Full wwPDB EM Validation Report ⓘ

Aug 3, 2026 – 06:01 pm BST

PDB ID	:	9S54 / pdb_00009s54
EMDB ID	:	EMD-54588
Title	:	Down class, Locked-state RyR1 with ryanodine in the native membrane
Authors	:	Mikirtumov, V.
Deposited on	:	2025-07-29
Resolution	:	3.90 Å(reported)
Based on initial model	:	7tzc

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

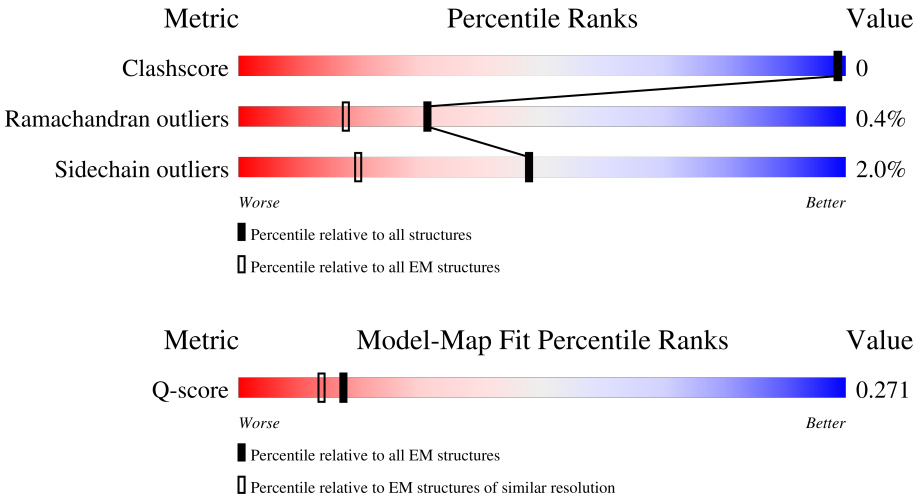
EMDB validation analysis	:	0.0.1.dev133
MolProbity	:	4-5-2 with Phenix2.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh &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

1 Overall quality at a glance

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

The reported resolution of this entry is 3.90 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	8855 (3.40 - 4.40)

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 <=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	12% 84% · 13%
1	B	5037	12% 84% · 13%
1	C	5037	12% 84% · 13%
1	D	5037	12% 84% · 13%

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

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 285936 atoms, of which 142252 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a protein called Ryanodine receptor 1.

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

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

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

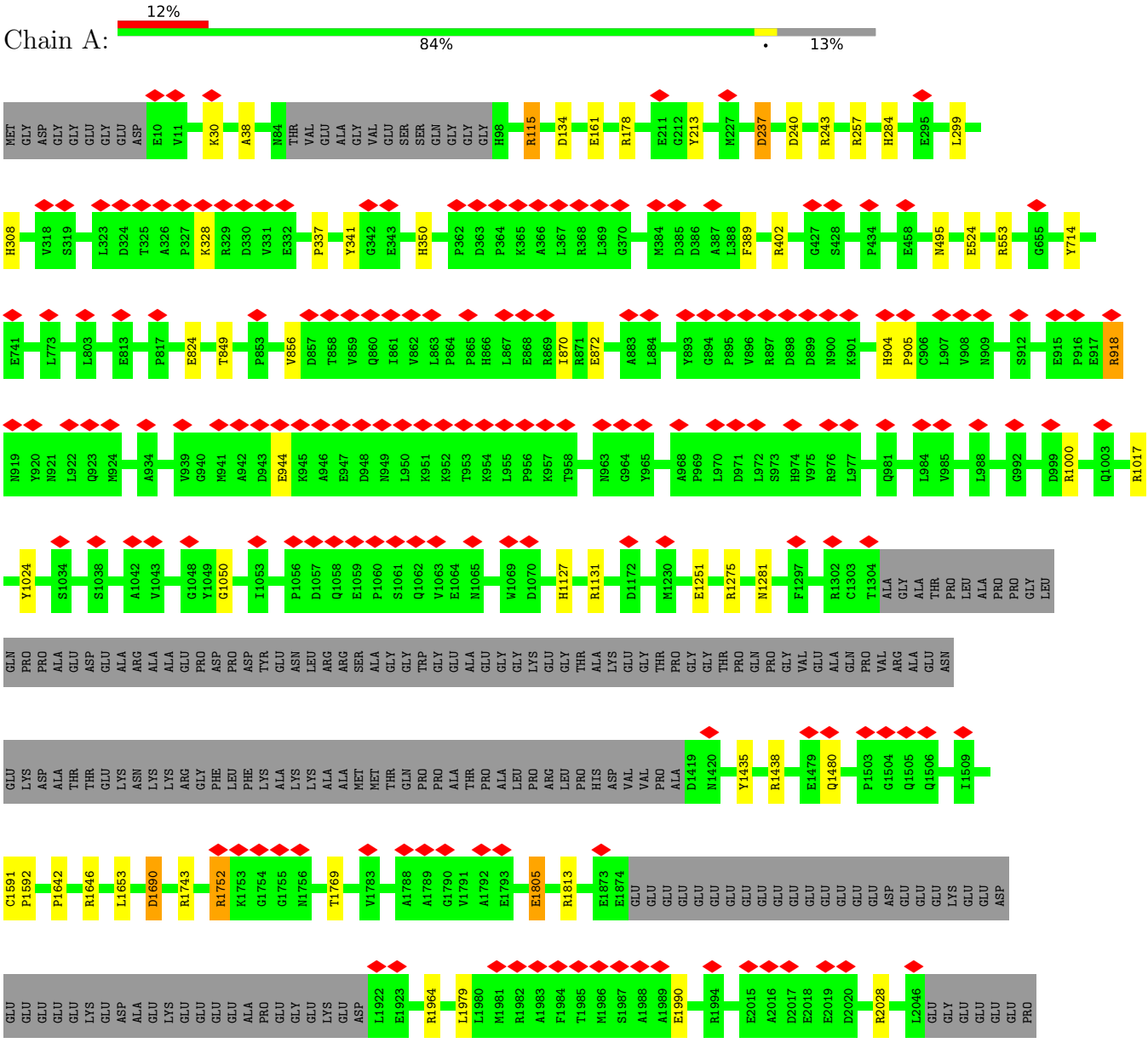
- Molecule 3 is ZINC ION (CCD ID: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

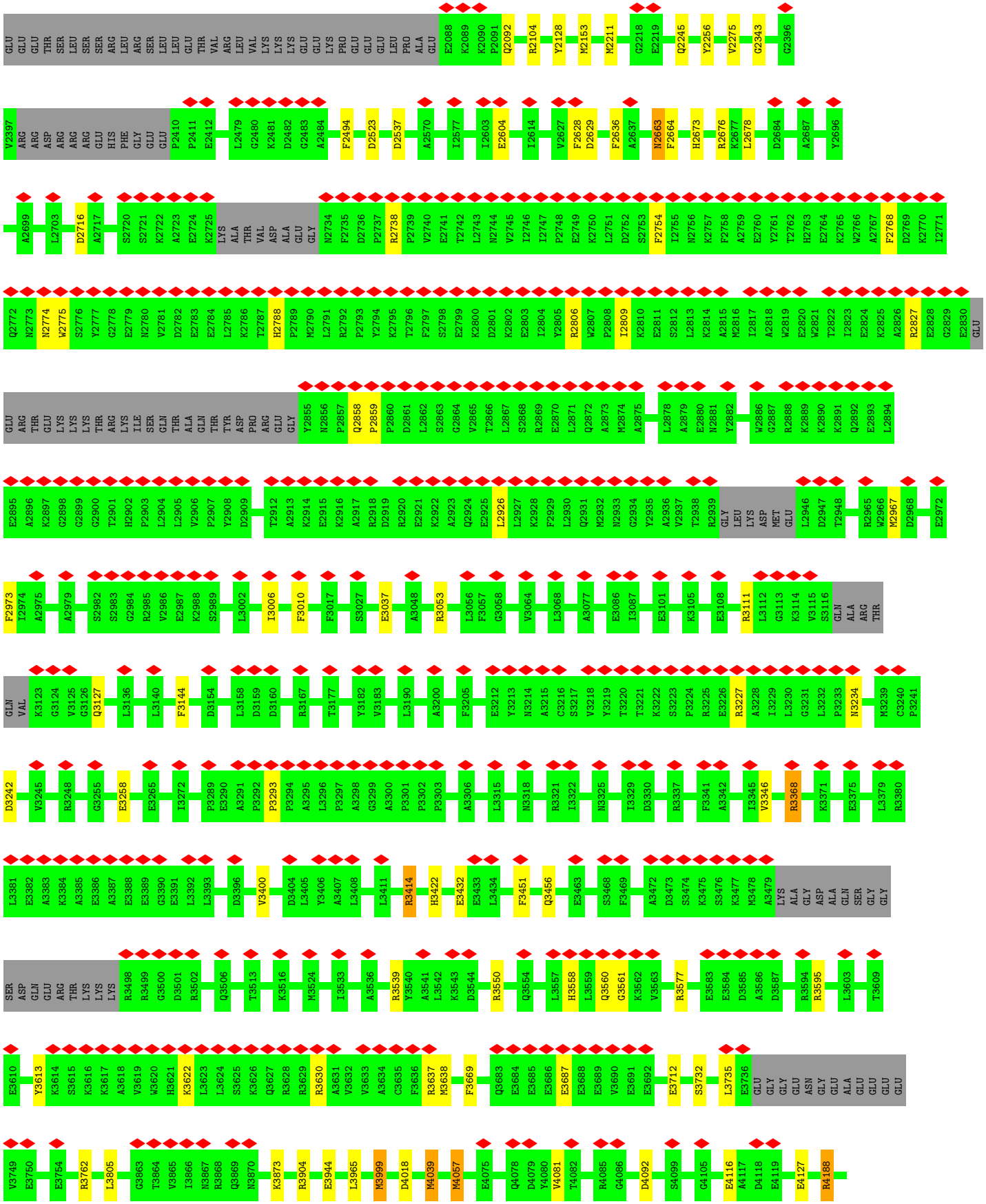
Mol	Chain	Residues	Atoms		AltConf
3	A	1	Total	Zn	0
			1	1	
3	B	1	Total	Zn	0
			1	1	
3	C	1	Total	Zn	0
			1	1	
3	D	1	Total	Zn	0
			1	1	

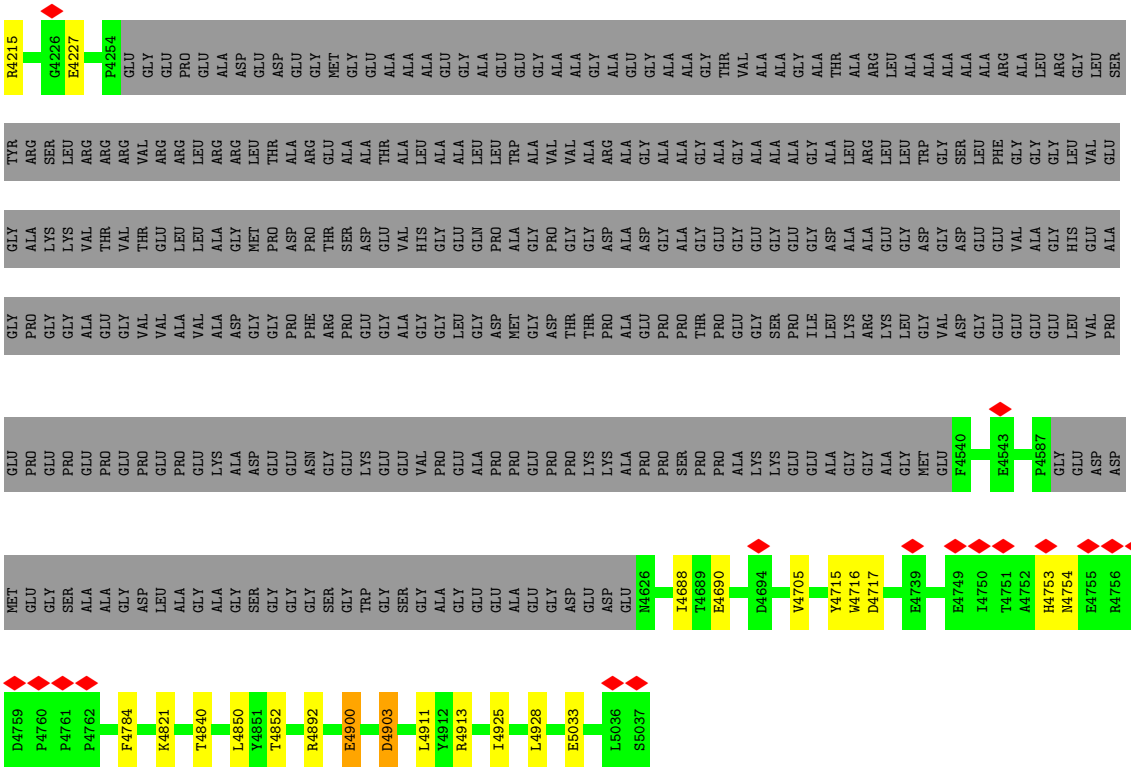
3 Residue-property plots (i)

