Full wwPDB EM Validation Report ⓘ

Aug 3, 2026 – 06:29 pm BST

PDB ID	:	9S3U / pdb_00009s3u
EMDB ID	:	EMD-54552
Title	:	Down class, Primed-state RyR1 with activating ligand mixture (Calcium/ACP/Caffeine) in the native membrane
Authors	:	Mikirtumov, V.
Deposited on	:	2025-07-25
Resolution	:	4.77 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:

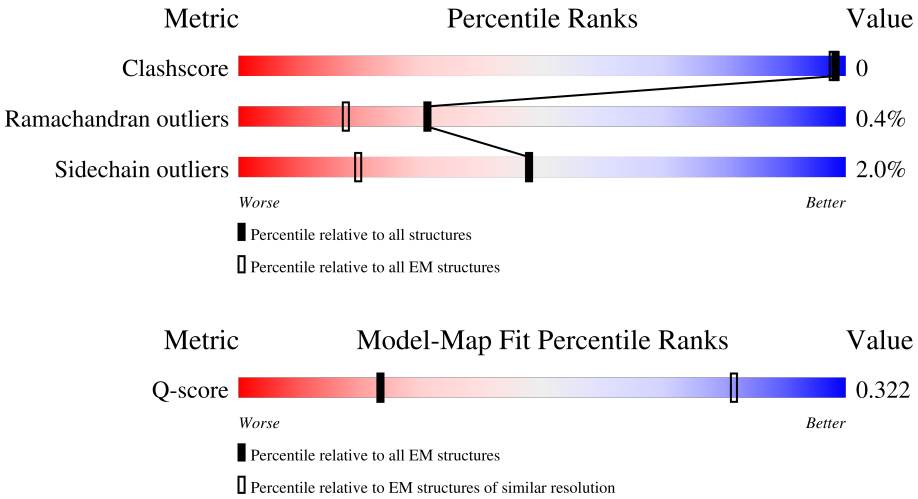
EMDB validation analysis	:	0.0.1.dev133
MolProbity	:	4-5-2 with Phenix2.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & 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 4.77 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	1583 (4.27 - 5.27)

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	21% 84% • 13%
1	B	5037	21% 84% • 13%
1	C	5037	21% 84% • 13%
1	D	5037	21% 83% • 13%

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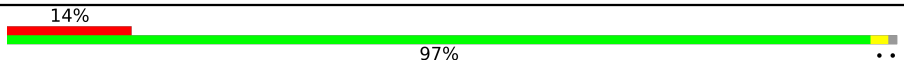
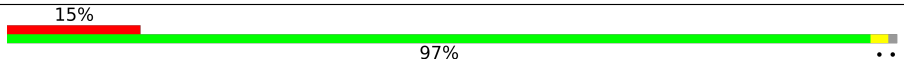
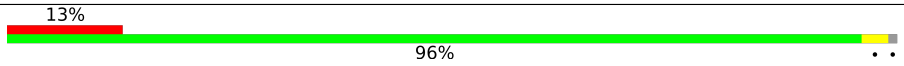
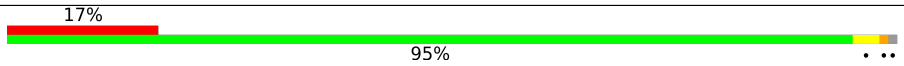
Mol	Chain	Length	Quality of chain
2	E	108	
2	F	108	
2	G	108	
2	H	108	

2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 285936 atoms, of which 142256 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
			69823	22323	34735	6046	6482	237		
1	B	4404	Total	C	H	N	O	S	0	0
			69823	22323	34735	6046	6482	237		
1	C	4404	Total	C	H	N	O	S	0	0
			69823	22323	34735	6046	6482	237		
1	D	4404	Total	C	H	N	O	S	0	0
			69823	22323	34735	6046	6482	237		

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

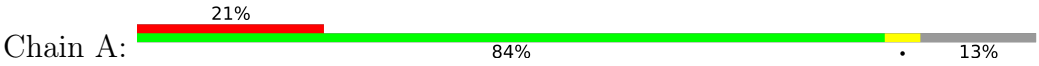
Mol	Chain	Residues	Atoms						AltConf	Trace
2	E	107	Total	C	H	N	O	S	0	0
			1661	527	829	146	155	4		
2	F	107	Total	C	H	N	O	S	0	0
			1661	527	829	146	155	4		
2	G	107	Total	C	H	N	O	S	0	0
			1661	527	829	146	155	4		
2	H	107	Total	C	H	N	O	S	0	0
			1661	527	829	146	155	4		

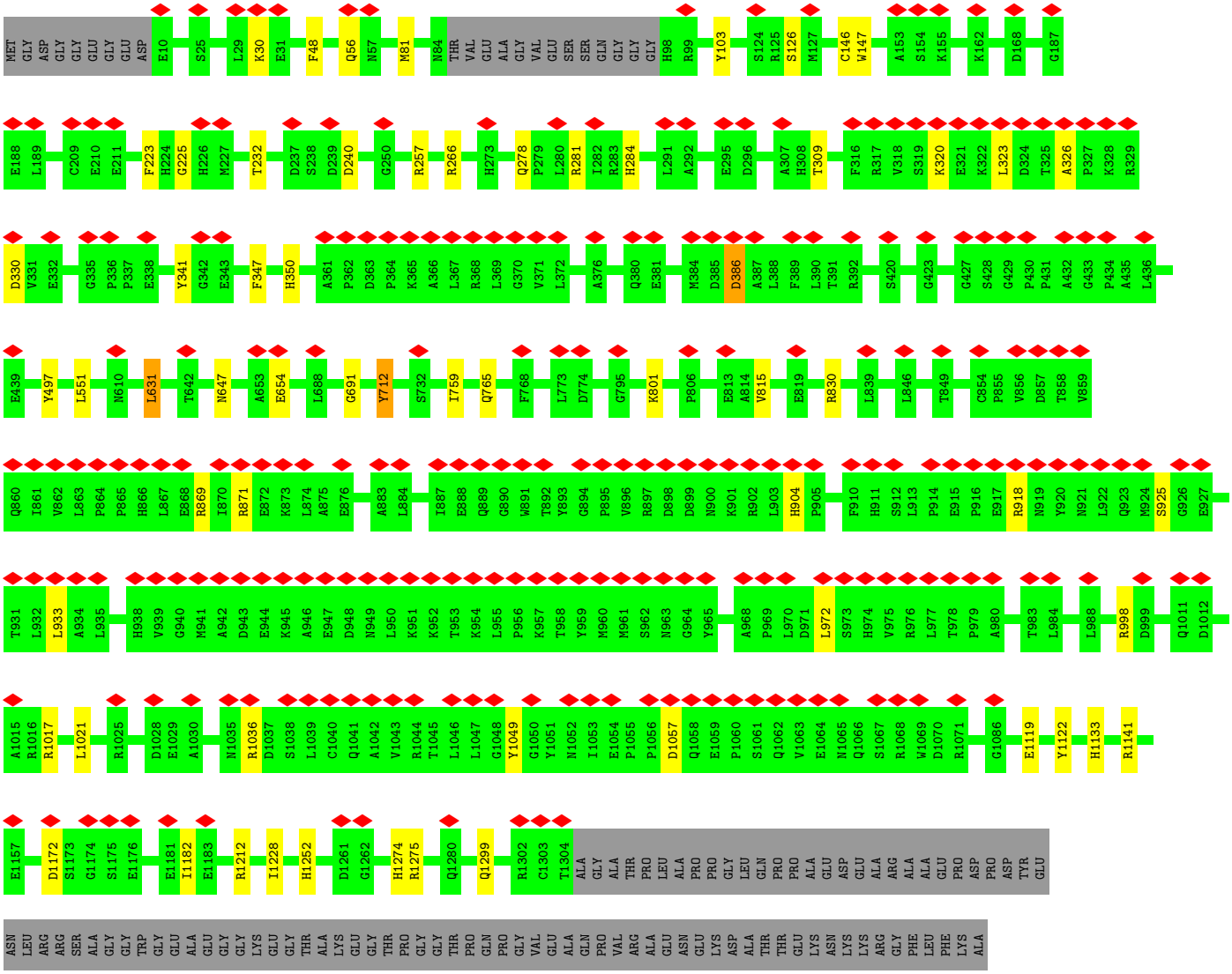
3 Residue-property plots (i)

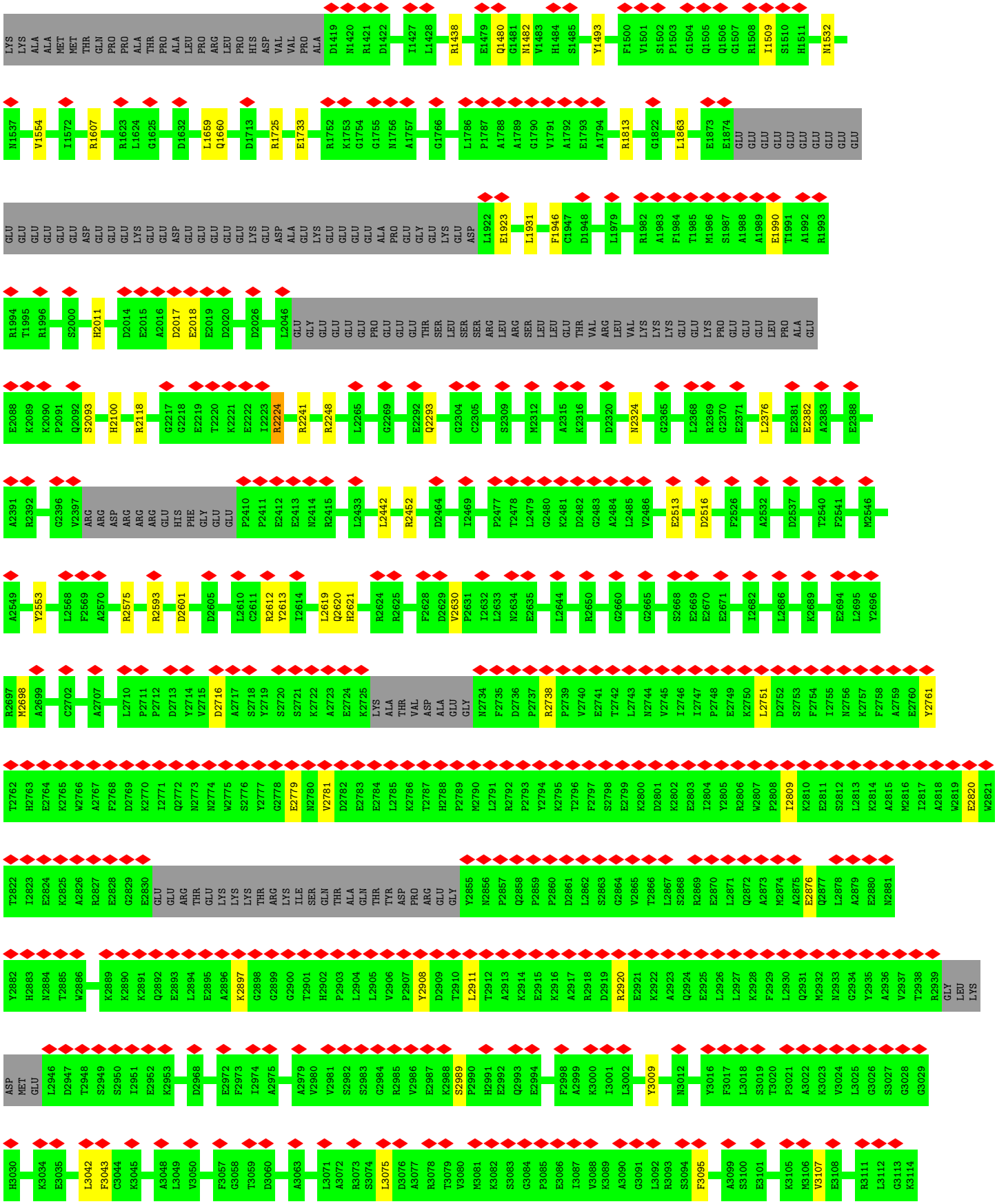
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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

Chain A:



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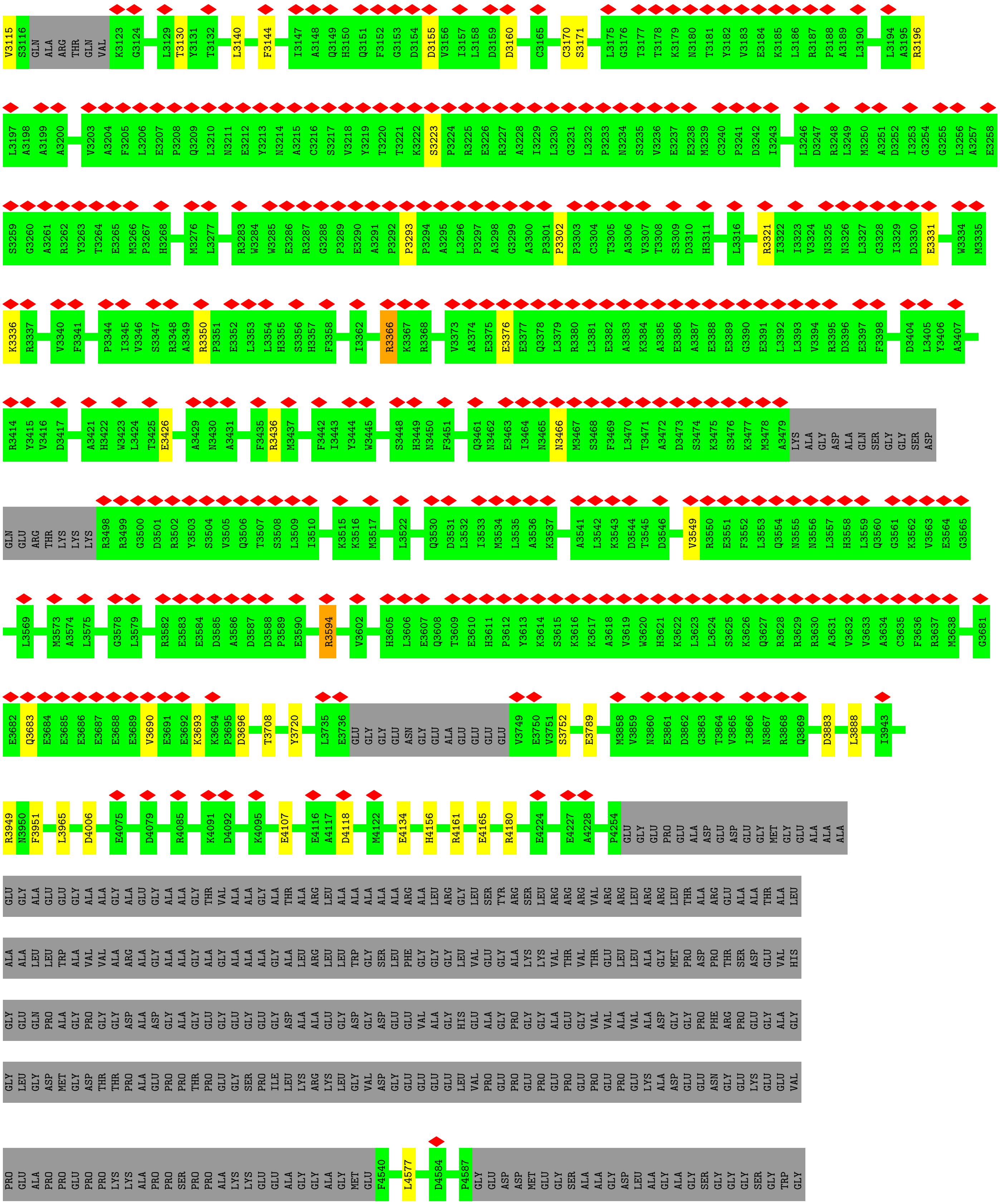
D1419 N1420 R1421 D1422 I1427 L1428 R1438 E1479 Q1480 G1481 N1482 V1483 H1484 S1485 Y1493 F1500 V1501 S1502 P1503 G1504 Q1505 Q1506 G1507 R1508 I1509 S1510 H1511 N1532
N1537 V1554 I1572 R1607 R1623 L1624 G1625 D1632 L1659 Q1660 D1713 R1725 E1733 R1752 K1753 G1754 G1755 N1756 A1757 G1766 L1786 P1787 A1788 A1789 G1790 V1791 A1792 E1793 A1794 R1813 G1822 L1863 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 LYS GLU ASP ALA GLU LYS GLU GLU GLU GLU ALA PRO GLU GLY GLU LYS GLU ASP
L1922 E1923 L1931 F1946 C1947 D1948 L1979 R1982 A1983 F1984 T1985 M1986 S1987 A1988 A1989 E1990 T1991 A1992 R1993
R1994 T1995 R1996 S2000 H2011 D2014 E2015 A2016 D2017 E2018 E2019 D2020 D2026 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 S2093 H2100 R2118 G2217 G2218 E2219 T2220 K2221 E2222 I2223 R2224 R2241 R2248 L2265 G2269 E2292 Q2293 G2304 C2305 S2309 M2312 A2315 K2316 D2320 N2324 G2365 L2368 R2369 G2370 E2371 L2376 E2381 E2382 A2383 E2388
A2391 R2392 G2396 V2397 ARG ARG ASP ARG ARG ARG GLU HIS PHE GLY GLU GLU P2410 P2411 E2412 E2413 N2414 R2415 L2433 L2442 R2452 D2464 I2469 P2477 T2478 L2479 G2480 K2481 D2482 G2483 A2484 L2485 V2486 E2513 D2516 F2526 A2532 D2537 T2540 F2541 M2546
A2549 Y2553 L2568 F2569 A2570 R2575 R2593 D2601 D2605 L2610 C2611 R2612 Y2613 I2614 L2619 Q2620 H2621 R2624 R2625 F2628 D2629 V2630 P2631 I2632 L2633 N2634 E2635 L2644 R2650 G2660 G2665 S2668 E2669 E2670 E2671 I2682 L2686 K2689 E2694 L2695 Y2696
R2697 M2698 A2699 C2702 A2707 L2710 P2711 P2712 D2713 Y2714 V2715 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 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 H2883 N2884 T2885 W2886 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 S2949 S2950 I2951 E2952 K2953 D2968 E2972 F2973 I2974 A2975 A2979 V2980 V2981 S2982 S2983 G2984 R2985 V2986 E2987 K2988 S2989 P2990 H2991 E2992 Q2993 E2994 F2998 A2999 K3000 I3001 L3002 Y3009 N3012 Y3016 F3017 L3018 S3019 T3020 P3021 A3022 K3023 V3024 L3025 G3026 S3027 G3028 G3029
H3030 K3034 E3035 L3042 F3043 C3044 K3045 A3048 L3049 V3050 F3057 G3058 T3059 D3060 A3063 L3071 A3072 R3073 S3074 L3075 D3076 A3077 R3078 T3079 V3080 M3081 K3082 S3083 G3084 P3085 E3086 I3087 V3088 K3089 A3090 G3091 L3092 R3093 S3094 F3095 A3099 S3100 E3101 K3105 M3106 V3107 E3108 R3111 L3112 G3113 K3114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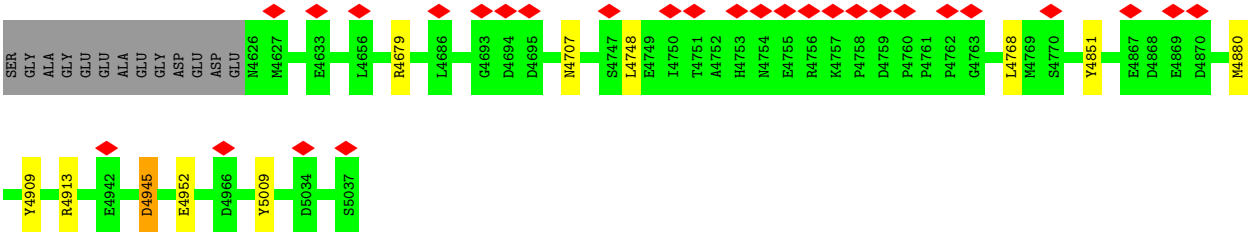
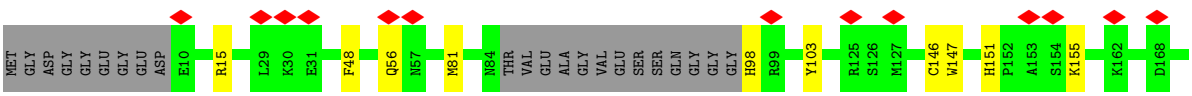
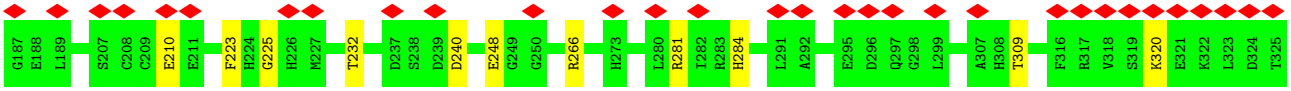
L3197 A3198 A3199 A3200 V3203 A3204 F3205 L3206 E3207 P3208 Q3209 L3210 N3211 E3212 Y3213 N3214 A3215 C3216 S3217 V3218 Y3219 T3220 T3221 K3222 S3223 P3224 R3225 E3226 R3227 A3228 I3229 L3230 G3231 L3232 P3233 N3234 S3235 V3236 E3237 E3238 M3239 C3240 P3241 D3242 I3243 L3246 D3247 R3248 L3249 M3250 A3251 D3252 I3253 G3254 G3255 L3256 A3257 E3258
S3259 G3260 A3261 R3262 Y3263 T3264 E3265 M3266 P3267 H3268 M3276 L3277 R3283 W3284 W3285 E3286 R3287 G3288 P3289 E3290 A3291 P3292 P3293 P3294 A3295 L3296 P3297 A3298 G3299 A3300 P3301 P3302 P3303 C3304 T3305 A3306 V3307 T3308 S3309 D3310 H3311 L3316 R3321 I3322 I3323 V3324 N3325 N3326 L3327 G3328 I3329 D3330 E3331 W3334 M3335
K3336 R3337 V3340 F3341 P3344 I3345 V3346 S3347 R3348 A3349 R3350 P3351 E3352 L3353 L3354 H3355 S3356 H3357 F3358 I3362 R3366 K3367 R3368 V3373 A3374 E3375 E3376 E3377 Q3378 L3379 R3380 L3381 E3382 A3383 K3384 A3385 E3386 A3387 E3388 R3389 G3390 E3391 L3392 L3393 V3394 R3395 D3396 E3397 F3398 D3404 L3405 Y3406 A3407
R3414 Y3415 V3416 D3417 A3421 H3422 W3423 L3424 T3425 E3426 A3429 N3430 A3431 F3435 R3436 M3437 F3442 I3443 Y3444 W3445 S3448 H3449 N3450 F3451 Q3461 N3462 E3463 I3464 N3465 N3466 M3467 S3468 F3469 L3470 T3471 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 Y3503 S3504 V3505 Q3506 T3507 S3508 L3509 I3510 K3515 K3516 M3517 L3522 Q3530 D3531 L3532 I3533 M3534 L3535 A3536 K3537 A3541 L3542 K3543 D3544 T3545 D3546 V3549 R3550 E3551 F3552 L3553 Q3554 N3555 N3556 L3557 H3558 L3559 Q3560 G3561 K3562 V3563 E3564 G3565
L3569 M3573 A3574 L3575 G3578 L3579 R3582 E3583 E3584 D3585 A3586 D3587 D3588 P3589 E3590 R3594 V3602 H3605 L3606 E3607 Q3608 T3609 E3610 H3611 P3612 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 G3681
E3682 Q3683 E3684 E3685 E3686 E3687 E3688 E3689 V3690 E3691 E3692 K3693 K3694 P3695 D3696 T3708 Y3720 L3735 E3736 GLU GLY GLY GLU ASN GLY GLU ALA GLU GLU GLU GLU V3749 E3750 V3751 S3752 E3789 M3858 V3859 N3860 E3861 D3862 G3863 T3864 V3865 I3866 N3867 R3868 Q3869 D3883 L3888 I3943
R3949 N3950 F3951 L3965 D4006 E4075 D4079 R4085 K4091 D4092 K4095 E4107 E4116 A4117 D4118 M4122 E4134 H4156 R4161 E4165 R4180 E4224 E4227 A4228 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 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 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 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 PRO PRO ALA LYS LYS GLU GLU ALA GLY GLY ALA GLY MET GLU F4540 L4577 D4584 P4587 GLY GLU ASP ASP MET GLU GLY SER ALA ALA GLY ASP LEU ALA GLY ALA GLY SER GLY GLY GLY SER GLY TRP GLY

