



wwPDB EM Validation Summary Report ⓘ

Oct 22, 2024 – 03:01 PM JST

PDB ID : 8XKH
EMDB ID : EMD-38417
Title : Structure of chimeric RyR Complex with tetraniliprole
Authors : Lin, L.; Wang, C.; Wang, W.; Jiang, H.; Yuchi, Z.
Deposited on : 2023-12-23
Resolution : 3.87 Å(reported)

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

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

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:

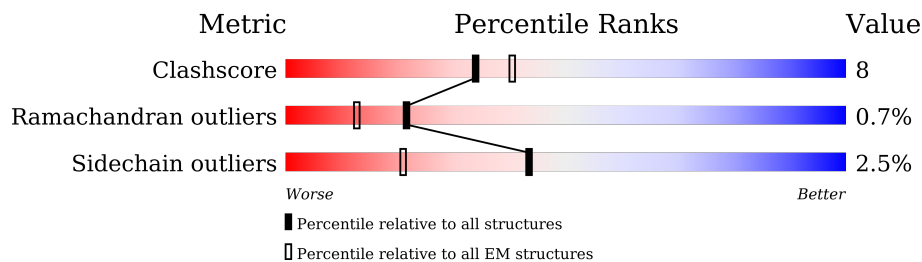
EMDB validation analysis : 0.0.1.dev113
Mogul : 1.8.5 (274361), CSD as541be (2020)
MolProbity : 4.02b-467
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.39

1 Overall quality at a glance i

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

The reported resolution of this entry is 3.87 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.



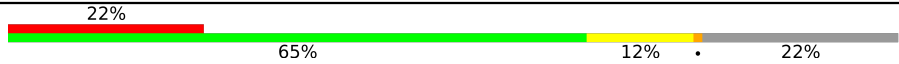

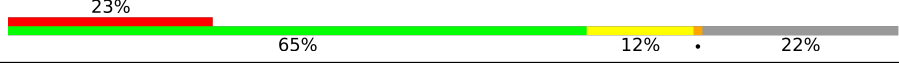
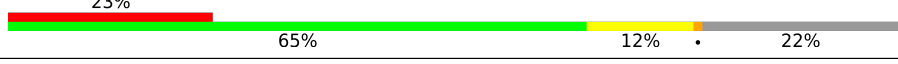
Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

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	I	149	
1	J	149	
1	K	149	
1	L	149	
2	E	107	
2	F	107	
2	G	107	
2	H	107	

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Mol	Chain	Length	Quality of chain
3	A	5037	
3	B	5037	
3	C	5037	
3	D	5037	

2 Entry composition i

There are 8 unique types of molecules in this entry. The entry contains 119942 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 Calmodulin-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	J	139	1042	646	174	212	10	0	0
1	I	139	1042	646	174	212	10	0	0
1	L	139	1042	646	174	212	10	0	0
1	K	139	1042	646	174	212	10	0	0

There are 16 discrepancies between the modelled and reference sequences:

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

- Molecule 2 is a protein called Peptidyl-prolyl cis-trans isomerase FKBP1B.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	F	107	Total	C	N	O	S	0	0
			804	510	144	146	4		
2	E	107	Total	C	N	O	S	0	0
			804	510	144	146	4		
2	H	107	Total	C	N	O	S	0	0
			804	510	144	146	4		
2	G	107	Total	C	N	O	S	0	0
			804	510	144	146	4		

- Molecule 3 is a protein called Ryanodine receptor 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	D	3928	Total	C	N	O	S	0	0
			28057	17892	4990	4999	176		
3	A	3928	Total	C	N	O	S	0	0
			28057	17892	4990	4999	176		
3	B	3928	Total	C	N	O	S	0	0
			28057	17892	4990	4999	176		
3	C	3928	Total	C	N	O	S	0	0
			28057	17892	4990	4999	176		

There are 16 discrepancies between the modelled and reference sequences:

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

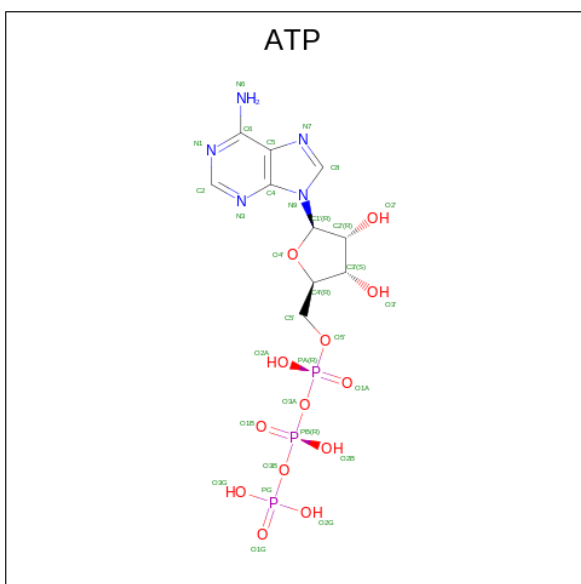
- Molecule 4 is ZINC ION (three-letter code: ZN) (formula: Zn).

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

- Molecule 5 is CALCIUM ION (three-letter code: CA) (formula: Ca).

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

- Molecule 6 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula: C₁₀H₁₆N₅O₁₃P₃) (labeled as "Ligand of Interest" by depositor).



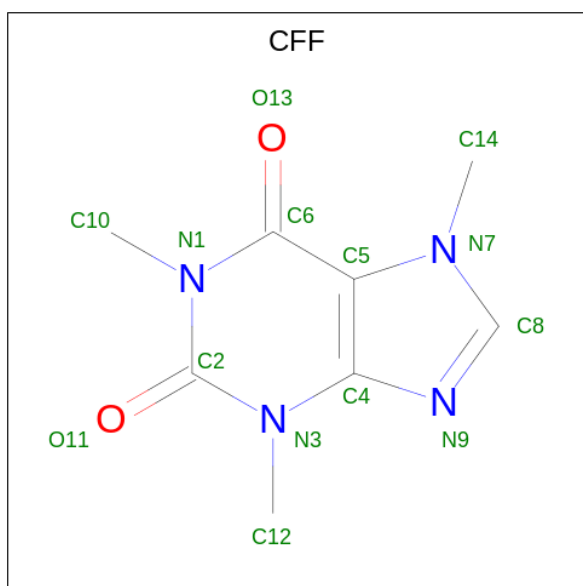
Mol	Chain	Residues	Atoms				AltConf	
6	D	1	Total	C	N	O	P	0
			31	10	5	13	3	

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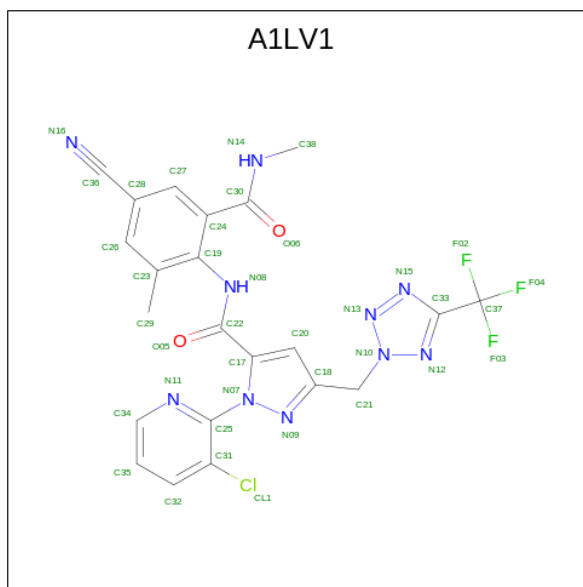
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
6	A	1	Total 31	C 10	N 5	O 13	P 3	0
6	B	1	Total 21	C 9	O 9	P 3		0
6	C	1	Total 31	C 10	N 5	O 13	P 3	0

- Molecule 7 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	
7	D	1	Total 14	C 8	N 4	O 2	0
7	A	1	Total 14	C 8	N 4	O 2	0
7	B	1	Total 14	C 8	N 4	O 2	0
7	C	1	Total 14	C 8	N 4	O 2	0

- Molecule 8 is tetraniliprole (three-letter code: A1LV1) (formula: $C_{22}H_{16}ClF_3N_{10}O_2$) (labeled as "Ligand of Interest" by depositor).

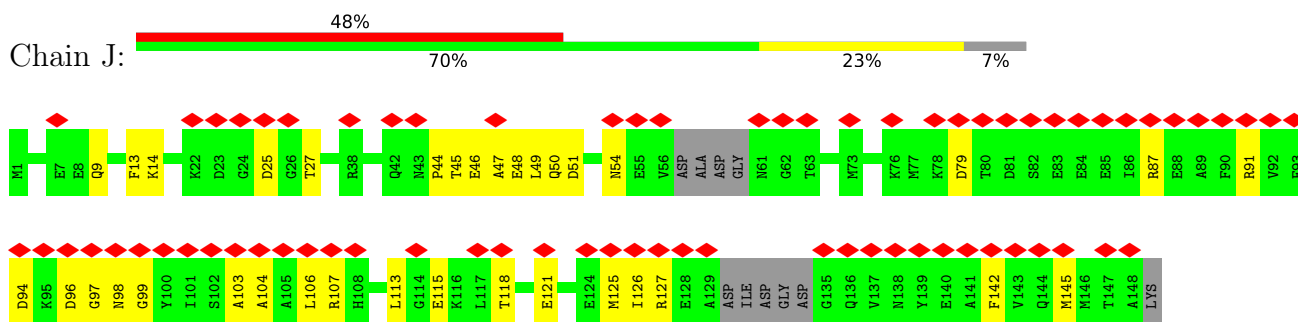


Mol	Chain	Residues	Atoms					AltConf	
			Total	C	Cl	F	N		O
8	D	1	Total 38	22	1	3	10	2	0
8	A	1	Total 38	22	1	3	10	2	0
8	B	1	Total 38	22	1	3	10	2	0
8	C	1	Total 38	22	1	3	10	2	0

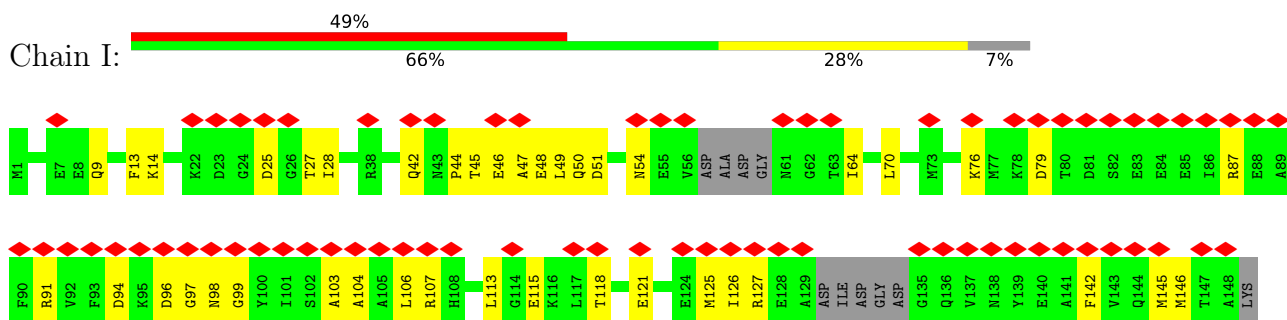
3 Residue-property plots [i](#)

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

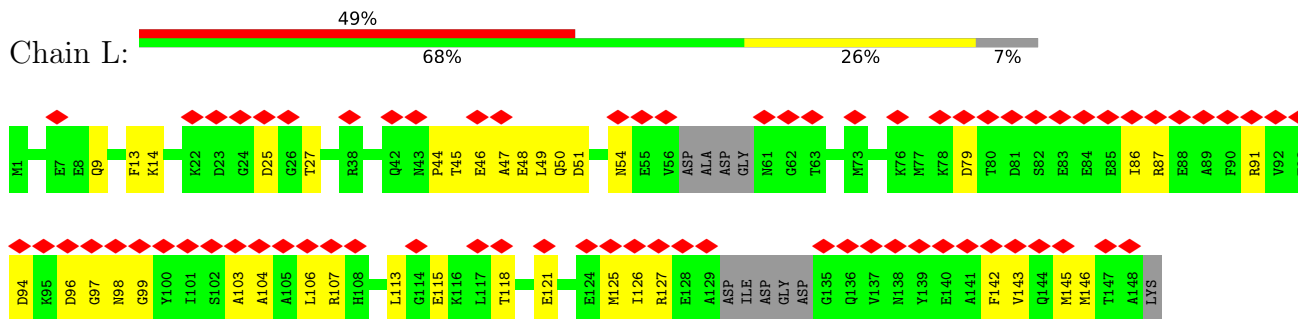
- Molecule 1: Calmodulin-1



- Molecule 1: Calmodulin-1

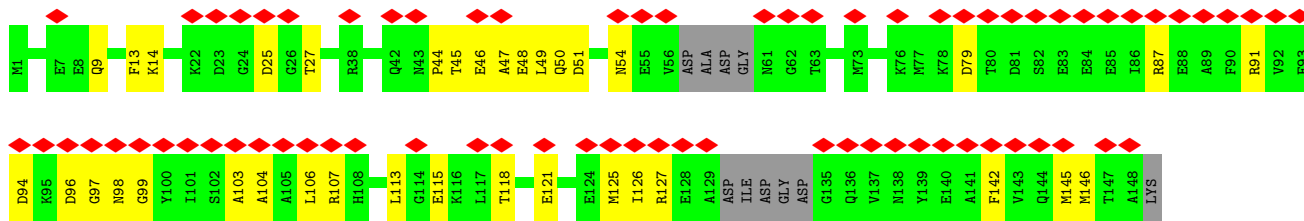


- Molecule 1: Calmodulin-1

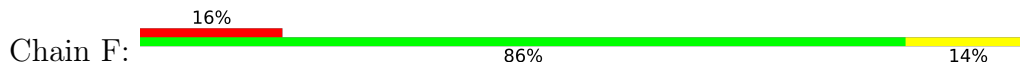


- Molecule 1: Calmodulin-1

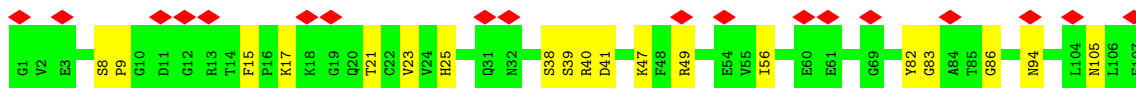
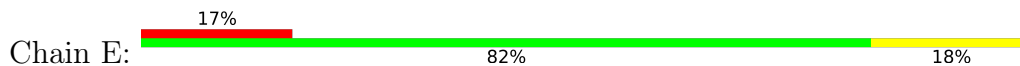




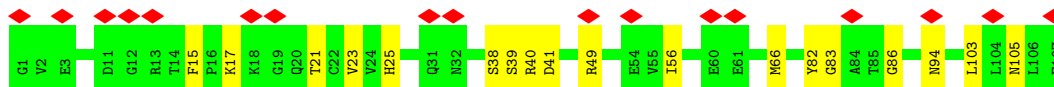
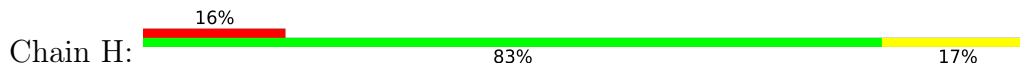
• Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1B



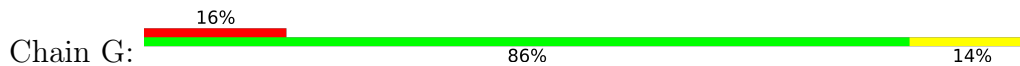
• Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1B



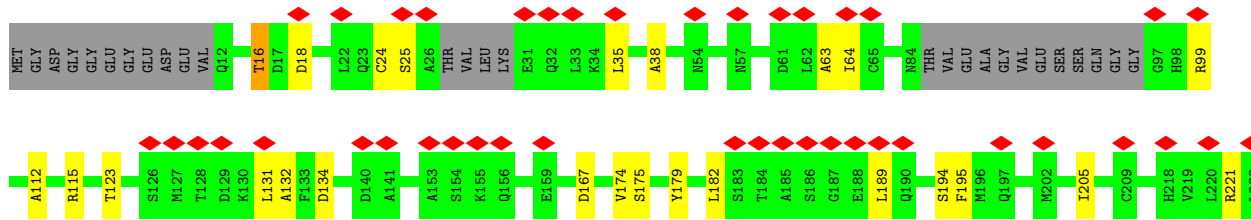
• Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1B

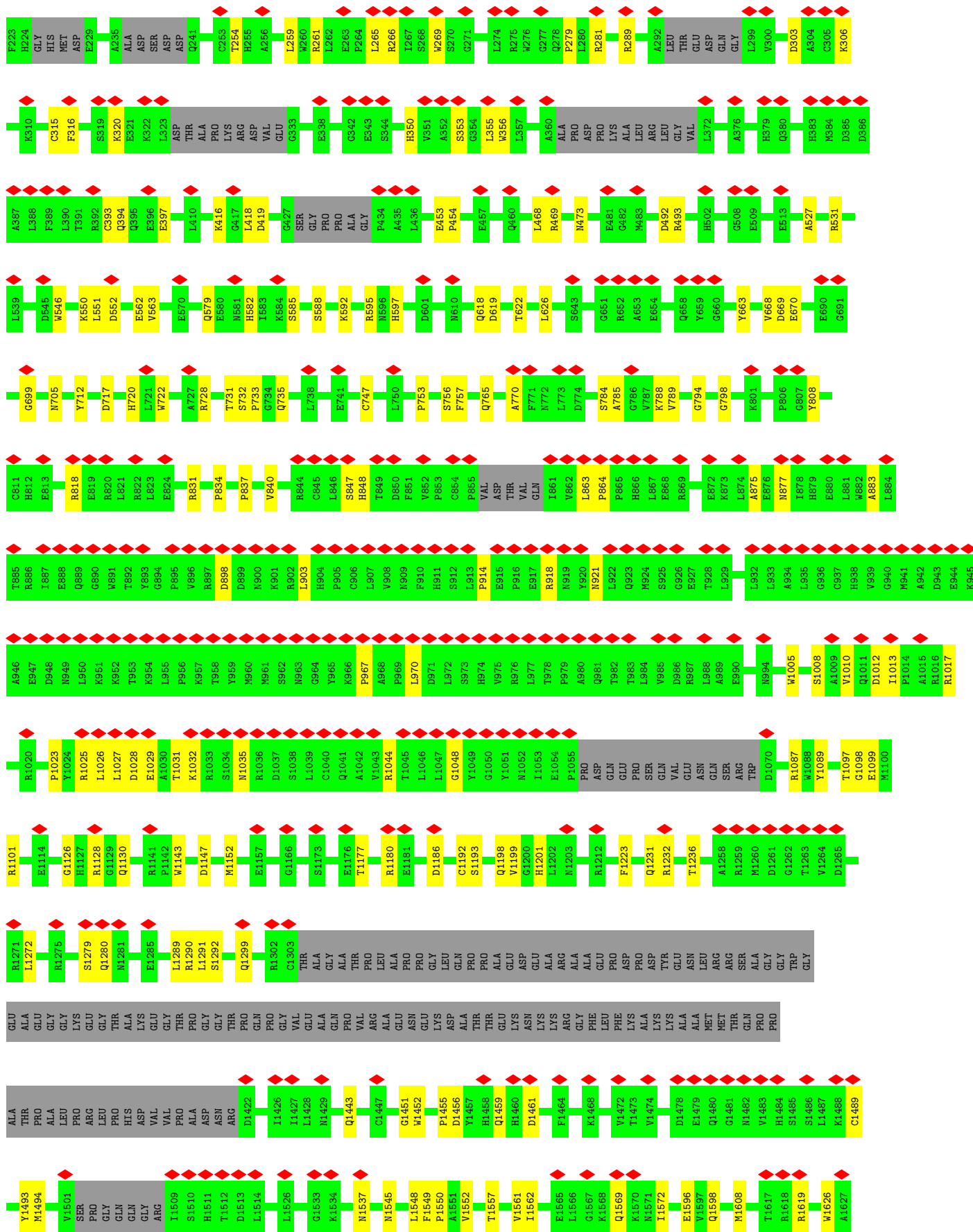


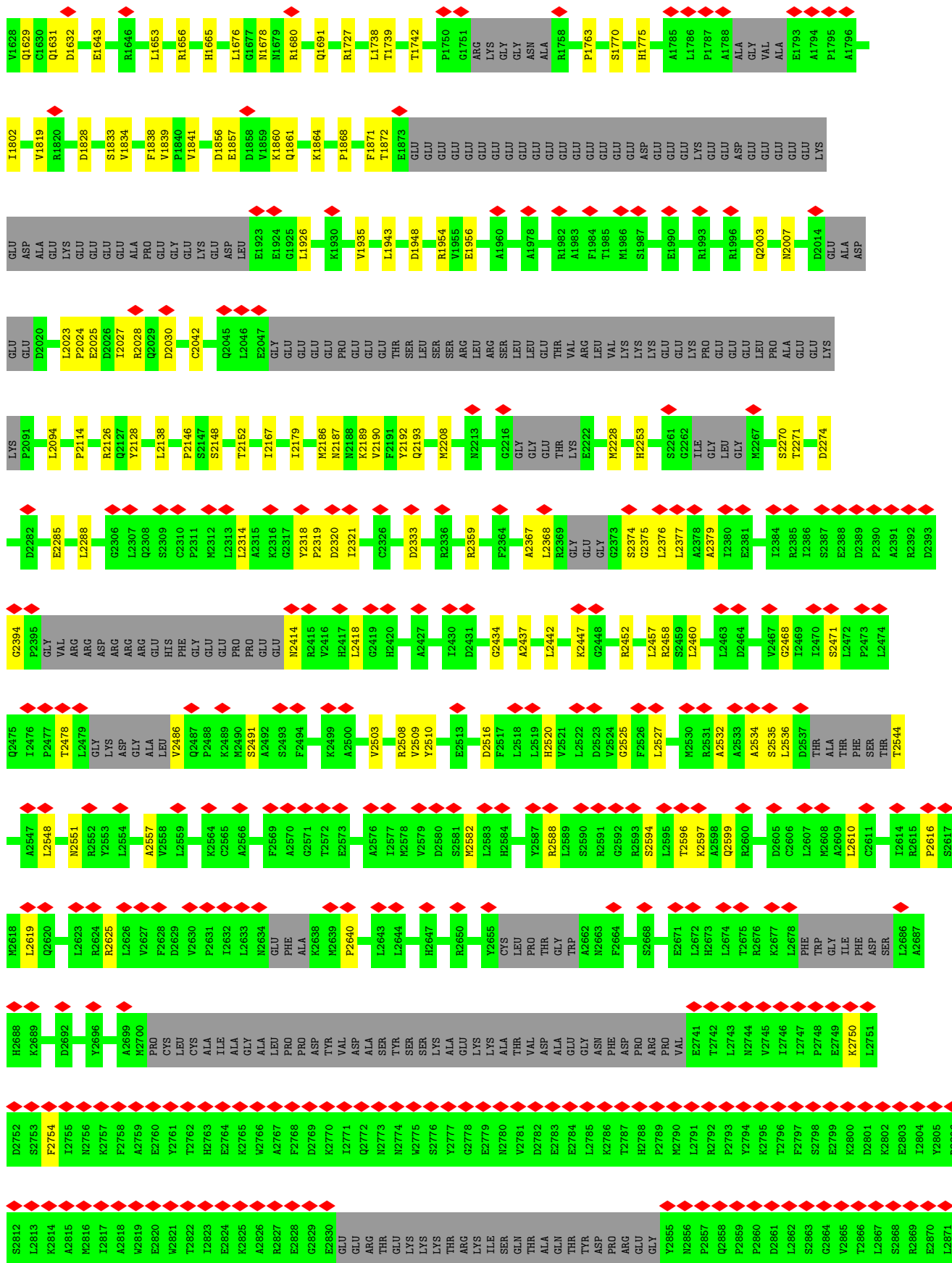
• Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1B

