



wwPDB EM Validation Summary Report ⓘ

Nov 4, 2024 – 12:40 am GMT

PDB ID : 8RS0
EMDB ID : EMD-19472
Title : Structure of RyR1 in detergent in primed state in complex with nanobody and FKBP
Authors : Li, C.; Efremov, R.G.
Deposited on : 2024-01-24
Resolution : 3.30 Å(reported)

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

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

EMDB validation analysis : 0.0.1.dev113
Mogul : 1.8.4, CSD as541be (2020)
MolProbity : 4.02b-467
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.39

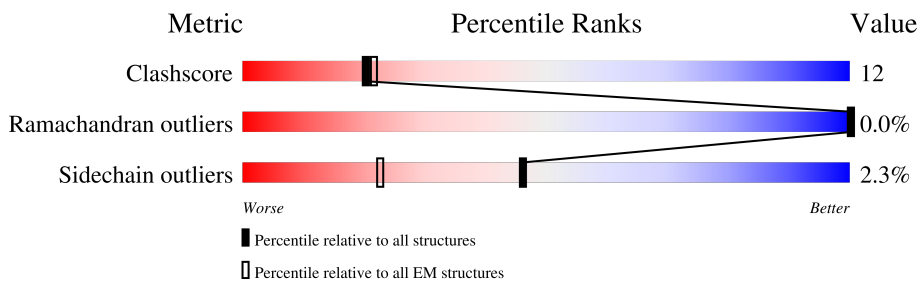
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.30 Å.

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



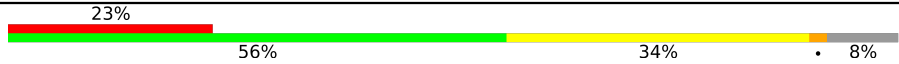

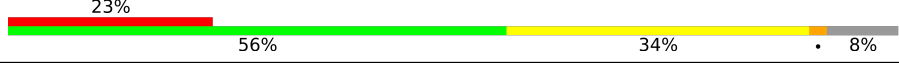
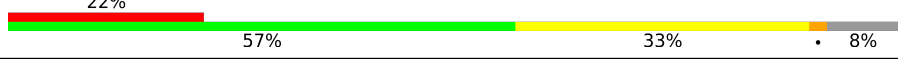
Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

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

Mol	Chain	Length	Quality of chain
1	A	107	
1	D	107	
1	H	107	
1	I	107	
2	B	5027	
2	E	5027	
2	G	5027	
2	J	5027	

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Mol	Chain	Length	Quality of chain
3	C	137	
3	F	137	
3	K	137	
3	M	137	

2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 143570 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a protein called Peptidyl-prolyl cis-trans isomerase FKBP1B.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	107	816	514	144	154	4	0	0
1	D	107	816	514	144	154	4	0	0
1	H	107	816	514	144	154	4	0	0
1	I	107	816	514	144	154	4	0	0

There are 4 discrepancies between the modelled and reference sequences:

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

- Molecule 2 is a protein called Ryanodine receptor 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	4305	34043	21690	5866	6261	226	1	0
2	E	4305	34043	21690	5866	6261	226	1	0
2	G	4319	34149	21751	5887	6284	227	1	0
2	J	4305	34043	21690	5866	6261	226	1	0

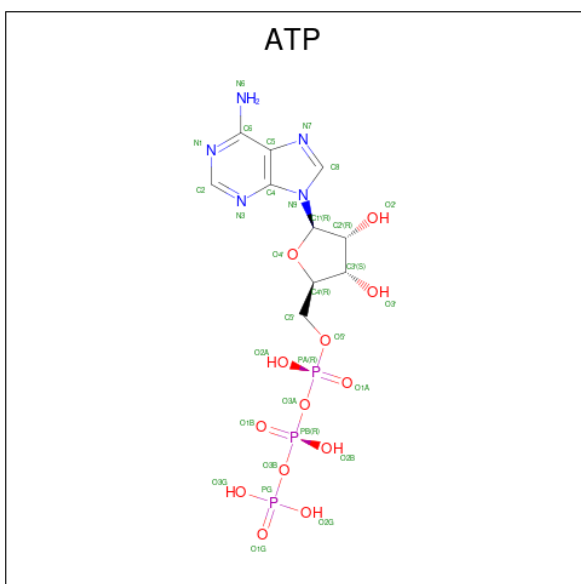
- Molecule 3 is a protein called Nanobody 9657.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	126	Total 960	C 591	N 170	O 194	S 5	0	0
3	F	126	Total 960	C 591	N 170	O 194	S 5	0	0
3	K	126	Total 960	C 591	N 170	O 194	S 5	0	0
3	M	126	Total 960	C 591	N 170	O 194	S 5	0	0

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

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

- Molecule 5 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula: C₁₀H₁₆N₅O₁₃P₃) (labeled as "Ligand of Interest" by depositor).



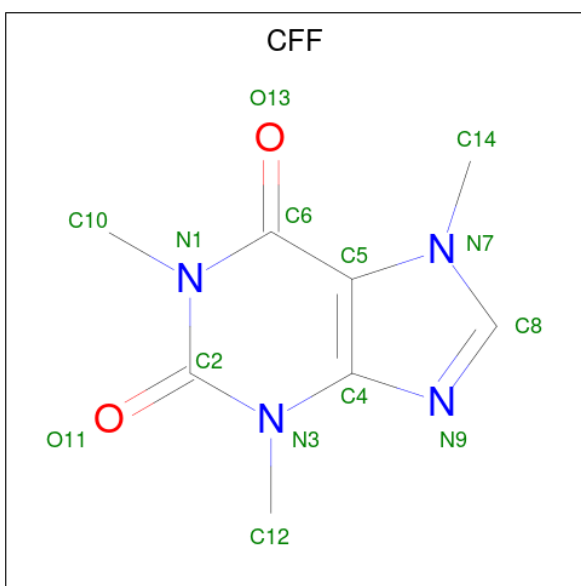
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
5	B	1	Total 31	C 10	N 5	O 13	P 3	0

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

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



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

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

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

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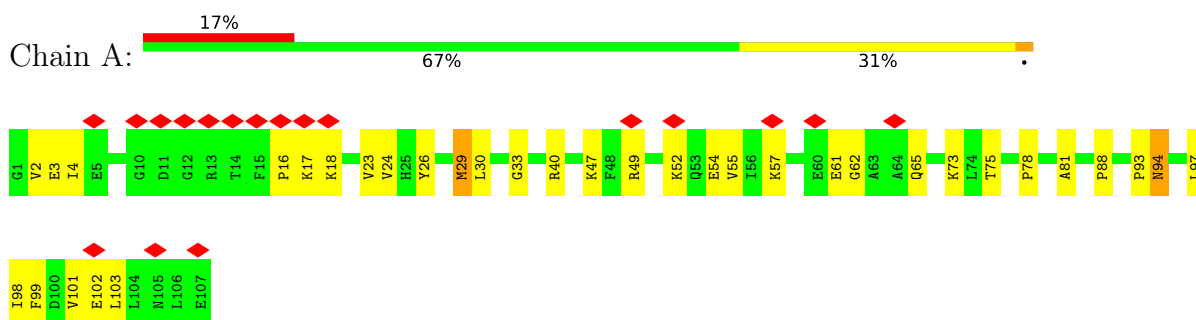
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Mol	Chain	Residues	Atoms		AltConf
7	E	1	Total 1	Ca 1	0
7	G	1	Total 1	Ca 1	0
7	J	1	Total 1	Ca 1	0

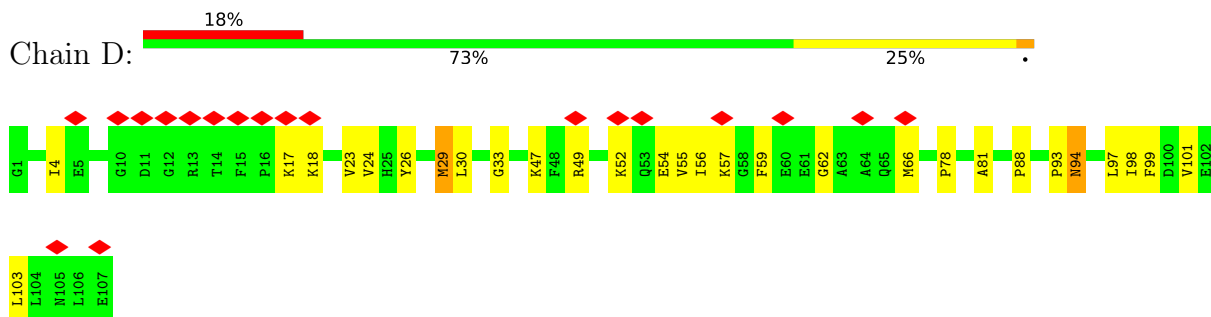
3 Residue-property plots [i](#)

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

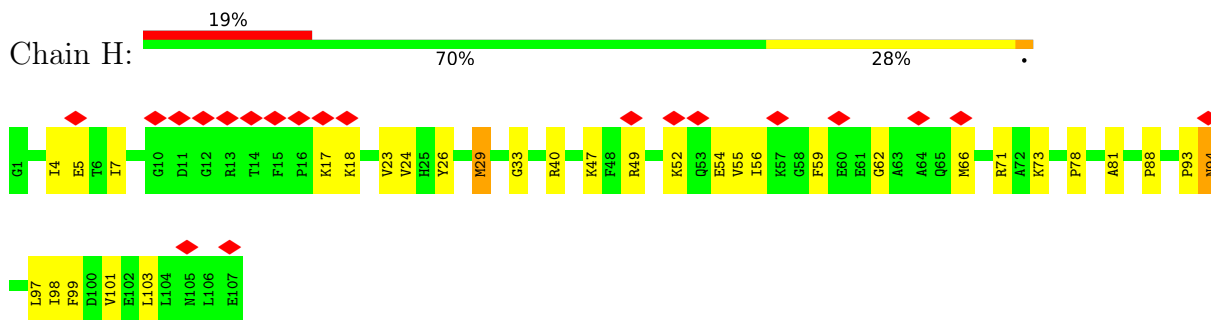
- Molecule 1: Peptidyl-prolyl cis-trans isomerase FKBP1B



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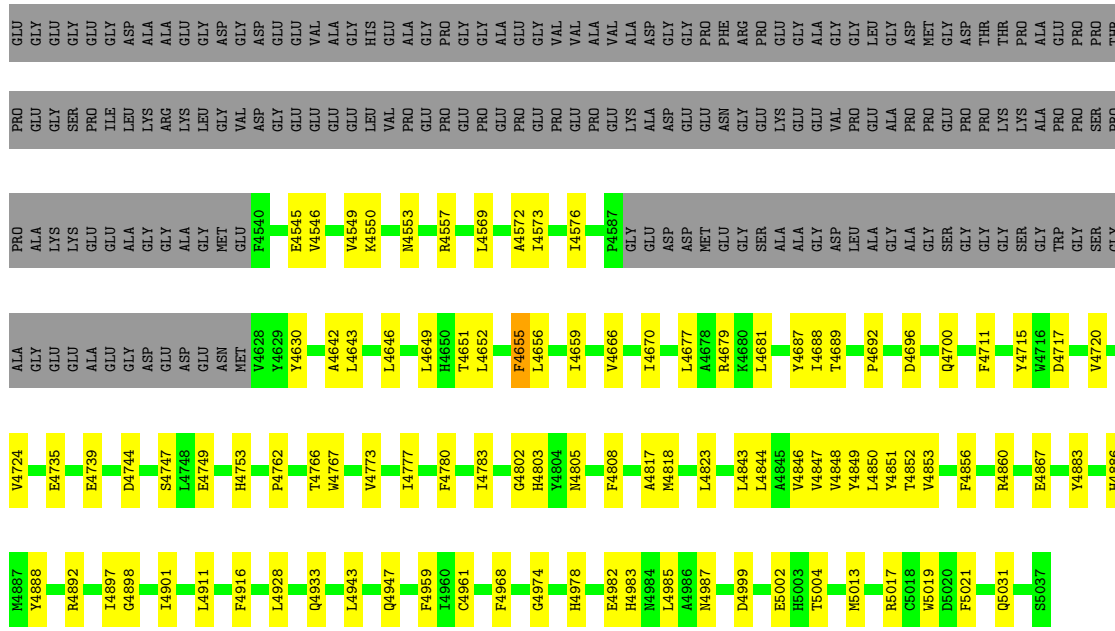
- Molecule 1: Peptidyl-prolyl cis-trans isomerase FKBP1B