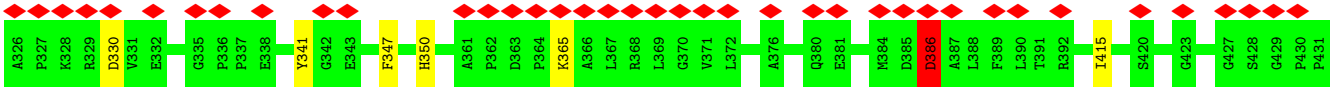


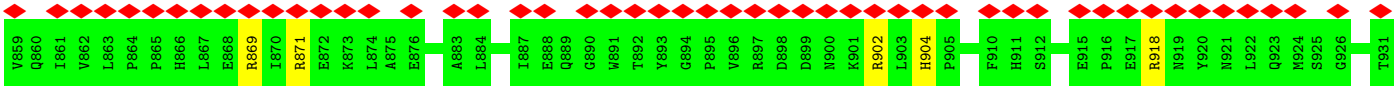
• Molecule 1: Ryanodine receptor 1

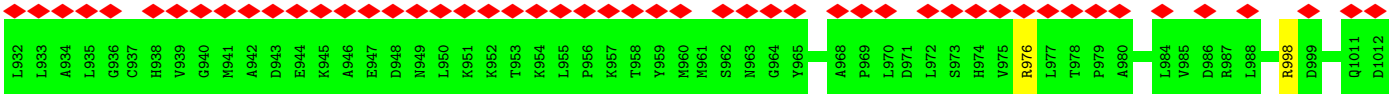
Chain B:

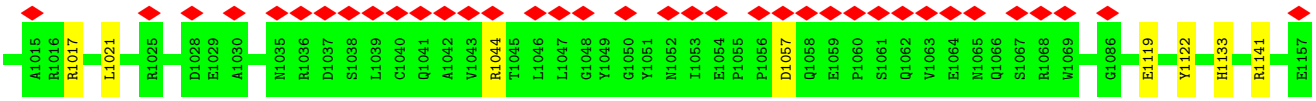


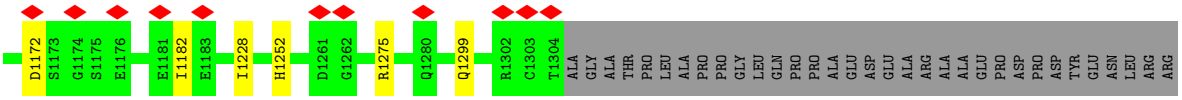


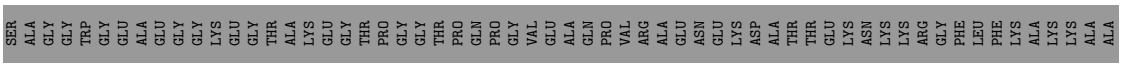


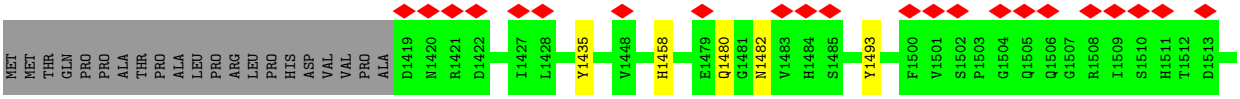


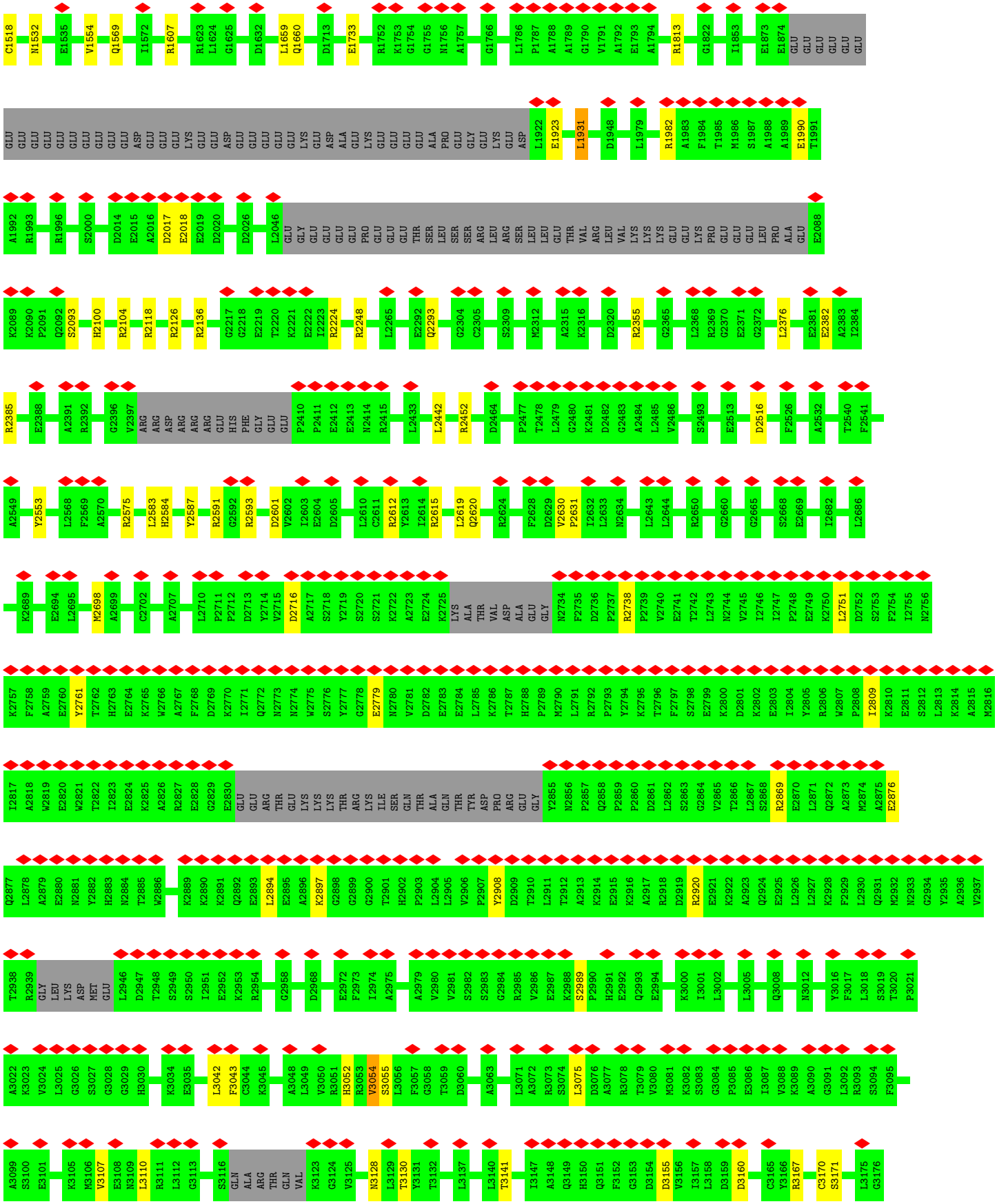








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GLU GLU GLU GLU GLU GLU GLU GLU GLU ASP GLU GLU GLU LYS GLU GLU GLU ASP GLU GLU GLU GLU GLU GLU GLU LYS GLU ASP ALA GLU LYS GLU GLU GLU GLU ALA PRO GLU GLY GLU LYS GLU ASP L1922 E1923 L1931 D1948 L1979 R1982 A1983 F1984 T1985 M1986 S1987 A1988 A1989 E1990 T1991
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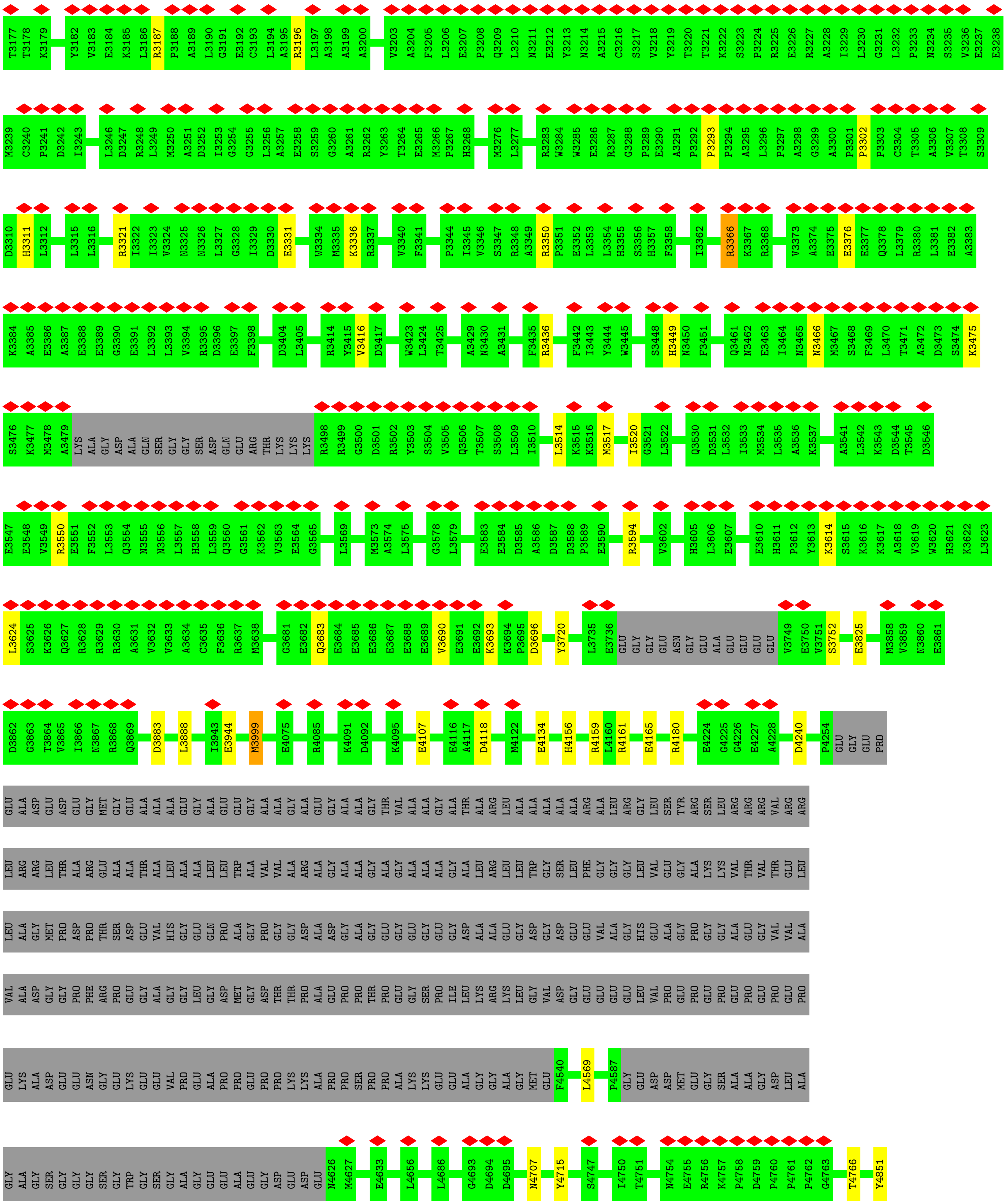
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D3862 G3863 T3864 V3865 I3866 N3867 R3868 Q3869 D3883 L3888 I3943 E3944 M3999 E4075 R4085 K4091 D4092 K4095 E4107 E4116 A4117 D4118 M4122 E4134 H4156 R4159 L4160 R4161 E4165 R4180 E4224 G4225 G4226 E4227 A4228 D4240 P4254 GLU GLY GLU PRO
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GLU 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 PRO PRO ALA LYS LYS GLU GLU ALA GLY GLY ALA GLY MET GLU F4540 L4569 P4587 GLY GLU ASP ASP MET GLU GLY SER ALA ALA ALA GLY ASP LEU ALA
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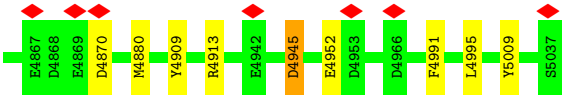
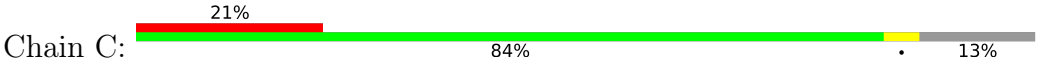
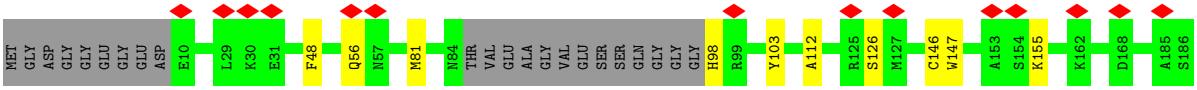
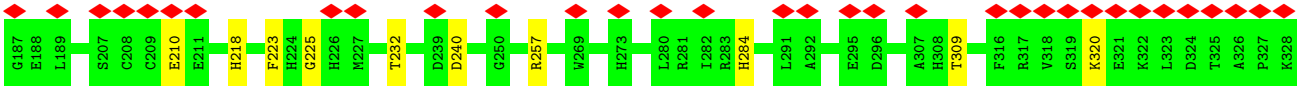
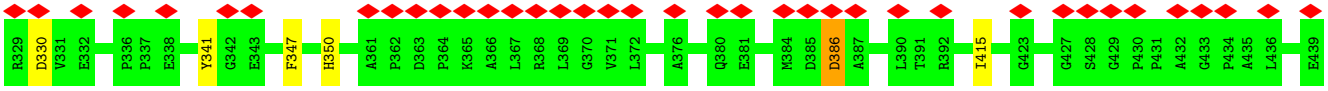