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: Ryanodine receptor 1

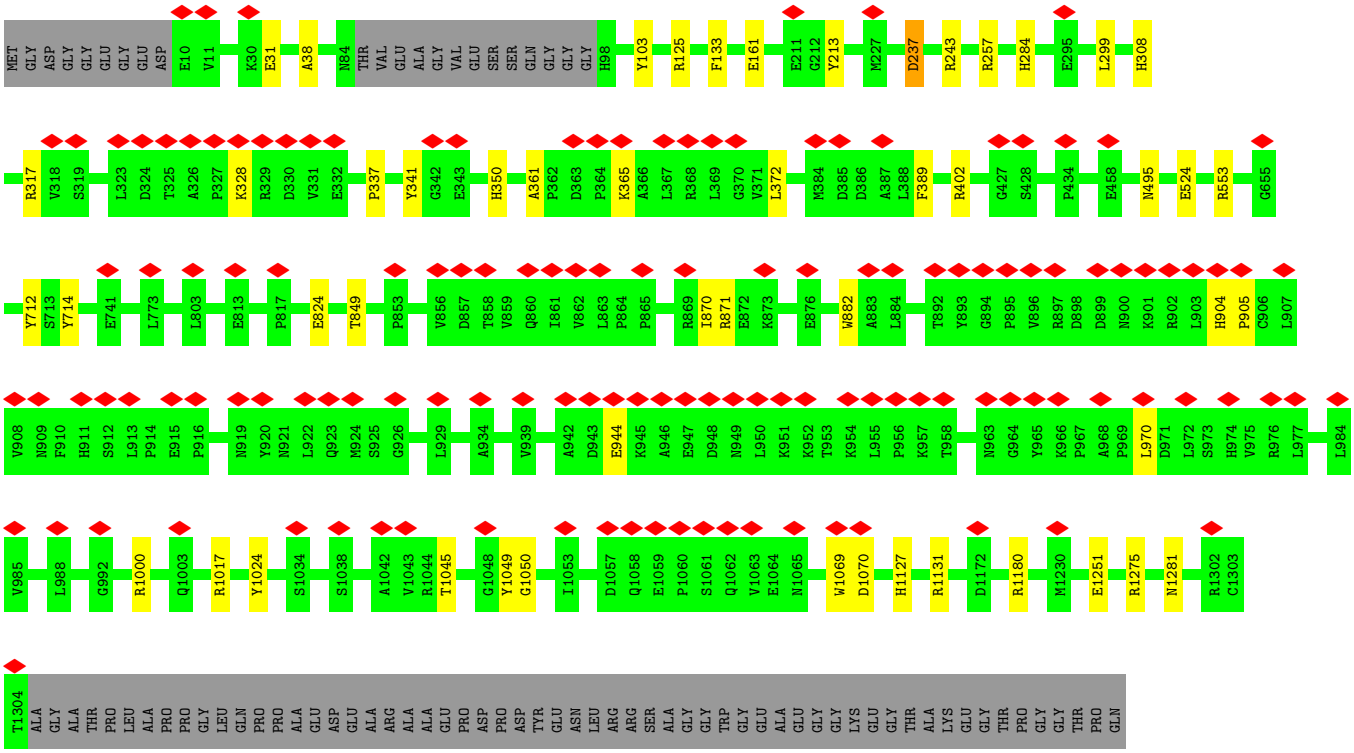


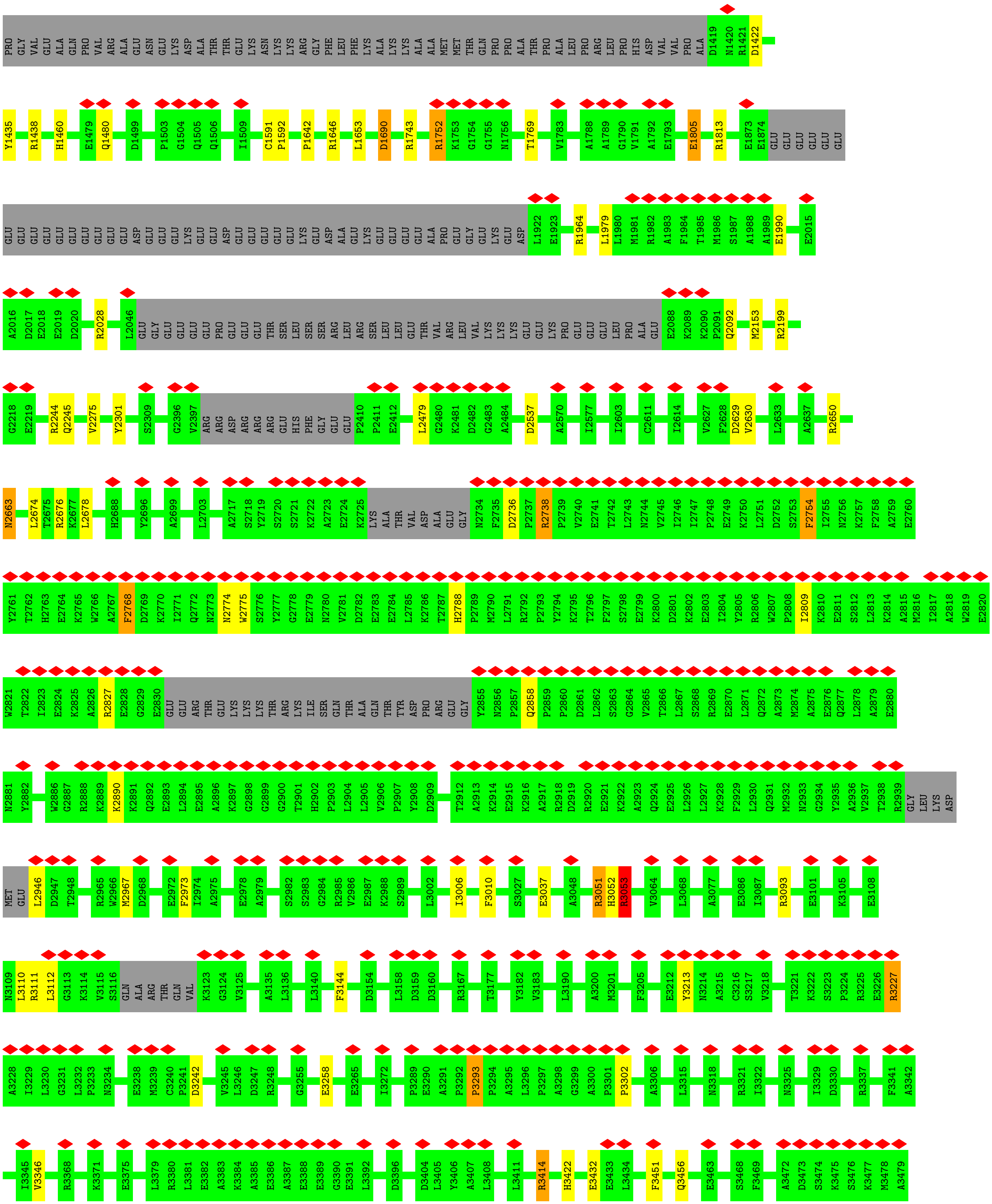

GLU GLU GLU THR SER LEU SER SER ARG LEU ARG SER LEU LEU GLU THR VAL ARG LEU VAL LYS LYS LYS GLU GLU LYS PRO GLU GLU GLU LEU PRO ALA GLU
E2088 K2089 K2090 P2091 Q2092 R2104 Y2128 M2153 M2211 G2218 E2219 Q2245 Y2256 V2275 G2343 G2396
V2397 ARG ARG ASP ARG ARG ARG GLU HIS PHE GLY GLU GLU
P2410 P2411 E2412 L2479 G2480 K2481 D2482 G2483 A2484 F2494 D2523 D2537 A2570 I2577 I2603 E2604 I2614 V2627 F2628 D2629 F2636 A2637 N2663 F2664 H2673 R2676 K2677 L2678 D2684 A2687 Y2696
A2699 L2703 D2716 A2717 S2720 S2721 K2722 A2723 E2724 K2725 LYS ALA THR VAL ASP ALA GLU GLY N2734 F2735 D2736 P2737 R2738 P2739 V2740 E2741 T2742 L2743 N2744 V2745 I2746 I2747 P2748 E2749 K2750 L2751 D2752 S2753 F2754 I2755 N2756 K2757 F2758 A2759 E2760 Y2761 T2762 H2763 E2764 K2765 W2766 A2767 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 E2799 K2800 D2801 K2802 E2803 I2804 Y2805 R2806 W2807 P2808 I2809 K2810 E2811 S2812 L2813 K2814 A2815 M2816 I2817 A2818 W2819 E2820 W2821 T2822 I2823 E2824 K2825 A2826 R2827 E2828 G2829 E2830 GLU
GLU ARG THR GLU LYS LYS LYS THR ARG LYS ILE SER GLN THR ALA GLN THR THR TYR ASP PRO ARG GLU GLY
Y2855 N2856 P2857 Q2858 P2859 P2860 D2861 L2862 S2863 G2864 V2865 T2866 L2867 S2868 R2869 E2870 L2871 Q2872 A2873 M2874 A2875 L2878 A2879 E2880 N2881 Y2882 W2886 G2887 R2888 K2889 K2890 K2891 Q2892 E2893 L2894
E2895 A2896 K2897 G2898 G2899 G2900 T2901 H2902 P2903 L2904 L2905 V2906 P2907 Y2908 D2909 T2912 A2913 K2914 E2915 K2916 A2917 R2918 D2919 R2920 E2921 K2922 A2923 Q2924 E2925 L2926 L2927 K2928 P2929 L2930 Q2931 M2932 N2933 G2934 Y2935 A2936 V2937 T2938 R2939 GLY LEU LYS ASP MET GLU L2946 D2947 T2948 R2965 W2966 M2967 D2968 E2972
F2973 I2974 A2975 A2979 S2982 S2983 G2984 R2985 V2986 E2987 K2988 S2989 L3002 I3006 F3010 F3017 S3027 E3037 A3048 R3053 L3056 F3057 G3058 V3064 L3068 A3077 E3086 I3087 E3101 K3105 E3108 R3111 L3112 G3113 K3114 V3115 S3116 GLN ALA ARG THR
GLN VAL K3123 G3124 V3125 G3126 Q3127 L3136 L3140 F3144 D3154 L3158 D3159 D3160 R3167 T3177 Y3182 V3183 L3190 A3200 F3205 E3212 Y3213 N3214 A3215 C3216 S3217 V3218 Y3219 T3220 T3221 K3222 S3223 P3224 R3225 E3226 R3227 A3228 I3229 L3230 G3231 L3232 P3233 N3234 H3239 C3240 P3241
D3242 V3245 R3248 G3255 E3258 E3265 I3272 P3289 E3290 A3291 P3292 P3293 P3294 A3295 L3296 P3297 A3298 G3299 A3300 P3301 P3302 P3303 A3306 L3315 N3318 R3321 I3322 N3325 I3329 D3330 R3337 F3341 A3342 I3345 Y3346 R3368 K3371 E3375 L3379 R3380
L3381 E3382 A3383 K3384 A3385 E3386 A3387 E3388 E3389 G3390 E3391 L3392 L3393 D3396 V3400 D3404 L3405 Y3406 A3407 L3408 L3411 R3414 H3422 E3432 E3433 L3434 F3451 Q3456 E3463 S3468 F3469 A3472 D3473 S3474 K3475 S3476 K3477 M3478 A3479 LYS ALA GLY ASP ALA GLN SER GLY GLY
SER ASP GLN GLU ARG THR LYS LYS LYS R3498 R3499 G3500 D3501 R3502 Q3506 T3513 K3516 M3524 I3533 A3536 R3539 Y3540 A3541 L3542 K3543 D3544 R3550 Q3554 L3557 H3558 L3559 Q3560 G3561 K3562 V3563 R3577 E3583 E3584 D3585 A3586 D3587 R3594 R3595 L3603 T3609
E3610 Y3613 K3614 S3615 K3616 K3617 A3618 V3619 W3620 H3621 K3622 L3623 L3624 S3625 K3626 Q3627 R3628 R3629 R3630 A3631 V3632 V3633 A3634 C3635 F3636 R3637 M3638 F3669 Q3683 E3684 E3685 E3686 E3687 E3688 E3689 V3690 E3691 E3692 E3712 S3732 L3735 E3736 GLU GLY GLY GLU ASN GLY GLU ALA GLU GLU GLU
V3749 E3750 E3754 R3762 L3805 G3863 T3864 V3865 I3866 N3867 R3868 Q3869 N3870 K3873 R3904 E3944 L3965 M3999 D4018 M4039 M4057 E4075 Q4078 D4079 Y4080 V4081 T4082 R4085 G4086 D4092 S4099 G4105 E4116 A4117 D4118 E4119 E4127 R4188

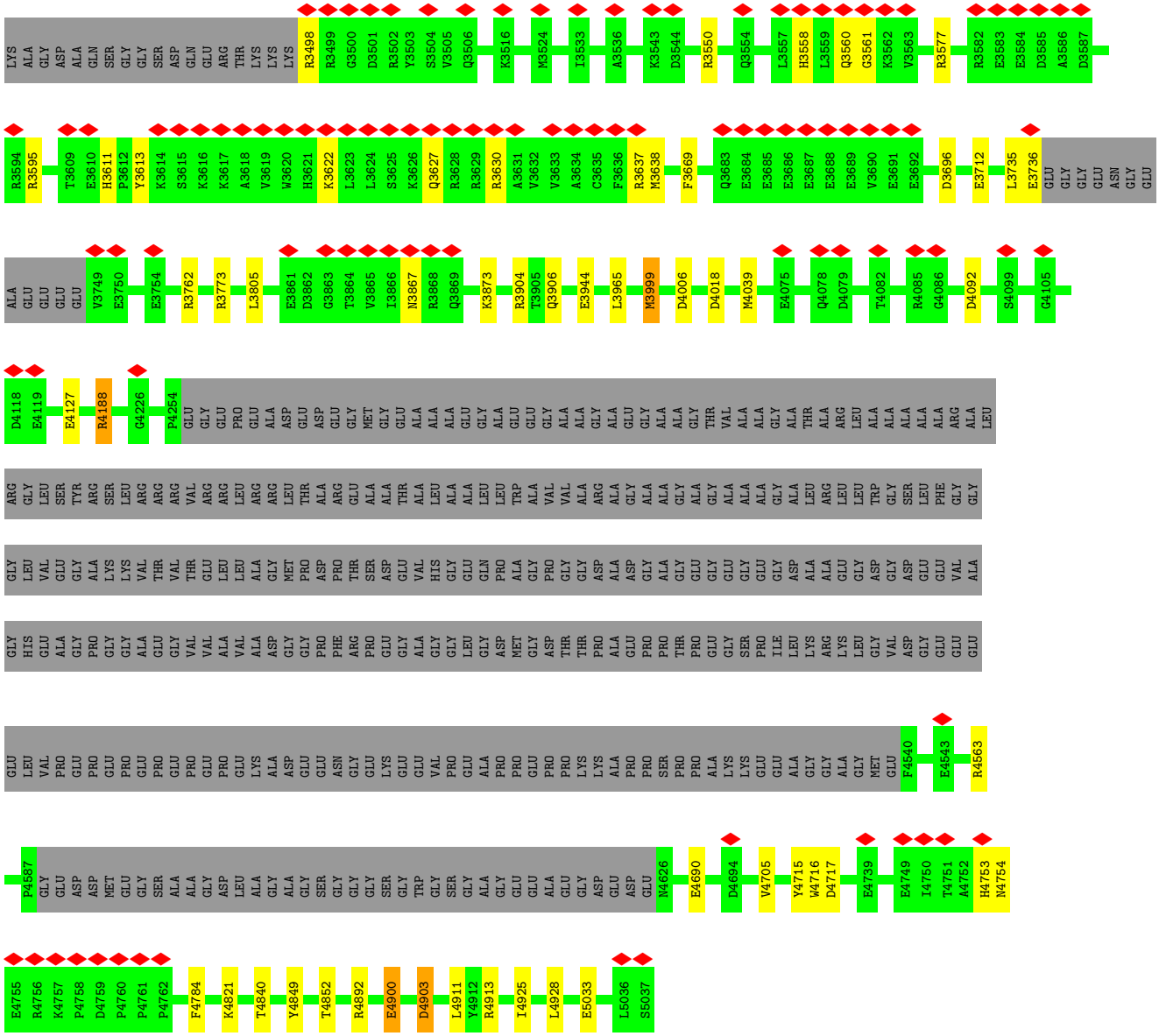


• Molecule 1: Ryanodine receptor 1

Chain B:

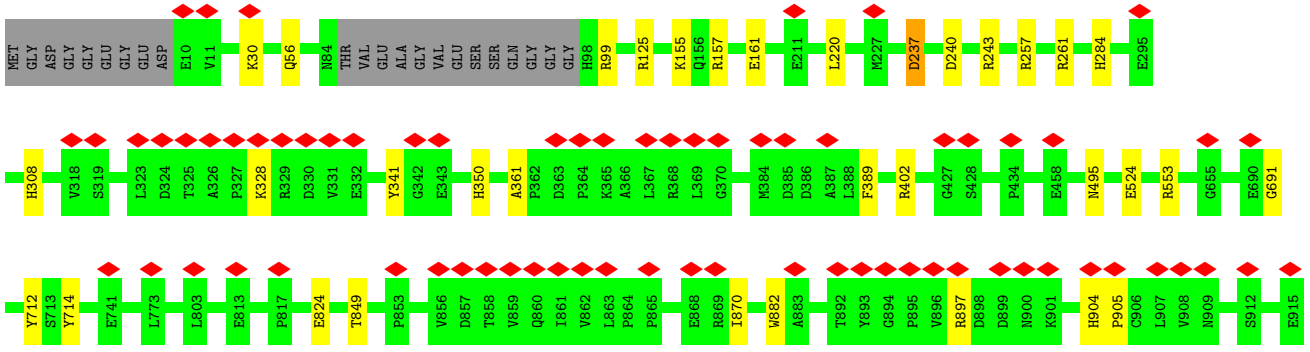


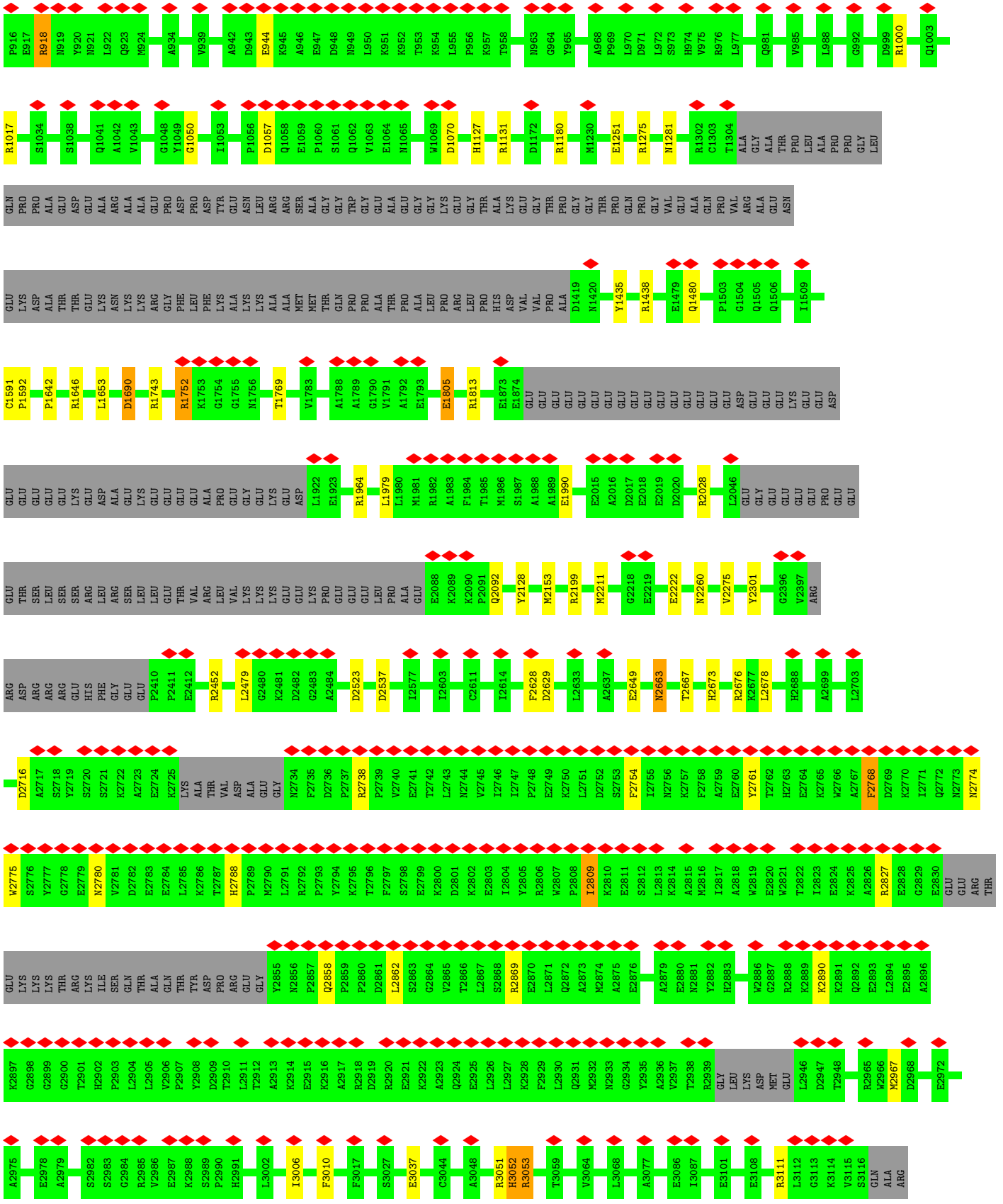

PRO GLY VAL GLU ALA GLN PRO VAL ARG ALA GLU ASN GLU LYS ASP ALA THR THR GLU LYS ASN LYS LYS ARG GLY PHE LEU PHE LYS ALA LYS LYS ALA ALA MET MET THR GLN PRO PRO ALA THR PRO ALA LEU PRO ARG LEU PRO HIS ASP VAL VAL PRO ALA D1419 N1420 R1421 D1422
Y1435 R1438 H1460 E1479 Q1480 D1499 P1503 G1504 Q1505 Q1506 I1509 C1591 P1592 P1642 R1646 L1653 D1690 R1743 R1752 K1753 G1754 G1755 N1756 T1769 V1783 A1788 A1789 G1790 V1791 A1792 E1793 E1805 R1813 E1873 E1874 GLU GLU GLU GLU GLU GLU
GLU GLU GLU GLU GLU GLU GLU GLU GLU GLU ASP GLU GLU GLU LYS GLU GLU ASP GLU GLU GLU GLU GLU LYS GLU ASP ALA GLU LYS GLU GLU GLU GLU ALA PRO GLU GLY GLU LYS GLU ASP L1922 E1923 R1964 L1979 L1980 M1981 R1982 A1983 F1984 T1985 M1986 S1987 A1988 A1989 E1990 E2015
A2016 D2017 E2018 E2019 D2020 R2028 L2046 GLU GLY GLU GLU GLU GLU PRO GLU GLU GLU THR SER LEU SER SER ARG LEU ARG SER LEU LEU GLU THR VAL ARG LEU VAL LYS LYS LYS GLU GLU LYS PRO GLU GLU GLU LEU PRO ALA GLU E2088 K2089 K2090 P2091 Q2092 M2153 R2199
G2218 E2219 R2244 Q2245 V2275 Y2301 S2309 G2396 V2397 ARG ARG ASP ARG ARG ARG GLU HIS PHE GLY GLU GLU P2410 P2411 E2412 L2479 G2480 K2481 D2482 G2483 A2484 D2537 A2570 I2577 I2603 C2611 I2614 V2627 F2628 D2629 V2630 L2633 A2637 R2650
N2663 L2674 T2675 R2676 K2677 L2678 H2688 Y2696 A2699 L2703 A2717 S2718 Y2719 S2720 S2721 K2722 A2723 E2724 K2725 LYS ALA THR VAL ASP ALA GLU GLY N2734 F2735 D2736 P2737 R2738 P2739 V2740 E2741 T2742 L2743 N2744 V2745 I2746 I2747 P2748 E2749 K2750 L2751 D2752 S2753 F2754 I2755 N2756 K2757 F2758 A2759 E2760
Y2761 T2762 H2763 E2764 K2765 W2766 A2767 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 E2799 K2800 D2801 K2802 E2803 I2804 Y2805 R2806 W2807 P2808 I2809 K2810 E2811 S2812 L2813 K2814 A2815 M2816 I2817 A2818 W2819 E2820
W2821 T2822 I2823 E2824 K2825 A2826 R2827 E2828 G2829 E2830 GLU GLU ARG THR GLU LYS LYS LYS THR ARG LYS ILE SER GLN THR ALA GLN THR TYR ASP PRO ARG GLU GLY Y2855 N2856 P2857 Q2858 P2859 P2860 D2861 L2862 S2863 G2864 V2865 T2866 L2867 S2868 R2869 E2870 L2871 Q2872 A2873 M2874 A2875 E2876 Q2877 L2878 A2879 E2880
N2881 Y2882 W2886 G2887 R2888 K2889 K2890 K2891 Q2892 E2893 L2894 E2895 A2896 K2897 G2898 G2899 G2900 T2901 H2902 P2903 L2904 L2905 V2906 P2907 Y2908 D2909 T2912 A2913 K2914 E2915 K2916 A2917 R2918 D2919 R2920 E2921 K2922 A2923 Q2924 E2925 L2926 L2927 K2928 F2929 L2930 Q2931 M2932 N2933 G2934 Y2935 A2936 V2937 T2938 R2939 GLY LEU LYS ASP
MET GLU L2946 D2947 T2948 R2965 W2966 M2967 D2968 E2972 F2973 I2974 A2975 E2978 A2979 S2982 S2983 G2984 R2985 V2986 E2987 K2988 S2989 L3002 I3006 F3010 S3027 E3037 A3048 R3051 H3052 R3053 V3064 L3068 A3077 E3086 I3087 R3093 E3101 K3105 E3108
N3109 L3110 R3111 L3112 G3113 K3114 V3115 S3116 GLN ALA ARG THR GLN VAL K3123 G3124 V3125 A3135 L3136 L3140 F3144 D3154 L3158 D3159 D3160 R3167 T3177 Y3182 V3183 L3190 A3200 M3201 F3205 E3212 Y3213 N3214 A3215 C3216 S3217 V3218 T3221 K3222 S3223 P3224 R3225 E3226 R3227
A3228 I3229 L3230 G3231 L3232 P3233 N3234 E3238 M3239 C3240 P3241 D3242 V3245 L3246 D3247 R3248 G3255 E3258 E3265 I3272 P3289 E3290 A3291 P3292 P3293 P3294 A3295 L3296 P3297 A3298 G3299 A3300 P3301 P3302 A3306 L3315 N3318 R3321 I3322 N3325 I3329 D3330 R3337 F3341 A3342
I3345 V3346 R3368 K3371 E3375 L3379 R3380 L3381 E3382 A3383 K3384 A3385 E3386 A3387 E3388 E3389 G3390 E3391 L3392 D3396 D3404 L3405 Y3406 A3407 L3408 L3411 R3414 H3422 E3432 E3433 L3434 F3451 Q3456 E3463 S3468 F3469 A3472 D3473 S3474 K3475 S3476 K3477 M3478 A3479

