wwPDB EM Validation Summary Report ⓘ

Nov 10, 2024 – 11:50 PM EST

PDB ID	:	9E1B
EMDB ID	:	EMD-47388
Title	:	Structure of RyR1 in the open state in the presence of dyphylline
Authors	:	Miotto, M.C.; Marks, A.R.
Deposited on	:	2024-10-21
Resolution	:	4.49 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:

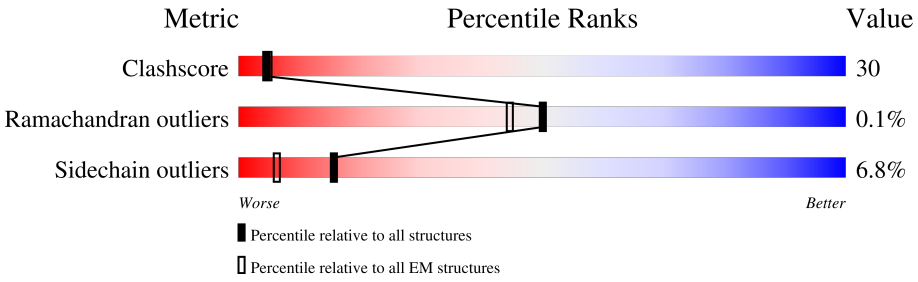
EMDB validation analysis	:	0.0.1.dev113
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, 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 4.49 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	57% 39% 45% · 13%
1	B	5037	57% 39% 45% · 13%
1	C	5037	57% 39% 45% · 13%
1	D	5037	57% 39% 45% · 13%
2	E	108	97% 32% 59% 7% ·
2	F	108	97% 37% 56% 6% ·
2	G	108	96% 42% 53% 5% ·
2	H	108	96% 42% 49% 8% ·

2 Entry composition (i)

There are 6 unique types of molecules in this entry. The entry contains 144128 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.

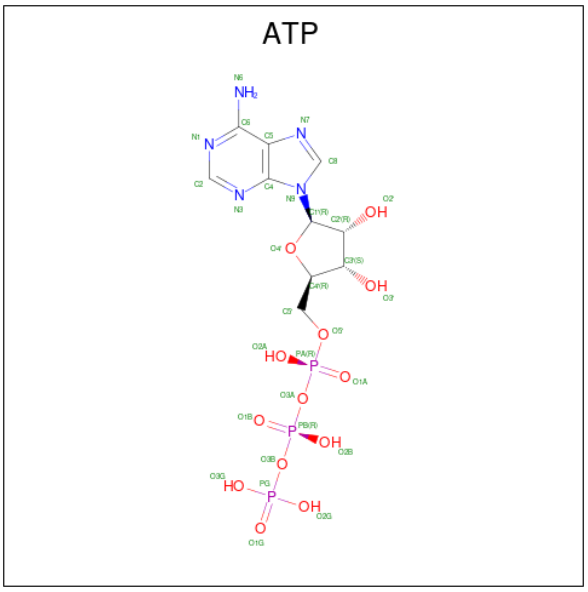
- Molecule 1 is a protein called Ryanodine receptor 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	4404	Total 35150	C 22365	N 6063	O 6485	S 237	9	0
1	B	4404	Total 35150	C 22365	N 6063	O 6485	S 237	9	0
1	D	4404	Total 35150	C 22365	N 6063	O 6485	S 237	9	0
1	C	4404	Total 35150	C 22365	N 6063	O 6485	S 237	9	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
2	E	107	Total 831	C 527	N 146	O 154	S 4	0	0
2	H	107	Total 831	C 527	N 146	O 154	S 4	0	0
2	G	107	Total 831	C 527	N 146	O 154	S 4	0	0
2	F	107	Total 831	C 527	N 146	O 154	S 4	0	0

- Molecule 3 is ADENOSINE-5'-TRIPHOSPHATE (three-letter code: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$).



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

- Molecule 4 is CALCIUM ION (three-letter code: CA) (formula: Ca).

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

- Molecule 5 is ZINC ION (three-letter code: ZN) (formula: Zn).

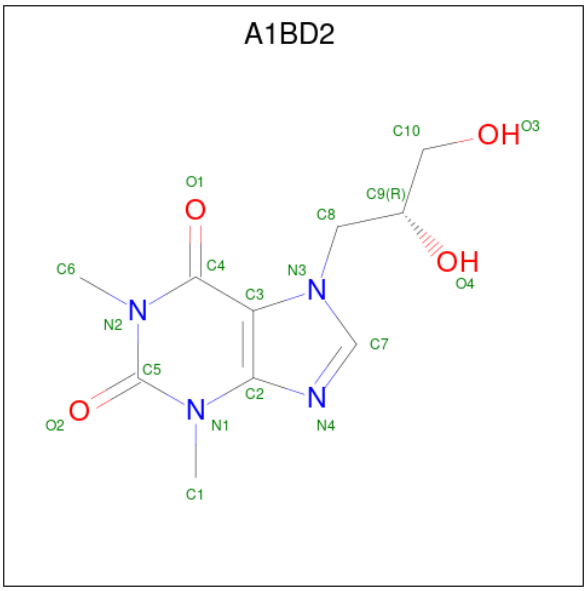
Mol	Chain	Residues	Atoms		AltConf
5	A	1	Total	Zn	0
			1	1	

Continued on next page...

Continued from previous page...

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

- Molecule 6 is dyphylline (three-letter code: A1BD2) (formula: $C_{10}H_{14}N_4O_4$) (labeled as "Ligand of Interest" by depositor).



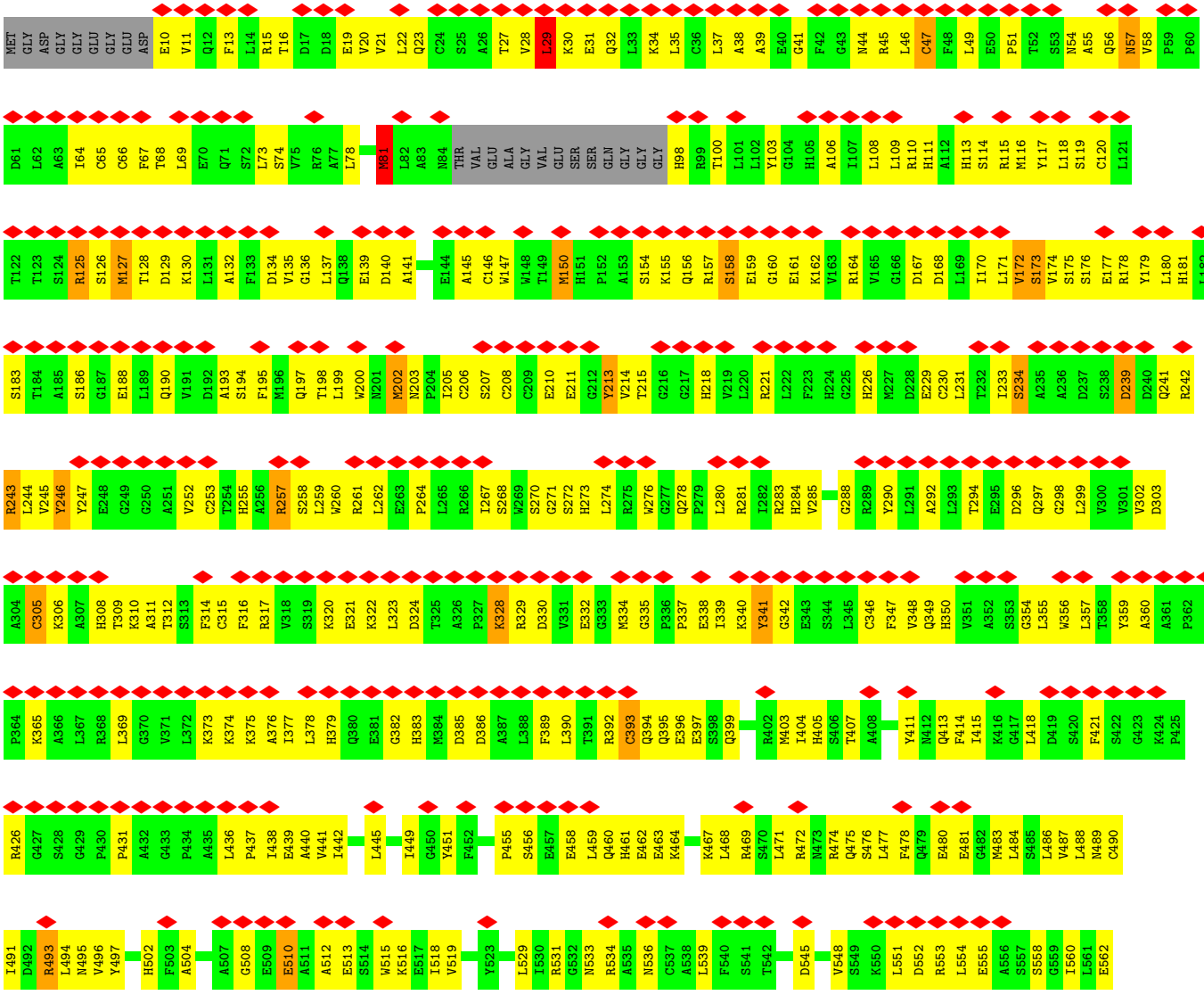
Mol	Chain	Residues	Atoms	AltConf
6	A	1	Total C N O 18 10 4 4	0
6	B	1	Total C N O 18 10 4 4	0
6	D	1	Total C N O 18 10 4 4	0
6	C	1	Total C N O 18 10 4 4	0

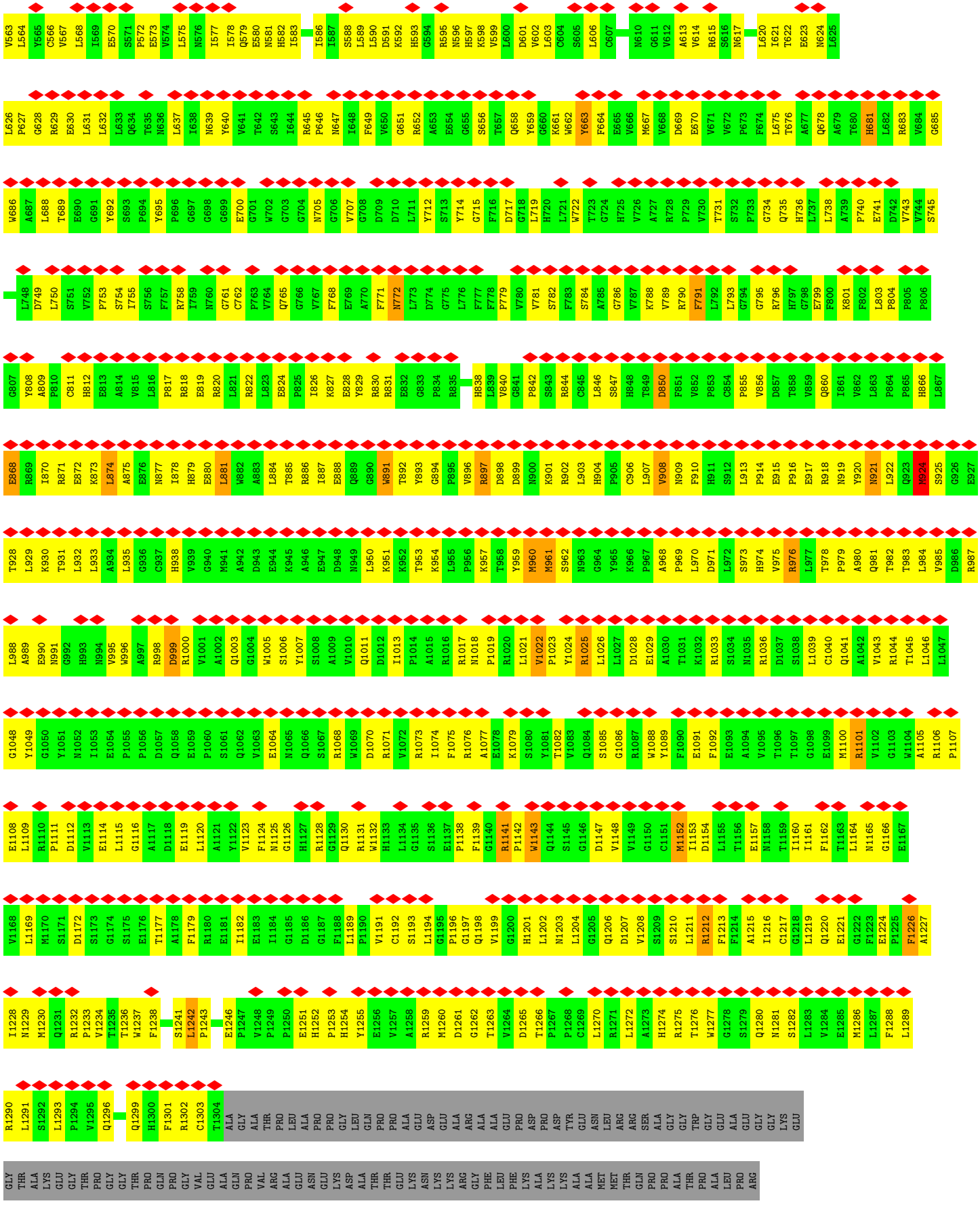
3 Residue-property plots (i)

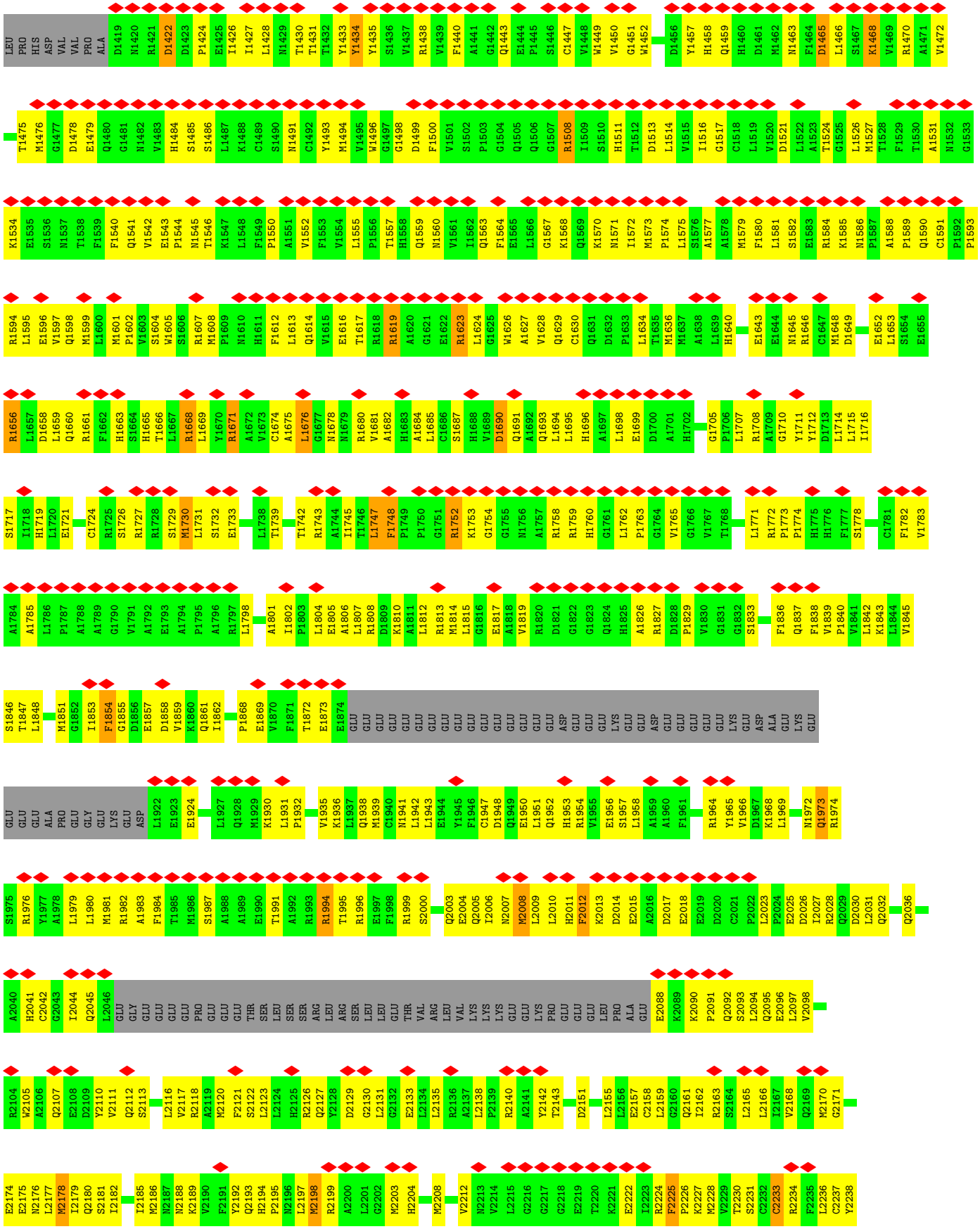
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion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

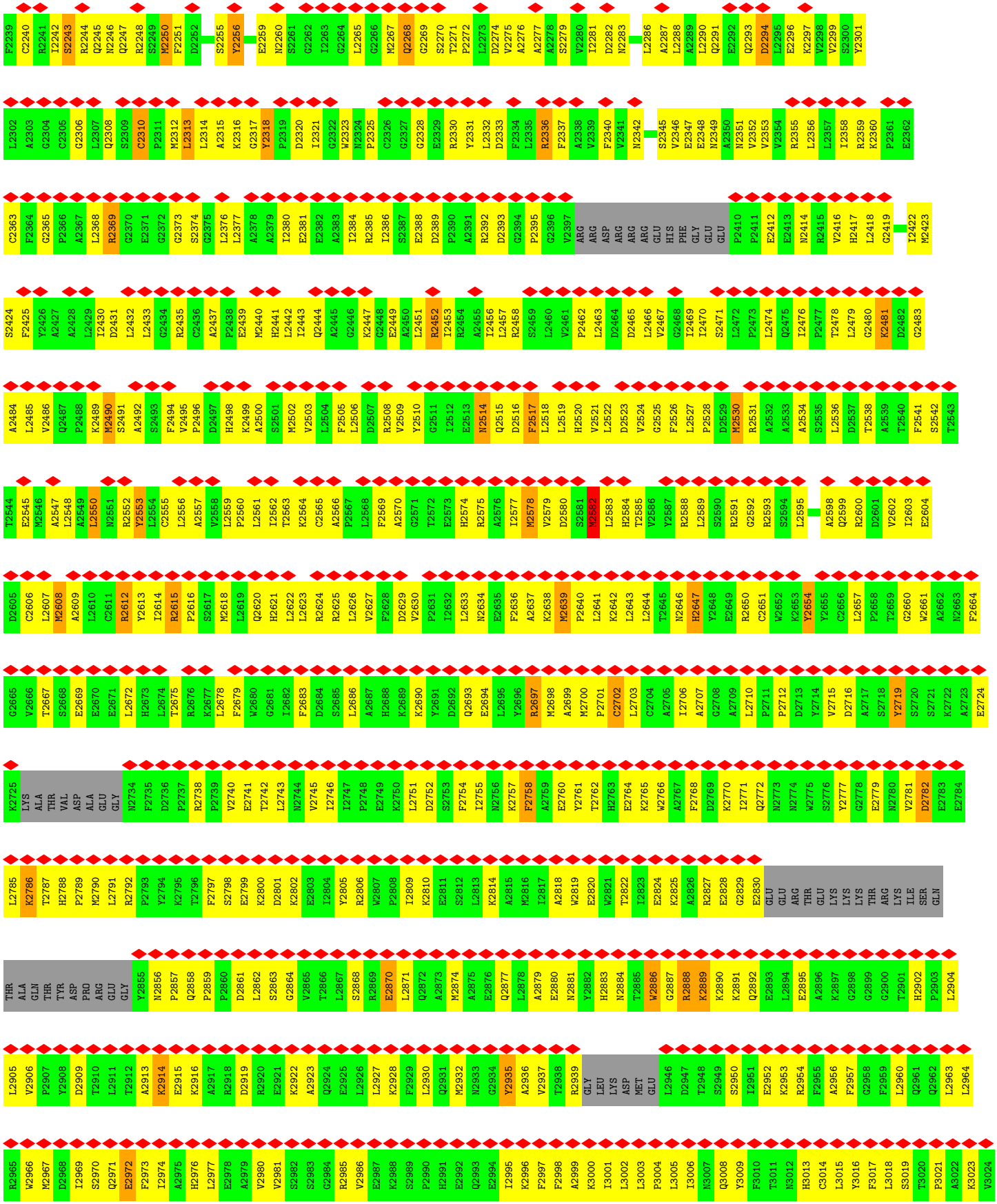
- Molecule 1: Ryanodine receptor 1

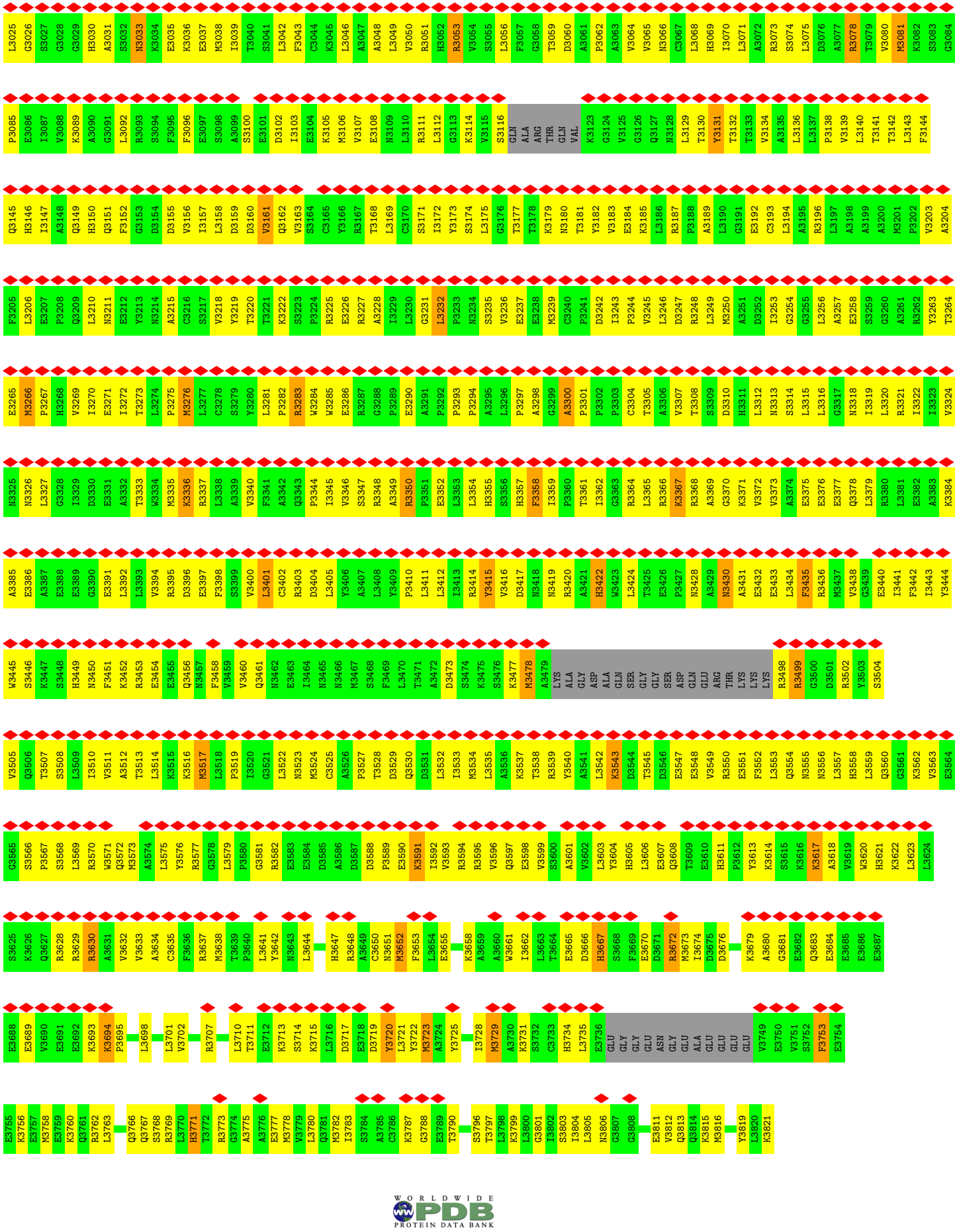
Chain A:

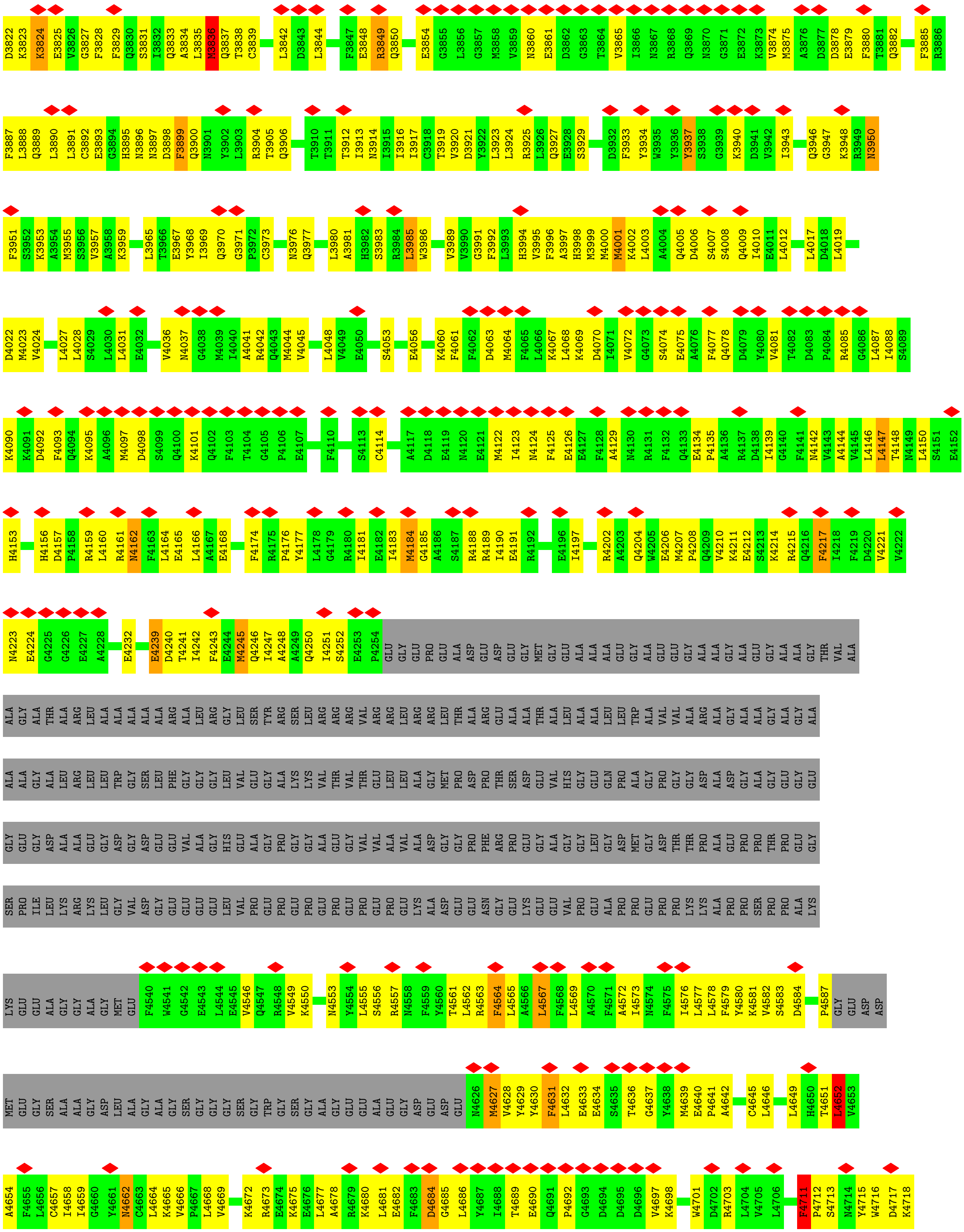


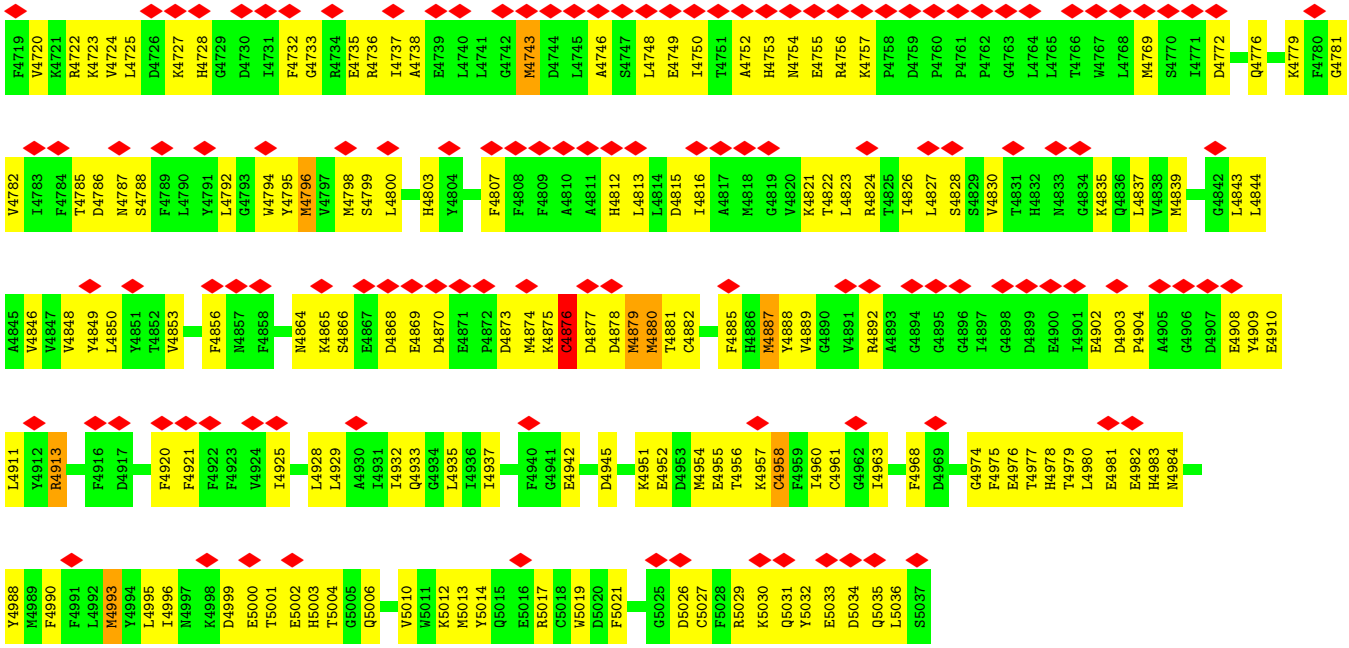

V563 L564 Y565 C566 V567 L568 I569 E570 S571 P572 E573 V574 L575 N576 I577 I578 Q579 E580 N581 H582 I583 I586 I587 S588 L589 L590 D591 K592 H593 G594 R595 N596 H597 K598 V599 L600 D601 V602 L603 C604 S605 L606 C607 N610 G611 V612 A613 V614 R615 S616 N617 L620 I621 T622 E623 N624 L625
L626 P627 G628 R629 E630 L631 L632 L633 Q634 T635 N636 L637 I638 N639 Y640 V641 T642 S643 I644 R645 P646 N647 I648 F649 V650 G651 R652 A653 E654 G655 S656 T657 Q658 Y659 G660 K661 W662 Y663 F664 E665 V666 M667 V668 D669 E670 V671 V672 P673 F674 L675 T676 A677 Q678 A679 T680 H681 L682 R683 V684 G685
W686 A687 L688 T689 E690 G691 Y692 S693 P694 Y695 P696 G697 G698 G699 E700 G701 W702 G703 G704 N705 G706 V707 G708 D709 D710 L711 Y712 S713 Y714 G715 F716 D717 G718 L719 H720 L721 W722 T723 G724 H725 V726 A727 R728 P729 V730 T731 S732 P733 G734 Q735 H736 L737 L738 A739 P740 E741 D742 V743 V744 S745
L748 D749 L750 S751 V752 P753 S754 I755 S756 F757 R758 I759 N760 G761 C762 P763 V764 Q765 G766 V767 F768 E769 A770 F771 N772 L773 D774 G775 L776 F777 F778 P779 V780 V781 S782 F783 S784 A785 G786 V787 K788 V789 R790 F791 L792 L793 G794 G795 R796 H797 G798 E799 F800 K801 F802 L803 P804 P805 P806
G807 Y808 A809 P810 C811 H812 E813 A814 V815 L816 P817 R818 E819 R820 L821 R822 L823 E824 P825 I826 K827 E828 Y829 R830 R831 E832 G833 P834 R835 H838 L839 V840 G841 P842 S843 R844 C845 L846 S847 H848 T849 D850 F851 V852 P853 C854 P855 V856 D857 T858 V859 Q860 I861 V862 L863 P864 P865 H866 L867
E868 R869 I870 R871 E872 K873 L874 A875 E876 N877 I878 H879 E880 L881 W882 A883 L884 T885 R886 I887 E888 Q889 G890 W891 T892 Y893 G894 P895 V896 R897 D898 D899 N900 K901 R902 L903 H904 P905 C906 L907 V908 N909 F910 H911 S912 L913 P914 E915 P916 E917 R918 N919 Y920 N921 L922 Q923 M924 S925 G926 E927
T928 L929 K930 T931 L932 L933 A934 L935 G936 C937 H938 V939 G940 M941 A942 D943 E944 K945 A946 E947 D948 N949 L950 K951 K952 T953 K954 L955 P956 K957 T958 Y959 M960 M961 S962 N963 G964 Y965 K966 P967 A968 P969 L970 D971 L972 S973 H974 V975 R976 L977 T978 P979 A980 Q981 T982 T983 L984 V985 D986 R987
L988 A989 E990 N991 G992 H993 N994 V995 W996 A997 R998 D999 R1000 V1001 A1002 Q1003 G1004 W1005 S1006 Y1007 S1008 A1009 V1010 Q1011 D1012 I1013 P1014 A1015 R1016 R1017 N1018 P1019 R1020 L1021 V1022 P1023 Y1024 R1025 L1026 L1027 D1028 E1029 A1030 T1031 K1032 R1033 S1034 N1035 R1036 D1037 S1038 L1039 C1040 Q1041 A1042 V1043 R1044 T1045 L1046 L1047
G1048 Y1049 G1050 Y1051 N1052 I1053 E1054 P1055 P1056 D1057 Q1058 E1059 P1060 S1061 Q1062 V1063 E1064 N1065 Q1066 S1067 R1068 W1069 D1070 R1071 V1072 R1073 I1074 F1075 R1076 A1077 E1078 K1079 S1080 Y1081 T1082 V1083 Q1084 S1085 G1086 R1087 W1088 Y1089 F1090 E1091 F1092 E1093 A1094 V1095 T1096 T1097 G1098 E1099 M1100 R1101 V1102 G1103 W1104 A1105 R1106 P1107
E1108 L1109 R1110 P1111 D1112 V1113 E1114 L1115 G1116 A1117 D1118 E1119 L1120 A1121 Y1122 V1123 F1124 N1125 G1126 H1127 R1128 G1129 Q1130 R1131 W1132 H1133 L1134 G1135 S1136 E1137 P1138 F1139 G1140 R1141 P1142 W1143 Q1144 S1145 G1146 D1147 V1148 V1149 G1150 C1151 M1152 I1153 D1154 L1155 T1156 E1157 N1158 T1159 I1160 I1161 F1162 T1163 L1164 N1165 G1166 E1167
V1168 L1169 M1170 S1171 D1172 S1173 G1174 S1175 E1176 T1177 A1178 F1179 R1180 E1181 I1182 E1183 I1184 G1185 D1186 G1187 F1188 L1189 P1190 V1191 C1192 S1193 L1194 G1195 P1196 G1197 Q1198 V1199 G1200 H1201 L1202 N1203 L1204 G1205 Q1206 D1207 V1208 S1209 S1210 L1211 R1212 F1213 F1214 A1215 I1216 C1217 G1218 L1219 Q1220 E1221 G1222 F1223 E1224 P1225 F1226 A1227
I1228 N1229 M1230 Q1231 R1232 P1233 V1234 T1235 T1236 W1237 F1238 S1241 L1242 P1243 E1246 P1247 V1248 P1249 P1250 E1251 H1252 P1253 H1254 Y1255 E1256 V1257 A1258 R1259 M1260 D1261 G1262 T1263 V1264 D1265 T1266 P1267 P1268 C1269 L1270 R1271 L1272 A1273 H1274 R1275 T1276 W1277 G1278 S1279 Q1280 N1281 S1282 L1283 V1284 E1285 M1286 L1287 F1288 L1289
R1290 L1291 S1292 L1293 P1294 V1295 Q1296 Q1299 H1300 F1301 R1302 C1303 T1304 ALA 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 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




