wwPDB EM Validation Summary Report

Oct 22, 2024 – 03:01 PM JST

PDB ID	:	8XLH
EMDB ID	:	EMD-38448
Title	:	Structure of chimeric RyR-I4657M/G4819E
Authors	:	Lin, L.; Wang, C.; Wang, W.; Jiang, H.; Yuchi, Z.
Deposited on	:	2023-12-26
Resolution	:	3.62 Å(reported)

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

We welcome your comments at *validation@mail.wwpdb.org*
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:

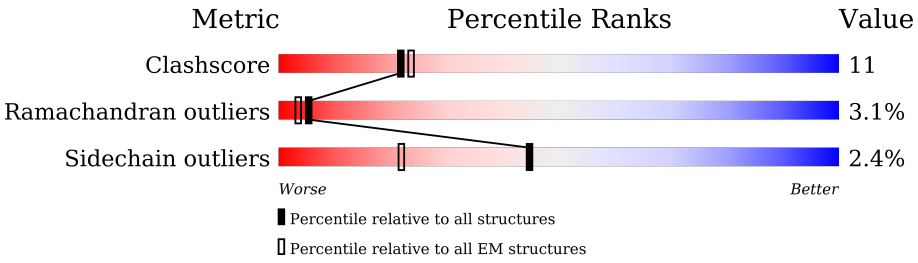
EMDB validation analysis	:	0.0.1.dev113
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (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 3.62 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	5037	6% 62% 18% • 18%
1	B	5037	6% 62% 18% • 18%
1	C	5037	6% 62% 18% • 18%
1	D	5037	7% 62% 18% • 18%
2	E	107	• 79% 21%
2	F	107	• 77% 23%
2	G	107	• 77% 23%
2	H	107	• 77% 23%

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Mol	Chain	Length	Quality of chain
3	I	149	17% 70% 23% 7%
3	J	149	17% 70% 23% 7%
3	K	149	17% 70% 23% 7%
3	L	149	19% 69% 24% 7%

2 Entry composition (i)

There are 7 unique types of molecules in this entry. The entry contains 124364 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a protein called Ryanodine receptor 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	4135	Total 29207	C 18536	N 5163	O 5346	S 162	0	0
1	D	4135	Total 29207	C 18536	N 5163	O 5346	S 162	0	0
1	C	4135	Total 29207	C 18536	N 5163	O 5346	S 162	0	0
1	B	4135	Total 29207	C 18536	N 5163	O 5346	S 162	0	0

There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	4563	LYS	ARG	engineered mutation	UNP P11716
A	4564	TYR	PHE	engineered mutation	UNP P11716
A	4657	MET	CYS	engineered mutation	UNP P11716
A	4792	SER	LEU	engineered mutation	UNP P11716
A	4819	GLU	GLY	engineered mutation	UNP P11716
D	4563	LYS	ARG	engineered mutation	UNP P11716
D	4564	TYR	PHE	engineered mutation	UNP P11716
D	4657	MET	CYS	engineered mutation	UNP P11716
D	4792	SER	LEU	engineered mutation	UNP P11716
D	4819	GLU	GLY	engineered mutation	UNP P11716
C	4563	LYS	ARG	engineered mutation	UNP P11716
C	4564	TYR	PHE	engineered mutation	UNP P11716
C	4657	MET	CYS	engineered mutation	UNP P11716
C	4792	SER	LEU	engineered mutation	UNP P11716
C	4819	GLU	GLY	engineered mutation	UNP P11716
B	4563	LYS	ARG	engineered mutation	UNP P11716
B	4564	TYR	PHE	engineered mutation	UNP P11716
B	4657	MET	CYS	engineered mutation	UNP P11716
B	4792	SER	LEU	engineered mutation	UNP P11716
B	4819	GLU	GLY	engineered mutation	UNP P11716

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

Mol	Chain	Residues	Atoms					AltConf	Trace
2	E	107	Total	C	N	O	S	0	0
			804	510	144	146	4		
2	H	107	Total	C	N	O	S	0	0
			804	510	144	146	4		
2	G	107	Total	C	N	O	S	0	0
			804	510	144	146	4		
2	F	107	Total	C	N	O	S	0	0
			804	510	144	146	4		

- Molecule 3 is a protein called Calmodulin-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	I	139	Total	C	N	O	S	0	0
			1033	638	174	212	9		
3	L	139	Total	C	N	O	S	0	0
			1033	638	174	212	9		
3	K	139	Total	C	N	O	S	0	0
			1033	638	174	212	9		
3	J	139	Total	C	N	O	S	0	0
			1033	638	174	212	9		

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
I	32	ALA	GLU	engineered mutation	UNP P0DP23
I	68	ALA	GLU	engineered mutation	UNP P0DP23
I	105	ALA	GLU	engineered mutation	UNP P0DP23
I	141	ALA	GLU	engineered mutation	UNP P0DP23
L	32	ALA	GLU	engineered mutation	UNP P0DP23
L	68	ALA	GLU	engineered mutation	UNP P0DP23
L	105	ALA	GLU	engineered mutation	UNP P0DP23
L	141	ALA	GLU	engineered mutation	UNP P0DP23
K	32	ALA	GLU	engineered mutation	UNP P0DP23
K	68	ALA	GLU	engineered mutation	UNP P0DP23
K	105	ALA	GLU	engineered mutation	UNP P0DP23
K	141	ALA	GLU	engineered mutation	UNP P0DP23
J	32	ALA	GLU	engineered mutation	UNP P0DP23
J	68	ALA	GLU	engineered mutation	UNP P0DP23
J	105	ALA	GLU	engineered mutation	UNP P0DP23
J	141	ALA	GLU	engineered mutation	UNP P0DP23

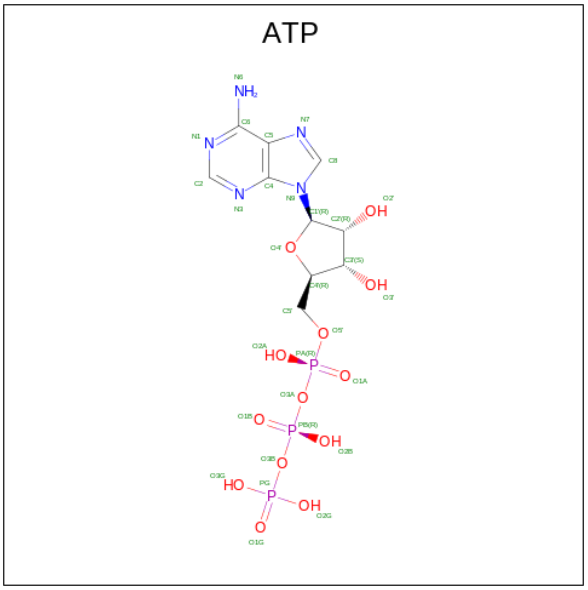
- Molecule 4 is ZINC ION (three-letter code: ZN) (formula: Zn).

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

- Molecule 5 is CALCIUM ION (three-letter code: CA) (formula: Ca).

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

- Molecule 6 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$).



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

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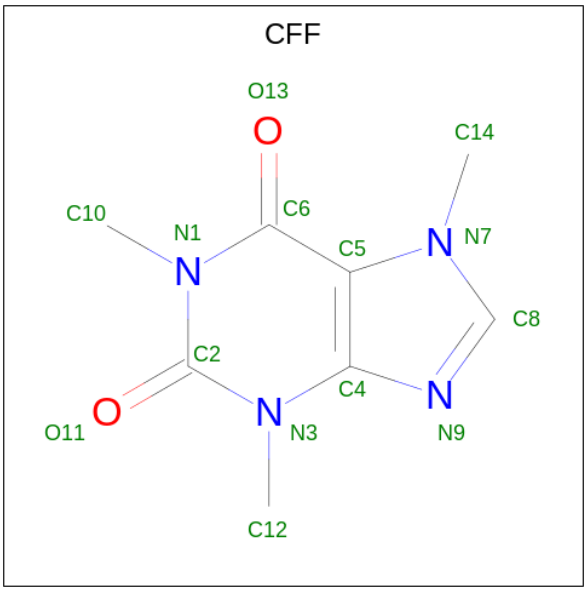
Mol	Chain	Residues	Atoms					AltConf
6	D	1	Total	C	N	O	P	0
			31	10	5	13	3	
6	C	1	Total	C	N	O	P	0
			31	10	5	13	3	
6	B	1	Total	C	N	O	P	0
			31	10	5	13	3	

- Molecule 7 is CAFFEINE (three-letter code: CFF) (formula: $C_8H_{10}N_4O_2$) (labeled as "Ligand of Interest" by depositor).



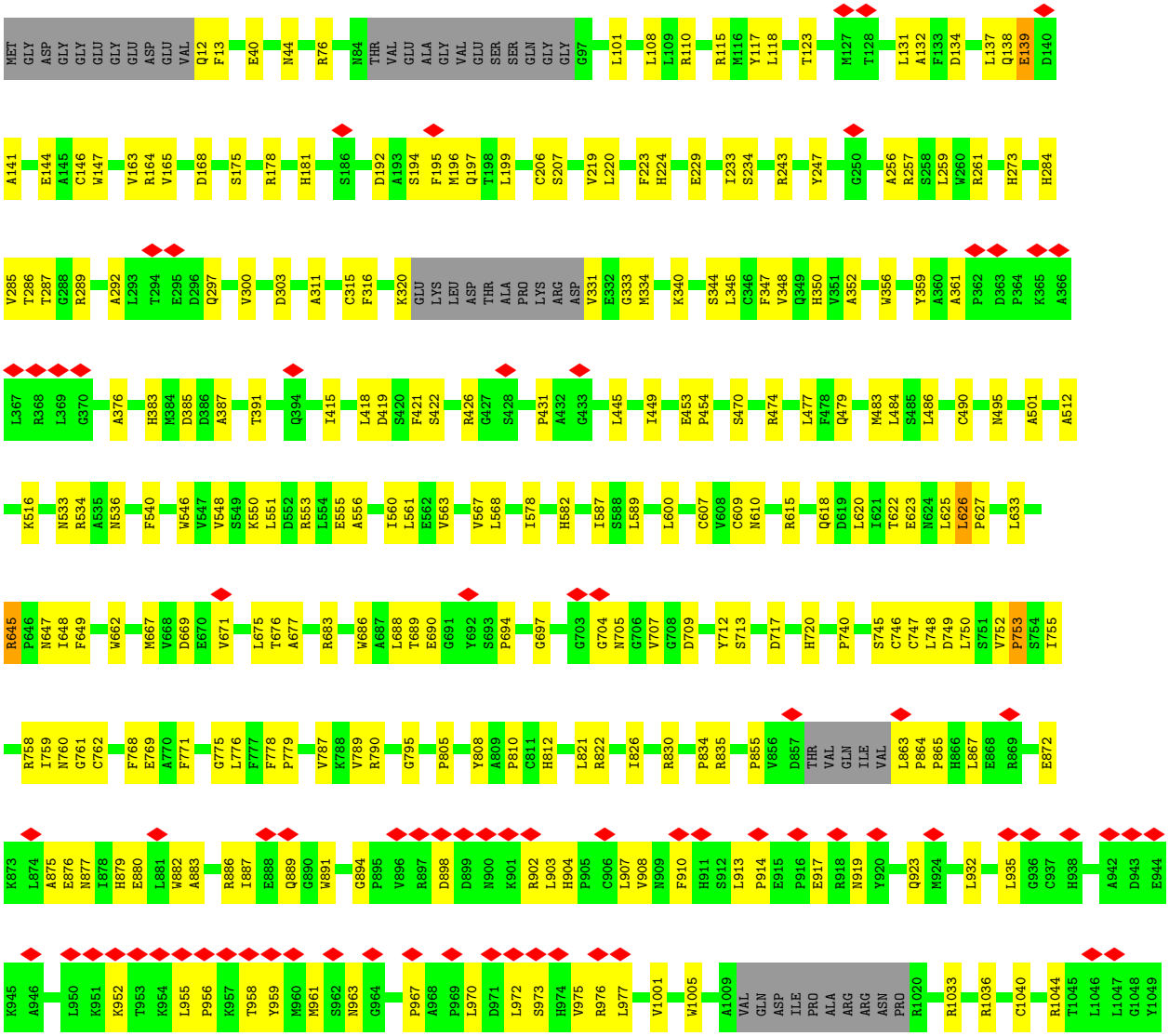
Mol	Chain	Residues	Atoms				AltConf
7	A	1	Total	C	N	O	0
			14	8	4	2	
7	D	1	Total	C	N	O	0
			14	8	4	2	
7	C	1	Total	C	N	O	0
			14	8	4	2	
7	B	1	Total	C	N	O	0
			14	8	4	2	

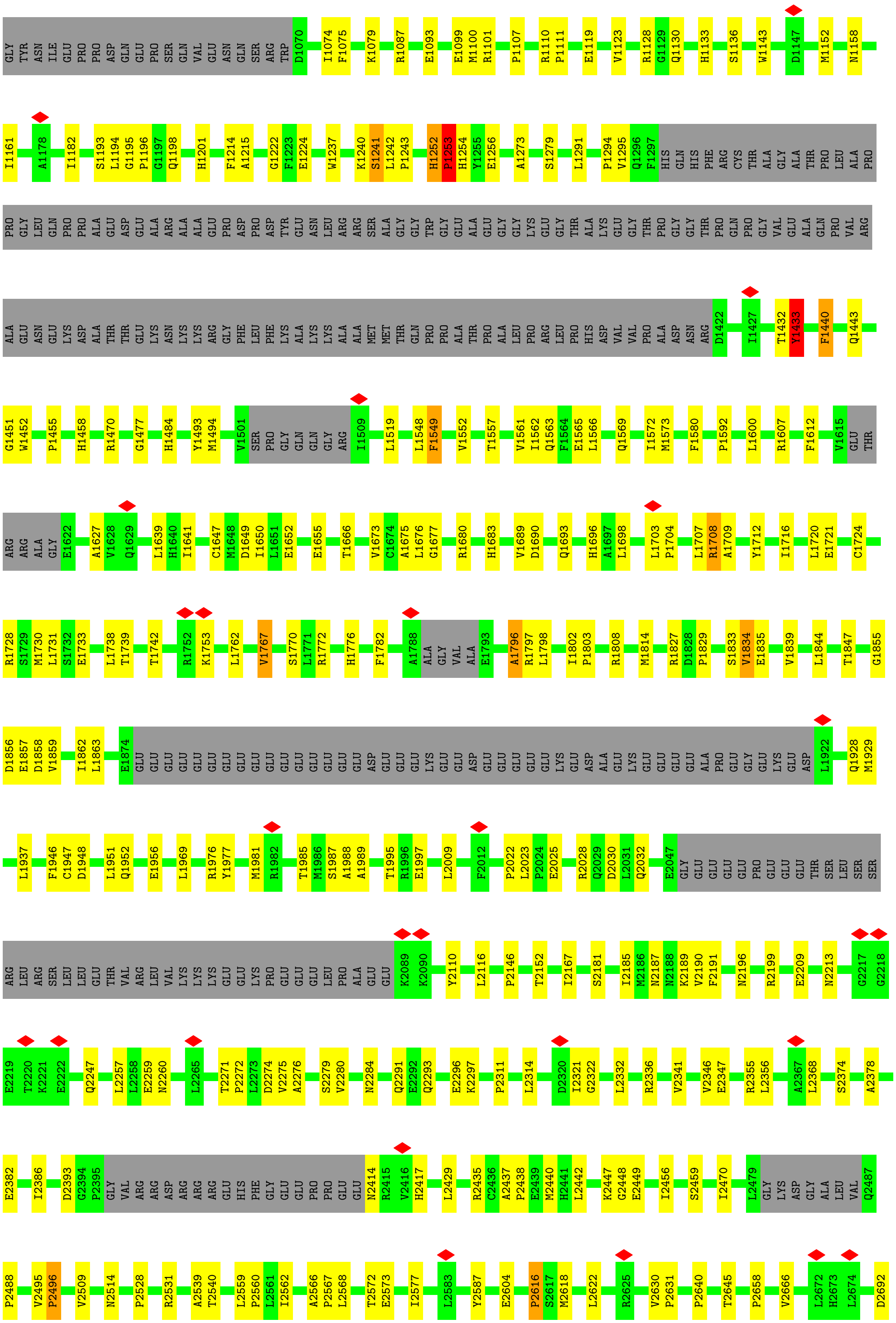
3 Residue-property plots (i)

