



## wwPDB EM Validation Summary Report ⓘ

Mar 19, 2024 – 02:19 PM JST

PDB ID : 5GKZ  
EMDB ID : EMD-9519  
Title : Structure of RyR1 in a closed state (C3 conformer)  
Authors : Bai, X.C.; Yan, Z.; Wu, J.P.; Yan, N.  
Deposited on : 2016-07-07  
Resolution : 4.00 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](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  
MolProbity : 4.02b-467  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36

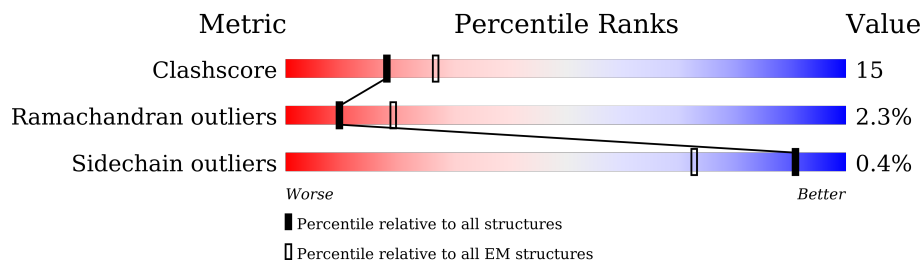
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 4.00 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	A	5037	
1	C	5037	
1	E	5037	
1	G	5037	
2	B	108	
2	D	108	
2	F	108	
2	H	108	

## 2 Entry composition i

There are 3 unique types of molecules in this entry. The entry contains 111000 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a protein called Ryanodine receptor 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	3660	26917	17107	4682	4971	157	0	0
1	C	3660	26917	17107	4682	4971	157	0	0
1	E	3660	26917	17107	4682	4971	157	0	0
1	G	3660	26917	17107	4682	4971	157	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	107	832	527	146	155	4	0	0
2	D	107	832	527	146	155	4	0	0
2	F	107	832	527	146	155	4	0	0
2	H	107	832	527	146	155	4	0	0

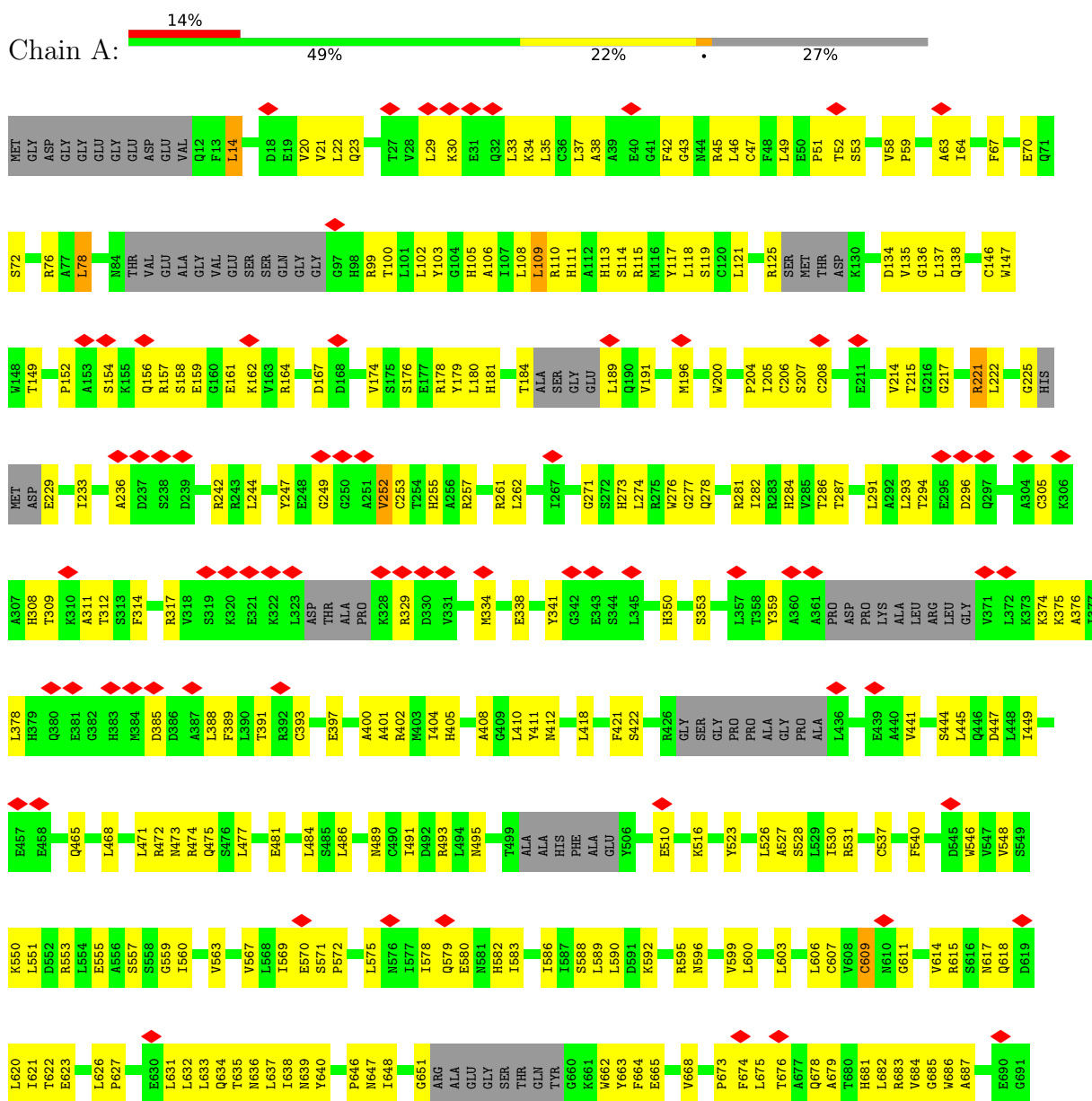
- Molecule 3 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
3	A	1	Total	Zn	0
			1	1	
3	C	1	Total	Zn	0
			1	1	
3	E	1	Total	Zn	0
			1	1	
3	G	1	Total	Zn	0
			1	1	