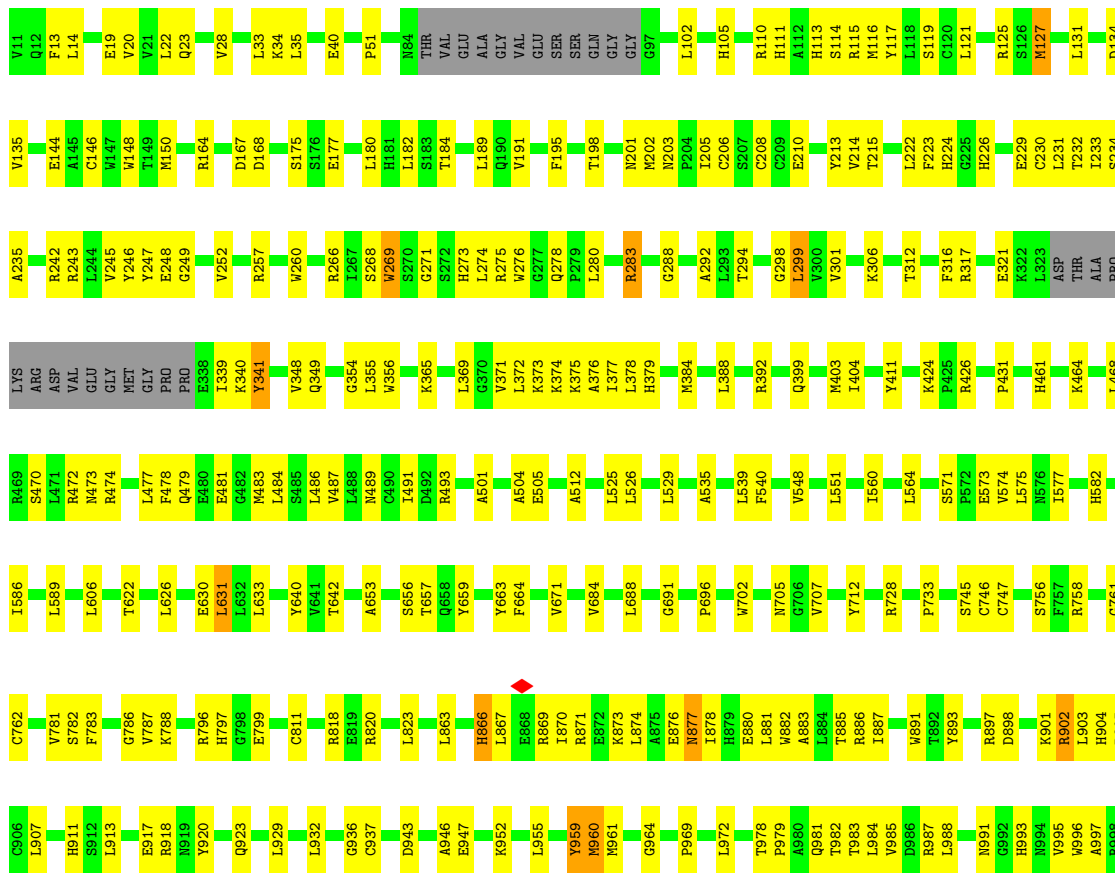
- Molecule 1: Peptidyl-prolyl cis-trans isomerase FKBP1B



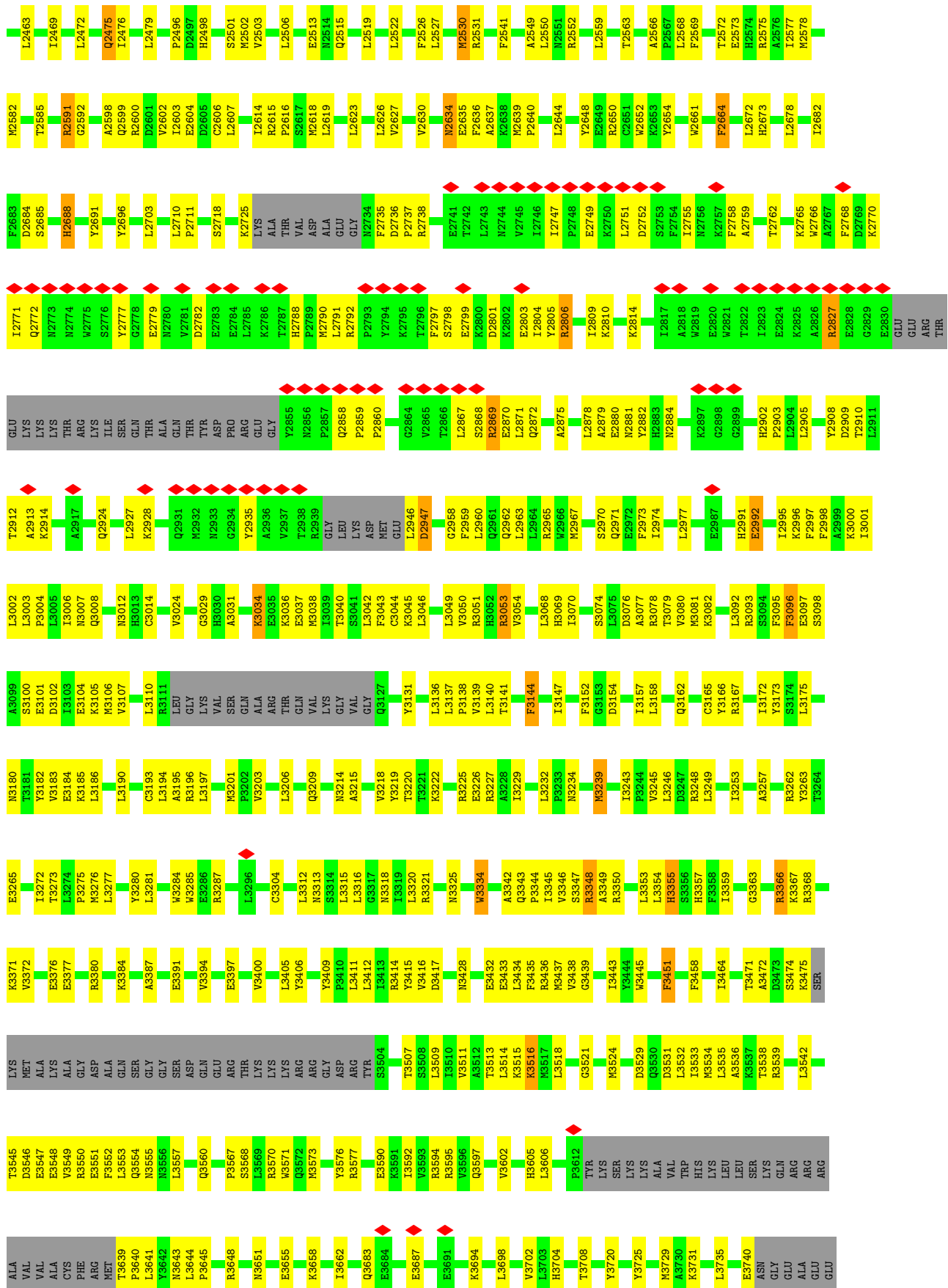
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ALA	GLY	THR	R4189	M4044	E3879	E3740	M3534	H3385	Q3162	T3079	E2987	R2897
ALA	GLY	THR	R4202	V4045	F3880	ASN	L3536	S3356	G3166	V3080	H2991	G2898
ALA	GLY	THR	R4203	L4048	F3887	GLY	K3537	F3358	C3165	M3081	E2982	G2899
ALA	GLY	THR	Q4204	V4055	R3538	GLN	T3538	F3358	Y3166	K3082	I2995	G2899
ALA	GLY	THR	M4207	K4060	R3539	ARG	R3539	I3359	R3167	L3092	K2996	H2902
ALA	GLY	THR	P4208	K4060	L3542	ARG	L3542	S3474	I3172	S3093	K2996	F2903
ALA	GLY	THR	K4211	D4063	D3546	ALA	D3546	SER	S3173	F3095	F2997	L2904
ALA	GLY	THR	R4215	M4064	E3548	ALA	E3548	MET	S3174	F3096	F2998	L2905
ALA	GLY	THR	E4232	K4067	V3549	ALA	V3549	ALA	L3175	E3097	K3000	Y2908
ALA	GLY	THR	C4238	K4088	R3550	CYS	R3550	LYS	M3180	S3098	I3001	D2909
ALA	GLY	THR	F4239	K4089	P3551	PHE	P3551	ALA	T3181	L3002	I3001	T2910
ALA	GLY	THR	D4240	F4077	Q3761	ARG	Q3761	GLY	Y3182	E3101	L3003	T2910
ALA	GLY	THR	F4241	F4077	S3768	MET	S3768	ASP	F3183	D3102	P3004	L2911
ALA	GLY	THR	F4242	Y4080	H3771	T3639	T3639	ALA	L3274	L3103	L3005	A2913
ALA	GLY	THR	F4243	L4087	L3780	P3640	P3640	ALA	F3275	E3104	I3006	K2914
ALA	GLY	THR	F4244	K4090	Q3781	L3641	L3641	GLN	M3276	K3105	N3007	K2914
ALA	GLY	THR	M4245	K4091	M3782	L3641	L3641	SER	L3277	K3106	Q3008	K2914
ALA	GLY	THR	E4253	M4096	R3648	GLY	R3648	GLY	L3190	V3107	Q2924	Q2924
ALA	GLY	THR	PRO	Q4100	N3809	GLN	N3809	ASP	C3193	L3110	H3012	L2927
ALA	GLY	THR	GLY	Q4100	V3812	ARG	V3812	ARG	L3194	R3111	N3013	L2927
ALA	GLY	THR	GLY	T4104	E3655	THR	E3655	THR	A3195	LEU	H3013	K2928
ALA	GLY	THR	PRO	Q4105	K3658	LYS	K3658	THR	R3196	GLY	Q2931	Q2931
ALA	GLY	THR	GLY	T4108	I3662	T3662	I3662	ARG	L3197	LYS	H2932	H2932
ALA	GLY	THR	GLY	Q4109	Q3683	ASP	Q3683	ASP	G3209	VAL	H2933	H2933
ALA	GLY	THR	GLY	F4110	E3684	THR	E3684	THR	M3201	SER	H2934	H2934
ALA	GLY	THR	GLY	S4115	E3687	THR	E3687	THR	P3202	GLN	G2934	G2934
ALA	GLY	THR	GLY	D4118	E3687	THR	E3687	THR	V3203	ALA	Y2935	Y2935
ALA	GLY	THR	GLY	E4119	E3691	THR	E3691	THR	K3034	ARG	A2936	A2936
ALA	GLY	THR	GLY	M4120	E3691	THR	E3691	THR	L3206	THR	E3035	E3035
ALA	GLY	THR	GLY	E4121	E3691	THR	E3691	THR	L3207	GLN	K3036	K3036
ALA	GLY	THR	GLY	M4122	E3691	THR	E3691	THR	P3208	VAL	E3037	E3037
ALA	GLY	THR	GLY	I4123	E3691	THR	E3691	THR	Q3209	LYS	M3038	M3038
ALA	GLY	THR	GLY	M4130	E3691	THR	E3691	THR	N3214	VAL	I3039	I3039
ALA	GLY	THR	GLY	N4130	E3691	THR	E3691	THR	A3215	VAL	S3041	S3041
ALA	GLY	THR	GLY	P4135	E3691	THR	E3691	THR	Y3218	GLY	F3043	F3043
ALA	GLY	THR	GLY	D4138	E3691	THR	E3691	THR	T3220	GLY	C3044	C3044
ALA	GLY	THR	GLY	R4159	E3691	THR	E3691	THR	K3221	VAL	L3046	L3046
ALA	GLY	THR	GLY	L4160	E3691	THR	E3691	THR	K3222	L3136	L3049	L3049
ALA	GLY	THR	GLY	R4161	E3691	THR	E3691	THR	R3225	F3138	V3050	V3050
ALA	GLY	THR	GLY	L4164	E3691	THR	E3691	THR	E3226	V3139	R3051	R3051
ALA	GLY	THR	GLY	P4176	E3691	THR	E3691	THR	R3227	L3140	H3052	H3052
ALA	GLY	THR	GLY	A4041	E3691	THR	E3691	THR	A3228	T3141	V3054	V3054
ALA	GLY	THR	GLY	R4042	E3691	THR	E3691	THR	F3144	L2963	L2964	L2964
ALA	GLY	THR	GLY		E3691	THR	E3691	THR	L3147	R2965	R2966	R2966
ALA	GLY	THR	GLY		E3691	THR	E3691	THR	F3152	H3069	H3070	H3070
ALA	GLY	THR	GLY		E3691	THR	E3691	THR	S3074	S3074	S3074	S3074
ALA	GLY	THR	GLY		E3691	THR	E3691	THR	D3075	L3075	L3075	L3075
ALA	GLY	THR	GLY		E3691	THR	E3691	THR	D3154	F2972	F2973	F2973
ALA	GLY	THR	GLY		E3691	THR	E3691	THR	I3243	I2974	I2974	I2974
ALA	GLY	THR	GLY		E3691	THR	E3691	THR	L3353	L2977	L2977	L2977

