



## wwPDB EM Validation Summary Report ⓘ

Nov 13, 2023 – 02:41 PM EST

PDB ID : 8UXM  
EMDB ID : EMD-42769  
Title : Structure of PKA phosphorylated human RyR2-R420W in the open state in the presence of calcium and calmodulin  
Authors : Miotto, M.C.; Marks, A.R.  
Deposited on : 2023-11-09  
Resolution : 3.56 Å(reported)  
Based on initial model : 7UA5

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

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

EMDB validation analysis : 0.0.1.dev70  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4.02b-467  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36

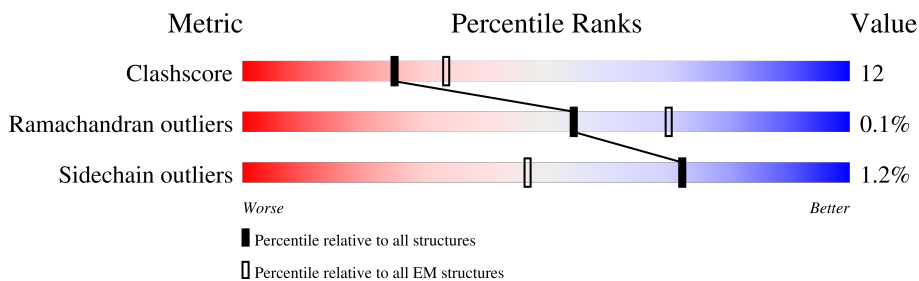
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.56 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.





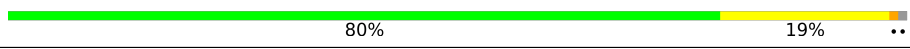

Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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

Mol	Chain	Length	Quality of chain
1	I	149	5% (Poor fit), 52% (0 outliers), 40% (1 outlier), 3% (2 outliers), 0% (3+ outliers)
1	J	149	5% (Poor fit), 58% (0 outliers), 34% (1 outlier), 3% (2 outliers), 0% (3+ outliers)
1	K	149	6% (Poor fit), 56% (0 outliers), 36% (1 outlier), 2% (2 outliers), 0% (3+ outliers)
1	L	149	6% (Poor fit), 56% (0 outliers), 36% (1 outlier), 2% (2 outliers), 0% (3+ outliers)
2	A	4967	10% (Poor fit), 63% (0 outliers), 21% (1 outlier), 6% (2 outliers), 0% (3+ outliers)
2	B	4967	10% (Poor fit), 63% (0 outliers), 21% (1 outlier), 6% (2 outliers), 0% (3+ outliers)
2	C	4967	10% (Poor fit), 64% (0 outliers), 21% (1 outlier), 5% (2 outliers), 0% (3+ outliers)
2	D	4967	10% (Poor fit), 63% (0 outliers), 21% (1 outlier), 6% (2 outliers), 0% (3+ outliers)

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Mol	Chain	Length	Quality of chain
3	E	108	 80% 19% ..
3	F	108	 80% 19% ..
3	G	108	 80% 19% ..
3	H	108	 79% 20% .

## 2 Entry composition i

There are 6 unique types of molecules in this entry. The entry contains 143464 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	I	143	1131	694	182	246	9	0	0
1	J	143	1131	694	182	246	9	0	0
1	L	143	1131	694	182	246	9	0	0
1	K	143	1131	694	182	246	9	0	0

- Molecule 2 is a protein called Ryanodine receptor 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	A	4231	33849	21572	5764	6283	230	2	0
2	B	4231	33849	21572	5764	6283	230	2	0
2	C	4231	33849	21572	5764	6283	230	2	0
2	D	4231	33849	21572	5764	6283	230	2	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	420	TRP	ARG	variant	UNP Q92736
B	420	TRP	ARG	variant	UNP Q92736
C	420	TRP	ARG	variant	UNP Q92736
D	420	TRP	ARG	variant	UNP Q92736

- Molecule 3 is a protein called Peptidyl-prolyl cis-trans isomerase FKBP1B.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	E	107	Total	C	N	O	S	0	0
			818	516	144	154	4		
3	F	107	Total	C	N	O	S	0	0
			818	516	144	154	4		
3	G	107	Total	C	N	O	S	0	0
			818	516	144	154	4		
3	H	107	Total	C	N	O	S	0	0
			818	516	144	154	4		

- Molecule 4 is CALCIUM ION (three-letter code: CA) (formula: Ca) (labeled as "Ligand of Interest" by depositor).

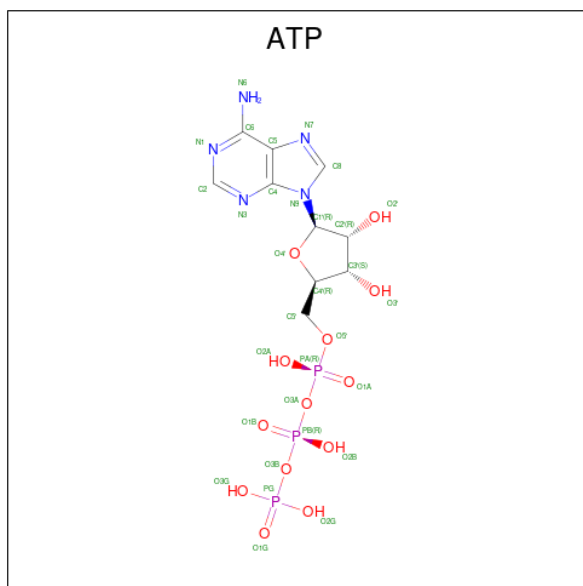
Mol	Chain	Residues	Atoms		AltConf
4	I	4	Total	Ca	0
			4	4	
4	A	1	Total	Ca	0
			1	1	
4	J	4	Total	Ca	0
			4	4	
4	L	4	Total	Ca	0
			4	4	
4	K	4	Total	Ca	0
			4	4	
4	B	1	Total	Ca	0
			1	1	
4	C	1	Total	Ca	0
			1	1	
4	D	1	Total	Ca	0
			1	1	

- Molecule 5 is ZINC ION (three-letter code: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

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

- Molecule 6 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula:

C<sub>10</sub>H<sub>16</sub>N<sub>5</sub>O<sub>13</sub>P<sub>3</sub> (labeled as "Ligand of Interest" by depositor).

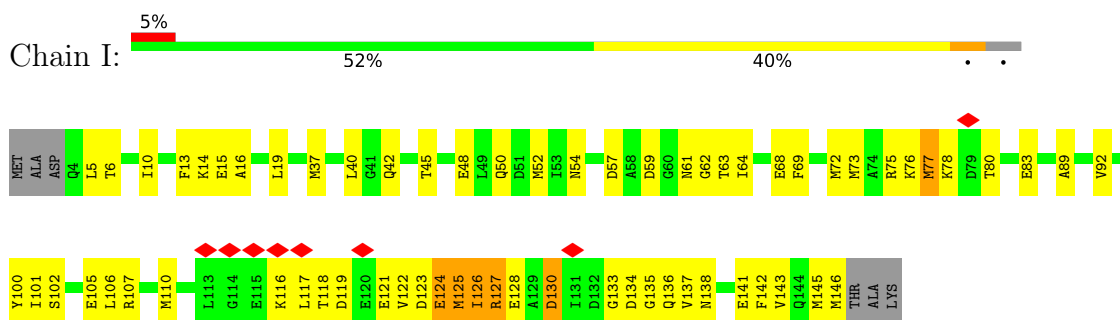


Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
6	A	1	Total	C	N	O	P	0
			31	10	5	13	3	
6	A	1	Total	C	N	O	P	0
			31	10	5	13	3	
6	B	1	Total	C	N	O	P	0
			31	10	5	13	3	
6	B	1	Total	C	N	O	P	0
			31	10	5	13	3	
6	C	1	Total	C	N	O	P	0
			31	10	5	13	3	
6	C	1	Total	C	N	O	P	0
			31	10	5	13	3	
6	D	1	Total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