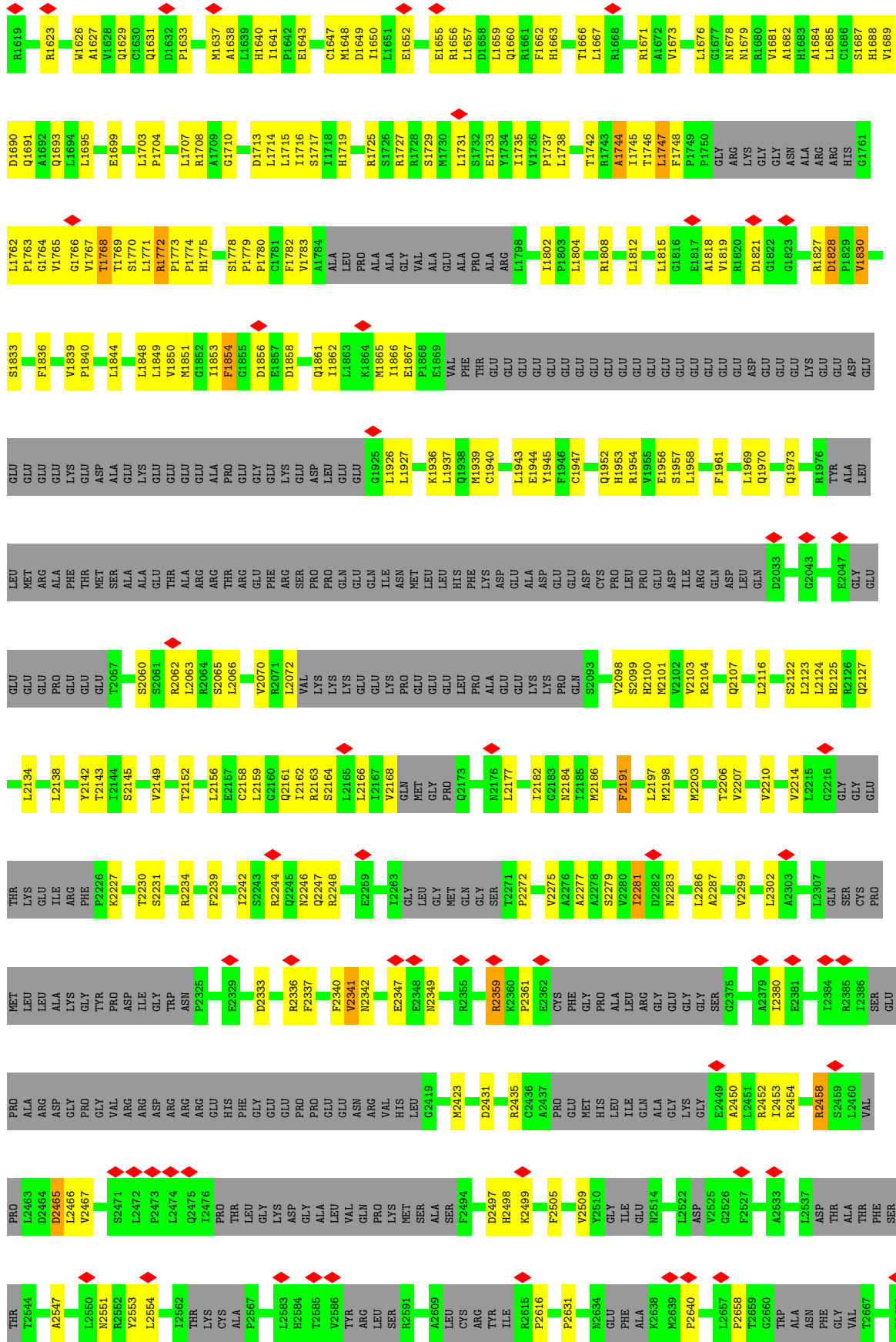
### 3 Residue-property plots

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

- Molecule 1: Ryanodine receptor 1



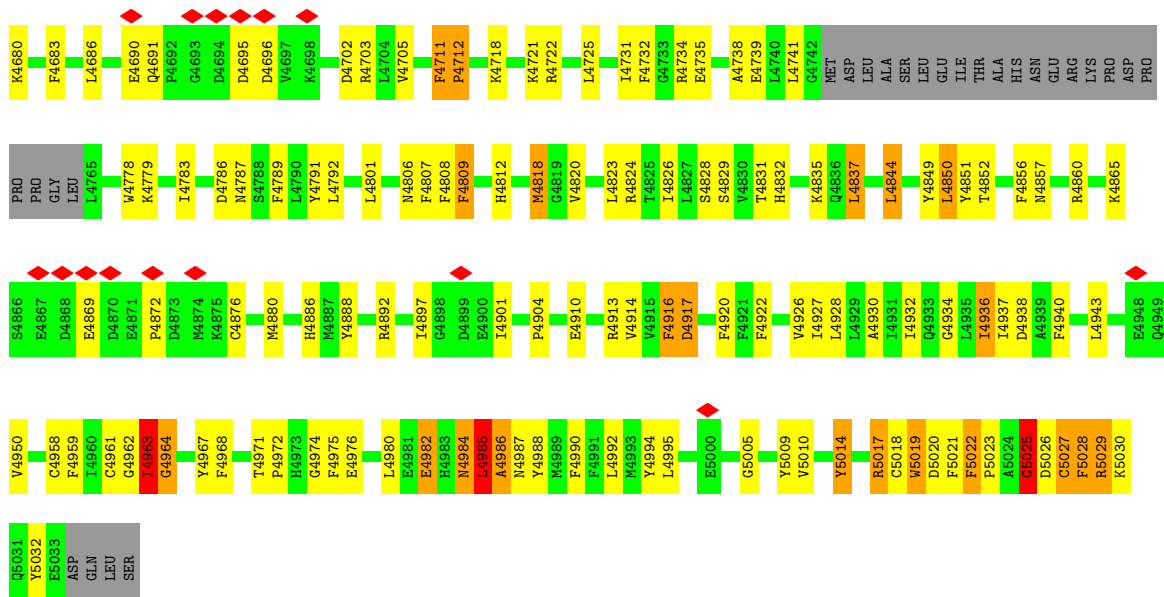




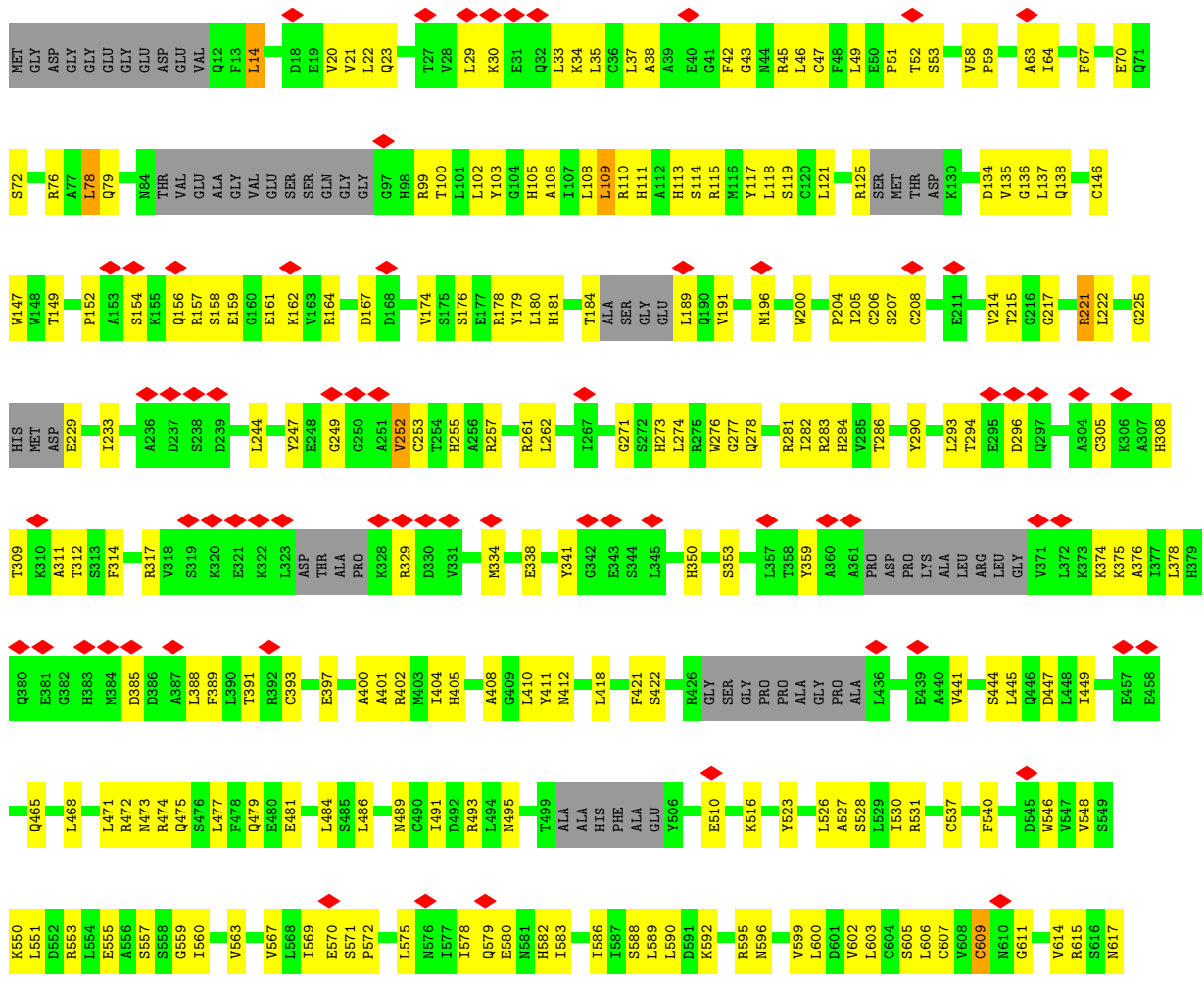


PHE	D3878	F3862	M4037	M4190	F4217	ALA	GLY	GLY	GLY	LYS
ARG	L3805	M3963	G4038	E4121	V4222	ALA	SER	GLU	PRO	LYS
MET	M3806	S3964	M4039	I4122	W4225	GLY	PRO	GLU	ILE	GLU
THR	G3807	L3965	I4123	I4123	G4225	ALA	ILE	GLY	GLU	GLU
PRO	Y3725	T3966	A4041	E4127	G4226	THR	ALA	ASP	ALA	ALA
LEU	A3726	F3885	R4042	R4131	F4227	ALA	LEU	ALA	LEU	GLY
TVR	D3727	R3886	D4046	P4131	A4228	ARG	LEU	ALA	ARG	ARG
ASN	I3728	F3887	M4047	PHE	M4231	LEU	ALA	GLY	LEU	LYS
LEU	M3729	L3888	L4048	GLU	F4234	ALA	ALA	ASP	TRP	GLY
F3645	A3730	Q3889	V4049	GLU	V4235	ALA	ALA	ASP	GLY	GLY
T3646	K3731	L3890	E4051	ALA	E4239	ALA	ALA	VAL	GLY	GLY
H3647	S3732	L3891	S4051	P4135	F4243	ARG	ALA	GLY	GLY	GLY
E3655	C3733	C3892	S4052	R4139	E4244	LEU	LEU	HIS	GLY	GLY
S3656	HIS	H3895	S4053	I4143	M4245	LEU	ALA	GLY	GLY	GLY
Y3657	LEU	F3899	M4054	V4143	R4246	LEU	ALA	ALA	GLY	GLY
K3658	GLU	L3902	E4056	L4146	I4247	LEU	ALA	VAL	GLY	GLY
I3662	GLY	L3903	M4057	R4156	I4251	LEU	ALA	VAL	GLY	GLY
L3663	GLU	R3904	L4058	H4159	SER	LEU	LEU	ARG	ARG	ARG
T3664	ASN	N3909	L4059	R4189	GLU	LEU	LEU	THR	ARG	ARG
H3667	GLY	M3836	M4064	M4162	PRO	LEU	LEU	ALA	ALA	ALA
S3668	ALA	G3837	PHE	F4163	SER	LEU	LEU	VAL	VAL	VAL
I3674	GLU	T3838	LEU	L4164	GLU	LEU	LEU	THR	THR	THR
D3675	GLU	C3839	LYS	E4165	PRO	ARG	ALA	VAL	VAL	VAL
L3677	GLU	L3940	LEU	L4166	GLY	VAL	GLY	VAL	VAL	VAL
S3678	VAL	V3921	LYS	E4167	GLY	VAL	GLY	VAL	VAL	VAL
K3679	E3750	L3922	ASP	A4167	PRO	ARG	ALA	LEU	LEU	LEU
A3680	V3751	R3925	L4071	Y4173	GLY	LEU	ALA	LEU	LEU	LEU
GLY	S3752	L3926	A4076	F4174	ALA	LEU	ALA	ALA	ALA	ALA
GLN	F3753	L3927	F4077	R4175	ASP	ARG	ALA	GLY	GLY	GLY
GLU	E3754	Q3927	D4078	F4176	GLU	ARG	ALA	GLY	GLY	GLY
GLU	S3755	S3928	D4079	Y4177	ASP	THR	ALA	GLY	GLY	GLY
GLU	Q3767	M3951	P4084	L4178	GLY	ARG	ALA	GLY	GLY	GLY
GLU	R3768	L3951	R4085	R4180	NET	GLU	ALA	GLY	GLY	GLY
GLU	R3769	F3933	G4086	I4181	GLY	ALA	ALA	GLY	GLY	GLY
GLU	L3770	M3935	L4087	E4182	GLU	THR	ALA	THR	THR	THR
GLU	H3771	M3936	L4088	M4183	ALA	ALA	ALA	VAL	VAL	VAL
VAL	T3772	Y3936	I4088	G4185	ALA	ALA	ALA	VAL	VAL	VAL
GLU	R3773	Y3937	S4089	A4186	ALA	ALA	ALA	HIS	HIS	HIS
GLU	G3774	ASN	R4090	A4187	ALA	ALA	ALA	GLY	GLY	GLY
LYS	A3775	ASP	K4090	S4187	GLY	ALA	ALA	LEU	LEU	LEU
K3694	M3778	THR	L4100	I4190	ALA	LEU	LEU	LEU	LEU	LEU
L3698	V3779	ILE	LYS	E4191	ALA	LEU	LEU	TRP	TRP	TRP
L3701	Q3781	ARG	Q4102	R4192	GLY	TRP	ALA	ALA	ALA	ALA
S3706	C3786	GLN	G4105	F4195	ALA	VAL	VAL	VAL	VAL	VAL
L3710	M3793	ASN	L4108	W4205	ALA	ALA	ALA	ALA	ALA	ALA
T3711	L3780	ASN	L4112	A4206	ALA	ALA	ALA	ALA	ALA	ALA
E3712	V3794	LYS	S4113	M4207	GLY	GLY	GLY	GLY	GLY	GLY
K3713	T3797	VAL	E4114	P4208	ALA	ALA	ALA	ALA	ALA	ALA
S3714	L3798	ALA	S4115	K4214	ALA	ALA	ALA	ALA	ALA	ALA
K3715	K3799	ALA	E4116	R4215	GLY	GLY	GLY	GLY	GLY	GLY
L3716	D3877	ALA	D4118	Q4216	THR	GLY	GLY	GLY	GLY	GLY