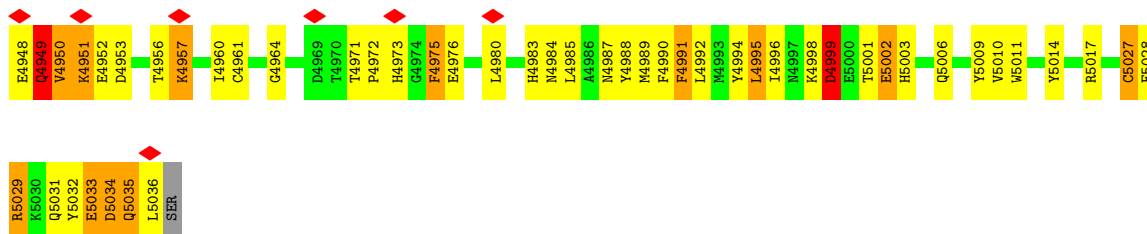


• Molecule 3: Ryanodine receptor 1

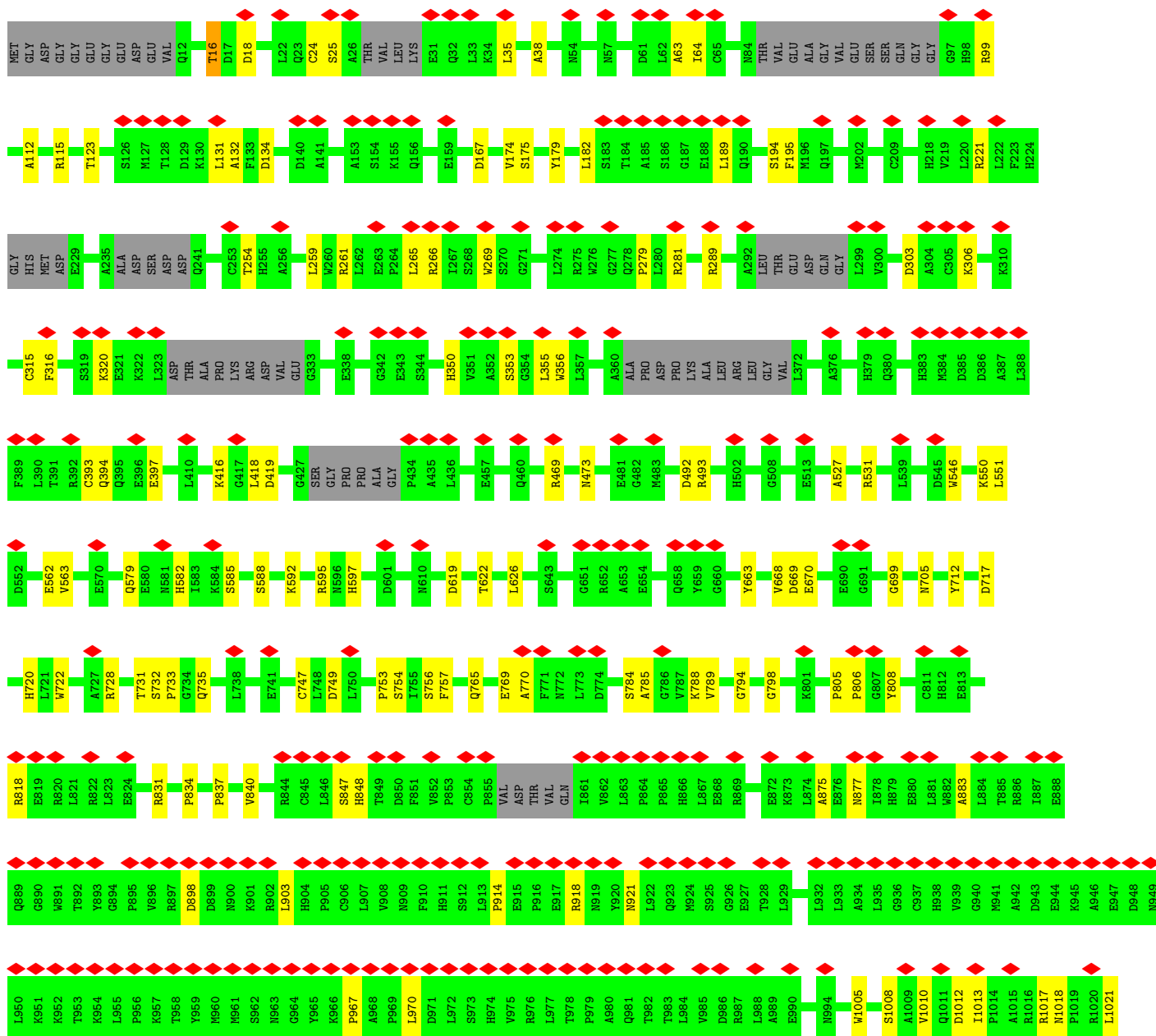


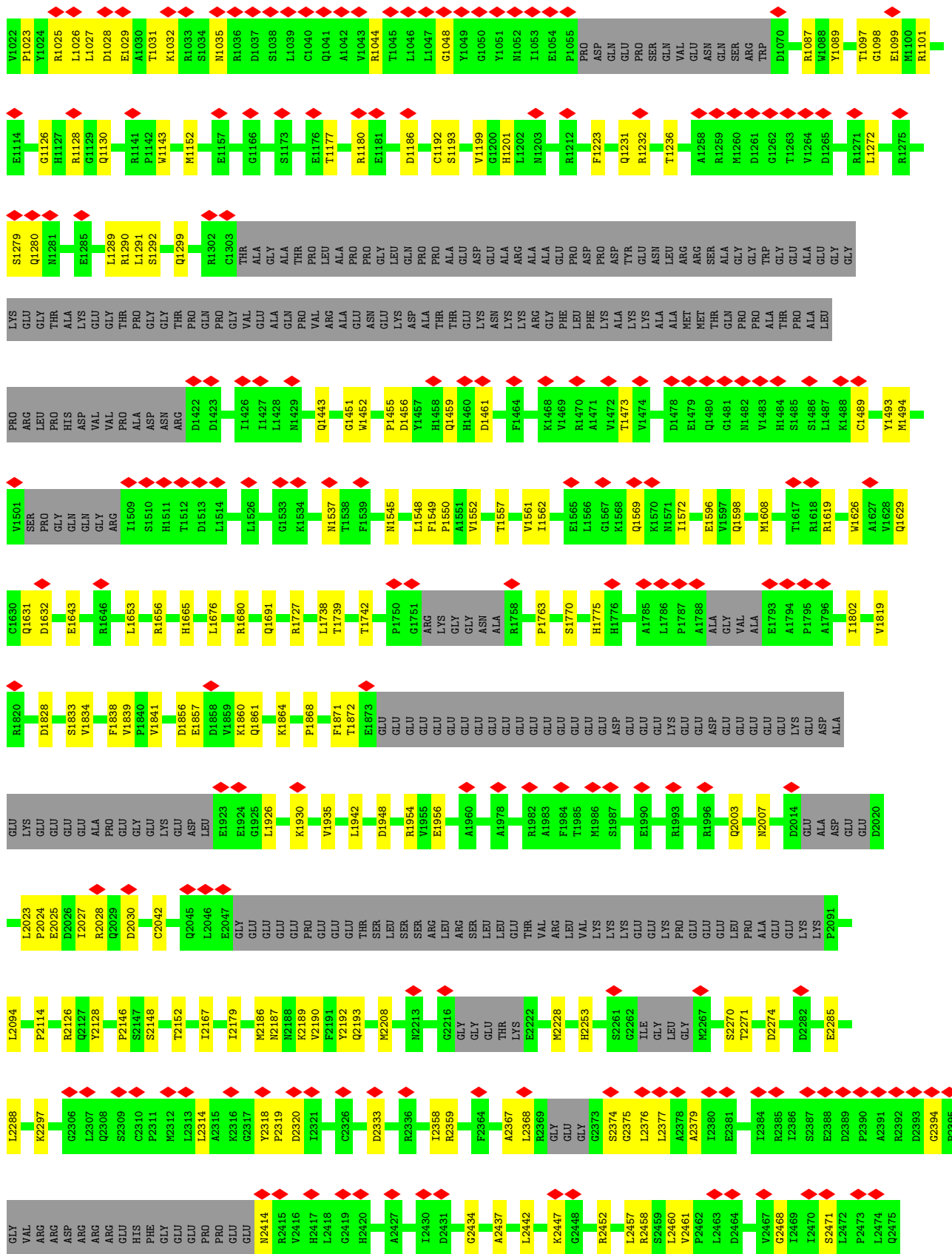




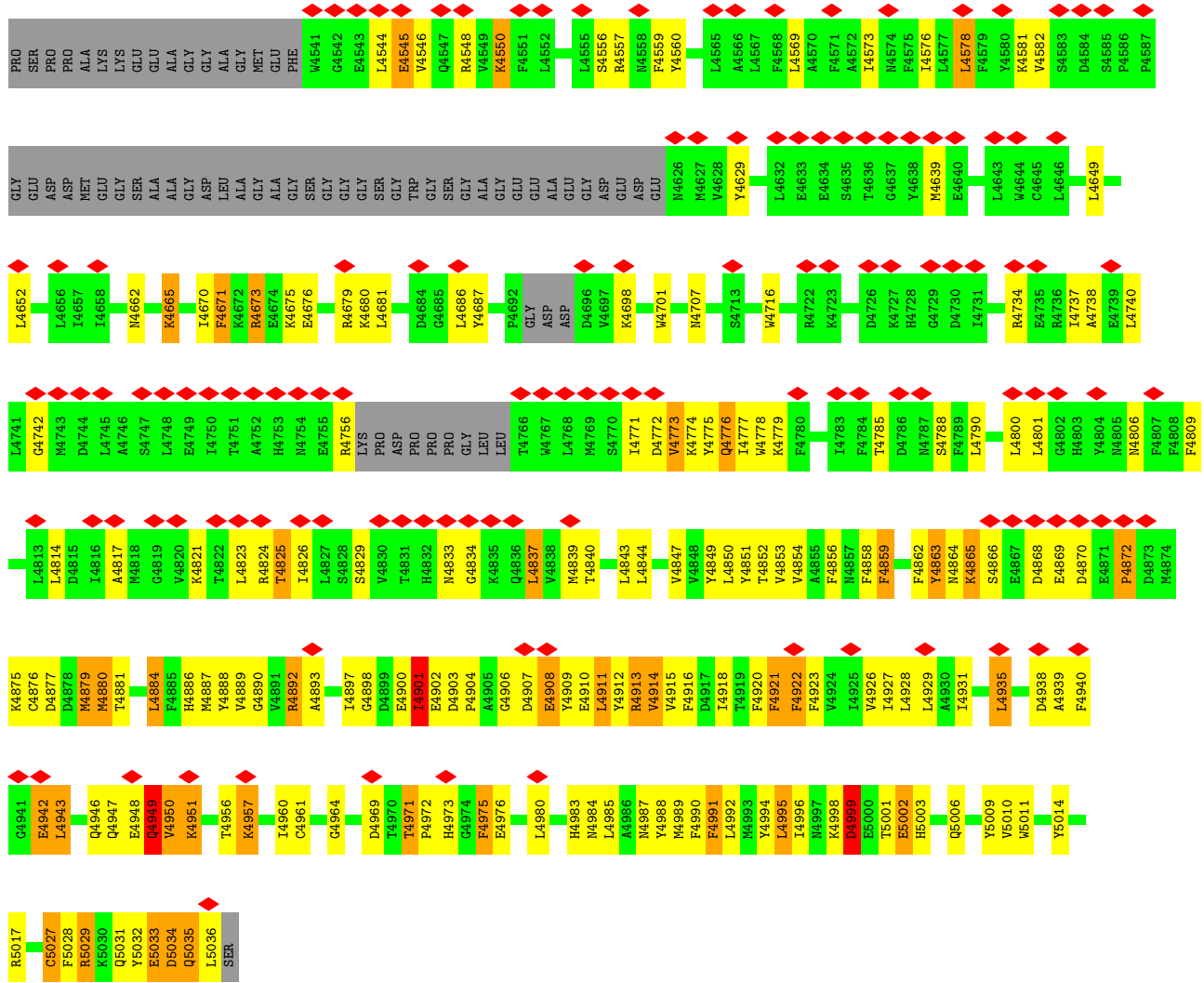


• Molecule 3: Ryanodine receptor 1

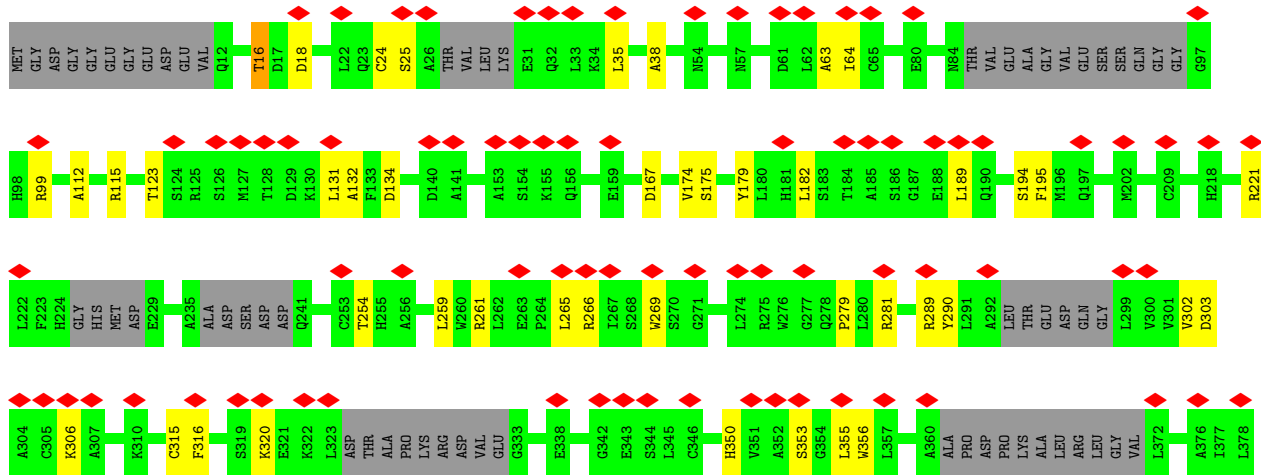


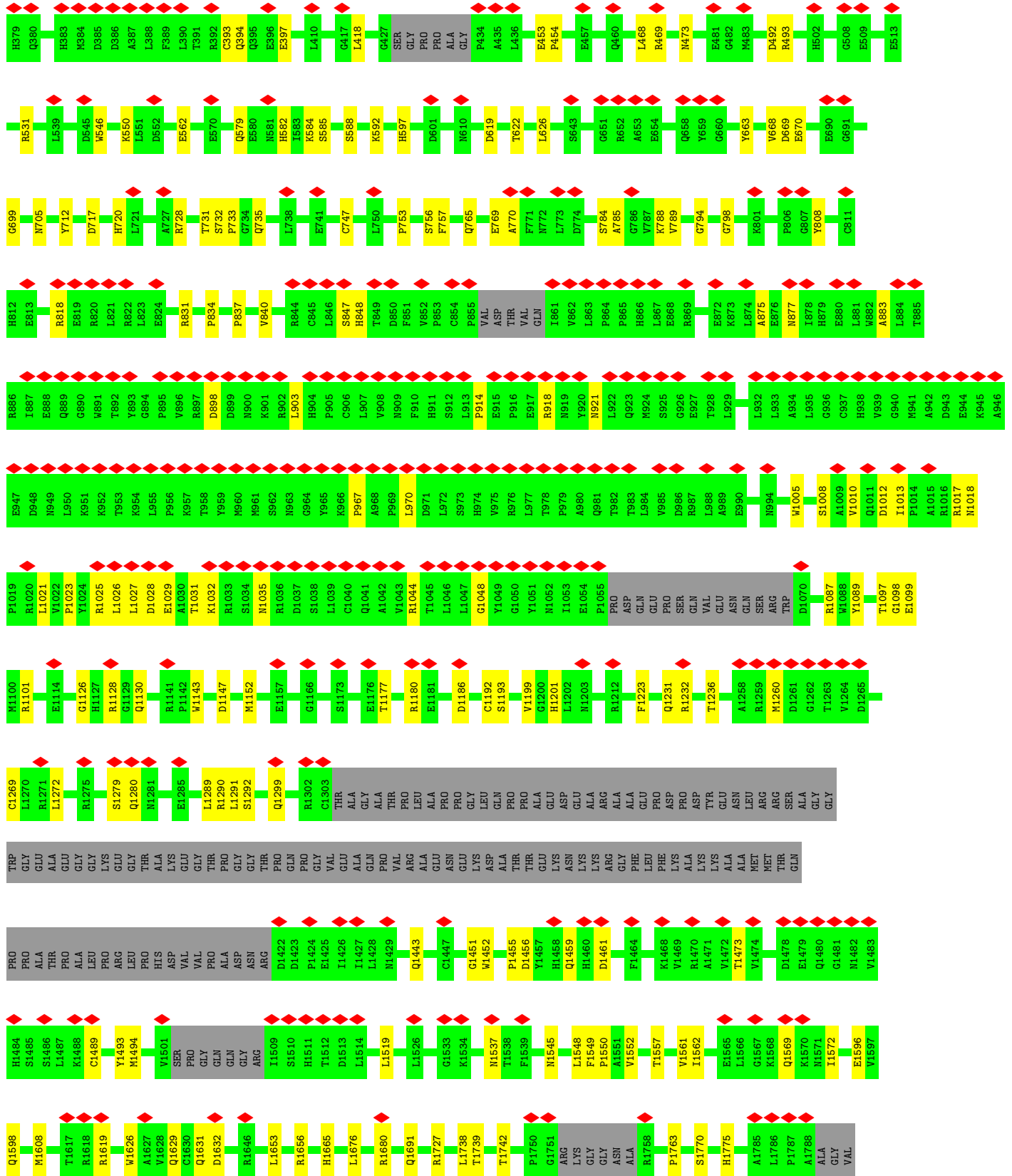


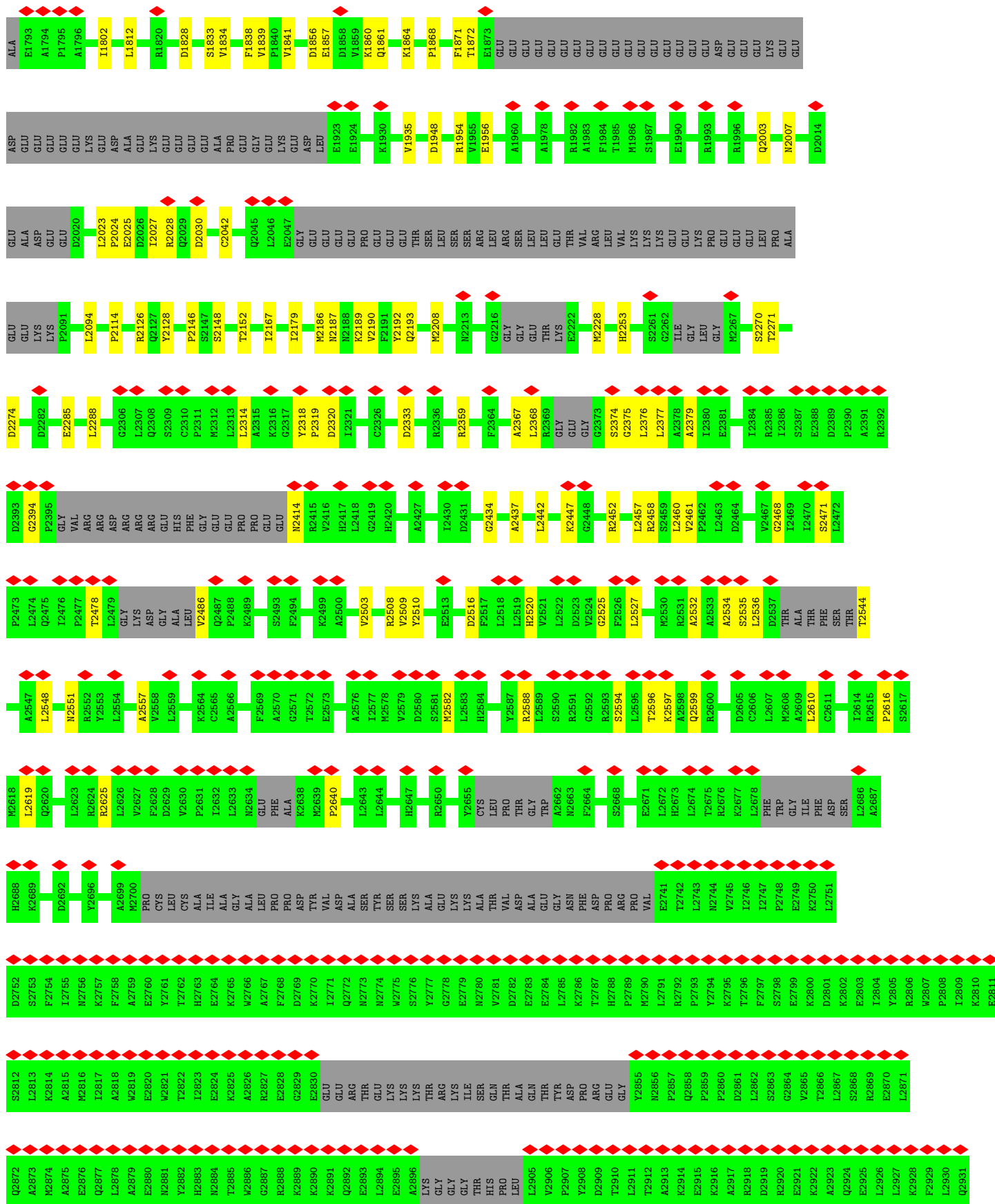
L2476	P2477	T2478	L2479	GLY	LYS	ASP	GLY	ALA	LEU	Y2486	Q2487	P2488	K2489	F2569	A2570	G2571	T2572	E2573	A2576	I2577	M2578	V2579	D2580	S2581	M2582	L2583	H2584	Y2587	L2588	L2589	S2590	L2592	R2591	D2594	G2592	R2593	F2526	L2527	M2530	R2531	A2532	A2533	A2534	S2535	L2536	D2537	THR	ALA	THR	PHE	SER	THR	T2544	A2547	L2548								
M2551	R2552	Y2553	L2554	A2557	V2558	L2559	K2564	C2565	P2566	F2569	A2570	G2571	T2572	E2573	A2576	I2577	M2578	V2579	D2580	S2581	M2582	L2583	H2584	Y2587	L2588	L2589	S2590	L2592	R2591	D2594	G2592	R2593	F2526	L2527	M2530	R2531	A2532	A2533	A2534	S2535	L2536	D2537	THR	ALA	THR	PHE	SER	THR	T2544	A2547	L2548												
L2623	R2624	R2625	L2626	V2627	P2628	D2629	V2630	P2631	L2632	L2633	N2634	GLU	PHE	ALA	K2638	M2639	P2640	L2643	L2644	H2647	R2650	Y2655	CYS	LEU	PRO	THR	GLY	TRP	A2662	L2663	P2664	S2668	E2671	L2672	L2673	L2674	T2675	R2676	L2677	L2678	PHE	TRP	GLY	ILE	PHE	ASP	SER	L2686	A2687	H2688	R2689	D2692											
Y2696	A2699	M2700	PRO	CYS	LEU	CYS	ALA	ILE	ALA	ALA	ALA	LEU	PRO	ALA	K2638	M2639	P2640	L2643	L2644	H2647	R2650	Y2655	CYS	LEU	PRO	THR	GLY	TRP	A2662	L2663	P2664	S2668	E2671	L2672	L2673	L2674	T2675	R2676	L2677	L2678	PHE	TRP	GLY	ILE	PHE	ASP	SER	L2686	A2687	H2688	R2689	D2692											
N2756	K2757	F2758	A2759	E2760	Y2761	T2762	H2763	E2764	K2765	W2766	A2767	F2768	D2769	K2770	I2771	Q2772	N2773	M2774	W2775	S2776	G2777	G2778	E2779	N2780	V2781	D2782	E2783	E2784	L2785	K2786	T2787	H2788	P2789	M2790	L2791	R2792	P2793	Y2794	K2795	L2796	F2797	S2798	E2799	K2800	D2801	K2802	E2803	L2804	Y2805	R2806	W2807	P2808	I2809	K2810	E2811	S2812	L2813	K2814	A2815				
M2816	I2817	A2818	M2819	E2820	W2821	T2822	L2823	E2824	K2825	A2826	R2827	E2828	G2829	E2830	GLU	ARG	THR	GLY	LYS	LYS	THR	ARG	LYS	THR	GLN	ALA	THR	ALA	GLN	THR	ASP	PRO	ARG	GLU	Y2855	M2856	P2857	Q2858	P2859	R2860	D2861	L2862	S2863	G2864	V2865	T2866	L2867	S2868	R2869	E2870	L2871	Q2872	A2873	M2874	A2875								
E2876	Q2877	L2878	A2879	E2880	N2881	Y2882	H2883	N2884	T2885	W2886	G2887	R2888	K2889	K2890	K2891	E2892	L2894	E2895	A2896	LYS	GLY	GLY	THR	HIS	PRO	LEU	L2905	V2906	P2907	Y2908	D2909	T2910	L2911	T2912	A2913	K2914	E2915	K2916	L2917	R2918	D2919	R2920	E2921	K2922	A2923	Q2924	E2925	L2926	L2927	L2928	F2929	L2930	Q2931	M2932	N2933	G2934	Y2935						
A2936	V2937	T2938	R2939	GLY	LEU	LYS	ASP	MET	GLU	LEU	THR	SER	I2951	E2952	K2953	R2954	F2955	A2956	F2959	L2960	L2963	L2964	R2965	W2966	M2967	D2968	I2969	S2970	Q2971	E2972	F2973	I2974	A2975	H2976	LEU	ALA	ALA	VAL	VAL	SER	SER	GLY	ARG	VAL	GLU	LYS	SER	PRO	HIS	GLU	GLN	GLY	ILE	K2996	F2997								
F2998	A2999	K3000	L3001	L3002	L3003	P3004	L3005	I3006	N3007	Q3008	Y3009	N3012	H3013	C3014	L3015	TTR	PHE	LEU	SER	THR	PRO	ALA	VAL	L3025	G3026	S3027	A3031	S3032	N3033	K3034	E3035	K3036	E3037	M3038	I3039	L3042	PHE	CYS	LYS	VAL	SER	GLN	ALA	ARG	THR	GLN	VAL	L3049	H3052	R3053	T3059	D3060	A3061	P3062	ALA	VAL	VAL	ASN					
CYS	LEU	HIS	ILE	LEU	ALA	ARG	SER	LEU	ASP	ALA	THR	VAL	LYS	SER	PRO	GLY	VAL	ALA	ALA	GLY	LEU	ARG	VAL	PHE	PHE	GLU	SER	ALA	SER	LYS	MET	VAL	GLU	ASN	LEU	ARG	LEU	GLY	LYS	VAL	VAL	SER	GLN	ALA	ARG	THR	GLN	VAL	L3049	H3052	R3053	T3059	D3060	A3061	P3062	ALA	VAL	VAL	ASN				
GLN	ASN	LEU	THR	TYR	THR	VAL	THR	VAL	ALA	LEU	LEU	T3141	T3142	L3143	F3144	I3147	A3148	Q3149	H3150	G3153	D3154	D3155	V3156	I3157	L3158	D3159	D3160	V3161	Q3162	VAL	SER	CYS	TYR	ARG	THR	L3169	C3170	S3171	I3172	Y3173	S3174	L3175	G3176	T3177	T3178	T3181	Y3182	V3183	E3184	K3185	P3188	A3189	LEU										
GLY	GLU	CYS	LEU	ALA	ARG	LEU	A3198	A3199	A3200	K3201	P3202	V3203	A3204	F3205	L3206	F3207	P3208	Q3209	L3210	N3211	E3212	TYR	ASN	ALA	CYS	VAL	SER	VAL	THR	T3221	K3222	S3223	P3224	R3225	E3226	K3227	A3228	I3229	L3230	G3231	PRO	ASN	ASN	SER	VAL	GLU	GLU	MET	CYS	PRO	ASP	ILE	PRO	VAL	VAL	LEU	ASP	S3309	ASP	ARG	LEU	LEU	ASN
ALA	ASP	ILE	GLY	GLY	LEU	ALA	A3198	A3199	A3200	K3201	P3202	V3203	A3204	F3205	L3206	F3207	P3208	Q3209	L3210	N3211	E3212	TYR	ASN	ALA	CYS	VAL	SER	VAL	THR	T3221	K3222	S3223	P3224	R3225	E3226	K3227	A3228	I3229	L3230	G3231	PRO	ASN	ASN	SER	VAL	GLU	GLU	MET	CYS	PRO	ASP	ILE	PRO	VAL	VAL	LEU	ASP	S3309	ASP	ARG	LEU	LEU	ASN

