



# wwPDB EM Validation Summary Report ⓘ

Feb 25, 2024 – 09:49 AM EST

PDB ID : 7JMH  
EMDB ID : EMD-22394  
Title : Functional Pathways of Biomolecules Retrieved from Single-particle Snapshots  
- Frame 35 - State 4 (S4)  
Authors : Dashti, A.; des Georges, A.; Frank, J.; Ourmazd, A.  
Deposited on : 2020-07-31  
Resolution : 4.50 Å(reported)  
Based on initial model : 5TB4

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

We welcome your comments at [validation@mail.wwpdb.org](mailto: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>.

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

EMDB validation analysis : 0.0.1.dev70  
MolProbity : 4.02b-467  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36

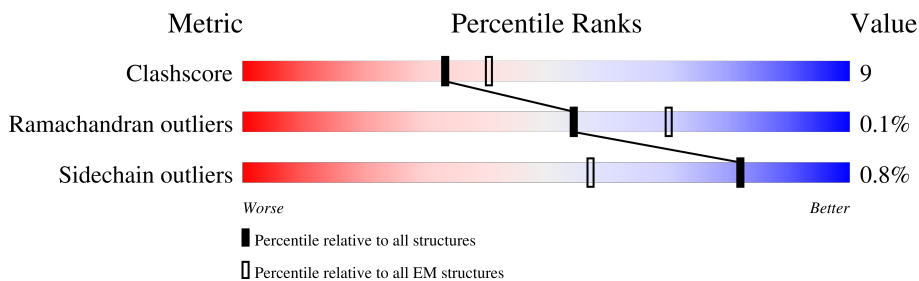
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 4.50 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	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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  $\geq 3$ , 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  $\leq 5\%$ . 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	107	<div style="display: flex; justify-content: space-between;"> <span>30%</span> <span>69%</span> <span>31%</span> </div>
1	F	107	<div style="display: flex; justify-content: space-between;"> <span>44%</span> <span>68%</span> <span>32%</span> </div>
1	H	107	<div style="display: flex; justify-content: space-between;"> <span>46%</span> <span>70%</span> <span>30%</span> </div>
1	J	107	<div style="display: flex; justify-content: space-between;"> <span>43%</span> <span>67%</span> <span>33%</span> </div>
2	B	4687	<div style="display: flex; justify-content: space-between;"> <span>34%</span> <span>71%</span> <span>18%</span> <span>11%</span> </div>
2	E	4687	<div style="display: flex; justify-content: space-between;"> <span>38%</span> <span>71%</span> <span>18%</span> <span>11%</span> </div>
2	G	4687	<div style="display: flex; justify-content: space-between;"> <span>44%</span> <span>70%</span> <span>18%</span> <span>11%</span> </div>
2	I	4687	<div style="display: flex; justify-content: space-between;"> <span>43%</span> <span>71%</span> <span>18%</span> <span>11%</span> </div>

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 120756 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 Peptidyl-prolyl cis-trans isomerase FKBP1B.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	107	818	516	144	154	4	0	0
1	F	107	818	516	144	154	4	0	0
1	H	107	818	516	144	154	4	0	0
1	J	107	818	516	144	154	4	0	0

- Molecule 2 is a protein called ryanodine receptor type 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	4168	29369	18608	5202	5402	157	0	0
2	E	4168	29369	18608	5202	5402	157	0	0
2	G	4168	29369	18608	5202	5402	157	0	0
2	I	4168	29369	18608	5202	5402	157	0	0

- Molecule 3 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
3	B	1	Total	Zn	0
			1	1	
3	E	1	Total	Zn	0
			1	1	
3	G	1	Total	Zn	0
			1	1	
3	I	1	Total	Zn	0
			1	1	

- Molecule 4 is CALCIUM ION (three-letter code: CA) (formula: Ca) (labeled as "Ligand of

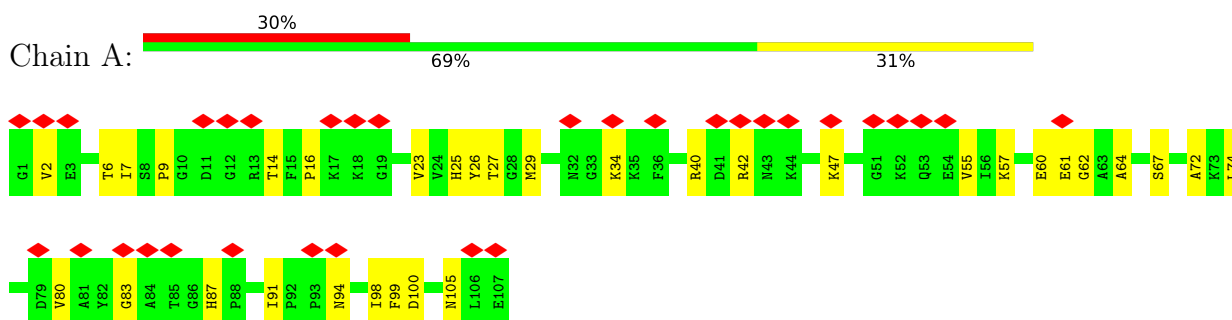
Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
4	B	1	Total 1	Ca 1	0
4	E	1	Total 1	Ca 1	0
4	G	1	Total 1	Ca 1	0
4	I	1	Total 1	Ca 1	0

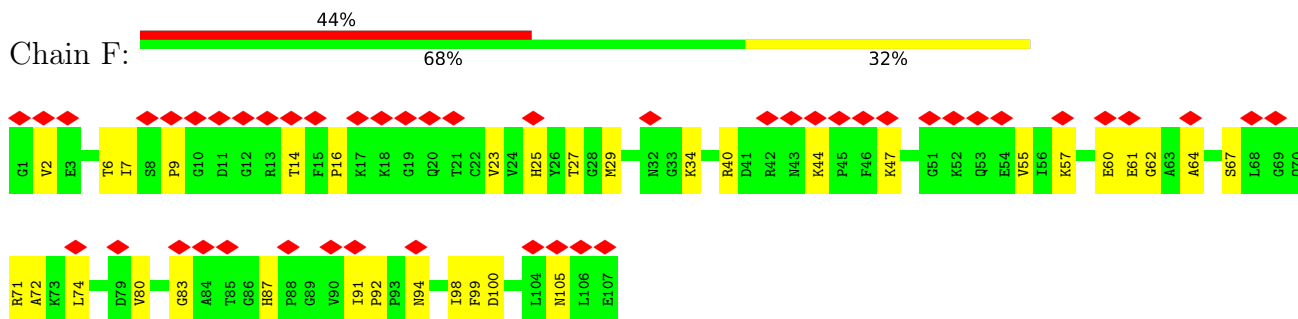
### 3 Residue-property plots [i](#)

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.

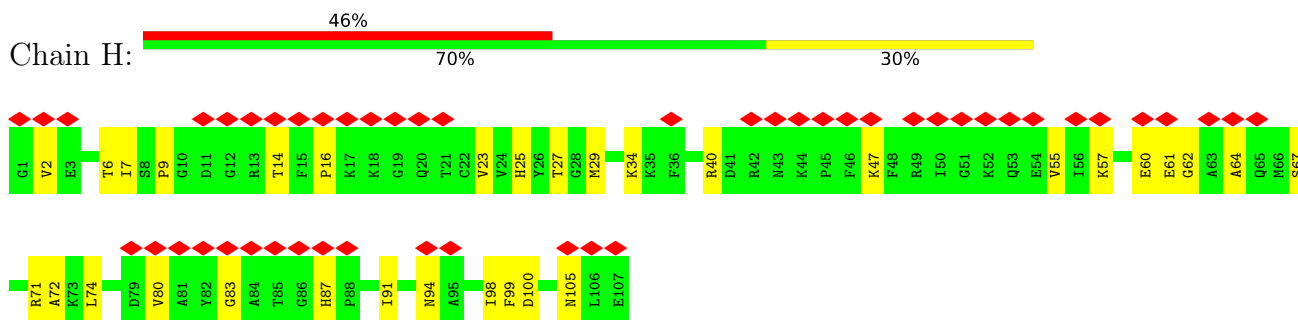
- Molecule 1: Peptidyl-prolyl cis-trans isomerase FKBP1B



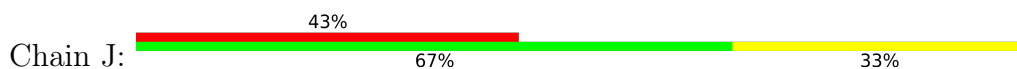
- Molecule 1: Peptidyl-prolyl cis-trans isomerase FKBP1B

