



wwPDB EM Validation Summary Report ⓘ

Aug 3, 2026 – 06:54 pm BST

PDB ID : 9S55 / pdb_00009s55
EMDB ID : EMD-54590
Title : Locked-state RyR1 with ryanodine in the native membrane
Authors : Mikirtumov, V.
Deposited on : 2025-07-29
Resolution : 3.70 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

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:

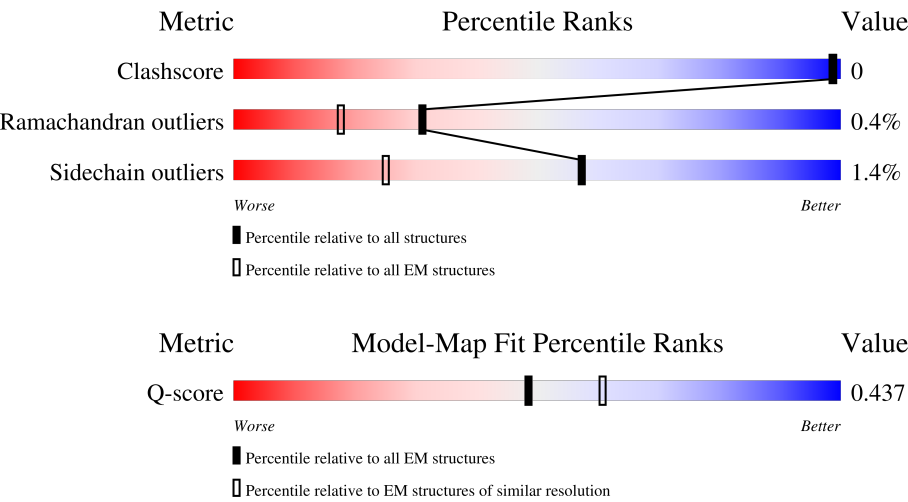
EMDB validation analysis : 0.0.1.dev133
Mogul : 1.8.4, CSD as541be (2020)
MolProbity : 4-5-2 with Phenix2.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.50

1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 3.70 Å.

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



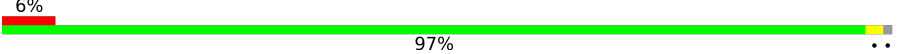
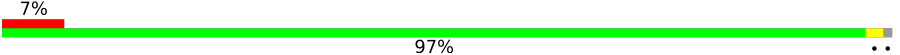
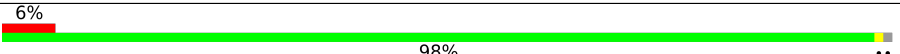
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	11569 (3.20 - 4.20)

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	5037	28% 85% 13%
1	B	5037	28% 84% 13%
1	C	5037	28% 84% 13%
1	D	5037	24% 84% 13%

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Mol	Chain	Length	Quality of chain
2	E	108	 6% 97% ..
2	F	108	 7% 97% ..
2	G	108	 7% 97% ..
2	H	108	 6% 98% ..

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 287008 atoms, of which 142908 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.

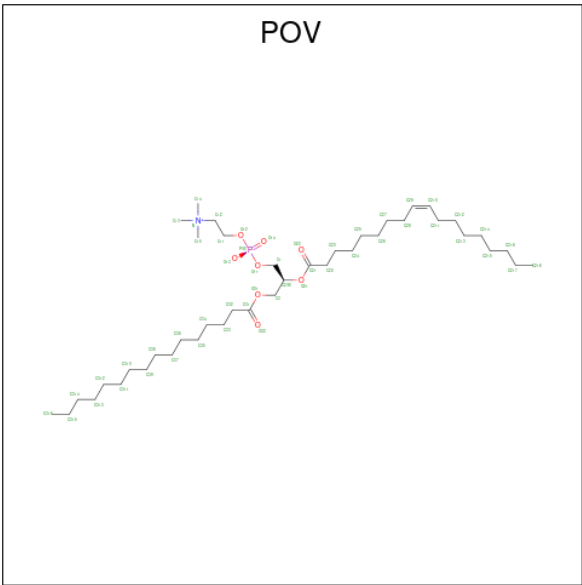
- Molecule 1 is a protein called Ryanodine receptor 1.

Mol	Chain	Residues	Atoms						AltConf	Trace
1	A	4404	Total	C	H	N	O	S	0	0
			69822	22323	34734	6046	6482	237		
1	B	4404	Total	C	H	N	O	S	0	0
			69822	22323	34734	6046	6482	237		
1	C	4404	Total	C	H	N	O	S	0	0
			69822	22323	34734	6046	6482	237		
1	D	4404	Total	C	H	N	O	S	0	0
			69822	22323	34734	6046	6482	237		

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

Mol	Chain	Residues	Atoms						AltConf	Trace
2	E	107	Total	C	H	N	O	S	0	0
			1661	527	829	146	155	4		
2	F	107	Total	C	H	N	O	S	0	0
			1661	527	829	146	155	4		
2	G	107	Total	C	H	N	O	S	0	0
			1661	527	829	146	155	4		
2	H	107	Total	C	H	N	O	S	0	0
			1661	527	829	146	155	4		

- Molecule 3 is (2S)-3-(hexadecanoyloxy)-2-[(9Z)-octadec-9-enoyloxy]propyl 2-(trimethylammonio)ethyl phosphate (CCD ID: POV) (formula: C₄₂H₈₂NO₈P) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms						AltConf
3	A	1	Total	C	H	N	O	P	0
			134	42	82	1	8	1	
3	A	1	Total	C	H	N	O	P	0
			134	42	82	1	8	1	
3	B	1	Total	C	H	N	O	P	0
			134	42	82	1	8	1	
3	B	1	Total	C	H	N	O	P	0
			134	42	82	1	8	1	
3	C	1	Total	C	H	N	O	P	0
			134	42	82	1	8	1	
3	C	1	Total	C	H	N	O	P	0
			134	42	82	1	8	1	
3	D	1	Total	C	H	N	O	P	0
			134	42	82	1	8	1	
3	D	1	Total	C	H	N	O	P	0
			134	42	82	1	8	1	

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

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

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Mol	Chain	Residues	Atoms		AltConf
			Total	Zn	
4	D	1	1	1	0