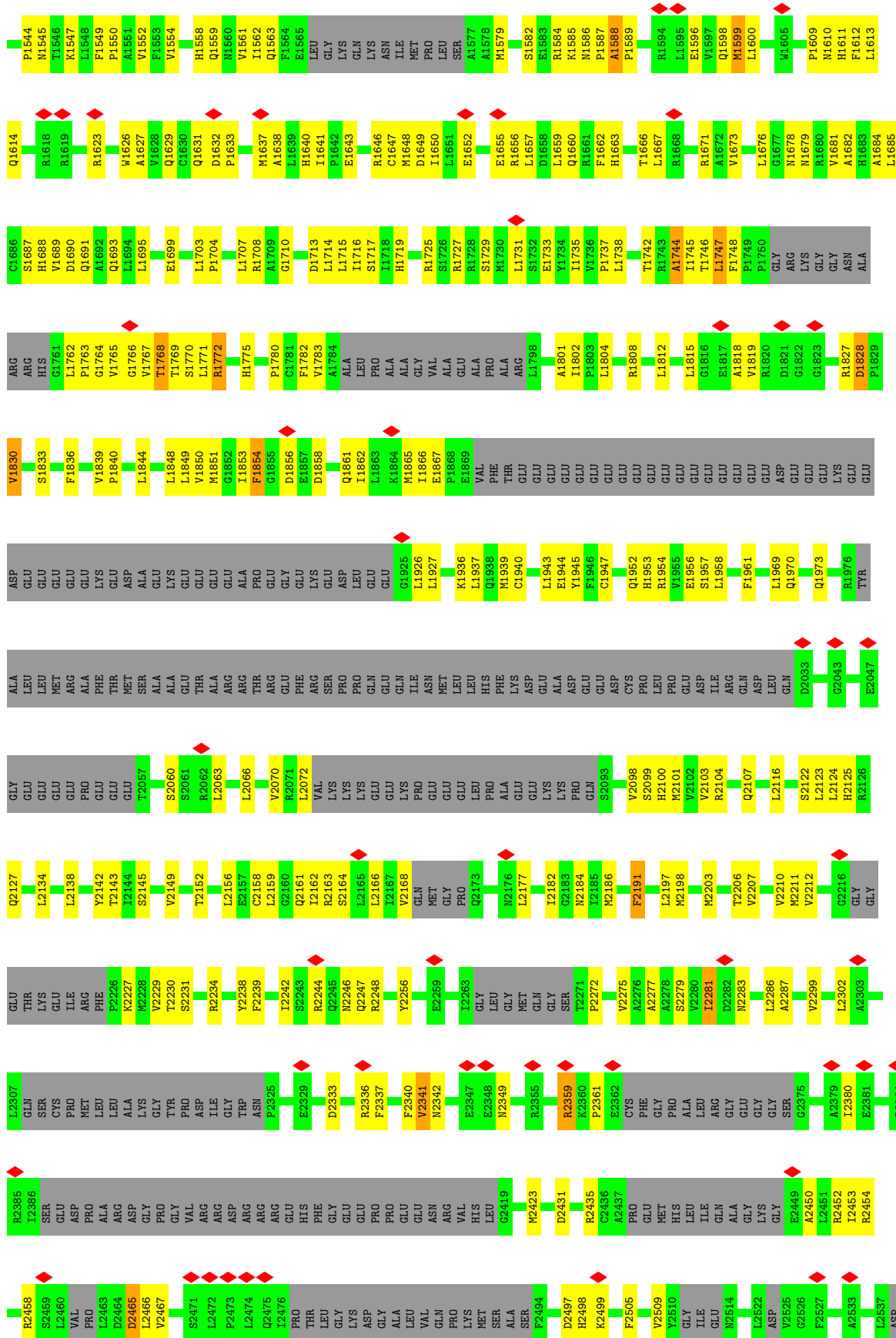




• Molecule 1: Ryanodine receptor 1

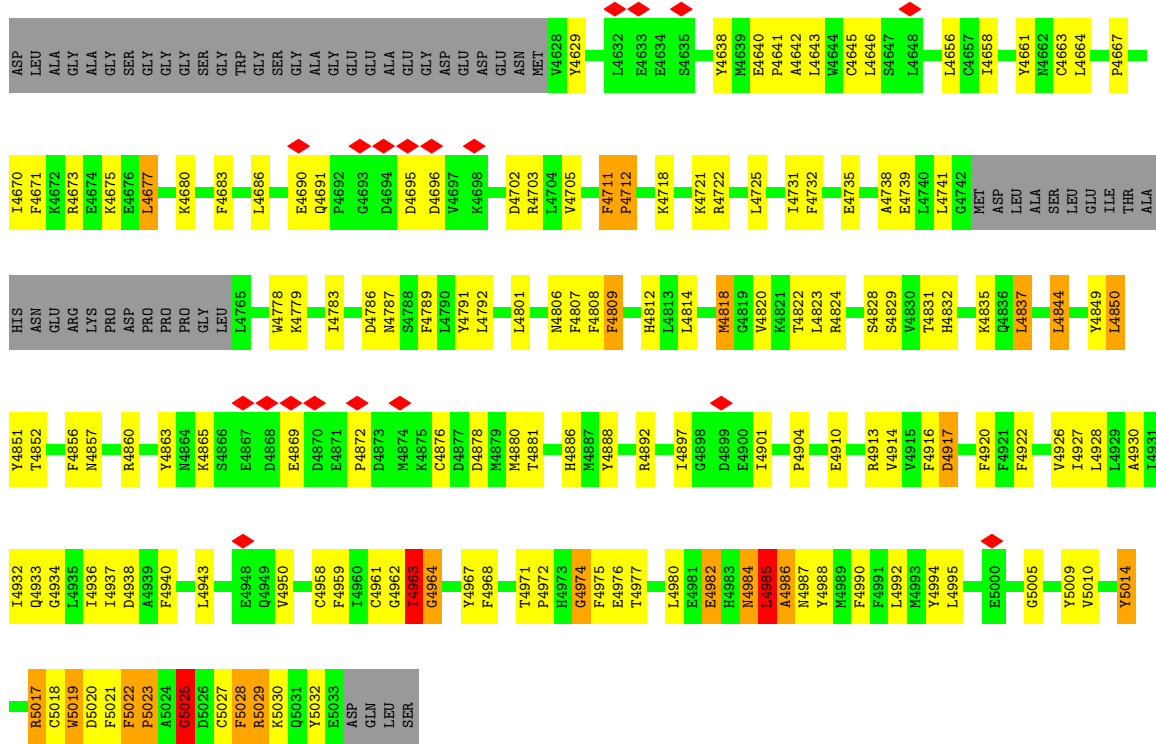




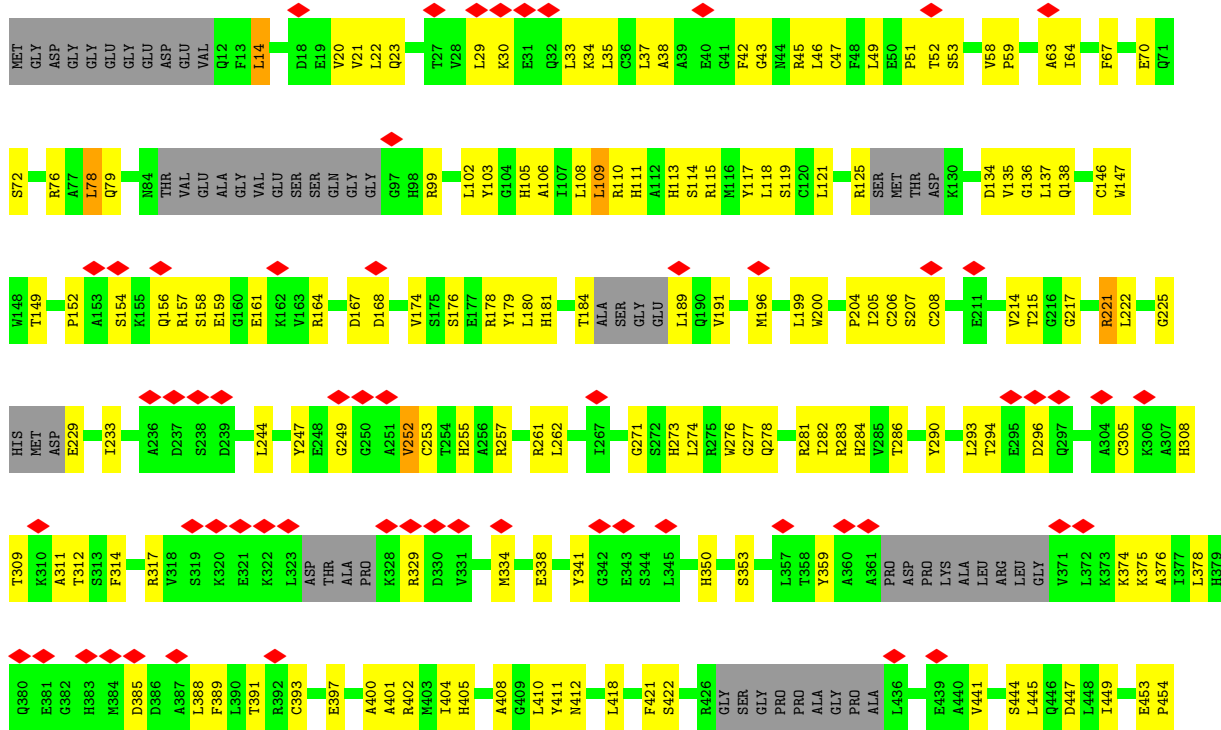


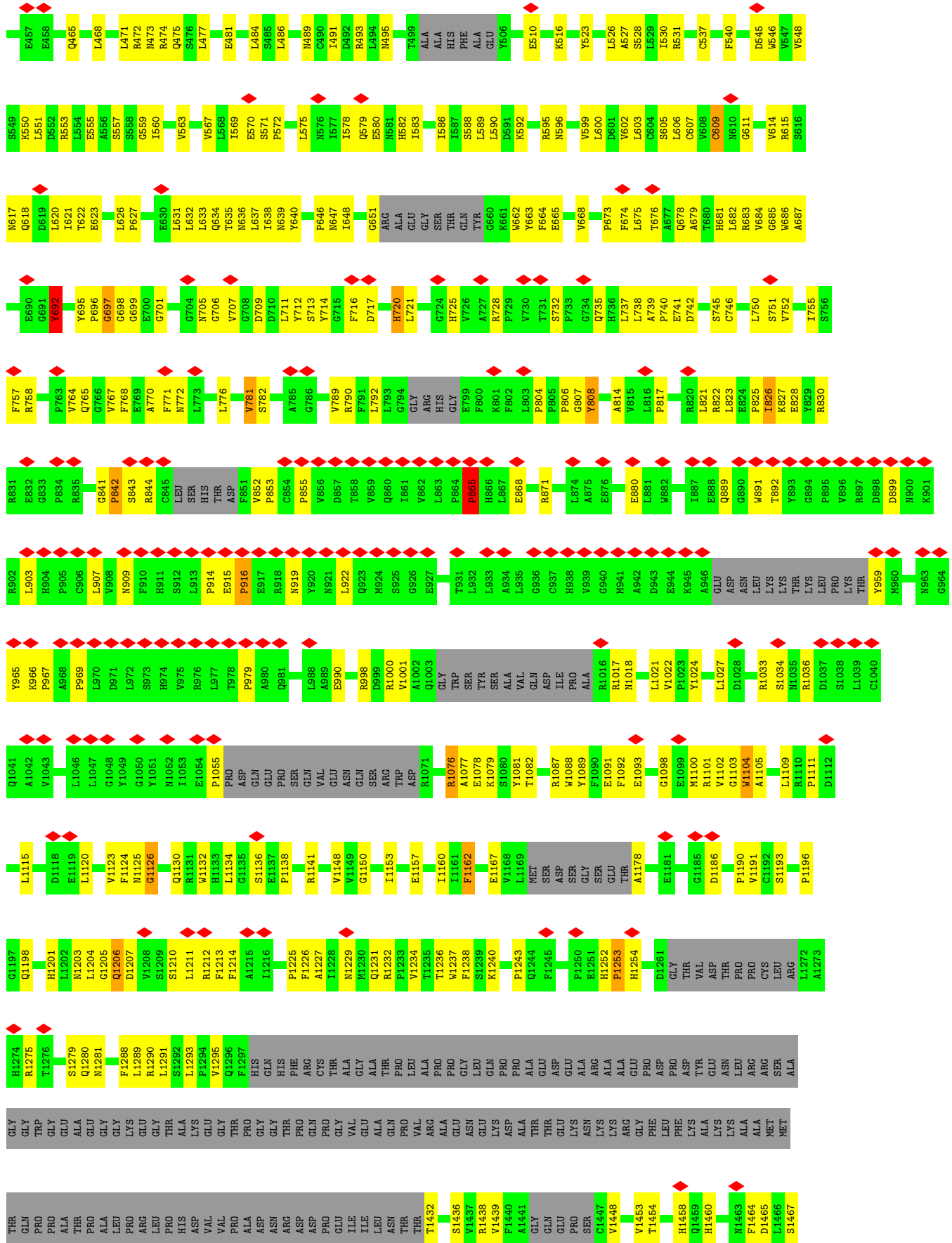
THR	ALA	THR	PHE	THR	THR	T2544	A2547	L2450	N2551	Y2553	L2554	L2561	L2562	THR	LYS	CYS	ALA	F2567	L2583	H2584	T2585	Y2586	TYR	ARG	LEU	SER	R2591	D2601	A2609	LEU	CYS	ARG	TYR	ILE	R2615	P2616	P2651	N2634	GLU	PHE	ALA	K2638	H2639	P2640	L2657	T2658	G2660	TRP											
ALA	ASN	PHE	GLY	VAL	T2667	F2679	I2682	L2686	ALA	HIS	LYS	LYS	Y2691	P2701	I2706	A2707	G2708	A2709	L2710	P2711	P2712	ASP	TYR	TRP	VAL	LEU	ASP	ALA	ALA	TYR	SER	SER	LYS	LYS	ALA	GLU	VAL	THR	VAL	ASP	ALA	GLU	N2794	F2735	D2736	P2737	R2738	P2739	V2740	E2741	T2742	L2743	N2744	V2745					
I2746	I2747	P2748	E2749	K2810	K2750	D2752	S2753	F2754	M2755	M2756	K2757	A2758	A2759	E2760	Y2761	T2762	H2763	E2764	K2765	A2766	F2768	D2769	K2770	I2771	Q2772	N2773	N2774	W2775	S2776	Y2777	G2778	E2779	N2780	V2781	D2782	E2783	E2784	L2785	K2786	T2787	H2788	P2789	M2790	L2791	R2792	P2793	Y2794	K2795	T2796	F2797	S2798	K2800	D2801	K2802	I2804	Y2805			
R2806	H2807	P2808	I2809	E2811	S2812	L2813	K2814	A2815	M2816	I2817	A2818	N2819	E2820	H2821	T2822	L2823	E2824	K2825	A2826	R2827	E2828	G2829	E2830	GLU	ARG	THR	GLU	LYS	LYS	LYS	THR	ARG	LYS	ILE	SER	GLN	THR	ALA	GLN	THR	Y2849	D2850	P2851	R2852	E2853	G2854	Y2855	N2856	P2857	Q2858	P2859	F2860	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	Q2892	E2893	L2894	E2895	A2896	K2897	G2898	G2899	G2900	T2901	H2902	P2903	L2904	L2905	V2906	P2907	Y2908	D2909	T2910	L2911	T2912	A2913	K2914	E2915	K2916	A2917	D2918	D2919	R2920	E2921	K2922	A2923	Q2924	E2925
L2926	L2927	K2928	F2929	L2930	Q2931	W2932	N2933	G2934	W2935	A2936	V2937	L2938	R2939	G2940	LEU	LYS	ASP	MET	GLU	THR	ASP	THR	HIS	CYS	SER	LEU	ILE	GLU	PHE	GLN	LEU	GLN	ARG	TRP	MET	ASP	ILE	SER	GLN	GLU	PHE	ILE	ALA	HIS	GLU	VAL	ALA	VAL	ASN	SER	GLY	ARG							
