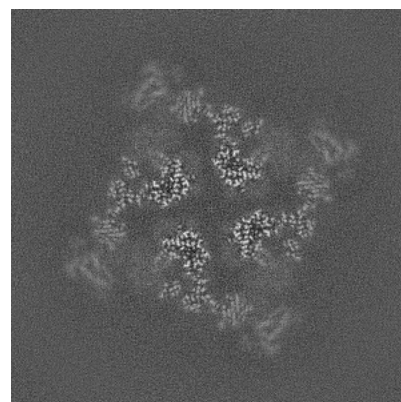
### 6.2.2 Raw map



X Index: 256



Y Index: 256



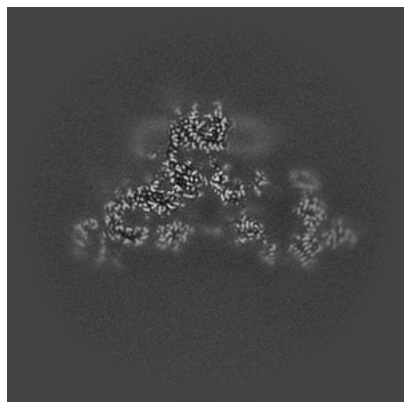
Z Index: 256

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

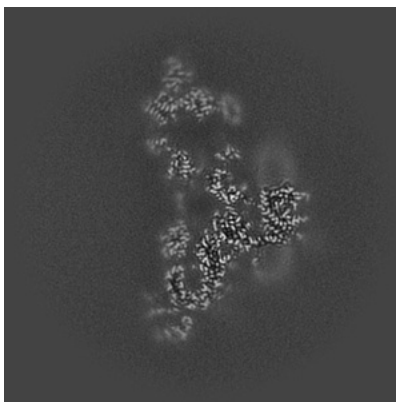


## 6.3 Largest variance slices [i](#)

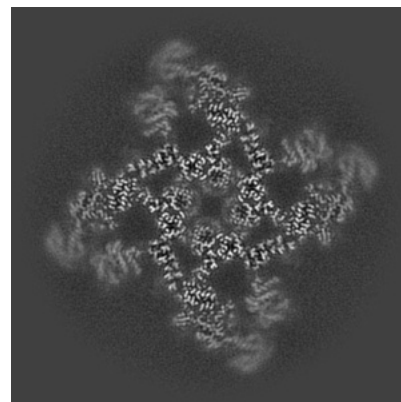
### 6.3.1 Primary map



X Index: 239

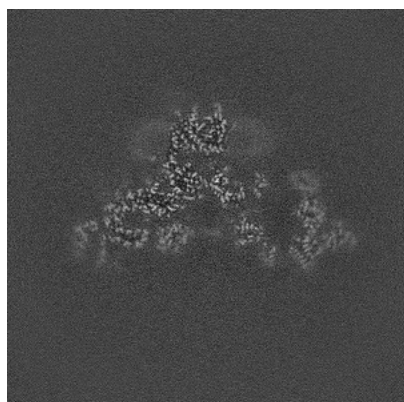


Y Index: 273