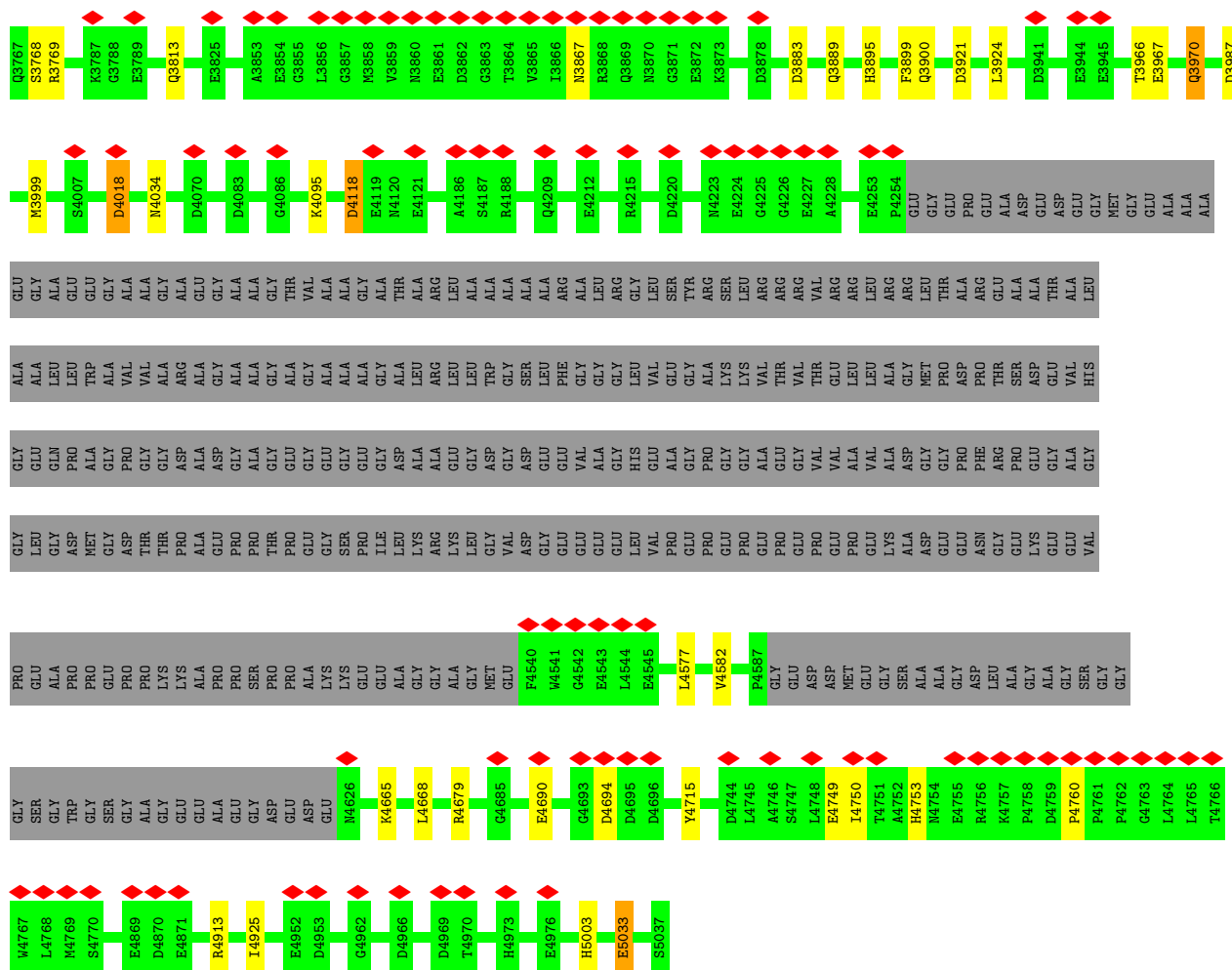


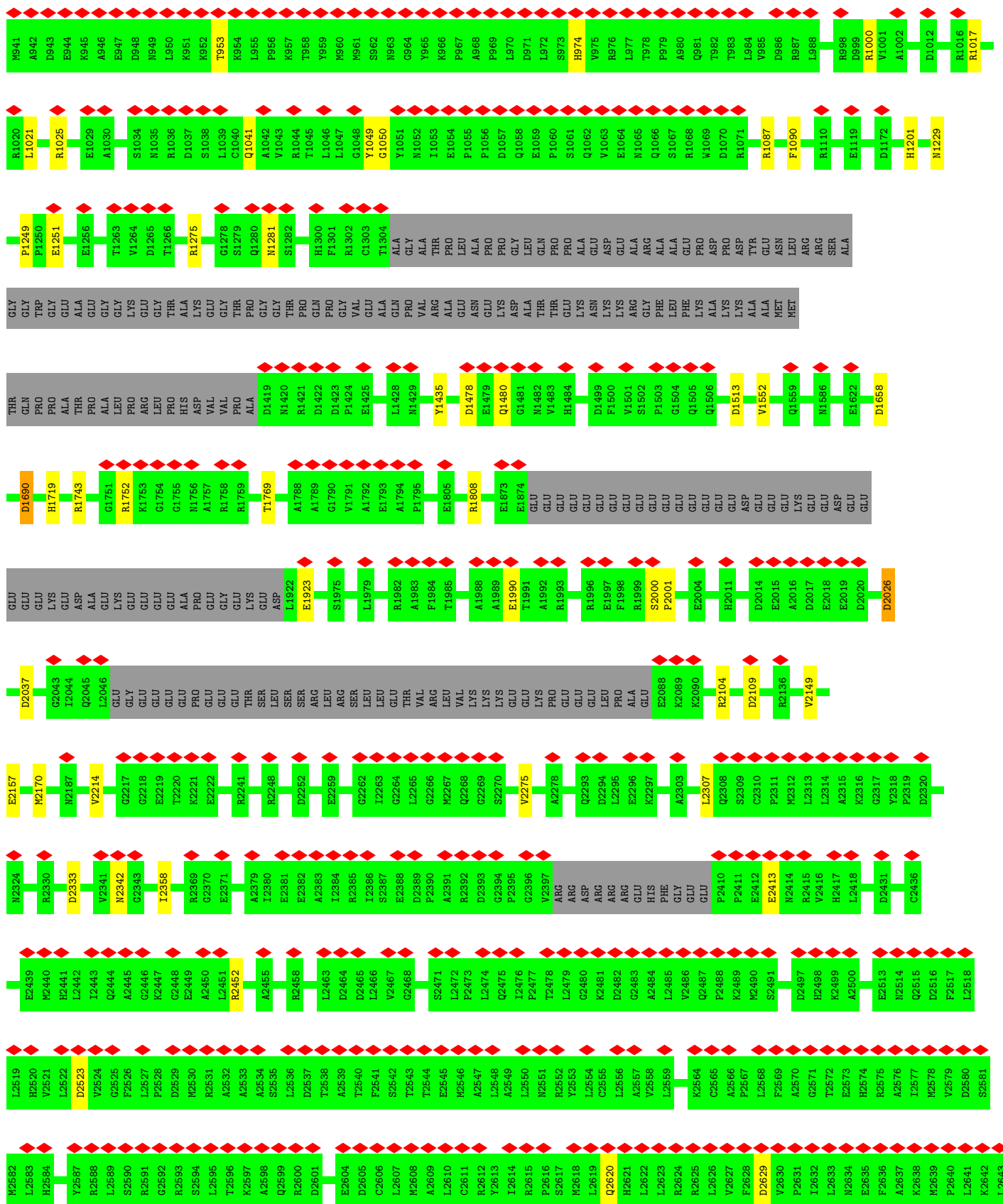
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V3749	E3750	V3751	S3752	F3753	R3762	Q3765	Q3766	Q3767	Q3768	Q3769	K3787	Q3786	E3789	E3825	A3853	E3854	G3855	L3856	G3857	M3858	N3859	N3860	E3861	D3862	G3863	T3864	V3865	I3866	N3867	Q3868	Q3869	N3870	E3871	E3872	K3873	D3876	D3883	H3895	H3896	N3897	F3898	Q3900	D3921	L3924	G3925	A4226	E4227	F3899	A4228	E4229	E4253	P4254	GLU	GLY	GLU	PRO	
L3623	L3624	S3625	K3626	Q3627	R3628	R3629	R3630	A3631	V3632	V3633	A3634	C3635	F3636	R3637	M3638	T3639	D3666	H3667	E3682	Q3683	E3684	E3685	E3686	E3687	E3688	E3689	V3690	E3691	E3692	K3693	H3699	E3712	K3713	S3714	K3715	L3716	D3717	E3718	D3719	H3734	L3735	E3736	GLU	GLY	GLY	ASN	GLY	GLU	ALA	GLU	GLU	GLU	GLU	H3621	K3622		
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M3467	S3468	F3469	L3470	T3471	A3472	D3473	S3474	K3475	S3476	K3477	M3478	A3479	LYS	GLY	GLY	ASP	ALA	GLN	SER	GLY	SER	ASP	GLN	ARG	THR	LYS	LYS	R3498	R3499	G3500	D3501	R3502	Y3503	S3504	V3505	Q3506	T3507	S3508	L3509	T3510	V3511	D3529	Q3530	D3531	M3534	L3535	A3536	K3537	T3538	R3539	Y3540	A3541	L3542	K3543			
A3385	E3386	A3387	E3388	E3389	G3390	E3391	L3392	L3393	V3394	R3395	D3396	E3397	F3398	S3399	V3400	L3401	C3402	R3403	D3404	L3405	Y3406	A3407	R3414	N3428	A3429	E3433	R3436	M3437	V3438	C3439	E3440	Y3444	W3445	S3446	K3447	S3448	H3449	N3450	F3451	K3452	R3453	E3454	E3455	Q3456	N3457	F3458	V3459	V3460	Q3461	N3462	E3463	I3464	N3465				
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D3544	T3545	D3546	E3547	E3548	V3549	R3550	E3551	Q3554	N3555	N3556	L3557	H3558	L3559	Q3560	G3561	K3562	S3566	R3577	G3578	L3579	P3580	Q3581	R3582	E3583	E3584	D3585	A3586	D3587	E3588	F3589	R3594	R3595	V3596	Q3597	L3603	Y3604	H3605	L3606	E3607	Q3608	T3609	E3610	H3611	F3612	Y3613	K3614	S3615	K3616	K3617	L3618	V3619	W3620	H3621	K3622			
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V3749	E3750	V3751	S3752	F3753	R3762	Q3765	Q3766	Q3767	Q3768	Q3769	K3787	Q3786	E3789	E3825	A3853	E3854	G3855	L3856	G3857	M3858	N3859	N3860	E3861	D3862	G3863	T3864	V3865	I3866	N3867	Q3868	Q3869	N3870	E3871	E3872	K3873	D3876	D3883	H3895	H3896	N3897	F3898	Q3900	D3921	L3924	G3925	A4226	E4227	F3899	A4228	E4229	E4253	P4254	GLU	GLY	GLU	PRO	
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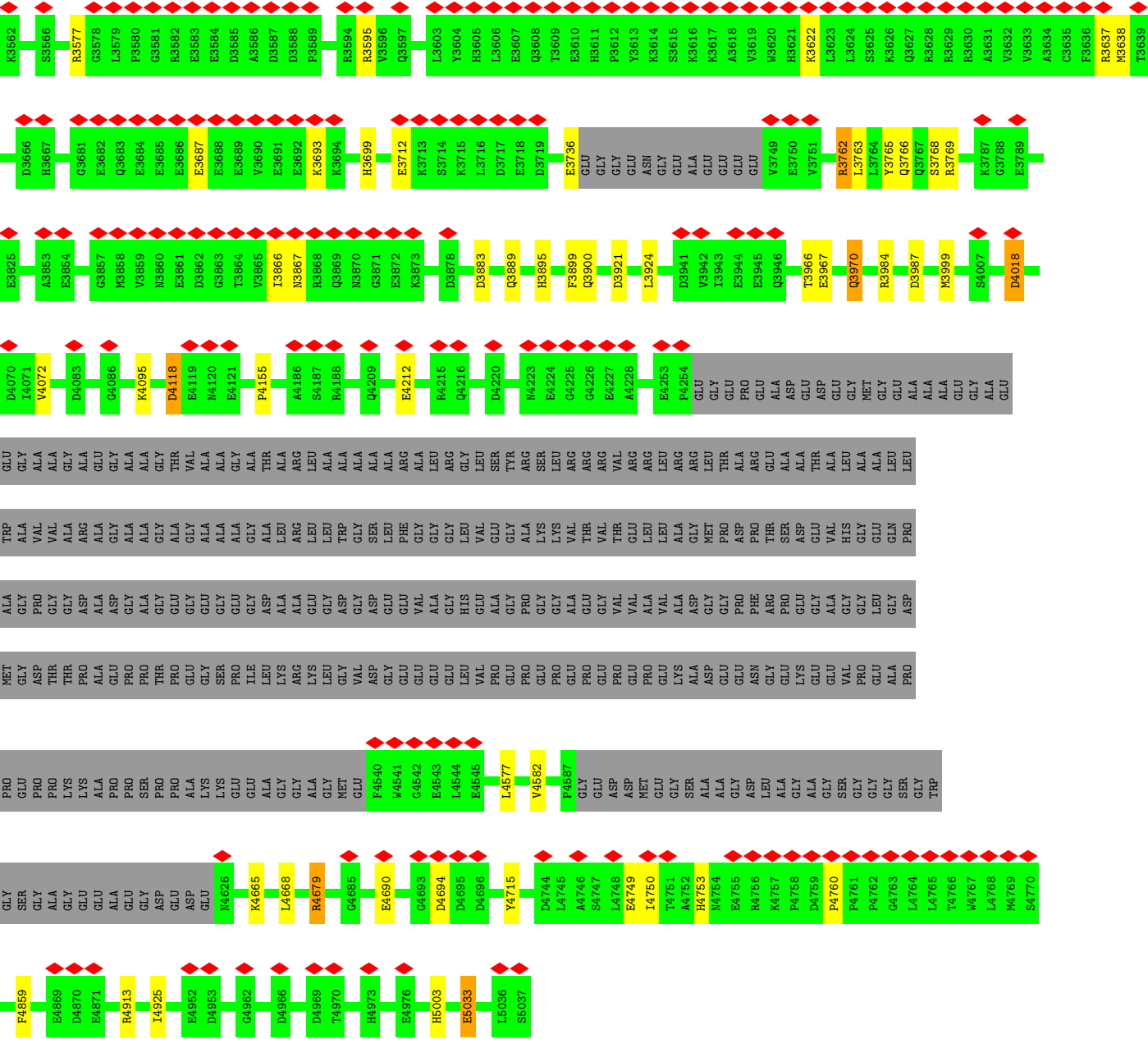




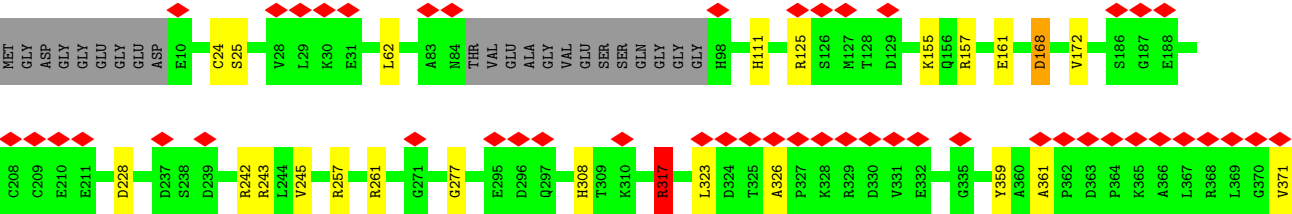
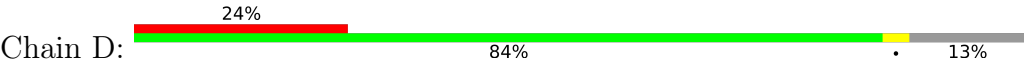