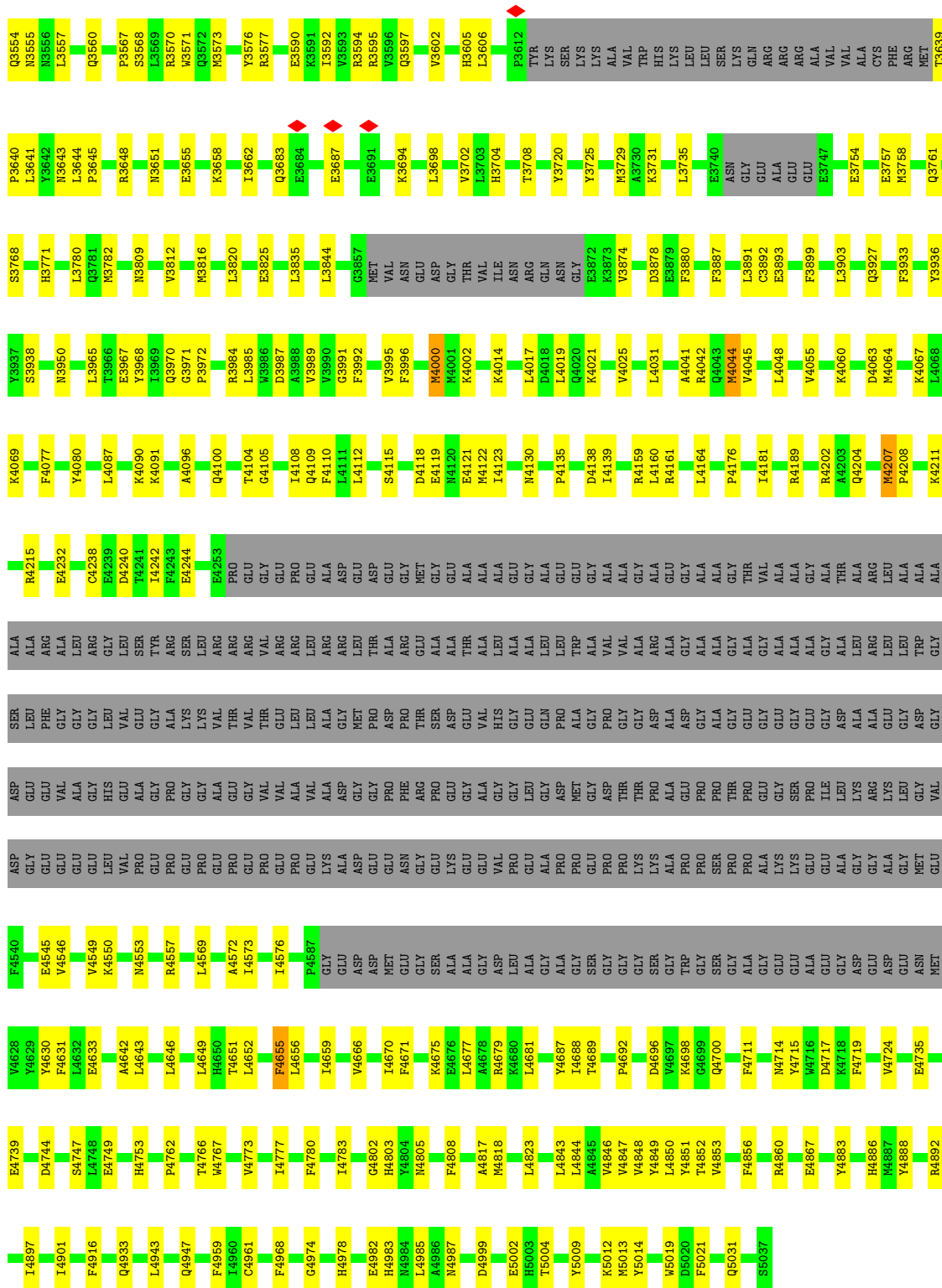


• Molecule 2: Ryanodine receptor 1



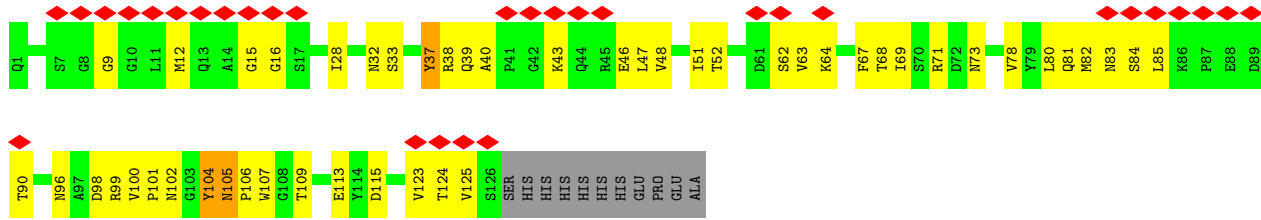
V4024	D3878	L3735	H3451	H3555	Y3166	L3092	I2995	P2903	R2827	T2762
V4025	E3879	L3533	F3458	S3566	R3167	K3093	K2996	L2904	E2828	K2765
G4038	F3880	M3534	F3458	H3357	Y3173	S3094	F2997	L2905	G2829	K2766
A4041	F3887	L3535	I3464	F3358	G3174	F3095	F2999	D2908	E2830	A2767
B4042	L3891	L3536	ASN	I3359	L3175	F3096	A2999	D2909	F2768	F2768
Q4043	L3892	T3538	A3472	G3363	M3180	E3097	K3000	T2910	G2769	D2769
M4044	L3893	R3539	S3474	R3366	T3181	S3098	I3001	L2911	K2770	K2770
V4045	L3542	L3540	D3475	K3368	Y3182	S3100	L3002	T2912	L2771	L2771
L4048	D3546	L3541	SER	R3368	Y3183	E3101	P3004	L2913	Q2772	Q2772
V4055	E3547	L3542	LYS	K3371	K3184	D3102	L3005	L2914	N2773	N2773
K4060	E3548	L3543	MET	V3372	E3185	T3103	I3006	N2774	N2774	N2774
D4063	V3549	E3549	ALA	E3376	L3190	K3105	N3007	N2775	N2775	N2775
M4064	R3551	R3550	GLY	E3377	L3191	M3106	Q3008	S2776	S2776	S2776
K4067	F3552	F3551	ASP	R3380	C3193	H3012	N3012	Y2777	Y2777	Y2777
K4069	L3553	L3552	ALA	L3281	L3194	H3013	H3013	G2778	G2778	G2778
F4077	Q3554	Q3553	GLN	L3281	A3195	R3110	R3110	E2779	E2779	E2779
Y4080	N3555	N3554	SER	W3284	R3196	LEU	ALA	N2780	N2780	N2780
L4087	L3557	L3556	GLY	W3285	L3197	GLY	ALA	V2781	V2781	V2781
K4090	L3557	L3556	GLY	E3286	L3197	LYS	GLN	D2782	D2782	D2782
A4096	Q3560	Q3559	ASP	R3287	M3201	VAL	H3030	E2783	E2783	E2783
Q4100	Q3560	Q3559	ASP	L3296	V3203	SER	A3031	E2784	E2784	E2784
T4104	P3567	P3566	GLN	C3304	L3206	ALA	K3034	L2785	L2785	L2785
G4105	S3568	S3567	ARG	C3304	E3207	ARG	E3035	K2786	K2786	K2786
I4108	L3569	L3568	THR	V3307	P3208	THR	K3036	N2787	N2787	N2787
Q4109	R3570	R3569	LYS	V3307	G3209	GLN	G3029	H2788	H2788	H2788
F4110	W3571	W3570	LYS	T3308	Q3209	VAL	M3038	N2789	N2789	N2789
L4111	Q3572	Q3571	LYS	H3311	N3214	LYS	I3039	L2790	L2790	L2790
L4112	M3573	M3572	ARG	L3311	A3215	GLY	L3040	L2791	L2791	L2791
S4115	Y3576	Y3575	GLY	M3313	A3215	VAL	S3041	L2792	L2792	L2792
D4118	R3577	R3576	ASP	S3314	Y3219	VAL	F3043	P2793	P2793	P2793
E4119	E3590	E3589	ARG	L3315	Y3219	GLY	C3044	P2794	P2794	P2794
M4120	R3591	R3590	TYR	L3316	T3220	GLY	K3045	K2795	K2795	K2795
K4014	L3592	L3591	S3504	G3317	T3221	GLY	L3046	L2796	L2796	L2796
L4017	V3602	V3601	T3507	I3318	K3222	L3136	D2947	G2864	G2864	G2864
L4123	H3605	H3604	T3513	I3318	L3232	L3137	G2958	V2865	V2865	V2865
M4130	L3606	L3605	L3514	L3320	P3233	P3138	F2959	V2866	V2866	V2866
P4135	H3704	H3703	K3516	R3321	N3234	V3139	L2960	T2867	T2867	T2867
D4138	H3704	H3703	F3435	N3325	M3239	L3140	Q2962	L2801	L2801	L2801
M4021	T3708	T3707	M3437	W3334	I3229	T3141	R2868	D2802	D2802	D2802
D4022	Y3720	Y3719	M3437	A3342	L3243	F3144	E2870	K2862	K2862	K2862
M4023	Y3725	Y3724	M3437	Q3343	P3244	I3147	L2871	E2803	E2803	E2803
K3872	L3725	L3724	M3437	P3344	V3245	F3152	L2872	L2804	L2804	L2804
K3873	L3725	L3724	M3437	I3345	V3245	D3154	A2875	Y2805	Y2805	Y2805
A3730	L3725	L3724	M3437	S3347	L2246	L3158	L2875	K2814	K2814	K2814
V3874	ALA	ALA	W3444	R3348	D3247	L3157	L2876	I2817	I2817	I2817
	TRP	TRP	W3445	A3350	R3248	L3158	L2877	A2818	A2818	A2818
			D3531	R3350	K3081	Q3162	L2977	E2819	E2819	E2819
				L3353	M3081	C3165	L2977	N2884	N2884	N2884
				L3354	K3082		L2977	Y2882	Y2882	Y2882
							L2977	H2883	H2883	H2883
							L2977	N2884	N2884	N2884
							L2977	K2897	K2897	K2897
							L2977	G2898	G2898	G2898
							L2977	G2899	G2899	G2899
							L2977	H2902	H2902	H2902



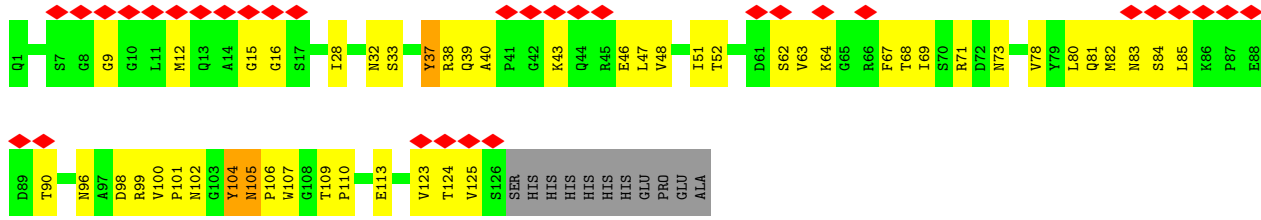


• Molecule 3: Nanobody 9657

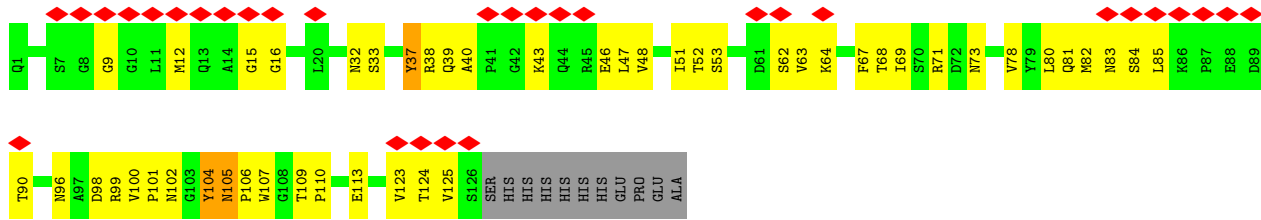




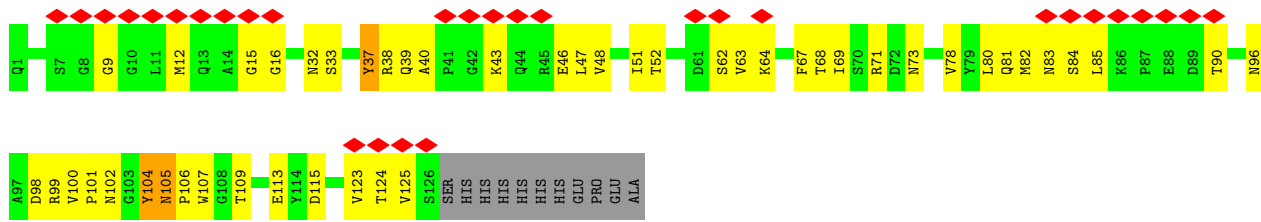
• Molecule 3: Nanobody 9657



• Molecule 3: Nanobody 9657



• Molecule 3: Nanobody 9657



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	145830	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	JEOL CRYO ARM 300	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	60	Depositor
Minimum defocus (nm)	1500	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	4.519	Depositor
Minimum map value	-0.106	Depositor
Average map value	0.057	Depositor
Map value standard deviation	0.125	Depositor
Recommended contour level	0.3	Depositor
Map size (\AA)	500.64, 500.64, 500.64	wwPDB
Map dimensions	336, 336, 336	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	1.49, 1.49, 1.49	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.27	0/831	0.55	0/1118
1	D	0.27	0/831	0.56	0/1118
1	H	0.27	0/831	0.56	0/1118
1	I	0.27	0/831	0.56	0/1118
2	B	0.25	0/34814	0.50	1/47183 (0.0%)
2	E	0.25	0/34814	0.50	1/47183 (0.0%)
2	G	0.25	0/34921	0.50	1/47329 (0.0%)
2	J	0.25	0/34814	0.50	1/47183 (0.0%)
3	C	0.28	0/979	0.58	0/1329
3	F	0.28	0/979	0.58	0/1329
3	K	0.28	0/979	0.58	0/1329
3	M	0.28	0/979	0.58	0/1329
All	All	0.25	0/146603	0.50	4/198666 (0.0%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	1503	PRO	N-CA-CB	5.74	110.19	103.30
2	J	1503	PRO	N-CA-CB	5.71	110.15	103.30
2	B	1503	PRO	N-CA-CB	5.68	110.11	103.30
2	G	1503	PRO	N-CA-CB	5.66	110.09	103.30

There are no chirality outliers.