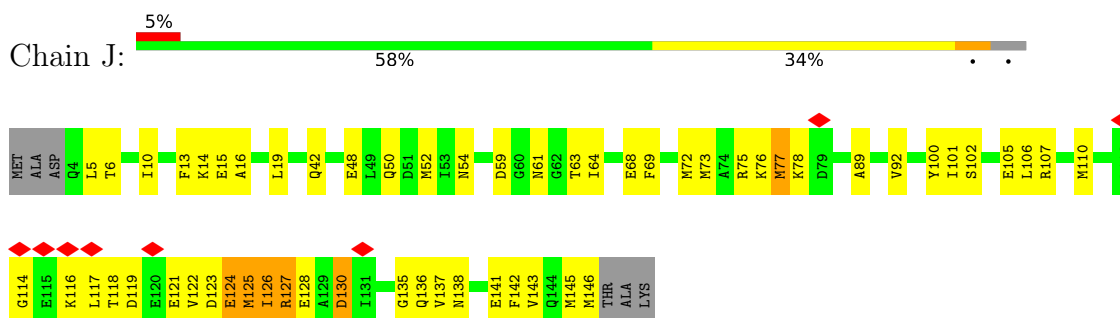
### 3 Residue-property plots

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

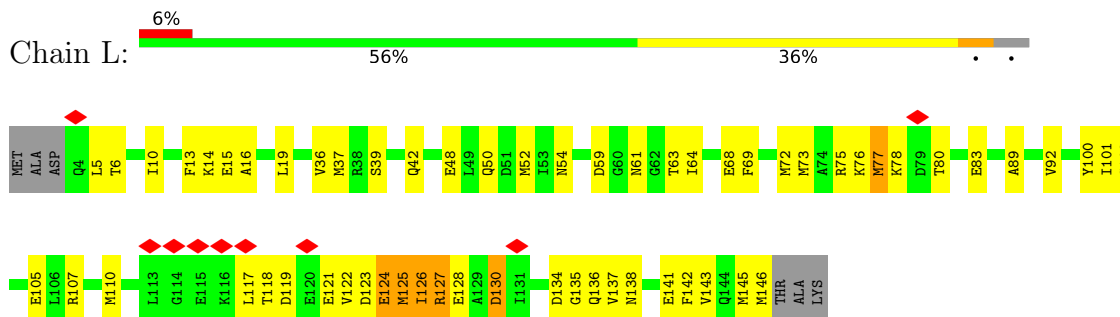
- Molecule 1: Calmodulin-1



- Molecule 1: Calmodulin-1

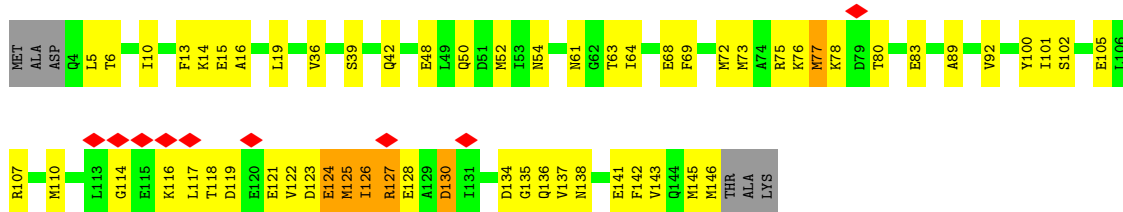


- Molecule 1: Calmodulin-1

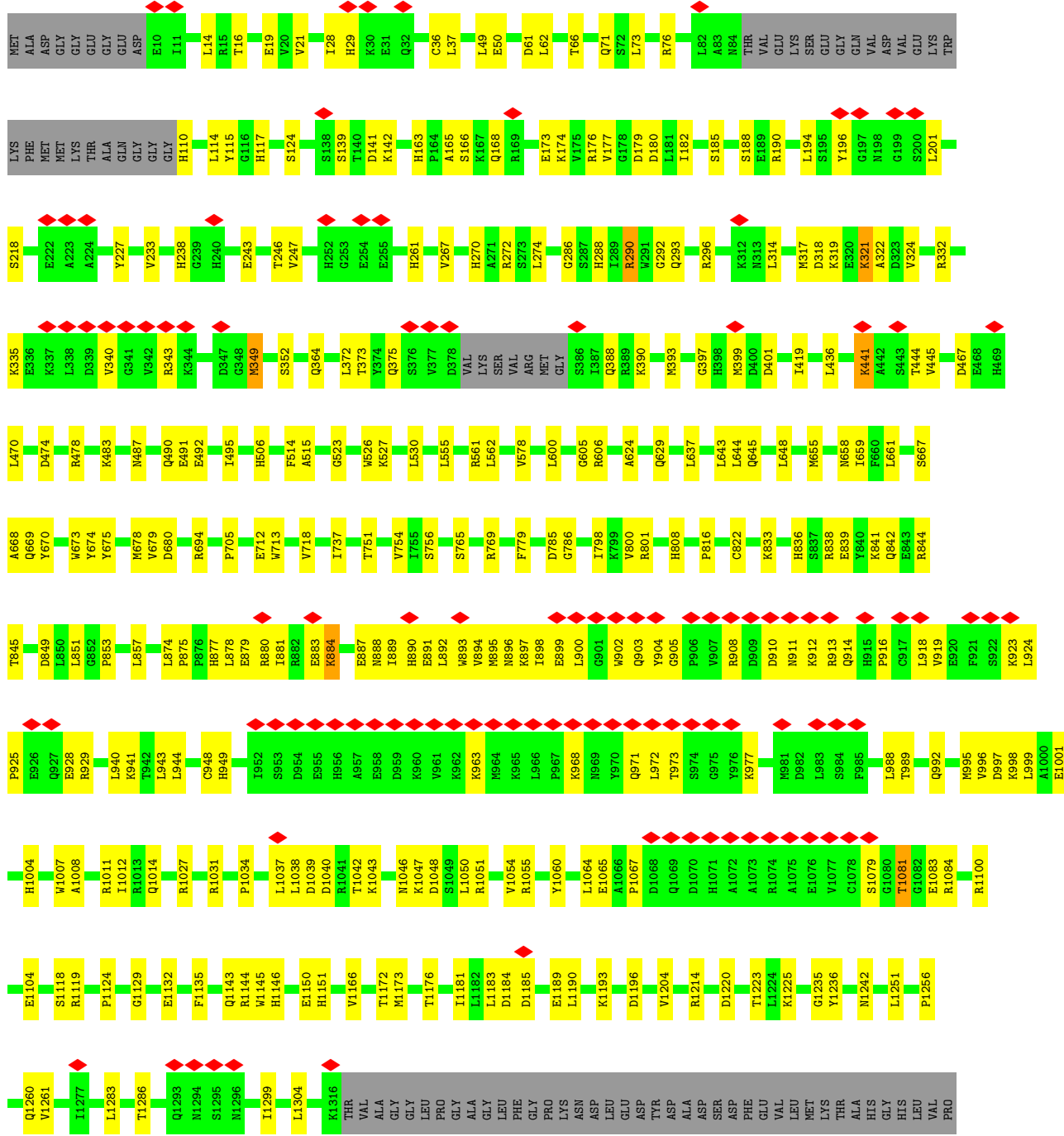


- Molecule 1: Calmodulin-1





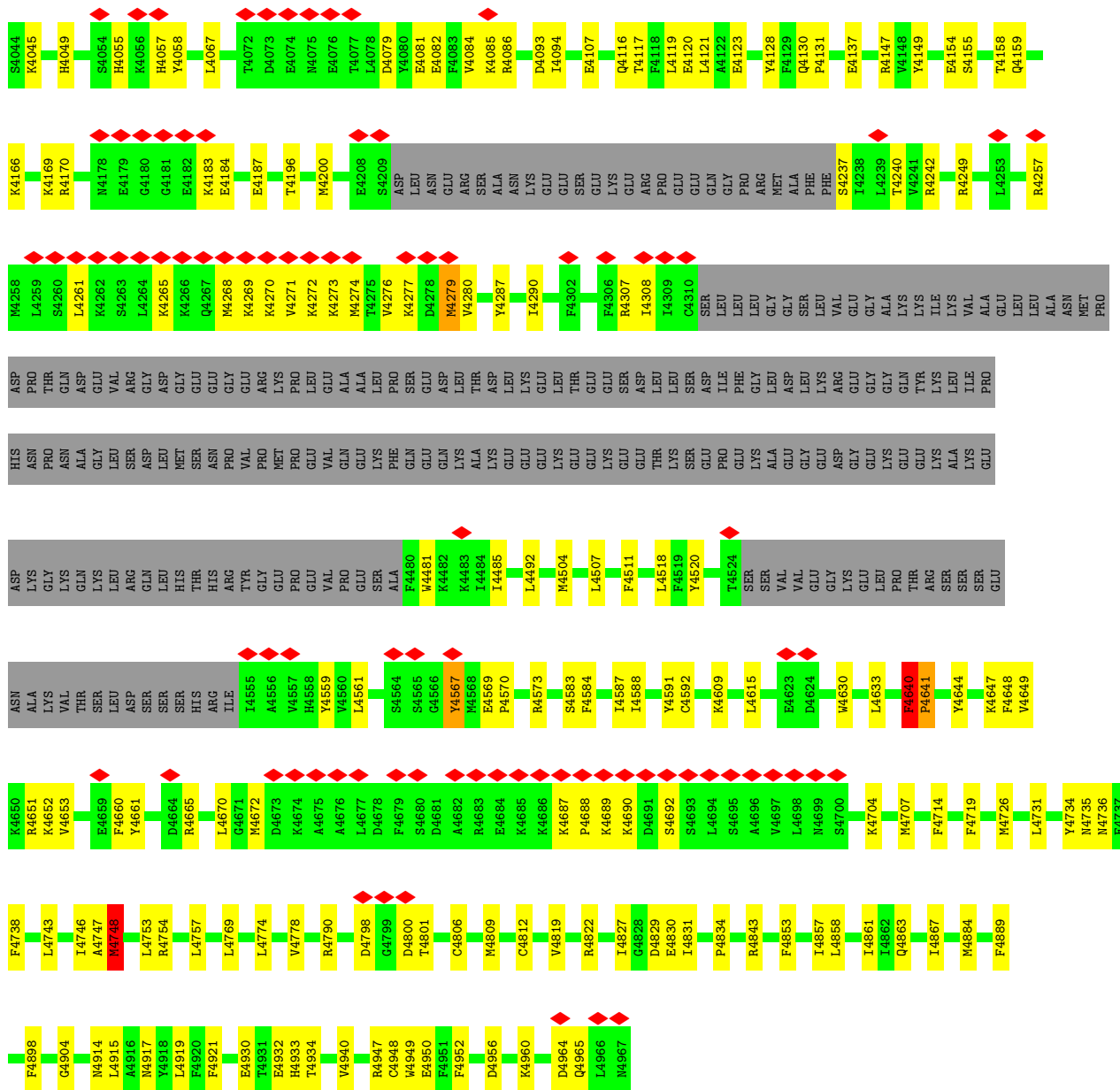
• Molecule 2: Ryanodine receptor 2



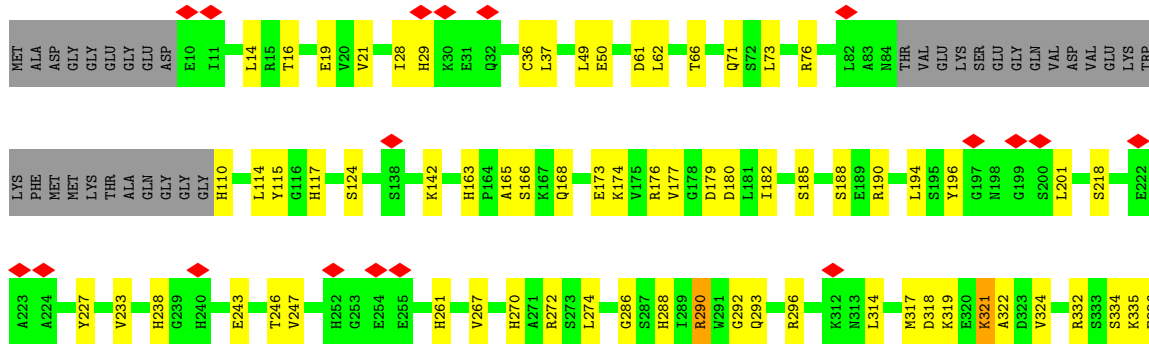


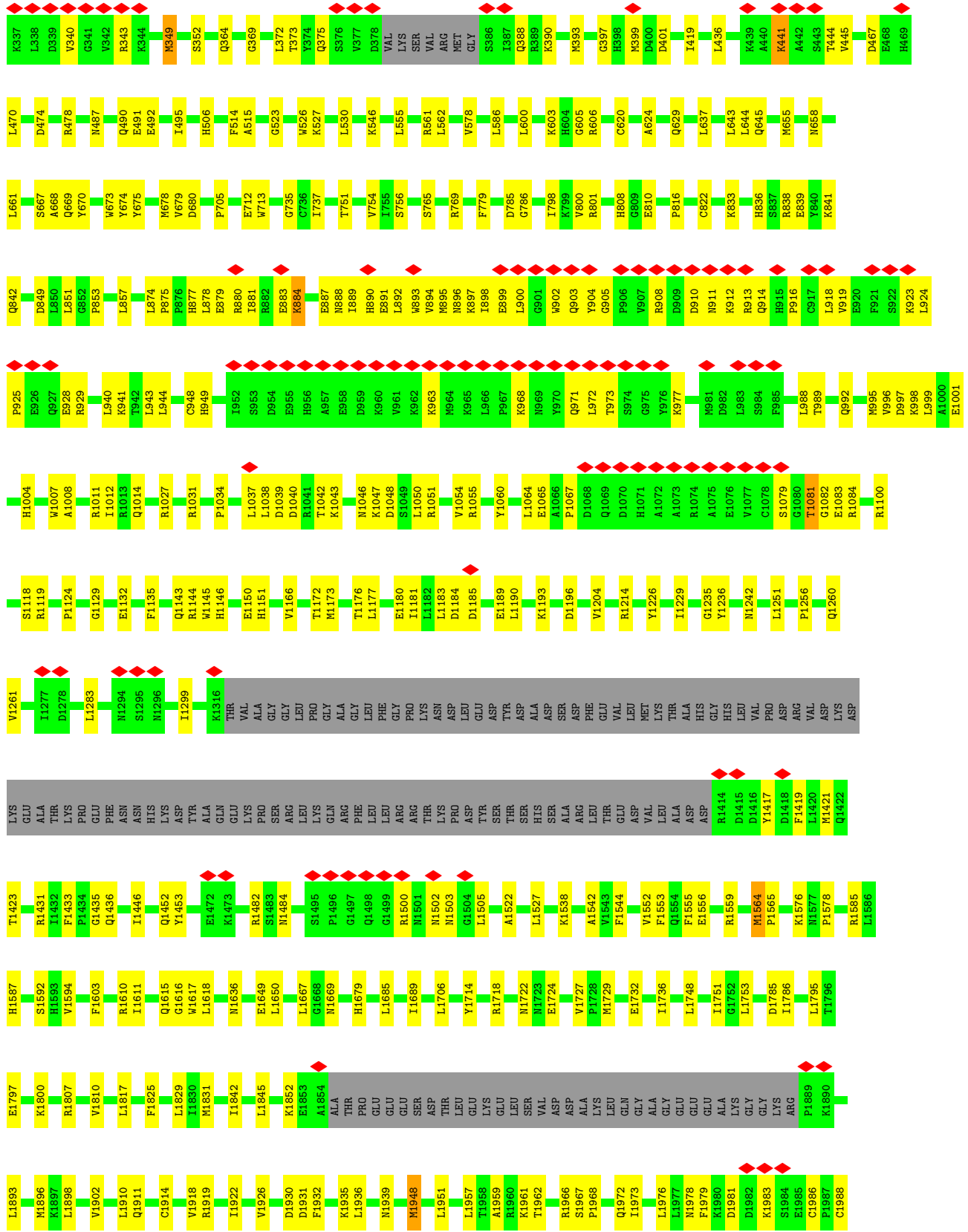
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Y2760	K2761	L2762	L2763	S2764	E2765	K2766	E2767	E2768	E2769	I2770	Y2771	R2772	W2773	P2774	K2775	L2776	L2779	M2782	L2783	A2784	W2785	G2786	W2787	R2788	R2791	E2794	G2795	D2796	S2797	M2798	A2799	L2800	Y2801	M2802	ARG	THR	ARG	THR	ILE	SER	GLN	THR	SER	GLN	THR	VAL	VAL	ASP	ALA	ALA	HIS	G2820	Y2821	S2822	P2823
M2684	Y2685	Y2686	M2687	S2688	M2689	E2690	K2691	M2695	D2696	S2697	G2698	G2699	M2700	F2701	M2702	P2703	Q2704	P2705	V2706	D2707	L2708	S2709	M2710	I2713	P2714	E2715	H2729	W2732	S2733	K2735	D2736	L2737	A2738	G2740	M2741	L2742	Y2743	G2744	E2745	L2746	F2662	L2747	S2748	D2749	S2750	K2751	L2752	Q2754	P2755	M2756	K2758	P2759			
D2495	L2496	R2497	S2508	M2512	L2520	L2525	P2526	L2527	L2548	S2550	L2561	T2562	Q2565	R2566	L2569	Q2586	H2587	R2590	R2591	L2592	V2593	P2606	L2610	Y2620	W2627	G2628	N2629	F2630	L2640	S2641	R2642	K2643	L2644	F2645	W2646	E2658	L2661	F2662	L2676	S2683	P2494														
D2495	L2496	R2497	S2508	M2512	L2520	L2525	P2526	L2527	L2548	S2550	L2561	T2562	Q2565	R2566	L2569	Q2586	H2587	R2590	R2591	L2592	V2593	P2606	L2610	Y2620	W2627	G2628	N2629	F2630	L2640	S2641	R2642	K2643	L2644	F2645	W2646	E2658	L2661	F2662	L2676	S2683	P2494														
ASP	THR	GLU	GLU	E2377	D2378	D2379	D2380	T2381	I2382	H2383	H2384	G2385	I2388	M2389	L2408	K2413	I2422	S2425	L2426	I2427	D2431	G2434	V2435	I2436	K2447	D2448	G2449	N2450	M2456	S2457	A2458	G2459	F2460	D2463	H2464	K2465	F2471	I2478	L2487	L2488	E2489	G2491	F2492	L2493	P2494										
GLU	SER	ASP	SER	K2063	K2054	S2055	S2056	T2057	L2066	Q2069	Q2060	L2061	L2062	L2080	M2084	F2085	V2086	L2087	R2090	Q2091	Y2106	L2123	M2134	L2146	M2150	K2153	Y2156	Q2157	L2165	G2166	M2167	V2171	M2172	E2173	V2174	M2175	L2176	N2177	V2178	G2181	C2182	E2183	S2184	E2185	L2187										
K1980	D1981	D1982	K1983	S1984	K1985	C1986	F1987	C1988	P1989	R1993	D1994	Q1995	L1996	H2000	E2001	M2004	E2010	LEU	ASP	GLU	ASP	GLY	SER	LEU	ASP	ASP	K1935	L1936	N1939	M1948	L1951	L1957	T1958	A1959	F1960	K1961	T1962	R1966	S1967	P1968	Q1972	I1973	L1976	L1977	N1978	F1979									
K1980	D1981	D1982	K1983	S1984	K1985	C1986	F1987	C1988	P1989	R1993	D1994	Q1995	L1996	H2000	E2001	M2004	E2010	LEU	ASP	GLU	ASP	GLY	SER	LEU	ASP	ASP	K1935	L1936	N1939	M1948	L1951	L1957	T1958	A1959	F1960	K1961	T1962	R1966	S1967	P1968	Q1972	I1973	L1976	L1977	N1978	F1979									
GLU	SER	ASP	SER	K2063	K2054	S2055	S2056	T2057	L2066	Q2069	Q2060	L2061	L2062	L2080	M2084	F2085	V2086	L2087	R2090	Q2091	Y2106	L2123	M2134	L2146	M2150	K2153	Y2156	Q2157	L2165	G2166	M2167	V2171	M2172	E2173	V2174	M2175	L2176	N2177	V2178	G2181	C2182	E2183	S2184	E2185	L2187										
Y2202	F2203	C2204	R2205	L2206	W2214	Y2220	L2221	L2222	E2223	N2224	V2227	P2232	A2244	M2248	D2249	N2250	L2253	E2259	P2260	M2290	V2293	E2296	F2301	L2302	K2303	E2338	L2344	M2347	A2350	I2351	K2352	L2353	P2364	ASN	SER	GLY	SER	SER	SER	THR	LEU														
Y2202	F2203	C2204	R2205	L2206	W2214	Y2220	L2221	L2222	E2223	N2224	V2227	P2232	A2244	M2248	D2249	N2250	L2253	E2259	P2260	M2290	V2293	E2296	F2301	L2302	K2303	E2338	L2344	M2347	A2350	I2351	K2352	L2353	P2364	ASN	SER	GLY	SER	SER	SER	THR	LEU														

