



wwPDB EM Validation Summary Report ⓘ

Jun 23, 2022 – 10:27 pm BST

PDB ID : 7R5K
EMDB ID : EMD-14322
Title : Human nuclear pore complex (constricted)
Authors : Mosalaganti, S.; Obarska-Kosinska, A.; Siggel, M.; Taniguchi, R.; Turonova, B.; Zimmerli, C.E.; Buczak, K.; Schmidt, F.H.; Margiotta, E.; Mackmull, M.T.; Hagen, W.J.H.; Hummer, G.; Kosinski, J.; Beck, M.
Deposited on : 2022-02-10
Resolution : 12.00 Å(reported)

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

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

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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

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

EMDB validation analysis : 0.0.1.dev8
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.29

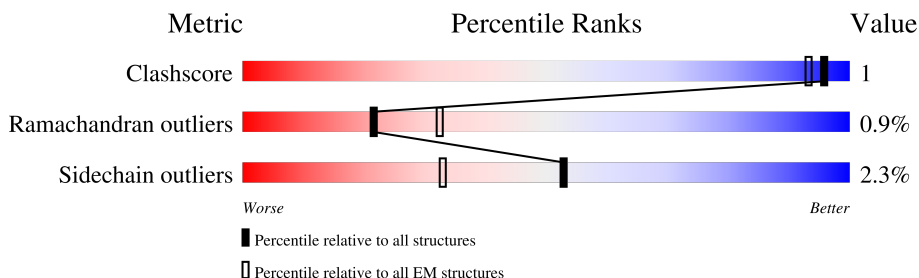
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 12.00 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 ≥ 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	00	3224	
1	01	3224	
1	02	3224	
1	03	3224	
1	04	3224	
2	10	1887	
2	11	1887	
2	12	1887	

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Mol	Chain	Length	Quality of chain
2	13	1887	96% 92% 5%
2	14	1887	97% 92% 5%
2	15	1887	97% 92% 5%
2	16	1887	96% 92% 5%
2	17	1887	96% 92% 5%
3	40	546	25% 65% 5% 30%
3	41	546	17% 65% 5% 30%
4	A0	819	31% 89% 9%
4	A1	819	27% 90% 9%
4	A2	819	31% 90% 9%
4	A3	819	54% 91% 8%
4	A4	819	44% 80% 8% 11%
4	A5	819	24% 81% 7% 11%
4	A6	819	36% 81% 7% 11%
5	B0	1749	26% 94% 6%
5	B1	1749	44% 94% 6%
6	C0	2012	33% 93% 7%
6	C1	2012	35% 93% 7%
6	C2	2012	20% 93% 6%
6	C3	2012	19% 91% 8%
6	C4	2012	39% 93% 6%
7	D0	1391	36% 87% 7% 6%
7	D1	1391	65% 85% 8% 6%
7	D2	1391	38% 87% 7% 6%
7	D3	1391	64% 86% 7% 6%

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Mol	Chain	Length	Quality of chain
7	D4	1391	34% 87% 7% 6%
7	D5	1391	56% 86% 8% 6%
8	E0	674	50% 77% 19%
8	E1	674	38% 78% 19%
9	F0	326	44% 58% 14% 26%
9	F1	326	35% 65% 8% 26%
9	F2	326	42% 61% 10% 26%
9	F3	326	41% 63% 9% 26%
10	H0	507	25% 70% 6% 24%
10	H1	507	24% 70% 5% 24%
10	H2	507	21% 71% 5% 24%
10	H3	507	22% 70% 6% 24%
11	I0	599	10% 27% 71%
11	I1	599	28% 71%
11	I2	599	10% 28% 71%
11	I3	599	28% 71%
12	J0	522	6% 31% 67%
12	J1	522	10% 31% 67%
12	J2	522	6% 31% 67%
12	J3	522	11% 31% 67%
12	J4	522	19% 31% 67%
13	K0	1156	31% 86% 8% 6%
13	K1	1156	32% 87% 7% 6%
13	K2	1156	51% 87% 7% 6%
13	K3	1156	48% 86% 7% 6%

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Mol	Chain	Length	Quality of chain
14	L0	925	10% 78% 6% 15%
14	L1	925	18% 77% 7% 15%
14	L2	925	25% 78% 6% 15%
14	L3	925	23% 78% 5% 15%
15	M0	937	10% 65% 6% 28%
15	M1	937	9% 65% 6% 28%
15	M2	937	17% 65% 6% 28%
15	M3	937	15% 66% 6% 28%
16	N0	322	14% 87% 7% 7%
16	N1	322	6% 88% 5% 7%
16	N2	322	30% 89% 5% 7%
16	N3	322	13% 88% 6% 7%
17	O0	360	. 84% 6% 10%
17	O1	360	17% 84% 5% 10%
17	O2	360	18% 83% 6% 10%
17	O3	360	27% 82% 7% 10%
18	P0	656	16% 91% 8%
18	P1	656	21% 91% 8% .
18	P2	656	27% 92% 7% .
18	P3	656	32% 92% 7% .
19	Q0	380	15% 87% . 9%
19	Q1	380	8% 88% . 9%
19	Q2	380	27% 86% . 9%
19	Q3	380	16% 88% . 9%
20	R0	1436	16% 89% 8% .

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Mol	Chain	Length	Quality of chain
20	R1	1436	22% 89% 7% . .
20	R2	1436	37% 89% 8% .
20	R3	1436	44% 90% 7% .
21	S0	326	40% 93% 6% .
21	S1	326	22% 93% 5% . .
21	S2	326	41% 93% 5% . .
21	S3	326	36% 92% 6% .
22	T0	2266	25% 41% . 56%
22	T1	2266	35% 42% . 56%
23	U0	880	14% 15% . 83%
23	U1	880	. . 98%
23	U2	880	. . 98%
23	U3	880	. . 98%
23	U4	880	. . 98%
23	U5	880	. . 98%
23	U6	880	. . 98%
24	V0	2090	8% 12% . 87%
25	W0	741	46% 91% 8% .

2 Entry composition [i](#)

There are 25 unique types of molecules in this entry. The entry contains 617133 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 E3 SUMO-protein ligase RanBP2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	00	756	Total 6085	C 3866	N 1045	O 1147	S 27	0	0
1	01	756	Total 6085	C 3866	N 1045	O 1147	S 27	0	0
1	02	756	Total 6085	C 3866	N 1045	O 1147	S 27	0	0
1	03	756	Total 6085	C 3866	N 1045	O 1147	S 27	0	0
1	04	756	Total 6085	C 3866	N 1045	O 1147	S 27	0	0

- Molecule 2 is a protein called Nuclear pore membrane glycoprotein 210.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	10	1831	Total 14046	C 8947	N 2406	O 2644	S 49	0	0
2	11	1831	Total 14046	C 8947	N 2406	O 2644	S 49	0	0
2	12	1831	Total 14046	C 8947	N 2406	O 2644	S 49	0	0
2	13	1831	Total 14046	C 8947	N 2406	O 2644	S 49	0	0
2	14	1831	Total 14046	C 8947	N 2406	O 2644	S 49	0	0
2	15	1831	Total 14046	C 8947	N 2406	O 2644	S 49	0	0
2	16	1831	Total 14046	C 8947	N 2406	O 2644	S 49	0	0
2	17	1831	Total 14046	C 8947	N 2406	O 2644	S 49	0	0

- Molecule 3 is a protein called Aladin.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	40	383	2922	1864	509	533	16	0	0
3	41	383	2922	1864	509	533	16	0	0

- Molecule 4 is a protein called Nuclear pore complex protein Nup93.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	A0	818	6568	4136	1145	1259	28	0	0
4	A1	818	6568	4136	1145	1259	28	0	0
4	A2	818	6568	4136	1145	1259	28	0	0
4	A3	818	6568	4136	1145	1259	28	0	0
4	A4	726	5860	3705	1018	1109	28	0	0
4	A5	726	5860	3705	1018	1109	28	0	0
4	A6	726	5860	3705	1018	1109	28	0	0

- Molecule 5 is a protein called Nucleoporin NUP188 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	B0	1748	13746	8743	2353	2559	91	0	0
5	B1	1748	13746	8743	2353	2559	91	0	0

- Molecule 6 is a protein called Nuclear pore complex protein Nup205.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	C0	2011	16013	10208	2753	2965	87	0	0
6	C1	2011	16013	10208	2753	2965	87	0	0
6	C2	2011	16013	10208	2753	2965	87	0	0
6	C3	2011	16013	10208	2753	2965	87	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
6	C4	2011	Total	C	N	O	S	0	0
			16013	10208	2753	2965	87		

- Molecule 7 is a protein called Nuclear pore complex protein Nup155.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	D0	1312	Total	C	N	O	S	0	0
			10363	6569	1786	1949	59		
7	D1	1312	Total	C	N	O	S	0	0
			10363	6569	1786	1949	59		
7	D2	1312	Total	C	N	O	S	0	0
			10363	6569	1786	1949	59		
7	D3	1312	Total	C	N	O	S	0	0
			10363	6569	1786	1949	59		
7	D4	1312	Total	C	N	O	S	0	0
			10363	6569	1786	1949	59		
7	D5	1312	Total	C	N	O	S	0	0
			10363	6569	1786	1949	59		

- Molecule 8 is a protein called Nucleoporin NDC1.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	E0	548	Total	C	N	O	S	0	0
			4432	2923	729	758	22		
8	E1	548	Total	C	N	O	S	0	0
			4432	2923	729	758	22		

- Molecule 9 is a protein called Nucleoporin NUP35.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	F0	241	Total	C	N	O	S	0	0
			1837	1154	313	359	11		
9	F1	241	Total	C	N	O	S	0	0
			1837	1154	313	359	11		
9	F2	241	Total	C	N	O	S	0	0
			1837	1154	313	359	11		
9	F3	241	Total	C	N	O	S	0	0
			1837	1154	313	359	11		

- Molecule 10 is a protein called Nucleoporin p54.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	H0	383	Total	C	N	O	S	0	0
			3066	1921	544	592	9		
10	H1	383	Total	C	N	O	S	0	0
			3066	1921	544	592	9		
10	H2	383	Total	C	N	O	S	0	0
			3066	1921	544	592	9		
10	H3	383	Total	C	N	O	S	0	0
			3066	1921	544	592	9		

- Molecule 11 is a protein called Nucleoporin p58/p45.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	I0	173	Total	C	N	O	S	0	0
			1398	881	245	267	5		
11	I1	173	Total	C	N	O	S	0	0
			1398	881	245	267	5		
11	I2	173	Total	C	N	O	S	0	0
			1398	881	245	267	5		
11	I3	173	Total	C	N	O	S	0	0
			1398	881	245	267	5		

- Molecule 12 is a protein called Nuclear pore glycoprotein p62.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	J0	171	Total	C	N	O	S	0	0
			1403	872	243	285	3		
12	J1	171	Total	C	N	O	S	0	0
			1403	872	243	285	3		
12	J2	171	Total	C	N	O	S	0	0
			1403	872	243	285	3		
12	J3	171	Total	C	N	O	S	0	0
			1403	872	243	285	3		
12	J4	171	Total	C	N	O	S	0	0
			1403	872	243	285	3		

- Molecule 13 is a protein called Nuclear pore complex protein Nup133.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	K0	1086	Total	C	N	O	S	0	0
			8574	5420	1425	1692	37		
13	K1	1086	Total	C	N	O	S	0	0
			8574	5420	1425	1692	37		

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Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	K2	1086	Total 8574	C 5420	N 1425	O 1692	S 37	0	0
13	K3	1086	Total 8574	C 5420	N 1425	O 1692	S 37	0	0

- Molecule 14 is a protein called Nuclear pore complex protein Nup107.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
14	L0	782	Total 6383	C 4064	N 1079	O 1208	S 32	0	0
14	L1	782	Total 6383	C 4064	N 1079	O 1208	S 32	0	0
14	L2	782	Total 6383	C 4064	N 1079	O 1208	S 32	0	0
14	L3	782	Total 6383	C 4064	N 1079	O 1208	S 32	0	0

- Molecule 15 is a protein called Nuclear pore complex protein Nup96.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
15	M0	673	Total 5461	C 3467	N 964	O 1004	S 26	0	0
15	M1	673	Total 5461	C 3467	N 964	O 1004	S 26	0	0
15	M2	673	Total 5461	C 3467	N 964	O 1004	S 26	0	0
15	M3	673	Total 5461	C 3467	N 964	O 1004	S 26	0	0

- Molecule 16 is a protein called Protein SEC13 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
16	N0	301	Total 2352	C 1479	N 409	O 452	S 12	0	0
16	N1	301	Total 2352	C 1479	N 409	O 452	S 12	0	0
16	N2	301	Total 2352	C 1479	N 409	O 452	S 12	0	0
16	N3	301	Total 2352	C 1479	N 409	O 452	S 12	0	0

- Molecule 17 is a protein called Nucleoporin SEH1.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	O0	323	Total	C	N	O	S	0	0
			2528	1584	452	475	17		
17	O1	323	Total	C	N	O	S	0	0
			2528	1584	452	475	17		
17	O2	323	Total	C	N	O	S	0	0
			2528	1584	452	475	17		
17	O3	323	Total	C	N	O	S	0	0
			2528	1584	452	475	17		

- Molecule 18 is a protein called Nuclear pore complex protein Nup85.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	P0	655	Total	C	N	O	S	0	0
			5257	3341	898	982	36		
18	P1	655	Total	C	N	O	S	0	0
			5257	3341	898	982	36		
18	P2	655	Total	C	N	O	S	0	0
			5257	3341	898	982	36		
18	P3	655	Total	C	N	O	S	0	0
			5257	3341	898	982	36		

- Molecule 19 is a protein called Nucleoporin Nup43.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	Q0	345	Total	C	N	O	S	0	0
			2703	1690	474	527	12		
19	Q1	345	Total	C	N	O	S	0	0
			2703	1690	474	527	12		
19	Q2	345	Total	C	N	O	S	0	0
			2703	1690	474	527	12		
19	Q3	345	Total	C	N	O	S	0	0
			2703	1690	474	527	12		

- Molecule 20 is a protein called Nuclear pore complex protein Nup160.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	R0	1399	Total	C	N	O	S	0	0
			11132	7093	1878	2088	73		
20	R1	1399	Total	C	N	O	S	0	0
			11132	7093	1878	2088	73		
20	R2	1399	Total	C	N	O	S	0	0
			11132	7093	1878	2088	73		

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Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
20	R3	1399	11132	7093	1878	2088	73	0	0

- Molecule 21 is a protein called Nucleoporin Nup37.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
21	S0	322	2552	1626	436	475	15	0	0
21	S1	322	2552	1626	436	475	15	0	0
21	S2	322	2552	1626	436	475	15	0	0
21	S3	322	2552	1626	436	475	15	0	0

- Molecule 22 is a protein called Protein ELYS.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
22	T0	1004	7960	5069	1359	1490	42	0	0
22	T1	1004	7960	5069	1359	1490	42	0	0

- Molecule 23 is a protein called Nuclear pore complex protein Nup98.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
23	U0	150	1193	756	205	229	3	0	0
23	U1	19	151	98	27	26		0	0
23	U2	19	151	98	27	26		0	0
23	U3	19	151	98	27	26		0	0
23	U4	19	151	98	27	26		0	0
23	U5	19	151	98	27	26		0	0
23	U6	19	151	98	27	26		0	0

- Molecule 24 is a protein called Nuclear pore complex protein Nup214.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
24	V0	273	2203	1376	398	423	6	0	0

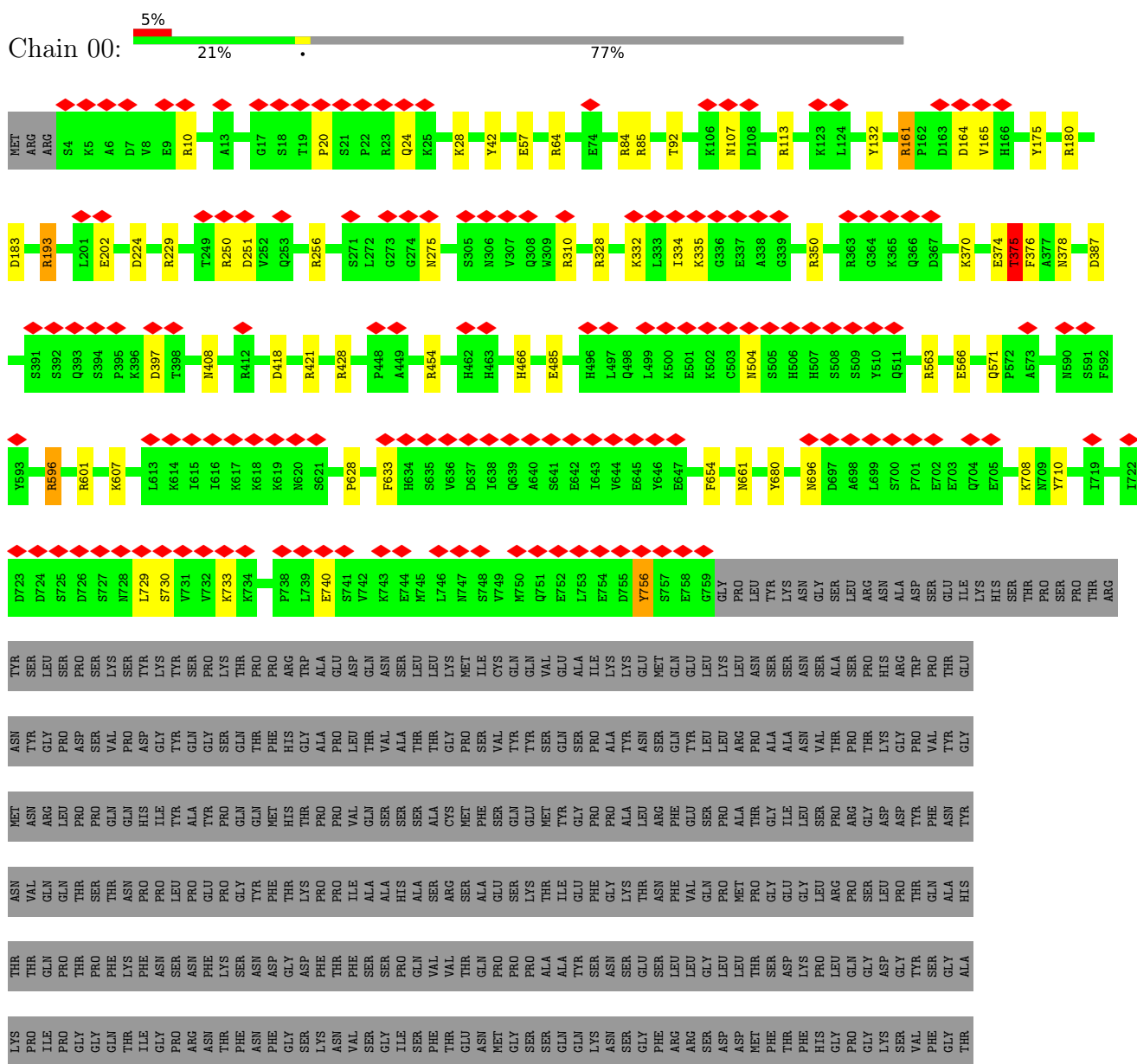
- Molecule 25 is a protein called Nuclear pore complex protein Nup88.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
25	W0	735	5836	3714	988	1103	31	0	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: E3 SUMO-protein ligase RanBP2

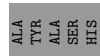
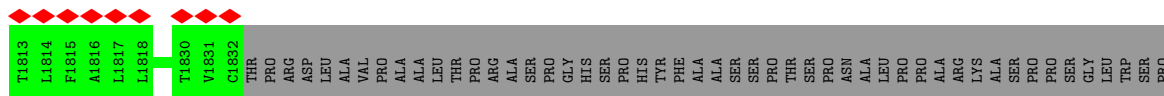


R454	H466	E485	N604	A643	A549	L553	R663	E566	Q571	Y593	R596	R601	K607	K619	I626	D627	P628	F633	Q639	A640	S641	F654	N661	K675	Y680	H688	M696	K708	N709	Y710	L711	R712	R715	D716					
I719	K720	I721	I722	D723	D724	S725	D726	S727	N728	L729	S730	V731	V732	K733	K734	L735	P736	V737	L738	L739	E740	S741	V742	K743	E744	M745	L746	N747	M750	Q751	E752	L753	E754	Y755	S757	E758	G759		
THR	PRO	THR	THR	THR	THR	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	
THR	PRO	THR	THR	THR	THR	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	
HIS	ARG	TRP	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR		
LYS	GLY	PRO	VAL	THR	GLY	ARG	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR		
ASP	ASP	THR	PHE	ASN	TYR	ALA	THR	ASN	THR	ASN	THR	ASN	THR	ASN	THR	ASN	THR	ASN	THR	ASN	THR	ASN	THR	ASN	THR	ASN	THR	ASN	THR	ASN	THR	ASN	THR	ASN	THR	ASN	THR	ASN	
LEU	PRO	THR	GLN	ALA	HIS	THR	THR	GLN	THR	GLN	THR	GLN	THR	GLN	THR	GLN	THR	GLN	THR	GLN	THR	GLN	THR	GLN	THR	GLN	THR	GLN	THR	GLN	THR	GLN	THR	GLN	THR	GLN	THR	GLN	
ASP	GLY	THR	VAL	SER	ILE	LEU	THR	ILE	THR	ILE	THR	ILE	THR	ILE	THR	ILE	THR	ILE	THR	ILE	THR	ILE	THR	ILE	THR	ILE	THR	ILE	THR	ILE	THR	ILE	THR	ILE	THR	ILE	THR	ILE	
LYS	SER	VAL	PHE	GLY	THR	PRO	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR		
ALA	LYS	LEU	PHE	ARG	GLY	THR	VAL	ASP	THR	VAL	ASP	THR	VAL	ASP	THR	VAL	ASP	THR	VAL	ASP	THR	VAL	ASP	THR	VAL	ASP	THR	VAL	ASP	THR	VAL	ASP	THR	VAL	ASP	THR	VAL	ASP	
GLY	SER	ASP	ARG	SER	PHE	VAL	THR	HIS	THR	TRP	THR	HIS	THR	TRP	THR	HIS	THR	TRP	THR	HIS	THR	TRP	THR	HIS	THR	TRP	THR	HIS	THR	TRP	THR	HIS	THR	TRP	THR	HIS	THR		
ALA	VAL	ARG	ILE	VAL	GLY	PRO	THR	ASP	THR	ASP	THR	ASP	THR	ASP	THR	ASP	THR	ASP	THR	ASP	THR	ASP	THR	ASP	THR	ASP	THR	ASP	THR	ASP	THR	ASP	THR	ASP	THR	ASP	THR	ASP	
ASN	PRO	SER	ASN	GLY	LEU	VAL	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	THR	GLY	
GLN	ASN	THR	LYS	SER	GLY	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL
CYS	ALA	ALA	CYS	GLN	ASN	PRO	THR	LEU	THR	ILE	THR	ILE	THR	ILE	THR	ILE	THR	ILE	THR	ILE	THR	ILE	THR	ILE	THR	ILE	THR	ILE	THR	ILE	THR	ILE	THR	ILE	THR	ILE	THR	ILE	THR
ASN	THR	ARG	CYS	VAL	ALA	CYS	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR
ASN	GLY	ALA	SER	THR	LYS	CYS	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR
GLU	ALA	SER	THR	THR	LYS	ILE	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR	VAL	THR
ALA	SER	THR	THR	CYS	ILE	ALA	THR	GLN	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR
LEU	LYS	SER	VAL	CYS	ILE	ALA	THR	GLN	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR