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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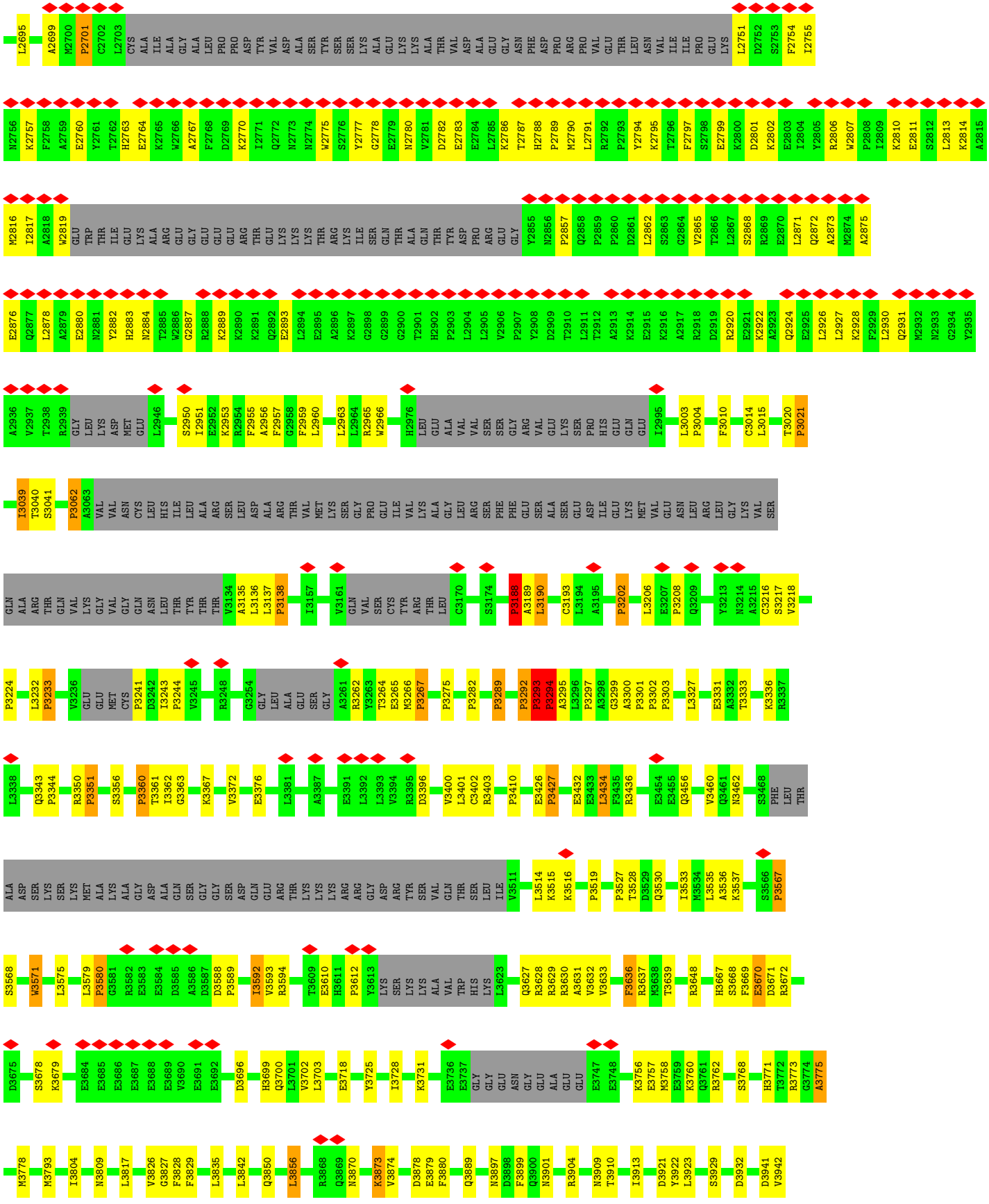
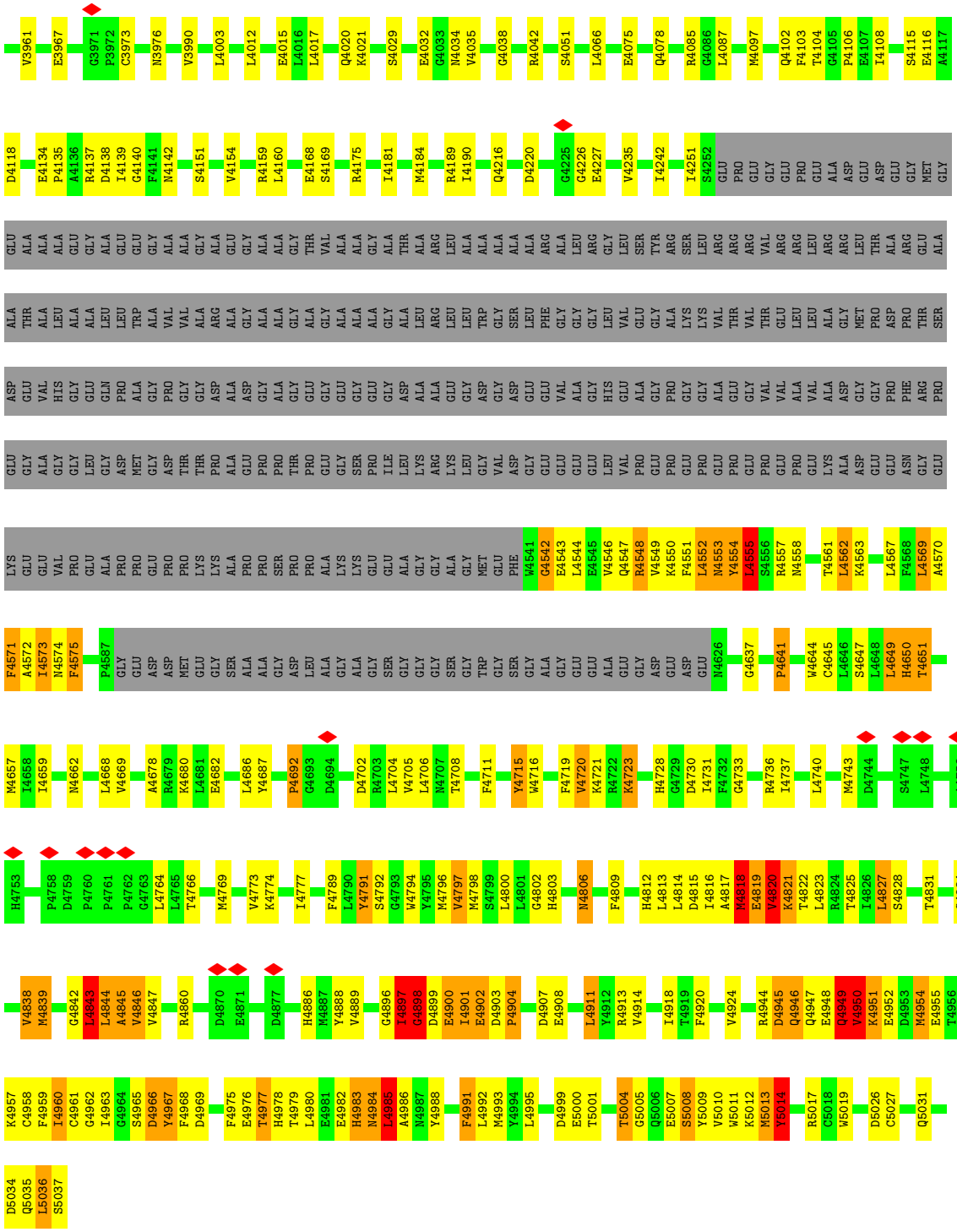
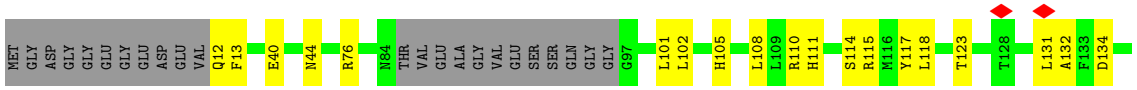
I1161 A1178 I1182 S1193 L1194 G1195 P1196 G1197 Q1198 H1201 F1214 A1215 G1222 F1223 E1224 W1237 K1240 S1241 L1242 P1243 H1252 P1253 H1254 Y1255 E1256 A1273 S1279 L1291 P1294 V1295 Q1296 F1297 HIS GLN HIS PHE ARG CYS THR ALA GLY ALA THR PRO LEU ALA PRO
PRO GLY LEU GLN PRO PRO ALA GLU ASP GLU ALA ARG ALA 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 ASP ASN ARG D1422 I1427 T1432 Y1433 F1440 Q1443
G1451 W1452 P1455 H1458 R1470 G1477 H1484 Y1493 M1494 V1501 SER PRO GLY GLN GLN GLY ARG I1509 L1519 L1548 F1549 V1552 T1557 V1561 I1562 Q1563 F1564 E1565 L1566 Q1569 I1572 M1573 F1580 P1592 L1600 R1607 F1612 V1615 GLU THR
ARG ARG ALA GLY E1622 A1627 V1628 Q1629 L1639 H1640 I1641 C1647 M1648 D1649 I1650 L1651 E1652 E1655 T1666 V1673 C1674 A1675 L1676 G1677 R1680 H1683 V1689 D1690 Q1693 H1696 A1697 L1698 L1703 P1704 L1707 R1708 A1709 Y1712 I1716 L1720 E1721 C1724
R1728 S1729 M1730 L1731 S1732 E1733 L1738 T1739 T1742 R1752 K1753 L1762 V1767 S1770 L1771 R1772 H1776 F1782 A1788 ALA GLY VAL ALA E1793 A1796 R1797 L1798 I1802 P1803 R1808 M1814 R1827 D1828 P1829 S1833 V1834 E1835 V1839 L1844 T1847 G1855
D1856 E1857 D1858 V1859 I1862 L1863 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 Q1928 M1929
L1937 F1946 C1947 D1948 L1951 Q1952 E1956 L1969 R1976 Y1977 M1981 R1982 T1985 M1986 S1987 A1988 A1989 T1995 R1996 E1997 L2009 F2012 P2022 L2023 P2024 E2025 R2028 Q2029 D2030 L2031 Q2032 E2047 GLY GLU GLU GLU GLU PRO GLU GLU GLU THR SER LEU SER SER
ARG LEU ARG SER LEU LEU GLU THR VAL ARG LEU VAL LYS LYS LYS GLU GLU LYS PRO GLU GLU GLU LEU PRO ALA GLU GLU K2089 K2090 Y2110 L2116 P2146 T2152 I2167 S2181 I2185 M2186 N2187 N2188 K2189 V2190 F2191 N2196 R2199 E2209 N2213 G2217 G2218
E2219 T2220 K2221 E2222 Q2247 L2257 L2258 E2259 N2260 L2265 T2271 P2272 L2273 D2274 V2275 A2276 S2279 V2280 N2284 Q2291 E2292 Q2293 E2296 K2297 P2311 L2314 D2320 I2321 G2322 L2332 R2336 V2341 V2346 E2347 R2355 L2356 A2367 L2368 S2374 A2378
E2382 I2386 D2393 G2394 P2395 GLY VAL ARG ARG ASP ARG ARG ARG GLU HIS PHE GLY GLU GLU PRO PRO GLU GLU N2414 R2415 V2416 H2417 L2429 R2435 C2436 A2437 P2438 E2439 M2440 H2441 L2442 K2447 G2448 E2449 I2456 S2459 I2470 L2479 GLY LYS ASP GLY ALA LEU VAL Q2487
P2488 V2495 P2496 V2509 N2514 P2528 R2531 A2539 T2540 L2559 P2560 L2561 I2562 A2566 P2567 L2568 T2572 E2573 I2577 L2583 Y2587 E2604 P2616 S2617 M2618 L2622 R2625 V2630 P2631 P2640 T2645 P2658 V2666 L2672 H2673 L2674 D2692

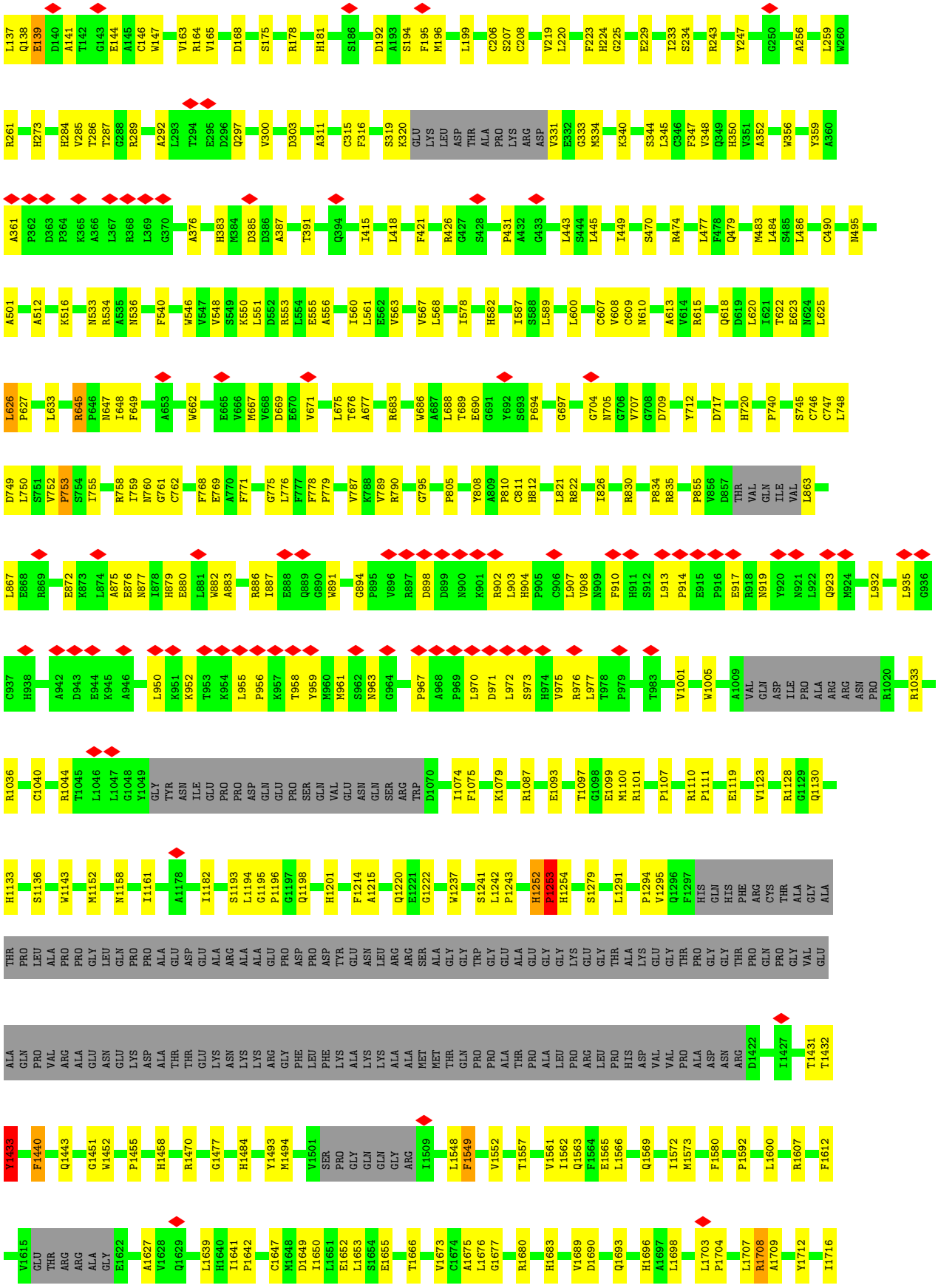


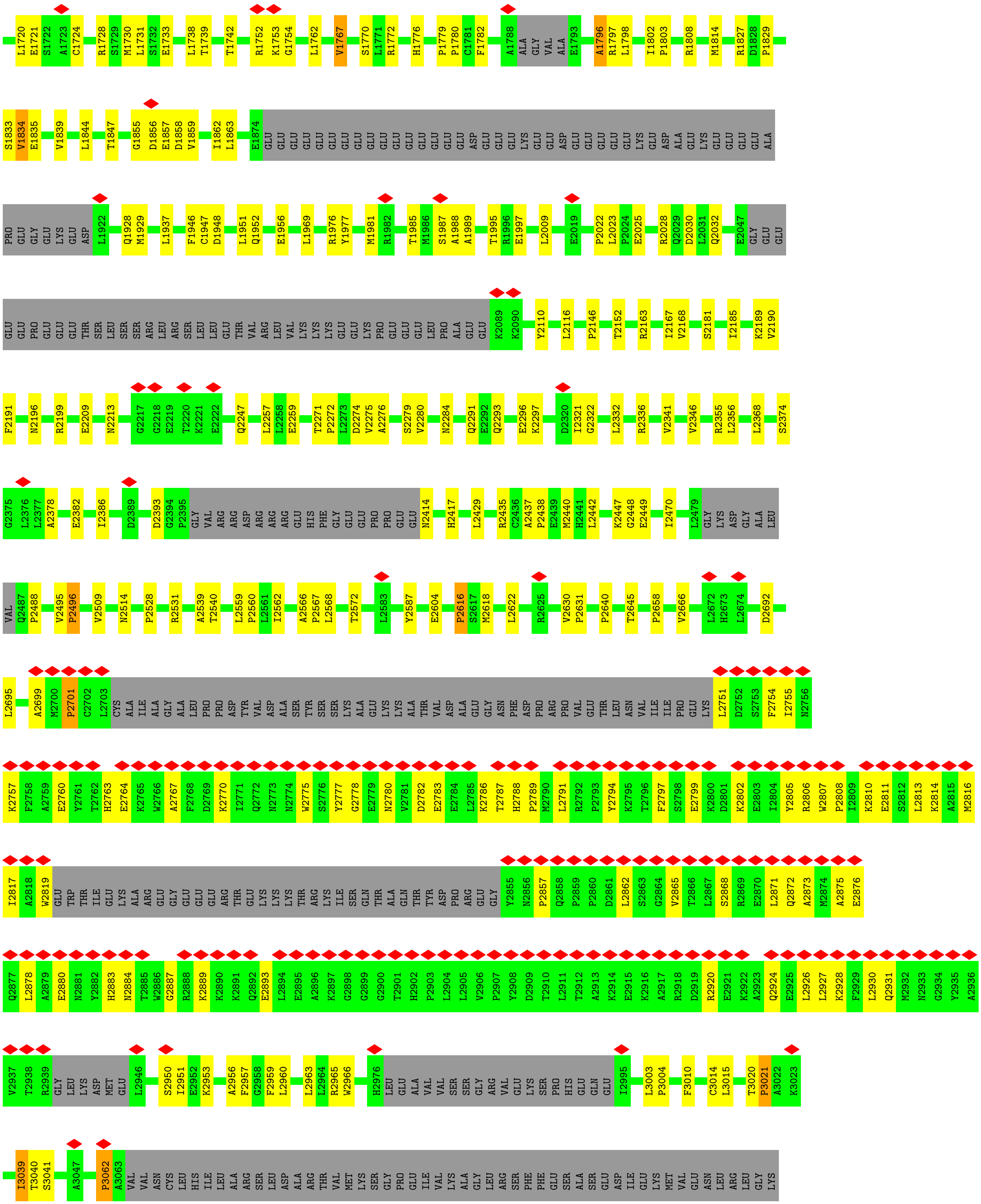


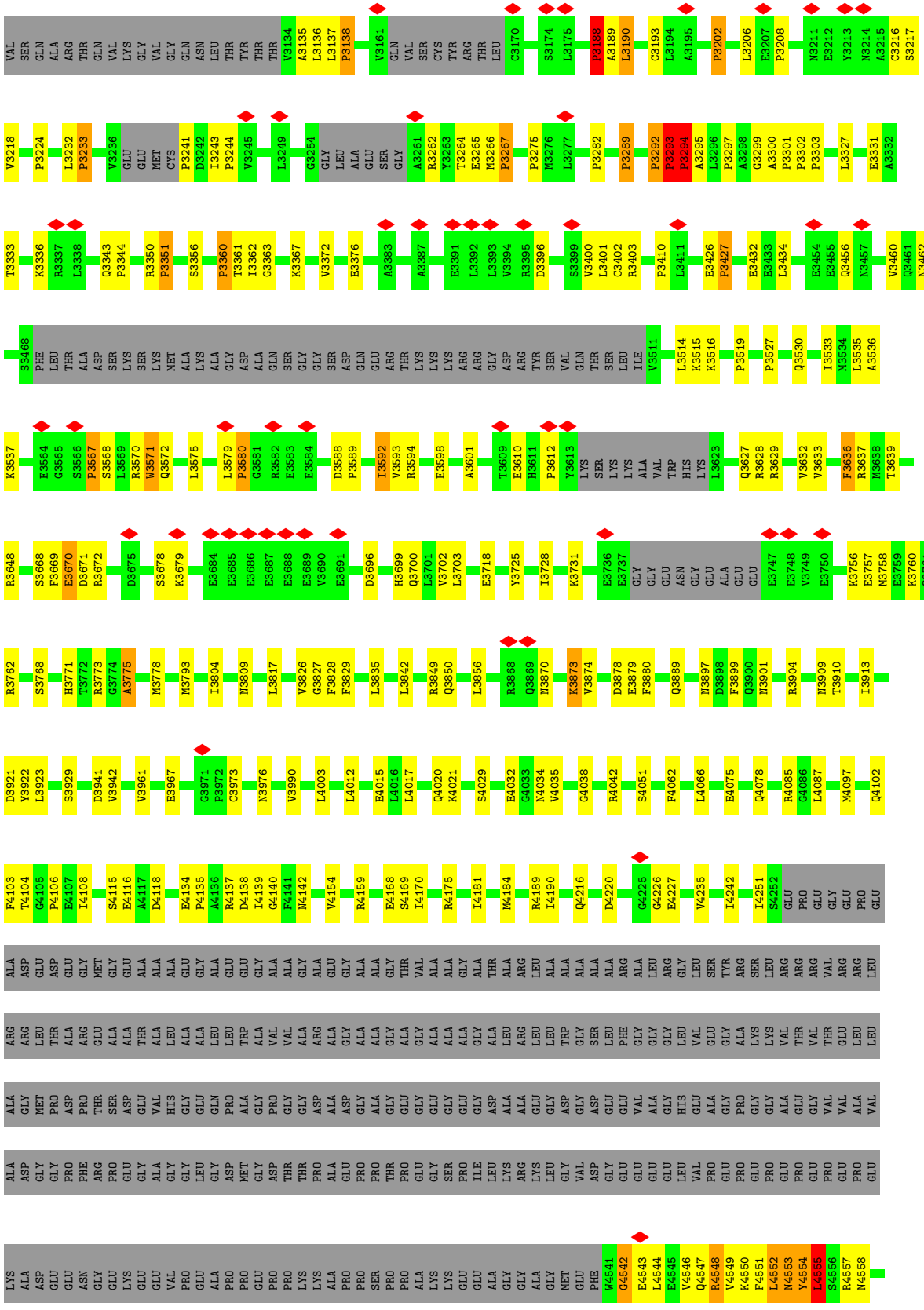
• Molecule 1: Ryanodine receptor 1

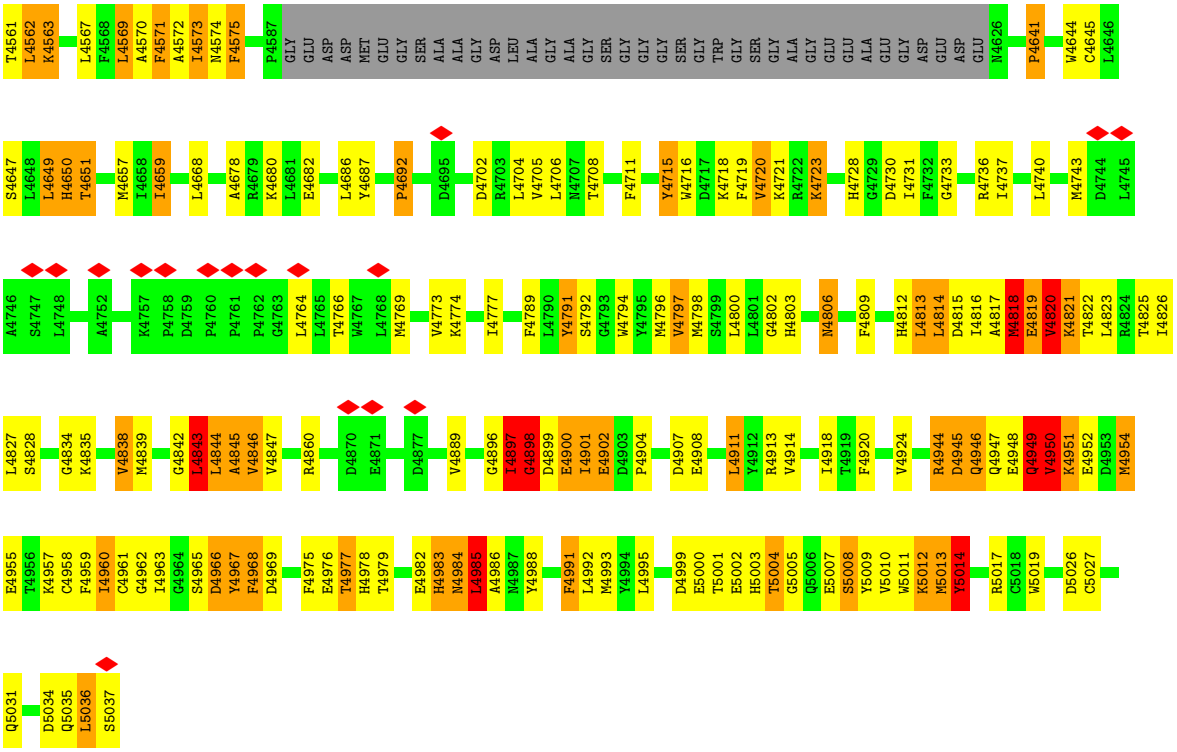
Chain D:





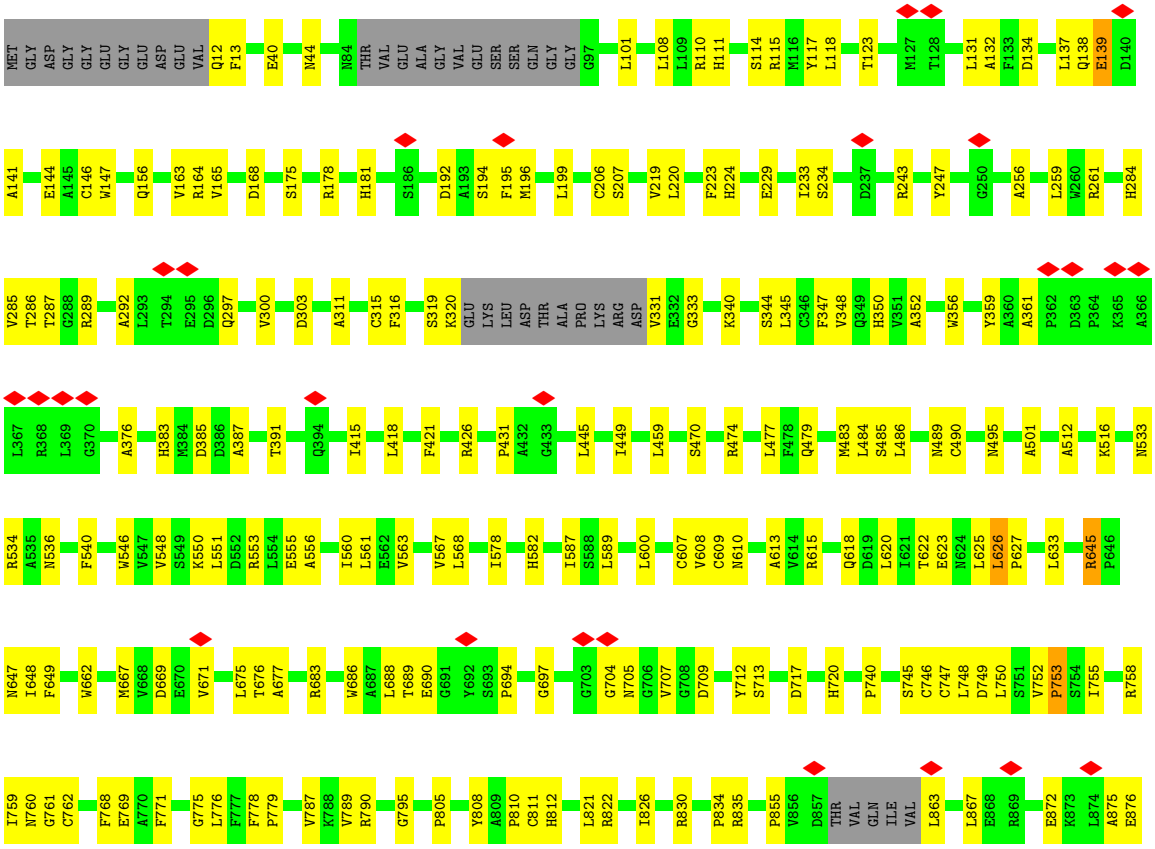

L1720 E1721 S1722 A1723 C1724 R1728 S1729 M1730 L1731 S1732 E1733 L1738 T1739 T1742 R1752 K1753 G1754 L1762 V1767 S1770 L1771 R1772 H1776 P1779 P1780 C1781 F1782 A1788 ALA GLY VAL ALA E1793 A1796 R1797 L1798 I1802 P1803 R1808 M1814 R1827 D1828 P1829
S1833 V1834 E1835 V1839 L1844 T1847 G1855 D1856 E1857 D1858 V1859 I1862 L1863 E1874 GLU GLU GLU GLU GLU GLU GLU GLU GLU GLU GLU GLU GLU GLU GLU GLU GLU ASP GLU GLU GLU LYS GLU GLU ASP GLU GLU GLU GLU GLU LYS GLU ASP ALA GLU LYS GLU GLU GLU GLU ALA
PRO GLU GLY GLU LYS GLU ASP L1922 Q1928 M1929 L1937 F1946 C1947 D1948 L1951 Q1952 E1956 L1969 R1976 Y1977 M1981 R1982 T1985 M1986 S1987 A1988 A1989 T1995 R1996 E1997 L2009 E2019 P2022 L2023 P2024 E2025 R2028 Q2029 D2030 L2031 Q2032 E2047 GLY GLU GLU
GLU GLU PRO GLU GLU GLU THR SER LEU SER SER ARG LEU ARG SER LEU LEU GLU THR VAL ARG LEU VAL LYS LYS LYS GLU GLU LYS PRO GLU GLU GLU LEU PRO ALA GLU GLU K2089 K2090 Y2110 L2116 P2146 T2152 R2163 I2167 V2168 S2181 I2185 K2189 V2190
F2191 N2196 R2199 E2209 N2213 G2217 G2218 E2219 T2220 K2221 E2222 Q2247 L2257 L2258 E2259 T2271 P2272 L2273 D2274 V2275 A2276 S2279 V2280 N2284 Q2291 E2292 Q2293 E2296 K2297 D2320 I2321 G2322 L2332 R2336 V2341 V2346 R2355 L2356 L2368 S2374
G2375 L2376 L2377 A2378 E2382 I2386 D2389 D2393 G2394 P2395 GLY VAL ARG ARG ASP ARG ARG ARG GLU HIS PHE GLY GLU GLU PRO PRO GLU GLU N2414 H2417 L2429 R2435 C2436 A2437 P2438 E2439 M2440 H2441 L2442 K2447 G2448 E2449 I2470 L2479 GLY LYS ASP GLY ALA LEU
VAL Q2487 P2488 V2495 P2496 V2509 N2514 P2528 R2531 A2539 T2540 L2559 P2560 L2561 I2562 A2566 P2567 L2568 T2572 L2583 Y2587 E2604 P2616 S2617 M2618 L2622 R2625 V2630 P2631 P2640 T2645 P2658 V2666 L2672 H2673 L2674 D2692
L2695 A2699 M2700 P2701 C2702 L2703 CYS ALA ILE ALA GLY ALA LEU PRO PRO ASP TYR VAL ASP ALA SER TYR SER SER LYS ALA GLU LYS LYS ALA THR VAL ASP ALA GLU GLY ASN PHE ASP PRO ARG PRO VAL GLU THR LEU ASN VAL ILE ILE PRO GLU LYS 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 GLU TRP THR ILE GLU LYS ALA ARG GLU GLY GLU 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 G2887 R2888 K2889 K2890 K2891 Q2892 E2893 L2894 E2895 A2896 K2897 G2898 G2899 G2900 T2901 H2902 P2903 L2904 L2905 V2906 P2907 Y2908 D2909 T2910 L2911 T2912 A2913 K2914 E2915 K2916 A2917 R2918 D2919 R2920 E2921 K2922 A2923 Q2924 E2925 L2926 L2927 K2928 F2929 L2930 Q2931 M2932 N2933 G2934 Y2935 A2936
V2937 T2938 R2939 GLY LEU LYS ASP MET GLU L2946 S2950 I2951 E2952 K2953 A2956 F2957 G2958 F2959 L2960 L2963 L2964 R2965 W2966 H2976 LEU GLU ALA VAL VAL SER SER GLY ARG VAL GLU LYS SER PRO HIS GLU GLN GLU I2995 L3003 P3004 F3010 C3014 L3015 T3020 P3021 A3022 K3023
I3039 T3040 S3041 A3047 P3062 A3063 VAL VAL ASN CYS LEU HIS ILE LEU ALA ARG SER LEU ASP ALA ARG THR VAL MET LYS SER GLY PRO GLU ILE VAL LYS ALA GLY LEU ARG SER PHE PHE GLU SER ALA SER GLU ASP ILE GLU LYS MET VAL GLU ASN LEU ARG LEU GLY LYS

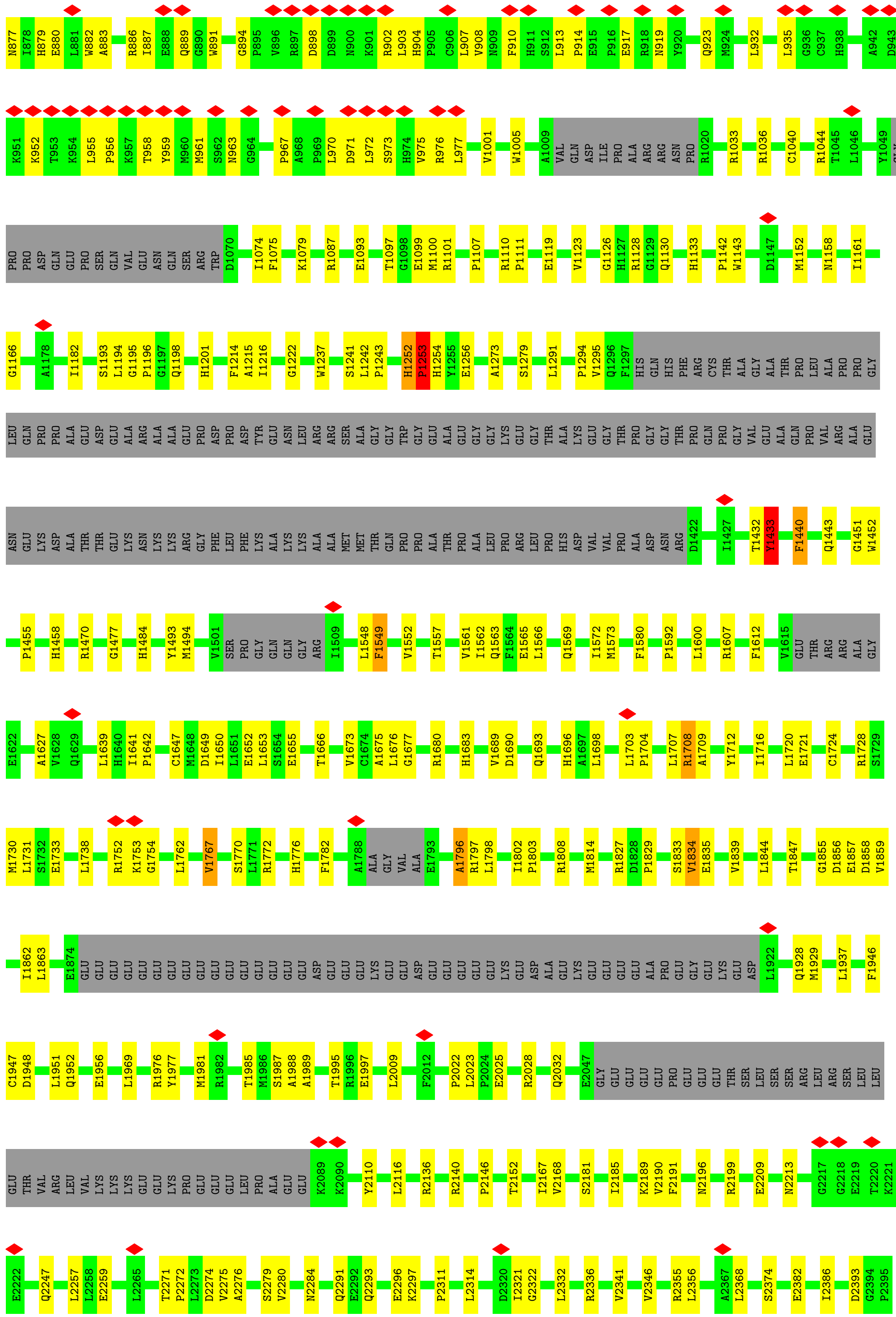




• Molecule 1: Ryanodine receptor 1

Chain C:

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K951 K952 T953 K954 L955 P956 K957 T958 Y959 M960 M961 S962 N963 G964 P967 A968 P969 L970 D971 L972 S973 H974 V975 R976 L977 V1001 W1005 A1009 VAL GLN ASP ILE PRO ALA ARG ARG ASN PRO R1020 R1033 R1036 C1040 R1044 T1045 L1046 Y1049 GLY TYR ASN ILE GLU
PRO PRO ASP GLN GLU PRO SER GLN VAL GLU ASN GLN SER ARG TRP D1070 I1074 F1075 K1079 R1087 E1093 T1097 G1098 E1099 M1100 R1101 P1107 R1110 P1111 E1119 V1123 G1126 H1127 R1128 G1129 Q1130 H1133 P1142 W1143 D1147 M1152 N1158 I1161
G1166 A1178 I1182 S1193 L1194 G1195 P1196 G1197 Q1198 H1201 F1214 A1215 I1216 G1222 W1237 S1241 L1242 P1243 H1252 P1253 H1254 Y1255 E1256 A1273 S1279 L1291 P1294 V1295 Q1296 F1297 HIS GLN HIS PHE ARG CYS THR 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 ASP ASN ARG D1422 I1427 T1432 Y1433 F1440 Q1443 G1451 W1452
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E1622 A1627 V1628 Q1629 L1639 H1640 I1641 P1642 C1647 M1648 D1649 I1650 L1651 E1652 L1653 S1654 E1655 T1666 V1673 C1674 A1675 L1676 G1677 R1680 H1683 V1689 D1690 Q1693 H1696 A1697 L1698 L1703 P1704 L1707 R1708 A1709 Y1712 I1716 L1720 E1721 C1724 R1728 S1729
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C1947 D1948 L1951 Q1952 E1956 L1969 R1976 Y1977 M1981 R1982 T1985 M1986 S1987 A1988 A1989 T1995 R1996 E1997 L2009 F2012 P2022 L2023 P2024 E2025 R2028 Q2032 E2047 GLY GLU GLU GLU GLU PRO GLU GLU GLU THR SER LEU SER SER ARG LEU ARG SER LEU LEU
GLU THR VAL ARG LEU VAL LYS LYS LYS GLU GLU LYS PRO GLU GLU GLU LEU PRO ALA GLU GLU K2089 K2090 Y2110 L2116 R2136 R2140 P2146 T2152 I2167 V2168 S2181 I2185 K2189 V2190 F2191 N2196 R2199 E2209 N2213 G2217 G2218 E2219 T2220 K2221
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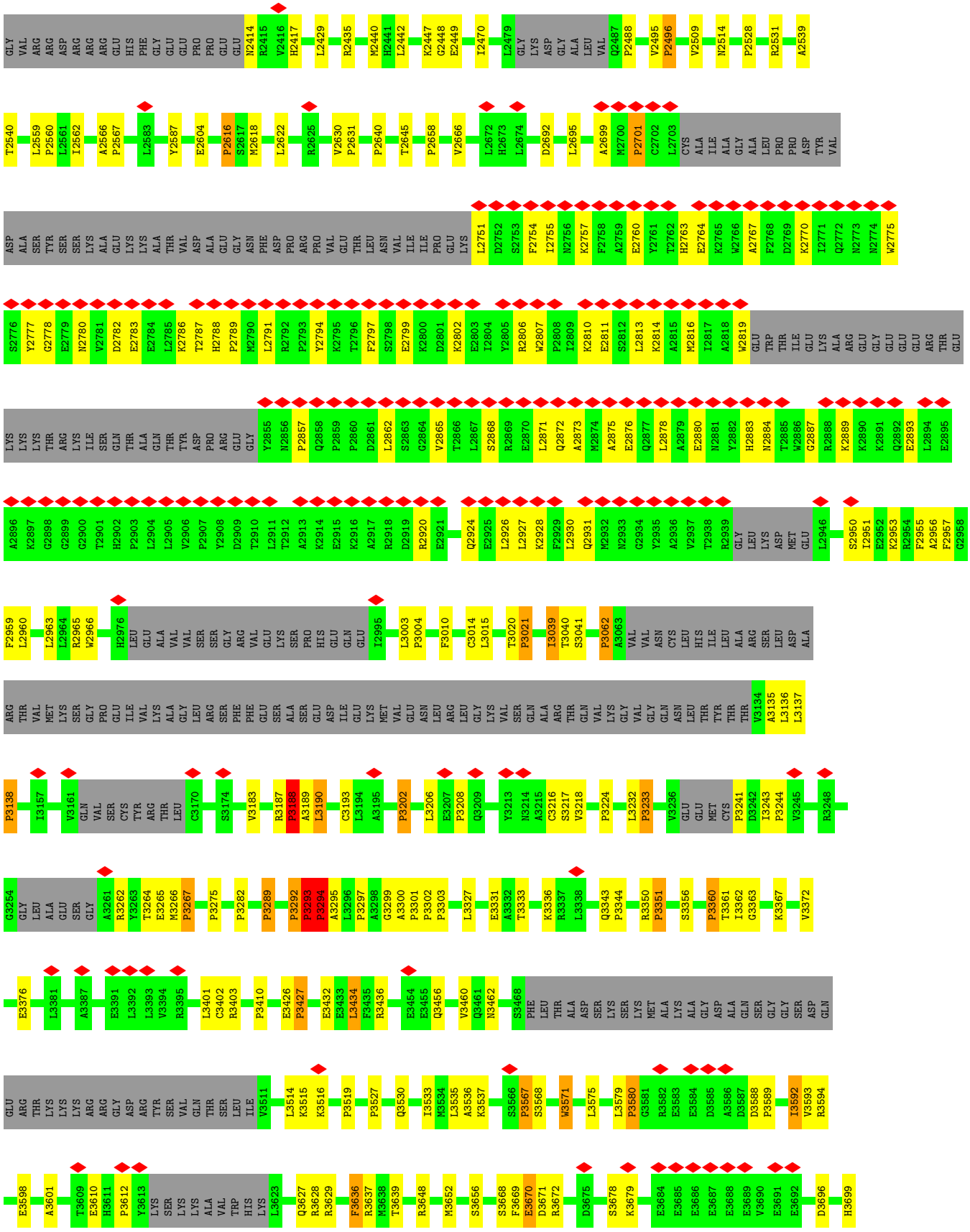
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T2540 L2559 P2560 L2561 I2562 A2566 P2567 L2583 Y2587 E2604 P2616 S2617 M2618 L2622 R2625 V2630 P2631 P2640 T2645 P2658 V2666 L2672 H2673 L2674 D2692 L2695 A2699 M2700 P2701 C2702 L2703 CYS ALA ILE ALA GLY ALA LEU PRO PRO ASP TYR VAL
ASP ALA SER TYR SER SER LYS ALA GLU LYS LYS ALA THR VAL ASP ALA GLU GLY ASN PHE ASP PRO ARG PRO VAL GLU THR LEU ASN VAL ILE ILE PRO GLU LYS 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 GLU TRP THR ILE GLU LYS ALA ARG GLU GLY GLU 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 G2887 R2888 K2889 K2890 K2891 Q2892 E2893 L2894 E2895
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F2959 L2960 L2963 L2964 R2965 W2966 H2976 LEU GLU ALA VAL VAL SER SER GLY ARG VAL GLU LYS SER PRO HIS GLU GLN GLU T2995 L3003 P3004 F3010 C3014 L3015 T3020 P3021 I3039 T3040 S3041 P3062 A3063 VAL VAL ASN CYS LEU HIS ILE LEU ALA ARG SER LEU ASP ALA
ARG THR VAL MET LYS SER GLY PRO GLU ILE VAL LYS ALA GLY LEU ARG SER PHE PHE GLU SER ALA SER GLU ASP ILE GLU LYS MET VAL GLU ASN LEU ARG LEU GLY LYS VAL SER GLN ALA ARG THR GLN VAL LYS GLY VAL GLY GLN ASN LEU THR TYR THR THR V3134 A3135 L3136 L3137
P3138 I3157 V3161 GLN VAL SER CYS TYR ARG THR LEU C3170 S3174 V3183 R3187 P3188 A3189 L3190 C3193 L3194 A3195 P3202 L3206 E3207 P3208 Q3209 Y3213 N3214 A3215 C3216 S3217 V3218 P3224 L3232 P3233 V3236 GLU GLU MET CYS P3241 D3242 I3243 P3244 V3245 R3248
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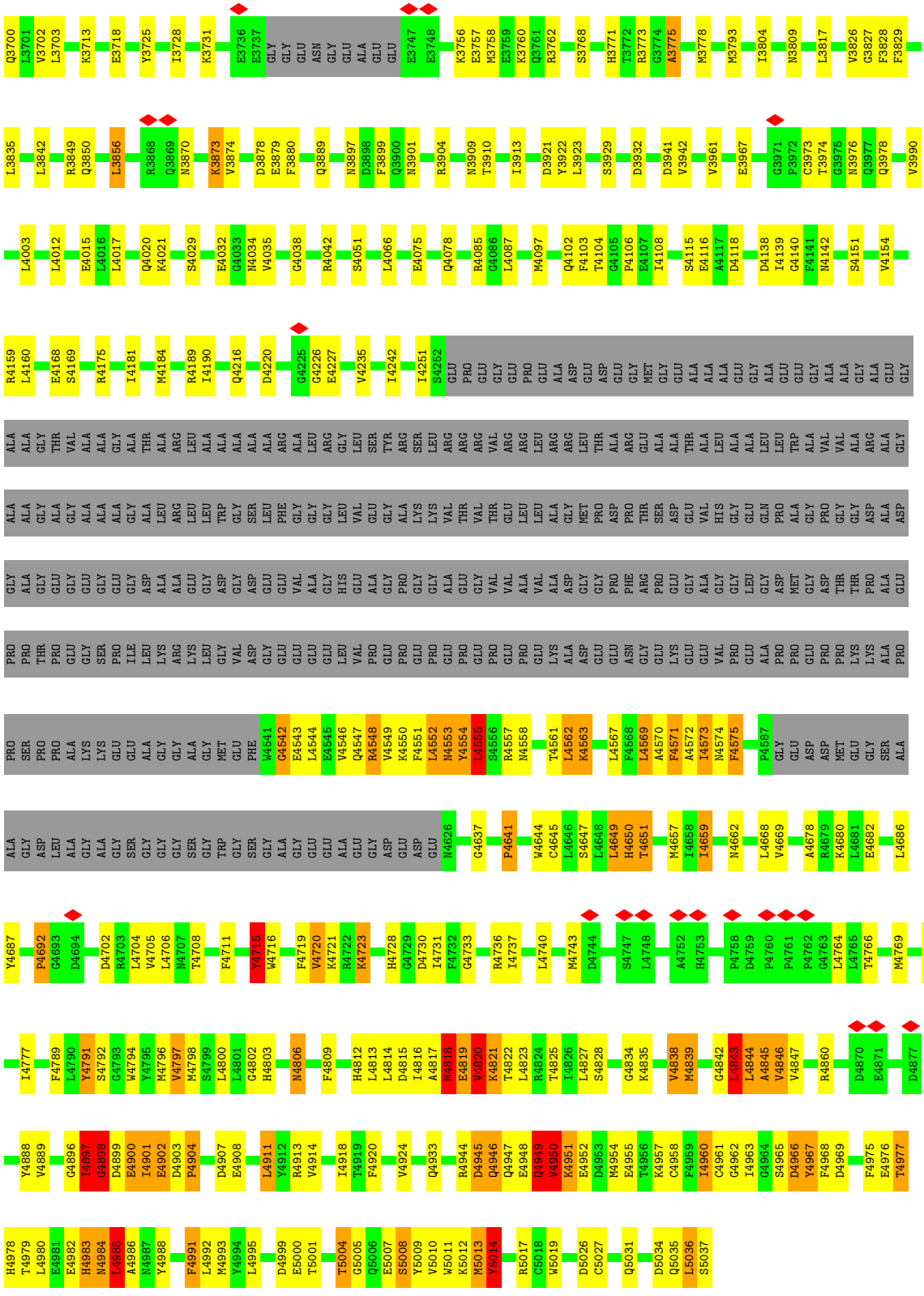
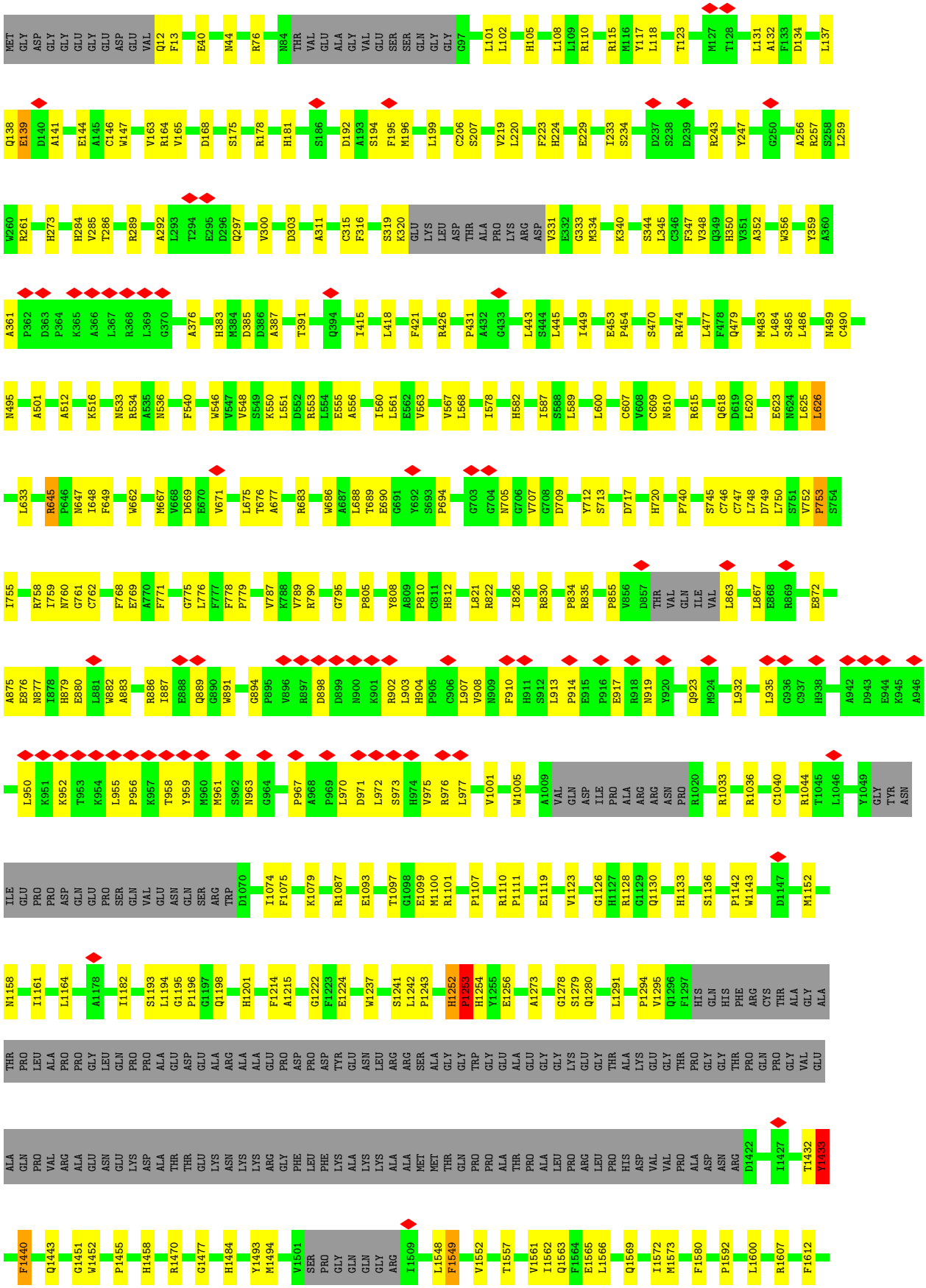
E3376 L3381 A3387 E3391 L3392 L3393 V3394 R3395 L3401 C3402 R3403 P3410 E3426 P3427 E3432 E3433 L3434 P3435 R3436 E3454 E3455 Q3456 V3460 Q3461 N3462 S3468 PHE LEU THR ALA ASP SER LYS SER LYS MET ALA LYS ALA GLY ASP ALA GLN SER GLY GLY SER ASP GLN
GLU ARG THR LYS LYS LYS ARG ARG GLY ASP ARG TYR SER VAL GLN THR SER LEU ILE V3511 L3514 K3515 K3516 P3519 P3527 Q3530 I3533 M3534 L3535 A3536 K3537 S3566 P3567 S3568 W3571 L3575 L3579 P3580 G3581 R3582 E3583 E3584 D3585 A3586 D3587 D3588 P3589 I3692 Y3593 R3594
E3598 A3601 T3609 E3610 H3611 P3612 Y3613 LYS SER LYS LYS ALA VAL TRP HIS LYS L3623 Q3627 R3628 R3629 F3636 R3637 M3638 T3639 R3648 M3652 S3656 S3668 F3669 E3670 D3671 R3672 D3675 S3678 K3679 E3684 E3685 E3686 E3687 E3688 E3689 V3690 E3691 E3692 D3696 H3699