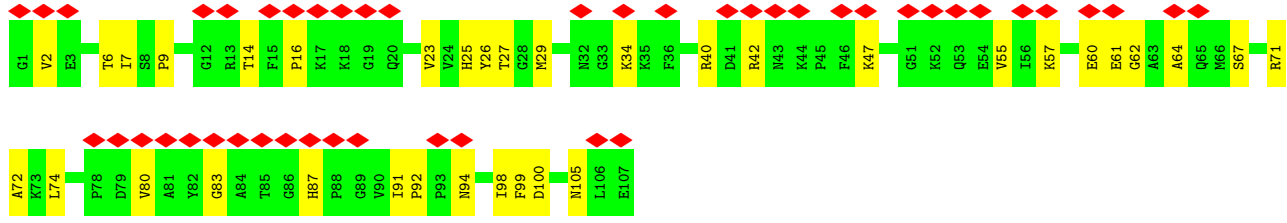


- Molecule 1: Peptidyl-prolyl cis-trans isomerase FKBP1B

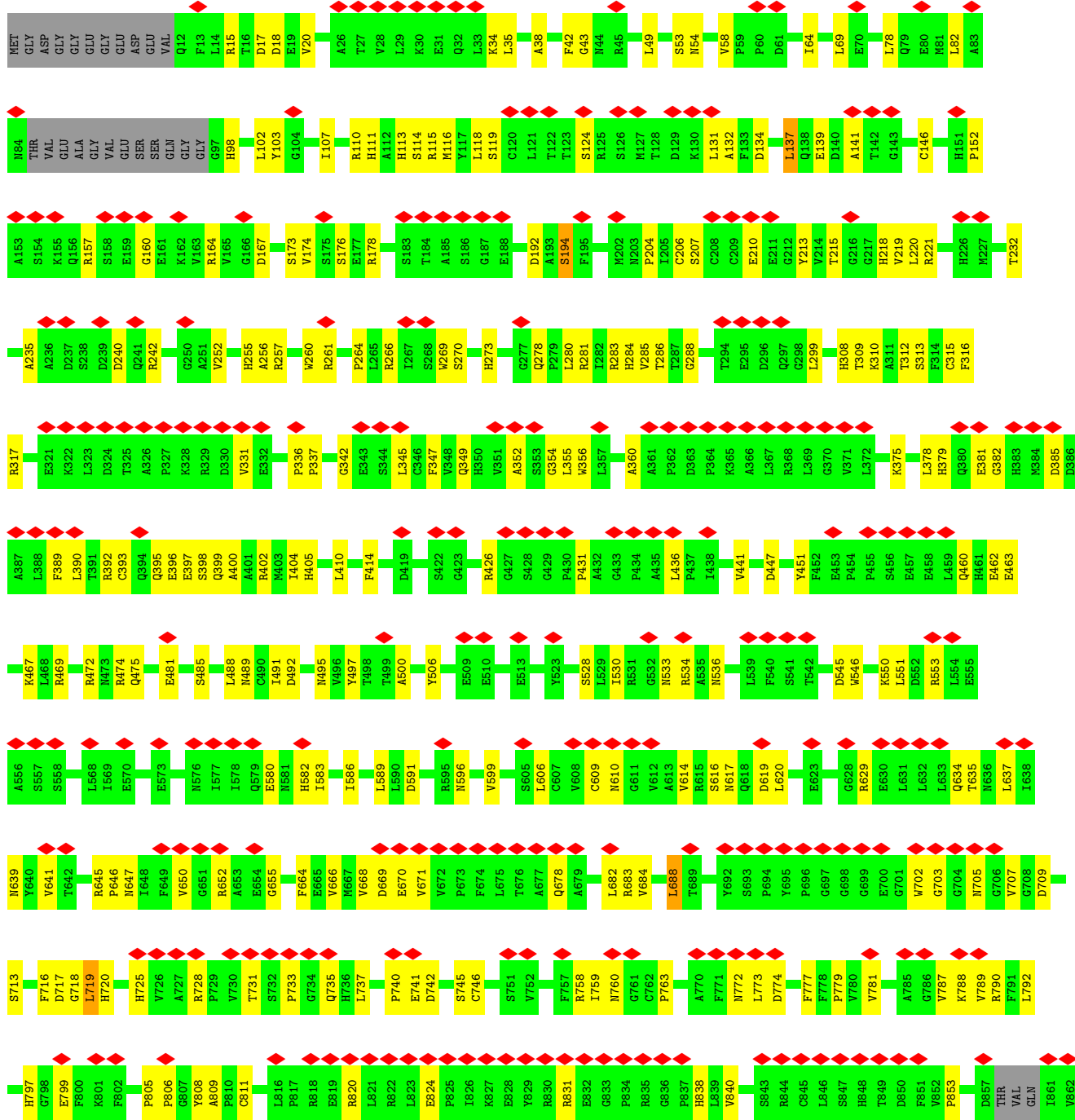


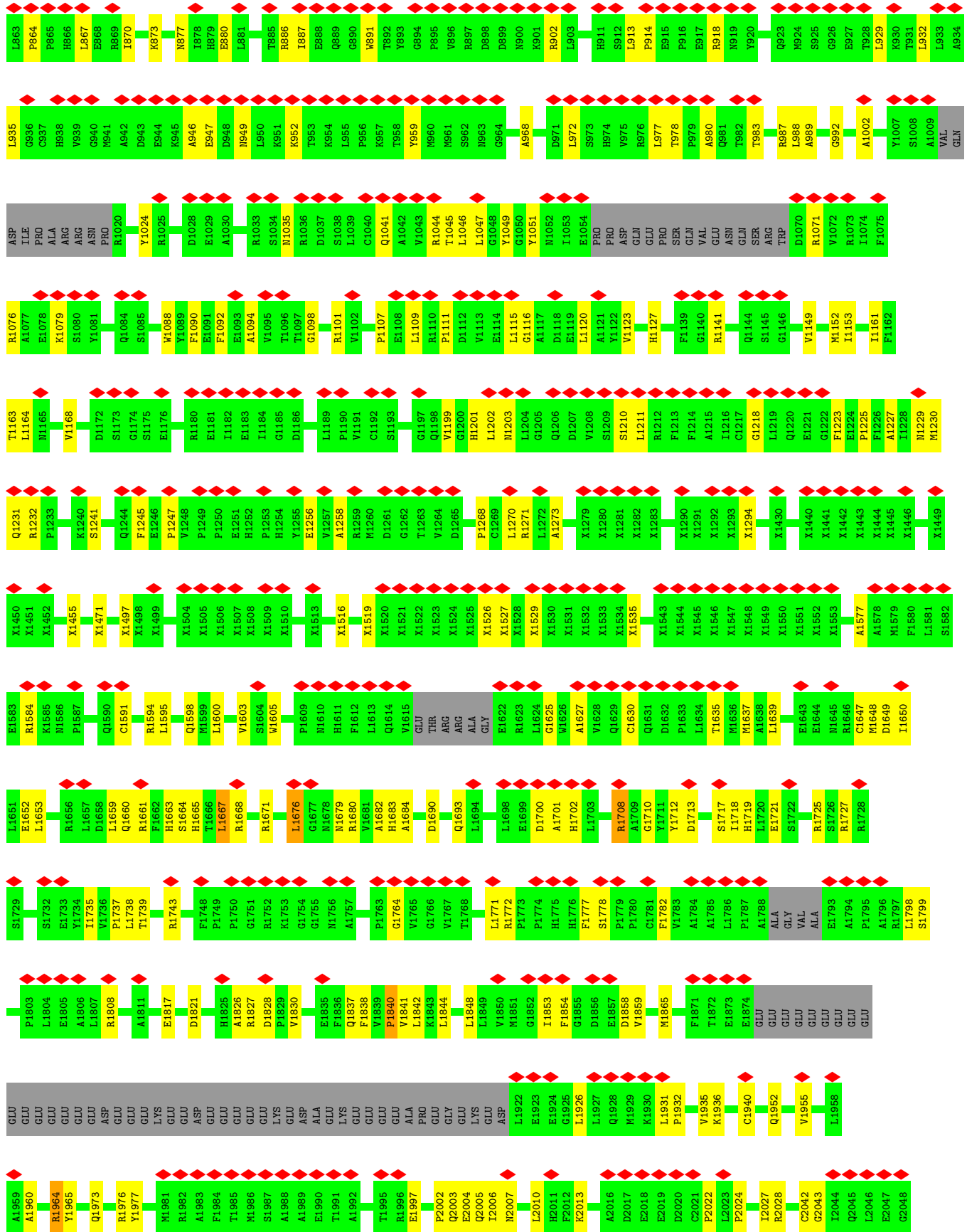
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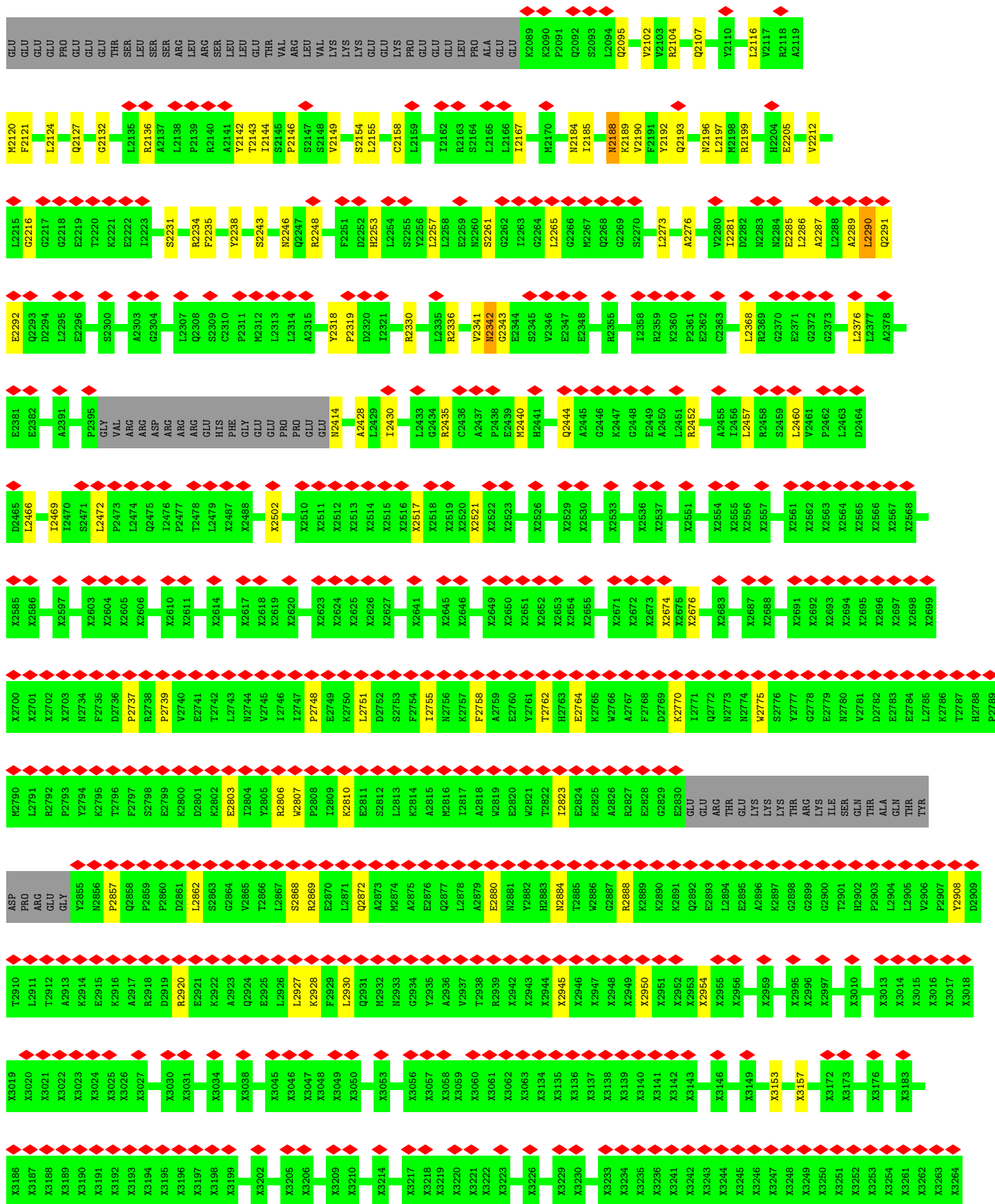