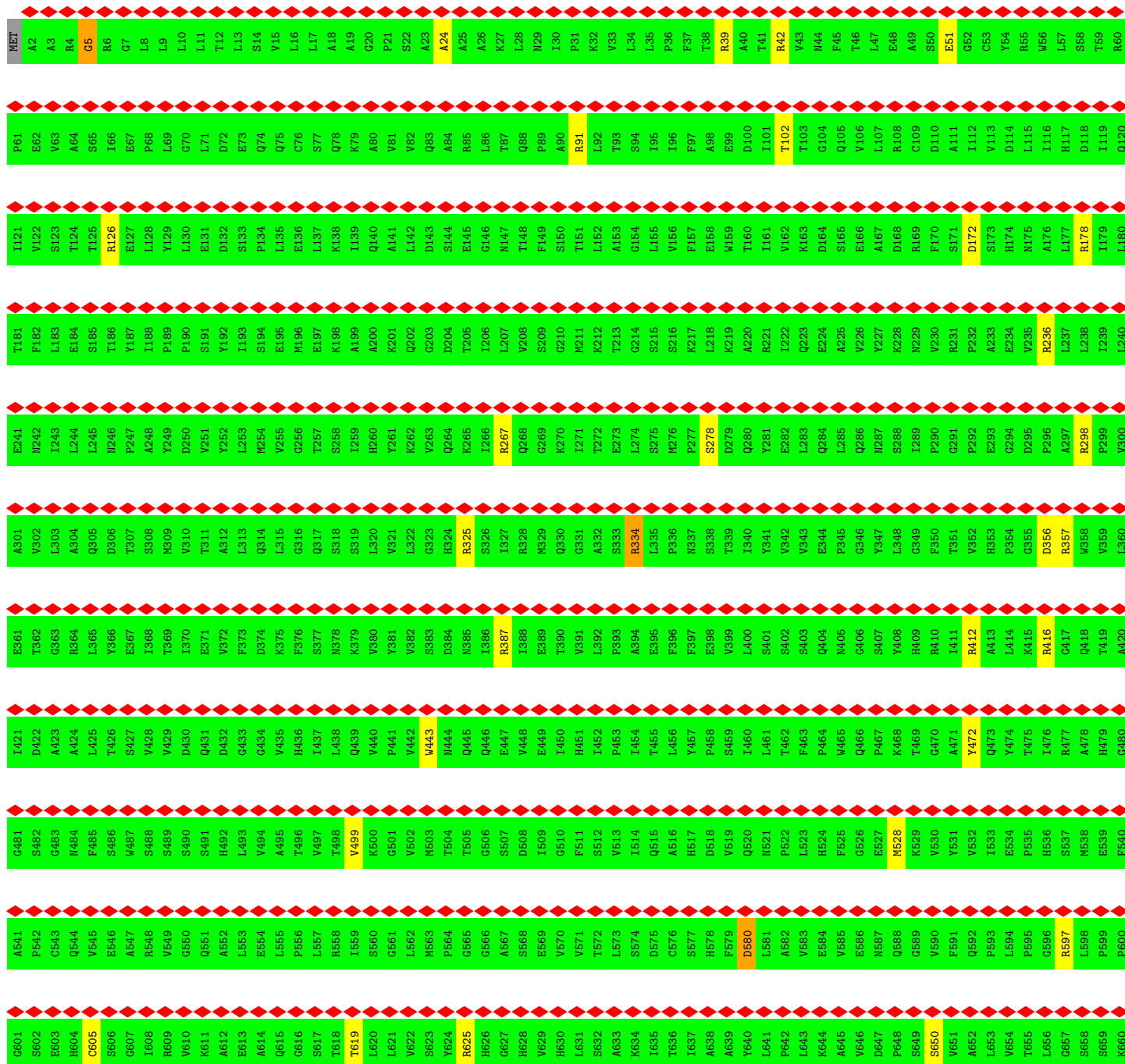
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ASP	LEU	SER	LYS	MET	CYS	GLN	VAL	GLU	ALA	ILE	LYS	PRO	GLY	LEU	LEU	ASN	ALA	ASN	GLU	ILE	LYS	PRO	SER	THR	ARG	ASN	SER	LYS	G662	N663	TYR	LYS	TYR	SER	PRO	LYS	PRO	GLN	LYS	THR	THR	PRO	ARG	ALA	ASP	GLN												
VAL	ALA	THR	THR	GLY	PRO	TYR	VAL	GLN	VAL	ILE	LYS	PRO	ALA	LEU	LEU	ASN	ALA	ASN	VAL	THR	PRO	THR	THR	THR	ASN	TYR	ASN	GLN	HIS	ILE	GLY	TYR	TYR	PRO	GLN	GLN	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR										
SER	SER	ALA	THR	MET	PHE	GLN	GLY	GLY	PRO	PRO	ALA	ALA	ARG	PHE	GLY	LEU	LEU	LEU	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR								
ALA	HIS	ALA	SER	ARG	ALA	GLU	SER	LYS	THR	THR	LYS	THR	ASN	PHE	VAL	GLN	LEU	LEU	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR						
SER	PRO	GLN	VAL	THR	THR	PRO	PRO	ALA	THR	THR	ASN	SER	ARG	PHE	VAL	GLY	LEU	LEU	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR						
GLY	ILE	SER	PHE	THR	GLY	MET	SER	SER	THR	THR	ASN	SER	PHE	ARG	ARG	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR					
ASP	GLY	PRO	HIS	PHE	THR	VAL	VAL	LEU	VAL	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR					
GLY	LYS	ILE	ARG	LEU	MET	ARG	ARG	GLU	VAL	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR					
PRO	GLU	LYS	ALA	ALA	PHE	CYS	LYS	GLN	THR	THR	SER	SER	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR					
VAL	ALA	LYS	GLY	GLY	TRP	CYS	THR	SER	THR	THR	SER	SER	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR				
PHE	ALA	LEU	VAL	THR	LYS	GLY	GLY	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR				
ILE	ASN	ASP	PHE	ARG	VAL	PHE	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR				
THR	SER	THR	THR	LEU	GLY	PHE	GLY	ASP	THR	THR	LYS	LYS	GLY	GLY	TRP	GLN	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR			
THR	SER	ALA	PRO	ALA	PRO	LYS	THR	THR	GLY	GLY	MET	THR	THR	THR	LYS	GLY	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR		
SER	GLY	THR	LYS	PRO	LYS	SER	PHE	GLY	THR	THR	PHE	THR	THR	THR	LYS	GLY	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR		
GLU	THR	SER	ALA	PRO	LYS	SER	PHE	GLY	THR	THR	PHE	THR	THR	THR	LYS	GLY	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	
SER	LYS	ALA	PRO	LYS	GLY	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR		
LYS	LEU	HIS	ASP	SER	SER	GLY	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR

E241	A301	E361	I421	G481	A541	G601	E661	A721	S781	G841	E901	L961
N242	V302	T362	D422	S482	P642	S602	M662	L722	H782	L842	V902	C962
I243	L303	G363	A423	G483	C543	E603	L663	S723	R783	Q843	T903	L963
L244	A304	R364	A424	M484	Q644	H604	F664	V724	N784	A844	I904	V964
L245	Q305	L365	L425	F485	V545	C605	E665	G725	F785	I845	Y905	F965
N246	D306	Y366	T426	S486	E546	S606	G666	N726	R786	L846	N906	P966
P247	T307	E367	S427	M487	A547	G607	G667	K727	L787	V847	H907	A967
A248	S308	I368	V428	S488	R548	1608	P668	P728	D788	H848	P908	P968
Y249	M309	V369	V429	S489	V549	R609	R669	S729	L789	E849	G909	A969
D250	V310	I370	D430	S490	G550	V610	P670	L730	A790	A850	I910	K970
V251	T311	E371	Q431	S491	Q551	K611	M671	T731	A791	S851	Q911	A971
Y252	A312	V372	D432	H492	A552	A612	I672	N732	Y792	G852	A912	V972
L253	L313	F373	G433	L493	L553	E613	L673	P733	D793	T853	E913	V973
M254	Q314	D374	G434	V494	E554	A614	E674	F734	Q794	T854	L914	Y974
V255	L315	K375	V435	A495	L555	Q615	P675	P735	E795	A855	R915	V975
G256	G316	F376	H436	T496	P556	G616	S676	A736	G796	T856	I916	S976
T257	Q317	S377	I437	V497	L557	S617	K677	V737	R797	T857	R917	D977
S258	S318	N378	L438	T498	R558	T618	F678	E738	R798	A858	E918	I978
I259	S319	K379	Q439	V499	I559	T619	F679	P739	F799	T859	G919	Q979
H260	L320	V380	V440	K500	S560	L620	Q680	A740	D800	A860	S920	E980
Y261	V321	Y381	P441	G501	G561	L621	N681	V741	M801	T861	G921	L981
K262	L322	V382	V442	V502	L562	V622	G682	W742	F802	G862	Y922	Y982
V263	G323	S383	W443	M503	M563	S623	T683	K743	S803	Y863	F923	I983
Q264	H324	D384	M444	T504	P564	V624	A684	F744	S804	Q864	F924	R984
K265	R325	N385	Q445	T505	G565	R625	E685	W745	L805	E865	L925	V985
I266	S326	I386	Q446	G506	G566	G626	D686	C746	S806	S866	N926	V986
R267	I327	R387	E447	S507	A567	G627	T687	A747	I807	H867	T927	D987
Q268	R328	I388	V448	D508	S568	H628	D688	P748	Q808	L868	S928	K988
G269	M329	E389	E449	I509	E569	V629	S689	P749	M809	S869	T929	V989
K270	Q330	T390	I450	G510	V570	H630	I690	S750	E810	S870	A930	E990
I271	G331	Y391	H451	F511	V571	L631	G691	R751	S811	A871	D931	I991
T272	A332	L392	I452	S512	T572	S632	L692	L752	T812	R872	Y932	G992
E273	S333	P393	P453	V513	L573	A633	A693	T753	R813	T873	K933	K993
L274	R334	A394	I454	I514	S574	G634	L694	L754	R814	K874	K934	T994
S275	L335	E395	V455	Q515	D575	I635	F695	A755	W815	Q875	Y935	V995
M276	P336	F396	L456	A516	C576	T636	A696	P756	L816	P876	A936	K996
Z277	N337	F997	Y457	H517	S577	I637	P697	V757	A817	H877	Y937	A997
P278	S338	E398	P458	D518	R578	A638	H698	W758	S818	D878	Q938	Y998
D279	T339	V399	S459	V519	F779	A639	S699	T759	I819	P879	E939	V999
Q280	I340	L400	I460	Q520	D580	Y640	R700	S760	E820	L880	A940	R1000
Y281	Y341	S401	L461	N521	L581	L641	R701	P761	P821	W881	R941	V1001
E282	V342	S402	T462	P522	A582	P642	N702	Q762	E822	L882	Q942	L1002
L283	V343	S403	F463	L523	V583	L643	Y703	L763	L823	L883	Y943	D1003
Q284	E344	Q404	P464	H524	E584	K644	Q704	D764	P824	S884	A944	L1004
L285	P345	N405	W465	F525	V585	A645	Q705	W765	H825	A885	M945	H1005
Q286	G346	G406	Q466	G526	E586	V646	H706	S766	O826	S886	V946	K1006
N287	Y347	S407	P467	E527	N587	D647	W707	C767	L827	I887	H947	K1007
S288	L348	Y408	K468	M528	G588	P648	I708	P768	H828	E888	P948	P1008
I289	G349	H409	T469	K529	G589	S649	L709	L769	S829	L889	L949	F1009
P290	R410	G470	T469	V530	V590	S650	V710	L770	O830	L890	I950	L1010
G291	T351	I411	A471	Y531	F591	M651	T711	Q771	D831	L891	P951	A1011
E292	V352	Y472	Y472	V532	Q592	A652	C712	Q772	D832	V892	Q952	K1012
E293	H353	Q473	Q473	I533	P593	L653	Q713	N773	E833	E893	S953	Y1013
G294	P354	L414	Y474	E534	L594	V654	A714	K774	D834	D894	S954	F1014
D295	G355	K415	T475	P535	P595	T655	L715	Q775	G835	G895	T955	P1015
P296	D356	R416	I476	H536	G596	L656	G716	V776	O836	R896	Y956	F1016
A297	R357	G417	R477	S537	R597	G657	E717	V777	K837	H897	H957	M1017
R298	L358	Q418	A478	M538	L598	S658	Q718	P778	X838	S898	I958	D1018
P299	V359	T419	H479	E539	P599	S659	V719	W779	L839	P899	H959	L1019
V300	L360	A420	G480	F540	P600	K660	I720	S780	H840	E900	D960	K1020

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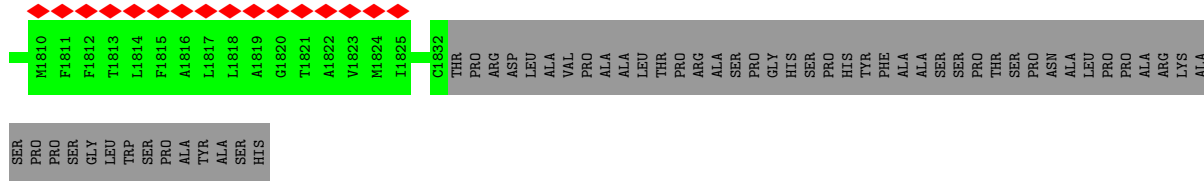
• Molecule 2: Nuclear pore membrane glycoprotein 210



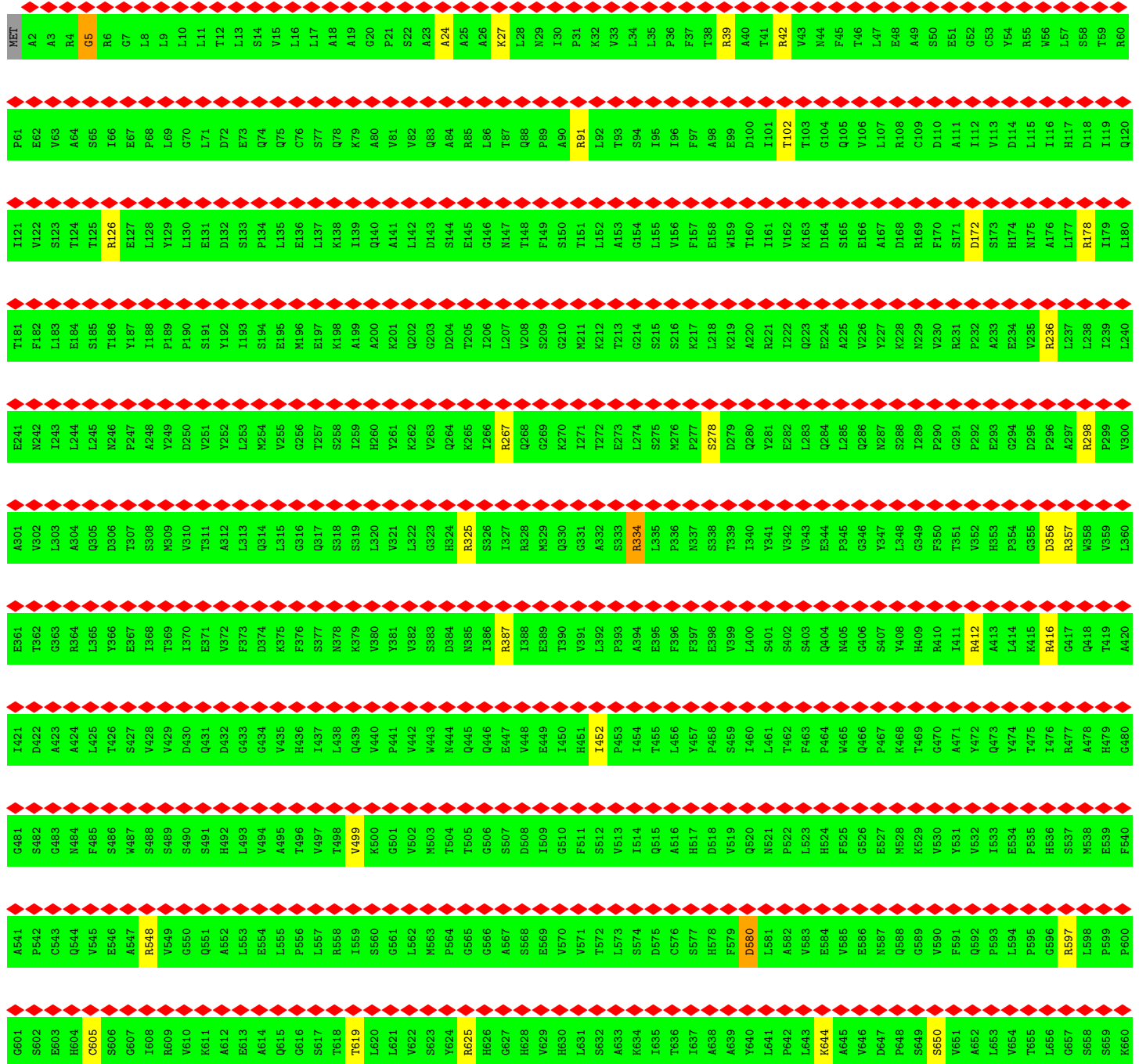
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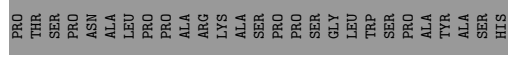
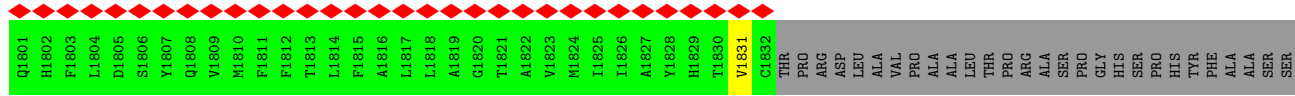
• Molecule 2: Nuclear pore membrane glycoprotein 210



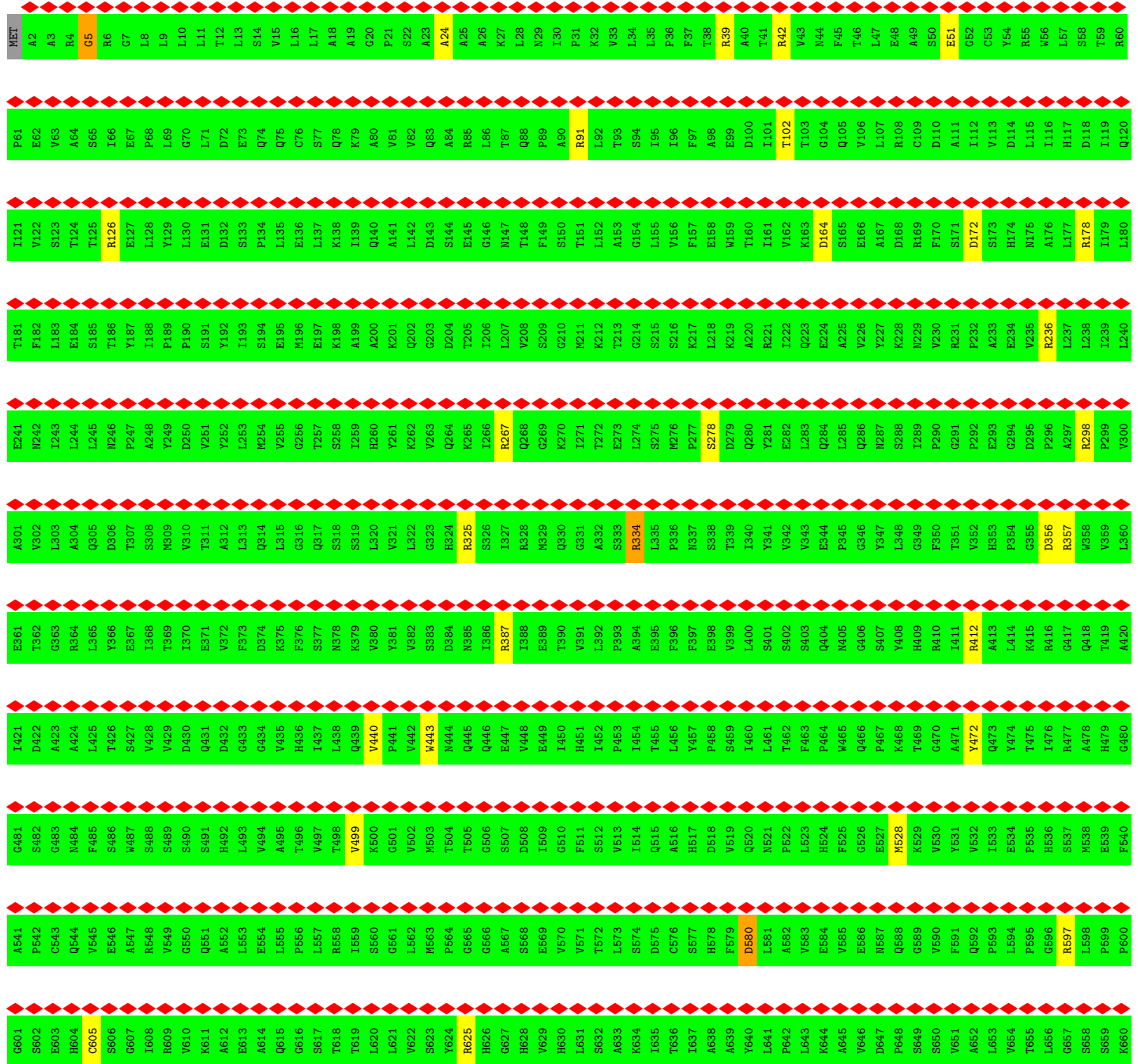
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E241	N242	I243	L244	L245	N246	P247	A248	Y249	D250	V251	Y252	L253	M254	V255	G256	T257	S258	I259	H260	Y261	K262	V263	Q264	K265	I266	R267	Q268	G269	K270	I271	T272	E273	L274	S275	M276	P277	S278	D279	Q280	Y281	E282	L283	Q284	L285	Q286	N287	S288	I289	P290	G291	P292	E293	G294	D295	P296	A297	R298	P299	V300	A301	V302	L303	A304	Q305	D306	T307	S308	M309	V310	T311	A312	L313	Q314	L315	G316	Q317	S318	S319	L320	V321	K322	G323	H324	R325	S326	I327	R328	M329	Q330	G331	A332	S333	R334	L335	P336	N337	S338	T339	I340	Y341	V342	S343	V344	E345	N346	P347	Y347	Y348	H349	G349	F350	T351	V352	H353	L354	P354	G355	K356	R357	S358	V359	L360	E361	T362	G363	R364	L365	V366	S367	I368	V369	I370	E371	V372	F373	D374	K375	L376	F377	N378	K379	V380	Y381	V382	S383	D384	N385	I386	R387	I388	E389	T390	G391	A392	S393	A394	E395	F396	F397	E398	E399	V399	L400	S401	S402	S403	Q404	N405	Q406	S407	Y408	H409	T469	G470	F471	I472	A473	Q473	Y474	L475	K476	R477	Q478	T479	A420	G480	I421	D422	A423	A424	L425	T426	V427	V428	V429	D430	Q431	D432	G433	G434	V435	H436	I437	L438	Q439	V440	P441	V442	V443	M444	Q445	R446	E447	V448	E449	I450	H451	I452	P453	I454	L455	L456	Y457	P458	S459	I460	L461	P462	F463	P464	W465	N405	Q406	S407	Y408	H409	T469	G470	F471	I472	A473	Q473	Y474	L475	K476	R477	Q478	T479	A420	G480	G481	S482	G483	N484	F485	S486	W487	S488	S489	S490	S491	H492	L493	V494	A495	T496	V497	L498	V499	K500	G501	V502	M503	T504	T505	G506	S507	D508	I509	G510	F511	S512	V513	I514	Q515	A516	H517	D518	V519	Q520	N521	P522	L523	H524	F525	G526	E527	N528	K529	V530	Y531	V532	I533	E534	F535	H536	S537	M538	E539	F540	S481	P542	C543	Q544	V545	E546	R548	V549	G550	Q551	A552	L553	E554	L555	P556	L557	R558	I559	S560	G561	L562	M563	P564	G565	G566	A567	S568	E569	V570	V571	T572	L573	S574	D575	C576	S577	H578	A638	A639	D580	L581	A582	V583	E584	V585	E586	N587	Q588	G589	S589	F591	Q592	P593	L594	P595	G596	R597	L598	P599	P600	G601	S602	E603	H604	C605	S606	G607	L608	R609	V610	K611	A612	E613	A614	Q615	G616	S617	T618	T619	L620	L621	V622	S623	V624	R625	G626	G627	H628	V629	H630	L631	S632	A633	K634	I635	T636	I637	A638	A639	V640	L641	P642	L643	K644	A645	V646	V647	P648	S649	V651	A652	L653	V654	T655	L656	G657	S658	S659	K660	E661	M662	L663	F664	E665	G666	G667	R668	R669	P670	M671	L672	L673	E674	P675	S676	K677	F678	F679	Q680	N681	V682	T683	A684	E685	D686	T687	H688	S689	I690	G691	L692	A693	L694	F695	A696	P697	H698	S699	S700	R701	N702	V703	Q704	Q705	H706	V707	I708	L709	V710	T711	C712	Q713	A714	L715	G716	E717	O718	V719	I720	A721	L722	S723	V724	G725	N726	K727	P728	S729	L730	T731	N732	P733	F734	V735	P736	A736	V737	E738	P739	A740	V741	V742	K743	F744	V745	C746	A747	P748	P749	S750	R751	L752	T753	L754	A755	P756	V757	V758	T759	S760	P761	Q762	L763	D764	M765	V766	C767	P768	L769	L770	L771	Q772	N773	K774	Q775	V776	V777	P778	V779	S780	S781	H782	R783	N784	F785	L786	L787	D788	L789	A790	A791	V792	D793	Q794	E795	G796	R797	R798	F799	D800	M801	F802	S803	S804	L805	S806	L807	Q808	M809	E810	S811	T812	R813	L814	V815	L816	A817	S818	L819	E820	P821	E822	L823	P824	H825	S826	L827	S828	S829	D830	D831	D832	E833	D834	G835	O836	K837	L838	L839	H840	G841	L842	Q843	A844	I845	V846	V847	H848	E849	A850	S851	G852	T853	T854	A855	T856	T857	R858	T859	A860	T861	F862	S863	Q864	E865	L866	S867	F868	F869	Q870	N871	V872	T873	T874	K875	F876	V877	V878	A879	P880	V881	P882	S883	K884	Q885	V886	H887	L888	S889	S890	E891	A892	S893	A940	R941	O942	V943	A944	H945	V946	H947	P948	L949	L950	P951	O952	S953	D954	V955	T956	R957	K958	P959	E960