• Molecule 1: Ryanodine receptor 1

Chain B: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Q138 E139 D140 A141 E144 A145 C146 W147 V163 R164 V165 D168 S175 R178 H181 S186 D192 A193 S194 F195 M196 L199 C206 S207 V219 L220 F223 H224 E229 I233 S234 D237 S238 D239 R243 Y247 G250 A256 R257 S258 L259
W260 R261 H273 H284 V285 T286 R289 A292 L293 T294 E295 D296 Q297 V300 D303 A311 C315 F316 S319 K320 GLU LYS LEU ASP THR ALA PRO LYS ARG ASP V331 E332 G333 M334 K340 S344 L345 G346 F347 V348 Q349 H350 V351 A352 W356 Y359 A360
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L633 R645 P646 N647 I648 F649 W662 M667 V668 D669 E670 V671 L675 T676 A677 R683 W686 A687 L688 T689 E690 G691 Y692 S693 P694 G703 G704 N705 G706 V707 G708 D709 Y712 S713 D717 H720 P740 S745 C746 C747 L748 D749 L750 S751 V752 P753 S754
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ILE GLU PRO PRO ASP GLN GLU PRO SER GLN VAL VAL GLU ASN GLN SER ARG TRP D1070 I1074 F1075 K1079 R1087 E1093 T1097 G1098 E1099 M1100 R1101 P1107 R1110 P1111 E1119 V1123 G1126 H1127 R1128 G1129 Q1130 H1133 S1136 P1142 W1143 D1147 M1152
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THR PRO LEU ALA PRO PRO GLY LEU GLN PRO PRO ALA GLU ASP GLU ALA ARG ALA 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 ASP ASN ARG D1422 I1427 T1432 Y1433
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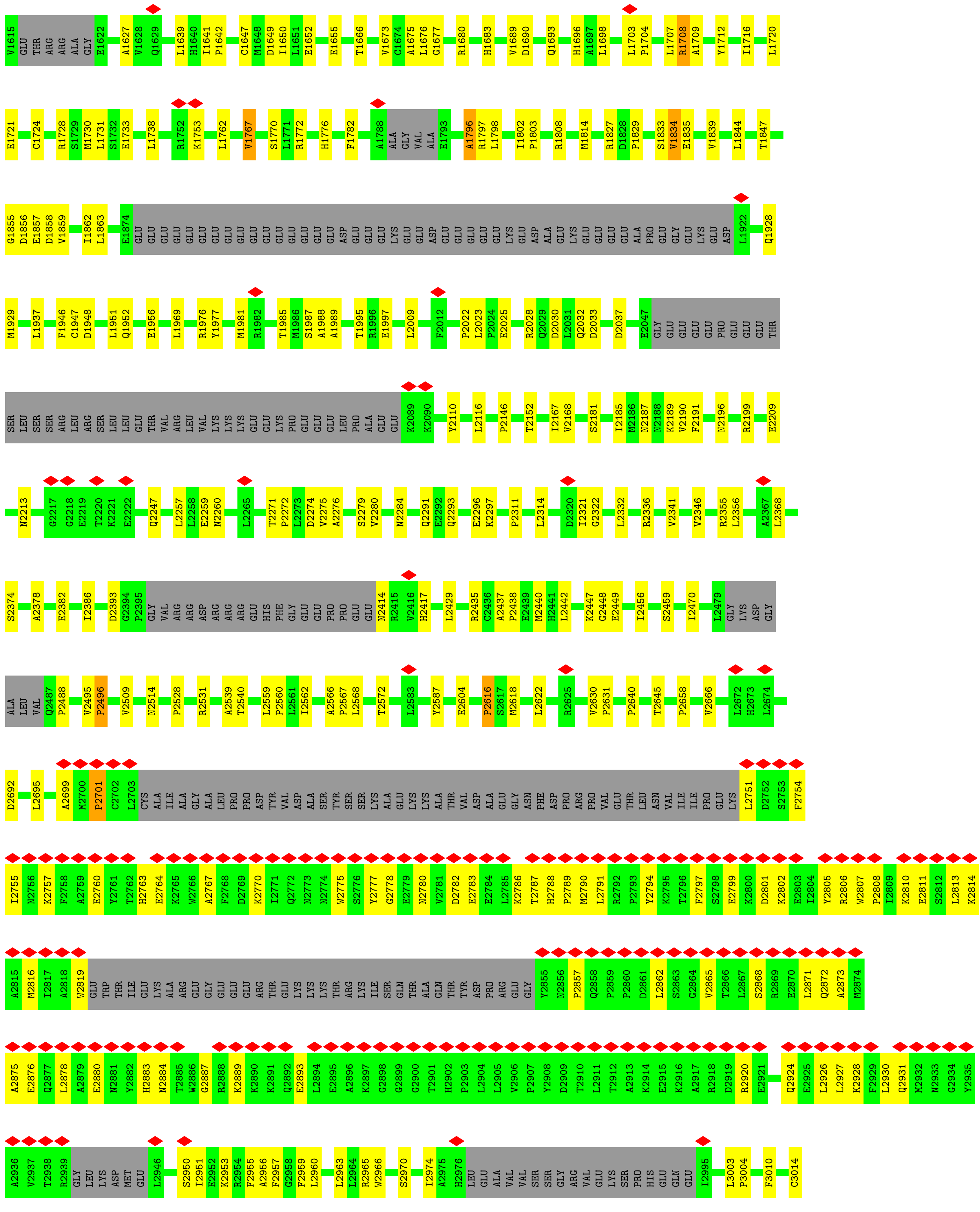
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E1721 C1724 R1728 S1729 M1730 L1731 S1732 E1733 L1738 R1752 K1753 L1762 V1767 S1770 L1771 R1772 H1776 F1782 A1788 ALA GLY VAL ALA E1793 A1796 R1797 L1798 I1802 P1803 R1808 M1814 R1827 D1828 P1829 S1833 V1834 E1835 V1839 L1844 T1847
G1855 D1856 E1857 D1858 V1859 I1862 L1863 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 Q1928
M1929 L1937 F1946 C1947 D1948 L1951 Q1952 E1956 L1969 R1976 Y1977 M1981 R1982 T1985 M1986 S1987 A1988 A1989 T1995 R1996 E1997 L2009 F2012 P2022 L2023 P2024 E2025 R2028 Q2029 D2030 L2031 Q2032 D2033 D2037 E2047 GLY GLU GLU GLU GLU PRO GLU GLU GLU THR
SER LEU SER SER ARG LEU ARG SER LEU LEU GLU THR VAL ARG LEU VAL LYS LYS LYS GLU GLU LYS PRO GLU GLU GLU LEU PRO ALA GLU GLU K2089 K2090 Y2110 L2116 P2146 T2152 I2167 V2168 S2181 I2185 M2186 N2187 N2188 K2189 V2190 F2191 N2196 R2199 E2209
N2213 G2217 G2218 E2219 T2220 K2221 E2222 Q2247 L2257 L2258 E2259 N2260 L2265 T2271 P2272 L2273 D2274 V2275 A2276 S2279 V2280 N2284 Q2291 E2292 Q2293 E2296 K2297 P2311 L2314 D2320 I2321 G2322 L2332 R2336 V2341 V2346 R2355 L2356 A2367 L2368
S2374 A2378 E2382 I2386 D2393 G2394 P2395 GLY VAL ARG ARG ASP ARG ARG ARG GLU HIS PHE GLY GLU GLU PRO PRO GLU GLU N2414 R2415 V2416 H2417 L2429 R2435 C2436 A2437 P2438 E2439 M2440 H2441 L2442 K2447 G2448 E2449 I2456 S2459 I2470 L2479 GLY LYS ASP GLY
ALA LEU VAL Q2487 P2488 V2495 P2496 V2509 N2514 P2528 R2531 A2539 T2540 L2559 P2560 L2561 I2562 A2566 P2567 L2568 T2572 L2583 Y2587 E2604 P2616 S2617 M2618 L2622 R2625 V2630 P2631 P2640 T2645 P2658 V2666 L2672 H2673 L2674
D2692 L2695 A2699 M2700 P2701 C2702 L2703 CYS ALA ILE ALA GLY ALA LEU PRO PRO ASP TYR VAL ASP ALA SER TYR SER SER LYS ALA GLU LYS LYS ALA THR VAL ASP ALA GLU GLY ASN PHE ASP PRO ARG PRO VAL GLU THR LEU ASN VAL ILE ILE PRO GLU LYS L2751 D2752 S2753 F2754
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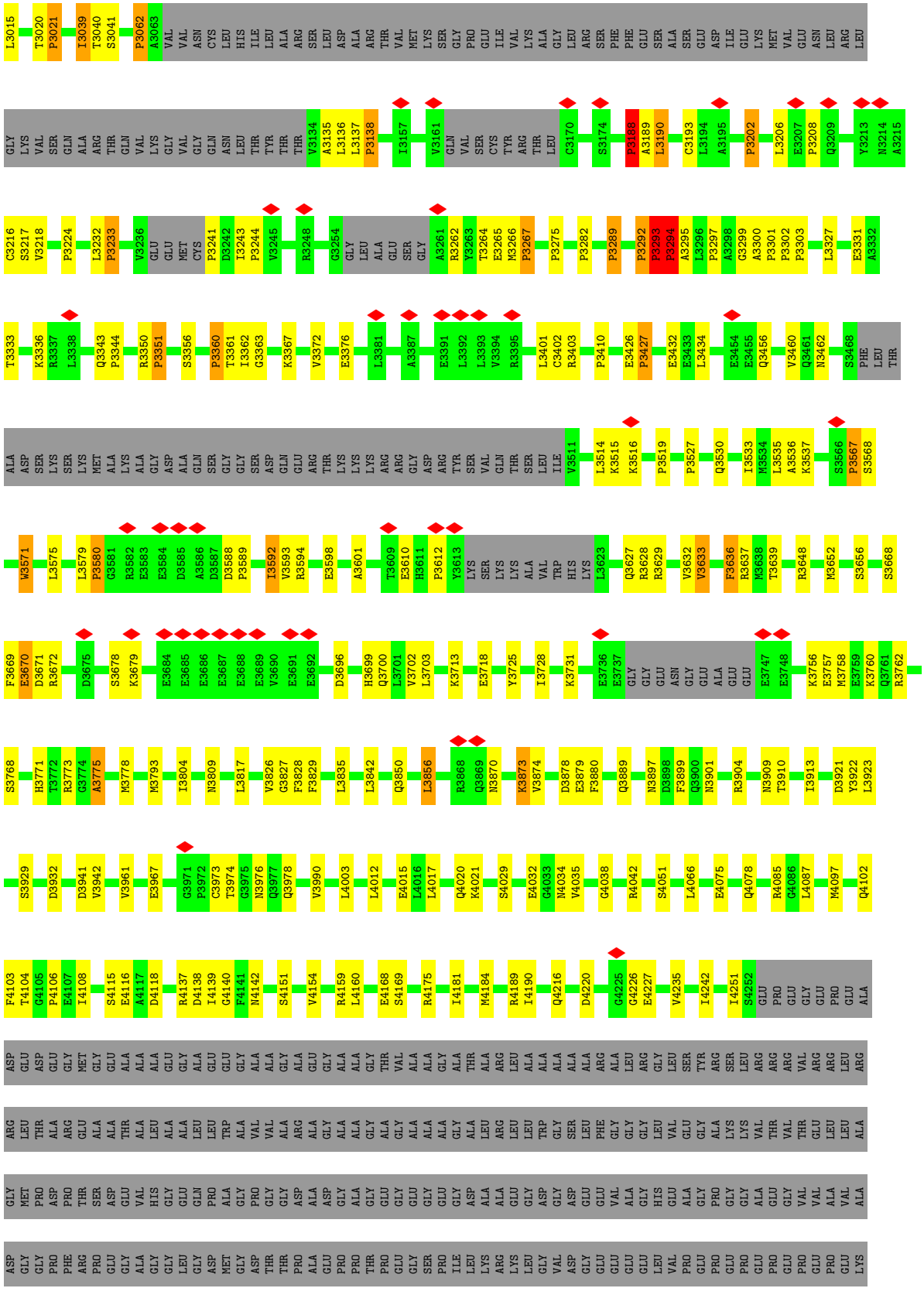
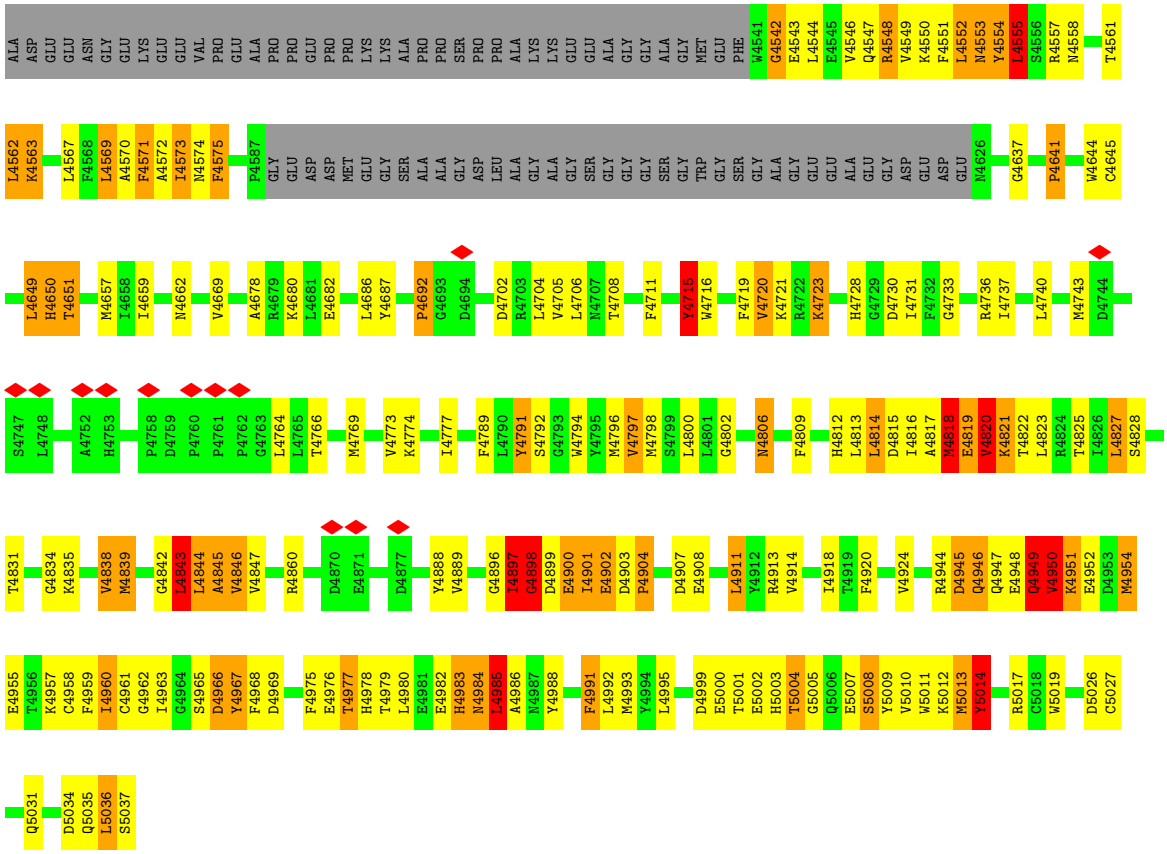




• Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1B

Chain E:

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

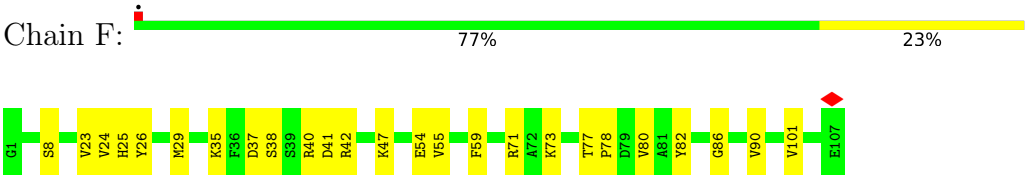
Chain H:

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

Chain G:

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

Chain F:



• Molecule 3: Calmodulin-1

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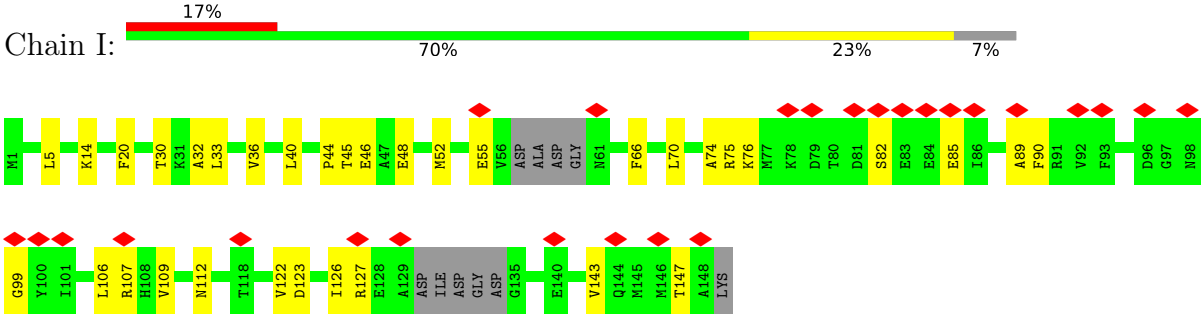

• Molecule 3: Calmodulin-1

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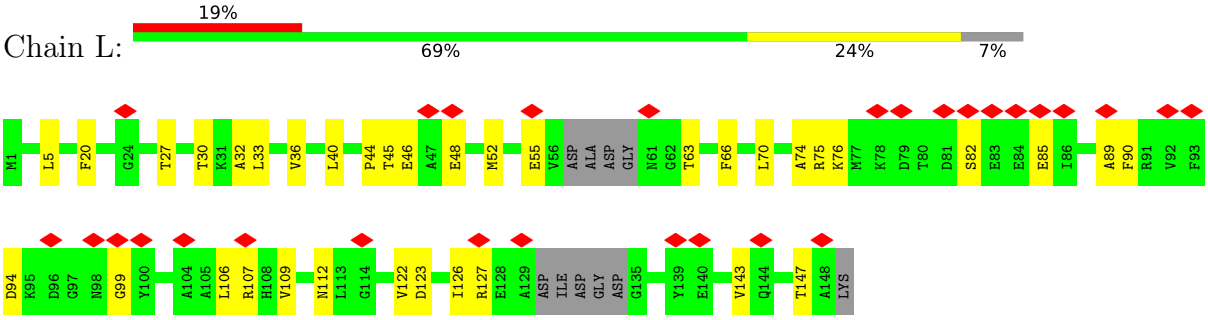

• Molecule 3: Calmodulin-1

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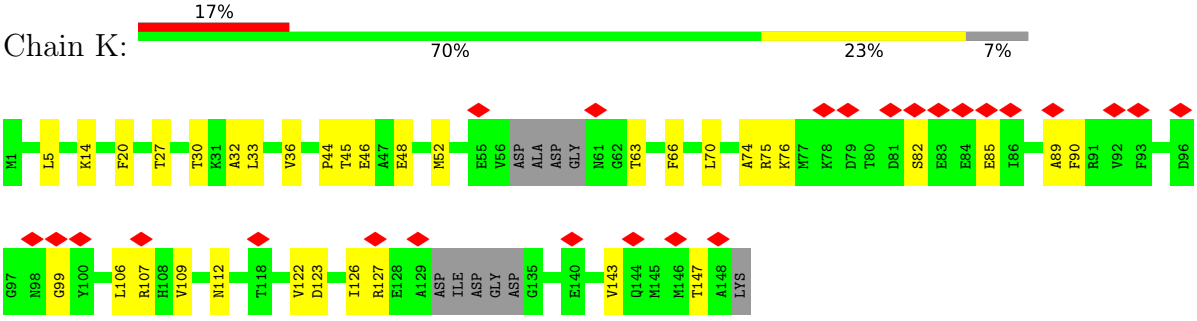
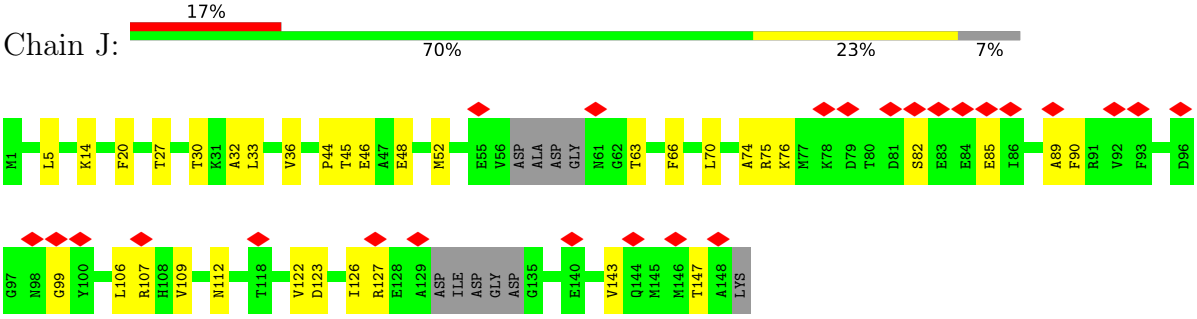


• Molecule 3: Calmodulin-1

Chain J:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	28189	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 ($e^-/Å^2$)	50	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2400	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	1.354	Depositor
Minimum map value	-0.808	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.043	Depositor
Recommended contour level	0.135	Depositor
Map size (Å)	502.80002, 502.80002, 502.80002	wwPDB
Map dimensions	480, 480, 480	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.0475, 1.0475, 1.0475	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, CFF, ZN, CA

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$\|Z\|$ >5	RMSZ	#$\|Z\|$ >5
1	A	0.39	2/29778 (0.0%)	0.64	60/40610 (0.1%)
1	B	0.39	2/29778 (0.0%)	0.64	61/40610 (0.2%)
1	C	0.39	2/29778 (0.0%)	0.64	61/40610 (0.2%)
1	D	0.39	2/29778 (0.0%)	0.64	60/40610 (0.1%)
2	E	0.27	0/820	0.54	0/1105
2	F	0.27	0/820	0.54	0/1105
2	G	0.27	0/820	0.54	0/1105
2	H	0.27	0/820	0.53	0/1105
3	I	0.25	0/1042	0.53	0/1404
3	J	0.25	0/1042	0.53	0/1404
3	K	0.25	0/1042	0.53	0/1404
3	L	0.25	0/1042	0.53	0/1404
All	All	0.38	8/126560 (0.0%)	0.63	242/172476 (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	7
1	B	0	8
1	C	0	7
1	D	0	7
All	All	0	29

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

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	855	PRO	CG-CD	-8.15	1.23	1.50
1	C	855	PRO	CG-CD	-8.15	1.23	1.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	855	PRO	CG-CD	-8.14	1.23	1.50
1	B	855	PRO	CG-CD	-8.14	1.23	1.50
1	B	1433	TYR	CE2-CZ	-5.09	1.31	1.38

The worst 5 of 242 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	855	PRO	N-CD-CG	-10.06	88.11	103.20
1	B	855	PRO	N-CD-CG	-10.06	88.11	103.20
1	D	855	PRO	N-CD-CG	-10.04	88.14	103.20
1	C	855	PRO	N-CD-CG	-10.04	88.15	103.20
1	B	1549	PHE	CB-CA-C	-7.48	95.44	110.40

There are no chirality outliers.

5 of 29 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	139	GLU	Peptide
1	A	1432	THR	Mainchain
1	A	1796	ALA	Peptide
1	A	4553	ASN	Mainchain
1	A	752	VAL	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	29207	0	25765	641	0
1	B	29207	0	25765	640	0
1	C	29207	0	25765	635	0
1	D	29207	0	25765	642	0
2	E	804	0	812	14	0
2	F	804	0	812	15	0
2	G	804	0	812	15	0
2	H	804	0	812	15	0
3	I	1033	0	958	28	0
3	J	1033	0	958	27	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	K	1033	0	958	27	0
3	L	1033	0	958	29	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
5	A	1	0	0	0	0
5	B	1	0	0	0	0
5	C	1	0	0	0	0
5	D	1	0	0	0	0
6	A	31	0	12	1	0
6	B	31	0	12	1	0
6	C	31	0	12	1	0
6	D	31	0	12	1	0
7	A	14	0	10	0	0
7	B	14	0	10	0	0
7	C	14	0	10	0	0
7	D	14	0	10	0	0
All	All	124364	0	110228	2684	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 11.

The worst 5 of 2684 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:D:1484:HIS:ND1	1:D:1484:HIS:O	2.07	0.86
1:B:1484:HIS:ND1	1:B:1484:HIS:O	2.07	0.86
1:A:1484:HIS:ND1	1:A:1484:HIS:O	2.07	0.86
1:C:1484:HIS:ND1	1:C:1484:HIS:O	2.07	0.84
2:E:82:TYR:HB3	2:E:86:GLY:HA2	1.60	0.83

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	4081/5037 (81%)	3348 (82%)	598 (15%)	135 (3%)	3 24
1	B	4081/5037 (81%)	3348 (82%)	598 (15%)	135 (3%)	3 24
1	C	4081/5037 (81%)	3351 (82%)	596 (15%)	134 (3%)	3 24
1	D	4081/5037 (81%)	3348 (82%)	598 (15%)	135 (3%)	3 24
2	E	105/107 (98%)	99 (94%)	6 (6%)	0	100 100
2	F	105/107 (98%)	99 (94%)	6 (6%)	0	100 100
2	G	105/107 (98%)	99 (94%)	6 (6%)	0	100 100
2	H	105/107 (98%)	99 (94%)	6 (6%)	0	100 100
3	I	133/149 (89%)	129 (97%)	4 (3%)	0	100 100
3	J	133/149 (89%)	129 (97%)	4 (3%)	0	100 100
3	K	133/149 (89%)	129 (97%)	4 (3%)	0	100 100
3	L	133/149 (89%)	129 (97%)	4 (3%)	0	100 100
All	All	17276/21172 (82%)	14307 (83%)	2430 (14%)	539 (3%)	5 26

5 of 539 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	626	LEU
1	A	1215	ALA
1	A	1241	SER
1	A	1291	LEU
1	A	1708	ARG

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	2516/4277 (59%)	2451 (97%)	65 (3%)	41 65
1	B	2516/4277 (59%)	2451 (97%)	65 (3%)	41 65

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	C	2516/4277 (59%)	2451 (97%)	65 (3%)	41 65
1	D	2516/4277 (59%)	2451 (97%)	65 (3%)	41 65
2	E	84/88 (96%)	84 (100%)	0	100 100
2	F	84/88 (96%)	84 (100%)	0	100 100
2	G	84/88 (96%)	84 (100%)	0	100 100
2	H	84/88 (96%)	84 (100%)	0	100 100
3	I	102/123 (83%)	102 (100%)	0	100 100
3	J	102/123 (83%)	102 (100%)	0	100 100
3	K	102/123 (83%)	102 (100%)	0	100 100
3	L	102/123 (83%)	102 (100%)	0	100 100
All	All	10808/17952 (60%)	10548 (98%)	260 (2%)	45 67

5 of 260 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	4819	GLU
1	B	4843	LEU
1	D	4813	LEU
1	D	4798	MET
1	B	4945	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 55 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	536	ASN
1	C	2931	GLN
1	B	5003	HIS
1	B	4250	GLN
1	C	618	GLN

5.3.3 RNA

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 16 ligands modelled in this entry, 8 are monoatomic - leaving 8 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
6	ATP	C	5103	-	26,33,33	0.86	0	31,52,52	1.61	7 (22%)
6	ATP	B	5103	-	26,33,33	0.86	0	31,52,52	1.62	7 (22%)
6	ATP	D	5103	-	26,33,33	0.86	0	31,52,52	1.62	7 (22%)
7	CFF	A	5104	-	8,15,15	1.73	1 (12%)	8,23,23	2.26	2 (25%)
7	CFF	C	5104	-	8,15,15	1.67	1 (12%)	8,23,23	2.21	2 (25%)
6	ATP	A	5103	-	26,33,33	0.86	0	31,52,52	1.62	7 (22%)
7	CFF	D	5104	-	8,15,15	1.69	1 (12%)	8,23,23	2.18	2 (25%)
7	CFF	B	5104	-	8,15,15	1.71	1 (12%)	8,23,23	2.29	2 (25%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	ATP	C	5103	-	-	3/18/38/38	0/3/3/3
6	ATP	B	5103	-	-	3/18/38/38	0/3/3/3
6	ATP	D	5103	-	-	3/18/38/38	0/3/3/3
7	CFF	A	5104	-	-	-	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
7	CFF	C	5104	-	-	-	0/2/2/2
6	ATP	A	5103	-	-	3/18/38/38	0/3/3/3
7	CFF	D	5104	-	-	-	0/2/2/2
7	CFF	B	5104	-	-	-	0/2/2/2

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	A	5104	CFF	C5-C4	-4.19	1.33	1.39
7	B	5104	CFF	C5-C4	-4.13	1.33	1.39
7	D	5104	CFF	C5-C4	-4.09	1.34	1.39
7	C	5104	CFF	C5-C4	-3.98	1.34	1.39

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

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
7	A	5104	CFF	C5-C6-N1	-4.60	113.29	118.20
7	B	5104	CFF	C5-C6-N1	-4.58	113.31	118.20
7	B	5104	CFF	C4-C5-C6	4.43	122.80	119.96
7	C	5104	CFF	C5-C6-N1	-4.43	113.48	118.20
7	D	5104	CFF	C5-C6-N1	-4.39	113.52	118.20

There are no chirality outliers.

5 of 12 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	A	5103	ATP	C4'-C5'-O5'-PA
6	D	5103	ATP	C4'-C5'-O5'-PA
6	C	5103	ATP	C4'-C5'-O5'-PA
6	B	5103	ATP	C4'-C5'-O5'-PA
6	A	5103	ATP	PG-O3B-PB-O1B

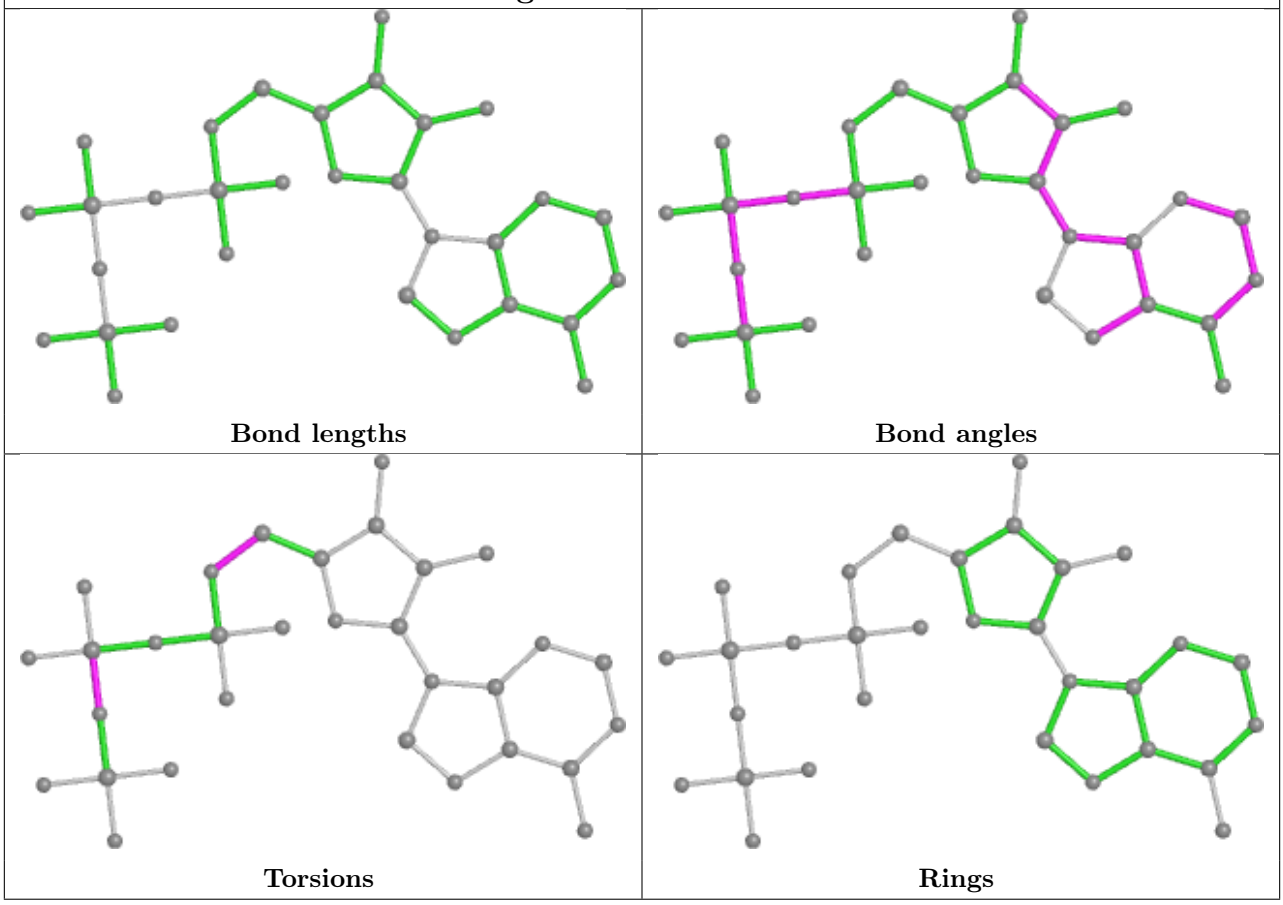
There are no ring outliers.

4 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	C	5103	ATP	1	0
6	B	5103	ATP	1	0
6	D	5103	ATP	1	0
6	A	5103	ATP	1	0