• Molecule 2: ryanodine receptor type 1

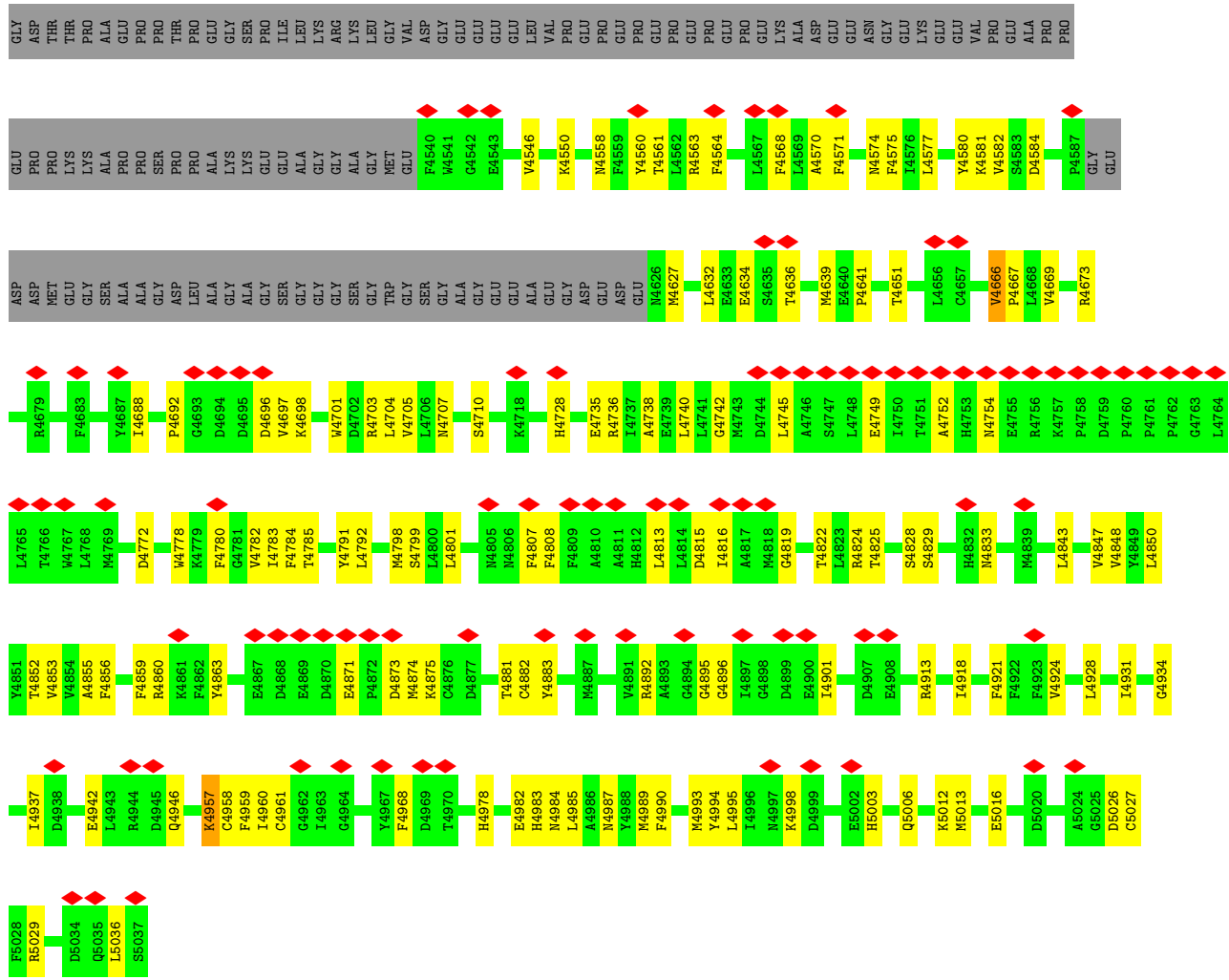




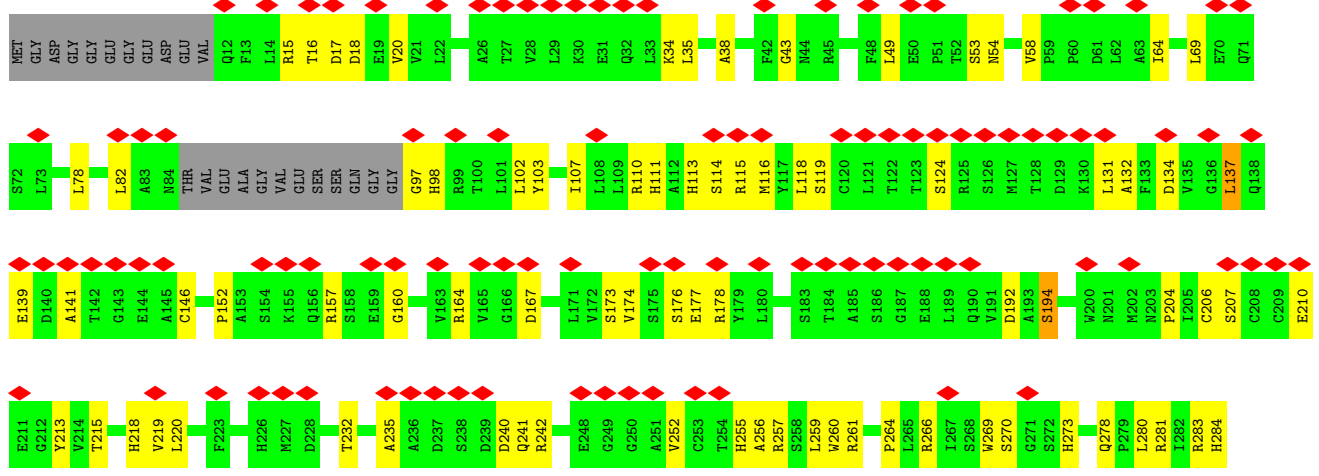




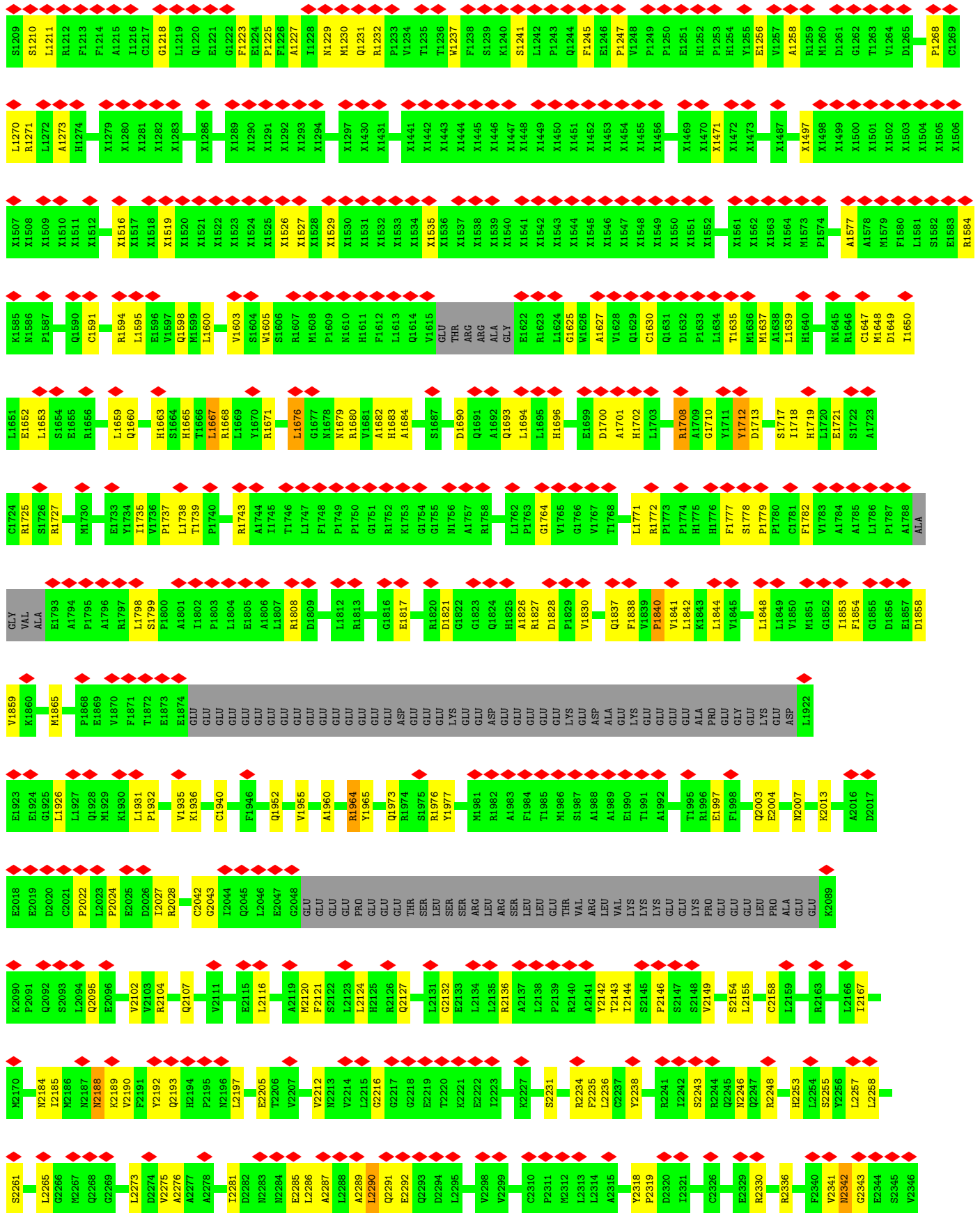


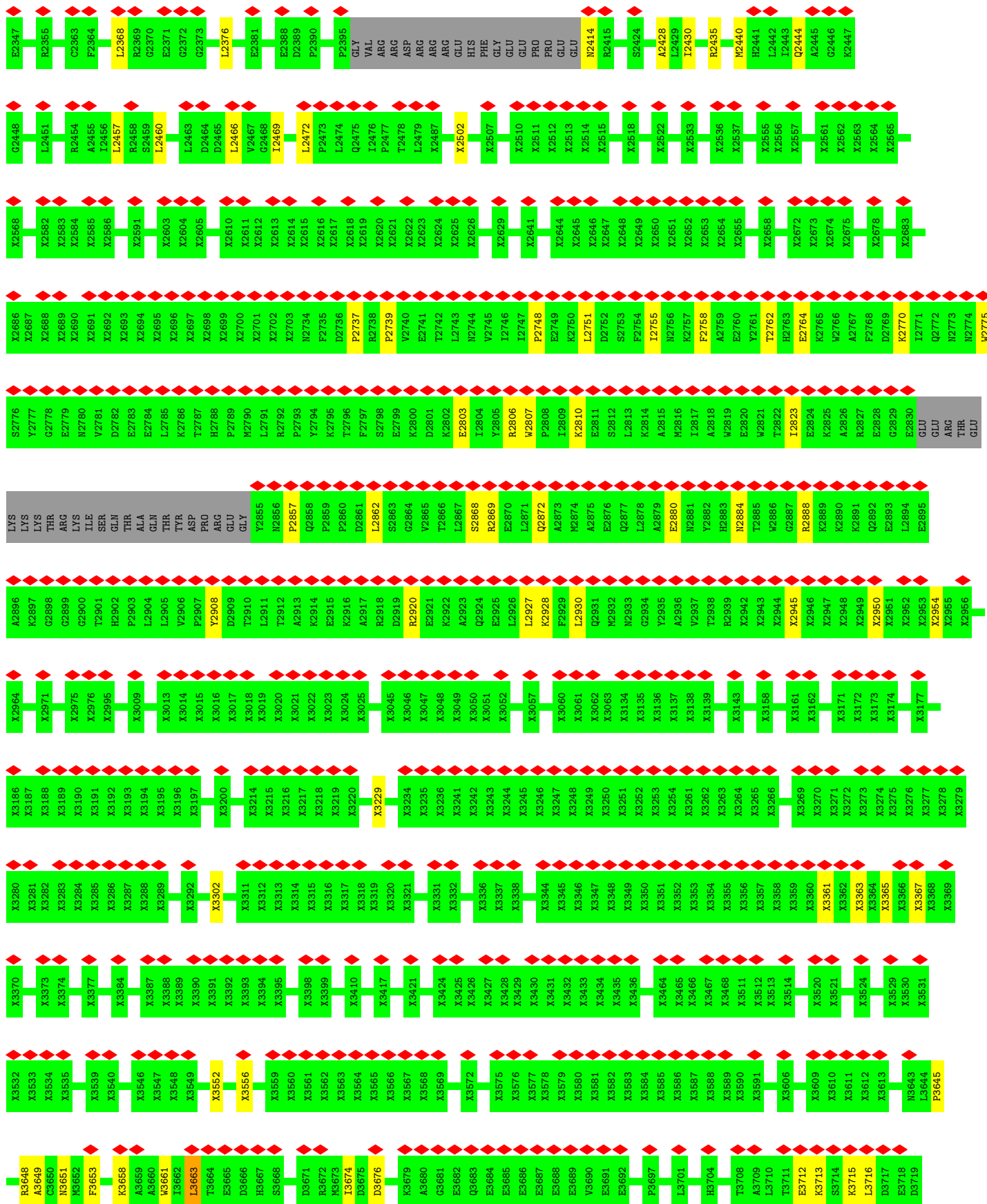


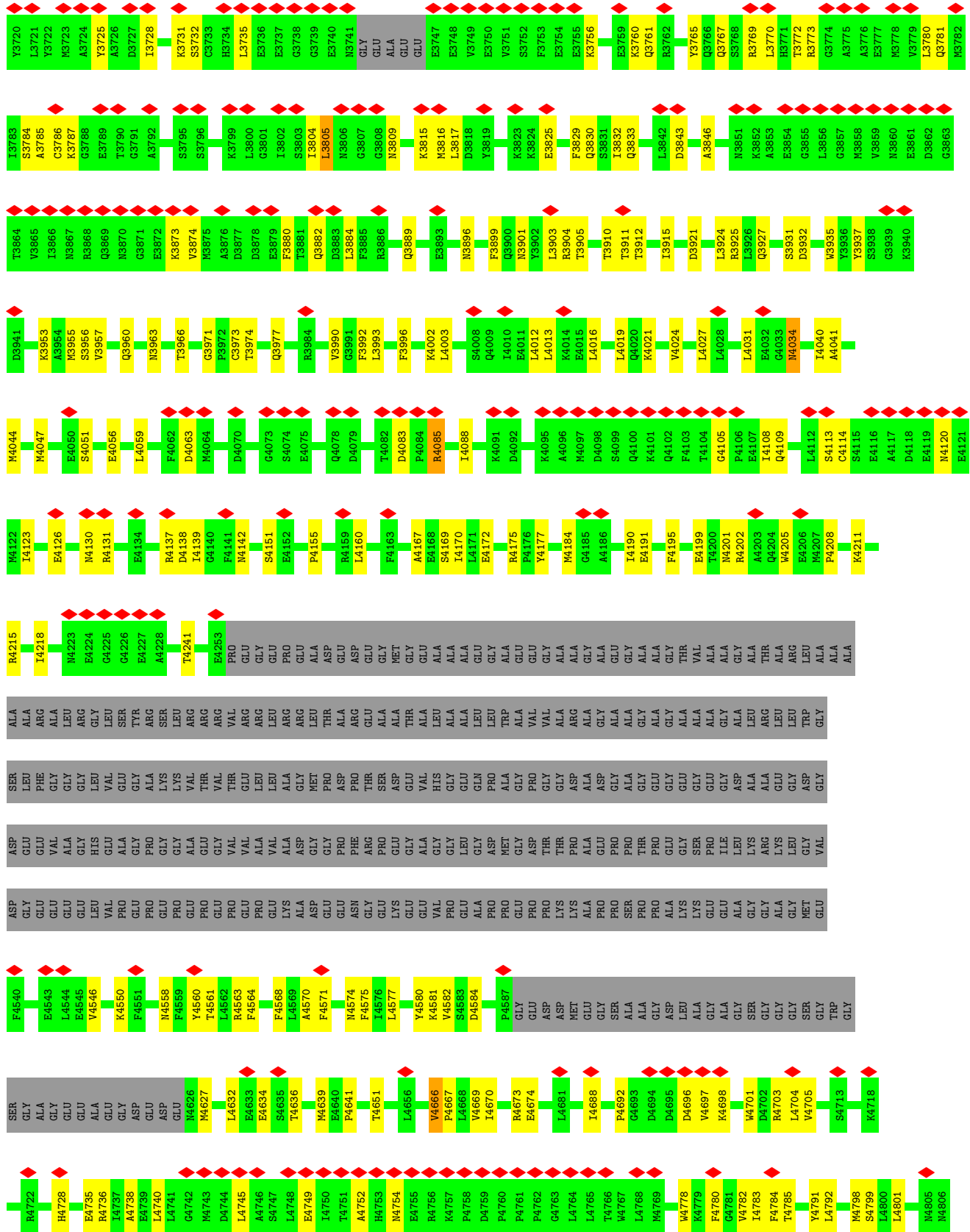
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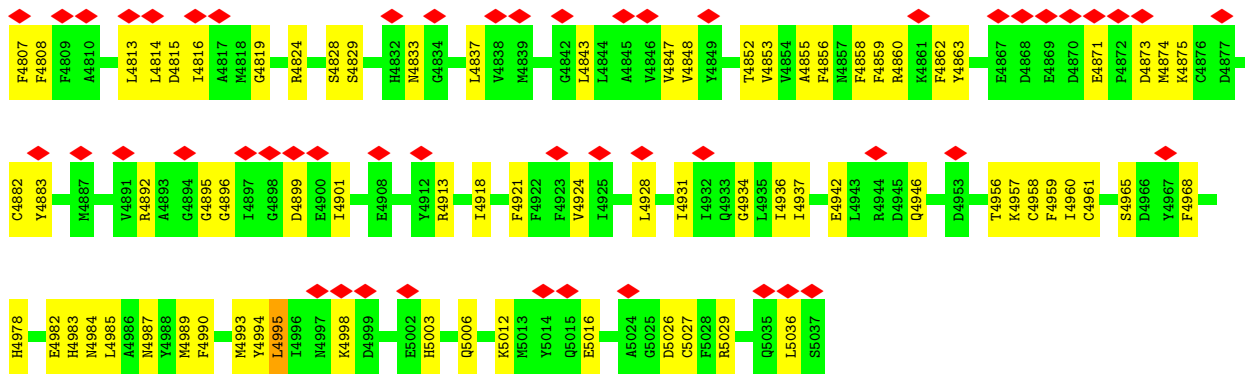


V285	T286	T287	G288	R289	E295	D296	Q297	A304	H308	T309	K310	A311	T312	S313	C315	F314	F316	R317	V318	S319	K320	E321	K322	L323	D324	T325	A326	P327	K328	R329	D330	V331	P336	R401	Y341	G342	E343	S344	L345	C346	F347	Q349	A352	G353	L355	W356	A360	A361	P362	D363					
P364	K365	A366	L367	R368	L369	G370	V371	K372	L373	K374	K375	L378	H379	Q380	E381	G382	H383	M384	D385	D386	A387	E388	K388	F389	L390	T391	R392	C393	Q394	Q395	E396	E397	S398	Q399	A400	R402	M403	I404	H405	S406	T407	A408	G409	L410	Y411	M412	K416	D419	S422	G423	K424	P425	G426	G427	S428
G429	P431	P434	A435	L436	P437	V438	E439	A440	Y441	I442	L445	Q446	D447	L448	I449	G450	Y451	F452	E453	P454	P455	S456	E457	E458	L459	Q460	H461	E462	E463	K467	L468	R469	R472	M473	R474	Q475	S476	Q479	E480	E481	G482	M483	L484	S485	L486	V487	L488	M489	C490	I491	D492	M495			
Y496	Y497	T498	T499	A500	A501	H502	Y506	E513	K516	V519	N520	H522	I523	E524	A527	S528	L529	I530	R531	G532	N533	R534	N536	C537	A538	L539	F540	S541	T542	N543	L544	D545	W546	V547	V548	S549	K550	L551	D552	R553	L554	E555	A556	S557	S558	G559	I560	L561	L564	Y565	L566				
I569	E570	S571	P572	E573	V574	L575	N576	I577	I578	Q579	E580	M581	I582	I583	I586	I587	S588	L589	L590	D591	G594	R595	N596	V599	L603	C604	S605	L606	C607	V608	C609	N610	G611	V614	R615	N617	S616	N617	Q618	D619	L620	L621	T622	E623	P627	G628	R629	E630	L631	L632	L633	Q634	T635	M636	
L637	L638	N639	Y640	V641	L644	R645	P646	N647	L648	F649	V650	G651	G652	G655	Q658	W662	F664	V666	V668	D669	E670	V671	V672	P673	F674	L675	T676	A677	Q678	L683	R683	V684	G685	L688	Y692	S693	P694	Y695	P696	G697	G698	G699	E700	G701	W702	L632	L633	Q634	T635	M636					
W707	G708	D709	S713	D717	G718	L719	H720	H725	V726	A727	R728	F729	W730	T731	S732	F733	G734	Q735	H736	L737	L738	A739	P740	E741	D742	V743	W744	S745	C746	S751	W752	R758	N760	G761	C762	P763	M772	L773	D774	L776	F777	F778	V779	W780	V781	A785	W787	K788	W789						
R790	F791	L792	G795	R796	H797	G798	E799	F800	K801	F802	L803	P806	G807	Y808	A809	C811	H812	E813	L816	P817	R818	E819	R820	L821	R822	L823	E824	P825	L826	R827	E828	H829	R830	R831	E832	G833	R834	R836	P837	H838	L839	W840	S843	H844	C846	L846	S847	H848	T849	D850	F851	P853			
D857	THR	VAL	GLN	I861	W862	L863	P864	P865	H866	L867	I870	K873	E876	H877	E880	L881	T885	R886	I887	E888	E889	G890	W891	T892	H893	G894	P895	W896	R897	D898	D899	N900	K901	R902	L903	H904	F905	H911	S912	L913	P914	E915	P916	E917	R918	N919	Y920	Q923	M924	S925	G926				
E927	T928	L929	K930	T931	L932	L935	H938	V939	G940	M941	A942	D943	E944	K945	E947	N949	L950	K951	K952	T953	K954	L955	P956	K957	T958	Y959	M960	M961	S962	N963	G964	A968	D971	L972	S973	H974	V975	L977	T978	P979	A980	Q981	T982	T983	R887	L988	A989	G992	A1002						
Q1003	G1004	W1005	S1006	Y1007	S1008	A1009	VAL	GLN	ASP	ILE	PRO	ALA	ARG	ARG	ASN	PRO	Y1024	D1028	E1029	A1030	T1031	K1032	R1033	S1034	M1035	R1036	D1037	S1038	L1039	C1040	Q1041	A1042	V1043	R1044	T1045	L1046	L1047	G1048	Y1049	Y1051	M1052	I1053	E1054	PRO	PRO	ASP	GLN	GLU	PRO	SER	GLN	VAL	GLU	ASN	GLN
SER	ARG	TRP	D1070	R1071	V1072	R1073	I1074	F1075	R1076	E1078	K1079	S1080	Y1081	T1082	V1083	Q1084	S1085	G1086	L1087	Y1088	Y1089	F1090	E1091	F1092	E1093	A1094	V1095	T1096	L1097	G1098	R1101	V1102	G1103	P1107	E1108	L1109	R1110	P1111	D1112	V1113	E1114	L1115	G1116	A1117	D1118	E1119	L1120	A1121	V1122	V1123	F1124	H1127	F1139	G1140	
R1141	P1142	W1143	Q1144	S1145	G1146	D1147	V1148	V1149	M1152	I1153	I1161	F1162	T1163	L1164	N1165	G1166	E1167	V1168	L1169	M1170	S1171	L1172	S1173	G1174	S1175	E1176	T1177	F1178	R1180	E1181	I1182	E1183	I1184	G1185	D1186	G1187	F1188	L1189	P1190	V1191	C1192	S1193	P1196	G1197	Q1198	V1199	H1201	L1202	N1203	L1204	G1205	Q1206	D1207	V1208	