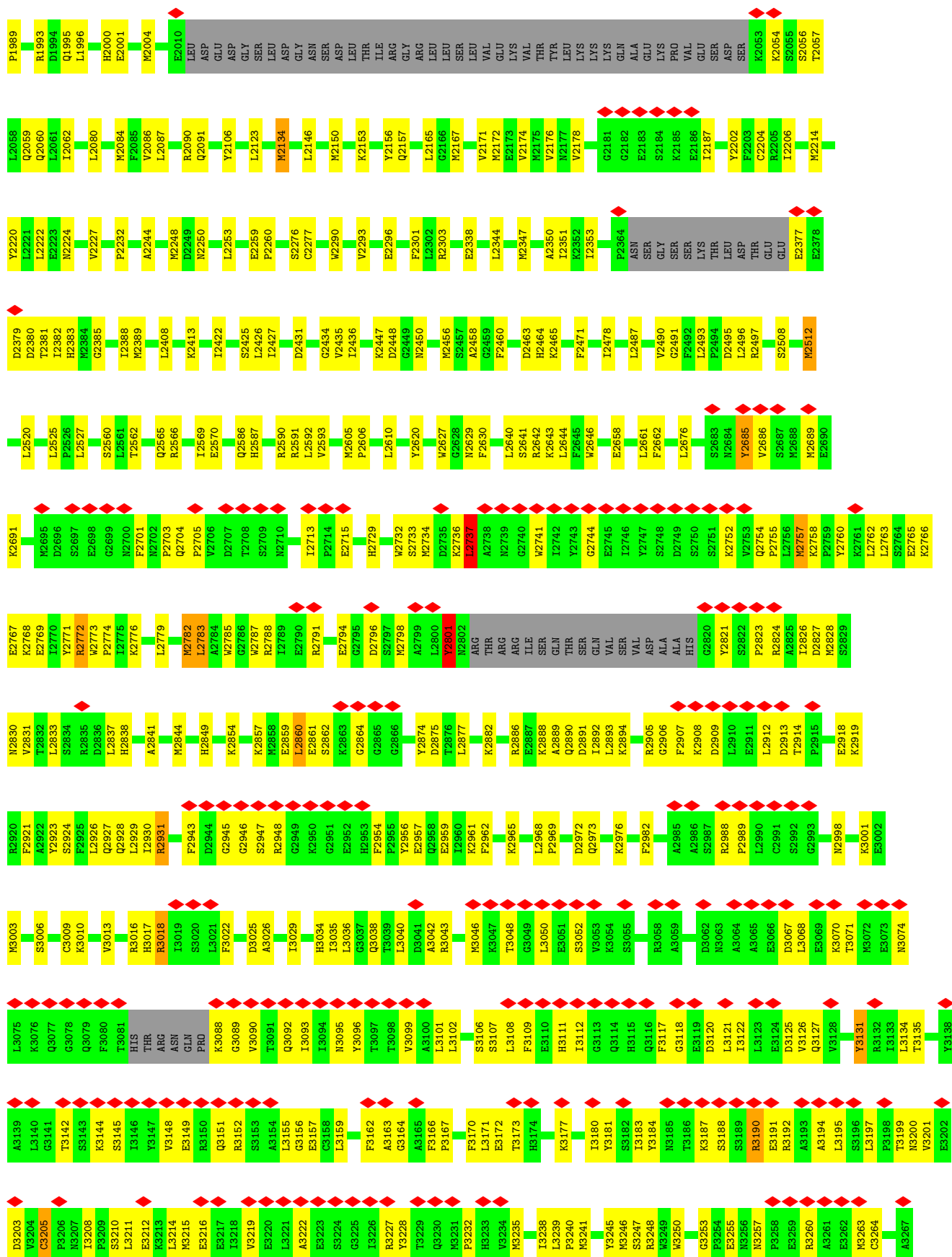
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P3927	N3812	T3658	LEU	ASN	THR	Q3313	W3250	K3187	T3122	R3063	R2988	L2910
L3935	E3815	K3659	ASN	ARG	THR	L3314	G3253	S3188	L3123	A3064	P2989	E2911
R3939	G3816	R3660	THR	PHE	ARG	L3315	E3255	R3189	E3124	A3065	L2990	L2912
D3942	L3817	V3661	LEU	SER	VAL	K3316	N3256	R3190	D3125	E3066	C2991	D2913
G3946	L3818	L3664	LEU	LEU	TYR	T3317	P3257	E3191	V3126	D3067	S2992	T2914
V3950	G3819	H3665	LEU	LEU	TYR	H3318	P3258	A3193	Y3131	L3068	G2993	F2915
M3954	M3819	H3666	THR	SER	ASN	F3319	E3259	A3194	R3132	E3069	G2994	E2918
Q3955	V3820	L3667	GLU	ALA	ALA	L3320	E3260	A3194	L3133	K3070	G2994	F2921
L3958	T3821	L3668	ASP	ALA	LYS	P3321	A3261	L3195	L3134	T3071	H2995	K0922
S3963	E3822	L3677	VAL	SER	TRP	L3322	E3262	S3196	T3135	M3072	N2998	Y2923
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M3972	L3830	L3687	ARG	GLU	ASN	L3326	L3268	V3201	L3075	K3076	S3006	Q2927
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V3979	D3833	M3689	TYR	LYS	ALA	K3328	N3270	D3203	T3142	Q3077	K3010	L2929
G3996	D3838	K3697	LEU	LEU	LEU	ALA	E3271	C3204	K3143	Q3078	V3013	I2930
K3997	L3846	H3700	GLY	GLY	PHE	ALA	H3272	P3206	S3144	Q3079	R3016	R2932
V4000	C3847	D3701	ASP	ASP	ARG	THR	N3273	I3208	T3146	HIS	R3016	F2943
D4001	E3848	E3702	LEU	ARG	MET	VAL	N3274	P3209	Y3147	THR	H3017	D2944
M4008	N3851	GLU	ASP	THR	VAL	VAL	T3275	S3210	V3148	ARG	R3018	G2945
N4009	F3854	ASP	GLU	GLU	ALA	GLU	L3276	S3210	E3149	ASN	I3019	G2946
V4010	Q3855	GLY	GLU	GLU	GLU	GLU	L3277	D3211	E3149	GLN	S3020	G2947
E4011	Q3861	GLU	LYS	LEU	LEU	ASP	L3277	K3213	R3150	PRO	F3022	S2948
L4021	T3867	GLU	LYS	LEU	LEU	ALA	G3278	M3215	Q3151	K3088	D3025	G2949
L4026	Q3882	E3710	ARG	TRP	ILE	ALA	I3280	E3216	R3152	G3089	A3026	K2950
T4027	F3888	V3711	LEU	TRP	ILE	ALA	K3282	E3217	R3152	V3090	I3029	H2953
D4030	Y3889	N3711	LEU	TRP	ILE	ALA	L3283	I3218	Q3156	T3091	H3035	F2954
F4034	Q3889	E3715	LEU	TRP	ILE	ALA	I3284	V3219	E3157	Q3092	L3035	Y2956
Y4035	S3884	A3729	LEU	TRP	ILE	ALA	Y3285	E3222	G3158	T3093	L3036	E2957
D4036	D3887	H3732	LEU	TRP	ILE	ALA	N3286	E3223	L3159	Y3096	G3037	Q2958
P4037	F3888	T3743	LEU	TRP	ILE	ALA	L3288	S3224	F3162	T3097	Q3038	I2959
D4038	Y3889	P3753	LEU	TRP	ILE	ALA	G3289	G3225	A3163	T3097	L3040	I2960
G4039	M3605	L3758	LEU	TRP	ILE	ALA	I3290	I3226	G3164	V3099	D3041	K2961
K4040	L3608	T3758	LEU	TRP	ILE	ALA	D3291	R3227	F3166	A3100	A3042	F2962
G4041	R3615	L3763	LEU	TRP	ILE	ALA	E3292	Y3228	P3167	L3101	R3043	K2965
V4042	E3650	E3783	LEU	TRP	ILE	ALA	G3293	T3229	V3168	L3102	M3046	V2966
L4043	P3651	K3784	LEU	TRP	ILE	ALA	W3295	Q3230	A3169	P3103	K3047	L2968
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		M3806	LEU	TRP	ILE	ALA	A3300	T3238	K3177	E3110	S3052	K2976
		M3806	LEU	TRP	ILE	ALA	V3301	L3239	H3178	H3111	V3053	
		M3806	LEU	TRP	ILE	ALA	V3301	P3240	N3179	H3111	K3054	F2982
		M3806	LEU	TRP	ILE	ALA	Q3303	M3241	T3180	T3112	V3055	
		M3806	LEU	TRP	ILE	ALA	Q3304	M3245	Y3181	G3113	S3055	
		M3806	LEU	TRP	ILE	ALA	I3307	S3247	S3182	G3113	R3058	
		M3806	LEU	TRP	ILE	ALA	M3308		T3184	G3116		
		M3806	LEU	TRP	ILE	ALA	V3310			E3119		



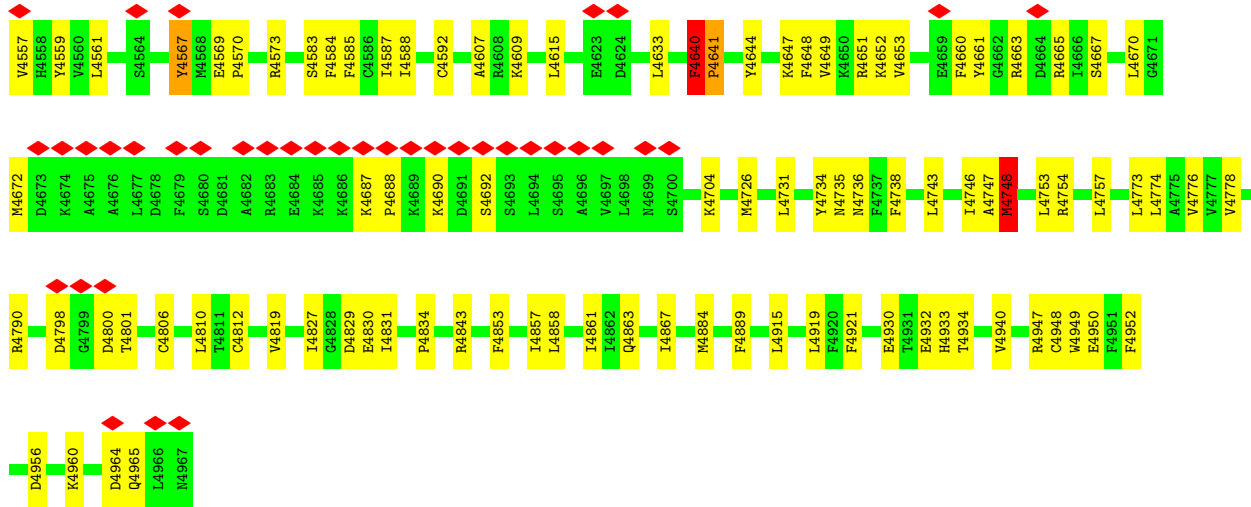
• Molecule 2: Ryanodine receptor 2



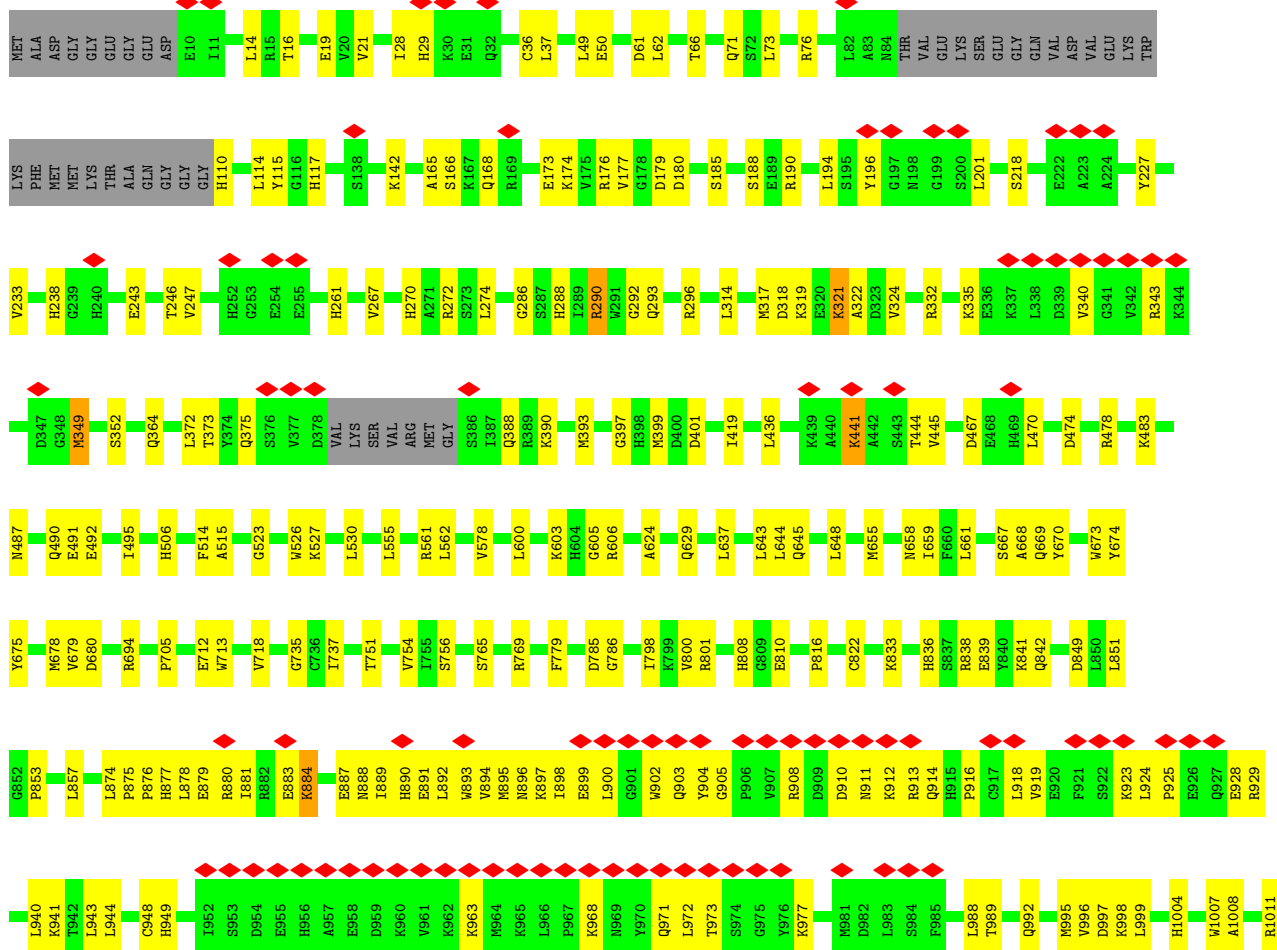








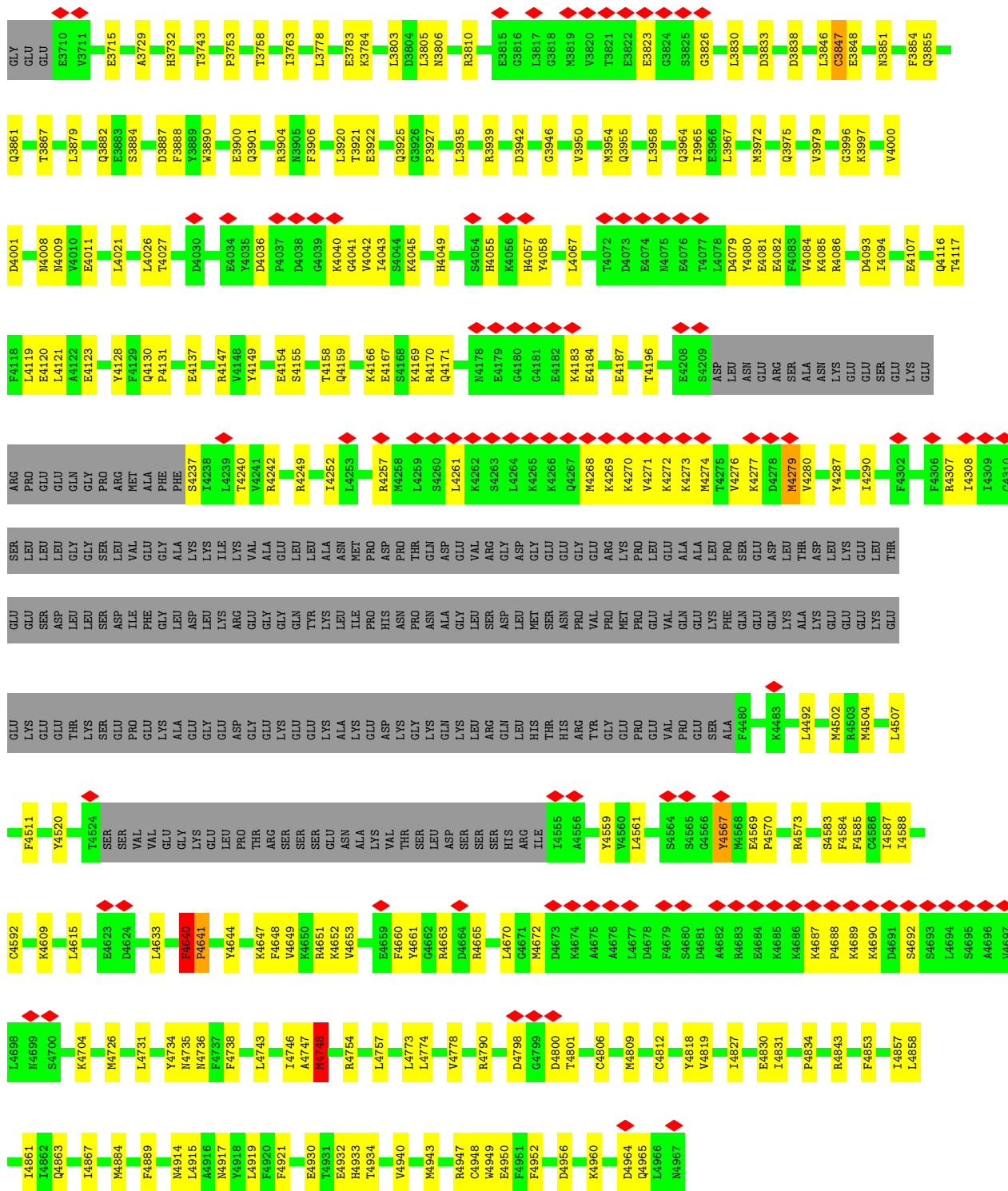
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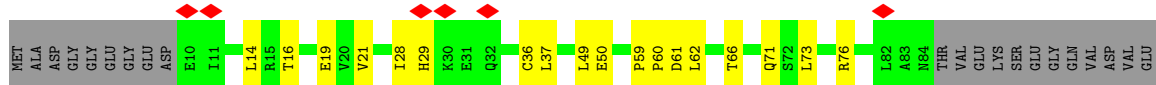