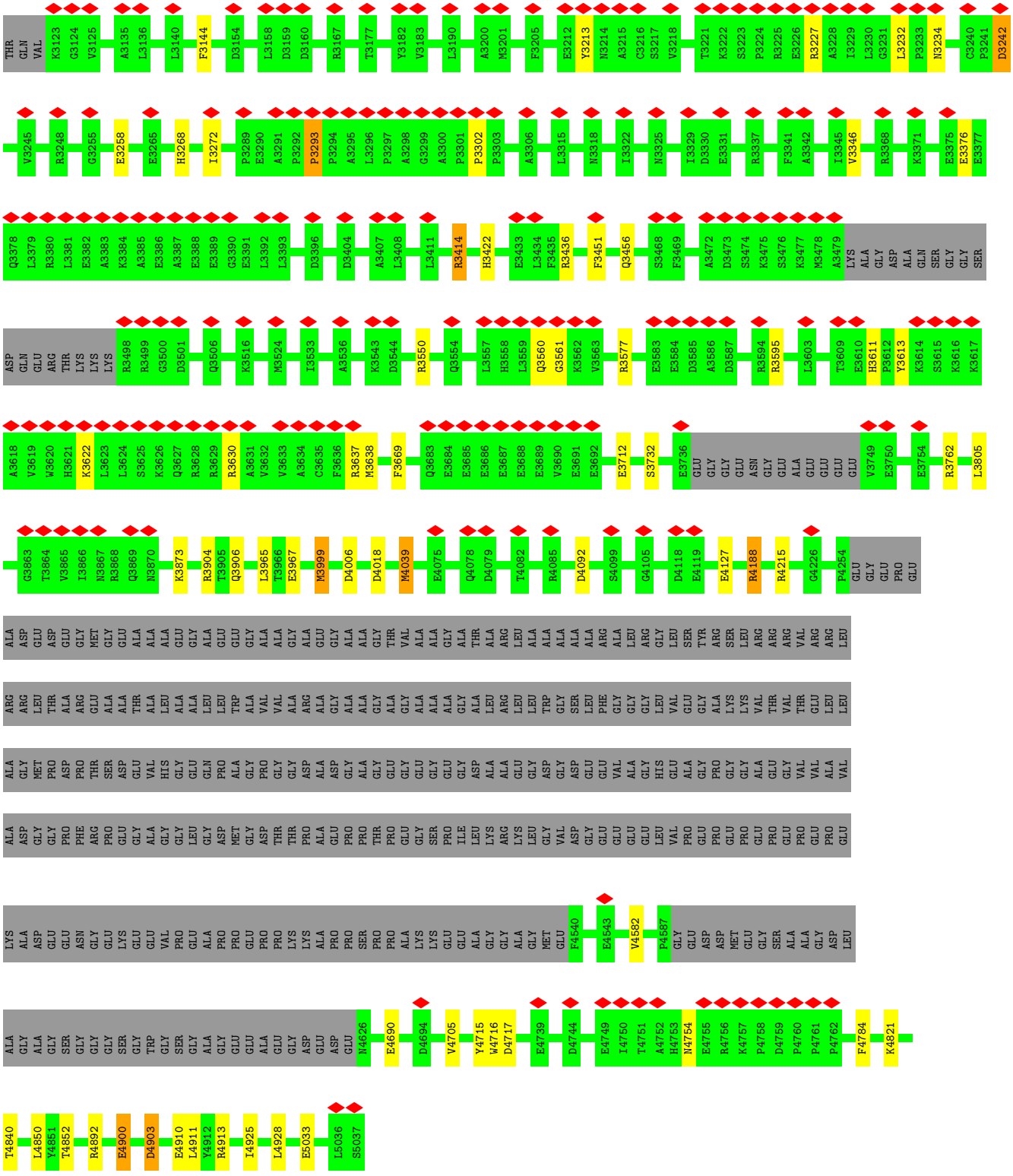


• Molecule 1: Ryanodine receptor 1

Chain C:

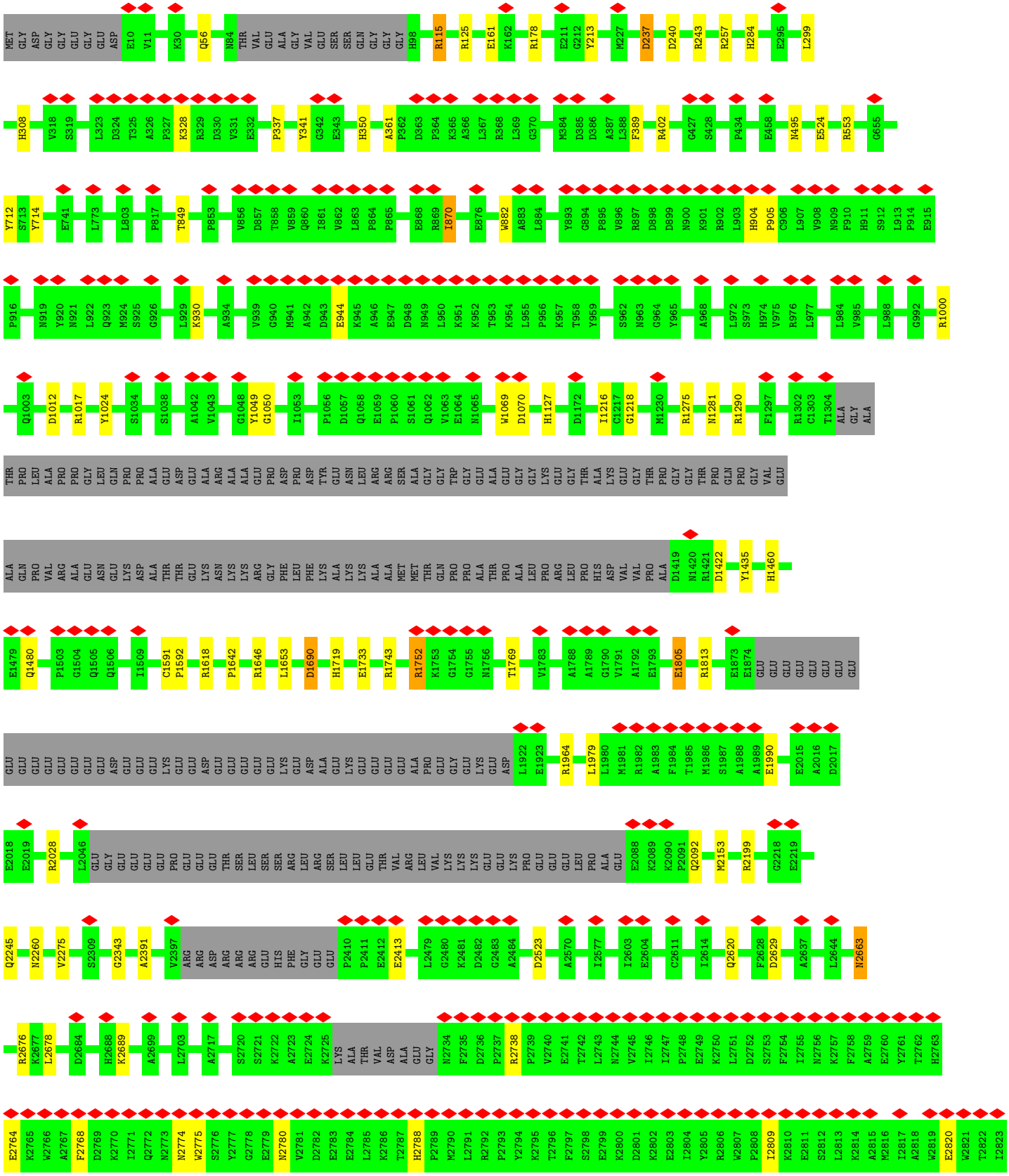



P916 E917 R918 N919 Y920 N921 L922 Q923 M924 A934 V939 A942 D943 E944 K945 A946 E947 D948 N949 L950 K951 K952 T953 K954 L955 P956 K957 T958 N963 G964 Y965 A968 P969 L970 D971 L972 S973 H974 V975 R976 L977 Q981 V985 L988 G992 D999 R1000 Q1003
R1017 S1034 S1038 Q1041 A1042 V1043 G1048 Y1049 G1050 I1053 P1056 D1057 Q1058 E1059 P1060 S1061 Q1062 V1063 E1064 N1065 W1069 D1070 H1127 R1131 D1172 R1180 M1230 E1251 R1275 N1281 R1302 C1303 T1304 ALA GLY ALA THR PRO LEU ALA PRO PRO GLY LEU
GLN PRO PRO ALA GLU ASP GLU ALA ARG ALA ALA GLU PRO ASP PRO ASP TYR GLU ASN LEU ARG ARG SER ALA GLY GLY TRP GLY GLU ALA GLU GLY GLY LYS GLU GLY THR ALA LYS GLU GLY THR PRO GLY GLY THR PRO GLN PRO GLY VAL GLU ALA GLN PRO VAL ARG ALA GLU ASN
GLU LYS ASP ALA THR THR GLU LYS ASN LYS LYS ARG GLY PHE LEU PHE LYS ALA LYS LYS ALA ALA MET MET THR GLN PRO PRO ALA THR PRO ALA LEU PRO ARG LEU PRO HIS ASP VAL VAL PRO ALA D1419 N1420 Y1435 R1438 E1479 Q1480 P1503 G1504 Q1505 Q1506 I1509
C1591 P1592 P1642 R1646 L1653 D1690 R1743 R1752 K1753 G1754 G1755 N1756 T1769 V1783 A1788 A1789 G1790 V1791 A1792 E1793 E1805 R1813 E1873 E1874 GLU GLU GLU GLU GLU GLU GLU GLU GLU GLU GLU GLU GLU GLU GLU GLU GLU ASP GLU GLU GLU LYS GLU GLU ASP
GLU GLU GLU GLU LYS GLU ASP ALA GLU LYS GLU GLU GLU ALA PRO GLU GLY GLU LYS GLU ASP L1922 E1923 R1964 L1979 L1980 M1981 R1982 A1983 F1984 T1985 M1986 S1987 A1988 A1989 E1990 E2015 A2016 D2017 E2018 E2019 D2020 R2028 L2046 GLU GLY GLU GLU GLU PRO GLU GLU
GLU THR SER LEU SER SER ARG LEU ARG SER LEU LEU LEU GLU THR VAL ARG LEU VAL LYS LYS LYS GLU GLU LYS PRO GLU GLU GLU LEU LEU PRO ALA GLU E2088 K2089 K2090 P2091 Q2092 Y2128 M2153 R2199 M2211 G2218 E2219 E2222 N2260 V2275 Y2301 G2396 V2397 ARG
ARG ASP ARG ARG ARG GLU HIS PHE GLY GLU GLU P2410 P2411 E2412 R2452 L2479 G2480 K2481 D2482 G2483 A2484 D2523 D2537 I2577 I2603 C2611 I2614 F2628 D2629 L2633 A2637 E2649 N2663 T2667 H2673 R2676 K2677 L2678 H2688 A2699 L2703
D2716 A2717 S2718 Y2719 S2720 S2721 K2722 A2723 E2724 K2725 LYS ALA THR VAL ASP ALA GLU GLY N2734 F2735 D2736 P2737 R2738 P2739 V2740 E2741 T2742 L2743 N2744 V2745 I2746 I2747 P2748 E2749 K2750 L2751 D2752 S2753 F2754 I2755 N2756 K2757 F2758 A2759 E2760 Y2761 T2762 H2763 E2764 K2765 W2766 A2767 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 E2799 K2800 D2801 K2802 E2803 I2804 Y2805 R2806 W2807 P2808 T2809 K2810 E2811 S2812 L2813 K2814 A2815 M2816 I2817 A2818 W2819 E2820 W2821 T2822 I2823 E2824 K2825 A2826 R2827 E2828 G2829 E2830 GLU GLU ARG THR
GLU LYS LYS LYS THR ARG LYS ILE SER GLN THR ALA GLN THR TYR ASP PRO ARG GLU GLY Y2855 N2856 P2857 Q2858 P2859 P2860 D2861 L2862 S2863 G2864 V2865 T2866 L2867 S2868 R2869 E2870 L2871 Q2872 A2873 M2874 A2875 E2876 A2879 E2880 N2881 Y2882 H2883 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 R2918 D2919 R2920 E2921 K2922 A2923 Q2924 E2925 L2926 L2927 K2928 F2929 L2930 Q2931 M2932 N2933 G2934 Y2935 A2936 V2937 T2938 R2939 GLY LEU LYS ASP MET GLU L2946 D2947 T2948 R2965 W2966 M2967 D2968 E2972
A2975 E2978 A2979 S2982 S2983 G2984 R2985 V2986 E2987 K2988 S2989 P2990 H2991 L3002 I3006 F3010 F3017 S3027 E3037 C3044 A3048 R3051 H3052 R3053 T3059 V3064 L3068 A3077 E3086 I3087 E3101 E3108 R3111 L3112 G3113 K3114 V3115 S3116 GLN ALA ARG



