wwPDB EM Validation Summary Report

Sep 29, 2024 – 05:20 AM EDT

PDB ID	:	7U9X
EMDB ID	:	EMD-26409
Title	:	Structure of PKA phosphorylated human RyR2-R2474S in the closed state
Authors	:	Miotto, M.C.; Marks, A.R.
Deposited on	:	2022-03-11
Resolution	:	2.58 Å(reported)
Based on initial model	:	7TZC

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

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

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

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

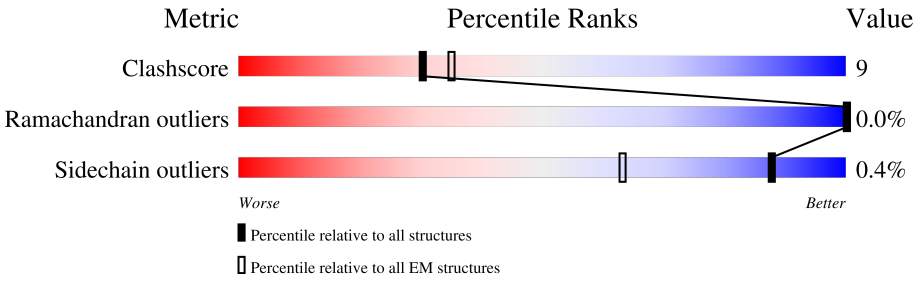
EMDB validation analysis	:	0.0.1.dev113
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.58 Å.

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



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

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=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	4967	8% 67% 18% 15%
1	B	4967	8% 67% 18% 15%
1	C	4967	8% 67% 18% 15%
1	D	4967	8% 67% 18% 15%
2	E	108	76% 23%
2	F	108	76% 23%
2	G	108	76% 23%
2	H	108	75% 24%

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 138588 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a protein called Ryanodine receptor 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	4224	Total 33766	C 21513	N 5742	O 6281	S 230	2	0
1	B	4224	Total 33766	C 21513	N 5742	O 6281	S 230	2	0
1	C	4224	Total 33766	C 21513	N 5742	O 6281	S 230	2	0
1	D	4224	Total 33766	C 21513	N 5742	O 6281	S 230	2	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	2474	SER	ARG	variant	UNP Q92736
B	2474	SER	ARG	variant	UNP Q92736
C	2474	SER	ARG	variant	UNP Q92736
D	2474	SER	ARG	variant	UNP Q92736

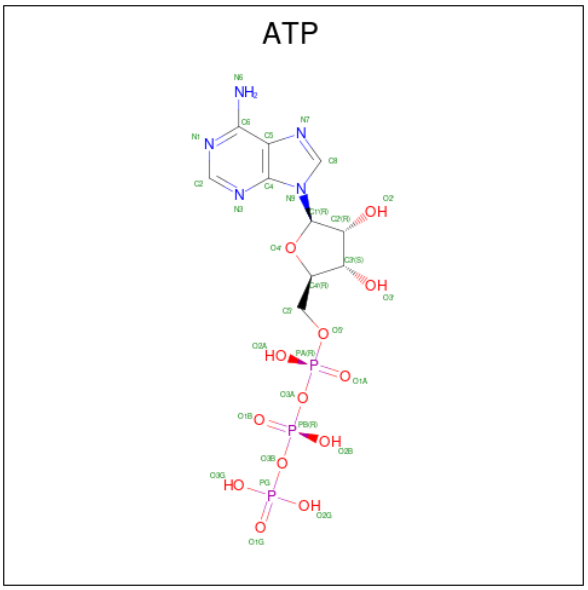
- Molecule 2 is a protein called Peptidyl-prolyl cis-trans isomerase FKBP1B.

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

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

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

- Molecule 4 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$) (labeled as "Ligand of Interest" by depositor).



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

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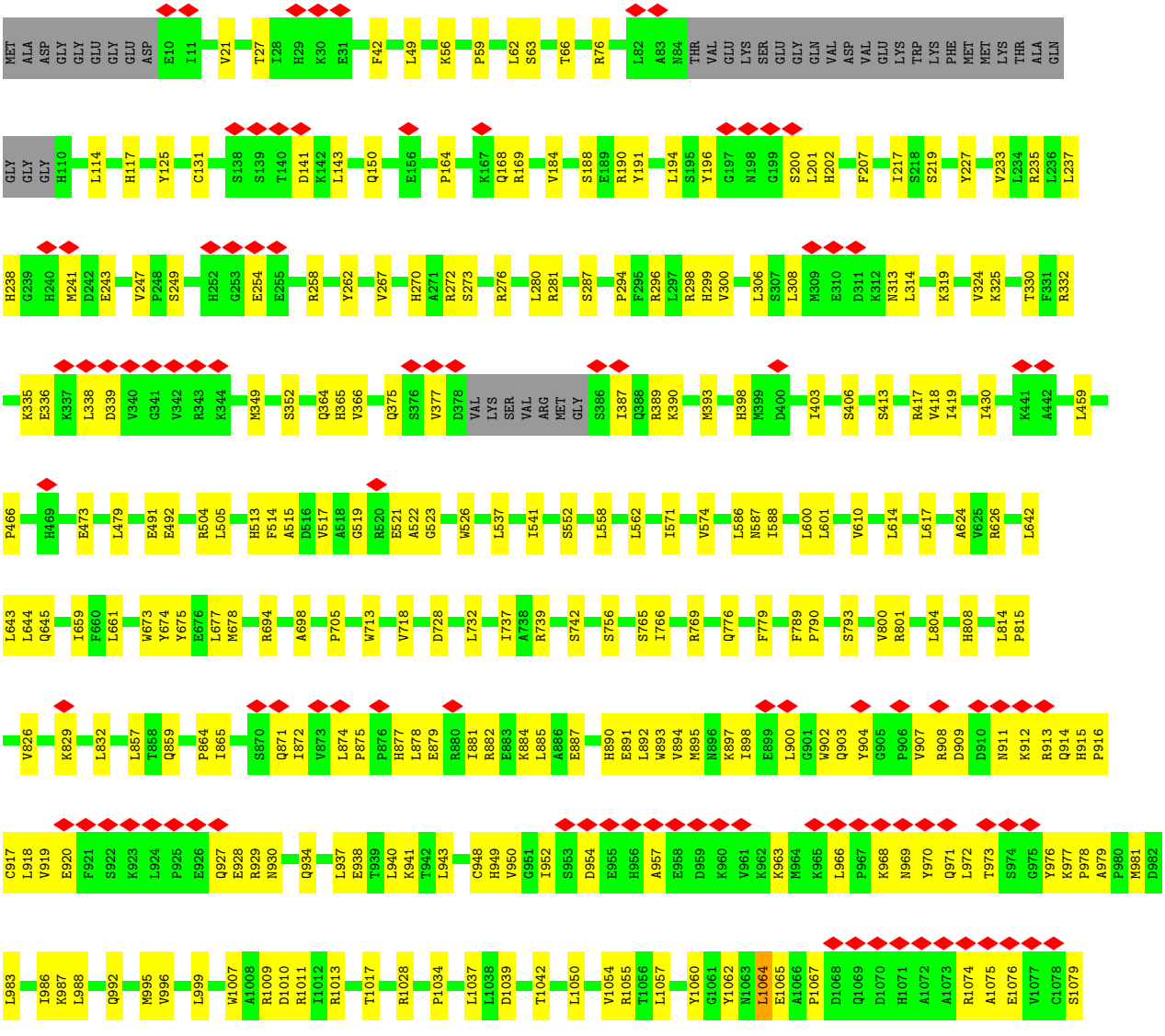
Mol	Chain	Residues	Atoms					AltConf
4	D	1	Total	C	N	O	P	0
			31	10	5	13	3	

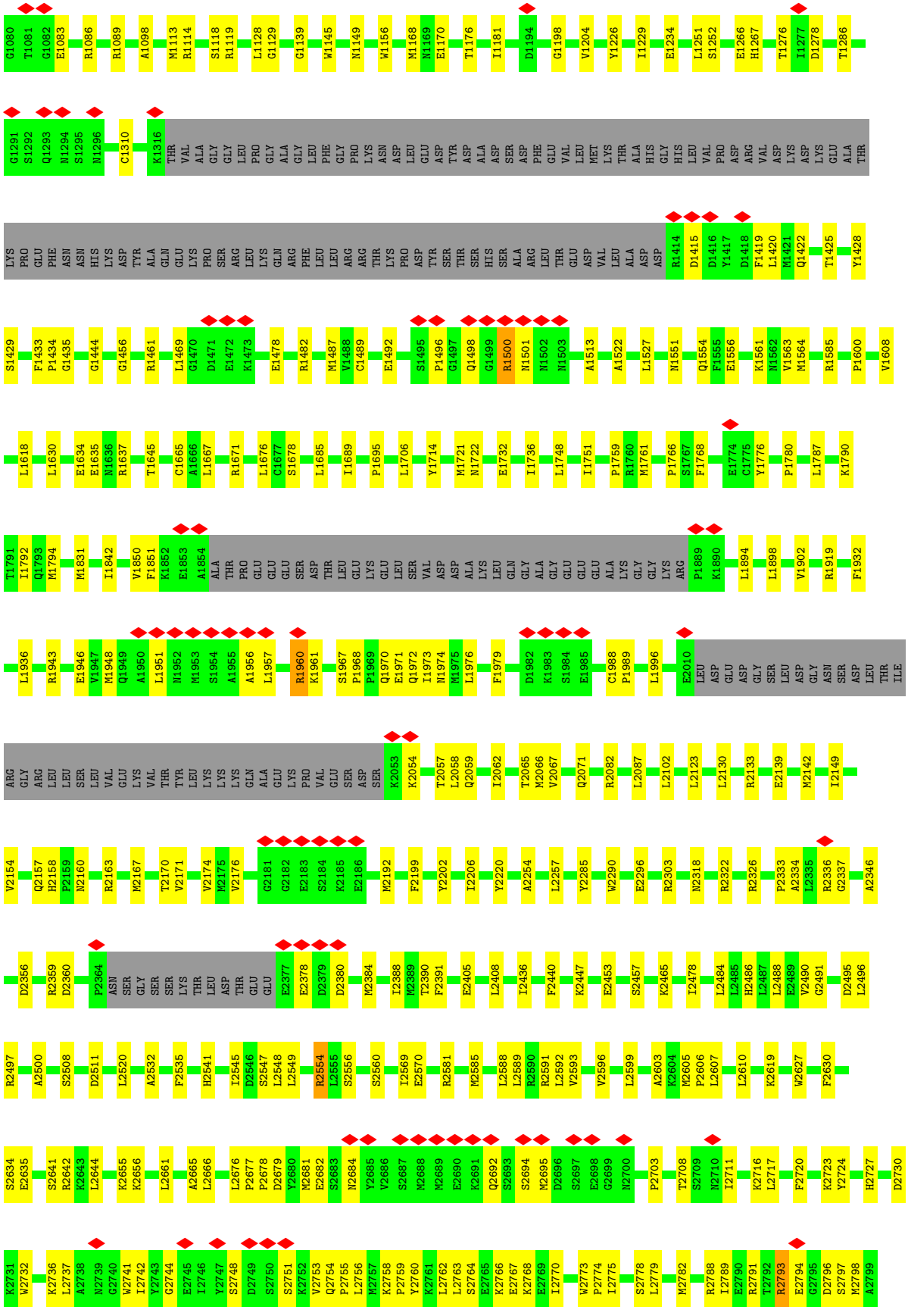
3 Residue-property plots (i)

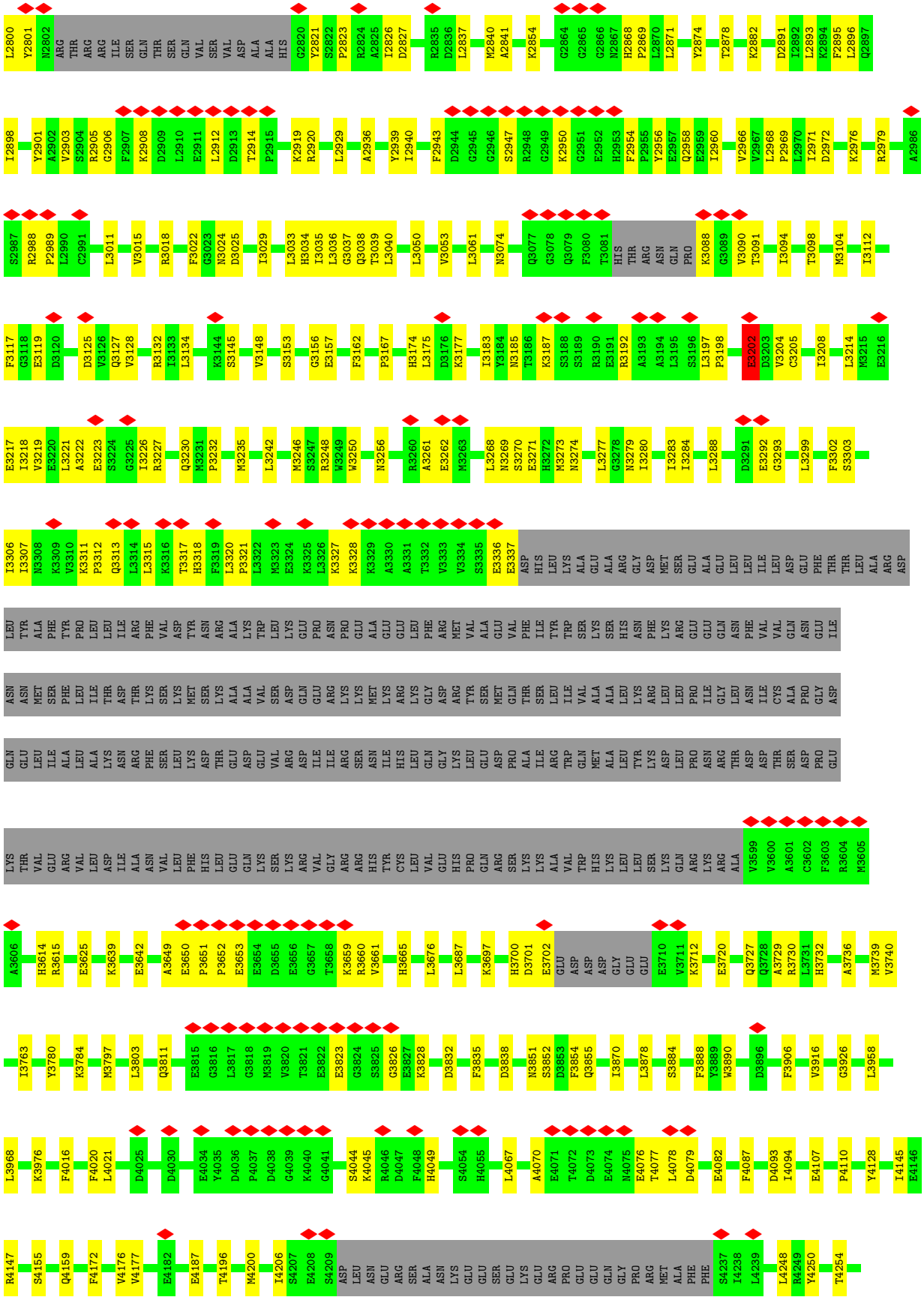
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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 2

Chain A:



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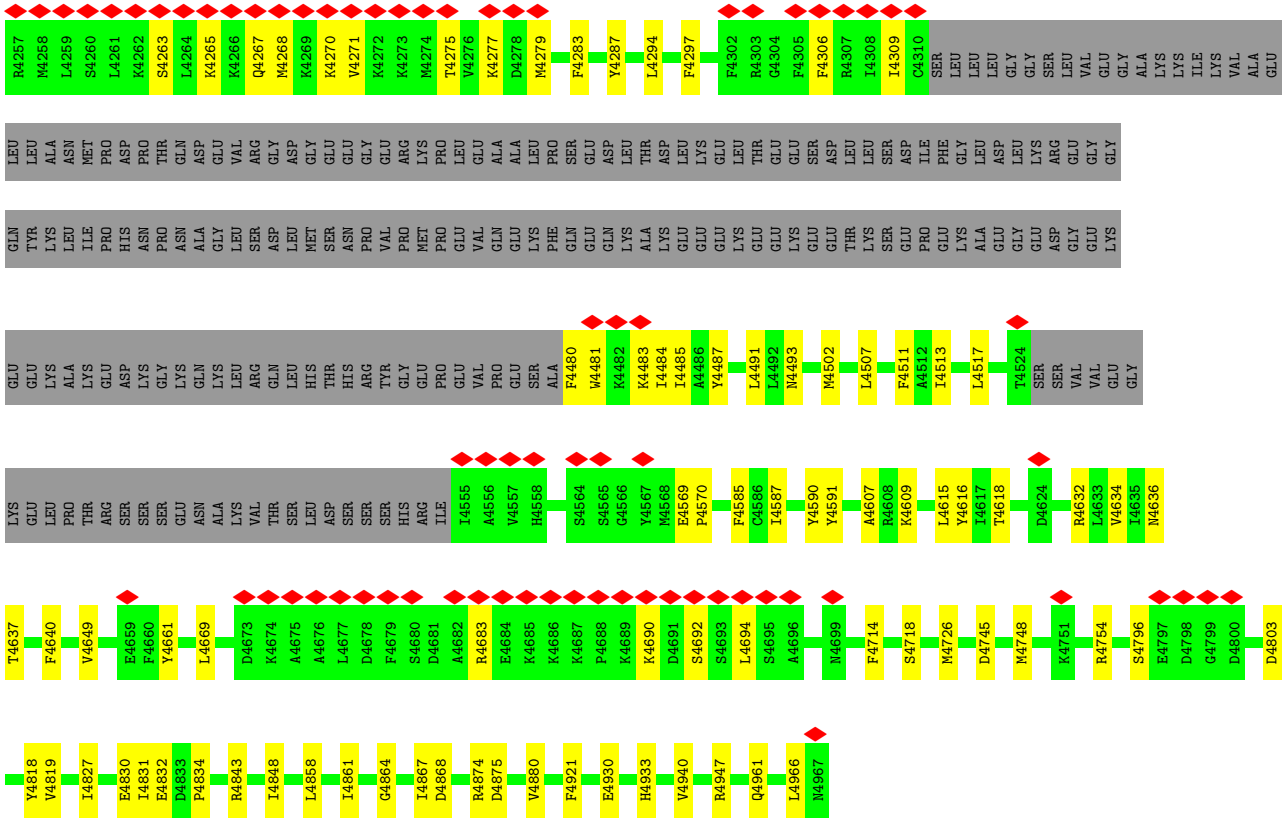
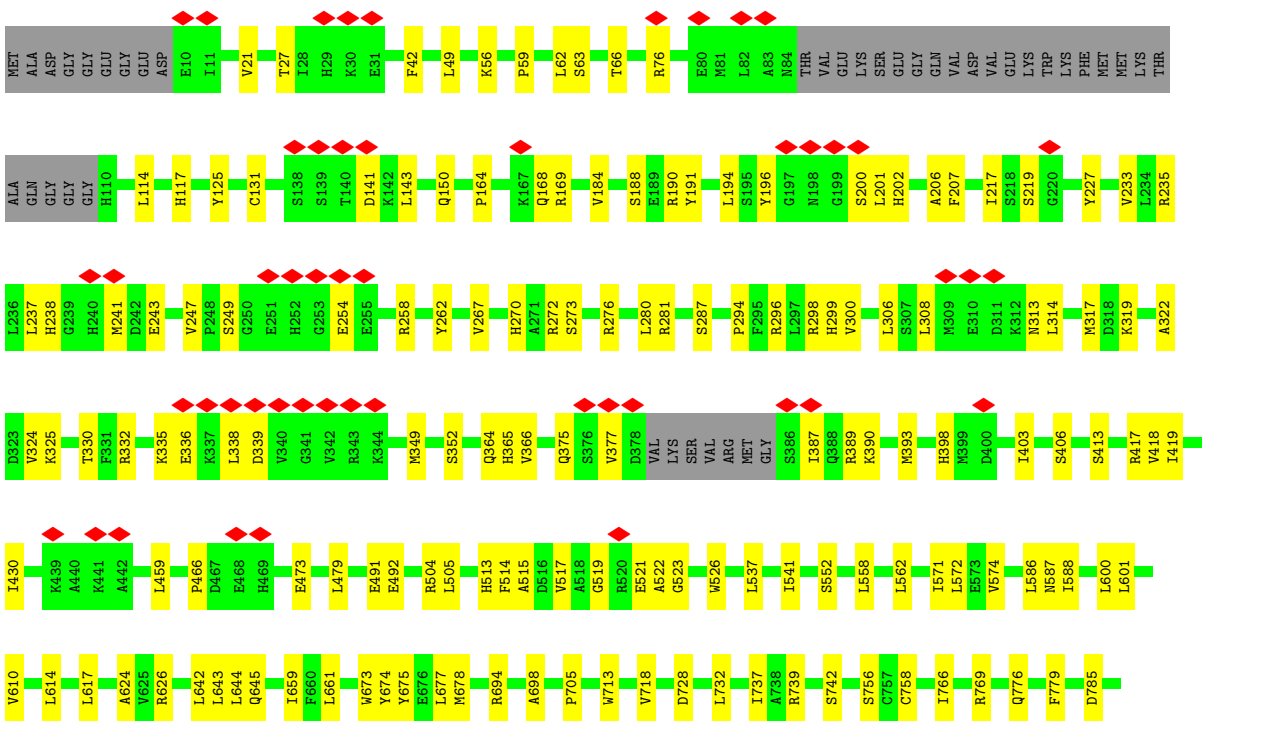
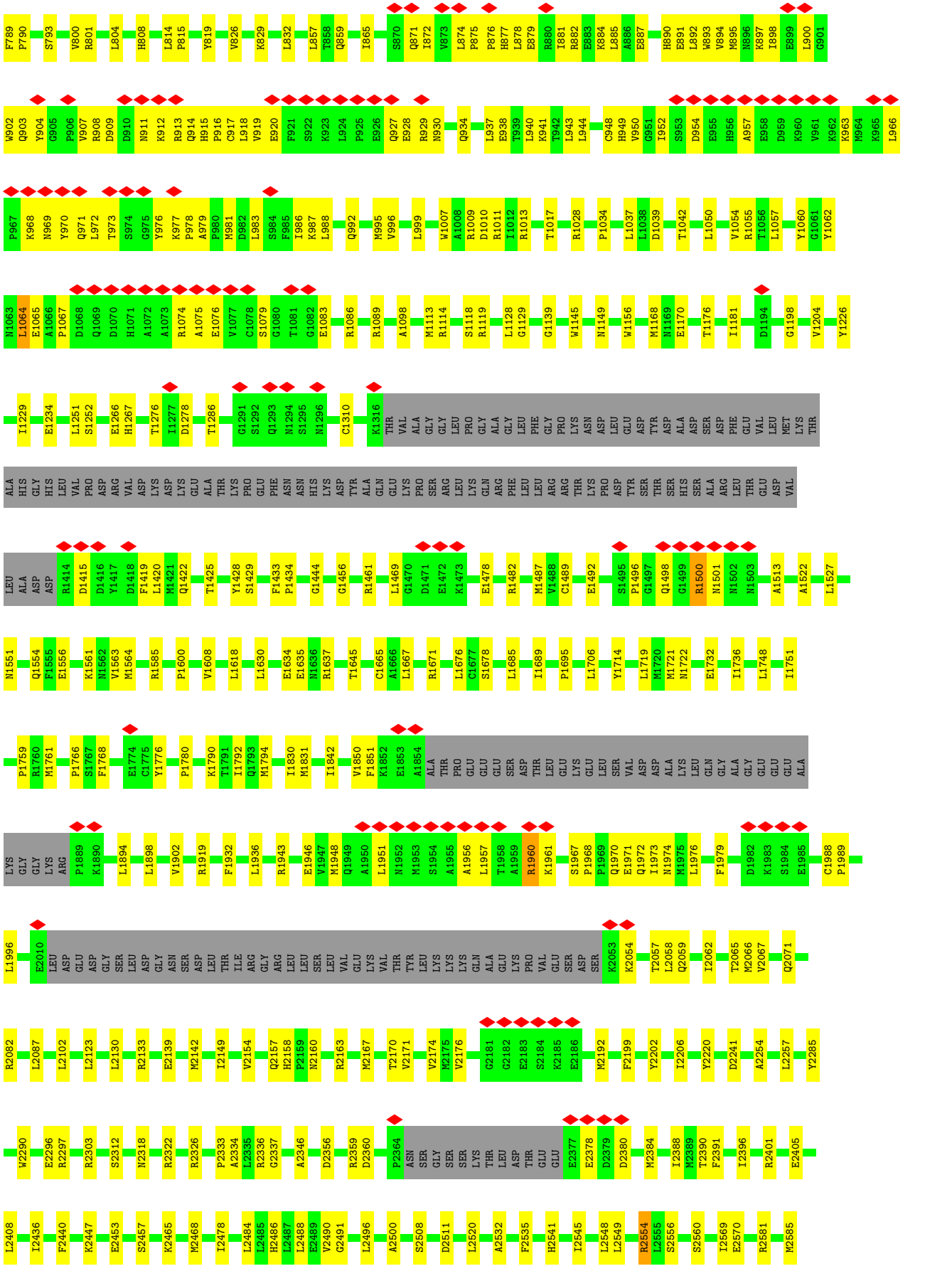
I2898 Y2901 A2902 V2903 S2904 R2905 G2906 F2907 K2908 D2909 L2910 E2911 L2912 D2913 T2914 P2915 K2919 R2920 L2929 A2936 Y2939 I2940 F2943 D2944 G2945 G2946 S2947 R2948 G2949 K2950 G2951 E2952 H2953 F2954 P2955 Y2956 E2957 Q2958 E2959 I2960 V2966 V2967 L2968 P2969 L2970 I2971 D2972 K2976 R2979 A2986
S2987 R2988 P2989 L2990 C2991 L3011 V3015 R3018 F3022 G3023 N3024 D3025 I3029 L3033 H3034 I3035 L3036 G3037 Q3038 T3039 L3040 L3050 V3053 L3061 N3074 Q3077 G3078 Q3079 F3080 T3081 HIS THR ARG ASN GLN PRO K3088 G3089 V3090 T3091 I3094 T3098 M3104 I3112
F3117 G3118 E3119 D3120 D3125 V3126 Q3127 V3128 R3132 I3133 L3134 K3144 S3145 V3148 S3153 G3156 E3157 F3162 P3167 H3174 L3175 D3176 K3177 I3183 Y3184 N3185 T3186 K3187 S3188 S3189 R3190 E3191 R3192 A3193 A3194 L3195 S3196 L3197 P3198 E3202 D3203 V3204 C3205 I3208 L3214 M3215 E3216
E3217 I3218 V3219 E3220 L3221 A3222 E3223 S3224 G3225 I3226 R3227 Q3230 M3231 P3232 M3235 L3242 M3246 S3247 R3248 W3249 W3250 N3256 R3260 A3261 E3262 M3263 L3268 N3269 S3270 E3271 H3272 M3273 N3274 L3277 G3278 N3279 I3280 I3283 I3284 L3288 D3291 E3292 G3293 L3299 F3302 S3303
I3306 I3307 N3308 K3309 V3310 K3311 P3312 Q3313 L3314 L3315 K3316 T3317 H3318 F3319 L3320 P3321 L3322 M3323 E3324 K3325 L3326 K3327 K3328 K3329 A3330 A3331 T3332 V3333 V3334 S3335 E3336 E3337 ASP HIS LEU LYS ALA GLU ALA ARG GLY ASP MET SER GLU ALA GLU LEU LEU ILE LEU ASP GLU PHE THR THR LEU ALA ARG ASP
LEU TYR ALA PHE TYR PRO LEU LEU ILE ARG PHE VAL ASP TYR ASN ARG ALA ALA LYS TRP LEU LYS GLU PRO ASN PRO GLU ALA GLU GLU LEU PHE ARG MET VAL ALA GLU VAL PHE ILE TYR TRP SER LYS SER HIS ASN PHE LYS ARG GLU GLU GLN ASN PHE VAL VAL GLN ASN GLU ILE
ASN ASN MET SER PHE LEU ILE THR ASP THR LYS SER LYS MET SER LYS ALA ALA VAL SER ASP GLN GLU ARG LYS LYS MET LYS ARG LYS GLY ASP ARG TYR SER MET GLN THR SER LEU ILE VAL ALA ALA LEU LEU LYS ARG LEU LEU PRO ILE GLY LEU ASN ILE CYS ALA PRO GLY ASP
GLN GLU LEU ILE ALA LEU ALA LYS ASN ARG PHE SER LEU LYS ASP THR GLU GLU ASP GLU VAL ARG ASP ILE ILE ARG SER ASN ILE HIS LEU GLN GLY LYS LEU GLU ASP PRO ALA ILE ARG TRP GLN MET ALA LEU TYR LYS ASP LEU PRO ASN ARG THR ASP ASP THR SER ASP PRO GLU
LYS THR VAL GLU ARG VAL LEU ASP ILE ALA ASN VAL LEU PHE HIS LEU GLU GLN LYS SER LYS ARG VAL GLY ARG ARG HIS TYR CYS LEU VAL GLU HIS PRO GLN ARG SER LYS LYS ALA VAL TRP HIS LYS LEU LEU SER LYS GLN ARG LYS ARG ALA V3599 V3600 A3601 C3602 F3603 R3604 M3605
A3606 H3614 R3615 E3625 K3639 E3642 A3649 E3650 P3651 P3652 E3653 E3654 D3655 E3656 G3657 T3658 K3659 R3660 V3661 H3665 L3676 L3687 K3697 H3700 D3701 E3702 GLU ASP ASP ASP GLY GLU GLU E3710 V3711 K3712 E3720 Q3727 Q3728 A3729 R3730 L3731 H3732 A3736 M3739 V3740
I3763 Y3780 K3784 M3797 L3803 Q3811 E3815 G3816 L3817 G3818 M3819 V3820 T3821 E3822 E3823 G3824 S3825 G3826 E3827 K3828 D3832 F3835 D3838 N3851 S3852 D3853 F3854 Q3855 I3870 L3878 S3884 F3888 Y3889 W3890 D3896 F3906 V3916 G3926 L3958
L3968 K3976 F4016 F4020 L4021 D4025 D4030 E4034 Y4035 D4036 P4037 D4038 G4039 K4040 G4041 S4044 K4045 R4046 D4047 F4048 H4049 S4054 H4055 L4067 A4070 E4071 T4072 D4073 E4074 N4075 E4076 T4077 L4078 D4079 E4082 F4087 D4093 I4094 E4107 P4110 Y4128 I4145 E4146
R4147 S4155 Q4159 F4172 V4176 V4177 E4182 E4187 T4196 M4200 I4206 S4207 E4208 S4209 ASP LEU ASN GLU ARG SER ALA ASN LYS GLU GLU SER GLU LYS GLU ARG PRO GLU GLU GLN GLY PRO ARG MET ALA PHE PHE S4237 I4238 L4239 L4248 R4249 Y4250 T4254



• Molecule 1: Ryanodine receptor 2

Chain B:

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W902 Q903 Y904 G905 P906 V907 R908 D909 D910 N911 K912 R913 Q914 H915 P916 C917 L918 V919 E920 F921 S922 K923 L924 P925 E926 Q927 E928 R929 N930 Q934 L937 E938 T939 L940 K941 T942 L943 L944 C948 H949 V950 G951 I952 S953 D954 E955 H956 A957 E958 D959 K960 V961 K962 K963 W964 K965 L966
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N1063 L1064 E1065 A1066 P1067 D1068 Q1069 D1070 H1071 A1072 A1073 R1074 A1075 E1076 V1077 C1078 S1079 G1080 T1081 G1082 E1083 R1086 R1089 A1098 M1113 R1114 S1118 R1119 L1128 G1129 G1139 W1145 N1149 W1156 M1168 N1169 E1170 T1176 I1181 D1194 G1198 V1204 Y1226
I1229 E1234 L1251 S1252 E1266 H1267 T1276 I1277 D1278 T1286 G1291 S1292 Q1293 N1294 S1295 N1296 C1310 K1316 THR VAL ALA GLY GLY LEU PRO GLY ALA GLY LEU PHE GLY PRO LYS ASN ASP LEU GLU ASP TYR ASP ALA ASP SER ASP PHE GLU VAL LEU MET LYS THR
ALA HIS GLY HIS LEU VAL PRO ASP ARG VAL ASP LYS ASP LYS GLU ALA THR LYS PRO GLU PHE ASN ASN HIS LYS ASP TYR ALA GLN GLU LYS PRO SER ARG LEU LYS GLN ARG PHE LEU LEU ARG ARG THR LYS PRO ASP TYR SER THR SER HIS SER ALA ARG LEU THR GLU ASP VAL
LEU ALA ASP ASP R1414 D1415 D1416 Y1417 D1418 F1419 L1420 M1421 Q1422 T1425 Y1428 S1429 F1433 P1434 G1444 G1456 R1461 L1469 G1470 D1471 E1472 K1473 E1478 R1482 M1487 V1488 C1489 E1492 S1495 P1496 G1497 Q1498 G1499 R1500 N1501 N1502 N1503 A1513 A1522 L1527
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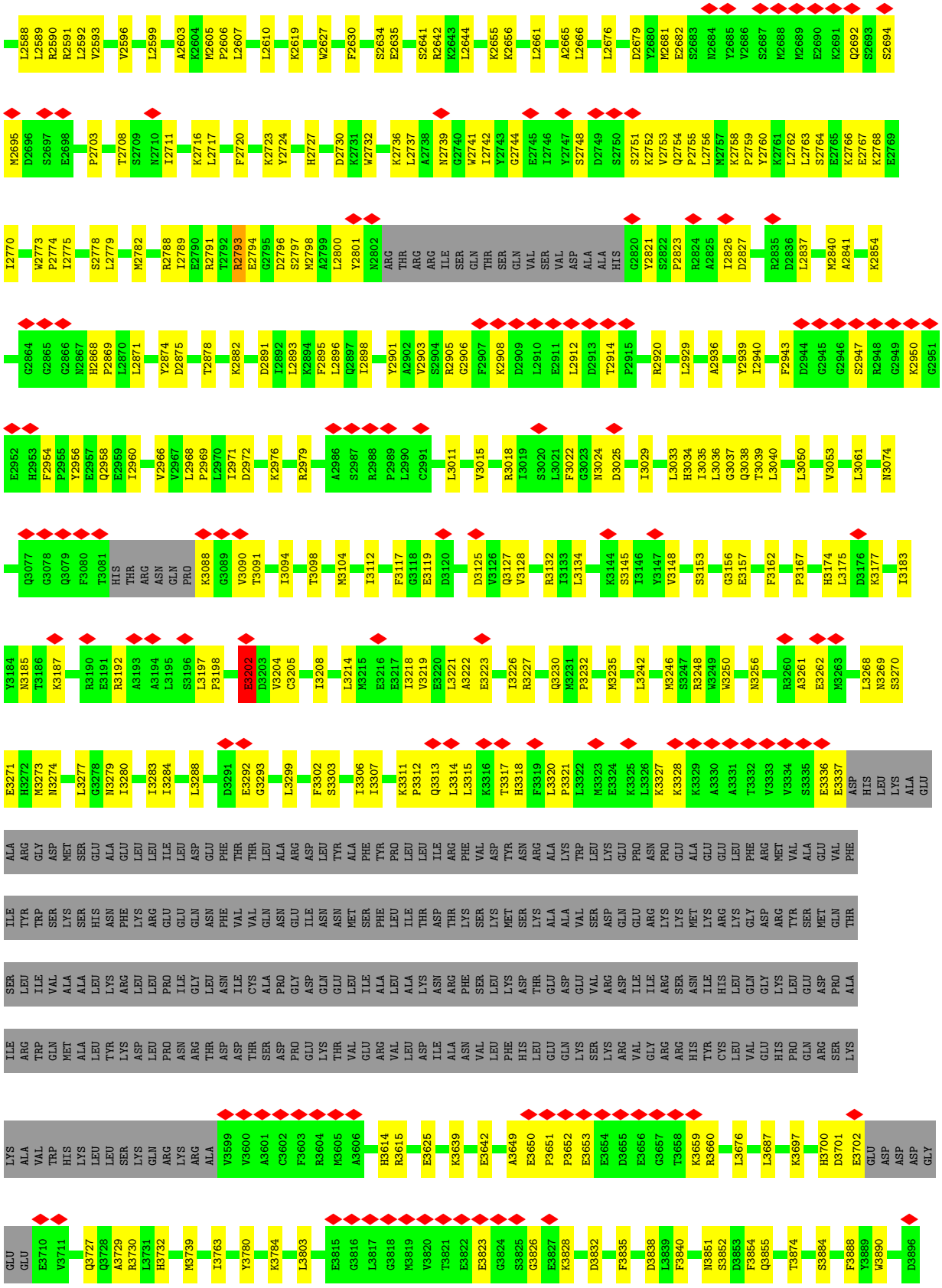
P1759 R1760 M1761 P1766 S1767 F1768 E1774 C1775 Y1776 P1780 K1790 T1791 I1792 Q1793 M1794 I1830 M1831 I1842 V1850 F1851 K1852 E1853 A1854 ALA THR PRO GLU GLU GLU SER ASP THR LEU GLU LYS GLU LEU SER VAL ASP ASP ALA LYS LEU GLN GLY ALA GLY GLU GLU GLU ALA
LYS GLY GLY LYS ARG P1889 K1890 L1894 L1898 V1902 R1919 F1932 L1936 R1943 E1946 V1947 M1948 Q1949 A1950 L1951 N1952 M1953 S1954 A1955 A1956 L1957 T1958 A1959 R1960 K1961 S1967 P1968 P1969 Q1970 E1971 Q1972 I1973 N1974 M1975 L1976 F1979 D1982 K1983 S1984 E1985 C1988 P1989
L1996 E2010 LEU ASP GLU ASP GLY SER LEU ASP GLY ASN SER ASP LEU THR ILE ARG GLY ARG LEU LEU SER LEU VAL GLU LYS VAL THR TYR LEU LYS LYS LYS GLN ALA GLU LYS PRO VAL GLU SER ASP SER K2053 K2054 T2057 L2058 Q2059 I2062 T2065 M2066 V2067 Q2071
R2082 L2087 L2102 L2123 L2130 R2133 E2139 M2142 I2149 V2154 Q2157 H2158 P2159 M2160 R2163 M2167 T2170 V2171 V2174 M2175 V2176 G2181 G2182 E2183 S2184 K2185 E2186 M2192 F2199 Y2202 I2206 Y2220 D2241 A2254 L2257 Y2285
W2290 E2296 R2297 R2303 S2312 N2318 R2322 R2326 P2333 A2334 L2335 R2336 G2337 A2346 D2356 R2359 D2360 P2364 ASN SER GLY SER SER LYS THR LEU ASP THR GLU GLU E2377 E2378 D2379 D2380 M2384 I2388 M2389 T2390 F2391 I2396 R2401 E2405
L2408 I2436 F2440 K2447 E2453 S2457 K2465 M2468 I2478 L2484 L2485 H2486 L2487 L2488 E2489 V2490 G2491 L2496 A2500 S2508 D2511 L2520 A2532 F2535 H2541 I2545 L2548 L2549 R2554 L2555 S2556 S2560 I2569 E2570 R2581 M2585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I2770 W2773 P2774 I2775 S2778 L2779 M2782 R2788 I2789 E2790 R2791 T2792 R2793 E2794 G2795 D2796 S2797 M2798 A2799 L2800 Y2801 N2802 ARG THR ARG ARG ILE SER GLN THR SER GLN VAL SER VAL ASP ALA ALA HIS G2820 Y2821 S2822 P2823 R2824 A2825 I2826 D2827 R2835 D2836 L2837 M2840 A2841 K2854
G2864 G2865 G2866 N2867 H2868 P2869 L2870 L2871 Y2874 D2875 T2878 K2882 D2891 I2892 L2893 K2894 F2895 L2896 Q2897 I2898 Y2901 A2902 V2903 S2904 R2905 G2906 F2907 K2908 D2909 L2910 E2911 L2912 D2913 T2914 P2915 R2920 L2929 A2936 Y2939 I2940 F2943 D2944 G2945 G2946 S2947 R2948 G2949 K2950 G2951
E2952 H2953 F2954 P2955 Y2956 E2957 Q2958 E2959 I2960 V2966 V2967 L2968 P2969 L2970 I2971 D2972 K2976 R2979 A2986 S2987 R2988 P2989 L2990 C2991 L3011 V3015 R3018 I3019 S3020 L3021 F3022 G3023 N3024 D3025 I3029 L3033 H3034 I3035 L3036 G3037 Q3038 T3039 L3040 L3050 V3053 L3061 N3074
Q3077 G3078 Q3079 F3080 T3081 HIS THR ARG ASN GLN PRO K3088 G3089 V3090 T3091 I3094 T3098 M3104 I3112 F3117 G3118 E3119 D3120 D3125 V3126 Q3127 V3128 R3132 I3133 L3134 K3144 S3145 I3146 Y3147 V3148 S3153 G3156 E3157 F3162 P3167 H3174 L3175 D3176 K3177 I3183
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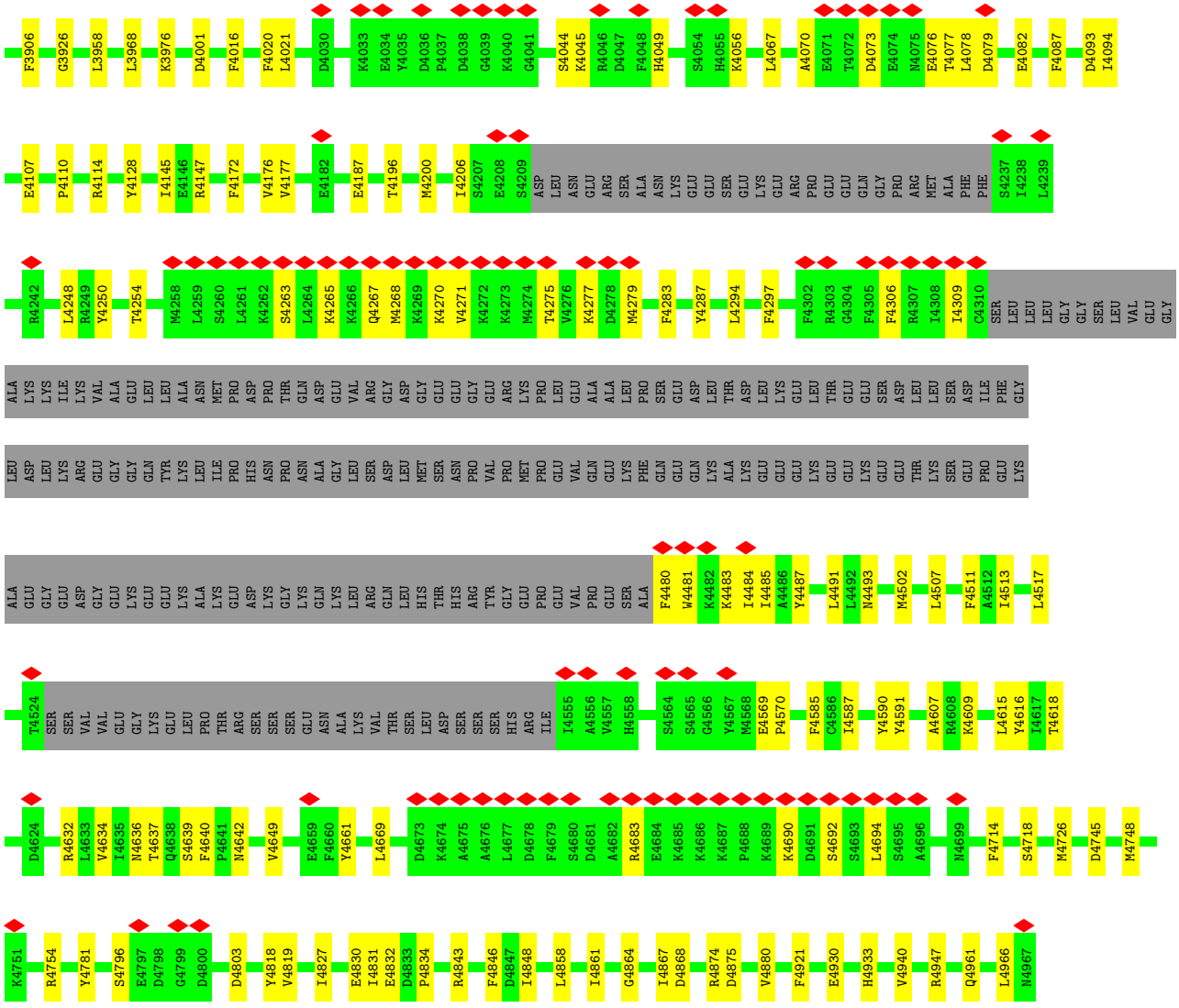
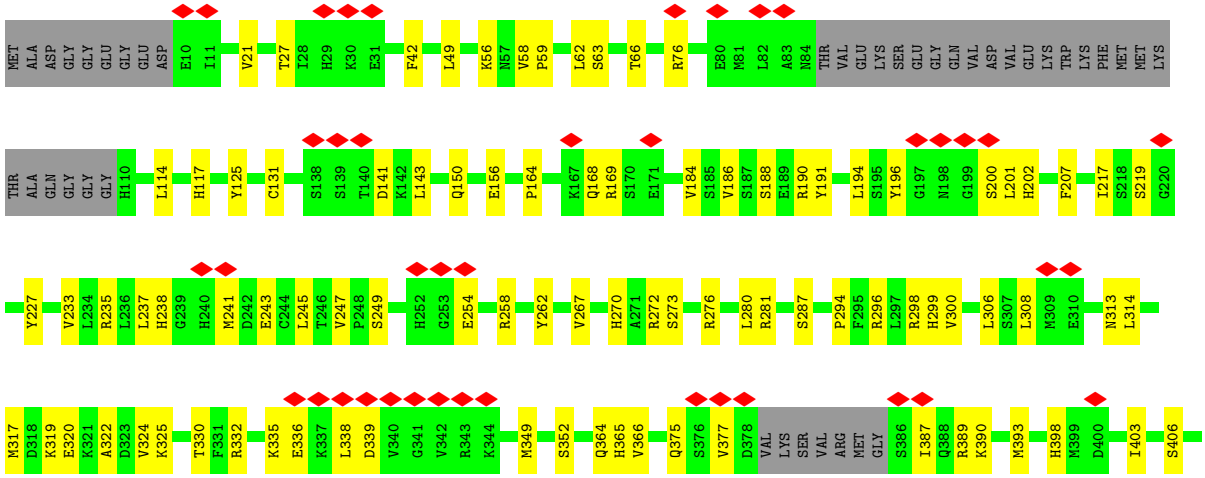
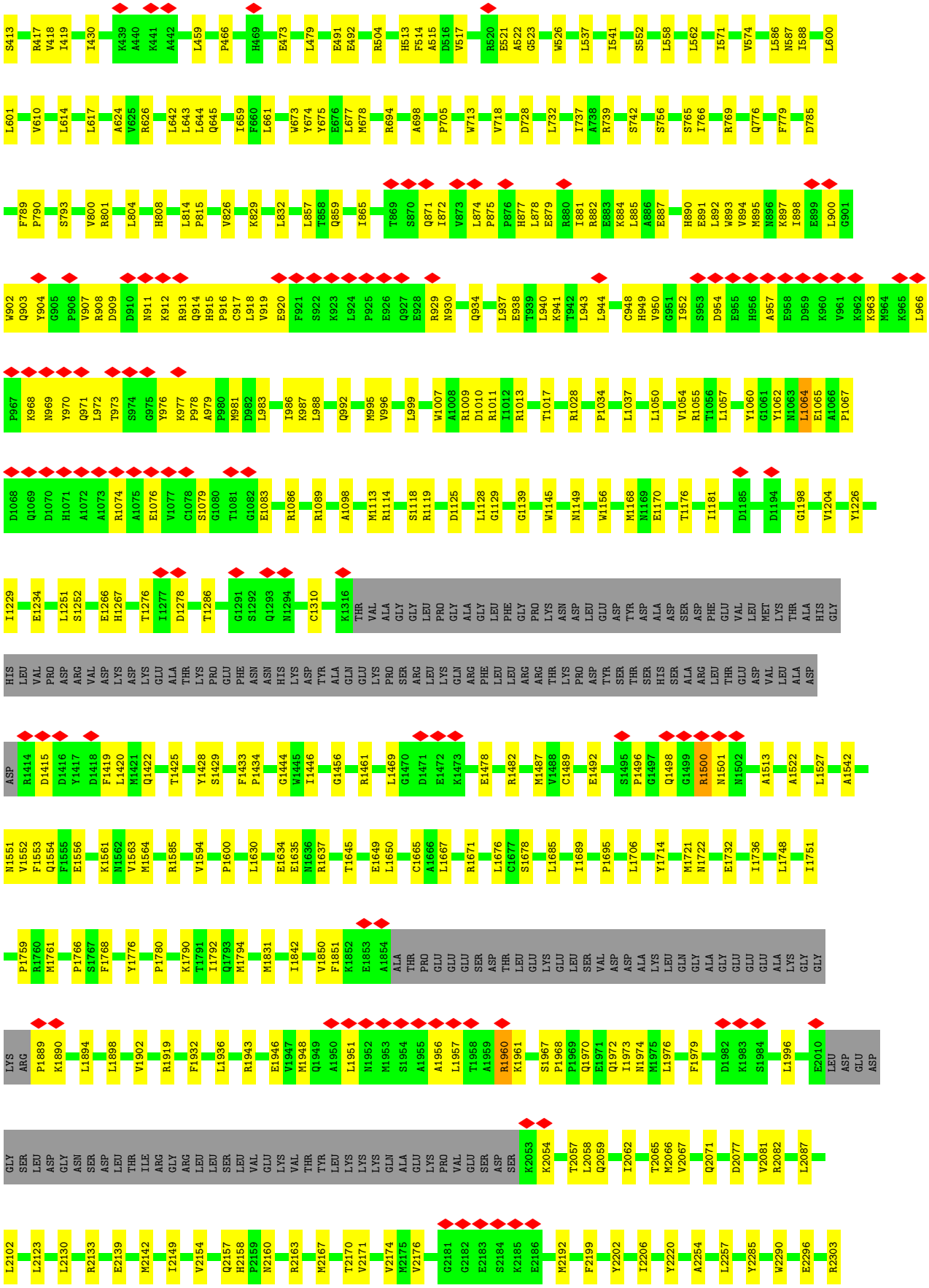
E3271 H3272 M3273 N3274 L3277 Q3278 N3279 I3280 I3283 I3284 L3288 D3291 E3292 G3293 L3299 F3302 S3303 I3306 I3307 K3311 P3312 Q3313 L3314 L3315 K3316 T3317 H3318 F3319 L3320 P3321 L3322 M3323 E3324 K3325 L3326 K3327 K3328 K3329 A3330 A3331 T3332 V3333 V3334 S3335 E3336 E3337 ASP HIS LEU LYS ALA GLU
ALA ARG GLY ASP MET SER GLU ALA GLU LEU LEU LEU ILE LEU ASP GLU PHE THR THR LEU ALA ARG ASP LEU TYR ALA PHE TYR PRO LEU LEU LEU ILE ARG PHE VAL ASP TYR ASN ARG ALA LYS TRP LEU LYS GLU PRO ASN PRO GLU ALA GLU GLU LEU PHE ARG MET VAL ALA GLU VAL PHE
ILE TYR TRP SER LYS SER HIS ASN PHE LYS ARG GLU GLU GLN ASN PHE VAL VAL GLN ASN GLU ILE ASN ASN MET SER PHE LEU ILE THR ASP THR LYS SER LYS MET SER LYS ALA ALA VAL SER ASP GLN GLU ARG LYS LYS MET LYS ARG LYS GLY ASP ARG TYR SER MET GLN THR
SER LEU ILE VAL ALA ALA LEU LYS ARG LEU LEU LEU PRO ILE GLY LEU ASN ILE CYS ALA PRO GLY ASP GLN GLU LEU ILE ALA LEU ALA ALA LYS ASN ARG PHE SER LEU LEU LYS ASP THR GLU ASP GLU VAL ARG ASP ILE ILE ARG SER ASN ILE HIS LEU GLN GLY LYS LEU GLU ASP PRO ALA
ILE ARG TRP GLN MET ALA LEU TYR LYS ASP LEU PRO ASN ARG THR ASP ASP THR SER ASP PRO GLU LYS THR VAL GLU ARG VAL LEU LEU ASP ILE ALA ASN VAL LEU PHE HIS LEU GLU GLN LYS SER LYS ARG VAL GLY ARG ARG HIS TYR CYS LEU VAL GLU HIS PRO GLN ARG SER LYS
LYS ALA VAL TRP HIS LYS LEU LEU SER LYS GLN ARG LYS ARG ALA V3599 V3600 A3601 C3602 F3603 R3604 M3605 A3606 H3614 R3615 E3625 K3639 E3642 A3649 E3650 P3651 P3652 E3653 E3654 D3655 E3656 G3657 T3658 K3659 R3660 L3676 L3687 K3697 H3700 D3701 E3702 GLU ASP ASP ASP GLY
GLU GLU E3710 V3711 Q3727 Q3728 A3729 R3730 L3731 H3732 M3739 I3763 Y3780 K3784 L3803 E3815 G3816 L3817 G3818 M3819 V3820 T3821 E3822 E3823 G3824 S3825 G3826 E3827 K3828 D3832 F3835 D3838 L3839 F3840 N3851 S3852 D3853 F3854 Q3855 T3874 S3884 F3888 Y3889 W3890 D3896



• Molecule 1: Ryanodine receptor 2

Chain C:

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I1229 E1234 L1251 S1252 E1266 H1267 T1276 I1277 D1278 T1286 G1291 S1292 Q1293 N1294 C1310 K1316 THR VAL ALA GLY GLY LEU PRO GLY ALA GLY LEU PHE GLY PRO LYS ASN ASP LEU GLU ASP TYR ASP ALA ASP SER ASP PHE GLU VAL LEU MET LYS THR ALA HIS GLY
HIS LEU VAL PRO ASP ARG VAL ASP LYS ASP LYS GLU ALA THR LYS PRO GLU PHE ASN ASN HIS LYS ASP TYR ALA GLN GLU LYS PRO SER ARG LEU LEU LYS GLN ARG PHE LEU LEU LEU ARG ARG THR THR LYS PRO ASP TYR SER THR THR SER HIS SER ALA ARG LEU LEU THR GLU ASP VAL LEU ALA ASP
ASP R1414 D1415 D1416 Y1417 D1418 F1419 L1420 M1421 Q1422 T1425 Y1428 S1429 F1433 P1434 G1444 W1445 I1446 G1456 R1461 L1469 G1470 D1471 E1472 K1473 E1478 R1482 M1487 V1488 C1489 E1492 S1495 P1496 G1497 Q1498 G1499 R1500 N1501 N1502 A1513 A1522 L1527 A1542
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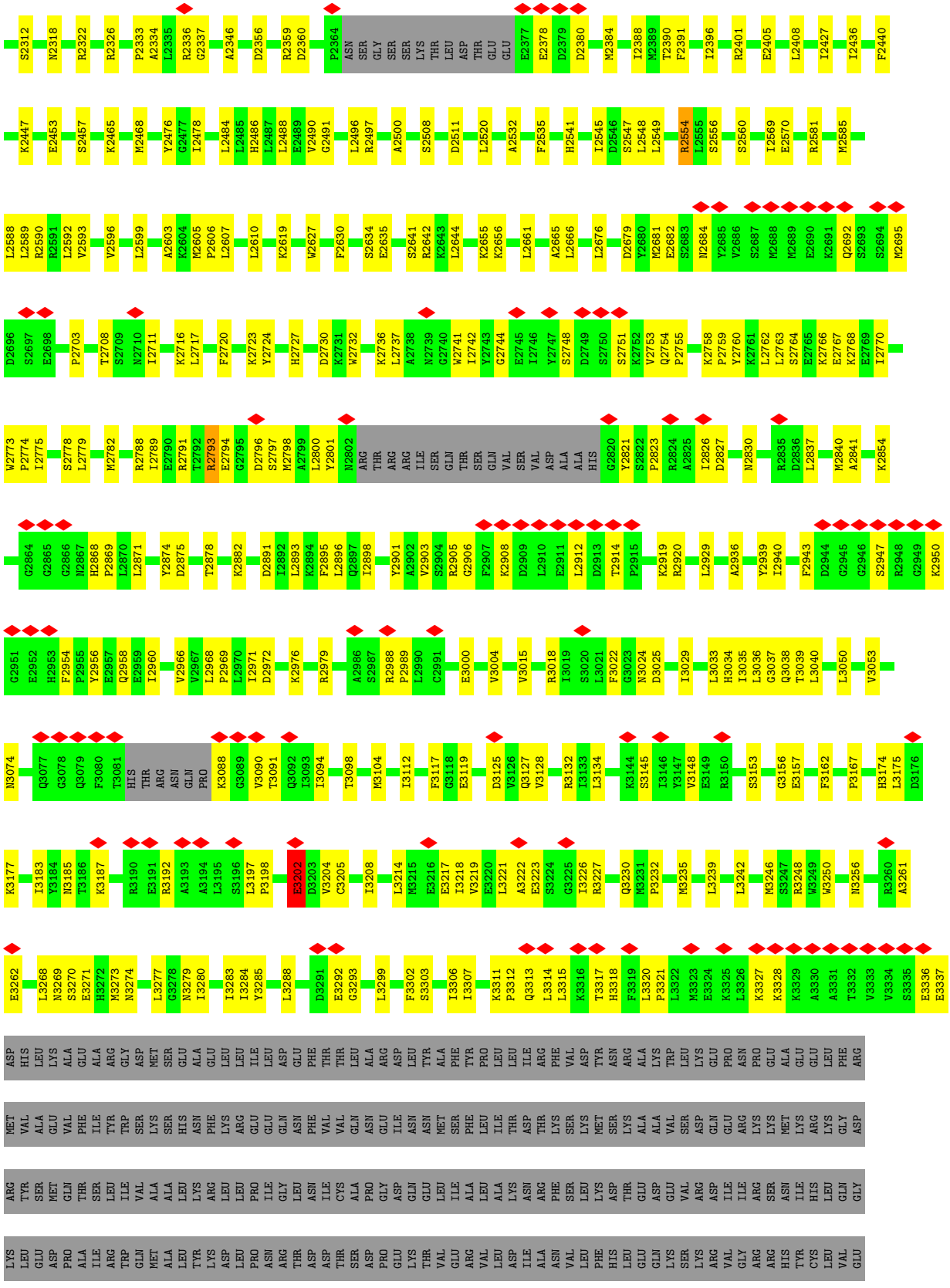
P1759 R1760 M1761 P1766 S1767 F1768 Y1776 P1780 K1790 T1791 I1792 Q1793 M1794 M1831 I1842 V1850 F1851 K1852 E1853 A1854 ALA THR PRO GLU GLU GLU SER ASP THR LEU GLU GLU LYS GLU LEU SER VAL ASP ASP ALA LYS LEU GLN GLY ALA GLY GLU GLU GLU GLU ALA LYS GLY GLY
LYS ARG P1889 K1890 L1894 L1898 V1902 R1919 F1932 L1936 R1943 E1946 V1947 M1948 Q1949 A1950 L1951 N1952 M1953 S1954 A1955 A1956 L1957 T1958 A1959 R1960 K1961 S1967 P1968 P1969 Q1970 E1971 Q1972 I1973 N1974 M1975 L1976 F1979 D1982 K1983 S1984 L1996 E2010 LEU ASP GLU ASP
GLY SER LEU ASP GLY ASN SER ASP LEU THR ILE ARG GLY ARG LEU LEU SER LEU VAL GLU LYS VAL THR TYR LEU LYS LYS LYS GLN ALA GLU LYS PRO VAL GLU SER ASP SER K2053 K2054 T2057 L2058 Q2059 I2062 T2065 M2066 V2067 Q2071 D2077 V2081 R2082 L2087
L2102 L2123 L2130 R2133 E2139 M2142 I2149 V2154 Q2157 H2158 P2159 N2160 R2163 M2167 T2170 V2171 V2174 M2175 V2176 G2181 G2182 E2183 S2184 K2185 E2186 M2192 F2199 Y2202 I2206 Y2220 A2254 L2257 Y2285 W2290 E2296 R2303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W2773 P2774 I2775 S2778 L2779 M2782 R2788 I2789 E2790 R2791 T2792 R2793 E2794 G2795 D2796 S2797 M2798 A2799 L2800 Y2801 N2802 ARG THR ARG ARG ILE SER GLN THR SER GLN VAL SER VAL ASP ALA ALA HIS G2820 Y2821 S2822 P2823 R2824 A2825 I2826 D2827 N2830 R2835 D2836 L2837 M2840 A2841 K2854
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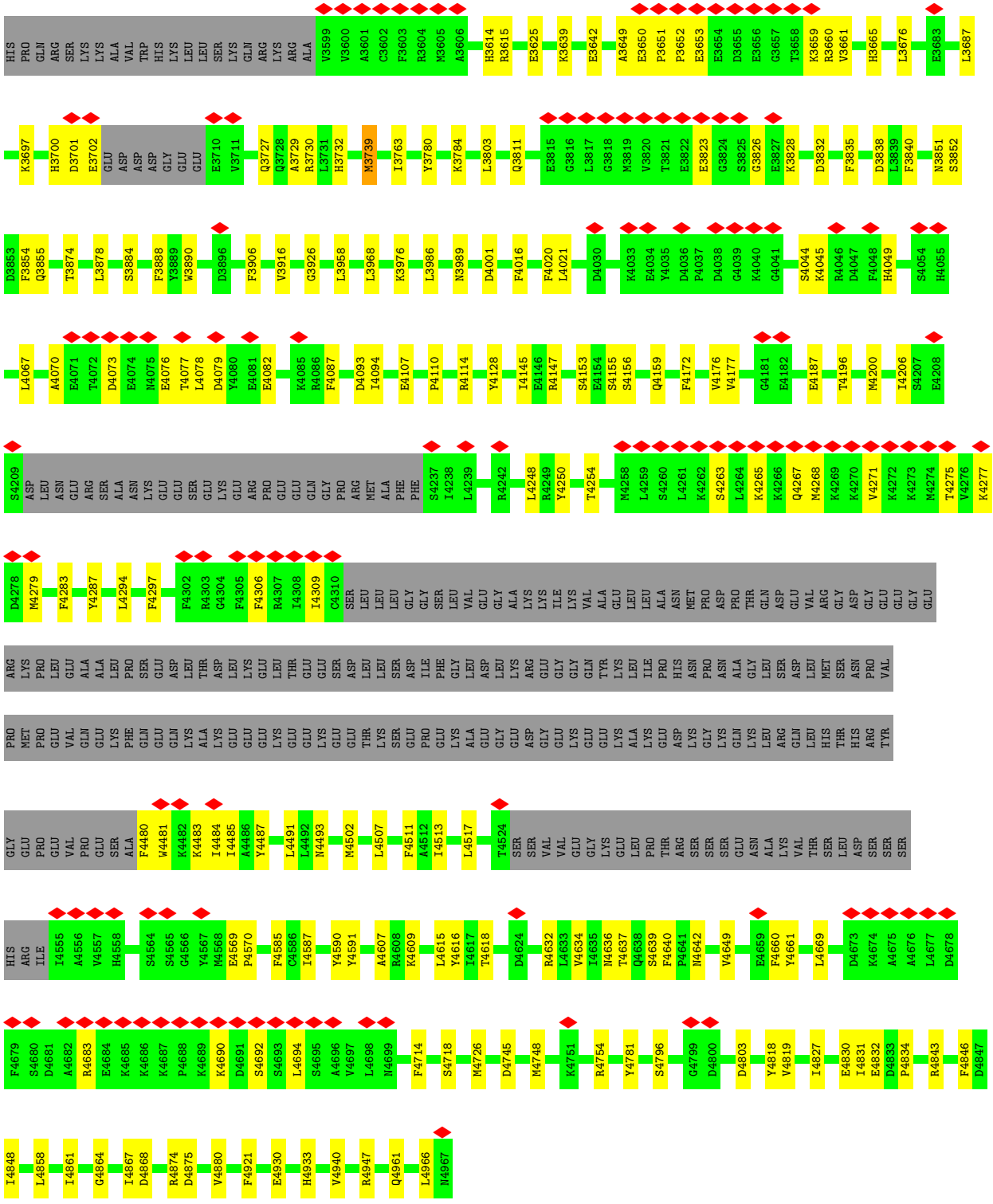
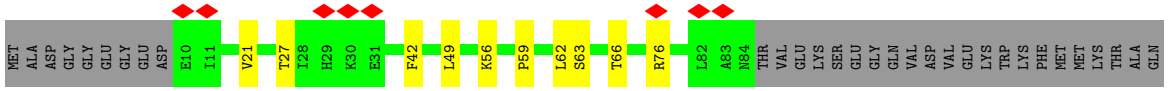
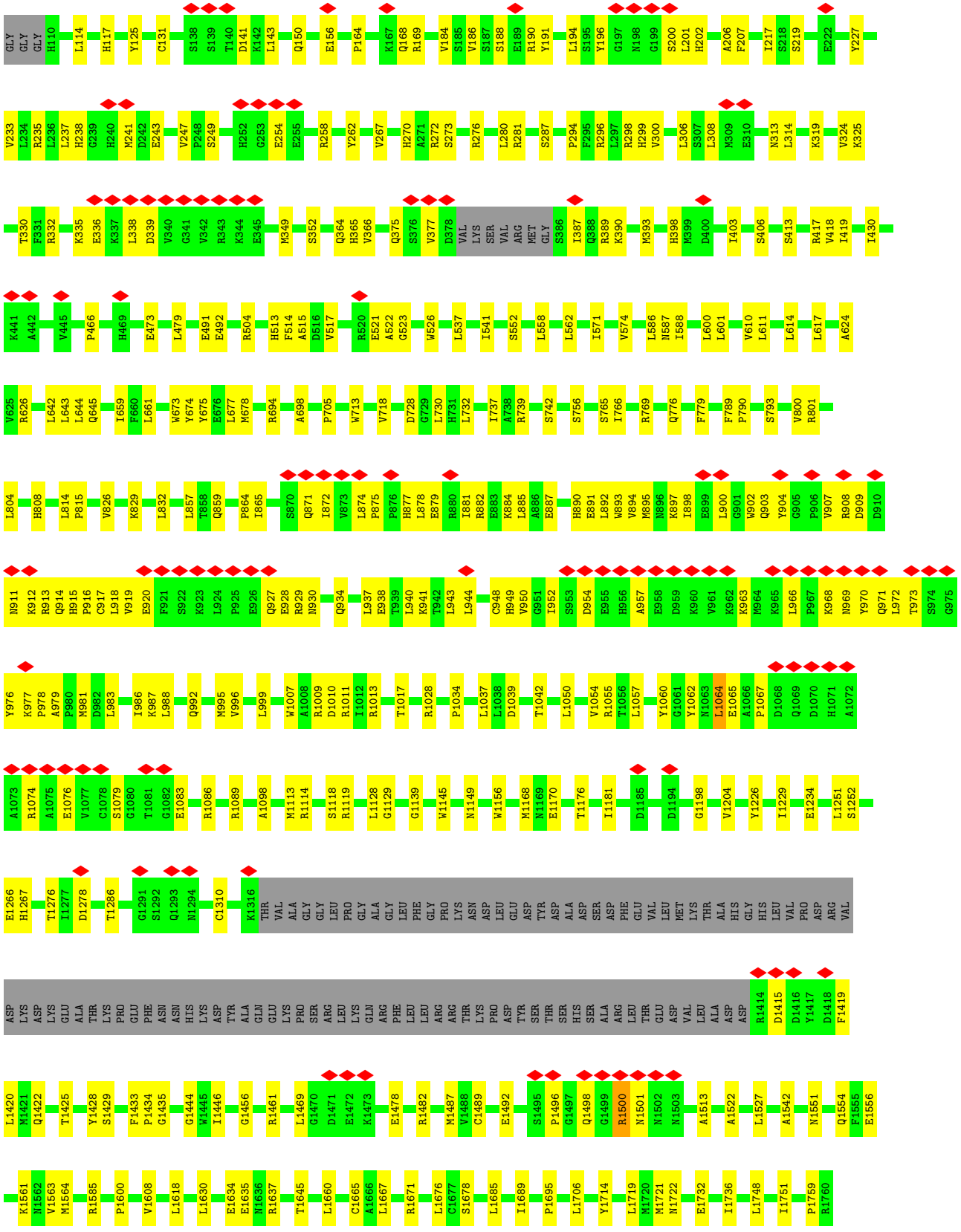
E3262 L3268 N3269 S3270 E3271 H3272 M3273 N3274 L3277 G3278 N3279 I3280 I3283 I3284 Y3285 L3288 D3291 E3292 G3293 L3299 F3302 S3303 I3306 I3307 K3311 P3312 Q3313 L3314 L3315 K3316 T3317 H3318 F3319 L3320 P3321 L3322 M3323 E3324 K3325 L3326 K3327 K3328 K3329 A3330 A3331 T3332 V3333 V3334 S3335 E3336 E3337
ASP HIS LEU LYS ALA GLU ALA ARG GLY ASP MET SER GLU ALA GLU LEU LEU ILE LEU ASP GLU PHE THR THR LEU ALA ARG ASP LEU TYR ALA PHE TYR PRO LEU LEU ILE ARG PHE VAL ASP TYR ASN ARG ALA LYS TRP LEU LYS GLU PRO ASN ARG GLU GLU GLU LEU PHE ARG
MET VAL ALA GLU VAL PHE ILE TYR TRP SER LYS SER HIS ASN PHE LYS ARG GLU GLN ASN PHE VAL VAL GLN ASN GLU ILE ASN MET SER PHE LEU ILE THR ASP THR LYS SER LYS MET SER LYS ALA ALA VAL SER ASP GLN GLU ARG LYS LYS MET LYS ARG LYS GLY ASP
ARG TYR SER MET GLN THR SER LEU ILE VAL ALA ALA LEU LYS ARG LEU LEU PRO ILE GLY LEU ASN ILE CYS ALA PRO GLY ASP GLN GLU LEU ILE ALA LEU ALA LYS ASN ARG PHE SER LEU LYS ASP THR GLU ASP GLU VAL ARG ASP ILE ILE ARG SER ASN ILE HIS LEU GLN GLY
LYS LEU GLU ASP PRO ALA ILE ARG TRP GLN MET ALA LEU TYR LYS ASP LEU PRO ASN ARG THR ASP ASP THR SER ASP PRO GLU LYS THR VAL GLU ARG VAL LEU ASP ILE ALA ASN VAL LEU PHE HIS LEU GLU GLN LYS SER LYS ARG VAL GLY ARG ARG HIS TYR CYS LEU VAL GLU



• Molecule 1: Ryanodine receptor 2

Chain D:

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V233 L234 R235 L236 L237 H238 G239 H240 M241 D242 E243 V247 P248 S249 H252 G253 E254 E255 R258 Y262 V267 H270 A271 R272 S273 R276 L280 R281 S287 P294 F295 R296 L297 R298 H299 V300 L306 S307 L308 M309 E310 N313 L314 K319 V324 K325
T330 F331 R332 K335 E336 K337 L338 D339 V340 G341 V342 R343 K344 E345 M349 S352 Q364 H365 V366 Q375 S376 V377 D378 VAL LYS SER VAL ARG MET GLY S386 I387 Q388 R389 K390 M393 H398 M399 D400 I403 S406 S413 R417 V418 I419 I430
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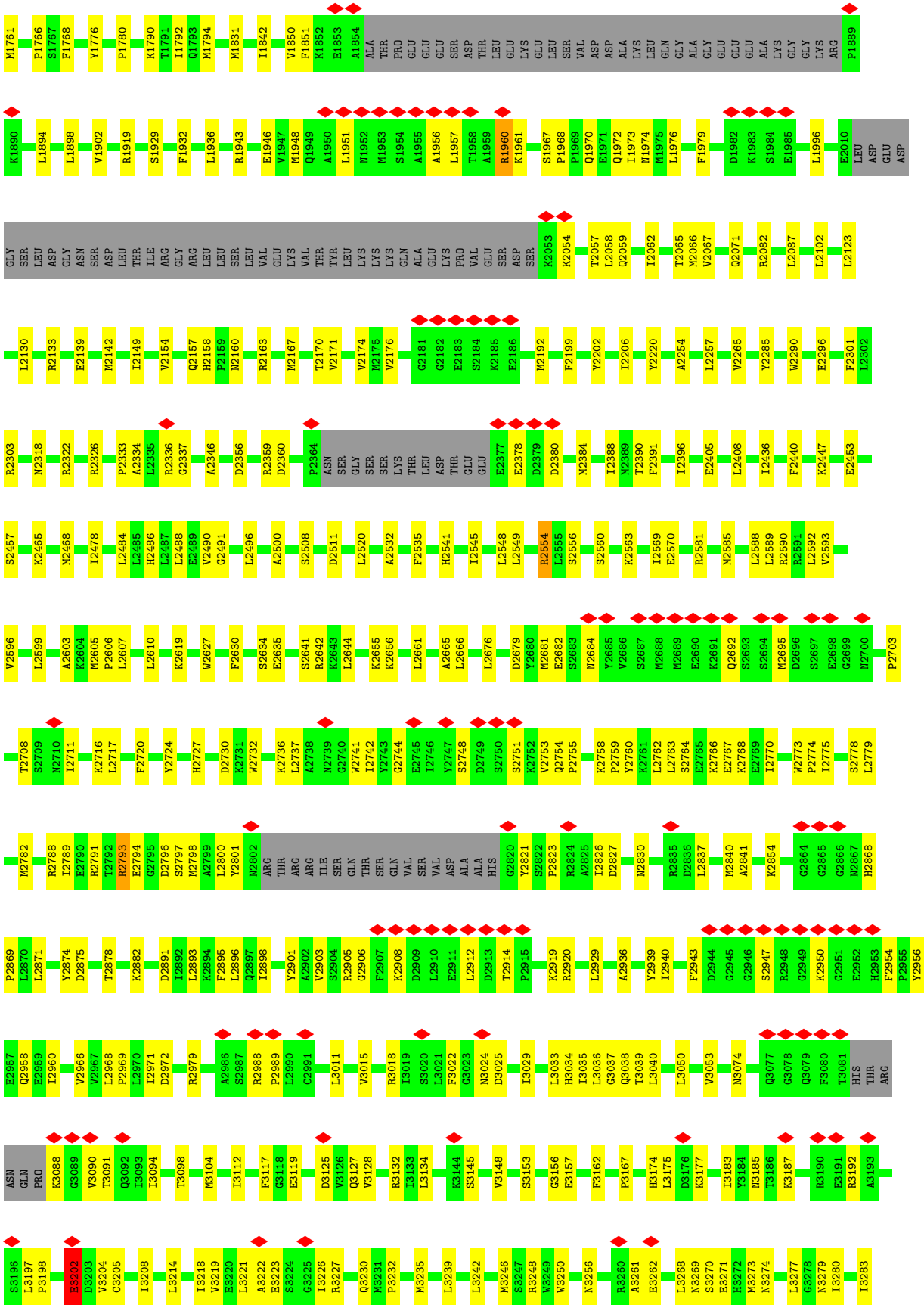
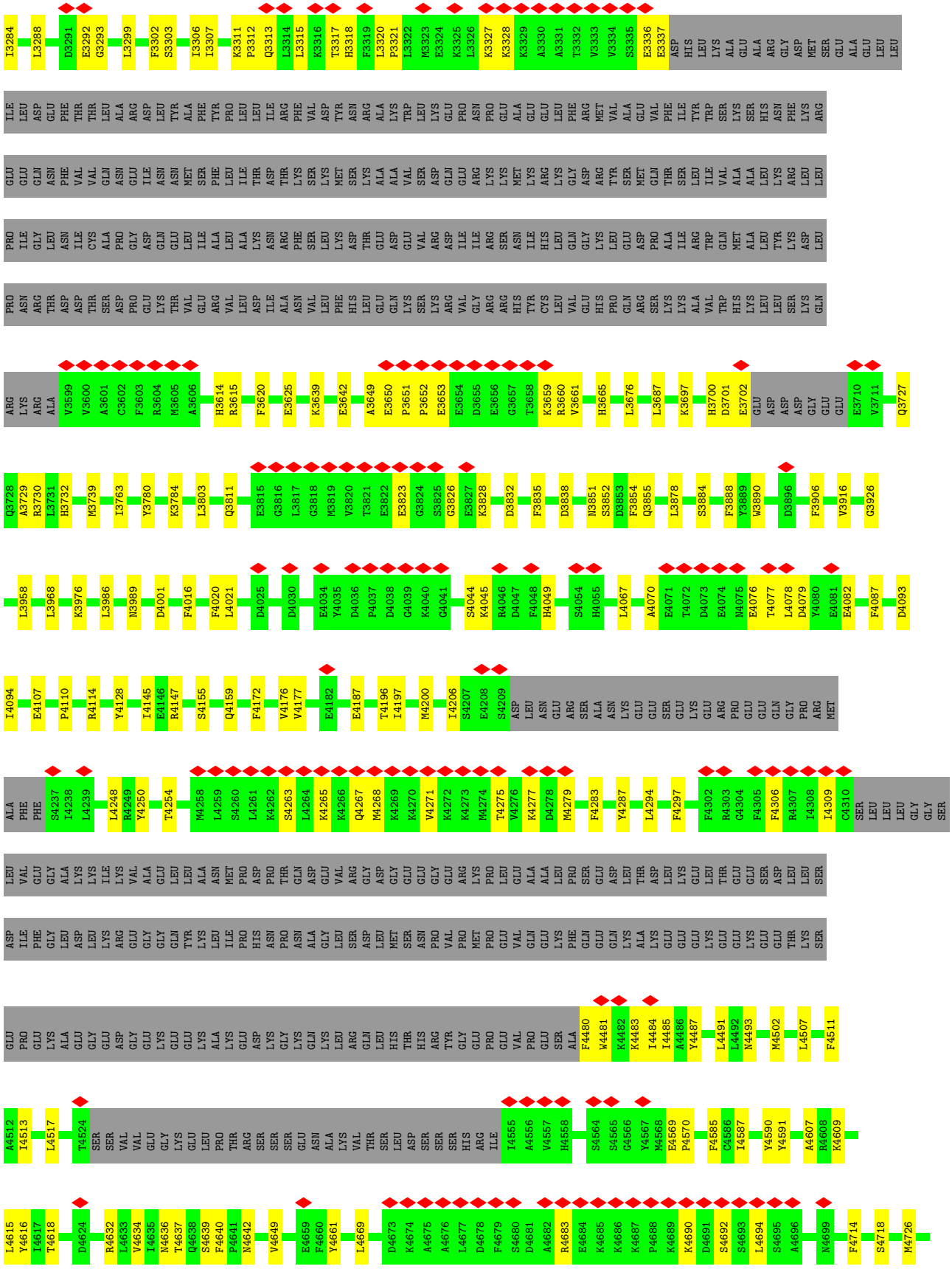
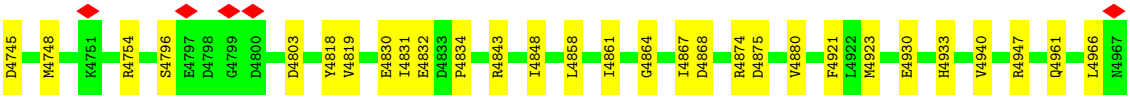
E1266 H1267 T1276 I1277 D1278 T1286 G1291 S1292 Q1293 N1294 C1310 K1316 THR VAL ALA GLY GLY LEU PRO GLY ALA GLY LEU PHE GLY PRO LYS ASN ASP LEU GLU ASP TYR ASP ALA ASP SER ASP PHE GLU VAL LEU MET LYS THR ALA HIS GLY HIS LEU VAL PRO ASP ARG VAL
ASP LYS ASP LYS GLU ALA THR LYS PRO GLU PHE ASN ASN HIS LYS ASP TYR ALA GLN GLU LYS PRO SER ARG LEU LYS GLN ARG PHE LEU LEU ARG ARG THR LYS PRO ASP TYR SER THR SER HIS SER ALA ARG LEU THR GLU ASP VAL LEU LEU ALA ASP R1414 D1415 D1416 Y1417 D1418 F1419
L1420 M1421 Q1422 T1425 Y1428 S1429 F1433 P1434 G1435 G1444 W1445 I1446 G1456 R1461 L1469 G1470 D1471 E1472 K1473 E1478 R1482 M1487 Y1488 C1489 E1492 S1495 P1496 G1497 Q1498 G1499 R1500 N1501 N1502 N1503 A1513 A1522 L1527 A1542 N1551 Q1554 F1555 E1556
K1561 N1562 V1563 M1564 R1585 P1600 V1608 L1618 L1630 E1634 E1635 N1636 R1637 T1645 L1660 C1665 A1666 L1667 R1671 L1676 C1677 S1678 L1685 I1689 P1695 L1706 Y1714 L1719 M1720 M1721 N1722 E1732 I1736 L1748 I1751 P1759 R1760

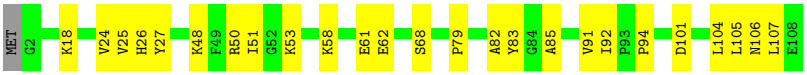






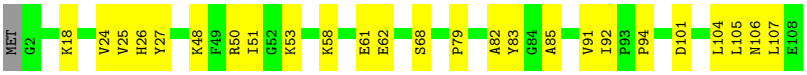
• Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1B

Chain E:



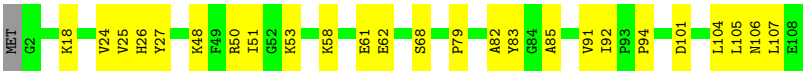
• Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1B

Chain F:



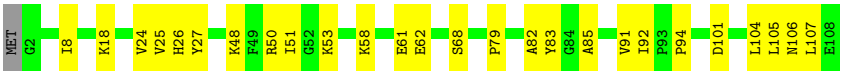
• Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1B

Chain G:



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

Chain H:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	212141	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	58	Depositor
Minimum defocus (nm)	400	Depositor
Maximum defocus (nm)	1200	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.859	Depositor
Minimum map value	-0.016	Depositor
Average map value	0.011	Depositor
Map value standard deviation	0.036	Depositor
Recommended contour level	0.15	Depositor
Map size (Å)	425.984, 425.984, 425.984	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.832, 0.832, 0.832	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: ATP, 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	0.26	0/34506	0.49	1/46608 (0.0%)
1	B	0.26	0/34506	0.49	1/46608 (0.0%)
1	C	0.26	0/34506	0.49	1/46608 (0.0%)
1	D	0.26	0/34506	0.49	1/46608 (0.0%)
2	E	0.37	0/834	0.57	0/1123
2	F	0.37	0/834	0.56	0/1123
2	G	0.37	0/834	0.57	0/1123
2	H	0.37	0/834	0.57	0/1123
All	All	0.26	0/141360	0.49	4/190924 (0.0%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1
1	B	0	1
1	C	0	1
1	D	0	1
All	All	0	4

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	3202	GLU	CA-CB-CG	5.44	125.36	113.40
1	C	3202	GLU	CA-CB-CG	5.44	125.36	113.40
1	A	3202	GLU	CA-CB-CG	5.42	125.33	113.40
1	D	3202	GLU	CA-CB-CG	5.41	125.31	113.40

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	3926	GLY	Peptide
1	B	3926	GLY	Peptide
1	C	3926	GLY	Peptide
1	D	3926	GLY	Peptide

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	33766	0	33447	613	0
1	B	33766	0	33447	611	0
1	C	33766	0	33447	619	0
1	D	33766	0	33447	609	0
2	E	818	0	821	15	0
2	F	818	0	821	14	0
2	G	818	0	821	15	0
2	H	818	0	821	15	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
4	A	62	0	24	2	0
4	B	62	0	24	2	0
4	C	62	0	24	2	0
4	D	62	0	24	2	0
All	All	138588	0	137168	2426	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 9.

The worst 5 of 2426 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:C:4834:PRO:HB3	1:C:4843:ARG:HD3	1.59	0.83

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:4834:PRO:HB3	1:D:4843:ARG:HD3	1.60	0.83
1:A:4834:PRO:HB3	1:A:4843:ARG:HD3	1.60	0.83
1:B:4834:PRO:HB3	1:B:4843:ARG:HD3	1.60	0.82
1:A:2142:MET:HE3	1:A:2174:VAL:HG21	1.64	0.79

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	4198/4967 (84%)	4102 (98%)	96 (2%)	0	100	100
1	B	4198/4967 (84%)	4102 (98%)	96 (2%)	0	100	100
1	C	4198/4967 (84%)	4101 (98%)	97 (2%)	0	100	100
1	D	4198/4967 (84%)	4103 (98%)	95 (2%)	0	100	100
2	E	105/108 (97%)	102 (97%)	2 (2%)	1 (1%)	13	27
2	F	105/108 (97%)	102 (97%)	2 (2%)	1 (1%)	13	27
2	G	105/108 (97%)	102 (97%)	2 (2%)	1 (1%)	13	27
2	H	105/108 (97%)	102 (97%)	2 (2%)	1 (1%)	13	27
All	All	17212/20300 (85%)	16816 (98%)	392 (2%)	4 (0%)	100	100

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	F	61	GLU
2	H	61	GLU
2	E	61	GLU
2	G	61	GLU

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	3708/4358 (85%)	3693 (100%)	15 (0%)	89 96
1	B	3708/4358 (85%)	3693 (100%)	15 (0%)	89 96
1	C	3708/4358 (85%)	3693 (100%)	15 (0%)	89 96
1	D	3708/4358 (85%)	3693 (100%)	15 (0%)	89 96
2	E	88/89 (99%)	88 (100%)	0	100 100
2	F	88/89 (99%)	88 (100%)	0	100 100
2	G	88/89 (99%)	88 (100%)	0	100 100
2	H	88/89 (99%)	88 (100%)	0	100 100
All	All	15184/17788 (85%)	15124 (100%)	60 (0%)	88 96

5 of 60 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	3202	GLU
1	D	2793	ARG
1	C	1960	ARG
1	D	2766	LYS
1	D	3739	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 19 such sidechains are listed below:

Mol	Chain	Res	Type
1	D	934	GLN
1	D	3811	GLN
1	D	4636	ASN
1	D	3274	ASN
1	B	4636	ASN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 12 ligands modelled in this entry, 4 are monoatomic - leaving 8 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
4	ATP	D	5003	-	28,33,33	0.62	0	34,52,52	0.59	1 (2%)
4	ATP	B	5002	-	28,33,33	0.61	0	34,52,52	0.60	1 (2%)
4	ATP	C	5003	-	28,33,33	0.63	0	34,52,52	0.58	1 (2%)
4	ATP	B	5003	-	28,33,33	0.63	0	34,52,52	0.59	1 (2%)
4	ATP	C	5002	-	28,33,33	0.61	0	34,52,52	0.60	1 (2%)
4	ATP	D	5002	-	28,33,33	0.61	0	34,52,52	0.60	1 (2%)
4	ATP	A	5003	-	28,33,33	0.63	0	34,52,52	0.59	1 (2%)
4	ATP	A	5002	-	28,33,33	0.61	0	34,52,52	0.61	1 (2%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	ATP	D	5003	-	-	5/18/38/38	0/3/3/3
4	ATP	B	5002	-	-	7/18/38/38	0/3/3/3
4	ATP	C	5003	-	-	5/18/38/38	0/3/3/3
4	ATP	B	5003	-	-	5/18/38/38	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	ATP	C	5002	-	-	7/18/38/38	0/3/3/3
4	ATP	D	5002	-	-	7/18/38/38	0/3/3/3
4	ATP	A	5003	-	-	5/18/38/38	0/3/3/3
4	ATP	A	5002	-	-	7/18/38/38	0/3/3/3

There are no bond length outliers.

The worst 5 of 8 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	A	5003	ATP	C5-C6-N6	2.36	123.90	120.31
4	B	5003	ATP	C5-C6-N6	2.36	123.90	120.31
4	D	5003	ATP	C5-C6-N6	2.36	123.90	120.31
4	A	5002	ATP	C5-C6-N6	2.34	123.87	120.31
4	D	5002	ATP	C5-C6-N6	2.32	123.84	120.31

There are no chirality outliers.

5 of 48 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	5002	ATP	C3'-C4'-C5'-O5'
4	A	5003	ATP	O4'-C4'-C5'-O5'
4	B	5002	ATP	C3'-C4'-C5'-O5'
4	B	5003	ATP	O4'-C4'-C5'-O5'
4	C	5002	ATP	C3'-C4'-C5'-O5'

There are no ring outliers.