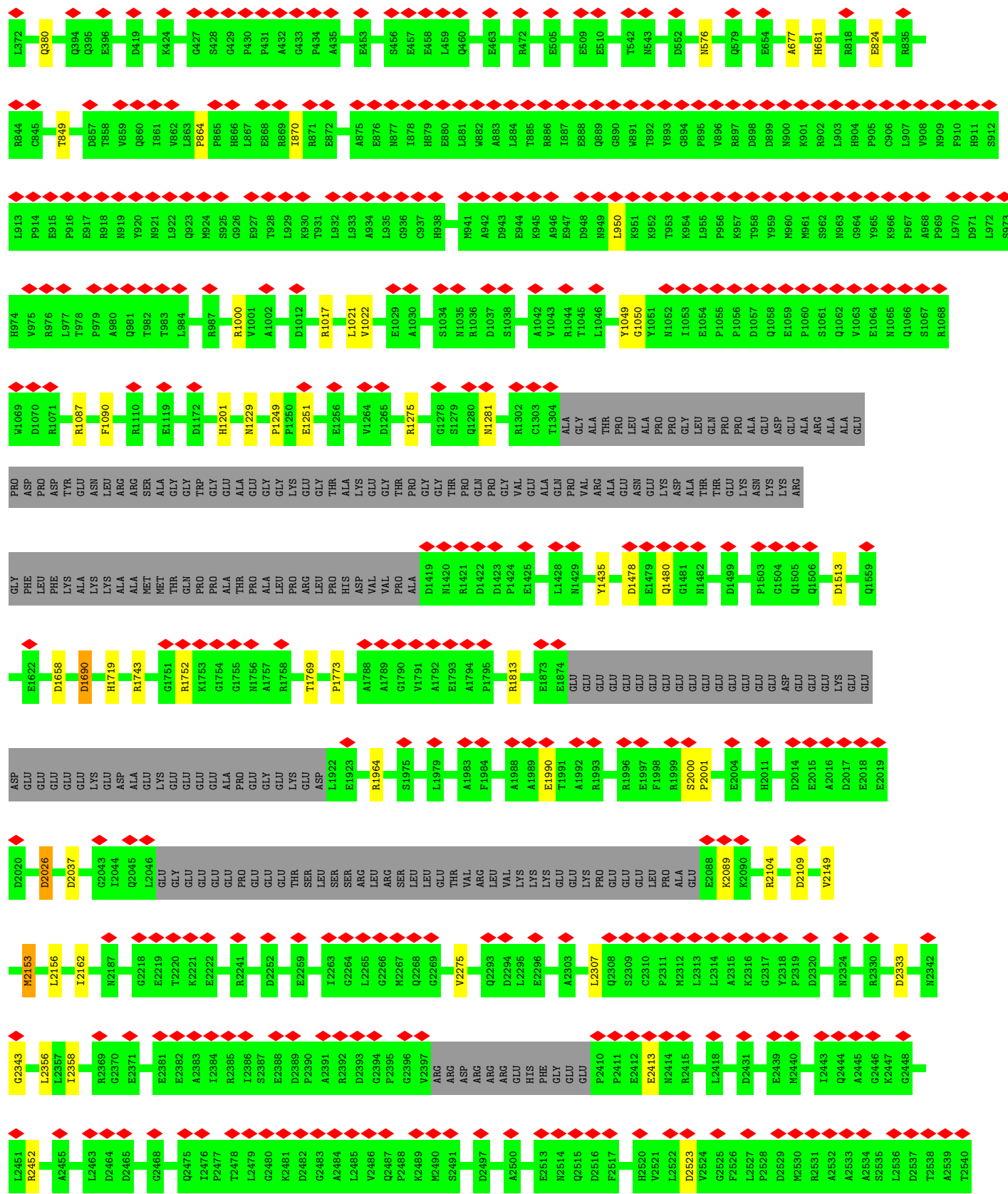


ALA	GLN	SER	GLY	GLY	SER	SER	ASP	GLN	GLU	ARG	THR	LYS	LYS	R3498	R3499	G3500	G3501	R3502	R3503	R3504	R3505	R3506	R3507	R3508	R3509	R3510	R3511	D3529	R3530	D3531	R3534	L3535	A3536	R3537	T3538	R3539	V3540	A3541	L3542	R3543	D3544	T3545	D3546	E3547	E3548	R3549	R3550	E3551	Q3554	N3555	R3556	L3557	H3558	L3559	Q3560	G3561						
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H3311	L3312	I3322	I3323	V3324	L3327	G3328	I3329	D3330	E3331	A3332	M3335	I3345	R3350	L3353	L3354	H3355	S3356	H3357	G3363	R3364	L3365	R3366	K3367	R3368	A3369	G3370	K3371	A3374	E3375	R3376	E3377	Q3378	L3379	R3380	L3381	E3382	A3383	R3384	A3385	E3386	A3387	E3388	E3389	G3390	E3391	L3392	L3393	V3394	R3395	D3396	E3397											
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T2948	S2949	S2950	T2951	E2952	R2953	K2954	P2955	A2956	P2957	G2958	Q2961	Q2962	L2963	L2964	R2965	W2966	W2967	D2968	T2969	S2970	Q2971	E2972	T2973	L2974	A2975	H2976	L2977	E2978	A2979	V2980	D2981	S2982	S2983	G2984	A2985	Q2986	V2987	E2988	S2989	P2990	H2991	E2992	Q2993	E2994	T2995	K2996	F2997	F2998	A2999	K3000	I3001	N3007	Q3008	N3012	H3013	C3014						
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E2828	G2829	E2830	GLU	ARG	THR	GLU	LYS	LYS	THR	ARG	LYS	ILE	SER	GLN	THR	ALA	GLN	TVR	ASP	PRO	ARG	GLU	GLY	Y2855	P2856	Q2857	Q2858	P2859	P2860	D2861	L2862	S2863	G2864	V2865	T2866	L2867	S2868	R2869	E2870	L2871	Q2872	K2873	M2874	A2875	E2876	Q2877	L2878	A2879	E2880	N2881	Y2882	H2883	N2884	T2885	W2886	G2887						
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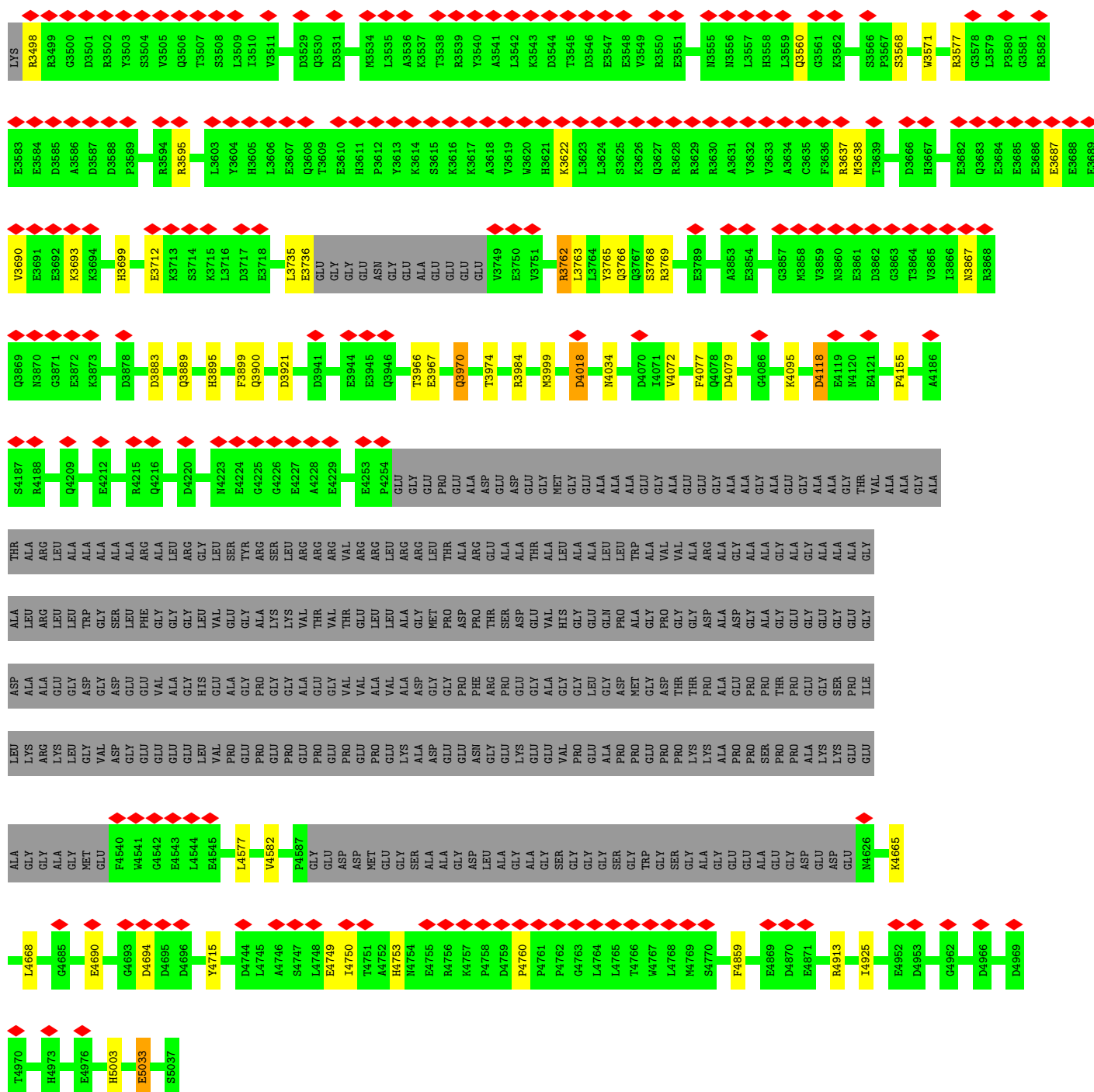


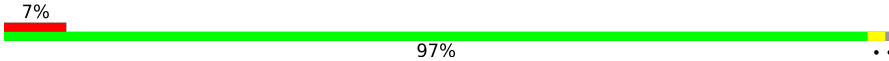
• Molecule 1: Ryanodine receptor 1





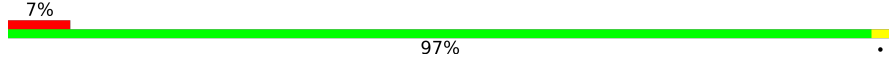
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E2803	L2804	Y2805	R2806	W2807	P2808	L2809	K2810	E2811	S2812	L2813	K2814	A2815	M2816	L2817	A2818	W2819	E2820	W2821	T2822	H2823	E2824	K2825	A2826	R2827	E2828	G2829	GLU	GLU	ARG	GLU	THR	LYS	LYS	THR	ARG	LYS	THR	GLN	ALA	THR	TYR	ASP	PRO	ARG	GLU	GLY	Y2855	N2856	P2857	Q2858	P2859	P2860	D2861	L2862					
K2677	W2680	G2681	L2682	F2683	D2684	S2685	L2686	A2687	K2688	K2689	K2690	Y2691	D2692	K2693	E2694	L2695	Y2696	D2697	I2632	L2633	N2634	E2635	F2636	A2637	K2638	M2639	P2640	L2641	K2642	H2647	R2650	C2651	W2652	K2653	Y2654	Y2655	C2656	L2657	P2658	T2659	G2660	W2661	A2662	N2663	F2664	G2665	V2666	E2669	E2670	E2671	L2672	H2673	L2674	L2675	R2676				
R2611	R2612	Y2613	L2614	R2615	P2616	S2617	M2618	L2619	Q2620	H2621	L2622	L2623	R2624	R2625	L2626	V2627	F2628	D2629	I2632	L2633	N2634	E2635	F2636	A2637	K2638	M2639	P2640	L2641	K2642	H2647	R2650	C2651	W2652	K2653	Y2654	Y2655	C2656	L2657	P2658	T2659	G2660	W2661	A2662	N2663	F2664	G2665	V2666	E2669	E2670	E2671	L2672	H2673	L2674	L2675	R2676				
F2541	S2542	T2543	T2544	A2547	L2548	N2551	R2552	L2553	C2554	C2555	L2556	R2564	C2565	A2566	P2567	L2568	F2569	A2570	C2571	T2572	H2574	R2575	A2576	L2577	M2578	V2579	D2580	S2581	M2582	L2583	H2584	Y2587	R2588	L2589	S2590	R2591	G2592	R2593	S2594	L2595	T2596	K2597	A2598	Q2599	R2600	D2601	D2604	C2605	C2606	L2607	R2608	A2609	L2610						



Chain F:  7% 97% ..