• Molecule 1: Ryanodine receptor 1

Chain D: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H308 V318 S319 L323 D324 T325 A326 P327 K328 R329 D330 V331 E332 P337 Y341 G342 E343 H350 A361 P362 D363 P364 K365 A366 L367 R368 L369 G370 M384 D385 D386 A387 L388 F389 R402 G427 S428 P434 E458 N495 E524 R553 G655
Y712 S713 Y714 E741 L773 L803 P817 T849 P853 V856 D857 T858 V859 Q860 I861 V862 L863 P864 P865 E868 R869 I870 E876 W882 A883 L884 Y893 G894 P895 V896 R897 D898 D899 N900 K901 R902 L903 H904 P905 C906 L907 V908 N909 F910 H911 S912 L913 P914 E915
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THR PRO LEU ALA PRO PRO GLY LEU GLN PRO PRO ALA GLU ASP GLU ALA ARG ALA ALA GLU PRO ASP PRO ASP TYR GLU ASN LEU ARG ARG SER ALA GLY GLY TRP GLY GLU ALA GLU GLY GLY LYS GLU GLY THR ALA LYS GLU GLY THR PRO GLY GLY THR PRO GLN PRO GLY VAL GLU
ALA GLN PRO VAL ARG ALA GLU ASN GLU LYS ASP ALA THR THR GLU LYS ASN LYS LYS ARG GLY PHE LEU PHE LYS ALA LYS LYS ALA ALA MET MET THR GLN PRO PRO ALA THR PRO ALA LEU PRO ARG LEU PRO HIS ASP VAL VAL PRO ALA D1419 N1420 R1421 D1422 Y1435 H1460
E1479 Q1480 P1503 G1504 Q1505 Q1506 I1509 C1591 P1592 R1618 P1642 R1646 L1653 D1690 H1719 E1733 R1743 R1752 K1753 G1754 G1755 N1756 T1769 V1783 A1788 A1789 G1790 V1791 A1792 E1793 E1805 R1813 E1873 E1874 GLU GLU GLU GLU GLU GLU GLU
GLU GLU GLU GLU GLU GLU GLU ASP GLU GLU GLU LYS GLU GLU ASP GLU GLU GLU GLU GLU LYS GLU ASP ALA GLU LYS GLU GLU GLU GLU GLU ALA PRO GLU GLY GLU LYS GLU ASP L1922 E1923 R1964 L1979 L1980 M1981 R1982 A1983 F1984 T1985 M1986 S1987 A1988 A1989 E1990 E2015 A2016 D2017
E2018 E2019 R2028 L2046 GLU GLY GLU GLU GLU PRO GLU GLU GLU THR SER LEU SER SER ARG LEU ARG SER LEU LEU GLU THR VAL ARG LEU VAL LYS LYS LYS GLU GLU LYS PRO GLU GLU GLU LEU PRO ALA GLU E2088 K2089 K2090 P2091 Q2092 M2153 R2199 G2218 E2219
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R2676 K2677 L2678 D2684 H2688 K2689 A2699 L2703 A2717 S2720 S2721 K2722 A2723 E2724 K2725 LYS ALA THR VAL ASP ALA GLU GLY N2734 F2735 D2736 P2737 R2738 P2739 V2740 E2741 T2742 L2743 N2744 V2745 I2746 I2747 P2748 E2749 K2750 L2751 D2752 S2753 F2754 I2755 N2756 K2757 F2758 A2759 E2760 Y2761 T2762 H2763
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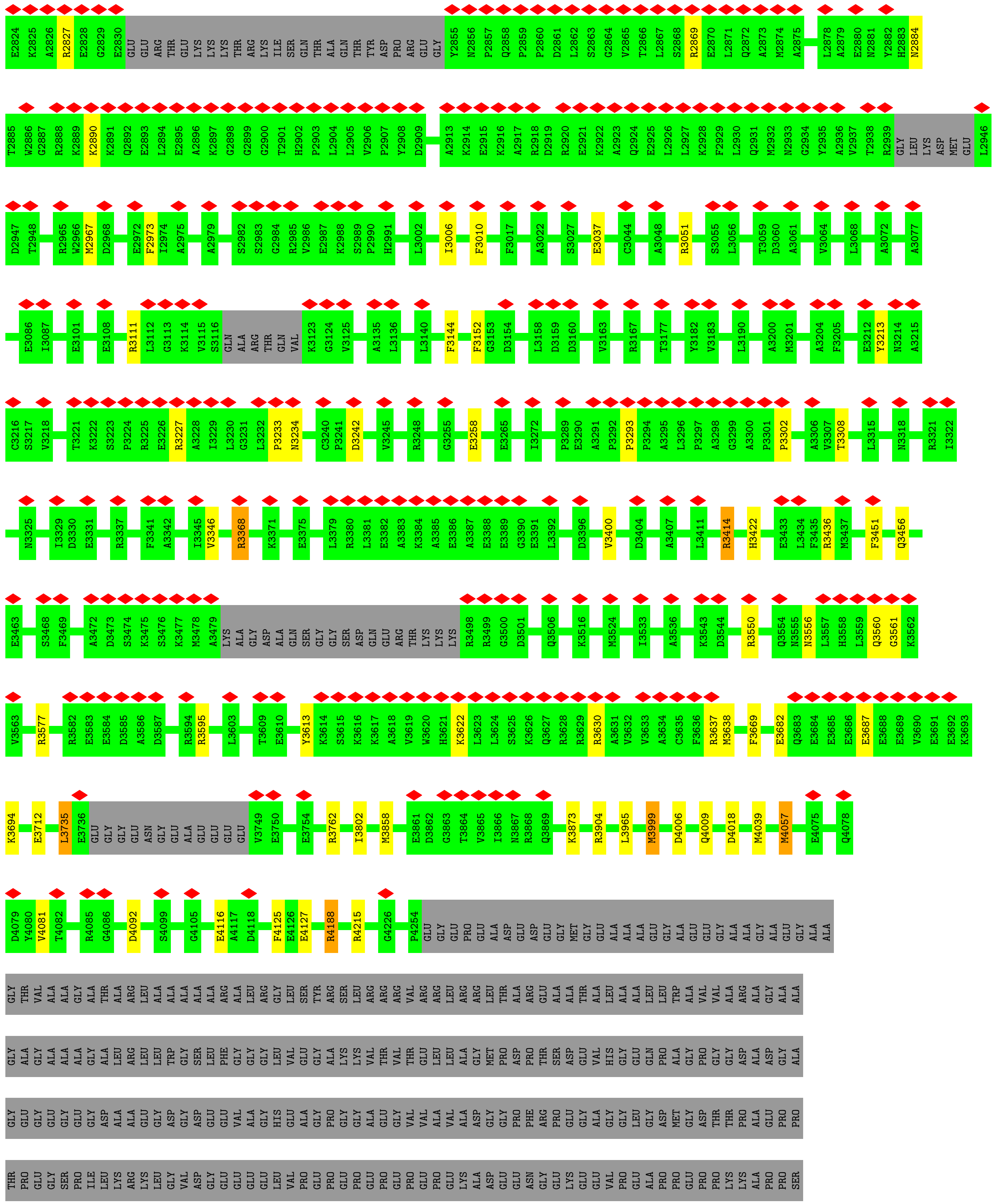
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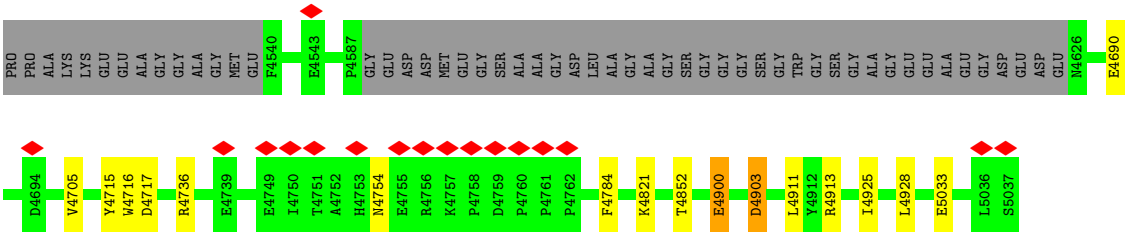
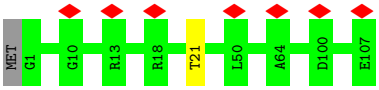
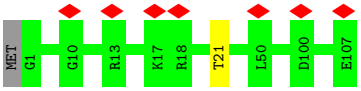
T2885 W2886 G2887 R2888 K2889 K2890 K2891 Q2892 E2893 L2894 E2895 A2896 K2897 G2898 G2899 G2900 T2901 H2902 P2903 L2904 L2905 V2906 P2907 Y2908 D2909 A2913 K2914 E2915 K2916 A2917 R2918 D2919 R2920 E2921 K2922 A2923 Q2924 E2925 L2926 L2927 K2928 F2929 L2930 Q2931 M2932 N2933 G2934 Y2935 A2936 V2937 T2938 R2939 GLY LEU LYS ASP MET GLU L2946
D2947 T2948 R2965 W2966 M2967 D2968 E2972 F2973 I2974 A2975 A2979 S2982 S2983 G2984 R2985 V2986 E2987 K2988 S2989 P2990 H2991 L3002 I3006 F3010 F3017 A3022 S3027 E3037 C3044 A3048 R3051 S3055 L3056 T3059 D3060 A3061 V3064 L3068 A3072 A3077
E3086 I3087 E3101 E3108 R3111 L3112 G3113 K3114 V3115 S3116 GLN ALA ARG THR GLN VAL K3123 G3124 V3125 A3135 L3136 L3140 F3144 F3152 G3153 D3154 L3158 D3159 D3160 V3163 R3167 T3177 Y3182 V3183 L3190 A3200 M3201 A3204 F3205 E3212 Y3213 N3214 A3215
C3216 S3217 V3218 T3221 K3222 S3223 P3224 R3225 E3226 R3227 A3228 I3229 L3230 G3231 L3232 P3233 N3234 C3240 P3241 D3242 V3245 R3248 G3255 E3258 E3265 I3272 P3289 E3290 A3291 P3292 P3293 P3294 A3295 L3296 P3297 A3298 G3299 A3300 P3301 P3302 A3306 V3307 T3308 L3315 N3318 R3321 I3322
N3325 I3329 D3330 E3331 R3337 F3341 A3342 I3345 V3346 R3368 K3371 E3375 L3379 R3380 L3381 E3382 A3383 K3384 A3385 E3386 A3387 E3388 E3389 G3390 E3391 L3392 D3396 V3400 D3404 A3407 L3411 R3414 H3422 E3433 L3434 F3435 R3436 M3437 F3451 Q3456
E3463 S3468 F3469 A3472 D3473 S3474 K3475 S3476 K3477 M3478 A3479 LYS ALA GLY ASP ALA GLN SER GLY GLY SER ASP GLN GLU ARG THR LYS LYS LYS R3498 R3499 G3500 D3501 Q3506 K3516 M3524 I3533 A3536 K3543 D3544 R3550 Q3554 N3555 N3556 L3557 H3558 L3559 Q3560 G3561 K3562
V3563 R3577 R3582 E3583 E3584 D3585 A3586 D3587 R3594 R3595 L3603 T3609 E3610 Y3613 K3614 S3615 K3616 K3617 A3618 V3619 W3620 H3621 K3622 L3623 L3624 S3625 K3626 Q3627 R3628 R3629 R3630 A3631 V3632 V3633 A3634 C3635 F3636 R3637 M3638 F3669 E3682 Q3683 E3684 E3685 E3686 E3687 E3688 E3689 V3690 E3691 E3692 K3693
K3694 E3712 L3735 E3736 GLU GLY GLY GLU ASN GLY GLU ALA GLU GLU GLU GLU V3749 E3750 E3754 R3762 I3802 M3858 E3861 D3862 G3863 T3864 V3865 I3866 N3867 R3868 Q3869 K3873 R3904 L3965 M3999 D4006 Q4009 D4018 M4039 M4057 E4075 Q4078
D4079 Y4080 V4081 T4082 R4085 G4086 D4092 S4099 G4105 E4116 A4117 D4118 F4125 E4126 E4127 R4188 R4215 G4226 P4254 GLU GLY GLU PRO GLU ALA ASP GLU ASP GLU GLY MET GLY GLU ALA ALA ALA GLU GLY ALA GLU GLU GLY ALA ALA GLY ALA GLU GLY ALA ALA
GLY THR VAL ALA ALA GLY ALA THR ALA ARG LEU ALA ALA ALA ALA ALA ARG ALA LEU ARG GLY LEU SER TYR ARG SER LEU ARG ARG ARG VAL ARG ARG LEU ARG ARG LEU THR ALA ARG GLU ALA ALA THR ALA LEU ALA ALA LEU LEU TRP ALA ALA VAL VAL ALA ARG ALA GLY ALA ALA
GLY ALA GLY ALA ALA ALA GLY ALA LEU ARG LEU LEU TRP GLY SER LEU PHE GLY GLY GLY LEU VAL GLU GLY ALA LYS LYS VAL THR VAL THR GLU LEU LEU ALA GLY MET PRO ASP PRO THR SER ASP GLU VAL HIS GLY GLU GLN PRO ALA GLY PRO GLY GLY ASP ALA ASP GLY ALA
GLY GLU GLY GLU GLY GLU GLY ASP ALA ALA GLU GLY ASP GLY ASP GLU GLU VAL ALA ALA GLY HIS GLU ALA GLY PRO GLY GLY ALA GLU GLY VAL VAL ALA VAL ALA ASP GLY GLY PRO PHE ARG PRO GLU GLY ALA GLY GLY LEU GLY ASP MET GLY ASP THR THR PRO ALA GLU PRO PRO
THR PRO GLU GLY SER PRO ILE LEU LYS ARG LYS LEU GLY VAL ASP GLY GLU GLU GLU GLU LEU VAL PRO GLU PRO GLU PRO GLU PRO GLU PRO GLU PRO GLU LYS ALA ASP GLU GLU ASN GLY GLU LYS GLU GLU VAL PRO GLU ALA PRO PRO GLU PRO PRO LYS LYS ALA PRO PRO SER



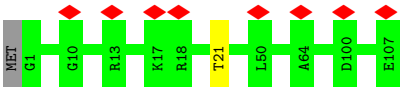
• Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1A



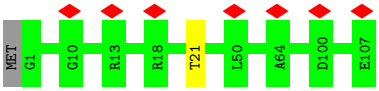
• Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1A



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



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



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C4	Depositor
Number of particles used	57655	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	67.44	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	4000	Depositor
Magnification	64000	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	1.068	Depositor
Minimum map value	-0.746	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.026	Depositor
Recommended contour level	0.106	Depositor
Map size (Å)	601.04004, 601.04004, 601.04004	wwPDB
Map dimensions	440, 440, 440	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.366, 1.366, 1.366	Depositor

5 Model quality

5.1 Standard geometry

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	0.78	1/35885 (0.0%)	1.31	74/48603 (0.2%)
1	B	0.78	2/35885 (0.0%)	1.31	75/48603 (0.2%)
1	C	0.78	1/35885 (0.0%)	1.31	75/48603 (0.2%)
1	D	0.78	2/35885 (0.0%)	1.31	74/48603 (0.2%)
2	E	0.80	0/851	1.33	0/1146
2	F	0.80	0/851	1.32	0/1146
2	G	0.80	0/851	1.33	0/1146
2	H	0.80	0/851	1.33	0/1146
All	All	0.78	6/146944 (0.0%)	1.31	298/198996 (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
1	A	0	11
1	B	0	13
1	C	0	15
1	D	0	10
All	All	0	49

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	1592	PRO	CA-C	5.51	1.54	1.51
1	A	1592	PRO	CA-C	5.39	1.54	1.51
1	D	3302	PRO	CA-C	5.38	1.54	1.51
1	B	3302	PRO	CA-C	5.34	1.54	1.51
1	C	1592	PRO	CA-C	5.32	1.54	1.51
1	B	1592	PRO	CA-C	5.26	1.54	1.51

All (298) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	2629	ASP	CA-C-N	9.29	126.10	120.24
1	B	2629	ASP	C-N-CA	9.29	126.10	120.24
1	A	3293	PRO	N-CA-C	7.31	119.62	110.70
1	A	4690	GLU	N-CA-C	7.26	120.26	111.40
1	D	3293	PRO	N-CA-C	7.04	119.29	110.70
1	B	4903	ASP	CA-CB-CG	6.98	119.58	112.60
1	D	4903	ASP	CA-CB-CG	6.98	119.58	112.60
1	D	4925	ILE	N-CA-C	6.97	117.08	110.53
1	C	4903	ASP	CA-CB-CG	6.94	119.54	112.60
1	C	4925	ILE	N-CA-C	6.91	117.03	110.53
1	A	4925	ILE	N-CA-C	6.91	117.02	110.53
1	A	4903	ASP	CA-CB-CG	6.88	119.48	112.60
1	B	4925	ILE	N-CA-C	6.88	116.99	110.53
1	B	4690	GLU	N-CA-C	6.62	119.48	111.40
1	B	4928	LEU	N-CA-C	6.61	118.15	111.07
1	C	4928	LEU	N-CA-C	6.60	118.13	111.07
1	D	1275	ARG	NE-CZ-NH2	6.58	125.12	119.20
1	D	4928	LEU	N-CA-C	6.54	118.07	111.07
1	D	4690	GLU	N-CA-C	6.51	119.35	111.40
1	A	4928	LEU	N-CA-C	6.48	118.01	111.07
1	C	243	ARG	NE-CZ-NH2	6.30	124.87	119.20
1	C	3052	HIS	CA-C-N	6.25	129.50	120.38
1	C	3052	HIS	C-N-CA	6.25	129.50	120.38
1	D	243	ARG	NE-CZ-NH2	6.22	124.80	119.20
1	D	1012	ASP	CA-C-N	6.18	124.14	120.24
1	D	1012	ASP	C-N-CA	6.18	124.14	120.24
1	B	243	ARG	NE-CZ-NH2	6.17	124.76	119.20
1	B	1070	ASP	CA-CB-CG	6.17	118.77	112.60
1	D	3556	ASN	CA-CB-CG	6.15	118.75	112.60
1	A	2676	ARG	NE-CZ-NH2	6.14	124.72	119.20
1	A	243	ARG	NE-CZ-NH2	6.12	124.71	119.20
1	D	2629	ASP	CA-C-N	6.09	124.08	120.24
1	D	2629	ASP	C-N-CA	6.09	124.08	120.24
1	C	4690	GLU	N-CA-C	6.09	119.18	111.69
1	C	3053	ARG	NE-CZ-NH2	6.01	124.61	119.20
1	C	2676	ARG	NE-CZ-NH2	5.97	124.57	119.20
1	A	1275	ARG	NE-CZ-NH2	5.93	124.54	119.20
1	D	2260	ASN	CA-CB-CG	5.93	118.53	112.60
1	C	3595	ARG	NE-CZ-NH2	5.91	124.52	119.20
1	A	3053	ARG	NE-CZ-NH2	5.91	124.52	119.20
1	C	1275	ARG	NE-CZ-NH2	5.91	124.52	119.20
1	C	2768	PHE	CA-CB-CG	5.89	119.69	113.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	1275	ARG	NE-CZ-NH2	5.86	124.48	119.20
1	C	2629	ASP	CA-C-N	5.84	123.92	120.24
1	C	2629	ASP	C-N-CA	5.84	123.92	120.24
1	A	1591	CYS	CA-C-N	5.83	123.91	119.66
1	A	1591	CYS	C-N-CA	5.83	123.91	119.66
1	C	3560	GLN	CA-C-N	5.82	125.63	120.10
1	C	3560	GLN	C-N-CA	5.82	125.63	120.10
1	D	1690	ASP	CA-CB-CG	5.82	118.42	112.60
1	D	1591	CYS	CA-C-N	5.81	123.90	119.66
1	D	1591	CYS	C-N-CA	5.81	123.90	119.66
1	C	1017	ARG	NE-CZ-NH2	5.79	124.41	119.20
1	A	3560	GLN	CA-C-N	5.79	125.60	120.10
1	A	3560	GLN	C-N-CA	5.79	125.60	120.10
1	D	1070	ASP	CA-CB-CG	5.79	118.39	112.60
1	D	3560	GLN	CA-C-N	5.79	125.60	120.10
1	D	3560	GLN	C-N-CA	5.79	125.60	120.10
1	B	2630	VAL	N-CA-CB	-5.78	106.86	110.50
1	B	1690	ASP	CA-CB-CG	5.78	118.38	112.60
1	A	2628	PHE	CA-CB-CG	5.77	119.57	113.80
1	A	3687	GLU	N-CA-C	5.77	119.90	112.86
1	A	3595	ARG	NE-CZ-NH2	5.76	124.38	119.20
1	A	4900	GLU	N-CA-C	5.76	120.42	113.17
1	A	389	PHE	CA-CB-CG	5.75	119.55	113.80
1	A	3368	ARG	NE-CZ-NH2	5.75	124.37	119.20
1	A	1690	ASP	CA-CB-CG	5.75	118.34	112.60
1	D	2676	ARG	NE-CZ-NH2	5.74	124.36	119.20
1	D	257	ARG	NE-CZ-NH2	5.73	124.36	119.20
1	A	1017	ARG	NE-CZ-NH2	5.72	124.35	119.20
1	C	1690	ASP	CA-CB-CG	5.72	118.32	112.60
1	B	3560	GLN	CA-C-N	5.71	125.53	120.10
1	B	3560	GLN	C-N-CA	5.71	125.53	120.10
1	B	1017	ARG	NE-CZ-NH2	5.71	124.34	119.20
1	A	2629	ASP	CA-C-N	5.71	123.83	120.24
1	A	2629	ASP	C-N-CA	5.71	123.83	120.24
1	D	3595	ARG	NE-CZ-NH2	5.71	124.33	119.20
1	B	257	ARG	NE-CZ-NH2	5.70	124.33	119.20
1	A	257	ARG	NE-CZ-NH2	5.70	124.33	119.20
1	B	3595	ARG	NE-CZ-NH2	5.69	124.32	119.20
1	D	3550	ARG	NE-CZ-NH2	5.68	124.31	119.20
1	A	3414	ARG	CD-NE-CZ	5.68	132.35	124.40
1	C	2628	PHE	CA-CB-CG	5.67	119.47	113.80
1	A	2859	PRO	N-CA-CB	5.67	106.17	103.22

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	4900	GLU	N-CA-C	5.67	120.31	113.17
1	D	4900	GLU	N-CA-C	5.67	120.31	113.17
1	C	257	ARG	NE-CZ-NH2	5.66	124.30	119.20
1	D	389	PHE	CA-CB-CG	5.66	119.46	113.80
1	C	3144	PHE	CA-CB-CG	5.66	119.46	113.80
1	B	389	PHE	CA-CB-CG	5.65	119.45	113.80
1	C	1591	CYS	CA-C-N	5.65	123.79	119.66
1	C	1591	CYS	C-N-CA	5.65	123.79	119.66
1	B	350	HIS	CB-CG-CD2	-5.65	123.86	131.20
1	B	3053	ARG	NE-CZ-NH2	5.65	124.28	119.20
1	B	3637	ARG	N-CA-C	5.64	117.66	110.61
1	B	2738	ARG	NE-CZ-NH2	5.63	124.27	119.20
1	D	3762	ARG	NE-CZ-NH2	5.62	124.26	119.20
1	D	350	HIS	CB-CG-CD2	-5.61	123.90	131.20
1	A	350	HIS	CB-CG-CD2	-5.60	123.92	131.20
1	D	2869	ARG	NE-CZ-NH2	5.60	124.24	119.20
1	B	4900	GLU	N-CA-C	5.59	120.21	113.17
1	C	3550	ARG	NE-CZ-NH2	5.59	124.23	119.20
1	B	1591	CYS	CA-C-N	5.59	123.74	119.66
1	B	1591	CYS	C-N-CA	5.59	123.74	119.66
1	B	2768	PHE	CA-CB-CG	5.59	119.39	113.80
1	A	38	ALA	N-CA-C	5.58	117.56	109.07
1	A	3550	ARG	NE-CZ-NH2	5.58	124.22	119.20
1	D	2738	ARG	NE-CZ-NH2	5.58	124.22	119.20
1	B	3144	PHE	CA-CB-CG	5.58	119.38	113.80
1	C	350	HIS	CB-CG-CD2	-5.58	123.95	131.20
1	B	3414	ARG	CD-NE-CZ	5.57	132.19	124.40
1	C	389	PHE	CA-CB-CG	5.56	119.36	113.80
1	A	3732	SER	N-CA-C	5.55	119.79	113.19
1	C	2260	ASN	CA-CB-CG	5.55	118.15	112.60
1	B	1752	ARG	NE-CZ-NH2	5.54	124.19	119.20
1	C	2869	ARG	NE-CZ-NH2	5.54	124.19	119.20
1	C	3414	ARG	CD-NE-CZ	5.53	132.15	124.40
1	A	3762	ARG	NE-CZ-NH2	5.52	124.17	119.20
1	D	553	ARG	NE-CZ-NH2	5.52	124.17	119.20
1	A	3422	HIS	CA-CB-CG	-5.51	108.29	113.80
1	A	2494	PHE	CA-CB-CG	5.51	119.31	113.80
1	B	4821	LYS	N-CA-C	5.51	116.96	111.07
1	D	944	GLU	N-CA-C	5.51	117.28	111.28
1	C	1752	ARG	NE-CZ-NH2	5.50	124.15	119.20
1	C	3302	PRO	N-CA-CB	5.50	106.08	103.22
1	A	3637	ARG	N-CA-C	5.49	117.48	110.61