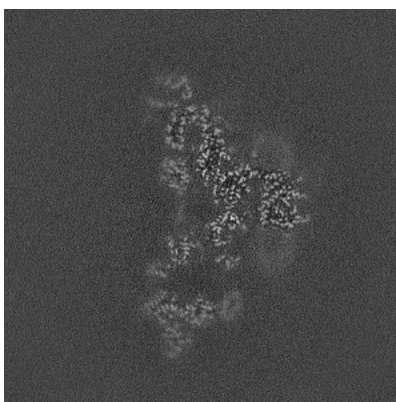


Z Index: 229

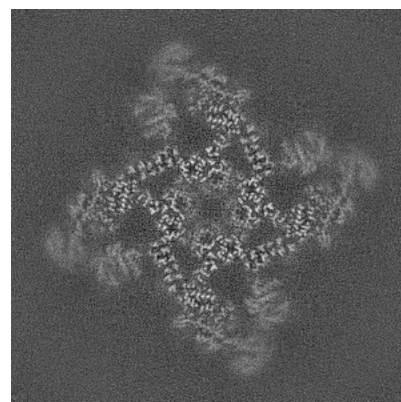
### 6.3.2 Raw map



X Index: 239



Y Index: 239



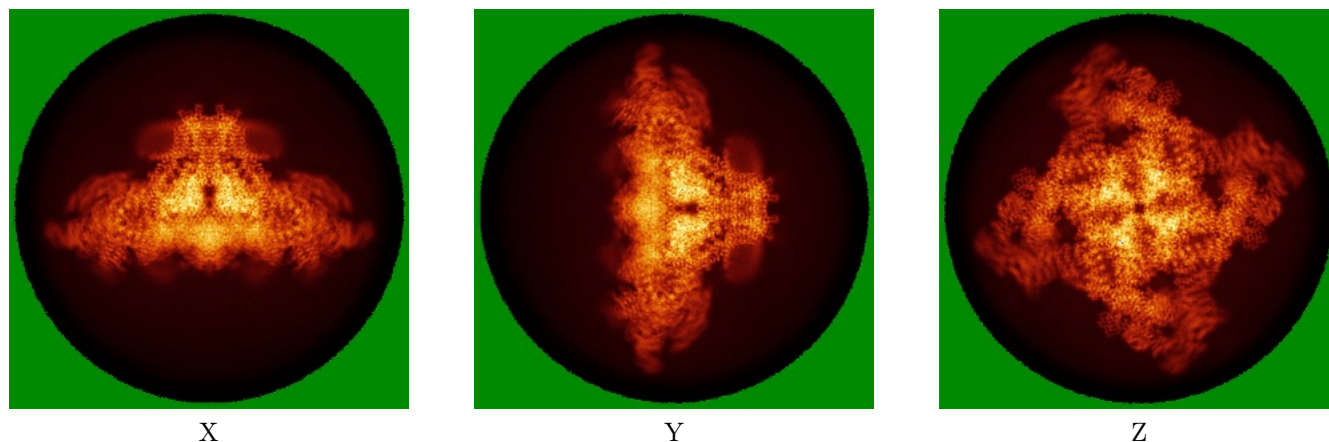
Z Index: 229

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



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

### 6.4.1 Primary map

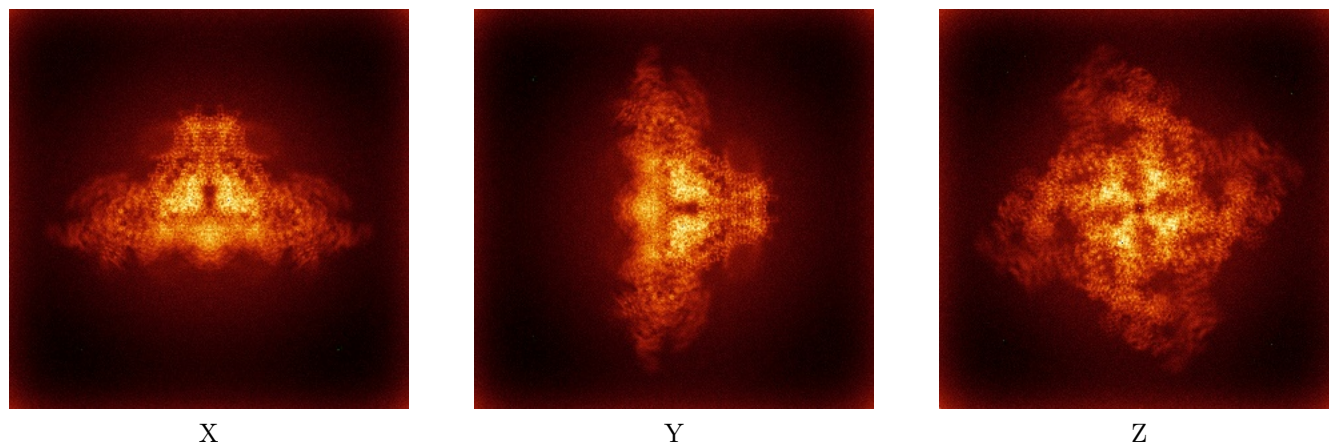


X

Y

Z

### 6.4.2 Raw map



X