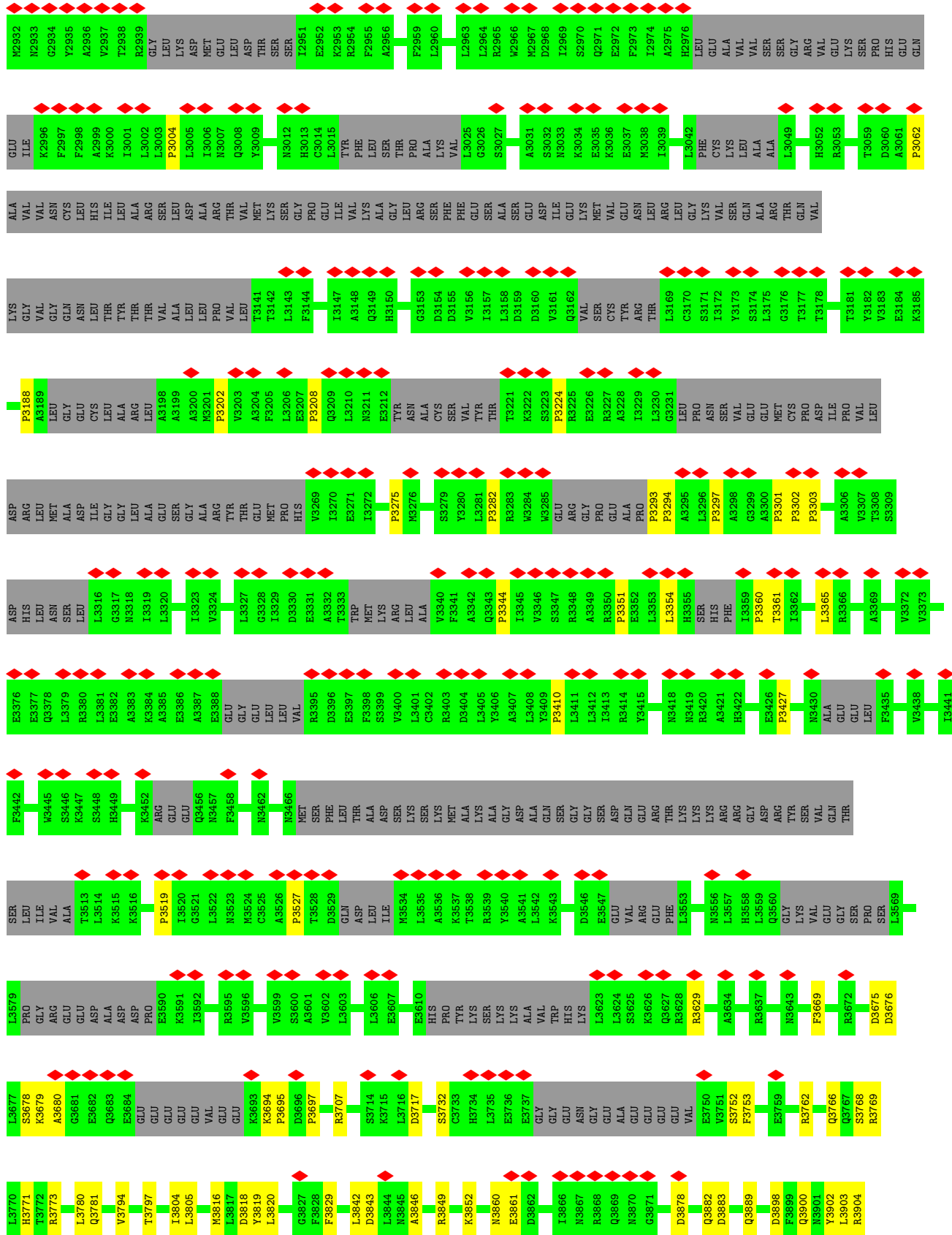


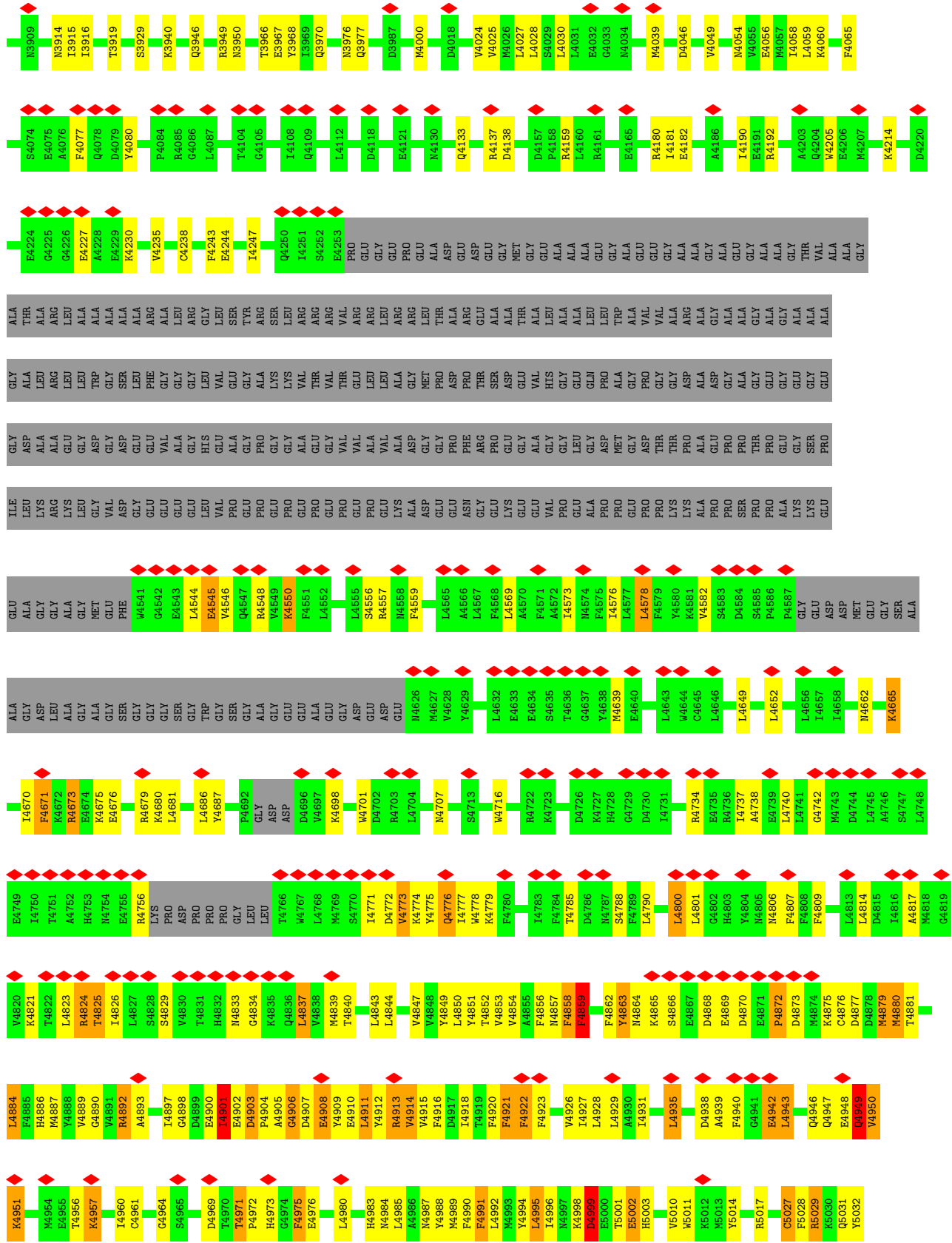
• Molecule 3: Ryanodine receptor 1





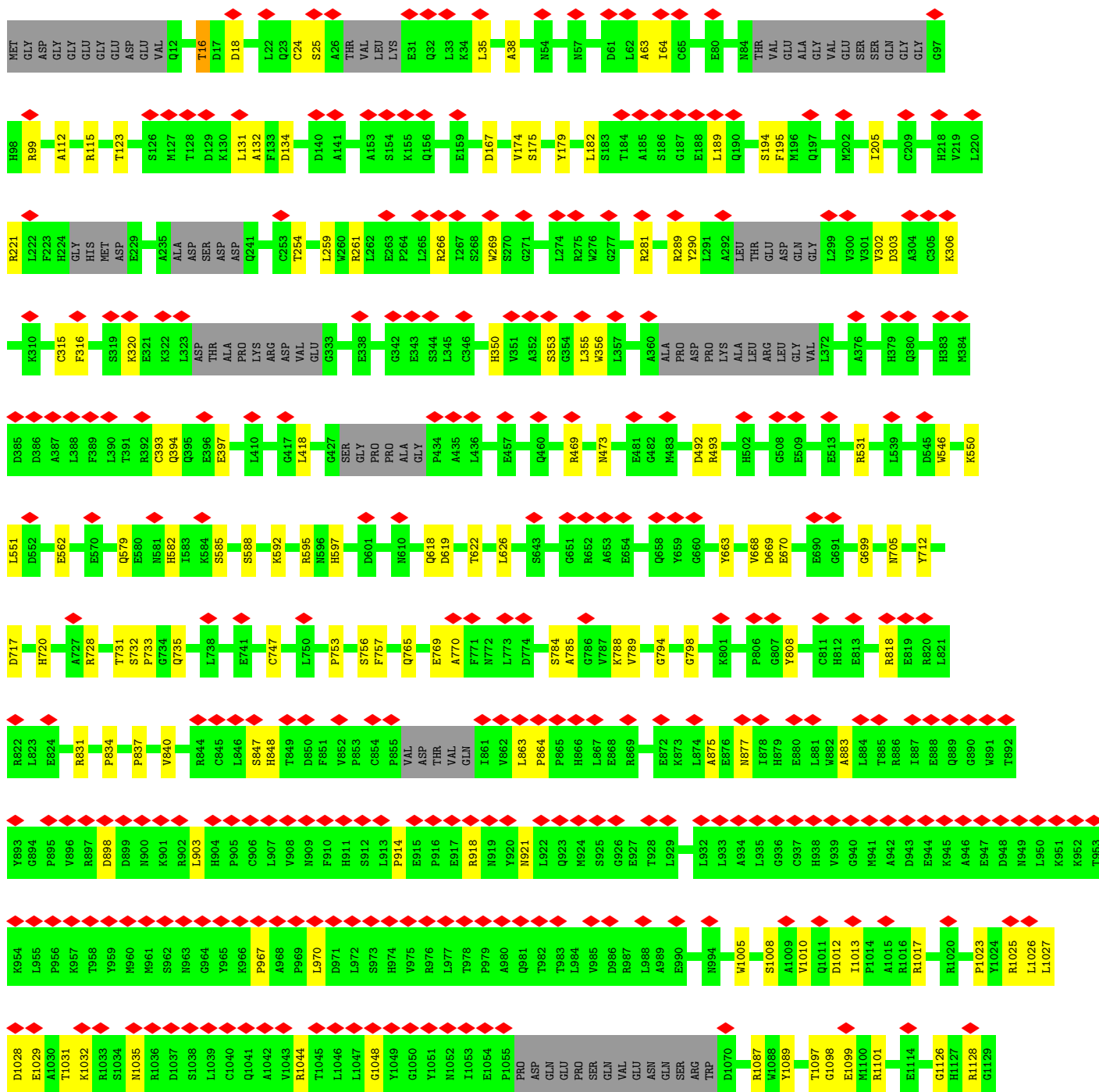


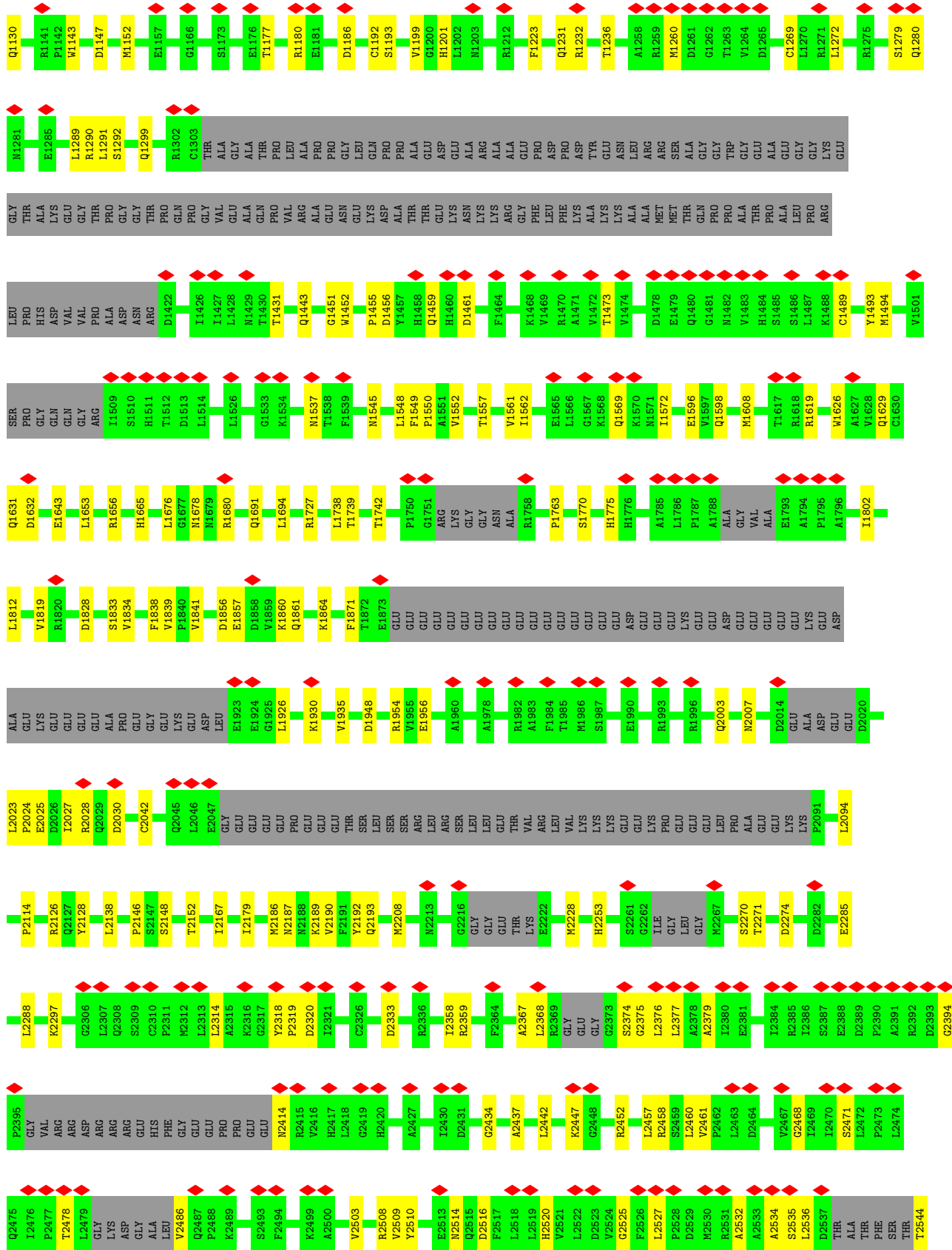


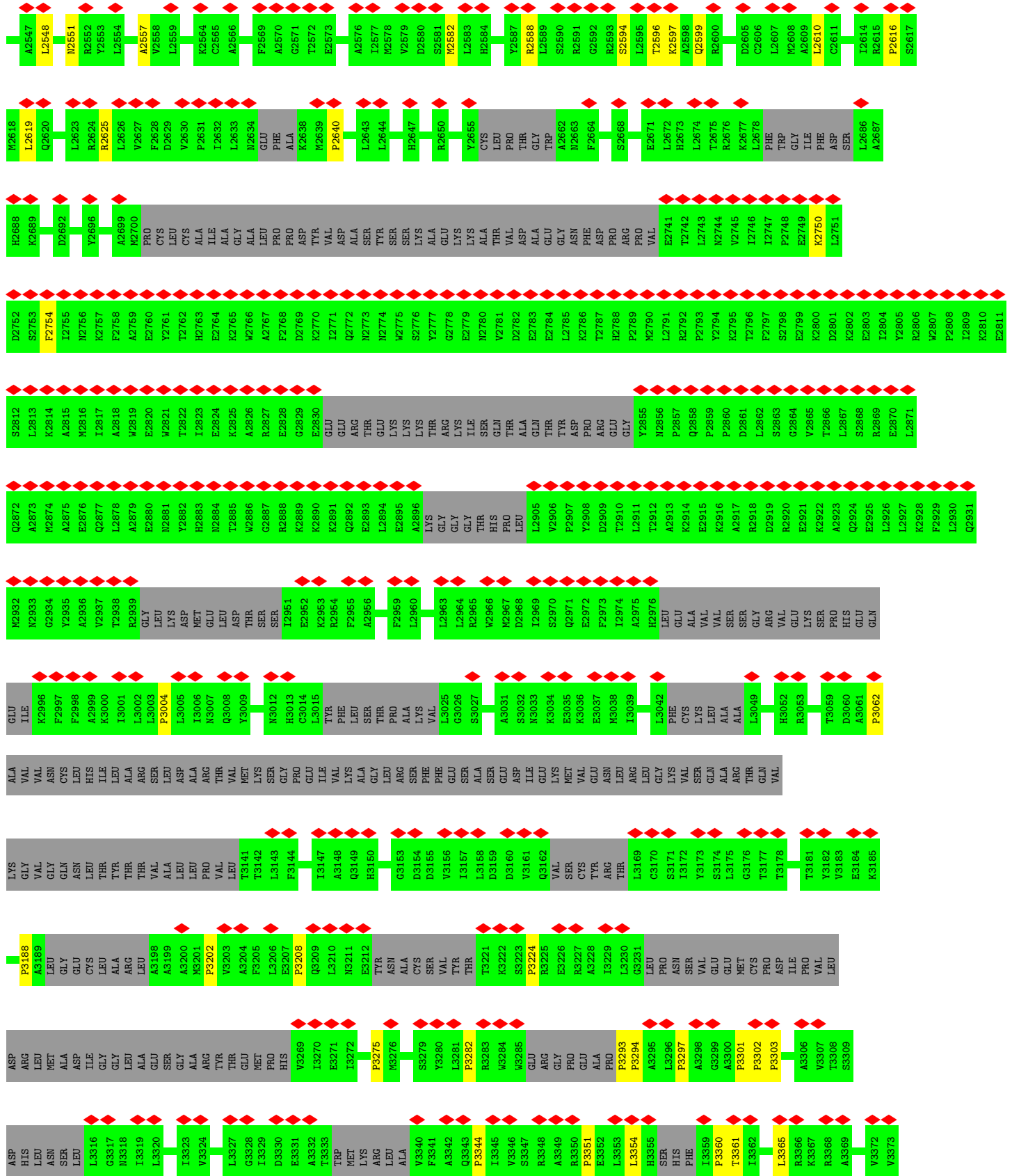


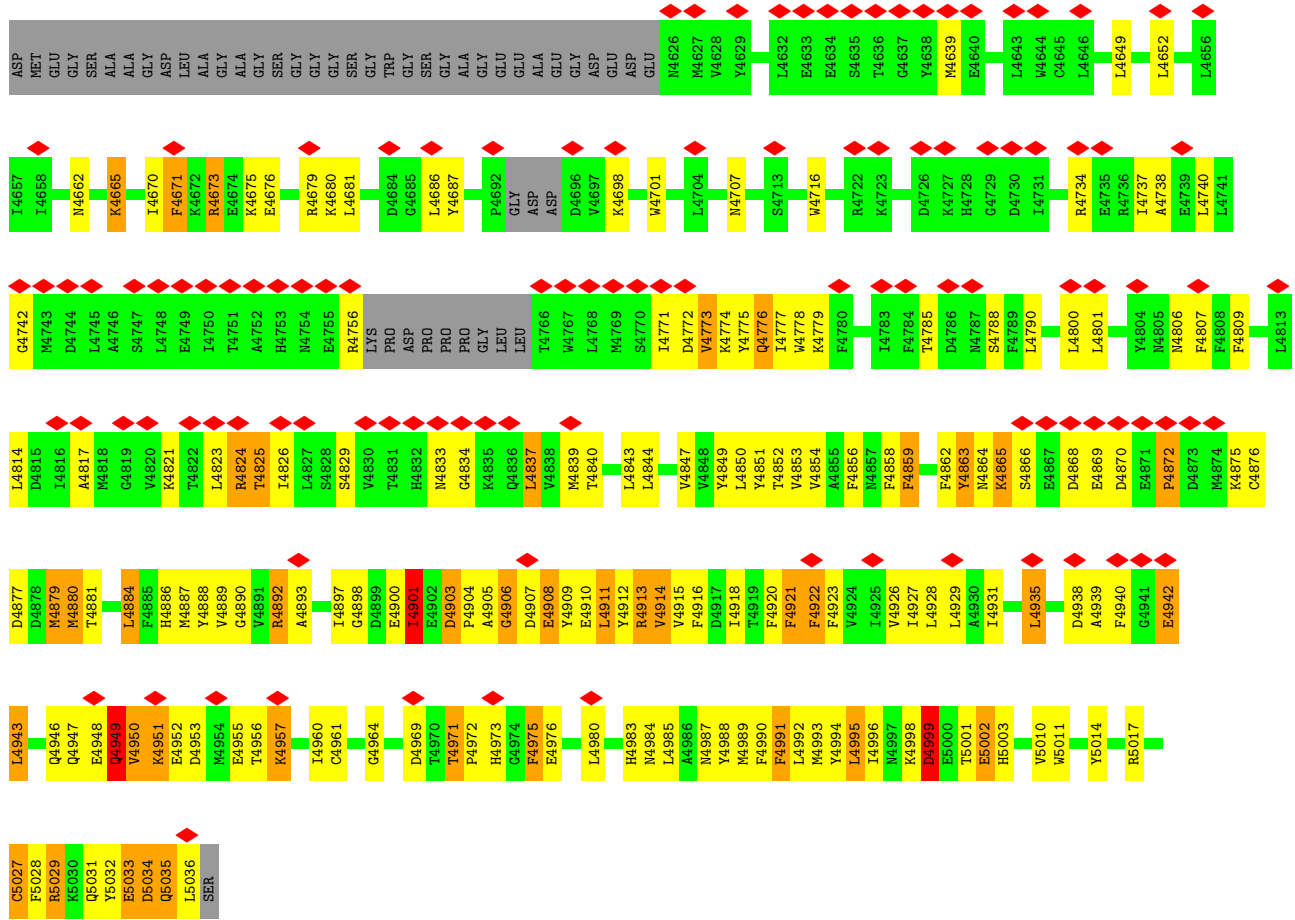


● Molecule 3: Ryanodine receptor 1









4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	46997	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2400	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.278	Depositor
Minimum map value	-0.156	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.009	Depositor
Recommended contour level	0.06	Depositor
Map size (\AA)	542.72, 542.72, 542.72	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	1.06, 1.06, 1.06	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: ATP, A1LV1, CA, ZN, CFF

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	I	0.30	0/1052	0.48	0/1416
1	J	0.30	0/1052	0.48	0/1416
1	K	0.30	0/1052	0.48	0/1416
1	L	0.30	0/1052	0.48	0/1416
2	E	0.39	0/820	0.54	0/1105
2	F	0.40	0/820	0.54	0/1105
2	G	0.39	0/820	0.54	0/1105
2	H	0.40	0/820	0.54	0/1105
3	A	0.39	0/28592	0.56	27/38932 (0.1%)
3	B	0.39	0/28592	0.56	26/38932 (0.1%)
3	C	0.39	0/28592	0.56	27/38932 (0.1%)
3	D	0.39	0/28592	0.56	27/38932 (0.1%)
All	All	0.39	0/121856	0.56	107/165812 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
3	A	0	6
3	B	0	6
3	C	0	6
3	D	0	6
All	All	0	24

There are no bond length outliers.

The worst 5 of 107 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	4545	GLU	OE1-CD-OE2	9.61	134.84	123.30
3	B	4545	GLU	OE1-CD-OE2	9.60	134.82	123.30
3	D	4545	GLU	OE1-CD-OE2	9.57	134.79	123.30
3	C	4545	GLU	OE1-CD-OE2	9.57	134.79	123.30
3	D	4673	ARG	NE-CZ-NH2	7.78	124.19	120.30

There are no chirality outliers.

5 of 24 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	D	4670	ILE	Mainchain
3	D	4675	LYS	Mainchain
3	D	4676	GLU	Mainchain
3	D	4775	TYR	Sidechain
3	D	4809	PHE	Mainchain

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	I	1042	0	972	28	0
1	J	1042	0	972	24	0
1	K	1042	0	972	26	0
1	L	1042	0	972	27	0
2	E	804	0	812	11	0
2	F	804	0	812	9	0
2	G	804	0	812	9	0
2	H	804	0	812	10	0
3	A	28057	0	25320	467	0
3	B	28057	0	25320	453	0
3	C	28057	0	25320	472	0
3	D	28057	0	25320	469	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

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	C	1	0	0	0	0
5	D	1	0	0	0	0
6	A	31	0	12	4	0
6	B	21	0	5	6	0
6	C	31	0	12	4	0
6	D	31	0	12	4	0
7	A	14	0	10	4	0
7	B	14	0	10	4	0
7	C	14	0	10	4	0
7	D	14	0	10	4	0
8	A	38	0	0	0	0
8	B	38	0	0	0	0
8	C	38	0	0	0	0
8	D	38	0	0	0	0
All	All	119942	0	108497	1835	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 8.

The worst 5 of 1835 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:D:4817:ALA:HB2	3:A:4843:LEU:CD1	1.41	1.50
3:D:4833:ASN:ND2	3:D:4939:ALA:CB	1.74	1.48
3:B:4833:ASN:ND2	3:B:4939:ALA:CB	1.74	1.48
3:D:4843:LEU:CD1	3:C:4817:ALA:HB2	1.42	1.47
3:A:4833:ASN:ND2	3:A:4939:ALA:CB	1.74	1.46

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	I	133/149 (89%)	128 (96%)	5 (4%)	0	100	100
1	J	133/149 (89%)	128 (96%)	5 (4%)	0	100	100
1	K	133/149 (89%)	128 (96%)	5 (4%)	0	100	100
1	L	133/149 (89%)	128 (96%)	5 (4%)	0	100	100
2	E	105/107 (98%)	99 (94%)	6 (6%)	0	100	100
2	F	105/107 (98%)	99 (94%)	6 (6%)	0	100	100
2	G	105/107 (98%)	99 (94%)	6 (6%)	0	100	100
2	H	105/107 (98%)	99 (94%)	6 (6%)	0	100	100