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

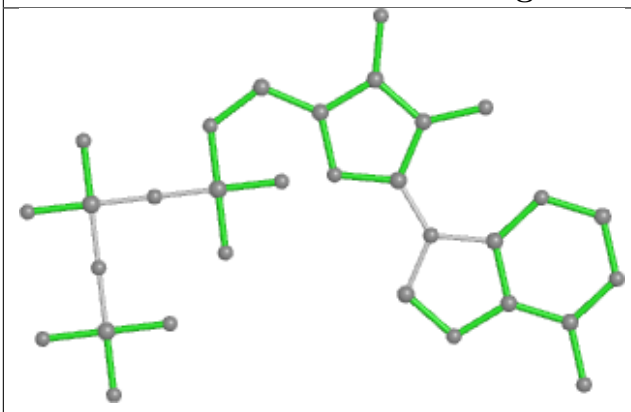
Ligand ATP C 5103



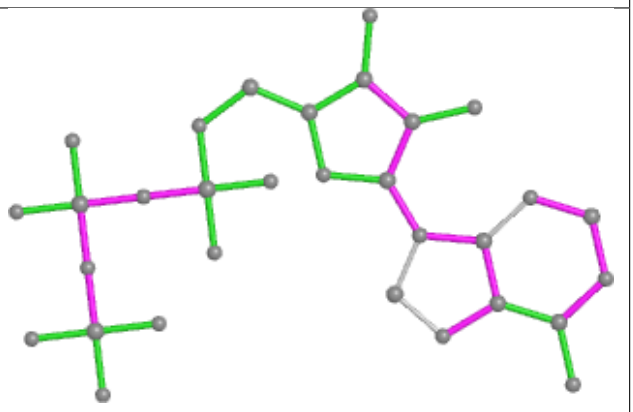
Bond lengths **Bond angles**

Torsions **Rings**

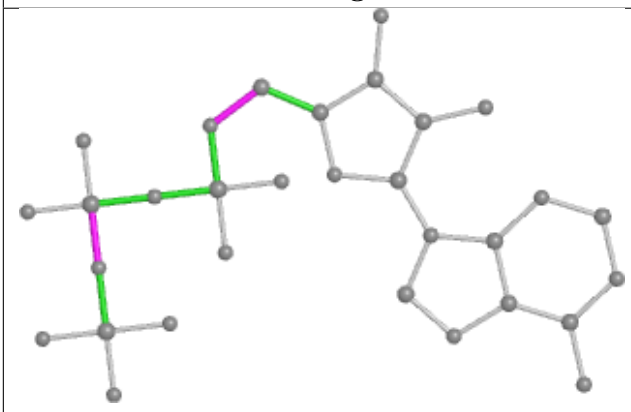
Ligand ATP B 5103



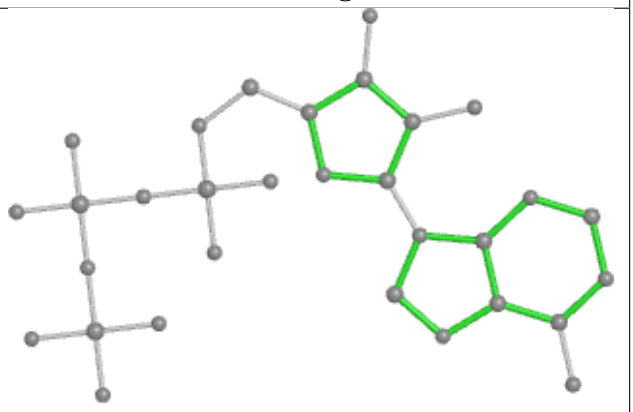
Bond lengths



Bond angles

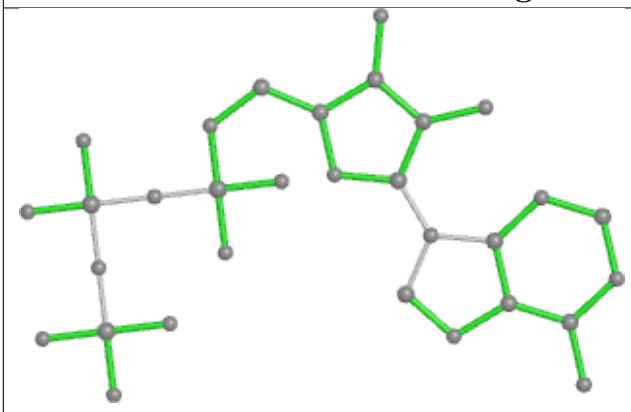


Torsions

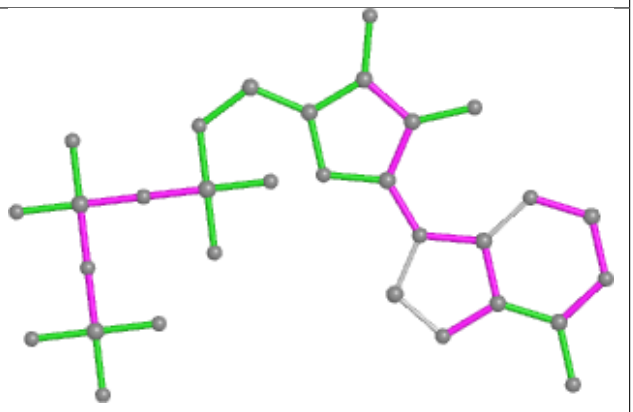


Rings

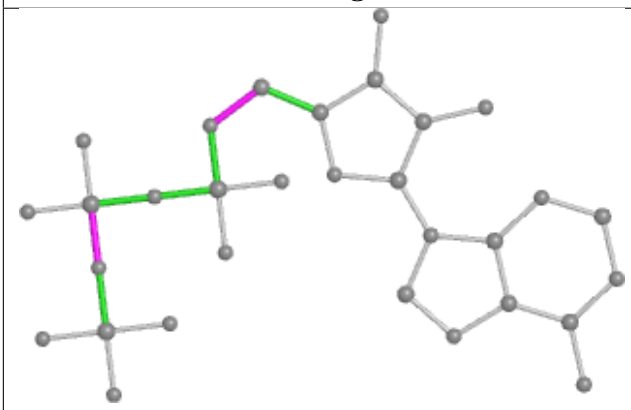
Ligand ATP D 5103



Bond lengths



Bond angles



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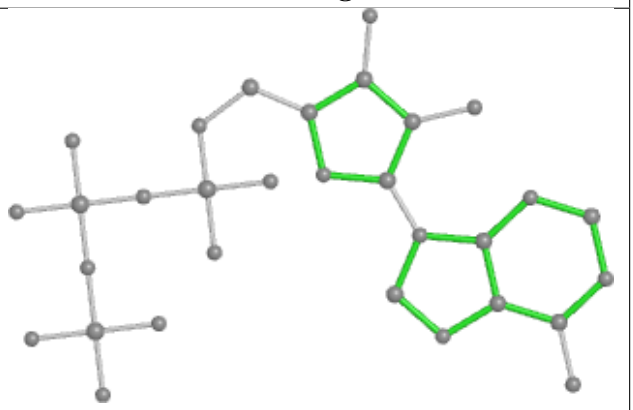
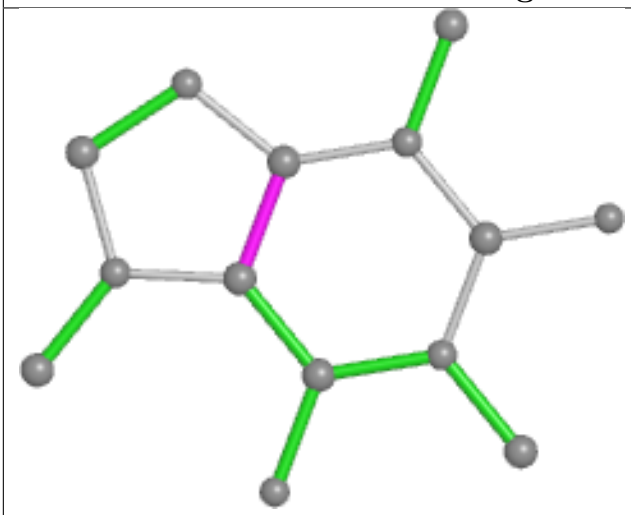
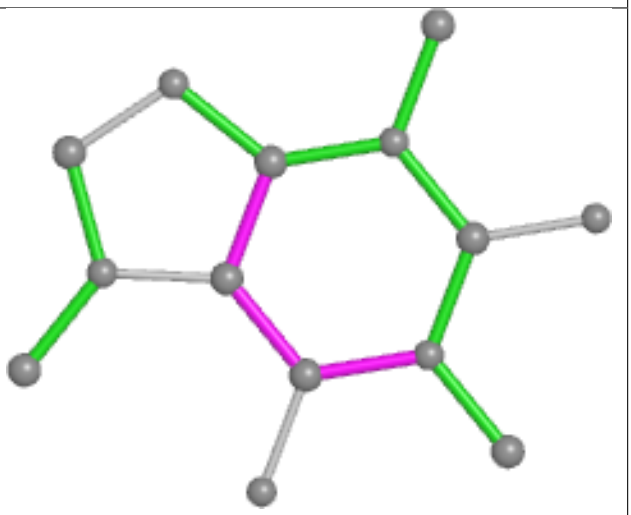


Rings

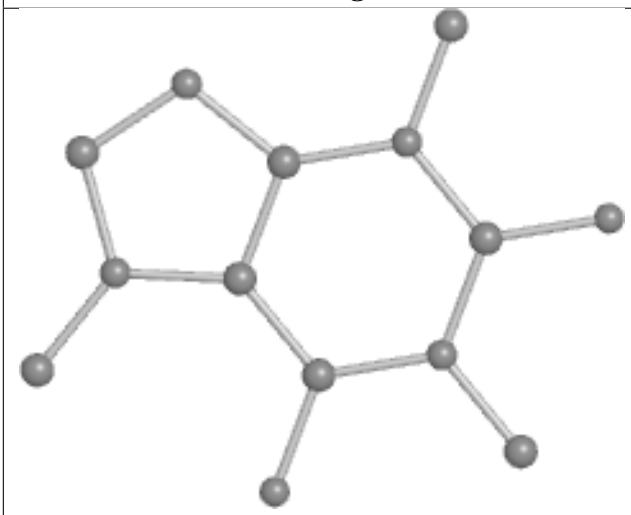
Ligand CFF A 5104



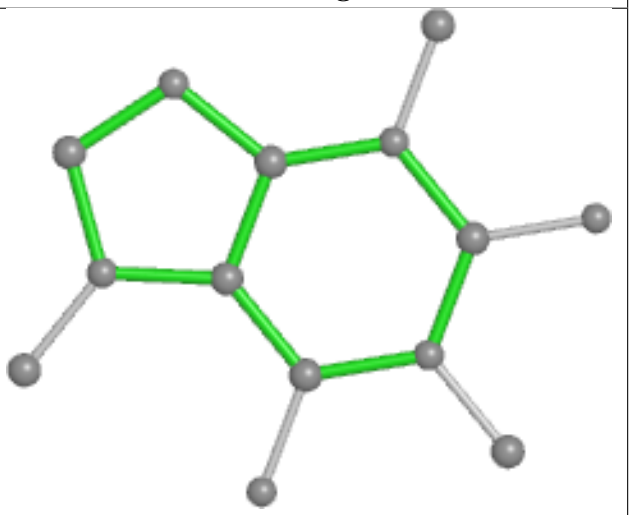
Bond lengths



Bond angles

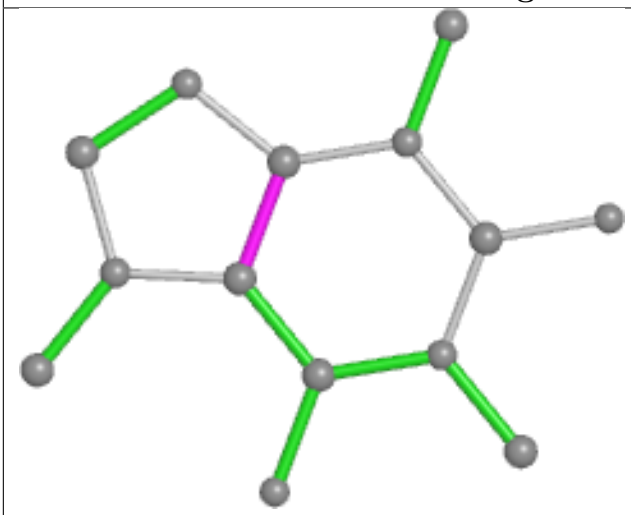


Torsions

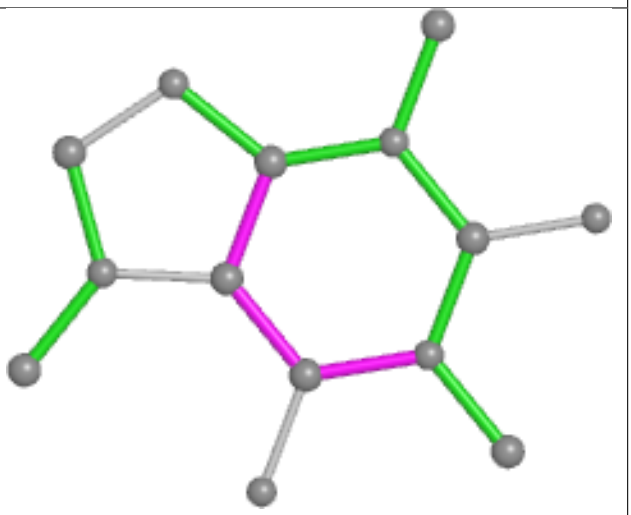


Rings

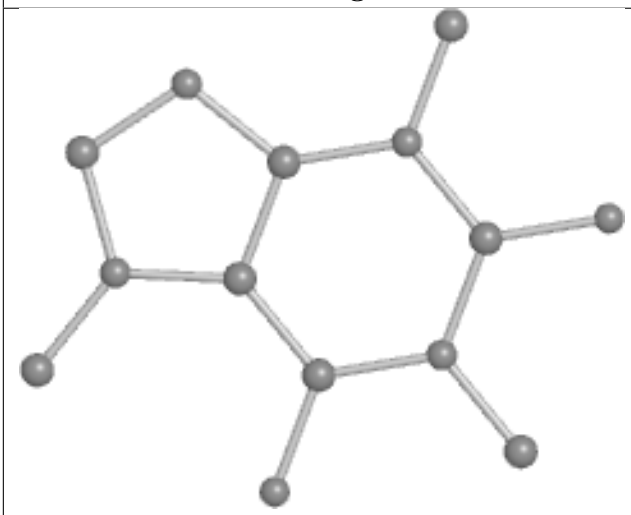
Ligand CFF C 5104



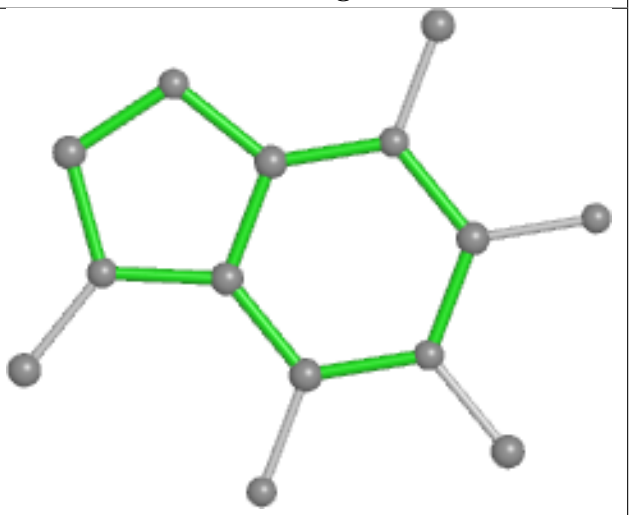
Bond lengths



Bond angles

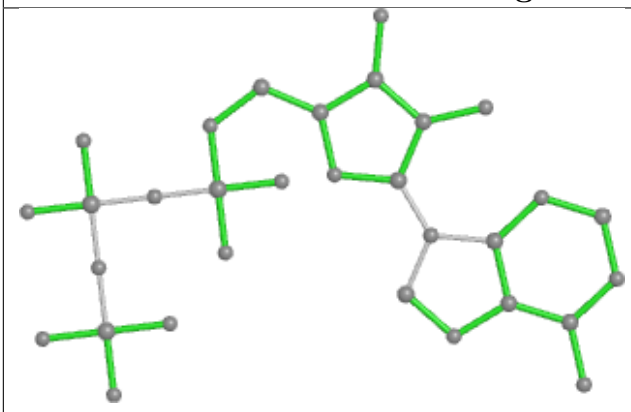


Torsions

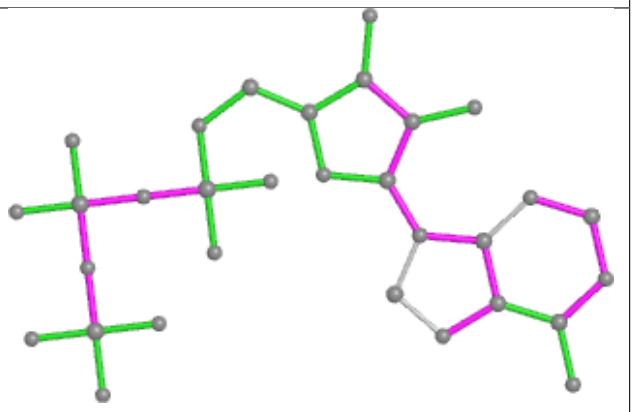


Rings

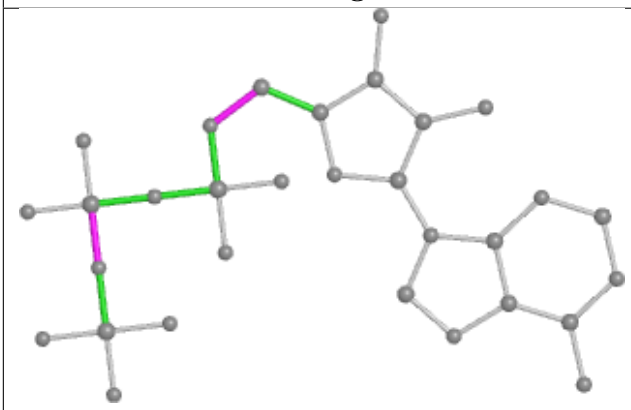
Ligand ATP A 5103



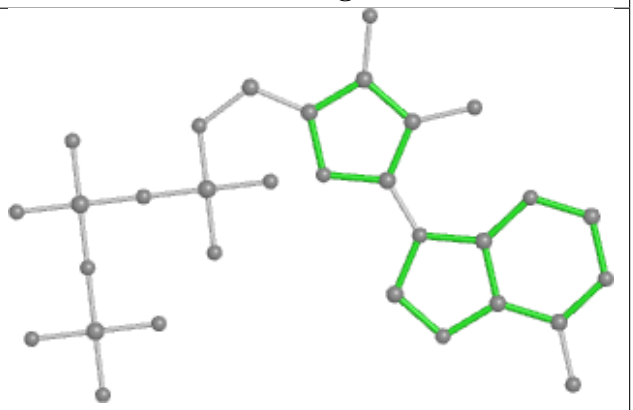
Bond lengths



Bond angles

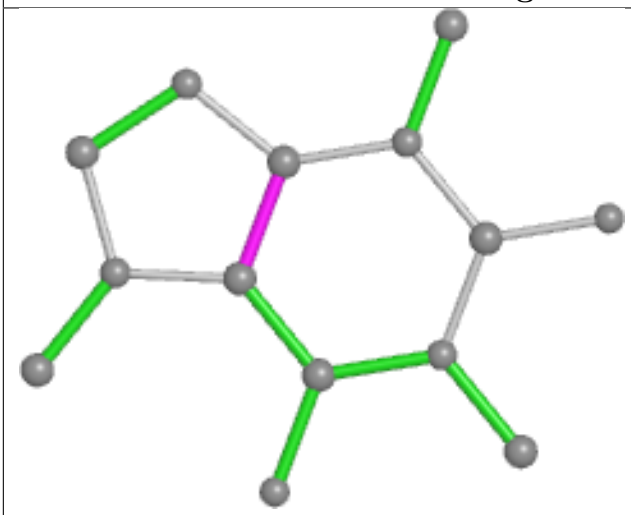


Torsions

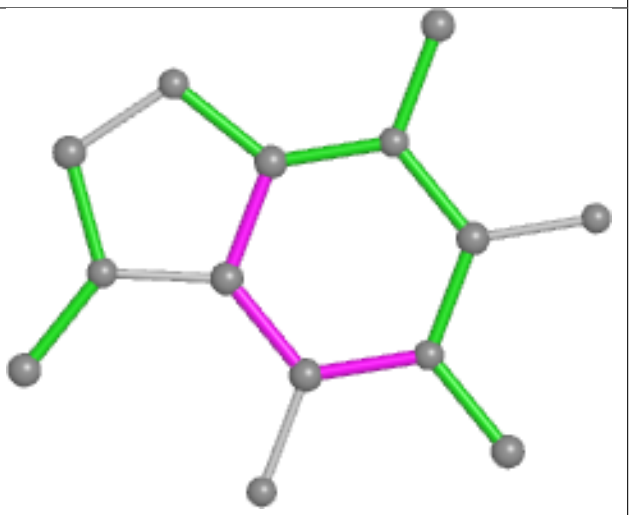


Rings

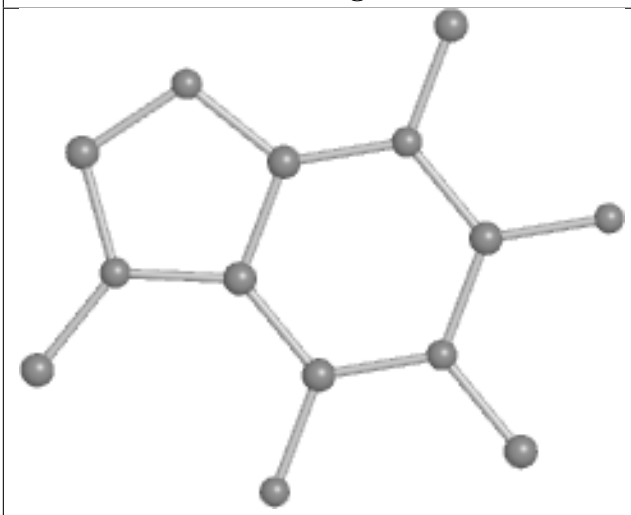
Ligand CFF D 5104



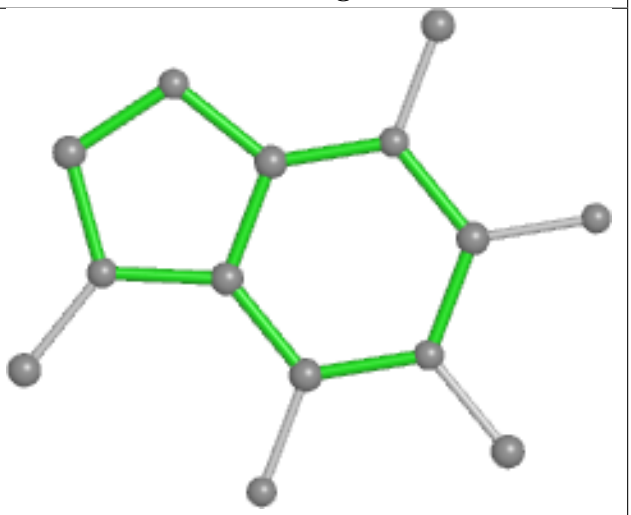
Bond lengths



Bond angles

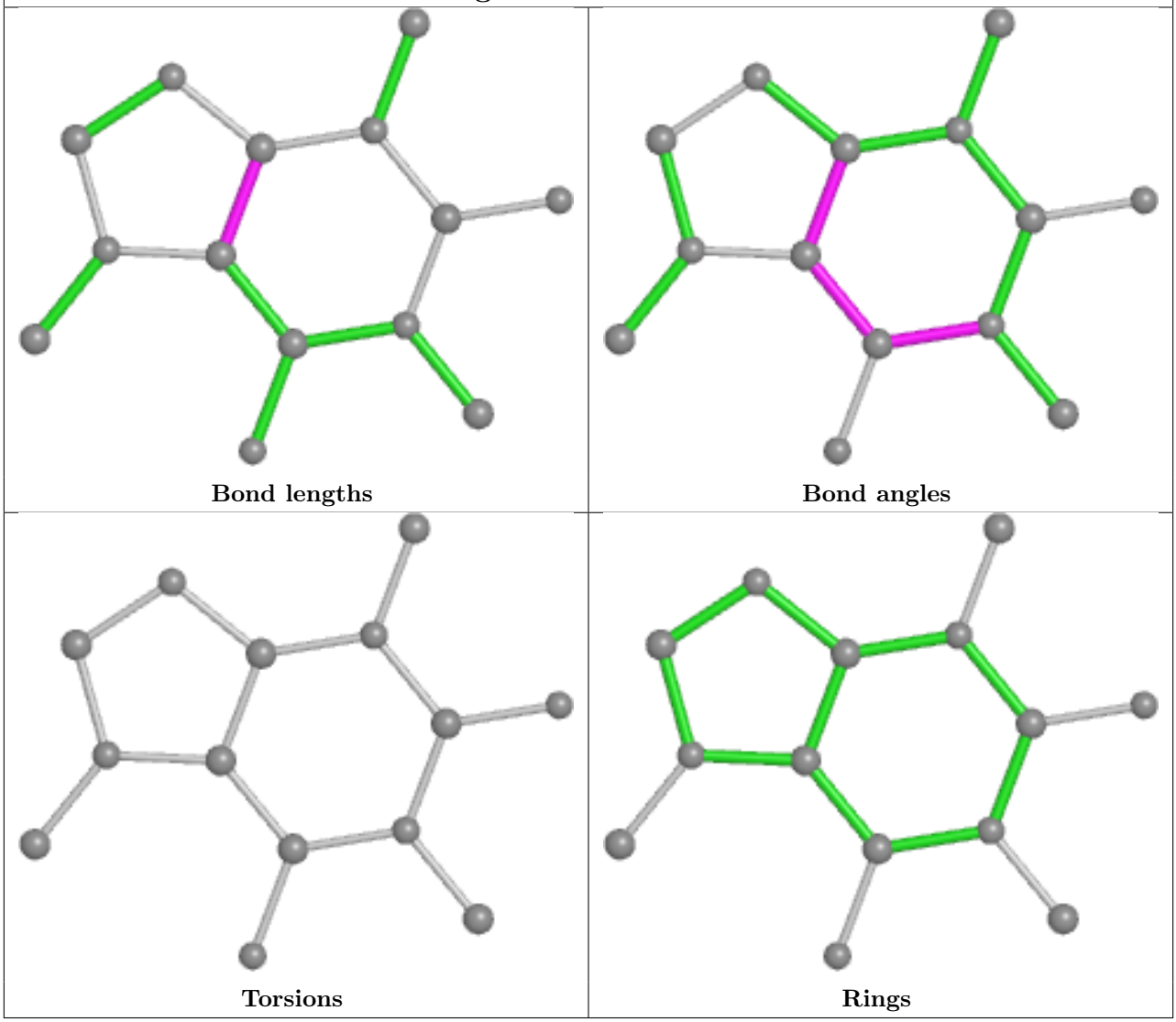


Torsions



Rings

Ligand CFF B 5104



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.