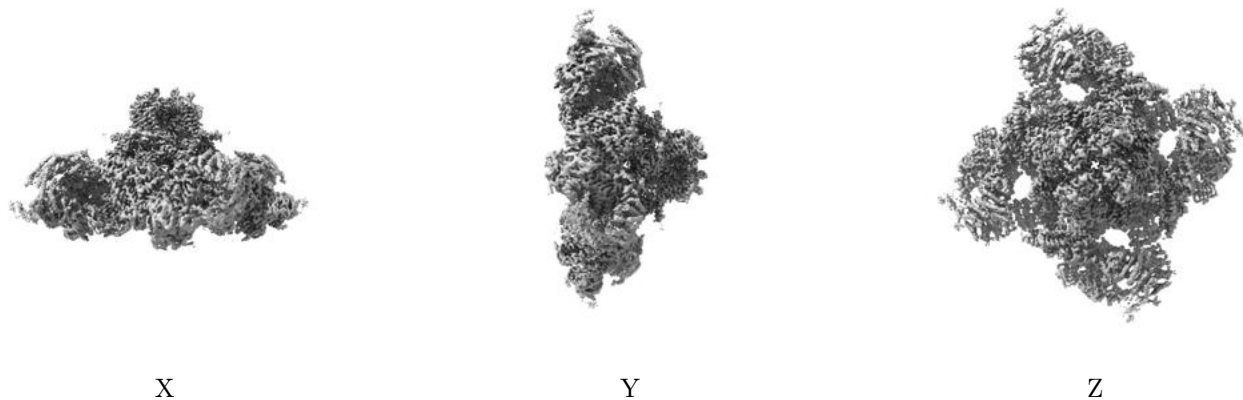
Y

Z

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

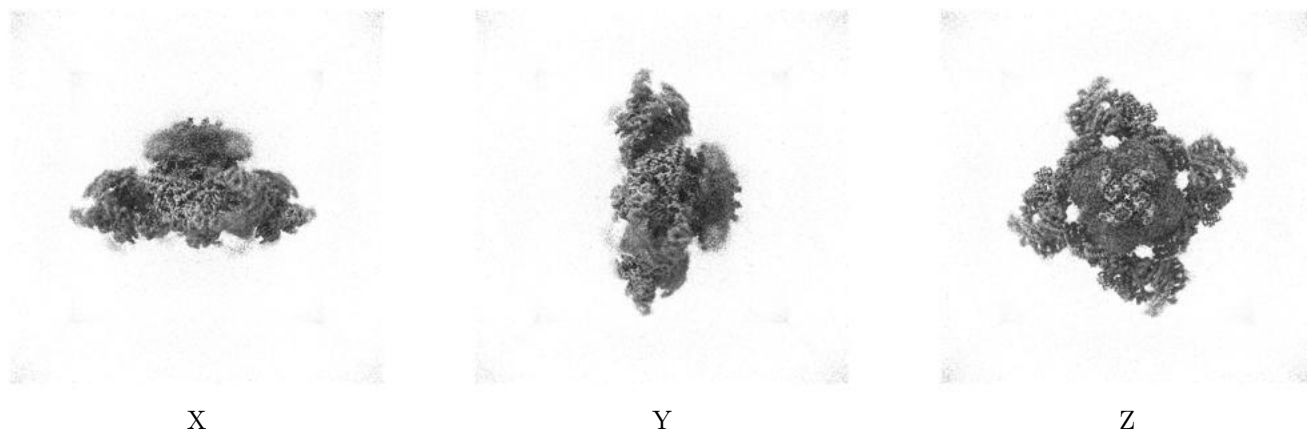
## 6.5 Orthogonal surface views [i](#)

### 6.5.1 Primary map



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

### 6.5.2 Raw map



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

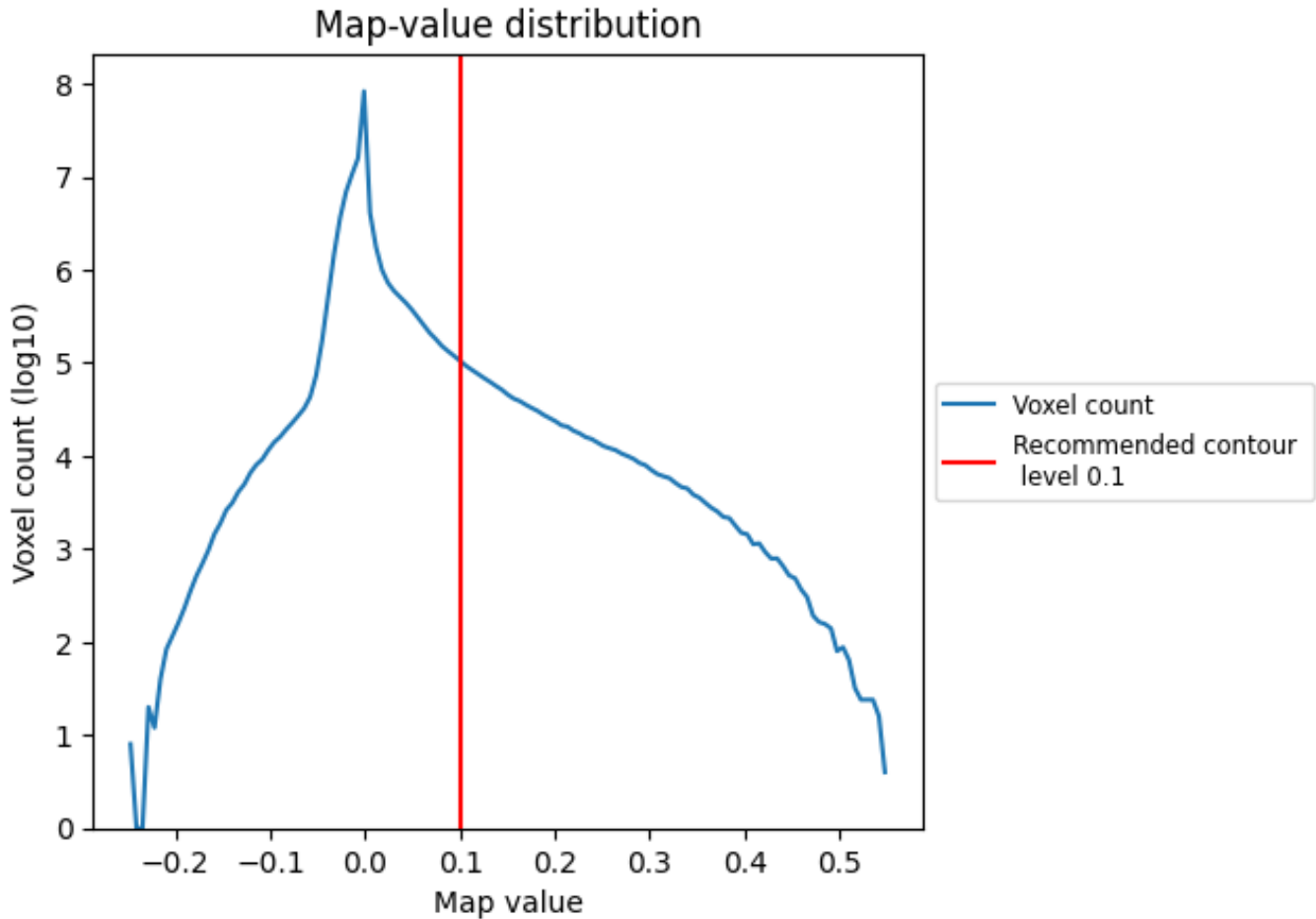
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