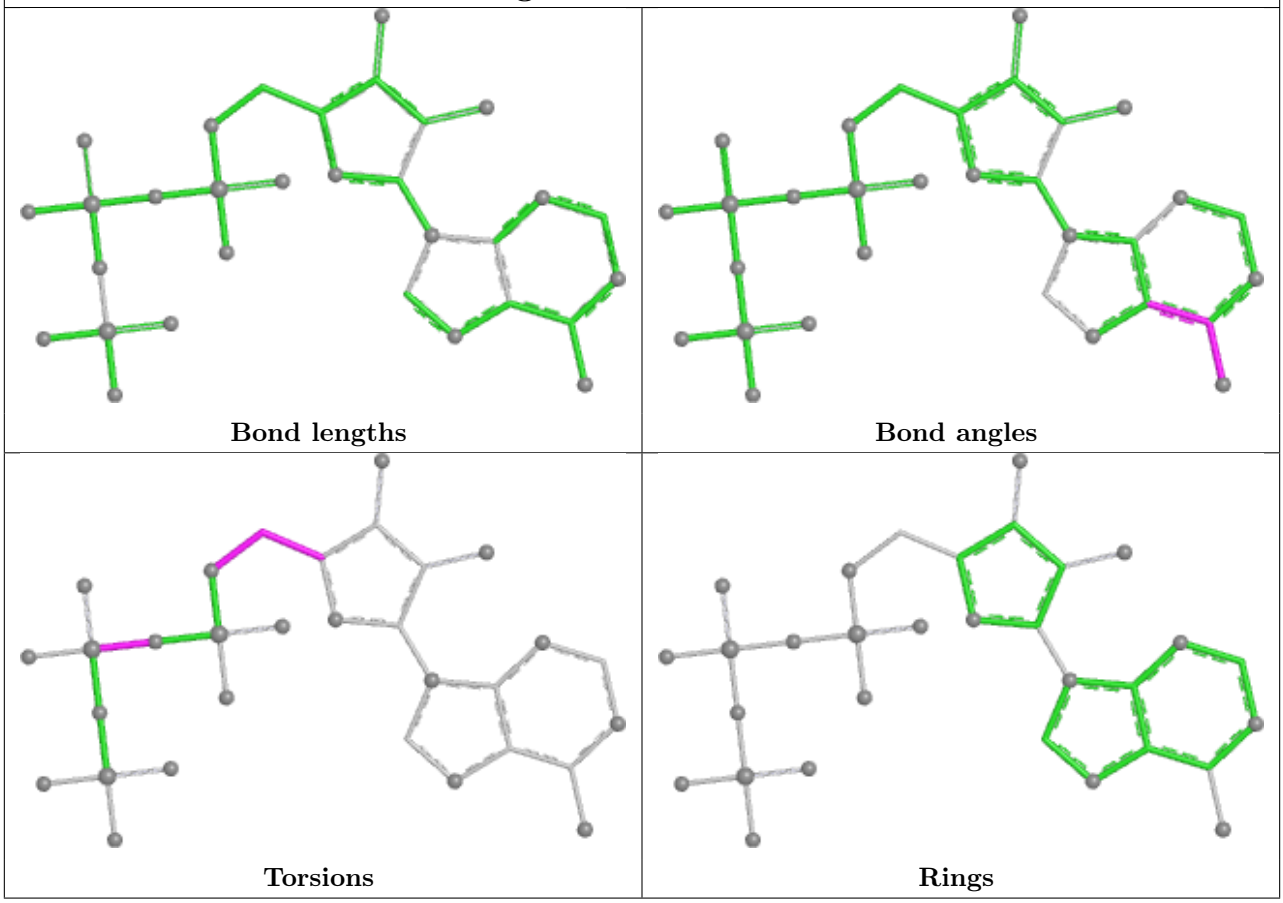
4 monomers are involved in 8 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	D	5003	ATP	2	0
4	C	5003	ATP	2	0
4	B	5003	ATP	2	0
4	A	5003	ATP	2	0

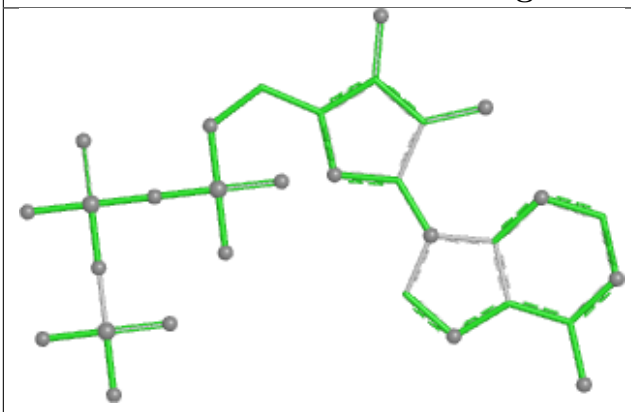
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be

highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

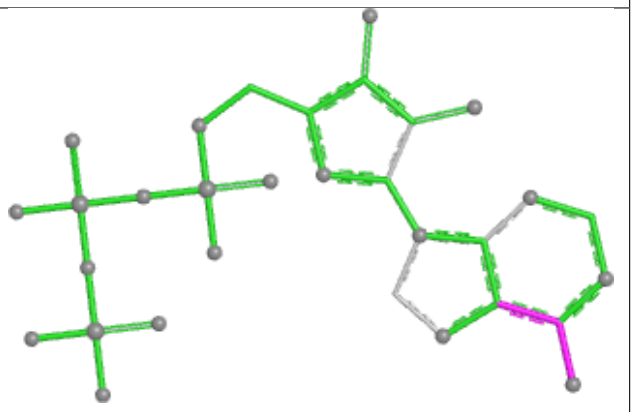
Ligand ATP D 5003



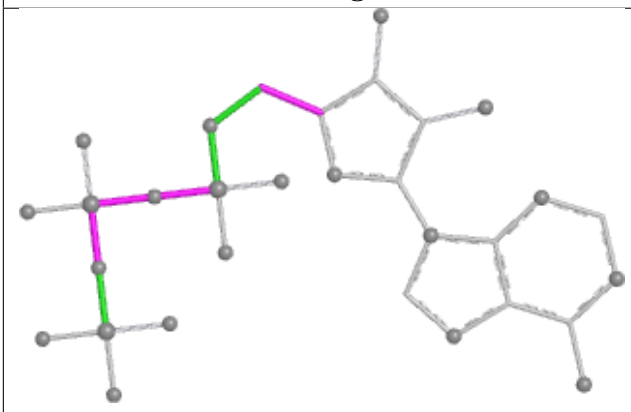
Ligand ATP B 5002



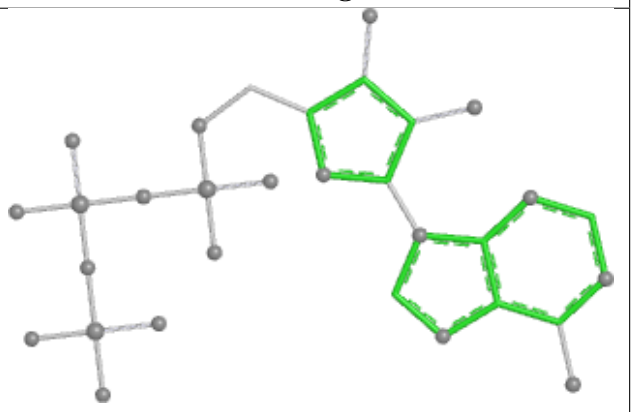
Bond lengths



Bond angles

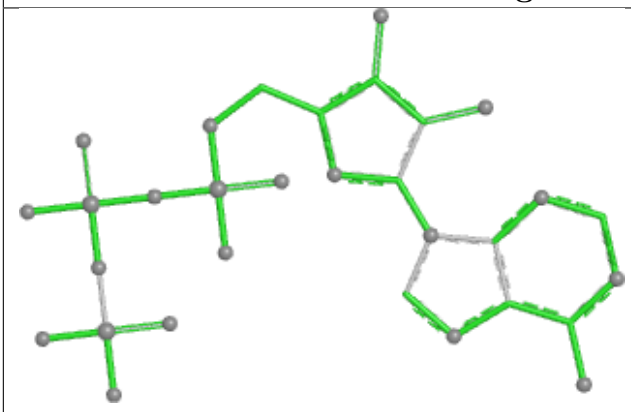


Torsions



Rings

Ligand ATP C 5003



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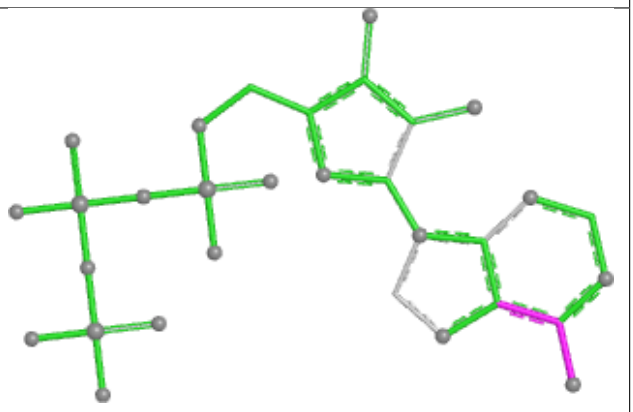

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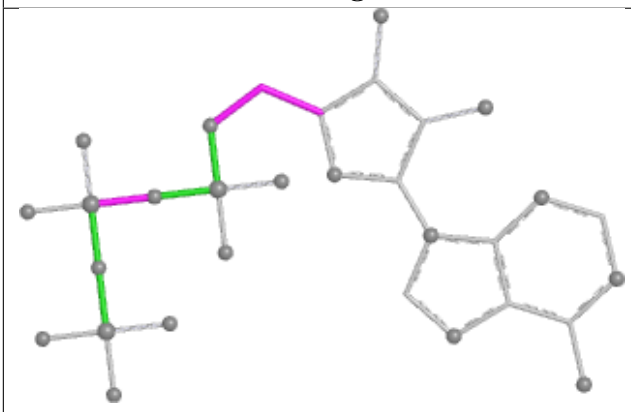

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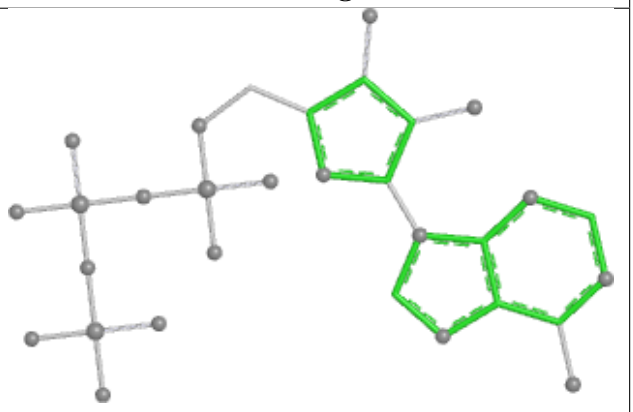

Rings

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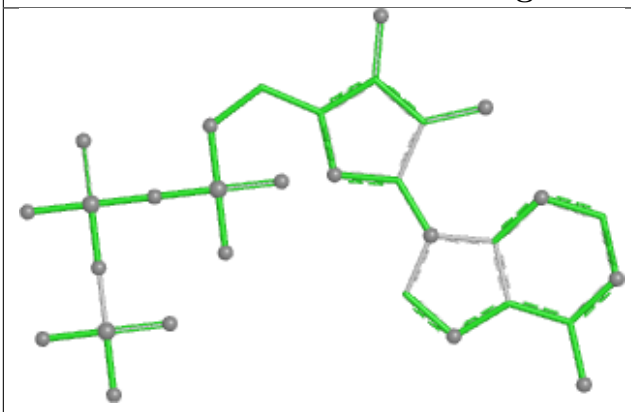

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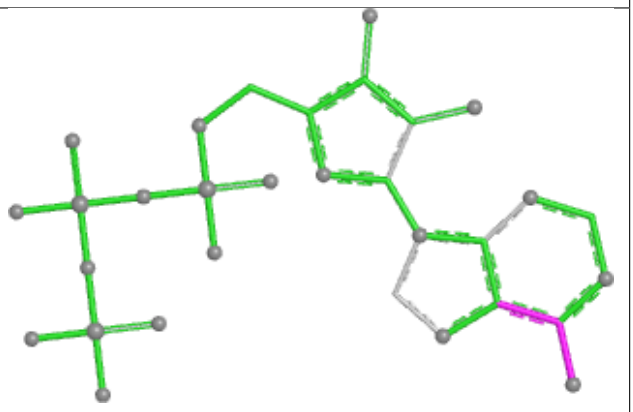
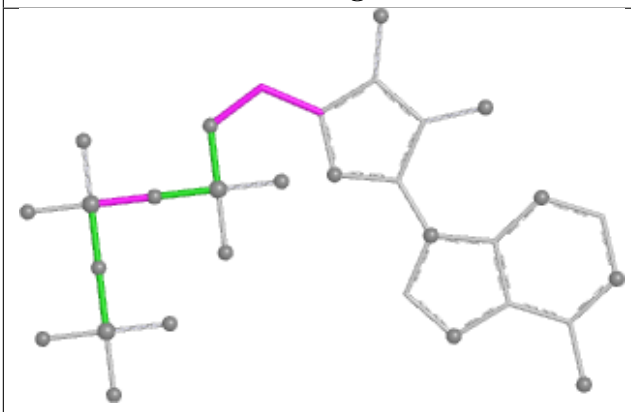
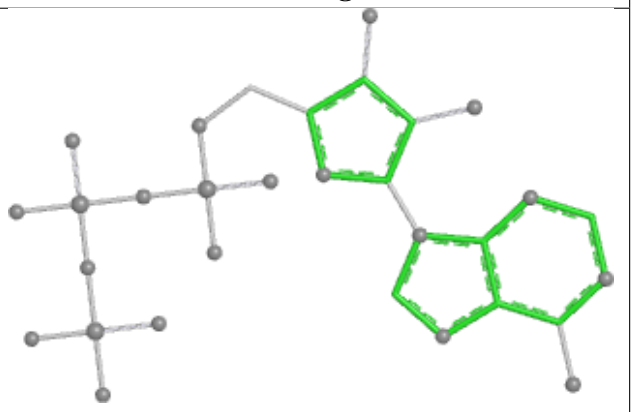


Bond angles

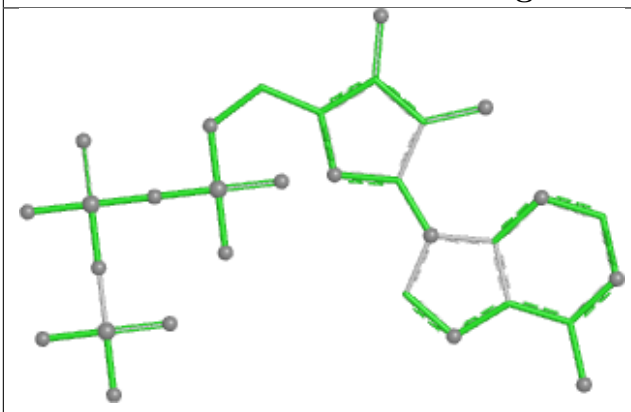


Torsions



Rings

Ligand ATP C 5002



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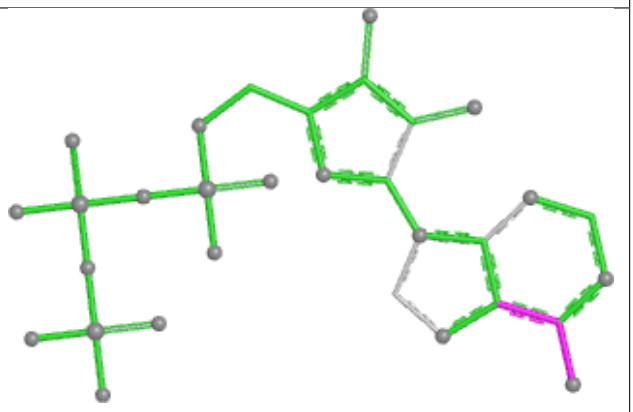
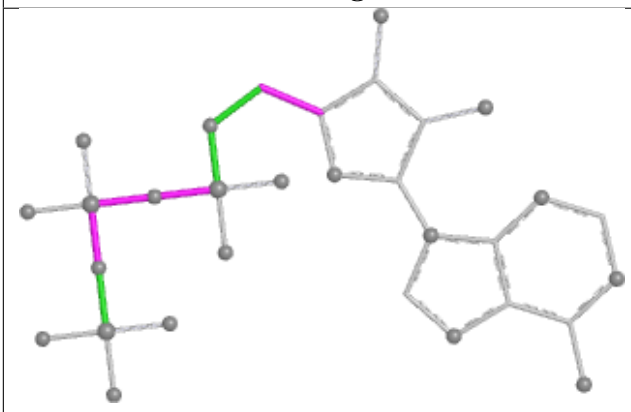


Bond angles



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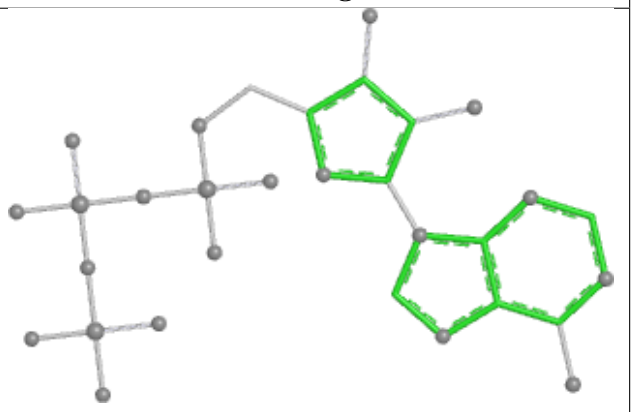
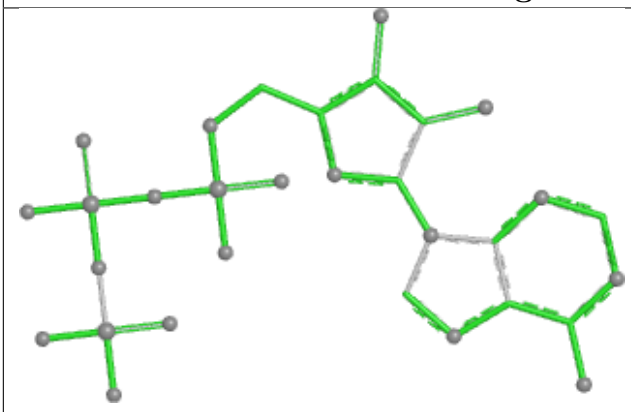


Rings

Ligand ATP D 5002



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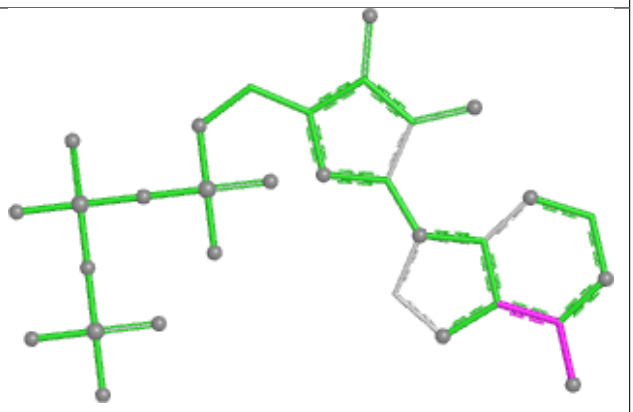
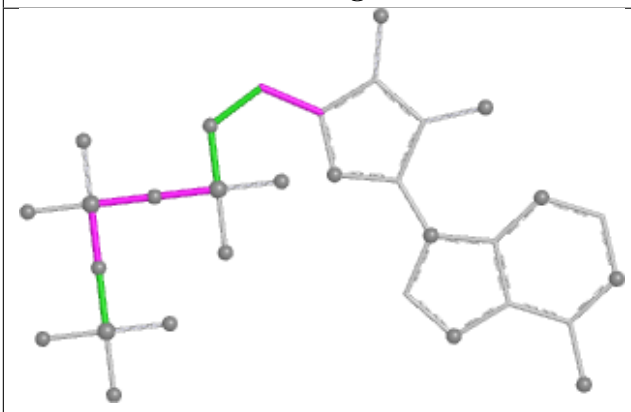
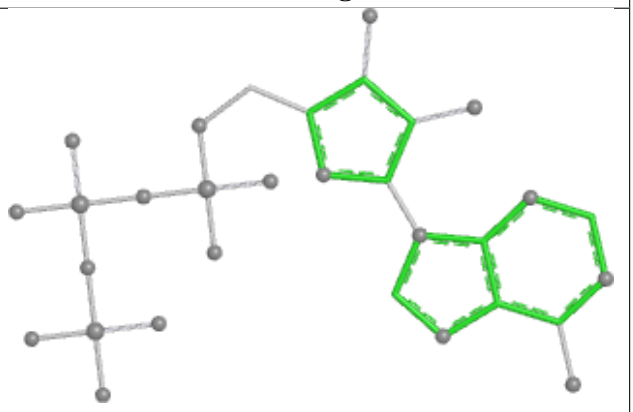