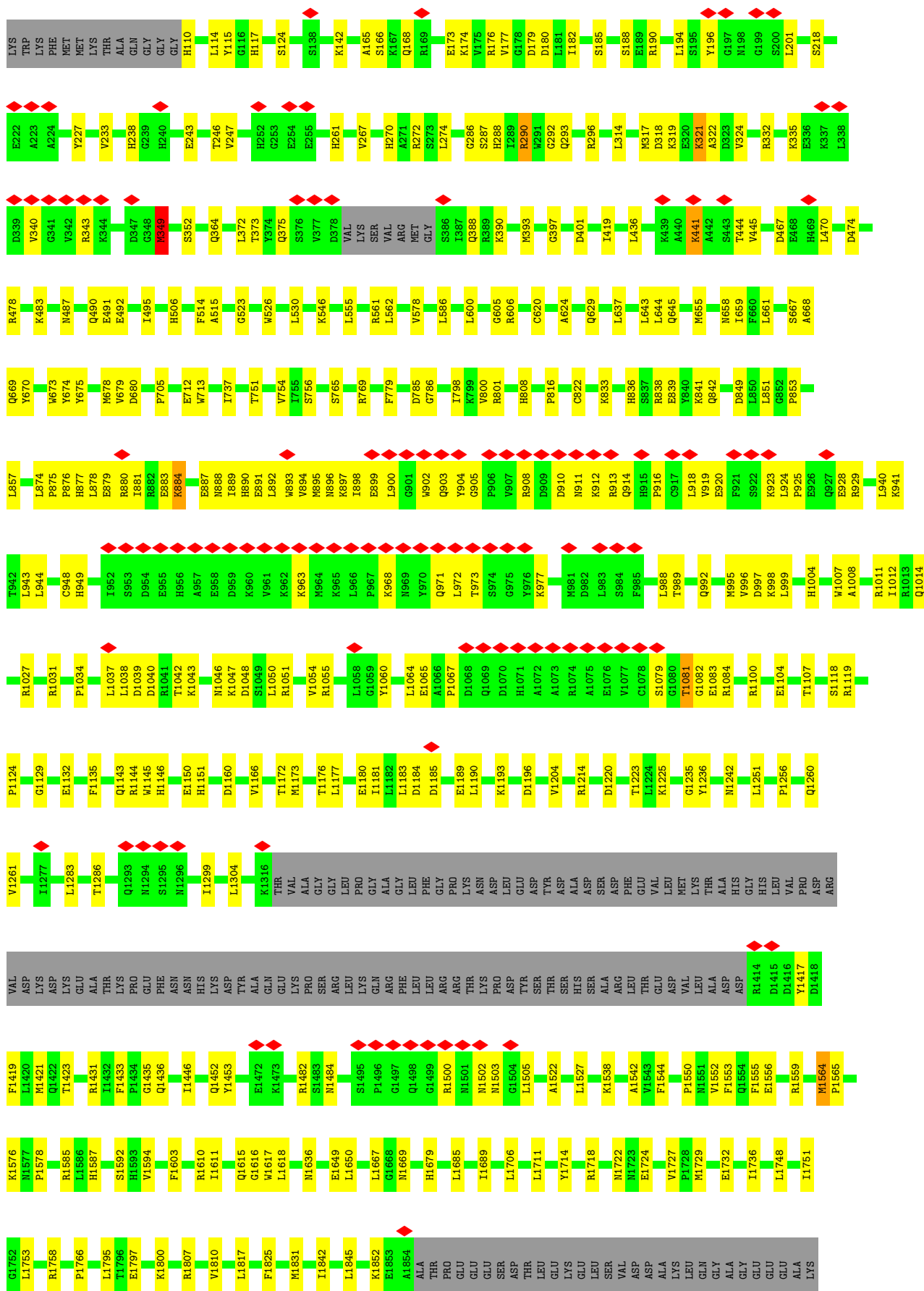






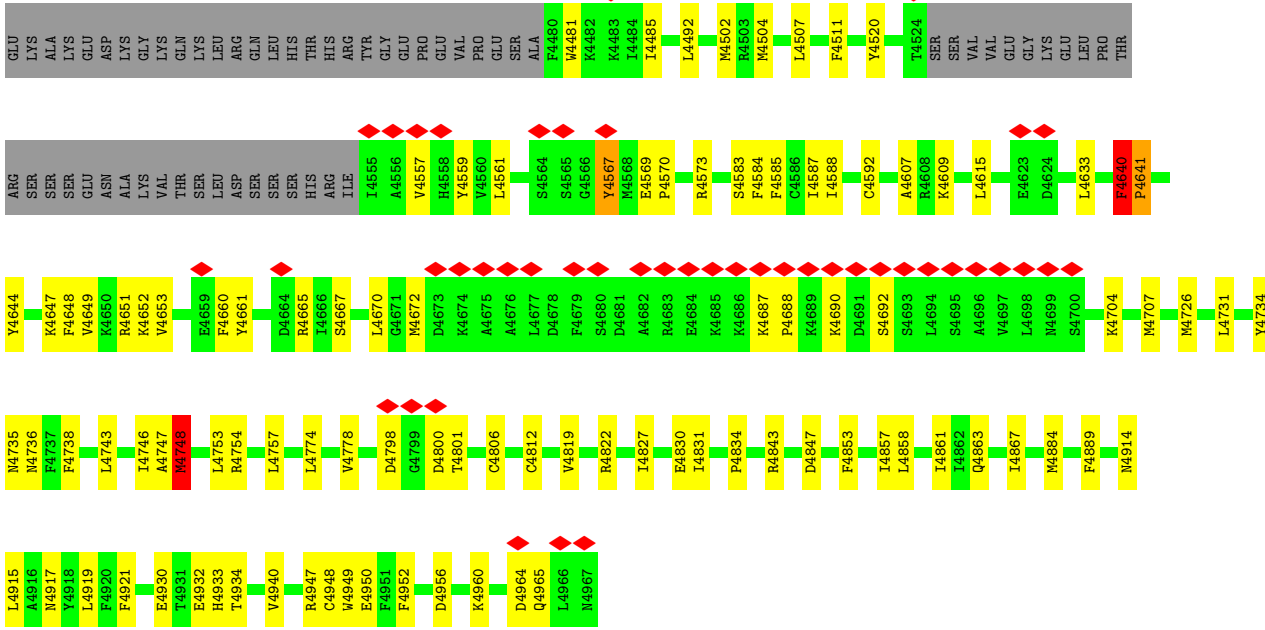
• Molecule 2: Ryanodine receptor 2



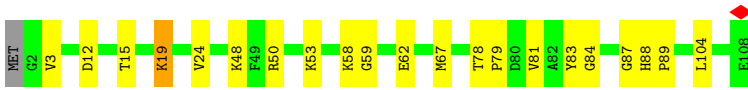
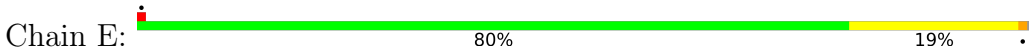


Gly	Gly	Lys	Arg	P1889	K1890	L1893	M1896	K1897	L1898	V1902	L1910	Q1911	C1914	V1918	R1919	I1922	V1926	D1930	D1931	F1932	K1935	L1936	M1939	M1948	L1951	L1957	T1958	A1959	K1961	T1962	R1966	S1967	P1968	Q1972	I1973	L1976	L1977	N1978	F1979	K1980	D1981															
D1982	K1983	S1984	E1985	C1986	P1987	P1988	P1989	R1983	D1994	Q1995	L1996	H2000	E2001	M2004	E2010	Leu	Asp	Glu	Asp	Gly	Asn	Ser	Asp	Leu	Thr	Ile	Arg	Gly	Leu	Leu	Ser	Val	Glu	Lys	Val	Thr	Tyr	Leu	Lys	Lys	Gln	Ala	Glu	Lys	Pro	Val	Glu	Ser								
ASP	SER	K2053	K2054	S2055	S2056	T2057	L2058	Q2059	Q2060	L2061	L2062	L2080	M2084	P2085	V2086	L2087	R2090	Q2091	Y2106	L2123	M2134	L2146	M2150	K2153	Y2156	Q2157	G2165	M2167	T2170	V2171	M2172	E2173	V2174	M2175	V2176	N2177	V2178	G2181	G2182	E2183	S2184	K2185	F2186	L2187												
Y2202	F2203	C2204	R2205	I2206	M2214	Y2220	L2221	L2222	E2223	M2224	G2227	G2228	L2229	P2232	L2240	A2244	M2248	H2249	M2250	L2253	E2259	P2280	S2276	C2277	D2287	W2290	V2293	E2296	F2301	L2302	R2303	R2327	P2328	E2329	E2338	L2344	M2347	A2350	L2351																	
K2352	I2353	S2363	P2364	ASN	SER	GLY	SER	SER	LYS	THR	L2493	D2495	L2496	R2497	S2508	M2512	L2520	L2525	P2526	L2527	L2548	S2560	L2561	T2562	Q2565	R2566	I2569	Q2586	H2587	R2590	R2591	L2592	V2593	P2606	L2610	Y2620	W2627	G2628	M2629	F2630	L2640	S2641	R2642	H2643	K2645	F2471										
L2478	L2487	L2488	E2489	V2490	G2491	F2492	L2493	P2494	D2495	L2496	R2497	S2508	M2512	L2520	L2525	P2526	L2527	L2548	S2560	L2561	T2562	Q2565	R2566	I2569	Q2586	H2587	R2590	R2591	L2592	V2593	P2606	L2610	Y2620	W2627	G2628	M2629	F2630	L2640	S2641	R2642	H2643	K2645	F2471													
F2645	W2646	E2658	Q2659	E2660	L2661	F2662	L2676	S2683	N2684	Y2685	V2686	S2687	M2688	M2689	E2690	K2691	S2697	E2698	G2699	N2700	F2701	N2702	P2703	Q2704	L2408	K2413	I2422	S2425	L2426	L2427	D2431	G2434	V2435	I2436	K2447	D2448	G2449	N2450	A2458	G2459	F2460	D2463	H2464	K2465	F2471											
S2750	S2751	K2752	V2753	Q2754	P2755	L2756	K2757	K2758	P2759	Y2760	L2761	L2762	L2763	S2764	E2765	K2766	E2767	K2768	E2769	I2770	Y2771	W2772	P2773	L2774	L2775	K2776	L2779	M2782	L2783	Q2784	W2785	G2786	W2787	R2788	R2791	E2794	G2795	D2796	S2797	M2798	A2799	L2800	N2801	ARG	THR	ARG	ARG	ILE	SER	Gln	THR	SER	Gln	VAL		
SER	VAL	ASP	ALA	ALA	HIS	G2820	Y2821	S2822	P2823	R2824	A2825	L2826	D2827	M2828	S2829	N2830	Y2831	L2832	L2833	L2837	H2838	A2841	M2844	H2849	K2854	K2857	M2858	E2859	L2860	E2861	S2862	K2863	G2864	G2865	G2866	N2867	H2868	L2871	Y2874	D2875	T2876	L2877	K2882	R2886	E2887	K2888	A2889	P2899	D2891							
L2892	L2893	K2894	R2905	G2906	F2907	K2908	D2909	L2910	P2911	L2912	D2913	T2914	P2915	E2918	K2919	R2920	F2921	Y2922	Y2923	S2924	F2925	L2926	Q2927	Q2928	L2929	L2930	R2931	F2943	D2944	G2945	G2946	S2947	R2948	G2949	K2950	G2951	E2952	H2953	F2954	P2955	Y2956	E2957	Q2958	E2959	L2960	K2961	F2962	K2965	L2968	P2969	D2972	Q2973				
K2976	F2982	A2985	A2986	S2987	R2988	P2989	L2990	P2991	C2991	S2992	G2993	G2994	H2995	N2998	K3001	E3002	M3003	S3006	G3009	K3010	V3013	R3016	H3017	R3018	I3019	R3020	S3021	L3021	F3022	D3025	A3026	I3029	H3034	L3035	L3036	G3037	Q3038	T3039	L3040	D3041	A3042	R3043	T3044	Y3045	M3046	Y3047	K3047	T3048	G3049	E3051						
S3052	V3053	K3054	S3055	R3058	A3059	D3062	N3063	A3064	A3065	E3066	D3067	L3068	E3069	K3070	T3071	M3072	E3073	N3074	L3075	K3076	Q3077	Q3078	Q3079	F3080	T3081	HIS	THR	ARG	ASN	GLN	PRO	K3088	G3089	V3090	T3091	Q3092	I3093	I3094	N3095	Q3096	T3097	T3098	V3099	A3100	L3101	L3102	P3103	M3104	L3105	S3106	S3107	F3109	E3110	H3111	I3112	G3113
Q3114	H3115	F3116	F3117	G3118	E3119	D3120	L3121	L3122	L3123	F3124	D3125	V3126	Q3127	Y3131	R3132	L3133	L3134	T3135	A3139	L3140	G3141	T3142	S3143	K3144	Q3145	L3146	L3147	V3148	E3149	R3150	Q3151	R3152	S3153	A3154	L3155	G3156	E3157	G3158	L3159	F3162	A3163	G3164	A3165	F3166	P3167	F3170	L3171	E3172	T3173	H3174	K3177	L3180	Y3181			

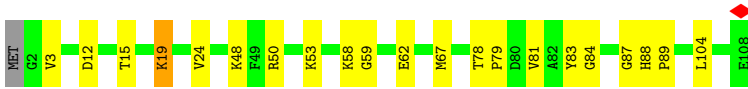
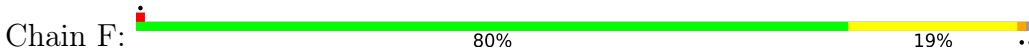




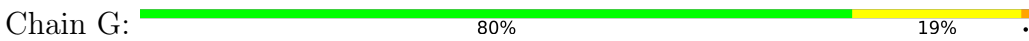
● Molecule 3: Peptidyl-prolyl cis-trans isomerase FKBP1B



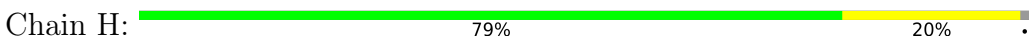
● Molecule 3: Peptidyl-prolyl cis-trans isomerase FKBP1B



● Molecule 3: Peptidyl-prolyl cis-trans isomerase FKBP1B



● Molecule 3: Peptidyl-prolyl cis-trans isomerase FKBP1B



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	49606	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 ( $e^-/\text{\AA}^2$ )	58	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	1200	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.594	Depositor
Minimum map value	-0.010	Depositor
Average map value	0.013	Depositor
Map value standard deviation	0.034	Depositor
Recommended contour level	0.14	Depositor
Map size (Å)	431.36, 431.36, 431.36	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.8425, 0.8425, 0.8425	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, ZN, CA

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	0/1143	0.58	1/1534 (0.1%)
1	J	0.30	0/1143	0.58	1/1534 (0.1%)
1	K	0.30	0/1143	0.58	1/1534 (0.1%)
1	L	0.30	0/1143	0.58	1/1534 (0.1%)
2	A	0.69	7/34594 (0.0%)	0.51	8/46723 (0.0%)
2	B	0.69	7/34594 (0.0%)	0.51	8/46723 (0.0%)
2	C	0.69	7/34594 (0.0%)	0.51	8/46723 (0.0%)
2	D	0.69	7/34594 (0.0%)	0.51	8/46723 (0.0%)
3	E	0.29	0/834	0.54	0/1123
3	F	0.28	0/834	0.53	0/1123
3	G	0.28	0/834	0.54	0/1123
3	H	0.28	0/834	0.54	0/1123
All	All	0.68	28/146284 (0.0%)	0.51	36/197520 (0.0%)

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
2	A	0	2
2	B	0	2
2	C	0	2
2	D	0	2
All	All	0	8

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

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	3205	CYS	CB-SG	105.30	3.61	1.82
2	B	3205	CYS	CB-SG	105.27	3.61	1.82

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	3205	CYS	CB-SG	105.27	3.61	1.82
2	C	3205	CYS	CB-SG	105.21	3.61	1.82
2	B	3131	TYR	CD2-CE2	29.66	1.83	1.39

The worst 5 of 36 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	3205	CYS	CA-CB-SG	12.07	135.73	114.00
2	A	3205	CYS	CA-CB-SG	12.06	135.71	114.00
2	D	3205	CYS	CA-CB-SG	12.05	135.68	114.00
2	B	3205	CYS	CA-CB-SG	12.04	135.68	114.00
2	D	2737	LEU	CA-CB-CG	7.16	131.77	115.30

There are no chirality outliers.