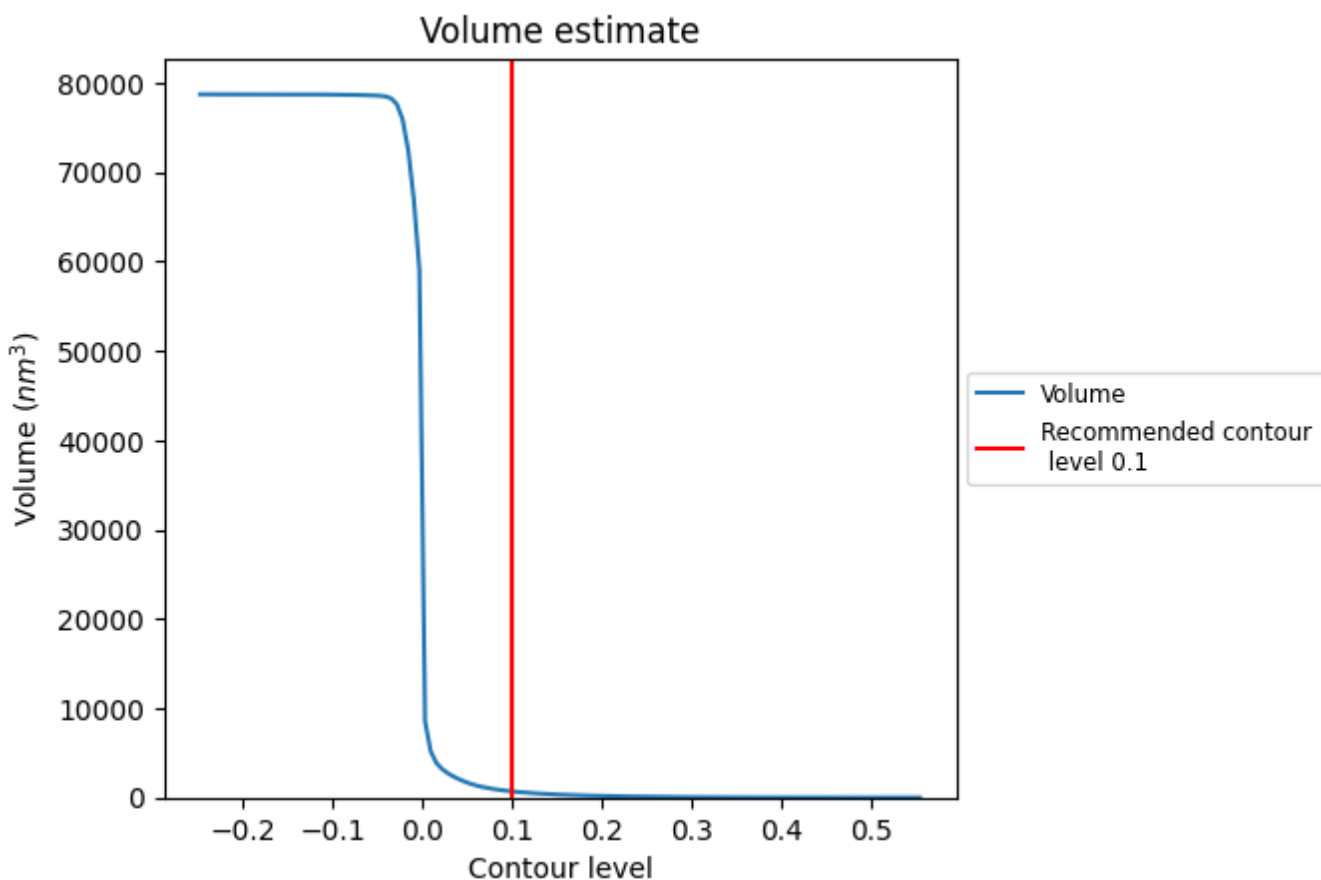
This section contains the results of statistical analysis of the map.