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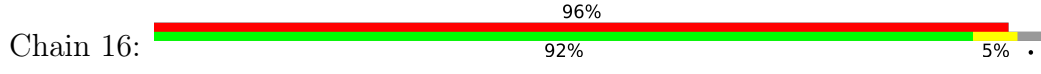
• Molecule 2: Nuclear pore membrane glycoprotein 210



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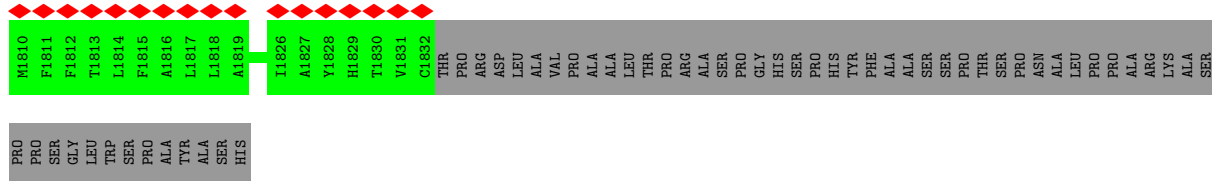
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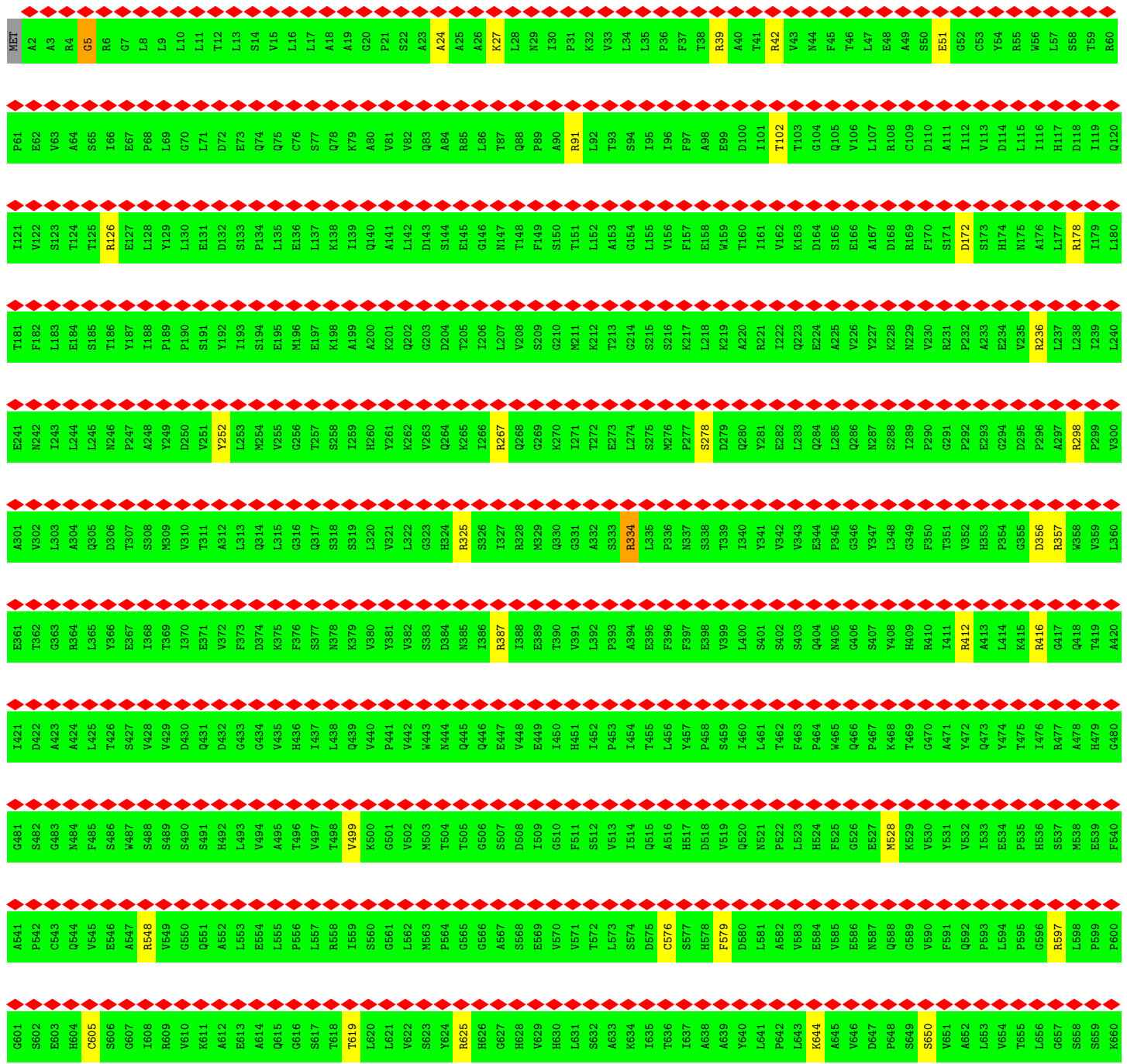
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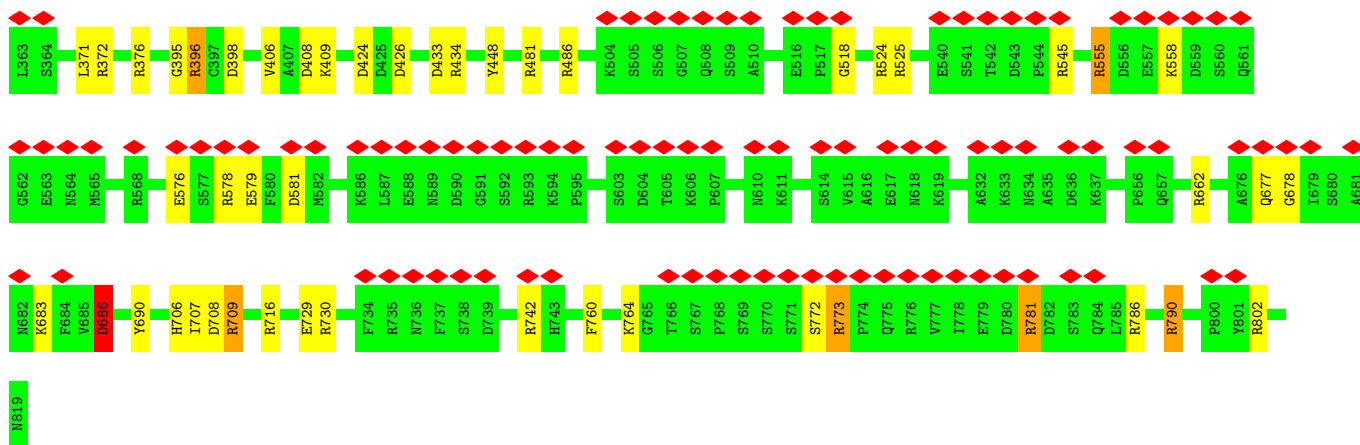
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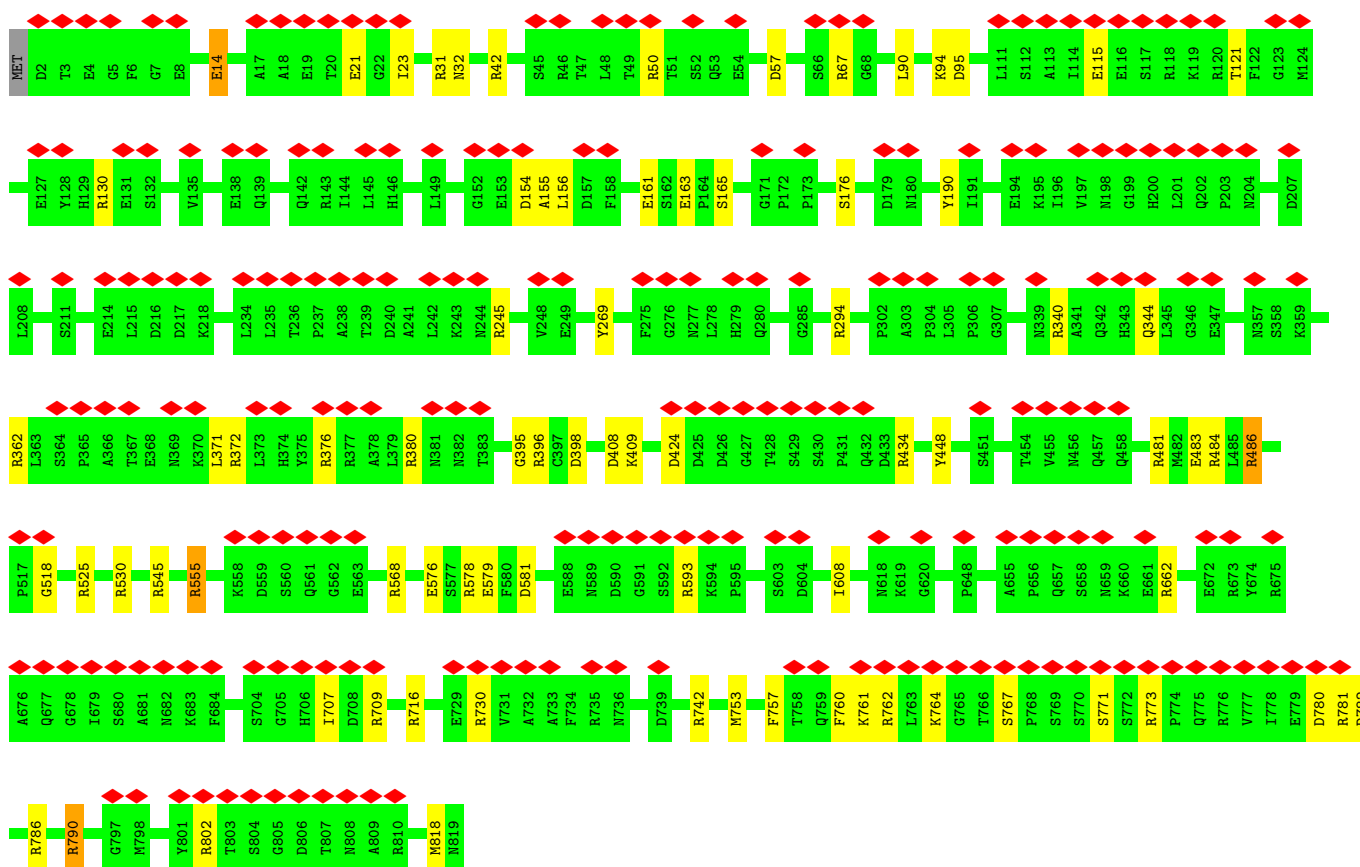
• Molecule 2: Nuclear pore membrane glycoprotein 210



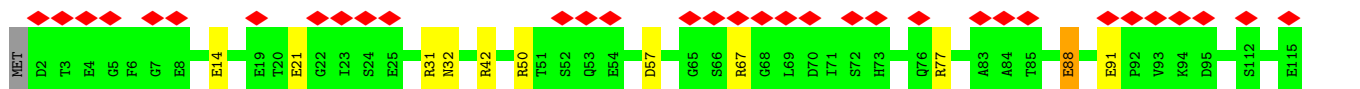
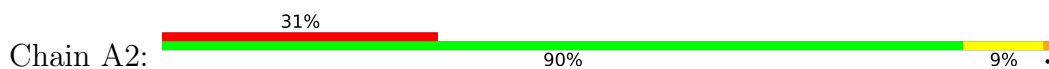
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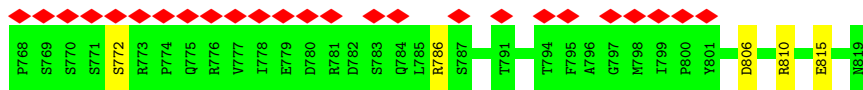


• Molecule 4: Nuclear pore complex protein Nup93

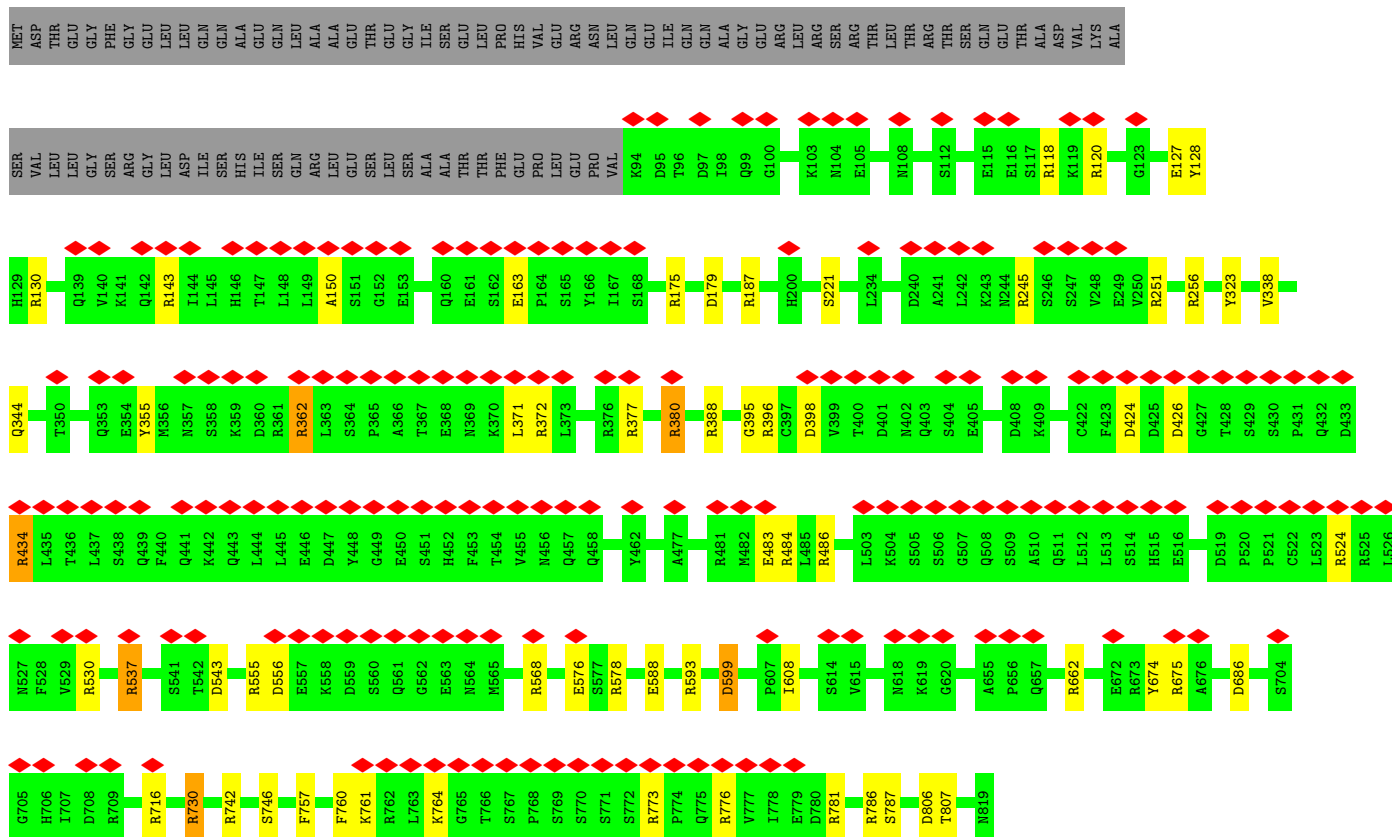
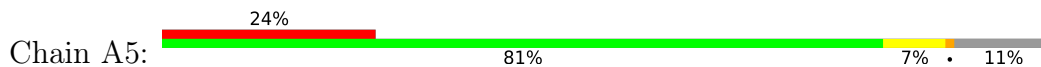


• Molecule 4: Nuclear pore complex protein Nup93

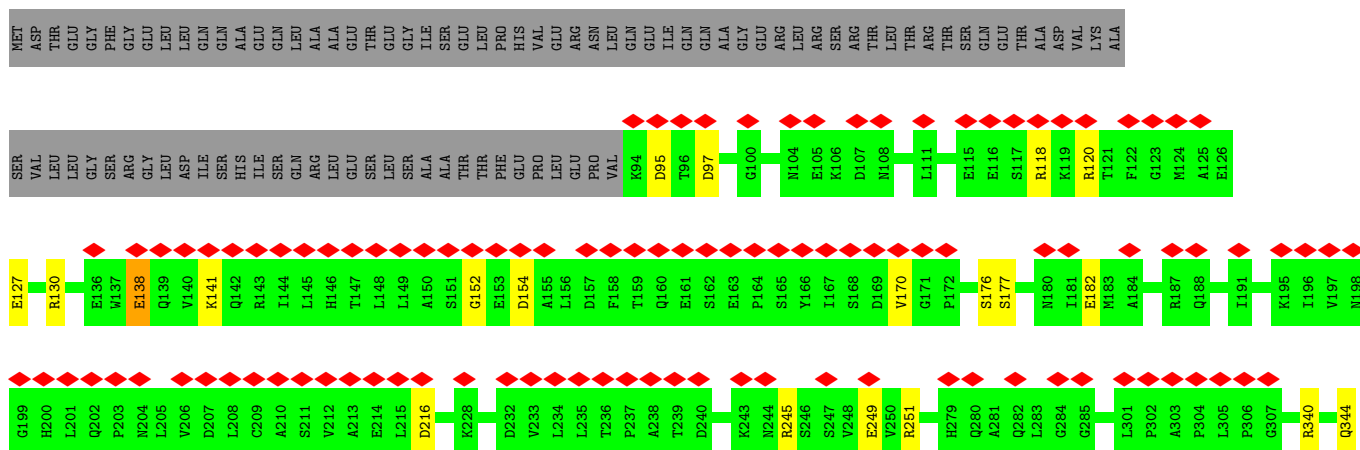
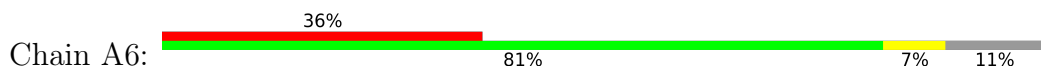