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	D	1752	ARG	NE-CZ-NH2	5.49	124.14	119.20
1	A	1752	ARG	NE-CZ-NH2	5.49	124.14	119.20
1	D	3422	HIS	CA-CB-CG	-5.48	108.32	113.80
1	B	4753	HIS	CB-CG-CD2	-5.48	124.08	131.20
1	C	2754	PHE	CA-CB-CG	5.48	119.28	113.80
1	A	402	ARG	NE-CZ-NH2	5.48	124.13	119.20
1	B	3550	ARG	NE-CZ-NH2	5.48	124.13	119.20
1	A	3144	PHE	CA-CB-CG	5.47	119.27	113.80
1	D	3414	ARG	CD-NE-CZ	5.47	132.06	124.40
1	B	2736	ASP	CA-CB-CG	5.46	118.06	112.60
1	C	3762	ARG	NE-CZ-NH2	5.46	124.11	119.20
1	B	2676	ARG	NE-CZ-NH2	5.45	124.10	119.20
1	B	3627	GLN	OE1-CD-NE2	-5.45	117.16	122.60
1	B	944	GLU	N-CA-C	5.44	117.29	111.36
1	C	1057	ASP	CA-CB-CG	5.44	118.04	112.60
1	B	553	ARG	NE-CZ-NH2	5.43	124.09	119.20
1	C	3272	ILE	CB-CA-C	5.43	116.23	110.91
1	A	1813	ARG	NE-CZ-NH2	5.43	124.08	119.20
1	B	133	PHE	CA-CB-CG	5.43	119.23	113.80
1	A	2738	ARG	NE-CZ-NH2	5.42	124.08	119.20
1	C	553	ARG	NE-CZ-NH2	5.42	124.08	119.20
1	B	3422	HIS	CA-CB-CG	-5.41	108.39	113.80
1	D	3111	ARG	CA-C-N	5.40	130.41	122.63
1	D	3111	ARG	C-N-CA	5.40	130.41	122.63
1	A	2973	PHE	CA-CB-CG	5.40	119.20	113.80
1	B	3111	ARG	CA-C-N	5.40	130.41	122.63
1	B	3111	ARG	C-N-CA	5.40	130.41	122.63
1	C	3111	ARG	CA-C-N	5.39	130.40	122.63
1	C	3111	ARG	C-N-CA	5.39	130.40	122.63
1	A	2028	ARG	NE-CZ-NH2	5.39	124.05	119.20
1	D	4821	LYS	N-CA-C	5.39	117.15	111.28
1	B	2028	ARG	NE-CZ-NH2	5.38	124.04	119.20
1	D	1813	ARG	NE-CZ-NH2	5.38	124.04	119.20
1	B	402	ARG	NE-CZ-NH2	5.37	124.03	119.20
1	A	1646	ARG	NE-CZ-NH2	5.36	124.03	119.20
1	B	2754	PHE	CA-CB-CG	5.35	119.15	113.80
1	C	3637	ARG	N-CA-C	5.35	117.30	110.61
1	B	3451	PHE	CA-CB-CG	5.35	119.15	113.80
1	D	3687	GLU	N-CA-C	5.35	119.10	112.47
1	A	553	ARG	NE-CZ-NH2	5.35	124.01	119.20
1	C	3422	HIS	CA-CB-CG	-5.34	108.46	113.80
1	D	3144	PHE	CA-CB-CG	5.34	119.14	113.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	402	ARG	NE-CZ-NH2	5.34	124.00	119.20
1	B	3561	GLY	N-CA-C	5.33	118.06	111.93
1	A	237	ASP	CA-CB-CG	5.33	117.93	112.60
1	C	3732	SER	N-CA-C	5.31	119.51	113.19
1	C	2028	ARG	NE-CZ-NH2	5.31	123.98	119.20
1	A	3561	GLY	N-CA-C	5.31	118.03	111.93
1	A	1131	ARG	NE-CZ-NH2	5.30	123.97	119.20
1	B	1813	ARG	NE-CZ-NH2	5.29	123.96	119.20
1	D	2028	ARG	NE-CZ-NH2	5.29	123.96	119.20
1	C	1127	HIS	CB-CG-CD2	-5.29	124.33	131.20
1	A	824	GLU	N-CA-C	5.29	114.38	108.25
1	C	944	GLU	N-CA-C	5.29	117.12	111.36
1	A	1964	ARG	NE-CZ-NH2	5.28	123.95	119.20
1	A	3451	PHE	CA-CB-CG	5.28	119.08	113.80
1	D	3451	PHE	CA-CB-CG	5.28	119.08	113.80
1	C	824	GLU	N-CA-C	5.27	114.36	108.25
1	D	237	ASP	CA-CB-CG	5.27	117.87	112.60
1	B	1131	ARG	NE-CZ-NH2	5.27	123.94	119.20
1	C	2869	ARG	CD-NE-CZ	5.27	131.77	124.40
1	D	402	ARG	NE-CZ-NH2	5.26	123.94	119.20
1	A	4821	LYS	N-CA-C	5.26	117.01	111.28
1	D	3637	ARG	N-CA-C	5.26	117.18	110.61
1	D	4125	PHE	N-CA-C	5.26	118.95	112.54
1	A	944	GLU	N-CA-C	5.25	117.08	111.36
1	C	4821	LYS	N-CA-C	5.25	117.00	111.28
1	B	1646	ARG	NE-CZ-NH2	5.25	123.92	119.20
1	D	1646	ARG	NE-CZ-NH2	5.25	123.92	119.20
1	D	1743	ARG	NE-CZ-NH2	5.25	123.92	119.20
1	C	1131	ARG	NE-CZ-NH2	5.24	123.92	119.20
1	A	3111	ARG	CA-C-N	5.24	130.18	122.63
1	A	3111	ARG	C-N-CA	5.24	130.18	122.63
1	D	2523	ASP	CA-CB-CG	5.24	117.84	112.60
1	B	2245	GLN	OE1-CD-NE2	-5.24	117.36	122.60
1	C	1813	ARG	NE-CZ-NH2	5.24	123.91	119.20
1	D	2869	ARG	CD-NE-CZ	5.24	131.73	124.40
1	D	4188	ARG	CD-NE-CZ	5.23	131.72	124.40
1	C	237	ASP	CA-CB-CG	5.23	117.83	112.60
1	B	3498	ARG	NE-CZ-NH2	5.23	123.90	119.20
1	C	1646	ARG	NE-CZ-NH2	5.23	123.91	119.20
1	C	1964	ARG	NE-CZ-NH2	5.22	123.90	119.20
1	C	4188	ARG	CD-NE-CZ	5.22	131.71	124.40
1	B	824	GLU	CA-C-N	5.22	125.19	120.03

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	824	GLU	C-N-CA	5.22	125.19	120.03
1	B	1127	HIS	CB-CG-CD2	-5.21	124.43	131.20
1	B	237	ASP	CA-CB-CG	5.21	117.81	112.60
1	C	1743	ARG	NE-CZ-NH2	5.21	123.89	119.20
1	A	1743	ARG	NE-CZ-NH2	5.20	123.88	119.20
1	A	4753	HIS	CB-CG-CD2	-5.20	124.44	131.20
1	B	3227	ARG	NE-CZ-NH2	5.20	123.88	119.20
1	D	1127	HIS	CB-CG-CD2	-5.19	124.45	131.20
1	A	4188	ARG	CD-NE-CZ	5.19	131.67	124.40
1	B	1743	ARG	NE-CZ-NH2	5.19	123.87	119.20
1	D	115	ARG	CA-C-N	5.19	130.18	120.95
1	D	115	ARG	C-N-CA	5.19	130.18	120.95
1	D	2199	ARG	NE-CZ-NH2	5.18	123.86	119.20
1	C	3904	ARG	NE-CZ-NH2	5.17	123.86	119.20
1	B	38	ALA	N-CA-C	5.17	116.93	109.07
1	B	1964	ARG	NE-CZ-NH2	5.17	123.85	119.20
1	B	3904	ARG	NE-CZ-NH2	5.17	123.85	119.20
1	C	4215	ARG	NE-CZ-NH2	5.17	123.85	119.20
1	A	1127	HIS	CB-CG-CD2	-5.17	124.48	131.20
1	D	3302	PRO	N-CA-CB	5.17	106.08	103.19
1	D	1964	ARG	NE-CZ-NH2	5.16	123.84	119.20
1	D	3577	ARG	NE-CZ-NH2	5.16	123.84	119.20
1	B	2788	HIS	CB-CG-CD2	-5.14	124.52	131.20
1	D	1719	HIS	N-CA-C	5.14	119.55	113.12
1	B	3762	ARG	NE-CZ-NH2	5.13	123.82	119.20
1	D	3152	PHE	CA-CB-CG	5.13	118.93	113.80
1	A	2664	PHE	CA-CB-CG	5.13	118.93	113.80
1	C	2523	ASP	CA-CB-CG	5.12	117.72	112.60
1	B	284	HIS	CB-CG-CD2	-5.12	124.54	131.20
1	C	2199	ARG	NE-CZ-NH2	5.12	123.81	119.20
1	D	2245	GLN	OE1-CD-NE2	-5.12	117.48	122.60
1	B	3302	PRO	N-CA-CB	5.12	106.06	103.19
1	D	3368	ARG	NE-CZ-NH2	5.12	123.81	119.20
1	A	2788	HIS	CB-CG-CD2	-5.12	124.55	131.20
1	A	115	ARG	CA-C-N	5.12	130.06	120.95
1	A	115	ARG	C-N-CA	5.12	130.06	120.95
1	B	2244	ARG	NE-CZ-NH2	5.11	123.80	119.20
1	C	284	HIS	CB-CG-CD2	-5.11	124.56	131.20
1	C	4910	GLU	N-CA-C	5.11	117.24	111.11
1	C	1438	ARG	NE-CZ-NH2	5.11	123.80	119.20
1	C	4039	MET	N-CA-C	5.10	116.92	111.36
1	D	3561	GLY	N-CA-C	5.10	117.79	111.93

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	1438	ARG	NE-CZ-NH2	5.09	123.78	119.20
1	A	4039	MET	N-CA-C	5.09	116.91	111.36
1	B	1000	ARG	NE-CZ-NH2	5.09	123.78	119.20
1	A	284	HIS	CB-CG-CD2	-5.09	124.59	131.20
1	D	284	HIS	CB-CG-CD2	-5.08	124.59	131.20
1	D	4736	ARG	NE-CZ-NH2	5.08	123.77	119.20
1	C	3451	PHE	CA-CB-CG	5.08	118.88	113.80
1	A	3904	ARG	NE-CZ-NH2	5.08	123.77	119.20
1	B	2973	PHE	CA-CB-CG	5.08	118.88	113.80
1	B	4188	ARG	CD-NE-CZ	5.08	131.51	124.40
1	C	2788	HIS	CB-CG-CD2	-5.08	124.60	131.20
1	D	3904	ARG	NE-CZ-NH2	5.07	123.77	119.20
1	A	2523	ASP	CA-CB-CG	5.07	117.67	112.60
1	B	3773	ARG	NE-CZ-NH2	5.07	123.77	119.20
1	D	1000	ARG	NE-CZ-NH2	5.07	123.77	119.20
1	C	3577	ARG	NE-CZ-NH2	5.07	123.76	119.20
1	A	918	ARG	NE-CZ-NH2	5.07	123.76	119.20
1	C	1000	ARG	NE-CZ-NH2	5.06	123.76	119.20
1	A	2104	ARG	NE-CZ-NH2	5.06	123.76	119.20
1	C	918	ARG	NE-CZ-NH2	5.06	123.75	119.20
1	A	1438	ARG	NE-CZ-NH2	5.06	123.75	119.20
1	C	3611	HIS	CB-CG-CD2	-5.05	124.64	131.20
1	B	3577	ARG	NE-CZ-NH2	5.05	123.74	119.20
1	B	4563	ARG	NE-CZ-NH2	5.05	123.74	119.20
1	D	2788	HIS	CB-CG-CD2	-5.04	124.64	131.20
1	D	2884	ASN	CA-CB-CG	5.04	117.64	112.60
1	D	4215	ARG	NE-CZ-NH2	5.04	123.74	119.20
1	C	261	ARG	NE-CZ-NH2	5.04	123.73	119.20
1	C	125	ARG	NE-CZ-NH2	5.03	123.73	119.20
1	A	3577	ARG	NE-CZ-NH2	5.03	123.73	119.20
1	D	1618	ARG	NE-CZ-NH2	5.03	123.72	119.20
1	B	2199	ARG	NE-CZ-NH2	5.02	123.72	119.20
1	C	3561	GLY	N-CA-C	5.02	117.71	111.93
1	D	2973	PHE	CA-CB-CG	5.02	118.82	113.80
1	A	4215	ARG	NE-CZ-NH2	5.02	123.72	119.20
1	B	871	ARG	NE-CZ-NH2	5.02	123.72	119.20
1	C	2452	ARG	NE-CZ-NH2	5.01	123.71	119.20
1	D	1017	ARG	NE-CZ-NH2	5.01	123.71	119.20
1	B	125	ARG	NE-CZ-NH2	5.01	123.71	119.20
1	D	125	ARG	NE-CZ-NH2	5.01	123.71	119.20
1	A	2636	PHE	CA-CB-CG	5.00	118.81	113.80
1	A	2806	ARG	NE-CZ-NH2	5.00	123.70	119.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	1000	ARG	NE-CZ-NH2	5.00	123.70	119.20
1	A	2245	GLN	OE1-CD-NE2	-5.00	117.60	122.60
1	C	3242	ASP	CA-CB-CG	5.00	117.60	112.60
1	B	3611	HIS	CB-CG-CD2	-5.00	124.70	131.20

There are no chirality outliers.

All (49) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1024	TYR	Sidechain
1	A	178	ARG	Sidechain
1	A	2128	TYR	Sidechain
1	A	2256	TYR	Sidechain
1	A	341	TYR	Sidechain
1	A	3539	ARG	Sidechain
1	A	4715	TYR	Sidechain
1	A	4892	ARG	Sidechain
1	A	4913	ARG	Sidechain
1	A	714	TYR	Sidechain
1	A	918	ARG	Sidechain
1	B	1024	TYR	Sidechain
1	B	103	TYR	Sidechain
1	B	1180	ARG	Sidechain
1	B	2301	TYR	Sidechain
1	B	2650	ARG	Sidechain
1	B	3053	ARG	Sidechain
1	B	341	TYR	Sidechain
1	B	4715	TYR	Sidechain
1	B	4849	TYR	Sidechain
1	B	4892	ARG	Sidechain
1	B	4913	ARG	Sidechain
1	B	712	TYR	Sidechain
1	B	714	TYR	Sidechain
1	C	1180	ARG	Sidechain
1	C	157	ARG	Sidechain
1	C	2128	TYR	Sidechain
1	C	2301	TYR	Sidechain
1	C	2761	TYR	Sidechain
1	C	3053	ARG	Sidechain
1	C	341	TYR	Sidechain
1	C	3436	ARG	Sidechain
1	C	4715	TYR	Sidechain

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Mol	Chain	Res	Type	Group
1	C	4892	ARG	Sidechain
1	C	4913	ARG	Sidechain
1	C	712	TYR	Sidechain
1	C	714	TYR	Sidechain
1	C	897	ARG	Sidechain
1	C	918	ARG	Sidechain
1	D	1024	TYR	Sidechain
1	D	1290	ARG	Sidechain
1	D	178	ARG	Sidechain
1	D	3213	TYR	Sidechain
1	D	341	TYR	Sidechain
1	D	3436	ARG	Sidechain
1	D	4715	TYR	Sidechain
1	D	4913	ARG	Sidechain
1	D	712	TYR	Sidechain
1	D	714	TYR	Sidechain

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	35088	34734	34715	9	0
1	B	35088	34734	34715	11	0
1	C	35088	34734	34715	6	0
1	D	35088	34734	34715	10	0
2	E	832	829	831	0	0
2	F	832	829	831	0	0
2	G	832	829	831	0	0
2	H	832	829	831	0	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
All	All	143684	142252	142184	36	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 0.