### 7.1 Map-value distribution [i](#)



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

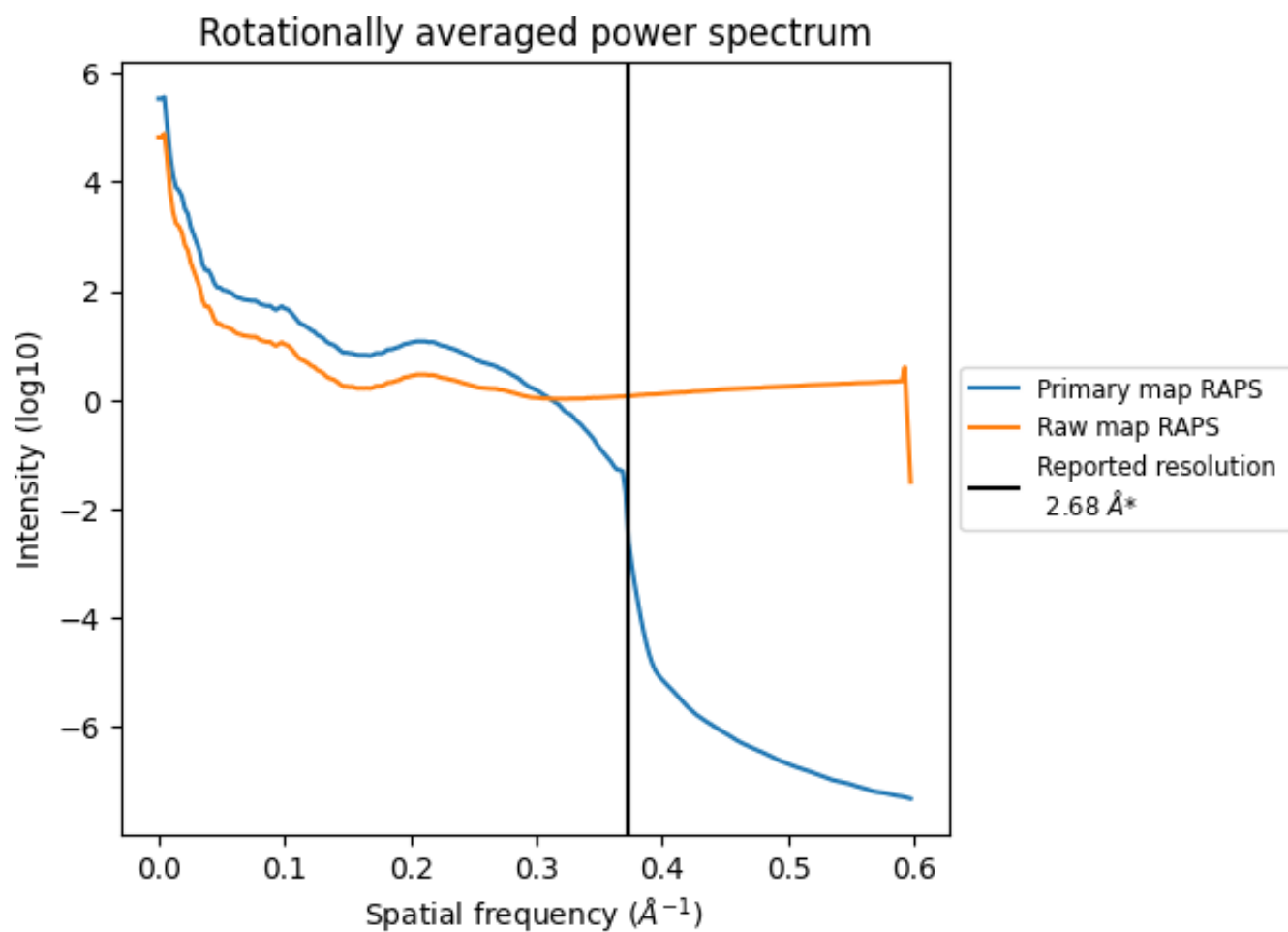
## 7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 692 nm<sup>3</sup>; this corresponds to an approximate mass of 625 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