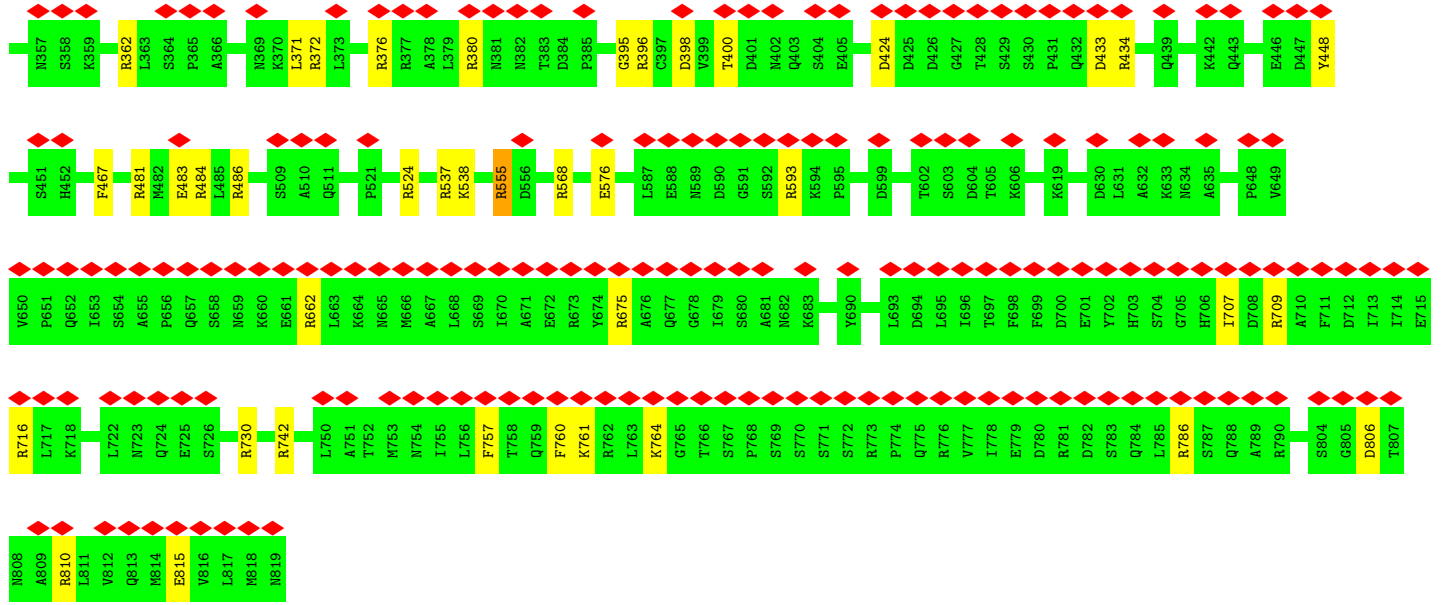


• Molecule 4: Nuclear pore complex protein Nup93

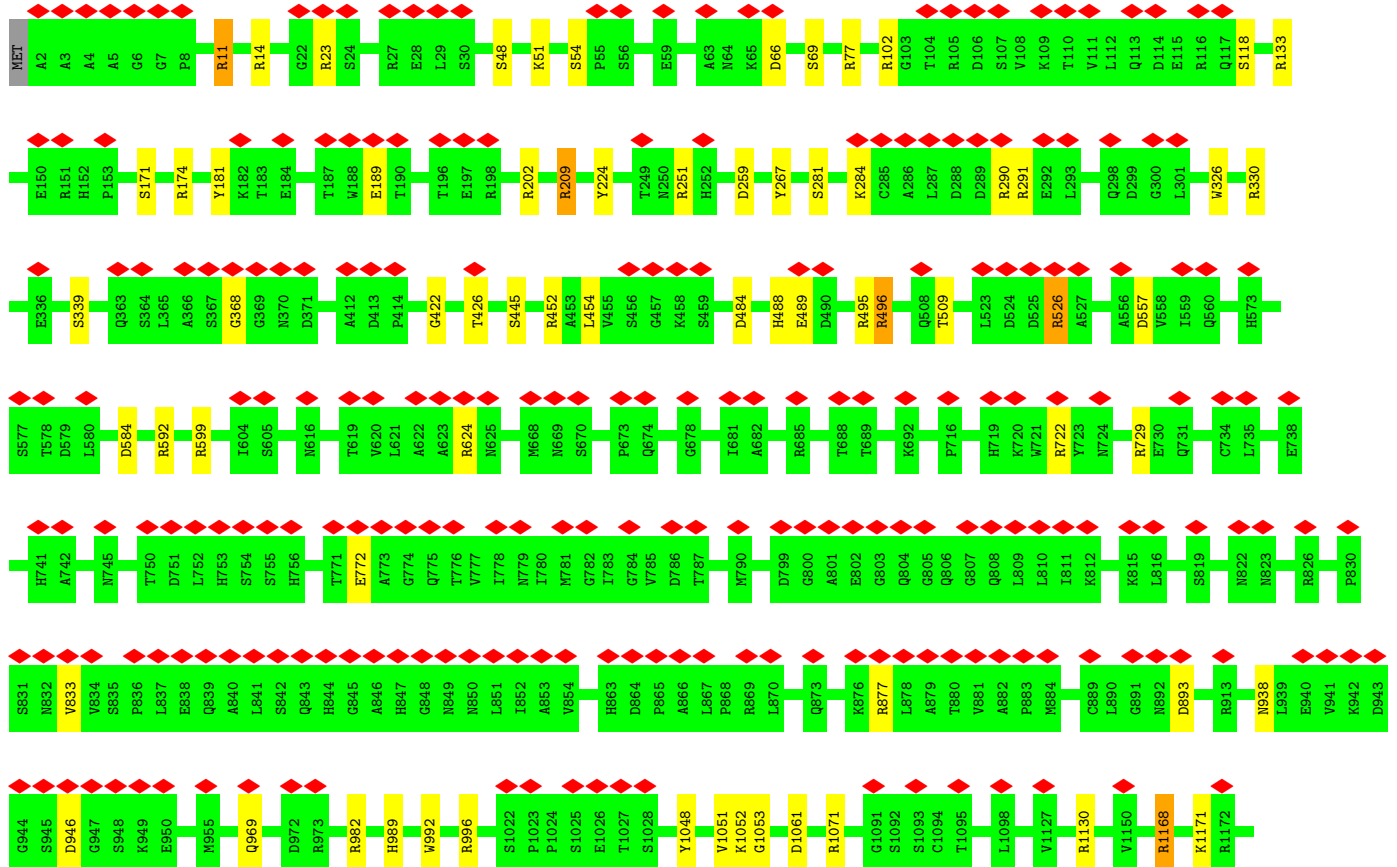


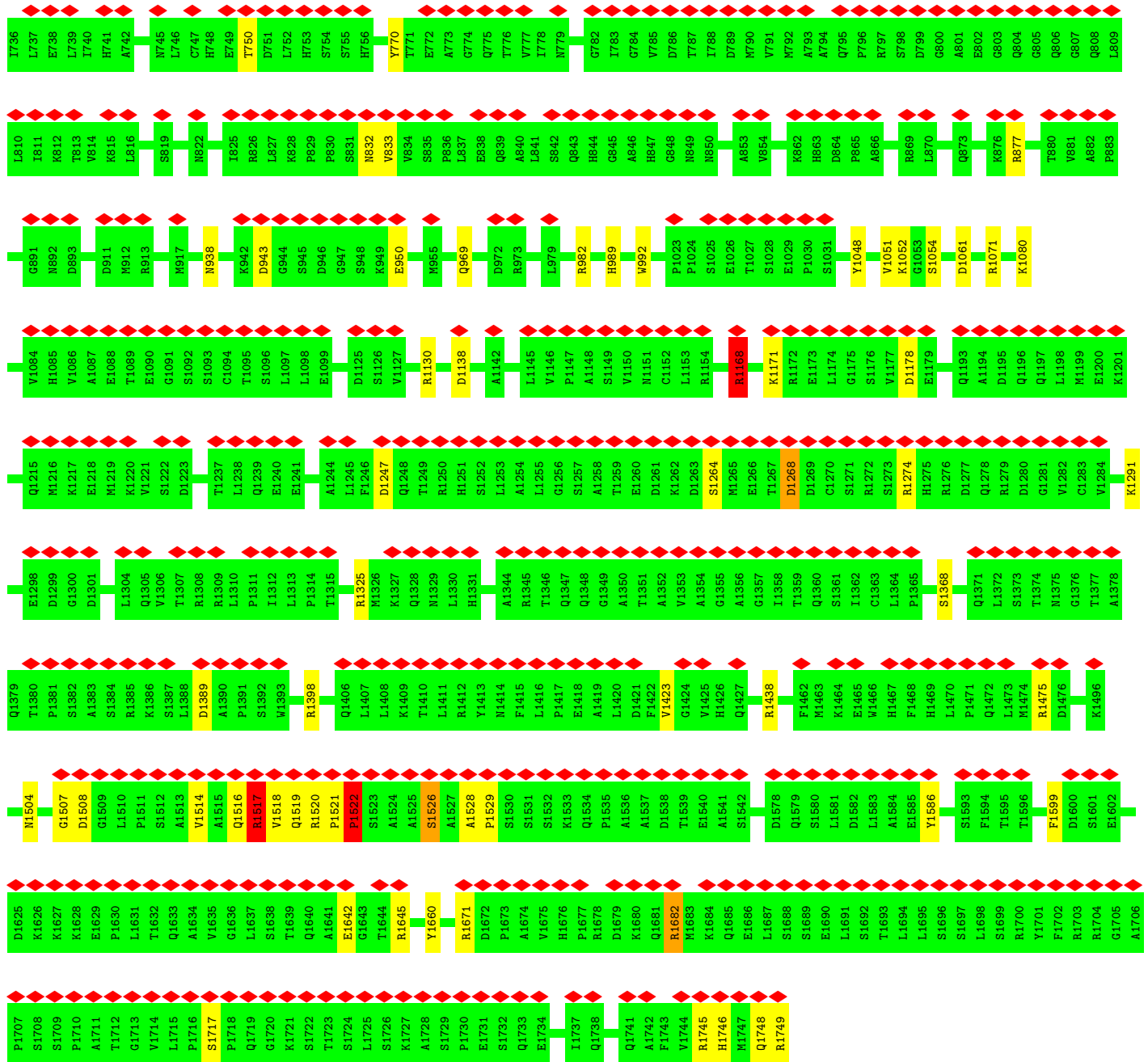
• Molecule 4: Nuclear pore complex protein Nup93



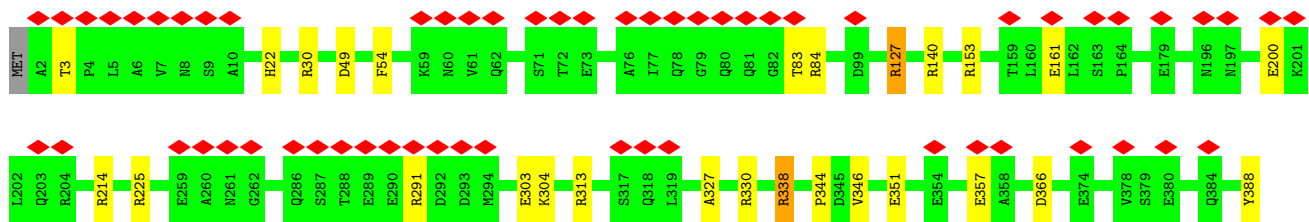


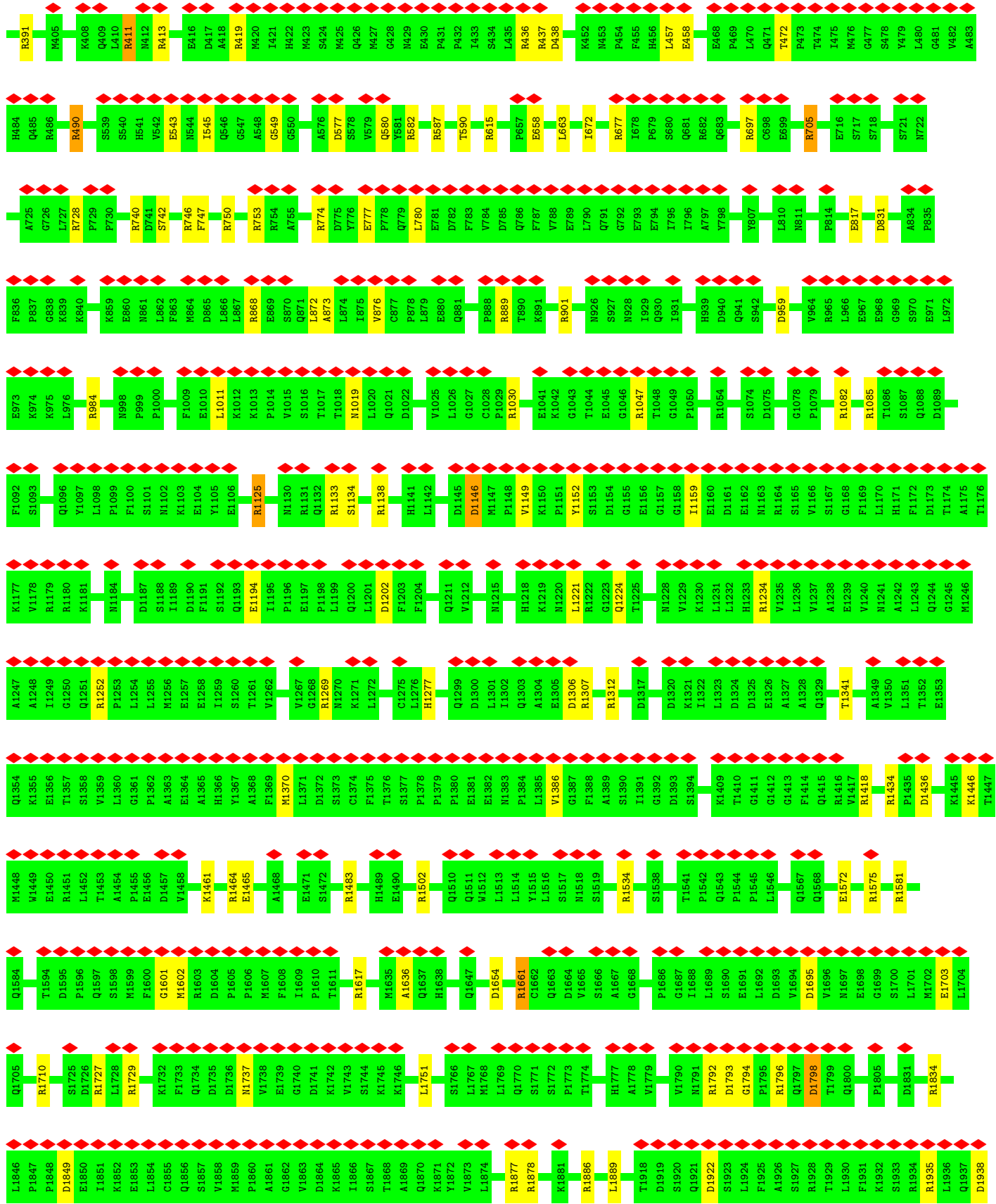
• Molecule 5: Nucleoporin NUP188 homolog

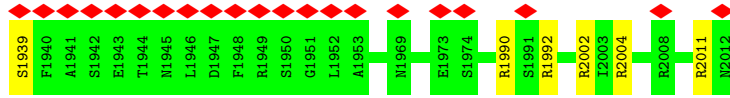




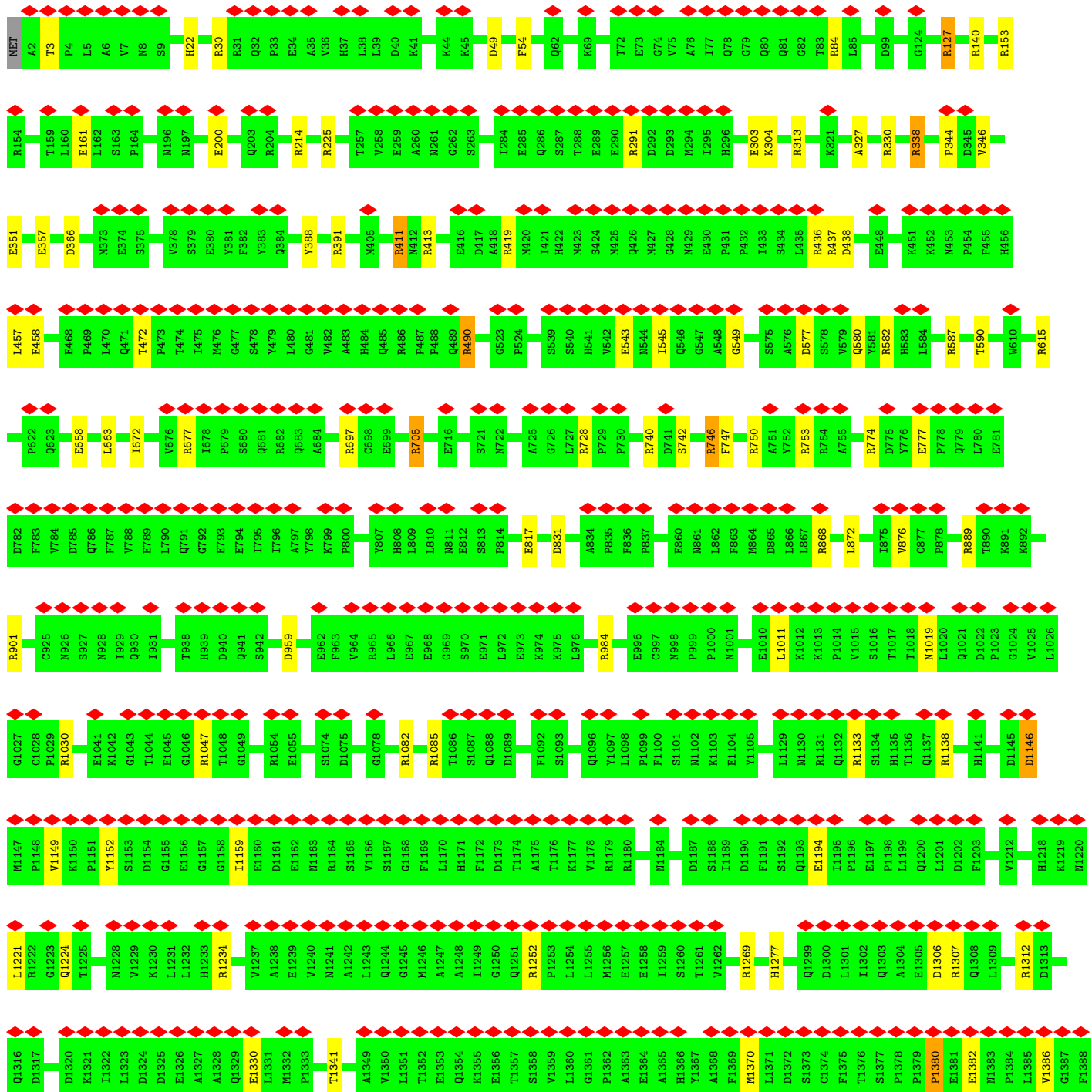
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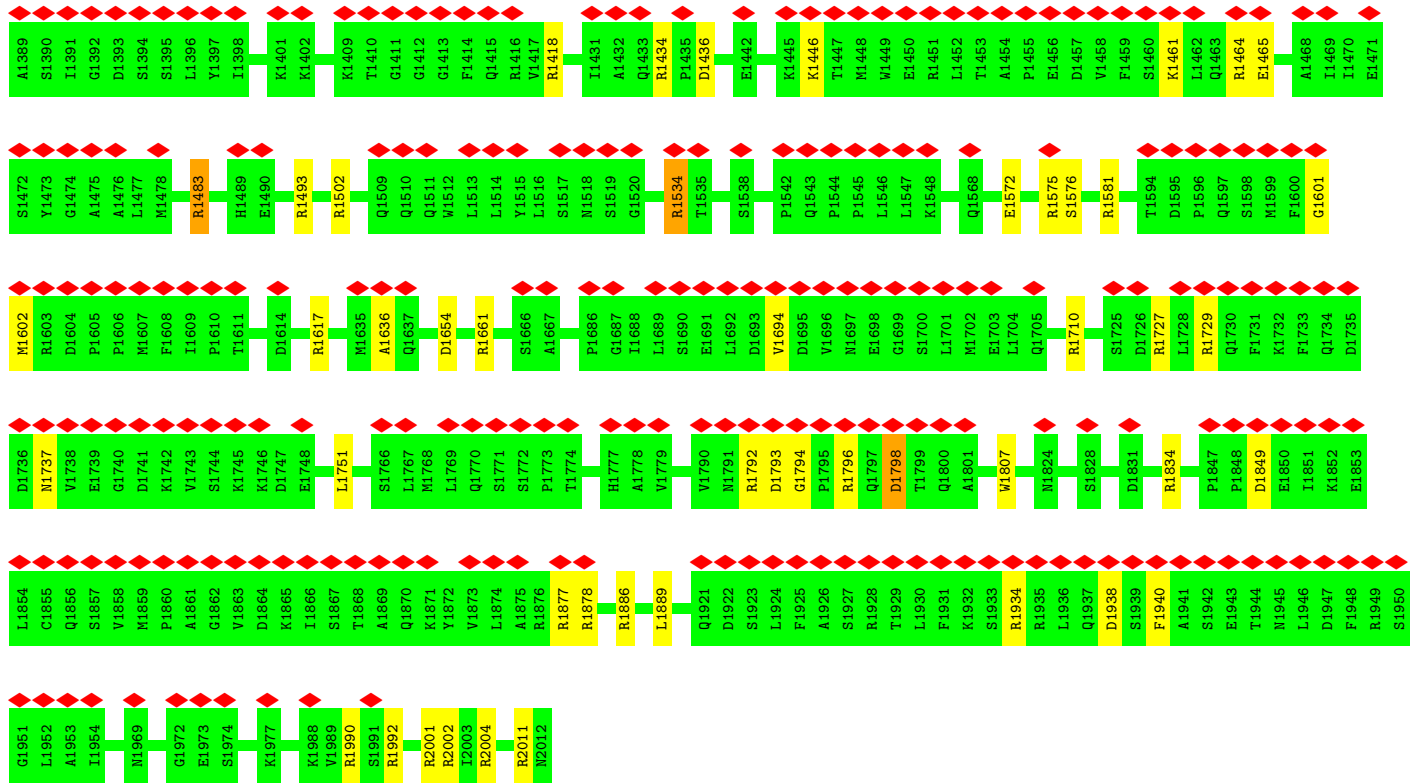




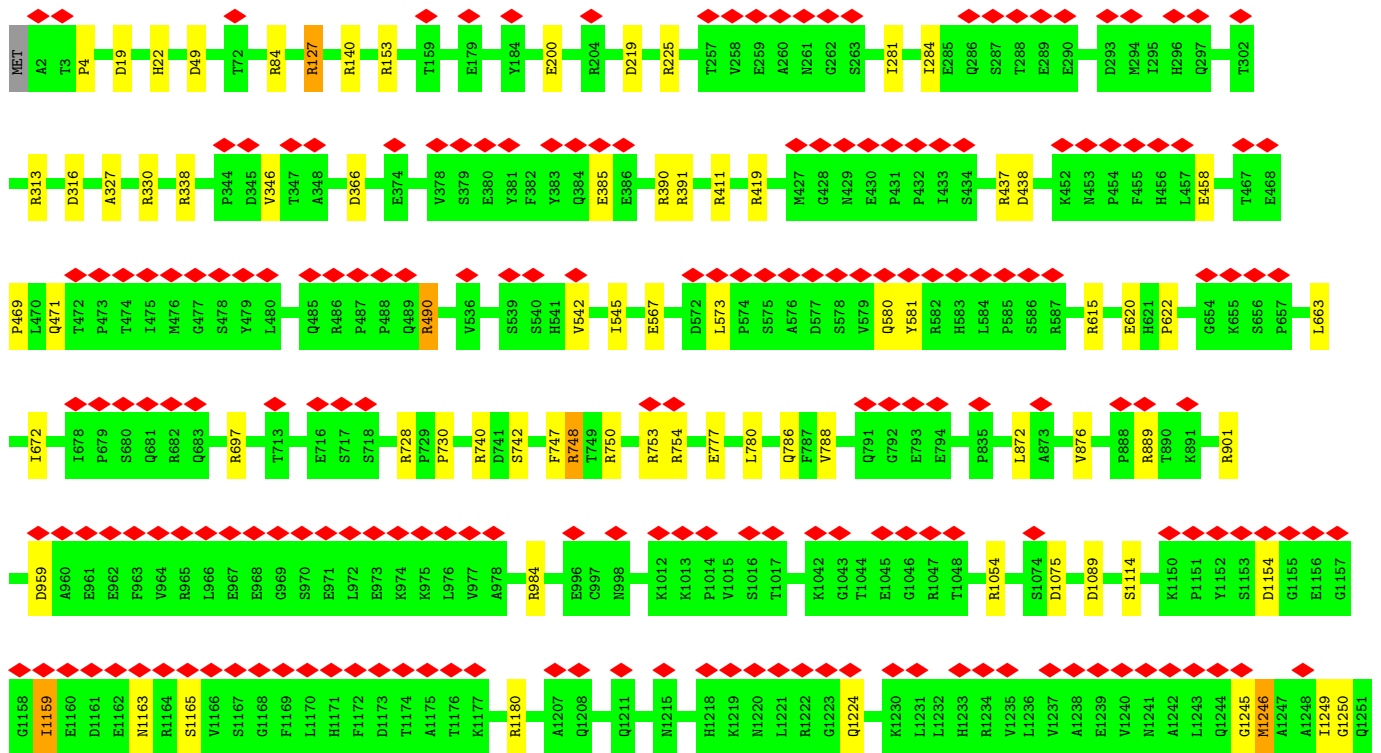
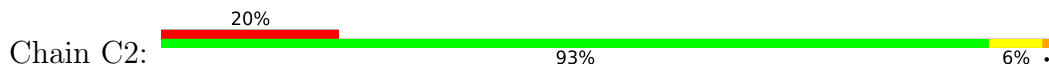


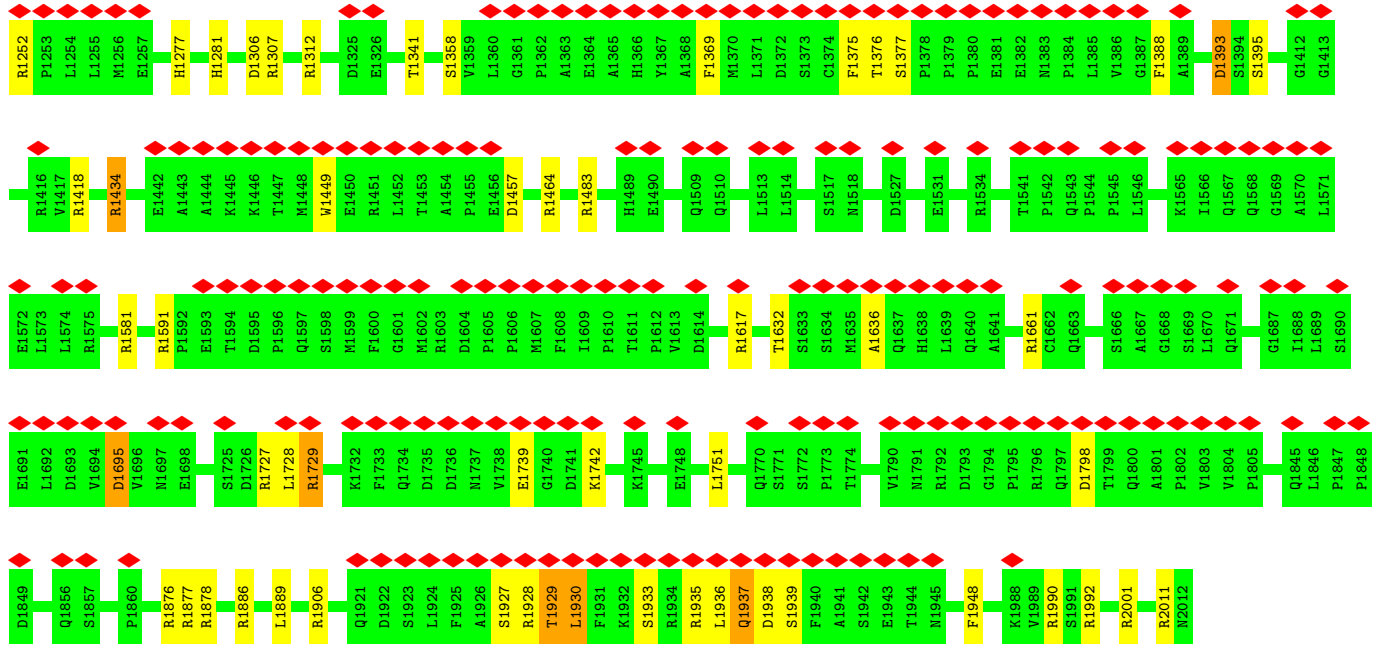
● Molecule 6: Nuclear pore complex protein Nup205