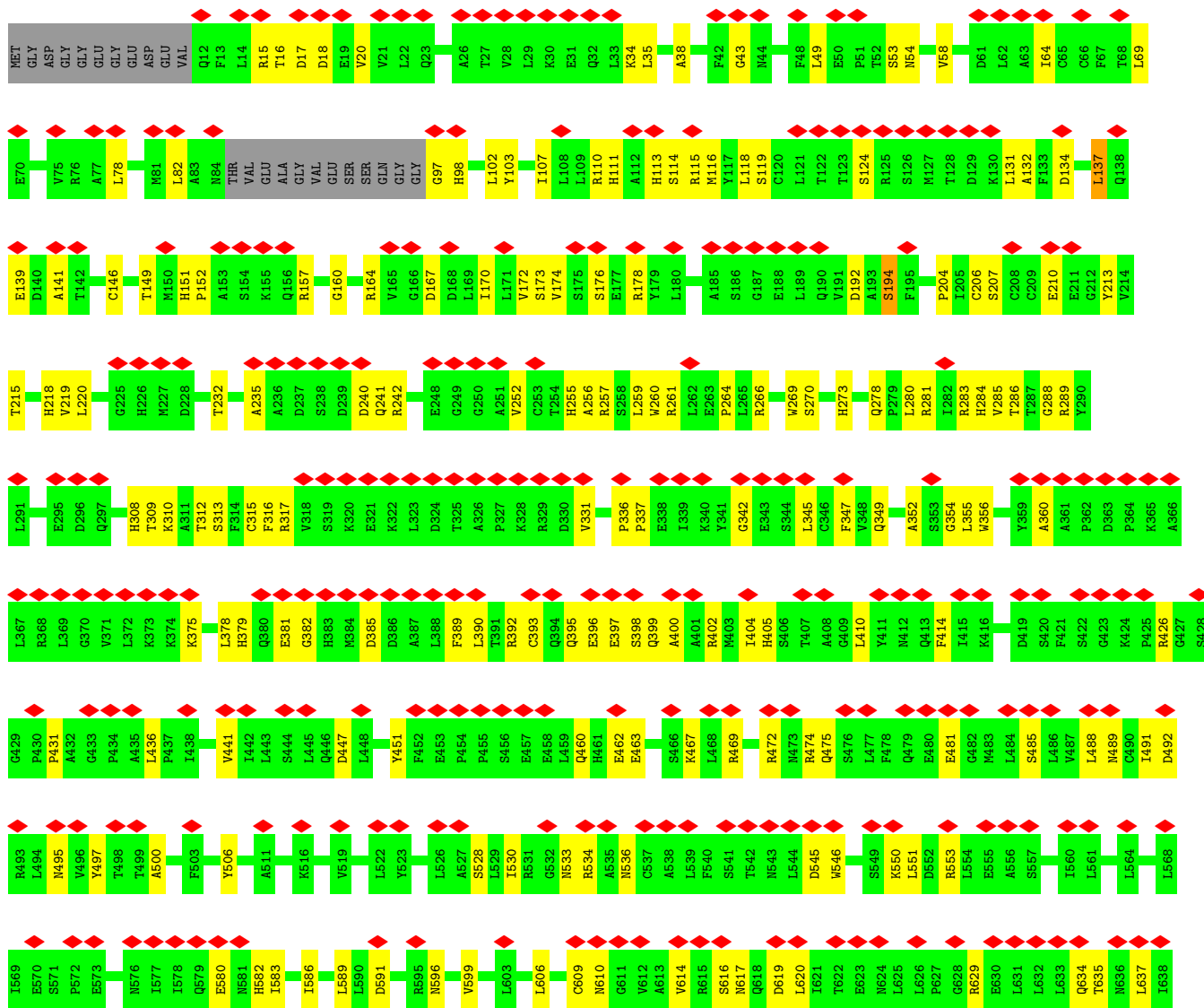
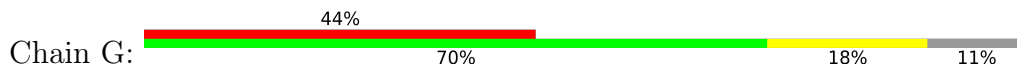








• Molecule 2: ryanodine receptor type 1



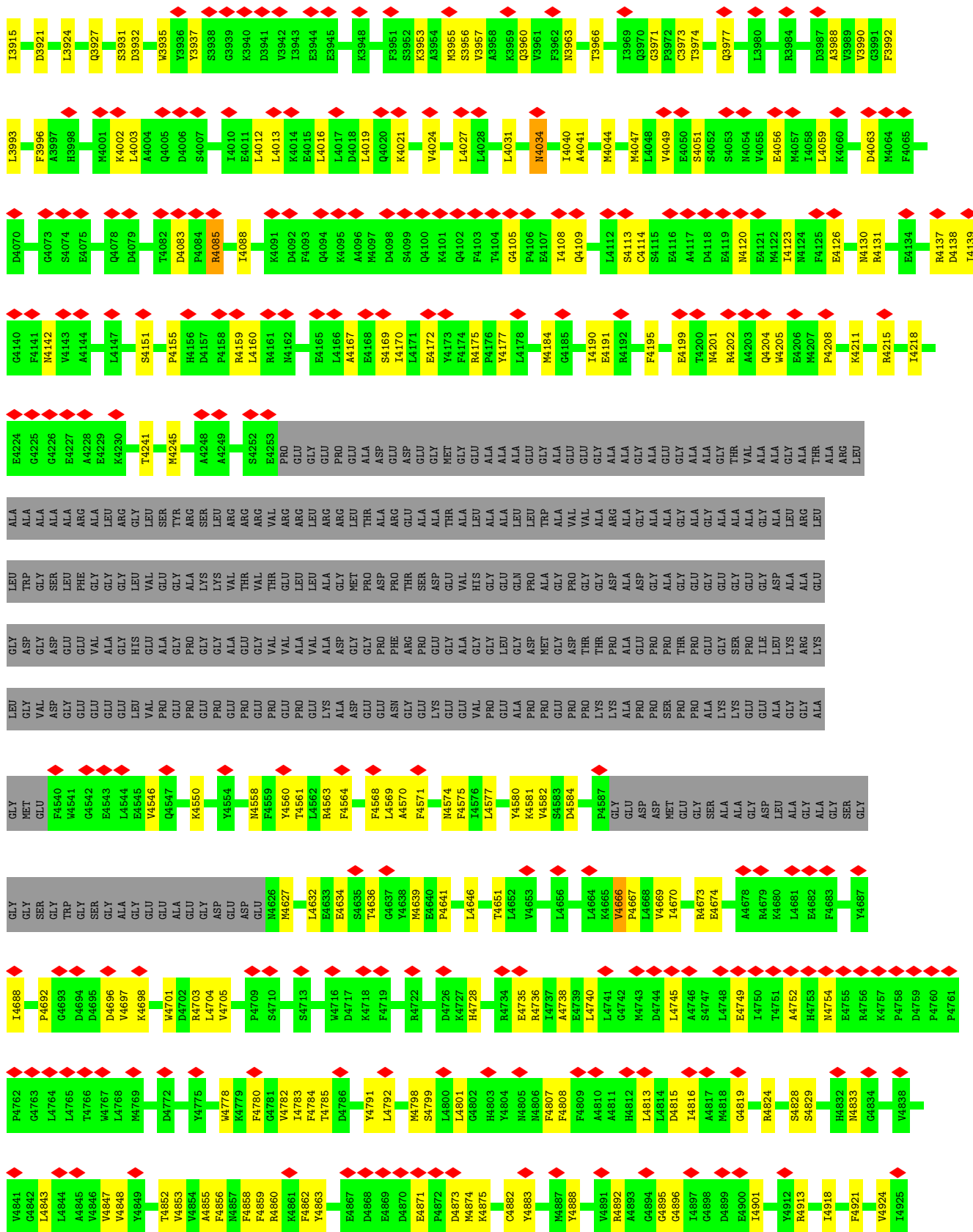
The image displays a grid of EM validation data points. Each point is represented by a 3-letter code (e.g., M639, Y640, V641) with a red diamond icon above it. The labels are organized into columns and rows, with some cells empty. The colors of the labels vary, likely representing different validation metrics or categories.

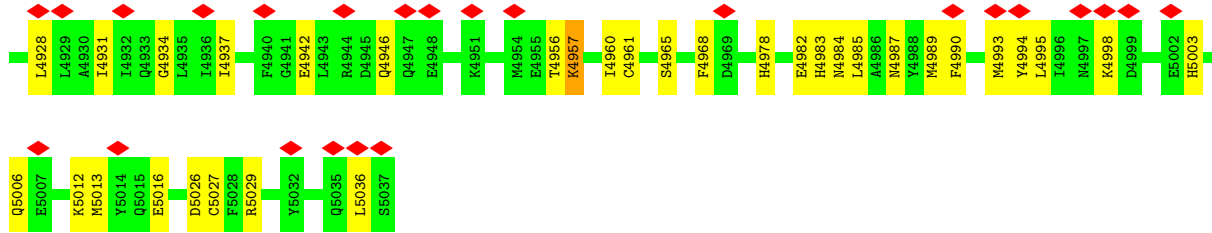
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G708	D709	S713	F716	D717	G718	L719	H720	L721	L722	T723	G724	H725	V726	A727	R728	P729	H730	T731	S732	F733	G734	H735	H736	L737	L738	A739	P740	E741	D742	S745	C746	S745	S751	V752	F757	R758	I759	N760	G761	C762	P763	Q765	N772	L773	D774	F777	F778	P779	V780	V781	A785	G786	V787	K788	V789	R790	L792	H797	G798	F800	K801	F802	L803	P804	P805	P806	V807	Y808	A809	F810	C811	L816	P817	R818	L822	R823	E824	P825	I826	K827	E828	Y829	R830	R831	E832	G833	P834	G835	G836	P837	H838	L839	V840	G841	P842	S843	R844	C845	L846	S847	D850	F851	V852	P853	D857	THR	VAL	GLN	I861	V862	L863	P864	P865	H866	L867	E868	I870	R871	E872	K873	L874	N877	I878	H879	E880	L881	W882	T885	R886	I887	E888	Q889	G890	W891	T892	E893	G894	P895	V896	R897	D898	D899	N900	K901	R902	L903	H904	L905	L906	L907	L908	L909	G1050	Y1051	M1052	I1053	E1054	PRO	ASP	GLN	GLU	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	K952	T953	K954	L955	P956	K957	T958	Y959	M960	M961	V1043	R1044	T1045	L1046	L1047	Q1048	Y1049	G1050	Y1051	M1052	I1053	E1054	PRO	ASP	GLN	GLU	PRO	SER	GLN	VAL	GLU	ASN	TRP	D1070	R1071	V1072	I1073	I1074	F1075	R1076	A1077	E1078	K1079	S1080	Y1081	T1082	V1083	Q1084	S1085	L1086	R1087	W1088	Y1089	F1090	F1092	E1093	A1094	V1095	T1096	T1097	G1098	R1101	V1102	G1103	M1104	A1105	R1106	P1107	E1108	L1109	R1110	P1111	D1112	V1113	E1114	L1115	G1116	A1117	D1118	E1119	L1120	A1121	Y1122	V1123	H1127	G1140	R1141	Q1144	S1145	G1146	D1147	V1149	M1152	L1153	D1154	L1155	T1156	I1161	F1162	L1163	L1164	N1165	V1168	S1176	E1176	R1180	E1181	I1182	E1183	I1184	G1185	D1186	P1190	V1191	C1192	S1193	G1197	Q1198	G1200	H2101	L2102	M2103	L2104	G2105	Q2106	D2107	V2108	S2109	S2110	L1211	R1212	F1213	F1214	I1215	C1217	G1218	L1219	Q1220	E1221	F1222	F1223	E1224	P1225	F1226	A1227	I1228	M1229	M1230	Q1231	R1232	P1233	V1234	T1235	T1236	W1237	K1240	S1241	L1242	P1243	Q1244	F1245	E1246	P1247	V1248	P1249	P1250	E1251	H1252	V1255	E1256	V1257	A1258	R1259	M1260	D1261	G1262	T1263	V1264	D1265	T1266	P1267	P1268	C1269	L1270	R1271	L1272	X1273	H1274	X1279	X1280	X1281	X1282	X1286	X1289	X1290	X1291	X1292	X1293	X1294	X1295	X1296	X1297	X1430	X1431	X1432	X1439	X1440	X1441	X1442	X1443	X1444	X1445	X1446	X1449	X1450	X1451	X1452	X1455	X1461	X1471	X1472	X1497	X1498	X1499	X1500	X1501	X1502	X1505	X1506	X1507	X1512	X1513	X1514	X1515	X1516	X1517	X1518	X1519	X1520	X1521	X1522	X1523	X1524	X1525	X1526	X1527	X1528	X1529	X1530	X1531	X1532	X1533	X1534	X1535	X1539	X1540	X1541	X1542	X1543	X1544	X1545	X1546	X1547	X1548	X1549	X1551	X1552	X1553	X1561	X1562	X1563	X1564	M1573	P1574	A1577	A1578	M1579	F1580	L1581	S1582	E1583	R1584	K1585	M1586	P1587	A1588	P1589	Q1590	C1591	P1592	P1593	R1594	L1595	E1596	Q1597	Q1598	M1599	L1600	V1603	S1604	V1605	S1606	R1607	M1608	P1609	M1610	H1611	F1612	L1613	Q1614	V1615	GLU	THR	ARG	ARG	ALA	GLY	E1622	R1623	L1624	G1625	W1626	A1627	V1628	Q1629	C1630	Q1631	D1632	P1633	L1634	T1635	M1636	M1637	A1638	L1639	H1640	E1643	E1644	M1645	R1646	C1647	M1648	D1649	I1650	L1651	E1652	L1653	S1654	E1655	L1669	L1670	R1671	L1676	G1677	M1678	M1679	R1680	V1681	A1682	H1683	A1684	D1690	A1691	A1692	Q1693	L1694	L1695	H1696	A1697	L1698	E1699	D1700	A1701	H1702	L1703	R1708	A1709	G1710	Y1711	Y1712	D1713	S1717	I1718	H1719	L1720	E1721	S1722	A1723	C1724	R1725	S1726	R1727	H1728	R1666	L1669	F1661	F1662	H1663	S1664	H1665	L1666	L1667	R1668	L1669	Y1670	R1671	L1676	G1677	M1678	M1679	R1680	V1681	A1682	H1683	A1684	D1690	A1691	A1692	Q1693	L1694	L1695	H1696	A1697	L1698	E1699	D1700	A1701	H1702	L1703	R1708	A1709	G1710	Y1711	Y1712	D1713	S1717	I1718	H1719	L1720	E1721	S1722	A1723	C1724	R1725	S1726	R1727	H1728