F2239 C2240 R2241 I2242 S2243 R2244 Q2245 N2246 Q2247 R2248 S2249 M2250 F2251 D2252 S2255 Y2256 E2259 N2260 S2261 G2262 I2263 G2264 L2265 G2266 M2267 Q2268 G2269 S2270 T2271 P2272 L2273 D2274 V2275 A2276 A2277 A2278 S2279 V2280 I2281 D2282 N2283 L2286 A2287 L2288 A2289 L2290 Q2291 E2292 Q2293 D2294 L2295 E2296 K2297 V2298 V2299 S2300 Y2301
L2302 A2303 G2304 C2305 G2306 L2307 Q2308 S2309 C2310 P2311 M2312 L2313 L2314 A2315 K2316 G2317 Y2318 P2319 D2320 I2321 G2322 W2323 N2324 P2325 C2326 G2327 G2328 E2329 R2330 Y2331 L2332 D2333 F2334 L2335 R2336 F2337 A2338 V2339 F2340 V2341 N2342 S2345 V2346 E2347 E2348 N2349 A2350 N2351 V2352 V2353 V2354 R2355 L2356 L2357 I2358 R2359 K2360 P2361 E2362
C2363 F2364 G2365 P2366 A2367 L2368 R2369 G2370 E2371 G2372 G2373 S2374 C2375 L2376 L2377 A2378 A2379 I2380 E2381 E2382 A2383 I2384 R2385 I2386 S2387 E2388 D2389 P2390 A2391 R2392 D2393 G2394 P2395 G2396 V2397 ARG ARG ASP ARG ARG GLU HIS PHE GLY GLU GLU P2410 P2411 E2412 E2413 N2414 R2415 V2416 H2417 L2418 G2419 I2422 M2423
S2424 F2425 Y2426 A2427 A2428 L2429 I2430 D2431 L2432 L2433 G2434 R2435 C2436 A2437 P2438 E2439 M2440 H2441 L2442 I2443 Q2444 A2445 G2446 K2447 G2448 E2449 A2450 L2451 R2452 I2453 R2454 A2455 I2456 L2457 R2458 S2459 L2460 V2461 P2462 L2463 D2464 D2465 L2466 V2467 G2468 I2469 I2470 S2471 L2472 P2473 L2474 Q2475 I2476 P2477 T2478 L2479 G2480 K2481 D2482 G2483
A2484 L2485 V2486 Q2487 P2488 K2489 M2490 S2491 A2492 S2493 F2494 V2495 P2496 D2497 H2498 K2499 A2500 S2501 M2502 V2503 L2504 F2505 L2506 D2507 R2508 V2509 Y2510 G2511 I2512 E2513 N2514 Q2515 D2516 F2517 L2518 L2519 H2520 V2521 L2522 D2523 V2524 G2525 F2526 L2527 P2528 D2529 M2530 R2531 A2532 A2533 A2534 S2535 L2536 D2537 T2538 A2539 T2540 F2541 S2542 T2543
T2544 E2545 M2546 A2547 L2548 A2549 L2550 N2551 R2552 Y2553 L2554 C2555 L2556 A2557 V2558 L2559 P2560 L2561 I2562 T2563 K2564 C2565 A2566 P2567 L2568 F2569 A2570 G2571 T2572 E2573 H2574 R2575 A2576 I2577 M2578 V2579 D2580 S2581 M2582 L2583 H2584 T2585 V2586 Y2587 R2588 L2589 S2590 R2591 G2592 R2593 S2594 L2595 A2598 Q2599 R2600 D2601 V2602 I2603 E2604
D2605 C2606 L2607 M2608 A2609 L2610 C2611 R2612 Y2613 I2614 R2615 P2616 S2617 M2618 L2619 Q2620 H2621 I2622 L2623 R2624 R2625 L2626 V2627 F2628 D2629 V2630 P2631 I2632 L2633 N2634 E2635 F2636 A2637 K2638 M2639 P2640 L2641 K2642 L2643 L2644 T2645 N2646 H2647 Y2648 E2649 R2650 C2651 W2652 K2653 Y2654 Y2655 C2656 L2657 P2658 T2659 G2660 W2661 A2662 N2663 F2664
G2665 V2666 T2667 S2668 E2669 E2670 E2671 L2672 H2673 L2674 T2675 R2676 K2677 L2678 F2679 W2680 G2681 I2682 F2683 D2684 S2685 L2686 A2687 H2688 K2689 K2690 Y2691 D2692 Q2693 E2694 L2695 Y2696 R2697 M2698 A2699 M2700 P2701 C2702 L2703 C2704 A2705 I2706 A2707 G2708 A2709 L2710 P2711 P2712 D2713 Y2714 V2715 D2716 A2717 S2718 Y2719 S2720 S2721 K2722 A2723 E2724
K2725 LYS ALA THR VAL ASP ALA GLU GLY N2734 F2735 D2736 P2737 R2738 P2739 V2740 E2741 T2742 L2743 N2744 V2745 I2746 I2747 P2748 E2749 K2750 L2751 D2752 S2753 F2754 I2755 N2756 K2757 F2758 A2759 E2760 Y2761 T2762 H2763 E2764 K2765 W2766 A2767 F2768 D2769 K2770 I2771 Q2772 N2773 N2774 W2775 S2776 Y2777 G2778 E2779 N2780 V2781 D2782 E2783 E2784
L2785 K2786 T2787 H2788 P2789 M2790 L2791 R2792 P2793 Y2794 K2795 T2796 F2797 S2798 E2799 K2800 D2801 K2802 E2803 I2804 Y2805 R2806 W2807 P2808 I2809 K2810 E2811 S2812 L2813 K2814 A2815 M2816 I2817 A2818 W2819 E2820 W2821 T2822 I2823 E2824 K2825 A2826 R2827 E2828 G2829 E2830 GLU GLU ARG THR GLU LYS LYS LYS THR ARG LYS ILE SER GLN
THR ALA GLN THR TYR ASP PRO ARG GLU GLY Y2855 N2856 P2857 Q2858 P2859 P2860 D2861 L2862 S2863 G2864 V2865 T2866 L2867 S2868 R2869 E2870 L2871 Q2872 A2873 M2874 A2875 E2876 Q2877 L2878 A2879 E2880 N2881 Y2882 H2883 N2884 T2885 W2886 G2887 R2888 K2889 K2890 K2891 Q2892 E2893 L2894 E2895 A2896 K2897 G2898 G2899 G2900 T2901 H2902 P2903 L2904
L2905 V2906 P2907 Y2908 D2909 T2910 L2911 T2912 A2913 K2914 E2915 K2916 A2917 R2918 D2919 R2920 E2921 K2922 A2923 Q2924 E2925 L2926 L2927 K2928 F2929 L2930 Q2931 M2932 N2933 G2934 Y2935 A2936 V2937 T2938 R2939 GLY LEU LYS ASP MET GLU L2946 D2947 T2948 S2949 S2950 I2951 E2952 K2953 R2954 F2955 A2956 F2957 G2958 F2959 L2960 Q2961 Q2962 L2963 L2964
R2965 W2966 M2967 D2968 I2969 S2970 Q2971 E2972 F2973 I2974 A2975 H2976 L2977 E2978 A2979 V2980 V2981 S2982 S2983 G2984 R2985 V2986 E2987 K2988 S2989 P2990 H2991 E2992 Q2993 E2994 I2995 K2996 F2997 F2998 A2999 K3000 I3001 L3002 L3003 P3004 L3005 I3006 N3007 Q3008 Y3009 F3010 T3011 N3012 H3013 C3014 L3015 Y3016 F3017 L3018 S3019 T3020 P3021 A3022 K3023 V3024

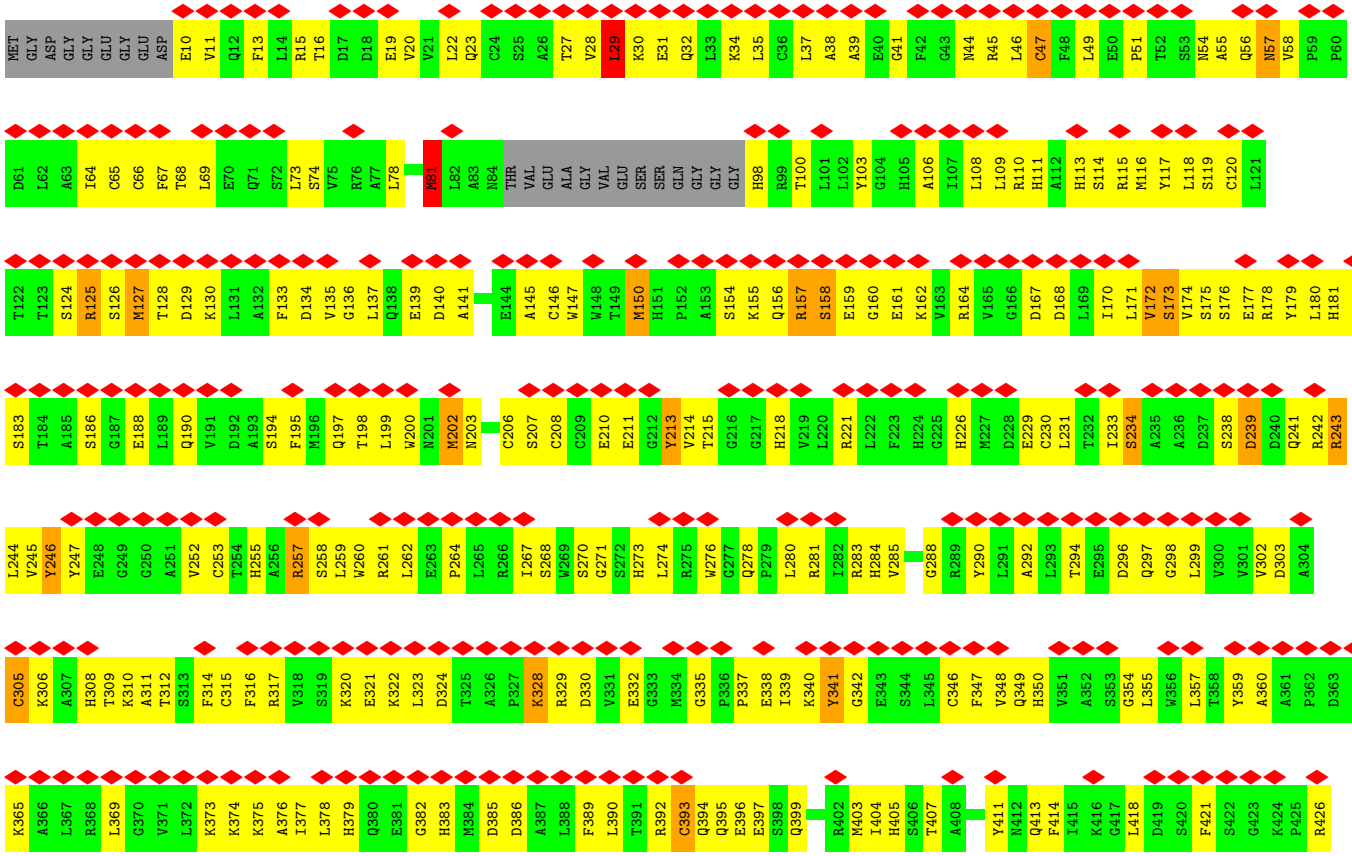

L3025 G3026 S3027 G3028 G3029 H3030 A3031 S3032 M3033 K3034 E3035 K3036 E3037 M3038 I3039 T3040 S3041 L3042 F3043 C3044 K3045 L3046 A3047 A3048 L3049 V3050 R3051 H3052 R3053 V3054 S3055 L3056 F3057 G3058 T3059 D3060 A3061 P3062 A3063 V3064 V3065 N3066 C3067 L3068 H3069 I3070 L3071 A3072 R3073 S3074 L3075 D3076 A3077 R3078 T3079 V3080 M3081 K3082 S3083 G3084
P3085 E3086 I3087 V3088 K3089 A3090 G3091 L3092 R3093 S3094 F3095 F3096 E3097 S3098 A3099 S3100 E3101 D3102 I3103 E3104 K3105 M3106 V3107 E3108 N3109 L3110 R3111 L3112 G3113 K3114 V3115 S3116 GLN ALA ARG THR GLN VAL K3123 G3124 V3125 G3126 Q3127 N3128 L3129 T3130 Y3131 T3132 T3133 V3134 A3135 L3136 L3137 P3138 V3139 L3140 T3141 T3142 L3143 F3144
Q3145 H3146 I3147 A3148 Q3149 H3150 Q3151 F3152 G3153 D3154 D3155 V3156 I3157 L3158 D3159 D3160 V3161 Q3162 V3163 S3164 C3165 Y3166 R3167 T3168 L3169 C3170 S3171 I3172 Y3173 S3174 L3175 G3176 T3177 T3178 K3179 N3180 T3181 Y3182 V3183 E3184 K3185 L3186 R3187 P3188 A3189 L3190 G3191 E3192 C3193 L3194 A3195 R3196 L3197 A3198 A3199 A3200 M3201 P3202 V3203 A3204
F3205 L3206 E3207 P3208 Q3209 L3210 N3211 E3212 Y3213 N3214 A3215 C3216 S3217 V3218 Y3219 T3220 T3221 K3222 S3223 P3224 R3225 E3226 R3227 A3228 I3229 L3230 G3231 L3232 P3233 N3234 S3235 V3236 E3237 E3238 M3239 C3240 P3241 D3242 I3243 P3244 V3245 L3246 D3247 R3248 L3249 M3250 A3251 D3252 I3253 G3254 G3255 L3256 A3257 E3258 S3259 G3260 A3261 R3262 Y3263 T3264
E3265 M3266 P3267 H3268 V3269 I3270 E3271 I3272 T3273 L3274 P3275 M3276 L3277 C3278 S3279 Y3280 L3281 P3282 R3283 W3284 W3285 E3286 R3287 G3288 P3289 E3290 A3291 P3292 P3293 P3294 A3295 L3296 P3297 A3298 G3299 A3300 P3301 P3302 P3303 C3304 T3305 A3306 V3307 T3308 S3309 D3310 H3311 L3312 N3313 S3314 L3315 L3316 G3317 N3318 I3319 L3320 R3321 I3322 I3323 V3324
N3325 N3326 L3327 G3328 I3329 D3330 E3331 A3332 T3333 W3334 M3335 K3336 R3337 L3338 A3339 V3340 F3341 A3342 Q3343 P3344 I3345 V3346 S3347 R3348 A3349 R3350 P3351 E3352 L3353 L3354 H3355 S3356 H3357 F3358 I3359 P3360 T3361 I3362 G3363 R3364 L3365 R3366 K3367 R3368 A3369 G3370 K3371 V3372 V3373 A3374 E3375 E3376 E3377 Q3378 L3379 R3380 L3381 E3382 A3383 K3384
A3385 E3386 A3387 E3388 E3389 G3390 E3391 L3392 L3393 V3394 R3395 D3396 E3397 F3398 S3399 V3400 L3401 C3402 R3403 D3404 L3405 Y3406 A3407 L3408 Y3409 P3410 L3411 L3412 I3413 R3414 Y3415 V3416 D3417 N3418 N3419 R3420 A3421 H3422 W3423 L3424 T3425 E3426 P3427 N3428 A3429 N3430 A3431 E3432 E3433 L3434 P3435 R3436 M3437 V3438 G3439 E3440 I3441 F3442 I3443 Y3444
W3445 S3446 K3447 S3448 H3449 N3450 F3451 K3452 R3453 E3454 E3455 Q3456 N3457 F3458 V3459 V3460 Q3461 N3462 E3463 I3464 N3465 N3466 M3467 S3468 F3469 L3470 T3471 A3472 D3473 S3474 K3475 S3476 K3477 M3478 A3479 LYS ALA GLY ASP ALA GLN SER GLY GLY SER ASP GLN GLU ARG THR LYS LYS LYS R3498 R3499 G3500 D3501 R3502 Y3503 S3504
Y3505 Q3506 T3507 S3508 L3509 I3510 V3511 A3512 T3513 L3514 K3515 K3516 M3517 L3518 P3519 I3520 G3521 L3522 N3523 M3524 C3525 A3526 P3527 T3528 D3529 Q3530 D3531 L3532 I3533 M3534 L3535 A3536 K3537 T3538 R3539 Y3540 A3541 L3542 K3543 D3544 T3545 D3546 E3547 E3548 V3549 R3550 E3551 F3552 L3553 Q3554 N3555 N3556 L3557 H3558 L3559 Q3560 G3561 K3562 V3563 E3564
G3565 S3566 P3567 S3568 L3569 R3570 W3571 Q3572 M3573 A3574 L3575 Y3576 R3577 G3578 L3579 P3580 G3581 R3582 E3583 E3584 D3585 A3586 D3587 D3588 P3589 E3590 K3591 I3592 V3593 R3594 R3595 V3596 Q3597 E3598 V3599 S3600 A3601 V3602 L3603 Y3604 H3605 L3606 E3607 Q3608 T3609 E3610 H3611 P3612 Y3613 K3614 S3615 K3616 K3617 A3618 V3619 W3620 H3621 K3622 L3623 L3624
S3625 K3626 Q3627 R3628 R3629 R3630 A3631 V3632 V3633 A3634 C3635 F3636 R3637 M3638 T3639 P3640 L3641 Y3642 N3643 L3644 H3647 R3648 A3649 C3650 N3651 M3652 F3653 L3654 E3655 K3658 A3659 A3660 W3661 I3662 L3663 T3664 E3665 D3666 H3667 S3668 F3669 E3670 D3671 R3672 M3673 I3674 D3675 D3676 K3679 A3680 G3681 E3682 Q3683 E3684 E3685 E3686 E3687
E3688 E3689 V3690 E3691 E3692 K3693 K3694 P3695 L3698 L3701 V3702 R3707 L3710 T3711 E3712 K3713 S3714 K3715 L3716 D3717 E3718 D3719 Y3720 L3721 Y3722 M3723 A3724 Y3725 I3728 M3729 A3730 K3731 S3732 C3733 H3734 L3735 E3736 GLU GLY GLY GLU ASN GLY GLU ALA GLU GLU GLU GLU V3749 E3750 V3751 S3752 F3753 E3754
E3755 K3756 E3757 M3758 E3759 K3760 Q3761 R3762 L3763 Q3766 Q3767 S3768 R3769 L3770 R3771 T3772 R3773 G3774 A3775 A3776 E3777 M3778 V3779 L3780 Q3781 M3782 I3783 S3784 A3785 C3786 K3787 G3788 E3789 T3790 S3796 T3797 L3798 K3799 L3800 G3801 I3802 S3803 I3804 L3805 N3806 G3807 G3808 E3811 V3812 Q3813 Q3814 K3815 M3816 Y3819 L3820 K3821

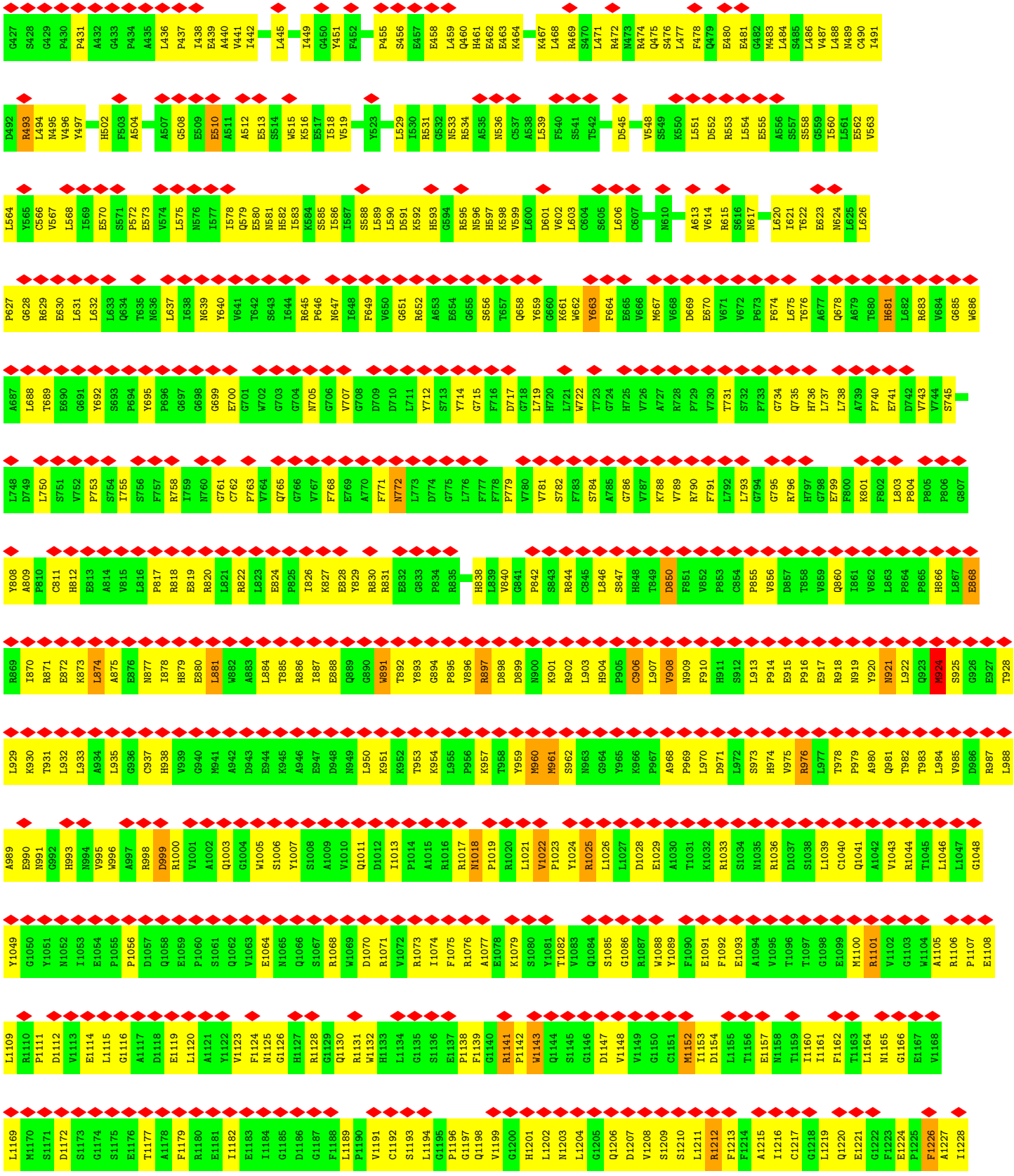

D3822 K3823 K3824 E3825 V3826 G3827 F3828 F3829 Q3830 S3831 I3832 Q3833 A3834 L3835 M3836 Q3837 T3838 C3839 L3842 D3843 L3844 F3847 E3848 R3849 Q3850 E3854 G3855 L3856 G3857 M3858 V3859 N3860 E3861 D3862 G3863 T3864 V3865 I3866 N3867 R3868 Q3869 N3870 G3871 E3872 K3873 V3874 M3875 A3876 D3877 D3878 E3879 F3880 T3881 Q3882 F3885 R3886
F3887 L3888 Q3889 L3890 L3891 C3892 E3893 G3894 H3895 N3896 N3897 D3898 F3899 Q3900 N3901 Y3902 L3903 R3904 T3905 Q3906 T3910 T3911 T3912 I3913 N3914 I3915 I3916 I3917 C3918 T3919 V3920 D3921 Y3922 L3923 L3924 R3925 L3926 Q3927 E3928 S3929 D3932 F3933 Y3934 W3935 Y3936 Y3937 S3938 G3939 K3940 D3941 V3942 I3943 Q3946 G3947 K3948 R3949 N3950
F3951 S3952 K3953 A3954 M3955 S3956 V3957 A3958 K3959 L3965 T3966 E3967 Y3968 I3969 Q3970 G3971 P3972 C3973 N3976 Q3977 L3980 A3981 H3982 S3983 R3984 L3985 W3986 V3989 V3990 G3991 F3992 L3993 H3994 V3995 F3996 A3997 H3998 M3999 M4000 M4001 K4002 L4003 A4004 Q4005 D4006 S4007 S4008 Q4009 I4010 E4011 L4012 L4017 D4018 L4019
D4022 M4023 V4024 L4027 L4028 S4029 L4030 L4031 E4032 V4036 N4037 G4038 M4039 I4040 A4041 R4042 Q4043 M4044 V4045 L4048 V4049 E4050 S4053 E4056 K4060 F4061 F4062 D4063 M4064 F4065 L4066 K4067 L4068 K4069 D4070 I4071 V4072 G4073 S4074 E4075 A4076 F4077 Q4078 D4079 Y4080 V4081 T4082 D4083 P4084 R4085 G4086 L4087 I4088 S4089
K4090 K4091 D4092 F4093 Q4094 K4095 A4096 M4097 D4098 S4099 Q4100 K4101 Q4102 F4103 T4104 G4105 P4106 E4107 F4110 S4113 C4114 A4117 D4118 E4119 N4120 E4121 M4122 I4123 N4124 F4125 E4126 E4127 F4128 A4129 N4130 R4131 F4132 Q4133 E4134 P4135 A4136 R4137 D4138 I4139 G4140 F4141 N4142 V4143 A4144 V4145 L4146 L4147 T4148 N4149 L4150 S4151 E4152
H4153 H4156 D4157 P4158 R4159 L4160 R4161 N4162 F4163 L4164 E4165 L4166 A4167 E4168 F4174 R4175 P4176 Y4177 L4178 G4179 R4180 I4181 E4182 I4183 M4184 G4185 A4186 S4187 R4188 R4189 I4190 E4191 R4192 E4196 I4197 R4202 A4203 Q4204 W4205 E4206 M4207 P4208 Q4209 V4210 K4211 E4212 S4213 K4214 R4215 Q4216 F4217 I4218 F4219 D4220 V4221 V4222
N4223 E4224 G4225 G4226 E4227 A4228 E4232 E4239 D4240 T4241 I4242 F4243 E4244 M4245 Q4246 I4247 A4248 A4249 Q4250 I4251 S4252 E4253 P4254 GLU GLY GLU PRO GLU ALA ASP GLU ASP GLU GLY MET GLY GLU ALA ALA ALA GLU GLY ALA GLU GLU GLY ALA ALA GLY ALA GLU GLY ALA ALA GLY THR VAL ALA
ALA GLY ALA THR ALA ARG LEU ALA ALA ALA ALA ARG ALA LEU ARG GLY LEU SER TYR ARG SER LEU ARG ARG ARG VAL ARG ARG LEU ARG ARG LEU THR ALA ARG GLU ALA ALA THR ALA LEU ALA ALA LEU LEU TRP ALA VAL VAL ALA ARG ALA GLY ALA ALA GLY ALA GLY ALA
ALA ALA GLY ALA LEU ARG LEU LEU TRP GLY SER LEU PHE GLY GLY GLY LEU VAL GLU GLY ALA LYS LYS VAL THR THR VAL THR GLU LEU LEU ALA GLY MET PRO ASP PRO THR SER ASP GLU VAL HIS GLY GLU GLN PRO ALA GLY PRO GLY GLY ASP ALA ASP GLY ALA GLY GLU GLY GLU
GLY GLU GLY ASP ALA ALA GLU GLY ASP GLY ASP GLU GLU VAL ALA GLY HIS GLU ALA GLY PRO GLY GLY ALA GLU GLY VAL VAL ALA VAL ALA ASP GLY GLY PRO PHE ARG PRO GLU GLY ALA GLY GLY LEU GLY ASP MET GLY ASP THR THR PRO ALA GLU PRO PRO THR PRO GLU GLY
SER PRO ILE LEU LYS ARG LYS LEU GLY VAL ASP GLY GLU GLU GLU GLU LEU VAL PRO GLU PRO GLU PRO GLU PRO GLU PRO GLU PRO GLU LYS ALA ASP GLU GLU ASN GLY GLU LYS GLU GLU VAL PRO GLU ALA PRO PRO GLU PRO PRO LYS LYS ALA PRO PRO SER PRO PRO ALA LYS
LYS GLU GLU ALA GLY GLY ALA GLY MET GLU F4540 W4541 G4542 E4543 L4544 E4545 V4546 Q4547 R4548 V4549 K4550 N4553 Y4554 L4555 S4556 R4557 N4558 F4559 Y4560 T4561 L4562 R4563 F4564 L4565 A4566 L4567 F4568 L4569 A4570 F4571 A4572 I4573 N4574 F4575 I4576 L4577 L4578 F4579 Y4580 K4581 V4582 S4583 D4584 P4587 GLY GLU ASP ASP
MET GLU GLY SER ALA ALA GLY ASP LEU ALA GLY ALA GLY SER GLY GLY GLY SER GLY TRP GLY SER GLY ALA GLY GLU GLU ALA GLU GLY ASP GLU ASP GLU N4626 M4627 V4628 Y4629 Y4630 F4631 L4632 E4633 E4634 S4635 T4636 G4637 Y4638 M4639 E4640 P4641 A4642 C4645 L4646 L4649 H4650 T4651 L4652 V4653
A4654 F4655 L4656 C4657 I4658 I4659 G4660 Y4661 N4662 C4663 L4664 K4665 V4666 P4667 L4668 V4669 K4672 R4673 E4674 K4675 E4676 L4677 A4678 R4679 K4680 L4681 E4682 F4683 D4684 G4685 L4686 Y4687 I4688 T4689 E4690 Q4691 P4692 G4693 D4694 D4695 D4696 V4697 K4698 W4701 D4702 R4703 L4704 V4705 L4706 F4711 P4712 S4713 N4714 Y4715 W4716 D4717 K4718