VAL	GLU	LYS	PRO	HIS	GLU	GLN	ILE	LYS	PHE	ALA	LYS	ILE	LEU	PRO	LEU	ILE	ASN	GLN	TYR	PHE	THR	ASN	HIS	CYS	SER	LEU	Y3016	F3017	L3018	S3019	P3020	A3022	K3023	V3024	S3027	S3032	N3033	H3036	I3039	THR	SER	SER	LEU	F3043	P3062	ALA	VAL	VAL	ASN	GLY	CYS	L3068							
H3069	I3070	L3071	S3074	F3085	E3086	I3087	A3090	GLY	LEU	ARG	SER	F3095	F3096	E3097	S3098	E3104	K3105	M3106	V3107	E3108	R3111	L3112	G3113	K3114	V3115	S3116	GLN	ALA	ARG	THR	GLN	VAL	LYS	GLY	VAL	GLY	GLN	ASN	ASN	THR	THR	TYR	T3132	L3137	P3138	Q3151	F3152	GLY	ASP	ASP	VAL	ILE	L3158						
D3159	V3163	S3164	C3165	Y3166	R3167	S3171	I3172	L3175	T3178	LYS	ASN	LYS	THR	V3183	E3184	K3185	L3186	R3187	P3188	A3189	L3190	A3199	MET	PRO	VAL	A3204	F3205	P3208	E3212	Y3213	N3214	S3217	VAL	TVR	THR	THR	THR	LYS	SER	PRO	PRO	ARG	GLU	ALA	PRO	PRO	P3294												
PRO	ASN	SER	VAL	GLU	MET	CYS	PRO	ILE	PRO	VAL	LEU	ASP	ARG	MET	LEU	ALA	LEU	GLU	SER	GLY	ALA	ARG	TYR	GLN	ALA	PRO	ILE	ILE	GLU	ILE	T3273	L3274	P3275	M3276	L3277	C3278	S3279	Y3280	L3281	P3282	R3283	R3287	G3288	P3289	E3290	ALA	PRO	PRO	P3294										
A3295	L3296	P3297	A3298	P3301	P3302	P3303	C3304	N3313	SER	LEU	LEU	G3317	N3318	I3319	L3320	R3321	D3330	E3331	A3339	VAL	PHE	ALA	GLN	PRO	ILE	V3346	P3351	L3354	H3355	S3356	H3357	F3358	I3359	P3360	T3361	I3362	G3363	ARG	LEU	ARG	K3367	K3371	Q3376	E3386	G3390	E3391	L3392	L3393	V3394										
R3395	D3396	E3397	PHE	D3490	I3491	VAL	LEU	C3402	R3403	D3404	L3405	Y3406	P3410	L3411	L3412	I3413	N3418	N3419	R3420	A3421	W3422	V3423	L3424	THR	GLU	P3427	N3428	A3431	E3432	F3436	ARG	M3437	V3438	E3445	GLN	N3457	V3460	N3465	S3466	F3469	L3470	THR	ALA	ASP	SER	LYS	SER	SER	M3478	G3482									
S3486	S3489	D3490	I3491	GLU	ARG	T3494	K3495	K3496	K3497	S3504	VAL	GLN	THR	THR	LEU	ILE	VAL	ALA	T3513	K3516	M3517	L3518	P3519	M3524	C3525	A3526	P3527	THR	ASP	GLN	ASP	LEU	ILE	MET	LEU	ALA	K3537	T3538	A3541	L3542	K3543	D3544	THR	ASP	GLU	GLU	V3549	R3550	I3554	H3558	P3567								