3	A	3812/5037 (76%)	3560 (93%)	223 (6%)	29 (1%)	16	51
3	B	3812/5037 (76%)	3562 (93%)	221 (6%)	29 (1%)	16	51
3	C	3812/5037 (76%)	3561 (93%)	222 (6%)	29 (1%)	16	51
3	D	3812/5037 (76%)	3561 (93%)	222 (6%)	29 (1%)	16	51
All	All	16200/21172 (76%)	15152 (94%)	932 (6%)	116 (1%)	21	54

5 of 116 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	D	4821	LYS
3	D	4872	PRO
3	D	4901	ILE
3	D	4921	PHE
3	D	4999	ASP

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	I	104/123 (85%)	103 (99%)	1 (1%)	73	81
1	J	104/123 (85%)	103 (99%)	1 (1%)	73	81
1	K	104/123 (85%)	103 (99%)	1 (1%)	73	81
1	L	104/123 (85%)	103 (99%)	1 (1%)	73	81

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	E	84/88 (96%)	84 (100%)	0	100	100
2	F	84/88 (96%)	84 (100%)	0	100	100
2	G	84/88 (96%)	84 (100%)	0	100	100
2	H	84/88 (96%)	84 (100%)	0	100	100
3	A	2494/4276 (58%)	2427 (97%)	67 (3%)	40	61
3	B	2494/4276 (58%)	2427 (97%)	67 (3%)	40	61
3	C	2494/4276 (58%)	2427 (97%)	67 (3%)	40	61
3	D	2494/4276 (58%)	2427 (97%)	67 (3%)	40	61
All	All	10728/17948 (60%)	10456 (98%)	272 (2%)	43	62

5 of 272 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	C	4801	LEU
3	C	4859	PHE
3	C	4951	LYS
3	A	4801	LEU
3	A	4788	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 211 such sidechains are listed below:

Mol	Chain	Res	Type
3	B	71	GLN
3	B	2284	ASN
3	C	4020	GLN
3	B	765	GLN
3	B	1560	ASN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 20 ligands modelled in this entry, 8 are monoatomic - leaving 12 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
7	CFF	B	5104	-	8,15,15	2.39	3 (37%)	8,23,23	1.22	1 (12%)
8	A1LV1	B	5105	-	38,41,41	1.18	4 (10%)	44,60,60	1.57	7 (15%)
6	ATP	C	5103	-	26,33,33	3.04	6 (23%)	31,52,52	1.58	6 (19%)
7	CFF	C	5104	-	8,15,15	2.40	3 (37%)	8,23,23	1.22	1 (12%)
6	ATP	A	5103	-	26,33,33	3.04	6 (23%)	31,52,52	1.58	6 (19%)
8	A1LV1	D	5105	-	38,41,41	1.18	4 (10%)	44,60,60	1.57	7 (15%)
8	A1LV1	A	5105	-	38,41,41	1.18	4 (10%)	44,60,60	1.57	7 (15%)
8	A1LV1	C	5105	-	38,41,41	1.18	4 (10%)	44,60,60	1.57	7 (15%)
6	ATP	D	5103	-	26,33,33	3.04	6 (23%)	31,52,52	1.58	6 (19%)
7	CFF	D	5104	-	8,15,15	2.40	3 (37%)	8,23,23	1.22	1 (12%)
7	CFF	A	5104	-	8,15,15	2.41	3 (37%)	8,23,23	1.21	1 (12%)
6	ATP	B	5103	-	9,19,33	5.30	6 (66%)	8,23,52	1.74	1 (12%)

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
7	CFF	B	5104	-	-	-	0/2/2/2
8	A1LV1	B	5105	-	-	3/21/30/30	0/4/4/4
6	ATP	C	5103	-	-	9/18/38/38	0/3/3/3
7	CFF	C	5104	-	-	-	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	ATP	A	5103	-	-	9/18/38/38	0/3/3/3
8	A1LV1	D	5105	-	-	3/21/30/30	0/4/4/4
8	A1LV1	A	5105	-	-	3/21/30/30	0/4/4/4
8	A1LV1	C	5105	-	-	3/21/30/30	0/4/4/4
6	ATP	D	5103	-	-	9/18/38/38	0/3/3/3
7	CFE	D	5104	-	-	-	0/2/2/2
7	CFE	A	5104	-	-	-	0/2/2/2
6	ATP	B	5103	-	-	3/3/23/38	0/1/1/3

The worst 5 of 52 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	B	5103	ATP	C2'-C3'	-10.47	1.34	1.52
6	B	5103	ATP	O4'-C4'	8.84	1.58	1.44
6	D	5103	ATP	O4'-C1'	-7.84	1.30	1.41
6	A	5103	ATP	O4'-C1'	-7.84	1.30	1.41
6	C	5103	ATP	O4'-C1'	-7.84	1.30	1.41

The worst 5 of 51 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	A	5105	A1LV1	C18-N09-N07	-4.88	99.99	105.66
8	C	5105	A1LV1	C18-N09-N07	-4.86	100.01	105.66
8	D	5105	A1LV1	C18-N09-N07	-4.86	100.01	105.66
8	B	5105	A1LV1	C18-N09-N07	-4.85	100.03	105.66
6	C	5103	ATP	N3-C2-N1	-4.56	121.55	128.68

There are no chirality outliers.