5 of 8 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	A	2801	TYR	Peptide
2	A	4640	PHE	Peptide
2	B	2801	TYR	Peptide
2	B	4640	PHE	Peptide
2	C	2801	TYR	Peptide

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

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	I	1131	0	1058	50	0
1	J	1131	0	1058	45	0
1	K	1131	0	1058	47	0
1	L	1131	0	1058	46	0
2	A	33849	0	33549	793	0
2	B	33849	0	33549	790	0
2	C	33849	0	33549	767	0
2	D	33849	0	33549	795	0
3	E	818	0	821	11	0
3	F	818	0	821	11	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	G	818	0	821	13	0
3	H	818	0	821	11	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
4	I	4	0	0	0	0
4	J	4	0	0	0	0
4	K	4	0	0	0	0
4	L	4	0	0	0	0
5	A	1	0	0	0	0
5	B	1	0	0	0	0
5	C	1	0	0	0	0
5	D	1	0	0	0	0
6	A	62	0	24	1	0
6	B	62	0	24	1	0
6	C	62	0	24	1	0
6	D	62	0	24	1	0
All	All	143464	0	141808	3297	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 3297 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:D:3131:TYR:CD1	2:D:3131:TYR:CE1	1.82	1.68
2:A:3131:TYR:CD1	2:A:3131:TYR:CE1	1.82	1.63
2:C:3131:TYR:CD2	2:C:3131:TYR:CE2	1.83	1.61
2:C:3131:TYR:CE1	2:C:3131:TYR:CD1	1.82	1.61
2:D:3131:TYR:CE2	2:D:3131:TYR:CD2	1.83	1.61

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	141/149 (95%)	139 (99%)	2 (1%)	0	100	100
1	J	141/149 (95%)	139 (99%)	2 (1%)	0	100	100
1	K	141/149 (95%)	139 (99%)	2 (1%)	0	100	100
1	L	141/149 (95%)	139 (99%)	2 (1%)	0	100	100
2	A	4205/4967 (85%)	4081 (97%)	119 (3%)	5 (0%)	51	84
2	B	4205/4967 (85%)	4081 (97%)	119 (3%)	5 (0%)	51	84
2	C	4205/4967 (85%)	4082 (97%)	118 (3%)	5 (0%)	51	84
2	D	4205/4967 (85%)	4080 (97%)	120 (3%)	5 (0%)	51	84
3	E	105/108 (97%)	103 (98%)	2 (2%)	0	100	100
3	F	105/108 (97%)	103 (98%)	2 (2%)	0	100	100
3	G	105/108 (97%)	103 (98%)	2 (2%)	0	100	100
3	H	105/108 (97%)	103 (98%)	2 (2%)	0	100	100
All	All	17804/20896 (85%)	17292 (97%)	492 (3%)	20 (0%)	54	84

5 of 20 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	A	3927	PRO
2	A	4641	PRO
2	B	3927	PRO
2	B	4641	PRO
2	C	3927	PRO

### 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	123/127 (97%)	112 (91%)	11 (9%)	9	39
1	J	123/127 (97%)	112 (91%)	11 (9%)	9	39

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	K	123/127 (97%)	112 (91%)	11 (9%)	9	39
1	L	123/127 (97%)	112 (91%)	11 (9%)	9	39
2	A	3715/4358 (85%)	3678 (99%)	37 (1%)	76	89
2	B	3715/4358 (85%)	3678 (99%)	37 (1%)	76	89
2	C	3715/4358 (85%)	3678 (99%)	37 (1%)	76	89
2	D	3715/4358 (85%)	3678 (99%)	37 (1%)	76	89
3	E	88/89 (99%)	87 (99%)	1 (1%)	73	88
3	F	88/89 (99%)	87 (99%)	1 (1%)	73	88
3	G	88/89 (99%)	87 (99%)	1 (1%)	73	88
3	H	88/89 (99%)	87 (99%)	1 (1%)	73	88
All	All	15704/18296 (86%)	15508 (99%)	196 (1%)	72	87

5 of 196 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	3847	CYS
2	C	2783	LEU
2	B	4748	MET
2	C	1564	MET
2	C	3591	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 76 such sidechains are listed below:

Mol	Chain	Res	Type
2	C	4933	HIS
2	D	3151	GLN
2	D	658	ASN
2	D	2540	HIS
2	D	4933	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 monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 32 ligands modelled in this entry, 24 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
6	ATP	D	5002	-	26,33,33	0.67	0	31,52,52	0.72	1 (3%)
6	ATP	A	5002	-	26,33,33	0.68	0	31,52,52	0.72	1 (3%)
6	ATP	C	5002	-	26,33,33	0.68	0	31,52,52	0.72	1 (3%)
6	ATP	D	5004	-	26,33,33	0.60	0	31,52,52	0.73	2 (6%)
6	ATP	C	5004	-	26,33,33	0.61	0	31,52,52	0.73	2 (6%)
6	ATP	A	5004	-	26,33,33	0.60	0	31,52,52	0.73	2 (6%)
6	ATP	B	5002	-	26,33,33	0.67	0	31,52,52	0.72	1 (3%)
6	ATP	B	5004	-	26,33,33	0.60	0	31,52,52	0.73	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
6	ATP	D	5002	-	-	7/18/38/38	0/3/3/3
6	ATP	A	5002	-	-	7/18/38/38	0/3/3/3
6	ATP	C	5002	-	-	7/18/38/38	0/3/3/3
6	ATP	D	5004	-	-	9/18/38/38	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	ATP	C	5004	-	-	9/18/38/38	0/3/3/3
6	ATP	A	5004	-	-	9/18/38/38	0/3/3/3
6	ATP	B	5002	-	-	7/18/38/38	0/3/3/3
6	ATP	B	5004	-	-	9/18/38/38	0/3/3/3

There are no bond length outliers.

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

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	A	5002	ATP	C5-C6-N6	2.32	123.88	120.35
6	B	5002	ATP	C5-C6-N6	2.31	123.86	120.35
6	C	5002	ATP	C5-C6-N6	2.31	123.86	120.35
6	A	5004	ATP	C5-C6-N6	2.30	123.84	120.35
6	C	5004	ATP	C5-C6-N6	2.29	123.84	120.35

There are no chirality outliers.

5 of 64 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	A	5002	ATP	C5'-O5'-PA-O1A
6	A	5002	ATP	C5'-O5'-PA-O2A
6	A	5004	ATP	PB-O3A-PA-O5'
6	A	5004	ATP	C5'-O5'-PA-O1A
6	A	5004	ATP	C5'-O5'-PA-O2A

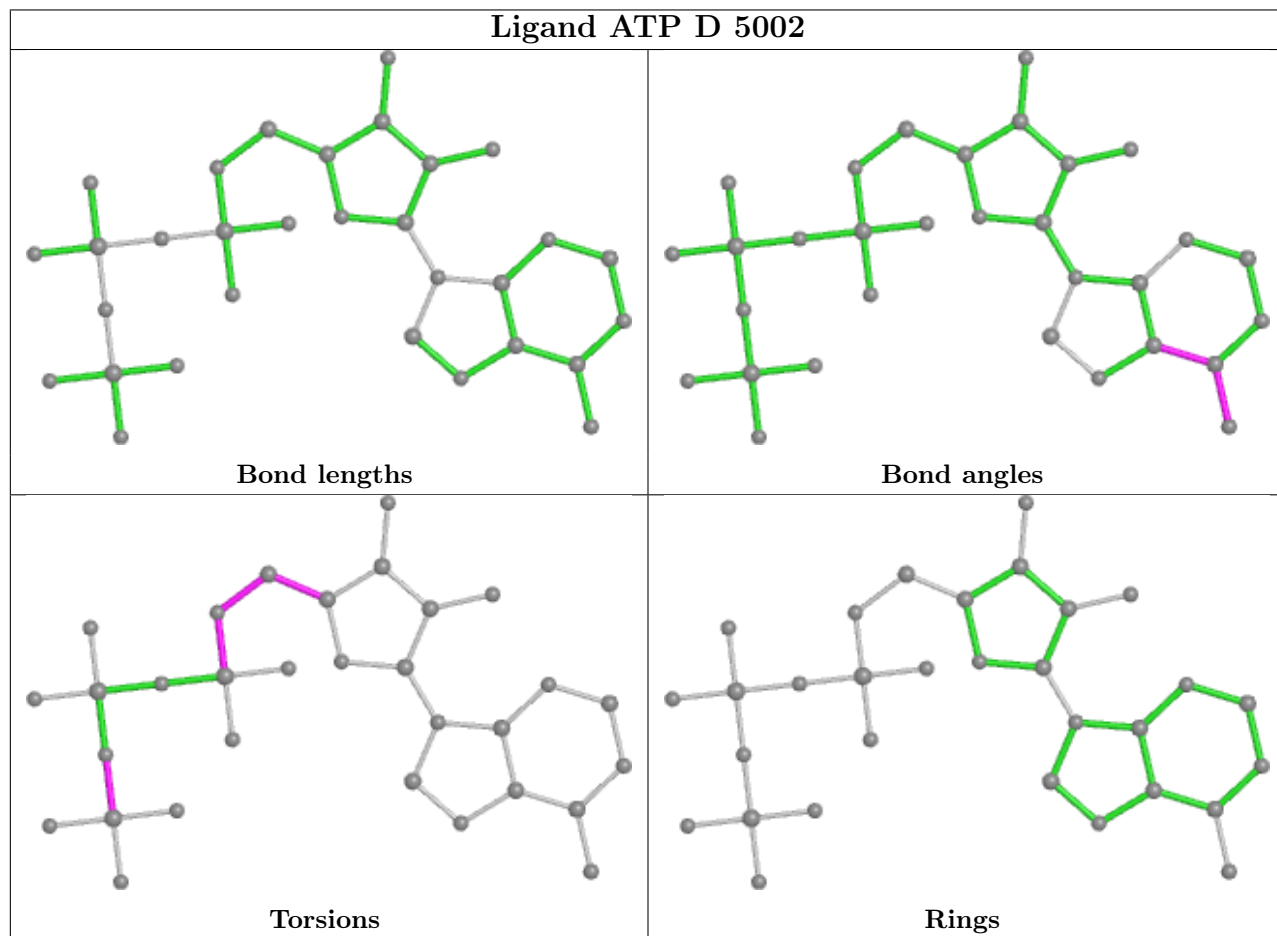
There are no ring outliers.

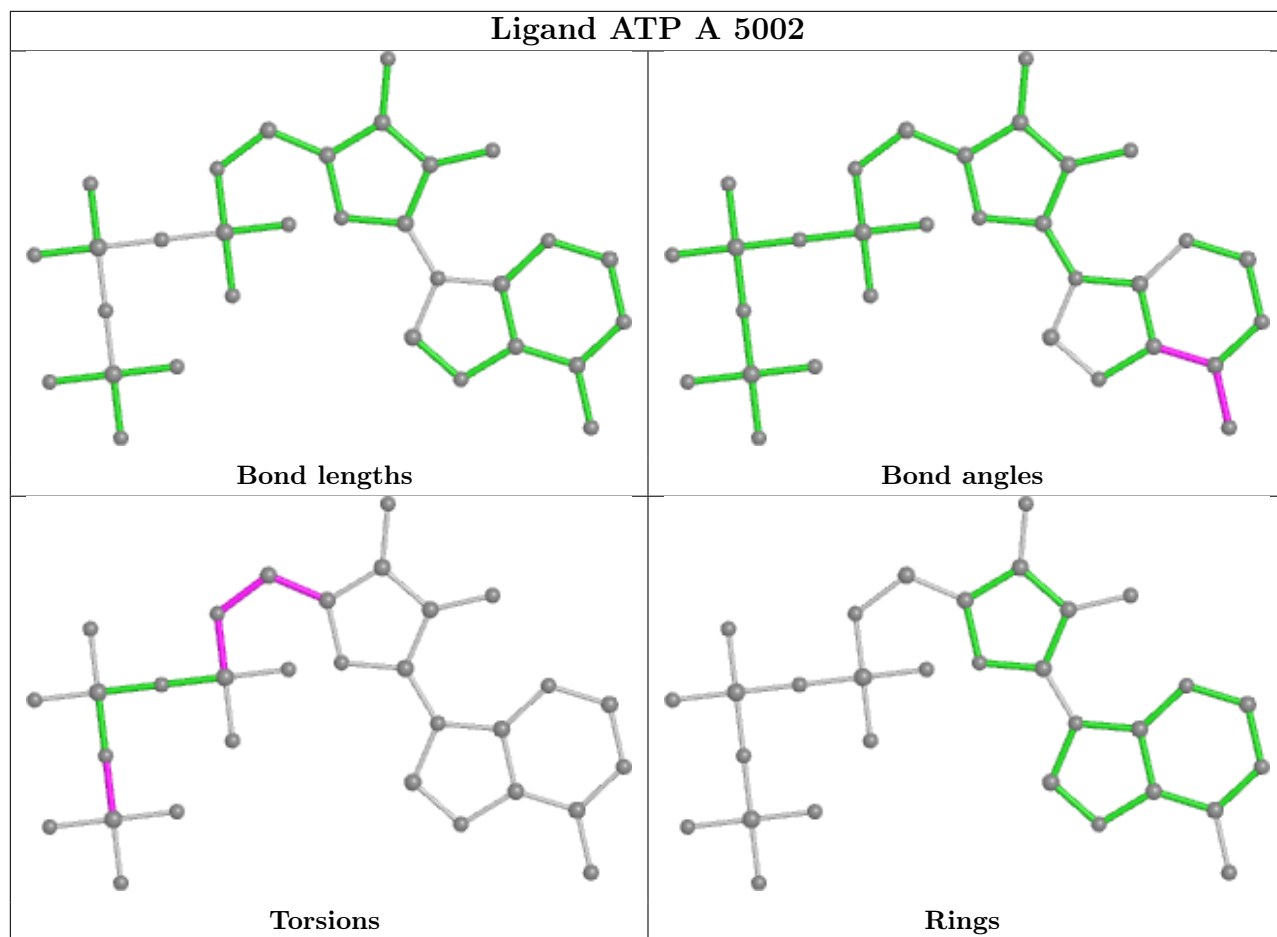
4 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	D	5004	ATP	1	0
6	C	5004	ATP	1	0
6	A	5004	ATP	1	0
6	B	5004	ATP	1	0

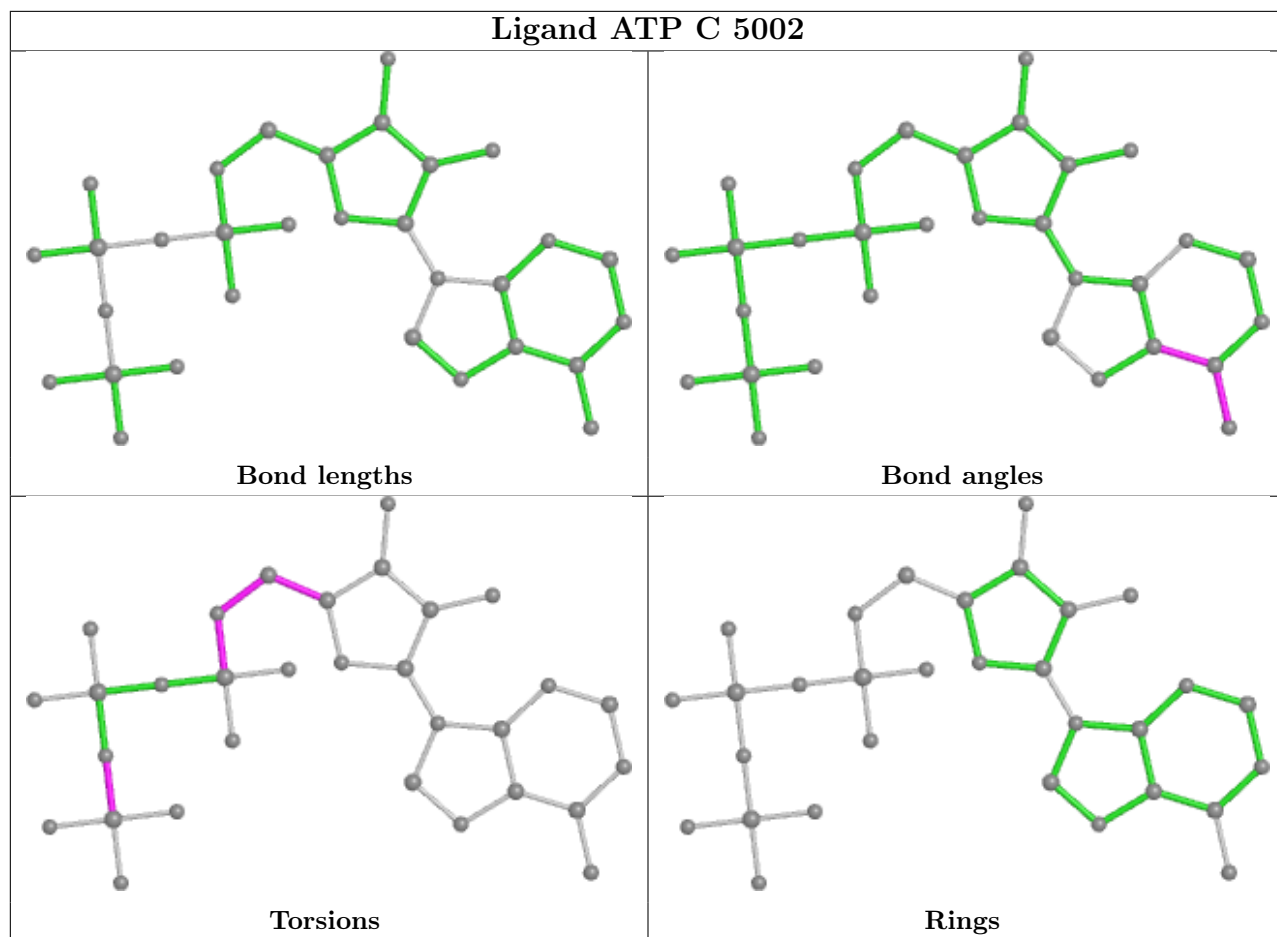
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