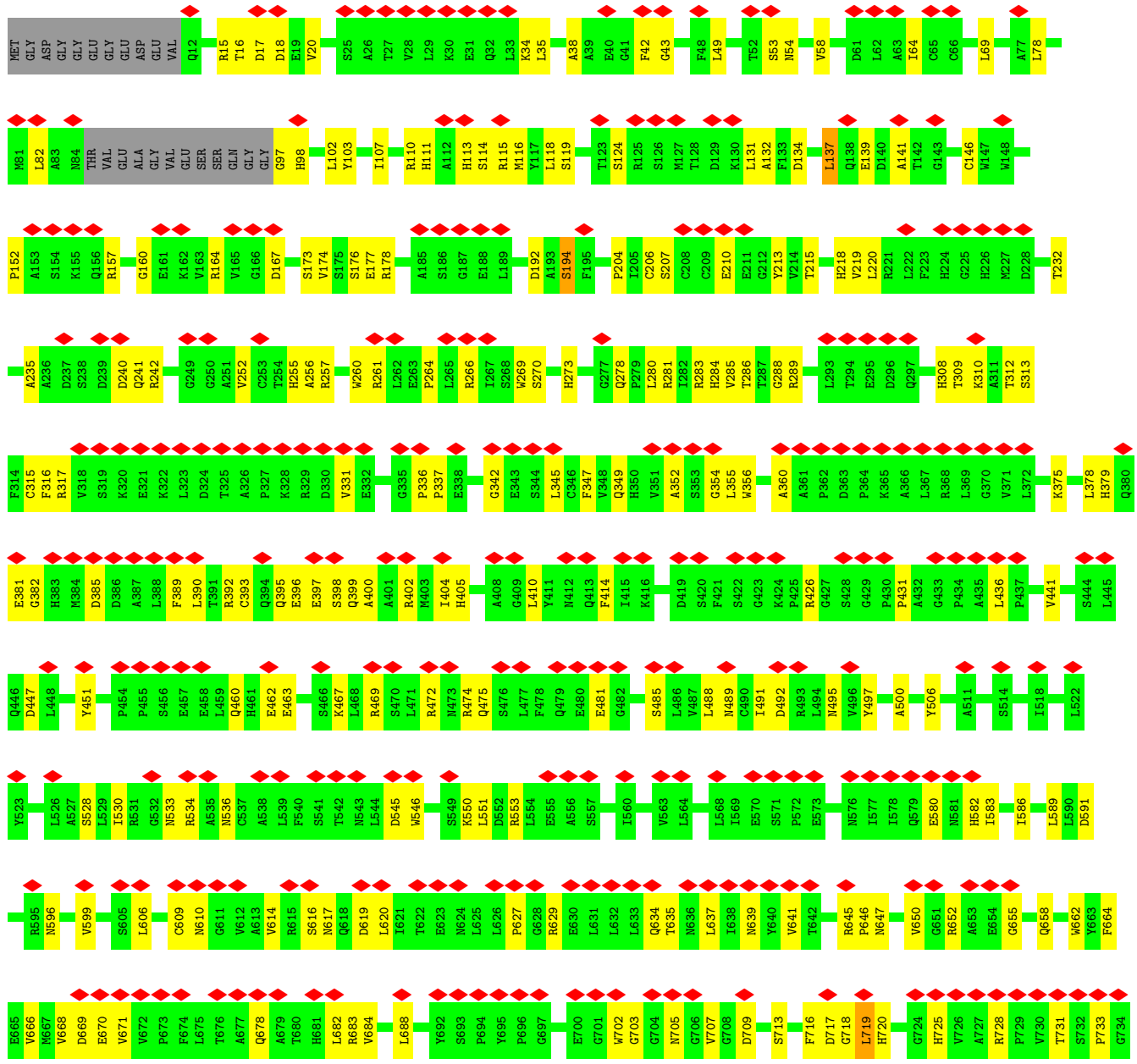
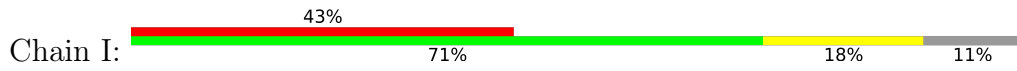


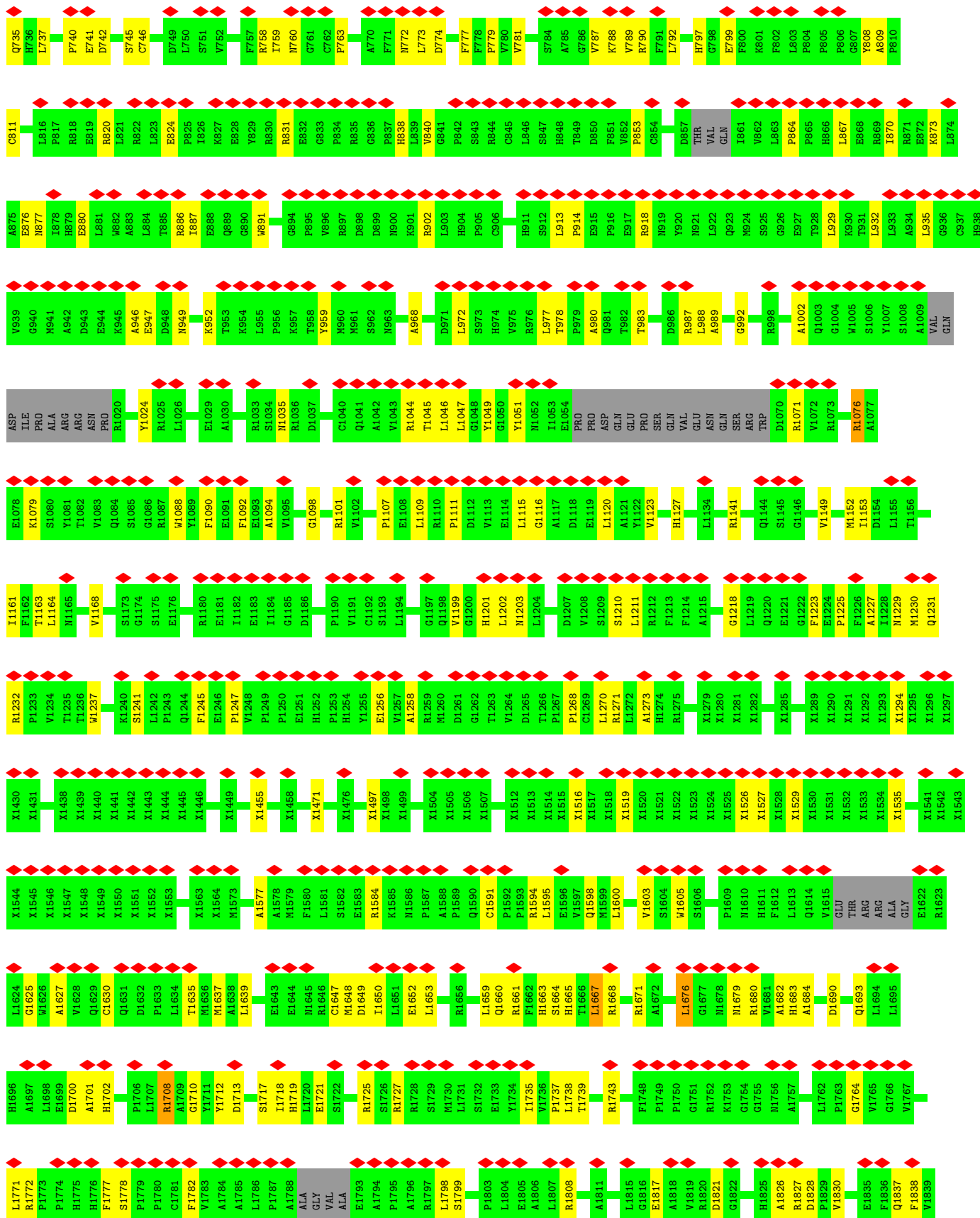
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F2758	A2818	L2878	T2938	X3049	X3235	X3313	X3387	X3528	X3613	E3712	R3772	E3848
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H2763	L2823	H2883	X2945	X3061	X3244	X3318	X3392	X3533	C3649	E3718	V3779	E3854
E2764	E2824	T2885	X2946	X3062	X3245	X3319	X3393	X3534	L3780	D3719	L3780	L3855
K2765	K2825	W2886	X2947	X3063	X3246	X3320	X3394	X3535	C3650	D3720	Q3781	Q3856
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D2862	L2862	A2917	X3023	X3096	X3279	X3353	X3437	X3582	V3690	S3754	E3825	N3896
S2863	S2863	X3024	X3024	X3097	X3280	X3354	X3438	X3583	E3691	E3755	F3825	N3899
G2864	G2864	X3025	X3025	X3098	X3281	X3355	X3439	X3584	E3692	K3756	F3829	F3899
V2865	V2865	E2921	X3026	X3099	X3282	X3356	X3465	X3585	E3693	E3759	Q3830	Q3830
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R2869	R2869	Q2924	X3029	X3102	X3285	X3359	X3468	X3588	L3698	Q3761	M3836	L3833
E2870	E2870	E2925	X3030	X3103	X3286	X3360	X3469	X3589	P3699	R3762	L3842	L3834
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W2806	W2806	L2926	X3032	X3105	X3288	X3362	X3471	X3591	E3699	L3764	L3842	L3834
Q2807	Q2807	L2927	X3033	X3106	X3289	X3363	X3472	X3592	E3700	X3765	L3842	L3834
L2871	L2871	L2928	X3034	X3107	X3290	X3364	X3473	X3593	L3701	Q3766	L3842	L3834
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F2808	F2808	L2929	X3036	X3109	X3292	X3366	X3475	X3595	L3703	Q3767	L3842	L3834
L2809	L2809	Q2929	X3037	X3110	X3293	X3367	X3476	X3596	L3704	Q3767	L3842	L3834
E2810	E2810	L2930	X3038	X3111	X3294	X3368	X3477	X3597	H3704	Q3767	L3842	L3834
E2811	E2811	Q2931	X3039	X3112	X3295	X3369	X3478	X3598	H3704	Q3767	L3842	L3834
S2812	S2812	M2932	X3040	X3113	X3296	X3370	X3479	X3599	H3704	Q3767	L3842	L3834
L2813	L2813	N2933	X3041	X3114	X3297	X3371	X3480	X3600	H3704	Q3767	L3842	L3834