All (36) close contacts within the same asymmetric unit are listed below, sorted by their clash

magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:3006:ILE:HD11	1:A:3010:PHE:CE2	2.46	0.51
1:B:3999:MET:HA	1:B:3999:MET:HE2	1.92	0.50
1:C:3999:MET:HE2	1:C:3999:MET:HA	1.94	0.49
1:D:3006:ILE:HD11	1:D:3010:PHE:CE2	2.47	0.49
1:C:3006:ILE:HD11	1:C:3010:PHE:CE2	2.48	0.48
1:B:3006:ILE:HD11	1:B:3010:PHE:CE2	2.49	0.47
1:D:2809:ILE:H	1:D:2809:ILE:HD12	1.78	0.47
1:D:3999:MET:HA	1:D:3999:MET:HE2	1.97	0.46
1:A:904:HIS:CG	1:A:905:PRO:HD2	2.51	0.46
1:C:3906:GLN:H	1:C:3906:GLN:CD	2.24	0.46
1:B:904:HIS:CG	1:B:905:PRO:HD2	2.51	0.45
1:D:904:HIS:CG	1:D:905:PRO:HD2	2.51	0.45
1:A:3999:MET:HA	1:A:3999:MET:HE2	1.99	0.45
1:D:1805:GLU:H	1:D:1805:GLU:CD	2.25	0.44
1:C:1805:GLU:H	1:C:1805:GLU:CD	2.26	0.44
1:B:1045:THR:HG22	1:B:1049:TYR:CE2	2.53	0.43
1:C:904:HIS:CG	1:C:905:PRO:HD2	2.52	0.43
1:A:2809:ILE:HD12	1:A:2809:ILE:H	1.84	0.43
1:B:1805:GLU:H	1:B:1805:GLU:CD	2.25	0.43
1:A:1805:GLU:H	1:A:1805:GLU:CD	2.26	0.43
1:A:4057:MET:HA	1:A:4057:MET:HE3	2.02	0.42
1:D:3368:ARG:HH12	1:D:3400:VAL:HG13	1.84	0.42
1:A:3368:ARG:HH12	1:A:3400:VAL:HG13	1.85	0.42
1:D:213:TYR:CD1	1:D:337:PRO:HB2	2.55	0.42
1:B:213:TYR:CD1	1:B:337:PRO:HB2	2.55	0.42
1:B:1069:TRP:CZ2	1:B:1460:HIS:CD2	3.08	0.42
1:B:3558:HIS:CD2	1:B:3558:HIS:H	2.38	0.42
1:A:3558:HIS:CD2	1:A:3558:HIS:H	2.38	0.41
1:D:1069:TRP:CZ2	1:D:1460:HIS:CD2	3.08	0.41
1:C:2809:ILE:H	1:C:2809:ILE:HD12	1.85	0.41
1:D:4057:MET:HE3	1:D:4057:MET:HA	2.03	0.41
1:B:3906:GLN:H	1:B:3906:GLN:CD	2.27	0.41
1:B:3051:ARG:C	1:B:3053:ARG:H	2.29	0.41
1:A:213:TYR:CD1	1:A:337:PRO:HB2	2.57	0.40
1:D:870:ILE:HD11	1:D:1049:TYR:CD2	2.56	0.40
1:B:3110:LEU:C	1:B:3112:LEU:H	2.29	0.40

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	4376/5037 (87%)	4144 (95%)	215 (5%)	17 (0%)	30	64
1	B	4376/5037 (87%)	4148 (95%)	211 (5%)	17 (0%)	30	64
1	C	4376/5037 (87%)	4153 (95%)	204 (5%)	19 (0%)	30	64
1	D	4376/5037 (87%)	4142 (95%)	212 (5%)	22 (0%)	24	59
2	E	105/108 (97%)	103 (98%)	2 (2%)	0	100	100
2	F	105/108 (97%)	103 (98%)	2 (2%)	0	100	100
2	G	105/108 (97%)	102 (97%)	3 (3%)	0	100	100
2	H	105/108 (97%)	103 (98%)	2 (2%)	0	100	100
All	All	17924/20580 (87%)	16998 (95%)	851 (5%)	75 (0%)	31	64

All (75) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	3227	ARG
1	A	3234	ASN
1	C	3227	ARG
1	A	3735	LEU
1	B	3051	ARG
1	B	3227	ARG
1	B	3293	PRO
1	B	3867	ASN
1	C	3051	ARG
1	C	3293	PRO
1	C	3622	LYS
1	A	308	HIS
1	A	1050	GLY
1	A	2663	ASN
1	A	3622	LYS
1	B	308	HIS
1	B	1050	GLY

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Mol	Chain	Res	Type
1	B	2663	ASN
1	B	3052	HIS
1	B	3735	LEU
1	C	308	HIS
1	C	1050	GLY
1	C	2537	ASP
1	C	2663	ASN
1	D	308	HIS
1	D	1050	GLY
1	D	1216	ILE
1	D	1218	GLY
1	D	3051	ARG
1	D	3227	ARG
1	A	2092	GLN
1	A	2343	GLY
1	A	2858	GLN
1	A	3669	PHE
1	B	2092	GLN
1	B	3669	PHE
1	C	691	GLY
1	C	2092	GLN
1	C	3052	HIS
1	C	3234	ASN
1	C	3669	PHE
1	D	2092	GLN
1	D	2343	GLY
1	D	2391	ALA
1	D	2413	GLU
1	D	3669	PHE
1	D	3735	LEU
1	D	4081	VAL
1	A	849	THR
1	A	2537	ASP
1	A	4081	VAL
1	B	2537	ASP
1	B	3622	LYS
1	C	849	THR
1	C	2858	GLN
1	D	849	THR
1	D	2663	ASN
1	D	3622	LYS
1	A	115	ARG

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Mol	Chain	Res	Type
1	A	240	ASP
1	B	849	THR
1	B	2858	GLN
1	C	240	ASP
1	D	115	ARG
1	D	240	ASP
1	D	3233	PRO
1	C	1642	PRO
1	A	1642	PRO
1	B	1642	PRO
1	D	1642	PRO
1	D	3694	LYS
1	B	361	ALA
1	C	361	ALA
1	C	3232	LEU
1	D	361	ALA

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	3827/4276 (90%)	3752 (98%)	75 (2%)	48	65
1	B	3827/4276 (90%)	3748 (98%)	79 (2%)	47	65
1	C	3827/4276 (90%)	3744 (98%)	83 (2%)	45	64
1	D	3827/4276 (90%)	3752 (98%)	75 (2%)	48	65
2	E	89/90 (99%)	88 (99%)	1 (1%)	65	74
2	F	89/90 (99%)	88 (99%)	1 (1%)	65	74
2	G	89/90 (99%)	88 (99%)	1 (1%)	65	74
2	H	89/90 (99%)	88 (99%)	1 (1%)	65	74
All	All	15664/17464 (90%)	15348 (98%)	316 (2%)	48	65

All (316) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	30	LYS
1	A	134	ASP
1	A	161	GLU
1	A	237	ASP
1	A	299	LEU
1	A	328	LYS
1	A	495	ASN
1	A	524	GLU
1	A	856	VAL
1	A	870	ILE
1	A	872	GLU
1	A	1251	GLU
1	A	1281	ASN
1	A	1435	TYR
1	A	1480	GLN
1	A	1653	LEU
1	A	1690	ASP
1	A	1752	ARG
1	A	1769	THR
1	A	1805	GLU
1	A	1979	LEU
1	A	1990	GLU
1	A	2153	MET
1	A	2211	MET
1	A	2275	VAL
1	A	2604	GLU
1	A	2663	ASN
1	A	2673	HIS
1	A	2678	LEU
1	A	2716	ASP
1	A	2754	PHE
1	A	2768	PHE
1	A	2774	ASN
1	A	2775	TRP
1	A	2827	ARG
1	A	2926	LEU
1	A	2967	MET
1	A	3037	GLU
1	A	3127	GLN
1	A	3242	ASP
1	A	3258	GLU
1	A	3346	VAL
1	A	3414	ARG

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Mol	Chain	Res	Type
1	A	3432	GLU
1	A	3456	GLN
1	A	3613	TYR
1	A	3630	ARG
1	A	3638	MET
1	A	3712	GLU
1	A	3805	LEU
1	A	3873	LYS
1	A	3944	GLU
1	A	3965	LEU
1	A	3999	MET
1	A	4018	ASP
1	A	4039	MET
1	A	4057	MET
1	A	4092	ASP
1	A	4116	GLU
1	A	4127	GLU
1	A	4188	ARG
1	A	4227	GLU
1	A	4688	ILE
1	A	4705	VAL
1	A	4716	TRP
1	A	4717	ASP
1	A	4754	ASN
1	A	4784	PHE
1	A	4840	THR
1	A	4850	LEU
1	A	4852	THR
1	A	4900	GLU
1	A	4903	ASP
1	A	4911	LEU
1	A	5033	GLU
1	B	31	GLU
1	B	161	GLU
1	B	237	ASP
1	B	299	LEU
1	B	317	ARG
1	B	328	LYS
1	B	365	LYS
1	B	372	LEU
1	B	495	ASN
1	B	524	GLU

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Mol	Chain	Res	Type
1	B	870	ILE
1	B	882	TRP
1	B	970	LEU
1	B	1251	GLU
1	B	1281	ASN
1	B	1422	ASP
1	B	1435	TYR
1	B	1480	GLN
1	B	1653	LEU
1	B	1690	ASP
1	B	1752	ARG
1	B	1769	THR
1	B	1805	GLU
1	B	1979	LEU
1	B	1990	GLU
1	B	2153	MET
1	B	2275	VAL
1	B	2479	LEU
1	B	2663	ASN
1	B	2674	LEU
1	B	2678	LEU
1	B	2738	ARG
1	B	2754	PHE
1	B	2768	PHE
1	B	2774	ASN
1	B	2775	TRP
1	B	2809	ILE
1	B	2827	ARG
1	B	2890	LYS
1	B	2946	LEU
1	B	2967	MET
1	B	3037	GLU
1	B	3093	ARG
1	B	3213	TYR
1	B	3242	ASP
1	B	3258	GLU
1	B	3293	PRO
1	B	3346	VAL
1	B	3414	ARG
1	B	3432	GLU
1	B	3456	GLN
1	B	3613	TYR

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Mol	Chain	Res	Type
1	B	3630	ARG
1	B	3638	MET
1	B	3696	ASP
1	B	3712	GLU
1	B	3736	GLU
1	B	3805	LEU
1	B	3873	LYS
1	B	3944	GLU
1	B	3965	LEU
1	B	3999	MET
1	B	4006	ASP
1	B	4018	ASP
1	B	4039	MET
1	B	4092	ASP
1	B	4127	GLU
1	B	4188	ARG
1	B	4705	VAL
1	B	4716	TRP
1	B	4717	ASP
1	B	4754	ASN
1	B	4784	PHE
1	B	4840	THR
1	B	4852	THR
1	B	4900	GLU
1	B	4903	ASP
1	B	4911	LEU
1	B	5033	GLU
1	C	30	LYS
1	C	56	GLN
1	C	99	ARG
1	C	155	LYS
1	C	161	GLU
1	C	220	LEU
1	C	237	ASP
1	C	328	LYS
1	C	495	ASN
1	C	524	GLU
1	C	870	ILE
1	C	882	TRP
1	C	1070	ASP
1	C	1251	GLU
1	C	1281	ASN

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Mol	Chain	Res	Type
1	C	1435	TYR
1	C	1480	GLN
1	C	1653	LEU
1	C	1690	ASP
1	C	1752	ARG
1	C	1769	THR
1	C	1805	GLU
1	C	1979	LEU
1	C	1990	GLU
1	C	2153	MET
1	C	2211	MET
1	C	2222	GLU
1	C	2275	VAL
1	C	2479	LEU
1	C	2649	GLU
1	C	2663	ASN
1	C	2667	THR
1	C	2673	HIS
1	C	2678	LEU
1	C	2716	ASP
1	C	2738	ARG
1	C	2768	PHE
1	C	2774	ASN
1	C	2775	TRP
1	C	2780	ASN
1	C	2809	ILE
1	C	2827	ARG
1	C	2862	LEU
1	C	2890	LYS
1	C	2967	MET
1	C	3037	GLU
1	C	3213	TYR
1	C	3242	ASP
1	C	3258	GLU
1	C	3268	HIS
1	C	3293	PRO
1	C	3346	VAL
1	C	3376	GLU
1	C	3414	ARG
1	C	3456	GLN
1	C	3613	TYR
1	C	3630	ARG

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Mol	Chain	Res	Type
1	C	3638	MET
1	C	3712	GLU
1	C	3805	LEU
1	C	3873	LYS
1	C	3965	LEU
1	C	3967	GLU
1	C	3999	MET
1	C	4006	ASP
1	C	4018	ASP
1	C	4039	MET
1	C	4092	ASP
1	C	4127	GLU
1	C	4188	ARG
1	C	4582	VAL
1	C	4705	VAL
1	C	4716	TRP
1	C	4717	ASP
1	C	4754	ASN
1	C	4784	PHE
1	C	4840	THR
1	C	4850	LEU
1	C	4852	THR
1	C	4900	GLU
1	C	4903	ASP
1	C	4911	LEU
1	C	5033	GLU
1	D	56	GLN
1	D	161	GLU
1	D	237	ASP
1	D	299	LEU
1	D	328	LYS
1	D	495	ASN
1	D	524	GLU
1	D	870	ILE
1	D	882	TRP
1	D	930	LYS
1	D	1281	ASN
1	D	1422	ASP
1	D	1435	TYR
1	D	1480	GLN
1	D	1653	LEU
1	D	1690	ASP

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Mol	Chain	Res	Type
1	D	1733	GLU
1	D	1752	ARG
1	D	1769	THR
1	D	1805	GLU
1	D	1979	LEU
1	D	1990	GLU
1	D	2153	MET
1	D	2275	VAL
1	D	2620	GLN
1	D	2663	ASN
1	D	2678	LEU
1	D	2689	LYS
1	D	2764	GLU
1	D	2768	PHE
1	D	2774	ASN
1	D	2775	TRP
1	D	2780	ASN
1	D	2820	GLU
1	D	2827	ARG
1	D	2890	LYS
1	D	2967	MET
1	D	3037	GLU
1	D	3234	ASN
1	D	3242	ASP
1	D	3258	GLU
1	D	3308	THR
1	D	3346	VAL
1	D	3414	ARG
1	D	3456	GLN
1	D	3613	TYR
1	D	3630	ARG
1	D	3638	MET
1	D	3682	GLU
1	D	3712	GLU
1	D	3735	LEU
1	D	3802	ILE
1	D	3858	MET
1	D	3873	LYS
1	D	3965	LEU
1	D	3999	MET
1	D	4006	ASP
1	D	4009	GLN

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Mol	Chain	Res	Type
1	D	4018	ASP
1	D	4039	MET
1	D	4057	MET
1	D	4092	ASP
1	D	4116	GLU
1	D	4127	GLU
1	D	4188	ARG
1	D	4705	VAL
1	D	4716	TRP
1	D	4717	ASP
1	D	4754	ASN
1	D	4784	PHE
1	D	4852	THR
1	D	4900	GLU
1	D	4903	ASP
1	D	4911	LEU
1	D	5033	GLU
2	E	21	THR
2	F	21	THR
2	G	21	THR
2	H	21	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (172) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	57	ASN
1	A	197	GLN
1	A	297	GLN
1	A	308	HIS
1	A	579	GLN
1	A	581	ASN
1	A	765	GLN
1	A	797	HIS
1	A	812	HIS
1	A	838	HIS
1	A	921	ASN
1	A	1011	GLN
1	A	1133	HIS
1	A	1165	ASN
1	A	1201	HIS
1	A	1299	GLN
1	A	1460	HIS

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Mol	Chain	Res	Type
1	A	1545	ASN
1	A	1688	HIS
1	A	1719	HIS
1	A	1775	HIS
1	A	2351	ASN
1	A	2515	GLN
1	A	2774	ASN
1	A	2856	ASN
1	A	2858	GLN
1	A	2931	GLN
1	A	3007	ASN
1	A	3013	HIS
1	A	3109	ASN
1	A	3313	ASN
1	A	3326	ASN
1	A	3556	ASN
1	A	3621	HIS
1	A	3704	HIS
1	A	3833	GLN
1	A	3870	ASN
1	A	3909	ASN
1	A	3970	GLN
1	A	3994	HIS
1	A	4037	ASN
1	A	4054	ASN
1	A	4204	GLN
1	A	4803	HIS
1	A	4806	ASN
1	A	4886	HIS
1	B	57	ASN
1	B	297	GLN
1	B	308	HIS
1	B	581	ASN
1	B	597	HIS
1	B	765	GLN
1	B	797	HIS
1	B	921	ASN
1	B	1052	ASN
1	B	1133	HIS
1	B	1201	HIS
1	B	1300	HIS
1	B	1688	HIS

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Mol	Chain	Res	Type
1	B	1719	HIS
1	B	1775	HIS
1	B	2253	HIS
1	B	2351	ASN
1	B	2487	GLN
1	B	2515	GLN
1	B	2756	ASN
1	B	2774	ASN
1	B	3007	ASN
1	B	3012	ASN
1	B	3013	HIS
1	B	3109	ASN
1	B	3313	ASN
1	B	3326	ASN
1	B	3556	ASN
1	B	3704	HIS
1	B	3833	GLN
1	B	3870	ASN
1	B	3909	ASN
1	B	3970	GLN
1	B	4009	GLN
1	B	4037	ASN
1	B	4043	GLN
1	B	4204	GLN
1	B	4806	ASN
1	B	4886	HIS
1	C	57	ASN
1	C	197	GLN
1	C	308	HIS
1	C	579	GLN
1	C	581	ASN
1	C	705	ASN
1	C	765	GLN
1	C	812	HIS
1	C	911	HIS
1	C	921	ASN
1	C	1052	ASN
1	C	1133	HIS
1	C	1165	ASN
1	C	1201	HIS
1	C	1299	GLN
1	C	1460	HIS

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Mol	Chain	Res	Type
1	C	1545	ASN
1	C	1688	HIS
1	C	1719	HIS
1	C	2351	ASN
1	C	2515	GLN
1	C	2756	ASN
1	C	2774	ASN
1	C	2933	ASN
1	C	3007	ASN
1	C	3109	ASN
1	C	3313	ASN
1	C	3326	ASN
1	C	3378	GLN
1	C	3556	ASN
1	C	3699	HIS
1	C	3704	HIS
1	C	3734	HIS
1	C	3860	ASN
1	C	3870	ASN
1	C	3909	ASN
1	C	4009	GLN
1	C	4037	ASN
1	C	4043	GLN
1	C	4124	ASN
1	C	4204	GLN
1	C	4803	HIS
1	C	4806	ASN
1	C	4886	HIS
1	D	57	ASN
1	D	197	GLN
1	D	297	GLN
1	D	308	HIS
1	D	579	GLN
1	D	581	ASN
1	D	765	GLN
1	D	838	HIS
1	D	921	ASN
1	D	963	ASN
1	D	1052	ASN
1	D	1133	HIS
1	D	1165	ASN
1	D	1201	HIS

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Mol	Chain	Res	Type
1	D	1460	HIS
1	D	1545	ASN
1	D	1688	HIS
1	D	1719	HIS
1	D	1970	GLN
1	D	2647	HIS
1	D	2756	ASN
1	D	2773	ASN
1	D	2774	ASN
1	D	2856	ASN
1	D	2931	GLN
1	D	3007	ASN
1	D	3012	ASN
1	D	3013	HIS
1	D	3109	ASN
1	D	3313	ASN
1	D	3326	ASN
1	D	3627	GLN
1	D	3704	HIS
1	D	3781	GLN
1	D	3833	GLN
1	D	3870	ASN
1	D	3909	ASN
1	D	3970	GLN
1	D	4037	ASN
1	D	4204	GLN
1	D	4806	ASN
1	D	4886	HIS
1	D	4973	HIS

5.3.3 RNA

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains

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

5.5 Carbohydrates

There are no oligosaccharides in this entry.

5.6 Ligand geometry

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

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

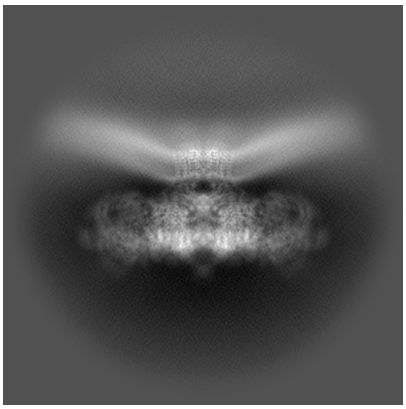
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-54588. These allow visual inspection of the internal detail of the map and identification of artifacts.