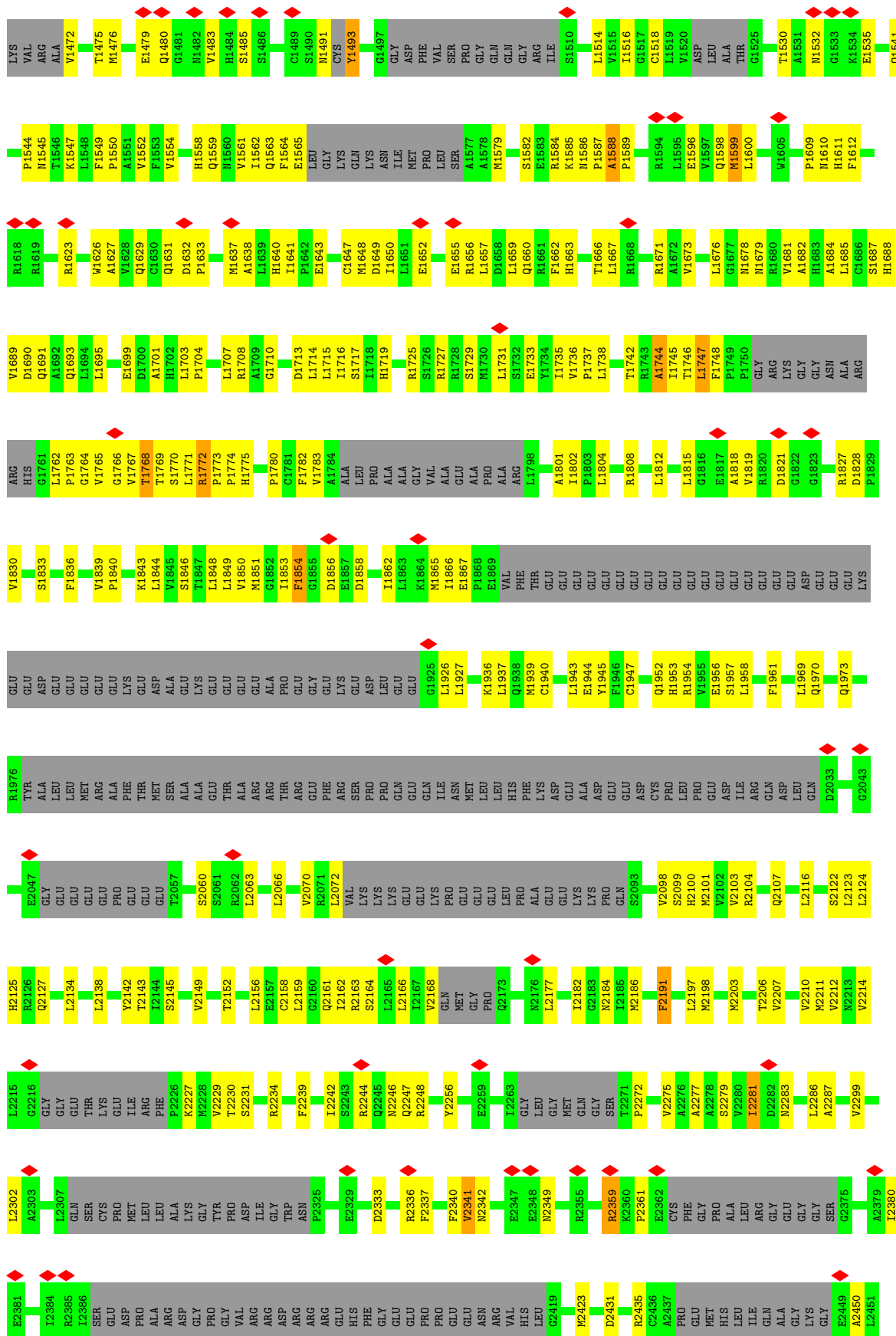




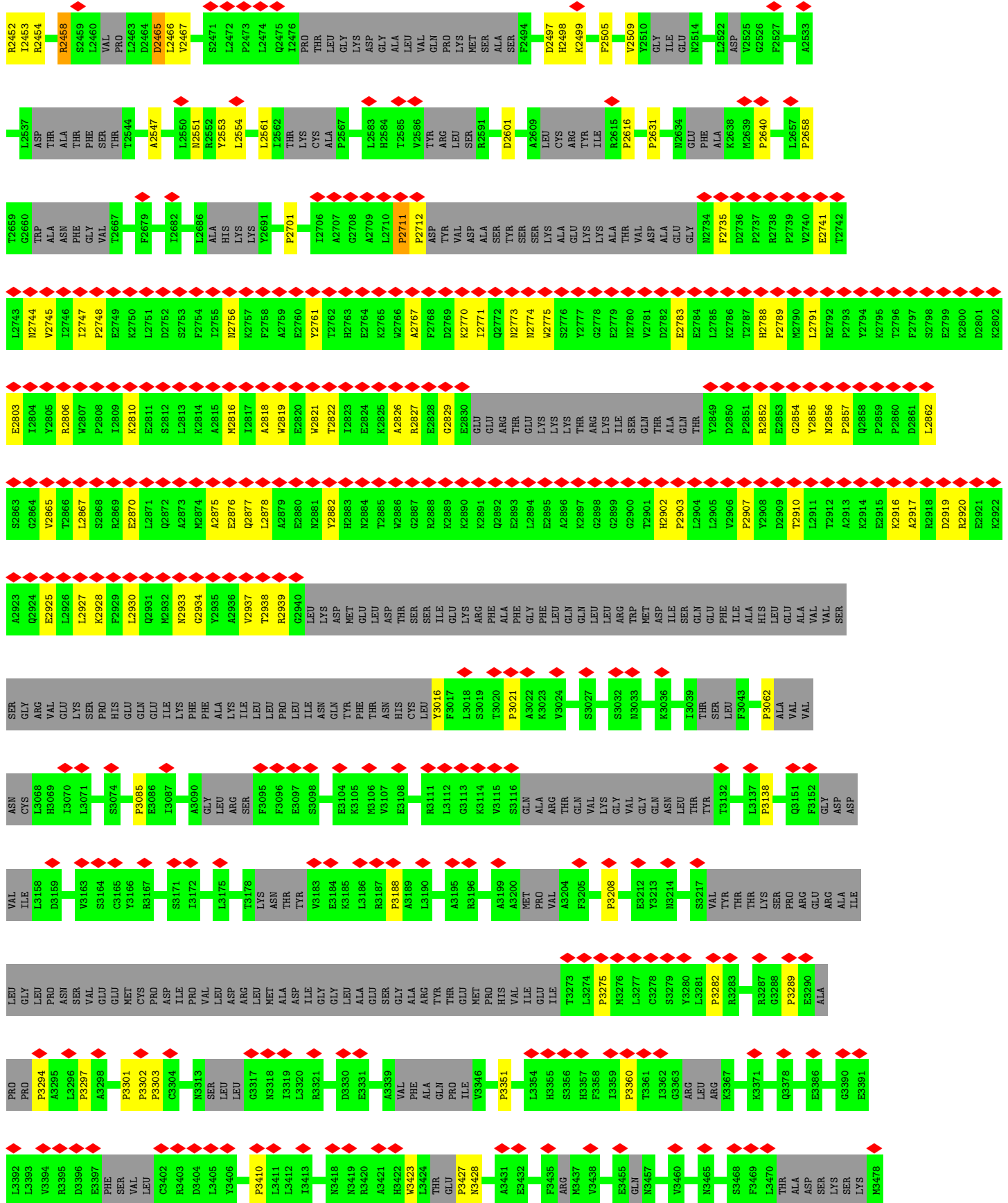
● Molecule 1: Ryanodine receptor 1



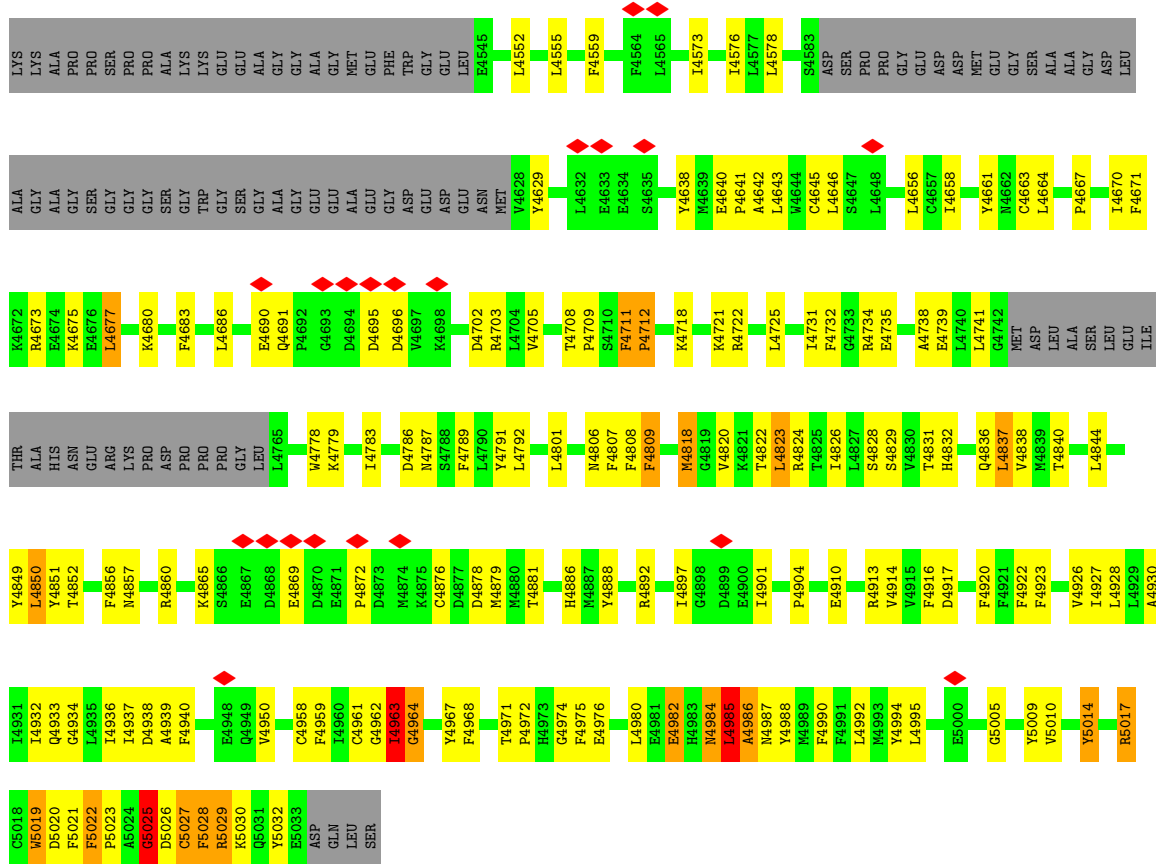




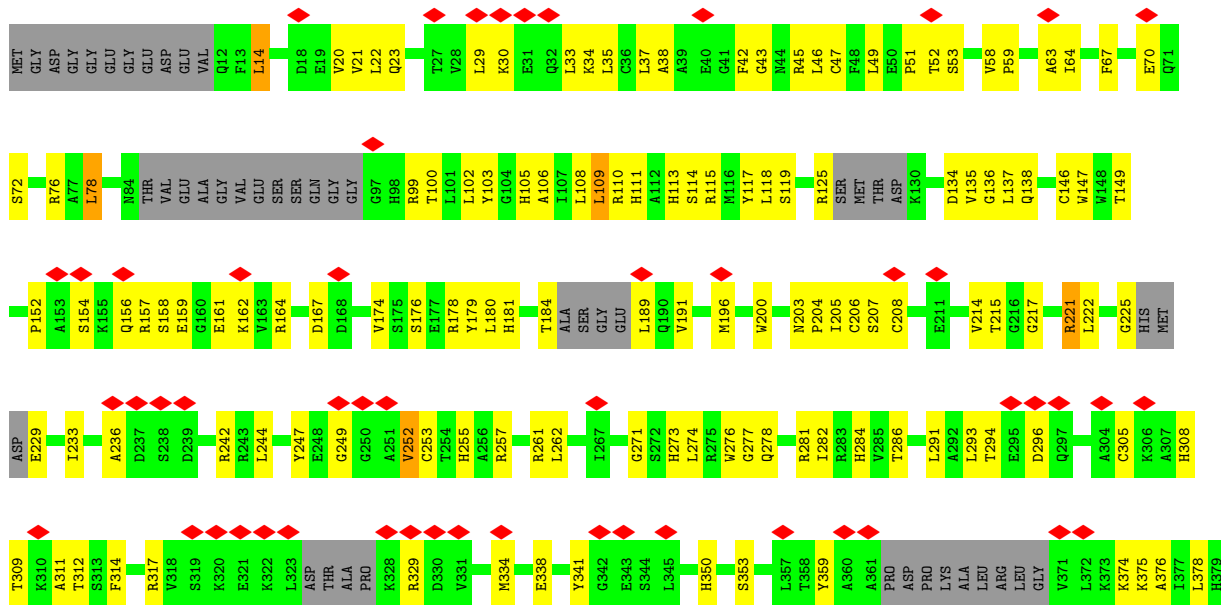








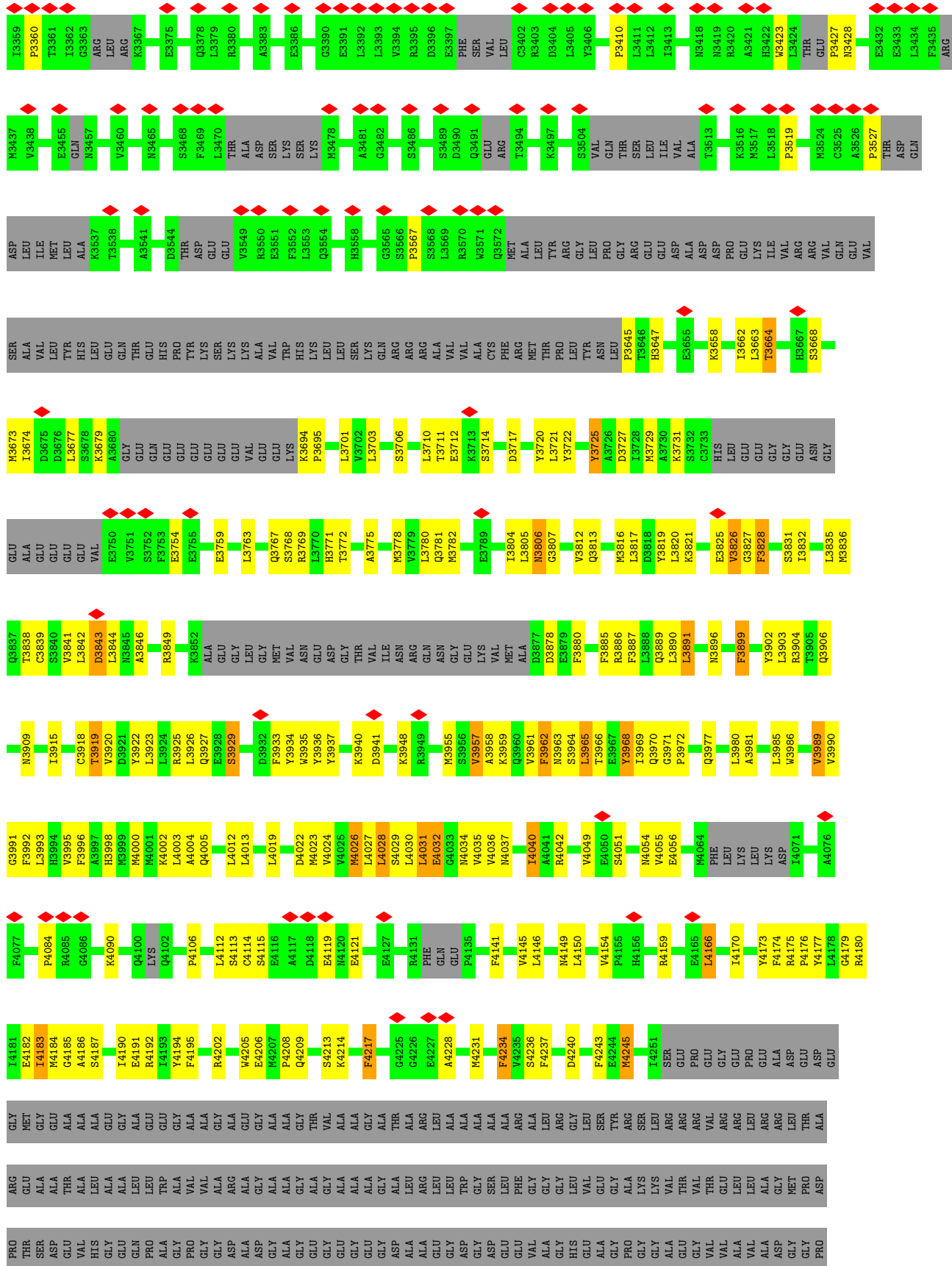
● Molecule 1: Ryanodine receptor 1





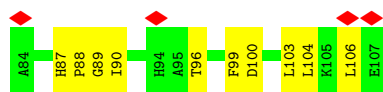




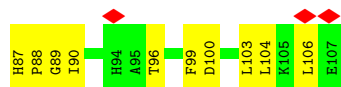
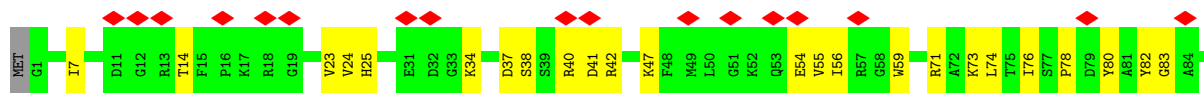