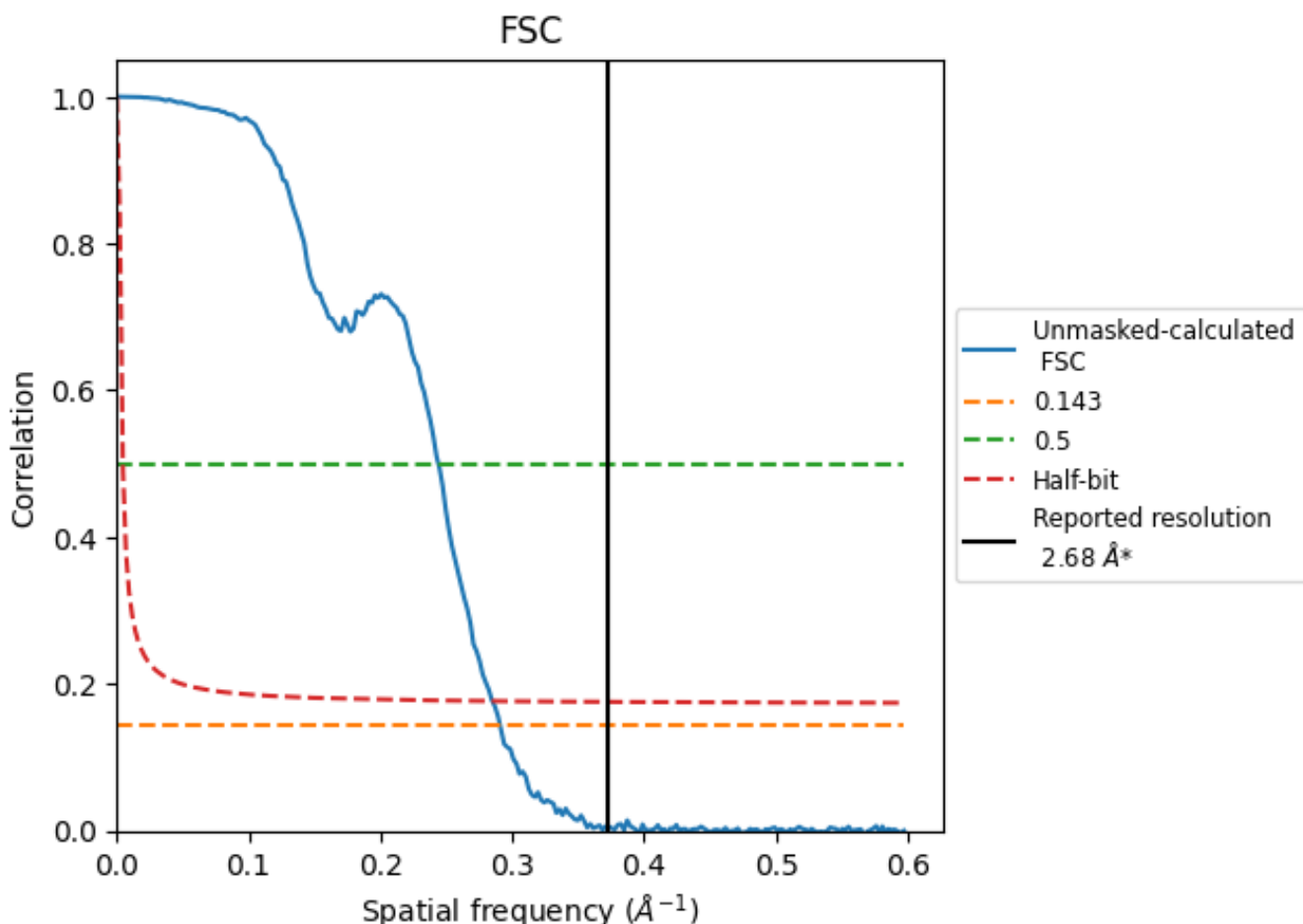


\*Reported resolution corresponds to spatial frequency of 0.373 Å<sup>-1</sup>

## 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 0.373 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

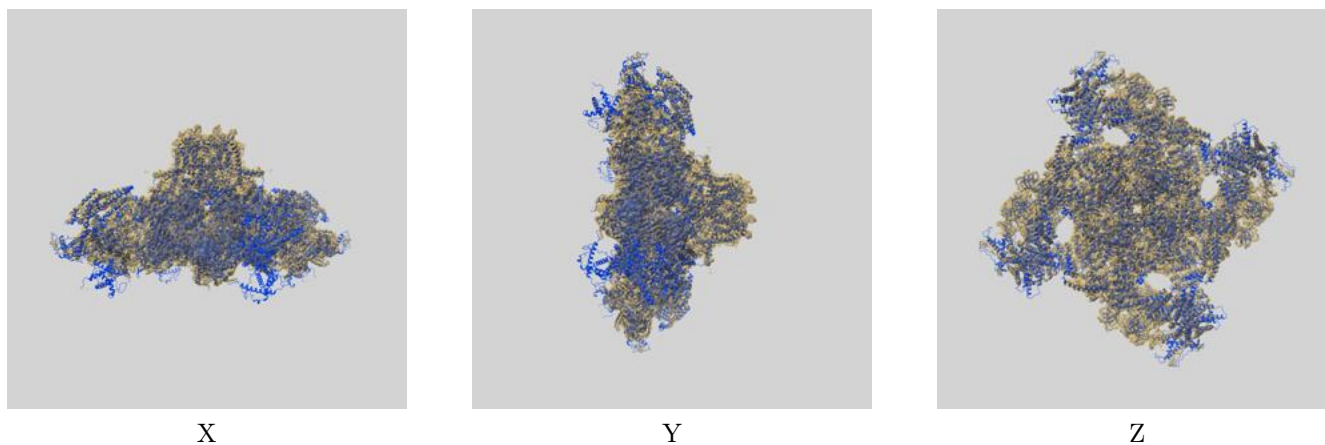
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.68	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.44	4.10	3.51