Bond angles

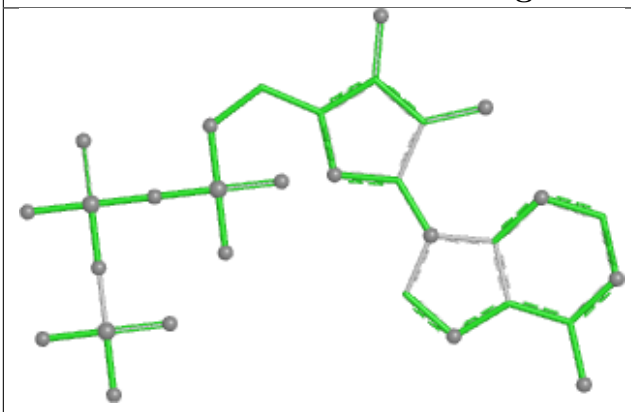


Torsions

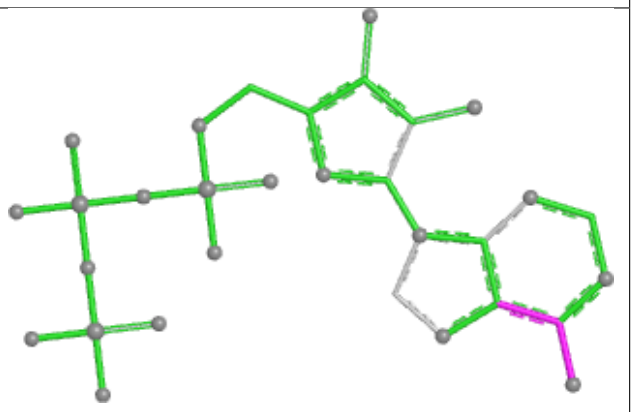


Rings

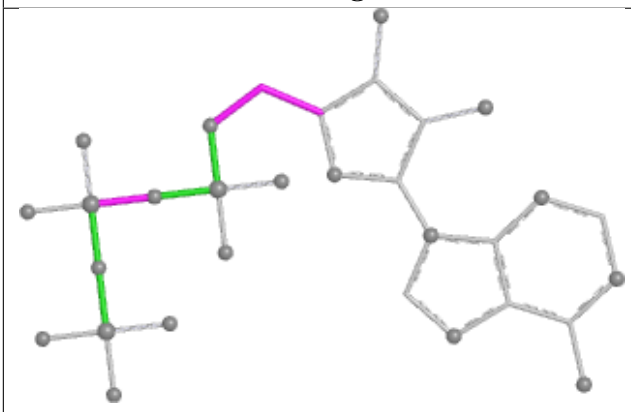
Ligand ATP A 5003



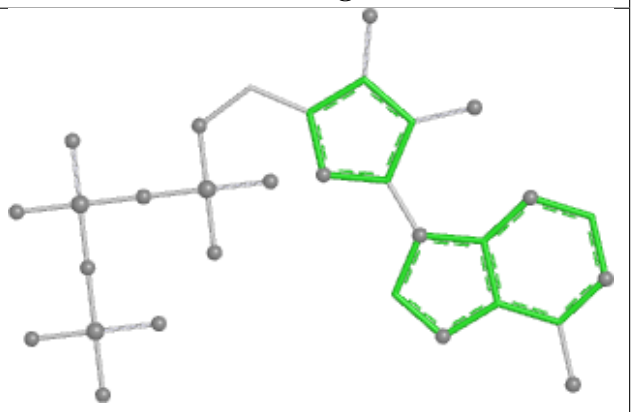
Bond lengths



Bond angles

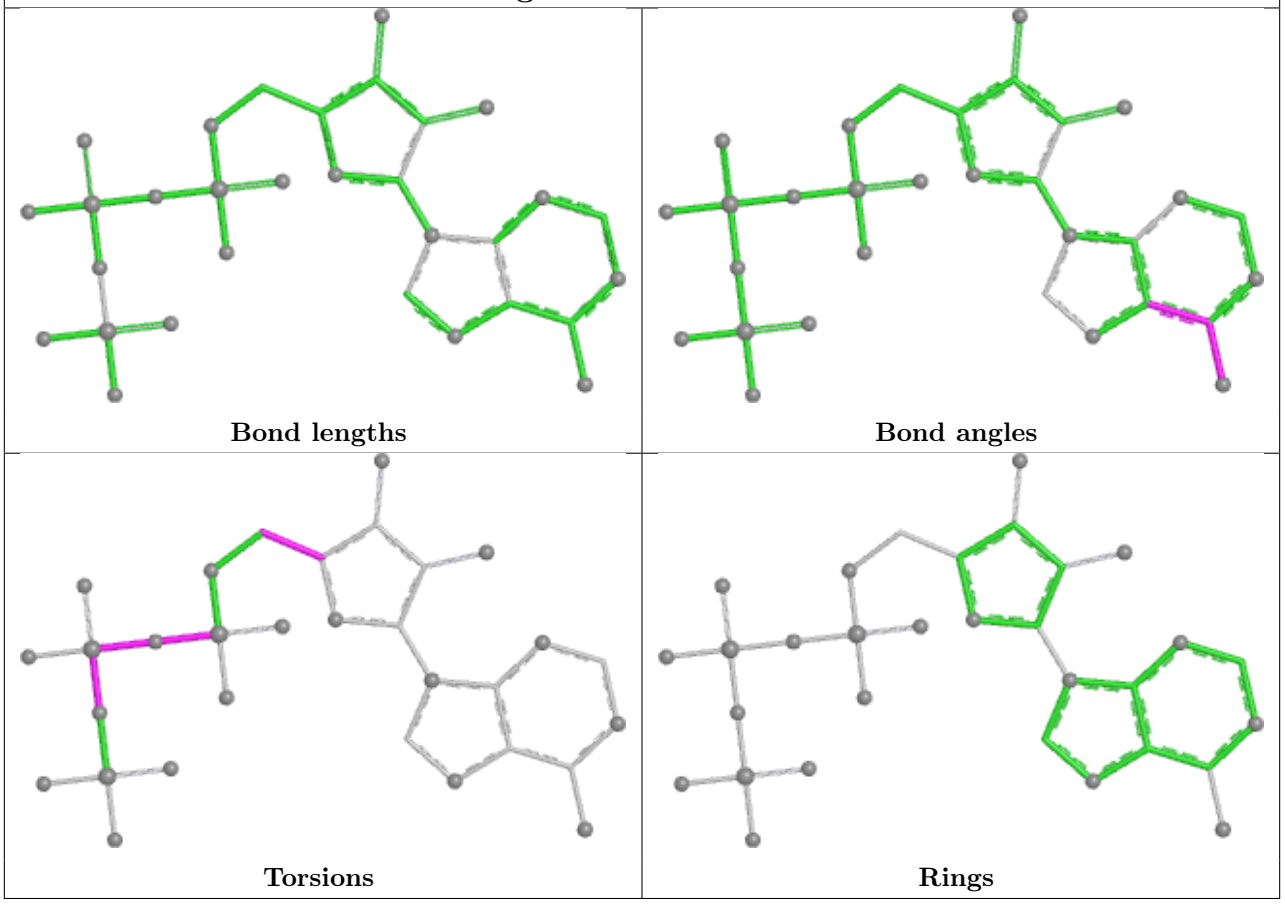


Torsions



Rings

Ligand ATP A 5002



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.

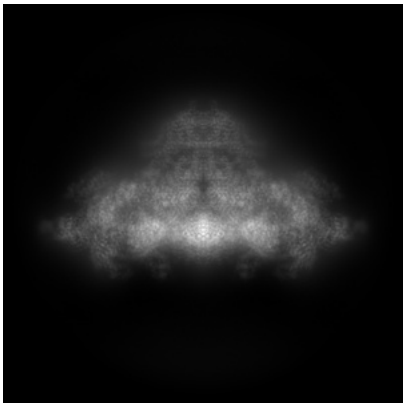
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-26409. These allow visual inspection of the internal detail of the map and identification of artifacts.

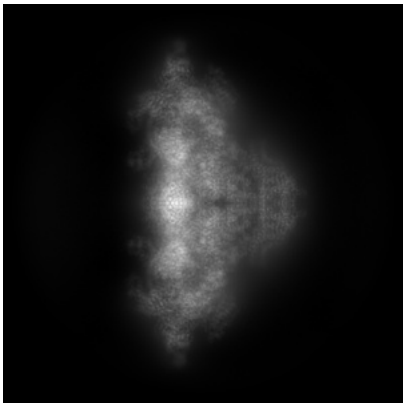
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections

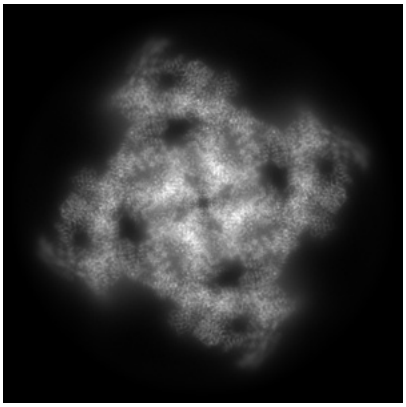
6.1.1 Primary map



X



Y

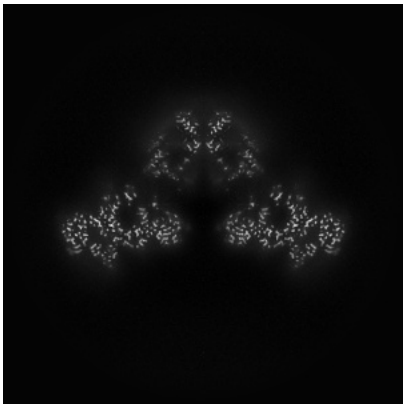


Z

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

6.2 Central slices

6.2.1 Primary map



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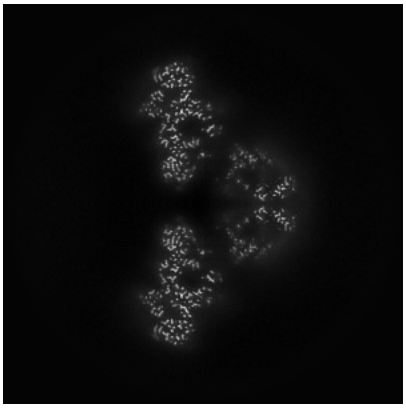

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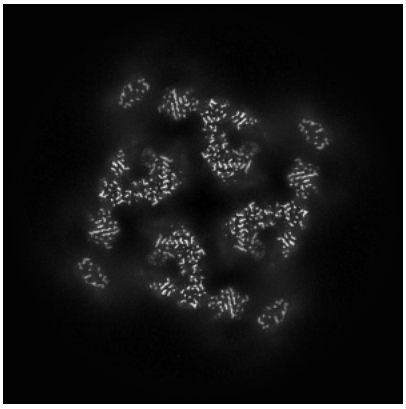
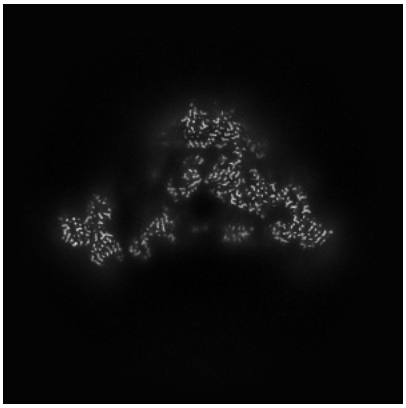


Z Index: 256

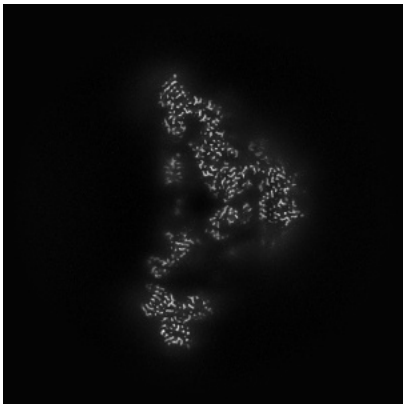
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

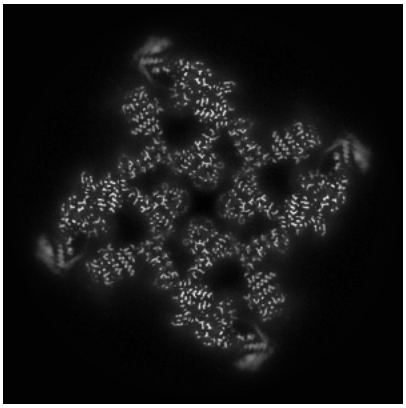
6.3.1 Primary map



X Index: 275



Y Index: 237

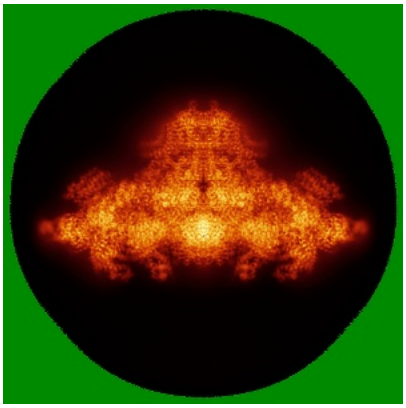


Z Index: 227

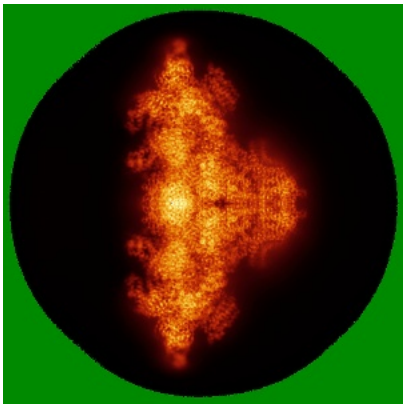
The images above show the largest variance slices of the map in three orthogonal directions.

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

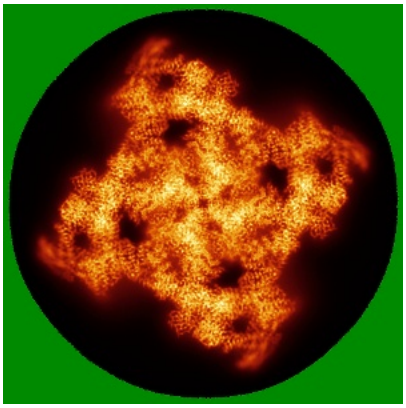
6.4.1 Primary map



X



Y

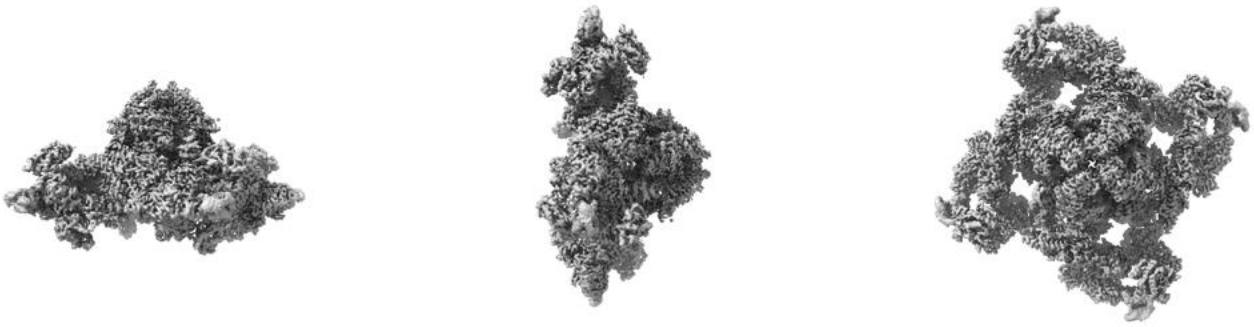


Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views (i)

6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.15. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

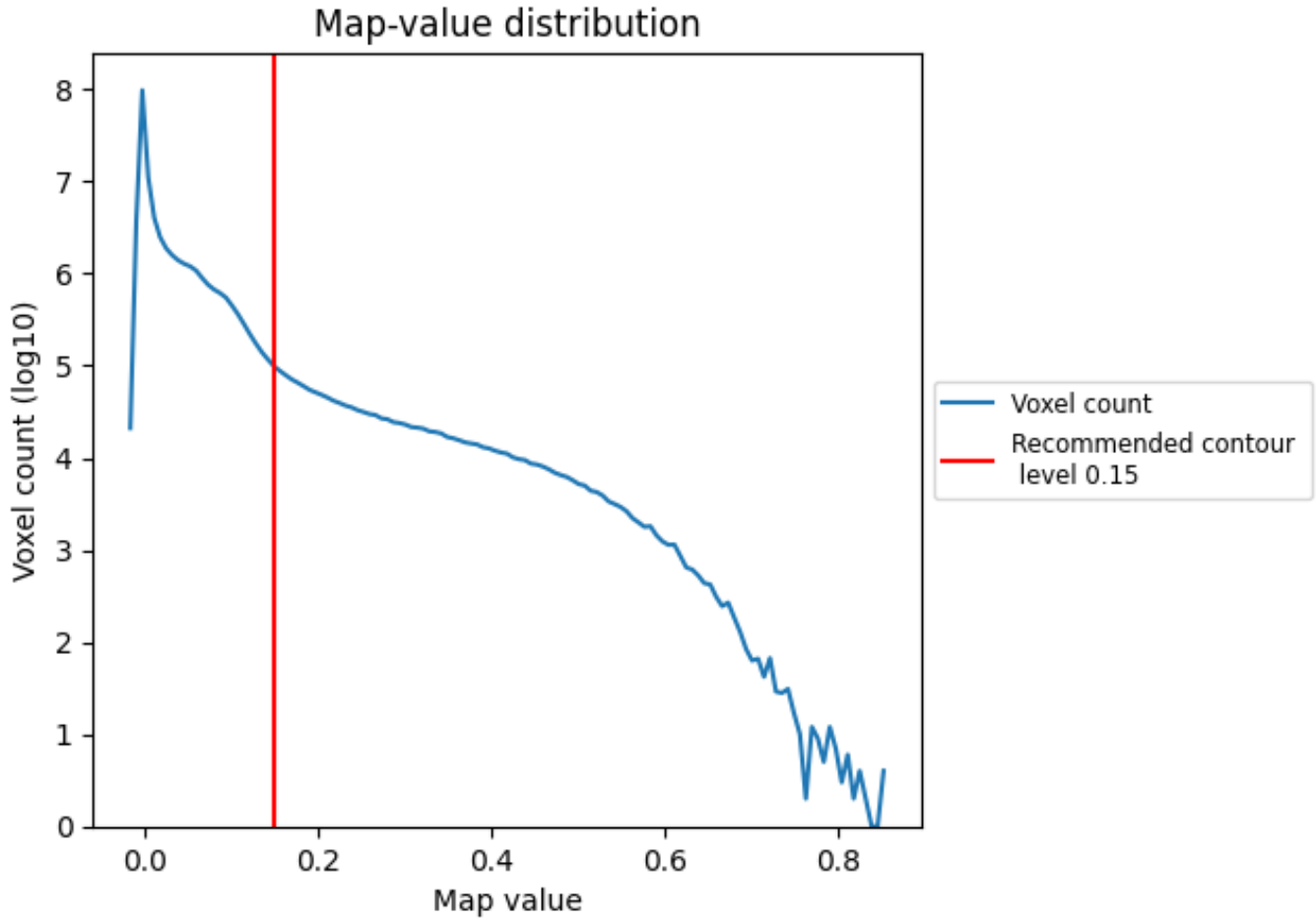
6.6 Mask visualisation (i)