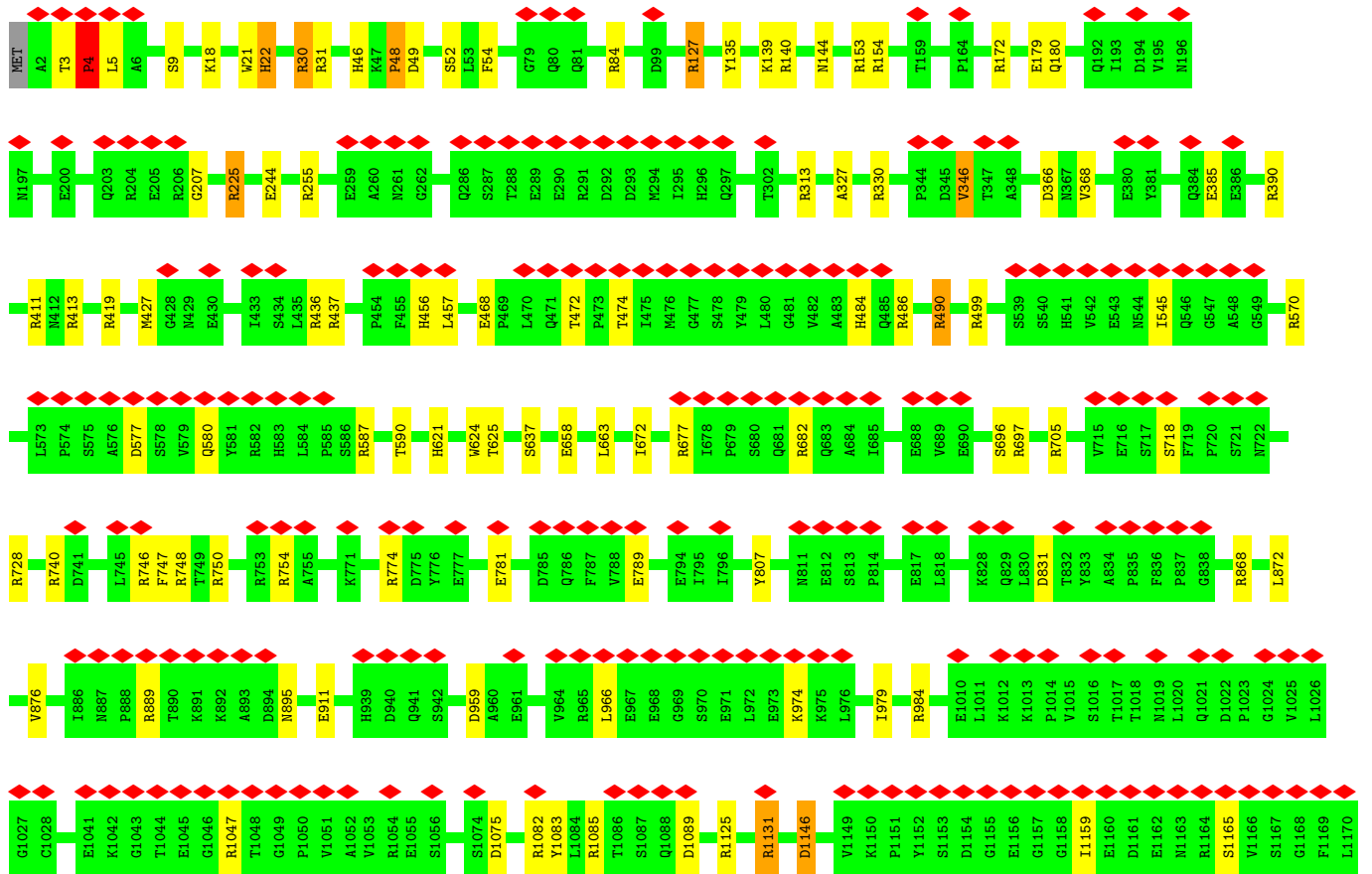
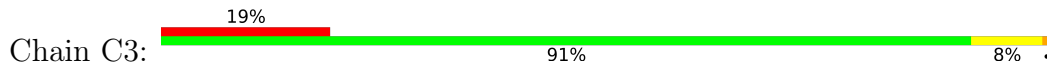


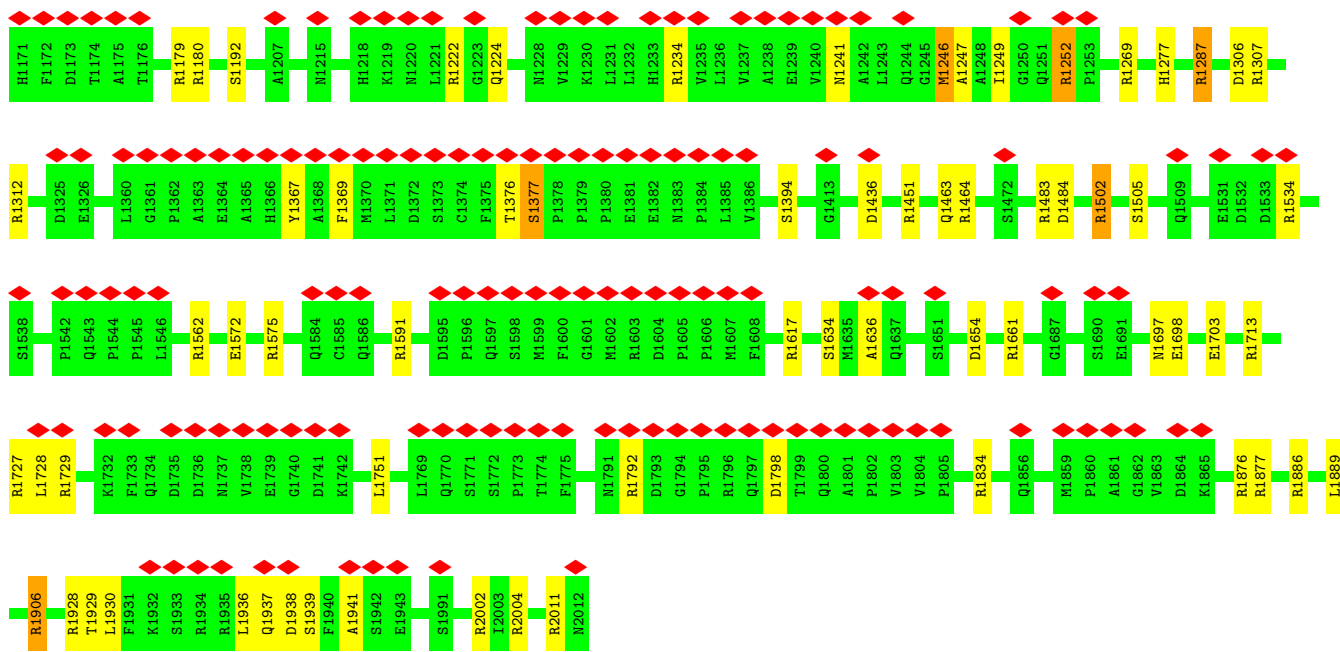
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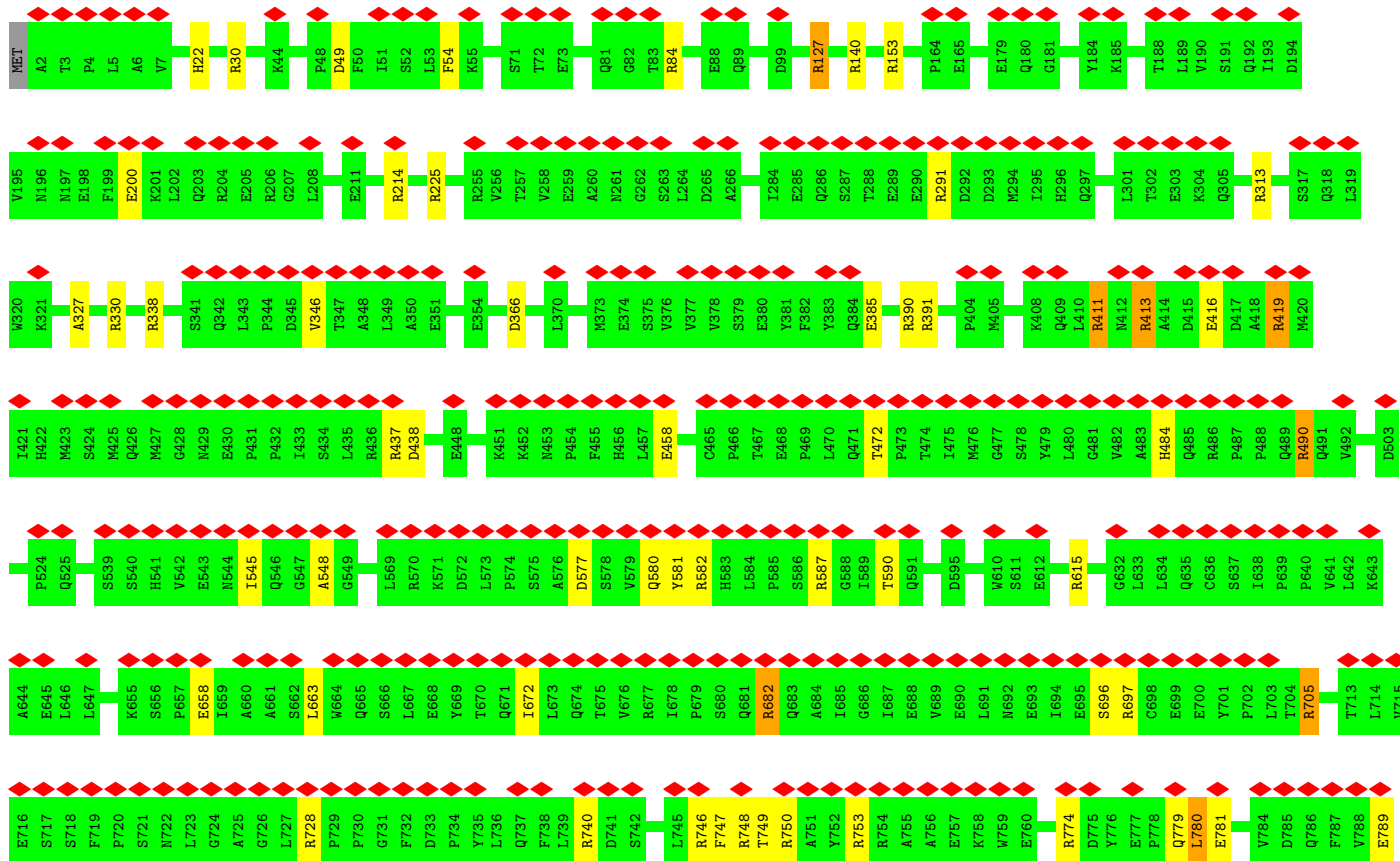
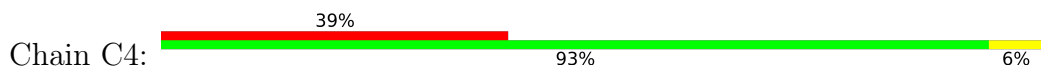


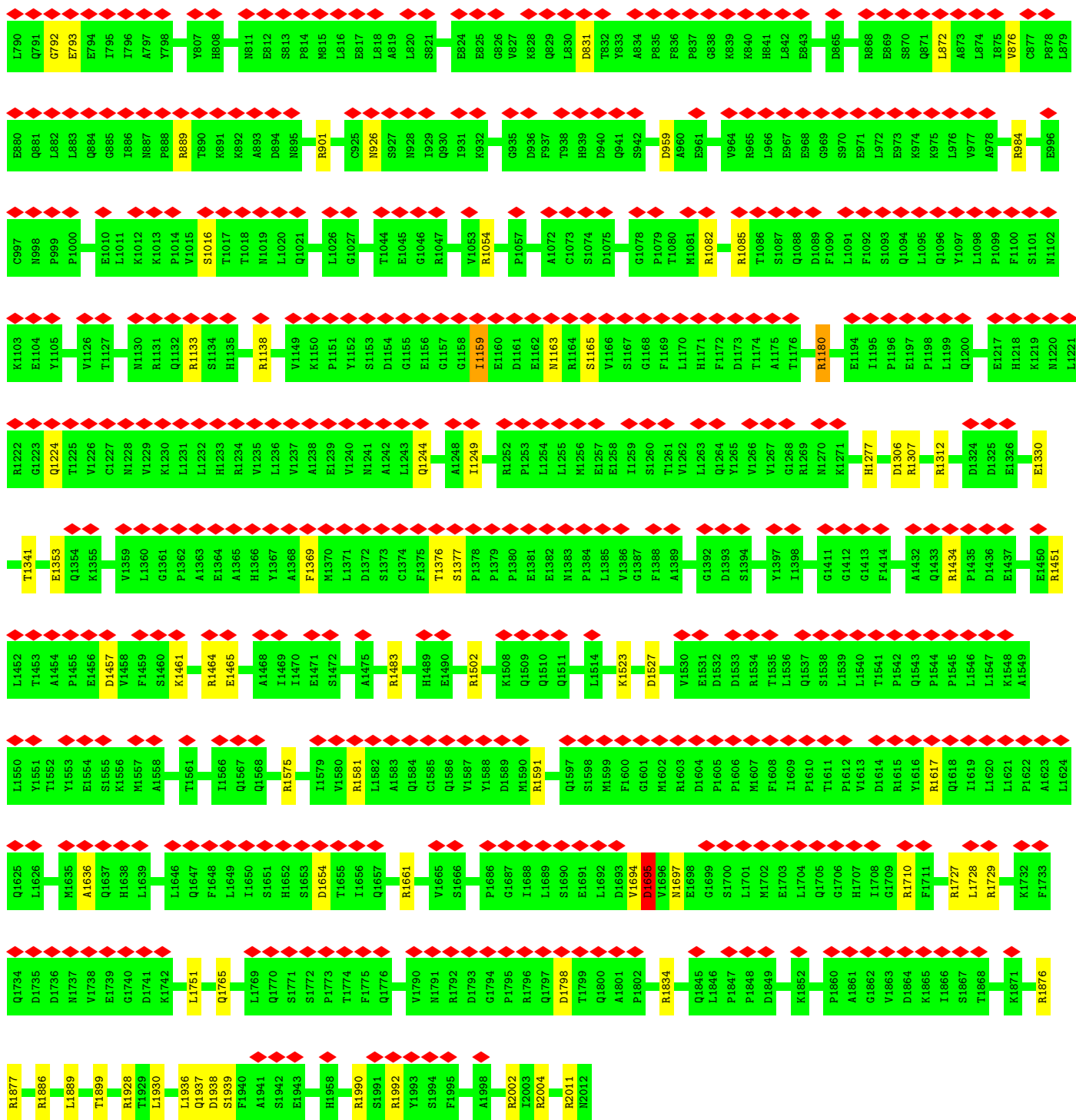
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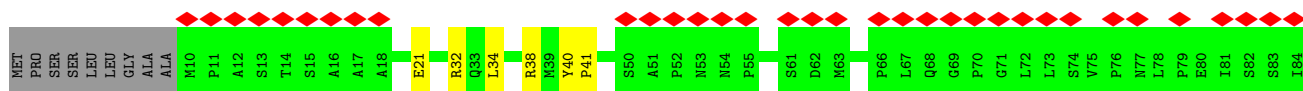
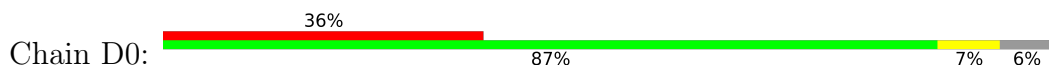


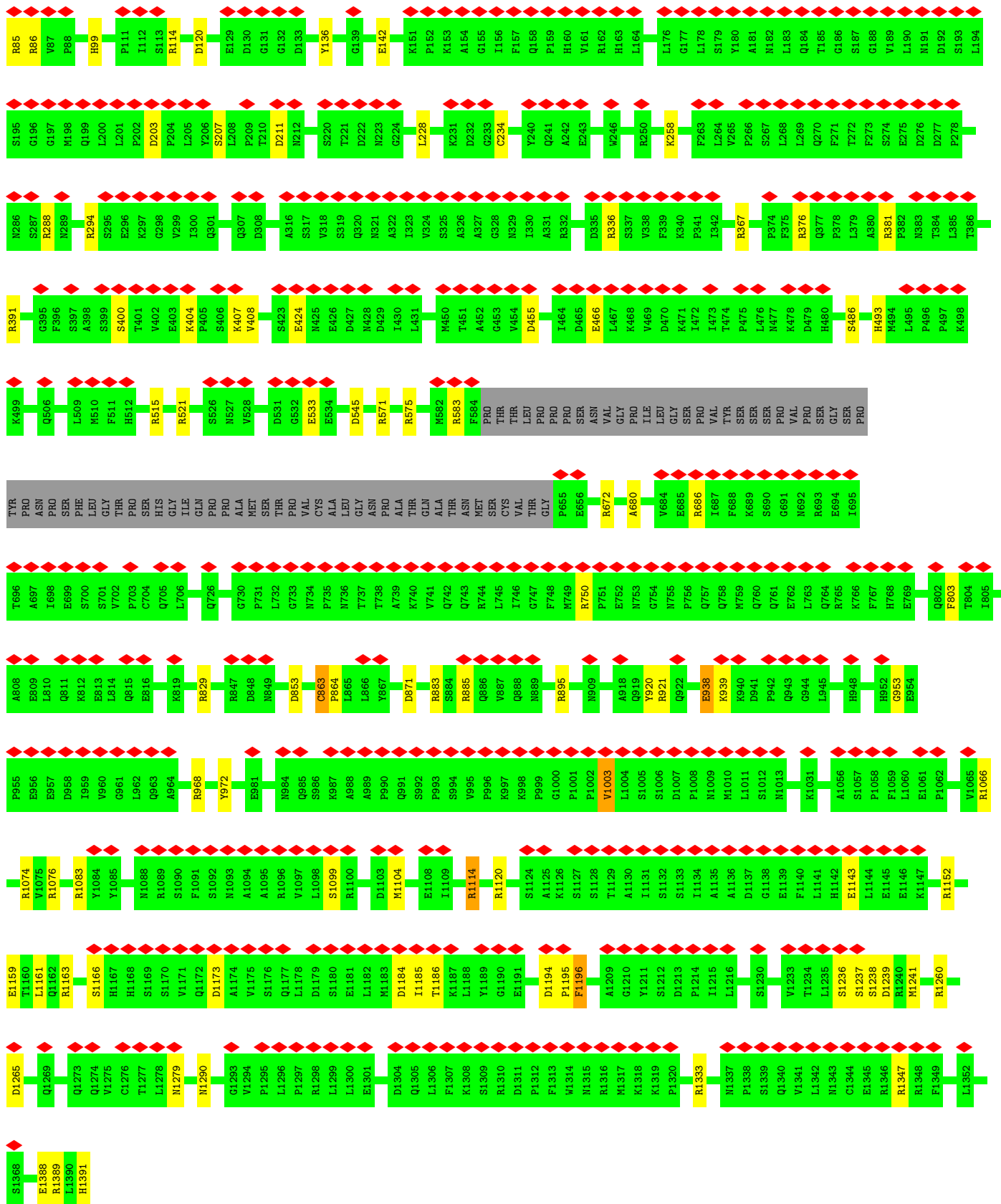
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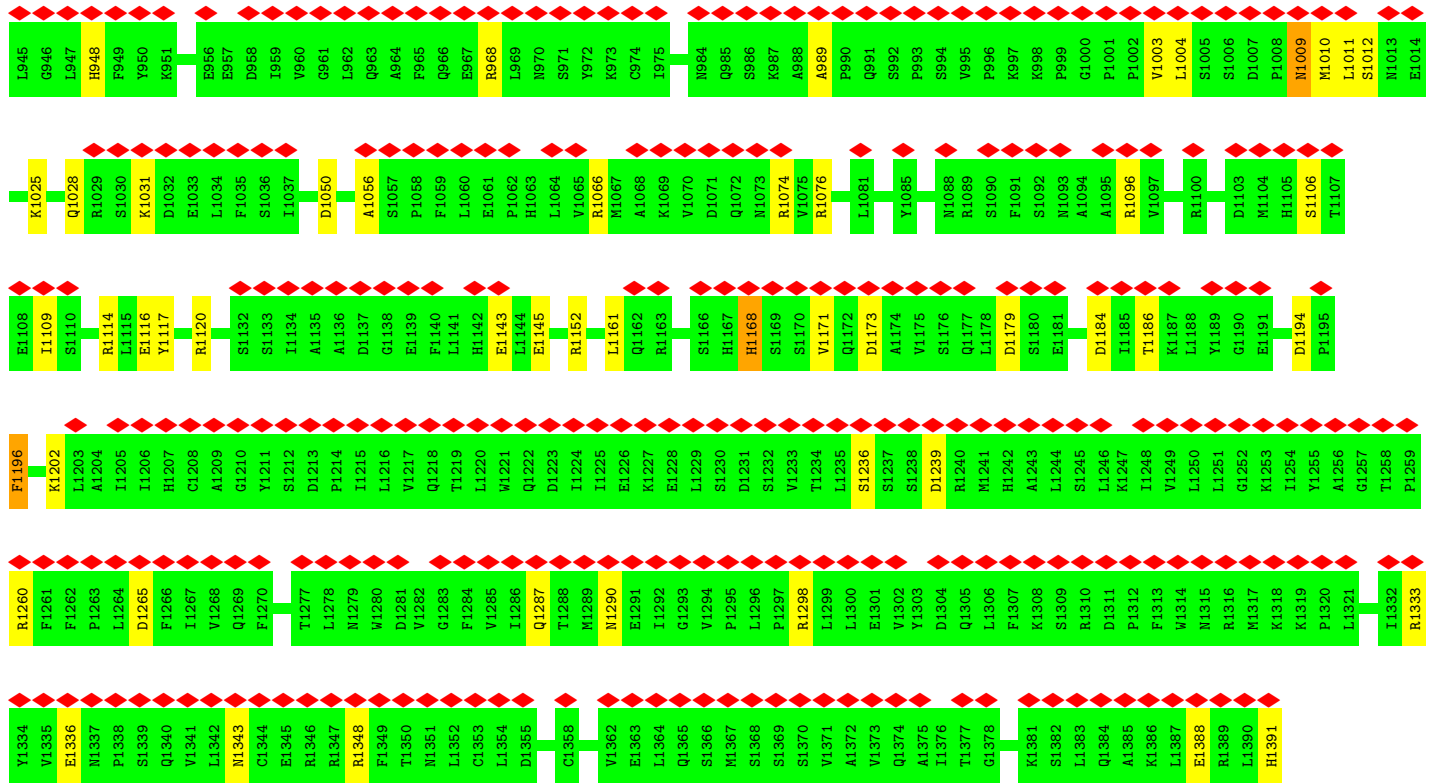