5 of 42 torsion outliers are listed below:

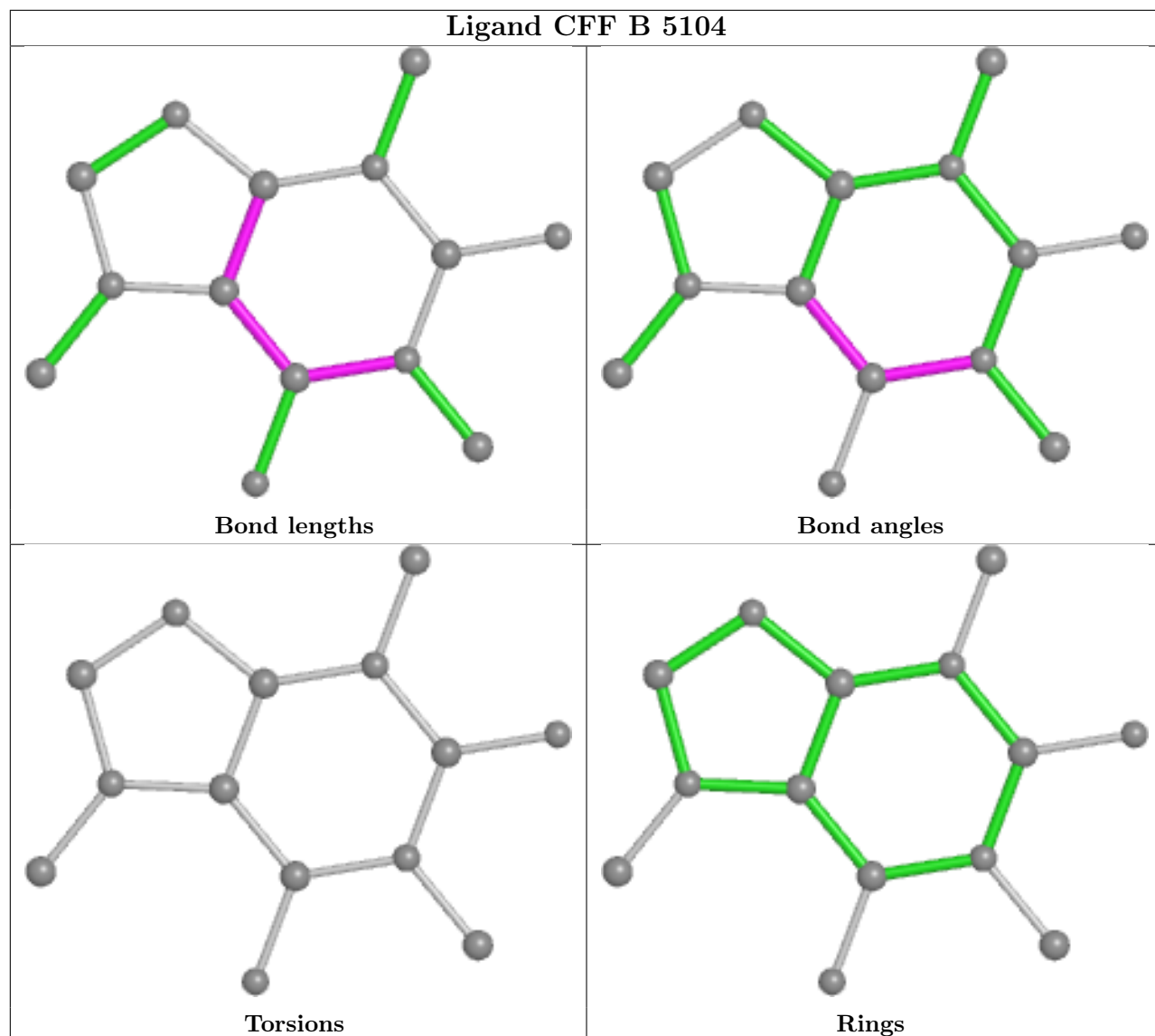
Mol	Chain	Res	Type	Atoms
6	D	5103	ATP	PB-O3B-PG-O2G
6	D	5103	ATP	C4'-C5'-O5'-PA
6	D	5103	ATP	C3'-C4'-C5'-O5'
6	A	5103	ATP	PB-O3B-PG-O2G
6	A	5103	ATP	C4'-C5'-O5'-PA

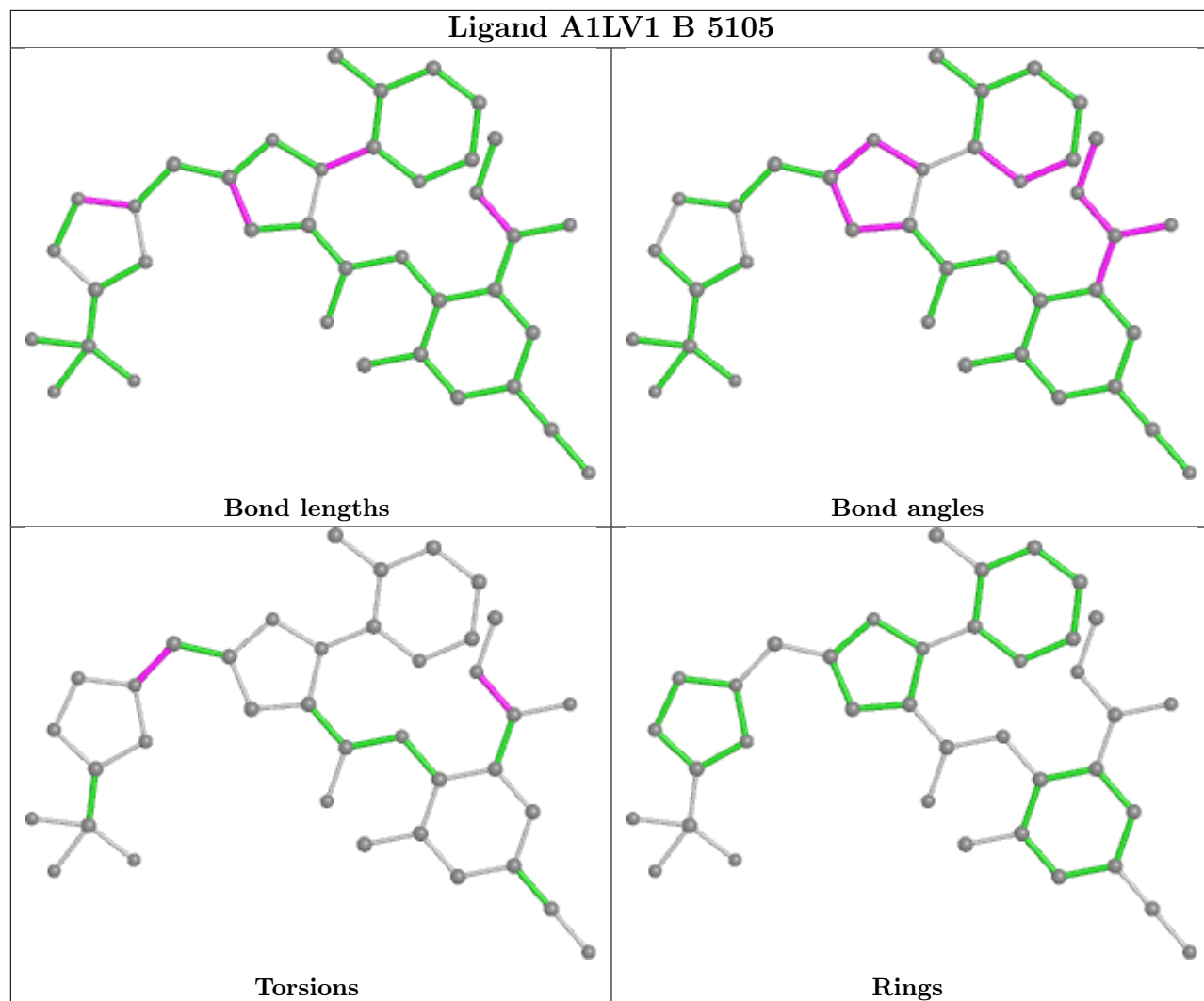
There are no ring outliers.

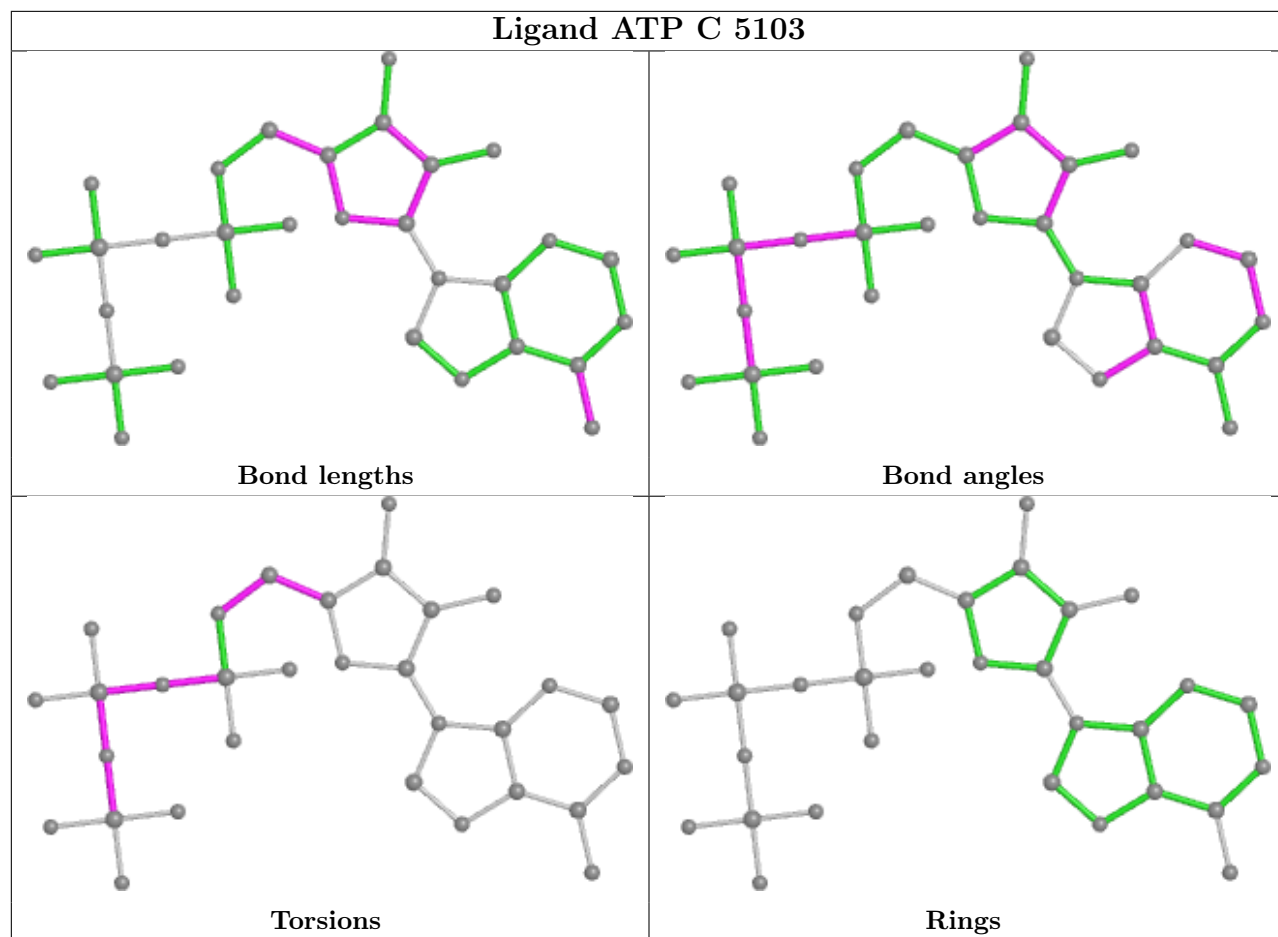
8 monomers are involved in 34 short contacts:

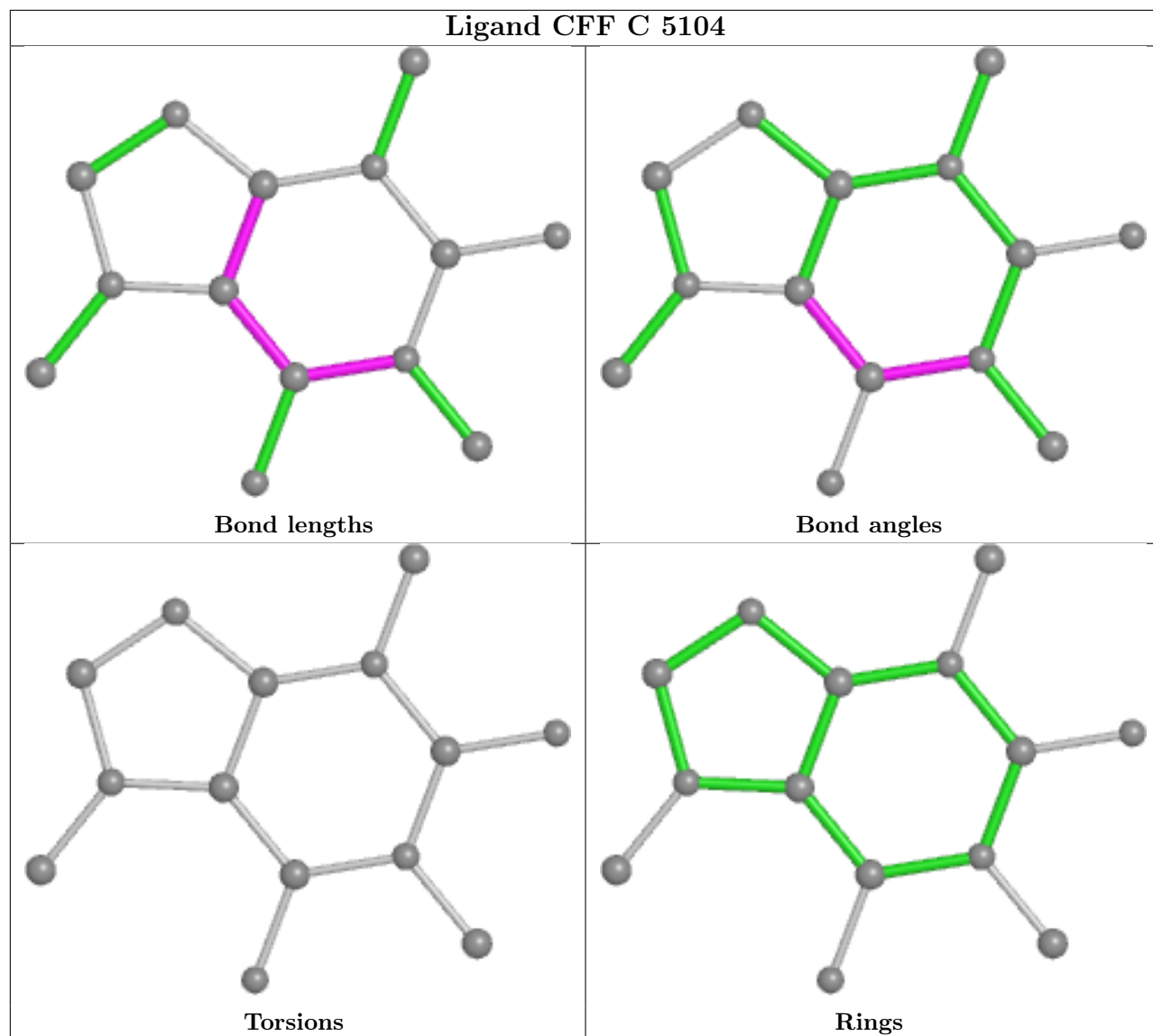
Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	B	5104	CFE	4	0
6	C	5103	ATP	4	0
7	C	5104	CFE	4	0
6	A	5103	ATP	4	0
6	D	5103	ATP	4	0
7	D	5104	CFE	4	0
7	A	5104	CFE	4	0
6	B	5103	ATP	6	0

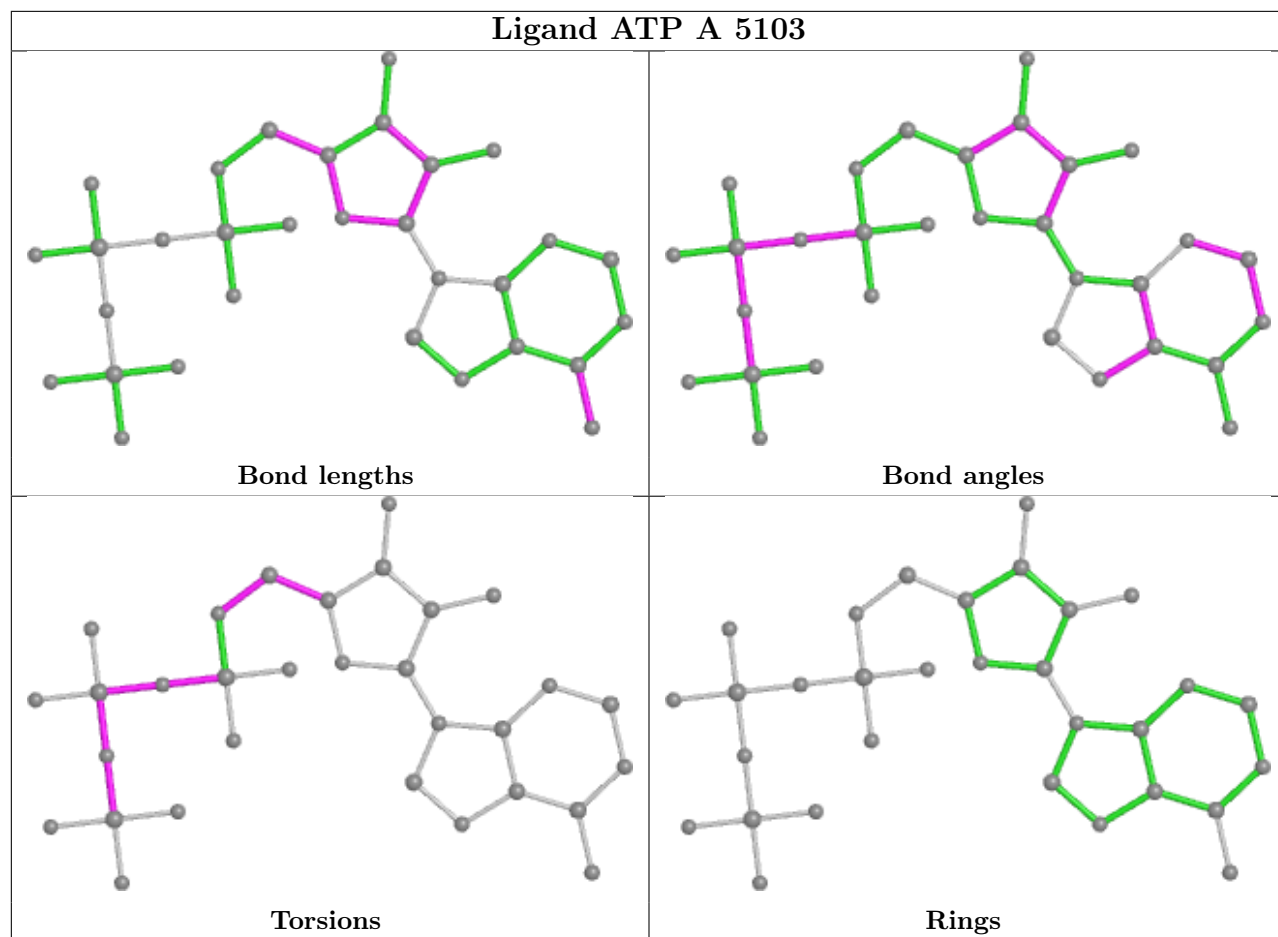
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