There are no planarity outliers.

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	816	0	818	28	0
1	D	816	0	818	23	0
1	H	816	0	818	25	0
1	I	816	0	818	24	0
2	B	34043	0	33446	799	0
2	E	34043	0	33446	803	0
2	G	34149	0	33547	812	0
2	J	34043	0	33446	792	0
3	C	960	0	909	36	0
3	F	960	0	909	41	0
3	K	960	0	909	41	0
3	M	960	0	909	40	0
4	B	1	0	0	0	0
4	E	1	0	0	0	0
4	G	1	0	0	0	0
4	J	1	0	0	0	0
5	B	31	0	12	0	0
5	E	31	0	12	0	0
5	G	31	0	12	0	0
5	J	31	0	12	0	0
6	B	14	0	10	0	0
6	E	14	0	10	0	0
6	G	14	0	10	0	0
6	J	14	0	10	0	0
7	B	1	0	0	0	0
7	E	1	0	0	0	0
7	G	1	0	0	0	0
7	J	1	0	0	0	0
All	All	143570	0	140881	3411	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 12.

The worst 5 of 3411 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:4961:CYS:SG	2:B:4983:HIS:CE1	2.61	0.94
2:G:4961:CYS:SG	2:G:4983:HIS:CE1	2.60	0.93
2:E:4961:CYS:SG	2:E:4983:HIS:CE1	2.60	0.93
3:K:100:VAL:HG22	3:K:105:ASN:HD22	1.34	0.92
2:J:4961:CYS:SG	2:J:4983:HIS:CE1	2.60	0.92

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	105/107 (98%)	100 (95%)	5 (5%)	0	100	100
1	D	105/107 (98%)	103 (98%)	2 (2%)	0	100	100
1	H	105/107 (98%)	101 (96%)	4 (4%)	0	100	100
1	I	105/107 (98%)	103 (98%)	2 (2%)	0	100	100
2	B	4264/5027 (85%)	4160 (98%)	103 (2%)	1 (0%)	100	100
2	E	4264/5027 (85%)	4162 (98%)	102 (2%)	0	100	100
2	G	4280/5027 (85%)	4175 (98%)	105 (2%)	0	100	100
2	J	4264/5027 (85%)	4161 (98%)	103 (2%)	0	100	100
3	C	124/137 (90%)	116 (94%)	8 (6%)	0	100	100
3	F	124/137 (90%)	116 (94%)	8 (6%)	0	100	100
3	K	124/137 (90%)	116 (94%)	8 (6%)	0	100	100
3	M	124/137 (90%)	116 (94%)	8 (6%)	0	100	100
All	All	17988/21084 (85%)	17529 (97%)	458 (2%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	375	LYS

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	87/88 (99%)	85 (98%)	2 (2%)	45	68
1	D	87/88 (99%)	85 (98%)	2 (2%)	45	68
1	H	87/88 (99%)	85 (98%)	2 (2%)	45	68
1	I	87/88 (99%)	85 (98%)	2 (2%)	45	68
2	B	3662/4270 (86%)	3580 (98%)	82 (2%)	47	69
2	E	3662/4270 (86%)	3581 (98%)	81 (2%)	47	69
2	G	3674/4270 (86%)	3594 (98%)	80 (2%)	47	69
2	J	3662/4270 (86%)	3580 (98%)	82 (2%)	47	69
3	C	103/114 (90%)	99 (96%)	4 (4%)	27	55
3	F	103/114 (90%)	99 (96%)	4 (4%)	27	55
3	K	103/114 (90%)	99 (96%)	4 (4%)	27	55
3	M	103/114 (90%)	99 (96%)	4 (4%)	27	55
All	All	15420/17888 (86%)	15071 (98%)	349 (2%)	46	68

5 of 349 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	G	3348	ARG
2	J	2392	ARG
2	G	3933	PHE
2	J	379	HIS
2	J	2914	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 53 such sidechains are listed below:

Mol	Chain	Res	Type
2	G	23	GLN
2	G	3605	HIS
3	C	105	ASN
2	G	203	ASN
2	G	1300	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$
5	ATP	J	5102	-	26,33,33	0.60	0	31,52,52	0.81	2 (6%)
6	CFF	B	5103	-	8,15,15	2.39	3 (37%)	8,23,23	1.16	1 (12%)
6	CFF	E	5103	-	8,15,15	2.39	3 (37%)	8,23,23	1.18	1 (12%)
5	ATP	G	5102	-	26,33,33	0.59	0	31,52,52	0.82	2 (6%)
6	CFF	J	5103	-	8,15,15	2.40	3 (37%)	8,23,23	1.18	1 (12%)
6	CFF	G	5103	-	8,15,15	2.40	3 (37%)	8,23,23	1.16	1 (12%)
5	ATP	B	5102	-	26,33,33	0.59	0	31,52,52	0.81	2 (6%)
5	ATP	E	5102	-	26,33,33	0.59	0	31,52,52	0.81	2 (6%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	ATP	J	5102	-	-	7/18/38/38	0/3/3/3
6	CFF	B	5103	-	-	-	0/2/2/2
6	CFF	E	5103	-	-	-	0/2/2/2
5	ATP	G	5102	-	-	7/18/38/38	0/3/3/3
6	CFF	J	5103	-	-	-	0/2/2/2
6	CFF	G	5103	-	-	-	0/2/2/2
5	ATP	B	5102	-	-	7/18/38/38	0/3/3/3
5	ATP	E	5102	-	-	7/18/38/38	0/3/3/3

The worst 5 of 12 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	B	5103	CFF	C5-C4	4.57	1.45	1.39
6	J	5103	CFF	C5-C4	4.49	1.45	1.39
6	G	5103	CFF	C5-C4	4.47	1.45	1.39
6	E	5103	CFF	C5-C4	4.46	1.45	1.39
6	G	5103	CFF	C5-C6	4.35	1.48	1.41

The worst 5 of 12 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	G	5102	ATP	C5-C6-N6	2.29	123.84	120.35
6	J	5103	CFF	C5-C6-N1	-2.28	115.77	118.20
5	B	5102	ATP	C5-C6-N6	2.27	123.80	120.35
5	E	5102	ATP	C5-C6-N6	2.27	123.80	120.35
5	J	5102	ATP	C5-C6-N6	2.27	123.80	120.35

There are no chirality outliers.

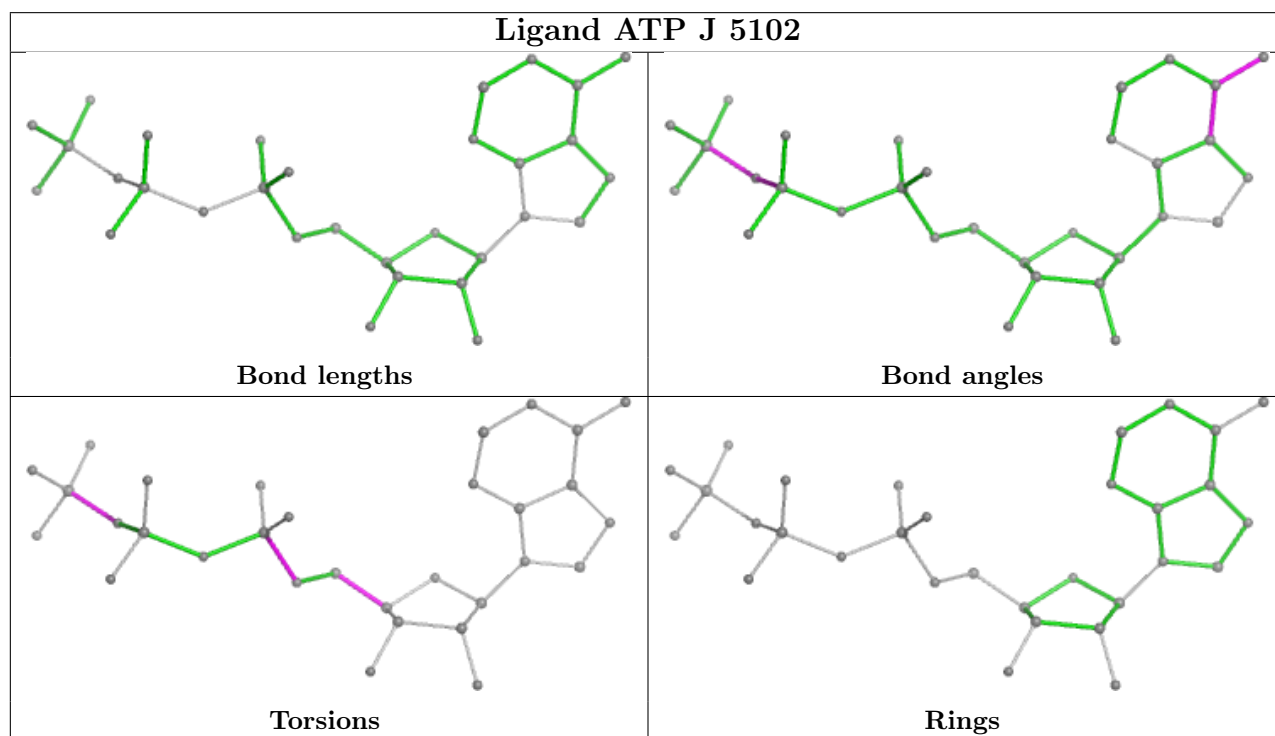
5 of 28 torsion outliers are listed below:

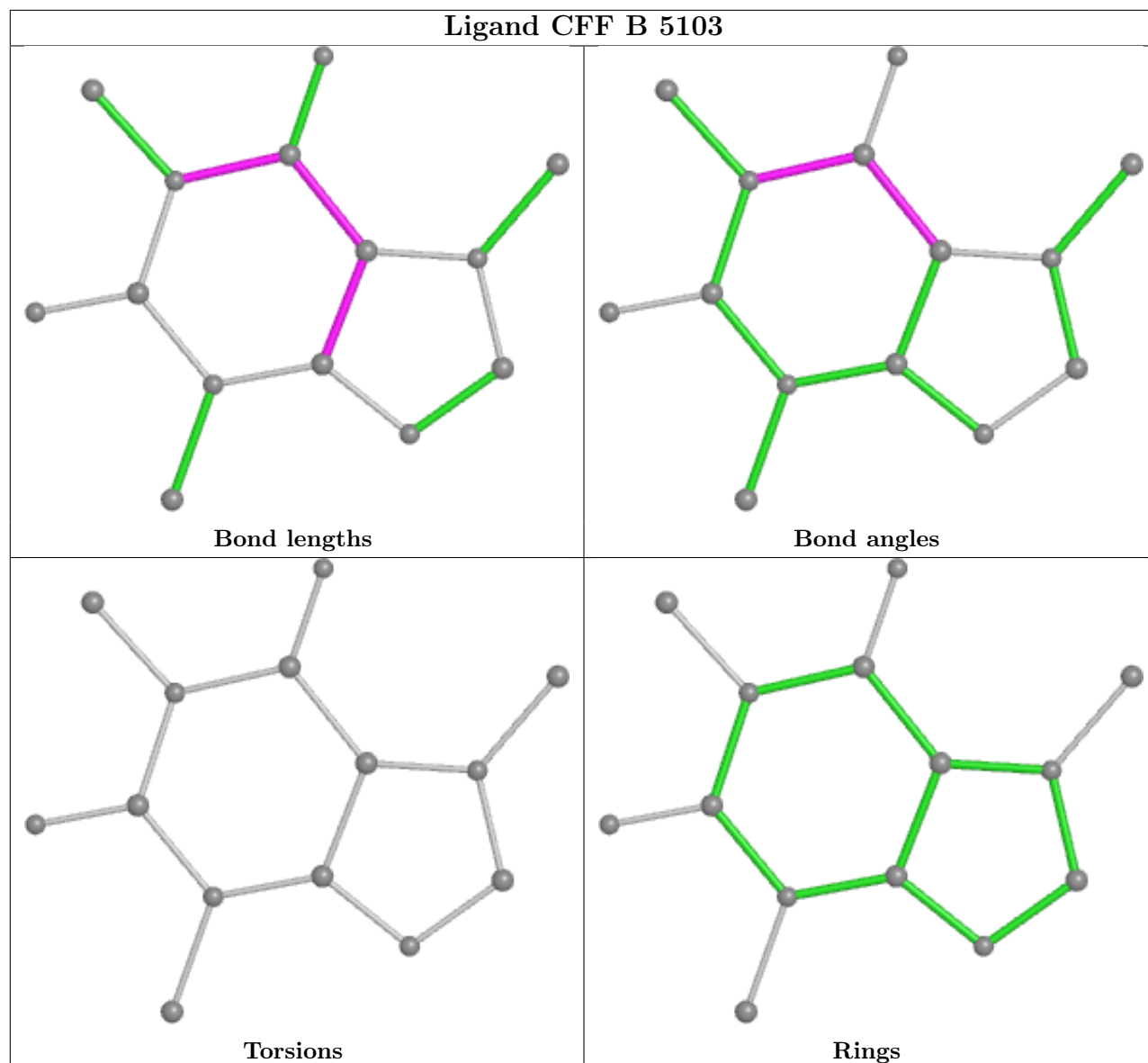
Mol	Chain	Res	Type	Atoms
5	B	5102	ATP	PB-O3B-PG-O2G
5	B	5102	ATP	C5'-O5'-PA-O3A
5	E	5102	ATP	PB-O3B-PG-O2G
5	E	5102	ATP	C5'-O5'-PA-O3A
5	G	5102	ATP	PB-O3B-PG-O2G