\*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 3.44 differs from the reported value 2.68 by more than 10 %

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

This section contains information regarding the fit between EMDB map EMD-47385 and PDB model 9E18. Per-residue inclusion information can be found in section 3 on page 7.

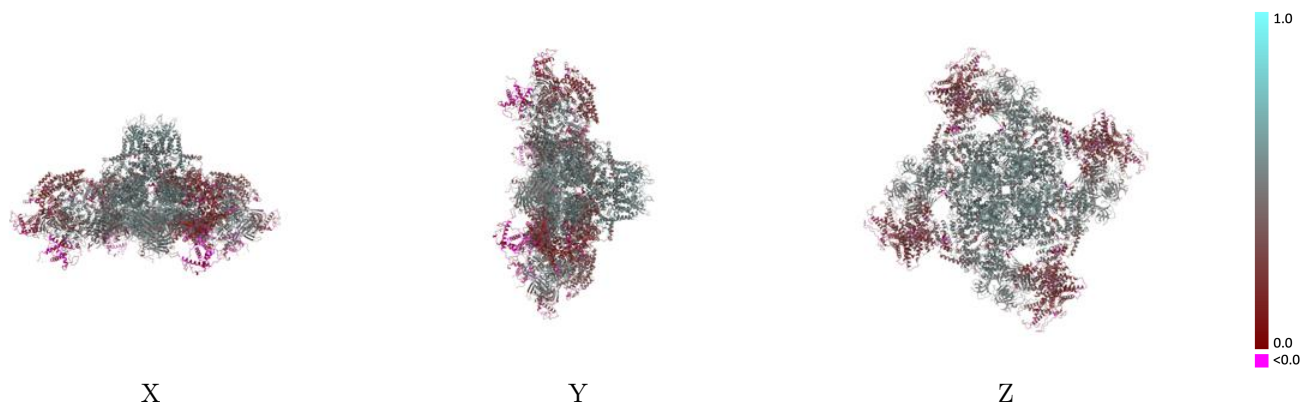
### 9.1 Map-model overlay [i](#)