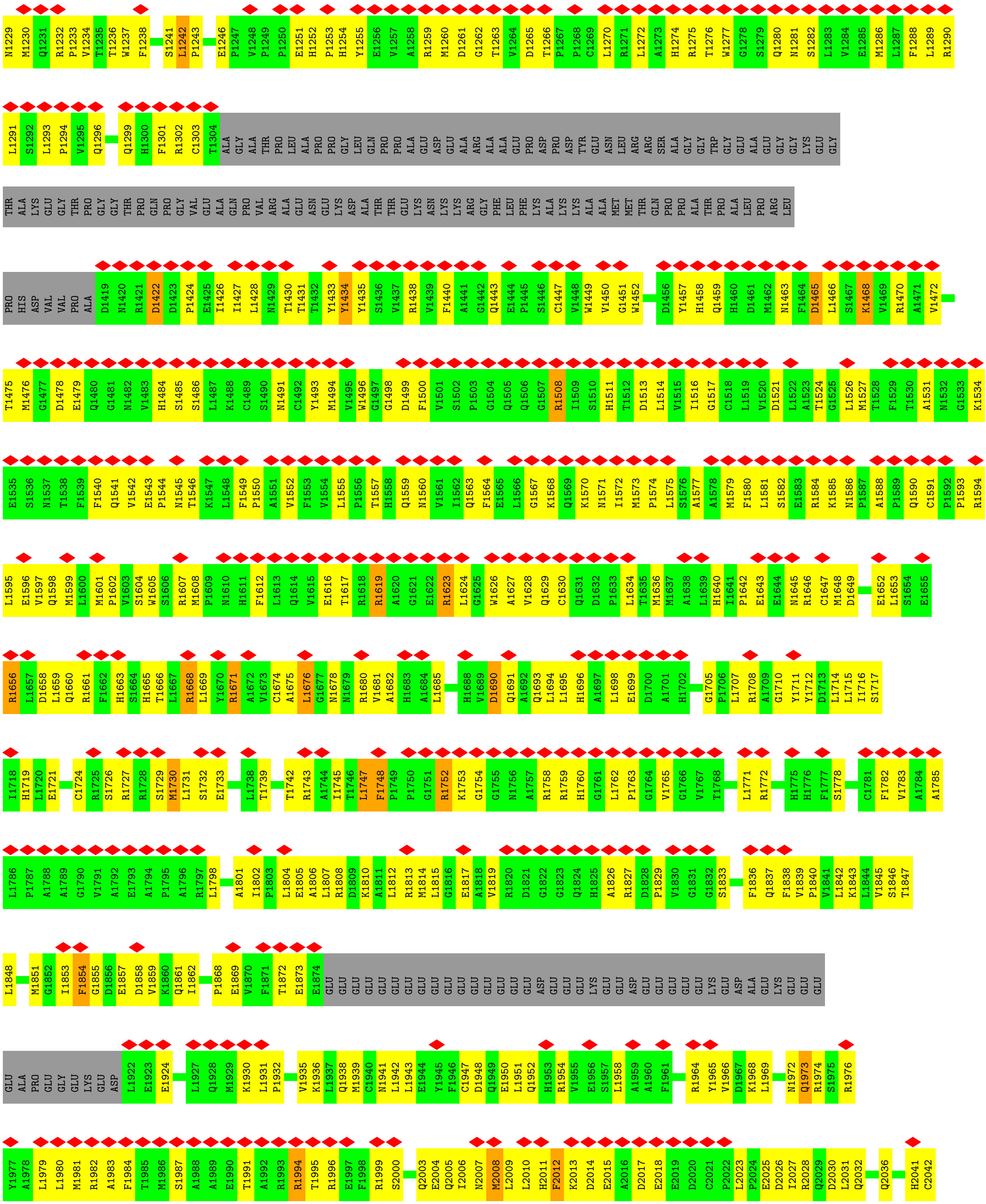


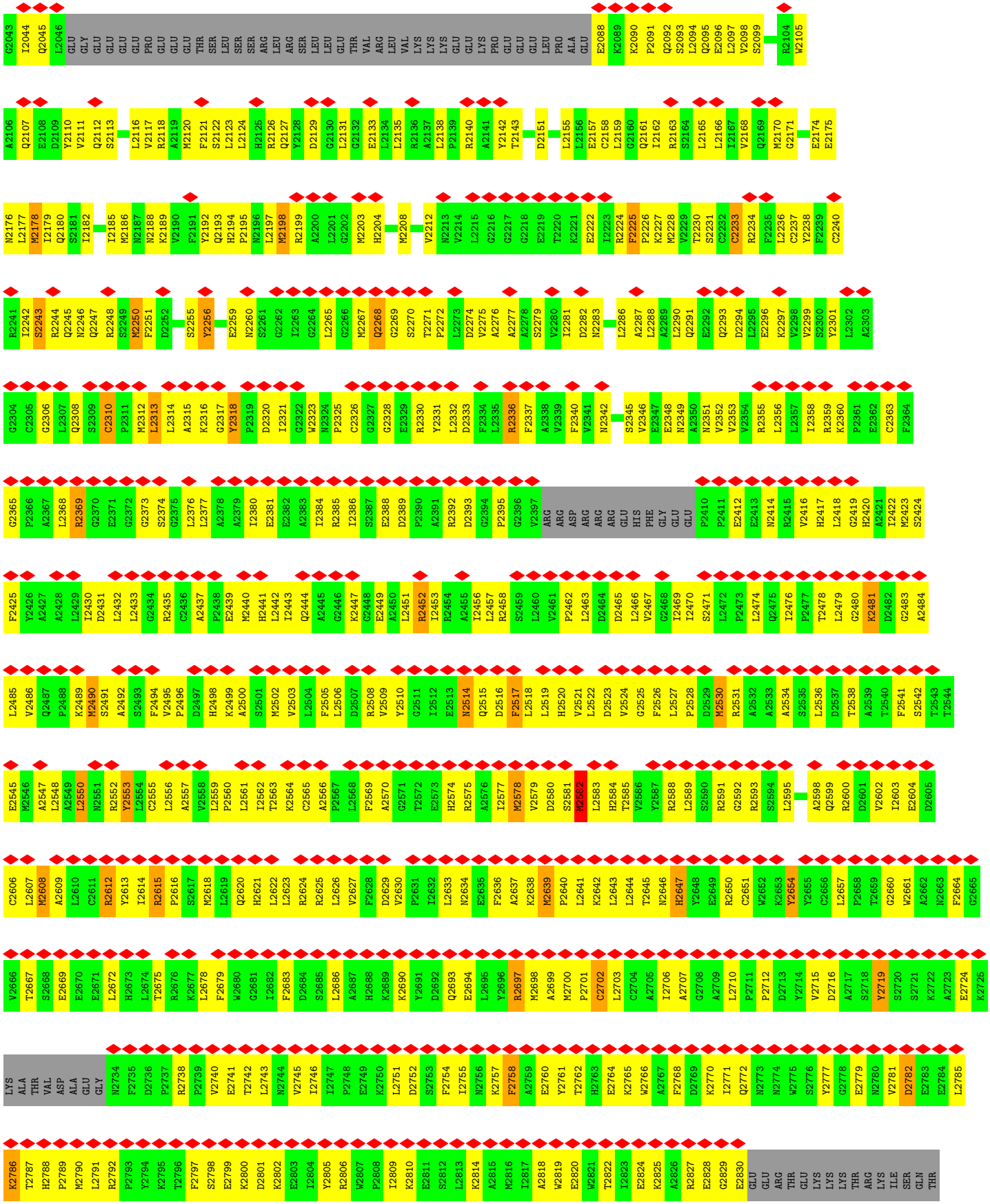
• Molecule 1: Ryanodine receptor 1

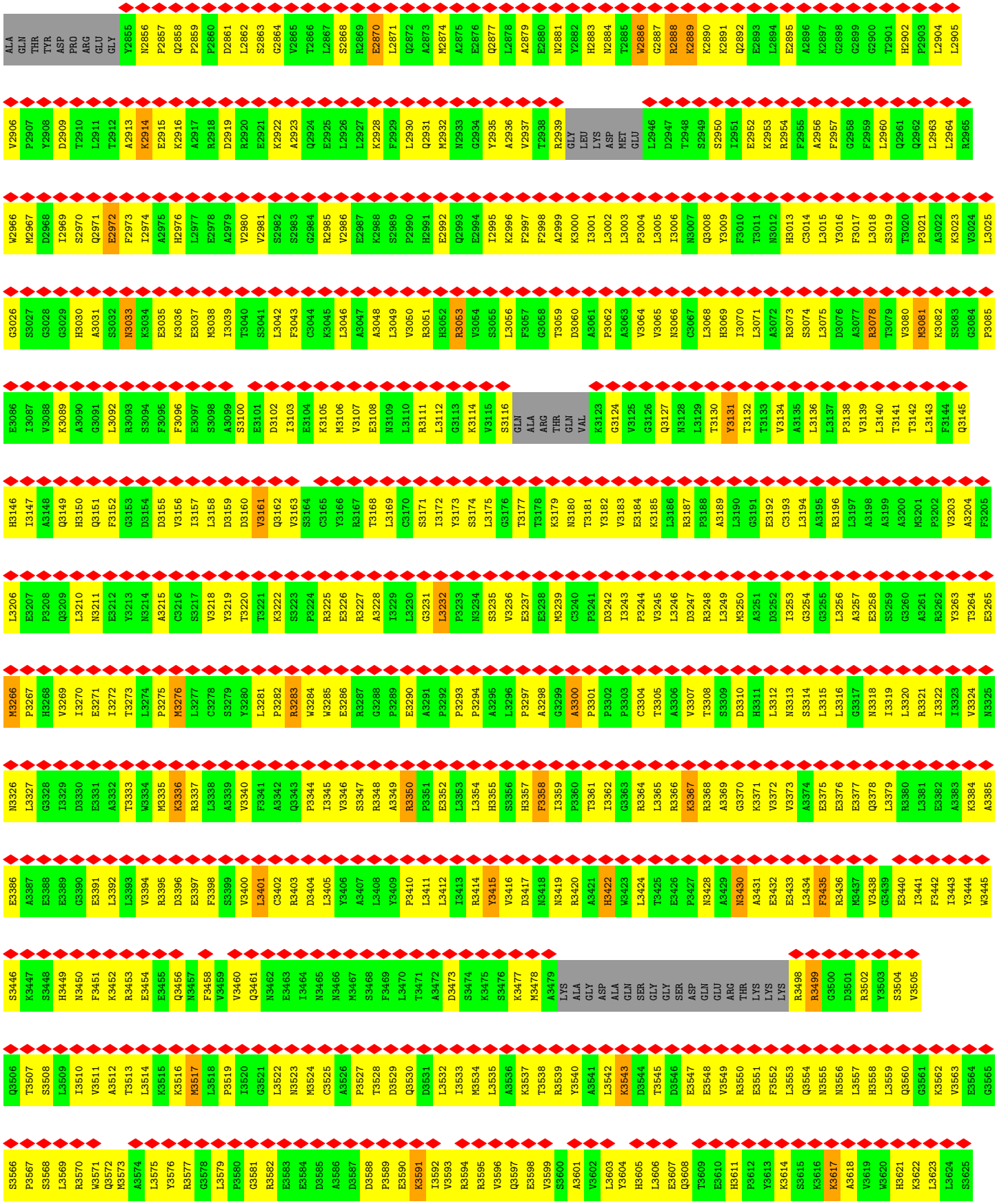
Chain B:

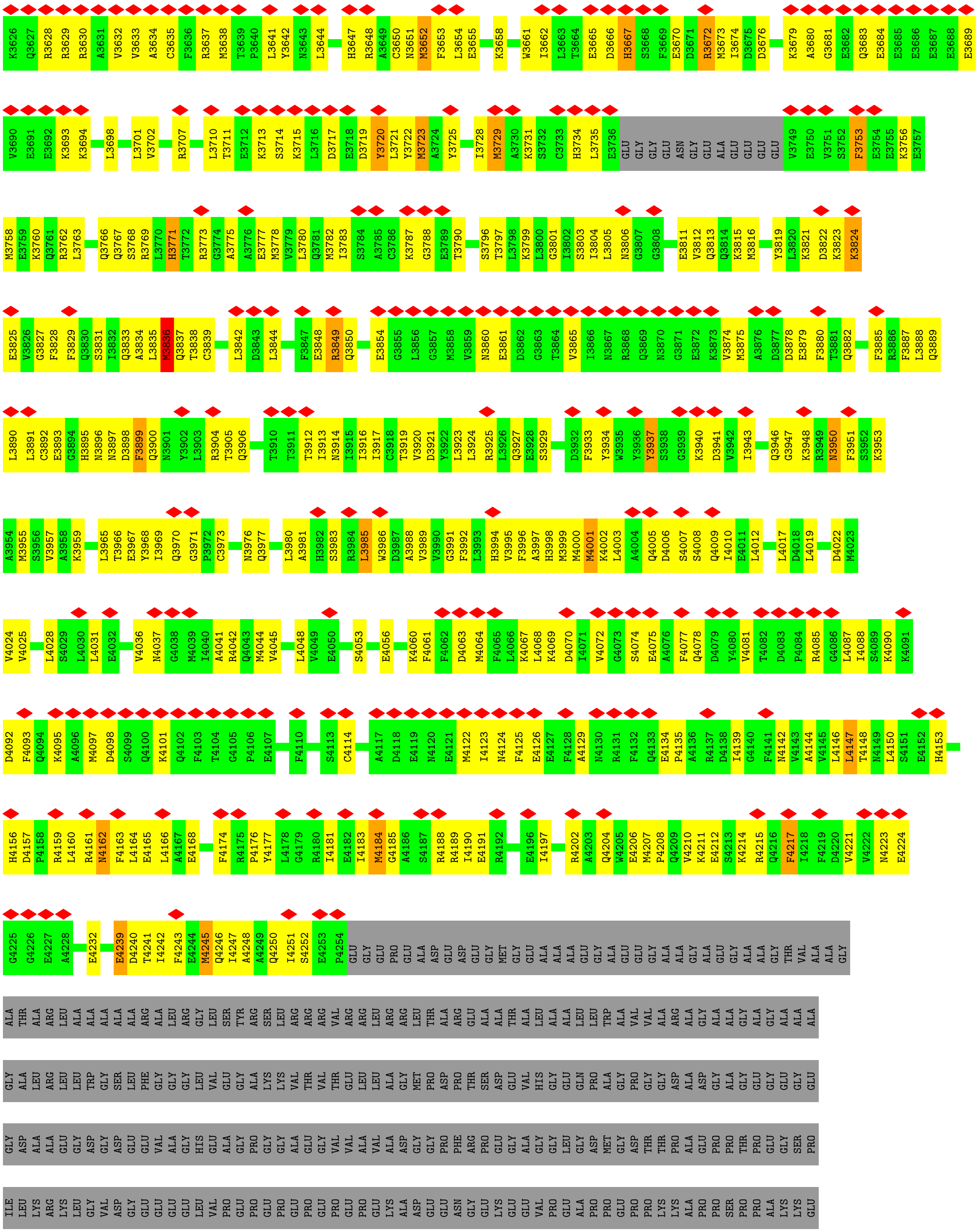


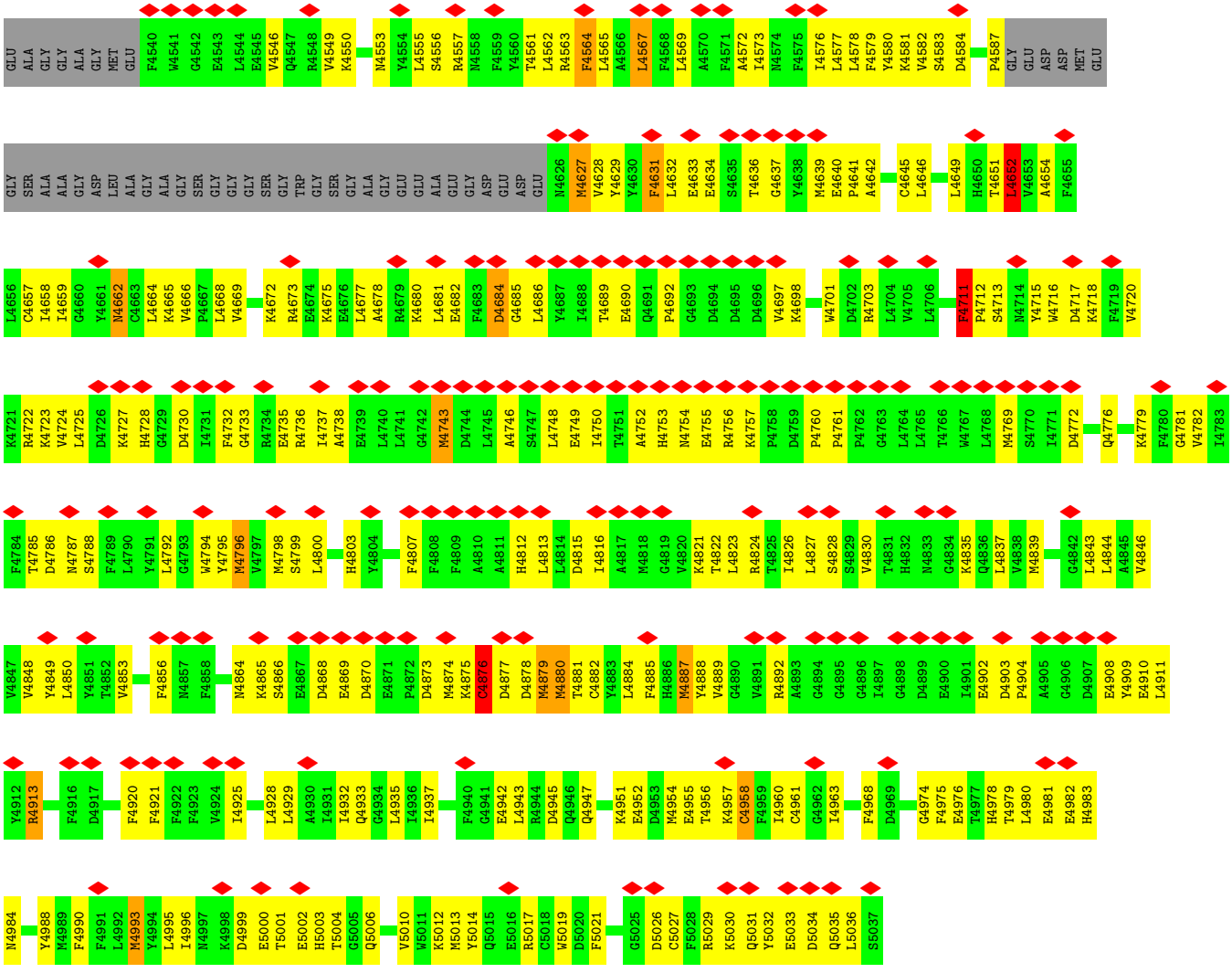

G427 S428 G429 P430 P431 A432 G433 P434 A435 L436 P437 I438 E439 A440 V441 I442 L445 I449 G450 Y451 F452 P455 S456 E457 E458 L459 Q460 H461 E462 E463 K464 K467 L468 R469 S470 L471 R472 N473 R474 Q475 S476 L477 F478 Q479 E480 E481 G482 M483 L484 S485 L486 V487 L488 N489 C490 I491
D492 R493 L494 N495 V496 Y497 H502 F503 A504 A507 G508 E509 E510 A511 A512 E513 S514 W515 K516 E517 I518 V519 Y523 L529 I530 R531 G532 N533 R534 A535 N536 C537 A538 L539 F540 S541 T542 D545 V548 S549 K550 L551 D552 R553 L554 E555 A556 S557 S558 G559 I560 L561 E562 V563
L564 Y565 C566 V567 L568 I569 E570 S571 P572 E573 V574 L575 N576 I577 I578 Q579 E580 N581 H582 I583 K584 S585 I586 I587 S588 L589 L590 D591 K592 H593 G594 R595 N596 H597 K598 V599 L600 D601 V602 L603 C604 S605 L606 C607 N610 A613 V614 R615 S616 N617 L620 I621 T622 E623 N624 L625 L626
P627 G628 R629 E630 L631 L632 L633 Q634 T635 N636 L637 I638 N639 Y640 V641 T642 S643 I644 R645 P646 N647 I648 F649 V650 G651 R652 A653 E654 G655 S656 T657 Q658 Y659 G660 K661 W662 Y663 F664 E665 V666 M667 V668 D669 E670 V671 V672 P673 F674 L675 T676 A677 Q678 A679 T680 H681 L682 R683 V684 G685 W686
A687 L688 T689 E690 G691 Y692 S693 P694 Y695 P696 G697 G698 G699 E700 G701 W702 G703 G704 N705 G706 V707 G708 D709 D710 L711 Y712 S713 Y714 G715 F716 D717 G718 L719 H720 L721 W722 T723 G724 H725 V726 A727 R728 P729 V730 T731 S732 P733 G734 Q735 H736 L737 L738 A739 P740 E741 D742 V743 V744 S745
L748 D749 L750 S751 V752 P753 S754 I755 S756 F757 R758 I759 N760 G761 C762 P763 V764 Q765 G766 V767 F768 E769 A770 F771 N772 L773 D774 G775 L776 F777 F778 P779 V780 V781 S782 F783 S784 A785 G786 V787 K788 V789 R790 F791 L792 L793 G794 G795 R796 H797 G798 E799 F800 K801 F802 L803 P804 P805 P806 G807
Y808 A809 P810 C811 H812 E813 A814 V815 L816 P817 R818 E819 R820 L821 R822 L823 E824 P825 I826 K827 E828 Y829 R830 R831 E832 G833 P834 R835 H838 L839 V840 G841 P842 S843 R844 C845 L846 S847 H848 T849 D850 F851 V852 P853 C854 P855 V856 D857 T858 V859 Q860 I861 V862 L863 P864 P865 H866 L867 E868
R869 I870 R871 E872 K873 L874 A875 E876 N877 I878 H879 E880 L881 W882 A883 L884 T885 R886 I887 E888 Q889 G890 W891 T892 Y893 G894 P895 V896 R897 D898 D899 N900 K901 R902 L903 H904 P905 C906 L907 V908 N909 P910 H911 S912 L913 P914 E915 P916 E917 R918 N919 Y920 N921 L922 Q923 M924 S925 G926 E927 T928
L929 K930 T931 L932 L933 A934 L935 G936 C937 H938 V939 G940 M941 A942 D943 E944 K945 A946 E947 D948 N949 L950 K951 K952 T953 K954 L955 P956 K957 T958 Y959 M960 M961 S962 N963 G964 Y965 K966 P967 A968 P969 L970 D971 L972 S973 H974 V975 R976 L977 T978 P979 A980 Q981 T982 T983 L984 V985 D986 R987 L988
A989 E990 N991 G992 H993 N994 V995 W996 A997 R998 D999 R1000 V1001 A1002 Q1003 G1004 W1005 S1006 Y1007 S1008 A1009 V1010 Q1011 D1012 I1013 P1014 A1015 R1016 R1017 N1018 P1019 R1020 L1021 V1022 P1023 Y1024 R1025 L1026 L1027 D1028 E1029 A1030 T1031 K1032 R1033 S1034 N1035 R1036 D1037 S1038 L1039 C1040 Q1041 A1042 V1043 R1044 T1045 L1046 L1047 G1048
Y1049 G1050 Y1051 N1052 I1053 E1054 P1055 P1056 D1057 Q1058 E1059 P1060 S1061 Q1062 V1063 E1064 N1065 Q1066 S1067 R1068 W1069 D1070 R1071 V1072 R1073 I1074 F1075 R1076 A1077 E1078 K1079 S1080 Y1081 T1082 V1083 Q1084 S1085 G1086 R1087 W1088 Y1089 F1090 E1091 F1092 E1093 A1094 V1095 T1096 T1097 G1098 E1099 M1100 R1101 V1102 G1103 W1104 A1105 R1106 P1107 E1108
L1109 R1110 P1111 D1112 V1113 E1114 L1115 G1116 A1117 D1118 E1119 L1120 A1121 Y1122 V1123 F1124 N1125 G1126 H1127 R1128 G1129 Q1130 R1131 W1132 H1133 L1134 G1135 S1136 E1137 P1138 F1139 G1140 R1141 P1142 W1143 Q1144 S1145 G1146 D1147 V1148 V1149 G1150 C1151 M1152 I1153 D1154 L1155 T1156 E1157 N1158 T1159 I1160 I1161 F1162 T1163 L1164 N1165 G1166 E1167 V1168
L1169 M1170 S1171 D1172 S1173 G1174 S1175 E1176 T1177 A1178 F1179 R1180 E1181 I1182 E1183 I1184 G1185 D1186 G1187 F1188 L1189 P1190 V1191 C1192 S1193 L1194 G1195 P1196 G1197 Q1198 V1199 G1200 H1201 L1202 N1203 L1204 G1205 Q1206 D1207 V1208 S1209 S1210 L1211 R1212 F1213 F1214 A1215 I1216 C1217 G1218 L1219 Q1220 E1221 G1222 F1223 E1224 P1225 F1226 A1227 I1228


N1229 M1230 Q1231 R1232 P1233 V1234 T1235 T1236 W1237 F1238 S1241 L1242 P1243 E1246 P1247 V1248 P1249 P1250 E1251 H1252 P1253 H1254 Y1255 E1256 V1257 A1258 R1259 M1260 D1261 G1262 T1263 V1264 D1265 T1266 P1267 P1268 C1269 L1270 R1271 L1272 A1273 H1274 R1275 T1276 W1277 G1278 S1279 Q1280 N1281 S1282 L1283 V1284 E1285 M1286 L1287 F1288 L1289 R1290
L1291 S1292 L1293 P1294 V1295 Q1296 Q1299 H1300 F1301 R1302 C1303 T1304 ALA GLY ALA THR PRO LEU ALA PRO PRO GLY LEU GLN PRO PRO ALA GLU ASP GLU ALA ARG ALA ALA GLU PRO ASP PRO ASP TYR GLU ASN LEU ARG ARG SER ALA GLY GLY TRP GLY GLU ALA GLU GLY GLY LYS GLU GLY
THR ALA LYS GLU GLY THR PRO GLY GLY THR PRO GLN PRO GLY VAL GLU ALA GLN PRO VAL ARG ALA GLU ASN GLU LYS ASP ALA THR THR GLU LYS ASN LYS LYS ARG GLY PHE LEU PHE LYS ALA LYS LYS ALA ALA MET MET THR GLN PRO PRO ALA THR PRO ALA LEU PRO ARG LEU
PRO HIS ASP VAL VAL PRO ALA D1419 N1420 R1421 D1422 D1423 P1424 E1425 I1426 I1427 L1428 N1429 T1430 T1431 T1432 Y1433 Y1434 Y1435 S1436 V1437 R1438 V1439 F1440 A1441 G1442 Q1443 E1444 P1445 S1446 C1447 V1448 W1449 V1450 G1451 W1452 D1456 Y1457 H1458 Q1459 H1460 D1461 M1462 N1463 F1464 D1465 L1466 S1467 K1468 V1469 R1470 A1471 V1472
T1475 M1476 G1477 D1478 E1479 Q1480 G1481 N1482 V1483 H1484 S1485 S1486 L1487 K1488 C1489 S1490 N1491 C1492 Y1493 M1494 V1495 W1496 G1497 G1498 D1499 F1500 V1501 S1502 P1503 G1504 Q1505 Q1506 G1507 R1508 I1509 S1510 H1511 T1512 D1513 L1514 V1515 I1516 G1517 C1518 L1519 V1520 D1521 L1522 A1523 T1524 G1525 L1526 M1527 T1528 F1529 T1530 A1531 N1532 G1533 K1534
E1535 S1536 N1537 T1538 F1539 F1540 Q1541 V1542 E1543 P1544 N1545 T1546 K1547 L1548 F1549 P1550 A1551 V1552 F1553 V1554 L1555 P1556 T1557 H1558 Q1559 N1560 V1561 I1562 Q1563 F1564 E1565 L1566 G1567 K1568 Q1569 K1570 N1571 I1572 M1573 P1574 L1575 S1576 A1577 A1578 M1579 F1580 L1581 S1582 E1583 R1584 K1585 N1586 P1587 A1588 P1589 Q1590 C1591 P1592 P1593 R1594
L1595 E1596 V1597 Q1598 M1599 L1600 M1601 P1602 V1603 S1604 W1605 S1606 R1607 M1608 P1609 N1610 H1611 F1612 L1613 Q1614 V1615 E1616 T1617 R1618 R1619 A1620 G1621 E1622 R1623 L1624 G1625 W1626 A1627 V1628 Q1629 C1630 Q1631 D1632 P1633 L1634 T1635 M1636 M1637 A1638 L1639 H1640 I1641 P1642 E1643 E1644 N1645 R1646 C1647 M1648 D1649 E1652 L1653 S1654 E1655
R1656 L1657 D1658 L1659 Q1660 R1661 F1662 H1663 S1664 H1665 T1666 L1667 R1668 L1669 Y1670 R1671 A1672 V1673 C1674 A1675 L1676 G1677 N1678 N1679 R1680 V1681 A1682 H1683 A1684 L1685 H1688 V1689 D1690 Q1691 A1692 Q1693 L1694 L1695 H1696 A1697 L1698 E1699 D1700 A1701 H1702 G1705 P1706 L1707 R1708 A1709 G1710 Y1711 Y1712 D1713 L1714 L1715 I1716 S1717
I1718 H1719 L1720 E1721 C1724 R1725 S1726 R1727 R1728 S1729 M1730 L1731 S1732 E1733 L1738 T1739 T1742 R1743 A1744 I1745 T1746 L1747 F1748 P1749 P1750 G1751 R1752 K1753 G1754 G1755 N1756 A1757 R1758 R1759 H1760 G1761 L1762 P1763 G1764 V1765 G1766 V1767 T1768 L1771 R1772 H1775 H1776 F1777 S1778 C1781 F1782 V1783 A1784 A1785
L1786 P1787 A1788 A1789 G1790 V1791 A1792 E1793 A1794 P1795 A1796 R1797 L1798 A1801 I1802 P1803 L1804 E1805 A1806 L1807 R1808 D1809 K1810 A1811 L1812 R1813 M1814 L1815 G1816 E1817 A1818 V1819 R1820 D1821 G1822 G1823 Q1824 H1825 A1826 R1827 D1828 P1829 V1830 G1831 G1832 S1833 F1836 Q1837 F1838 V1839 P1840 V1841 L1842 K1843 L1844 V1845 S1846 T1847
L1848 M1851 G1852 I1853 F1854 G1855 D1856 E1857 D1858 V1859 K1860 Q1861 I1862 P1868 E1869 V1870 F1871 T1872 E1873 E1874 GLU GLU GLU GLU GLU GLU GLU GLU GLU GLU GLU GLU GLU GLU GLU GLU ASP GLU GLU GLU LYS GLU GLU ASP GLU GLU GLU GLU GLU LYS GLU ASP ALA GLU LYS GLU GLU GLU
GLU ALA PRO GLU GLY GLU LYS GLU ASP L1922 E1923 E1924 L1927 Q1928 M1929 K1930 L1931 P1932 V1935 I1936 L1937 Q1938 M1939 C1940 N1941 L1942 L1943 E1944 Y1945 F1946 C1947 D1948 Q1949 E1950 L1951 Q1952 H1953 R1954 V1955 E1956 S1957 L1958 A1959 A1960 F1961 R1964 Y1965 V1966 D1967 K1968 L1969 N1972 Q1973 R1974 S1975 R1976
Y1977 A1978 L1979 L1980 M1981 R1982 A1983 F1984 T1985 M1986 S1987 A1988 A1989 E1990 T1991 A1992 R1993 R1994 T1995 R1996 E1997 F1998 R1999 S2000 Q2003 E2004 Q2005 I2006 N2007 M2008 I2009 L2010 H2011 F2012 K2013 D2014 E2015 A2016 D2017 E2018 E2019 D2020 C2021 P2022 L2023 P2024 E2025 D2026 I2027 R2028 Q2029 D2030 L2031 Q2032 Q2036 H2041 C2042



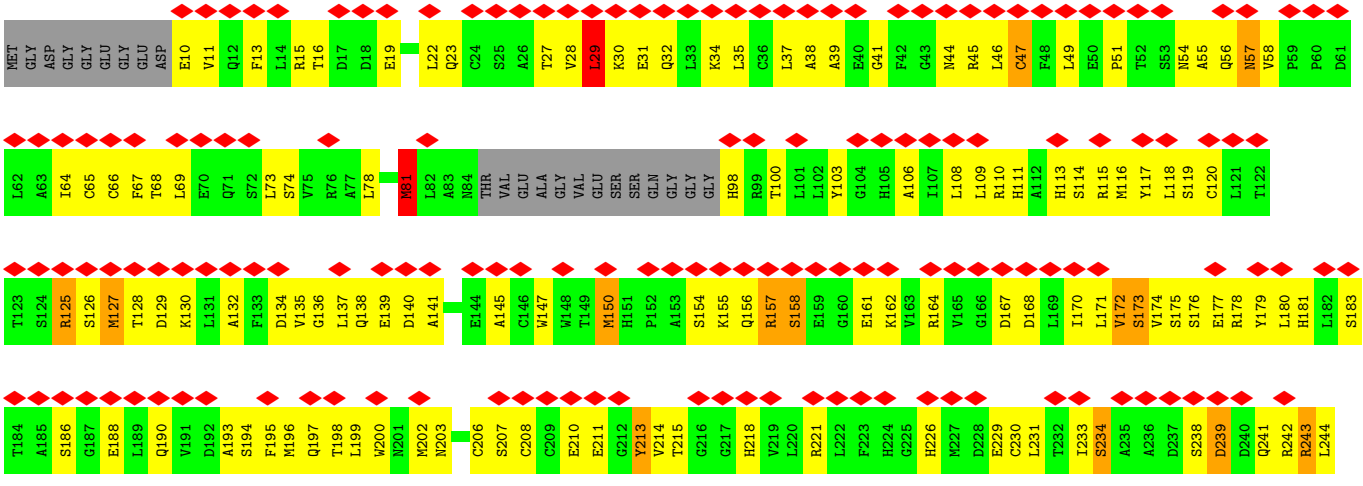

ALA GLN THR TYR ASP PRO ARG GLU GLY Y2855 N2856 P2857 Q2858 P2859 P2860 D2861 L2862 S2863 G2864 V2865 T2866 L2867 S2868 R2869 E2870 L2871 Q2872 A2873 M2874 A2875 E2876 Q2877 L2878 A2879 E2880 N2881 Y2882 H2883 N2884 T2885 W2886 G2887 R2888 K2889 K2890 K2891 Q2892 E2893 L2894 E2895 A2896 K2897 G2898 G2899 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 D2947 T2948 S2949 S2950 I2951 E2952 K2953 R2954 F2955 A2956 F2957 G2958 F2959 L2960 Q2961 Q2962 L2963 L2964 R2965
W2966 M2967 D2968 I2969 S2970 Q2971 E2972 F2973 I2974 A2975 H2976 L2977 E2978 A2979 V2980 V2981 S2982 S2983 G2984 R2985 V2986 E2987 K2988 S2989 P2990 H2991 E2992 Q2993 E2994 I2995 K2996 F2997 F2998 A2999 K3000 I3001 L3002 L3003 P3004 L3005 I3006 N3007 Q3008 Y3009 F3010 T3011 N3012 H3013 C3014 L3015 Y3016 F3017 L3018 S3019 T3020 P3021 A3022 K3023 V3024 L3025
G3026 S3027 G3028 G3029 H3030 A3031 S3032 N3033 K3034 E3035 K3036 E3037 M3038 I3039 T3040 S3041 L3042 F3043 C3044 K3045 L3046 A3047 A3048 L3049 V3050 R3051 H3052 R3053 V3054 S3055 L3056 F3057 G3058 T3059 D3060 A3061 P3062 A3063 V3064 V3065 N3066 C3067 L3068 H3069 I3070 L3071 A3072 R3073 S3074 L3075 D3076 A3077 R3078 T3079 V3080 M3081 K3082 S3083 G3084 P3085
E3086 I3087 V3088 K3089 A3090 G3091 L3092 R3093 S3094 F3095 F3096 E3097 S3098 A3099 S3100 E3101 D3102 I3103 E3104 K3105 M3106 V3107 E3108 N3109 L3110 R3111 L3112 G3113 K3114 V3115 S3116 GLN ALA ARG THR GLN VAL K3123 G3124 V3125 G3126 Q3127 N3128 L3129 T3130 Y3131 T3132 T3133 V3134 A3135 L3136 L3137 P3138 V3139 L3140 T3141 T3142 L3143 F3144 Q3145
H3146 I3147 A3148 Q3149 H3150 Q3151 F3152 G3153 D3154 D3155 V3156 I3157 L3158 D3159 D3160 V3161 Q3162 V3163 S3164 C3165 Y3166 R3167 T3168 L3169 C3170 S3171 I3172 Y3173 S3174 L3175 G3176 T3177 T3178 K3179 N3180 T3181 Y3182 V3183 E3184 K3185 L3186 R3187 P3188 A3189 L3190 G3191 E3192 C3193 L3194 A3195 R3196 L3197 A3198 A3199 A3200 M3201 P3202 V3203 A3204 F3205
L3206 E3207 P3208 Q3209 I3210 N3211 E3212 Y3213 N3214 A3215 C3216 S3217 V3218 Y3219 T3220 T3221 K3222 S3223 P3224 R3225 E3226 R3227 A3228 I3229 L3230 G3231 L3232 P3233 N3234 S3235 V3236 E3237 E3238 M3239 C3240 P3241 D3242 I3243 P3244 V3245 L3246 D3247 R3248 L3249 M3250 A3251 D3252 I3253 G3254 G3255 L3256 A3257 E3258 S3259 G3260 A3261 R3262 Y3263 T3264 E3265
M3266 P3267 H3268 V3269 I3270 E3271 I3272 T3273 L3274 P3275 M3276 L3277 C3278 S3279 Y3280 L3281 P3282 R3283 W3284 W3285 E3286 R3287 G3288 P3289 E3290 A3291 P3292 P3293 P3294 A3295 L3296 P3297 A3298 G3299 A3300 P3301 P3302 P3303 C3304 T3305 A3306 V3307 T3308 S3309 D3310 H3311 L3312 N3313 S3314 L3315 L3316 G3317 N3318 I3319 L3320 R3321 I3322 I3323 V3324 N3325
N3326 L3327 G3328 I3329 D3330 E3331 A3332 T3333 W3334 M3335 K3336 R3337 L3338 A3339 V3340 F3341 A3342 Q3343 P3344 I3345 V3346 S3347 R3348 A3349 R3350 P3351 E3352 L3353 L3354 H3355 S3356 H3357 F3358 I3359 P3360 T3361 I3362 G3363 R3364 L3365 R3366 K3367 R3368 A3369 G3370 K3371 V3372 V3373 A3374 E3375 E3376 E3377 Q3378 L3379 R3380 L3381 E3382 A3383 K3384 A3385
E3386 A3387 E3388 E3389 G3390 E3391 L3392 L3393 V3394 R3395 D3396 E3397 F3398 S3399 V3400 L3401 C3402 R3403 D3404 L3405 Y3406 A3407 L3408 Y3409 P3410 L3411 L3412 I3413 R3414 Y3415 V3416 D3417 N3418 N3419 R3420 A3421 H3422 W3423 L3424 T3425 E3426 P3427 N3428 A3429 N3430 A3431 E3432 E3433 L3434 F3435 R3436 M3437 V3438 G3439 E3440 I3441 F3442 I3443 Y3444 W3445
S3446 K3447 S3448 H3449 N3450 F3451 K3452 R3453 E3454 E3455 Q3456 N3457 F3458 V3459 V3460 Q3461 N3462 E3463 I3464 N3465 N3466 M3467 S3468 F3469 L3470 T3471 A3472 D3473 S3474 K3475 S3476 K3477 M3478 A3479 LYS ALA GLY ASP ALA GLN SER GLY GLY SER ASP GLN GLU ARG THR LYS LYS LYS R3498 R3499 G3500 D3501 R3502 Y3503 S3504 V3505
Q3506 T3507 S3508 L3509 I3510 V3511 A3512 T3513 L3514 K3515 K3516 M3517 L3518 P3519 I3520 G3521 L3522 N3523 M3524 C3525 A3526 P3527 T3528 D3529 Q3530 D3531 L3532 I3533 M3534 L3535 A3536 K3537 T3538 R3539 Y3540 A3541 L3542 K3543 D3544 T3545 D3546 E3547 E3548 V3549 R3550 E3551 F3552 L3553 Q3554 N3555 N3556 L3557 H3558 L3559 Q3560 G3561 K3562 V3563 E3564 G3565
S3566 P3567 S3568 L3569 R3570 W3571 Q3572 M3573 A3574 L3575 Y3576 R3577 G3578 L3579 P3580 G3581 R3582 E3583 E3584 D3585 A3586 D3587 D3588 P3589 E3590 K3591 I3592 V3593 R3594 R3595 V3596 Q3597 E3598 V3599 S3600 A3601 V3602 L3603 Y3604 H3605 L3606 E3607 Q3608 T3609 E3610 H3611 P3612 Y3613 K3614 S3615 K3616 K3617 A3618 V3619 W3620 H3621 K3622 L3623 L3624 S3625