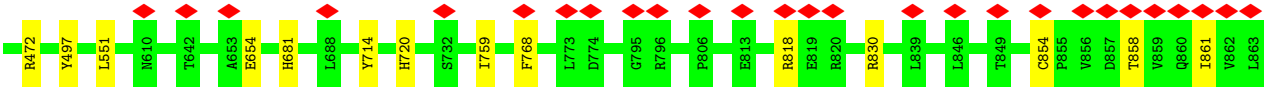
• Molecule 1: Ryanodine receptor 1

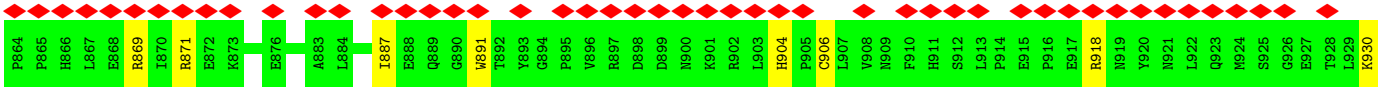


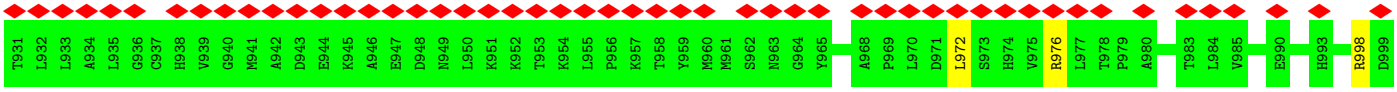


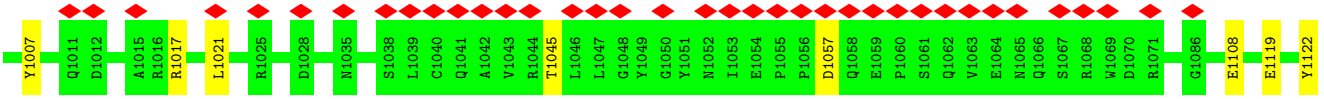


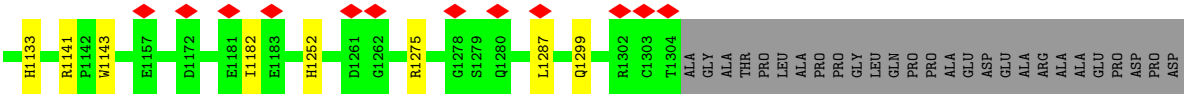


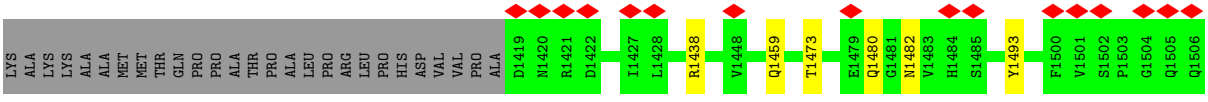


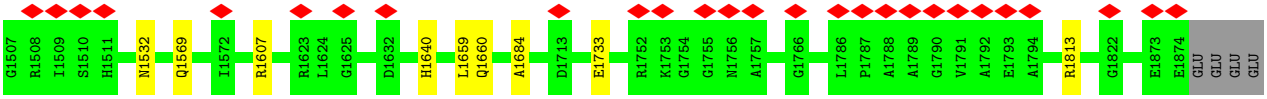


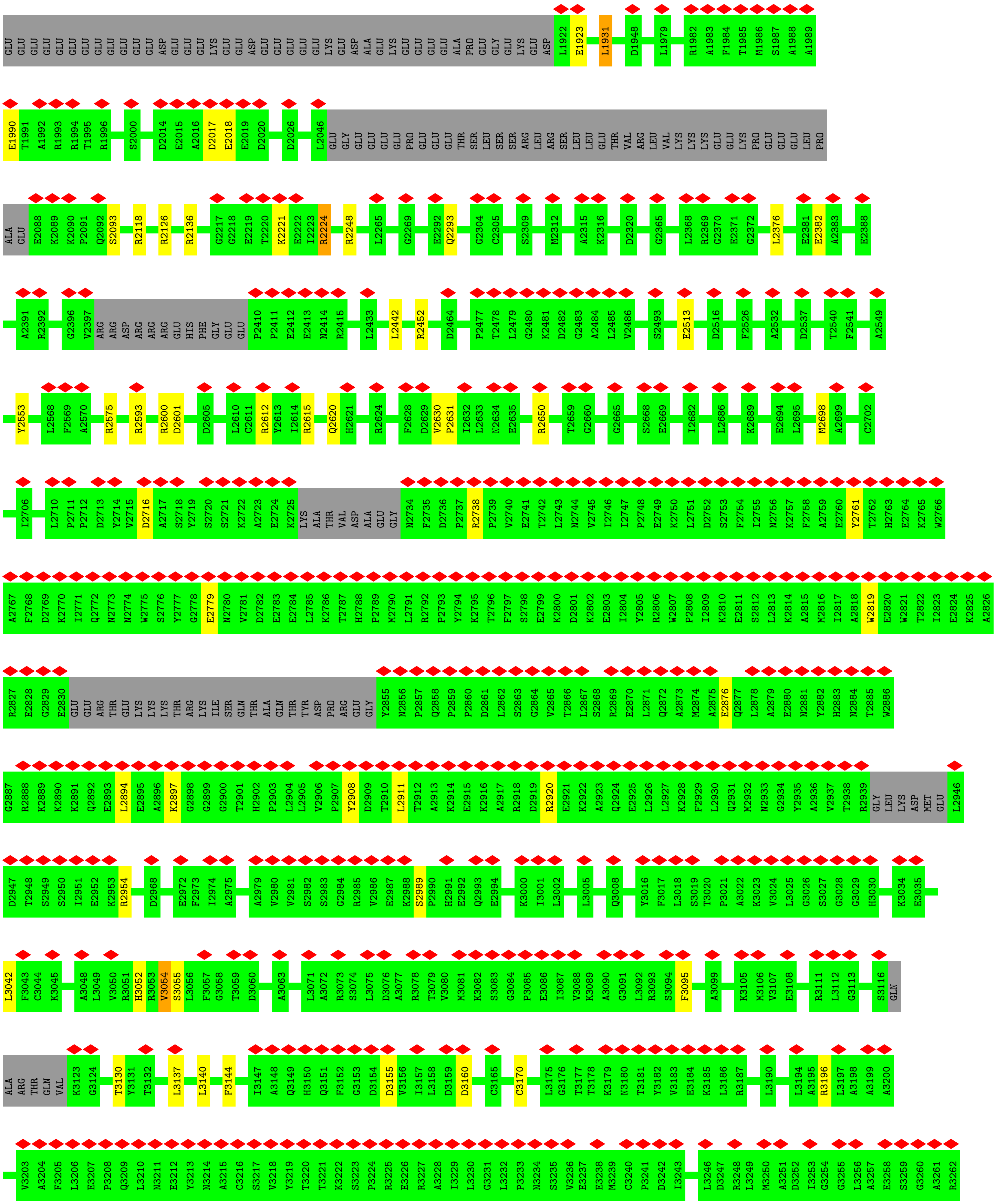








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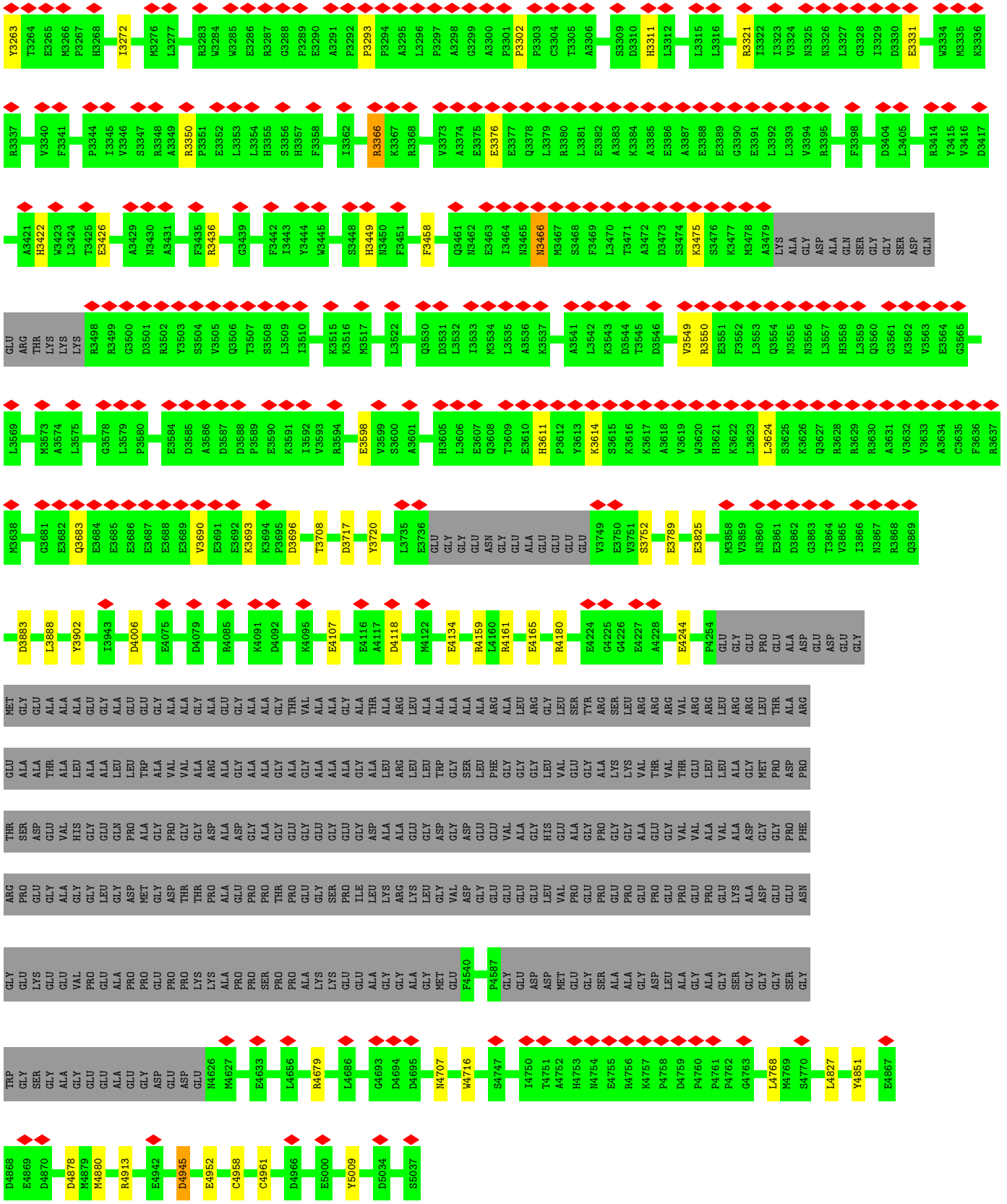
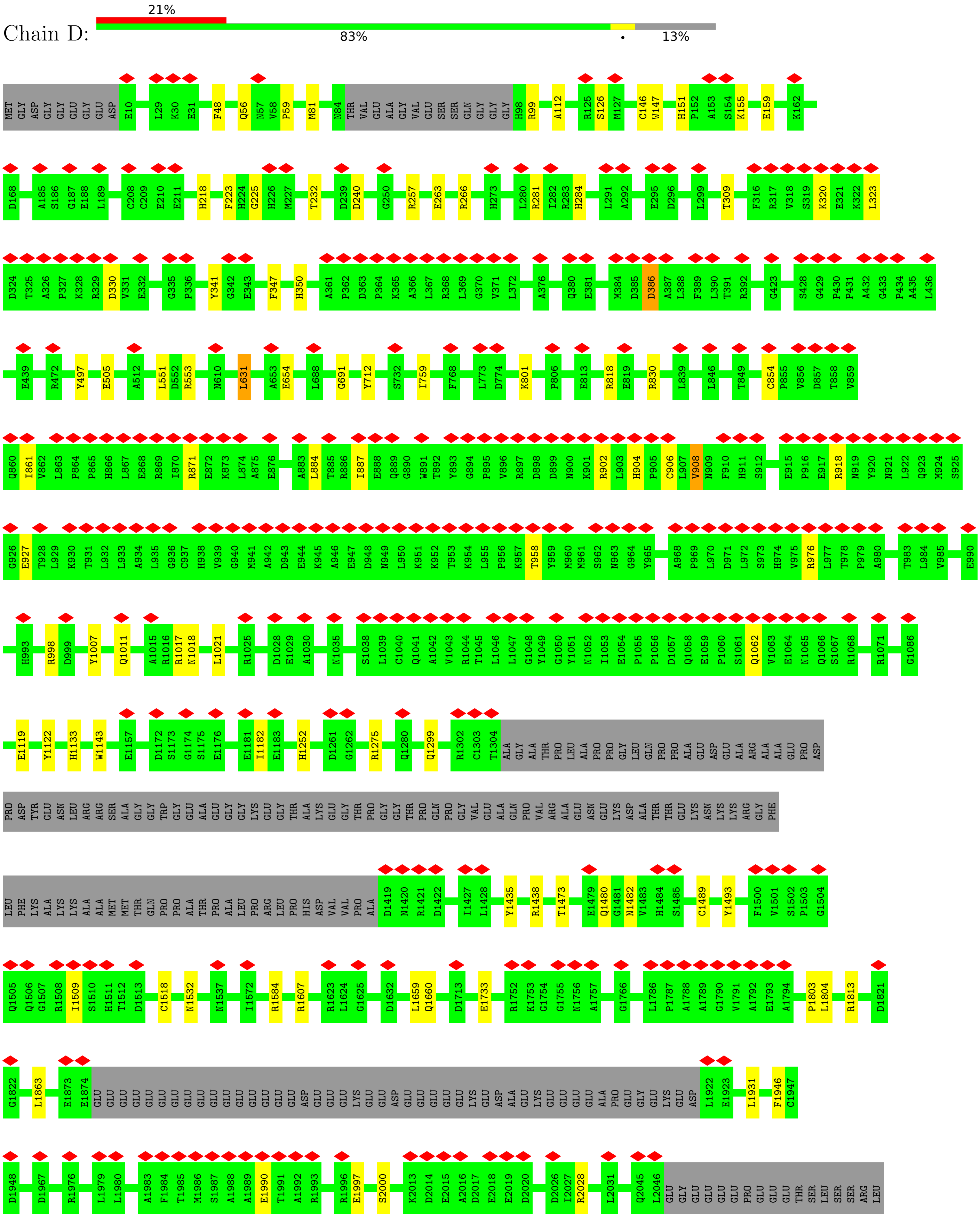


• Molecule 1: Ryanodine receptor 1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•
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H993 R998 D999 Y1007 Q1011 A1015 R1016 R1017 N1018 L1021 R1025 D1028 E1029 A1030 N1035 S1038 L1039 C1040 Q1041 A1042 V1043 R1044 T1045 L1046 L1047 G1048 Y1049 G1050 Y1051 N1052 I1053 E1054 P1055 P1056 D1057 Q1058 E1059 P1060 S1061 Q1062 V1063 E1064 N1065 Q1066 S1067 R1068 R1071 G1086
E1119 Y1122 H1133 W1143 E1157 D1172 S1173 G1174 S1175 E1176 E1181 I1182 E1183 H1252 D1261 G1262 R1275 Q1280 Q1299 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 R1421 D1422 I1427 L1428 Y1435 R1438 T1473 E1479 Q1480 G1481 N1482 V1483 H1484 S1485 C1489 Y1493 F1500 V1501 S1502 P1503 G1504
Q1505 Q1506 G1507 R1508 I1509 S1510 H1511 T1512 D1513 C1518 N1532 N1537 I1572 R1584 R1607 R1623 L1624 G1625 D1632 L1659 Q1660 D1713 E1733 R1752 K1753 G1754 G1755 N1756 A1757 G1766 L1786 P1787 A1788 A1789 G1790 V1791 A1792 E1793 A1794 P1803 L1804 R1813 D1821
G1822 L1863 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 L1931 F1946 C1947
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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 S2093 H2100 R2118 R2136 G2217 G2218 E2219 T2220 K2221 E2222 I2223 R2224 R2248 L2265 G2269 E2292 Q2293 G2304 C2305 M2312
A2315 K2316 G2317 I2321 G2322 G2365 L2368 R2369 G2370 E2371 G2372 G2373 E2381 E2382 E2388 A2391 R2392 G2396 V2397 ARG ARG ASP ARG ARG ARG GLU HIS PHE GLY GLU GLU P2410 P2411 E2412 E2413 N2414 R2452 D2464 L2472 Q2475 I2476 P2477 T2478 L2479 G2480 K2481 D2482 G2483 A2484
L2485 V2486 F2494 E2513 D2516 H2520 D2523 V2524 G2525 F2526 L2536 T2540 L2550 L2568 L2589 G2592 R2593 R2600 D2605 R2612 R2615 P2616 L2619 Q2620 H2621 L2622 L2623 R2624 F2628 D2629 I2632 L2633 N2634 E2635 L2641 K2642 L2643 L2644 R2650
G2660 N2663 F2664 G2665 V2666 T2667 S2668 E2669 I2682 L2686 K2689 Q2693 E2694 L2695 Y2696 R2697 M2698 I2706 A2707 L2710 P2711 P2712 D2713 Y2714 V2715 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
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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 H2883 N2884 T2885 W2886 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
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C3170 S3171 L3175 G3176 T3177 T3178 K3179 Y3182 V3183 E3184 K3185 L3186 R3187 P3188 A3189 L3190 G3191 E3192 C3193 L3194 A3199 A3200 V3203 A3204 F3205 L3206 E3207 P3208 Q3209 L3210 N3211 E3212 Y3213 N3214 A3215 C3216 S3217 V3218 Y3219 T3220 T3221 K3222 S3223 P3224 R3225 E3226 R3227 A3228 I3229 L3230 G3231 L3232 P3233 N3234 S3235 V3236
E3237 E3238 M3239 C3240 P3241 D3242 I3243 P3244 V3245 L3246 D3247 R3248 L3249 M3250 A3251 D3252 I3253 G3254 G3255 L3256 A3257 E3258 S3259 G3260 A3261 R3262 Y3263 T3264 E3265 M3266 P3267 H3268 I3272 L3277 R3283 W3284 W3285 E3286 R3287 G3288 P3289 E3290 A3291 P3292 P3293 P3294 A3295 L3296 P3297 A3298 G3299 A3300 P3301 P3302 P3303 C3304 T3305
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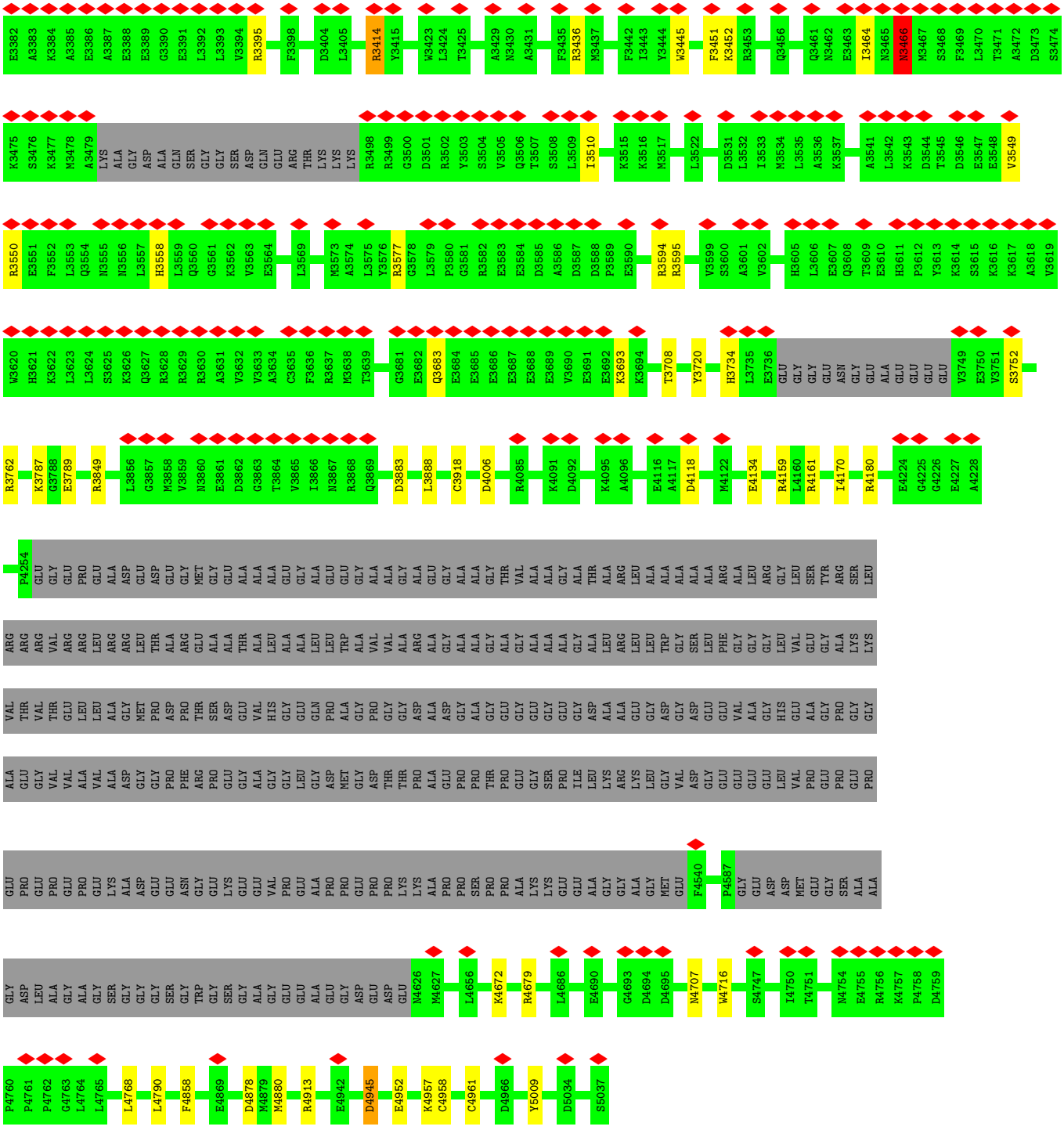
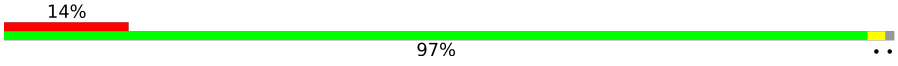
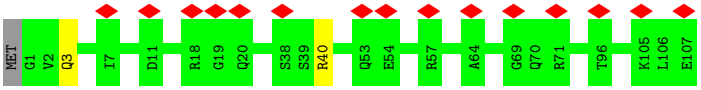


• Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1A

Chain E:





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

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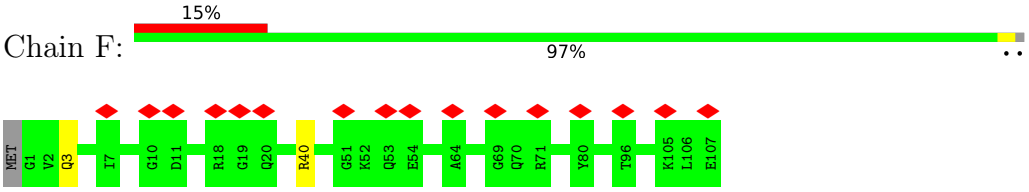
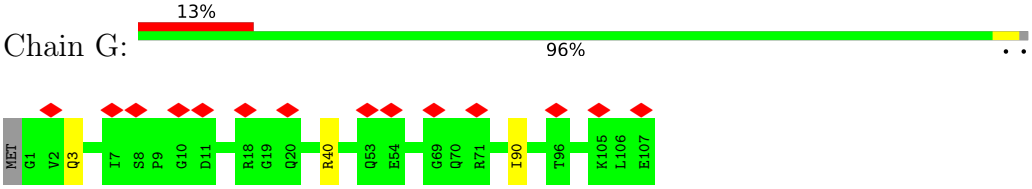


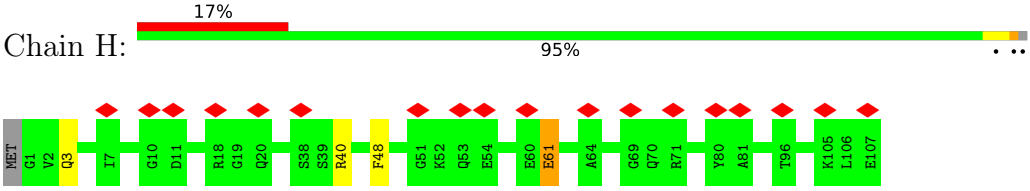
• Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1A

Chain G:



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

Chain H:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C4	Depositor
Number of particles used	19082	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	0.028	Depositor
Minimum map value	-0.016	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.002	Depositor
Recommended contour level	0.00592	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

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	0.77	0/35885	1.31	66/48603 (0.1%)
1	B	0.77	0/35885	1.31	65/48603 (0.1%)
1	C	0.77	0/35885	1.31	70/48603 (0.1%)
1	D	0.78	0/35885	1.33	74/48603 (0.2%)
2	E	0.79	0/851	1.29	1/1146 (0.1%)
2	F	0.81	0/851	1.31	1/1146 (0.1%)
2	G	0.80	0/851	1.29	1/1146 (0.1%)
2	H	0.80	0/851	1.33	4/1146 (0.3%)
All	All	0.77	0/146944	1.32	282/198996 (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	22
1	B	0	18
1	C	0	19
1	D	0	20
All	All	0	79

There are no bond length outliers.

All (282) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	3293	PRO	N-CA-C	7.61	119.98	110.70
1	B	3293	PRO	N-CA-C	7.56	119.92	110.70
1	D	3293	PRO	N-CA-C	7.42	119.75	110.70
1	A	3293	PRO	N-CA-C	7.31	119.62	110.70
1	D	2758	PHE	CA-CB-CG	7.30	121.10	113.80
1	A	386	ASP	CA-CB-CG	7.22	119.82	112.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	386	ASP	CA-CB-CG	6.81	119.41	112.60
1	B	386	ASP	CA-CB-CG	6.80	119.40	112.60
1	B	1057	ASP	CA-CB-CG	6.71	119.31	112.60
1	D	2806	ARG	CD-NE-CZ	6.68	133.75	124.40
1	B	240	ASP	CA-CB-CG	6.62	119.22	112.60
1	A	2018	GLU	N-CA-C	6.61	118.36	111.03
1	C	2593	ARG	NE-CZ-NH2	6.50	125.05	119.20
1	C	871	ARG	NE-CZ-NH2	6.40	124.96	119.20
1	D	2801	ASP	CA-CB-CG	6.40	119.00	112.60
1	B	4945	ASP	CA-CB-CG	6.38	118.98	112.60
1	C	1813	ARG	NE-CZ-NH2	6.37	124.94	119.20
1	A	240	ASP	CA-CB-CG	6.35	118.95	112.60
1	A	2017	ASP	CA-C-N	6.33	129.23	120.63
1	A	2017	ASP	C-N-CA	6.33	129.23	120.63
1	B	1813	ARG	NE-CZ-NH2	6.30	124.88	119.20
1	B	2593	ARG	NE-CZ-NH2	6.30	124.87	119.20
1	A	1813	ARG	NE-CZ-NH2	6.29	124.86	119.20
1	D	386	ASP	CA-CB-CG	6.26	118.86	112.60
1	A	4118	ASP	CA-CB-CG	6.23	118.83	112.60
1	C	4118	ASP	CA-CB-CG	6.21	118.81	112.60
1	A	2593	ARG	NE-CZ-NH2	6.21	124.79	119.20
1	D	1018	ASN	CA-C-N	6.20	125.89	119.56
1	D	1018	ASN	C-N-CA	6.20	125.89	119.56
1	A	3366	ARG	NE-CZ-NH2	6.19	124.77	119.20
2	H	61	GLU	CA-C-N	6.19	126.81	120.00
2	H	61	GLU	C-N-CA	6.19	126.81	120.00
1	D	240	ASP	CA-CB-CG	6.16	118.76	112.60
1	A	232	THR	N-CA-C	6.16	116.69	108.38
1	B	3436	ARG	NE-CZ-NH2	6.15	124.73	119.20
1	A	3436	ARG	NE-CZ-NH2	6.15	124.73	119.20
1	C	240	ASP	CA-CB-CG	6.13	118.73	112.60
1	A	4945	ASP	CA-CB-CG	6.13	118.73	112.60
1	D	3157	ILE	CA-C-N	6.12	132.16	122.36
1	D	3157	ILE	C-N-CA	6.12	132.16	122.36
1	D	2593	ARG	NE-CZ-NH2	6.12	124.70	119.20
1	B	1275	ARG	NE-CZ-NH2	6.11	124.70	119.20
1	C	3272	ILE	N-CA-C	6.11	117.25	112.12
1	D	1813	ARG	NE-CZ-NH2	6.11	124.70	119.20
2	H	40	ARG	NE-CZ-NH2	6.10	124.69	119.20
1	A	1057	ASP	CA-CB-CG	6.07	118.67	112.60
1	D	3734	HIS	CA-CB-CG	6.03	119.83	113.80
1	C	2224	ARG	NE-CZ-NH2	6.01	124.61	119.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	830	ARG	NE-CZ-NH2	6.00	124.60	119.20
1	B	2018	GLU	N-CA-C	5.99	117.67	111.03
1	D	3366	ARG	NE-CZ-NH2	5.98	124.58	119.20
1	D	871	ARG	NE-CZ-NH2	5.97	124.57	119.20
1	C	4945	ASP	CA-CB-CG	5.97	118.57	112.60
1	C	830	ARG	NE-CZ-NH2	5.96	124.57	119.20
1	A	869	ARG	NE-CZ-NH2	5.94	124.55	119.20
1	C	2601	ASP	CA-CB-CG	5.92	118.52	112.60
1	D	4945	ASP	CA-CB-CG	5.91	118.51	112.60
1	B	3160	ASP	CA-CB-CG	5.91	118.51	112.60
2	G	40	ARG	NE-CZ-NH2	5.89	124.50	119.20
1	B	1554	VAL	N-CA-C	5.87	115.58	108.06
1	A	3196	ARG	NE-CZ-NH2	5.87	124.48	119.20
2	F	40	ARG	NE-CZ-NH2	5.86	124.48	119.20
1	B	1228	ILE	N-CA-C	5.86	117.30	110.62
1	C	232	THR	N-CA-C	5.86	116.82	108.74
1	A	2920	ARG	NE-CZ-NH2	5.84	124.46	119.20
1	D	902	ARG	NE-CZ-NH2	5.84	124.45	119.20
1	B	2584	HIS	CA-CB-CG	5.82	119.62	113.80
1	D	2523	ASP	CA-CB-CG	5.82	118.42	112.60
1	A	1554	VAL	N-CA-C	5.81	115.49	108.06
1	D	2797	PHE	CA-CB-CG	5.80	119.60	113.80
1	B	830	ARG	NE-CZ-NH2	5.79	124.41	119.20
1	D	3451	PHE	CA-CB-CG	5.79	119.59	113.80
1	A	904	HIS	CA-CB-CG	5.77	119.57	113.80
1	D	284	HIS	CB-CG-CD2	-5.76	123.72	131.20
1	A	1228	ILE	N-CA-C	5.75	117.18	110.62
1	B	2355	ARG	NE-CZ-NH2	5.75	124.37	119.20
1	D	3436	ARG	NE-CZ-NH2	5.73	124.35	119.20
1	A	3223	SER	CA-C-N	5.72	125.43	119.82
1	A	3223	SER	C-N-CA	5.72	125.43	119.82
1	C	2575	ARG	NE-CZ-NH2	5.71	124.34	119.20
1	D	3762	ARG	NE-CZ-NH2	5.69	124.32	119.20
1	B	2575	ARG	NE-CZ-NH2	5.68	124.31	119.20
1	B	2920	ARG	NE-CZ-NH2	5.68	124.31	119.20
1	C	1017	ARG	NE-CZ-NH2	5.68	124.31	119.20
1	D	2806	ARG	NE-CZ-NH2	5.67	124.30	119.20
1	B	4118	ASP	CA-CB-CG	5.66	118.26	112.60
1	C	3321	ARG	NE-CZ-NH2	5.66	124.29	119.20
1	C	3436	ARG	NE-CZ-NH2	5.66	124.29	119.20
1	C	2126	ARG	NE-CZ-NH2	5.66	124.29	119.20
1	D	232	THR	N-CA-C	5.66	116.55	108.74