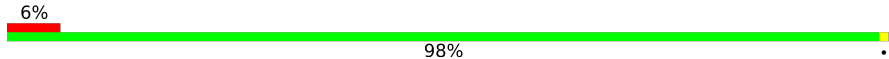


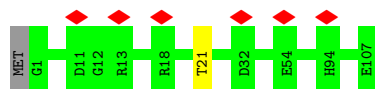
- Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1A

Chain G:  7% 97% ..



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

Chain H:  6% 98% ..



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C4	Depositor
Number of particles used	157550	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 ($e^-/\text{\AA}^2$)	67.44	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	4000	Depositor
Magnification	64000	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	36.485	Depositor
Minimum map value	0.000	Depositor
Average map value	0.051	Depositor
Map value standard deviation	0.346	Depositor
Recommended contour level	1.39	Depositor
Map size (Å)	409.80002, 409.80002, 409.80002	wwPDB
Map dimensions	300, 300, 300	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.366, 1.366, 1.366	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: POV, ZN

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z > 5$	RMSZ	$\# Z > 5$
1	A	0.81	1/35885 (0.0%)	1.33	73/48603 (0.2%)
1	B	0.80	1/35885 (0.0%)	1.33	77/48603 (0.2%)
1	C	0.80	1/35885 (0.0%)	1.33	77/48603 (0.2%)
1	D	0.80	1/35885 (0.0%)	1.35	79/48603 (0.2%)
2	E	0.82	0/851	1.38	1/1146 (0.1%)
2	F	0.81	0/851	1.37	1/1146 (0.1%)
2	G	0.81	0/851	1.37	1/1146 (0.1%)
2	H	0.81	0/851	1.37	0/1146
All	All	0.80	4/146944 (0.0%)	1.34	309/198996 (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	8
1	B	0	7
1	C	0	7
1	D	0	6
All	All	0	28

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	864	PRO	CA-C	5.52	1.54	1.51
1	D	864	PRO	CA-C	5.50	1.54	1.51
1	A	864	PRO	CA-C	5.44	1.54	1.51
1	B	864	PRO	CA-C	5.32	1.54	1.51

The worst 5 of 309 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	167	ASP	CA-CB-CG	7.88	120.47	112.60
1	B	2629	ASP	CA-C-N	7.75	125.13	120.24
1	B	2629	ASP	C-N-CA	7.75	125.13	120.24
1	D	1690	ASP	CA-CB-CG	7.49	120.09	112.60
1	B	1690	ASP	CA-CB-CG	7.38	119.98	112.60

There are no chirality outliers.

5 of 28 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1049	TYR	Sidechain
1	A	157	ARG	Sidechain
1	A	2794	TYR	Sidechain
1	A	3436	ARG	Sidechain
1	A	3762	ARG	Sidechain

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	35088	34734	34715	8	0
1	B	35088	34734	34715	9	0
1	C	35088	34734	34715	8	0
1	D	35088	34734	34715	12	0
2	E	832	829	831	0	0
2	F	832	829	831	0	0
2	G	832	829	831	0	0
2	H	832	829	831	0	0
3	A	104	164	164	0	0
3	B	104	164	164	0	0
3	C	104	164	164	0	0
3	D	104	164	164	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
All	All	144100	142908	142840	37	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 0.

The worst 5 of 37 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:A:3966:THR:CG2	1:A:3970:GLN:HE21	2.17	0.57
1:C:3966:THR:CG2	1:C:3970:GLN:HE21	2.17	0.57
1:D:3966:THR:CG2	1:D:3970:GLN:HE21	2.18	0.57
1:B:3966:THR:CG2	1:B:3970:GLN:HE21	2.19	0.55
1:A:3765:TYR:CD1	1:A:3765:TYR:C	2.90	0.50

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	4376/5037 (87%)	4164 (95%)	199 (4%)	13 (0%)	36	65
1	B	4376/5037 (87%)	4166 (95%)	193 (4%)	17 (0%)	30	60
1	C	4376/5037 (87%)	4162 (95%)	197 (4%)	17 (0%)	30	60
1	D	4376/5037 (87%)	4160 (95%)	199 (4%)	17 (0%)	30	60
2	E	105/108 (97%)	100 (95%)	5 (5%)	0	100	100
2	F	105/108 (97%)	101 (96%)	4 (4%)	0	100	100
2	G	105/108 (97%)	101 (96%)	4 (4%)	0	100	100
2	H	105/108 (97%)	100 (95%)	5 (5%)	0	100	100
All	All	17924/20580 (87%)	17054 (95%)	806 (4%)	64 (0%)	31	60

5 of 64 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	3693	LYS

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Mol	Chain	Res	Type
1	D	3693	LYS
1	A	849	THR
1	A	2663	ASN
1	A	3622	LYS

5.3.2 Protein sidechains ⓘ

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	3827/4276 (90%)	3780 (99%)	47 (1%)	63	72
1	B	3827/4276 (90%)	3777 (99%)	50 (1%)	61	71
1	C	3827/4276 (90%)	3774 (99%)	53 (1%)	59	70
1	D	3827/4276 (90%)	3767 (98%)	60 (2%)	55	68
2	E	89/90 (99%)	88 (99%)	1 (1%)	65	73
2	F	89/90 (99%)	88 (99%)	1 (1%)	65	73
2	G	89/90 (99%)	88 (99%)	1 (1%)	65	73
2	H	89/90 (99%)	88 (99%)	1 (1%)	65	73
All	All	15664/17464 (90%)	15450 (99%)	214 (1%)	57	70

5 of 214 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	1990	GLU
1	C	4212	GLU
1	D	3967	GLU
1	C	2275	VAL
1	C	3456	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 179 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	2773	ASN

Continued on next page...

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Mol	Chain	Res	Type
1	D	705	ASN
1	C	3109	ASN
1	D	57	ASN
1	D	1460	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 12 ligands modelled in this entry, 4 are monoatomic - leaving 8 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
3	POV	C	5102	-	51,51,51	0.71	0	57,59,59	0.45	0
3	POV	A	5102	-	51,51,51	0.72	0	57,59,59	0.47	0
3	POV	D	5101	-	51,51,51	0.71	1 (1%)	57,59,59	0.76	2 (3%)
3	POV	B	5101	-	51,51,51	0.69	0	57,59,59	0.49	0
3	POV	C	5101	-	51,51,51	0.71	1 (1%)	57,59,59	0.74	2 (3%)
3	POV	B	5102	-	51,51,51	0.73	1 (1%)	57,59,59	0.79	2 (3%)
3	POV	D	5102	-	51,51,51	0.73	0	57,59,59	0.47	0
3	POV	A	5101	-	51,51,51	0.74	1 (1%)	57,59,59	0.76	2 (3%)

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	POV	C	5102	-	-	5/55/55/55	-
3	POV	A	5102	-	-	8/55/55/55	-
3	POV	D	5101	-	-	17/55/55/55	-
3	POV	B	5101	-	-	11/55/55/55	-
3	POV	C	5101	-	-	14/55/55/55	-
3	POV	B	5102	-	-	12/55/55/55	-
3	POV	D	5102	-	-	7/55/55/55	-
3	POV	A	5101	-	-	17/55/55/55	-

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	5101	POV	C3-C2	2.21	1.57	1.50
3	B	5102	POV	C3-C2	2.18	1.57	1.50
3	C	5101	POV	C3-C2	2.17	1.57	1.50
3	D	5101	POV	C3-C2	2.15	1.57	1.50

The worst 5 of 8 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	5102	POV	C2-O21-C21	4.17	128.05	117.79
3	A	5101	POV	C2-O21-C21	3.97	127.56	117.79
3	D	5101	POV	C2-O21-C21	3.93	127.46	117.79
3	C	5101	POV	C2-O21-C21	3.73	126.98	117.79
3	A	5101	POV	O21-C21-C22	2.40	116.68	111.50

There are no chirality outliers.

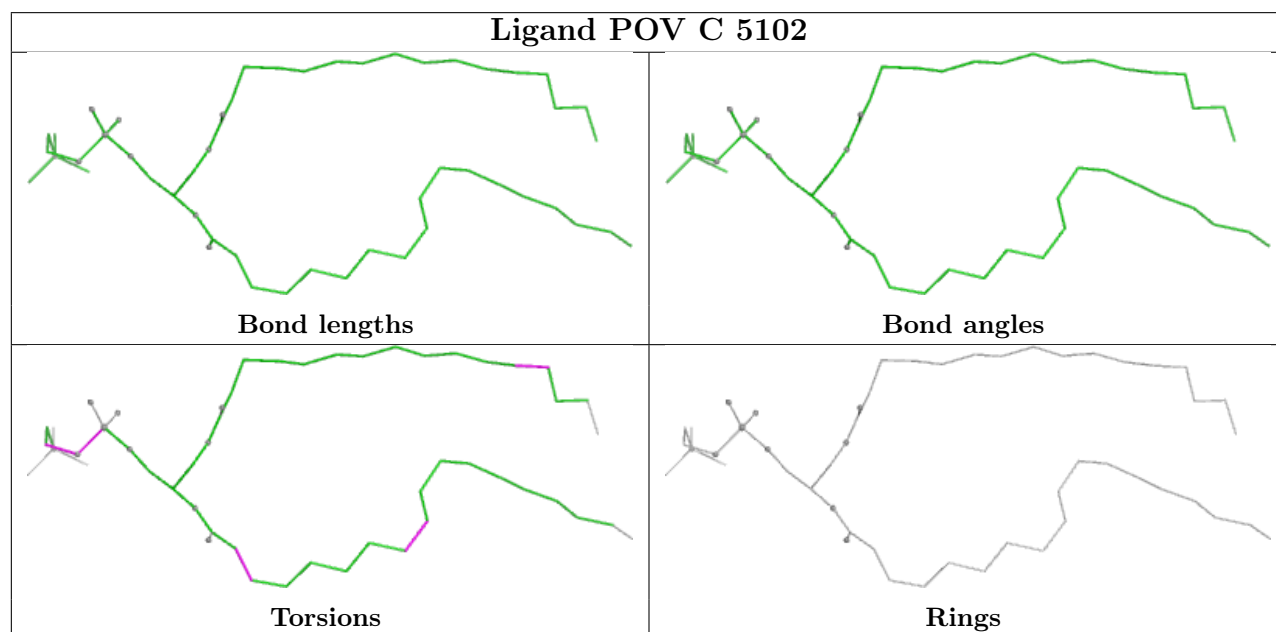
5 of 91 torsion outliers are listed below:

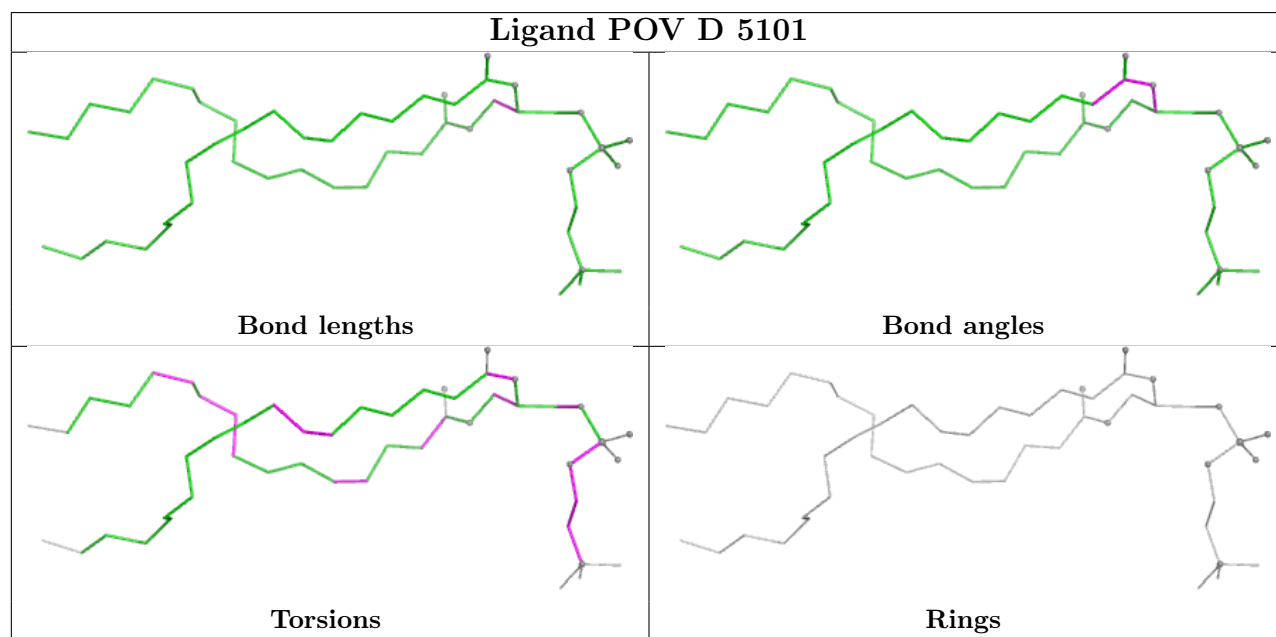
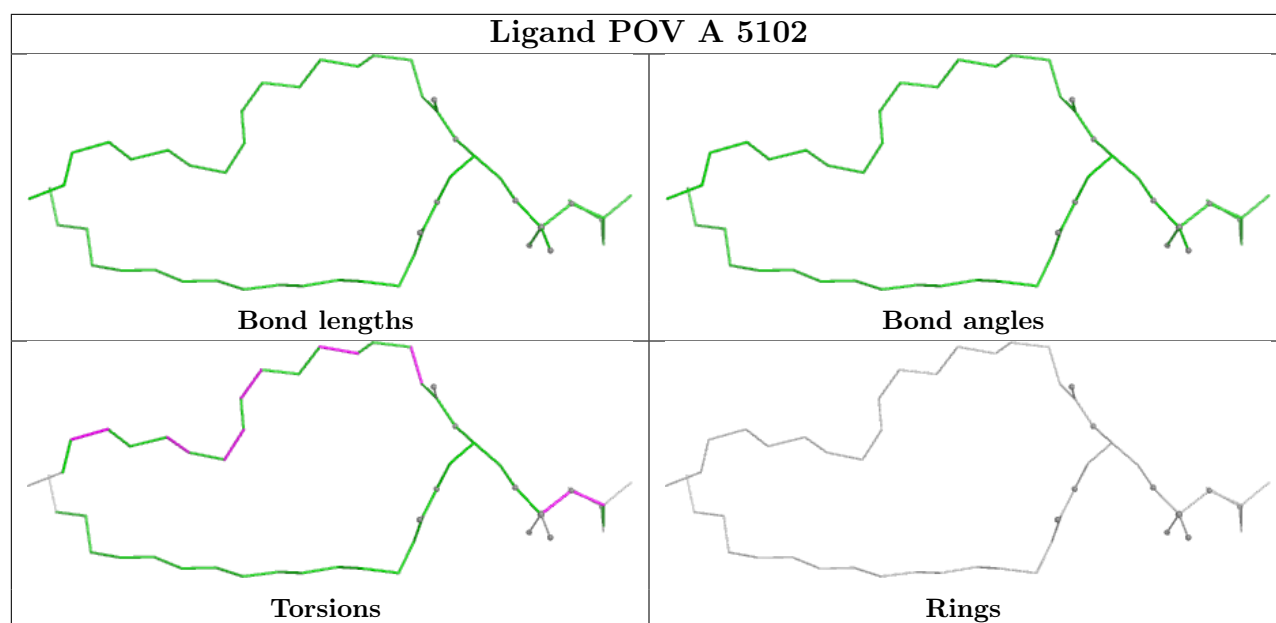
Mol	Chain	Res	Type	Atoms
3	A	5101	POV	C22-C21-O21-C2
3	A	5101	POV	O22-C21-O21-C2
3	B	5101	POV	C12-C11-O12-P
3	B	5102	POV	C22-C21-O21-C2
3	B	5102	POV	O22-C21-O21-C2

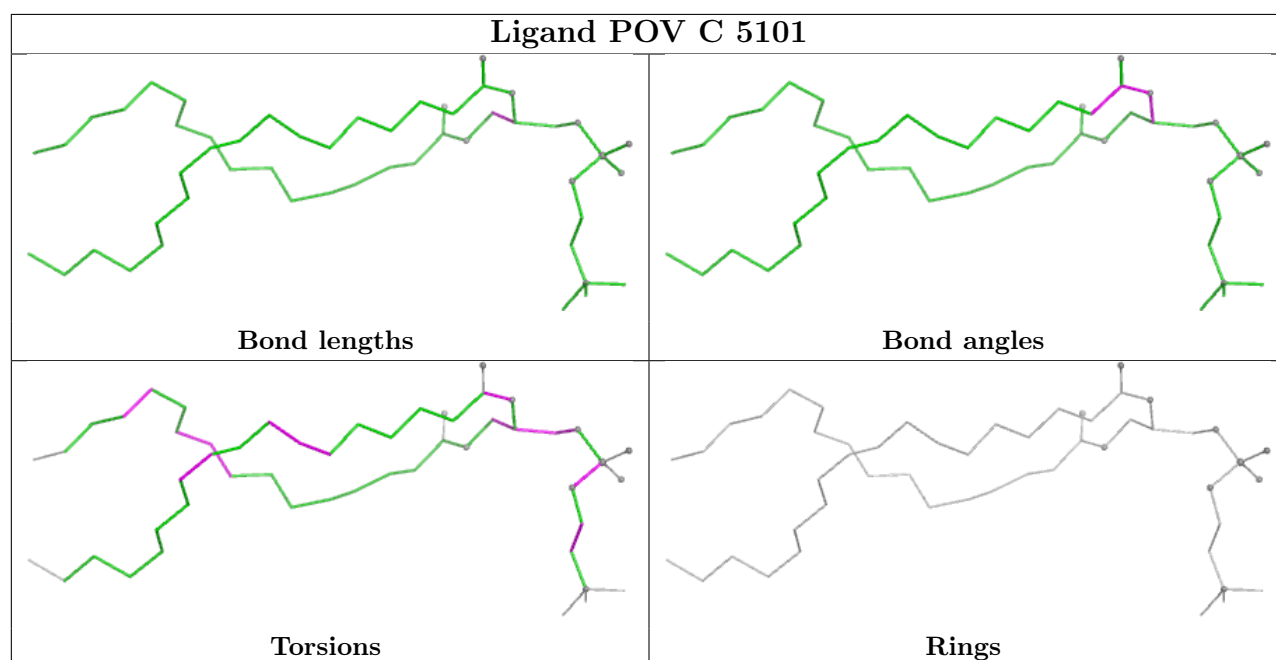
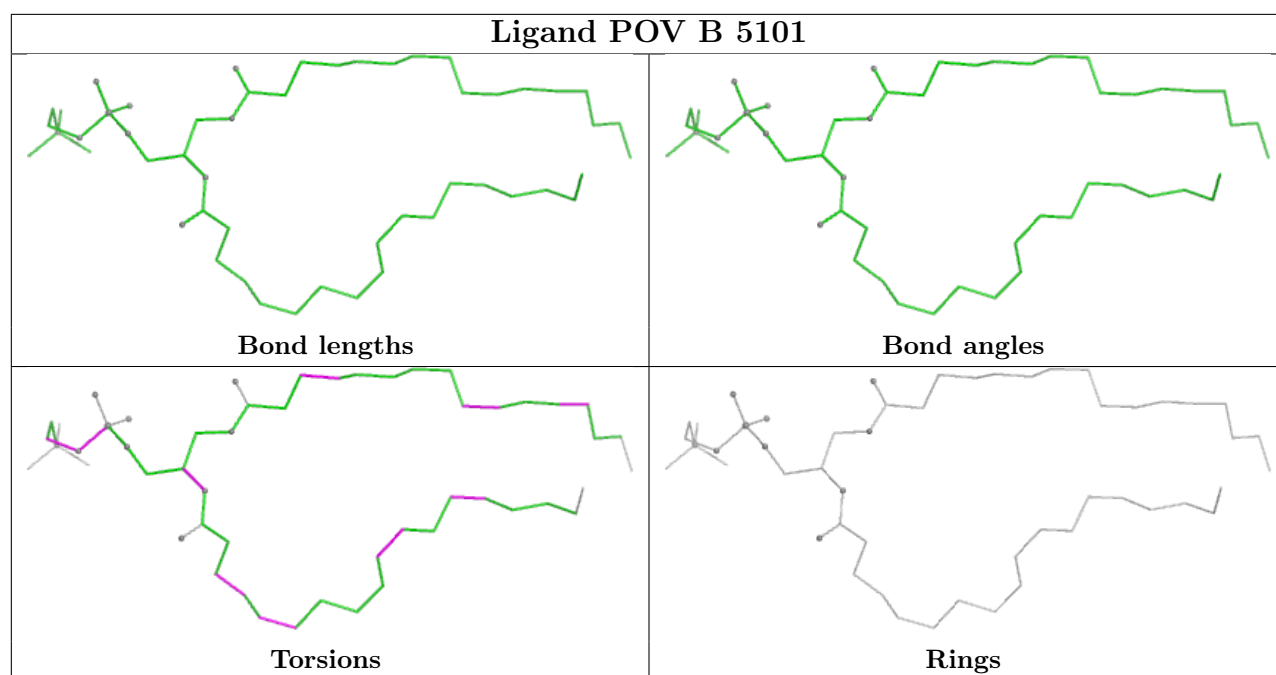
There are no ring outliers.