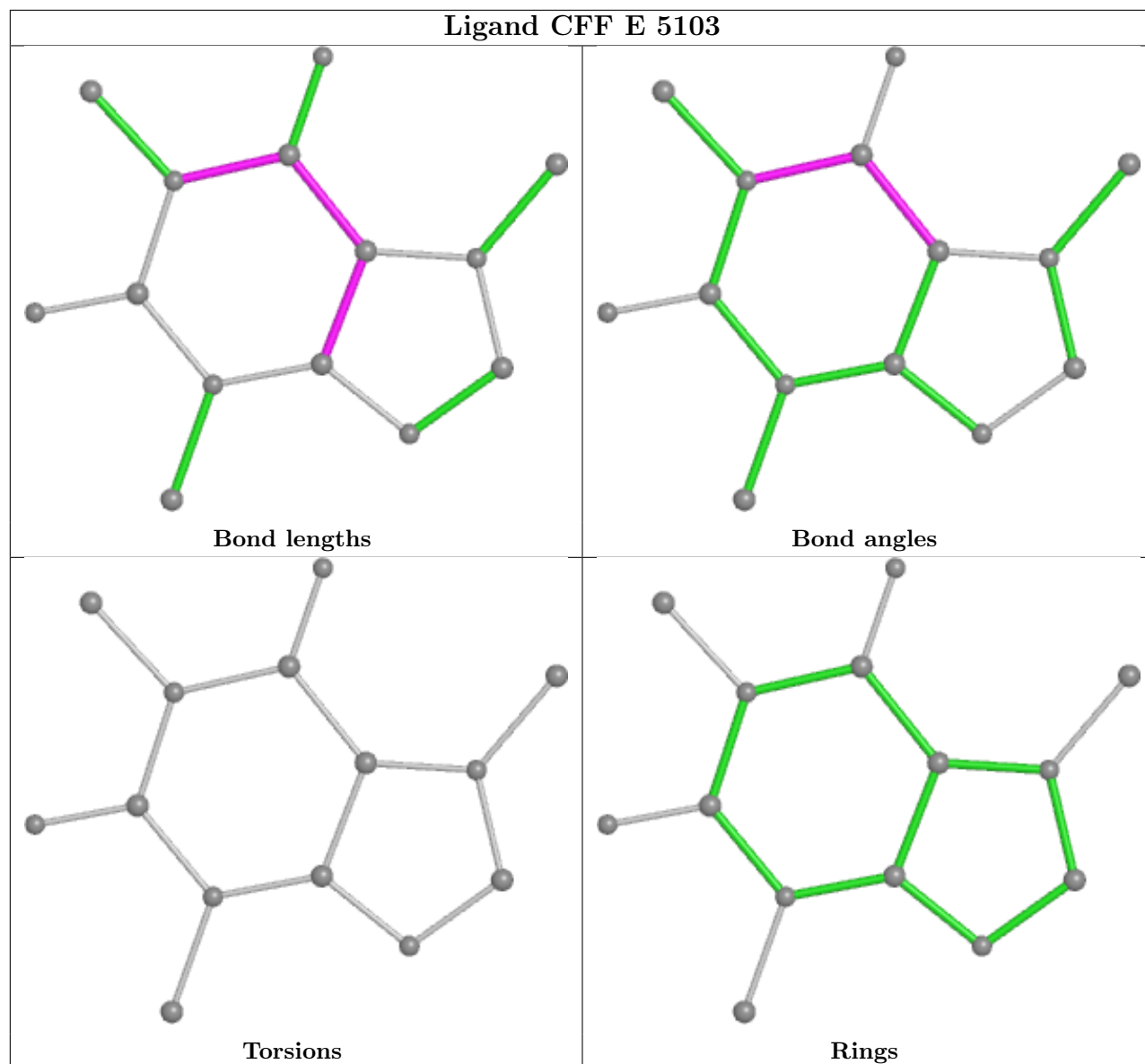
There are no ring outliers.

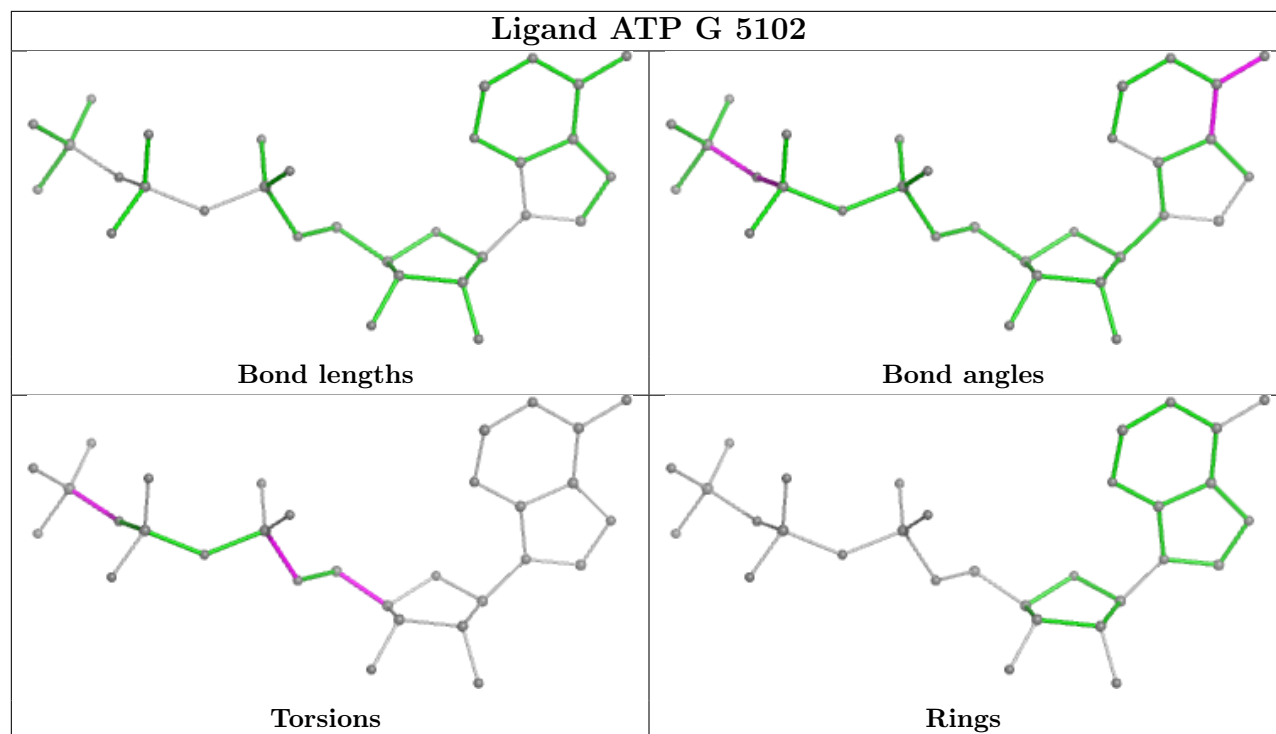
No monomer is involved in short contacts.

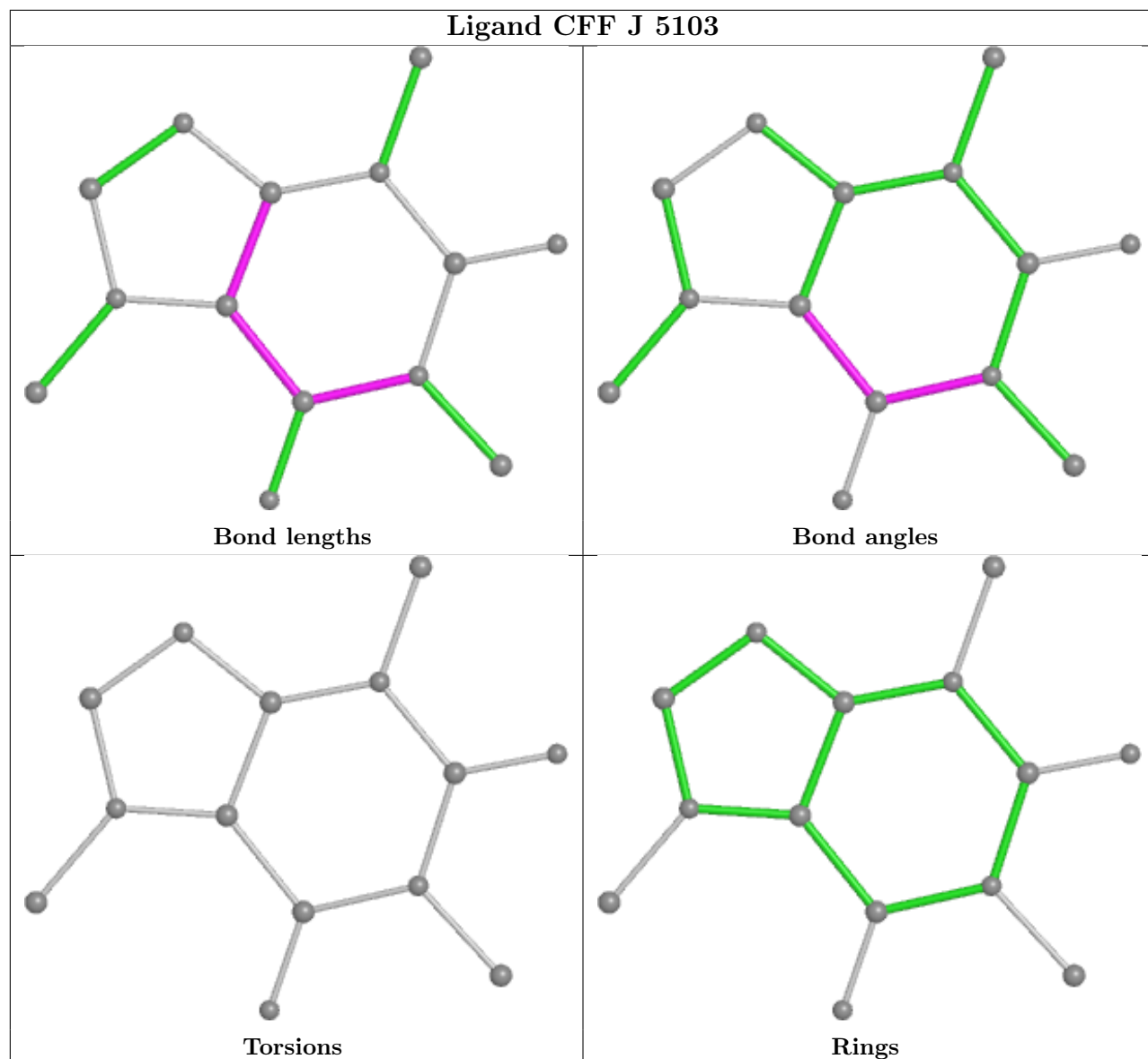
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