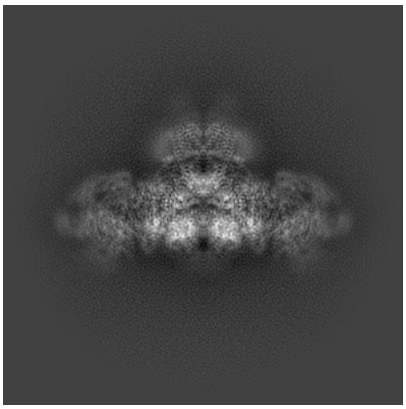
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-38448. These allow visual inspection of the internal detail of the map and identification of artifacts.

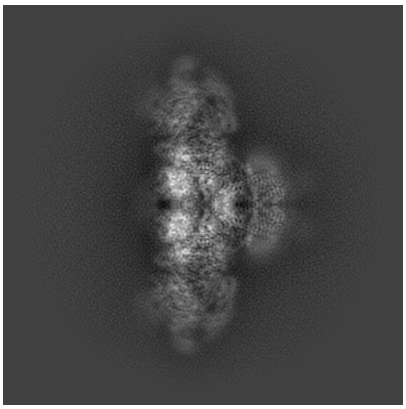
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

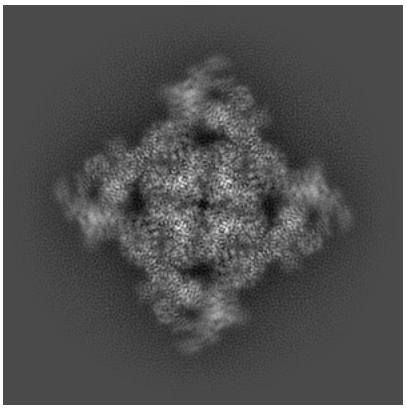
6.1.1 Primary map



X

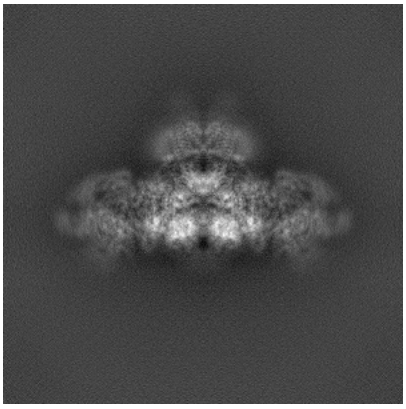


Y

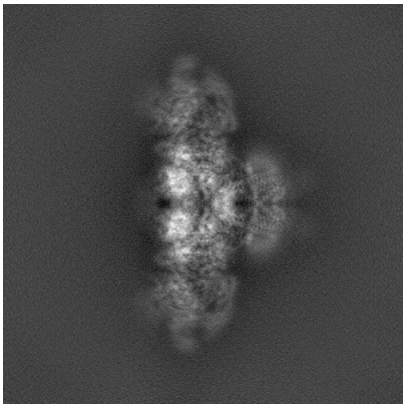


Z

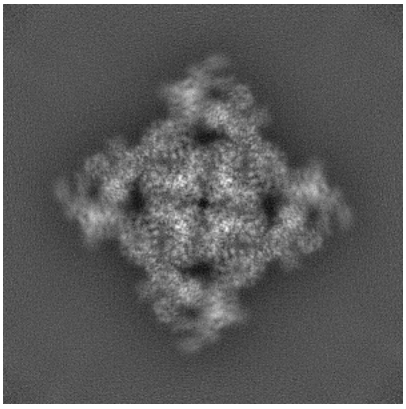
6.1.2 Raw map



X



Y

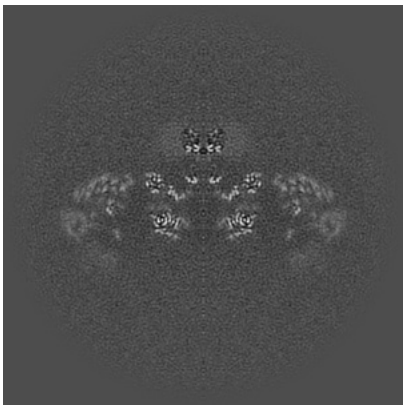


Z

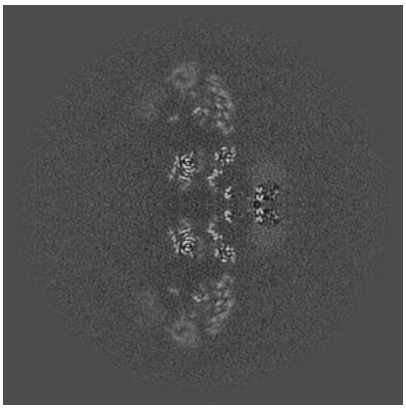
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

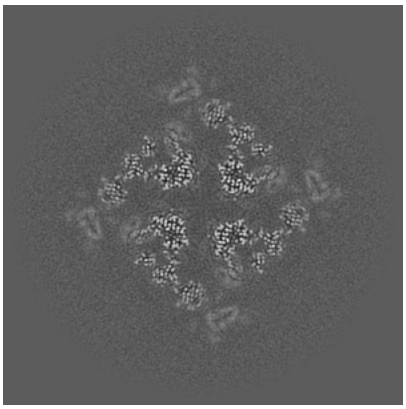
6.2.1 Primary map



X Index: 240

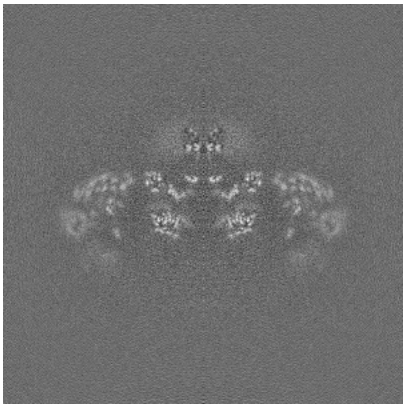


Y Index: 240

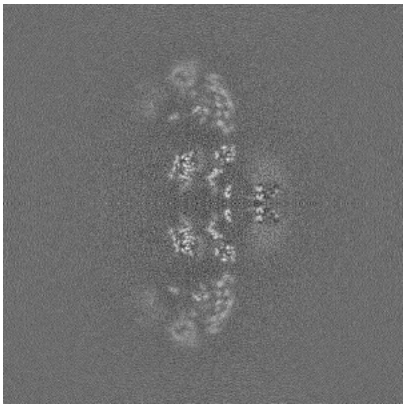


Z Index: 240

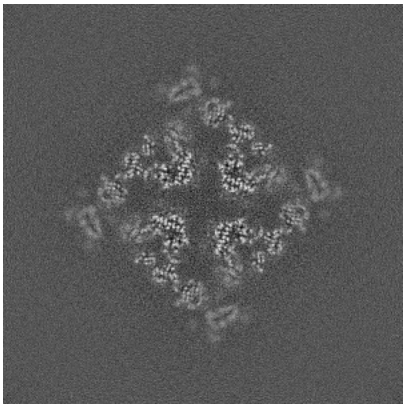
6.2.2 Raw map



X Index: 240



Y Index: 240

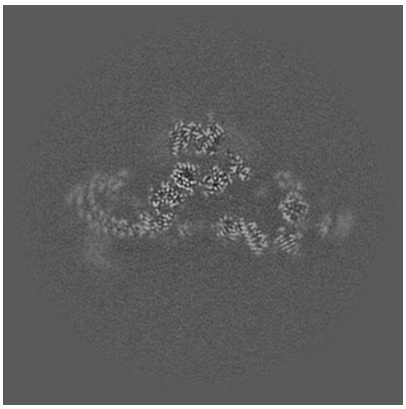


Z Index: 240

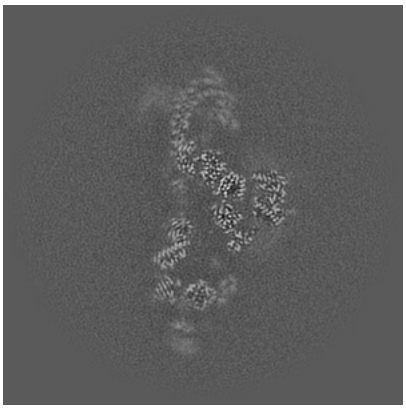
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

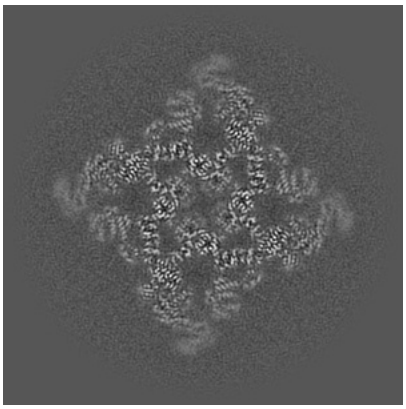
6.3.1 Primary map



X Index: 256

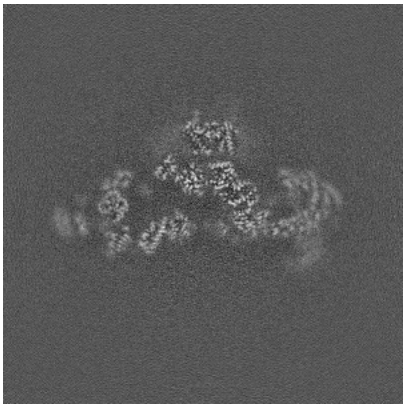


Y Index: 256



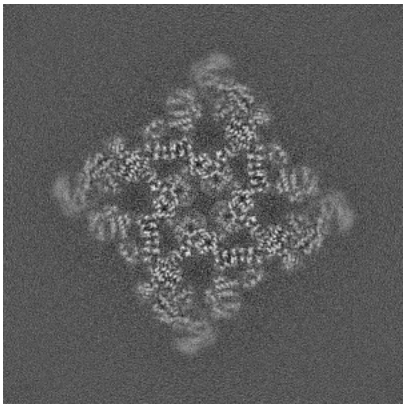
Z Index: 218

6.3.2 Raw map



X Index: 225

Y Index: 225

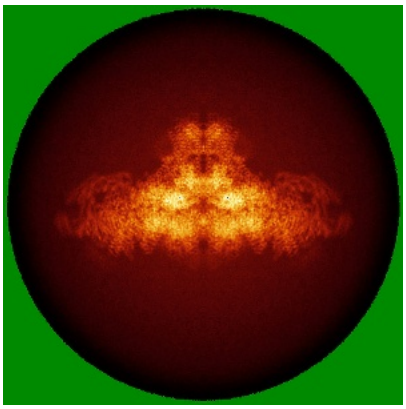


Z Index: 218

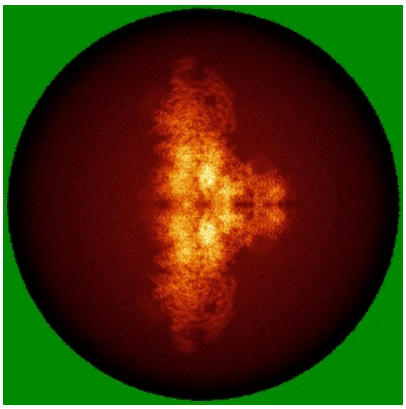
The images above show the largest variance slices of the map in three orthogonal directions.

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

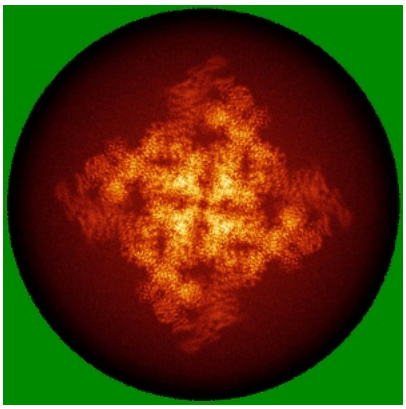
6.4.1 Primary map



X

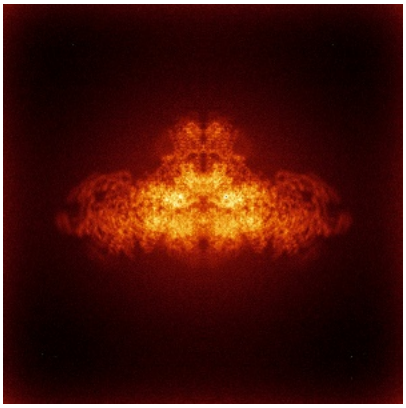


Y

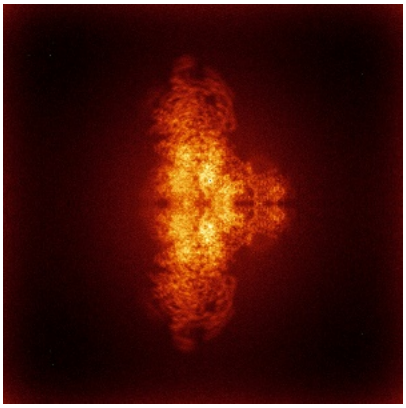


Z

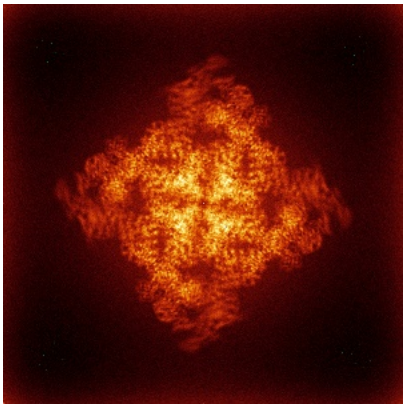
6.4.2 Raw map



X



Y

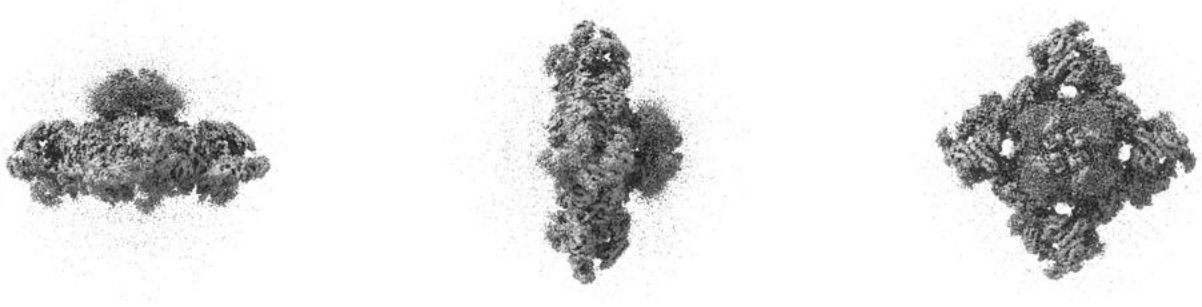


Z

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)

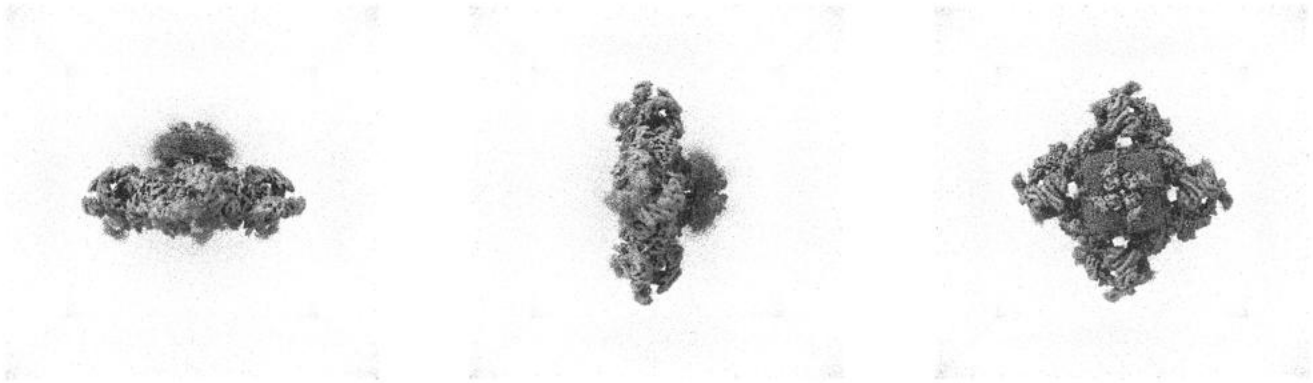
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.135. 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.

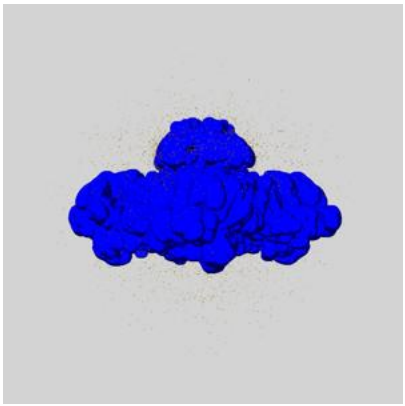
6.6 Mask visualisation (i)

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

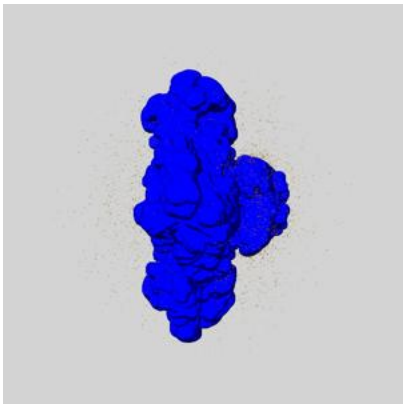
A mask typically either:

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

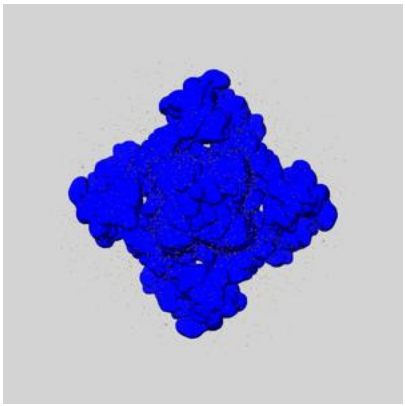
6.6.1 emd_38448_msk_1.map (i)