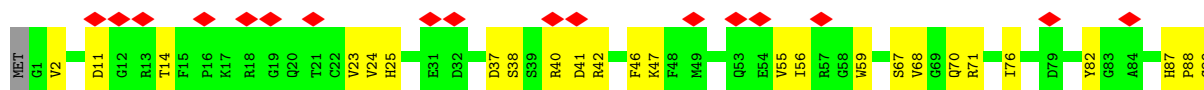




- Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1A



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



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	64000	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI POLARA 300	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	40	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	FEI FALCON II (4k x 4k)	Depositor
Maximum map value	0.428	Depositor
Minimum map value	-0.192	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.018	Depositor
Recommended contour level	0.085	Depositor
Map size (Å)	482.40002, 482.40002, 482.40002	wwPDB
Map dimensions	360, 360, 360	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.34, 1.34, 1.34	Depositor

## 5 Model quality i

### 5.1 Standard geometry i

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

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
1	A	0.98	87/27385 (0.3%)	0.88	108/37104 (0.3%)
1	C	0.98	89/27385 (0.3%)	0.88	114/37104 (0.3%)
1	E	0.98	87/27385 (0.3%)	0.88	108/37104 (0.3%)
1	G	0.99	94/27385 (0.3%)	0.88	112/37104 (0.3%)
2	B	0.63	0/851	0.63	0/1146
2	D	0.63	0/851	0.63	0/1146
2	F	0.63	0/851	0.63	0/1146
2	H	0.63	0/851	0.62	0/1146
All	All	0.98	357/112944 (0.3%)	0.88	442/153000 (0.3%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	20
1	C	0	20
1	E	0	20
1	G	0	20
All	All	0	80

The worst 5 of 357 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	G	4988	TYR	CG-CD2	-20.55	1.12	1.39
1	E	4988	TYR	CG-CD2	-19.42	1.14	1.39
1	C	4988	TYR	CG-CD2	-19.41	1.14	1.39
1	A	4988	TYR	CG-CD2	-19.37	1.14	1.39
1	G	4988	TYR	CE1-CZ	-17.94	1.15	1.38

The worst 5 of 442 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	G	5029	ARG	NE-CZ-NH1	10.79	125.69	120.30
1	E	5029	ARG	NE-CZ-NH1	10.60	125.60	120.30
1	E	4988	TYR	CB-CG-CD1	10.56	127.34	121.00
1	A	4988	TYR	CB-CG-CD1	10.55	127.33	121.00
1	C	4988	TYR	CB-CG-CD1	10.53	127.32	121.00

There are no chirality outliers.

5 of 80 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1464	PHE	Peptide,Mainchain
1	A	1465	ASP	Peptide
1	A	697	GLY	Peptide,Mainchain
1	A	807	GLY	Peptide,Mainchain
1	A	841	GLY	Peptide,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	A	26917	0	24461	801	0
1	C	26917	0	24461	789	0
1	E	26917	0	24461	787	0
1	G	26917	0	24461	770	0
2	B	832	0	831	34	0
2	D	832	0	831	35	0
2	F	832	0	831	33	0
2	H	832	0	831	28	0
3	A	1	0	0	0	0
3	C	1	0	0	0	0
3	E	1	0	0	0	0
3	G	1	0	0	0	0
All	All	111000	0	101168	3132	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 15.

The worst 5 of 3132 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:1782:PHE:O	2:H:82:TYR:OH	1.75	1.03
1:A:1782:PHE:O	2:B:82:TYR:OH	1.76	1.03
1:A:4888:TYR:CD1	1:G:4914:VAL:HG23	1.95	1.02
1:C:1782:PHE:O	2:D:82:TYR:OH	1.78	1.01
1:E:1782:PHE:O	2:F:82:TYR:OH	1.77	1.00

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

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

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	3496/5037 (69%)	3185 (91%)	227 (6%)	84 (2%)	6	36
1	C	3496/5037 (69%)	3185 (91%)	228 (6%)	83 (2%)	6	36
1	E	3496/5037 (69%)	3187 (91%)	226 (6%)	83 (2%)	6	36
1	G	3496/5037 (69%)	3192 (91%)	217 (6%)	87 (2%)	5	35
2	B	105/108 (97%)	96 (91%)	9 (9%)	0	100	100
2	D	105/108 (97%)	96 (91%)	9 (9%)	0	100	100
2	F	105/108 (97%)	96 (91%)	9 (9%)	0	100	100
2	H	105/108 (97%)	93 (89%)	12 (11%)	0	100	100
All	All	14404/20580 (70%)	13130 (91%)	937 (6%)	337 (2%)	9	37

5 of 337 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	701	GLY
1	A	915	GLU
1	A	916	PRO

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
1	A	969	PRO
1	A	1589	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	A	2503/4276 (58%)	2493 (100%)	10 (0%)	91	94
1	C	2502/4276 (58%)	2492 (100%)	10 (0%)	91	94
1	E	2500/4276 (58%)	2491 (100%)	9 (0%)	91	94
1	G	2501/4276 (58%)	2489 (100%)	12 (0%)	88	93
2	B	89/90 (99%)	88 (99%)	1 (1%)	73	85
2	D	89/90 (99%)	88 (99%)	1 (1%)	73	85
2	F	89/90 (99%)	88 (99%)	1 (1%)	73	85
2	H	89/90 (99%)	89 (100%)	0	100	100
All	All	10362/17464 (59%)	10318 (100%)	44 (0%)	91	94

5 of 44 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	E	1055	PRO
1	G	916	PRO
1	E	4850	LEU
1	G	806	PRO
1	G	1001	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 208 such sidechains are listed below:

Mol	Chain	Res	Type
1	E	582	HIS
1	E	3906	GLN
1	G	4223	ASN

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
1	E	765	GLN
1	E	1678	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 monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 4 ligands modelled in this entry, 4 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

## 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.

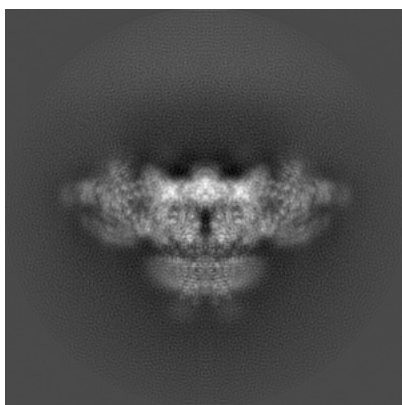
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-9519. These allow visual inspection of the internal detail of the map and identification of artifacts.

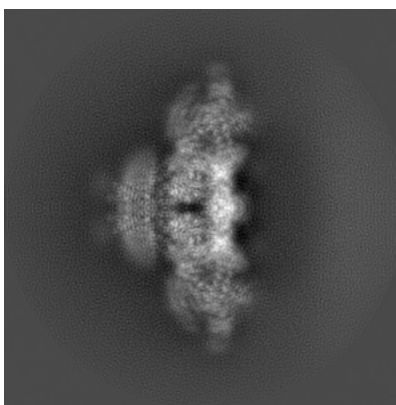
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

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

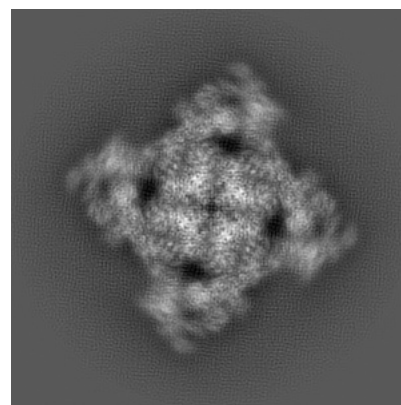
#### 6.1.1 Primary map



X



Y

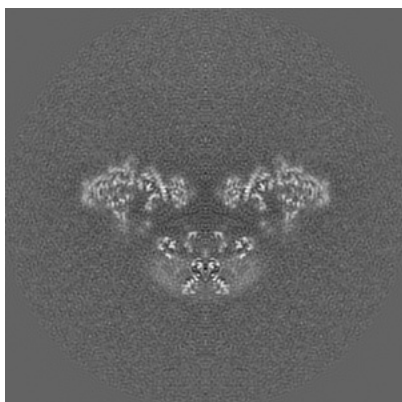


Z

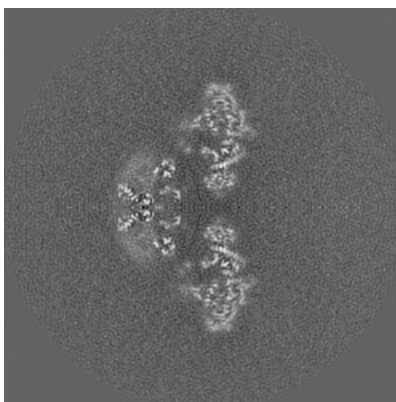
The images above show the map projected in three orthogonal directions.

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

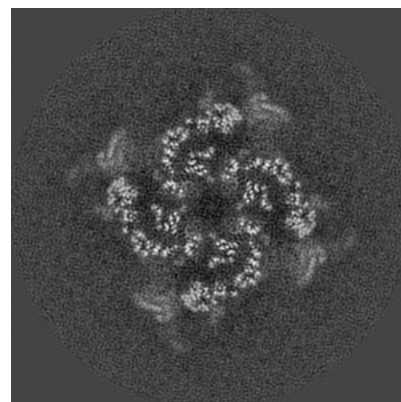
#### 6.2.1 Primary map



X Index: 180



Y Index: 180



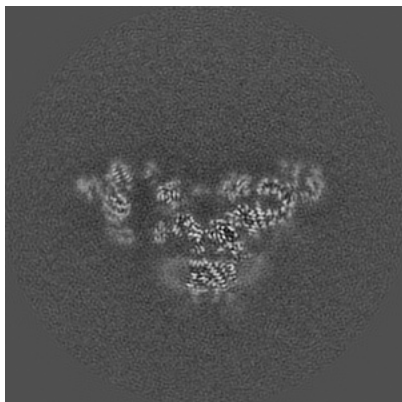
Z Index: 180



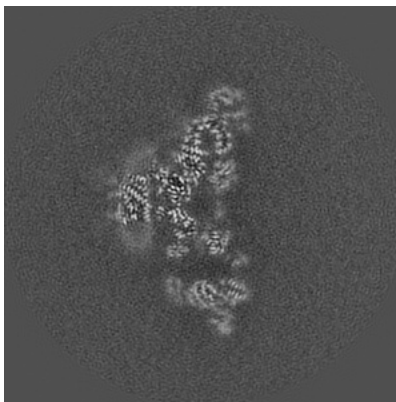
The images above show central slices of the map in three orthogonal directions.

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

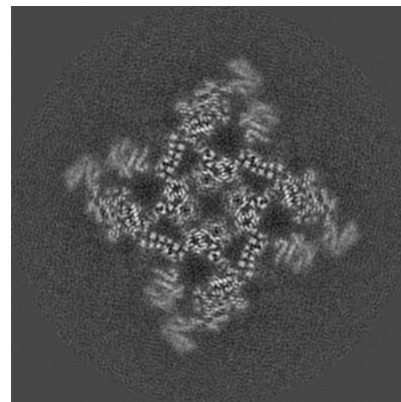
### 6.3.1 Primary map



X Index: 169



Y Index: 191

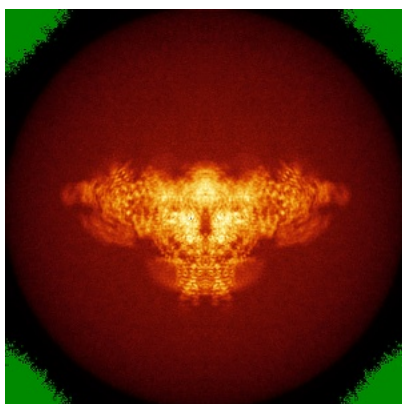


Z Index: 190

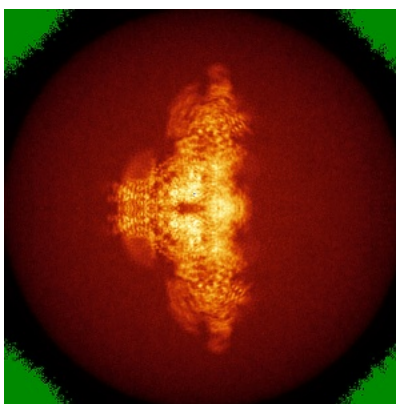
The images above show the largest variance slices of the map in three orthogonal directions.