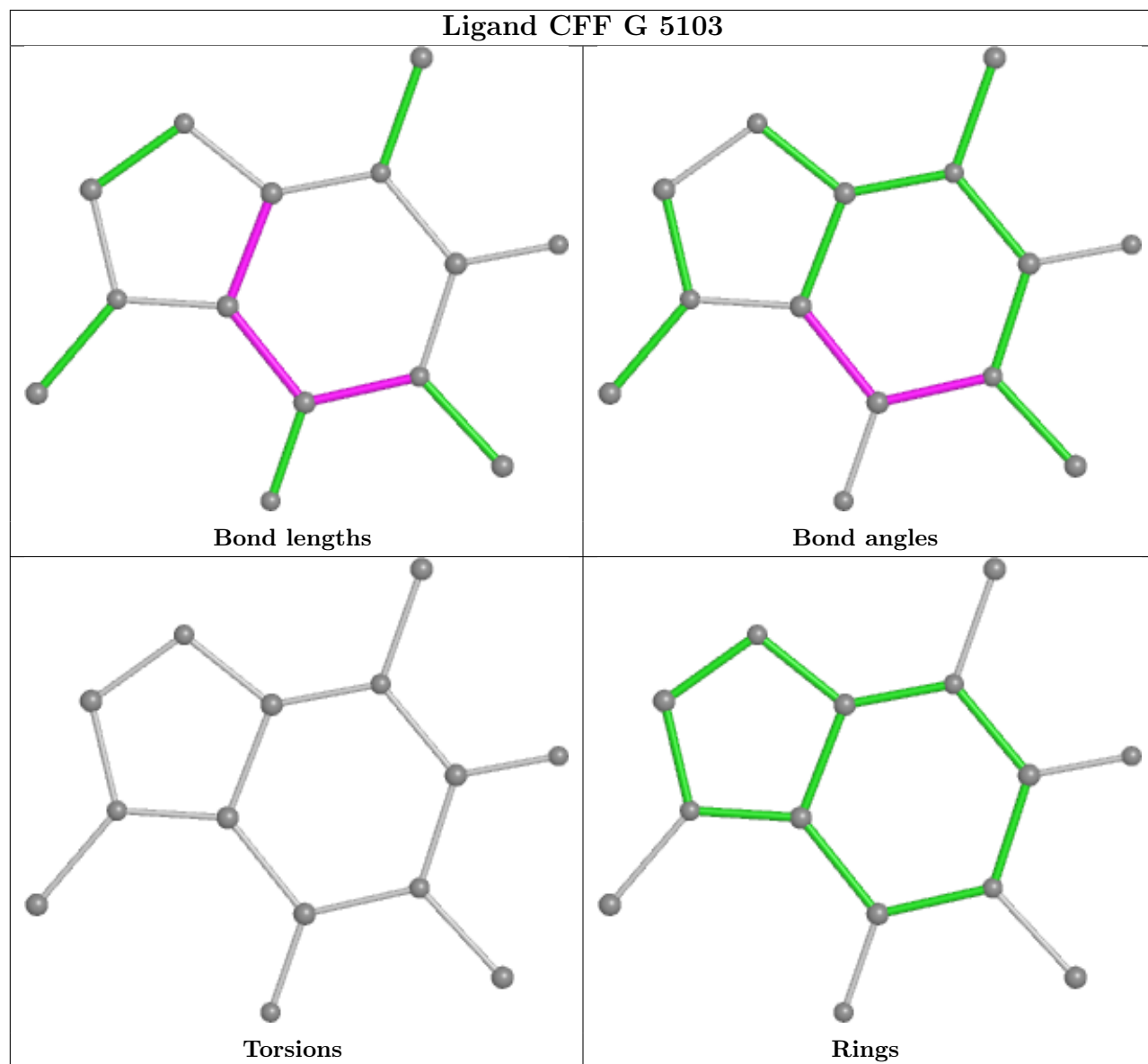


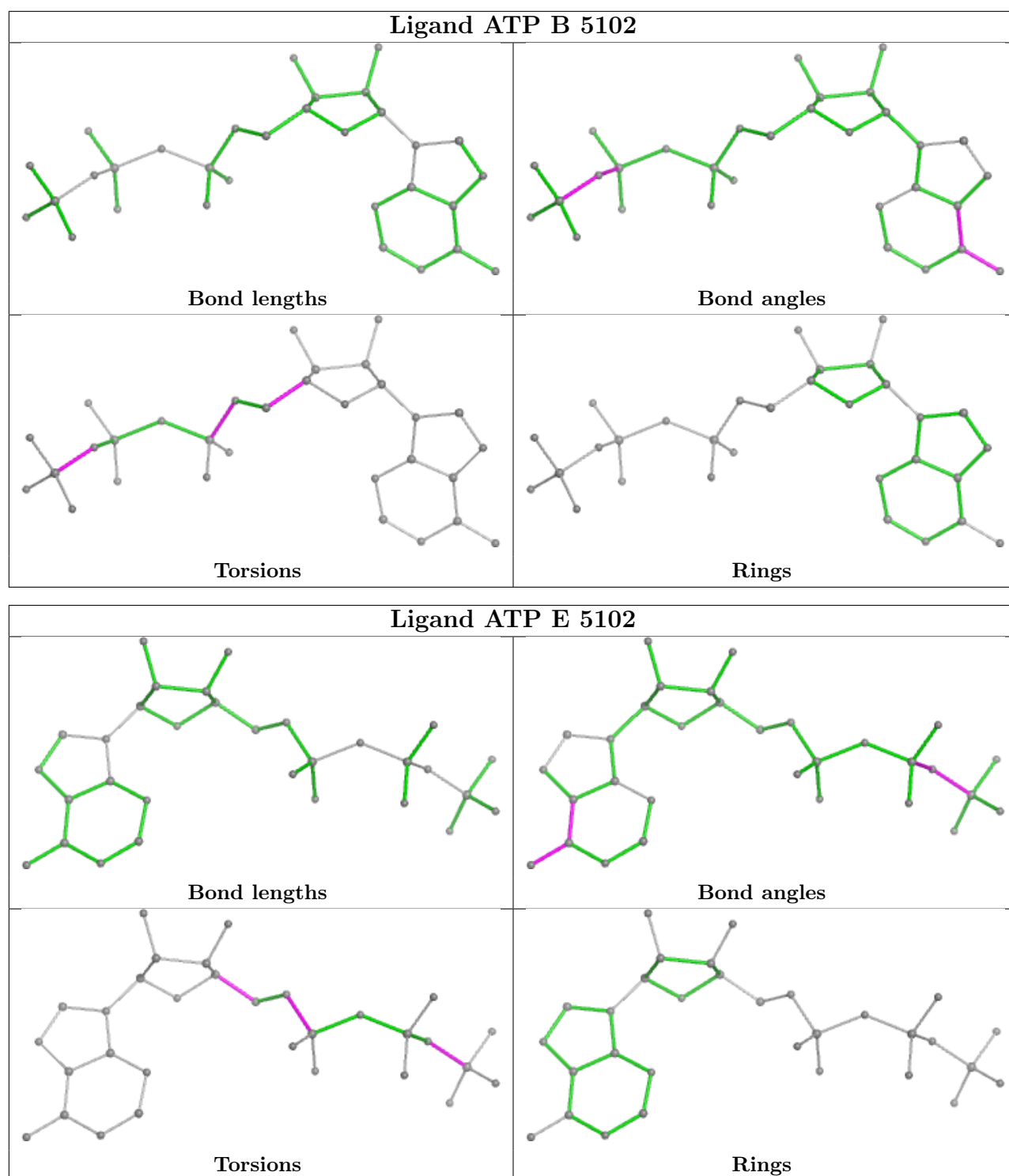












5.7 Other polymers [\(i\)](#)

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

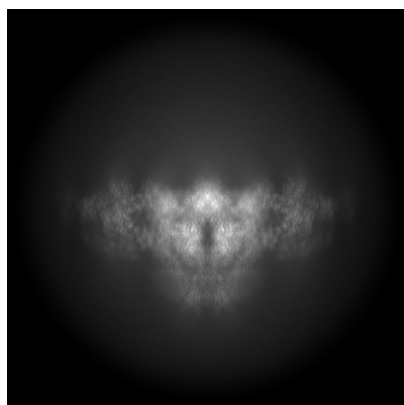
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-19472. These allow visual inspection of the internal detail of the map and identification of artifacts.

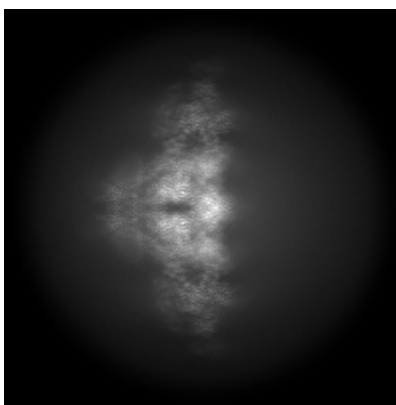
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

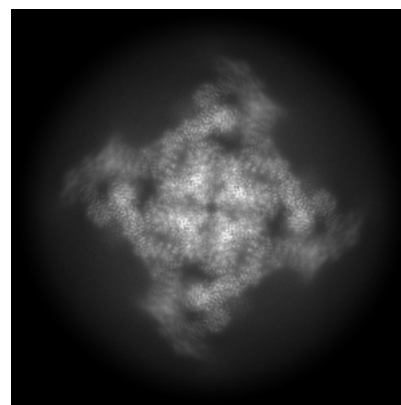
6.1.1 Primary map



X



Y

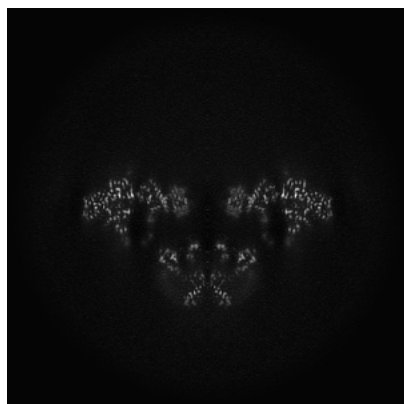


Z

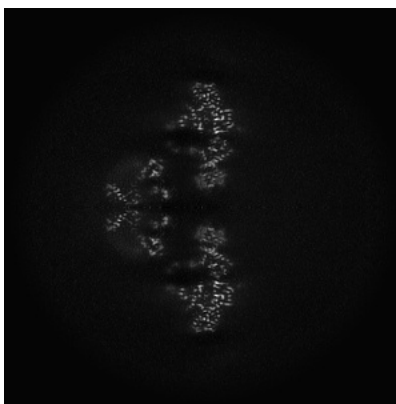
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

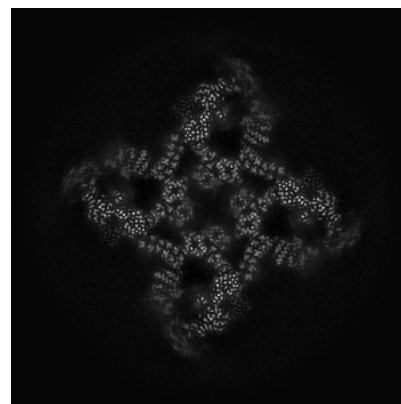
6.2.1 Primary map



X Index: 168



Y Index: 168

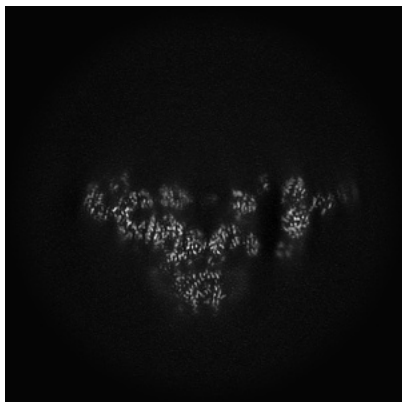


Z Index: 168

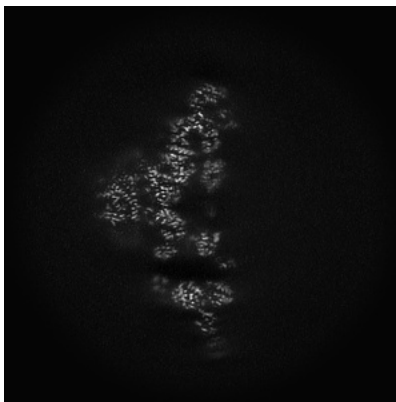
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

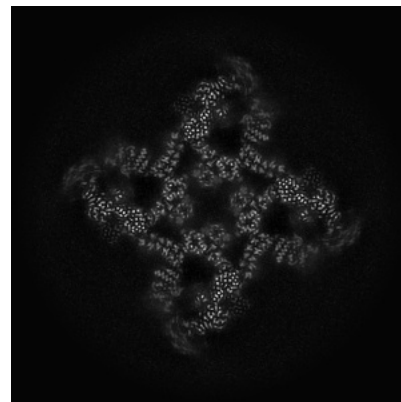
6.3.1 Primary map



X Index: 178



Y Index: 178

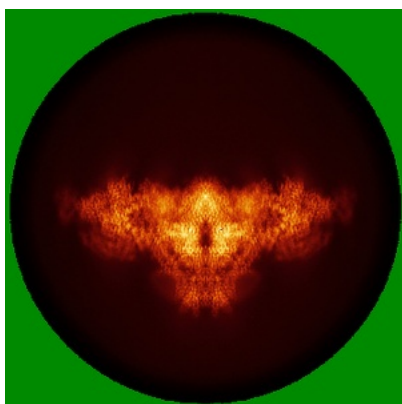


Z Index: 168

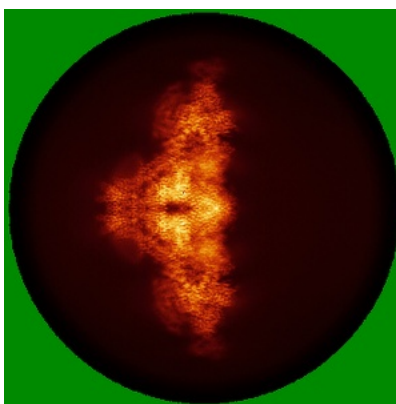
The images above show the largest variance slices of the map in three orthogonal directions.