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	768	PHE	CA-CB-CG	5.65	119.45	113.80
1	B	3594	ARG	NE-CZ-NH2	5.65	124.28	119.20
1	D	3414	ARG	NE-CZ-NH2	5.65	124.28	119.20
1	D	551	LEU	N-CA-C	5.64	117.43	111.28
1	D	4118	ASP	CA-CB-CG	5.64	118.24	112.60
1	C	3366	ARG	NE-CZ-NH2	5.63	124.27	119.20
1	D	1275	ARG	NE-CZ-NH2	5.63	124.27	119.20
1	C	1438	ARG	NE-CZ-NH2	5.62	124.26	119.20
1	B	284	HIS	CB-CG-CD2	-5.60	123.92	131.20
1	C	3160	ASP	CA-CB-CG	5.60	118.20	112.60
1	A	3095	PHE	CA-CB-CG	5.60	119.40	113.80
1	D	350	HIS	CB-CG-CD2	-5.59	123.93	131.20
1	B	551	LEU	N-CA-C	5.59	117.37	111.28
1	C	2018	GLU	N-CA-C	5.59	117.23	111.03
1	B	350	HIS	CB-CG-CD2	-5.58	123.95	131.20
1	B	1017	ARG	NE-CZ-NH2	5.58	124.22	119.20
1	A	284	HIS	CB-CG-CD2	-5.57	123.96	131.20
1	A	551	LEU	N-CA-C	5.56	117.34	111.28
1	C	3350	ARG	NE-CZ-NH2	5.56	124.20	119.20
1	A	330	ASP	CA-CB-CG	5.55	118.15	112.60
1	A	1017	ARG	NE-CZ-NH2	5.55	124.19	119.20
2	E	40	ARG	NE-CZ-NH2	5.54	124.19	119.20
1	B	2017	ASP	CA-C-N	5.54	128.16	120.63
1	B	2017	ASP	C-N-CA	5.54	128.16	120.63
1	C	2017	ASP	CA-C-N	5.54	128.16	120.63
1	C	2017	ASP	C-N-CA	5.54	128.16	120.63
1	C	2920	ARG	NE-CZ-NH2	5.53	124.17	119.20
1	A	326	ALA	N-CA-C	5.52	113.19	108.22
1	A	3594	ARG	NE-CZ-NH2	5.52	124.17	119.20
1	A	1212	ARG	NE-CZ-NH2	5.51	124.16	119.20
1	C	2630	VAL	CA-C-N	5.51	125.22	119.82
1	C	2630	VAL	C-N-CA	5.51	125.22	119.82
1	C	2738	ARG	NE-CZ-NH2	5.51	124.16	119.20
1	D	830	ARG	NE-CZ-NH2	5.50	124.16	119.20
1	A	2575	ARG	NE-CZ-NH2	5.50	124.15	119.20
1	C	2136	ARG	NE-CZ-NH2	5.50	124.15	119.20
1	B	3366	ARG	NE-CZ-NH2	5.48	124.13	119.20
1	C	284	HIS	CB-CG-CD2	-5.47	124.09	131.20
1	C	3466	ASN	CA-CB-CG	5.46	118.06	112.60
1	A	350	HIS	CB-CG-CD2	-5.45	124.11	131.20
1	D	2028	ARG	NE-CZ-NH2	5.45	124.11	119.20
1	C	3095	PHE	CA-CB-CG	5.45	119.25	113.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	871	ARG	NE-CZ-NH2	5.45	124.11	119.20
1	C	1057	ASP	CA-CB-CG	5.44	118.04	112.60
1	C	1141	ARG	NE-CZ-NH2	5.44	124.10	119.20
1	C	3883	ASP	CA-CB-CG	5.44	118.04	112.60
1	A	2630	VAL	CA-C-N	5.43	125.15	119.82
1	A	2630	VAL	C-N-CA	5.43	125.15	119.82
1	B	871	ARG	NE-CZ-NH2	5.43	124.09	119.20
1	B	3550	ARG	NE-CZ-NH2	5.43	124.09	119.20
1	C	2615	ARG	NE-CZ-NH2	5.42	124.08	119.20
1	A	3883	ASP	CA-CB-CG	5.42	118.02	112.60
1	B	2738	ARG	NE-CZ-NH2	5.41	124.07	119.20
1	A	3350	ARG	NE-CZ-NH2	5.40	124.06	119.20
1	C	3550	ARG	NE-CZ-NH2	5.39	124.05	119.20
1	A	1275	ARG	NE-CZ-NH2	5.39	124.05	119.20
1	B	2136	ARG	NE-CZ-NH2	5.38	124.05	119.20
1	B	2601	ASP	CA-CB-CG	5.38	117.98	112.60
1	D	330	ASP	CA-CB-CG	5.38	117.98	112.60
1	C	551	LEU	N-CA-C	5.38	117.14	111.28
1	A	3321	ARG	NE-CZ-NH2	5.37	124.03	119.20
1	C	869	ARG	NE-CZ-NH2	5.36	124.03	119.20
1	C	2248	ARG	NE-CZ-NH2	5.36	124.02	119.20
1	C	818	ARG	NE-CZ-NH2	5.35	124.02	119.20
1	D	2920	ARG	NE-CZ-NH2	5.35	124.02	119.20
1	B	2615	ARG	NE-CZ-NH2	5.35	124.02	119.20
1	B	3196	ARG	NE-CZ-NH2	5.34	124.00	119.20
1	B	3321	ARG	NE-CZ-NH2	5.34	124.00	119.20
1	B	4715	TYR	CA-C-N	5.34	127.69	120.65
1	B	4715	TYR	C-N-CA	5.34	127.69	120.65
1	B	3350	ARG	NE-CZ-NH2	5.33	123.99	119.20
1	D	3466	ASN	CA-CB-CG	5.33	117.93	112.60
1	A	2601	ASP	CA-CB-CG	5.32	117.92	112.60
1	C	1275	ARG	NE-CZ-NH2	5.32	123.98	119.20
1	B	2126	ARG	NE-CZ-NH2	5.32	123.98	119.20
1	A	2738	ARG	NE-CZ-NH2	5.31	123.98	119.20
1	C	3196	ARG	NE-CZ-NH2	5.31	123.98	119.20
1	B	2630	VAL	CA-C-N	5.31	125.02	119.82
1	B	2630	VAL	C-N-CA	5.31	125.02	119.82
1	A	647	ASN	CA-CB-CG	5.30	117.90	112.60
1	D	1438	ARG	NE-CZ-NH2	5.30	123.97	119.20
1	B	3883	ASP	CA-CB-CG	5.30	117.90	112.60
1	C	350	HIS	CB-CG-CD2	-5.29	124.32	131.20
1	C	3458	PHE	CA-CB-CG	5.29	119.09	113.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	1640	HIS	CA-CB-CG	5.29	119.09	113.80
1	B	2248	ARG	NE-CZ-NH2	5.28	123.95	119.20
1	B	330	ASP	CA-CB-CG	5.27	117.87	112.60
1	A	904	HIS	CB-CG-CD2	-5.26	124.36	131.20
1	D	2693	GLN	N-CA-C	5.26	116.70	111.07
1	B	2869	ARG	NE-CZ-NH2	5.26	123.93	119.20
1	C	2650	ARG	NE-CZ-NH2	5.26	123.93	119.20
1	D	2136	ARG	NE-CZ-NH2	5.26	123.93	119.20
1	C	681	HIS	CB-CG-CD2	-5.25	124.37	131.20
1	D	4858	PHE	CA-CB-CG	5.25	119.05	113.80
1	A	2989	SER	CA-C-N	5.24	125.29	119.32
1	A	2989	SER	C-N-CA	5.24	125.29	119.32
1	C	3449	HIS	CA-CB-CG	-5.24	108.56	113.80
1	D	2248	ARG	NE-CZ-NH2	5.24	123.92	119.20
1	B	2100	HIS	CA-CB-CG	-5.23	108.57	113.80
1	B	2631	PRO	N-CA-C	5.23	120.72	113.98
1	D	3883	ASP	CA-CB-CG	5.23	117.83	112.60
2	H	48	PHE	CA-CB-CG	5.23	119.03	113.80
1	B	818	ARG	NE-CZ-NH2	5.22	123.90	119.20
1	C	112	ALA	N-CA-C	5.22	117.72	111.71
1	A	3160	ASP	CA-CB-CG	5.22	117.82	112.60
1	D	263	GLU	CA-C-N	5.22	125.16	119.78
1	D	263	GLU	C-N-CA	5.22	125.16	119.78
1	C	1252	HIS	CB-CG-CD2	-5.22	124.42	131.20
1	D	958	THR	N-CA-C	5.22	117.71	111.71
1	C	2819	TRP	CA-C-N	5.21	129.74	122.08
1	C	2819	TRP	C-N-CA	5.21	129.74	122.08
1	B	824	GLU	CA-C-N	5.21	125.49	119.92
1	B	824	GLU	C-N-CA	5.21	125.49	119.92
1	C	472	ARG	NE-CZ-NH2	5.20	123.88	119.20
1	A	2100	HIS	CA-CB-CG	-5.20	108.60	113.80
1	A	1252	HIS	CB-CG-CD2	-5.19	124.45	131.20
1	C	2954	ARG	NE-CZ-NH2	5.19	123.87	119.20
1	C	257	ARG	NE-CZ-NH2	5.19	123.87	119.20
1	A	4156	HIS	N-CA-C	5.18	118.87	112.54
1	D	2738	ARG	NE-CZ-NH2	5.18	123.86	119.20
1	A	1036	ARG	NE-CZ-NH2	5.17	123.86	119.20
1	D	3337	ARG	NE-CZ-NH2	5.17	123.85	119.20
1	D	3321	ARG	NE-CZ-NH2	5.17	123.85	119.20
1	A	278	GLN	OE1-CD-NE2	-5.16	117.44	122.60
1	D	1017	ARG	NE-CZ-NH2	5.16	123.84	119.20
1	D	2615	ARG	NE-CZ-NH2	5.15	123.84	119.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	D	553	ARG	NE-CZ-NH2	5.15	123.84	119.20
1	D	59	PRO	N-CA-CB	5.14	105.89	103.22
1	A	266	ARG	NE-CZ-NH2	5.14	123.83	119.20
1	A	1141	ARG	NE-CZ-NH2	5.13	123.82	119.20
1	A	1274	HIS	CB-CG-CD2	-5.13	124.53	131.20
1	D	2989	SER	CA-C-N	5.13	126.25	119.84
1	D	2989	SER	C-N-CA	5.13	126.25	119.84
1	C	2221	LYS	N-CA-C	5.13	114.91	108.45
1	D	2616	PRO	CA-C-N	5.13	127.46	120.54
1	D	2616	PRO	C-N-CA	5.13	127.46	120.54
1	A	2324	ASN	CB-CA-C	5.12	116.04	110.15
1	C	1473	THR	CA-C-N	5.12	129.38	122.93
1	C	1473	THR	C-N-CA	5.12	129.38	122.93
1	B	869	ARG	NE-CZ-NH2	5.11	123.80	119.20
1	C	4159	ARG	NE-CZ-NH2	5.10	123.79	119.20
1	A	2781	VAL	N-CA-C	5.09	115.60	108.17
1	B	3167	ARG	NE-CZ-NH2	5.09	123.78	119.20
1	C	720	HIS	CB-CG-CD2	-5.09	124.58	131.20
1	A	2224	ARG	NE-CZ-NH2	5.09	123.78	119.20
1	B	4870	ASP	CA-CB-CG	5.09	117.69	112.60
1	D	2000	SER	CA-C-N	5.09	123.38	119.66
1	D	2000	SER	C-N-CA	5.09	123.38	119.66
1	C	3311	HIS	CB-CG-CD2	-5.09	124.58	131.20
1	D	3157	ILE	CB-CA-C	5.09	119.63	111.29
1	B	4159	ARG	NE-CZ-NH2	5.08	123.78	119.20
1	D	266	ARG	NE-CZ-NH2	5.08	123.77	119.20
1	B	3449	HIS	CA-CB-CG	-5.08	108.72	113.80
1	C	98	HIS	CA-CB-CG	5.08	118.88	113.80
1	A	925	SER	CA-C-N	5.07	125.61	119.98
1	A	925	SER	C-N-CA	5.07	125.61	119.98
1	D	3577	ARG	NE-CZ-NH2	5.07	123.76	119.20
1	B	1458	HIS	CA-CB-CG	5.07	118.87	113.80
1	D	818	ARG	NE-CZ-NH2	5.07	123.76	119.20
1	D	2100	HIS	CA-CB-CG	-5.06	108.74	113.80
1	A	2820	GLU	N-CA-C	5.06	118.58	111.90
1	C	2600	ARG	NE-CZ-NH2	5.06	123.75	119.20
1	A	257	ARG	NE-CZ-NH2	5.05	123.75	119.20
1	B	1141	ARG	NE-CZ-NH2	5.05	123.75	119.20
1	C	2631	PRO	N-CA-C	5.05	120.49	113.98
1	B	4240	ASP	CA-CB-CG	5.05	117.65	112.60
1	A	3949	ARG	NE-CZ-NH2	5.04	123.74	119.20
1	B	1252	HIS	CB-CG-CD2	-5.04	124.65	131.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	3611	HIS	CB-CG-CD2	-5.04	124.65	131.20
1	B	151	HIS	CB-CG-CD2	-5.04	124.65	131.20
1	B	1044	ARG	NE-CZ-NH2	5.04	123.73	119.20
1	D	1473	THR	CA-C-N	5.04	129.28	122.93
1	D	1473	THR	C-N-CA	5.04	129.28	122.93
1	C	3717	ASP	CA-CB-CG	5.03	117.63	112.60
1	D	1252	HIS	CB-CG-CD2	-5.03	124.66	131.20
1	D	112	ALA	N-CA-C	5.02	117.49	111.71
1	C	330	ASP	CA-CB-CG	5.02	117.62	112.60
1	D	2221	LYS	N-CA-C	5.02	114.92	108.34
1	B	902	ARG	CB-CA-C	5.02	119.44	112.11
1	D	4159	ARG	NE-CZ-NH2	5.02	123.72	119.20
1	D	151	HIS	CB-CG-CD2	-5.02	124.68	131.20
1	D	257	ARG	NE-CZ-NH2	5.02	123.72	119.20
1	A	2248	ARG	NE-CZ-NH2	5.02	123.71	119.20
1	D	2973	PHE	CA-CB-CG	5.01	118.81	113.80
1	B	3311	HIS	CB-CG-CD2	-5.01	124.68	131.20
1	D	3558	HIS	CB-CG-CD2	-5.01	124.68	131.20
1	B	4156	HIS	N-CA-C	5.01	119.11	112.89
1	A	2011	HIS	CB-CG-CD2	-5.01	124.69	131.20
1	D	3227	ARG	NE-CZ-NH2	5.01	123.71	119.20
1	A	1438	ARG	NE-CZ-NH2	5.01	123.71	119.20
1	D	3594	ARG	NE-CZ-NH2	5.00	123.70	119.20
1	B	266	ARG	NE-CZ-NH2	5.00	123.70	119.20

There are no chirality outliers.

All (79) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	103	TYR	Sidechain
1	A	1049	TYR	Sidechain
1	A	1493	TYR	Sidechain
1	A	1607	ARG	Sidechain
1	A	1725	ARG	Sidechain
1	A	2452	ARG	Sidechain
1	A	2553	TYR	Sidechain
1	A	2613	TYR	Sidechain
1	A	281	ARG	Sidechain
1	A	2908	TYR	Sidechain
1	A	3009	TYR	Sidechain
1	A	341	TYR	Sidechain
1	A	3720	TYR	Sidechain

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Mol	Chain	Res	Type	Group
1	A	4180	ARG	Sidechain
1	A	4679	ARG	Sidechain
1	A	4851	TYR	Sidechain
1	A	4909	TYR	Sidechain
1	A	4913	ARG	Sidechain
1	A	497	TYR	Sidechain
1	A	5009	TYR	Sidechain
1	A	712	TYR	Sidechain
1	A	918	ARG	Sidechain
1	B	103	TYR	Sidechain
1	B	1493	TYR	Sidechain
1	B	1607	ARG	Sidechain
1	B	2104	ARG	Sidechain
1	B	2385	ARG	Sidechain
1	B	2452	ARG	Sidechain
1	B	2553	TYR	Sidechain
1	B	281	ARG	Sidechain
1	B	2908	TYR	Sidechain
1	B	341	TYR	Sidechain
1	B	3720	TYR	Sidechain
1	B	4180	ARG	Sidechain
1	B	4851	TYR	Sidechain
1	B	4909	TYR	Sidechain
1	B	4913	ARG	Sidechain
1	B	5009	TYR	Sidechain
1	B	712	TYR	Sidechain
1	B	918	ARG	Sidechain
1	C	1007	TYR	Sidechain
1	C	103	TYR	Sidechain
1	C	1493	TYR	Sidechain
1	C	1607	ARG	Sidechain
1	C	2452	ARG	Sidechain
1	C	2553	TYR	Sidechain
1	C	2908	TYR	Sidechain
1	C	3263	TYR	Sidechain
1	C	341	TYR	Sidechain
1	C	3720	TYR	Sidechain
1	C	3902	TYR	Sidechain
1	C	4180	ARG	Sidechain
1	C	4679	ARG	Sidechain
1	C	4851	TYR	Sidechain
1	C	4913	ARG	Sidechain

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Mol	Chain	Res	Type	Group
1	C	497	TYR	Sidechain
1	C	5009	TYR	Sidechain
1	C	714	TYR	Sidechain
1	C	918	ARG	Sidechain
1	D	1007	TYR	Sidechain
1	D	1493	TYR	Sidechain
1	D	1607	ARG	Sidechain
1	D	2452	ARG	Sidechain
1	D	2714	TYR	Sidechain
1	D	2794	TYR	Sidechain
1	D	281	ARG	Sidechain
1	D	3009	TYR	Sidechain
1	D	3395	ARG	Sidechain
1	D	341	TYR	Sidechain
1	D	3550	ARG	Sidechain
1	D	3595	ARG	Sidechain
1	D	3720	TYR	Sidechain
1	D	3849	ARG	Sidechain
1	D	4180	ARG	Sidechain
1	D	4679	ARG	Sidechain
1	D	4913	ARG	Sidechain
1	D	497	TYR	Sidechain
1	D	5009	TYR	Sidechain
1	D	918	ARG	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	34735	34717	13	0
1	B	35088	34735	34717	21	0
1	C	35088	34735	34717	13	0
1	D	35088	34735	34717	24	0
2	E	832	829	831	0	0
2	F	832	829	831	0	0
2	G	832	829	831	1	0
2	H	832	829	831	0	0
All	All	143680	142256	142192	71	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 (71) 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:B:3416:VAL:HG21	1:B:3517:MET:HE1	1.76	0.66
1:C:146:CYS:HG	1:C:147:TRP:CD1	2.17	0.62
1:A:146:CYS:HG	1:A:147:TRP:CD1	2.20	0.60
1:B:146:CYS:HG	1:B:147:TRP:CD1	2.20	0.60
1:B:1931:LEU:H	1:B:1931:LEU:HD22	1.68	0.58
1:C:1931:LEU:HD22	1:C:1931:LEU:H	1.70	0.56
1:C:320:LYS:HE3	1:C:347:PHE:CZ	2.41	0.56
1:D:146:CYS:HG	1:D:147:TRP:CD1	2.25	0.54
1:A:320:LYS:HE3	1:A:347:PHE:CZ	2.43	0.54
1:B:320:LYS:HE3	1:B:347:PHE:CZ	2.43	0.54
1:A:3107:VAL:HG21	1:A:3171:SER:HB2	1.91	0.53
1:D:1931:LEU:H	1:D:1931:LEU:HD22	1.72	0.53
1:A:1931:LEU:H	1:A:1931:LEU:HD22	1.73	0.53
1:D:320:LYS:HE3	1:D:347:PHE:CZ	2.44	0.52
1:D:3445:TRP:CZ2	1:D:3452:LYS:HE2	2.45	0.52
1:D:2823:ILE:HD11	1:D:2930:LEU:HD21	1.91	0.51
1:B:3054:VAL:HG13	1:B:3055:SER:H	1.76	0.50
1:D:3107:VAL:HG11	1:D:3171:SER:HB2	1.94	0.49
1:D:4958:CYS:CB	1:D:4961:CYS:HG	2.25	0.49
1:D:3291:ALA:HB1	1:D:3292:PRO:HD2	1.94	0.48
1:B:1122:TYR:CE1	1:B:1133:HIS:CD2	3.02	0.47
1:C:1122:TYR:CE1	1:C:1133:HIS:CD2	3.02	0.47
1:D:3464:ILE:HG22	1:D:3466:ASN:H	1.79	0.47
1:B:3999:MET:HE3	1:B:3999:MET:HA	1.97	0.47
1:B:3052:HIS:CE1	1:B:3128:ASN:HD21	2.32	0.47
1:B:3520:ILE:H	1:B:3520:ILE:HD12	1.78	0.47
1:C:904:HIS:CD2	1:C:906:CYS:H	2.33	0.47
1:D:3291:ALA:HB1	1:D:3292:PRO:CD	2.45	0.46
1:C:3624:LEU:HD23	1:C:3624:LEU:H	1.81	0.46
1:C:1659:LEU:C	1:C:1659:LEU:HD23	2.40	0.46
1:A:1122:TYR:CE1	1:A:1133:HIS:CD2	3.04	0.46
1:D:904:HIS:CD2	1:D:906:CYS:H	2.34	0.45
1:B:3624:LEU:H	1:B:3624:LEU:HD23	1.82	0.45
1:B:3107:VAL:HG21	1:B:3171:SER:HB2	1.99	0.44
1:D:3445:TRP:CH2	1:D:3452:LYS:HE2	2.52	0.44
1:C:858:THR:O	1:C:930:LYS:HE2	2.17	0.44
1:C:3054:VAL:HG13	1:C:3055:SER:H	1.81	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:1122:TYR:CE1	1:D:1133:HIS:CD2	3.05	0.44
1:D:4958:CYS:HB3	1:D:4961:CYS:HG	1.83	0.44
1:A:2897:LYS:HA	1:A:2897:LYS:HE2	1.99	0.44
1:C:4958:CYS:CB	1:C:4961:CYS:HG	2.31	0.43
1:A:691:GLY:HA3	1:A:712:TYR:CD1	2.53	0.43
1:A:1659:LEU:C	1:A:1659:LEU:HD23	2.43	0.43
1:D:3288:GLY:O	1:D:3291:ALA:HB3	2.18	0.43
1:B:232:THR:HG21	1:B:248:GLU:HB2	2.00	0.43
1:C:1684:ALA:HA	2:G:90:ILE:HD11	2.01	0.43
1:B:691:GLY:HA3	1:B:712:TYR:CD1	2.53	0.43
1:B:3944:GLU:H	1:B:3944:GLU:CD	2.26	0.43
1:D:801:LYS:HA	1:D:801:LYS:HE2	2.01	0.43
1:B:1659:LEU:C	1:B:1659:LEU:HD23	2.44	0.42
1:D:3054:VAL:HG13	1:D:3055:SER:H	1.84	0.42
1:B:4991:PHE:CE2	1:B:4995:LEU:HD11	2.55	0.42
1:A:30:LYS:HA	1:A:30:LYS:HE2	2.02	0.42
1:A:1863:LEU:HD21	1:A:1946:PHE:CE1	2.54	0.42
1:D:3110:LEU:C	1:D:3112:LEU:H	2.28	0.42
1:A:3043:PHE:CE2	1:A:3075:LEU:HD11	2.55	0.41
1:B:2897:LYS:HA	1:B:2897:LYS:HE2	2.01	0.41
1:B:1435:TYR:CE1	1:B:1518:CYS:HB2	2.55	0.41
1:D:1863:LEU:HD21	1:D:1946:PHE:CE1	2.55	0.41
1:C:3140:LEU:HD11	1:C:3144:PHE:CZ	2.54	0.41
1:D:691:GLY:HA3	1:D:712:TYR:CD1	2.56	0.41
1:D:1659:LEU:C	1:D:1659:LEU:HD23	2.46	0.41
1:A:3140:LEU:HD11	1:A:3144:PHE:CZ	2.56	0.41
1:C:2897:LYS:HA	1:C:2897:LYS:HE2	2.02	0.41
1:D:1435:TYR:CE1	1:D:1518:CYS:HB2	2.55	0.41
1:B:15:ARG:HH12	1:B:98:HIS:CE1	2.39	0.41
1:A:801:LYS:HA	1:A:801:LYS:HE2	2.02	0.40
1:B:2587:TYR:CZ	1:B:2591:ARG:HD2	2.56	0.40
1:D:4170:ILE:H	1:D:4170:ILE:HD12	1.86	0.40
1:B:3043:PHE:CE2	1:B:3075:LEU:HD11	2.57	0.40
1:D:2806:ARG:HH21	1:D:2806:ARG:CG	2.34	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%)	4158 (95%)	202 (5%)	16 (0%)	30	67
1	B	4376/5037 (87%)	4164 (95%)	196 (4%)	16 (0%)	30	67
1	C	4376/5037 (87%)	4147 (95%)	213 (5%)	16 (0%)	30	67
1	D	4376/5037 (87%)	4063 (93%)	282 (6%)	31 (1%)	18	55
2	E	105/108 (97%)	102 (97%)	3 (3%)	0	100	100
2	F	105/108 (97%)	101 (96%)	4 (4%)	0	100	100
2	G	105/108 (97%)	102 (97%)	3 (3%)	0	100	100
2	H	105/108 (97%)	101 (96%)	4 (4%)	0	100	100
All	All	17924/20580 (87%)	16938 (94%)	907 (5%)	79 (0%)	31	67