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

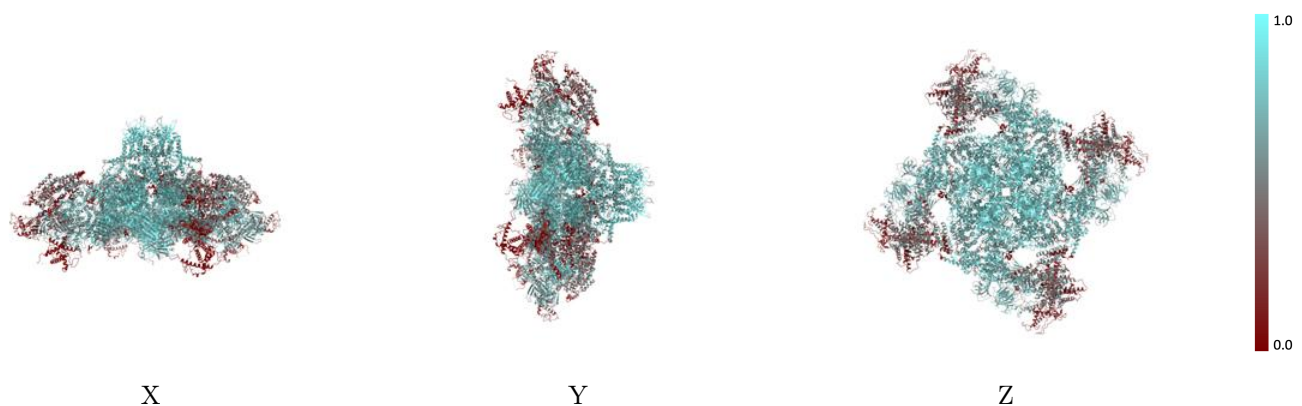


## 9.2 Q-score mapped to coordinate model [i](#)



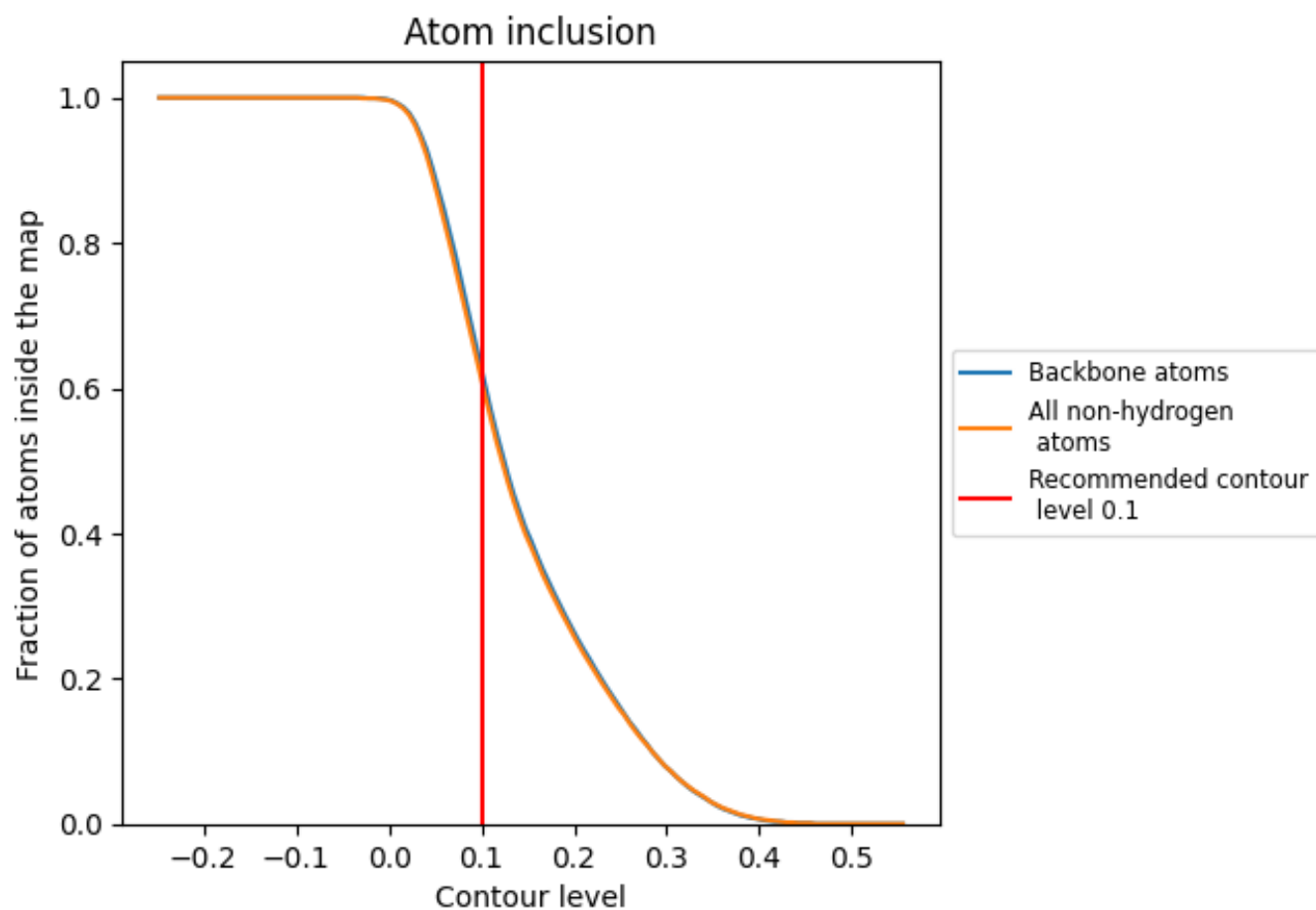
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.1).



















## 9.4 Atom inclusion [i](#)



At the recommended contour level, 63% of all backbone atoms, 61% 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 (0.1) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6110	 0.4160
A	 0.6180	 0.4140
B	 0.6180	 0.4150
C	 0.6180	 0.4140
D	 0.6180	 0.4140
E	 0.6470	 0.5000
F	 0.6500	 0.4970
G	 0.6430	 0.4940
H	 0.6470	 0.4960