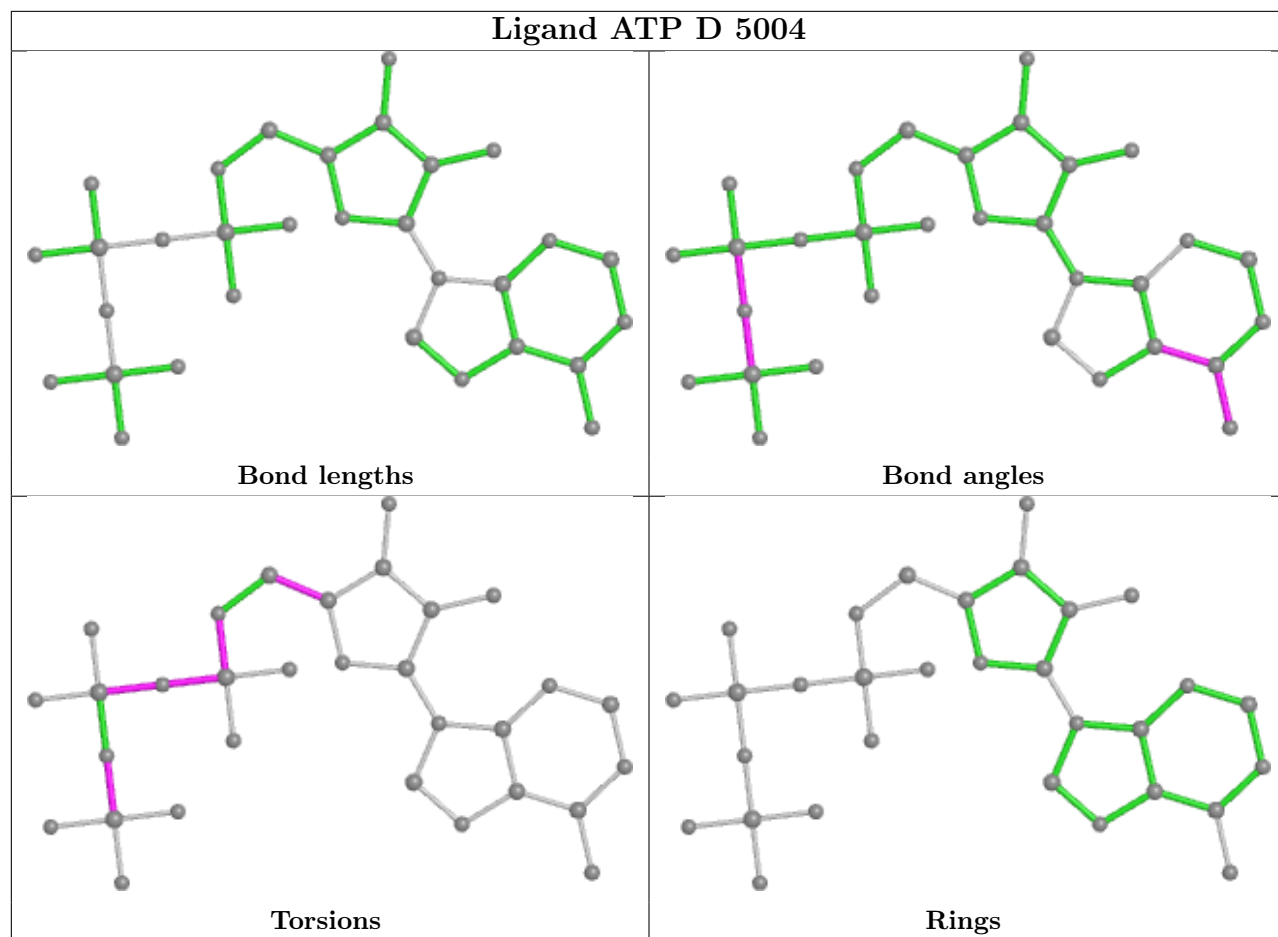
highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified 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.