All (79) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	908	VAL
1	D	3693	LYS
1	A	126	SER
1	A	225	GLY
1	A	309	THR
1	B	225	GLY
1	B	693	SER
1	B	1482	ASN
1	B	3054	VAL
1	C	126	SER
1	C	225	GLY
1	C	309	THR
1	C	1482	ASN
1	C	1532	ASN
1	D	126	SER
1	D	225	GLY
1	D	309	THR

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Mol	Chain	Res	Type
1	D	861	ILE
1	D	1482	ASN
1	D	2663	ASN
1	D	2869	ARG
1	A	631	LEU
1	A	1119	GLU
1	A	1482	ASN
1	A	4134	GLU
1	B	309	THR
1	B	1119	GLU
1	B	1532	ASN
1	B	4134	GLU
1	C	3054	VAL
1	C	4134	GLU
1	D	631	LEU
1	D	1119	GLU
1	D	1532	ASN
1	D	1584	ARG
1	D	2482	ASP
1	D	3787	LYS
1	A	1532	ASN
1	A	4748	LEU
1	C	972	LEU
1	C	1119	GLU
1	D	2483	GLY
1	D	3054	VAL
1	A	323	LEU
1	A	3693	LYS
1	B	386	ASP
1	B	1172	ASP
1	B	3693	LYS
1	C	861	ILE
1	C	3052	HIS
1	C	3302	PRO
1	C	3693	LYS
1	D	1997	GLU
1	D	2990	PRO
1	D	2998	PHE
1	D	3272	ILE
1	D	3304	CYS
1	A	1172	ASP
1	B	365	LYS

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Mol	Chain	Res	Type
1	B	3302	PRO
1	C	2989	SER
1	D	323	LEU
1	D	1803	PRO
1	D	2414	ASN
1	D	4672	LYS
1	D	2373	GLY
1	A	1509	ILE
1	A	3115	VAL
1	A	3302	PRO
1	B	3690	VAL
1	C	854	CYS
1	D	4134	GLU
1	A	3690	VAL
1	C	3690	VAL
1	D	1509	ILE
1	B	3187	ARG
1	D	854	CYS
1	D	3187	ARG
1	B	2989	SER

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%)	3754 (98%)	73 (2%)	50 66
1	B	3827/4276 (90%)	3753 (98%)	74 (2%)	50 66
1	C	3827/4276 (90%)	3745 (98%)	82 (2%)	47 65
1	D	3827/4276 (90%)	3742 (98%)	85 (2%)	45 64
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%)	87 (98%)	2 (2%)	45 64

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	15664/17464 (90%)	15345 (98%)	319 (2%)	48 66

All (319) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	48	PHE
1	A	56	GLN
1	A	81	MET
1	A	223	PHE
1	A	386	ASP
1	A	631	LEU
1	A	654	GLU
1	A	759	ILE
1	A	765	GLN
1	A	815	VAL
1	A	933	LEU
1	A	972	LEU
1	A	998	ARG
1	A	1021	LEU
1	A	1182	ILE
1	A	1299	GLN
1	A	1480	GLN
1	A	1660	GLN
1	A	1733	GLU
1	A	1923	GLU
1	A	1990	GLU
1	A	2093	SER
1	A	2118	ARG
1	A	2224	ARG
1	A	2241	ARG
1	A	2293	GLN
1	A	2376	LEU
1	A	2382	GLU
1	A	2442	LEU
1	A	2513	GLU
1	A	2516	ASP
1	A	2612	ARG
1	A	2619	LEU
1	A	2620	GLN
1	A	2621	HIS
1	A	2698	MET
1	A	2716	ASP

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Mol	Chain	Res	Type
1	A	2751	LEU
1	A	2761	TYR
1	A	2779	GLU
1	A	2809	ILE
1	A	2876	GLU
1	A	2911	LEU
1	A	3042	LEU
1	A	3130	THR
1	A	3155	ASP
1	A	3170	CYS
1	A	3331	GLU
1	A	3336	LYS
1	A	3366	ARG
1	A	3376	GLU
1	A	3426	GLU
1	A	3466	ASN
1	A	3549	VAL
1	A	3594	ARG
1	A	3683	GLN
1	A	3696	ASP
1	A	3708	THR
1	A	3752	SER
1	A	3789	GLU
1	A	3888	LEU
1	A	3951	PHE
1	A	3965	LEU
1	A	4006	ASP
1	A	4107	GLU
1	A	4161	ARG
1	A	4165	GLU
1	A	4577	LEU
1	A	4707	ASN
1	A	4768	LEU
1	A	4880	MET
1	A	4945	ASP
1	A	4952	GLU
1	B	48	PHE
1	B	56	GLN
1	B	81	MET
1	B	155	LYS
1	B	210	GLU
1	B	223	PHE

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Mol	Chain	Res	Type
1	B	386	ASP
1	B	415	ILE
1	B	483	MET
1	B	654	GLU
1	B	759	ILE
1	B	904	HIS
1	B	976	ARG
1	B	998	ARG
1	B	1021	LEU
1	B	1182	ILE
1	B	1299	GLN
1	B	1480	GLN
1	B	1569	GLN
1	B	1660	GLN
1	B	1733	GLU
1	B	1923	GLU
1	B	1931	LEU
1	B	1982	ARG
1	B	1990	GLU
1	B	2093	SER
1	B	2118	ARG
1	B	2224	ARG
1	B	2293	GLN
1	B	2376	LEU
1	B	2382	GLU
1	B	2442	LEU
1	B	2516	ASP
1	B	2583	LEU
1	B	2612	ARG
1	B	2619	LEU
1	B	2620	GLN
1	B	2698	MET
1	B	2716	ASP
1	B	2751	LEU
1	B	2761	TYR
1	B	2779	GLU
1	B	2809	ILE
1	B	2876	GLU
1	B	2894	LEU
1	B	3042	LEU
1	B	3110	LEU
1	B	3130	THR

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Mol	Chain	Res	Type
1	B	3141	THR
1	B	3155	ASP
1	B	3170	CYS
1	B	3331	GLU
1	B	3336	LYS
1	B	3366	ARG
1	B	3376	GLU
1	B	3466	ASN
1	B	3475	LYS
1	B	3514	LEU
1	B	3614	LYS
1	B	3683	GLN
1	B	3696	ASP
1	B	3752	SER
1	B	3825	GLU
1	B	3888	LEU
1	B	3999	MET
1	B	4107	GLU
1	B	4161	ARG
1	B	4165	GLU
1	B	4569	LEU
1	B	4707	ASN
1	B	4766	THR
1	B	4880	MET
1	B	4945	ASP
1	B	4952	GLU
1	C	48	PHE
1	C	56	GLN
1	C	81	MET
1	C	155	LYS
1	C	210	GLU
1	C	218	HIS
1	C	223	PHE
1	C	386	ASP
1	C	415	ILE
1	C	654	GLU
1	C	759	ILE
1	C	887	ILE
1	C	891	TRP
1	C	976	ARG
1	C	998	ARG
1	C	1021	LEU

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Mol	Chain	Res	Type
1	C	1045	THR
1	C	1108	GLU
1	C	1143	TRP
1	C	1182	ILE
1	C	1287	LEU
1	C	1299	GLN
1	C	1459	GLN
1	C	1480	GLN
1	C	1569	GLN
1	C	1660	GLN
1	C	1733	GLU
1	C	1923	GLU
1	C	1931	LEU
1	C	1990	GLU
1	C	2093	SER
1	C	2118	ARG
1	C	2224	ARG
1	C	2293	GLN
1	C	2376	LEU
1	C	2382	GLU
1	C	2442	LEU
1	C	2513	GLU
1	C	2612	ARG
1	C	2620	GLN
1	C	2698	MET
1	C	2716	ASP
1	C	2761	TYR
1	C	2779	GLU
1	C	2876	GLU
1	C	2894	LEU
1	C	2911	LEU
1	C	3042	LEU
1	C	3130	THR
1	C	3137	LEU
1	C	3155	ASP
1	C	3170	CYS
1	C	3331	GLU
1	C	3366	ARG
1	C	3376	GLU
1	C	3422	HIS
1	C	3426	GLU
1	C	3466	ASN

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Mol	Chain	Res	Type
1	C	3475	LYS
1	C	3549	VAL
1	C	3598	GLU
1	C	3614	LYS
1	C	3683	GLN
1	C	3696	ASP
1	C	3708	THR
1	C	3752	SER
1	C	3789	GLU
1	C	3825	GLU
1	C	3888	LEU
1	C	4006	ASP
1	C	4107	GLU
1	C	4161	ARG
1	C	4165	GLU
1	C	4244	GLU
1	C	4707	ASN
1	C	4716	TRP
1	C	4768	LEU
1	C	4827	LEU
1	C	4878	ASP
1	C	4880	MET
1	C	4945	ASP
1	C	4952	GLU
1	D	48	PHE
1	D	56	GLN
1	D	81	MET
1	D	99	ARG
1	D	155	LYS
1	D	159	GLU
1	D	218	HIS
1	D	223	PHE
1	D	386	ASP
1	D	505	GLU
1	D	631	LEU
1	D	654	GLU
1	D	759	ILE
1	D	884	LEU
1	D	887	ILE
1	D	908	VAL
1	D	927	GLU
1	D	976	ARG

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Mol	Chain	Res	Type
1	D	998	ARG
1	D	1011	GLN
1	D	1021	LEU
1	D	1062	GLN
1	D	1143	TRP
1	D	1182	ILE
1	D	1299	GLN
1	D	1480	GLN
1	D	1489	CYS
1	D	1660	GLN
1	D	1733	GLU
1	D	1804	LEU
1	D	1990	GLU
1	D	2093	SER
1	D	2118	ARG
1	D	2224	ARG
1	D	2293	GLN
1	D	2321	ILE
1	D	2382	GLU
1	D	2413	GLU
1	D	2472	LEU
1	D	2513	GLU
1	D	2516	ASP
1	D	2520	HIS
1	D	2524	VAL
1	D	2619	LEU
1	D	2622	LEU
1	D	2698	MET
1	D	2761	TYR
1	D	2806	ARG
1	D	2855	TYR
1	D	2877	GLN
1	D	2884	ASN
1	D	2978	GLU
1	D	2981	VAL
1	D	3002	LEU
1	D	3107	VAL
1	D	3130	THR
1	D	3160	ASP
1	D	3170	CYS
1	D	3175	LEU
1	D	3179	LYS

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Mol	Chain	Res	Type
1	D	3190	LEU
1	D	3331	GLU
1	D	3366	ARG
1	D	3376	GLU
1	D	3414	ARG
1	D	3466	ASN
1	D	3510	ILE
1	D	3549	VAL
1	D	3683	GLN
1	D	3708	THR
1	D	3752	SER
1	D	3789	GLU
1	D	3888	LEU
1	D	3918	CYS
1	D	4006	ASP
1	D	4161	ARG
1	D	4707	ASN
1	D	4716	TRP
1	D	4768	LEU
1	D	4790	LEU
1	D	4878	ASP
1	D	4880	MET
1	D	4945	ASP
1	D	4952	GLU
1	D	4957	LYS
2	E	3	GLN
2	F	3	GLN
2	G	3	GLN
2	H	3	GLN
2	H	61	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (142) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	12	GLN
1	A	23	GLN
1	A	54	ASN
1	A	57	ASN
1	A	479	GLN
1	A	593	HIS
1	A	812	HIS
1	A	1133	HIS

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Mol	Chain	Res	Type
1	A	1229	ASN
1	A	1563	GLN
1	A	1629	GLN
1	A	2003	GLN
1	A	2127	GLN
1	A	2441	HIS
1	A	2620	GLN
1	A	2744	ASN
1	A	2856	ASN
1	A	3007	ASN
1	A	3162	GLN
1	A	3268	HIS
1	A	3313	ASN
1	A	3554	GLN
1	A	3572	GLN
1	A	3621	HIS
1	A	3895	HIS
1	A	4009	GLN
1	A	4204	GLN
1	A	4223	ASN
1	A	4662	ASN
1	A	4857	ASN
1	A	4987	ASN
1	B	54	ASN
1	B	57	ASN
1	B	156	GLN
1	B	479	GLN
1	B	610	ASN
1	B	634	GLN
1	B	938	HIS
1	B	1003	GLN
1	B	1133	HIS
1	B	1640	HIS
1	B	1702	HIS
1	B	2032	GLN
1	B	2127	GLN
1	B	2441	HIS
1	B	2498	HIS
1	B	2574	HIS
1	B	2663	ASN
1	B	2744	ASN
1	B	2756	ASN

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Mol	Chain	Res	Type
1	B	2856	ASN
1	B	2976	HIS
1	B	3007	ASN
1	B	3008	GLN
1	B	3052	HIS
1	B	3128	ASN
1	B	3149	GLN
1	B	3268	HIS
1	B	3313	ASN
1	B	3456	GLN
1	B	3572	GLN
1	B	3806	ASN
1	B	3833	GLN
1	B	3895	HIS
1	B	3927	GLN
1	B	4204	GLN
1	B	4223	ASN
1	B	4662	ASN
1	C	54	ASN
1	C	57	ASN
1	C	105	HIS
1	C	138	GLN
1	C	156	GLN
1	C	273	HIS
1	C	765	GLN
1	C	1003	GLN
1	C	1035	ASN
1	C	1133	HIS
1	C	1563	GLN
1	C	2127	GLN
1	C	2441	HIS
1	C	2621	HIS
1	C	2744	ASN
1	C	2856	ASN
1	C	2961	GLN
1	C	2976	HIS
1	C	3007	ASN
1	C	3008	GLN
1	C	3128	ASN
1	C	3268	HIS
1	C	3313	ASN
1	C	3343	GLN

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Mol	Chain	Res	Type
1	C	3419	ASN
1	C	3422	HIS
1	C	3554	GLN
1	C	3572	GLN
1	C	3621	HIS
1	C	3806	ASN
1	C	3833	GLN
1	C	3895	HIS
1	C	4009	GLN
1	C	4223	ASN
1	C	4662	ASN
1	C	4857	ASN
1	D	23	GLN
1	D	54	ASN
1	D	57	ASN
1	D	71	GLN
1	D	138	GLN
1	D	151	HIS
1	D	156	GLN
1	D	203	ASN
1	D	479	GLN
1	D	900	ASN
1	D	911	HIS
1	D	981	GLN
1	D	1035	ASN
1	D	1133	HIS
1	D	1229	ASN
1	D	1563	GLN
1	D	1702	HIS
1	D	1837	GLN
1	D	2003	GLN
1	D	2007	ASN
1	D	2284	ASN
1	D	2744	ASN
1	D	2856	ASN
1	D	2858	GLN
1	D	2877	GLN
1	D	2881	ASN
1	D	2883	HIS
1	D	2924	GLN
1	D	3313	ASN
1	D	3462	ASN

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Mol	Chain	Res	Type
1	D	3465	ASN
1	D	3830	GLN
1	D	3927	GLN
1	D	4832	HIS
2	E	3	GLN
2	F	3	GLN
2	G	3	GLN
2	H	3	GLN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

There are no ligands in this entry.

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.

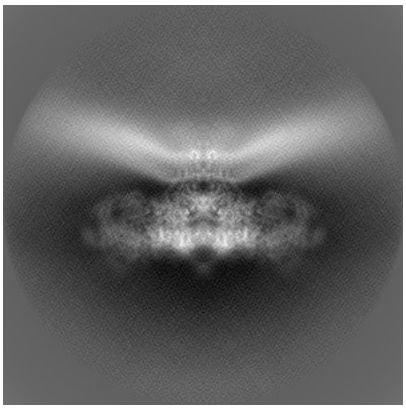
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-54552. These allow visual inspection of the internal detail of the map and identification of artifacts.

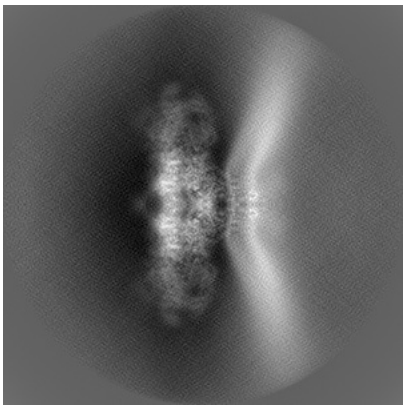
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

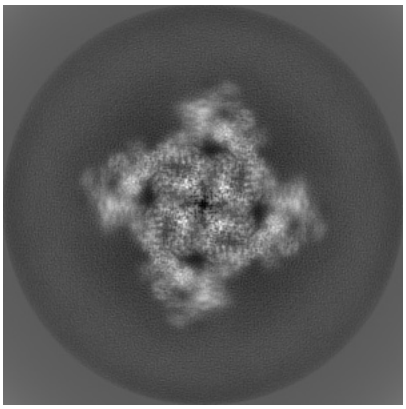
6.1.1 Primary map



X

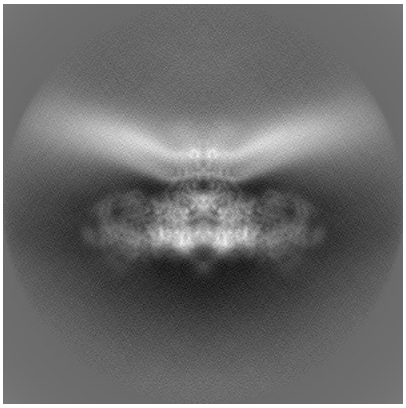


Y

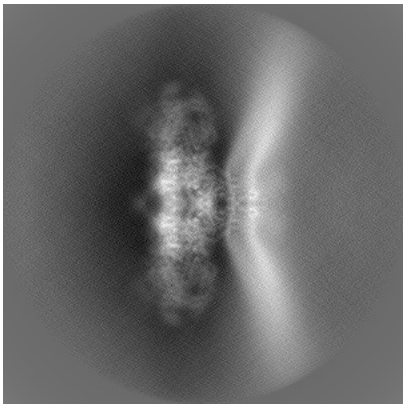


Z

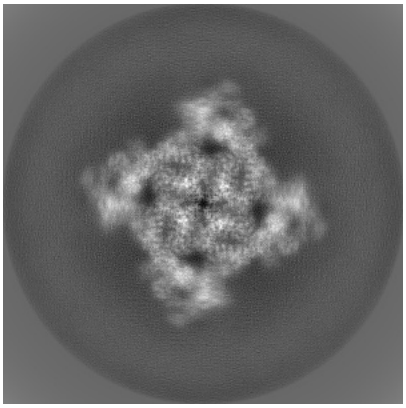
6.1.2 Raw map



X



Y

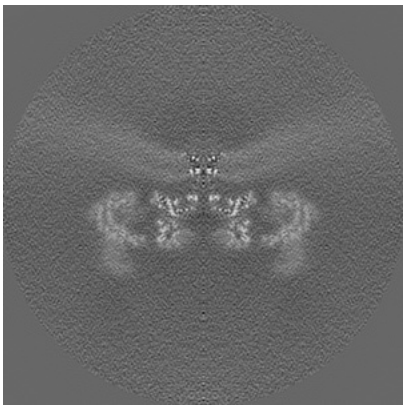


Z

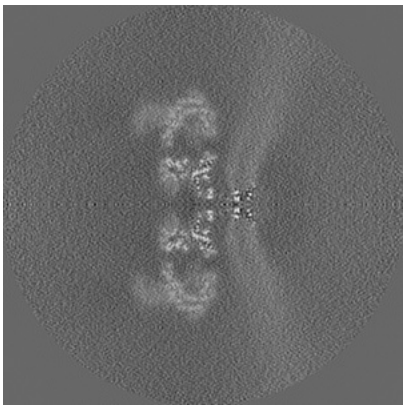
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