• Molecule 7: Nuclear pore complex protein Nup155

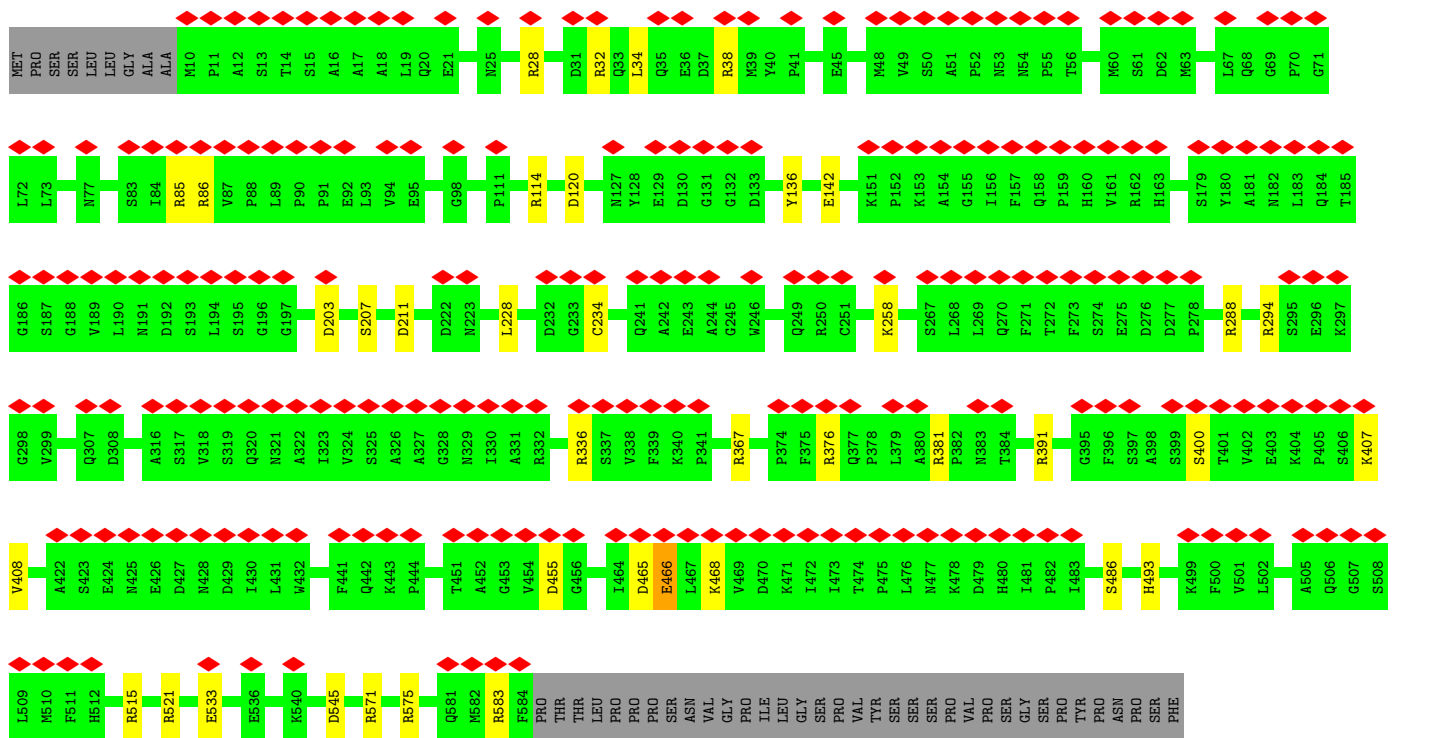
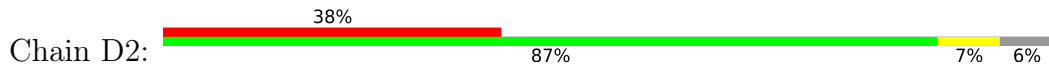


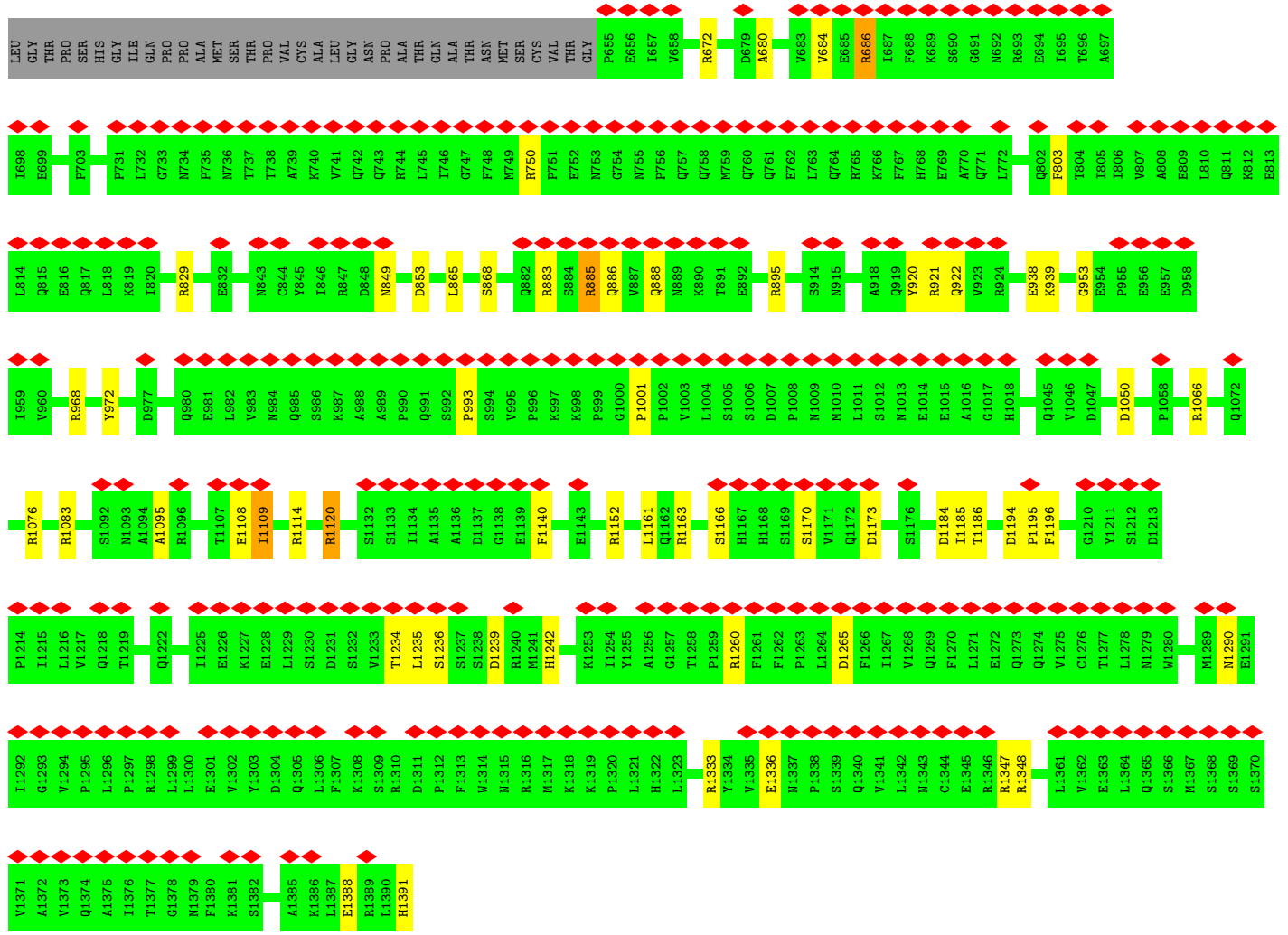


• Molecule 7: Nuclear pore complex protein Nup155

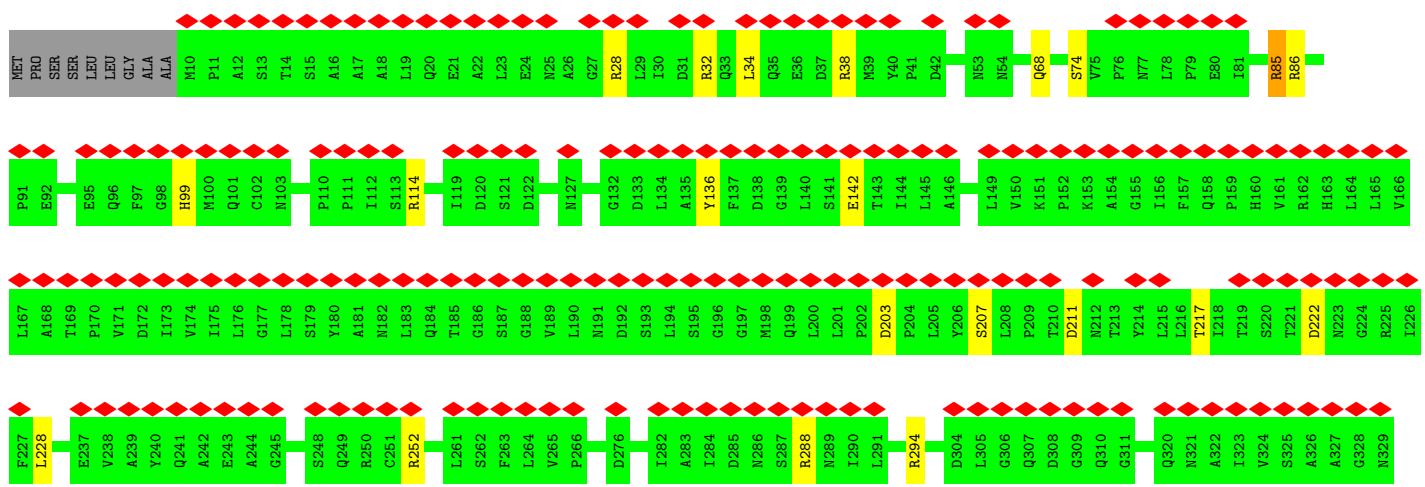
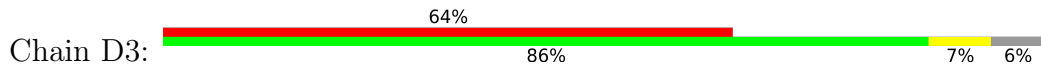


• Molecule 7: Nuclear pore complex protein Nup155

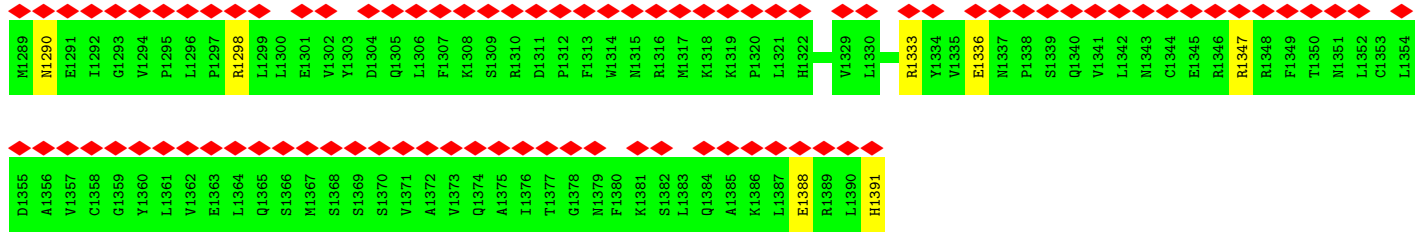




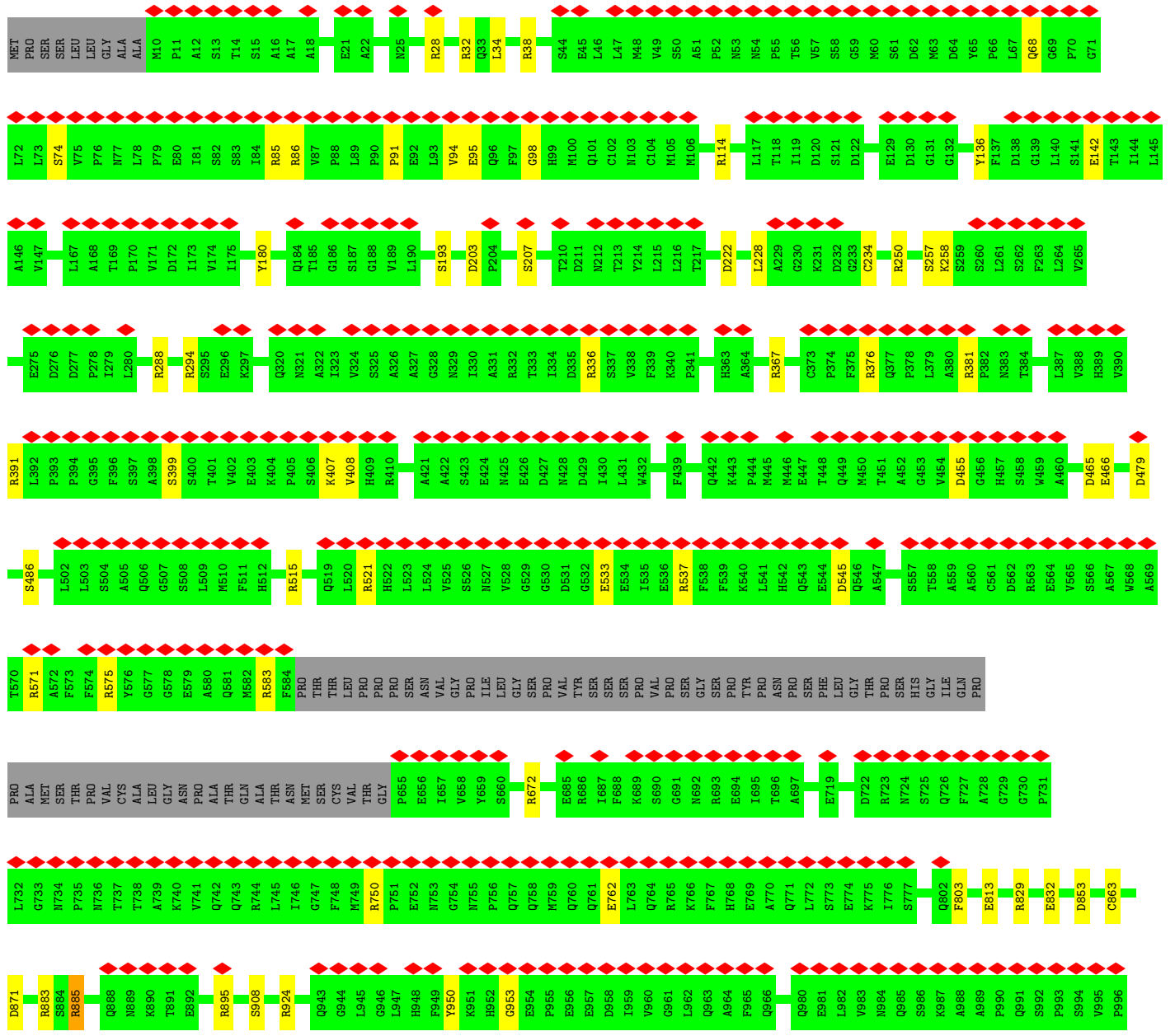
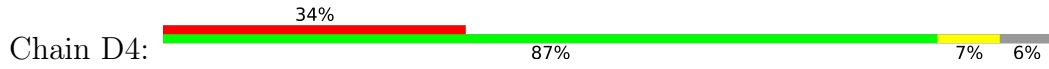
● Molecule 7: Nuclear pore complex protein Nup155

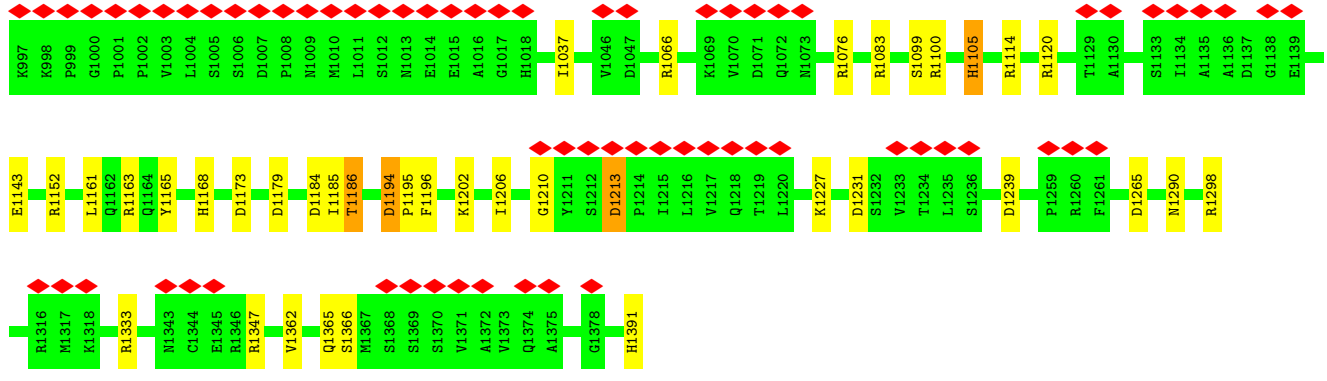


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K499	F500	H512	K513	L514	R515	P516	V517	D518	R521	H522	F523	S526	N527	V528	G529	G532	E533	E534	R537	D545	I553	L554	A560	R563	R571	R575	Q581	M582	R583	F584	PRO	THR	THR	THR	LEU	PRO	PRO	PRO	PRO	ASN	ASN	VAL	GLY	PRO	ILE	LEU	GLY	SER	PRO									
VAL	TTR	SER	SER	PRO	VAL	PRO	GLY	SER	PRO	PRO	ASN	SER	PHE	LEU	GLY	THR	SER	HIS	GLY	ILE	GLN	PRO	ALA	MET	SER	THR	PRO	VAL	ALA	LEU	GLY	ASN	ALA	THR	GLN	ALA	THR	ASN	MET	SER	CYS	VAL	THR	THR	THR	LEU	PRO	P655	E656	I657	V658	R672						
G675	N676	D679	A680	S681	L682	V683	V684	E685	R686	I687	F688	K689	S690	G691	N692	R693	E694	I695	T696	A697	I698	E699	S700	S701	V702	F703	C704	Q705	L706	S709	Q712	R715	Q718	E719	D722	R723	L732	P735	M736	T737	T738	A739	K740	V741	Q742	Q743	R744	L745	I746	G747	F748							
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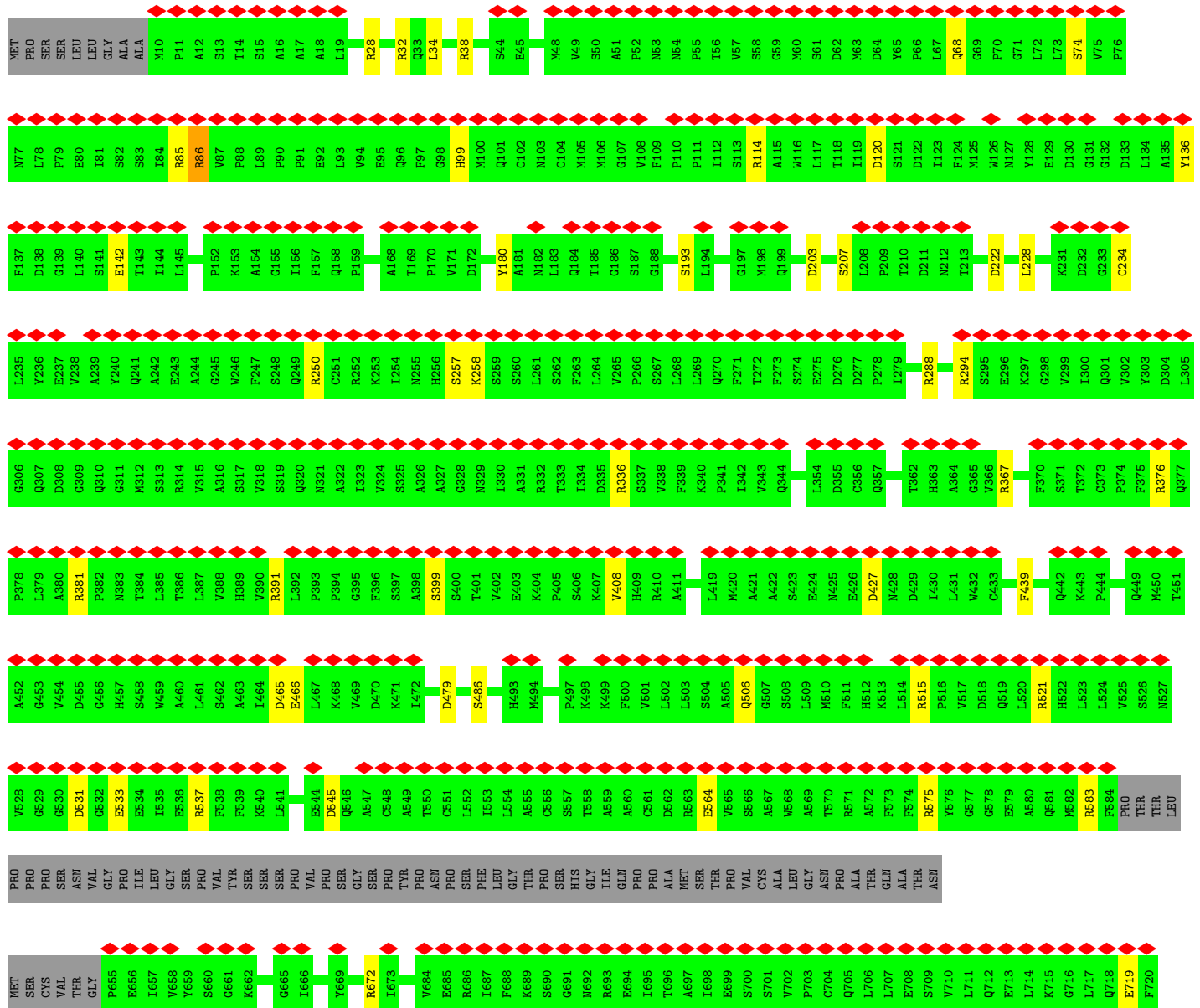
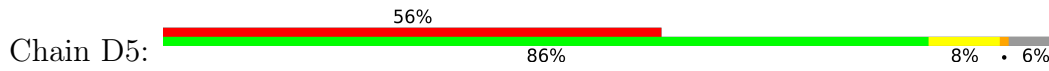