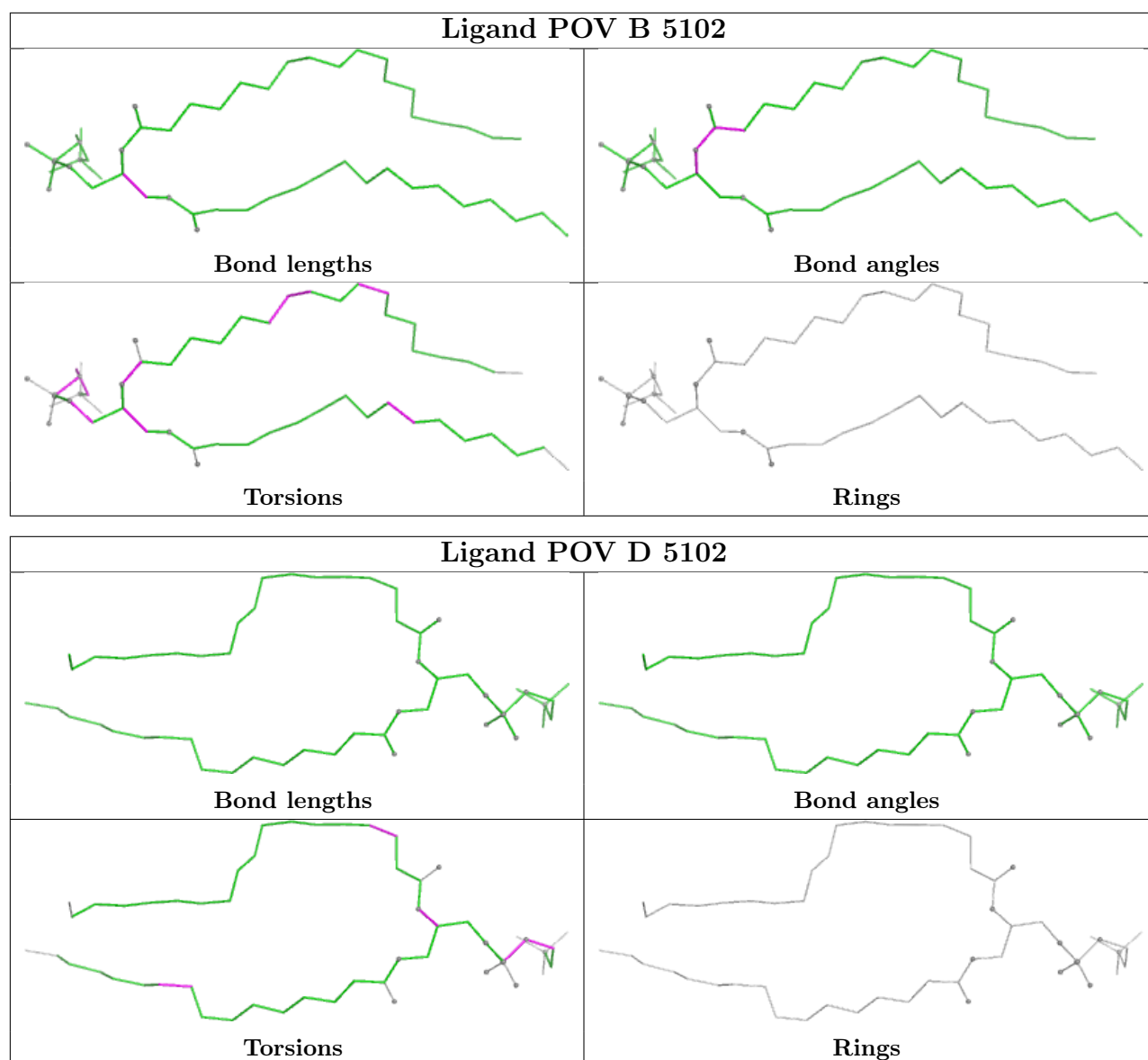
No monomer is involved in short contacts.

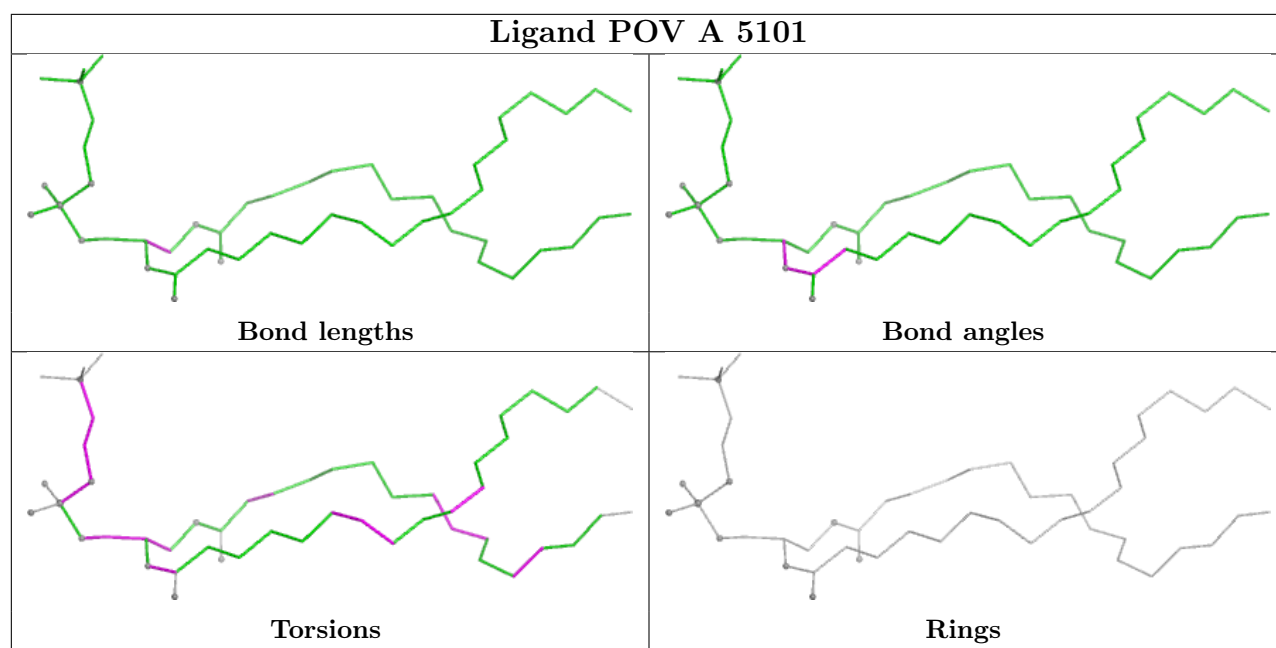
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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











5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

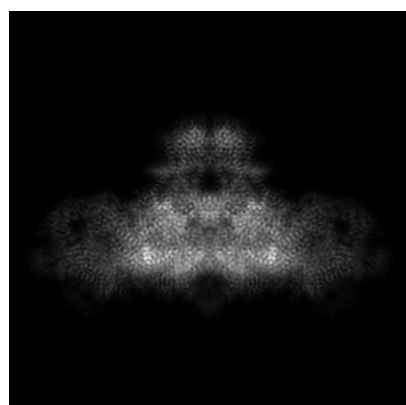
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-54590. These allow visual inspection of the internal detail of the map and identification of artifacts.

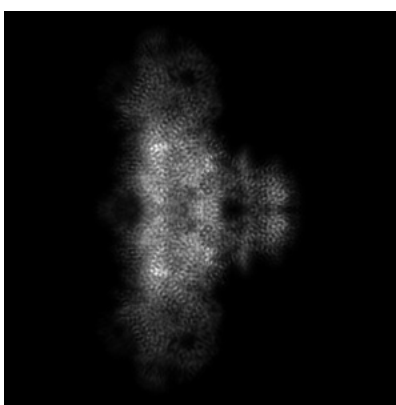
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

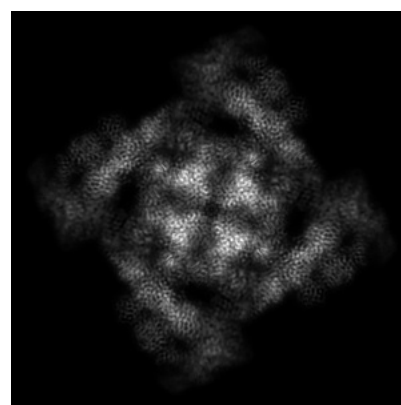
6.1.1 Primary map



X



Y

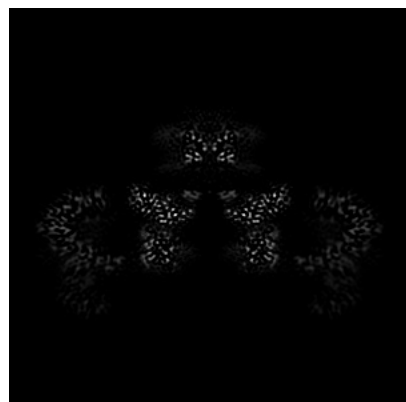


Z

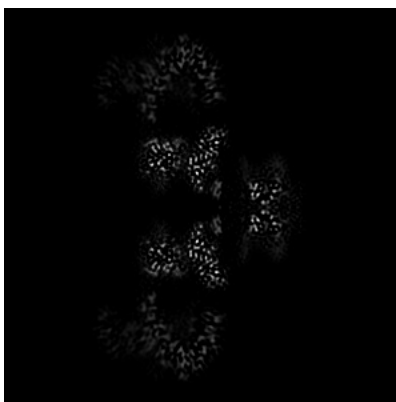
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

6.2.1 Primary map



X Index: 150



Y Index: 150



Z Index: 150

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: 182



Y Index: 120

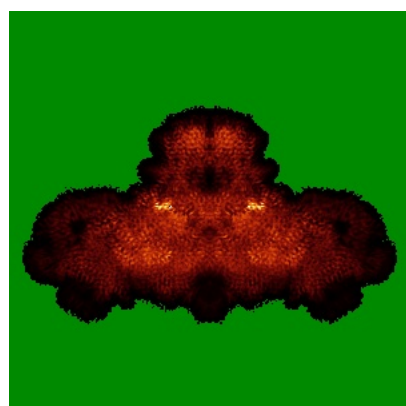


Z Index: 153

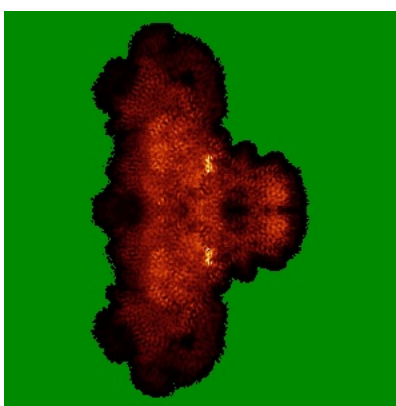
The images above show the largest variance slices of the map in three orthogonal directions.