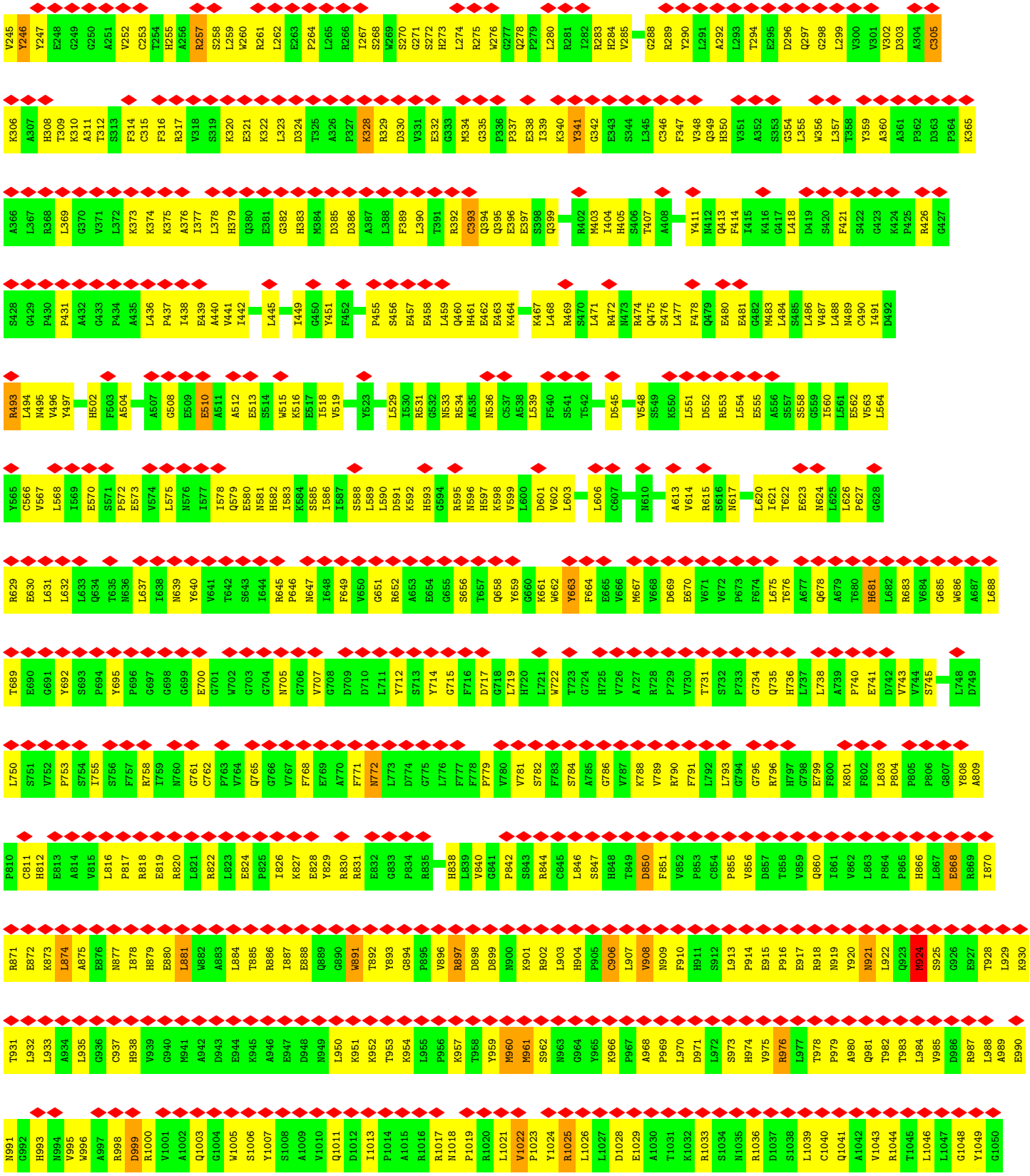

K3626 Q3627 R3628 R3629 R3630 A3631 V3632 V3633 A3634 C3635 F3636 R3637 M3638 T3639 P3640 L3641 Y3642 N3643 L3644 H3647 R3648 A3649 C3650 N3651 M3652 F3653 L3654 E3655 K3658 W3661 I3662 L3663 T3664 E3665 D3666 H3667 S3668 F3669 E3670 D3671 R3672 M3673 I3674 D3675 D3676 K3679 A3680 G3681 E3682 Q3683 E3684 E3685 E3686 E3687 E3688 E3689
V3690 E3691 E3692 K3693 K3694 L3698 L3701 V3702 R3707 L3710 T3711 E3712 K3713 S3714 K3715 L3716 D3717 E3718 D3719 Y3720 L3721 Y3722 M3723 A3724 Y3725 I3728 M3729 A3730 K3731 S3732 C3733 H3734 L3735 E3736 GLU GLY GLY GLU ASN GLY GLU ALA GLU GLU GLU GLU V3749 E3750 V3751 S3752 F3753 E3754 E3755 K3756 E3757
M3758 E3759 K3760 Q3761 R3762 L3763 Q3766 Q3767 S3768 R3769 L3770 H3771 T3772 R3773 G3774 A3775 A3776 E3777 M3778 V3779 L3780 Q3781 M3782 I3783 S3784 A3785 C3786 K3787 G3788 E3789 T3790 S3796 T3797 L3798 K3799 L3800 G3801 I3802 S3803 I3804 L3805 N3806 G3807 G3808 E3811 V3812 Q3813 Q3814 K3815 M3816 Y3819 L3820 K3821 D3822 K3823 K3824
E3825 V3826 G3827 F3828 F3829 Q3830 S3831 I3832 Q3833 A3834 L3835 M3836 Q3837 T3838 C3839 L3842 D3843 L3844 F3847 E3848 R3849 Q3850 E3854 G3855 L3856 G3857 M3858 V3859 N3860 E3861 D3862 G3863 T3864 V3865 I3866 N3867 R3868 Q3869 N3870 G3871 E3872 K3873 V3874 M3875 A3876 D3877 D3878 E3879 F3880 T3881 Q3882 F3885 R3886 F3887 L3888 Q3889
L3890 L3891 C3892 E3893 G3894 H3895 N3896 N3897 D3898 F3899 Q3900 N3901 Y3902 L3903 R3904 T3905 Q3906 T3910 T3911 T3912 I3913 N3914 I3915 I3916 I3917 C3918 T3919 V3920 D3921 Y3922 L3923 L3924 R3925 L3926 Q3927 E3928 S3929 D3932 F3933 Y3934 W3935 Y3936 Y3937 S3938 G3939 K3940 D3941 V3942 I3943 Q3946 G3947 K3948 R3949 N3950 F3951 S3952 K3953
A3954 M3955 S3956 V3957 A3958 K3959 L3965 T3966 E3967 Y3968 I3969 Q3970 G3971 P3972 C3973 N3976 Q3977 L3980 A3981 H3982 S3983 R3984 L3985 W3986 D3987 A3988 V3989 V3990 G3991 F3992 L3993 H3994 V3995 F3996 A3997 H3998 M3999 M4000 M4001 K4002 L4003 A4004 Q4005 D4006 S4007 S4008 Q4009 I4010 E4011 L4012 L4017 D4018 L4019 D4022 M4023
V4024 V4025 L4028 S4029 L4030 L4031 E4032 V4036 N4037 G4038 M4039 I4040 A4041 R4042 G4043 M4044 V4045 L4048 V4049 E4050 S4053 E4056 K4060 F4061 F4062 D4063 M4064 F4065 L4066 K4067 L4068 K4069 D4070 I4071 V4072 G4073 S4074 E4075 A4076 F4077 Q4078 D4079 Y4080 V4081 T4082 D4083 P4084 R4085 G4086 L4087 I4088 S4089 K4090 K4091
D4092 F4093 Q4094 K4095 A4096 M4097 D4098 S4099 Q4100 K4101 Q4102 F4103 T4104 G4105 P4106 E4107 F4110 S4113 C4114 A4117 D4118 E4119 N4120 E4121 M4122 I4123 N4124 F4125 E4126 E4127 F4128 A4129 N4130 R4131 F4132 Q4133 E4134 P4135 A4136 R4137 D4138 I4139 G4140 F4141 N4142 V4143 A4144 V4145 L4146 L4147 T4148 N4149 L4150 S4151 E4152 H4153
H4156 D4157 P4158 R4159 L4160 R4161 N4162 F4163 L4164 E4165 L4166 A4167 E4168 F4174 R4175 P4176 Y4177 L4178 G4179 R4180 I4181 E4182 I4183 M4184 G4185 A4186 S4187 R4188 R4189 I4190 E4191 R4192 E4196 I4197 R4202 A4203 Q4204 W4205 E4206 M4207 P4208 Q4209 V4210 K4211 E4212 S4213 K4214 R4215 Q4216 F4217 I4218 F4219 D4220 V4221 V4222 N4223 E4224
G4225 G4226 E4227 A4228 E4232 E4239 D4240 T4241 I4242 F4243 E4244 M4245 Q4246 I4247 A4248 A4249 Q4250 I4251 S4252 E4253 P4254 GLU GLY GLU PRO GLU ALA ASP GLU ASP GLU GLY MET GLY GLU ALA ALA ALA GLU GLY ALA GLU GLU GLY ALA ALA GLY ALA GLU GLY ALA ALA GLY THR VAL ALA ALA GLY
ALA THR ALA ARG LEU ALA ALA ALA ALA ARG ALA LEU ARG GLY LEU SER TYR ARG SER LEU ARG ARG ARG VAL ARG ARG LEU ARG ARG LEU THR ALA ARG GLU ALA ALA THR ALA LEU ALA ALA LEU LEU TRP ALA VAL VAL ALA ARG ALA GLY ALA ALA GLY ALA GLY ALA ALA
GLY ALA LEU ARG LEU LEU TRP GLY SER LEU PHE GLY GLY GLY LEU VAL GLU GLY ALA LYS LYS VAL THR VAL THR GLU LEU LEU ALA GLY MET PRO ASP PRO THR SER ASP GLU VAL HIS GLY GLU GLN PRO ALA GLY PRO GLY GLY ASP ALA ASP GLY ALA GLY GLU GLY GLU GLY GLU
GLY ASP ALA ALA GLU GLY ASP GLY ASP GLU GLU VAL ALA GLY HIS GLU ALA GLY PRO GLY GLY ALA GLU GLY VAL VAL ALA VAL ALA ASP GLY GLY PRO PHE ARG PRO GLU GLY ALA GLY GLY LEU GLY ASP MET GLY ASP THR THR PRO ALA GLU PRO PRO THR PRO GLU GLY SER PRO
ILE LEU LYS ARG LYS LEU GLY VAL ASP GLY GLU GLU GLU GLU LEU VAL PRO GLU PRO GLU PRO GLU PRO GLU PRO GLU PRO GLU LYS ALA ASP GLU GLU ASN GLY GLU LYS GLU GLU VAL PRO GLU ALA PRO PRO GLU PRO PRO LYS LYS ALA PRO PRO SER PRO PRO ALA LYS LYS GLU

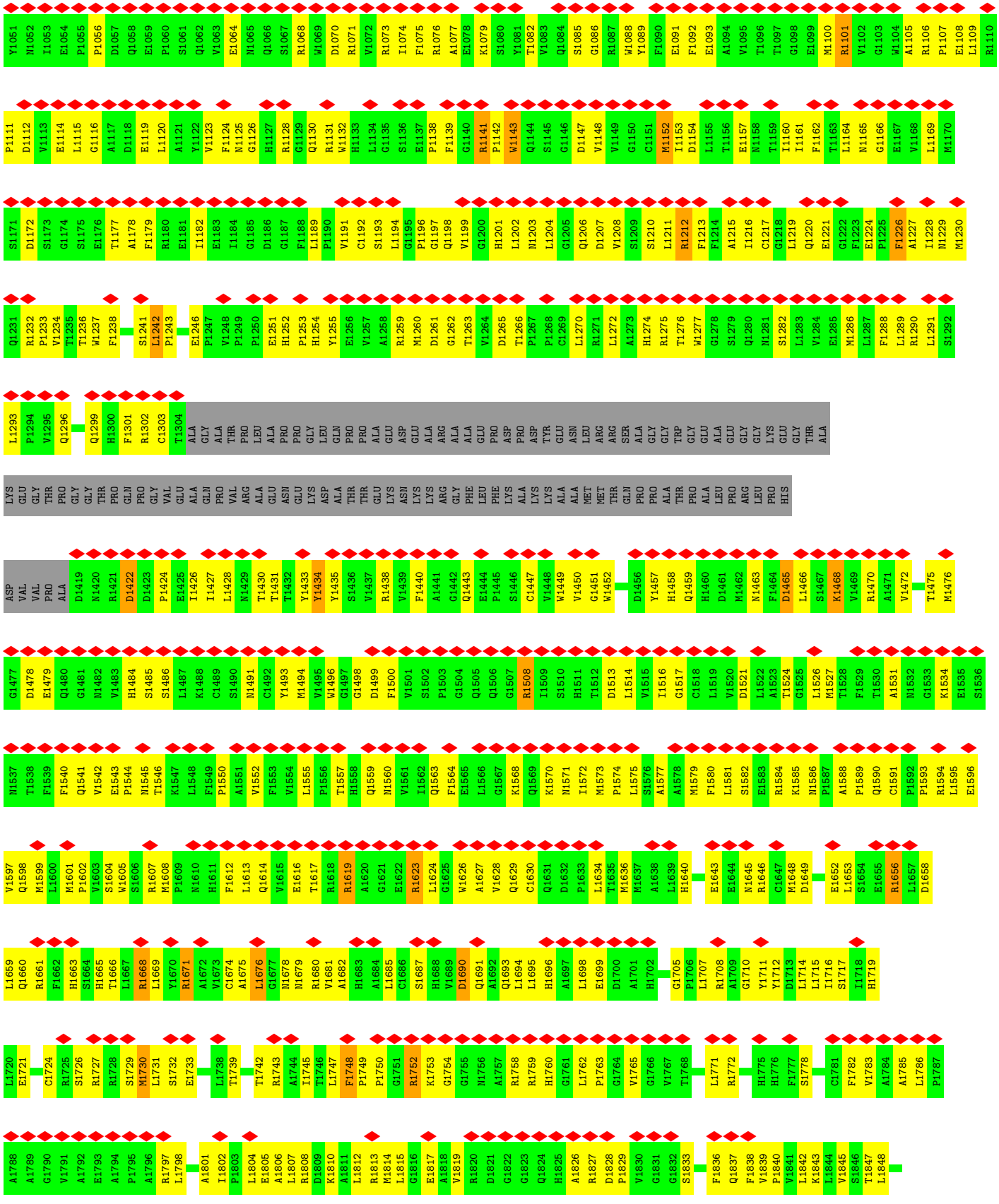


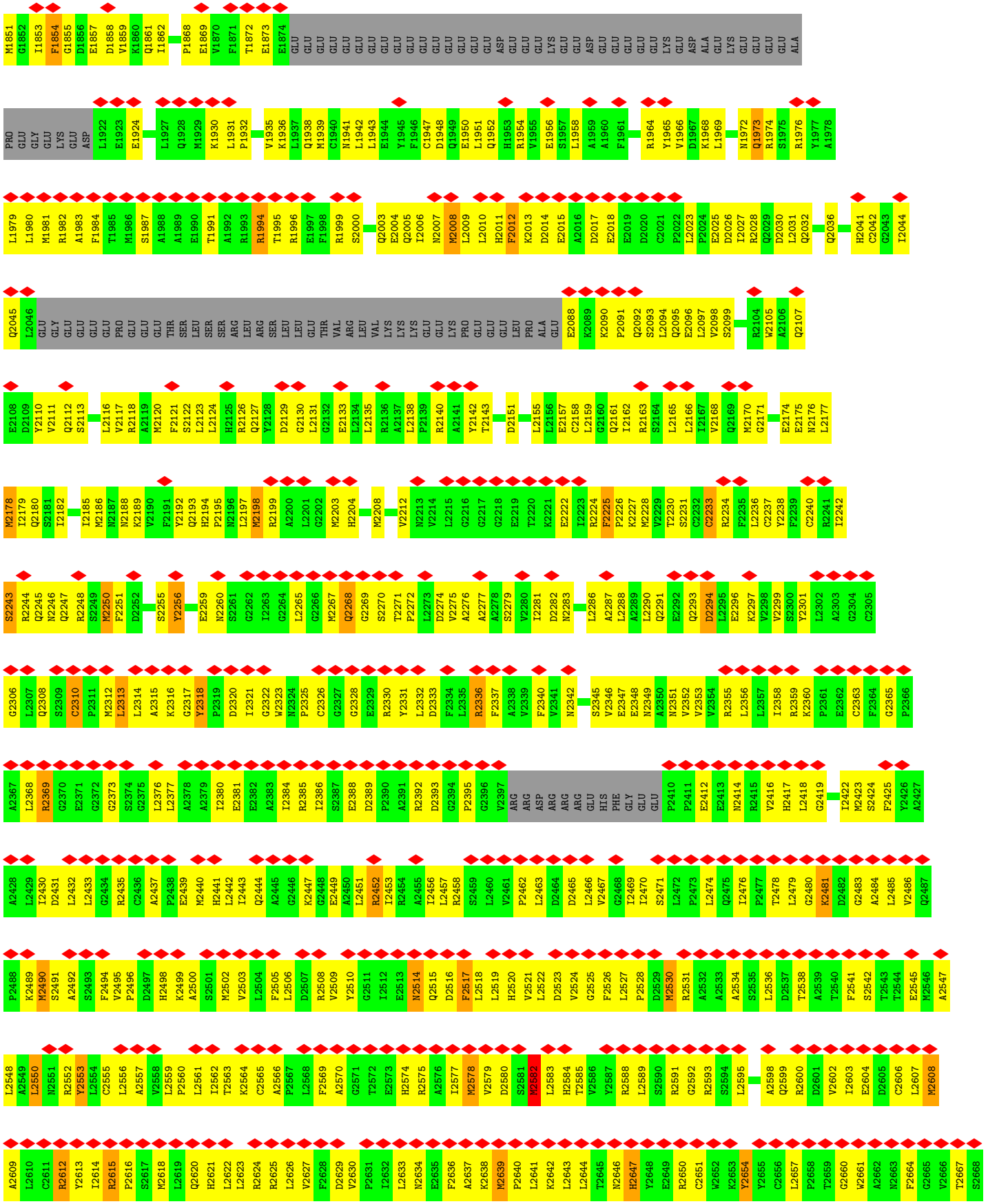
• Molecule 1: Ryanodine receptor 1

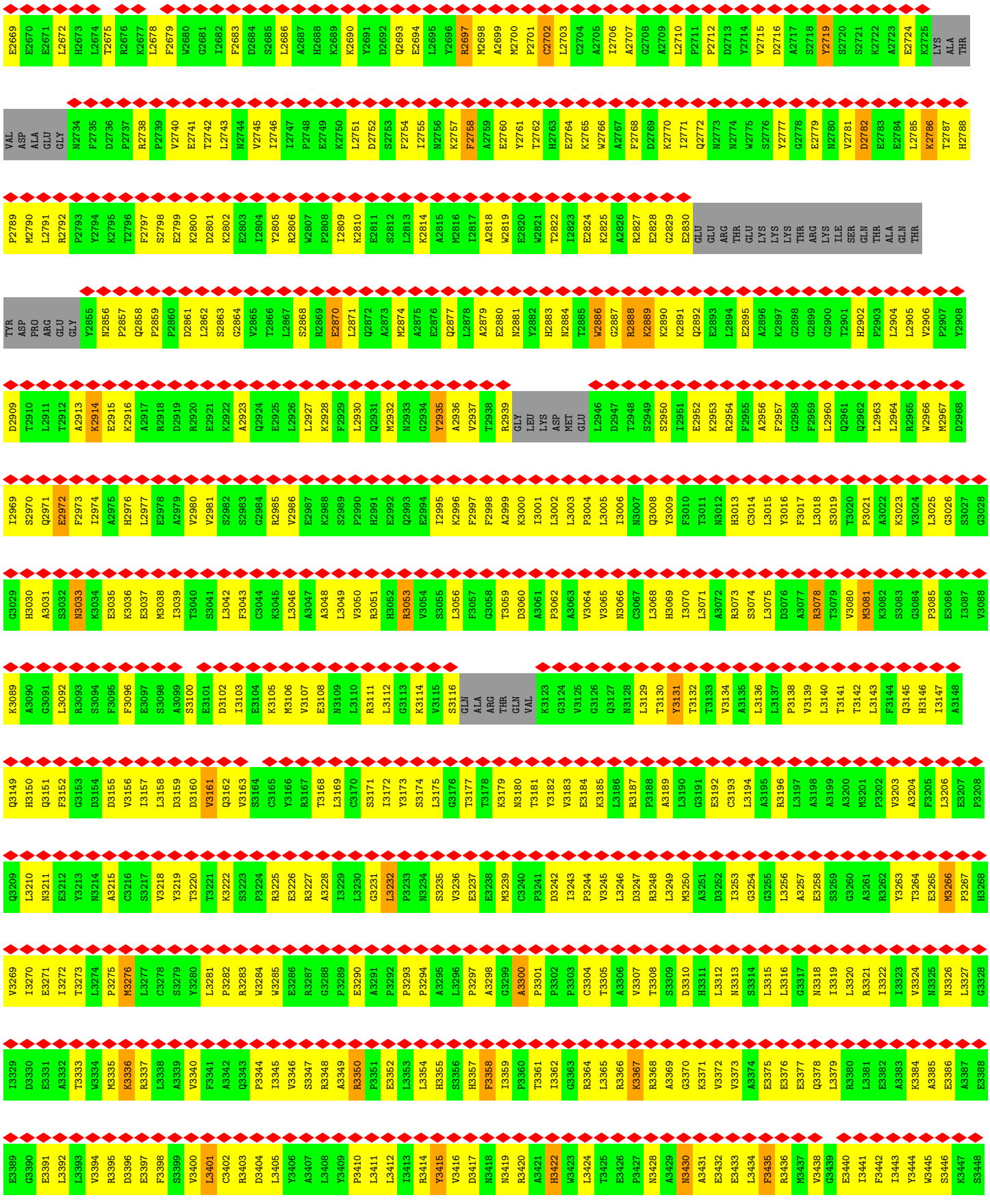
Chain D:

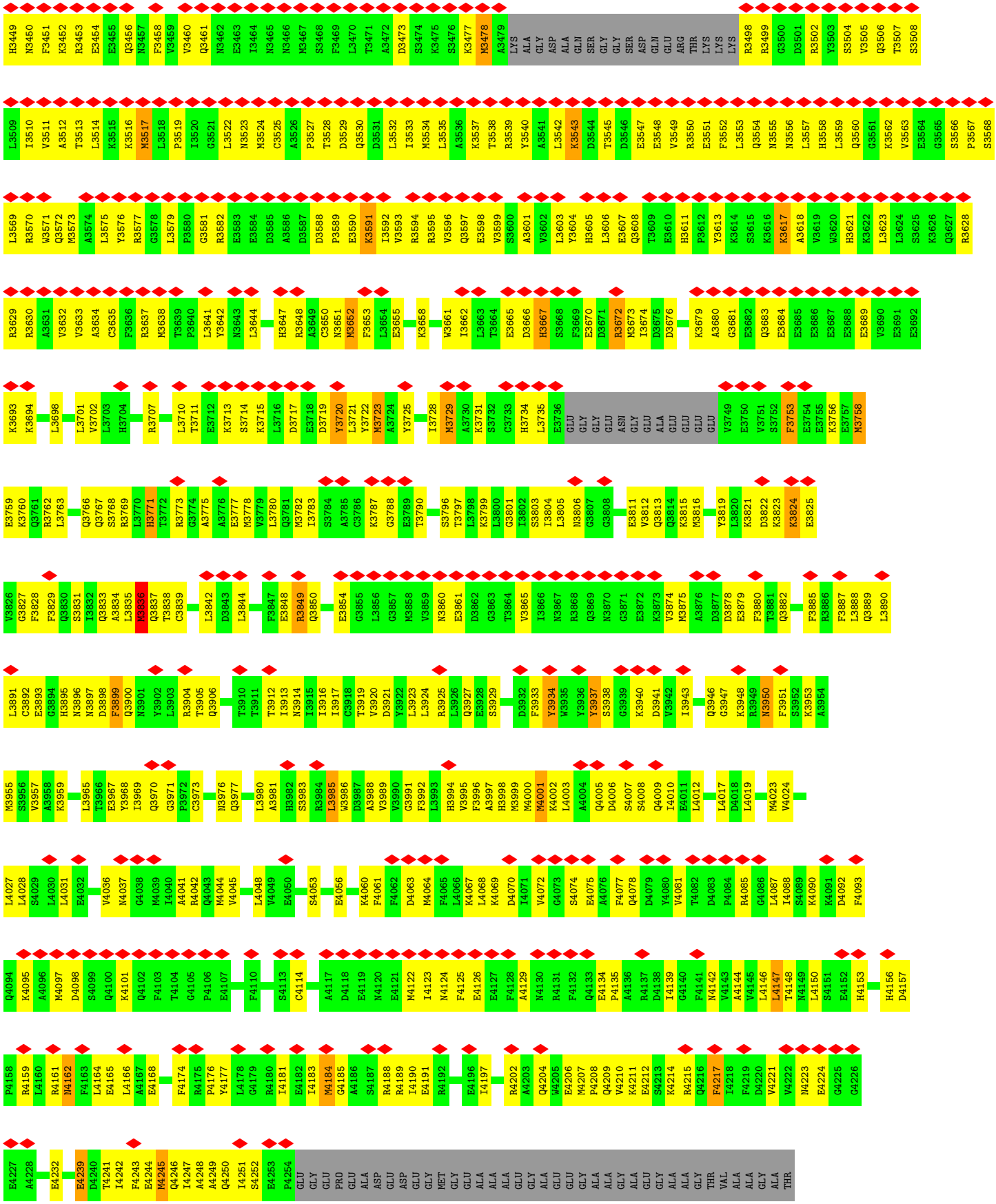


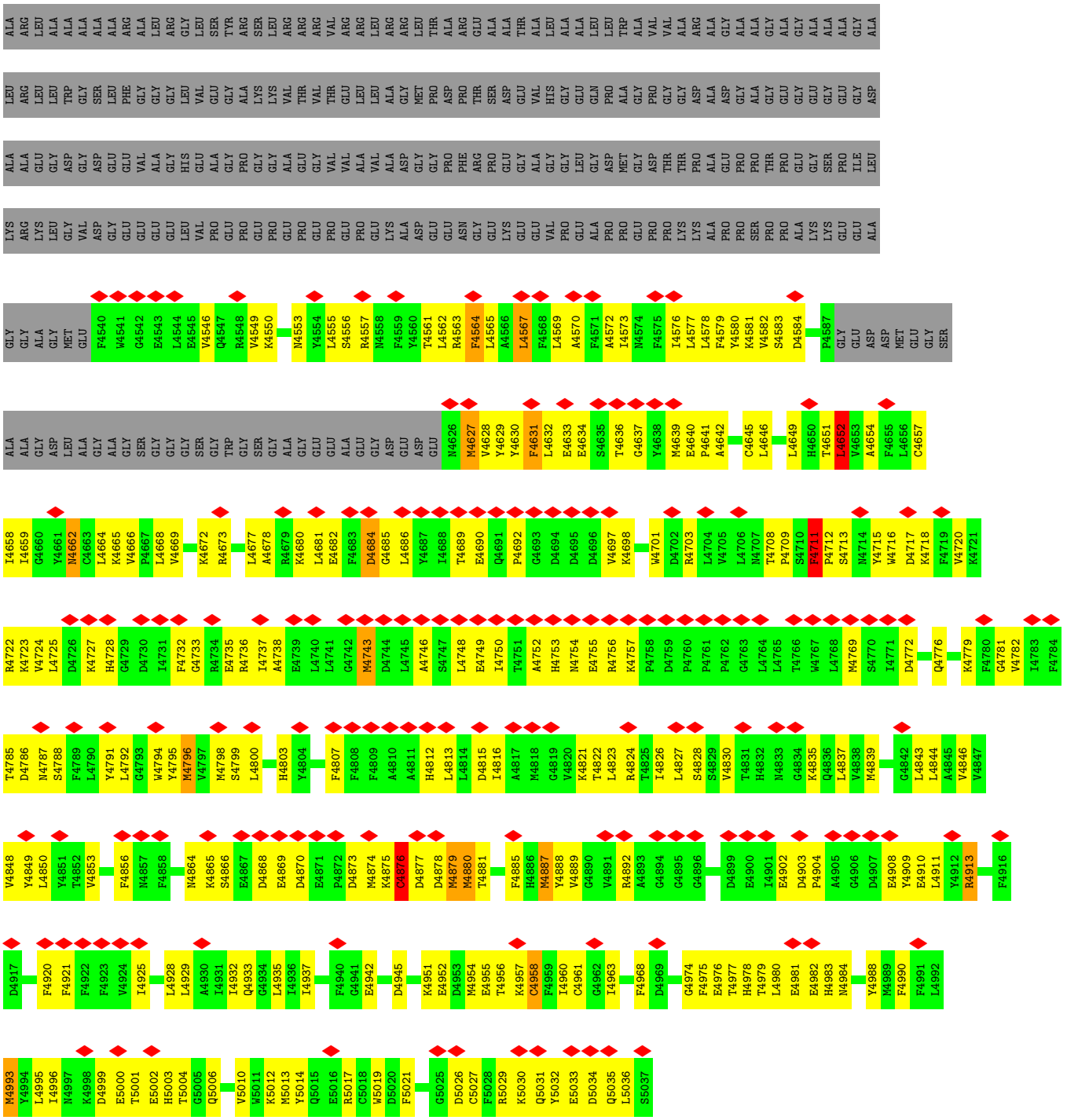

V245 Y246 Y247 E248 G249 G250 A251 V252 C253 T254 H255 A256 R257 S258 L259 W260 R261 L262 E263 P264 L265 R266 I267 S268 W269 S270 G271 S272 H273 L274 R275 W276 G277 Q278 P279 L280 R281 I282 R283 H284 V285 G288 R289 Y290 L291 A292 L293 T294 E295 D296 Q297 G298 L299 V300 V301 V302 D303 A304 C305
K306 A307 H308 T309 K310 A311 T312 S313 F314 C315 F316 R317 V318 S319 K320 E321 K322 L323 D324 T325 A326 P327 K328 R329 D330 V331 E332 G333 M334 G335 P336 P337 E338 I339 K340 Y341 G342 E343 S344 L345 C346 F347 V348 Q349 H350 V351 A352 S353 G354 L355 W356 L357 T358 Y359 A360 A361 P362 D363 P364 K365
A366 L367 R368 L369 G370 V371 L372 K373 K374 K375 A376 I377 L378 H379 Q380 E381 G382 H383 M384 D385 D386 A387 L388 F389 L390 T391 R392 C393 Q394 Q395 E396 E397 S398 Q399 R402 M403 I404 H405 S406 T407 A408 Y411 N412 Q413 F414 I415 K416 G417 L418 D419 S420 F421 S422 G423 K424 P425 R426 G427
S428 G429 P430 P431 A432 G433 P434 A435 L436 P437 I438 E439 A440 V441 I442 L445 I449 G450 Y451 F452 P455 S456 E457 E458 L459 Q460 H461 E462 E463 K464 K467 L468 R469 S470 L471 R472 N473 R474 Q475 S476 L477 F478 Q479 E480 E481 G482 M483 L484 S485 L486 V487 L488 N489 C490 I491 D492
R493 L494 N495 V496 Y497 H502 F503 A504 A507 G508 E509 E510 A511 A512 E513 S514 W515 K516 E517 I518 V519 Y523 L529 I530 R531 G532 N533 R534 A535 N536 C537 A538 L539 F540 S541 T542 D545 V548 S549 K550 L551 D552 R553 L554 E555 A556 S557 S558 G559 I560 L561 E562 V563 L564
Y565 C566 V567 L568 I569 E570 S571 P572 E573 V574 L575 N576 I577 I578 Q579 E580 N581 H582 I583 K584 S585 I586 I587 S588 L589 L590 D591 K592 H593 G594 R595 N596 H597 K598 V599 L600 D601 V602 L603 L606 C607 N610 A613 V614 R615 S616 N617 L620 I621 T622 E623 N624 L625 L626 P627 G628
R629 E630 L631 L632 L633 Q634 T635 N636 L637 I638 N639 Y640 V641 T642 S643 I644 R645 P646 N647 I648 F649 V650 G651 R652 A653 E654 G655 S656 T657 Q658 Y659 G660 K661 W662 Y663 F664 E665 V666 H667 V668 D669 E670 V671 V672 F673 F674 L675 T676 A677 Q678 A679 T680 H681 L682 R683 V684 G685 W686 A687 L688
T689 E690 G691 Y692 S693 P694 Y695 P696 G697 G698 G699 E700 G701 W702 G703 G704 N705 G706 V707 G708 D709 D710 L711 Y712 S713 Y714 G715 F716 D717 G718 L719 H720 L721 W722 T723 G724 H725 V726 A727 R728 P729 V730 T731 S732 P733 G734 Q735 H736 L737 L738 A739 P740 E741 D742 V743 V744 S745 L748 D749
L750 S751 V752 P753 S754 I755 S756 F757 R758 I759 N760 G761 C762 P763 V764 Q765 G766 V767 F768 E769 A770 F771 N772 L773 D774 G775 L776 F777 F778 P779 V780 V781 S782 F783 S784 A785 G786 V787 K788 V789 R790 F791 L792 L793 G794 G795 R796 H797 G798 E799 F800 K801 F802 L803 P804 P805 P806 G807 Y808 A809
P810 C811 H812 E813 A814 V815 L816 P817 R818 E819 R820 L821 R822 L823 E824 P825 I826 K827 E828 Y829 R830 R831 E832 G833 P834 R835 H838 L839 V840 G841 P842 S843 R844 C845 L846 S847 H848 T849 D850 F851 V852 P853 C854 P855 V856 D857 T858 V859 Q860 I861 V862 L863 P864 P865 H866 L867 E868 R869 I870
R871 E872 K873 L874 A875 E876 N877 I878 H879 E880 L881 W882 A883 L884 T885 R886 I887 E888 Q889 G890 W891 T892 Y893 G894 P895 V896 R897 D898 D899 N900 K901 R902 L903 H904 P905 C906 L907 V908 N909 F910 H911 S912 L913 P914 E915 P916 E917 R918 N919 Y920 N921 L922 Q923 N924 S925 G926 E927 T928 L929 K930
T931 L932 L933 A934 L935 G936 C937 H938 V939 G940 M941 A942 D943 E944 K945 A946 E947 D948 N949 L950 K951 K952 T953 K954 L955 P956 K957 T958 Y959 M960 M961 S962 N963 G964 Y965 K966 P967 A968 P969 L970 D971 L972 S973 H974 V975 R976 L977 T978 P979 A980 Q981 T982 T983 L984 V985 D986 R987 L988 A989 E990
N991 G992 H993 N994 V995 W996 A997 R998 D999 R1000 V1001 A1002 Q1003 G1004 W1005 S1006 Y1007 S1008 A1009 V1010 Q1011 D1012 I1013 P1014 A1015 R1016 R1017 N1018 P1019 R1020 L1021 V1022 P1023 Y1024 R1025 L1026 L1027 D1028 E1029 A1030 T1031 K1032 R1033 S1034 N1035 R1036 D1037 S1038 L1039 C1040 Q1041 A1042 V1043 R1044 T1045 L1046 L1047 G1048 Y1049 G1050