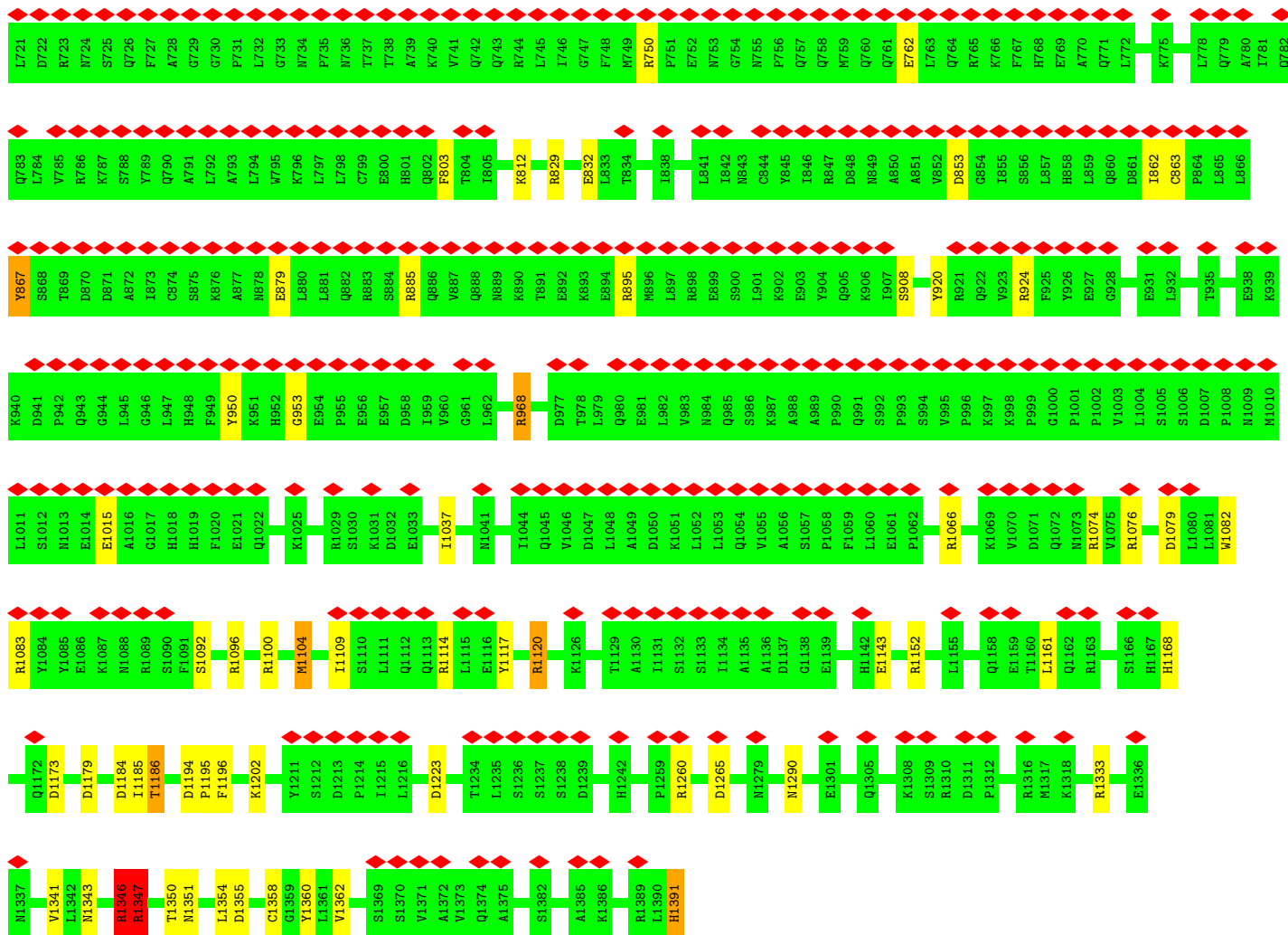
• Molecule 7: Nuclear pore complex protein Nup155



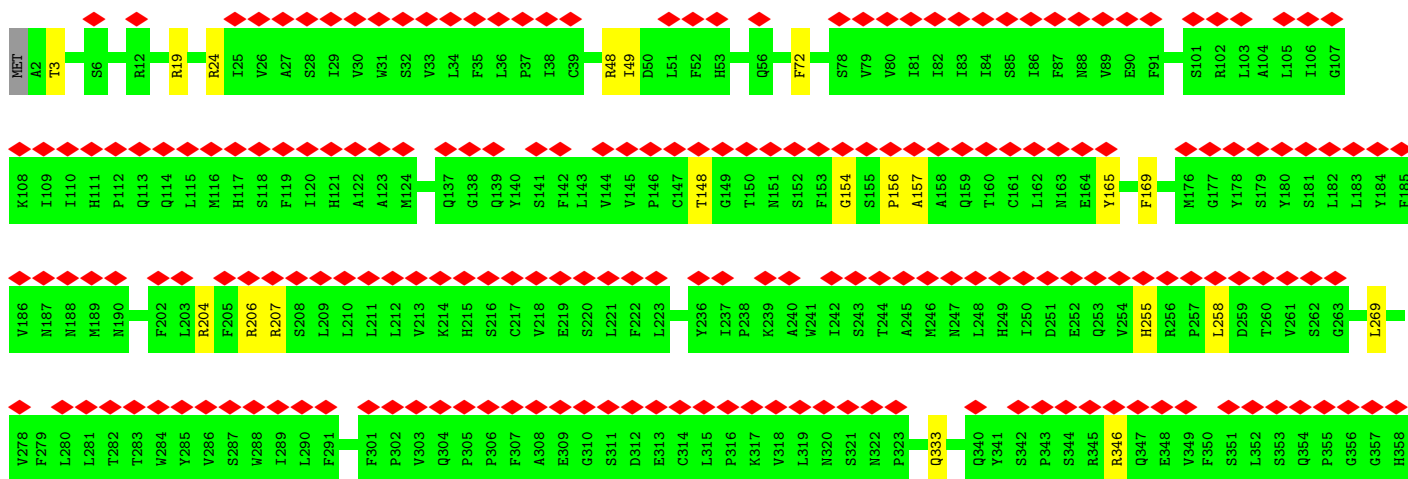
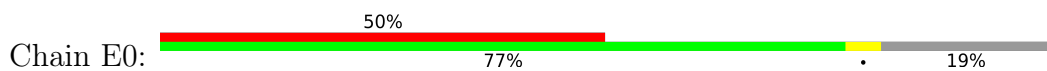


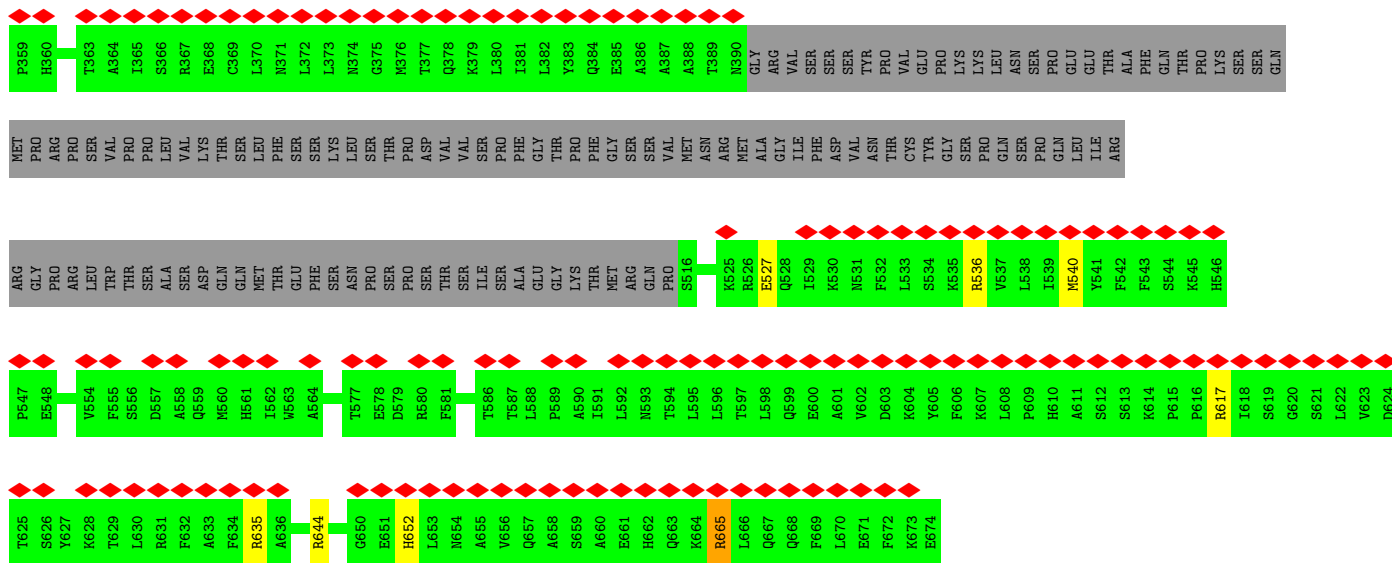
• Molecule 7: Nuclear pore complex protein Nup155



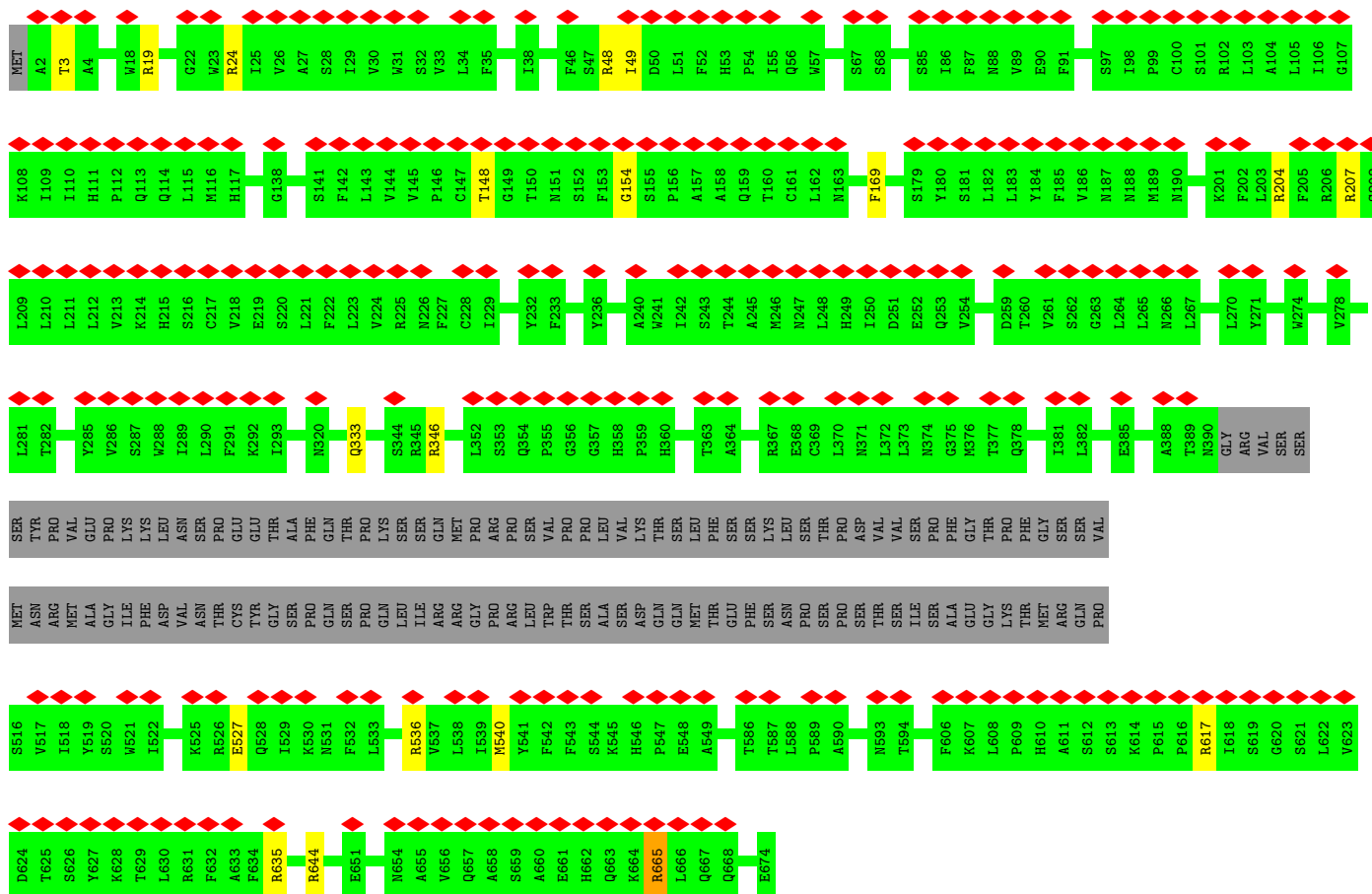
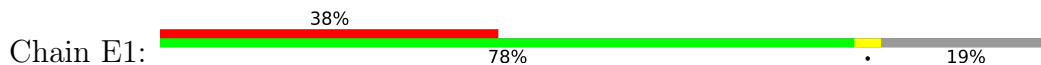


• Molecule 8: Nucleoporin NDC1

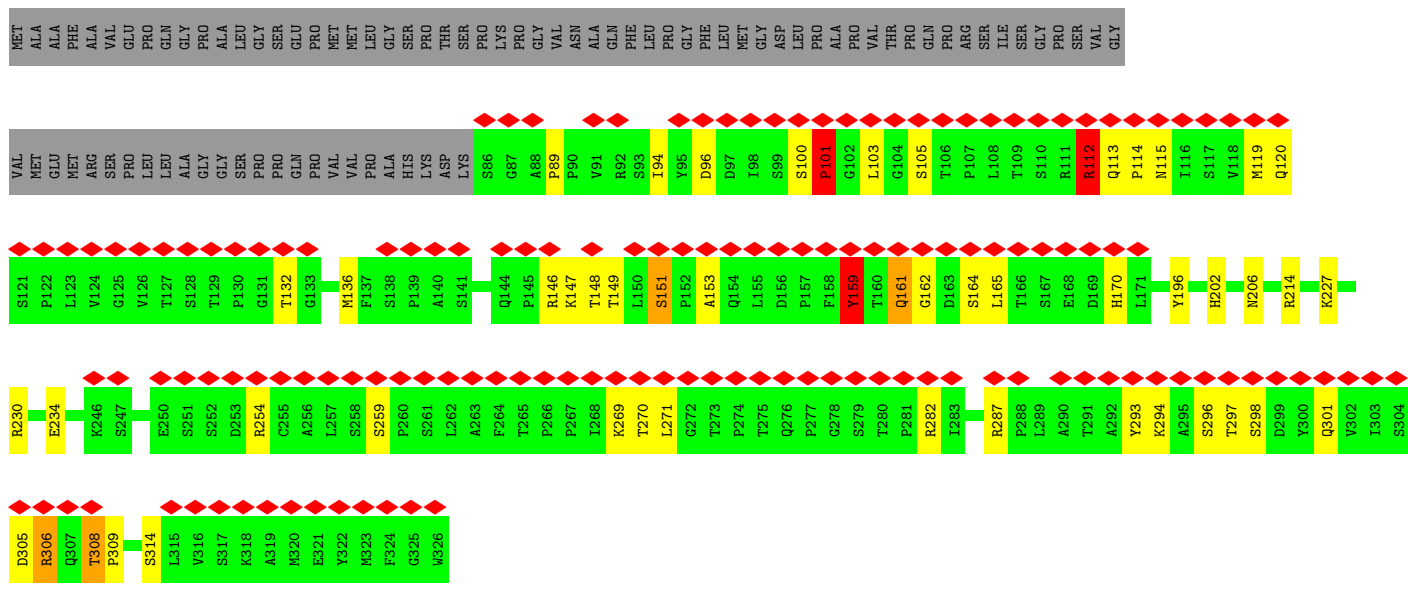




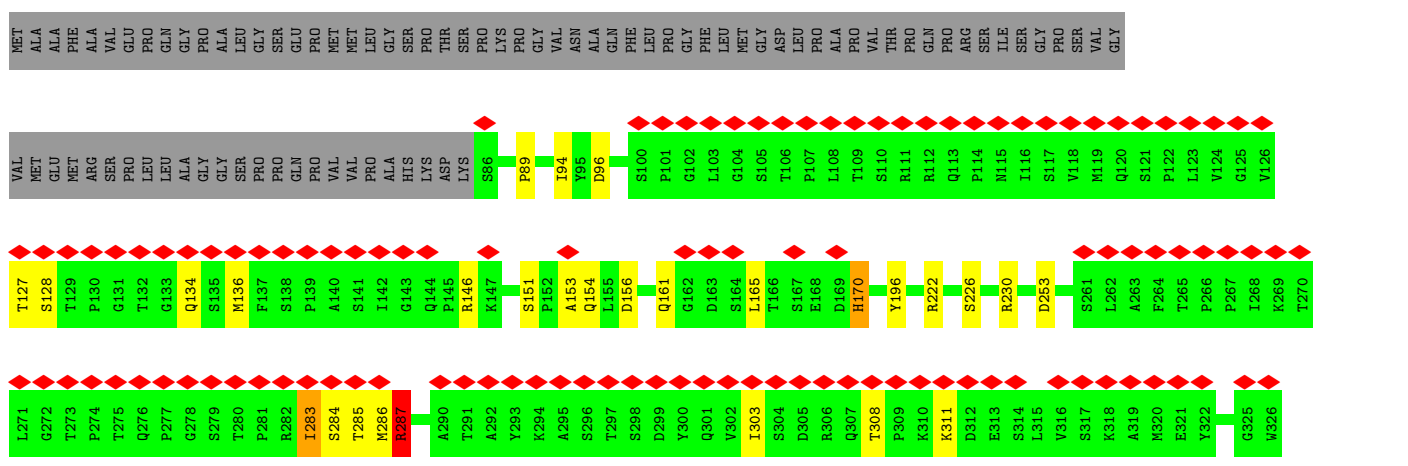
• Molecule 8: Nucleoporin NDC1



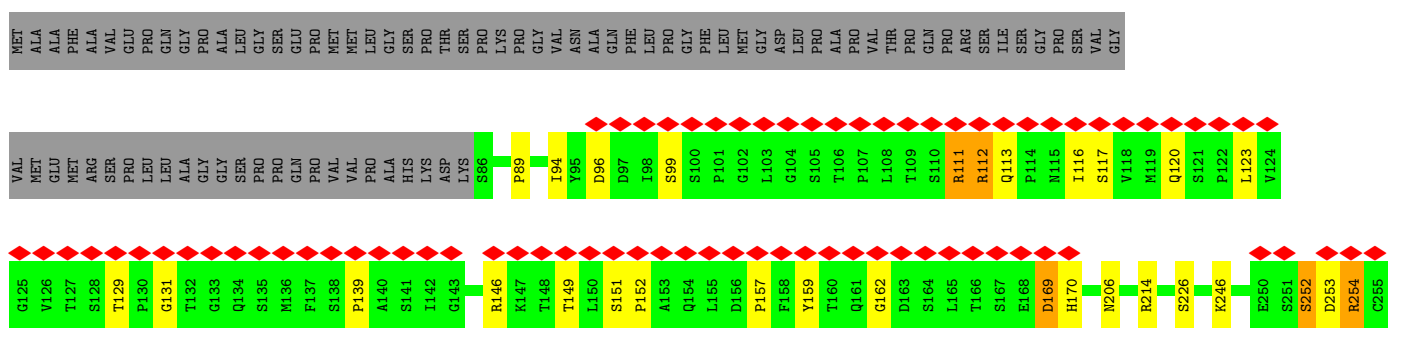
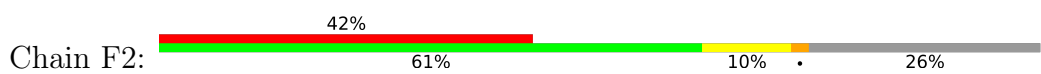
• Molecule 9: Nucleoporin NUP35

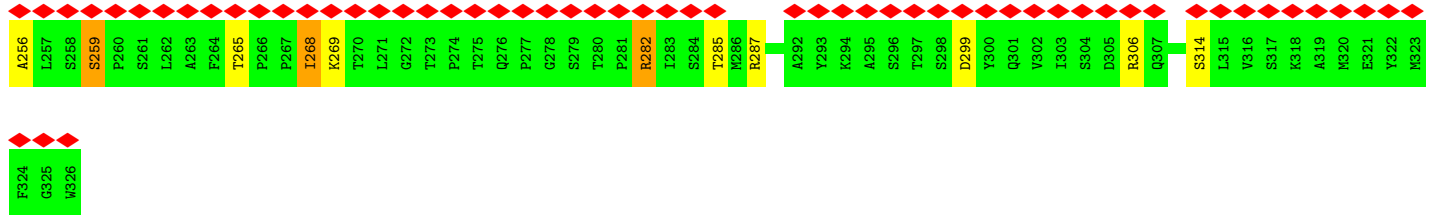


• Molecule 9: Nucleoporin NUP35

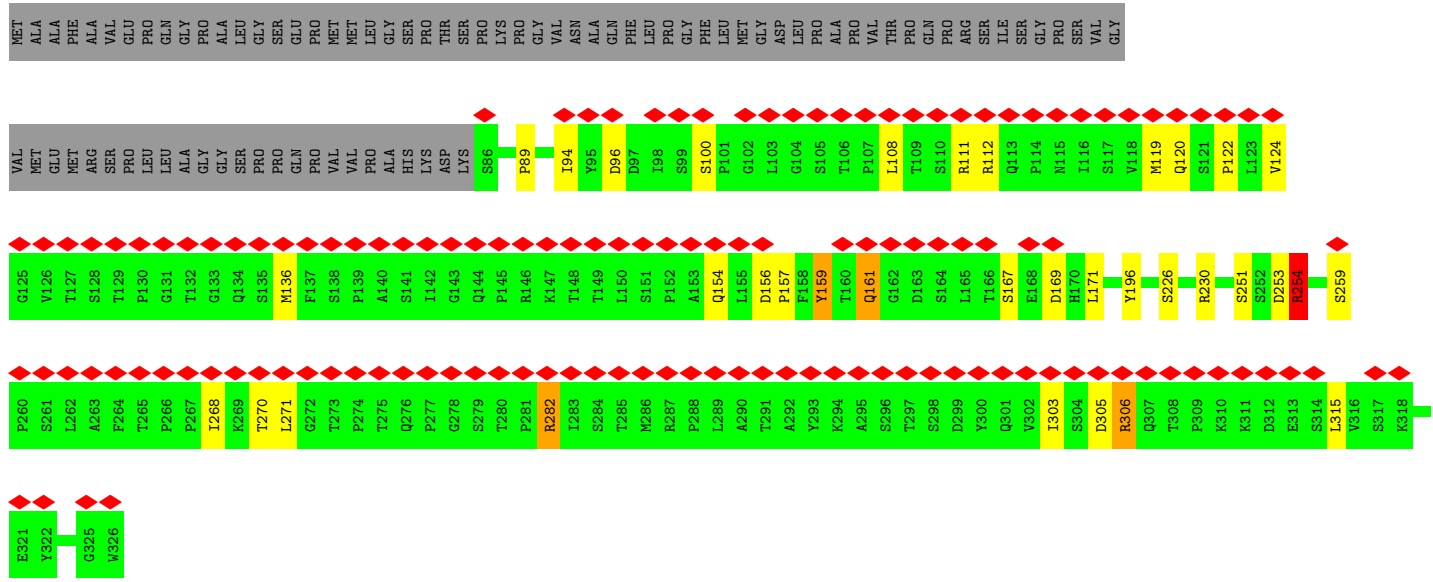
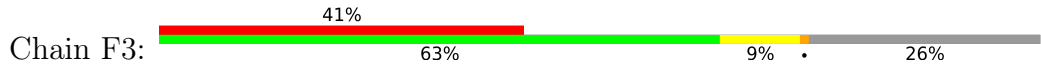