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

7 Map analysis

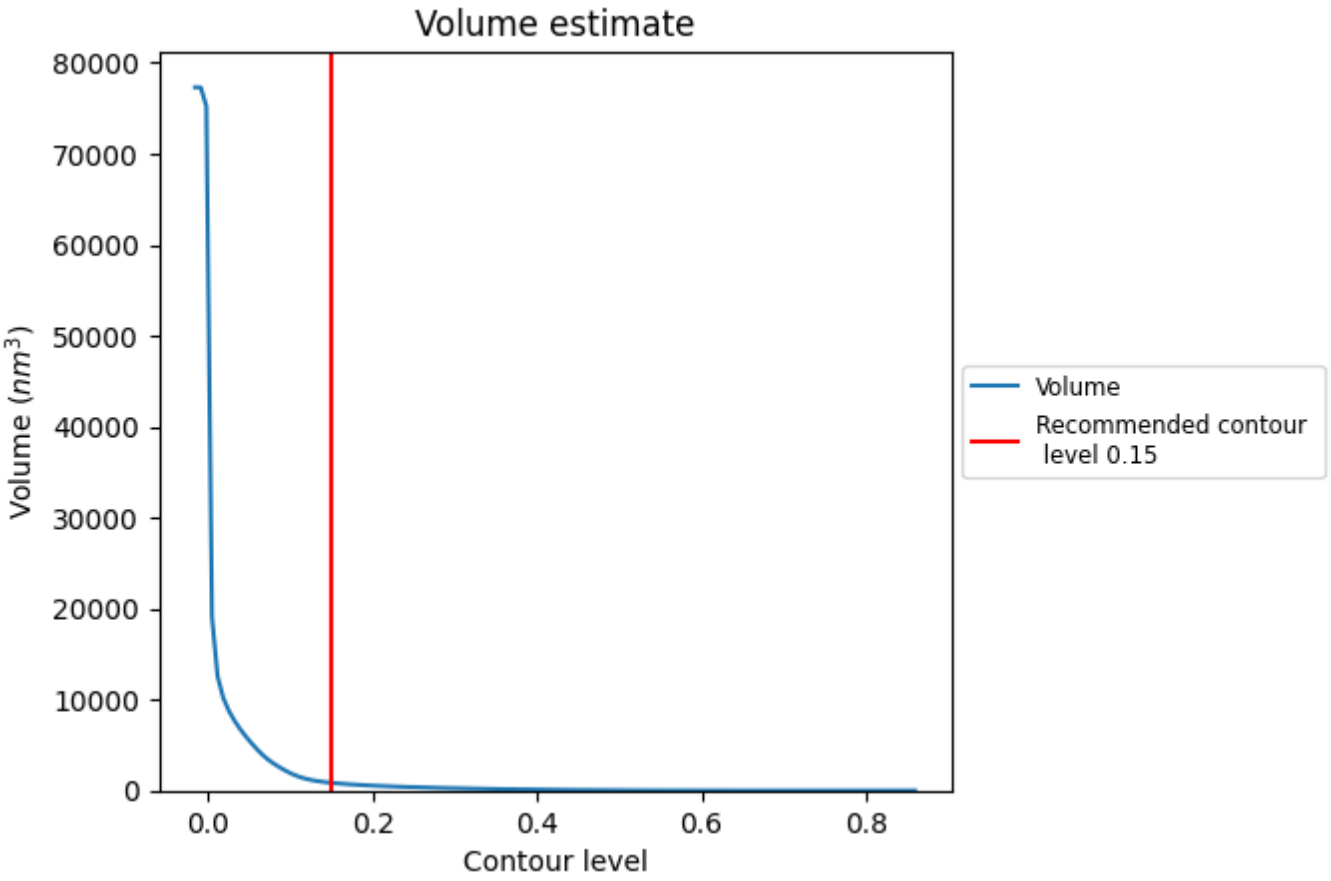
This section contains the results of statistical analysis of the map.

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.

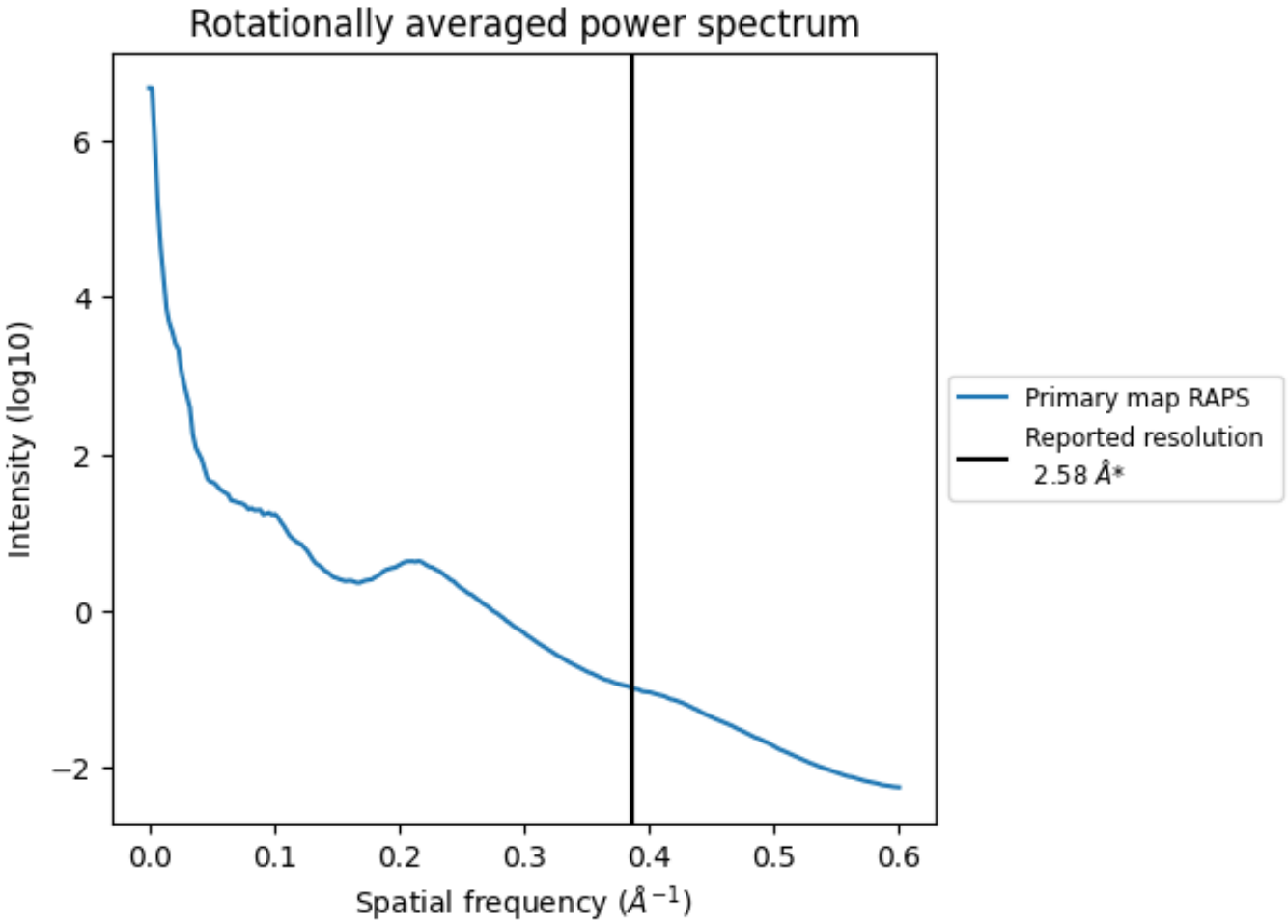
7.2 Volume estimate (i)



The volume at the recommended contour level is 847 nm^3; this corresponds to an approximate mass of 765 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 0.388 Å^{-1}

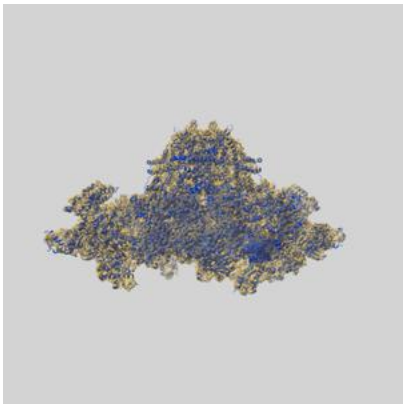
8 Fourier-Shell correlation

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

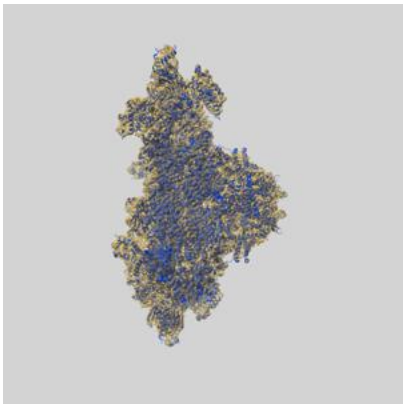
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-26409 and PDB model 7U9X. Per-residue inclusion information can be found in section 3 on page 6.

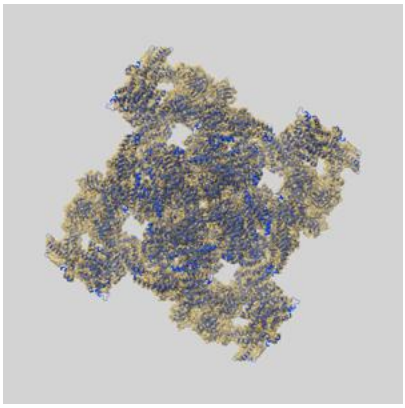
9.1 Map-model overlay



X



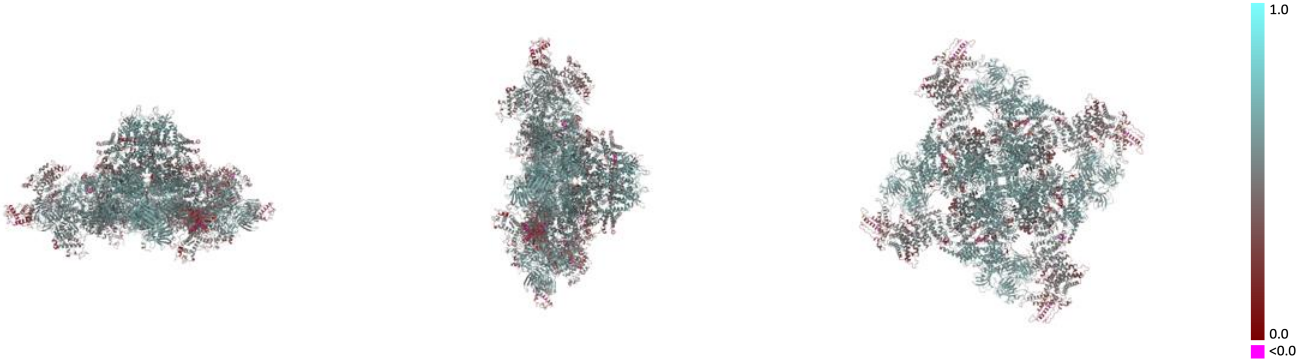
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.15 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.

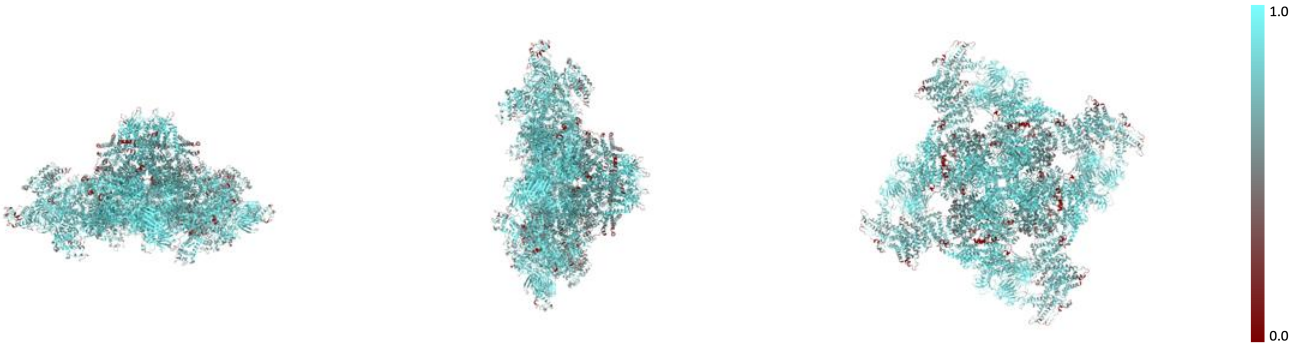
9.2 Q-score mapped to coordinate model



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.

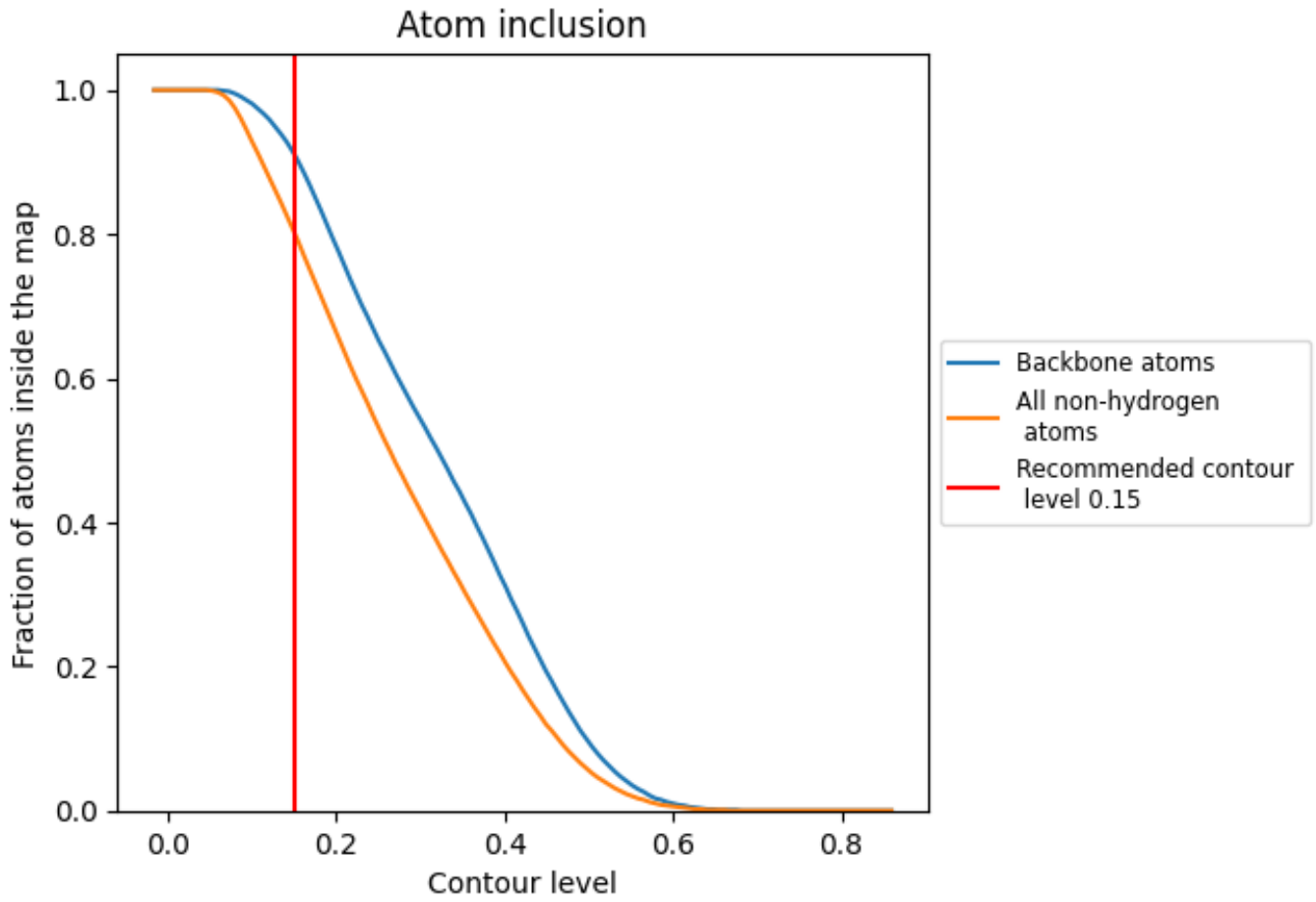
9.3 Atom inclusion mapped to coordinate model



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 (0.15).

9.4 Atom inclusion (i)



At the recommended contour level, 91% of all backbone atoms, 80% 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 (0.15) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8030	0.5150
A	0.8010	0.5150
B	0.8000	0.5100
C	0.8000	0.5100
D	0.8020	0.5170
E	0.9070	0.5880
F	0.8930	0.5750
G	0.9060	0.5720
H	0.9160	0.5910