• Molecule 2: ryanodine receptor type 1







LYS	LYS	LYS	THR	ARG	LYS	TLE	SER	GLN	THR	ALA	GLN	THR	TYR	ASP	PRO	ARG	GLU	GLY	Y2855	H2856	P2857	Q2858	P2859	P2860	D2861	L2862	S2863	G2864	V2865	T2866	L2867	S2868	R2869	E2870	L2871	Q2872	A2873	H2874	A2875	E2876	Q2877	L2878	A2879	E2880	H2881	Y2882	H2883	H2884	T2885	W2886	G2887	R2888	K2889	K2890	K2891	Q2892	E2893	L2894	E2895																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
A2896	K2897	G2898	G2899	G2900	T2901	H2902	P2903	L2904	L2905	V2906	P2907	D2908	Y2909	T2910	L2911	T2912	A2913	K2914	E2915	K2916	A2917	R2918	D2919	R2920	E2921	K2922	A2923	Q2924	E2925	L2926	L2927	Y2928	F2929	L2930	Q2931	M2932	N2933	G2934	Y2935	A2936	V2937	T2938	R2939	X2942	X2943	X2944	X2945	X2946	X2947	X2948	X2949	X2950	X2951	X2952	X2953	X2954	X2955																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
X2956	X2957	X2958	X2959	X2960	X2961	X2962	X2963	X2964	X2965	X2966	X2967	X2968	X2969	X2970	X2971	X2972	X2973	X2974	X2975	X2976	X2977	X2978	X2979	X2980	X2981	X2982	X2983	X2984	X2985	X2986	X2987	X2988	X2989	X2990	X2991	X2992	X2993	X2994	X2995	X2996	X2997	X2998	X2999	X3000	X3001	X3002	X3003	X3004	X3005	X3006	X3007	X3008	X3009	X3010	X3011	X3012	X3013	X3014	X3015	X3016	X3017	X3018	X3019	X3020	X3021	X3022	X3023	X3024	X3025	X3026	X3027	X3028	X3029	X3030	X3031	X3032	X3033	X3034	X3035	X3036	X3037	X3038	X3039	X3040	X3041	X3042	X3043	X3044	X3045	X3046	X3047	X3048	X3049	X3050	X3051	X3052	X3053	X3054	X3055	X3056	X3057	X3058	X3059	X3060	X3061	X3062	X3063	X3064	X3065	X3066	X3067	X3068	X3069	X3070	X3071	X3072	X3073	X3074	X3075	X3076	X3077	X3078	X3079	X3080	X3081	X3082	X3083	X3084	X3085	X3086	X3087	X3088	X3089	X3090	X3091	X3092	X3093	X3094	X3095	X3096	X3097	X3098	X3099	X3100	X3101	X3102	X3103	X3104	X3105	X3106	X3107	X3108	X3109	X3110	X3111	X3112	X3113	X3114	X3115	X3116	X3117	X3118	X3119	X3120	X3121	X3122	X3123	X3124	X3125	X3126	X3127	X3128	X3129	X3130	X3131	X3132	X3133	X3134	X3135	X3136	X3137	X3138	X3139	X3140	X3141	X3142	X3143	X3144	X3145	X3146	X3147	X3148	X3149	X3150	X3151	X3152	X3153	X3154	X3155	X3156	X3157	X3158	X3159	X3160	X3161	X3162	X3163	X3164	X3165	X3166	X3167	X3168	X3169	X3170	X3171	X3172	X3173	X3174	X3175	X3176	X3177	X3178	X3179	X3180	X3181	X3182	X3183	X3184	X3185	X3186	X3187	X3188	X3189	X3190	X3191	X3192	X3193	X3194	X3195	X3196	X3197	X3198	X3199	X3200	X3201	X3202	X3203	X3204	X3205	X3206	X3207	X3208	X3209	X3210	X3211	X3212	X3213	X3214	X3215	X3216	X3217	X3218	X3219	X3220	X3221	X3222	X3223	X3224	X3225	X3226	X3227	X3228	X3229	X3230	X3231	X3232	X3233	X3234	X3235	X3236	X3237	X3238	X3239	X3240	X3241	X3242	X3243	X3244	X3245	X3246	X3247	X3248	X3249	X3250	X3251	X3252	X3253	X3254	X3255	X3256	X3257	X3258	X3259	X3260	X3261	X3262	X3263	X3264	X3265	X3266	X3267	X3268	X3269	X3270	X3271	X3272	X3273	X3274	X3275	X3276	X3277	X3278	X3279	X3280	X3281	X3282	X3283	X3284	X3285	X3286	X3287	X3288	X3289	X3290	X3291	X3292	X3293	X3294	X3295	X3296	X3297	X3298	X3299	X3300	X3301	X3302	X3303	X3304	X3305	X3306	X3307	X3308	X3309	X3310	X3311	X3312	X3313	X3314	X3315	X3316	X3317	X3318	X3319	X3320	X3321	X3322	X3323	X3324	X3325	X3326	X3327	X3328	X3329	X3330	X3331	X3332	X3333	X3334	X3335	X3336	X3337	X3338	X3339	X3340	X3341	X3342	X3343	X3344	X3345	X3346	X3347	X3348	X3349	X3350	X3351	X3352	X3353	X3354	X3355	X3356	X3357	X3358	X3359	X3360	X3361	X3362	X3363	X3364	X3365	X3366	X3367	X3368	X3369	X3370	X3371	X3372	X3373	X3374	X3375	X3376	X3377	X3378	X3379	X3380	X3381	X3382	X3383	X3384	X3385	X3386	X3387	X3388	X3389	X3390	X3391	X3392	X3393	X3394	X3395	X3396	X3397	X3398	X3399	X3400	X3401	X3402	X3403	X3404	X3405	X3406	X3407	X3408	X3409	X3410	X3411	X3412	X3413	X3414	X3415	X3416	X3417	X3418	X3419	X3420	X3421	X3422	X3423	X3424	X3425	X3426	X3427	X3428	X3429	X3430	X3431	X3432	X3433	X3434	X3435	X3436	X3437	X3438	X3439	X3440	X3441	X3442	X3443	X3444	X3445	X3446	X3447	X3448	X3449	X3450	X3451	X3452	X3453	X3454	X3455	X3456	X3457	X3458	X3459	X3460	X3461	X3462	X3463	X3464	X3465	X3466	X3467	X3468	X3469	X3470	X3471	X3472	X3473	X3474	X3475	X3476	X3477	X3478	X3479	X3480	X3481	X3482	X3483	X3484	X3485	X3486	X3487	X3488	X3489	X3490	X3491	X3492	X3493	X3494	X3495	X3496	X3497	X3498	X3499	X3500	X3501	X3502	X3503	X3504	X3505	X3506	X3507	X3508	X3509	X3510	X3511	X3512	X3513	X3514	X3515	X3516	X3517	X3518	X3519	X3520	X3521	X3522	X3523	X3524	X3525	X3526	X3527	X3528	X3529	X3530	X3531	X3532	X3533	X3534	X3535	X3536	X3537	X3538	X3539	X3540	X3541	X3542	X3543	X3544	X3545	X3546	X3547	X3548	X3549	X3550	X3551	X3552	X3553	X3554	X3555	X3556	X3557	X3558	X3559	X3560	X3561	X3562	X3563	X3564	X3565	X3566	X3567	X3568	X3569	X3570	X3571	X3572	X3573	X3574	X3575	X3576	X3577	X3578	X3579	X3580	X3581	X3582	X3583	X3584	X3585	X3586	X3587	X3588	X3589	X3590	X3591	X3592	X3593	X3594	X3595	X3596	X3597	X3598	X3599	X3600	X3601	X3602	X3603	X3604	X3605	X3606	X3607	X3608	X3609	X3610	X3611	X3612	X3613	X3614	X3615	X3616	X3617	X3618	X3619	X3620	X3621	X3622	X3623	X3624	X3625	X3626	X3627	X3628	X3629	X3630	X3631	X3632	X3633	X3634	X3635	X3636	X3637	X3638	X3639	X3640	X3641	X3642	X3643	X3644	X3645	X3646	X3647	X3648	X3649	X3650	X3651	X3652	X3653	X3654	X3655	X3656	X3657	X3658	X3659	X3660	X3661	X3662	X3663	X3664	X3665	X3666	X3667	X3668	X3669	X3670	X3671	X3672	X3673	X3674	X3675	X3676	X3677	X3678	X3679	X3680	X3681	X3682	X3683	X3684	X3685	X3686	X3687	X3688	X3689	X3690	X3691	X3692	X3693	X3694	X3695	X3696	X3697	X3698	X3699	X3700	X3701	X3702	X3703	X3704	X3705	X3706	X3707	X3708	X3709	X3710	X3711	X3712	X3713	X3714	X3715	X3716	X3717	X3718	X3719	X3720	X3721	X3722	X3723	X3724	X3725	X3726	X3727	X3728	X3729	X3730	X3731	X3732	X3733	X3734	X3735	X3736	X3737	X3738	X3739	X3740	X3741	X3742	X3743	X3744	X3745	X3746	X3747	X3748	X3749	X3750	X3751	X3752	X3753	X3754	X3755	X3756	X3757	X3758	X3759	X3760	X3761	X3762	X3763	X3764	X3765	X3766	X3767	X3768	X3769	X3770	X3771	X3772	X3773	X3774	X3775	X3776	X3777	X3778	X3779	X3780	X3781	X3782	X3783	X3784	X3785	X3786	X3787	X3788	X3789	X3790	X3791	X3792	X3793	X3794	X3795	X3796	X3797	X3798	X3799	X3800	X3801	X3802	X3803	X3804	X3805	X3806	X3807	X3808	X3809	X3810	X3811	X3812	X3813	X3814	X3815	X3816	X3817	X3818	X3819	X3820	X3821	X3822	X3823	X3824	X3825	X3826	X3827	X3828	X3829	X3829	X3830	X3831	X3832	X3833	X3834	X3835	X3836	X3837	X3838	X3839	X3840	X3841	X3842	X3843	X3844	X3845	X3846	X3847	X3848	X3849	X3850	X3851	X3852	X3853	X3854	X3855	X3856	X3857	X3858	X3859	X3860	X3861	X3862	X3863	X3864	X3865	X3866	X3867	X3868	X3869	X3870	X3871	X3872	X3873	X3874	X3875	X3876	X3877	X3878	X3879	X3880	X3881	X3882	X3883	X3884	X3885	X3886	X3887	X3888	X3889	X3890	X3891	X3892	X3893	X3894	X3895	X3896	X3897	X3898	X3899	X3900	X3901	X3902	X3903	X3904	X3905	X3906	X3907	X3908	X3909	X3910	X3911	X3912	X3913	X3914	X3915	X3916	X3917	X3918	X3919	X3920	X3921	X3922	X3923	X3924	X3925	X3926	X3927	X3928	X3929	X3930	X3931	X3932	X3933	X3934	X3935	X3936	X3937	X3938	X3939	X3940	X3941	X3942	X3943	X3944	X3945	X3946	X3947	X3948	X3949	X3950	X3951	X3952	X3953	X3954	X3955	X3956	X3957	X3958	X3959	X3960	X3961	X3962	X3963	X3964	X3965	X3966	X3967	X3968	X3969	X3970	X3971	X3972	X3973	X3974	X3975	X3976	X3977	X3978	X3979	X3980	X3981	X3982	X3983	X3984	X3985	X3986	X3987	X3988	X3989	X3990	X3991	X3992	X3993	X3994	X3995	X3996	X3997	X3998	X3999	X4000	X4001	X4002	X4003	X4004	X4005	X4006	X4007	X4008	X4009	X4010	X4011	X4012	X4013	X4014	X4015	X4016	X4017	X4018	X4019	X4020	X4021	X4022	X4023	X4024	X4025	X4026	X4027	X4028	X4029	X4030	X4031	X4032	X4033	X4034	X4035	X4036	X4037	X4038	X4039	X4040	X4041	X4042	X4043	X4044	X4045	X4046	X4047	X4048	X4049	X4050	X4051	X4052	X4053	X4054	X4055	X4056	X4057	X4058	X4059	X4060	X4061	X4062	X4063	X4064	X4065	X4066	X4067	X4068	X4069	X4070	X4071	X4072	X4073	X4074	X4075	X4076	X4077	X4078	X4079	X4080	X4081	X4082	X4083	X4084	X4085	X4086	X4087	X4088	X4089	X4090	X4091	X4092	X4093	X4094	X4095	X4096	X4097	X4098	X4099	X4100	X4101	X4102	X4103	X4104	X4105	X4106	X4107	X4108	X4109	X4110	X4111	X4112	X4113	X4114	X4115	X4116	X4117	X4118	X4119	X4120	X4121	X4122	X4123	X4124	X4125	X4126	X4127	X4128	X4129	X4130	X4131	X4132	X4133	X4134	X4135	X4136	X4137	X4138	X4139	X4140	X4141	X4142	X4143	X4144	X4145	X4146	X4147	X4148	X4149	X4150	X4151	X4152	X4153	X4154	X4155	X4156	X4157	X4158	X4159	X4160	X4161	X4162	X4163	X4164	X4165	X4166	X4167	X4168	X4169	X4170	X4171	X4172	X4173	X4174	X4175	X4176	X4177	X4178	X4179	X4180	X4181	X4182	X4183	X4184	X4185	X4186	X4187	X4188	X4189	X4190	X4191	X4192	X4193	X4194	X4195	X4196





## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C4	Depositor
Number of particles used	791956	Depositor
Resolution determination method	OTHER	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI POLARA 300	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	50	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.486	Depositor
Minimum map value	-0.257	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.027	Depositor
Recommended contour level	0.16	Depositor
Map size (Å)	502.0, 502.0, 502.0	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.255, 1.255, 1.255	Depositor

## 5 Model quality i

### 5.1 Standard geometry i

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

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
1	A	0.33	0/834	0.59	0/1123
1	F	0.33	0/834	0.59	0/1123
1	H	0.33	0/834	0.59	0/1123
1	J	0.33	0/834	0.59	0/1123
2	B	0.34	0/25428	0.58	6/34534 (0.0%)
2	E	0.34	0/25428	0.58	6/34534 (0.0%)
2	G	0.34	0/25428	0.58	6/34534 (0.0%)
2	I	0.34	0/25428	0.58	6/34534 (0.0%)
All	All	0.34	0/105048	0.58	24/142628 (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
2	B	0	23
2	E	0	23
2	G	0	23
2	I	0	23
All	All	0	92

There are no bond length outliers.

The worst 5 of 24 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	1667	LEU	CA-CB-CG	6.02	129.15	115.30
2	G	1667	LEU	CA-CB-CG	6.02	129.14	115.30
2	B	1667	LEU	CA-CB-CG	5.99	129.08	115.30
2	B	719	LEU	CA-CB-CG	5.98	129.06	115.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	719	LEU	CA-CB-CG	5.98	129.06	115.30

There are no chirality outliers.

5 of 92 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	B	137	LEU	Peptide
2	B	1676	LEU	Peptide
2	B	194	SER	Peptide
2	B	240	ASP	Peptide
2	B	808	TYR	Peptide

## 5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	818	0	824	18	0
1	F	818	0	824	20	0
1	H	818	0	824	18	0
1	J	818	0	824	20	0
2	B	29369	0	24713	491	0
2	E	29369	0	24712	503	0
2	G	29369	0	24716	502	0
2	I	29369	0	24713	489	0
3	B	1	0	0	0	0
3	E	1	0	0	0	0
3	G	1	0	0	0	0
3	I	1	0	0	0	0
4	B	1	0	0	0	0
4	E	1	0	0	0	0
4	G	1	0	0	0	0
4	I	1	0	0	0	0
All	All	120756	0	102150	2033	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 9.

The worst 5 of 2033 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:G:4859:PHE:HA	2:G:4862:PHE:CD2	1.88	1.08
2:G:4859:PHE:HA	2:G:4862:PHE:HD2	1.28	0.97
2:E:4859:PHE:HA	2:E:4862:PHE:CD2	2.05	0.92
2:E:4859:PHE:HA	2:E:4862:PHE:HD2	1.43	0.83
2:G:4859:PHE:CA	2:G:4862:PHE:HD2	1.99	0.73

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	105/107 (98%)	95 (90%)	10 (10%)	0	100	100
1	F	105/107 (98%)	95 (90%)	10 (10%)	0	100	100
1	H	105/107 (98%)	95 (90%)	10 (10%)	0	100	100
1	J	105/107 (98%)	95 (90%)	10 (10%)	0	100	100
2	B	3235/4687 (69%)	2848 (88%)	382 (12%)	5 (0%)	47	81
2	E	3235/4687 (69%)	2849 (88%)	381 (12%)	5 (0%)	47	81
2	G	3235/4687 (69%)	2848 (88%)	382 (12%)	5 (0%)	47	81
2	I	3235/4687 (69%)	2850 (88%)	380 (12%)	5 (0%)	47	81
All	All	13360/19176 (70%)	11775 (88%)	1565 (12%)	20 (0%)	54	85

5 of 20 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	1708	ARG
2	E	1708	ARG
2	G	1708	ARG
2	I	1708	ARG

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Mol	Chain	Res	Type
2	B	1932	PRO

### 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	88/88 (100%)	88 (100%)	0	100	100
1	F	88/88 (100%)	88 (100%)	0	100	100
1	H	88/88 (100%)	88 (100%)	0	100	100
1	J	88/88 (100%)	88 (100%)	0	100	100
2	B	2493/3209 (78%)	2473 (99%)	20 (1%)	81	89
2	E	2493/3209 (78%)	2473 (99%)	20 (1%)	81	89
2	G	2493/3209 (78%)	2472 (99%)	21 (1%)	81	89
2	I	2493/3209 (78%)	2473 (99%)	20 (1%)	81	89
All	All	10324/13188 (78%)	10243 (99%)	81 (1%)	82	89

5 of 81 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	G	4913	ARG
2	I	4034	ASN
2	G	4984	ASN
2	I	1141	ARG
2	I	4798	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 164 such sidechains are listed below:

Mol	Chain	Res	Type
2	G	4130	ASN
2	I	1719	HIS
2	G	4984	ASN
2	I	379	HIS

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
2	I	3889	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 monosaccharides in this entry.