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

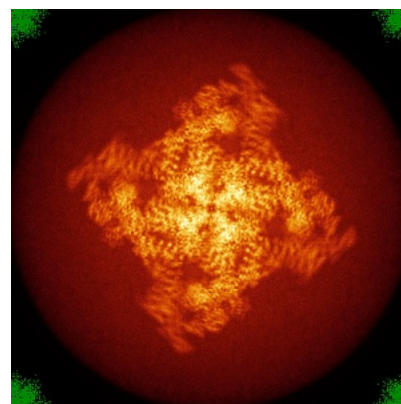
### 6.4.1 Primary map



X



Y

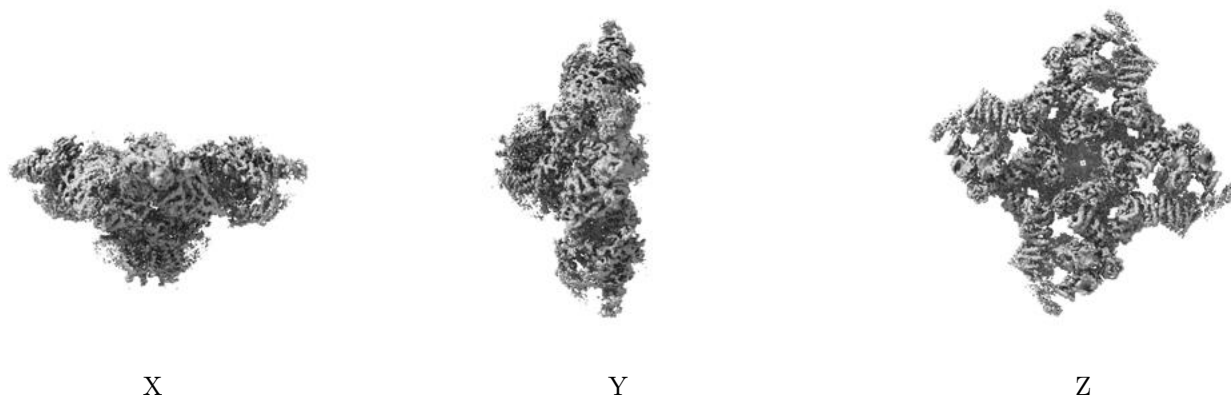


Z

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

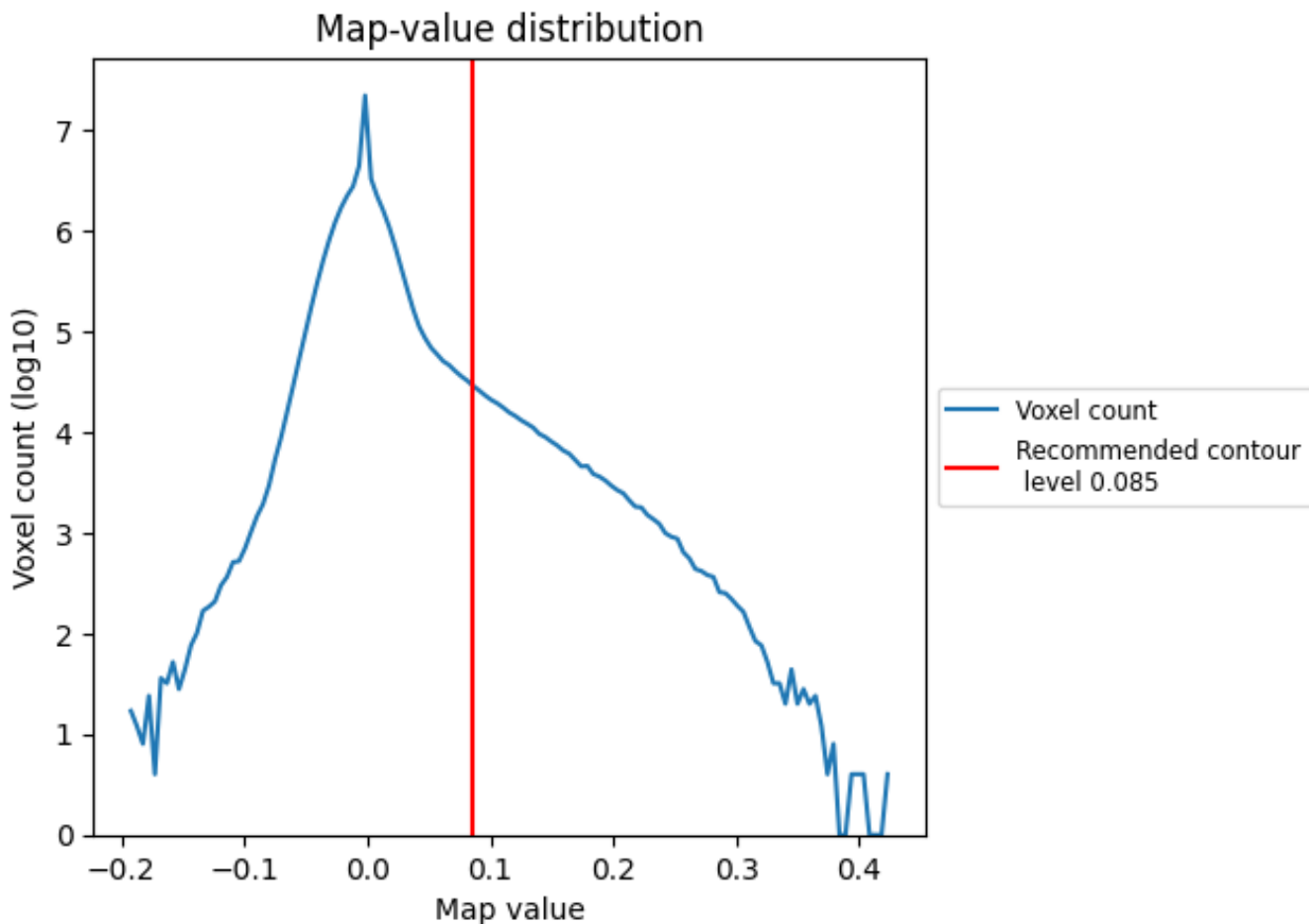
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

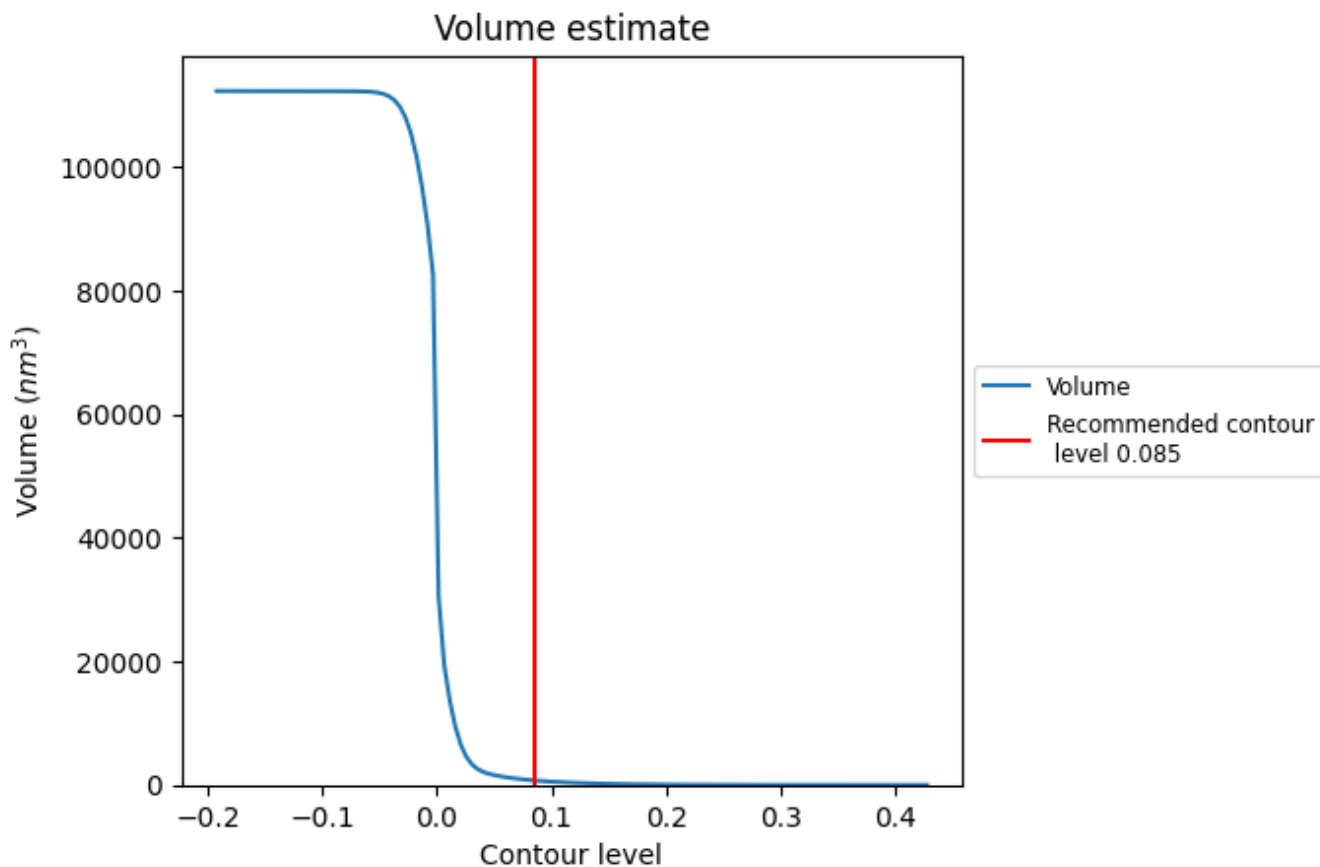
This section contains the results of statistical analysis of the map.

### 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.

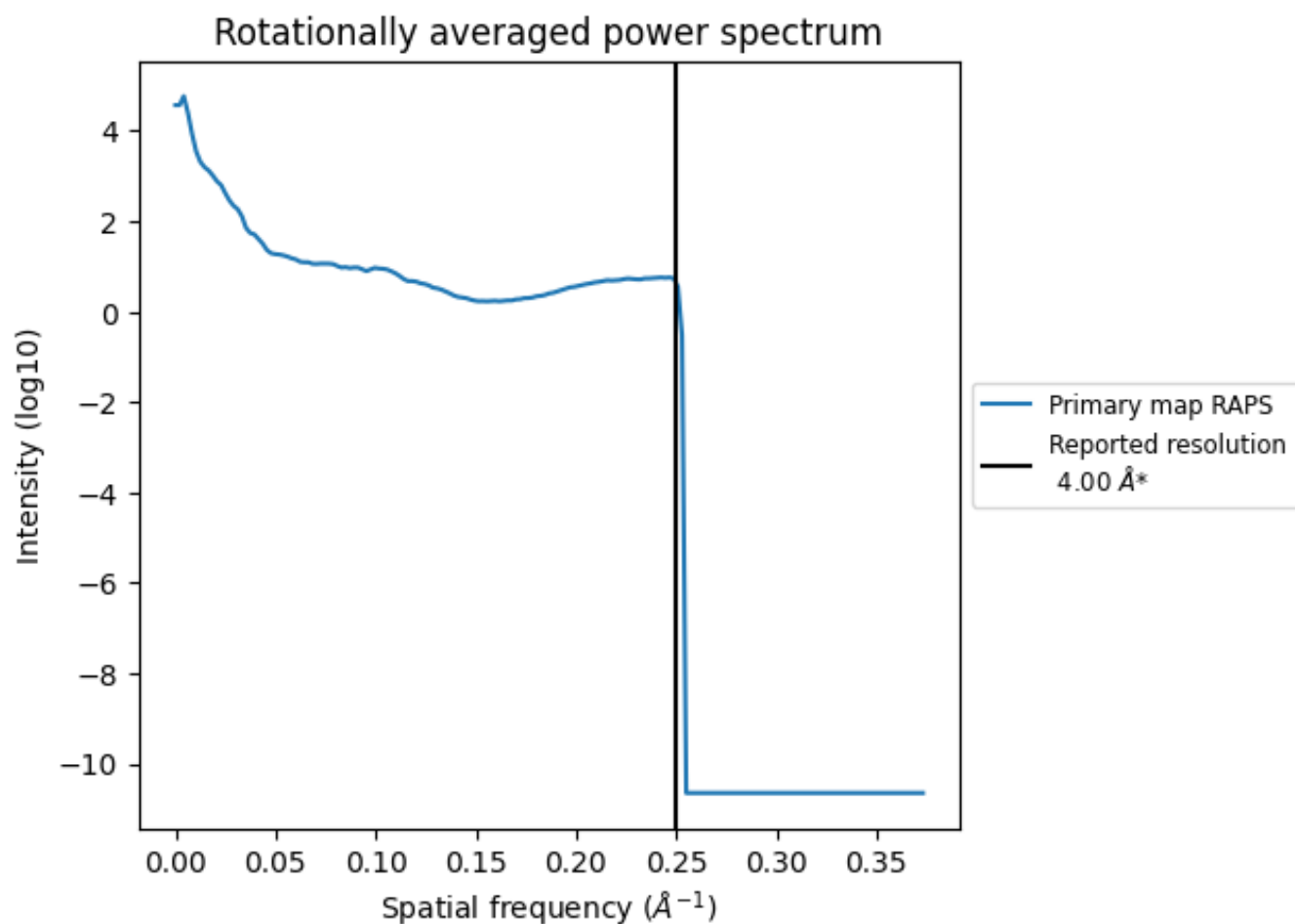
## 7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 734  $\text{nm}^3$ ; this corresponds to an approximate mass of 663 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 0.250 Å<sup>-1</sup>