Y1051 N1052 I1053 E1054 P1055 P1056 D1057 Q1058 E1059 P1060 S1061 Q1062 V1063 E1064 N1065 Q1066 S1067 R1068 W1069 D1070 R1071 V1072 R1073 I1074 F1075 R1076 A1077 E1078 K1079 S1080 Y1081 T1082 V1083 Q1084 S1085 G1086 R1087 W1088 Y1089 F1090 E1091 F1092 E1093 A1094 V1095 T1096 T1097 G1098 E1099 M1100 R1101 V1102 G1103 W1104 A1105 R1106 P1107 E1108 L1109 R1110
P1111 D1112 V1113 E1114 L1115 G1116 A1117 D1118 E1119 L1120 A1121 Y1122 V1123 F1124 N1125 G1126 H1127 R1128 G1129 Q1130 R1131 W1132 H1133 L1134 G1135 S1136 E1137 P1138 F1139 G1140 R1141 P1142 W1143 Q1144 S1145 G1146 D1147 V1148 V1149 G1150 C1151 M1152 I1153 D1154 L1155 T1156 E1157 N1158 T1159 I1160 I1161 F1162 T1163 L1164 N1165 G1166 E1167 V1168 L1169 M1170
S1171 D1172 S1173 G1174 S1175 E1176 T1177 A1178 F1179 R1180 E1181 I1182 E1183 I1184 G1185 D1186 G1187 F1188 L1189 P1190 V1191 C1192 S1193 L1194 G1195 P1196 G1197 Q1198 V1199 G1200 H1201 L1202 N1203 L1204 G1205 Q1206 D1207 V1208 S1209 S1210 L1211 R1212 F1213 F1214 A1215 I1216 C1217 G1218 L1219 Q1220 E1221 G1222 F1223 E1224 P1225 F1226 A1227 I1228 N1229 M1230
Q1231 R1232 P1233 V1234 T1235 T1236 W1237 F1238 S1241 L1242 P1243 E1246 P1247 V1248 P1249 P1250 E1251 H1252 P1253 H1254 Y1255 E1256 V1257 A1258 R1259 M1260 D1261 G1262 T1263 V1264 D1265 T1266 P1267 P1268 C1269 L1270 R1271 L1272 A1273 H1274 R1275 T1276 W1277 G1278 S1279 Q1280 N1281 S1282 L1283 V1284 E1285 M1286 L1287 F1288 L1289 R1290 L1291 S1292
L1293 P1294 V1295 Q1296 Q1299 H1300 F1301 R1302 C1303 T1304 ALA GLY ALA THR PRO LEU ALA PRO PRO GLY LEU GLN PRO PRO ALA GLU GLU ASP GLU ALA ARG ALA ALA GLU PRO ASP PRO ASP TYR GLU ASN LEU ARG ARG SER ALA GLY GLY TRP GLY GLU ALA GLU GLY GLY LYS GLU GLY THR ALA
LYS GLU GLY THR PRO GLY GLY THR PRO GLN PRO GLY VAL GLU ALA GLN PRO VAL ARG ALA GLU ASN GLU LYS ASP ALA THR THR GLU LYS ASN LYS LYS ARG GLY PHE LEU PHE LYS ALA LYS LYS ALA ALA MET MET THR GLN PRO PRO ALA THR PRO ALA LEU PRO ARG LEU PRO HIS
ASP VAL VAL PRO ALA D1419 N1420 R1421 D1422 D1423 P1424 E1425 I1426 I1427 L1428 N1429 T1430 T1431 T1432 Y1433 Y1434 Y1435 S1436 V1437 R1438 V1439 F1440 A1441 G1442 Q1443 E1444 P1445 S1446 C1447 V1448 W1449 V1450 G1451 W1452 D1456 Y1457 H1458 Q1459 H1460 D1461 M1462 N1463 F1464 D1465 L1466 S1467 K1468 V1469 R1470 A1471 V1472 T1475 M1476
G1477 D1478 E1479 Q1480 G1481 N1482 V1483 H1484 S1485 S1486 L1487 K1488 C1489 S1490 N1491 C1492 Y1493 M1494 V1495 W1496 G1497 G1498 D1499 F1500 V1501 S1502 P1503 G1504 Q1505 Q1506 G1507 R1508 I1509 S1510 H1511 T1512 D1513 L1514 V1515 I1516 G1517 C1518 L1519 V1520 D1521 L1522 A1523 T1524 G1525 L1526 M1527 T1528 F1529 T1530 A1531 N1532 G1533 K1534 E1535 S1536
N1537 T1538 F1539 F1540 Q1541 V1542 E1543 P1544 N1545 T1546 K1547 L1548 F1549 P1550 A1551 V1552 F1553 V1554 L1555 P1556 T1557 H1558 Q1559 N1560 V1561 I1562 Q1563 F1564 E1565 L1566 G1567 K1568 Q1569 K1570 N1571 I1572 M1573 P1574 L1575 S1576 A1577 A1578 M1579 F1580 L1581 S1582 E1583 R1584 K1585 N1586 P1587 A1588 P1589 Q1590 C1591 P1592 P1593 R1594 L1595 E1596
V1597 Q1598 M1599 L1600 M1601 P1602 Y1603 S1604 W1605 S1606 R1607 M1608 P1609 N1610 H1611 F1612 L1613 Q1614 V1615 E1616 T1617 R1618 R1619 A1620 G1621 E1622 R1623 L1624 G1625 W1626 A1627 V1628 Q1629 C1630 Q1631 D1632 P1633 L1634 T1635 M1636 M1637 A1638 L1639 H1640 E1643 E1644 N1645 R1646 C1647 M1648 D1649 E1652 L1653 S1654 E1655 R1656 L1657 D1658
L1659 Q1660 R1661 F1662 H1663 S1664 H1665 T1666 L1667 R1668 L1669 Y1670 R1671 A1672 V1673 C1674 A1675 L1676 G1677 N1678 N1679 R1680 V1681 A1682 H1683 A1684 L1685 C1686 S1687 H1688 V1689 D1690 Q1691 A1692 Q1693 L1694 L1695 H1696 A1697 L1698 E1699 D1700 A1701 H1702 G1705 P1706 L1707 R1708 A1709 G1710 Y1711 Y1712 D1713 L1714 I1715 I1716 S1717 I1718 H1719
L1720 E1721 C1724 R1725 S1726 R1727 R1728 S1729 M1730 L1731 S1732 E1733 L1738 T1739 T1742 R1743 A1744 I1745 T1746 L1747 F1748 P1749 P1750 G1751 R1752 K1753 G1754 G1755 N1756 A1757 R1758 R1759 H1760 G1761 L1762 P1763 G1764 V1765 G1766 V1767 T1768 L1771 R1772 H1775 H1776 F1777 S1778 C1781 F1782 V1783 A1784 A1785 L1786 P1787
A1788 A1789 G1790 V1791 A1792 E1793 A1794 P1795 A1796 R1797 L1798 A1801 I1802 P1803 L1804 E1805 A1806 L1807 R1808 D1809 K1810 A1811 L1812 R1813 M1814 L1815 G1816 E1817 A1818 V1819 R1820 D1821 G1822 G1823 Q1824 H1825 A1826 R1827 D1828 P1829 V1830 G1831 G1832 S1833 F1836 Q1837 F1838 V1839 P1840 V1841 L1842 K1843 L1844 V1845 S1846 T1847 L1848



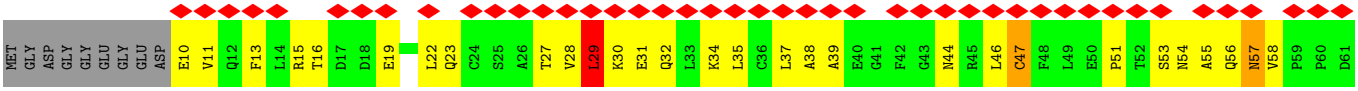

E2669 E2670 E2671 L2672 H2673 L2674 T2675 R2676 K2677 L2678 F2679 W2680 G2681 I2682 F2683 D2684 S2685 L2686 A2687 H2688 K2689 K2690 Y2691 D2692 Q2693 E2694 L2695 Y2696 R2697 M2698 A2699 M2700 P2701 C2702 L2703 C2704 A2705 I2706 A2707 G2708 A2709 L2710 P2711 P2712 D2713 Y2714 V2715 D2716 A2717 S2718 Y2719 S2720 S2721 K2722 A2723 E2724 K2725 LYS ALA THR
VAL ASP ALA GLU GLY N2734 F2735 D2736 P2737 R2738 P2739 V2740 E2741 T2742 L2743 N2744 V2745 I2746 I2747 P2748 E2749 K2750 L2751 D2752 S2753 F2754 I2755 N2756 K2757 F2758 A2759 E2760 Y2761 T2762 H2763 E2764 K2765 W2766 A2767 F2768 D2769 K2770 I2771 Q2772 N2773 N2774 W2775 S2776 Y2777 G2778 E2779 N2780 V2781 D2782 E2783 E2784 L2785 K2786 T2787 H2788
P2789 M2790 L2791 R2792 P2793 Y2794 K2795 T2796 F2797 S2798 E2799 K2800 D2801 K2802 E2803 I2804 Y2805 R2806 W2807 P2808 I2809 K2810 E2811 S2812 L2813 K2814 A2815 M2816 I2817 A2818 W2819 E2820 W2821 T2822 I2823 E2824 K2825 A2826 R2827 E2828 G2829 E2830 GLU GLU ARG THR GLU LYS LYS LYS THR ARG LYS ILE SER GLN THR ALA GLN THR
TYR ASP PRO ARG GLU GLY Y2855 N2856 P2857 Q2858 P2859 P2860 D2861 L2862 S2863 G2864 V2865 T2866 L2867 S2868 L2927 K2928 F2929 L2930 Q2931 M2932 N2933 G2934 Y2935 A2936 V2937 T2938 R2939 GLY LEU LYS ASP MET GLU L2946 D2947 T2948 S2949 S2950 I2951 E2952 K2953 R2954 F2955 A2956 F2957 G2958 F2959 L2960 Q2961 Q2962 L2963 L2964 R2965 W2966 M2967 D2968 R2969 S2970 Q2971 E2972 F2973 I2974 A2975 H2976 L2977 E2978 A2979 V2980 V2981 S2982 S2983 G2984 R2985 V2986 E2987 K2988 S2989 P2990 H2991 E2992 Q2993 E2994 I2995 K2996 F2997 F2998 A2999 K3000 I3001 L3002 L3003 P3004 L3005 I3006 N3007 Q3008 Y3009 F3010 T3011 N3012 H3013 C3014 L3015 Y3016 F3017 L3018 S3019 T3020 P3021 A3022 K3023 V3024 L3025 G3026 S3027 G3028
G3029 H3030 A3031 S3032 N3033 K3034 E3035 K3036 E3037 M3038 I3039 T3040 S3041 L3042 F3043 C3044 K3045 L3046 A3047 A3048 L3049 V3050 R3051 H3052 R3053 V3054 S3055 L3056 F3057 G3058 T3059 D3060 A3061 P3062 A3063 V3064 V3065 N3066 C3067 L3068 H3069 I3070 L3071 A3072 R3073 S3074 L3075 D3076 A3077 R3078 T3079 V3080 M3081 K3082 S3083 G3084 P3085 E3086 I3087 V3088
K3089 A3090 G3091 L3092 R3093 S3094 F3095 F3096 E3097 S3098 A3099 S3100 E3101 D3102 I3103 E3104 K3105 M3106 V3107 E3108 N3109 L3110 R3111 L3112 G3113 K3114 V3115 S3116 GLN ALA ARG THR GLN VAL K3123 G3124 V3125 G3126 Q3127 N3128 L3129 T3130 Y3131 T3132 T3133 V3134 A3135 L3136 L3137 P3138 V3139 L3140 T3141 T3142 L3143 F3144 Q3145 H3146 I3147 A3148
Q3149 H3150 Q3151 F3152 G3153 D3154 D3155 V3156 I3157 L3158 D3159 D3160 V3161 Q3162 V3163 S3164 C3165 Y3166 R3167 T3168 L3169 C3170 S3171 I3172 Y3173 S3174 L3175 G3176 T3177 T3178 K3179 N3180 T3181 Y3182 V3183 E3184 K3185 L3186 R3187 P3188 A3189 L3190 G3191 E3192 C3193 L3194 A3195 R3196 L3197 A3198 A3199 A3200 M3201 P3202 V3203 A3204 F3205 L3206 E3207 P3208
Q3209 L3210 N3211 E3212 Y3213 N3214 A3215 C3216 S3217 V3218 Y3219 T3220 T3221 K3222 S3223 P3224 R3225 E3226 R3227 A3228 I3229 L3230 G3231 L3232 P3233 N3234 S3235 V3236 E3237 E3238 M3239 C3240 P3241 D3242 I3243 P3244 V3245 L3246 D3247 R3248 L3249 M3250 A3251 D3252 I3253 G3254 G3255 L3256 A3257 E3258 S3259 G3260 A3261 R3262 Y3263 T3264 E3265 M3266 P3267 H3268
V3269 I3270 E3271 I3272 T3273 L3274 P3275 M3276 L3277 C3278 S3279 Y3280 L3281 P3282 R3283 W3284 W3285 E3286 R3287 G3288 P3289 E3290 A3291 P3292 P3293 P3294 A3295 L3296 P3297 A3298 G3299 A3300 P3301 P3302 P3303 C3304 T3305 A3306 V3307 T3308 S3309 D3310 H3311 L3312 N3313 S3314 L3315 L3316 G3317 N3318 I3319 L3320 R3321 I3322 I3323 V3324 N3325 N3326 L3327 G3328
I3329 D3330 E3331 A3332 T3333 W3334 M3335 K3336 R3337 L3338 A3339 V3340 F3341 A3342 Q3343 P3344 I3345 V3346 S3347 R3348 A3349 R3350 P3351 E3352 L3353 L3354 H3355 S3356 H3357 F3358 I3359 P3360 T3361 I3362 G3363 R3364 L3365 R3366 K3367 R3368 A3369 G3370 K3371 V3372 V3373 A3374 E3375 E3376 E3377 Q3378 L3379 R3380 L3381 E3382 A3383 K3384 A3385 E3386 A3387 E3388
E3389 G3390 E3391 L3392 L3393 V3394 R3395 D3396 E3397 F3398 S3399 V3400 L3401 C3402 R3403 D3404 L3405 Y3406 A3407 L3408 Y3409 P3410 L3411 L3412 I3413 R3414 Y3415 V3416 D3417 N3418 N3419 R3420 A3421 H3422 W3423 L3424 T3425 E3426 P3427 N3428 A3429 N3430 A3431 E3432 E3433 L3434 F3435 R3436 M3437 V3438 G3439 E3440 I3441 F3442 I3443 Y3444 W3445 S3446 K3447 S3448

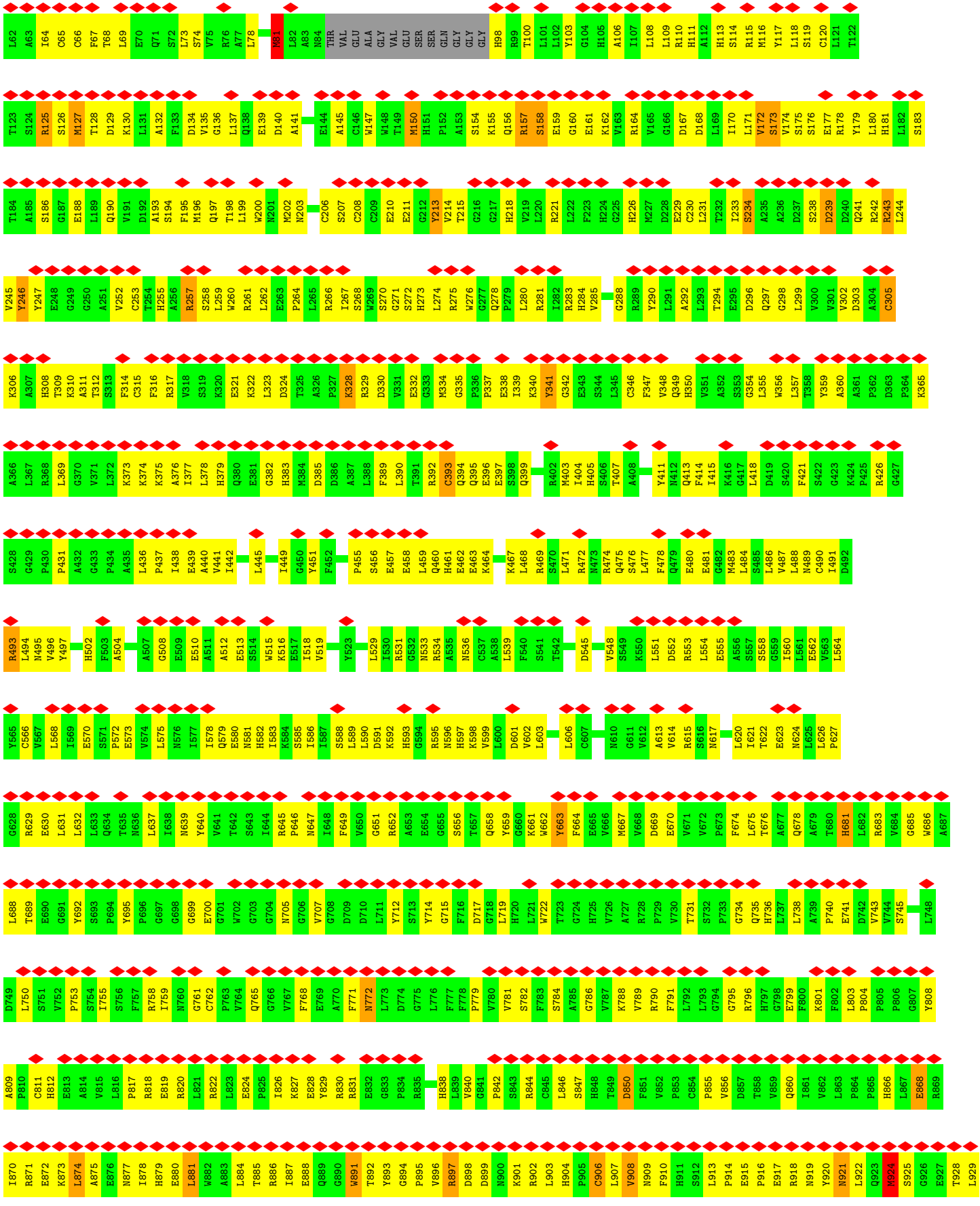

H3449 N3450 F3451 K3452 R3453 E3454 E3455 Q3456 N3457 F3458 V3459 V3460 Q3461 N3462 E3463 I3464 N3465 N3466 M3467 S3468 F3469 L3470 T3471 A3472 D3473 S3474 K3475 S3476 K3477 M3478 A3479 LYS ALA GLY ASP ALA GLN SER GLY GLY SER ASP GLN GLU ARG THR LYS LYS LYS R3498 R3499 G3500 D3501 R3502 Y3503 S3504 V3505 Q3506 T3507 S3508
L3509 I3510 V3511 A3512 T3513 L3514 K3515 K3516 M3517 L3518 P3519 I3520 G3521 L3522 N3523 M3524 C3525 A3526 P3527 T3528 D3529 Q3530 D3531 L3532 I3533 M3534 L3535 A3536 K3537 T3538 R3539 Y3540 A3541 L3542 K3543 D3544 T3545 D3546 E3547 E3548 V3549 R3550 E3551 F3552 L3553 Q3554 N3555 N3556 L3557 H3558 L3559 Q3560 G3561 K3562 V3563 E3564 G3565 S3566 P3567 S3568
L3569 R3570 W3571 Q3572 M3573 A3574 L3575 Y3576 R3577 G3578 L3579 P3580 G3581 R3582 E3583 E3584 D3585 A3586 D3587 D3588 P3589 E3590 K3591 I3592 V3593 R3594 R3595 V3596 Q3597 E3598 V3599 S3600 A3601 V3602 L3603 Y3604 H3605 L3606 E3607 Q3608 T3609 E3610 H3611 P3612 Y3613 K3614 S3615 K3616 K3617 A3618 V3619 W3620 H3621 K3622 L3623 L3624 S3625 K3626 Q3627 R3628
R3629 R3630 A3631 V3632 V3633 A3634 C3635 F3636 R3637 M3638 T3639 P3640 L3641 Y3642 N3643 L3644 H3647 R3648 A3649 C3650 N3651 M3652 F3653 L3654 E3655 K3658 W3661 I3662 L3663 T3664 E3665 D3666 H3667 S3668 F3669 E3670 D3671 R3672 M3673 I3674 D3675 D3676 K3679 A3680 G3681 E3682 Q3683 E3684 E3685 E3686 E3687 E3688 E3689 V3690 E3691 E3692
K3693 K3694 L3698 L3701 V3702 L3703 H3704 R3707 L3710 T3711 E3712 K3713 S3714 K3715 L3716 D3717 E3718 D3719 Y3720 L3721 Y3722 M3723 A3724 Y3725 I3728 M3729 A3730 K3731 S3732 C3733 H3734 L3735 E3736 GLU GLY GLY GLU ASN GLY GLU ALA GLU GLU GLU V3749 E3750 V3751 S3752 F3753 E3754 E3755 K3756 E3757 M3758
E3759 K3760 Q3761 R3762 L3763 Q3766 Q3767 S3768 R3769 L3770 H3771 T3772 R3773 G3774 A3775 A3776 E3777 M3778 V3779 L3780 Q3781 M3782 I3783 S3784 A3785 C3786 K3787 G3788 E3789 T3790 S3796 T3797 L3798 K3799 L3800 G3801 I3802 S3803 I3804 L3805 N3806 G3807 G3808 E3811 V3812 Q3813 Q3814 K3815 M3816 Y3819 L3820 K3821 D3822 K3823 K3824 E3825
V3826 G3827 F3828 F3829 Q3830 S3831 I3832 Q3833 A3834 L3835 M3836 Q3837 T3838 C3839 L3842 D3843 L3844 F3847 E3848 R3849 Q3850 E3854 G3855 L3856 G3857 M3858 V3859 N3860 E3861 D3862 G3863 T3864 V3865 I3866 N3867 R3868 Q3869 N3870 G3871 E3872 K3873 V3874 M3875 A3876 D3877 D3878 E3879 F3880 T3881 Q3882 F3885 R3886 F3887 L3888 Q3889 L3890
L3891 C3892 E3893 G3894 H3895 N3896 N3897 D3898 F3899 Q3900 N3901 Y3902 L3903 R3904 T3905 Q3906 T3910 T3911 T3912 I3913 N3914 I3915 I3916 I3917 C3918 T3919 V3920 D3921 Y3922 L3923 L3924 R3925 L3926 Q3927 E3928 S3929 D3932 F3933 Y3934 W3935 Y3936 Y3937 S3938 G3939 K3940 D3941 V3942 I3943 Q3946 G3947 K3948 R3949 N3950 F3951 S3952 K3953 A3954
M3955 S3956 V3957 A3958 K3959 L3965 T3966 E3967 Y3968 I3969 Q3970 G3971 P3972 C3973 N3976 Q3977 L3980 A3981 H3982 S3983 R3984 L3985 W3986 D3987 A3988 V3989 V3990 G3991 F3992 L3993 H3994 V3995 F3996 A3997 H3998 M3999 M4000 M4001 K4002 L4003 A4004 Q4005 D4006 S4007 S4008 Q4009 I4010 E4011 L4012 L4017 D4018 L4019 M4023 V4024
L4027 L4028 S4029 L4030 L4031 E4032 V4036 N4037 G4038 M4039 I4040 A4041 R4042 Q4043 M4044 V4045 L4048 V4049 E4050 S4053 E4056 K4060 F4061 F4062 D4063 M4064 F4065 L4066 K4067 L4068 K4069 D4070 I4071 V4072 G4073 S4074 E4075 A4076 F4077 Q4078 D4079 Y4080 V4081 T4082 D4083 P4084 R4085 G4086 L4087 I4088 S4089 K4090 K4091 D4092 F4093
Q4094 K4095 A4096 M4097 D4098 S4099 Q4100 K4101 Q4102 F4103 T4104 G4105 P4106 E4107 F4110 S4113 C4114 A4117 D4118 E4119 N4120 E4121 M4122 I4123 N4124 F4125 E4126 E4127 F4128 A4129 N4130 R4131 F4132 Q4133 E4134 P4135 A4136 R4137 D4138 I4139 G4140 F4141 N4142 V4143 A4144 V4145 L4146 L4147 T4148 N4149 L4150 S4151 E4152 H4153 H4156 D4157
P4158 R4159 L4160 R4161 M4162 F4163 L4164 E4165 L4166 A4167 E4168 F4174 R4175 P4176 Y4177 L4178 G4179 R4180 I4181 E4182 I4183 M4184 G4185 A4186 S4187 R4188 R4189 I4190 E4191 R4192 E4196 I4197 R4202 A4203 Q4204 W4205 E4206 M4207 P4208 Q4209 V4210 K4211 E4212 S4213 K4214 R4215 Q4216 F4217 I4218 F4219 D4220 V4221 V4222 N4223 E4224 G4225 G4226
E4227 A4228 E4232 E4239 D4240 T4241 I4242 F4243 E4244 M4245 Q4246 I4247 A4248 A4249 Q4250 I4251 S4252 E4253 P4254 GLU GLY GLU PRO GLU ALA ASP GLU ASP GLU GLY MET GLY GLU ALA ALA ALA GLU GLY ALA GLU GLU GLY ALA ALA GLY ALA GLU GLY ALA ALA GLY THR VAL ALA ALA GLY ALA THR

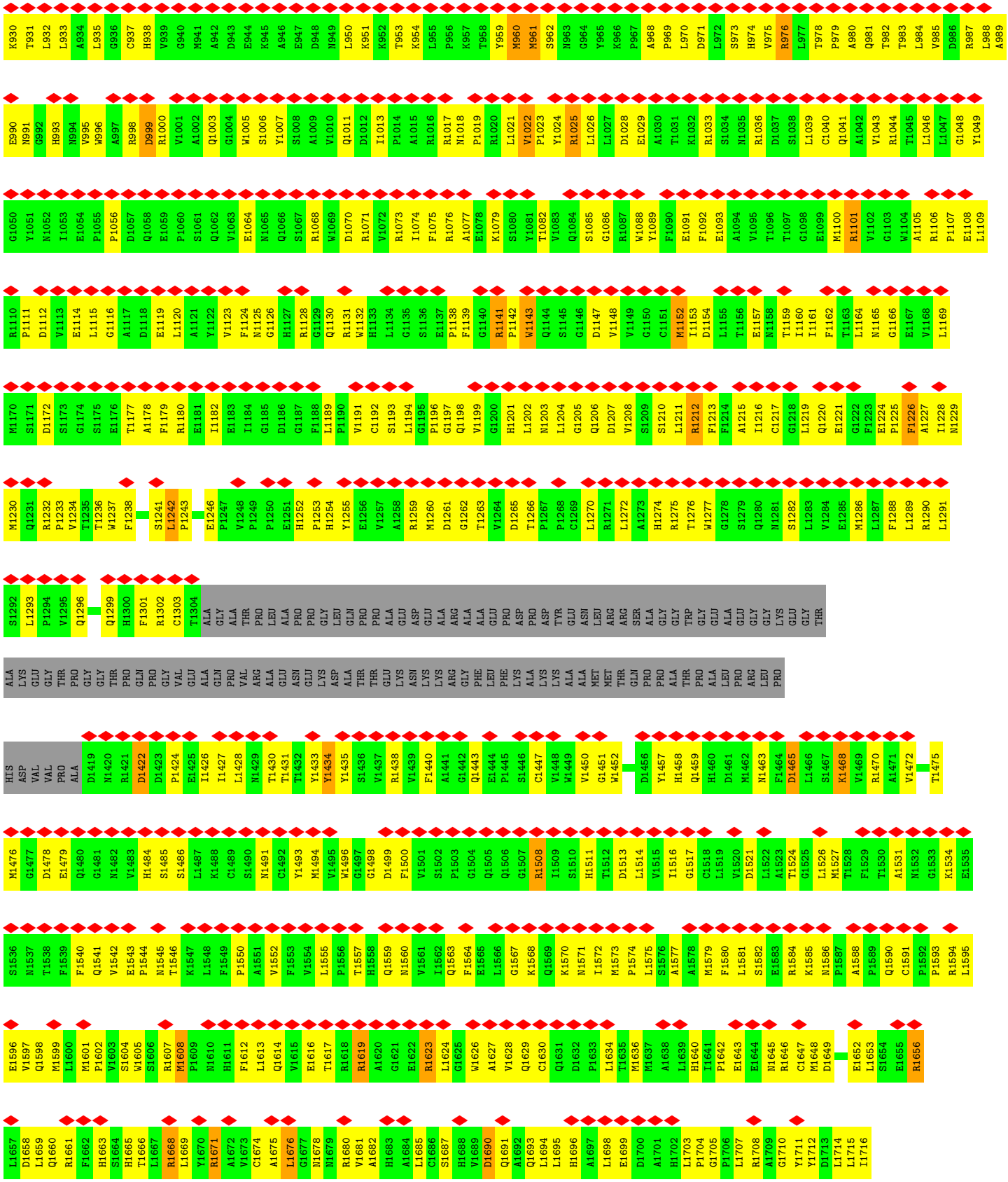


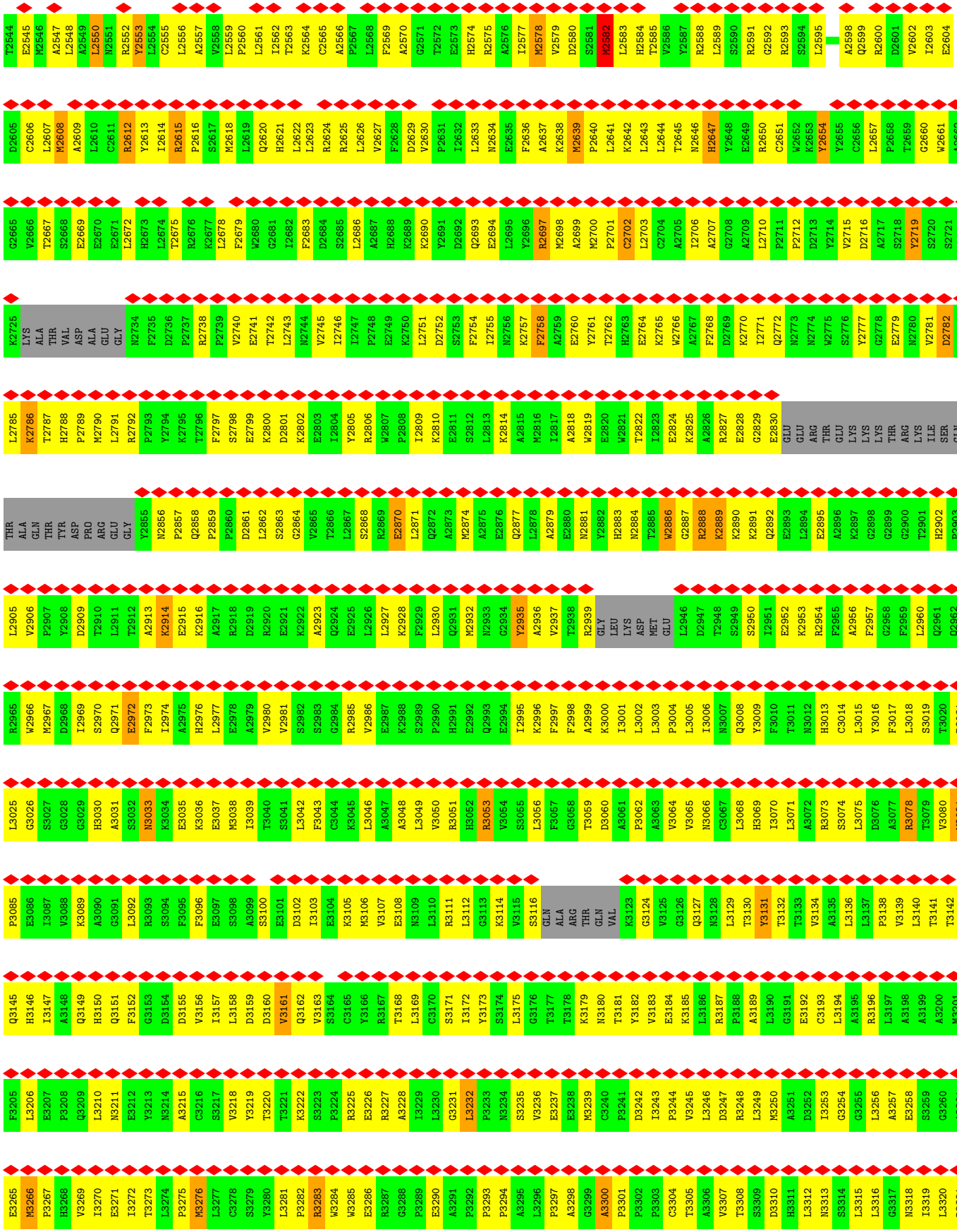
• Molecule 1: Ryanodine receptor 1

Chain C:

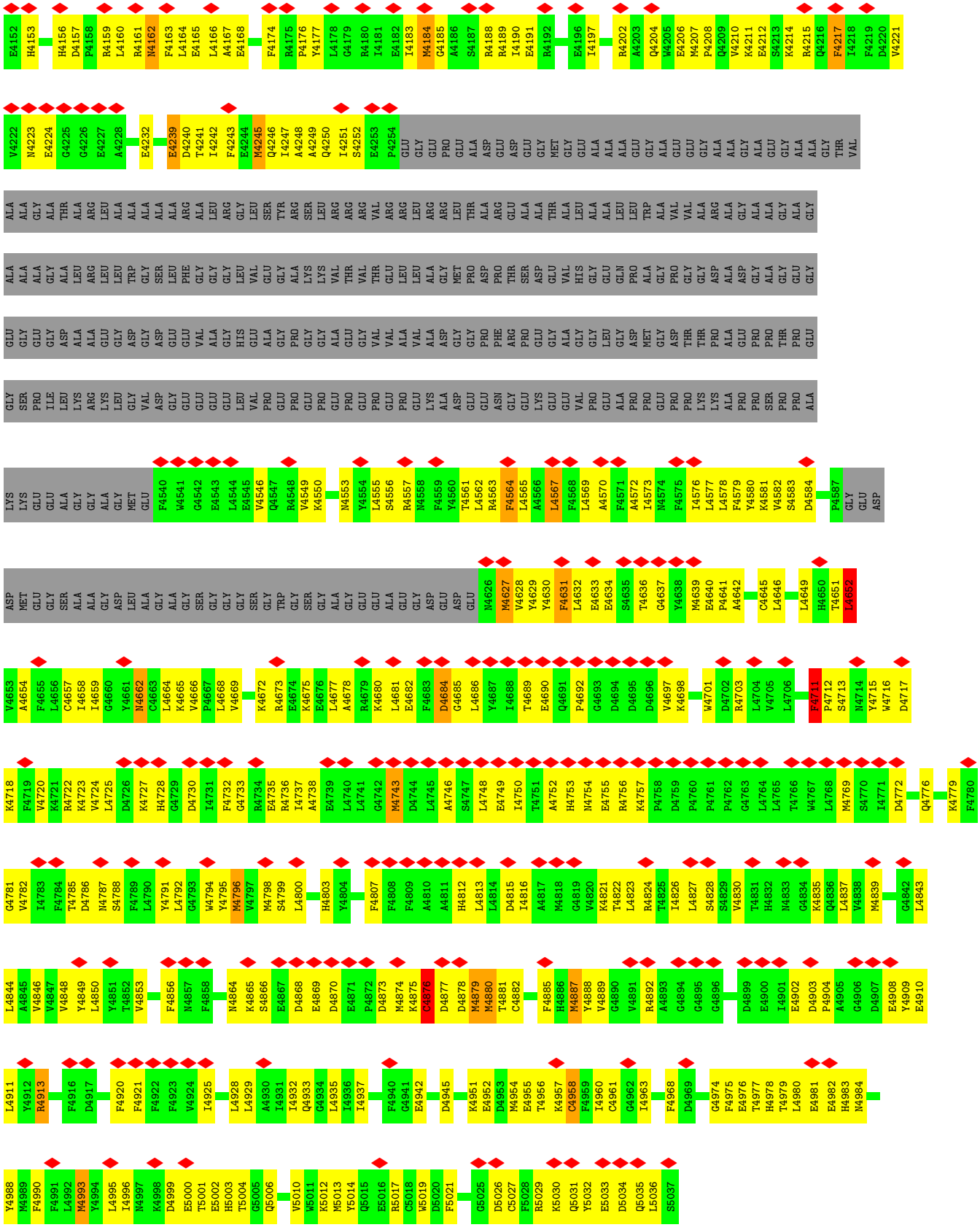



L62 A63 I64 C65 C66 F67 T68 L69 E70 Q71 S72 L73 S74 V75 R76 A77 L78 M81 L82 A83 N84 THR VAL GLU ALA GLY VAL GLU SER SER GLN GLY GLY GLY H98 R99 T100 L101 L102 Y103 G104 H105 A106 I107 L108 L109 R110 H111 A112 H113 S114 R115 M116 Y117 L118 S119 C120 L121 T122
T123 S124 R125 S126 M127 T128 D129 K130 L131 A132 F133 D134 V135 G136 L137 Q138 E139 D140 A141 E144 A145 C146 W147 W148 T149 M150 H151 P152 A153 S154 K155 Q156 R157 S158 E159 G160 E161 K162 V163 R164 V165 G166 D167 D168 L169 I170 L171 V172 S173 V174 S175 S176 E177 R178 Y179 L180 H181 L182 S183
T184 A185 S186 G187 E188 L189 Q190 V191 D192 A193 S194 F195 M196 Q197 T198 L199 W200 N201 M202 N203 C206 S207 C208 C209 E210 E211 G212 Y213 V214 T215 G216 G217 H218 V219 L220 R221 L222 F223 H224 G225 H226 M227 D228 E229 C230 L231 T232 I233 S234 A235 A236 D237 S238 D239 D240 Q241 R242 R243 L244
V245 Y246 Y247 E248 G249 G250 A251 V252 C253 T254 H255 A256 R257 S258 L259 W260 R261 L262 E263 P264 L265 R266 I267 S268 W269 S270 G271 S272 H273 L274 R275 W276 G277 Q278 P279 L280 R281 I282 R283 H284 V285 G288 R289 Y290 L291 A292 L293 T294 E295 D296 Q297 G298 L299 V300 V301 V302 D303 A304 C305
K306 A307 H308 T309 K310 A311 T312 S313 F314 C315 F316 R317 V318 S319 K320 E321 K322 L323 D324 T325 A326 P327 K328 R329 D330 V331 E332 G333 M334 G335 P336 P337 E338 I339 K340 Y341 G342 E343 S344 L345 C346 F347 V348 Q349 H350 V351 A352 S353 G354 L355 W356 L357 T358 Y359 A360 A361 P362 D363 P364 K365
A366 L367 R368 L369 G370 V371 L372 K373 K374 K375 A376 I377 L378 H379 Q380 E381 G382 H383 M384 D385 D386 A387 L388 F389 L390 T391 R392 C393 Q394 Q395 E396 E397 S398 Q399 R402 M403 I404 H405 S406 T407 A408 Y411 N412 Q413 F414 I415 K416 G417 L418 D419 S420 F421 S422 G423 K424 P425 R426 G427
S428 G429 P430 P431 A432 G433 P434 A435 L436 P437 I438 E439 A440 V441 I442 L445 I449 G450 Y451 F452 P455 S456 E457 E458 L459 Q460 H461 E462 E463 K464 K467 L468 R469 S470 L471 R472 N473 R474 Q475 S476 L477 F478 Q479 E480 E481 G482 M483 L484 S485 L486 V487 L488 N489 C490 I491 D492
R493 L494 N495 V496 Y497 H502 F503 A504 A507 G508 E509 E510 A511 A512 E513 S514 W515 K516 E517 I518 V519 Y523 L529 I530 R531 G532 N533 R534 A535 N536 C537 A538 L539 F540 S541 T542 D545 V548 S549 K550 L551 D552 R553 L554 E555 A556 S557 S558 G559 I560 L561 E562 V563 L564
Y565 C566 V567 L568 I569 E570 S571 P572 E573 V574 L575 N576 I577 I578 Q579 E580 N581 H582 I583 K584 S585 I586 I587 S588 L589 L590 D591 K592 H593 G594 R595 N596 H597 K598 V599 L600 D601 V602 L603 L606 C607 N610 G611 V612 A613 V614 R615 S616 N617 L620 I621 T622 E623 N624 L625 L626 P627
G628 R629 E630 L631 L632 L633 Q634 T635 N636 L637 I638 N639 Y640 V641 T642 S643 I644 R645 P646 N647 I648 F649 V650 G651 R652 A653 E654 G655 S656 T657 Q658 Y659 G660 K661 W662 Y663 F664 E665 V666 M667 V668 D669 E670 V671 V672 P673 F674 L675 T676 A677 Q678 A679 T680 H681 L682 R683 V684 G685 W686 A687
L688 T689 E690 G691 Y692 S693 P694 Y695 P696 G697 G698 G699 E700 G701 W702 G703 G704 N705 G706 V707 G708 D709 D710 L711 Y712 S713 Y714 G715 F716 D717 G718 L719 H720 L721 W722 T723 G724 H725 V726 A727 R728 P729 V730 T731 S732 P733 G734 Q735 H736 L737 L738 A739 P740 E741 D742 V743 W744 S745 L748
D749 L750 S751 V752 P753 S754 I755 S756 F757 R758 I759 N760 G761 C762 P763 V764 Q765 G766 V767 F768 E769 A770 F771 N772 L773 D774 G775 L776 F777 F778 P779 V780 V781 S782 F783 S784 A785 G786 V787 K788 V789 R790 F791 L792 L793 G794 G795 R796 H797 G798 E799 F800 K801 F802 L803 P804 P805 P806 G807 Y808
A809 P810 C811 H812 E813 A814 V815 L816 P817 R818 E819 R820 L821 R822 L823 E824 P825 I826 K827 E828 Y829 R830 R831 E832 G833 P834 R835 H838 L839 V840 G841 P842 S843 R844 C845 L846 S847 H848 T849 D850 F851 V852 P853 C854 P855 V856 D857 T858 V859 Q860 I861 V862 L863 P864 P865 H866 L867 E868 R869
I870 R871 E872 K873 L874 A875 E876 N877 I878 H879 E880 L881 W882 A883 L884 T885 R886 I887 E888 Q889 G890 W891 T892 Y893 G894 P895 V896 R897 D898 D899 N900 K901 R902 L903 H904 P905 C906 L907 V908 N909 F910 H911 S912 L913 P914 E915 P916 E917 R918 N919 Y920 N921 L922 Q923 M924 S925 G926 E927 T928 L929


K930 T931 L932 L933 A934 L935 G936 C937 H938 V939 G940 M941 A942 D943 E944 K945 A946 E947 D948 N949 L950 K951 K962 T953 K954 L955 P956 K957 T958 Y959 M960 M961 S962 N963 G964 Y965 K966 P967 A968 P969 L970 D971 L972 S973 H974 V975 R976 L977 T978 P979 A980 Q981 T982 T983 L984 V985 D986 R987 L988 A989
E990 N991 G992 H993 N994 V995 W996 A997 R998 D999 R1000 V1001 A1002 Q1003 G1004 W1005 S1006 Y1007 S1008 A1009 V1010 Q1011 D1012 I1013 P1014 A1015 R1016 R1017 N1018 P1019 R1020 L1021 V1022 P1023 Y1024 R1025 L1026 L1027 D1028 E1029 A1030 T1031 K1032 R1033 S1034 N1035 R1036 D1037 S1038 L1039 C1040 Q1041 A1042 V1043 R1044 T1045 L1046 L1047 G1048 Y1049
G1050 Y1051 N1052 I1053 E1054 P1055 P1056 D1057 Q1058 E1059 P1060 S1061 Q1062 V1063 E1064 N1065 Q1066 S1067 R1068 W1069 D1070 R1071 V1072 R1073 I1074 F1075 R1076 A1077 E1078 K1079 S1080 Y1081 T1082 V1083 Q1084 S1085 G1086 R1087 W1088 Y1089 F1090 E1091 F1092 E1093 A1094 V1095 T1096 T1097 G1098 E1099 M1100 R1101 V1102 G1103 W1104 A1105 R1106 P1107 E1108 L1109
R1110 P1111 D1112 V1113 E1114 L1115 G1116 A1117 D1118 E1119 L1120 A1121 Y1122 V1123 F1124 N1125 G1126 H1127 R1128 G1129 Q1130 R1131 W1132 H1133 L1134 G1135 S1136 E1137 P1138 F1139 G1140 R1141 P1142 W1143 Q1144 S1145 G1146 D1147 V1148 V1149 G1150 C1151 M1152 I1153 D1154 L1155 T1156 E1157 N1158 T1159 I1160 I1161 F1162 T1163 L1164 N1165 G1166 E1167 V1168 L1169
M1170 S1171 D1172 S1173 G1174 S1175 E1176 T1177 A1178 F1179 R1180 E1181 I1182 E1183 I1184 G1185 D1186 G1187 F1188 L1189 P1190 V1191 C1192 S1193 L1194 G1195 P1196 G1197 Q1198 V1199 G1200 H1201 L1202 N1203 L1204 G1205 Q1206 D1207 V1208 S1209 S1210 L1211 R1212 F1213 F1214 A1215 I1216 C1217 G1218 L1219 Q1220 E1221 G1222 F1223 E1224 P1225 F1226 A1227 I1228 N1229
M1230 Q1231 R1232 P1233 V1234 T1235 T1236 W1237 F1238 S1241 L1242 P1243 E1246 P1247 V1248 P1249 P1250 E1251 H1252 P1253 H1254 Y1255 E1256 V1257 A1258 R1259 M1260 D1261 G1262 T1263 V1264 D1265 T1266 P1267 P1268 C1269 L1270 R1271 L1272 A1273 H1274 R1275 T1276 W1277 G1278 S1279 Q1280 N1281 S1282 L1283 V1284 E1285 M1286 L1287 F1288 L1289 R1290 L1291
S1292 L1293 P1294 V1295 Q1296 Q1299 H1300 F1301 R1302 C1303 T1304 ALA GLY ALA THR PRO LEU ALA PRO PRO GLY LEU GLN PRO PRO ALA GLU ASP GLU ALA ARG ALA ALA GLU PRO ASP PRO ASP TYR GLU ASN LEU ARG ARG SER ALA GLY GLY TRP GLY GLU ALA GLU GLY GLY 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 LEU PHE LYS ALA LYS LYS ALA ALA MET MET THR GLN PRO PRO ALA THR PRO ALA ALA LEU PRO ARG LEU PRO
HIS ASP VAL VAL PRO ALA D1419 N1420 R1421 D1422 D1423 P1424 E1425 I1426 I1427 L1428 N1429 T1430 T1431 T1432 Y1433 Y1434 Y1435 S1436 V1437 R1438 V1439 F1440 A1441 G1442 Q1443 E1444 P1445 S1446 C1447 V1448 W1449 V1450 G1451 W1452 D1456 Y1457 H1458 Q1459 H1460 D1461 M1462 N1463 F1464 D1465 L1466 S1467 K1468 V1469 R1470 A1471 V1472 T1475
M1476 G1477 D1478 E1479 Q1480 G1481 N1482 V1483 H1484 S1485 S1486 L1487 K1488 C1489 S1490 N1491 C1492 Y1493 M1494 V1495 W1496 G1497 G1498 D1499 F1500 V1501 S1502 P1503 G1504 Q1505 Q1506 G1507 R1508 I1509 S1510 H1511 T1512 D1513 L1514 V1515 I1516 G1517 C1518 L1519 V1520 D1521 L1522 A1523 T1524 G1525 L1526 M1527 T1528 F1529 T1530 A1531 N1532 G1533 K1534 E1535
S1536 N1537 T1538 F1539 F1540 Q1541 V1542 E1543 P1544 N1545 T1546 K1547 L1548 F1549 P1550 A1551 V1552 F1553 V1554 L1555 P1556 T1557 H1558 Q1559 N1560 V1561 I1562 Q1563 F1564 E1565 L1566 G1567 K1568 Q1569 K1570 N1571 I1572 M1573 P1574 L1575 S1576 A1577 A1578 M1579 F1580 L1581 S1582 E1583 R1584 K1585 N1586 P1587 A1588 P1589 Q1590 C1591 P1592 P1593 R1594 L1595
E1596 V1597 Q1598 M1599 L1600 M1601 P1602 V1603 S1604 W1605 S1606 R1607 M1608 P1609 N1610 H1611 F1612 L1613 Q1614 V1615 E1616 T1617 R1618 R1619 A1620 G1621 E1622 R1623 L1624 G1625 W1626 A1627 V1628 Q1629 C1630 Q1631 D1632 P1633 L1634 T1635 M1636 M1637 A1638 L1639 H1640 I1641 P1642 E1643 E1644 N1645 R1646 C1647 M1648 D1649 E1652 L1653 S1654 E1655 R1656
L1657 D1658 L1659 Q1660 R1661 F1662 H1663 S1664 H1665 T1666 L1667 R1668 L1669 Y1670 R1671 A1672 V1673 C1674 A1675 L1676 G1677 N1678 N1679 R1680 V1681 A1682 H1683 A1684 L1685 C1686 S1687 H1688 V1689 D1690 Q1691 A1692 Q1693 L1694 L1695 H1696 A1697 L1698 E1699 D1700 A1701 H1702 L1703 P1704 G1705 P1706 L1707 R1708 A1709 G1710 Y1711 Y1712 D1713 L1714 L1715 I1716

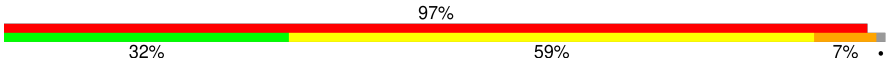

T2544 E2545 M2546 A2547 L2548 A2549 L2550 N2551 R2552 Y2553 L2554 C2555 L2556 A2557 V2558 L2559 P2560 L2561 I2562 T2563 K2564 C2565 A2566 P2567 L2568 F2569 A2570 G2571 T2572 E2573 H2574 R2575 A2576 I2577 M2578 V2579 D2580 S2581 M2582 L2583 H2584 T2585 V2586 Y2587 R2588 L2589 S2590 R2591 G2592 R2593 S2594 L2595 A2598 Q2599 R2600 D2601 V2602 I2603 E2604
D2605 C2606 L2607 M2608 A2609 L2610 C2611 R2612 Y2613 I2614 R2615 P2616 S2617 M2618 L2619 Q2620 H2621 L2622 L2623 R2624 R2625 L2626 V2627 F2628 D2629 V2630 P2631 I2632 L2633 N2634 E2635 F2636 A2637 K2638 M2639 P2640 L2641 K2642 L2643 L2644 T2645 N2646 H2647 Y2648 E2649 R2650 C2651 W2652 K2653 Y2654 Y2655 C2656 L2657 P2658 T2659 G2660 W2661 A2662 N2663 F2664
G2665 V2666 T2667 S2668 E2669 E2670 E2671 L2672 H2673 L2674 T2675 R2676 K2677 L2678 F2679 W2680 G2681 I2682 F2683 D2684 S2685 L2686 A2687 H2688 K2689 K2690 Y2691 D2692 Q2693 E2694 L2695 Y2696 R2697 M2698 A2699 M2700 P2701 C2702 L2703 C2704 A2705 I2706 A2707 G2708 A2709 L2710 P2711 P2712 D2713 Y2714 V2715 D2716 A2717 S2718 Y2719 S2720 S2721 K2722 A2723 E2724
K2725 LYS ALA THR VAL ASP ALA GLU GLY N2734 F2735 D2736 P2737 R2738 P2739 V2740 E2741 T2742 L2743 N2744 V2745 I2746 I2747 P2748 E2749 K2750 L2751 D2752 S2753 F2754 I2755 N2756 K2757 F2758 A2759 E2760 Y2761 T2762 H2763 E2764 K2765 W2766 A2767 F2768 D2769 K2770 I2771 Q2772 N2773 N2774 W2775 S2776 Y2777 G2778 E2779 N2780 V2781 D2782 E2783 E2784
L2785 K2786 T2787 H2788 P2789 M2790 L2791 R2792 P2793 Y2794 K2795 T2796 F2797 S2798 E2799 K2800 D2801 K2802 E2803 I2804 Y2805 R2806 W2807 P2808 I2809 K2810 E2811 S2812 L2813 K2814 A2815 M2816 I2817 A2818 W2819 E2820 W2821 T2822 I2823 E2824 K2825 A2826 R2827 E2828 G2829 E2830 GLU GLU ARG THR GLU LYS LYS LYS THR ARG LYS ILE SER GLN
THR ALA GLN THR TYR ASP PRO ARG GLU GLY Y2855 N2856 P2857 Q2858 P2859 P2860 D2861 L2862 S2863 G2864 V2865 T2866 L2867 S2868 R2869 E2870 L2871 Q2872 A2873 M2874 A2875 E2876 Q2877 L2878 A2879 E2880 N2881 Y2882 H2883 N2884 T2885 W2886 G2887 R2888 K2889 K2890 K2891 Q2892 E2893 L2894 E2895 A2896 K2897 G2898 G2899 G2900 T2901 H2902 P2903 L2904
L2905 V2906 P2907 Y2908 D2909 T2910 L2911 T2912 A2913 K2914 E2915 K2916 A2917 R2918 D2919 R2920 E2921 K2922 A2923 Q2924 E2925 L2926 L2927 K2928 F2929 L2930 Q2931 M2932 N2933 G2934 Y2935 A2936 V2937 T2938 R2939 GLY LEU LYS ASP MET GLU L2946 D2947 T2948 S2949 S2950 I2951 E2952 K2953 R2954 F2955 A2956 F2957 G2958 F2959 L2960 Q2961 Q2962 L2963 L2964
R2965 W2966 M2967 D2968 I2969 S2970 Q2971 E2972 F2973 I2974 A2975 H2976 L2977 E2978 A2979 V2980 V2981 S2982 S2983 G2984 R2985 V2986 E2987 K2988 S2989 P2990 H2991 E2992 Q2993 E2994 I2995 K2996 F2997 F2998 A2999 K3000 I3001 L3002 L3003 P3004 L3005 I3006 N3007 Q3008 Y3009 F3010 T3011 N3012 H3013 C3014 L3015 Y3016 F3017 L3018 S3019 T3020 P3021 A3022 K3023 V3024
L3025 G3026 S3027 G3028 G3029 H3030 A3031 S3032 N3033 K3034 E3035 K3036 E3037 M3038 I3039 T3040 S3041 L3042 F3043 C3044 K3045 L3046 A3047 A3048 L3049 V3050 R3051 H3052 R3053 V3054 S3055 L3056 F3057 G3058 T3059 D3060 A3061 P3062 A3063 V3064 V3065 N3066 C3067 L3068 H3069 I3070 L3071 A3072 R3073 S3074 L3075 D3076 A3077 R3078 T3079 V3080 M3081 K3082 S3083 G3084
P3085 E3086 I3087 V3088 K3089 A3090 G3091 L3092 R3093 S3094 F3095 F3096 E3097 S3098 A3099 S3100 E3101 D3102 I3103 E3104 K3105 M3106 V3107 E3108 N3109 L3110 R3111 L3112 G3113 K3114 V3115 S3116 GLN ALA ARG THR GLN VAL K3123 G3124 V3125 G3126 Q3127 N3128 L3129 T3130 Y3131 T3132 T3133 V3134 A3135 L3136 L3137 P3138 V3139 L3140 T3141 T3142 L3143 F3144
Q3145 H3146 I3147 A3148 Q3149 H3150 Q3151 F3152 G3153 D3154 D3155 V3156 I3157 L3158 D3159 D3160 V3161 Q3162 V3163 S3164 C3165 Y3166 R3167 T3168 L3169 C3170 S3171 I3172 Y3173 S3174 L3175 G3176 T3177 T3178 K3179 N3180 T3181 Y3182 V3183 E3184 K3185 L3186 R3187 P3188 A3189 L3190 G3191 E3192 C3193 L3194 A3195 R3196 L3197 A3198 A3199 A3200 M3201 P3202 V3203 A3204
F3205 L3206 E3207 P3208 Q3209 L3210 N3211 E3212 Y3213 N3214 A3215 C3216 S3217 V3218 Y3219 T3220 T3221 K3222 S3223 P3224 R3225 E3226 R3227 A3228 I3229 L3230 G3231 L3232 P3233 N3234 S3235 V3236 E3237 E3238 M3239 C3240 P3241 D3242 I3243 P3244 C3304 V3245 L3246 D3247 R3248 L3249 M3250 A3251 D3252 I3253 G3254 G3255 L3256 A3257 E3258 S3259 G3260 A3261 R3262 Y3263 T3264
E3265 M3266 P3267 H3268 V3269 I3270 E3271 I3272 T3273 L3274 P3275 M3276 L3277 C3278 S3279 Y3280 L3281 P3282 R3283 W3284 W3285 E3286 R3287 G3288 P3289 E3290 A3291 P3292 P3293 P3294 A3295 L3296 P3297 A3298 G3299 A3300 P3301 P3302 P3303 C3304 T3305 A3306 V3307 T3308 S3309 D3310 H3311 L3312 N3313 S3314 L3315 L3316 G3317 N3318 I3319 L3320 R3321 I3322 I3323 V3324

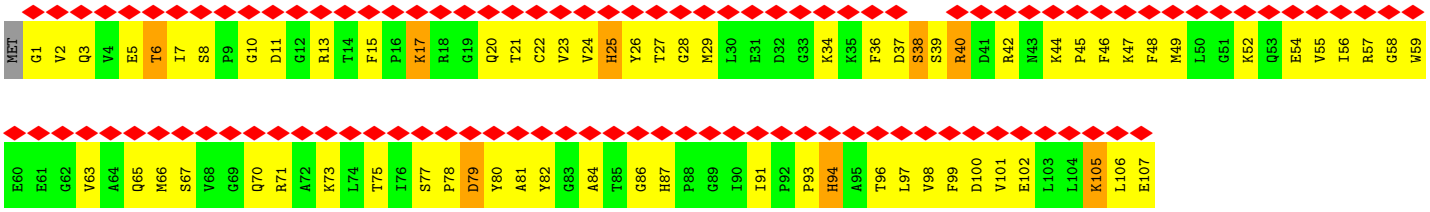

M3325 N3326 L3327 G3328 I3329 D3330 E3331 A3332 T3333 W3334 M3335 K3336 R3337 L3338 A3339 V3340 F3341 A3342 Q3343 P3344 I3345 V3346 S3347 R3348 A3349 R3350 P3351 E3352 L3353 L3354 H3355 S3356 H3357 F3358 I3359 P3360 T3361 I3362 G3363 R3364 L3365 R3366 K3367 R3368 A3369 G3370 K3371 V3372 V3373 A3374 E3375 E3376 E3377 Q3378 L3379 R3380 L3381 E3382 A3383 K3384
A3385 E3386 A3387 E3388 E3389 G3390 E3391 L3392 L3393 V3394 R3395 D3396 E3397 F3398 S3399 V3400 L3401 C3402 R3403 D3404 L3405 Y3406 A3407 L3408 Y3409 P3410 L3411 L3412 I3413 R3414 Y3415 V3416 D3417 N3418 N3419 R3420 A3421 H3422 W3423 L3424 T3425 E3426 P3427 N3428 A3429 N3430 A3431 E3432 E3433 L3434 F3435 R3436 M3437 V3438 G3439 E3440 I3441 F3442 I3443 Y3444
W3445 S3446 K3447 S3448 H3449 N3450 F3451 K3452 R3453 E3454 E3455 Q3456 N3457 F3458 V3459 V3460 Q3461 N3462 E3463 I3464 N3465 N3466 M3467 S3468 F3469 L3470 T3471 A3472 D3473 S3474 K3475 S3476 K3477 M3478 A3479 LYS ALA GLY ASP ALA GLN SER GLY GLY SER ASP GLN GLU ARG THR LYS LYS LYS R3498 R3499 G3500 D3501 R3502 Y3503 S3504
Y3505 Q3506 T3507 S3508 L3509 I3510 V3511 A3512 T3513 L3514 K3515 K3516 N3517 L3518 P3519 I3520 G3521 L3522 N3523 M3524 C3525 A3526 P3527 T3528 D3529 Q3530 D3531 L3532 I3533 M3534 L3535 A3536 K3537 T3538 R3539 Y3540 A3541 L3542 K3543 D3544 T3545 D3546 E3547 E3548 V3549 R3550 E3551 F3552 L3553 Q3554 N3555 N3556 L3557 H3558 L3559 Q3560 G3561 K3562 V3563 E3564
G3565 S3566 P3567 S3568 L3569 R3570 W3571 Q3572 M3573 A3574 L3575 Y3576 R3577 G3578 L3579 P3580 G3581 R3582 E3583 E3584 D3585 A3586 D3587 D3588 P3589 E3590 K3591 I3592 V3593 R3594 R3595 V3596 Q3597 E3598 V3599 S3600 A3601 V3602 L3603 Y3604 H3605 L3606 E3607 Q3608 T3609 E3610 H3611 P3612 Y3613 K3614 S3615 K3616 K3617 A3618 V3619 W3620 H3621 K3622 L3623 L3624
S3625 K3626 Q3627 R3628 R3629 R3630 A3631 V3632 V3633 A3634 C3635 F3636 R3637 M3638 T3639 P3640 L3641 Y3642 N3643 L3644 H3647 R3648 A3649 C3650 N3651 M3652 F3653 L3654 E3655 K3658 W3661 I3662 L3663 T3664 E3665 D3666 H3667 S3668 F3669 E3670 D3671 R3672 M3673 I3674 D3675 D3676 K3679 A3680 G3681 E3682 Q3683 E3684 E3685 E3686 E3687 E3688
E3689 V3690 E3691 E3692 K3693 K3694 P3695 L3698 L3701 V3702 L3703 H3704 R3707 L3710 T3711 E3712 K3713 S3714 K3715 L3716 D3717 E3718 D3719 Y3720 L3721 Y3722 M3723 A3724 Y3725 I3728 M3729 A3730 K3731 S3732 C3733 H3734 L3735 E3736 GLU GLY GLY GLU ASN GLY GLU ALA GLU GLU GLU GLU V3749 E3750 V3751 S3752 F3753
E3754 E3755 K3756 E3757 M3758 E3759 K3760 R3761 R3762 L3763 Q3766 Q3767 S3768 R3769 L3770 H3771 T3772 R3773 G3774 A3775 A3776 E3777 M3778 V3779 L3780 R3781 M3782 I3783 S3784 A3785 C3786 K3787 G3788 E3789 T3790 S3796 T3797 L3798 K3799 L3800 G3801 I3802 S3803 I3804 L3805 N3806 G3807 G3808 E3811 V3812 Q3813 Q3814 K3815 M3816 Y3819 L3820
K3821 D3822 K3823 K3824 E3825 V3826 G3827 F3828 F3829 Q3830 S3831 I3832 Q3833 A3834 L3835 M3836 Q3837 T3838 C3839 L3842 D3843 L3844 F3847 E3848 R3849 Q3850 E3854 G3855 L3856 G3857 M3858 V3859 N3860 E3861 D3862 G3863 T3864 V3865 I3866 N3867 R3868 Q3869 N3870 G3871 E3872 K3873 V3874 M3875 A3876 D3877 D3878 E3879 F3880 T3881 Q3882 F3885
R3886 F3887 L3888 Q3889 L3890 L3891 C3892 E3893 G3894 H3895 N3896 N3897 D3898 F3899 Q3900 N3901 Y3902 L3903 R3904 T3905 Q3906 T3910 T3911 T3912 I3913 N3914 I3915 I3916 I3917 C3918 T3919 V3920 D3921 Y3922 L3923 L3924 R3925 L3926 Q3927 E3928 S3929 D3932 F3933 Y3934 W3935 Y3936 Y3937 S3938 G3939 K3940 D3941 V3942 I3943 Q3946 G3947 K3948 R3949
N3950 F3951 S3952 K3953 A3954 M3955 S3956 V3957 A3958 K3959 L3965 T3966 E3967 Y3968 I3969 Q3970 G3971 P3972 C3973 N3976 Q3977 L3980 A3981 H3982 S3983 R3984 L3985 W3986 D3987 A3988 V3989 V3990 G3991 F3992 L3993 H3994 V3995 F3996 A3997 H3998 M3999 M4000 M4001 K4002 L4003 A4004 Q4005 D4006 S4007 S4008 Q4009 I4010 E4011 L4012 L4017 D4018
L4019 M4023 V4024 V4025 M4026 L4027 L4028 S4029 L4030 L4031 E4032 V4036 N4037 G4038 M4039 I4040 A4041 R4042 Q4043 M4044 V4045 L4048 V4049 E4050 S4053 E4056 L4059 K4060 F4061 F4062 D4063 M4064 F4065 L4066 K4067 L4068 K4069 D4070 I4071 V4072 G4073 S4074 E4075 A4076 F4077 Q4078 D4079 Y4080 V4081 T4082 D4083 P4084 R4085 G4086
L4087 I4088 S4089 K4090 K4091 D4092 F4093 Q4094 K4095 A4096 M4097 D4098 S4099 Q4100 K4101 Q4102 F4103 T4104 G4105 P4106 E4107 F4110 S4113 C4114 A4117 D4118 E4119 N4120 E4121 M4122 I4123 N4124 F4125 E4126 E4127 F4128 A4129 N4130 R4131 F4132 Q4133 F4134 P4135 A4136 R4137 D4138 I4139 G4140 F4141 N4142 V4143 A4144 V4145 L4146 L4147 T4148



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

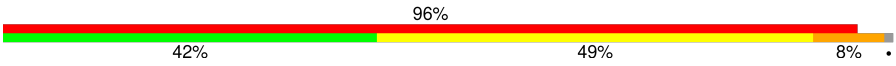
Chain E:

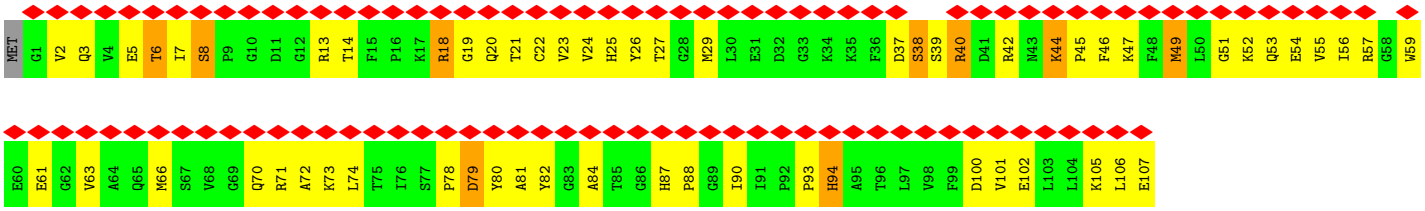




• Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1A

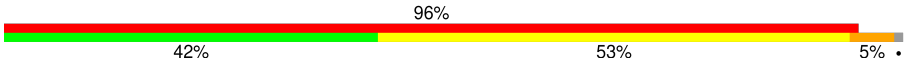
Chain H:

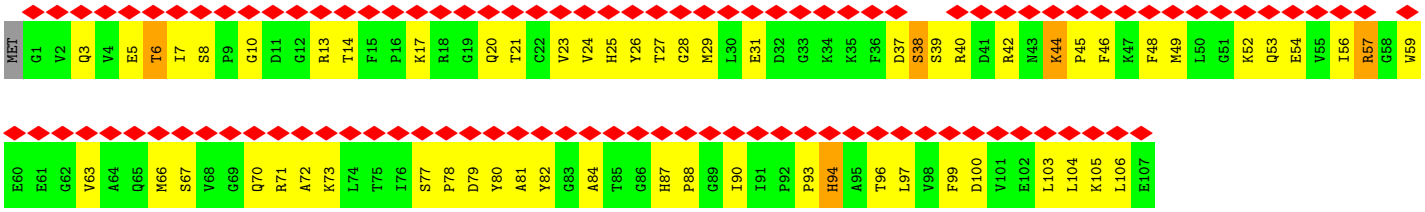




• Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1A

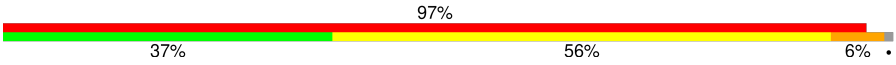
Chain G:

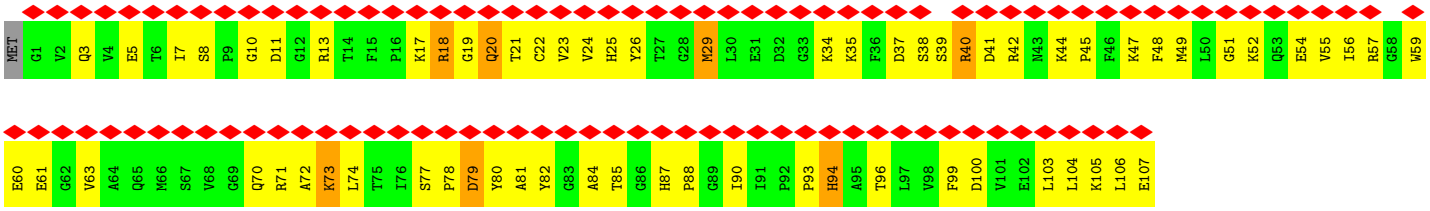




• Molecule 2: Peptidyl-prolyl cis-trans isomerase FKBP1A

Chain F:





4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	17284	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	58	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	1500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.224	Depositor
Minimum map value	-0.085	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.015	Depositor
Recommended contour level	0.1	Depositor
Map size (Å)	427.008, 427.008, 427.008	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.834, 0.834, 0.834	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, A1BD2, CA, ATP

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	0.29	1/35977 (0.0%)	0.59	20/48726 (0.0%)
1	B	0.29	1/35977 (0.0%)	0.59	20/48726 (0.0%)
1	C	0.29	1/35977 (0.0%)	0.59	20/48726 (0.0%)
1	D	0.29	1/35977 (0.0%)	0.59	20/48726 (0.0%)
2	E	0.31	0/850	0.65	0/1146
2	F	0.30	0/850	0.64	0/1146
2	G	0.28	0/850	0.59	0/1146
2	H	0.30	0/850	0.65	0/1146
All	All	0.29	4/147308 (0.0%)	0.59	80/199488 (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	2
1	B	0	2
1	C	0	2
1	D	0	2
All	All	0	8

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	4876	CYS	CB-SG	-5.89	1.72	1.81
1	D	4876	CYS	CB-SG	-5.88	1.72	1.81
1	B	4876	CYS	CB-SG	-5.85	1.72	1.81
1	C	4876	CYS	CB-SG	-5.85	1.72	1.81

The worst 5 of 80 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	4876	CYS	CA-CB-SG	9.65	131.37	114.00
1	A	4876	CYS	CA-CB-SG	9.64	131.34	114.00
1	B	4876	CYS	CA-CB-SG	9.62	131.31	114.00
1	D	4876	CYS	CA-CB-SG	9.61	131.30	114.00
1	A	29	LEU	CA-CB-CG	7.15	131.75	115.30

There are no chirality outliers.