### 5.6 Ligand geometry [i](#)

Of 8 ligands modelled in this entry, 8 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

### 5.7 Other polymers [i](#)

There are no such residues in this entry.

### 5.8 Polymer linkage issues [i](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
2	B	12
2	I	12

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Number of breaks
2	E	12
2	G	12

The worst 5 of 48 chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	B	3613:UNK	C	3639:THR	N	44.41
1	I	3613:UNK	C	3639:THR	N	44.36
1	E	3613:UNK	C	3639:THR	N	44.35
1	G	3613:UNK	C	3639:THR	N	44.35
1	B	3163:UNK	C	3170:UNK	N	16.42

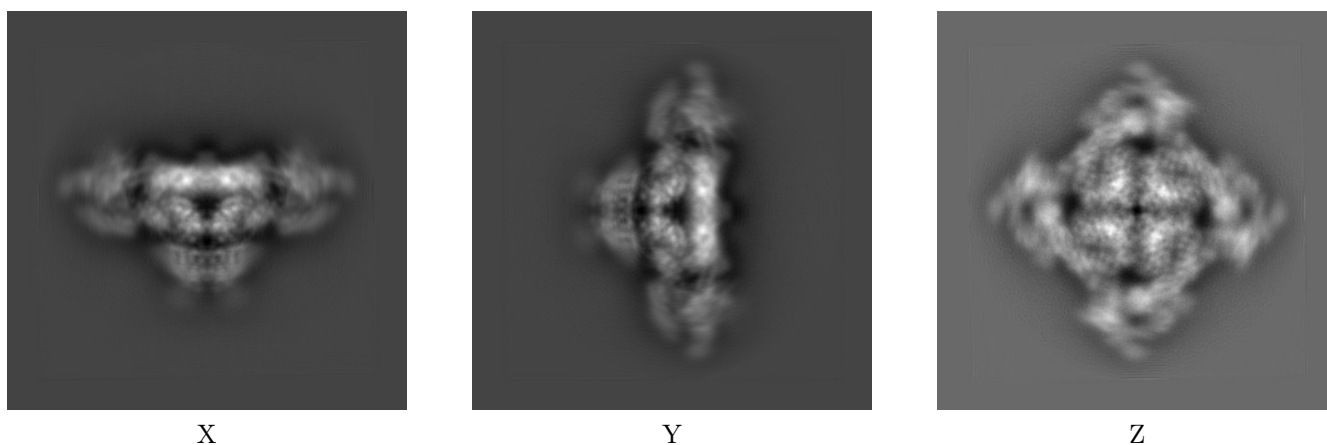
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-22394. These allow visual inspection of the internal detail of the map and identification of artifacts.

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

### 6.1 Orthogonal projections [i](#)

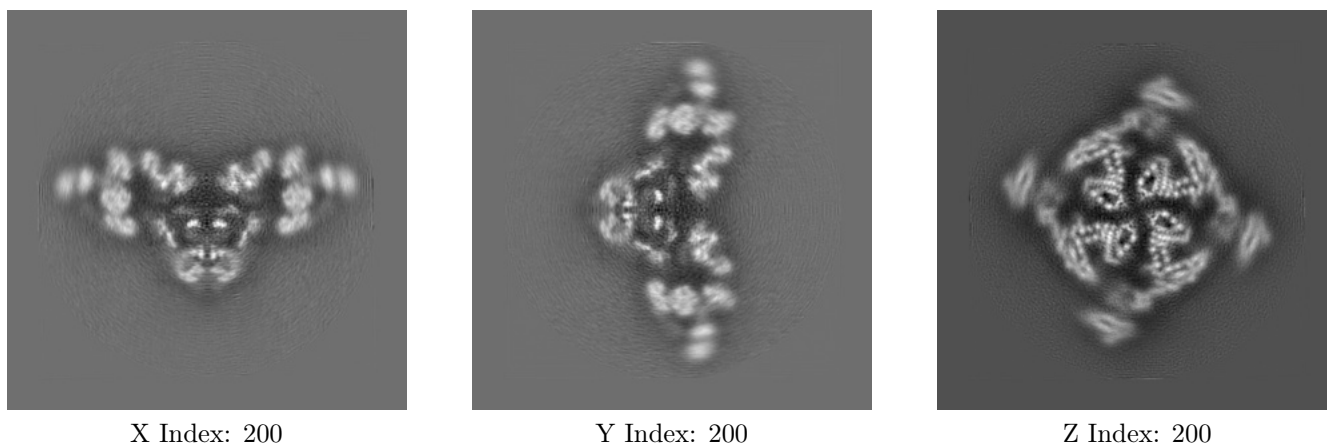
#### 6.1.1 Primary map



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

### 6.2 Central slices [i](#)

#### 6.2.1 Primary map

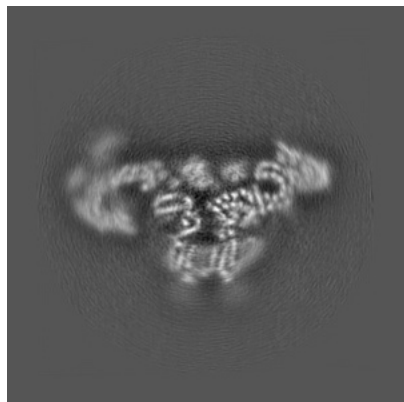




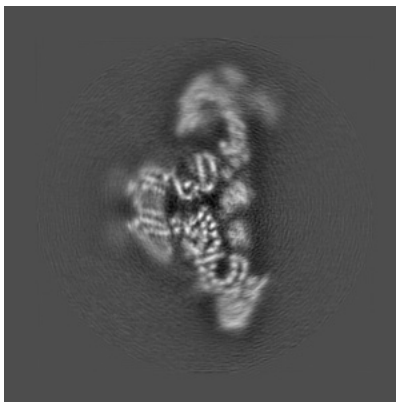
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

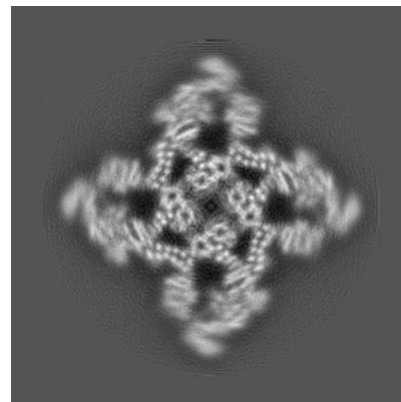
### 6.3.1 Primary map



X Index: 177



Y Index: 177



Z Index: 227

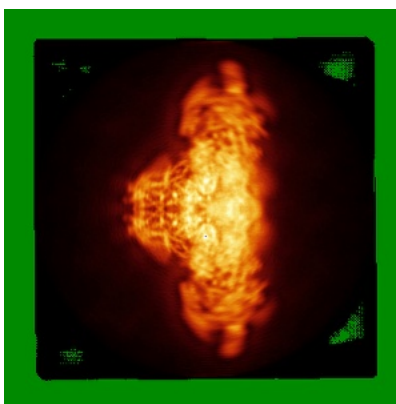
The images above show the largest variance slices of the map in three orthogonal directions.

## 6.4 Orthogonal standard-deviation projections (False-color) [i](#)

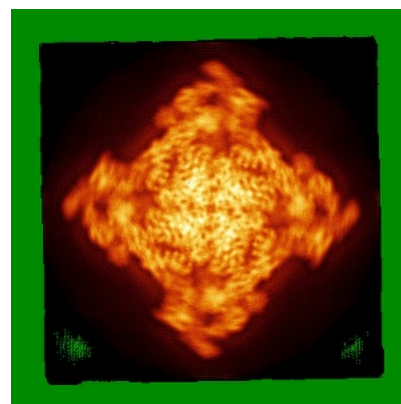
### 6.4.1 Primary map



X



Y



Z

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

## 6.5 Orthogonal surface views [i](#)

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.16. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

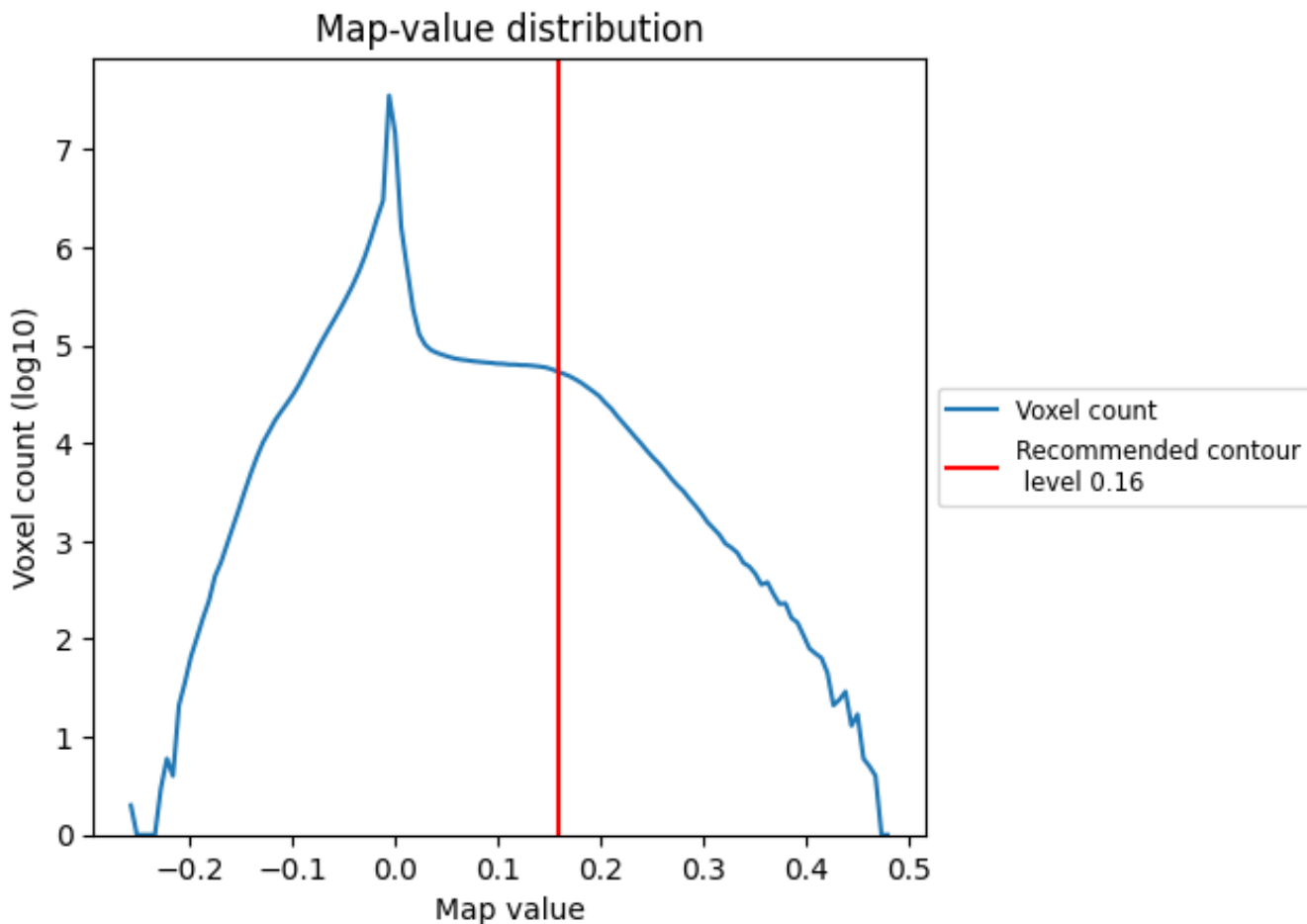
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

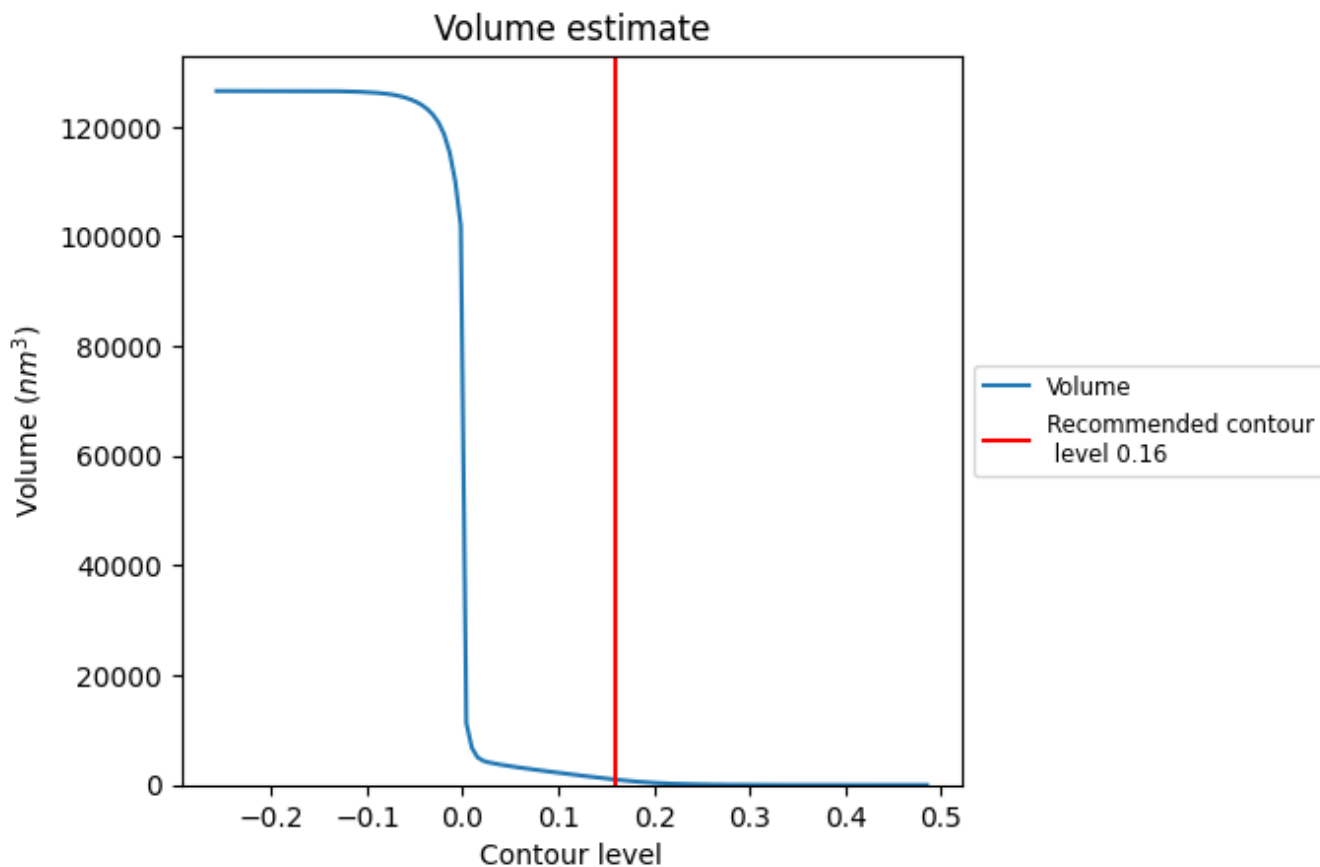
This section contains the results of statistical analysis of the map.