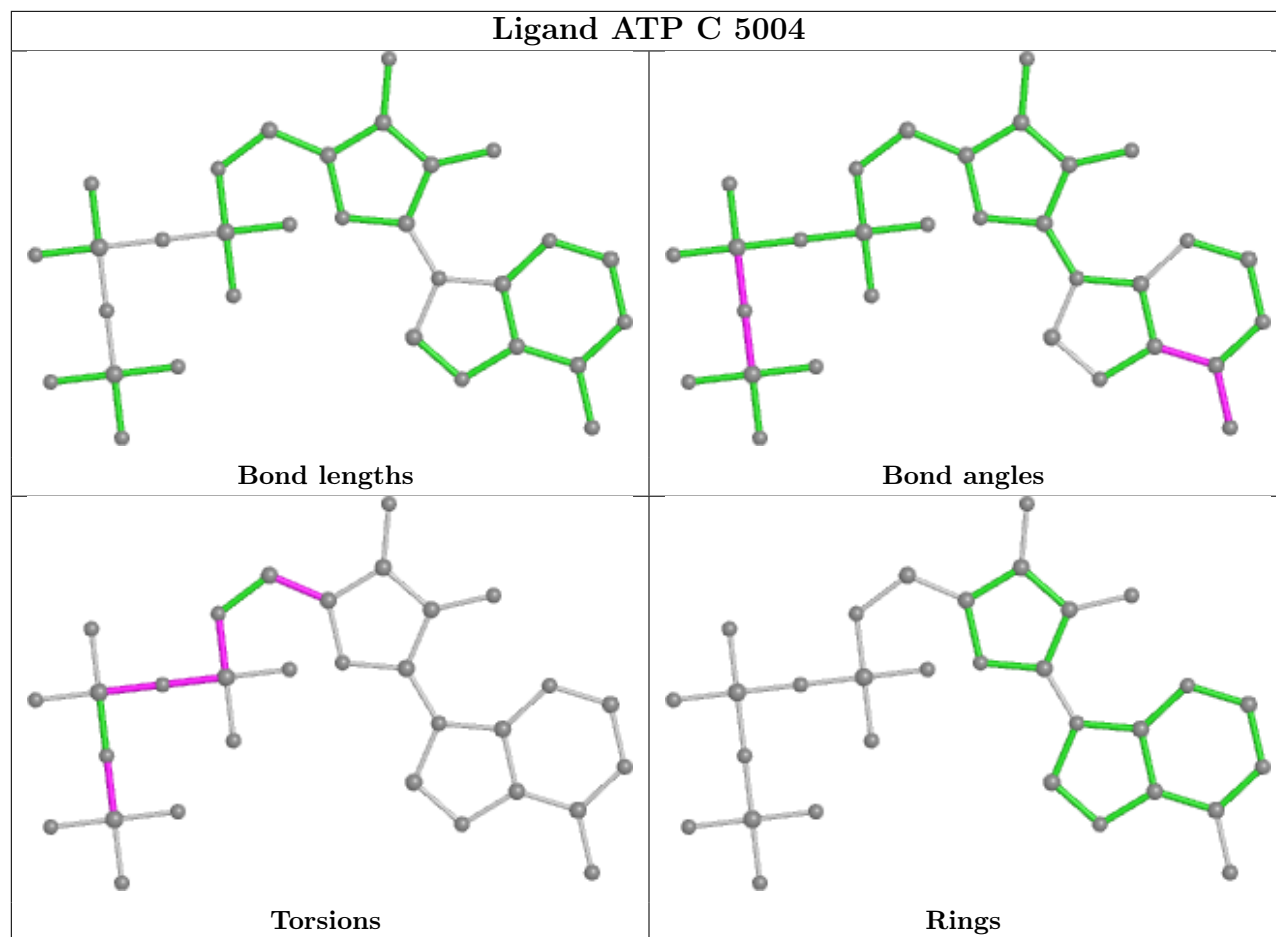


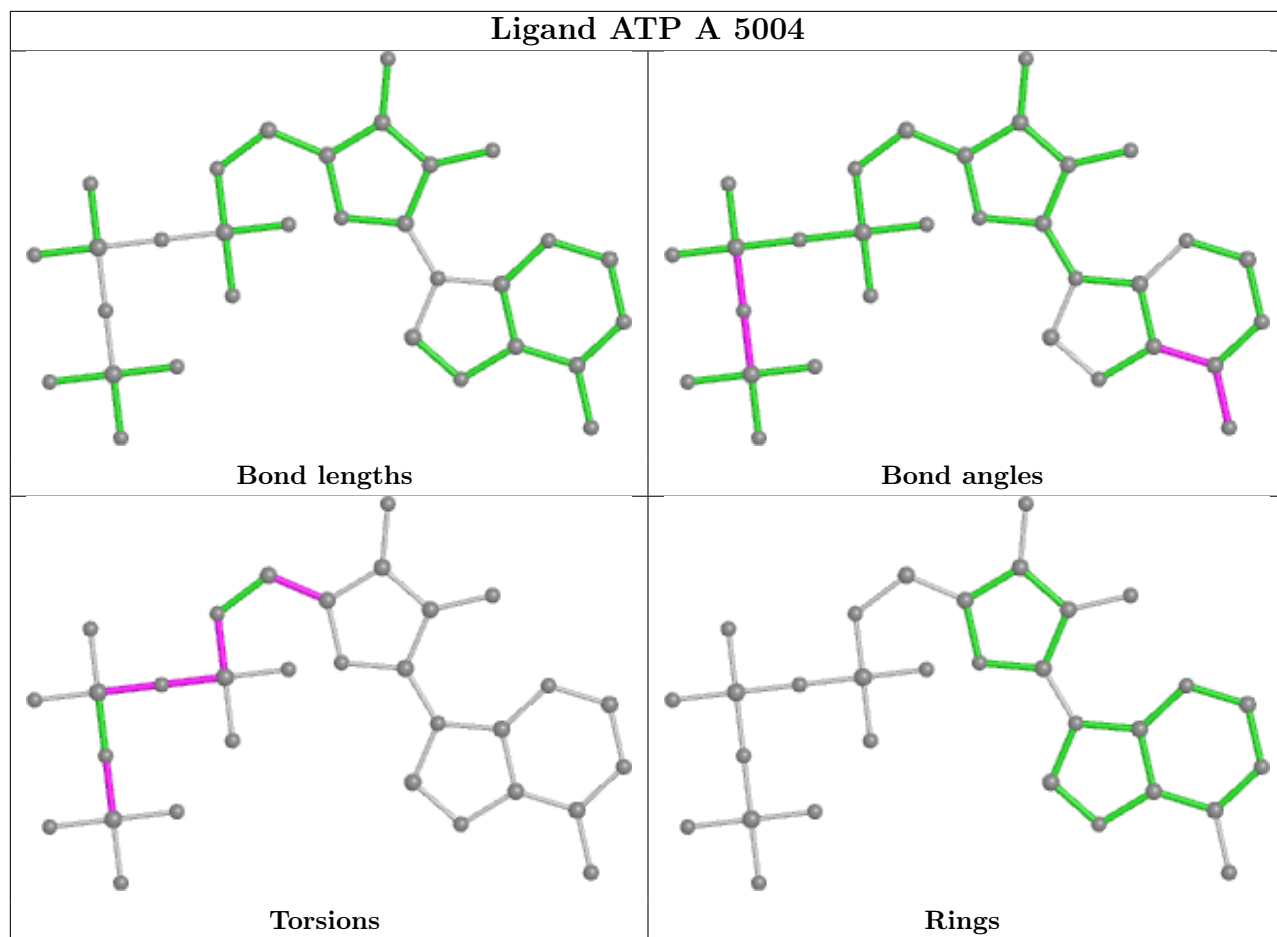


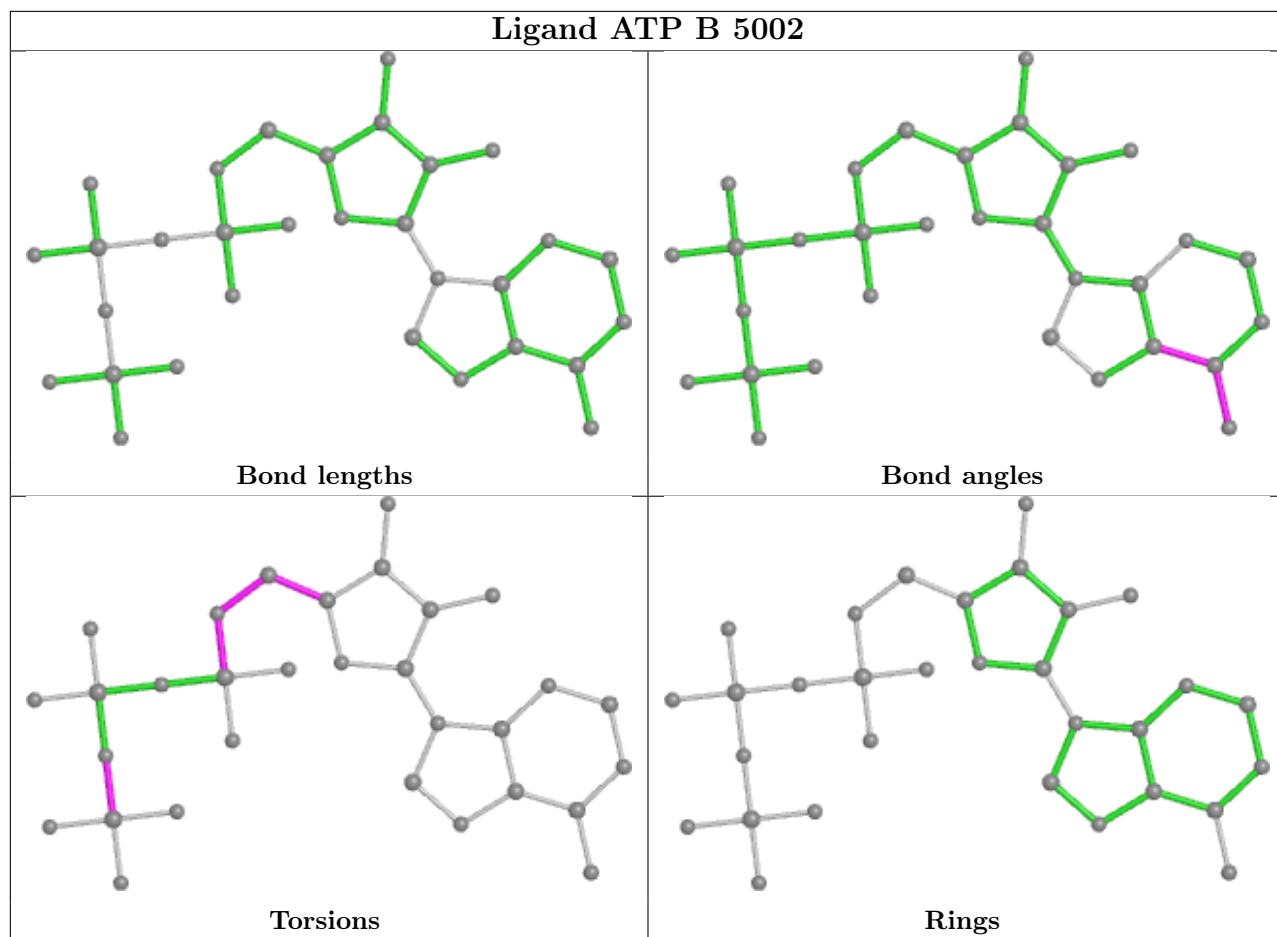


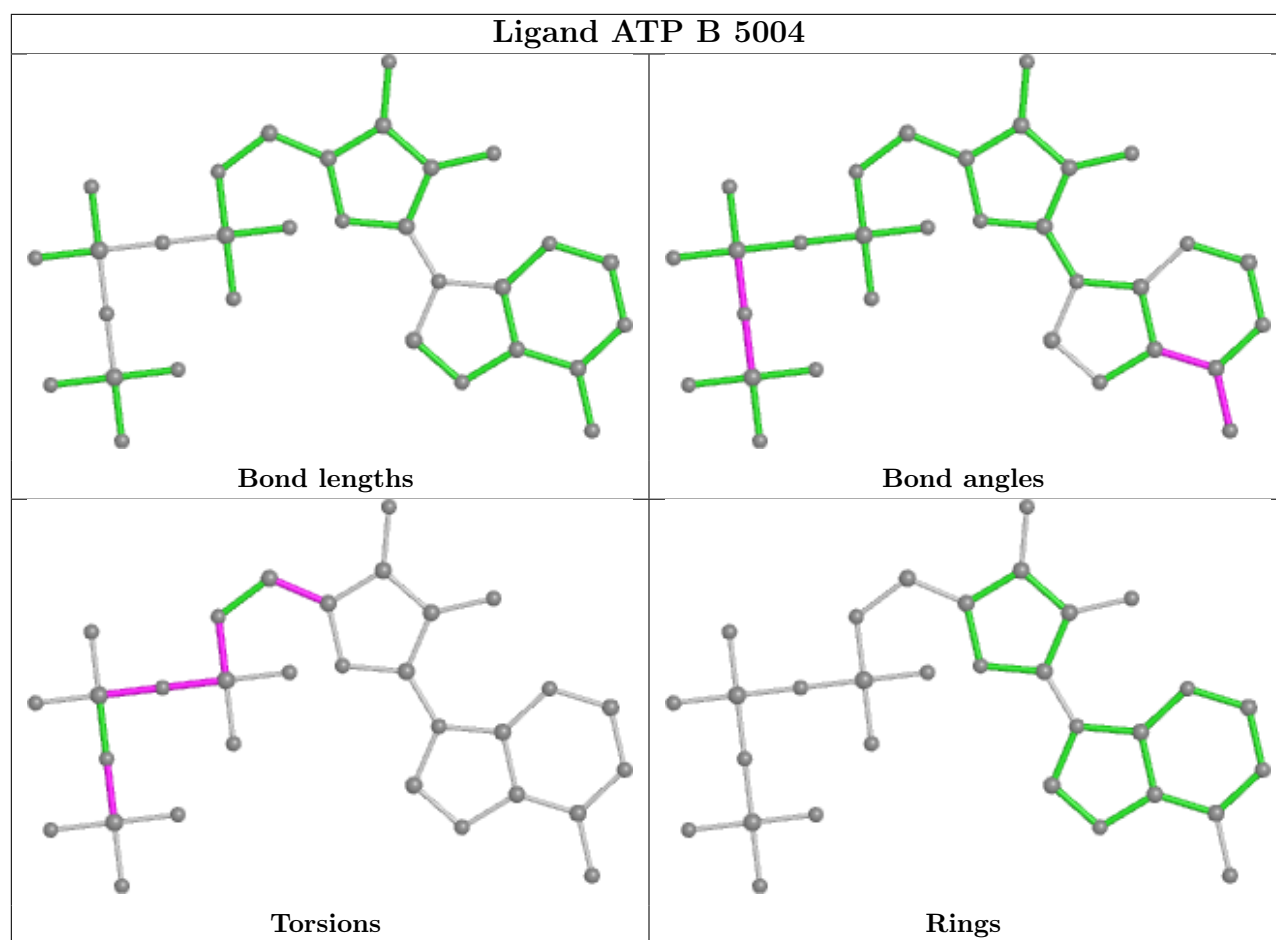












## 5.7 Other polymers [i](#)

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-42769. These allow visual inspection of the internal detail of the map and identification of artifacts.

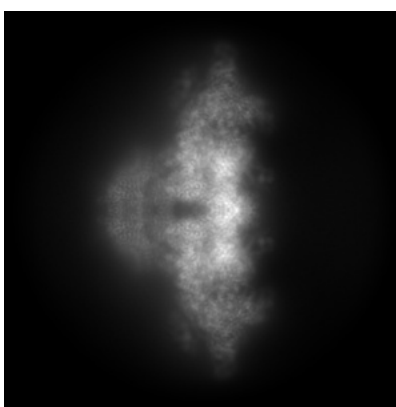
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

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

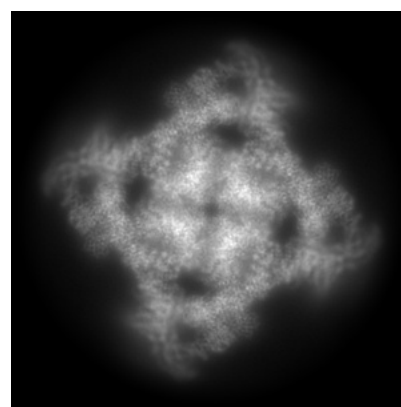
#### 6.1.1 Primary map



X



Y



Z

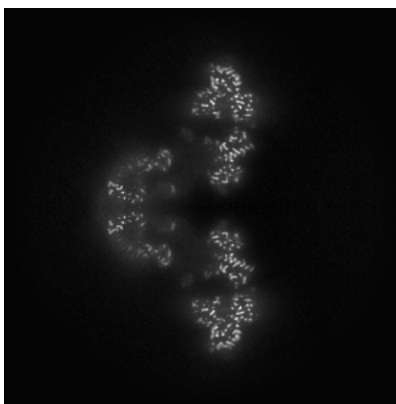
The images above show the map projected in three orthogonal directions.

### 6.2 Central slices [i](#)

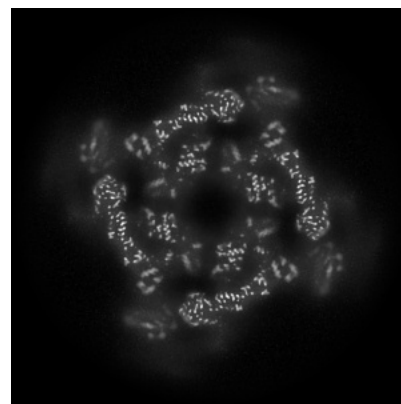
#### 6.2.1 Primary map



X Index: 256



Y Index: 256

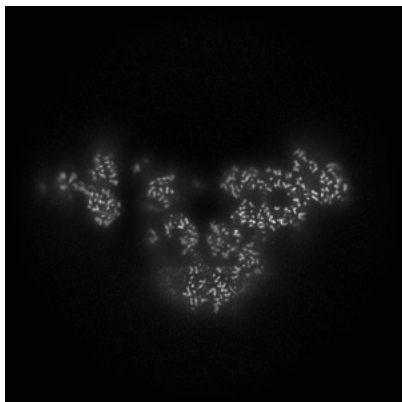


Z Index: 256

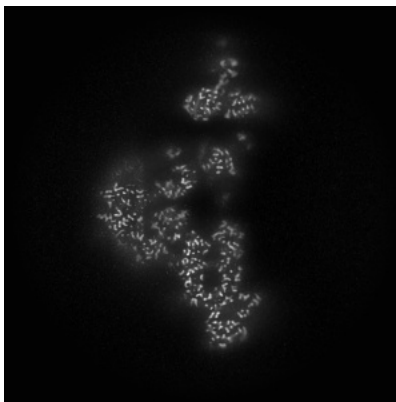
The images above show central slices of the map in three orthogonal directions.

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

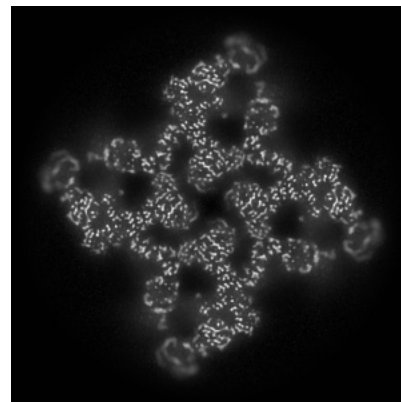
### 6.3.1 Primary map



X Index: 239



Y Index: 239



Z Index: 283

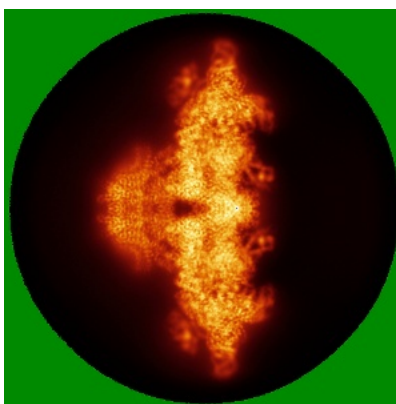
The images above show the largest variance slices of the map in three orthogonal directions.

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

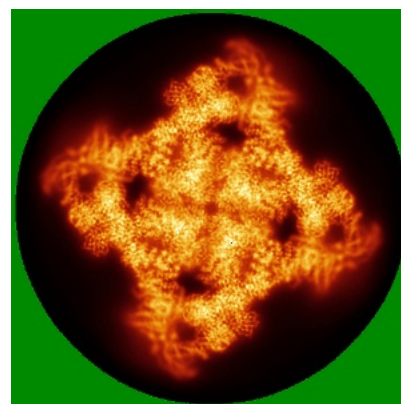
### 6.4.1 Primary map



X



Y



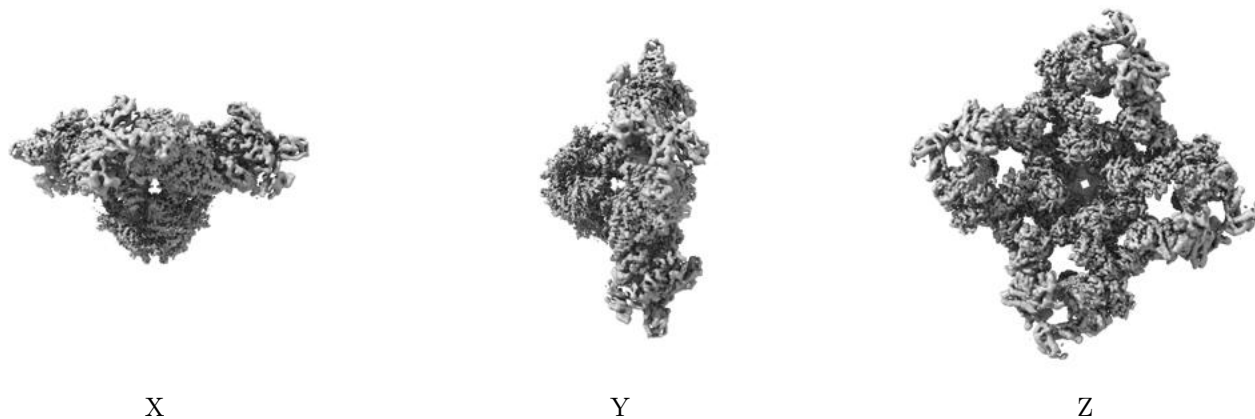
Z

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

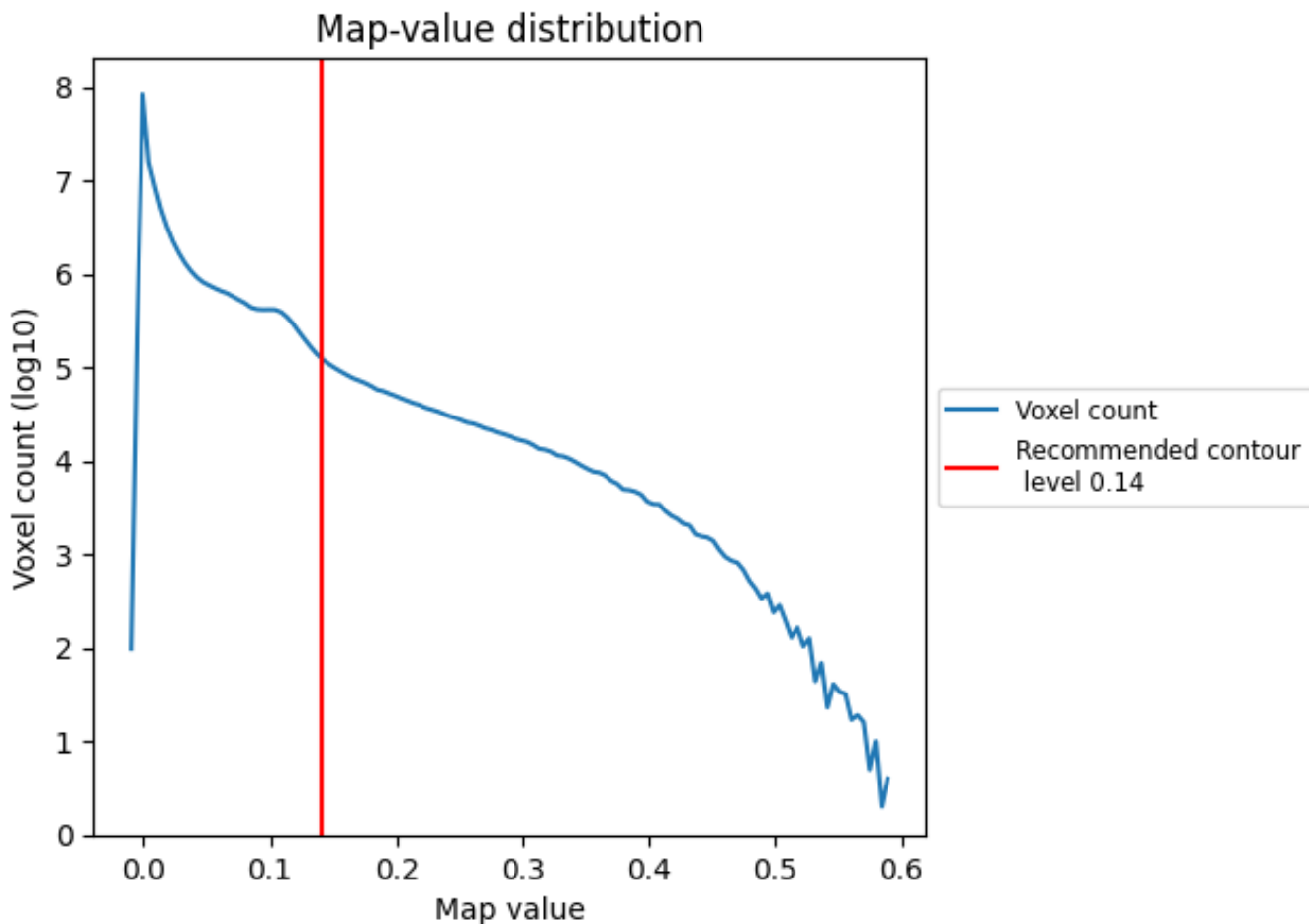
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

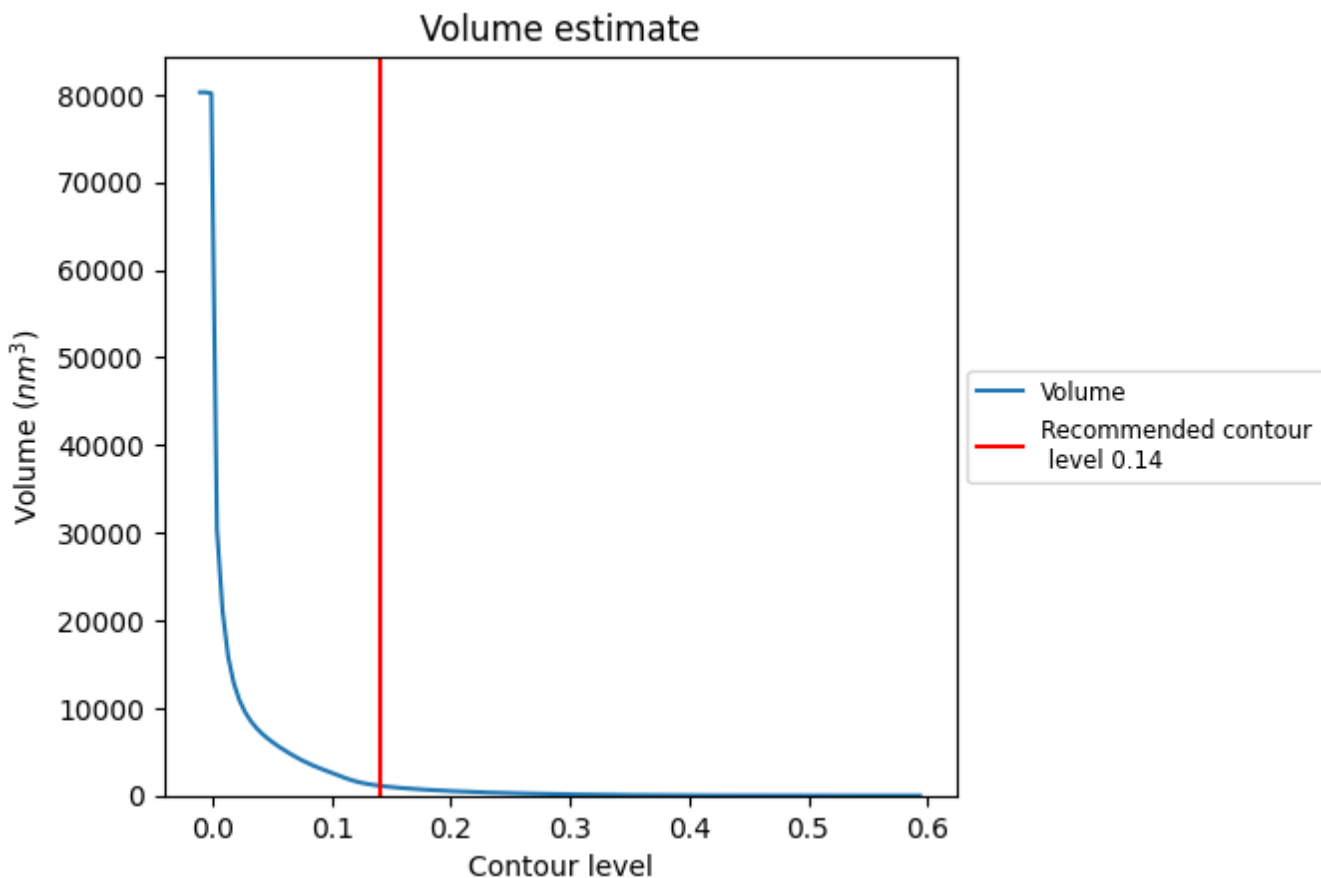
This section contains the results of statistical analysis of the map.