5 of 8 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1671	ARG	Sidechain
1	A	4876	CYS	Peptide
1	B	1671	ARG	Sidechain
1	B	4876	CYS	Peptide
1	D	1671	ARG	Sidechain

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	35150	0	34793	2161	0
1	B	35150	0	34793	2145	0
1	C	35150	0	34793	2181	0
1	D	35150	0	34793	2174	0
2	E	831	0	831	75	0
2	F	831	0	830	64	0
2	G	831	0	831	75	0
2	H	831	0	831	75	0
3	A	31	0	12	1	0
3	B	31	0	12	2	0
3	C	31	0	12	2	0
3	D	31	0	12	2	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

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	C	1	0	0	0	0
5	D	1	0	0	0	0
6	A	18	0	0	1	0
6	B	18	0	0	1	0
6	C	18	0	0	1	0
6	D	18	0	0	1	0
All	All	144128	0	142543	8717	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 30.

The worst 5 of 8717 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)
2:F:40:ARG:NH2	1:B:674:PHE:CE2	1.90	1.19
1:D:1220:GLN:HB3	1:C:3522:LEU:HD13	1.12	1.12
1:A:3522:LEU:HD13	1:B:1220:GLN:HB3	1.09	1.07
1:B:3522:LEU:HD13	1:C:1220:GLN:HB3	1.11	1.07
1:A:1220:GLN:HB3	1:D:3522:LEU:HD13	1.06	1.06

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	4385/5037 (87%)	4250 (97%)	129 (3%)	6 (0%)	48	83
1	B	4385/5037 (87%)	4250 (97%)	129 (3%)	6 (0%)	48	83
1	C	4385/5037 (87%)	4249 (97%)	130 (3%)	6 (0%)	48	83
1	D	4385/5037 (87%)	4250 (97%)	129 (3%)	6 (0%)	48	83
2	E	105/108 (97%)	97 (92%)	8 (8%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
2	F	105/108 (97%)	102 (97%)	3 (3%)	0	100 100
2	G	105/108 (97%)	103 (98%)	2 (2%)	0	100 100
2	H	105/108 (97%)	103 (98%)	2 (2%)	0	100 100
All	All	17960/20580 (87%)	17404 (97%)	532 (3%)	24 (0%)	50 83

5 of 24 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	908	VAL
1	A	3300	ALA
1	A	4711	PHE
1	B	908	VAL
1	B	3300	ALA

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	3836/4276 (90%)	3575 (93%)	261 (7%)	13 34
1	B	3836/4276 (90%)	3575 (93%)	261 (7%)	13 34
1	C	3836/4276 (90%)	3574 (93%)	262 (7%)	13 34
1	D	3836/4276 (90%)	3575 (93%)	261 (7%)	13 34
2	E	89/90 (99%)	80 (90%)	9 (10%)	6 21
2	F	89/90 (99%)	78 (88%)	11 (12%)	4 16
2	G	89/90 (99%)	83 (93%)	6 (7%)	13 34
2	H	89/90 (99%)	78 (88%)	11 (12%)	4 16
All	All	15700/17464 (90%)	14618 (93%)	1082 (7%)	16 33

5 of 1082 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	1973	GLN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	C	2490	MET
1	C	1854	PHE
1	C	3790	THR
1	B	1619	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 163 such sidechains are listed below:

Mol	Chain	Res	Type
1	D	3837	GLN
1	C	2417	HIS
1	D	4037	ASN
1	C	772	ASN
1	C	3149	GLN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

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	A1BD2	B	5304	-	16,19,19	0.82	0	15,28,28	1.22	2 (13%)
3	ATP	D	5301	-	28,33,33	0.68	0	34,52,52	0.87	2 (5%)
6	A1BD2	A	5304	-	16,19,19	0.82	0	15,28,28	1.21	2 (13%)
3	ATP	A	5301	-	28,33,33	0.68	0	34,52,52	0.87	2 (5%)
3	ATP	C	5301	-	28,33,33	0.68	0	34,52,52	0.87	2 (5%)
6	A1BD2	D	5304	-	16,19,19	0.82	0	15,28,28	1.21	2 (13%)
6	A1BD2	C	5304	-	16,19,19	0.81	0	15,28,28	1.19	2 (13%)
3	ATP	B	5301	-	28,33,33	0.68	0	34,52,52	0.87	2 (5%)

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	A1BD2	B	5304	-	-	0/4/6/6	0/2/2/2
3	ATP	D	5301	-	-	5/18/38/38	0/3/3/3
6	A1BD2	A	5304	-	-	0/4/6/6	0/2/2/2
3	ATP	A	5301	-	-	5/18/38/38	0/3/3/3
3	ATP	C	5301	-	-	5/18/38/38	0/3/3/3
6	A1BD2	D	5304	-	-	0/4/6/6	0/2/2/2
6	A1BD2	C	5304	-	-	0/4/6/6	0/2/2/2
3	ATP	B	5301	-	-	5/18/38/38	0/3/3/3

There are no bond length outliers.

The worst 5 of 16 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	D	5301	ATP	C4'-O4'-C1'	-3.65	106.58	109.92
3	A	5301	ATP	C4'-O4'-C1'	-3.64	106.59	109.92
3	B	5301	ATP	C4'-O4'-C1'	-3.64	106.59	109.92
3	C	5301	ATP	C4'-O4'-C1'	-3.62	106.61	109.92
6	A	5304	A1BD2	C2-N1-C5	-2.92	119.52	122.22

There are no chirality outliers.

5 of 20 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	D	5301	ATP	O4'-C4'-C5'-O5'

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
3	A	5301	ATP	O4'-C4'-C5'-O5'
3	B	5301	ATP	O4'-C4'-C5'-O5'
3	C	5301	ATP	O4'-C4'-C5'-O5'
3	A	5301	ATP	PG-O3B-PB-O3A

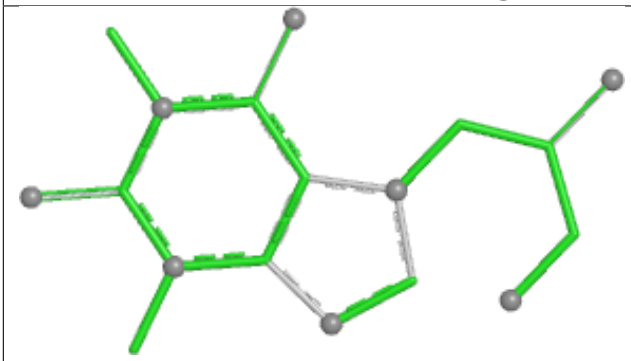
There are no ring outliers.

8 monomers are involved in 11 short contacts:

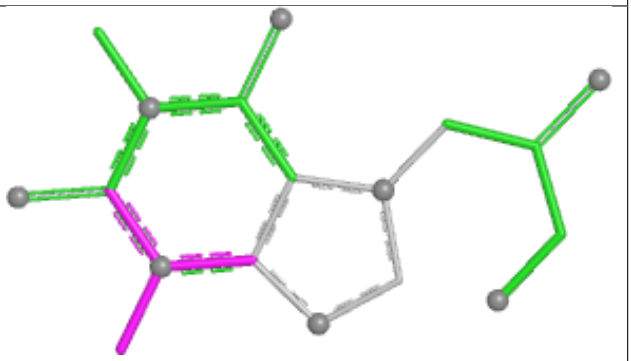
Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	B	5304	A1BD2	1	0
3	D	5301	ATP	2	0
6	A	5304	A1BD2	1	0
3	A	5301	ATP	1	0
3	C	5301	ATP	2	0
6	D	5304	A1BD2	1	0
6	C	5304	A1BD2	1	0
3	B	5301	ATP	2	0

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.

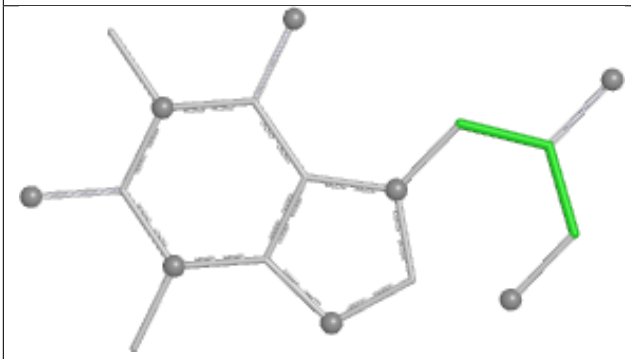
Ligand A1BD2 B 5304



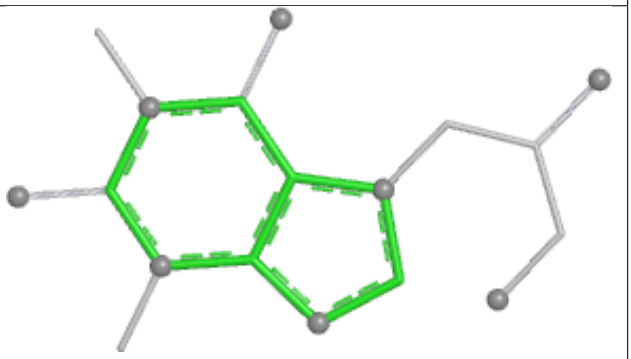
Bond lengths



Bond angles

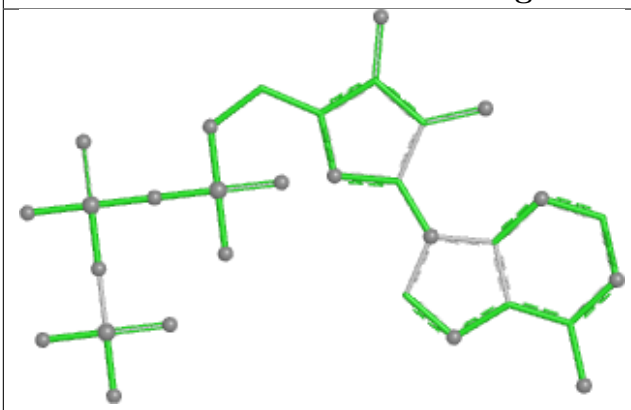


Torsions

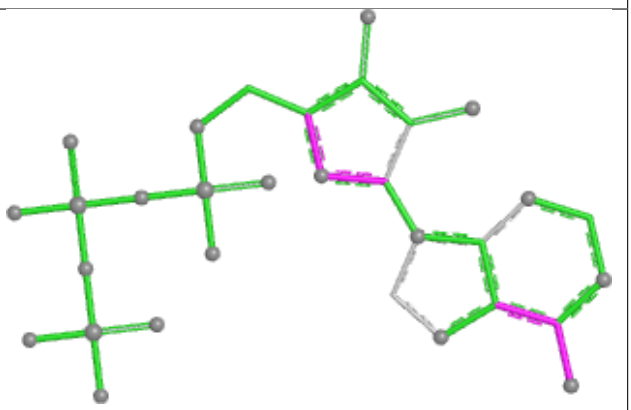


Rings

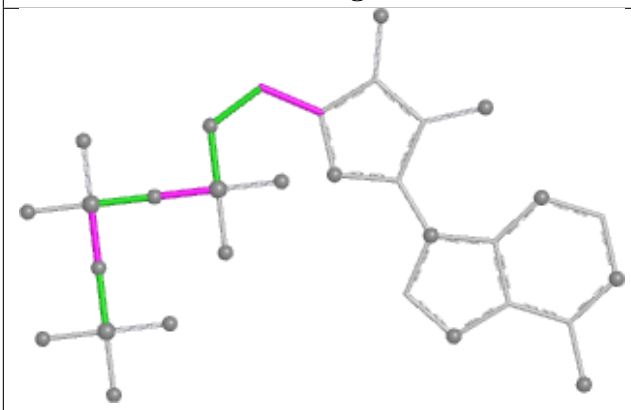
Ligand ATP D 5301



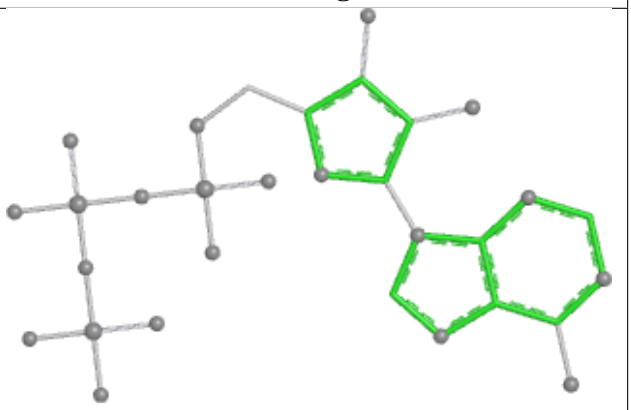
Bond lengths



Bond angles

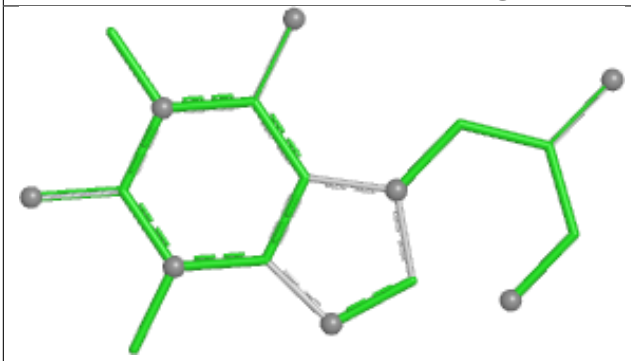


Torsions

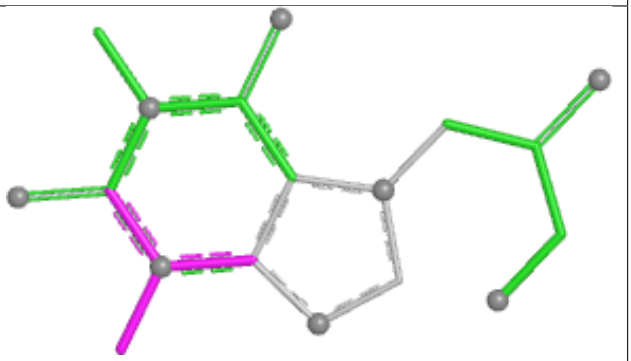


Rings

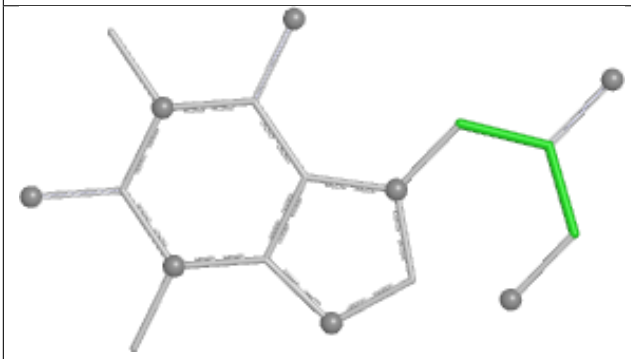
Ligand A1BD2 A 5304



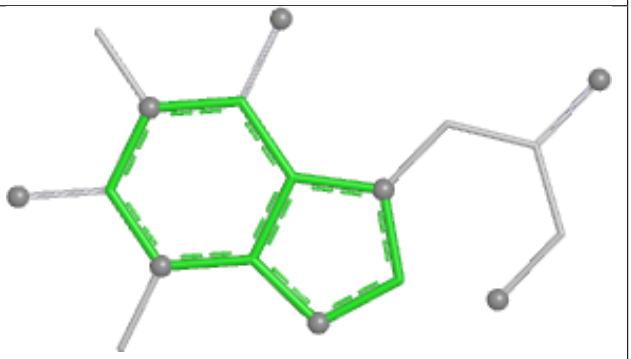
Bond lengths



Bond angles

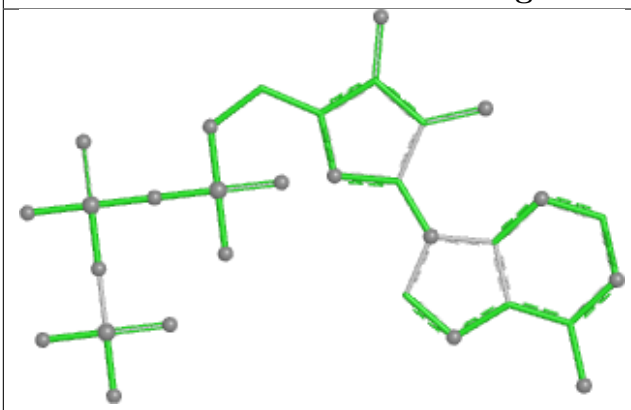


Torsions

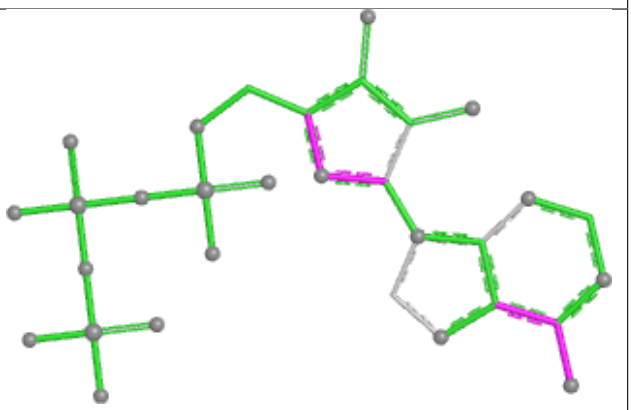


Rings

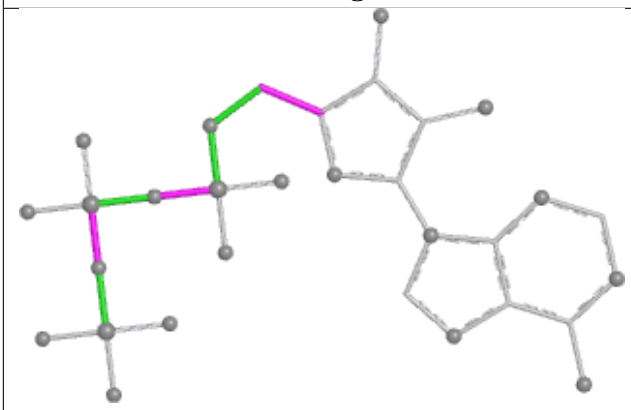
Ligand ATP A 5301



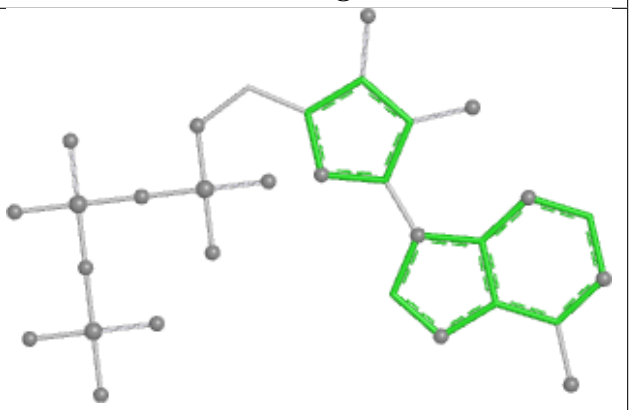
Bond lengths



Bond angles

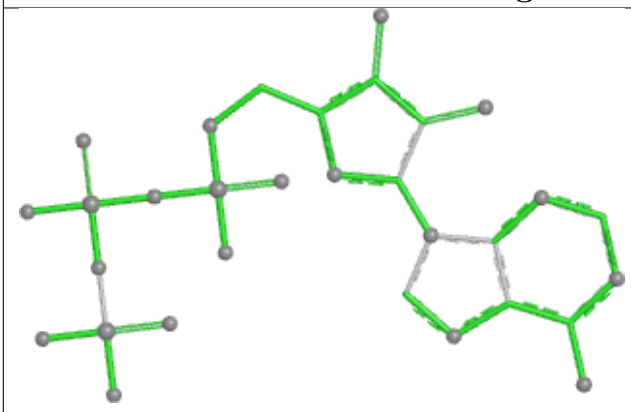


Torsions

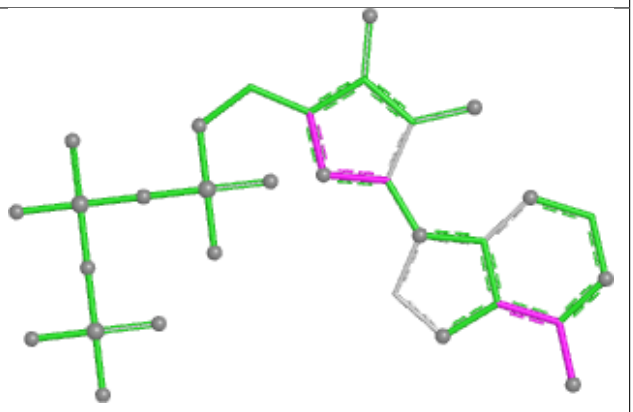


Rings

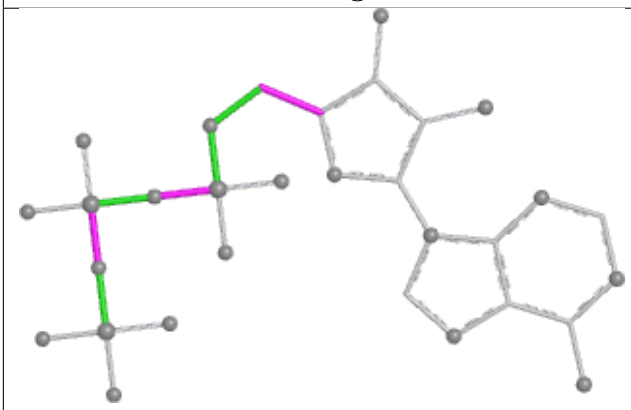
Ligand ATP C 5301



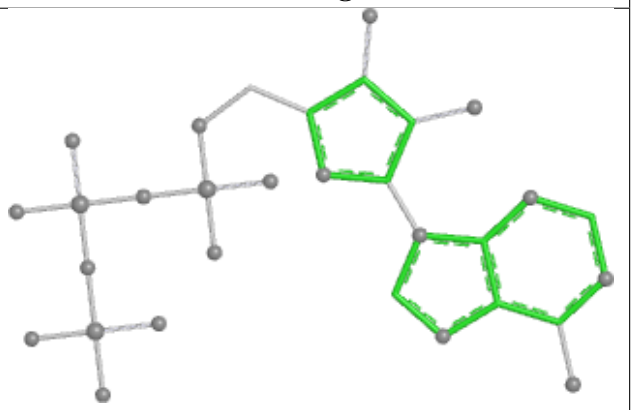
Bond lengths



Bond angles

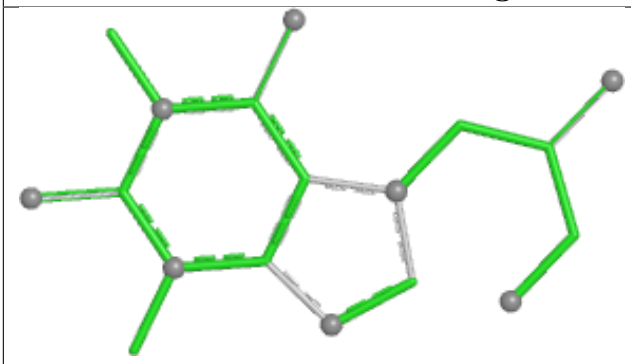


Torsions

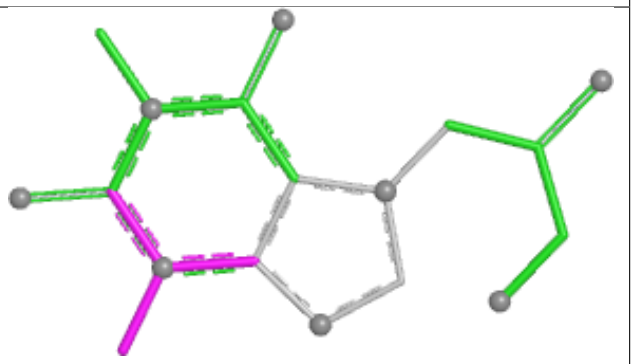


Rings

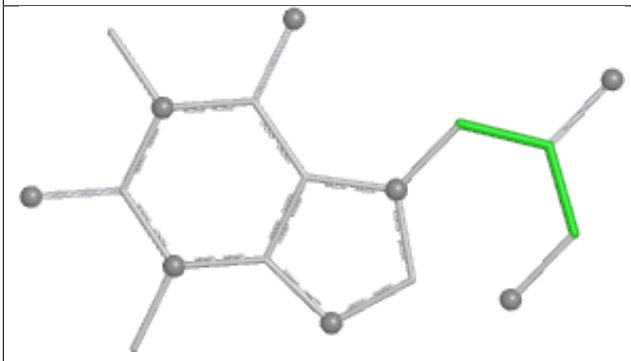
Ligand A1BD2 D 5304



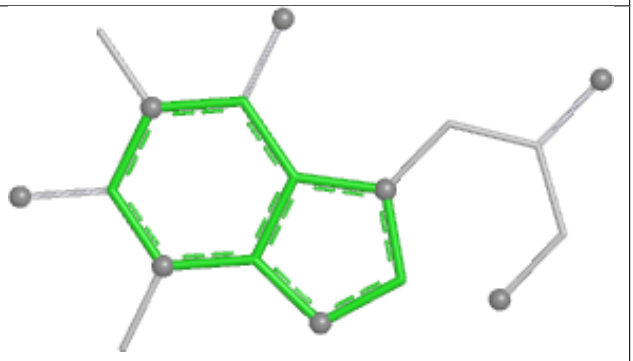
Bond lengths



Bond angles

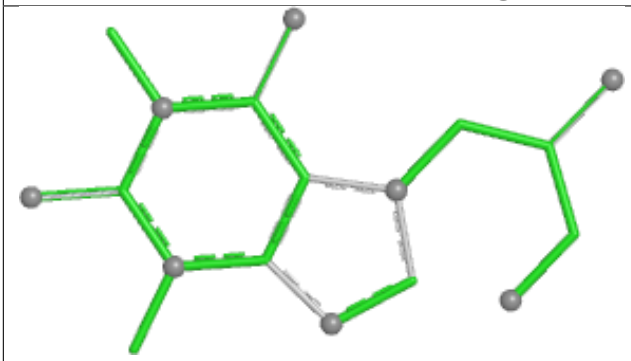


Torsions

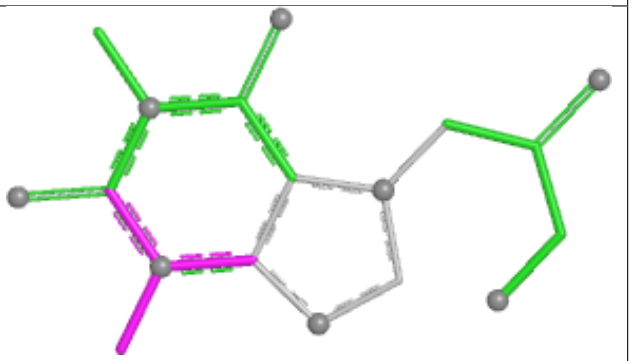


Rings

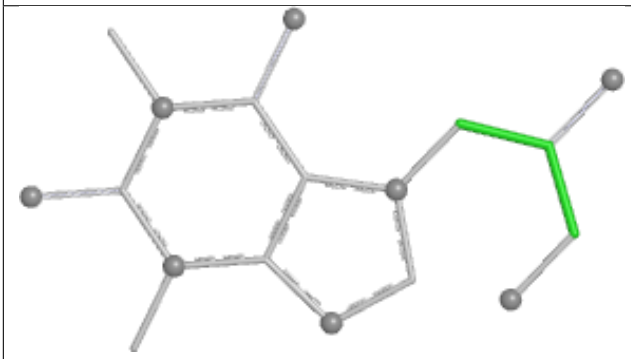
Ligand A1BD2 C 5304



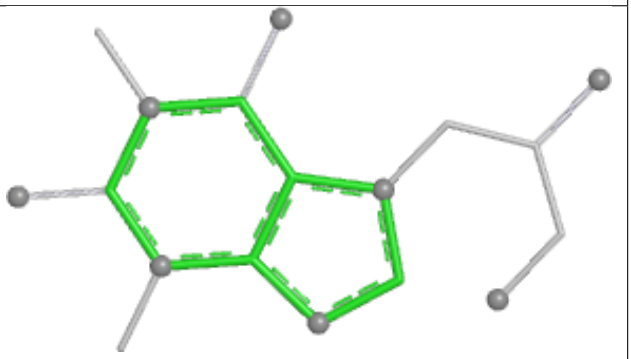
Bond lengths



Bond angles

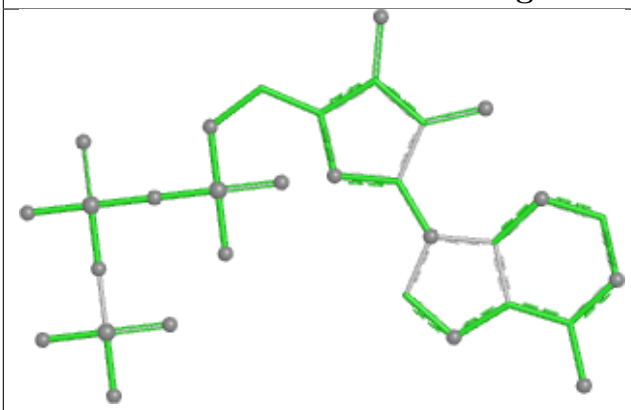


Torsions

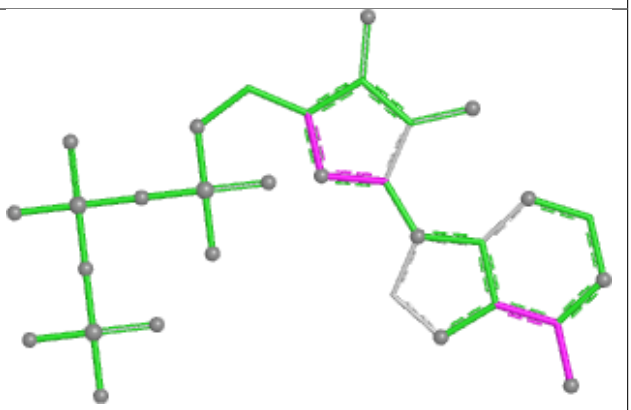


Rings

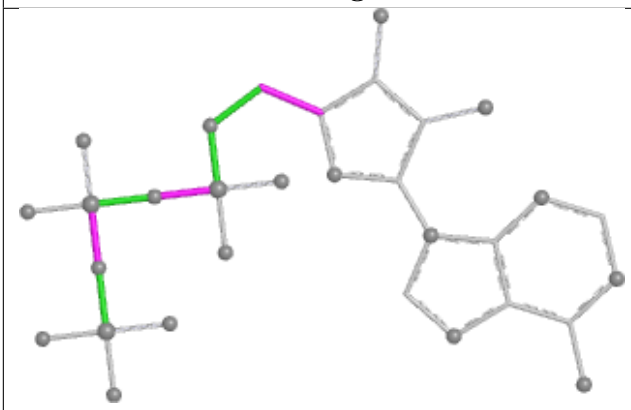
Ligand ATP B 5301



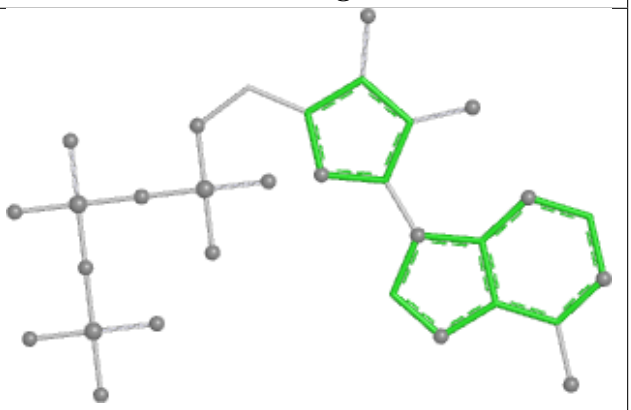
Bond lengths



Bond angles



Torsions



Rings

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.

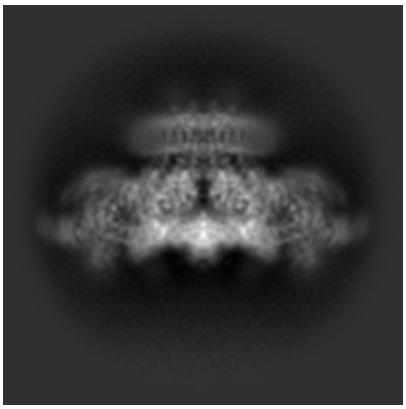
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-47388. These allow visual inspection of the internal detail of the map and identification of artifacts.