### 7.1 Map-value distribution [i](#)



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.

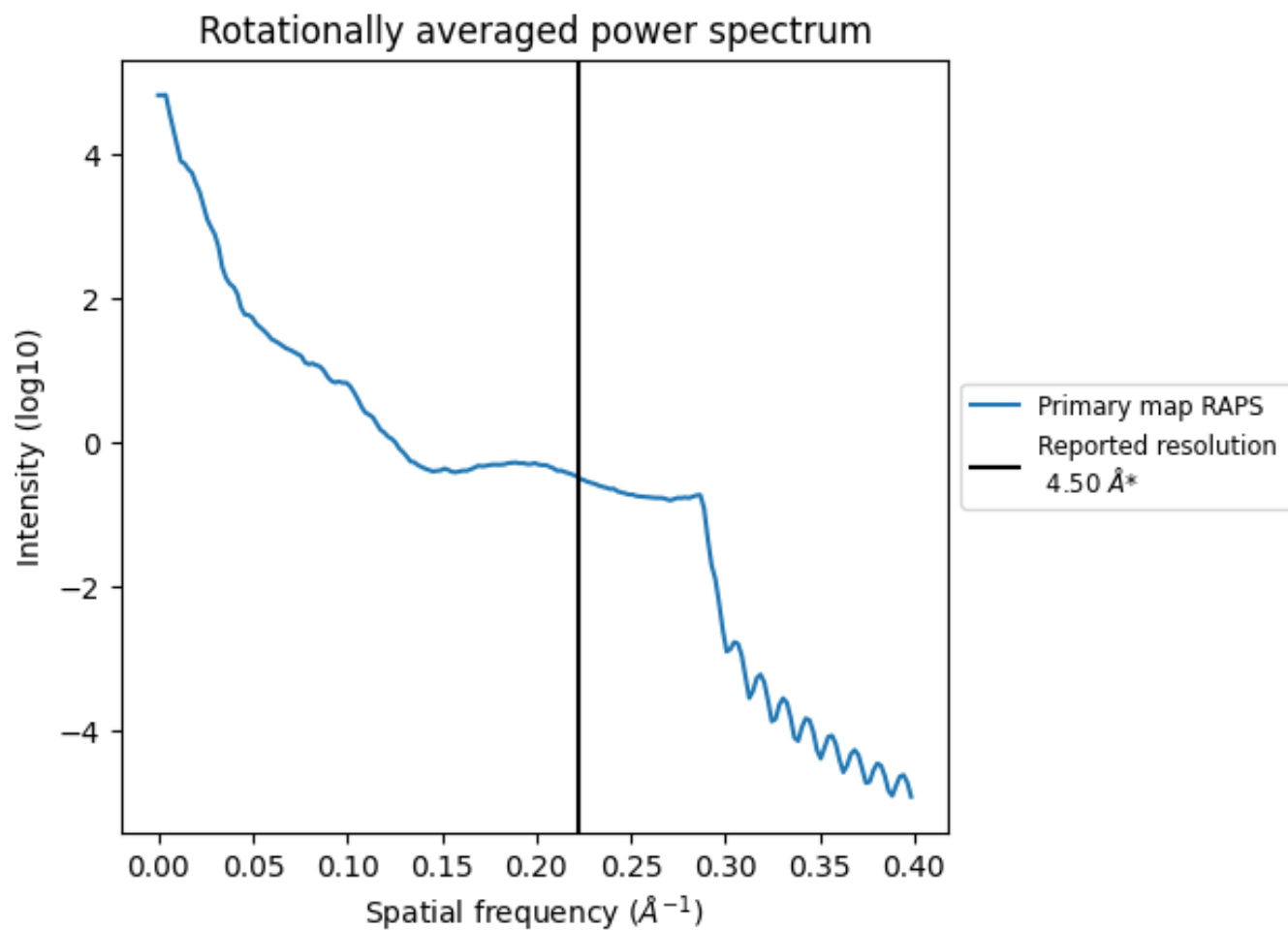
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 979  $\text{nm}^3$ ; this corresponds to an approximate mass of 884 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  $0.222 \text{\AA}^{-1}$

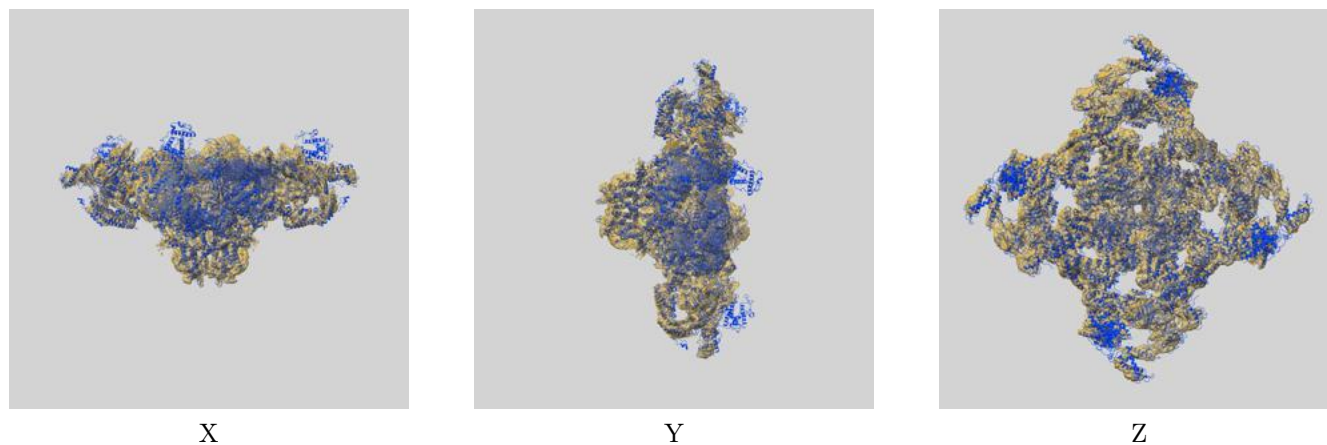
## 8 Fourier-Shell correlation

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

## 9 Map-model fit [i](#)

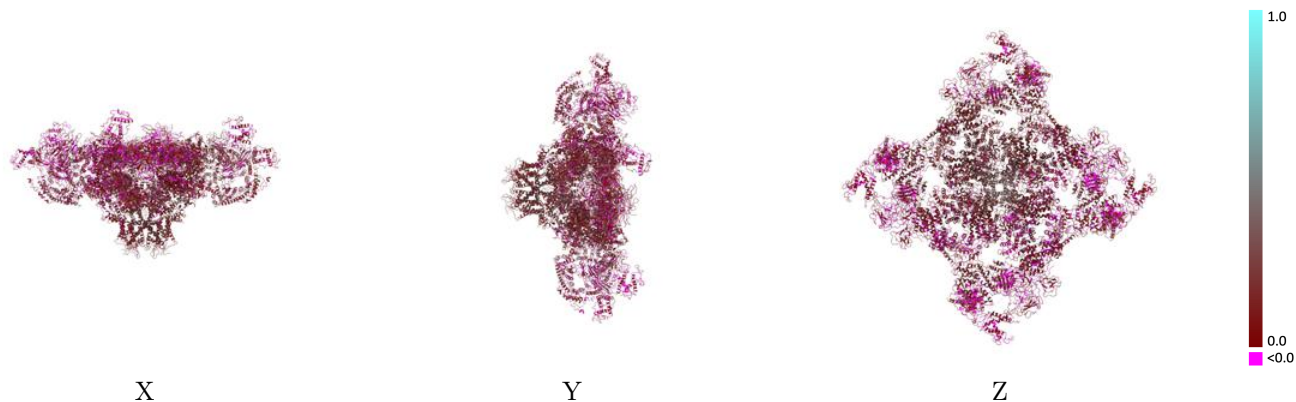
This section contains information regarding the fit between EMDB map EMD-22394 and PDB model 7JMH. Per-residue inclusion information can be found in section 3 on page 5.

### 9.1 Map-model overlay [i](#)



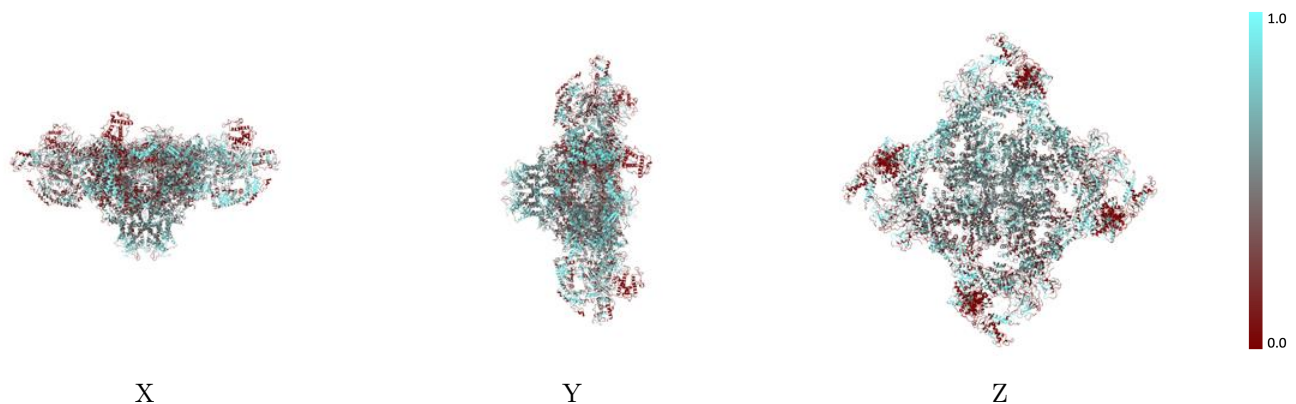
The images above show the 3D surface view of the map at the recommended contour level 0.16 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

## 9.2 Q-score mapped to coordinate model [\(i\)](#)



The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

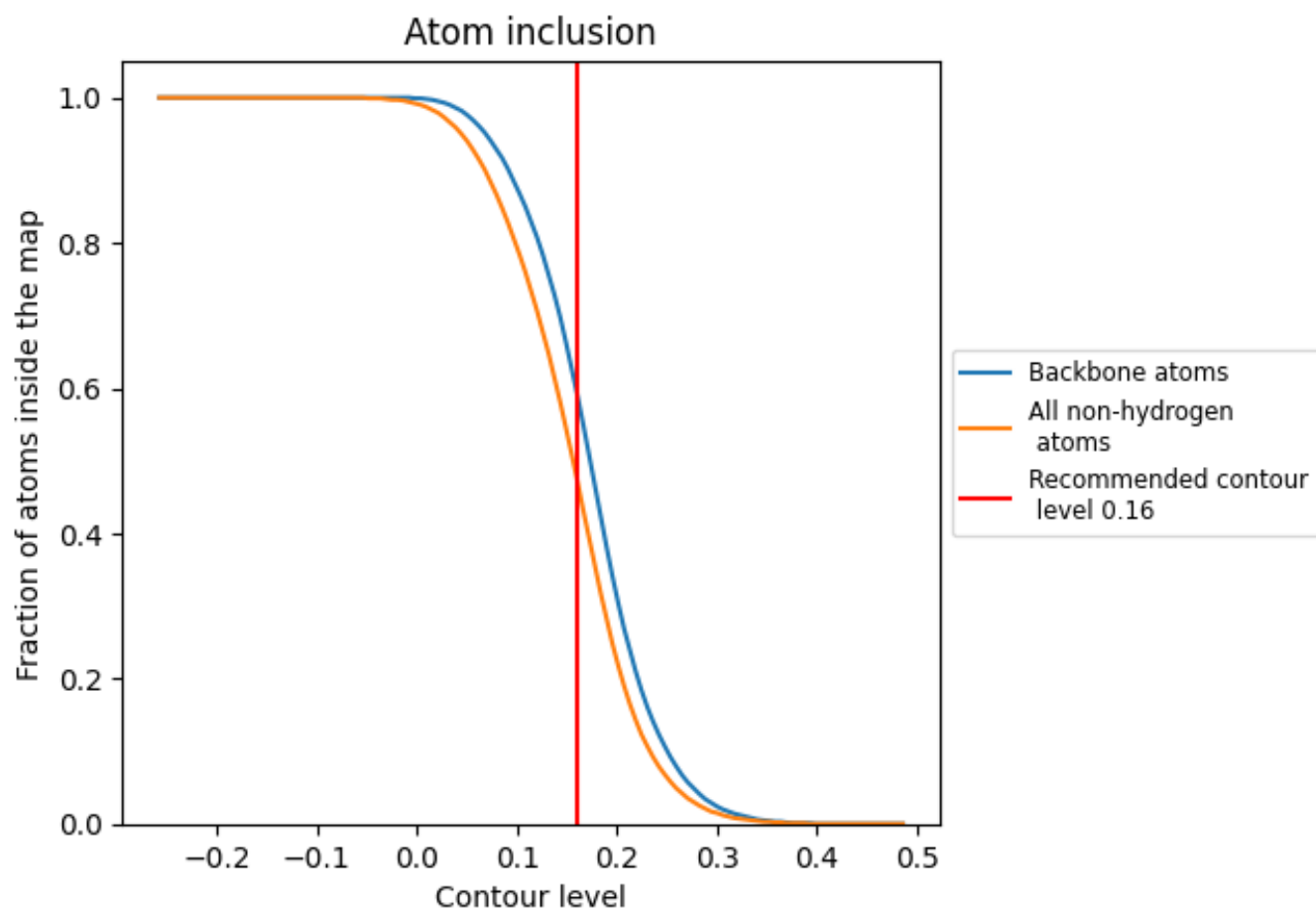
## 9.3 Atom inclusion mapped to coordinate model [\(i\)](#)



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 (0.16).





















## 9.4 Atom inclusion [i](#)



At the recommended contour level, 59% of all backbone atoms, 48% 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 (0.16) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.4750	 0.1320
A	 0.5620	 0.1390
B	 0.5150	 0.1680
E	 0.4810	 0.1330
F	 0.4890	 0.1070
G	 0.4450	 0.1070
H	 0.4530	 0.1190
I	 0.4560	 0.1230
J	 0.4690	 0.1180