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

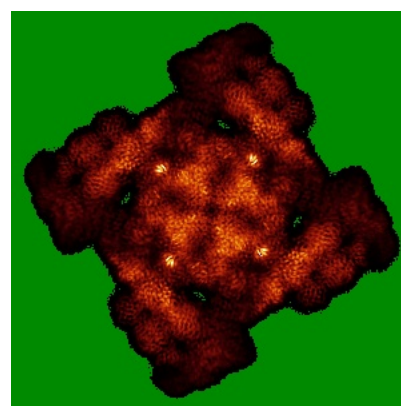
6.4.1 Primary map



X



Y

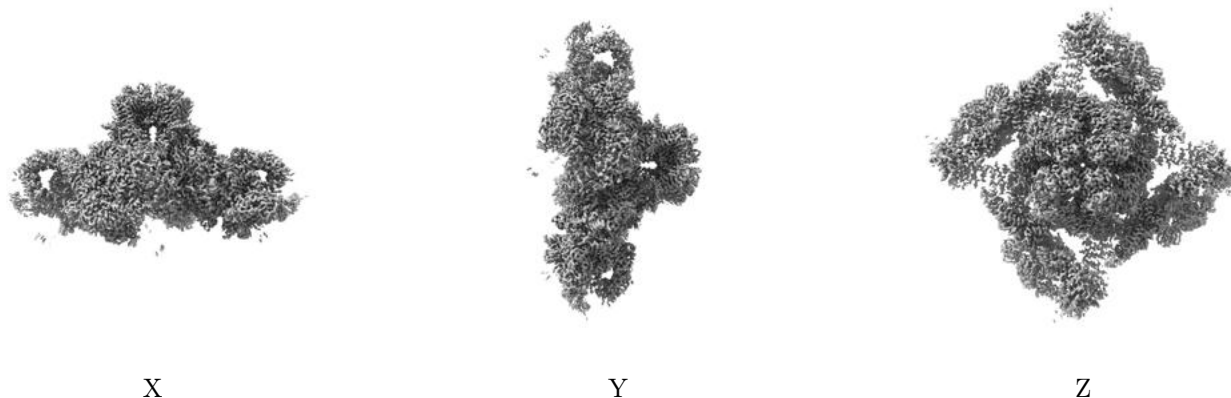


Z

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

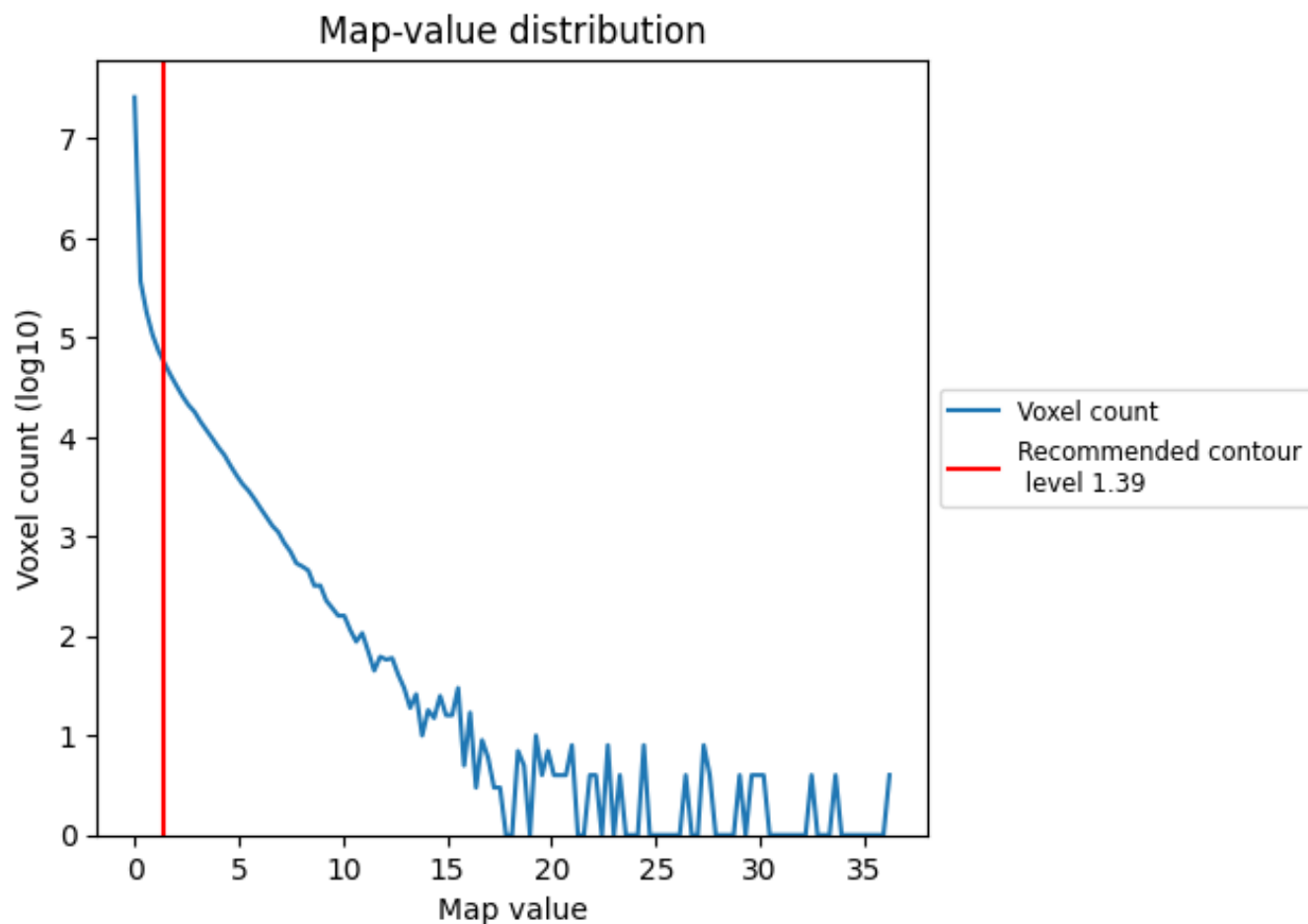
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

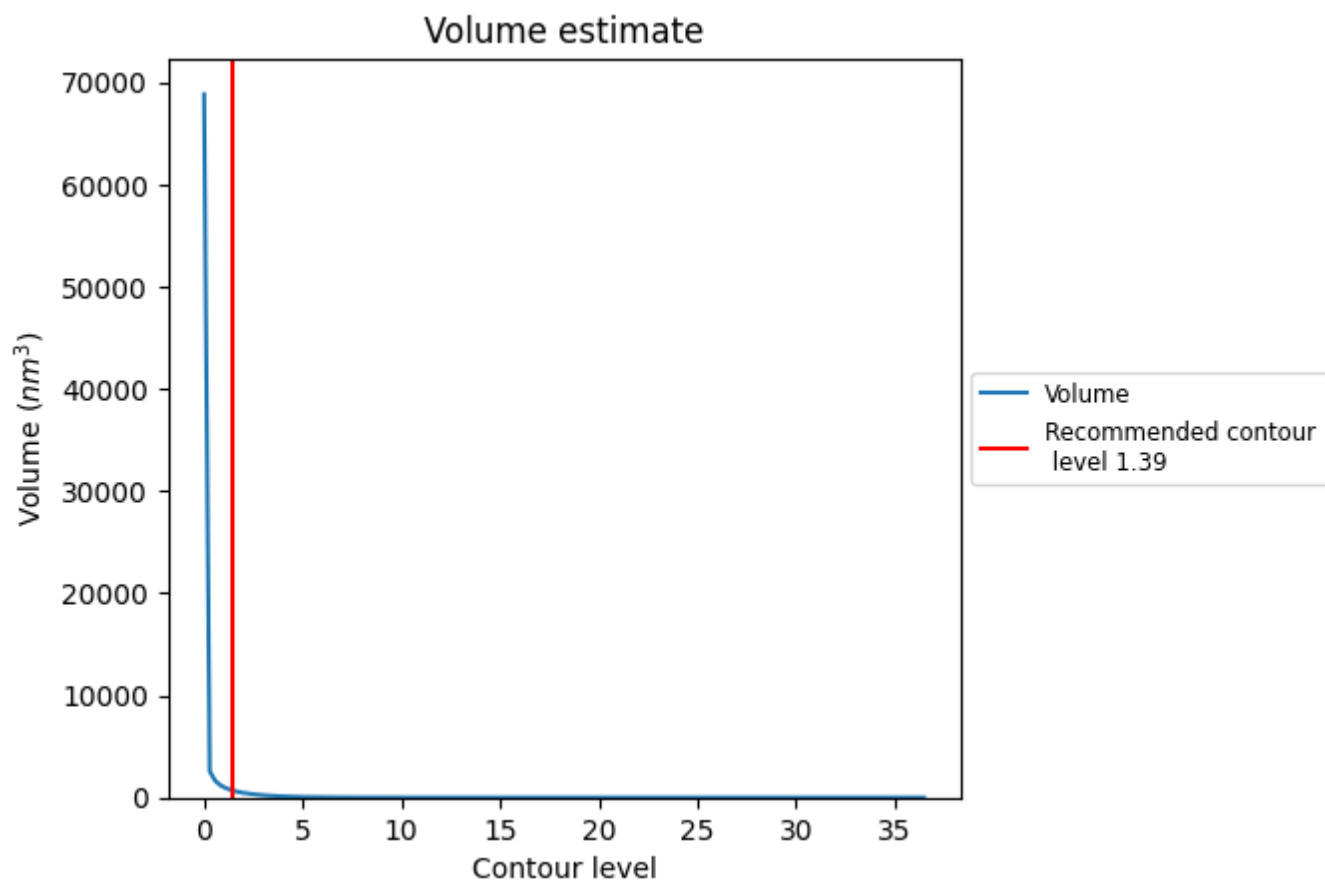
This section contains the results of statistical analysis of the map.

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.

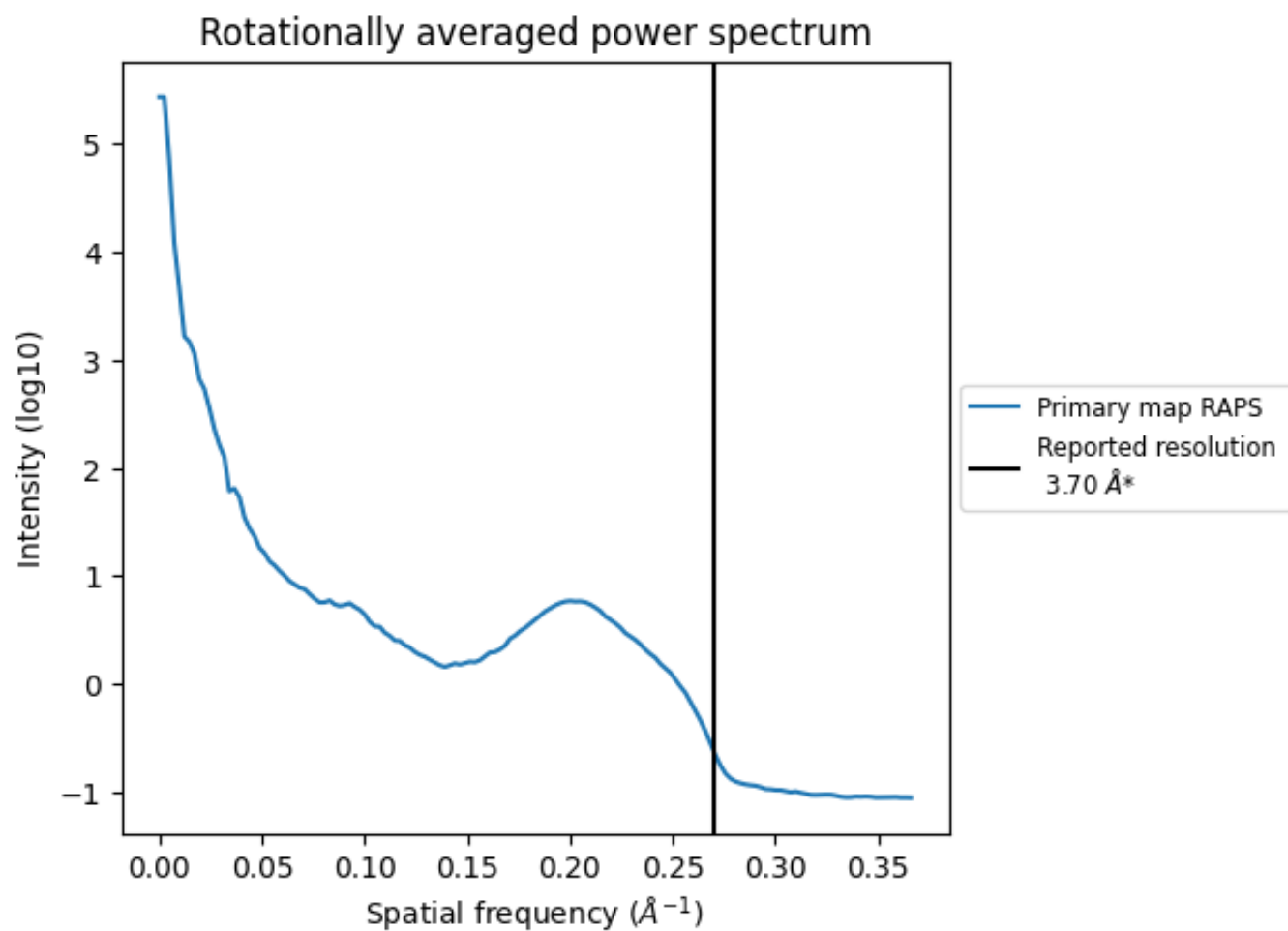
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 729 nm³; this corresponds to an approximate mass of 658 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 ⓘ