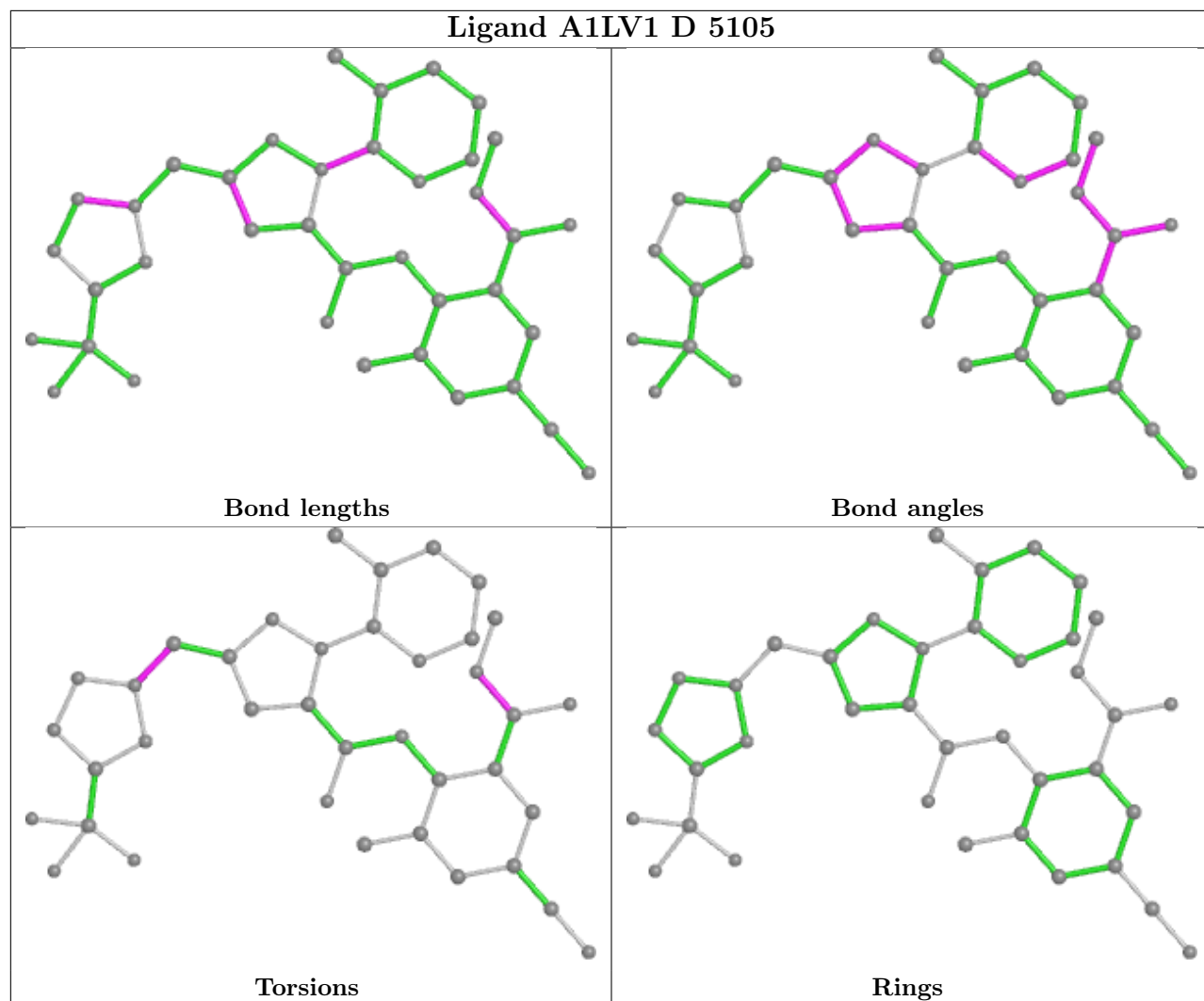


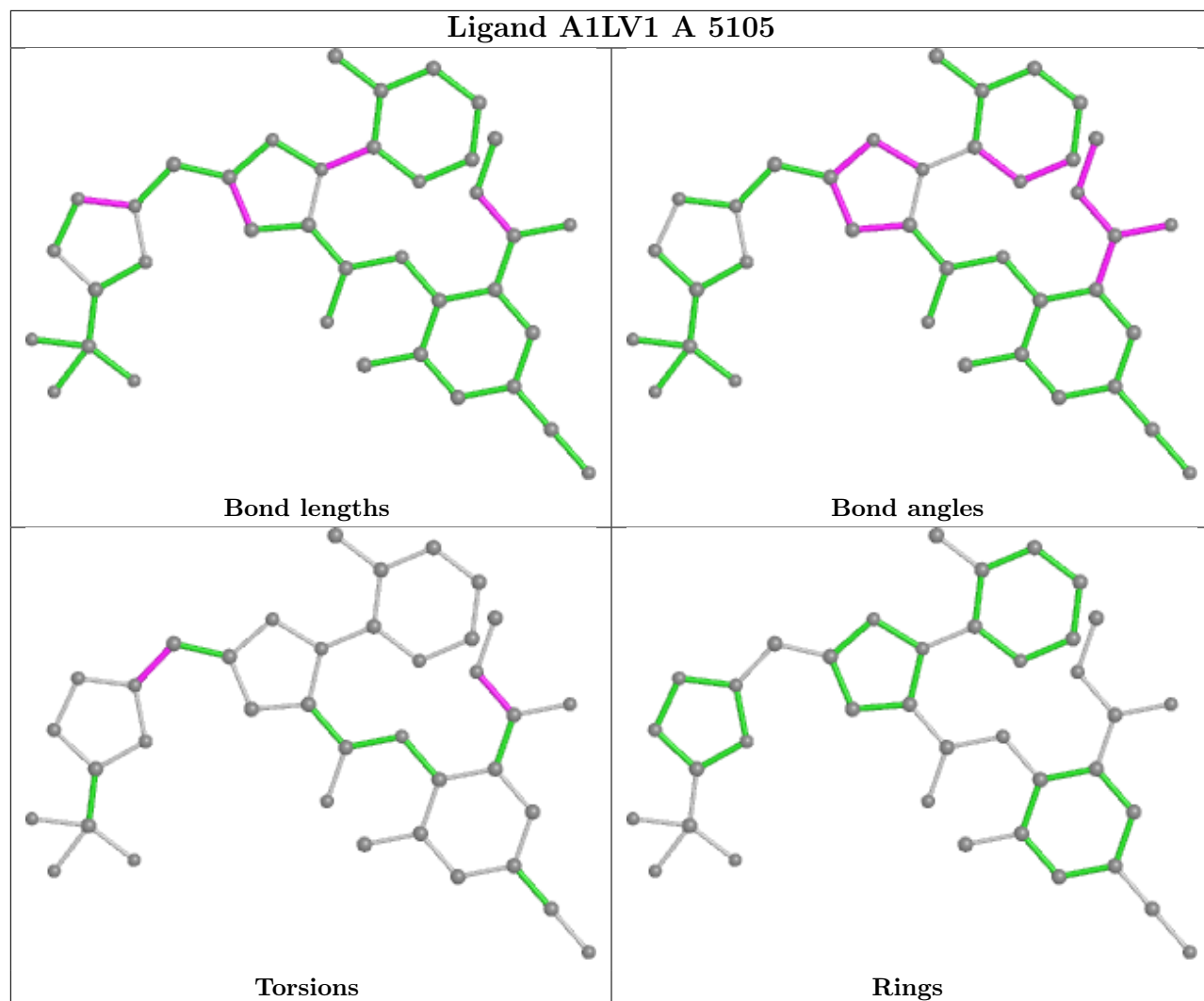


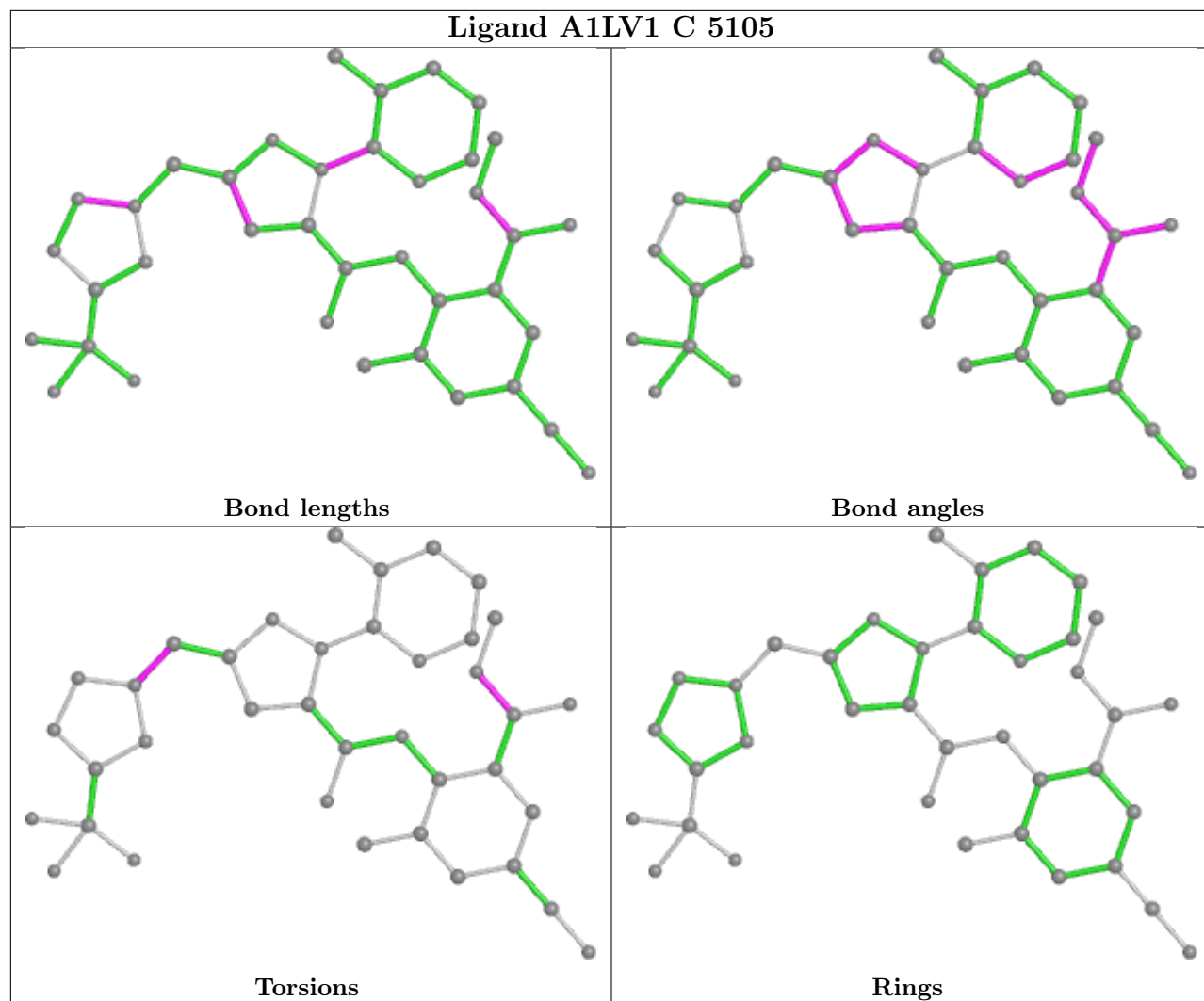


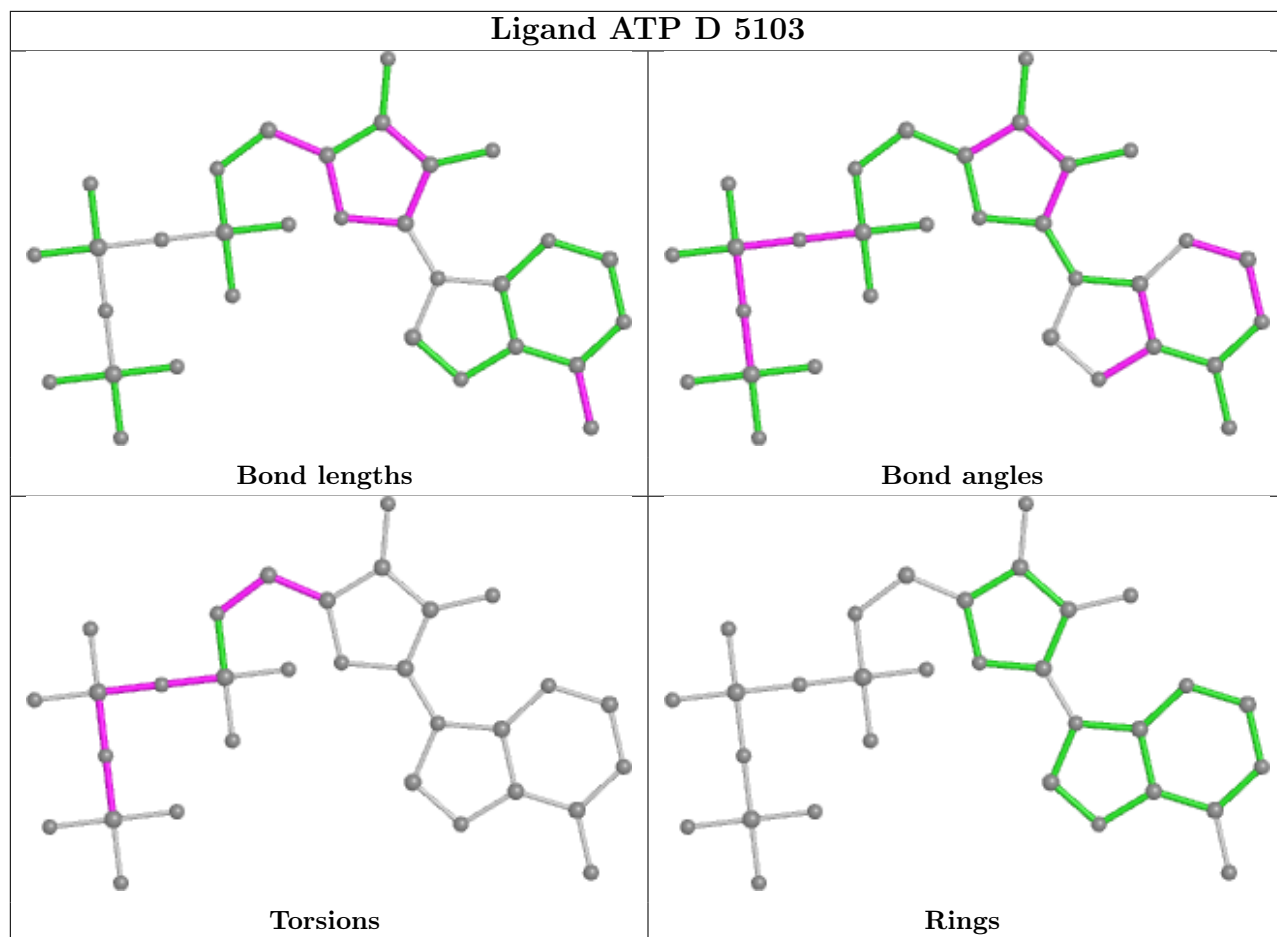


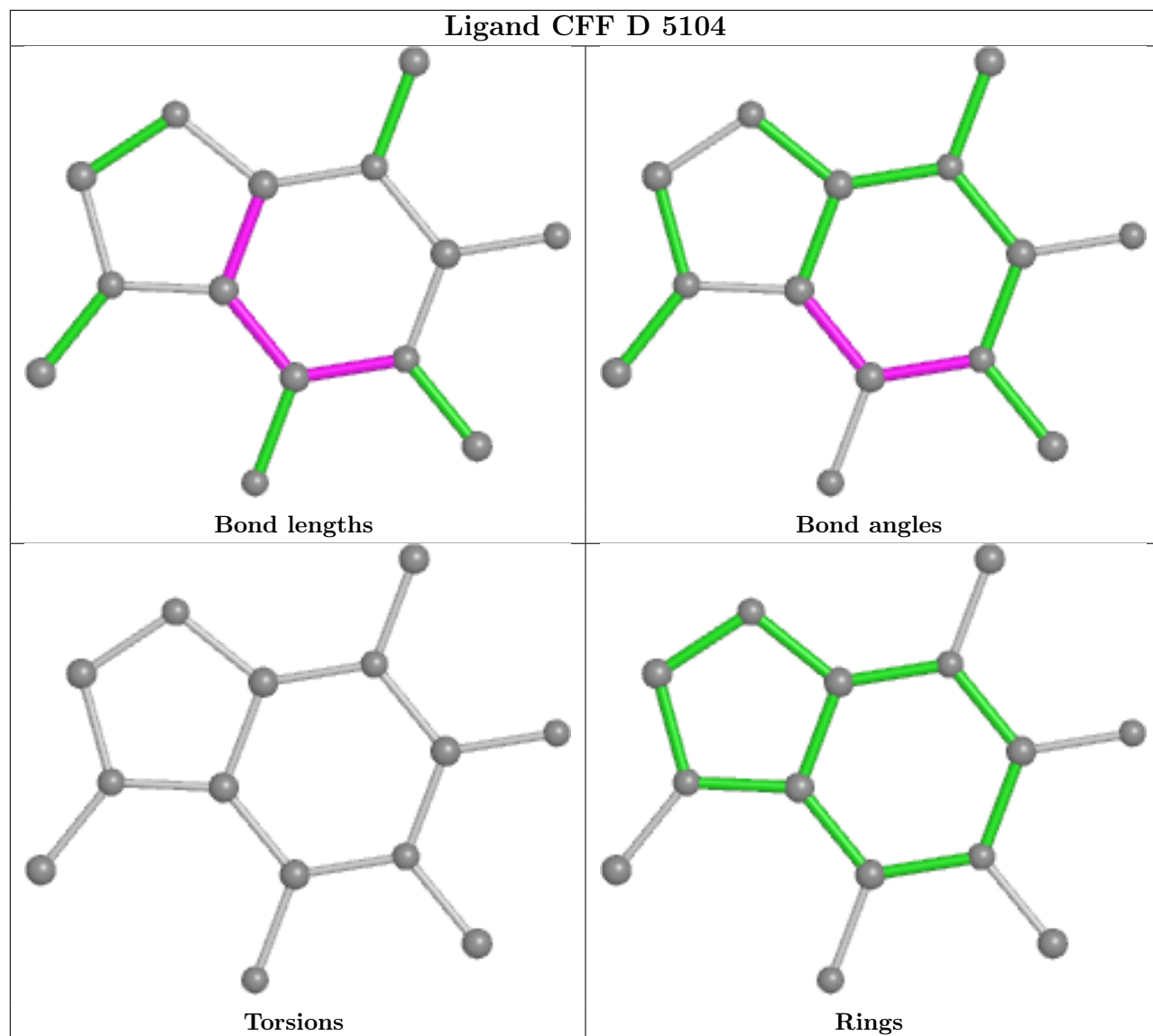


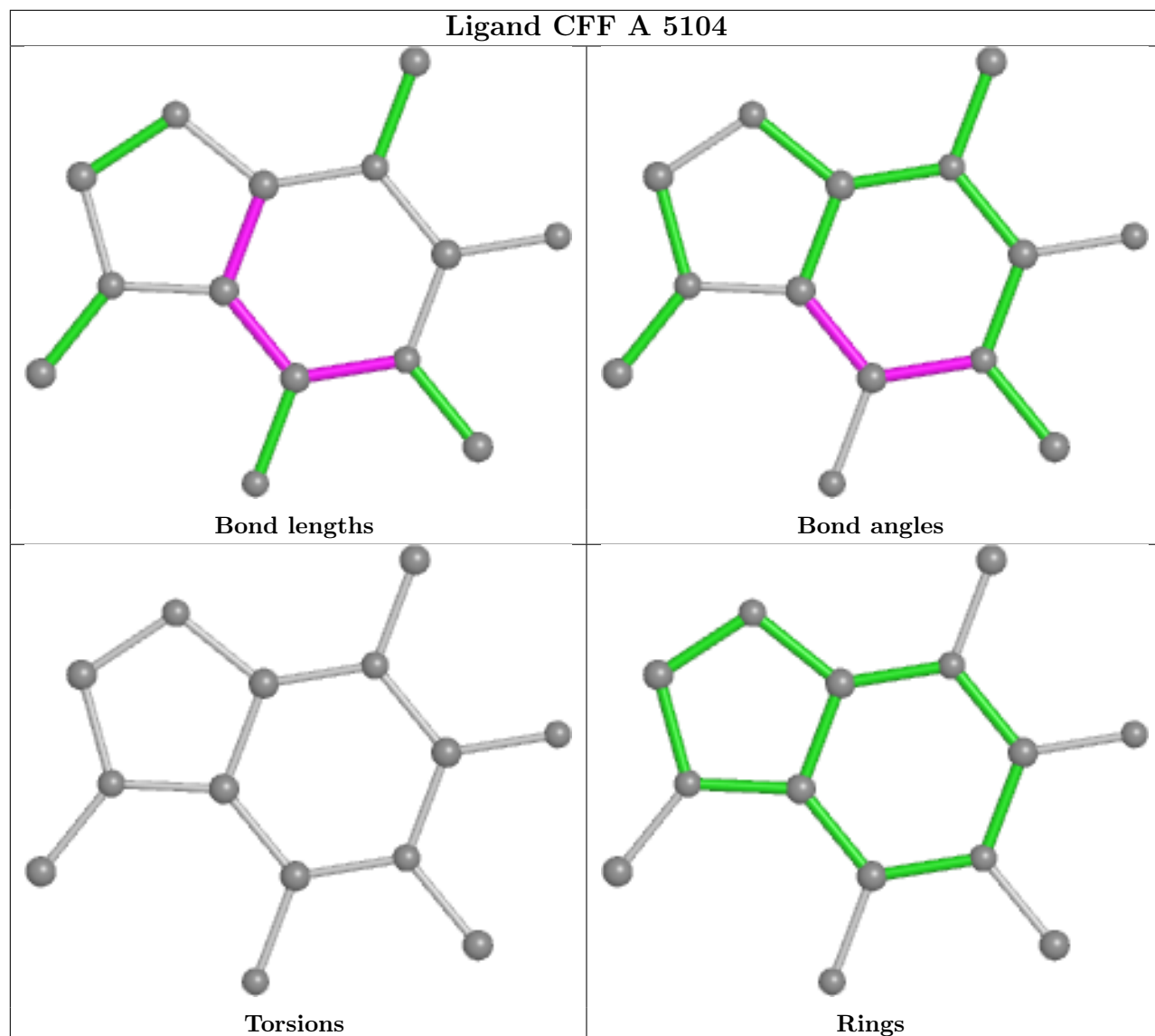


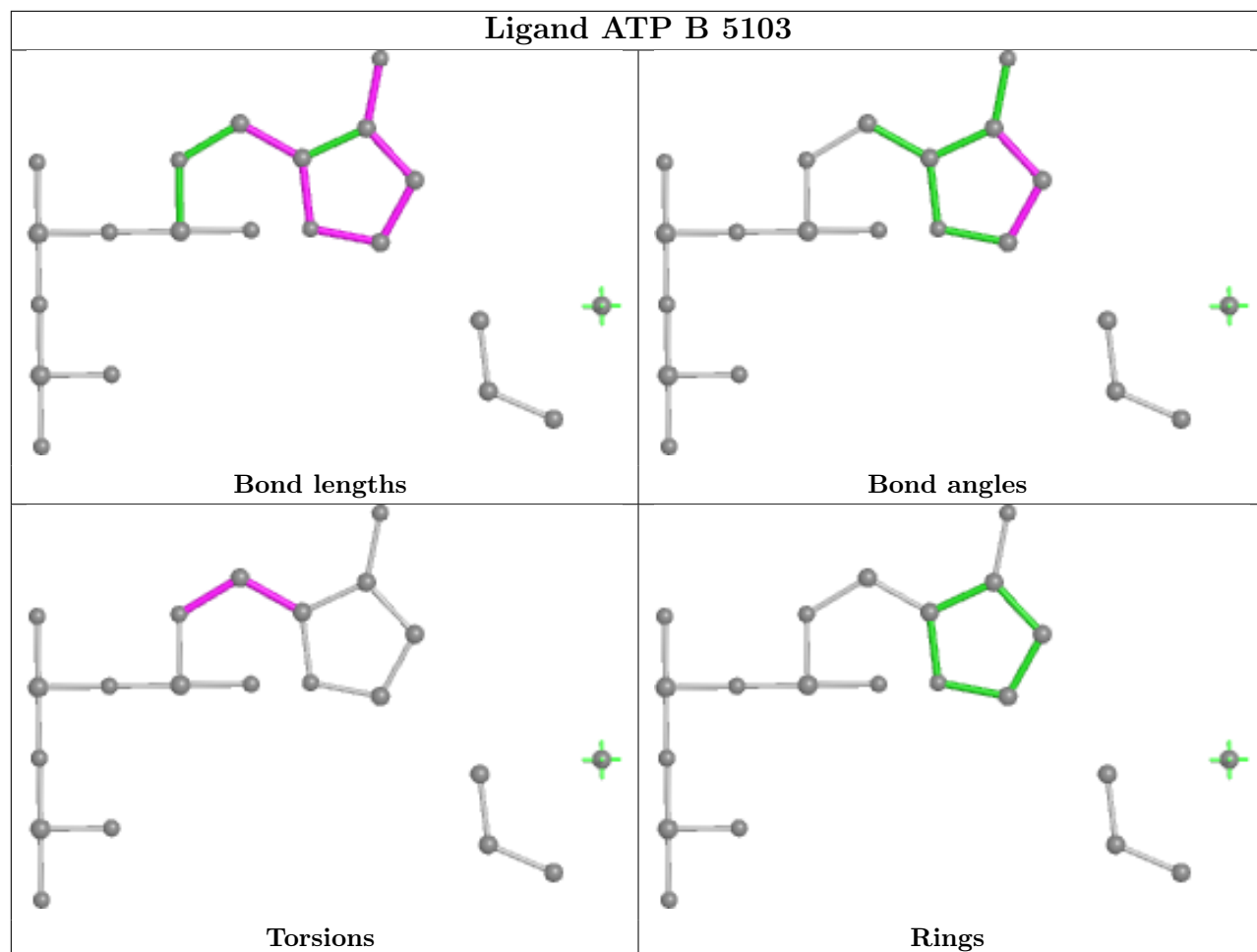












5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

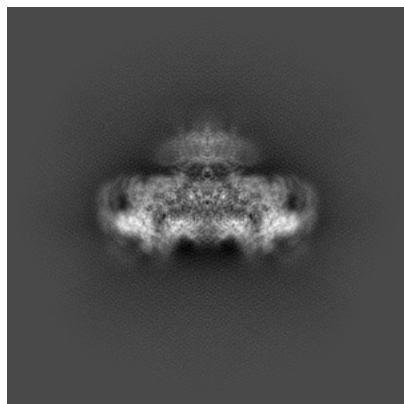
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-38417. These allow visual inspection of the internal detail of the map and identification of artifacts.