### 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.

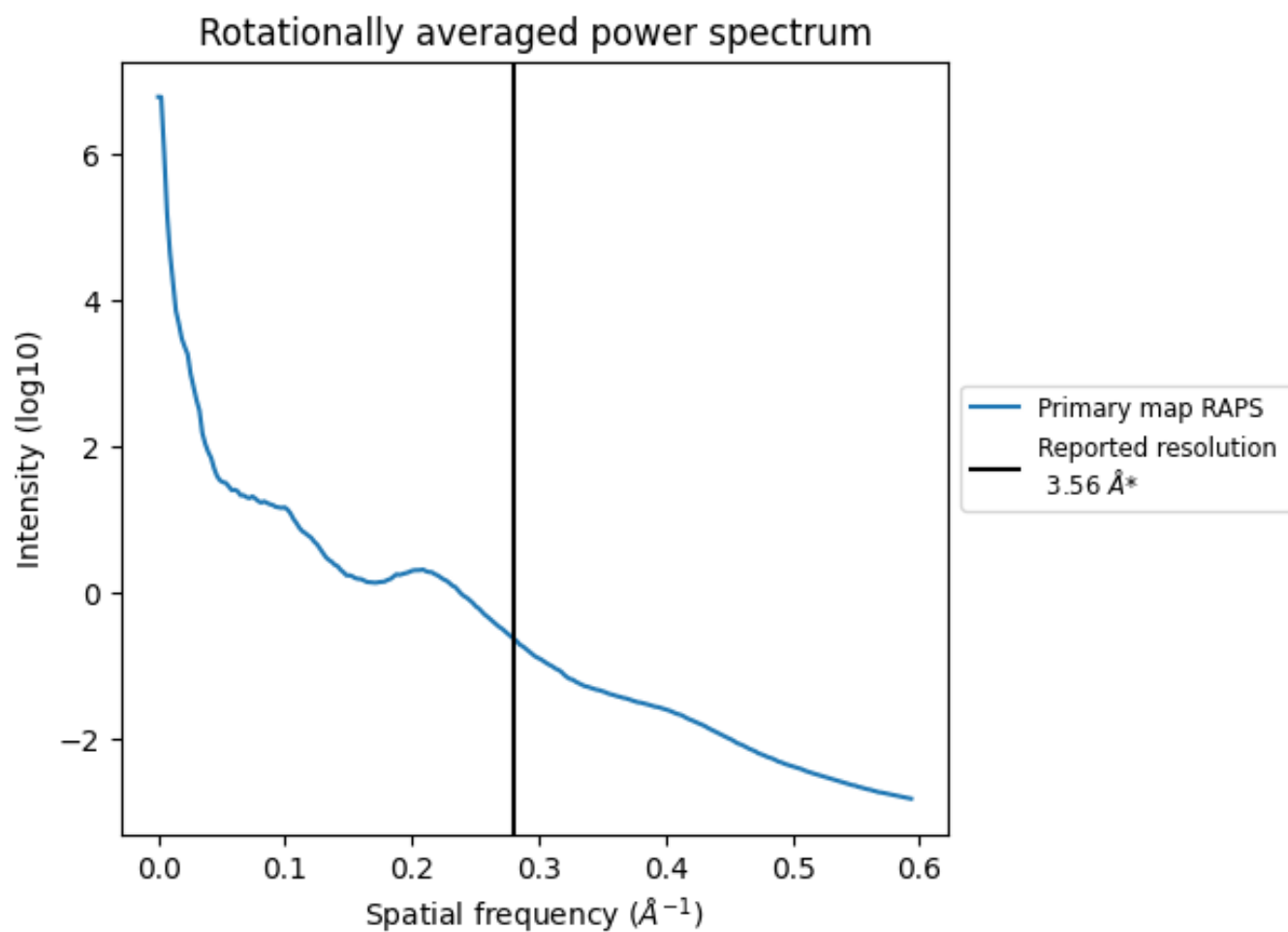
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 1122  $\text{nm}^3$ ; this corresponds to an approximate mass of 1014 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 0.281 Å<sup>-1</sup>

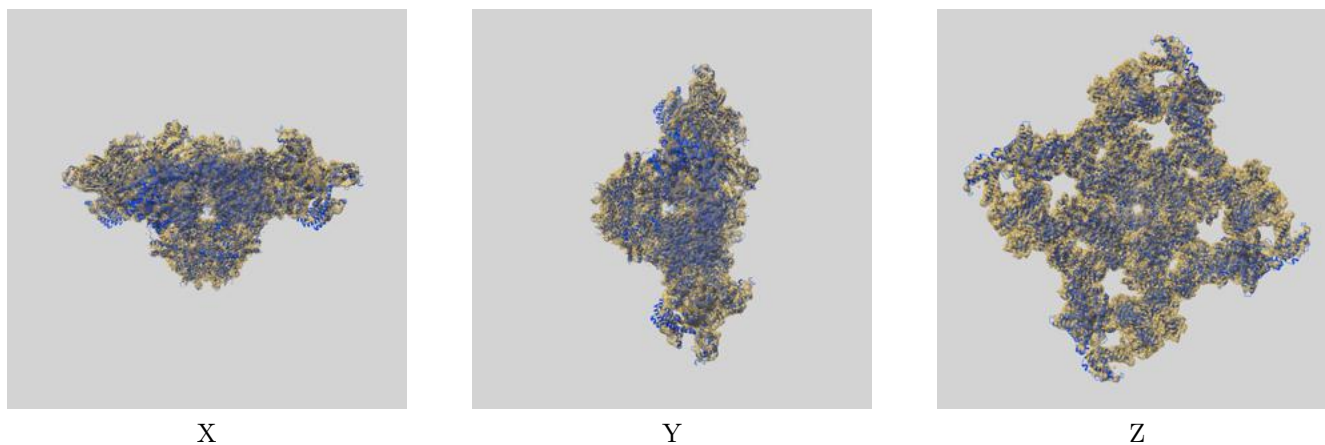
## 8 Fourier-Shell correlation

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

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

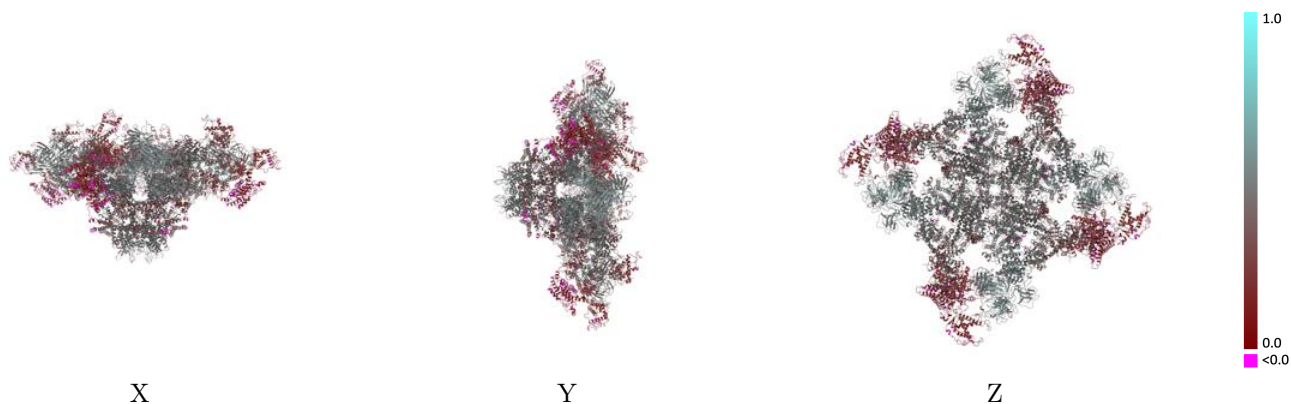
This section contains information regarding the fit between EMDB map EMD-42769 and PDB model 8UXM. Per-residue inclusion information can be found in section [3](#) on page [7](#).

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



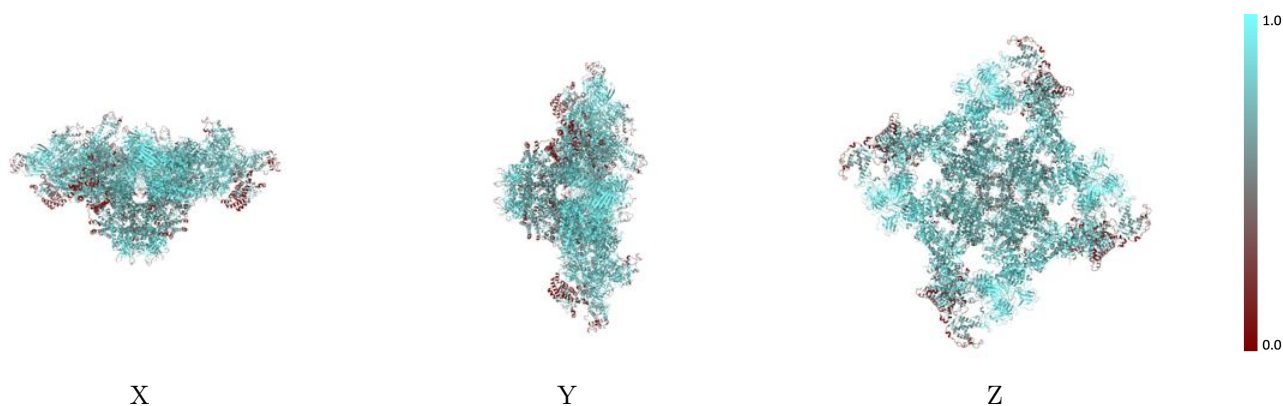
The images above show the 3D surface view of the map at the recommended contour level 0.14 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



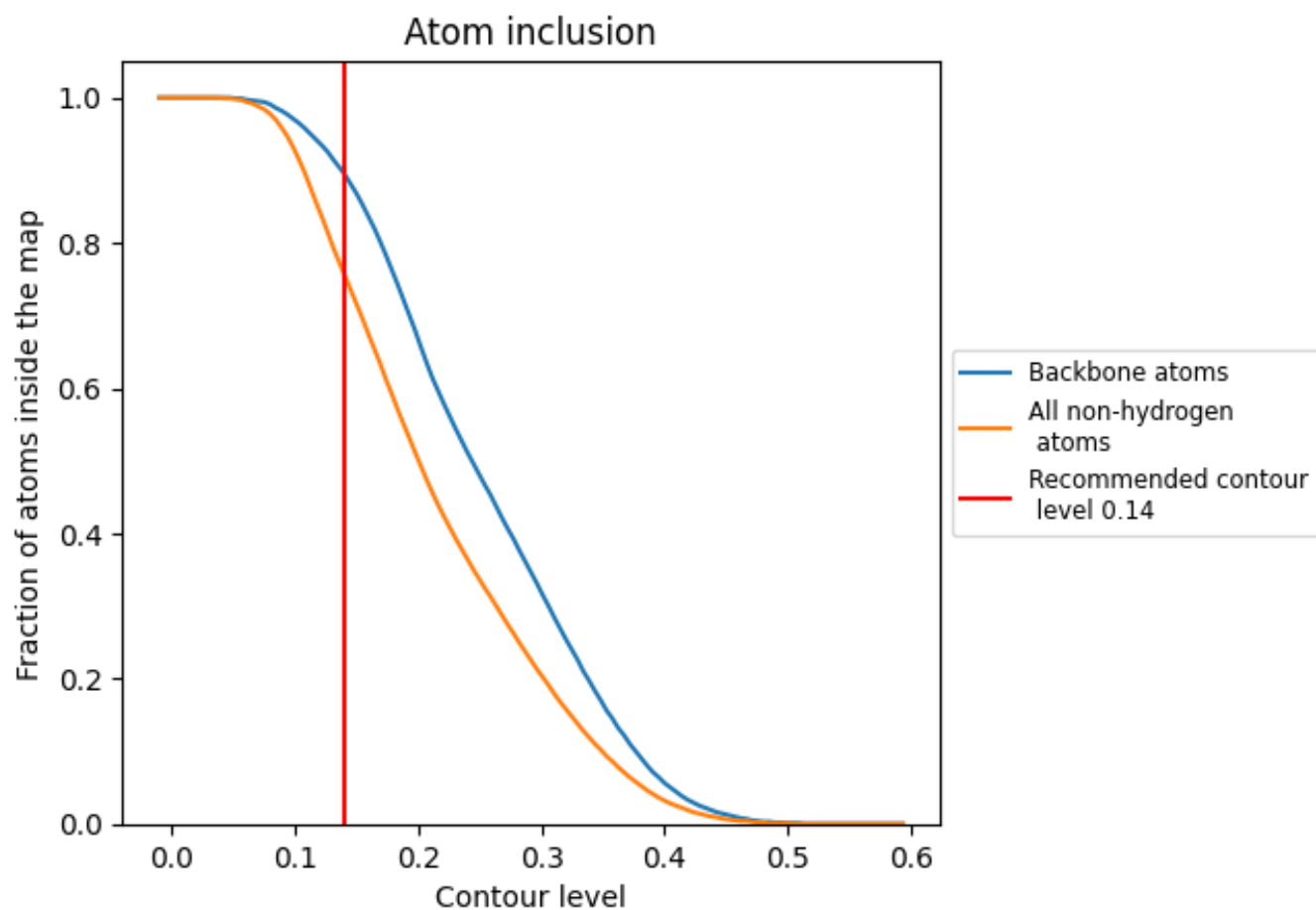
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.14).

## 9.4 Atom inclusion [i](#)





























At the recommended contour level, 90% of all backbone atoms, 76% 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 (0.14) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7560	 0.3810
A	 0.7540	 0.3840
B	 0.7560	 0.3860
C	 0.7520	 0.3800
D	 0.7540	 0.3820
E	 0.8920	 0.5130
F	 0.8910	 0.5110
G	 0.8960	 0.5120
H	 0.8970	 0.5110
I	 0.7240	 0.2220
J	 0.7320	 0.2220
K	 0.7240	 0.2220
L	 0.7310	 0.2190