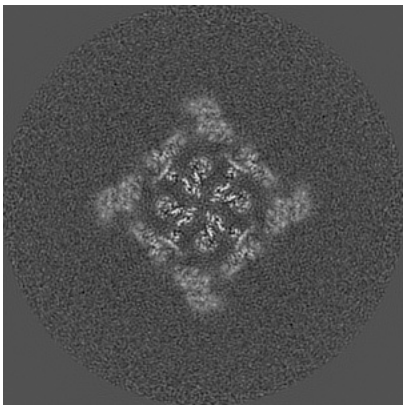
6.2.1 Primary map



X Index: 220

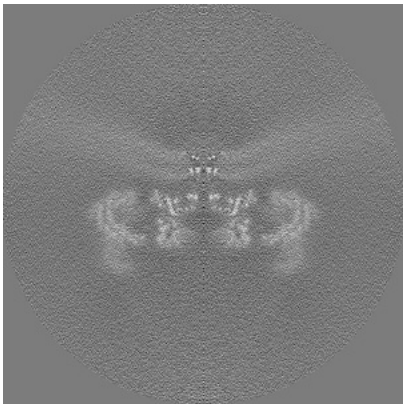


Y Index: 220

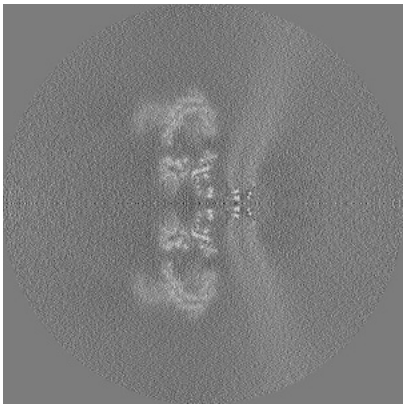


Z Index: 220

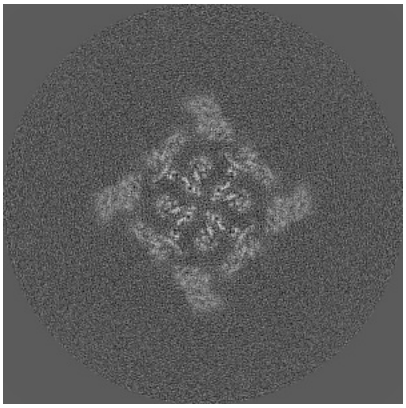
6.2.2 Raw map



X Index: 220



Y Index: 220

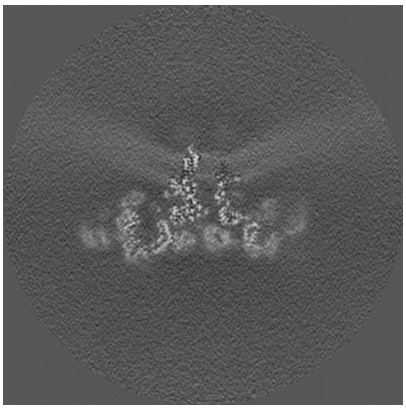


Z Index: 220

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

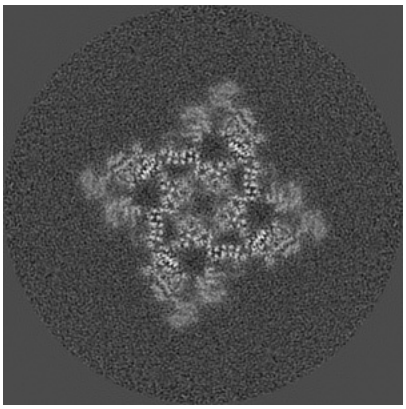
6.3 Largest variance slices (i)

6.3.1 Primary map



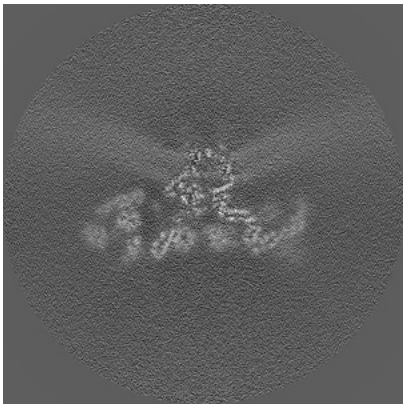
X Index: 197

Y Index: 243

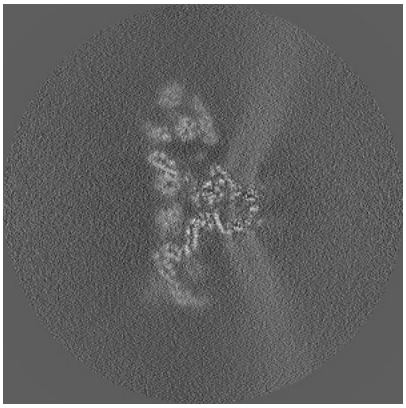


Z Index: 188

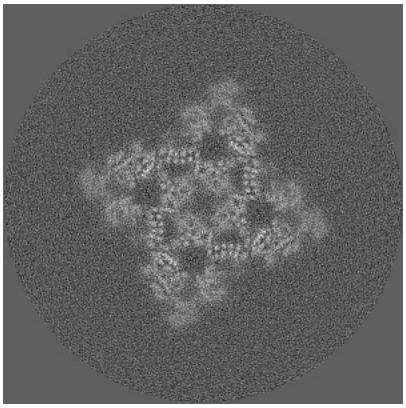
6.3.2 Raw map



X Index: 203



Y Index: 203

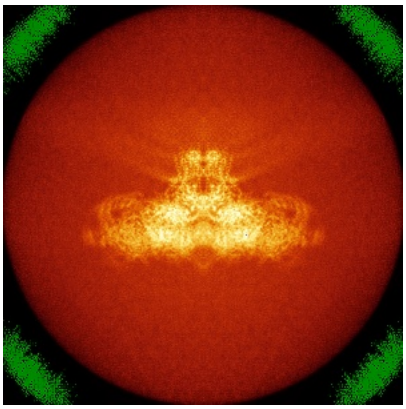


Z Index: 188

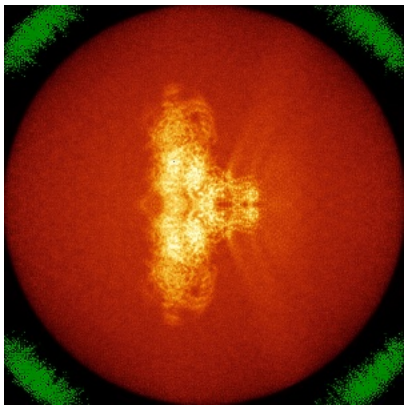
The images above show the largest variance slices of the map in three orthogonal directions.

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

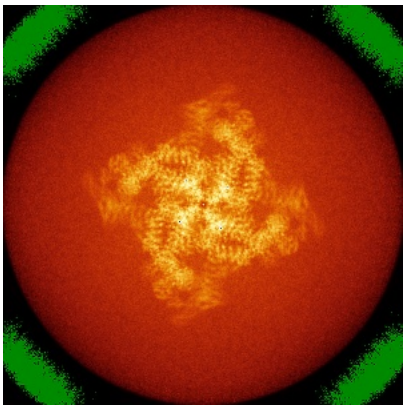
6.4.1 Primary map



X

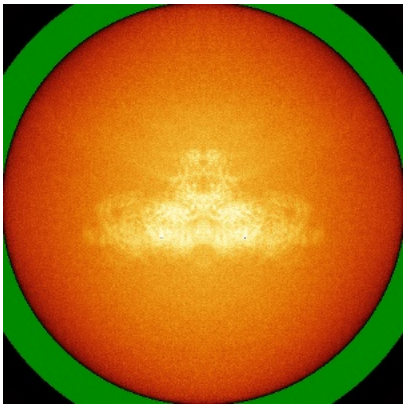


Y

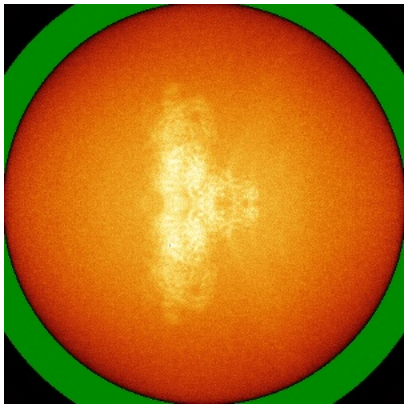


Z

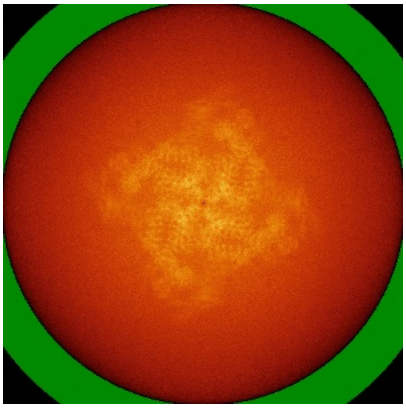
6.4.2 Raw map



X



Y

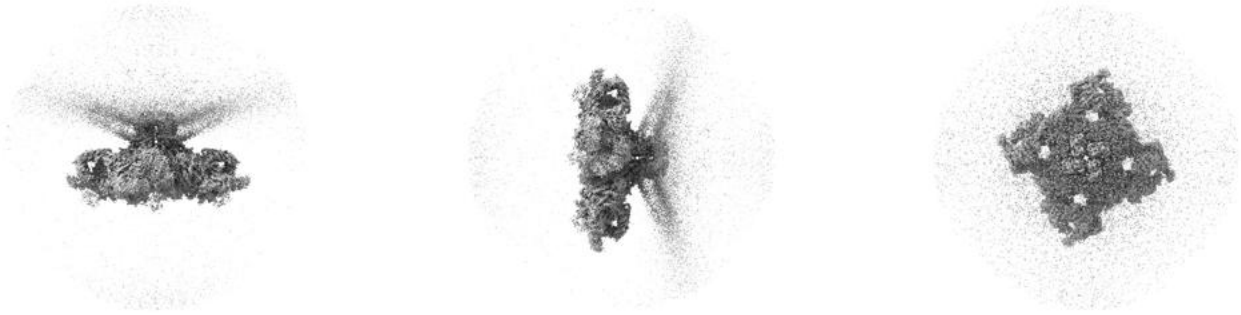


Z

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)

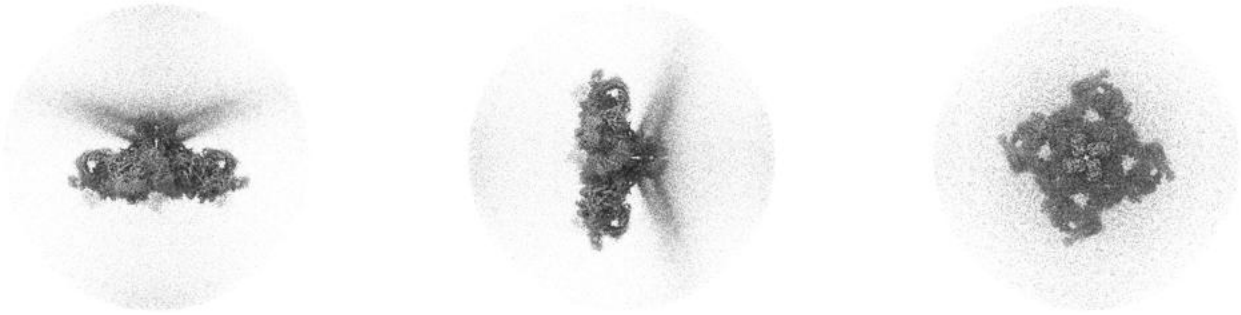
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.00592. 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.

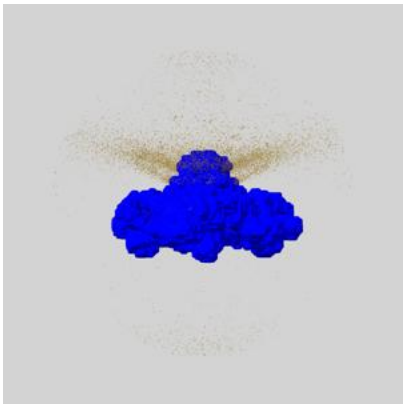
6.6 Mask visualisation (i)

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

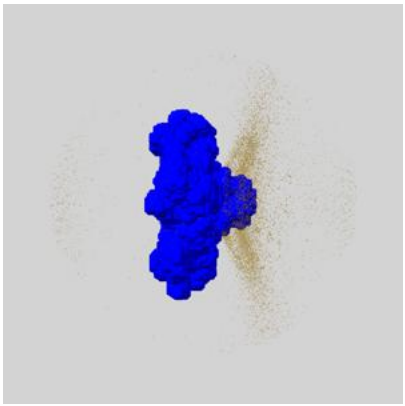
A mask typically either:

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

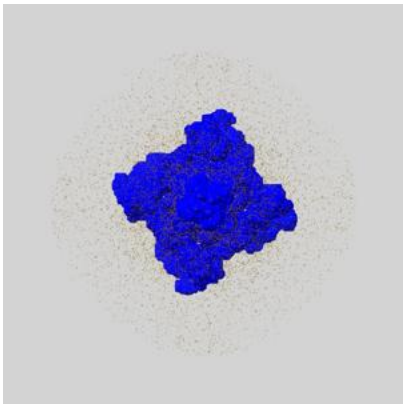
6.6.1 emd_54552_msk_1.map (i)



X



Y

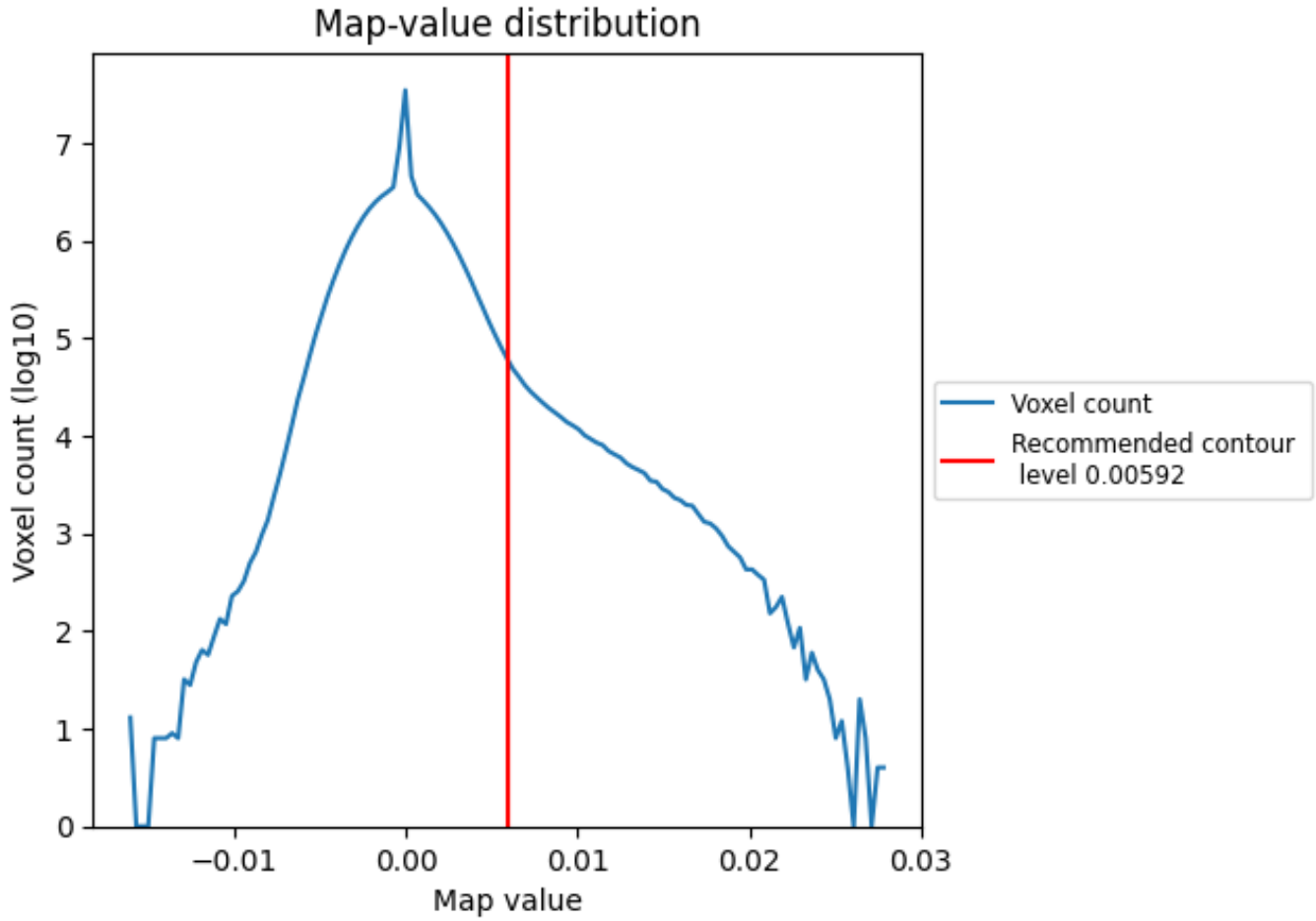


Z

7 Map analysis

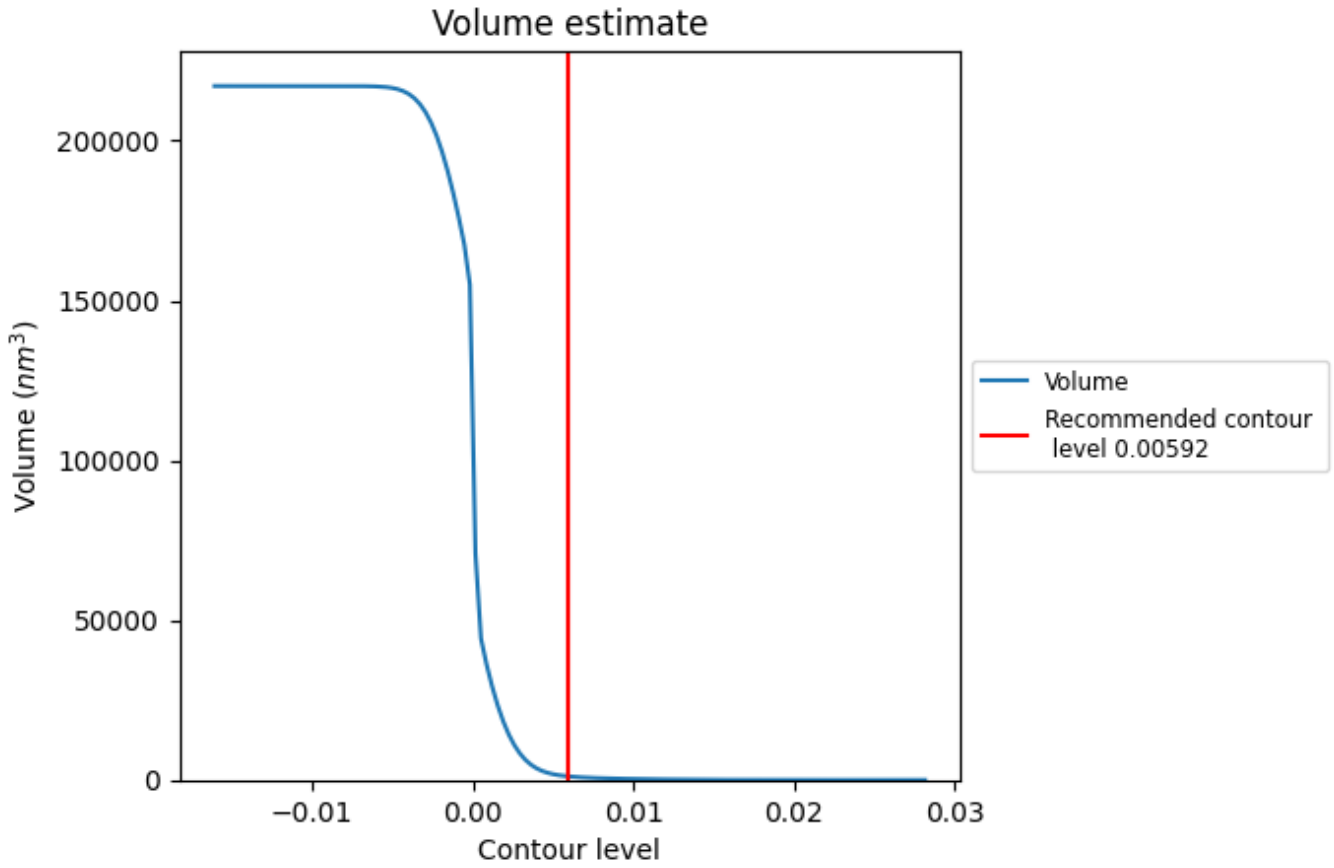
This section contains the results of statistical analysis of the map.