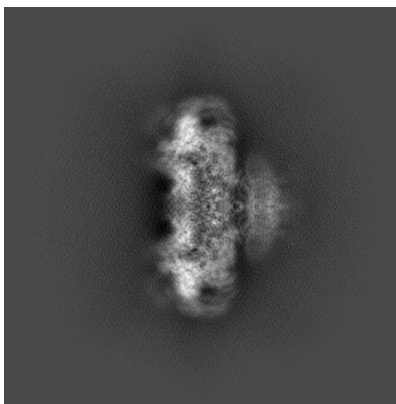
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

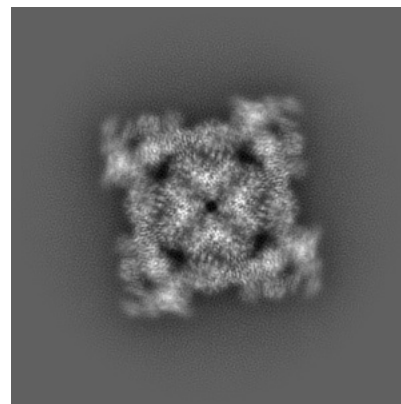
6.1.1 Primary map



X

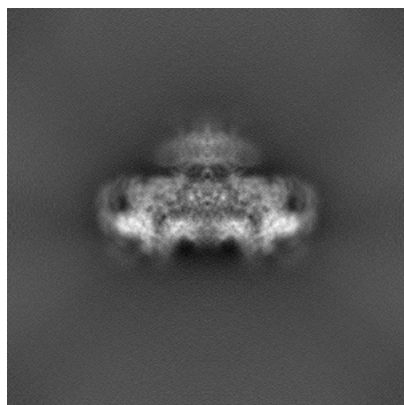


Y

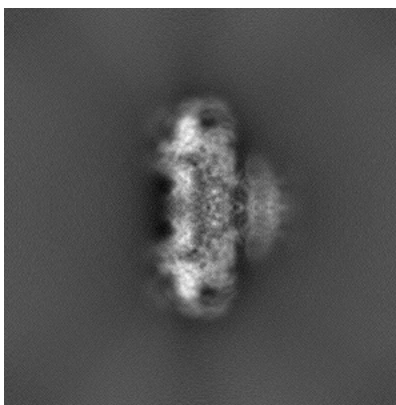


Z

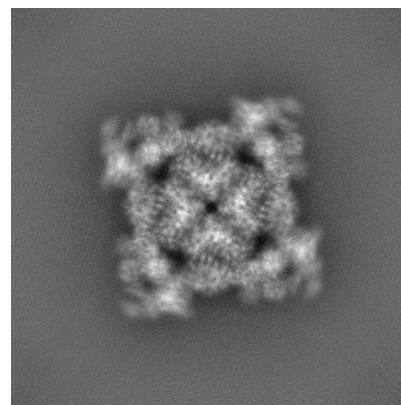
6.1.2 Raw map



X



Y

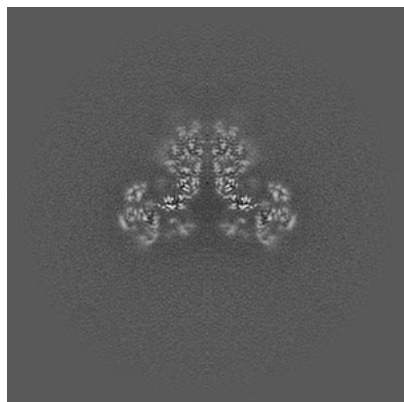


Z

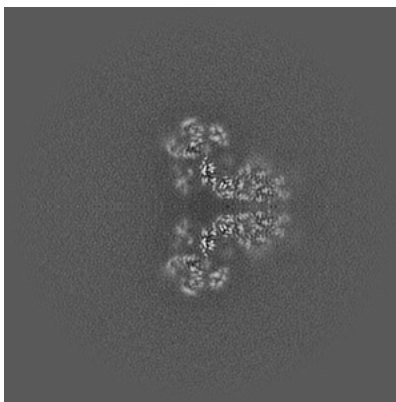
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

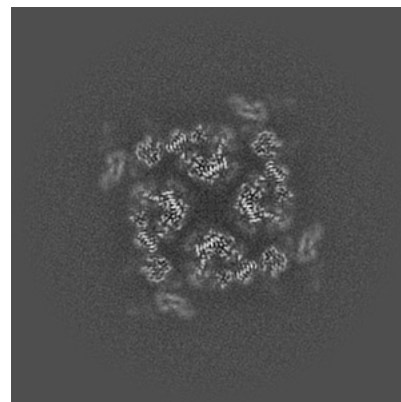
6.2.1 Primary map



X Index: 256

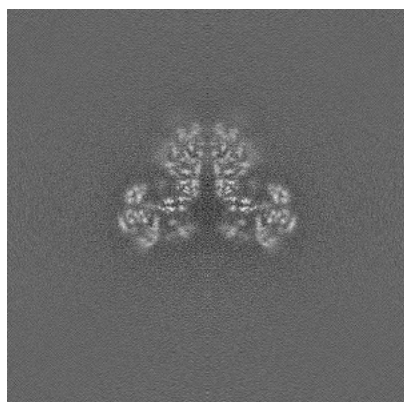


Y Index: 256

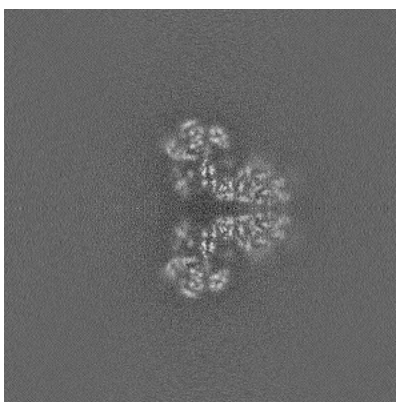


Z Index: 256

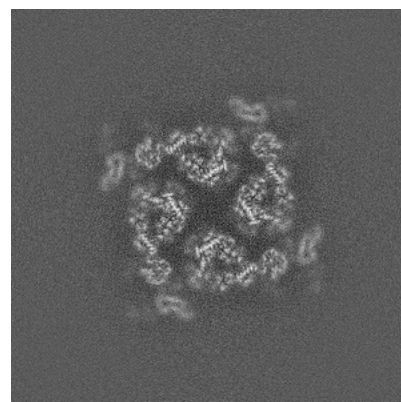
6.2.2 Raw map



X Index: 256



Y Index: 256

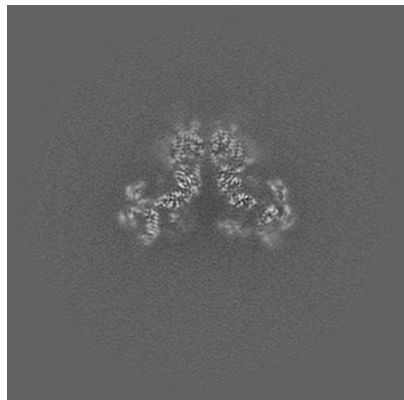


Z Index: 256

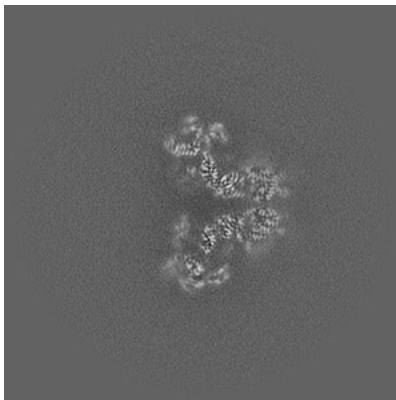
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

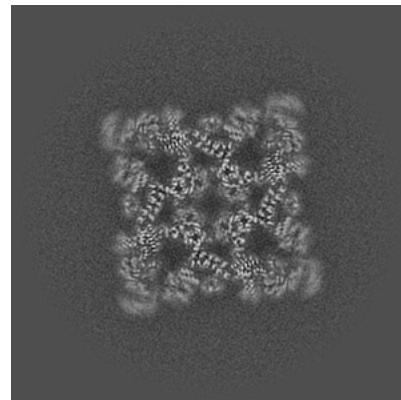
6.3.1 Primary map



X Index: 253

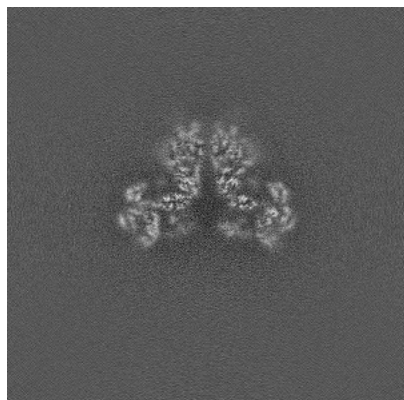


Y Index: 253

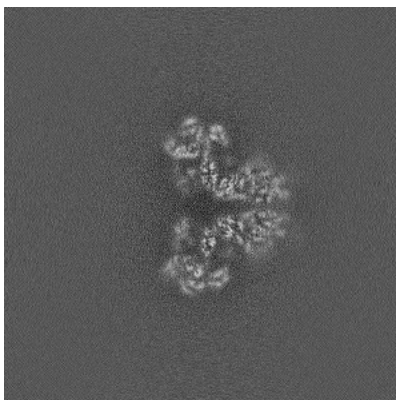


Z Index: 236

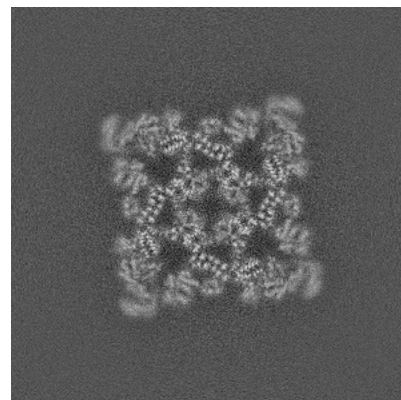
6.3.2 Raw map



X Index: 254



Y Index: 254

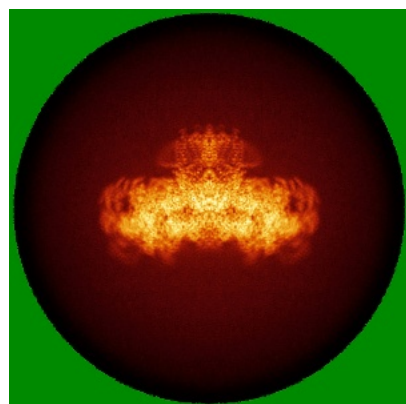


Z Index: 237

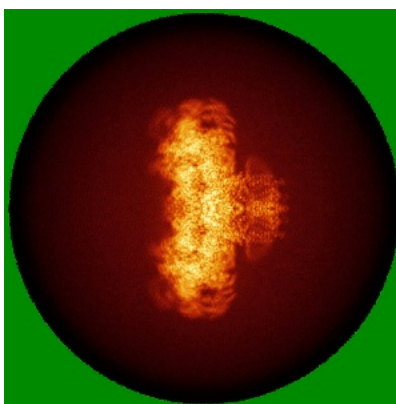
The images above show the largest variance slices of the map in three orthogonal directions.

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

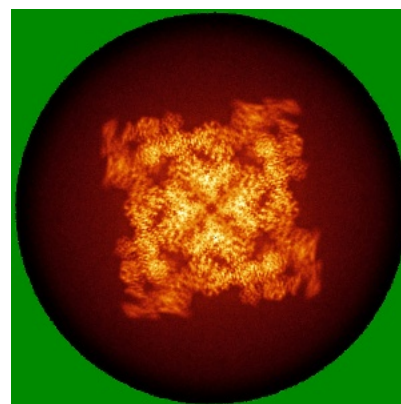
6.4.1 Primary map



X

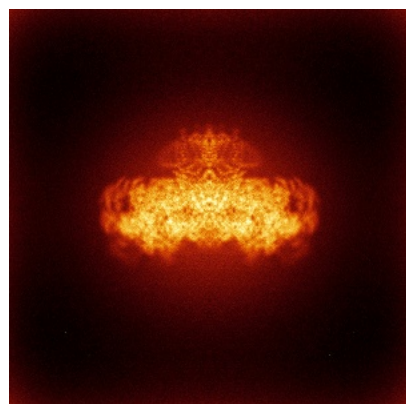


Y

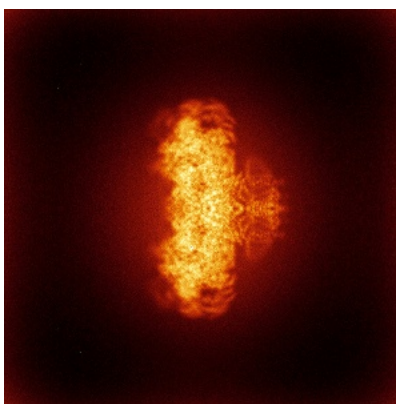


Z

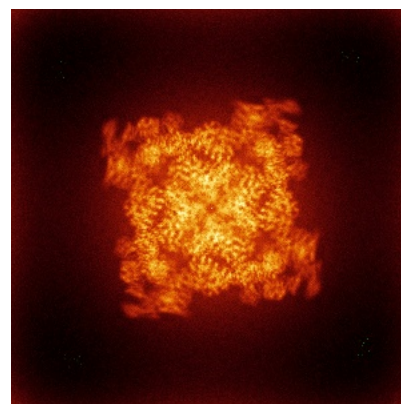
6.4.2 Raw map



X



Y

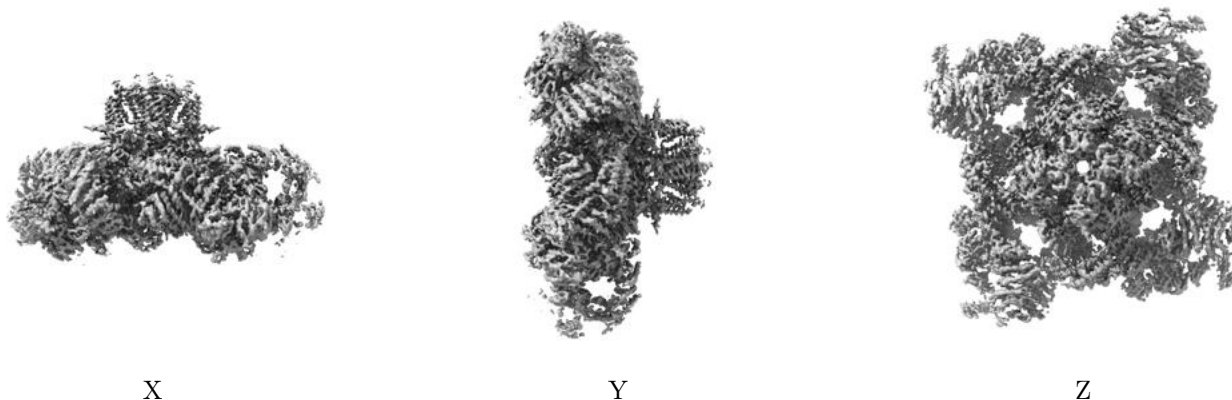


Z

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

6.5.2 Raw map



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

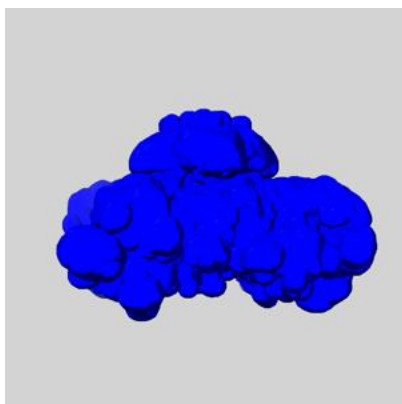
6.6 Mask visualisation [i](#)

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

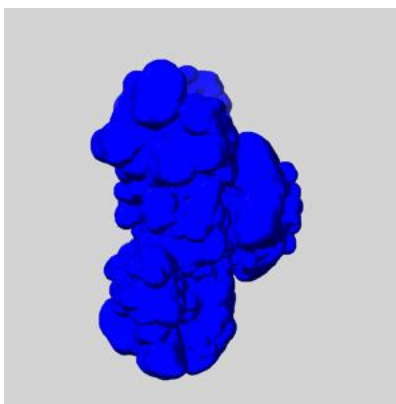
A mask typically either:

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

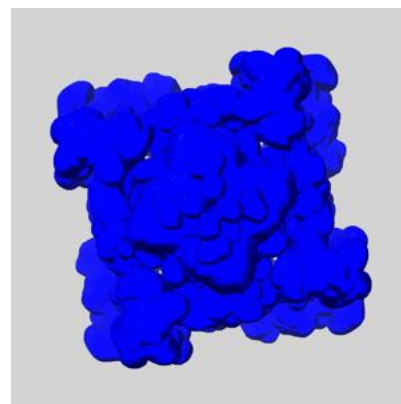
6.6.1 emd_38417_msk_1.map [i](#)