X



Y

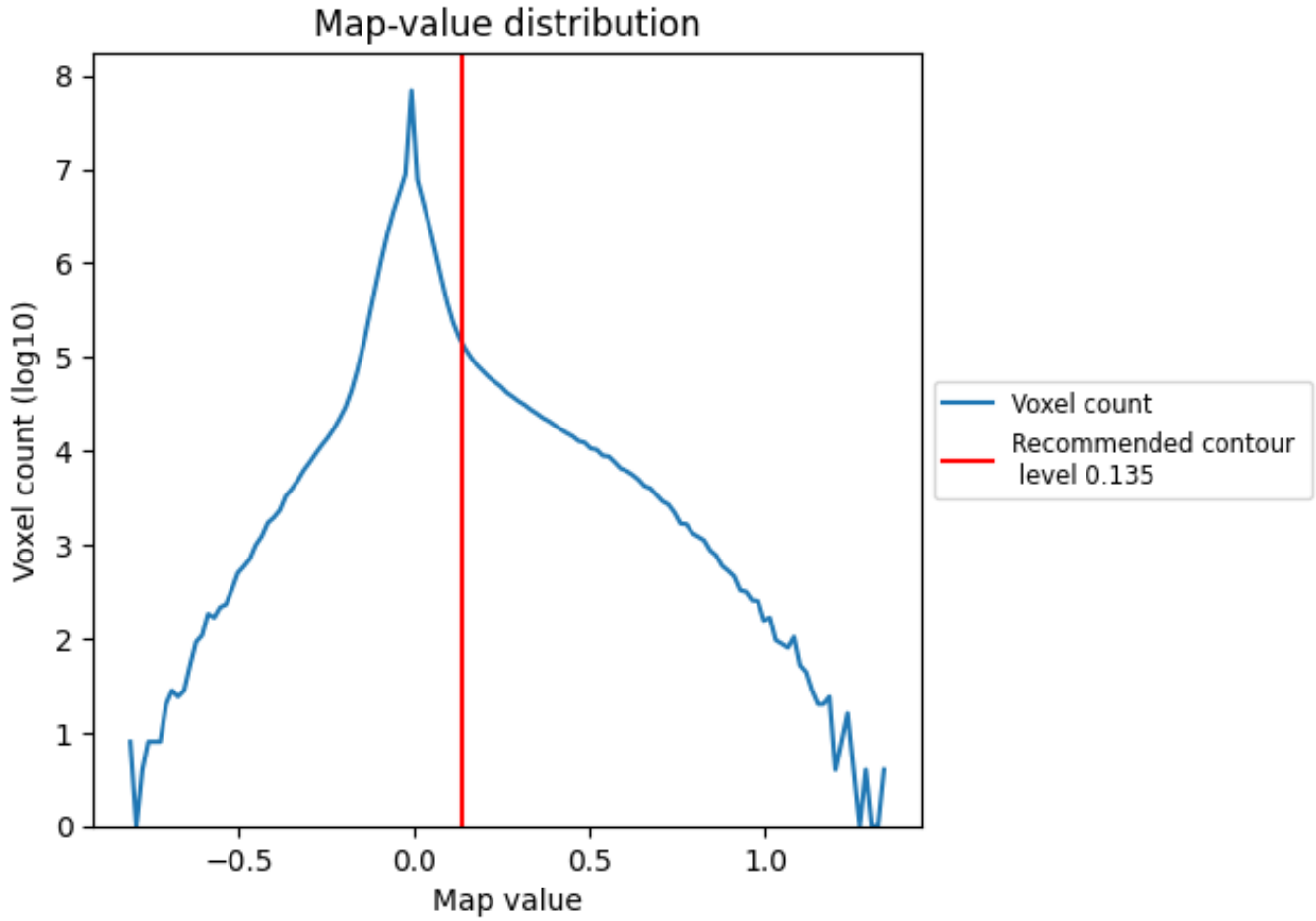


Z

7 Map analysis

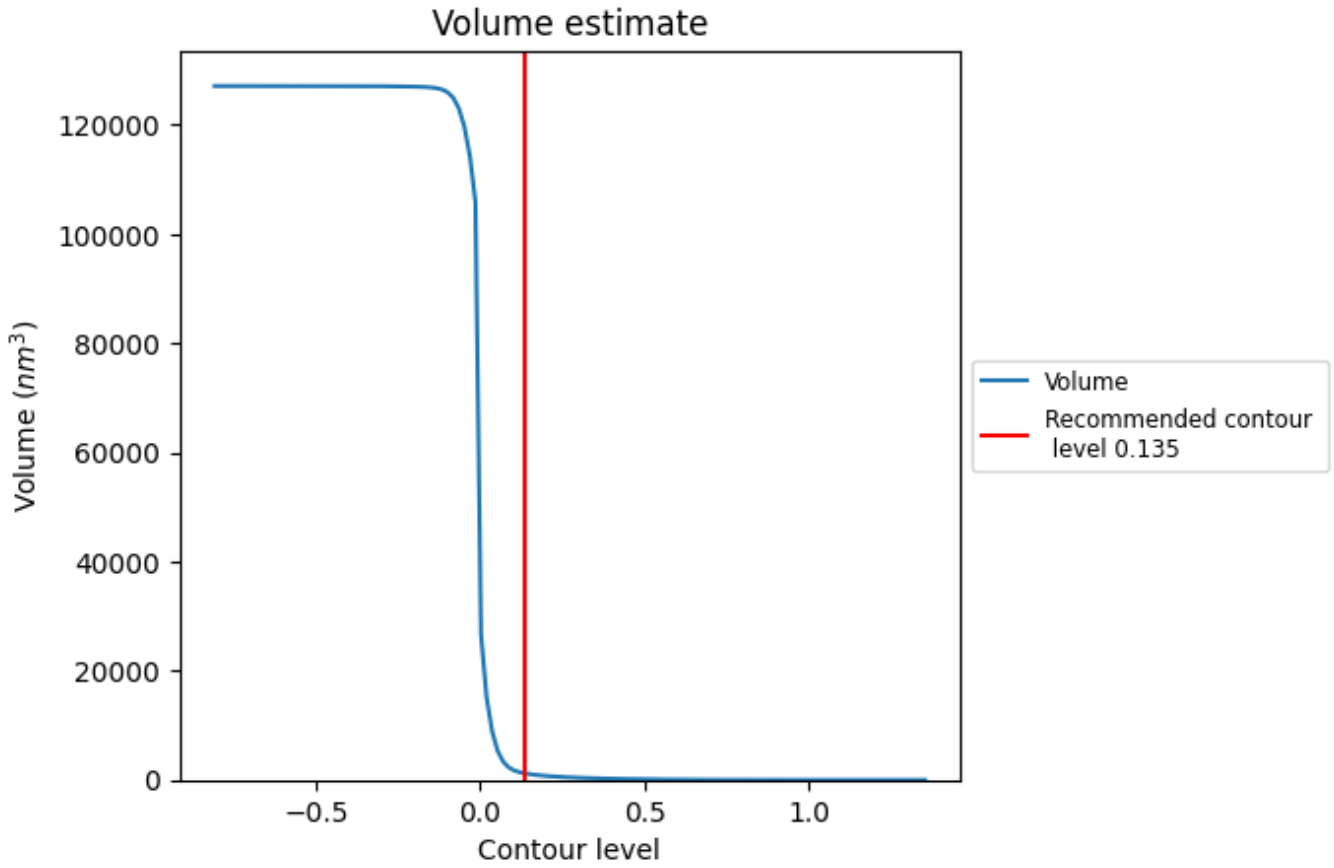
This section contains the results of statistical analysis of the map.

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.

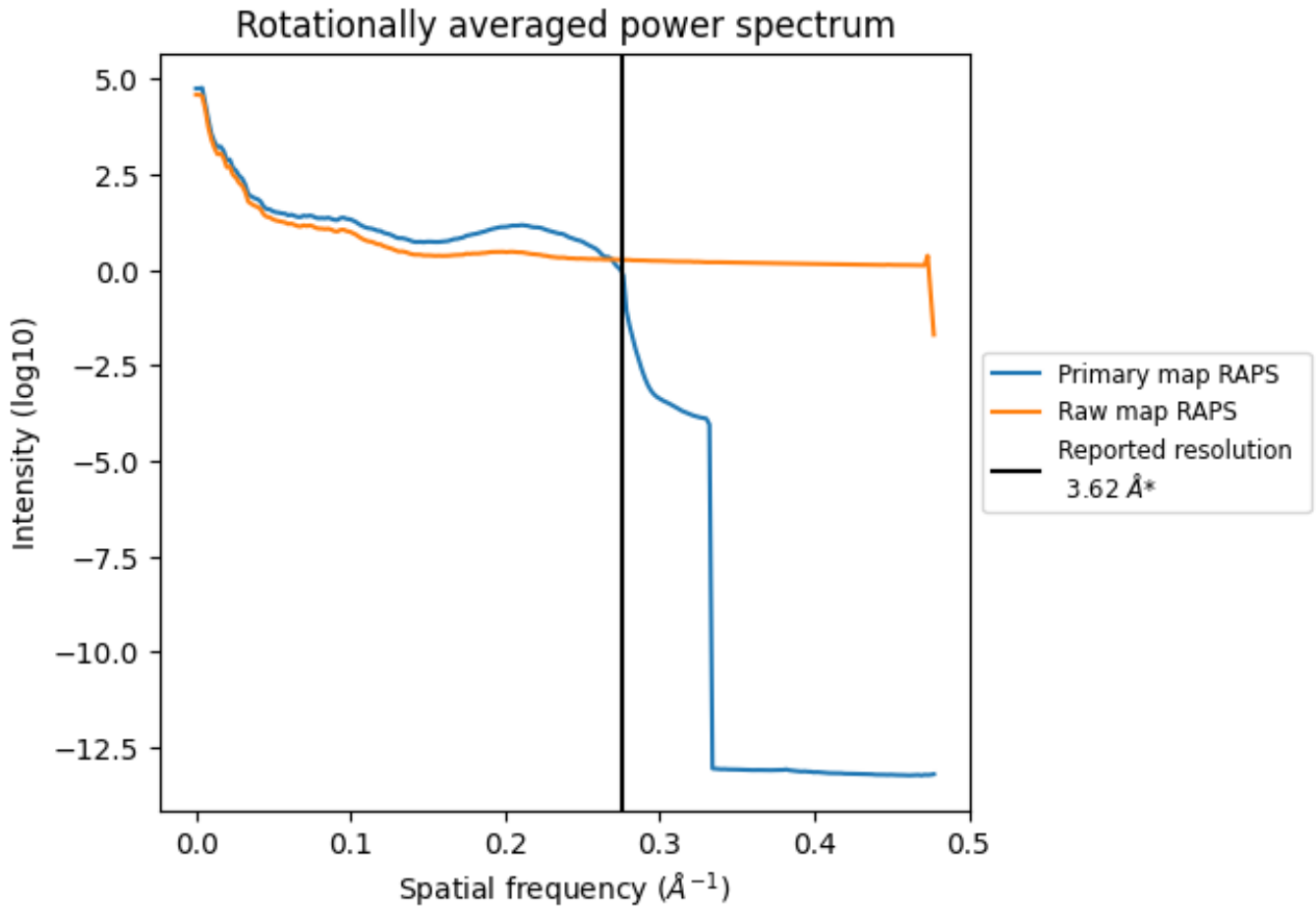
7.2 Volume estimate (i)



The volume at the recommended contour level is 1226 nm^3; this corresponds to an approximate mass of 1107 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)

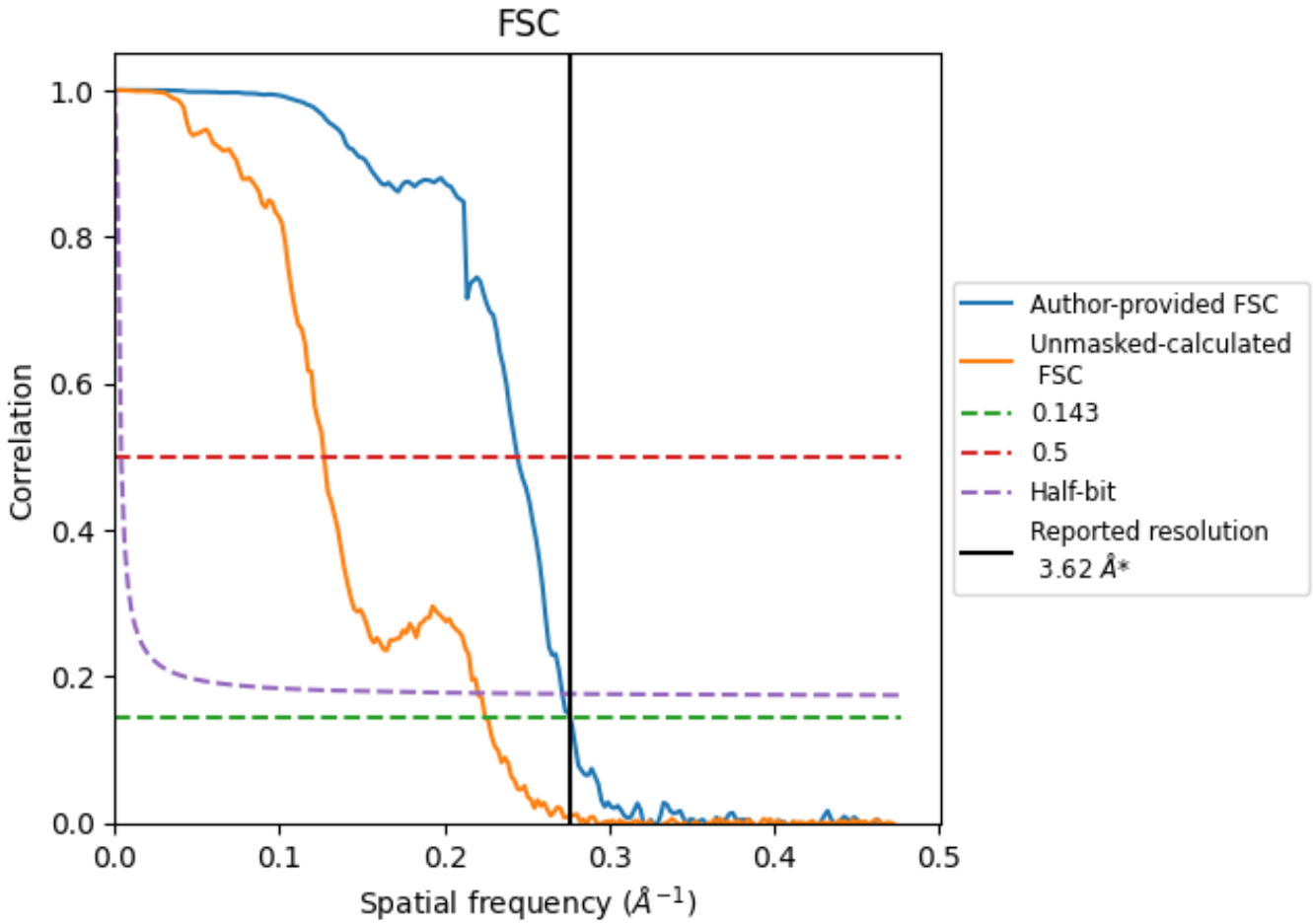


*Reported resolution corresponds to spatial frequency of 0.276 $Å^{-1}$

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 0.276 Å^{-1}

8.2 Resolution estimates (i)

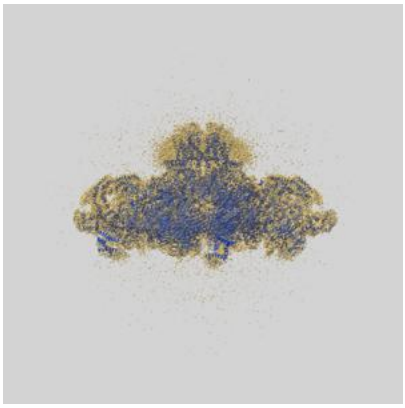
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.62	-	-
Author-provided FSC curve	3.62	4.09	3.68
Unmasked-calculated*	4.44	7.88	4.54

*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 4.44 differs from the reported value 3.62 by more than 10 %

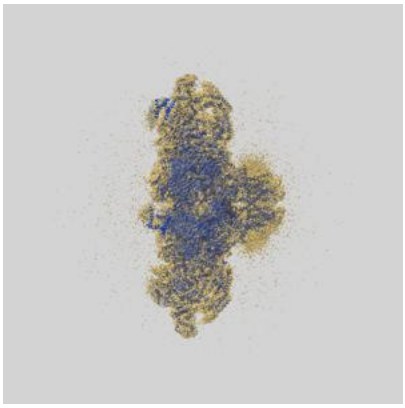
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-38448 and PDB model 8XLH. Per-residue inclusion information can be found in section 3 on page 8.

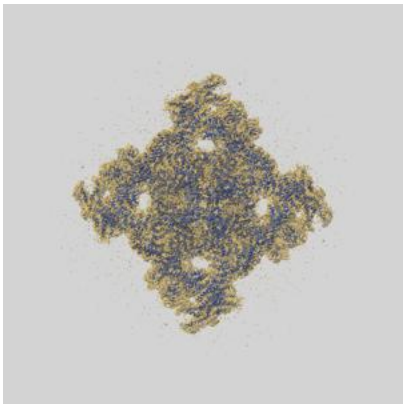
9.1 Map-model overlay



X



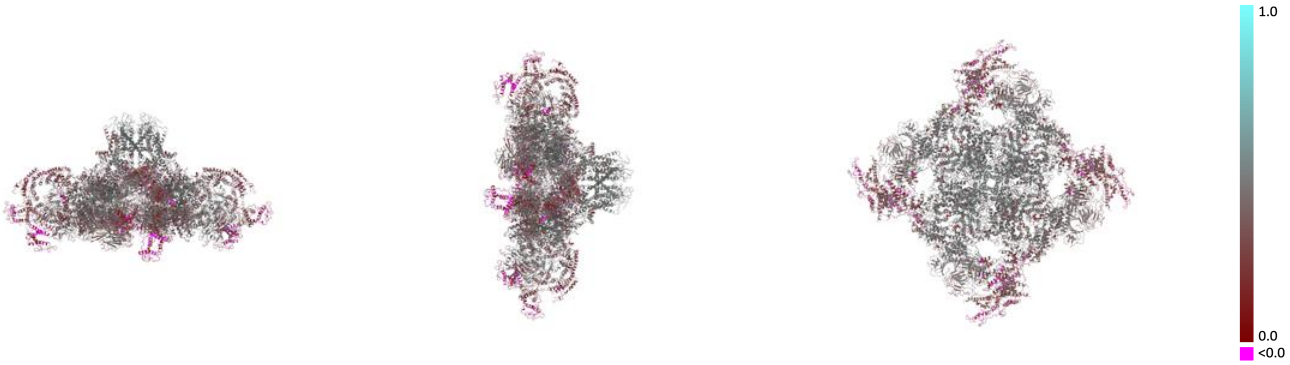
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.135 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.

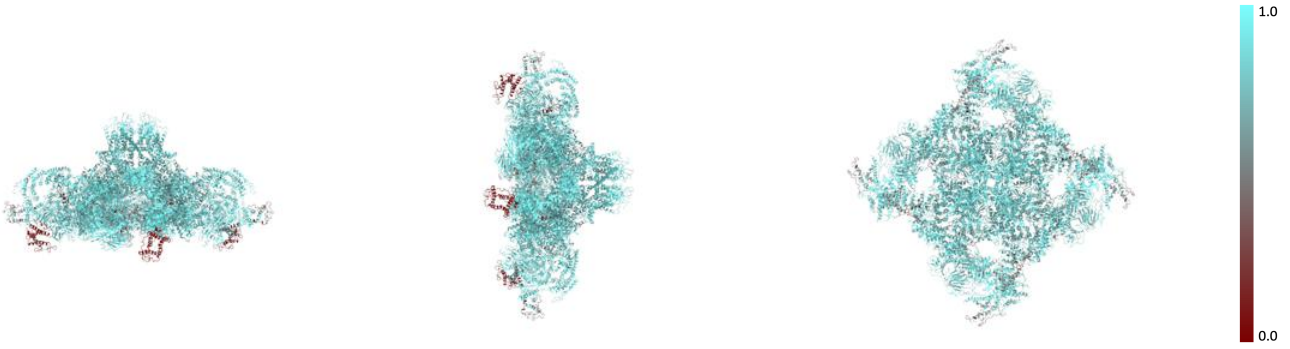
9.2 Q-score mapped to coordinate model



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.

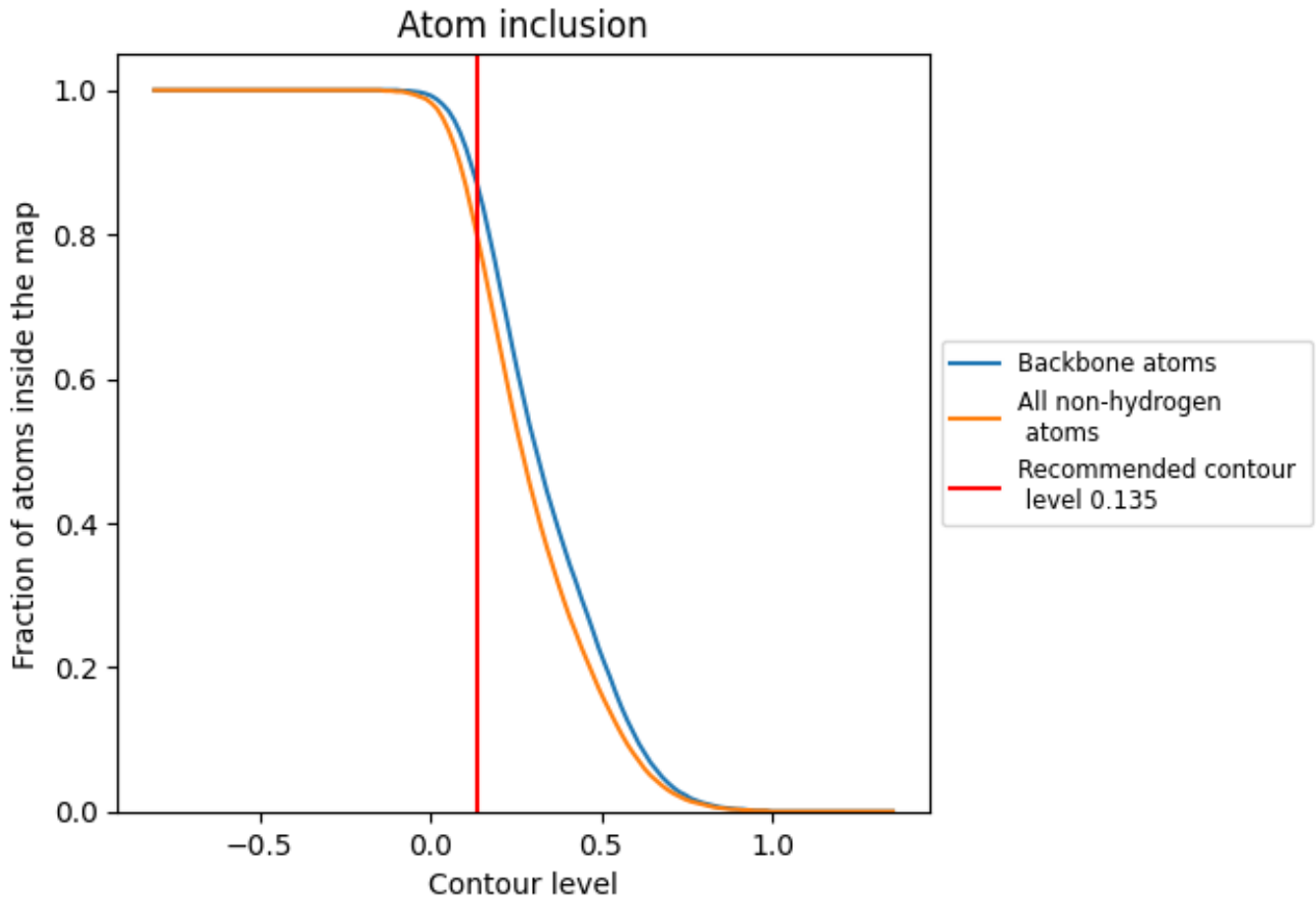
9.3 Atom inclusion mapped to coordinate model



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 (0.135).

9.4 Atom inclusion (i)



At the recommended contour level, 87% 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 (0.135) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8030	0.3860
A	0.8120	0.3950
B	0.8110	0.3950
C	0.8110	0.3960
D	0.7960	0.3770
E	0.8380	0.4100
F	0.8380	0.4150
G	0.8360	0.4110
H	0.8190	0.3940
I	0.6560	0.2530
J	0.6550	0.2540
K	0.6580	0.2500
L	0.6400	0.2360