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.

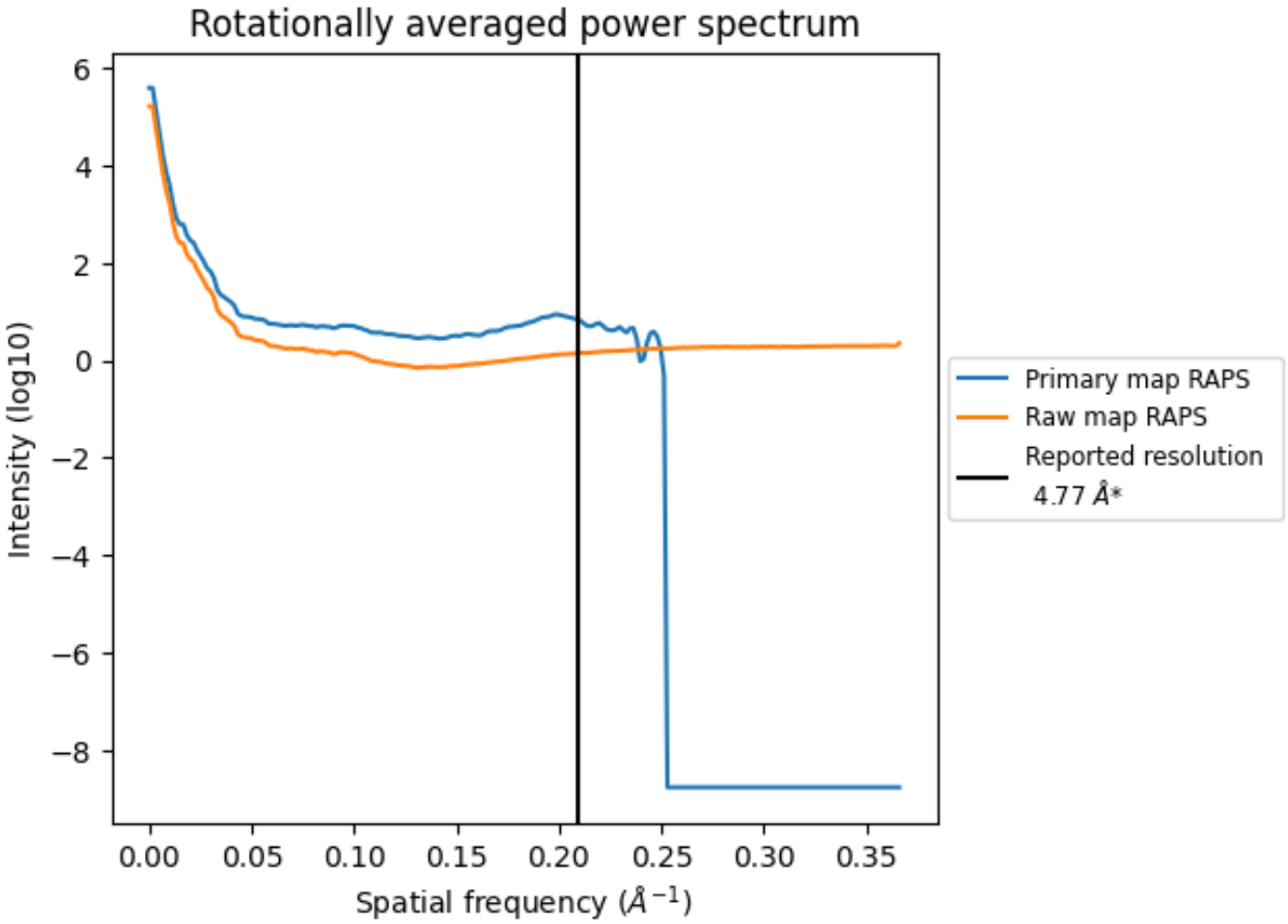
7.2 Volume estimate



The volume at the recommended contour level is 1141 nm^3; this corresponds to an approximate mass of 1030 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)

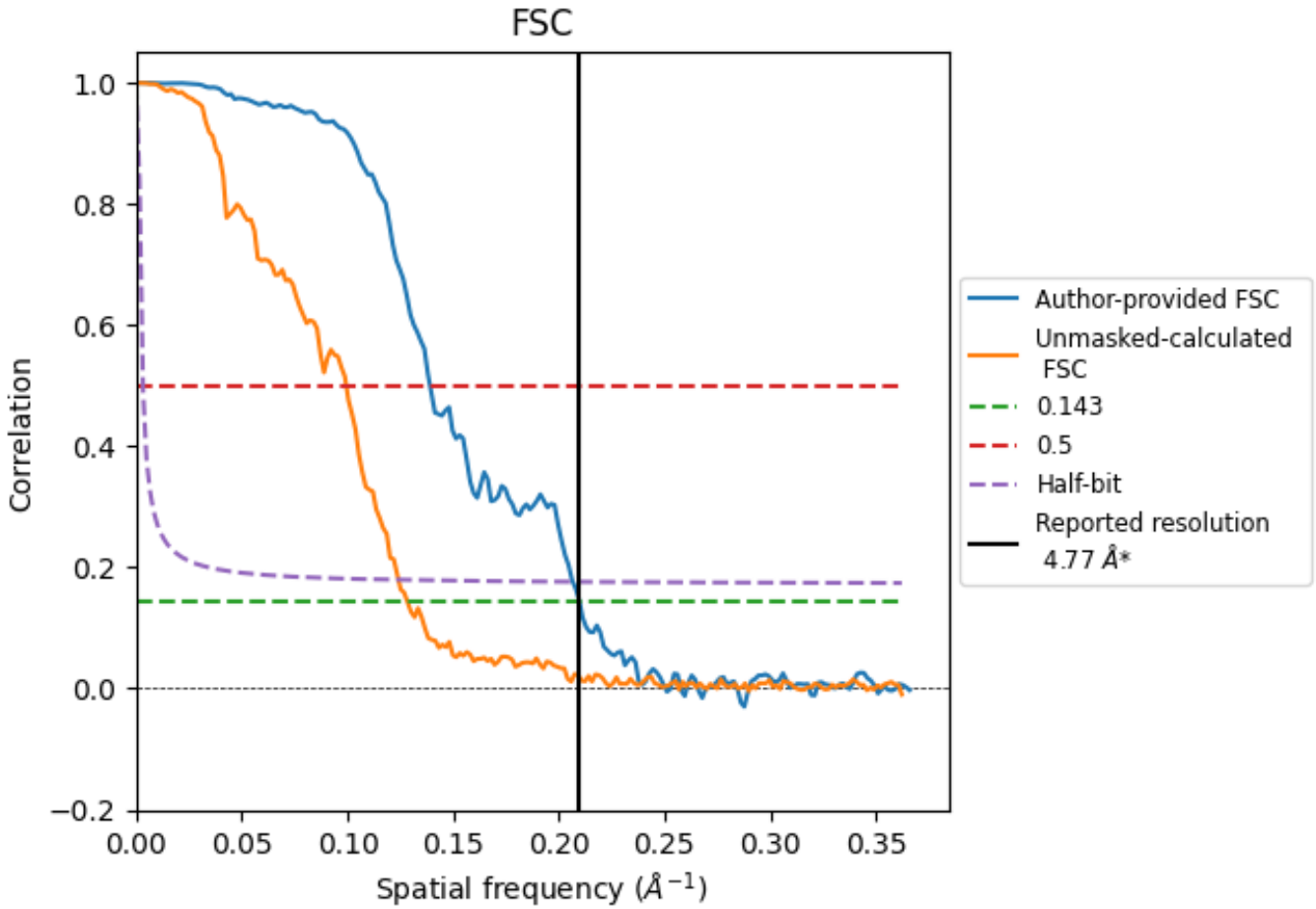


*Reported resolution corresponds to spatial frequency of 0.210 Å^{-1}

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 0.210 Å^{-1}

8.2 Resolution estimates (i)

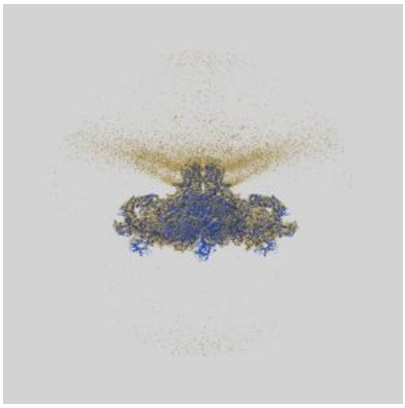
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.77	-	-
Author-provided FSC curve	4.76	7.19	4.84
Unmasked-calculated*	7.79	10.06	8.05

*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 7.79 differs from the reported value 4.77 by more than 10 %

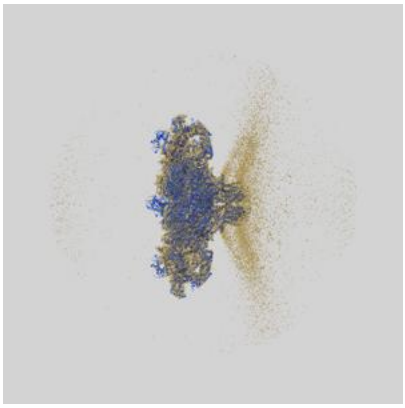
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-54552 and PDB model 9S3U. Per-residue inclusion information can be found in section 3 on page 5.

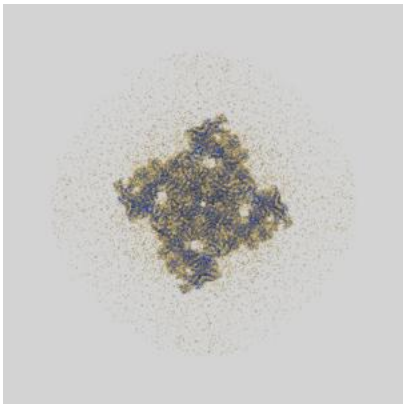
9.1 Map-model overlay



X



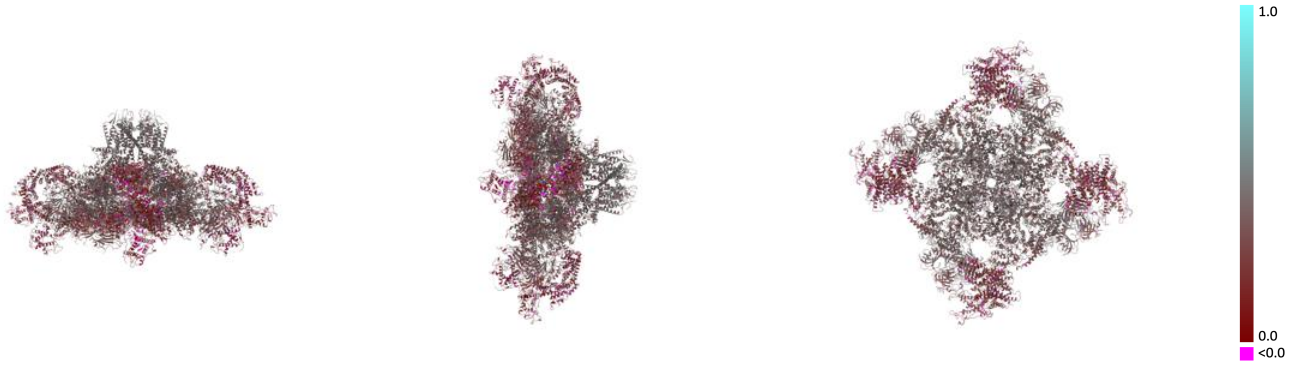
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.00592 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.

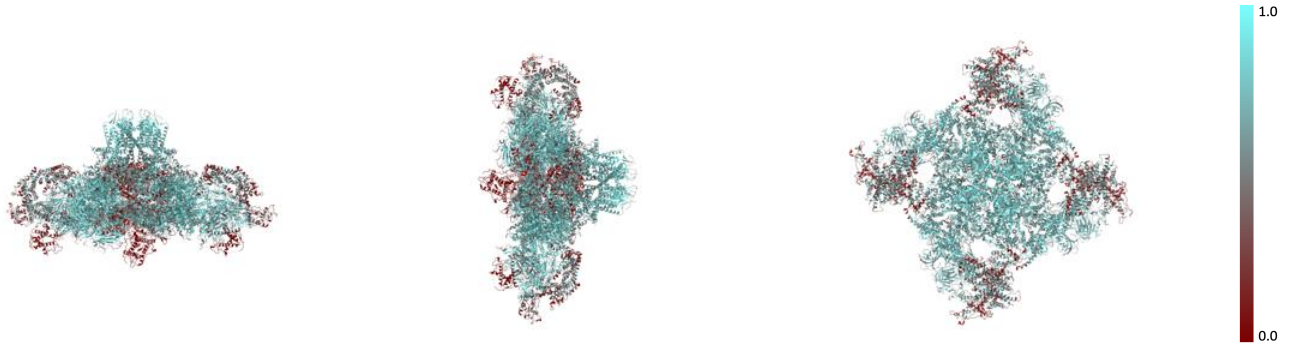
9.2 Q-score mapped to coordinate model



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.

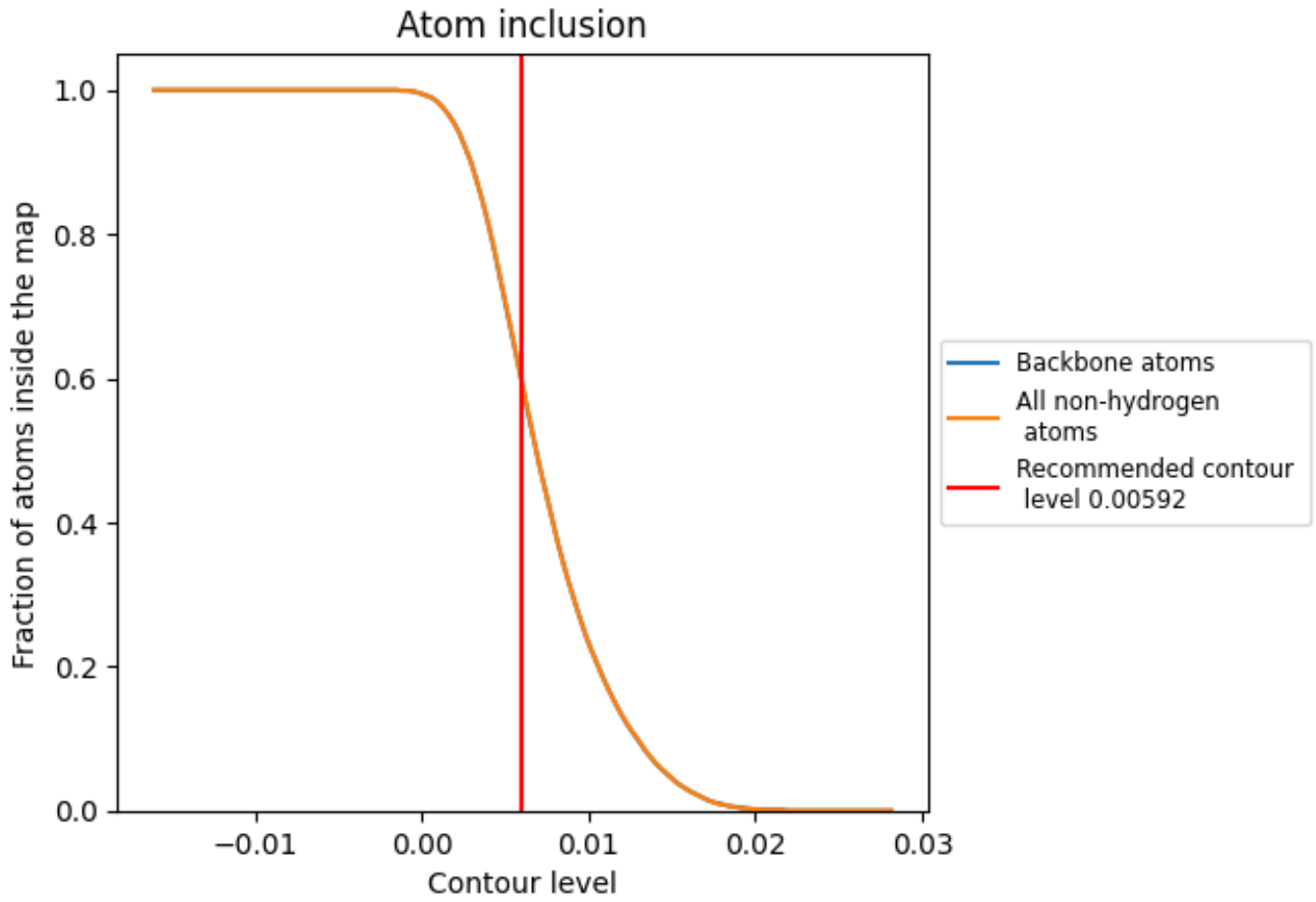
9.3 Atom inclusion mapped to coordinate model



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 (0.00592).

9.4 Atom inclusion (i)



At the recommended contour level, 60% of all backbone atoms, 60% 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 (0.00592) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.6040	0.3220
A	0.6090	0.3180
B	0.6100	0.3180
C	0.6090	0.3180
D	0.6170	0.3290
E	0.6380	0.3500
F	0.6460	0.3530
G	0.6400	0.3500
H	0.6430	0.3530