X



Y

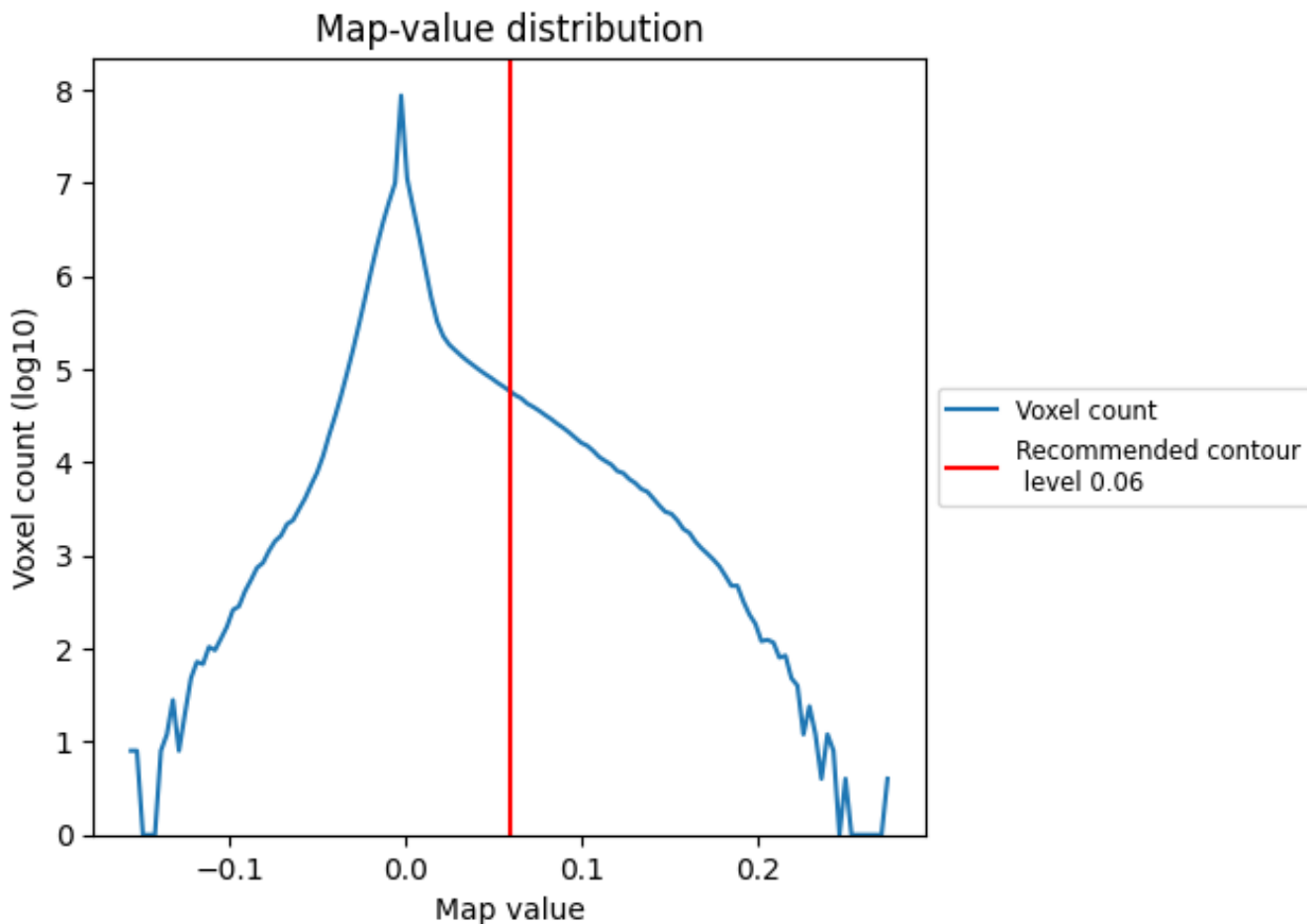


Z

7 Map analysis [i](#)

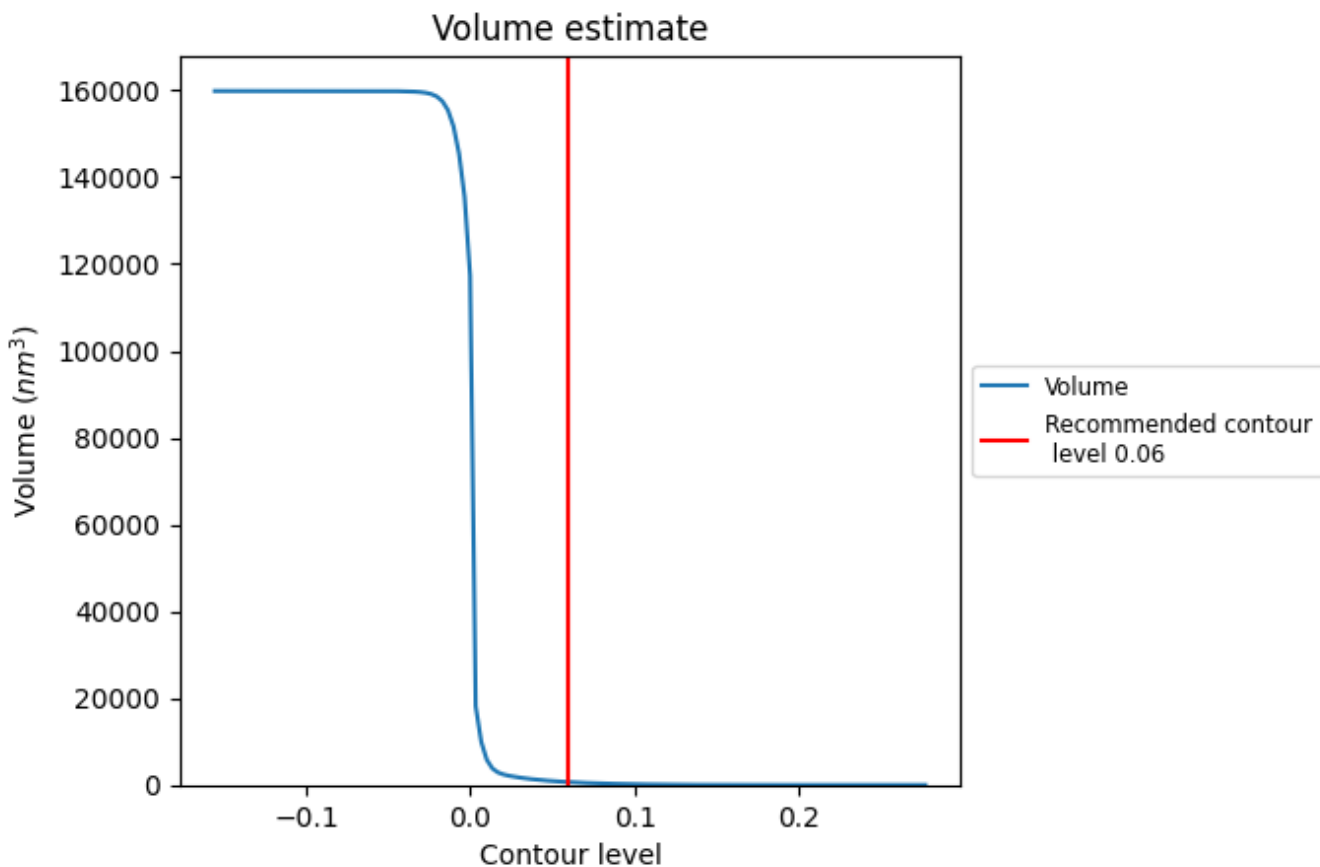
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

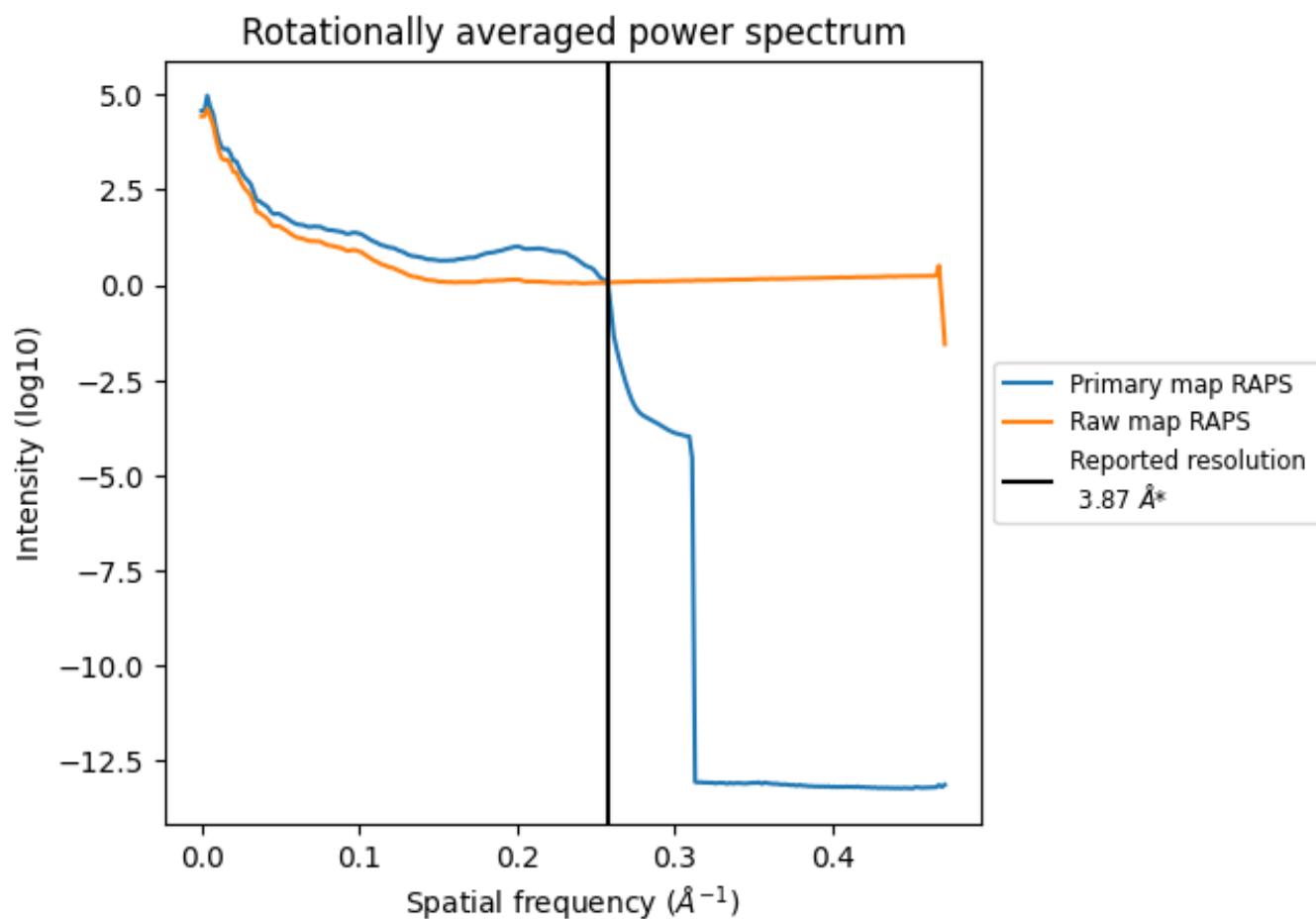
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 657 nm^3 ; this corresponds to an approximate mass of 594 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](#)

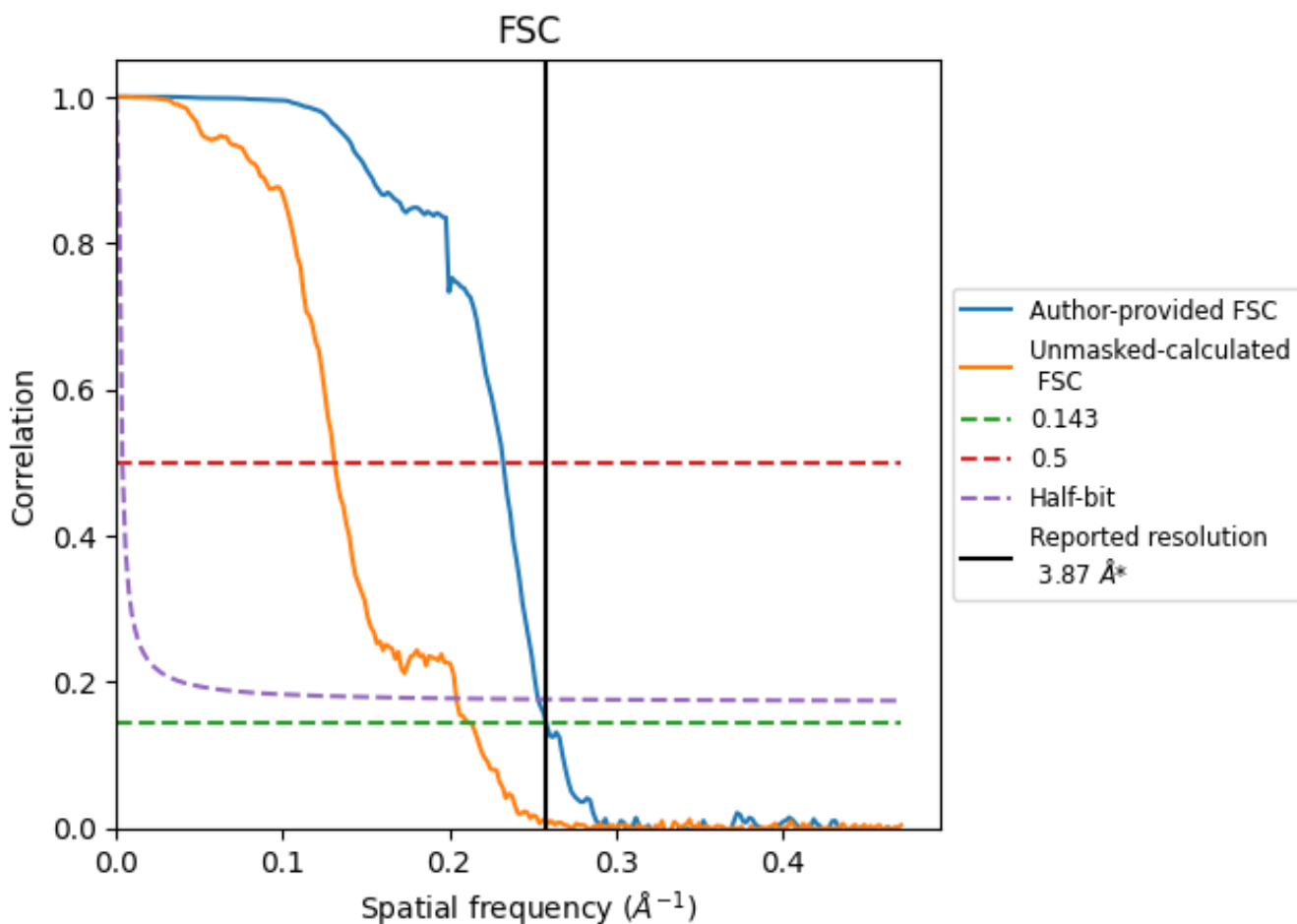


*Reported resolution corresponds to spatial frequency of 0.258 Å⁻¹

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 0.258 Å⁻¹

8.2 Resolution estimates [i](#)

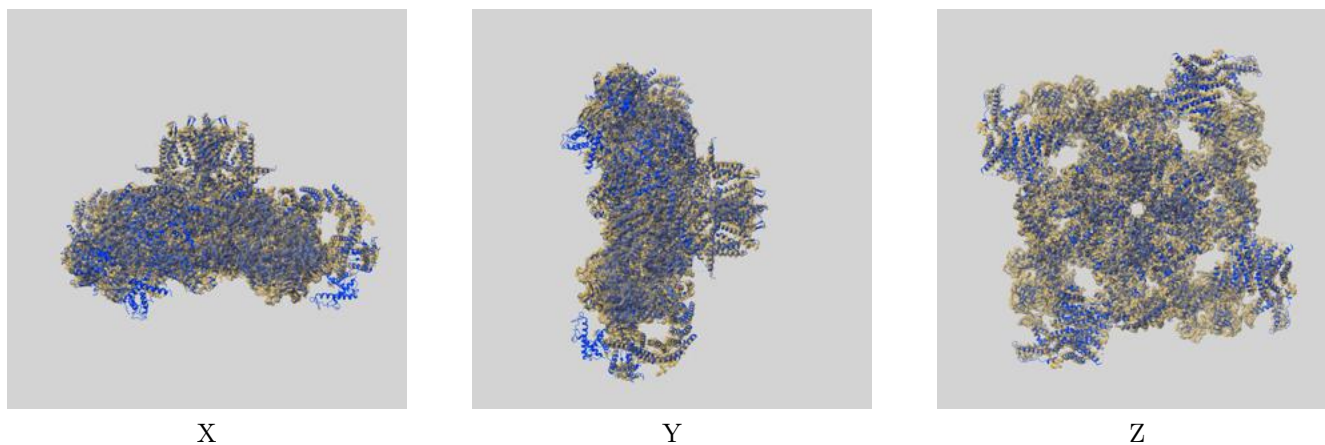
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.87	-	-
Author-provided FSC curve	3.87	4.30	3.95
Unmasked-calculated*	4.70	7.63	4.89

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 4.70 differs from the reported value 3.87 by more than 10 %

9 Map-model fit [i](#)

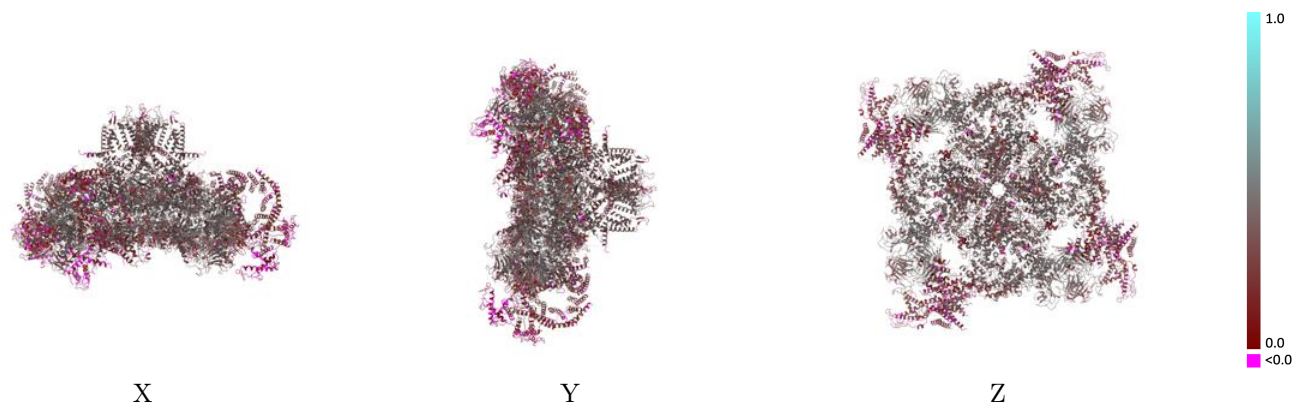
This section contains information regarding the fit between EMDB map EMD-38417 and PDB model 8XKH. Per-residue inclusion information can be found in section [3](#) on page [9](#).

9.1 Map-model overlay [i](#)



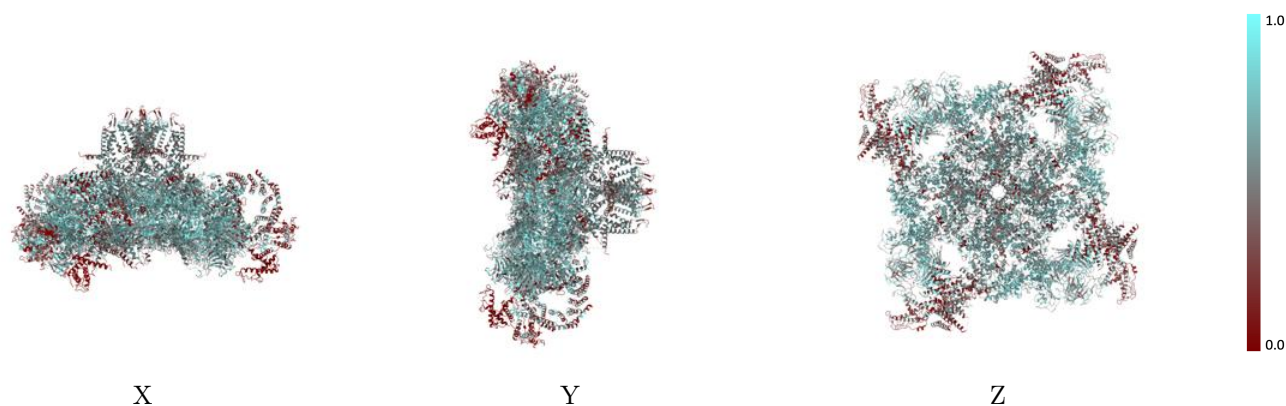
The images above show the 3D surface view of the map at the recommended contour level 0.06 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



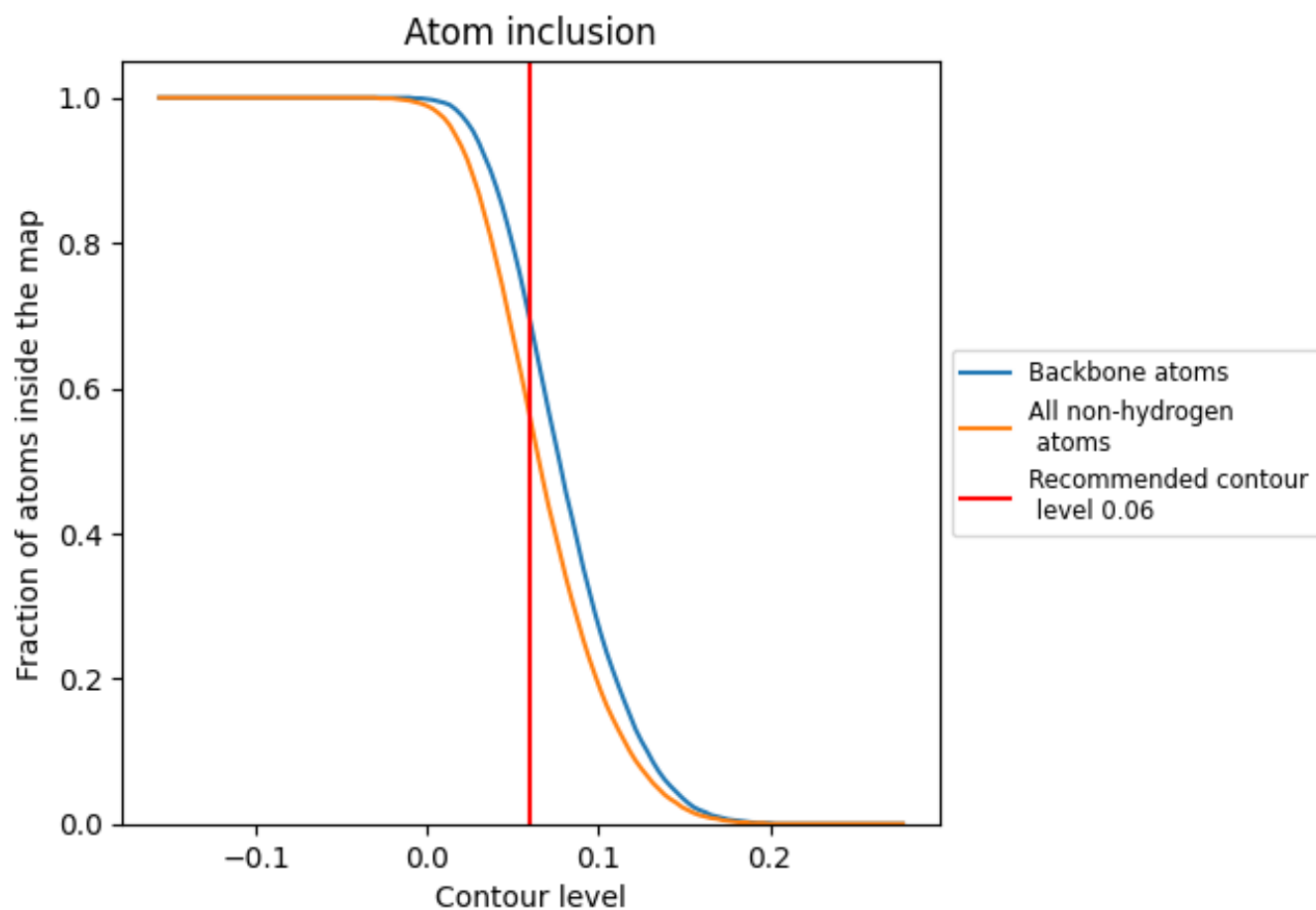
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.06).



























9.4 Atom inclusion [i](#)



At the recommended contour level, 69% of all backbone atoms, 56% 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 (0.06) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.5610	 0.3260
A	 0.5660	 0.3280
B	 0.5650	 0.3270
C	 0.5660	 0.3280
D	 0.5660	 0.3290
E	 0.6170	 0.3680
F	 0.6200	 0.3660
G	 0.6200	 0.3700
H	 0.6160	 0.3710
I	 0.3780	 0.2390
J	 0.3810	 0.2400
K	 0.3780	 0.2420
L	 0.3770	 0.2410