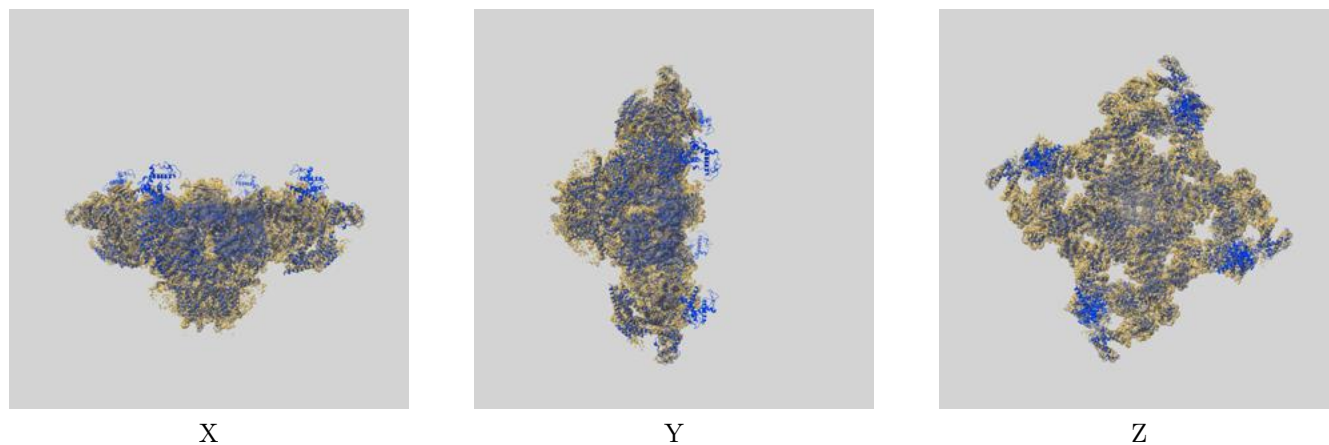
## 8 Fourier-Shell correlation

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

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

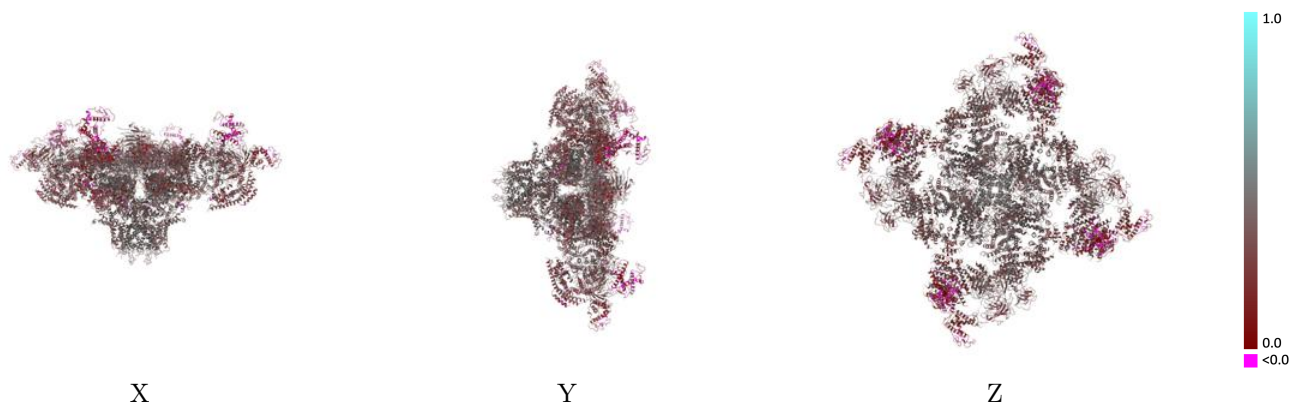
This section contains information regarding the fit between EMDB map EMD-9519 and PDB model 5GKZ. Per-residue inclusion information can be found in section 3 on page 4.

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



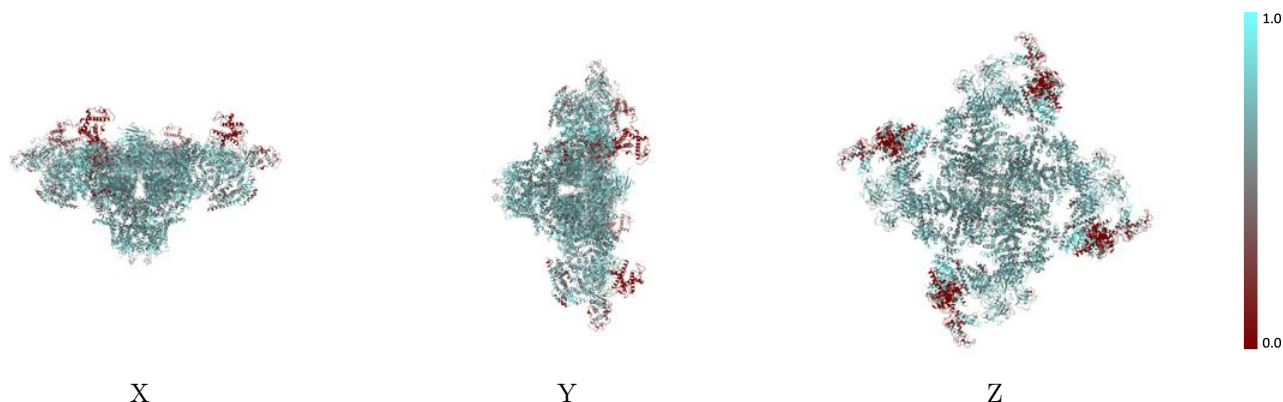
The images above show the 3D surface view of the map at the recommended contour level 0.085 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

## 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.

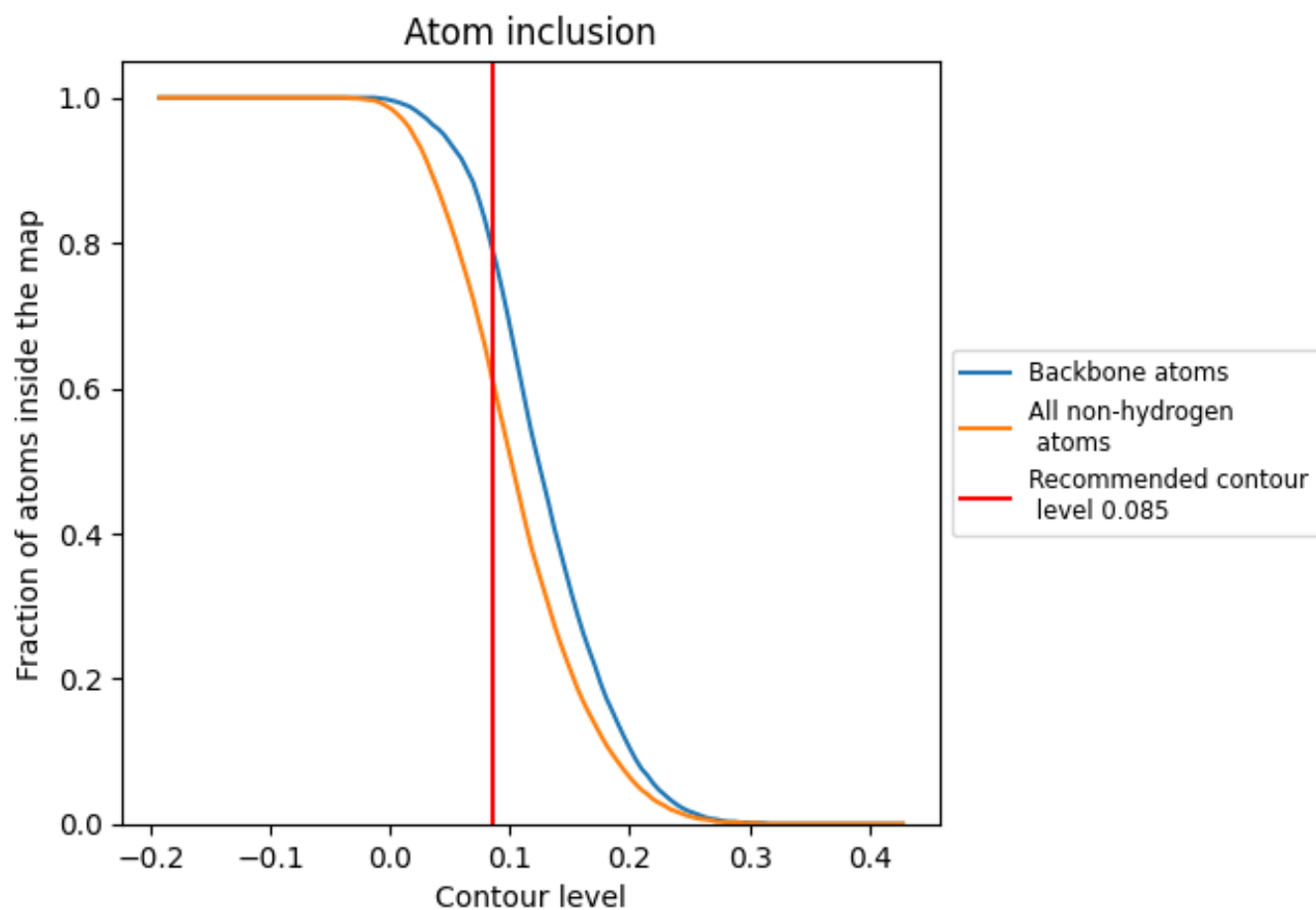
## 9.3 Atom inclusion mapped to coordinate model [i](#)



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 (0.085).





















## 9.4 Atom inclusion [i](#)



At the recommended contour level, 79% of all backbone atoms, 62% 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 (0.085) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6150	 0.3370
A	 0.6160	 0.3370
B	 0.5720	 0.3390
C	 0.6170	 0.3360
D	 0.5700	 0.3370
E	 0.6170	 0.3360
F	 0.5700	 0.3360
G	 0.6170	 0.3400
H	 0.5710	 0.3380