*Reported resolution corresponds to spatial frequency of 0.270 $\text{\AA}^{-1}$

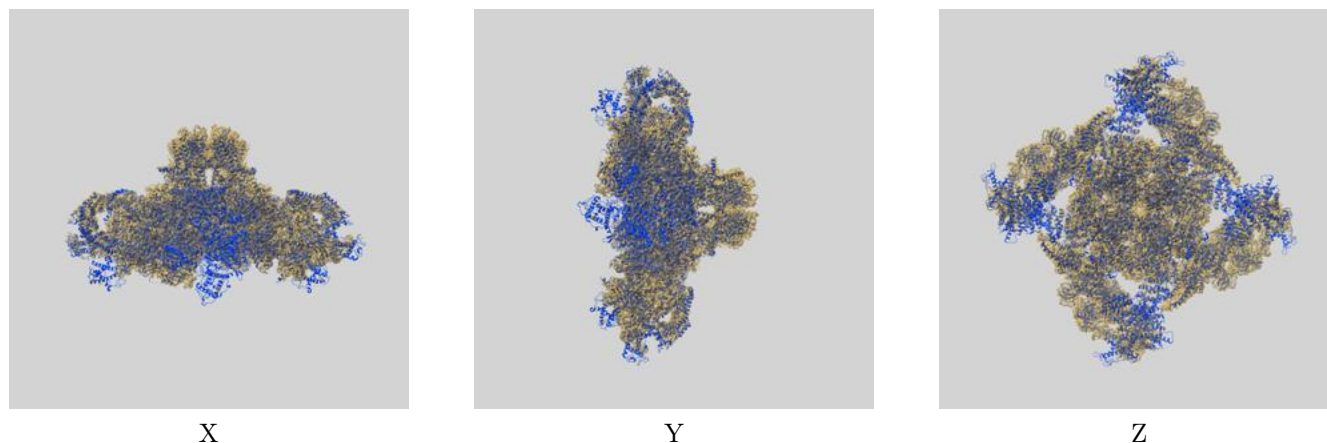
8 Fourier-Shell correlation

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

9 Map-model fit [i](#)

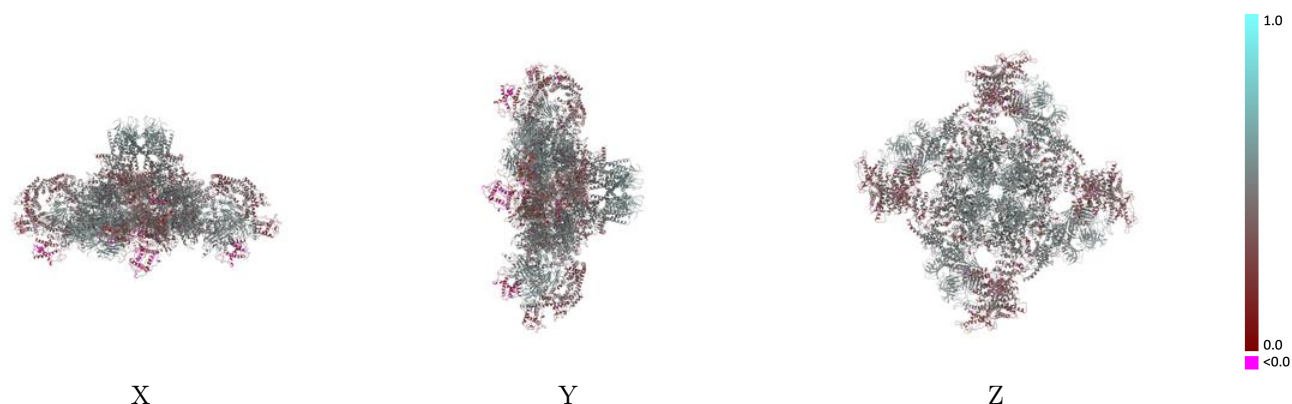
This section contains information regarding the fit between EMDB map EMD-54590 and PDB model 9S55. Per-residue inclusion information can be found in section [3](#) on page [7](#).

9.1 Map-model overlay [i](#)



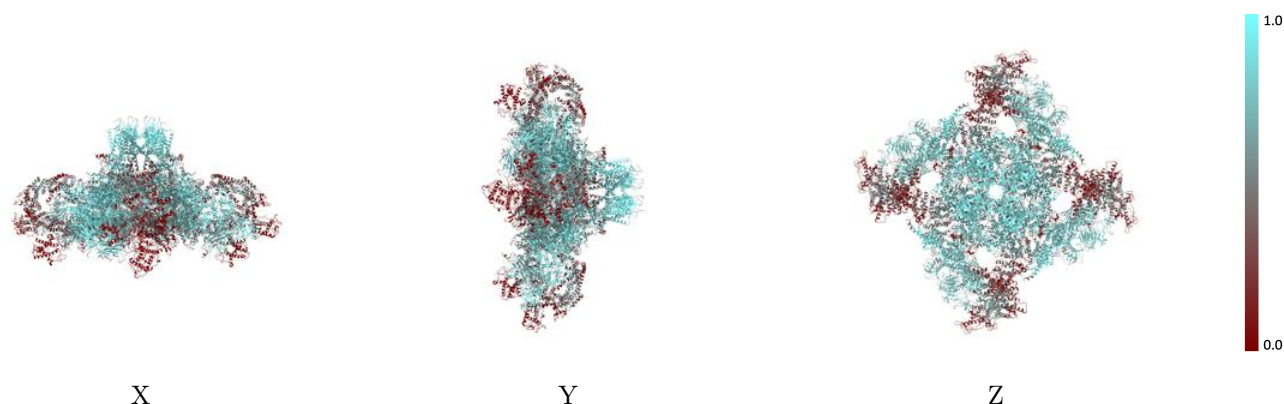
The images above show the 3D surface view of the map at the recommended contour level 1.39 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



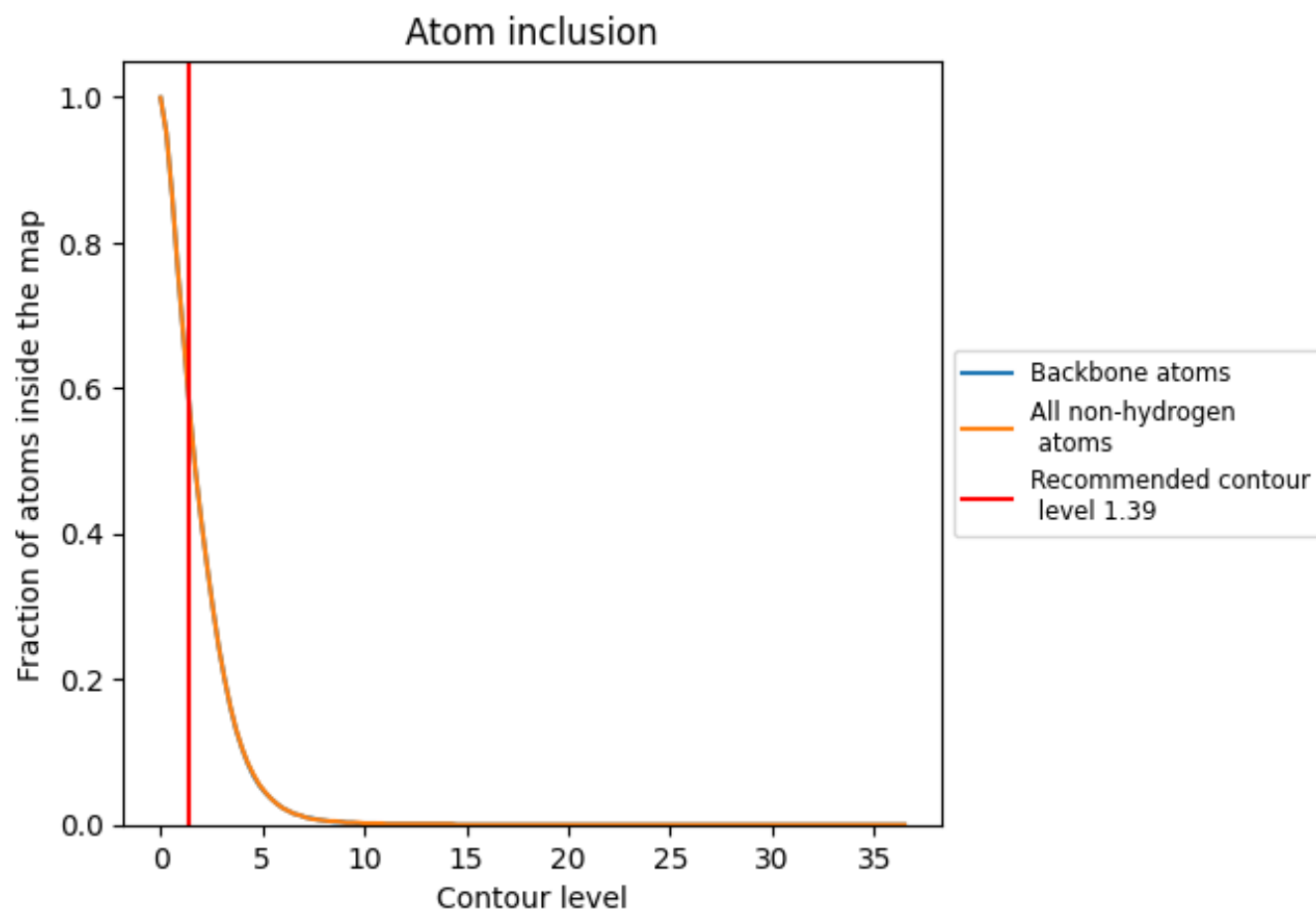
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (1.39).

9.4 Atom inclusion [i](#)



At the recommended contour level, 58% of all backbone atoms, 58% 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 (1.39) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.5810	0.4370
A	0.5760	0.4340
B	0.5770	0.4340
C	0.5770	0.4340
D	0.6110	0.4370
E	0.7100	0.5240
F	0.7020	0.5260
G	0.7030	0.5270
H	0.7280	0.5290

1.0

0.0

<0.0