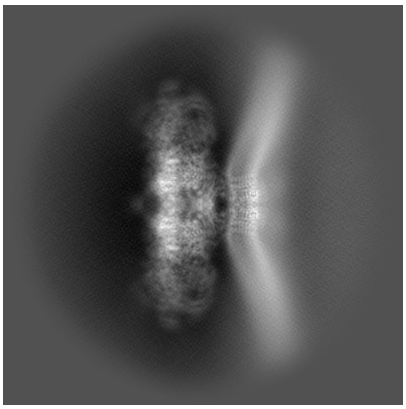
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

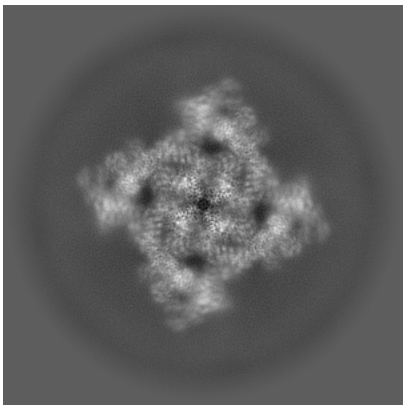
6.1.1 Primary map



X

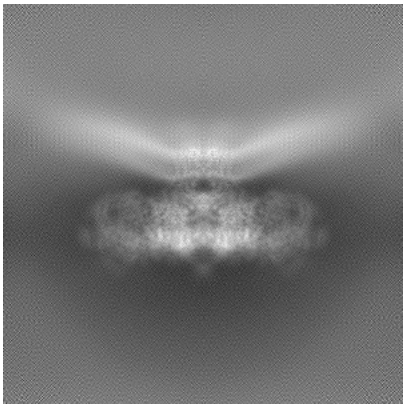


Y

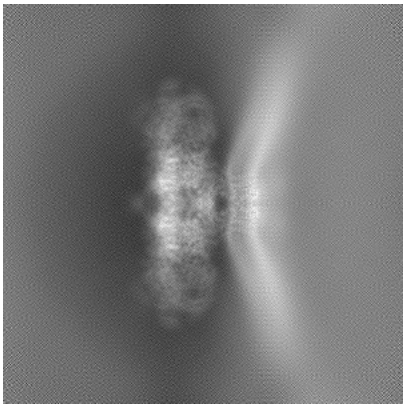


Z

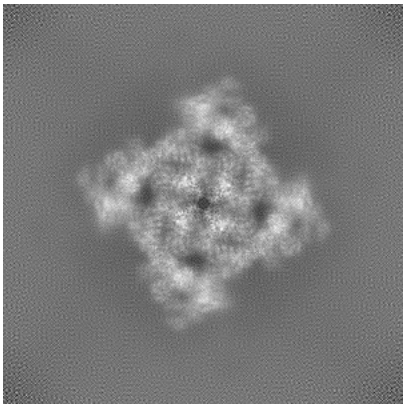
6.1.2 Raw map



X



Y

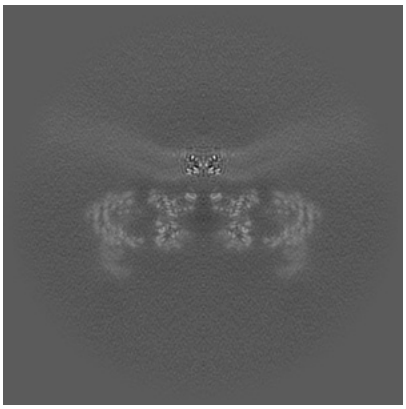


Z

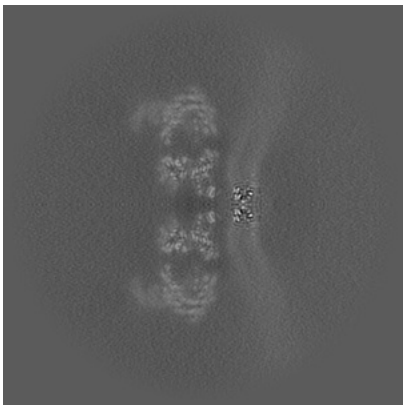
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

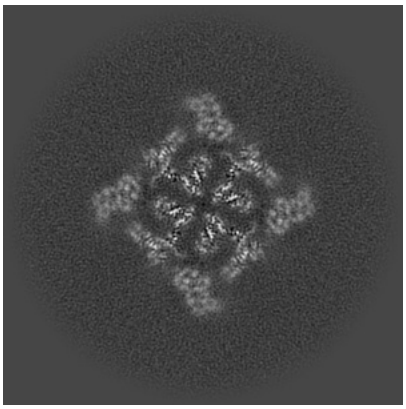
6.2.1 Primary map



X Index: 220

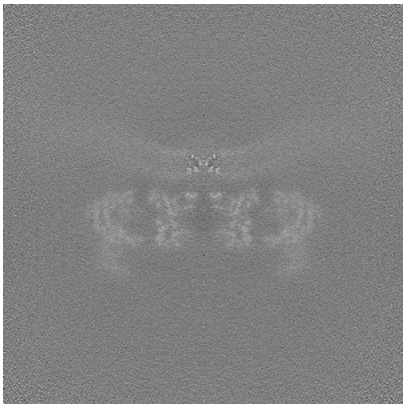


Y Index: 220

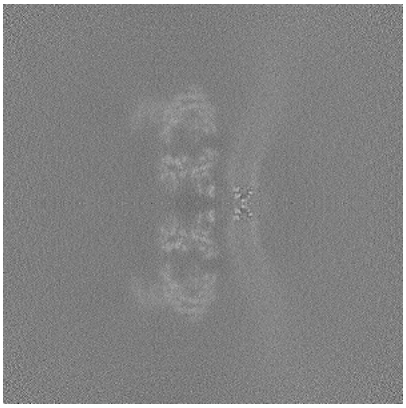


Z Index: 220

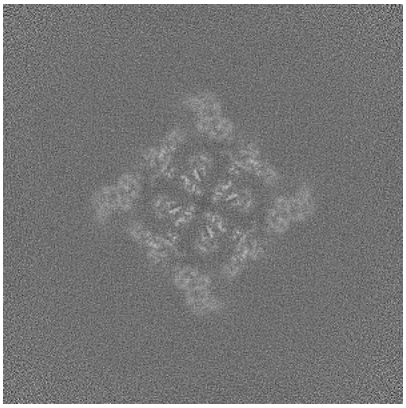
6.2.2 Raw map



X Index: 220



Y Index: 220

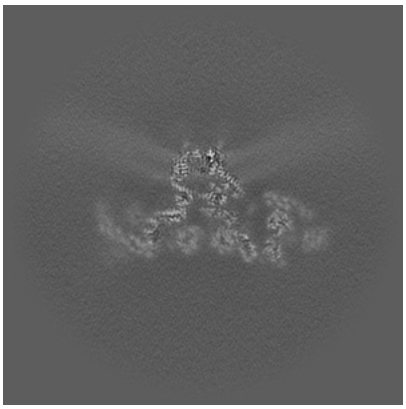


Z Index: 220

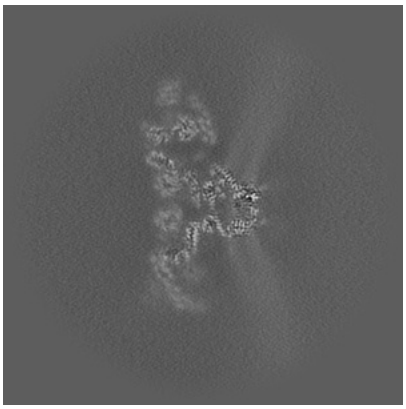
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

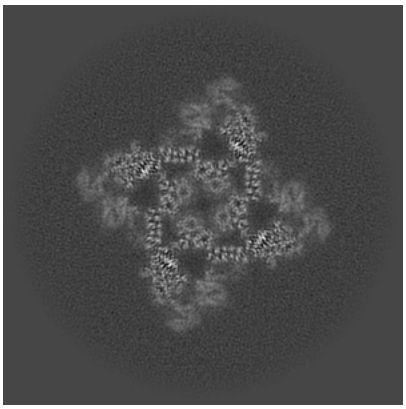
6.3.1 Primary map



X Index: 239

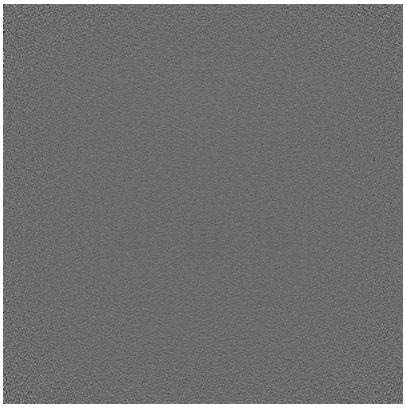


Y Index: 201

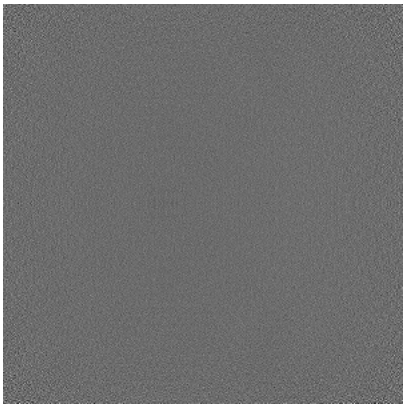


Z Index: 187

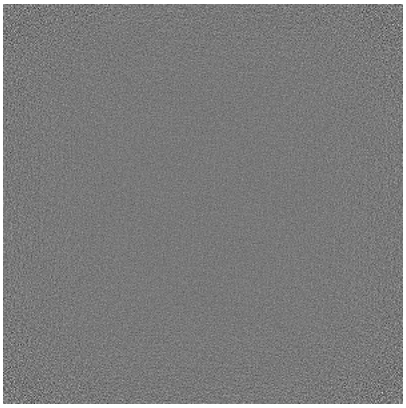
6.3.2 Raw map



X Index: 0



Y Index: 0

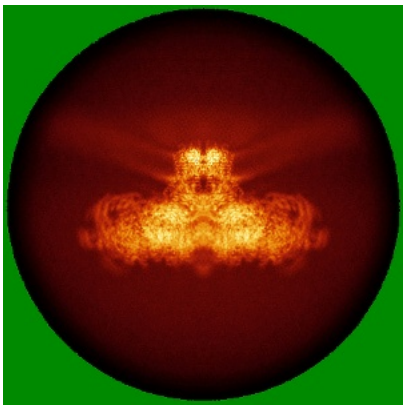


Z Index: 0

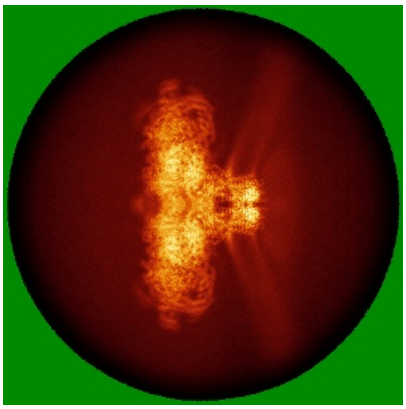
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) (i)

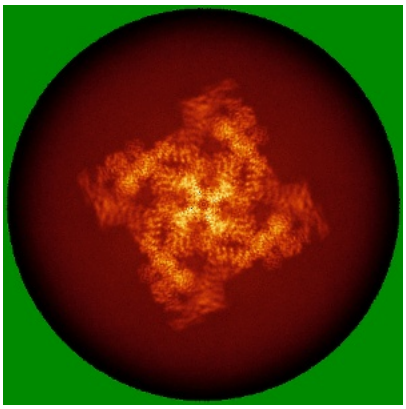
6.4.1 Primary map



X

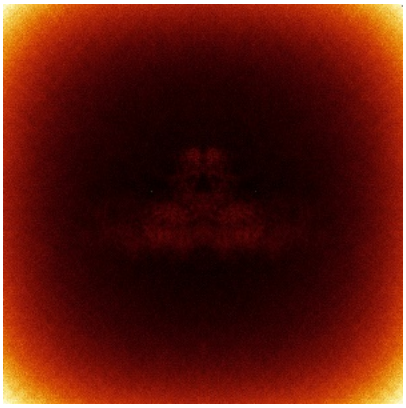


Y

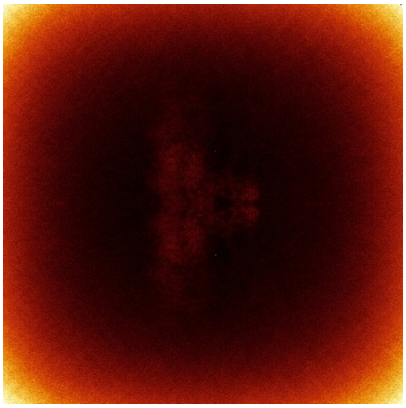


Z

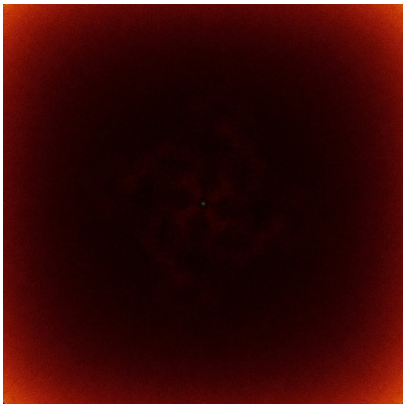
6.4.2 Raw map



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.

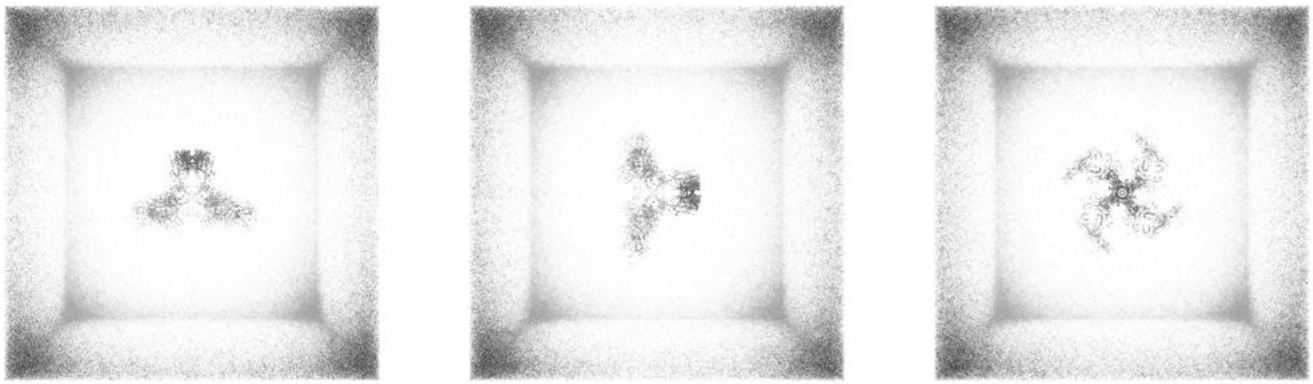
6.5 Orthogonal surface views (i)

6.5.1 Primary map

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.106. 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



X Y Z

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.

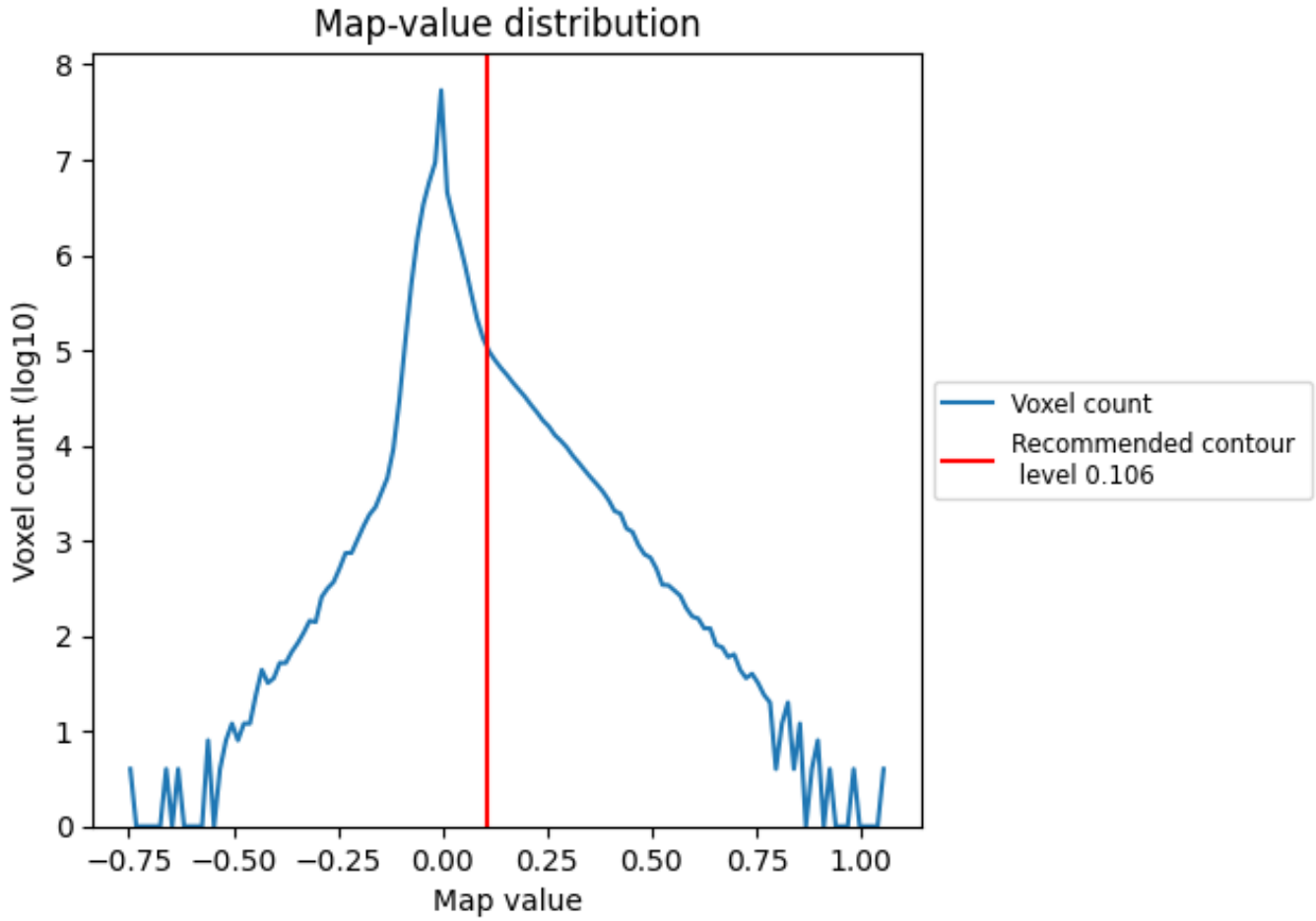
6.6 Mask visualisation (i)

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

7 Map analysis

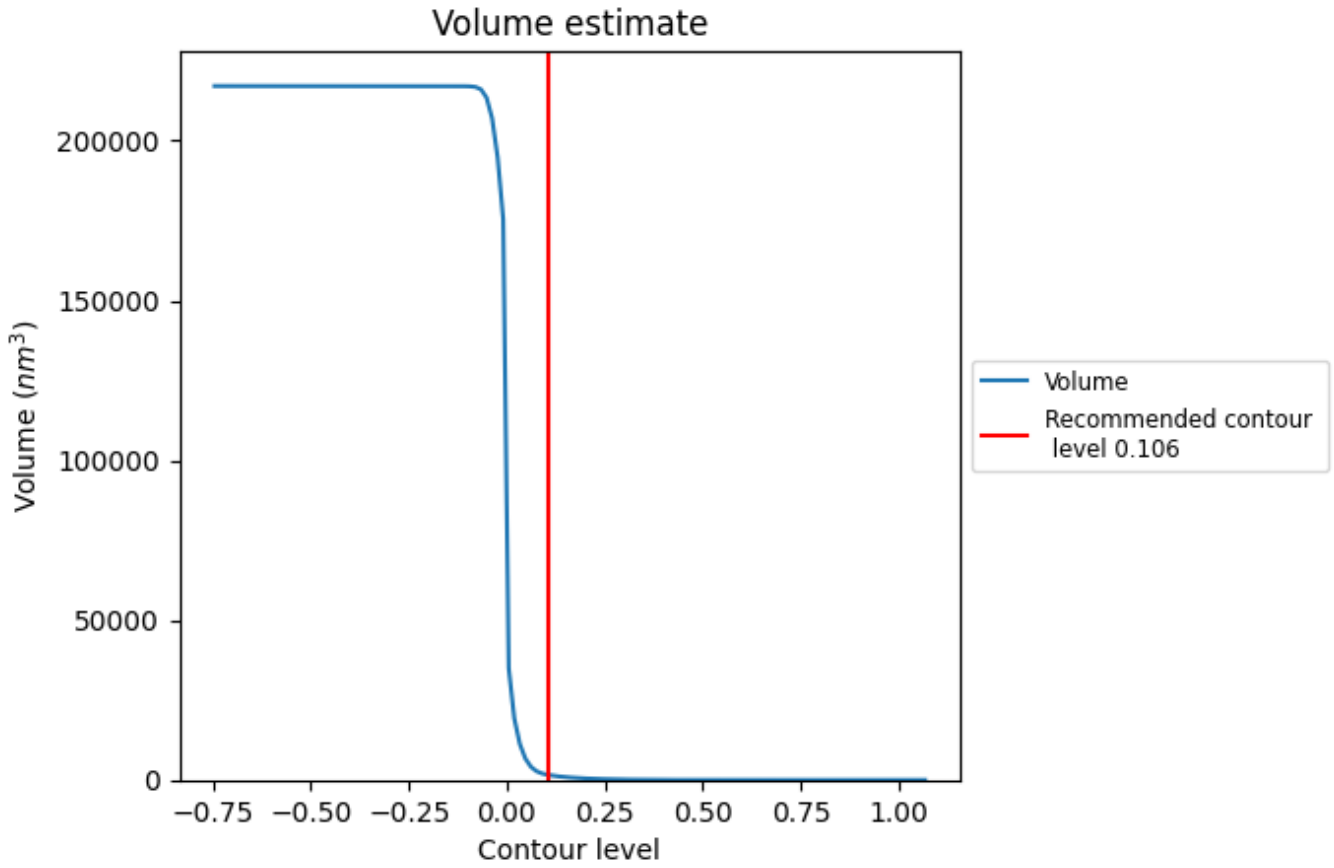
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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.