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

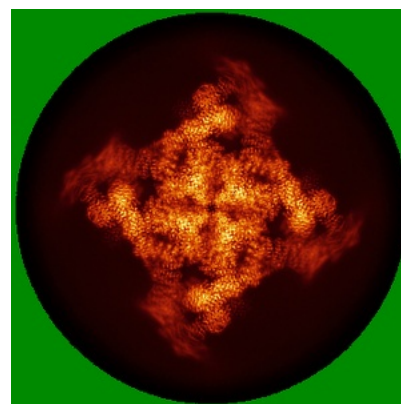
6.4.1 Primary map



X



Y

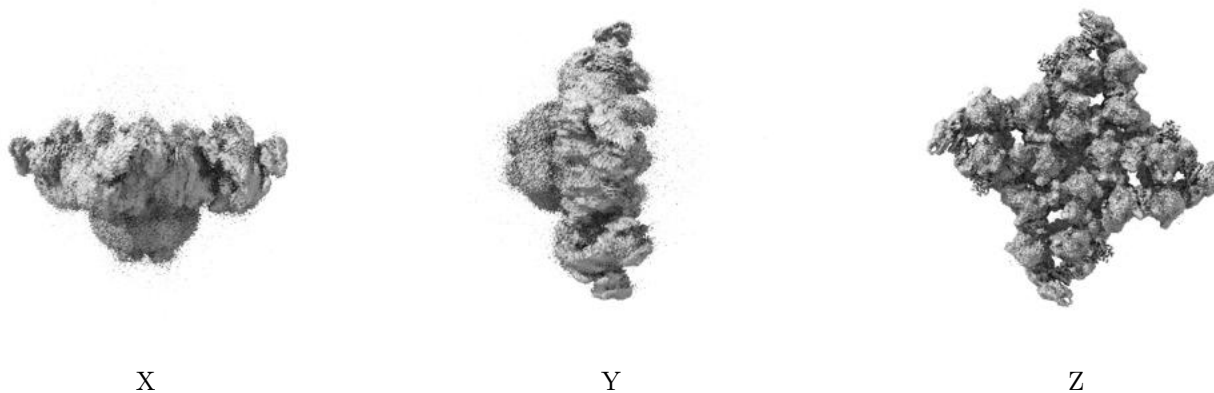


Z

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

6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.3. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

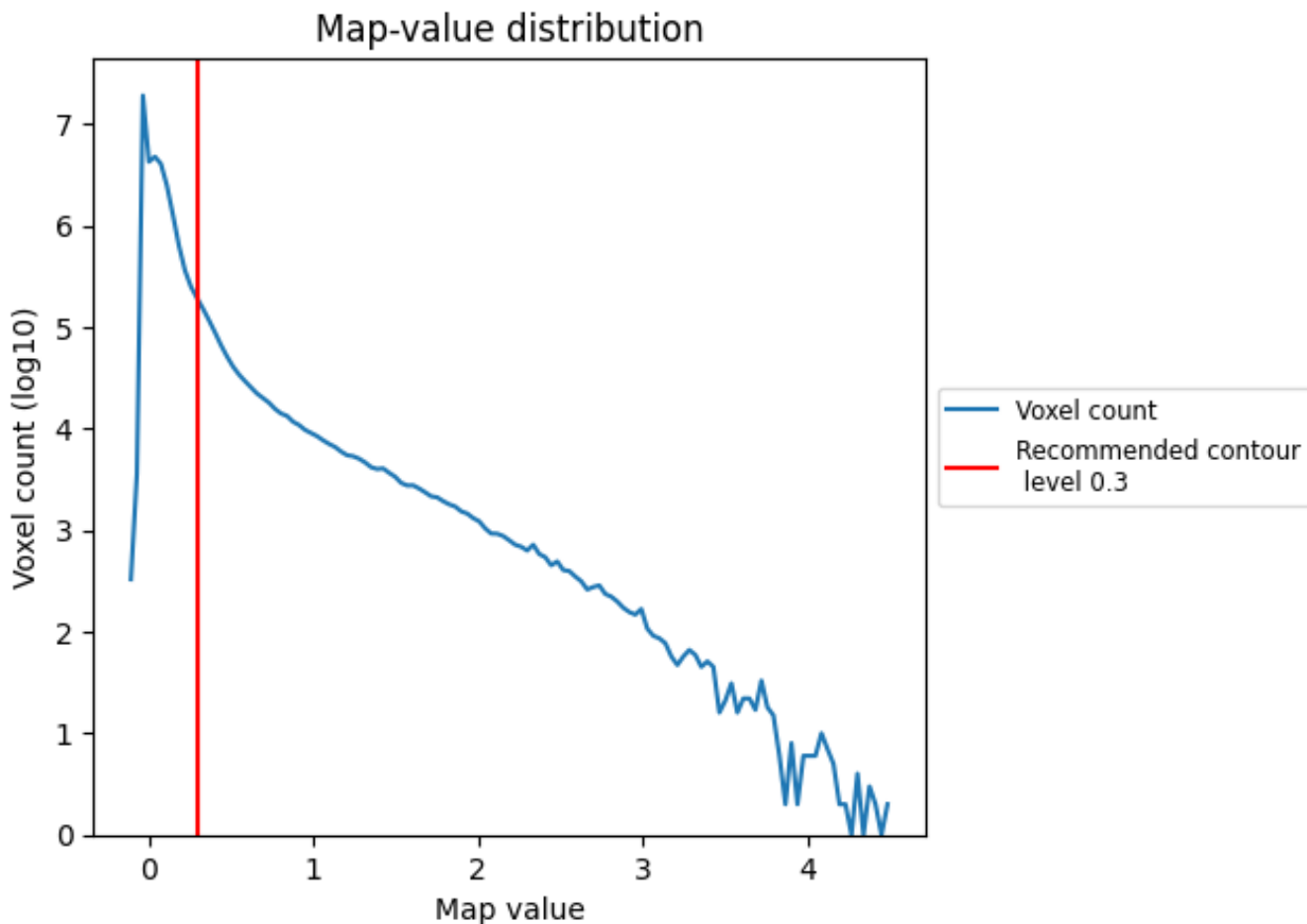
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

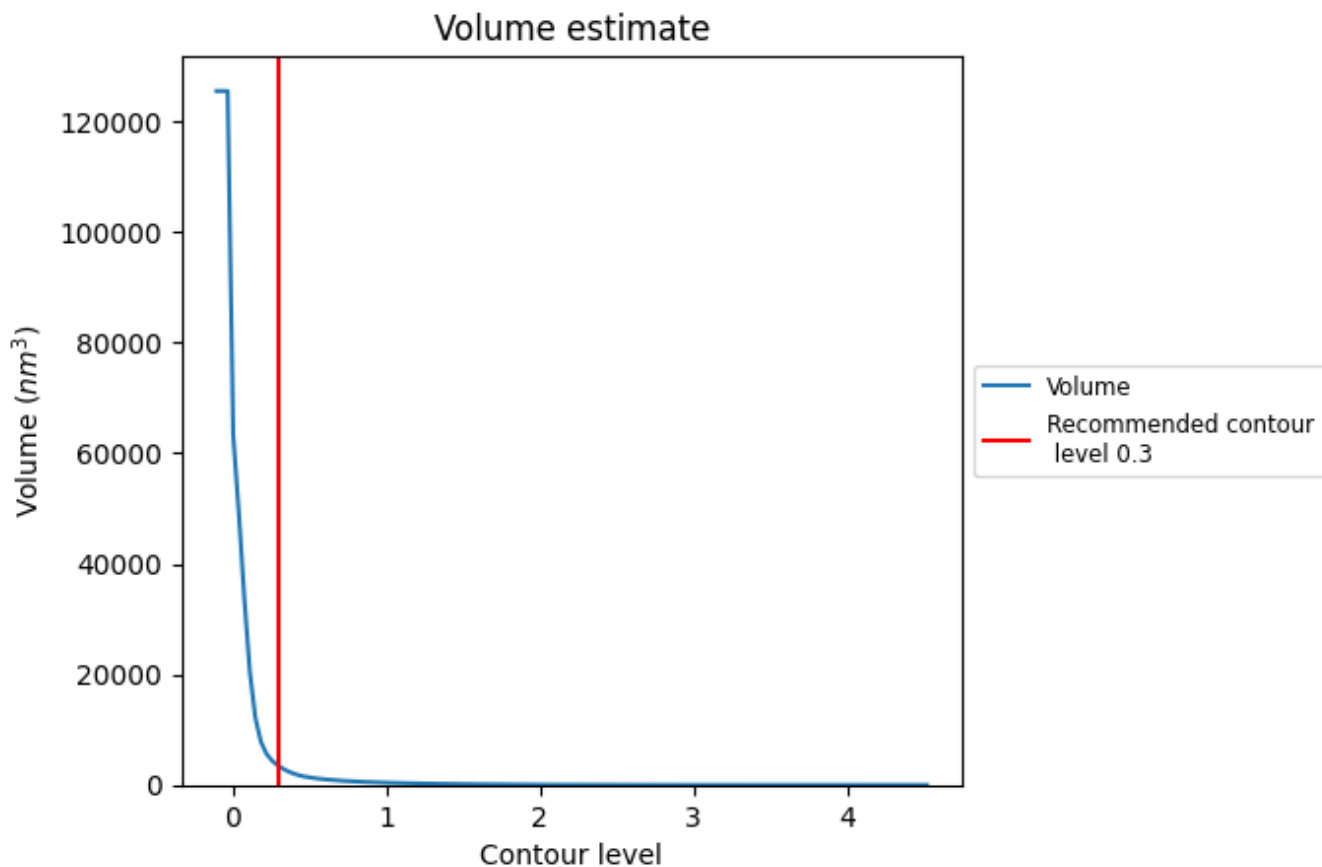
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

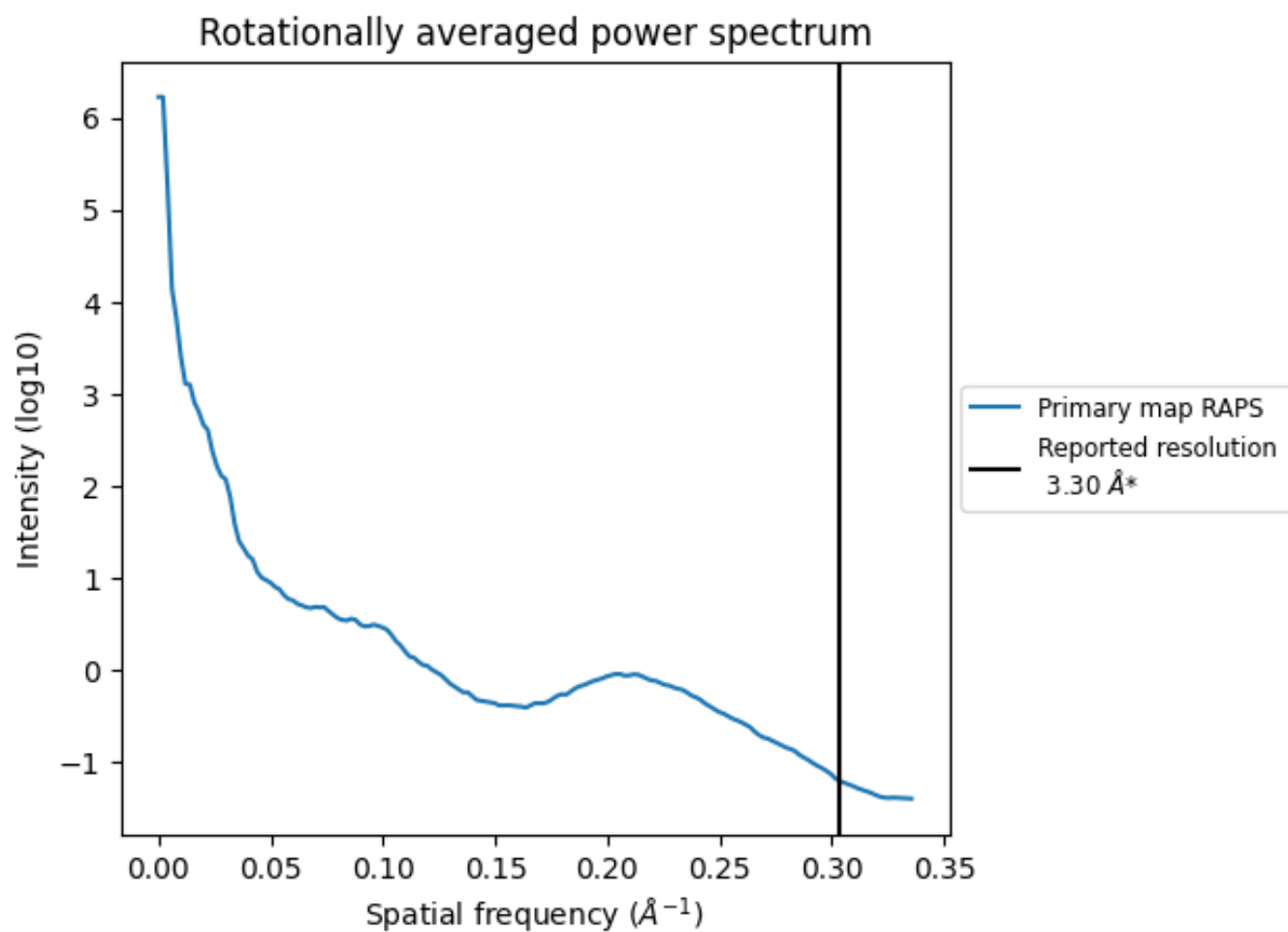
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 3395 nm³; this corresponds to an approximate mass of 3067 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