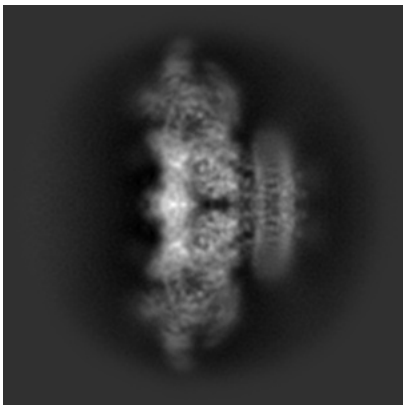
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

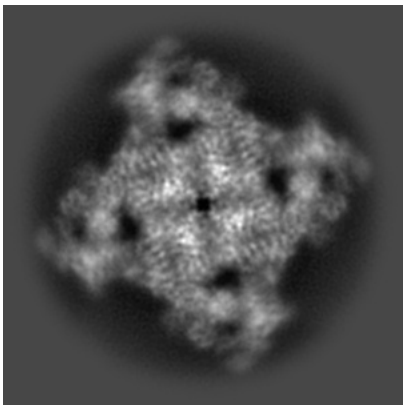
6.1.1 Primary map



X

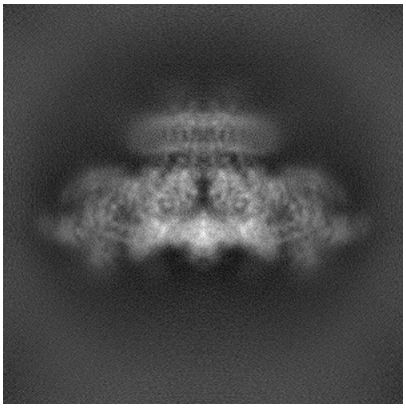


Y

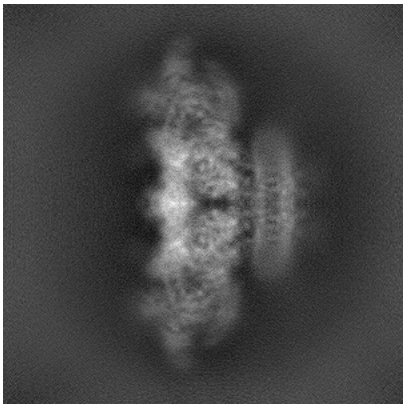


Z

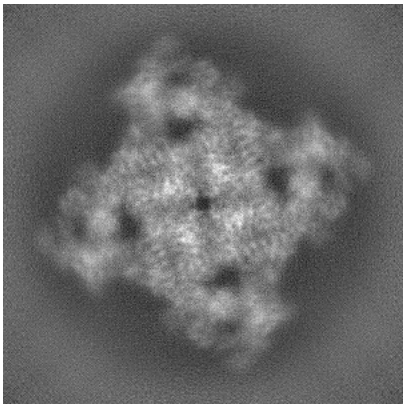
6.1.2 Raw map



X



Y

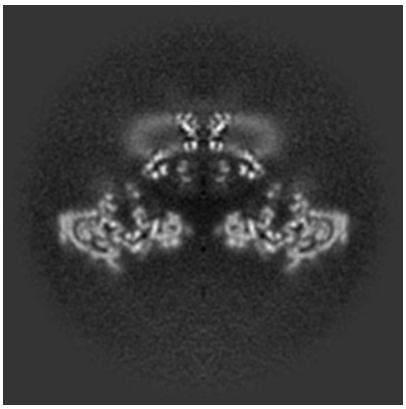


Z

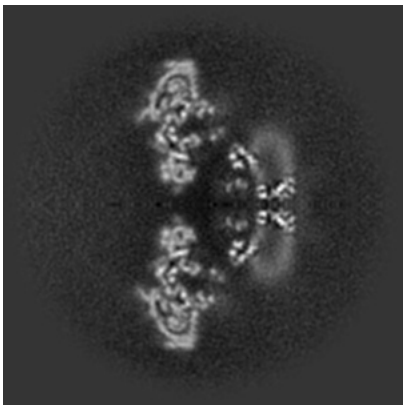
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

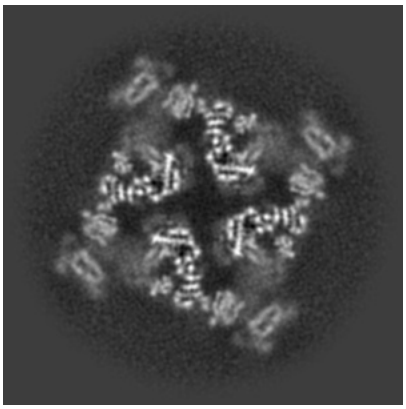
6.2.1 Primary map



X Index: 256

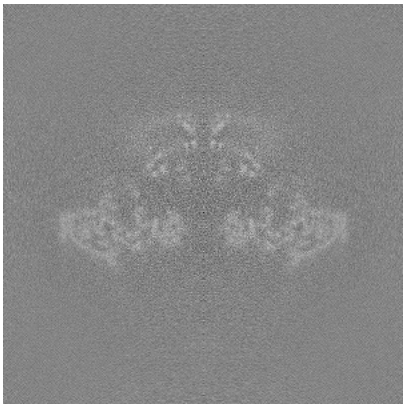


Y Index: 256

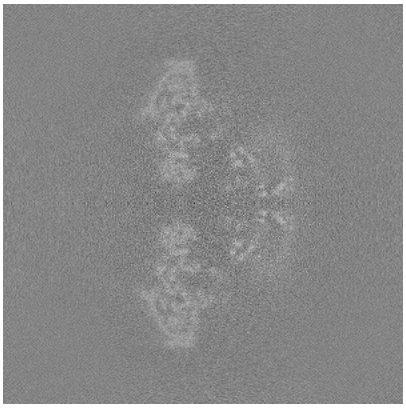


Z Index: 256

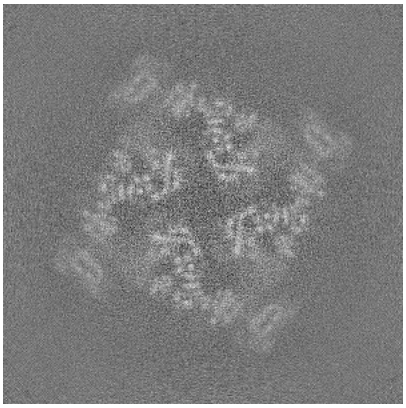
6.2.2 Raw map



X Index: 256



Y Index: 256

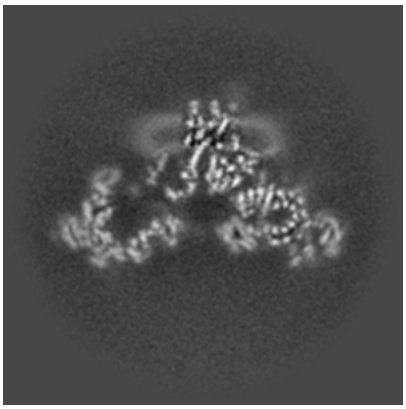


Z Index: 256

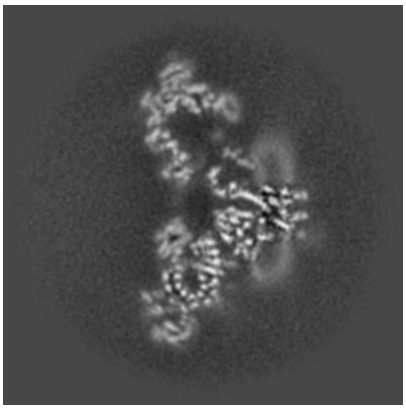
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

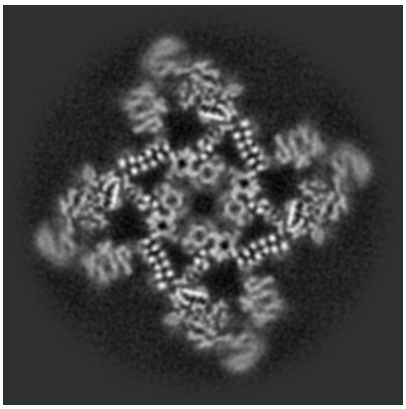
6.3.1 Primary map



X Index: 269

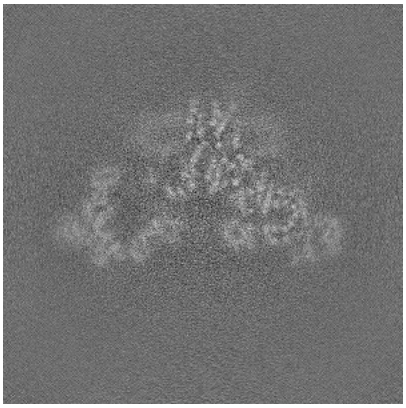


Y Index: 269

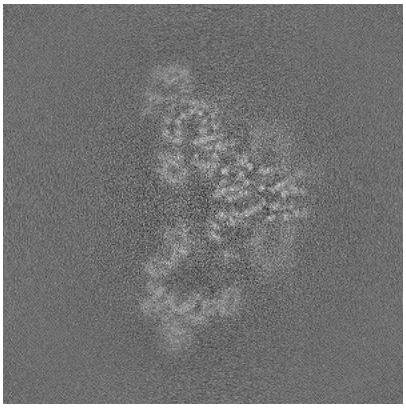


Z Index: 229

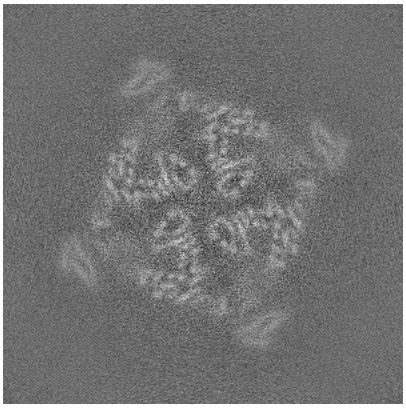
6.3.2 Raw map



X Index: 271



Y Index: 241

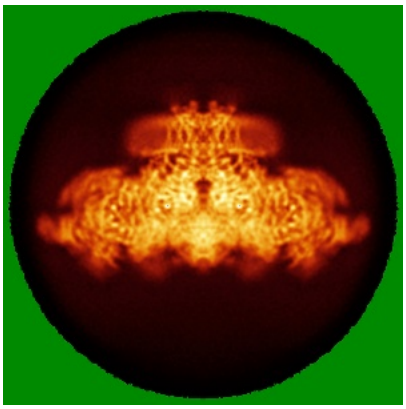


Z Index: 268

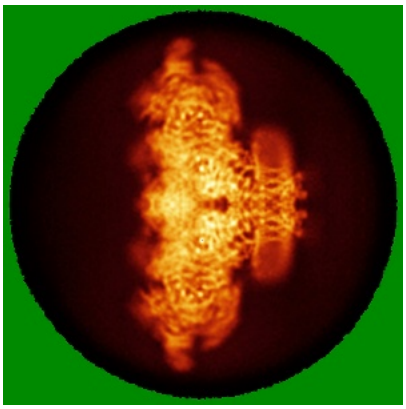
The images above show the largest variance slices of the map in three orthogonal directions.

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

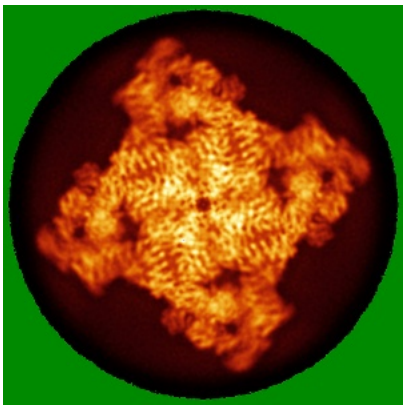
6.4.1 Primary map



X

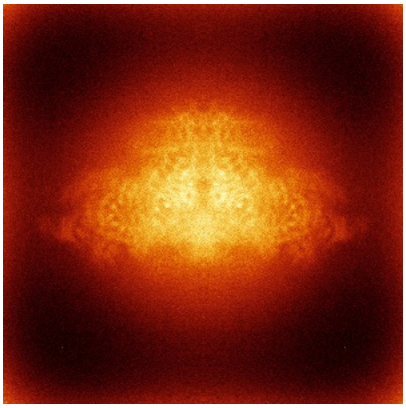


Y

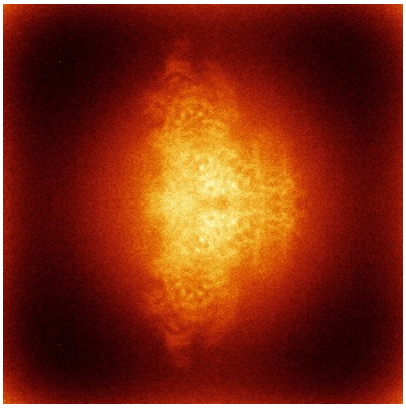


Z

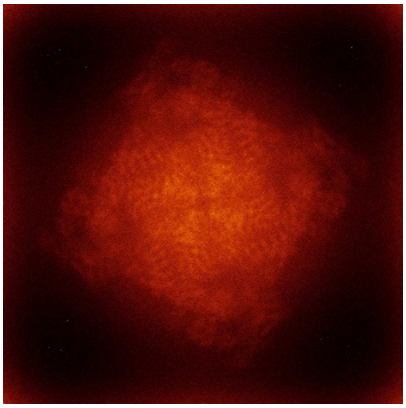
6.4.2 Raw map



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.

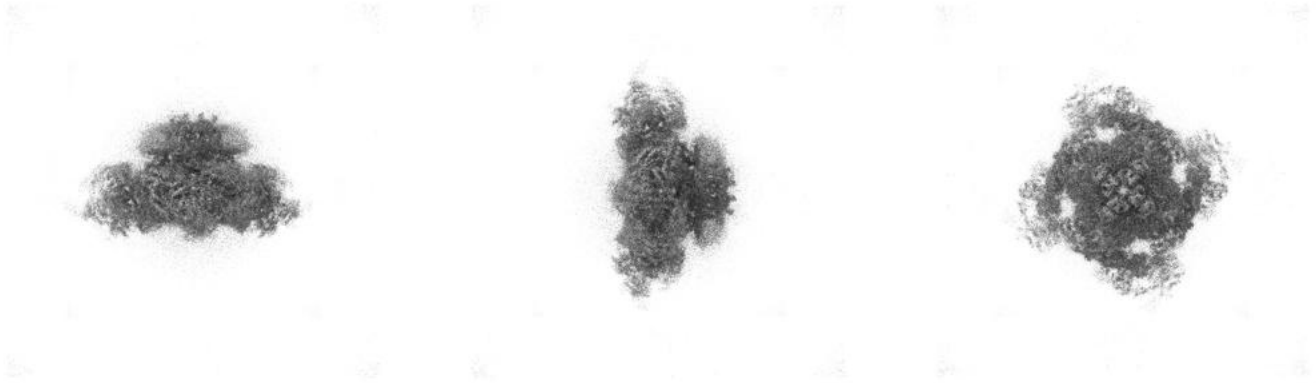
6.5 Orthogonal surface views (i)

6.5.1 Primary map

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.1. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



X Y Z

These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

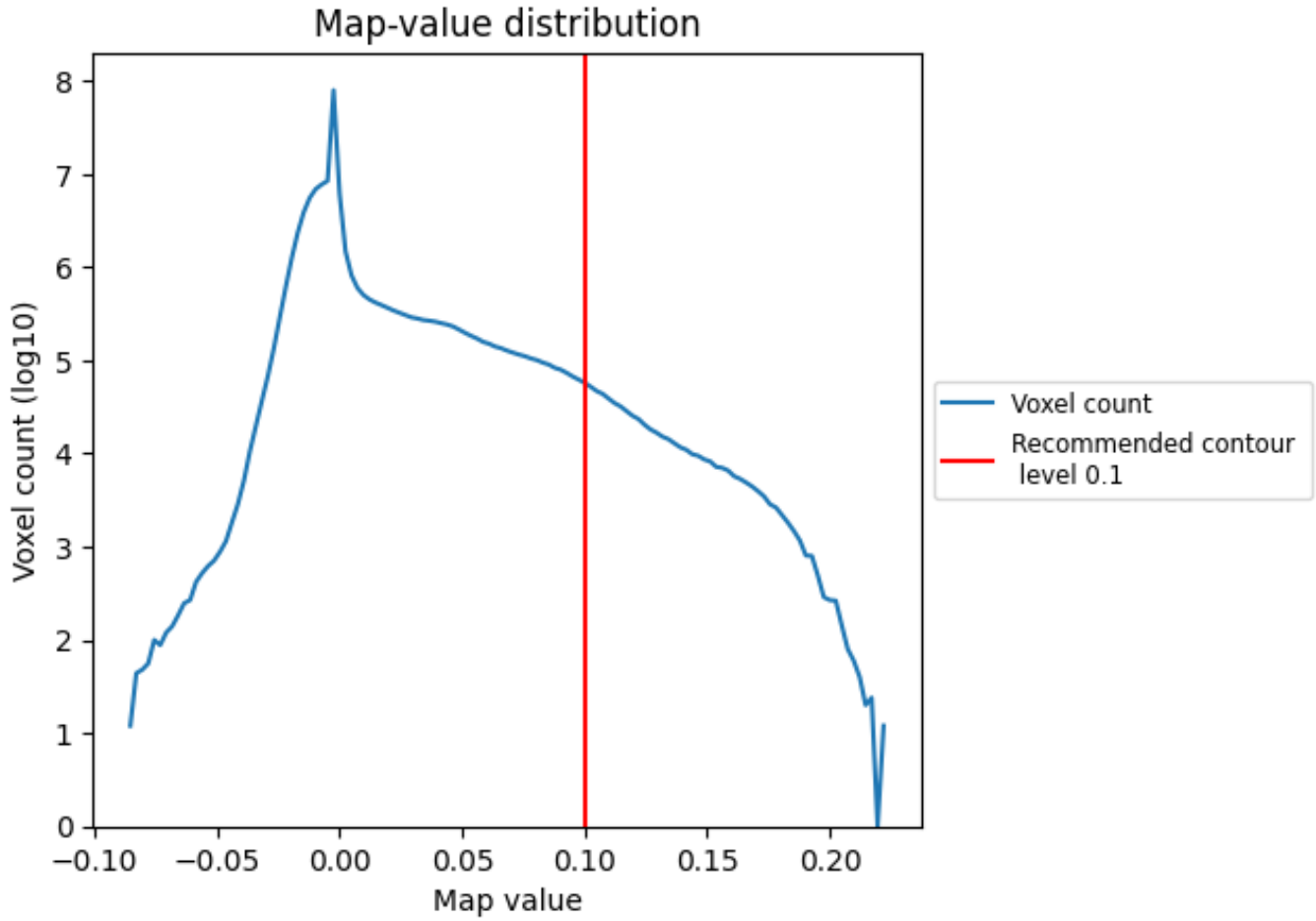
6.6 Mask visualisation (i)

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

7 Map analysis

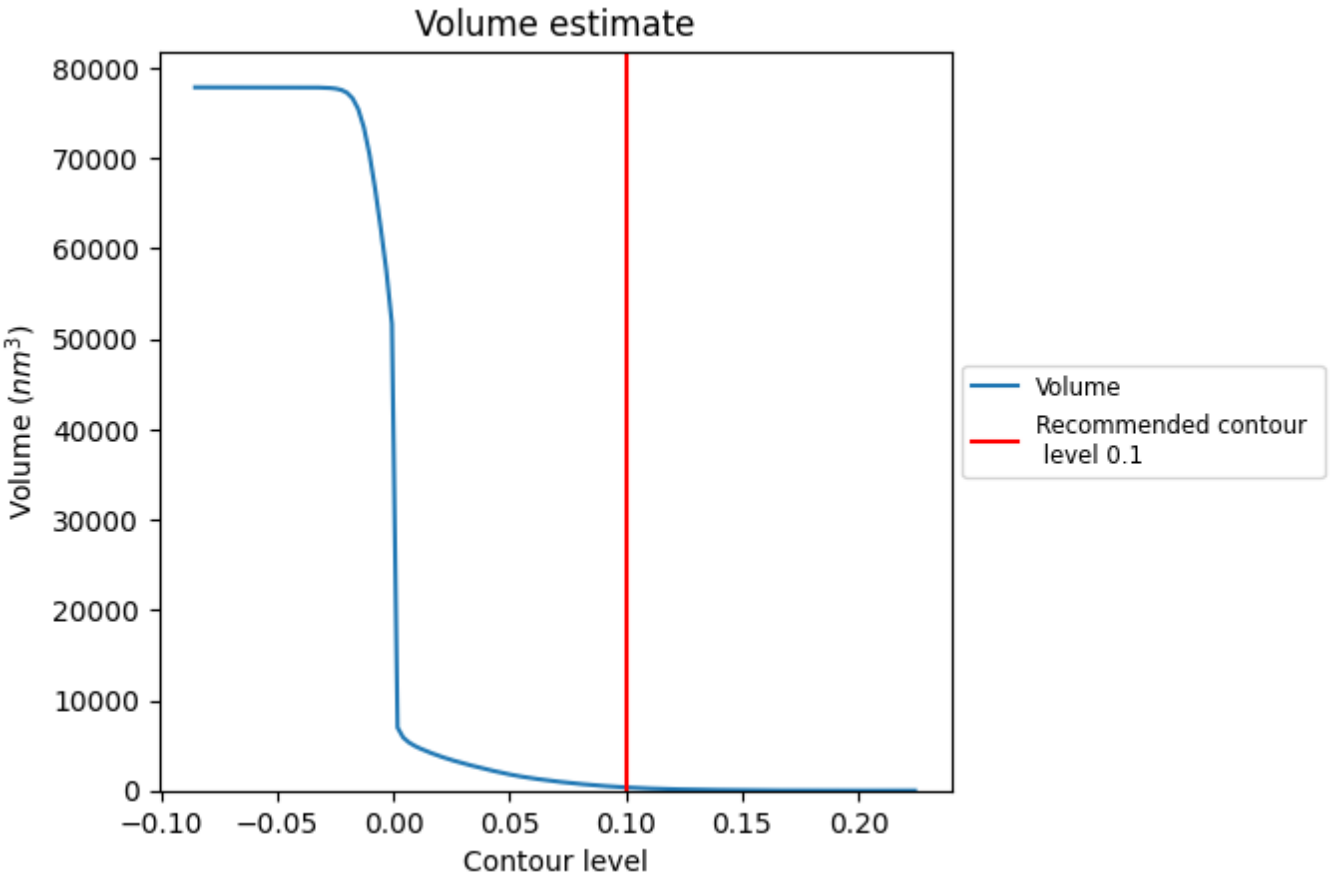
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

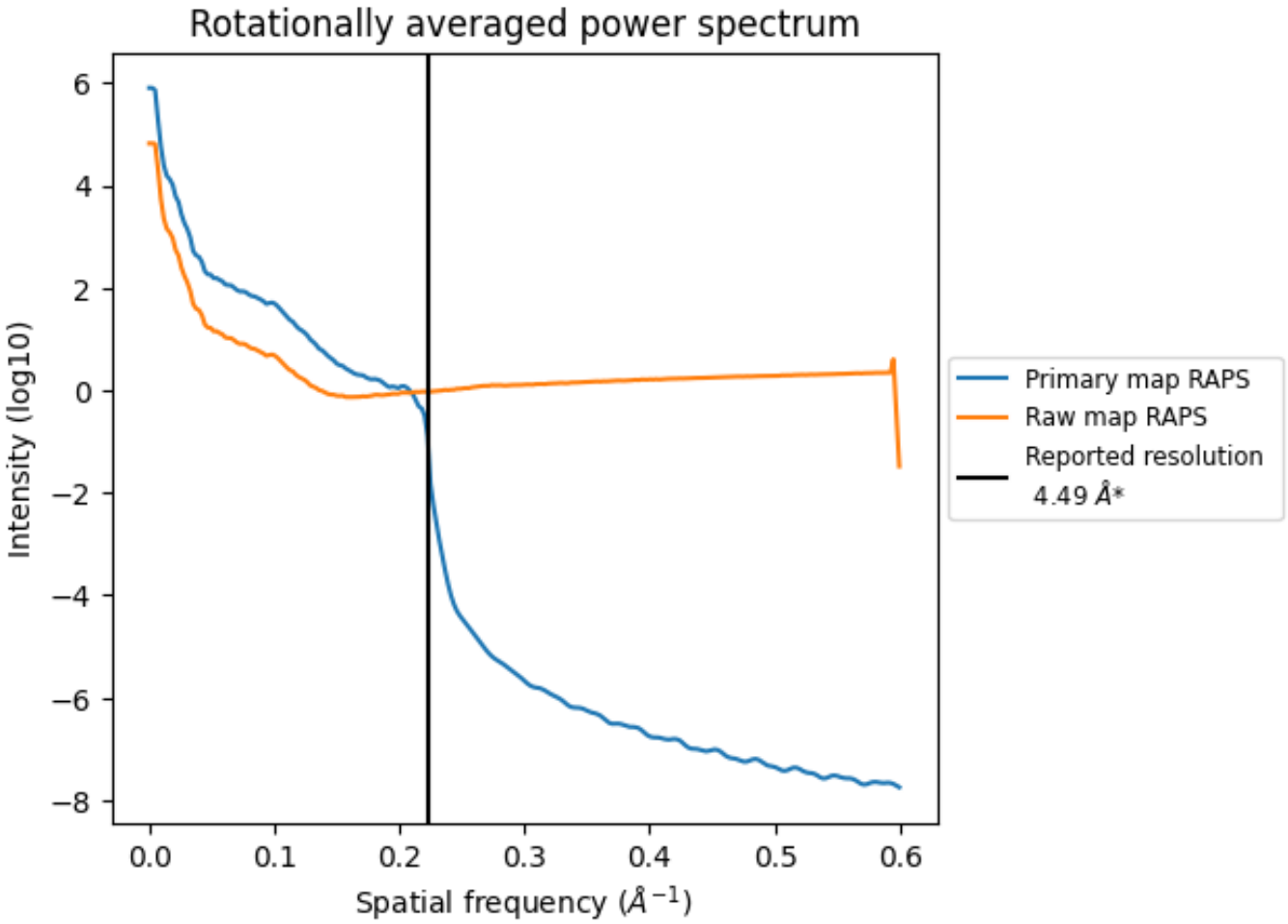
7.2 Volume estimate (i)



The volume at the recommended contour level is 352 nm^3; this corresponds to an approximate mass of 318 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)

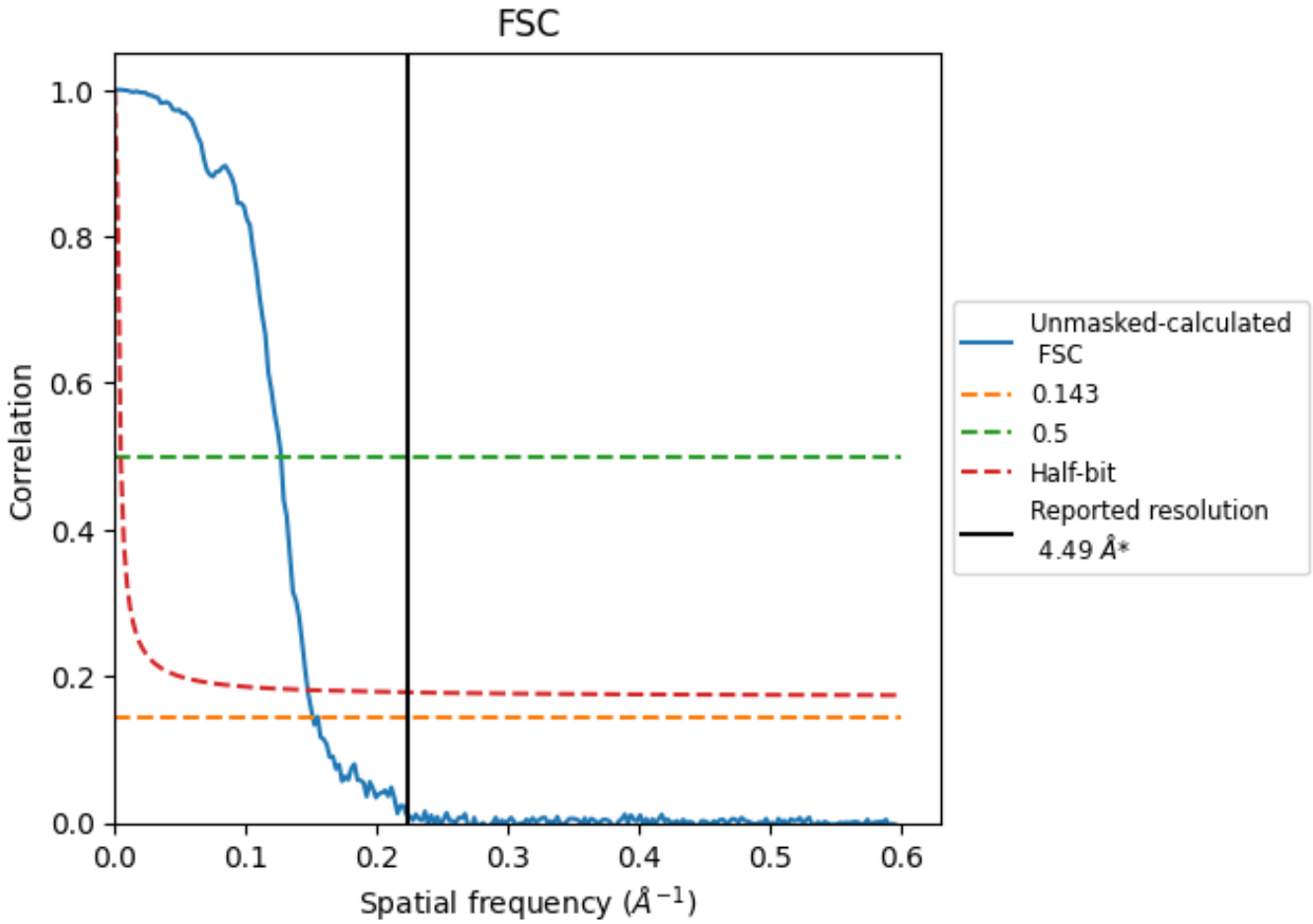


*Reported resolution corresponds to spatial frequency of 0.223 Å^{-1}

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 0.223 Å^{-1}

8.2 Resolution estimates (i)

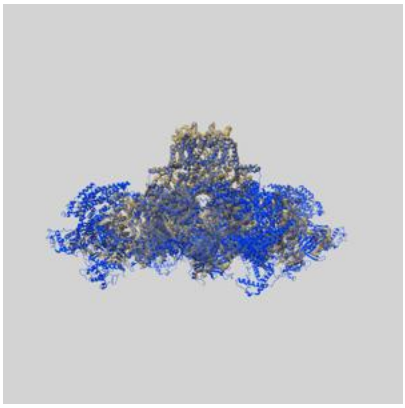
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.49	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	6.62	7.89	6.80

*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 6.62 differs from the reported value 4.49 by more than 10 %

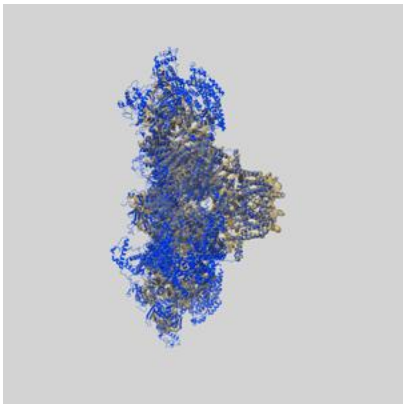
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-47388 and PDB model 9E1B. Per-residue inclusion information can be found in section 3 on page 6.

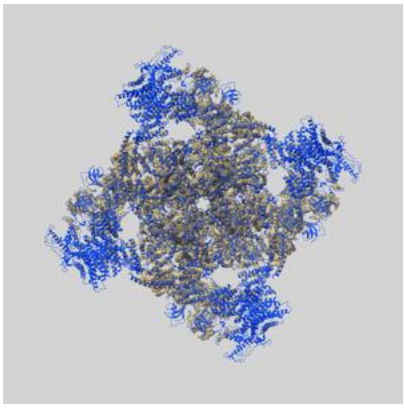
9.1 Map-model overlay



X



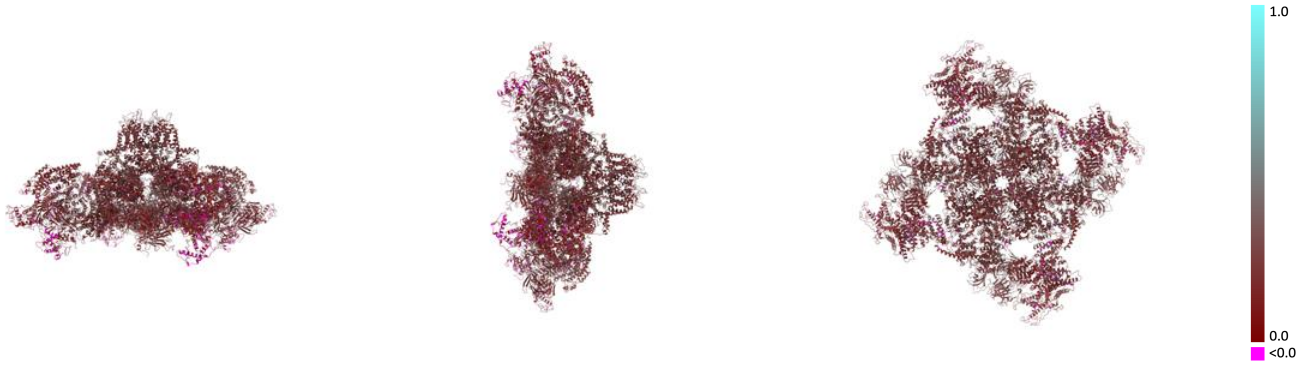
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.1 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.

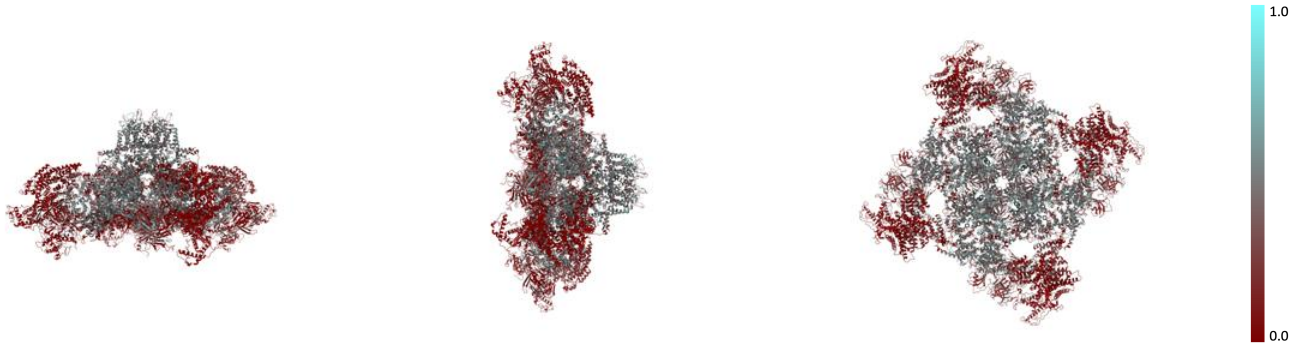
9.2 Q-score mapped to coordinate model



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.

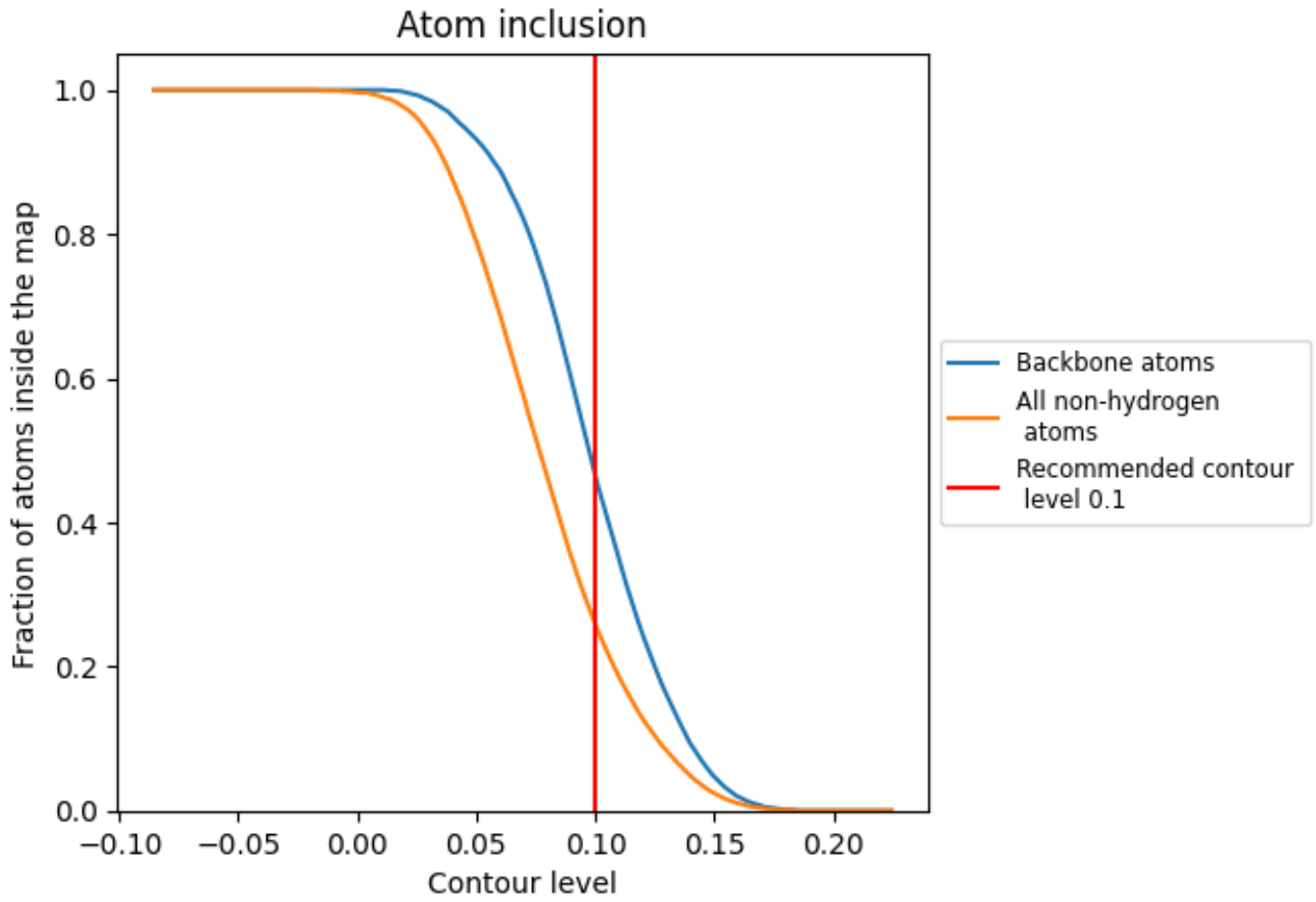
9.3 Atom inclusion mapped to coordinate model



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 (0.1).

9.4 Atom inclusion (i)



At the recommended contour level, 47% of all backbone atoms, 26% 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 (0.1) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.2590	0.2100
A	0.2640	0.2100
B	0.2640	0.2090
C	0.2640	0.2090
D	0.2640	0.2090
E	0.0360	0.2600
F	0.0310	0.2560
G	0.0320	0.2630
H	0.0360	0.2580