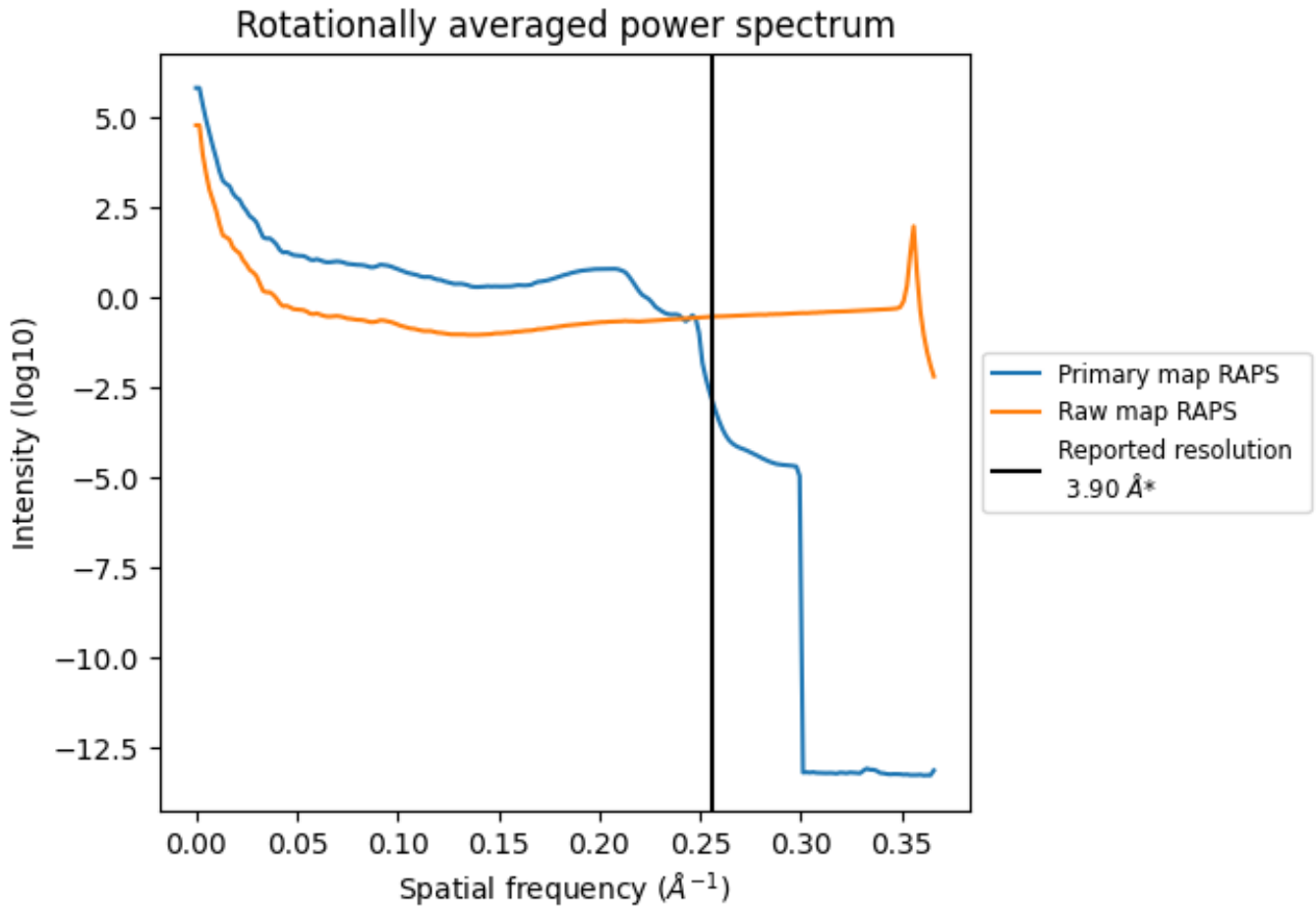
7.2 Volume estimate



The volume at the recommended contour level is 1579 nm^3; this corresponds to an approximate mass of 1427 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)

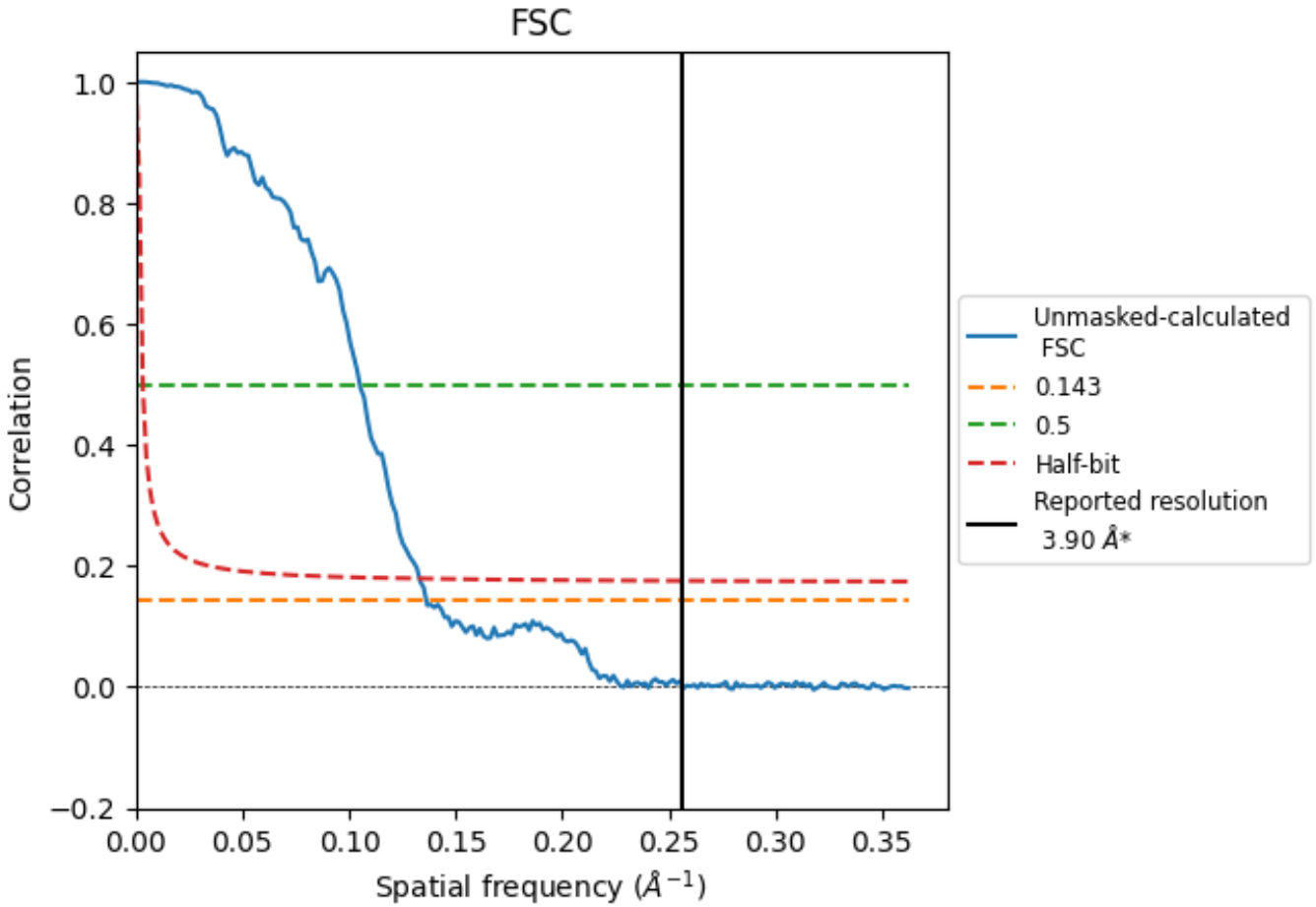


*Reported resolution corresponds to spatial frequency of 0.256 Å^{-1}

8 Fourier-Shell correlation

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



*Reported resolution corresponds to spatial frequency of 0.256 Å^{-1}

8.2 Resolution estimates (i)

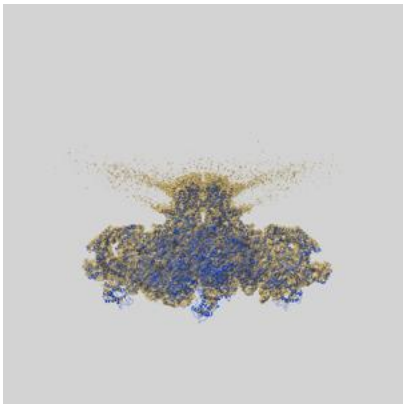
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.90	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	7.34	9.52	7.52

*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 7.34 differs from the reported value 3.9 by more than 10 %

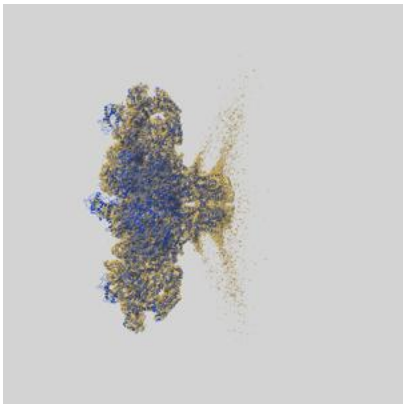
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-54588 and PDB model 9S54. Per-residue inclusion information can be found in section 3 on page 5.

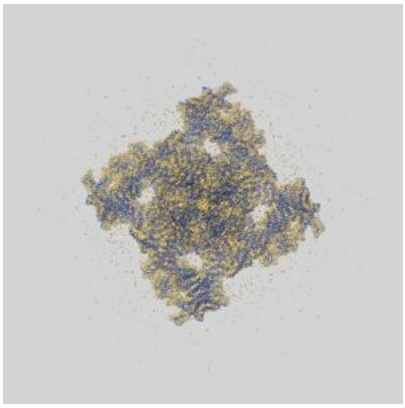
9.1 Map-model overlay



X



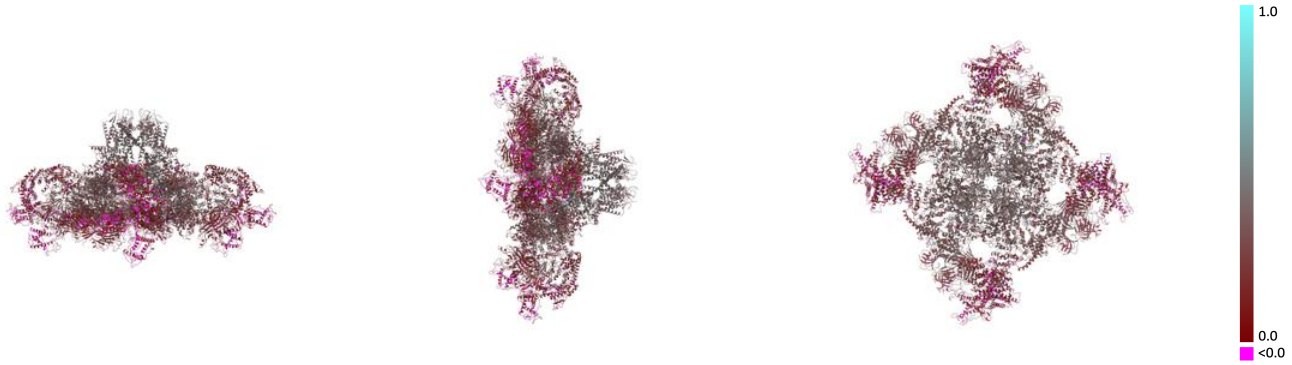
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.106 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.

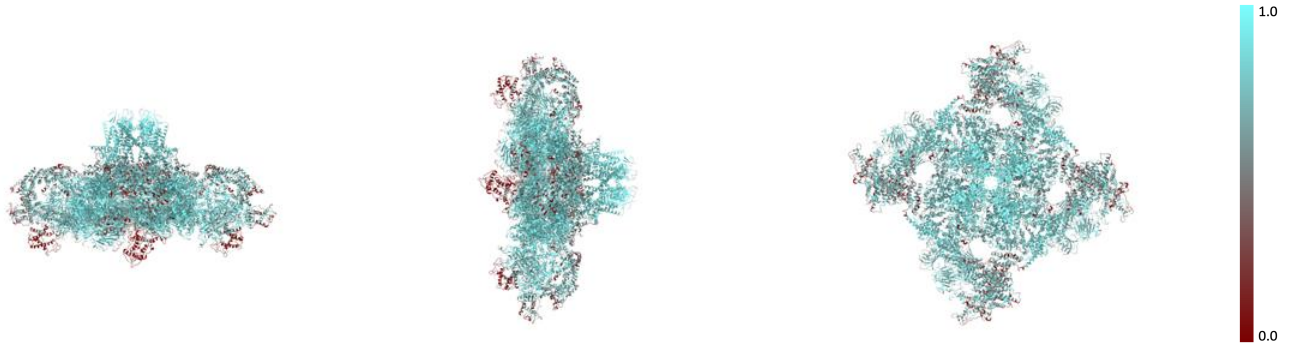
9.2 Q-score mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according 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.

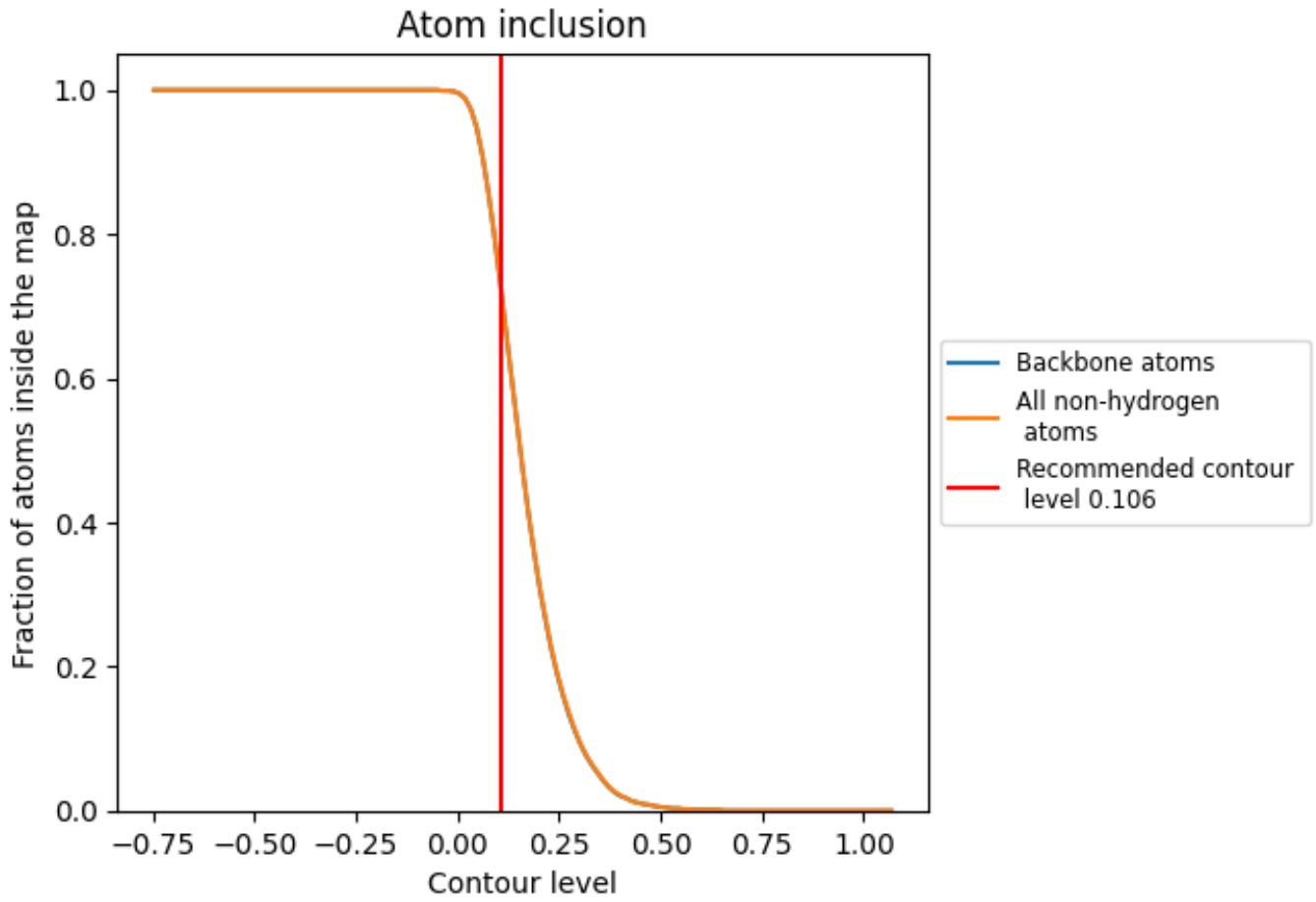
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

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 (0.106).

9.4 Atom inclusion (i)



At the recommended contour level, 73% of all backbone atoms, 73% 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 (0.106) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7300	0.2710
A	0.7340	0.2710
B	0.7350	0.2720
C	0.7340	0.2730
D	0.7340	0.2720
E	0.7370	0.2210
F	0.7400	0.2210
G	0.7390	0.2260
H	0.7350	0.2220