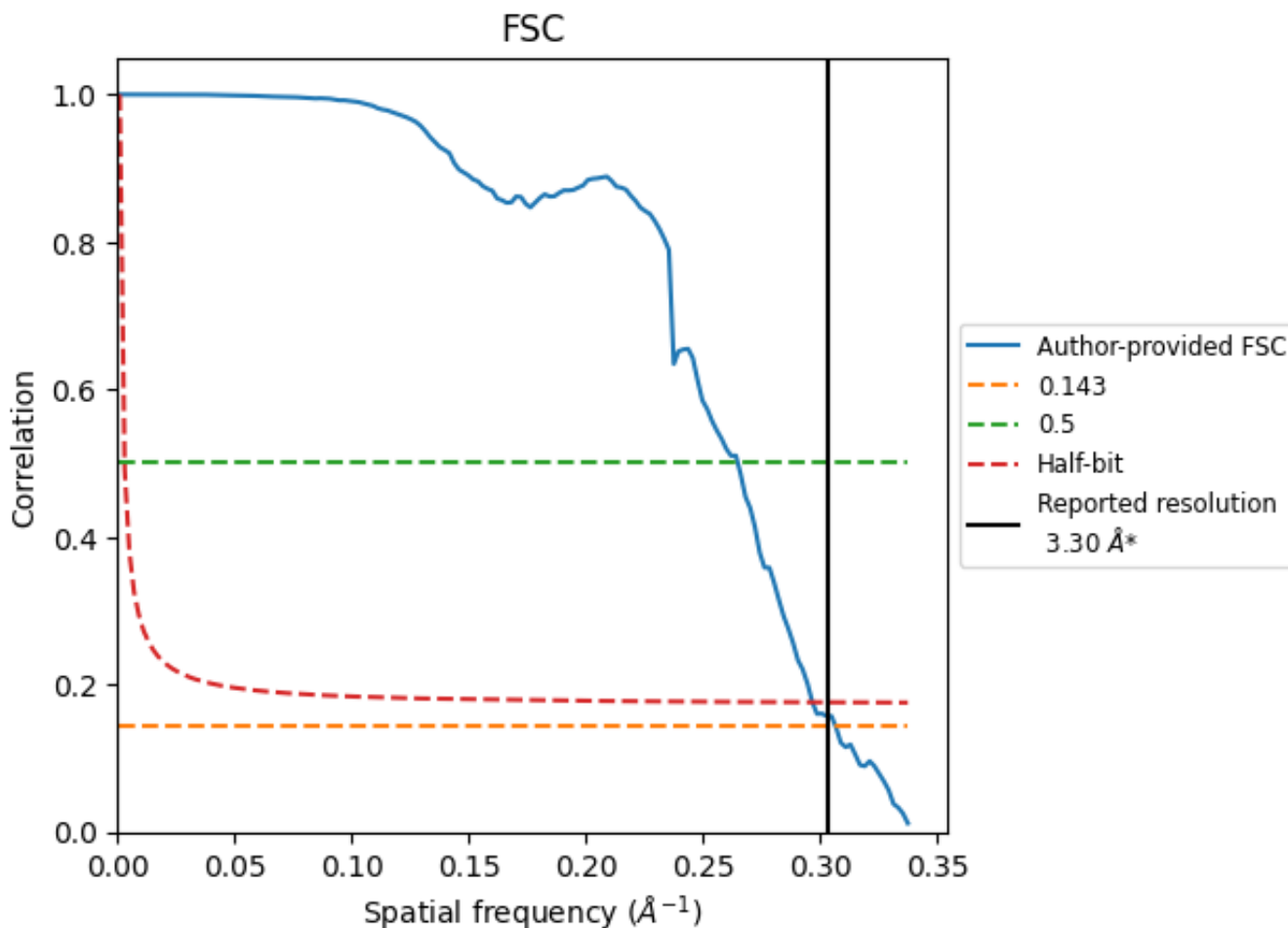


*Reported resolution corresponds to spatial frequency of 0.303 Å⁻¹

8 Fourier-Shell correlation [i](#)

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

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.303 Å⁻¹

8.2 Resolution estimates [i](#)

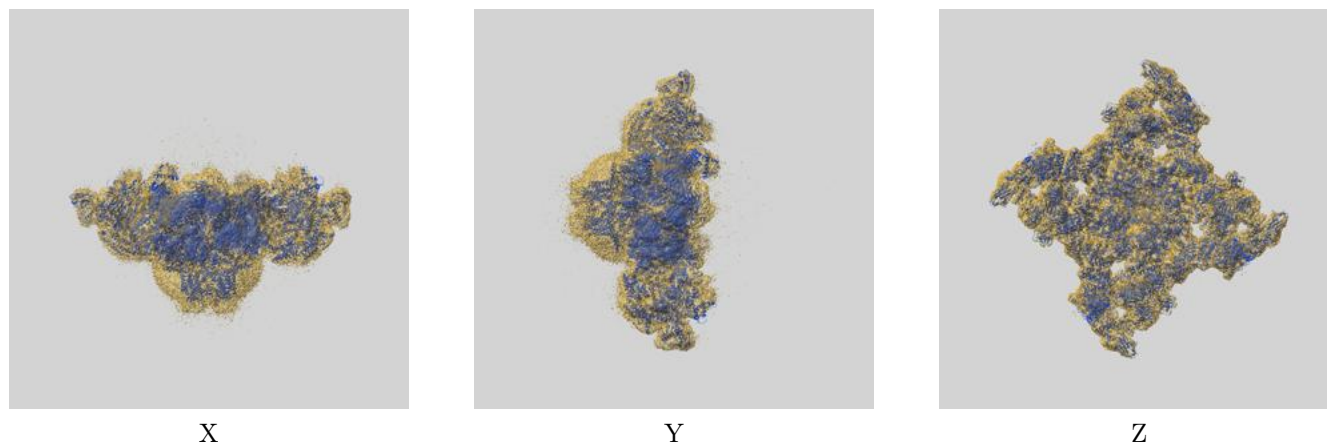
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.30	-	-
Author-provided FSC curve	3.26	3.78	3.37
Unmasked-calculated*	-	-	-

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

9 Map-model fit [i](#)

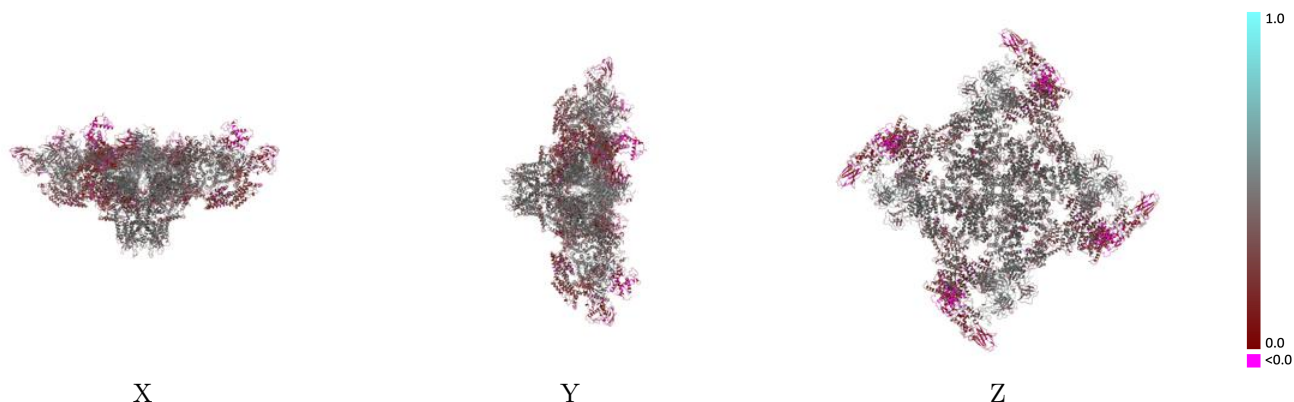
This section contains information regarding the fit between EMDB map EMD-19472 and PDB model 8RS0. Per-residue inclusion information can be found in section 3 on page 8.

9.1 Map-model overlay [i](#)



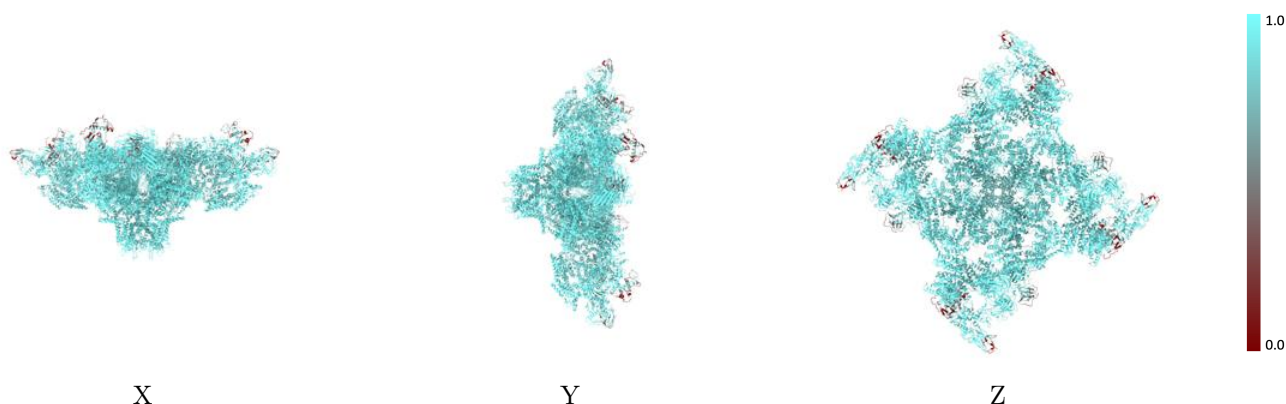
The images above show the 3D surface view of the map at the recommended contour level 0.3 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



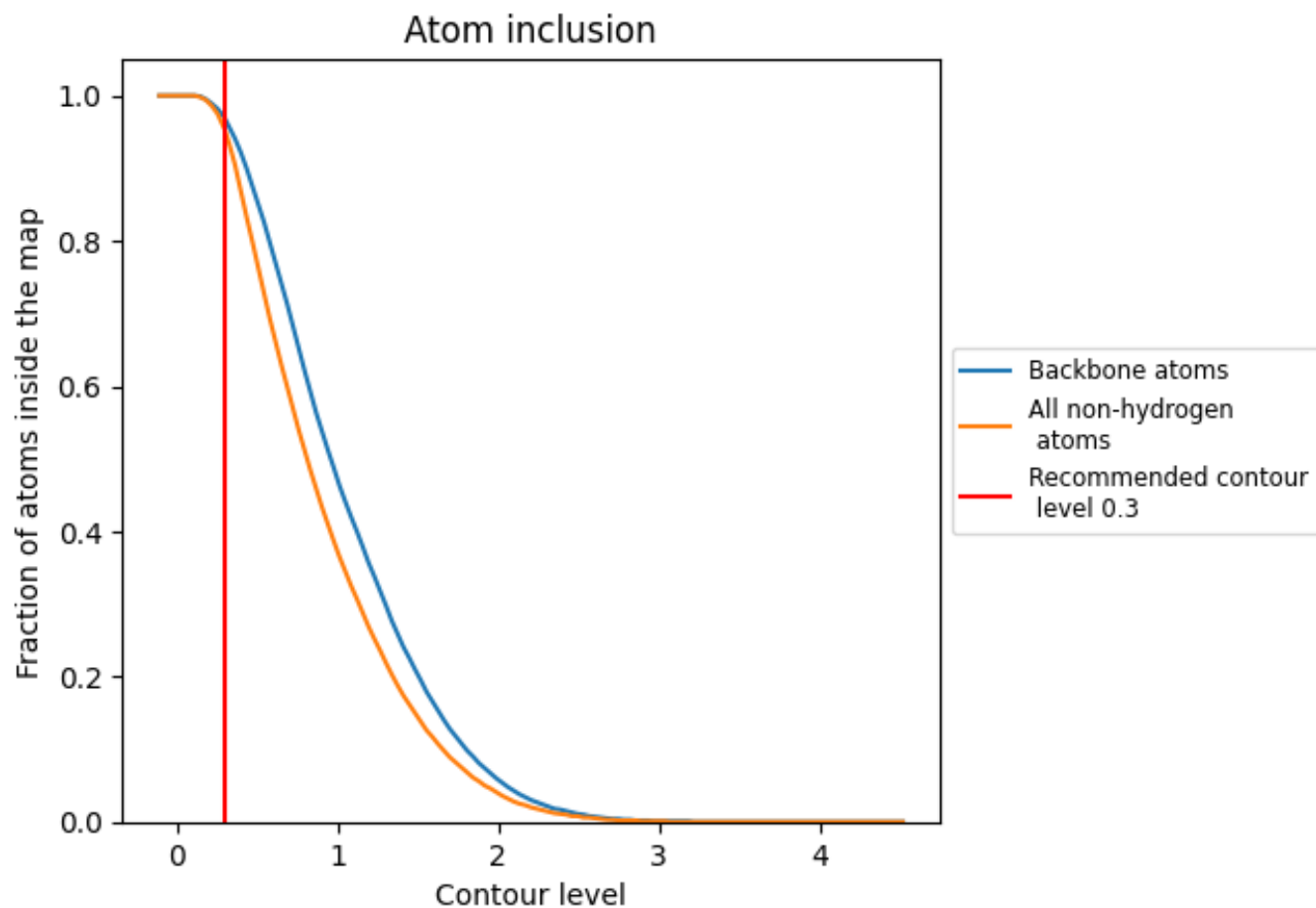
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.3).



























9.4 Atom inclusion [i](#)



At the recommended contour level, 97% of all backbone atoms, 95% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.3) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9530	 0.3560
A	 0.6870	 0.3860
B	 0.9670	 0.3620
C	 0.6930	 0.1320
D	 0.6890	 0.3950
E	 0.9670	 0.3620
F	 0.6880	 0.1320
G	 0.9670	 0.3610
H	 0.6880	 0.3920
I	 0.6850	 0.3940
J	 0.9670	 0.3620
K	 0.6880	 0.1340
M	 0.6910	 0.1310