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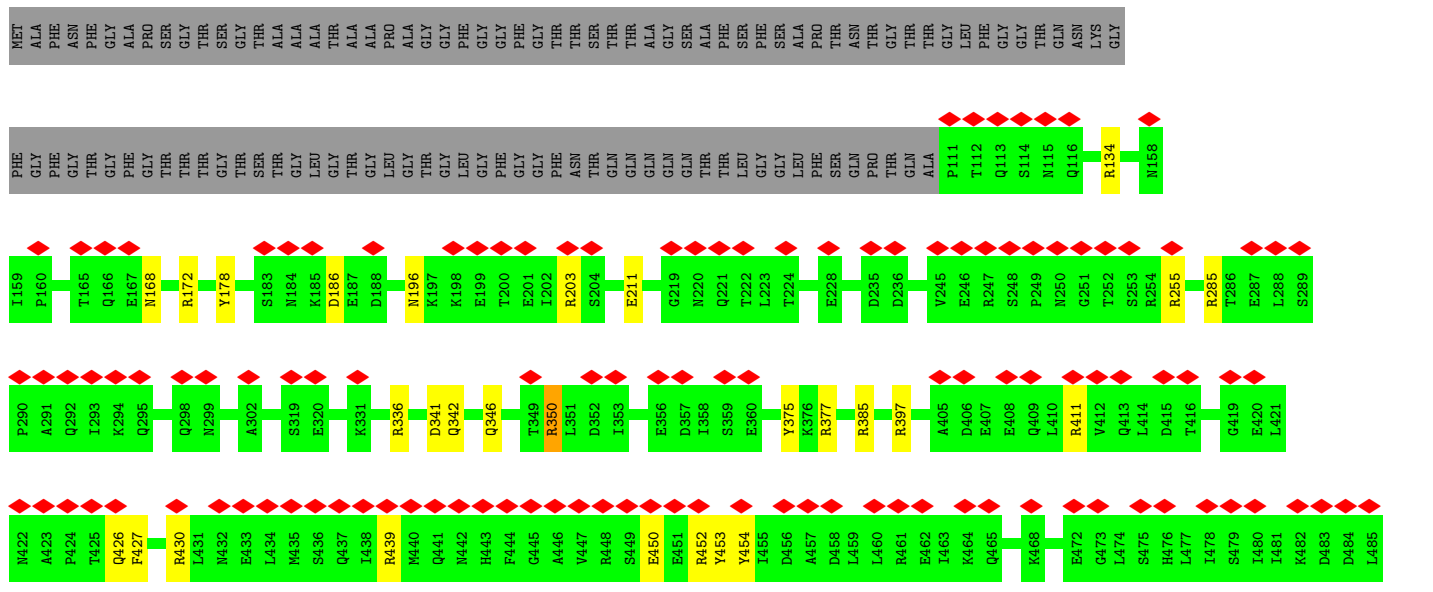




• Molecule 9: Nucleoporin NUP35

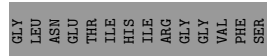
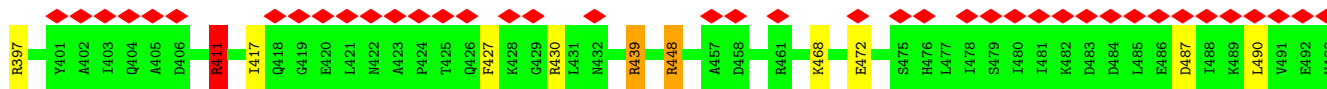
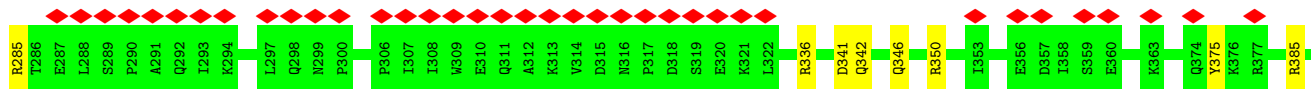
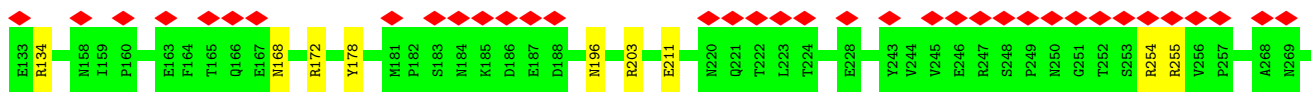
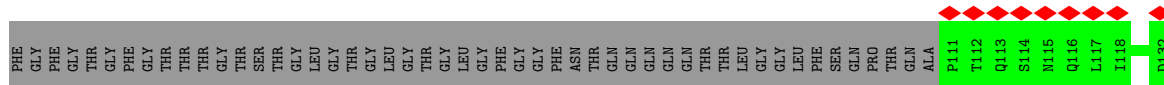
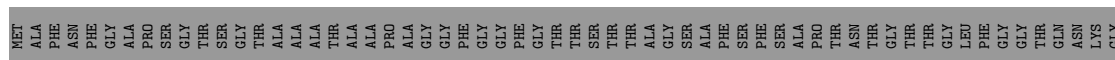
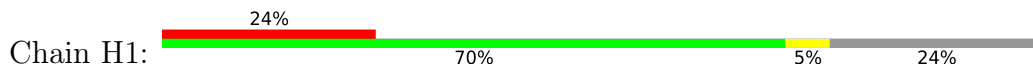


• Molecule 10: Nucleoporin p54

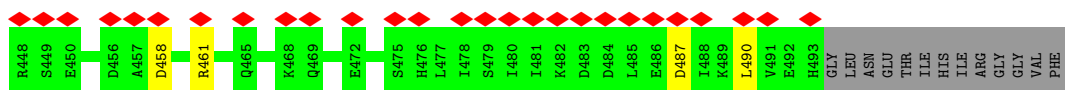
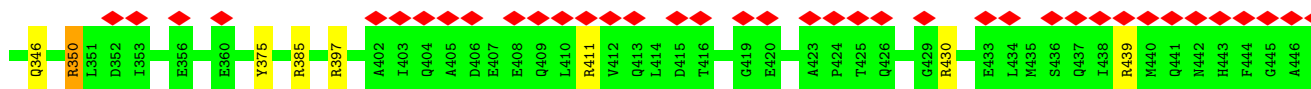
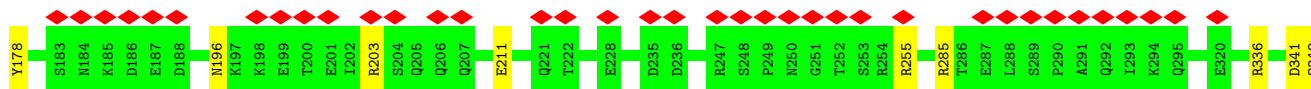
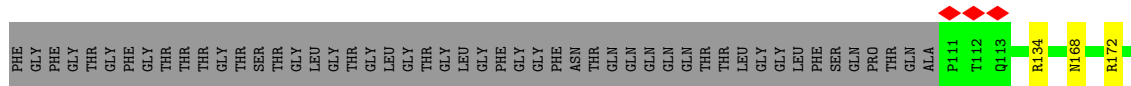
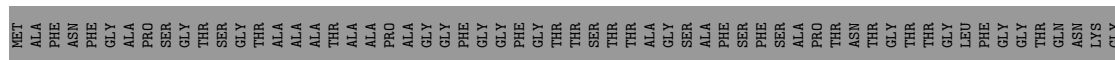
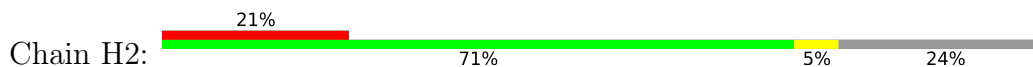




• Molecule 10: Nucleoporin p54

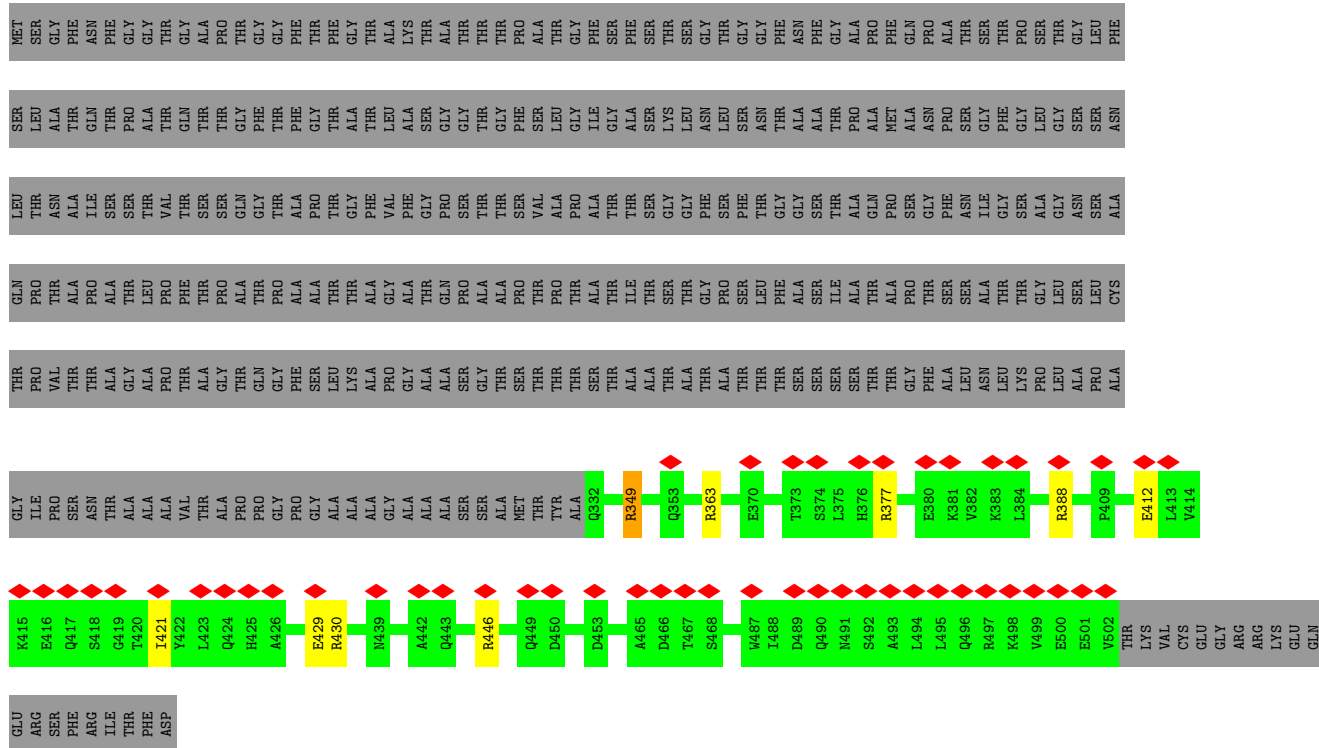


• Molecule 10: Nucleoporin p54

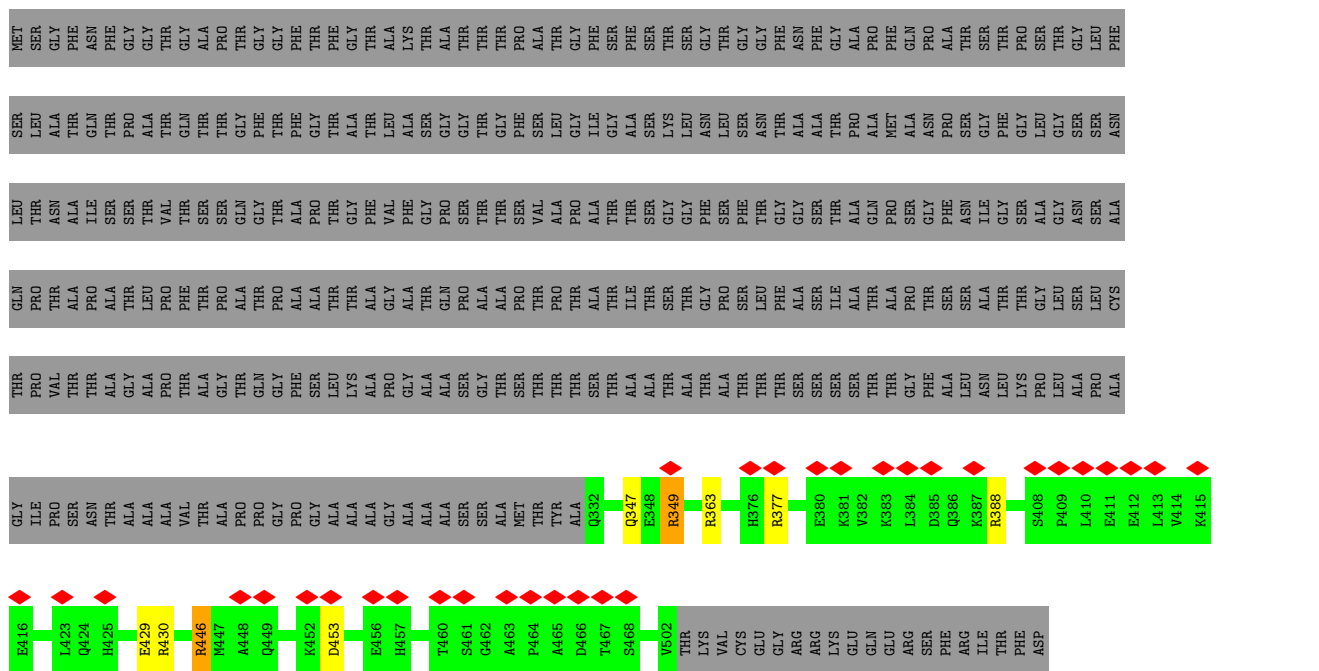


• Molecule 10: Nucleoporin p54

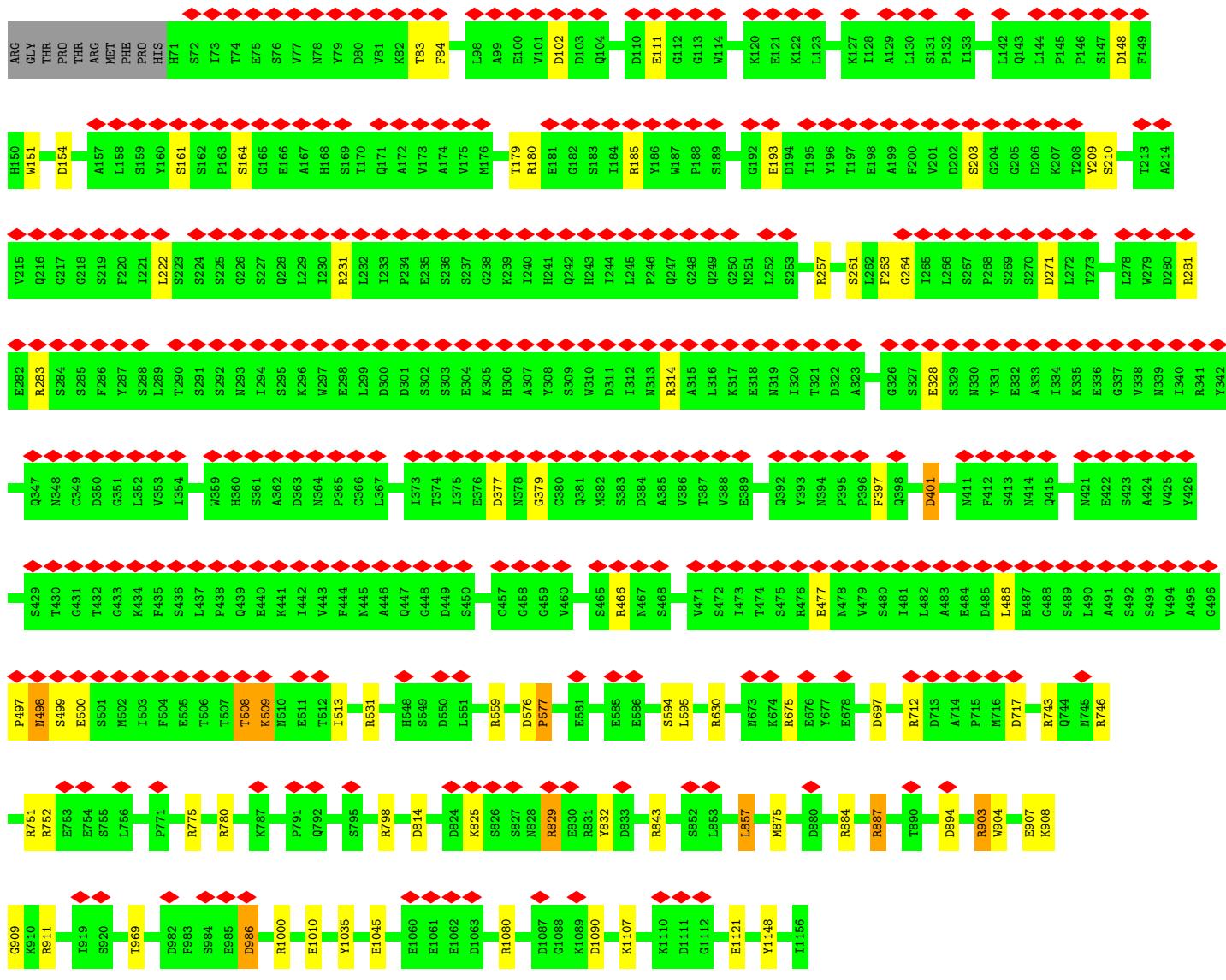
● Molecule 12: Nuclear pore glycoprotein p62



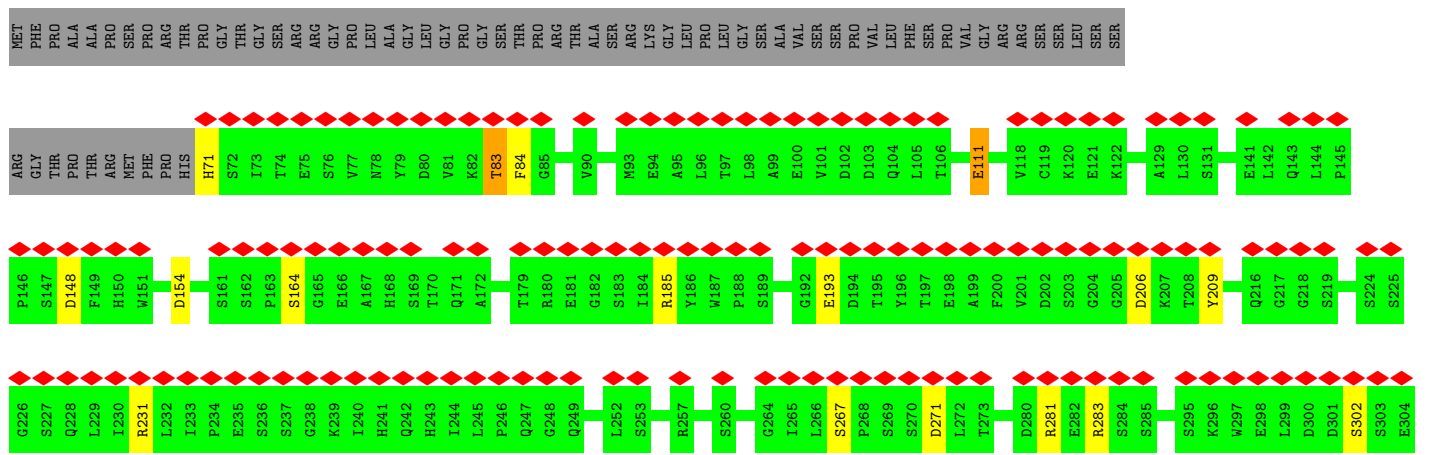
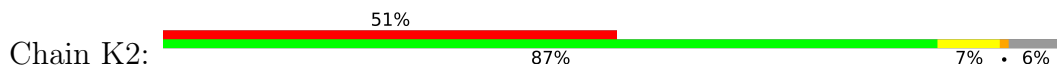
● Molecule 12: Nuclear pore glycoprotein p62

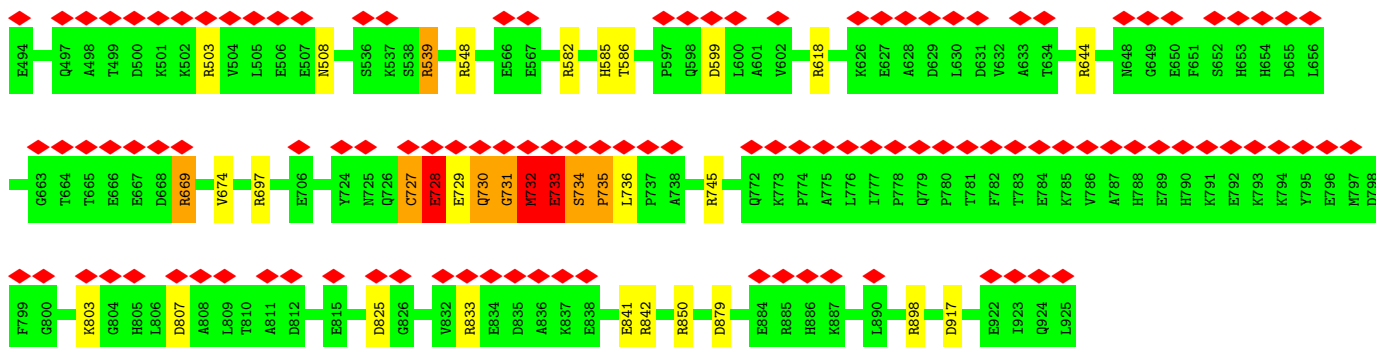


● Molecule 12: Nuclear pore glycoprotein p62

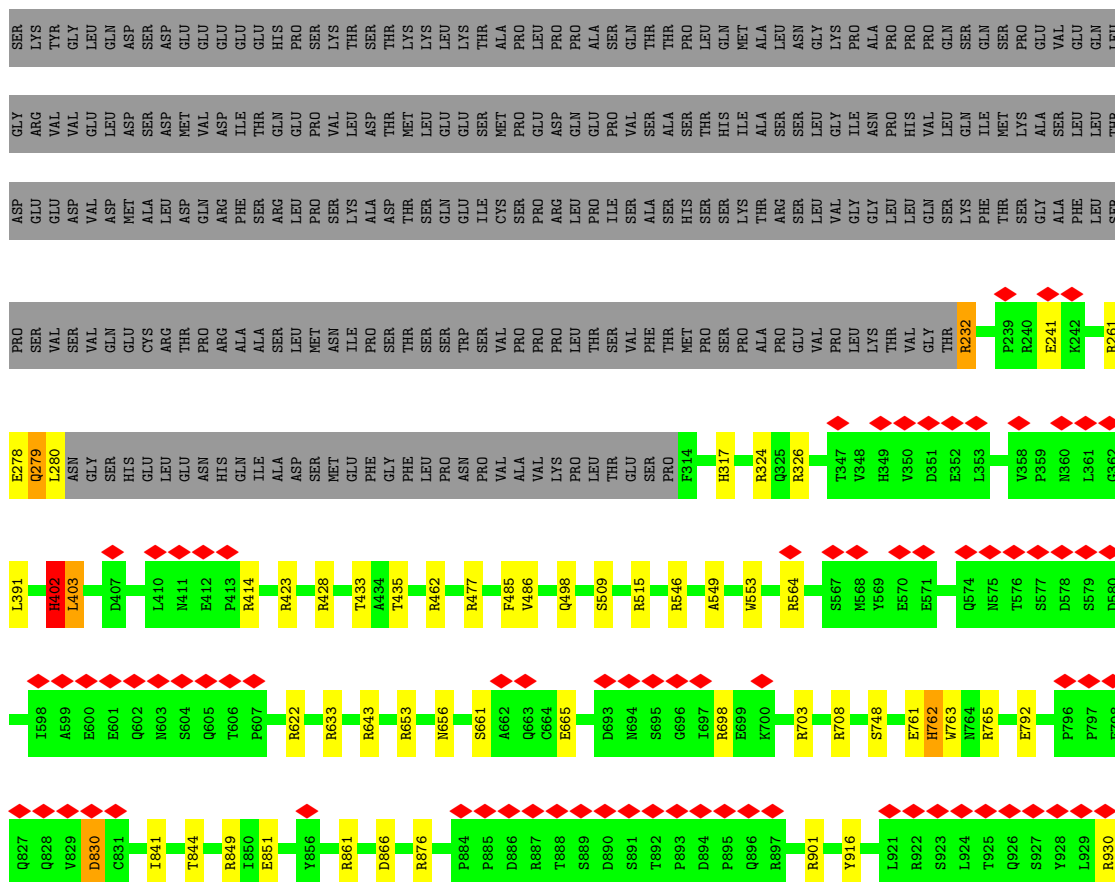


• Molecule 13: Nuclear pore complex protein Nup133

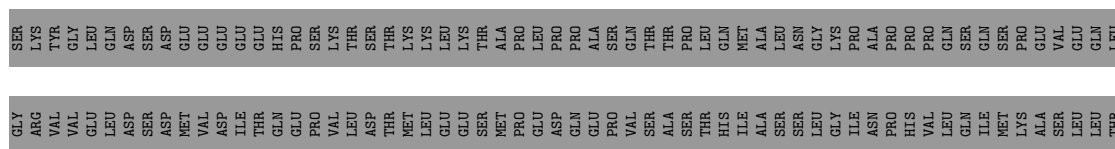


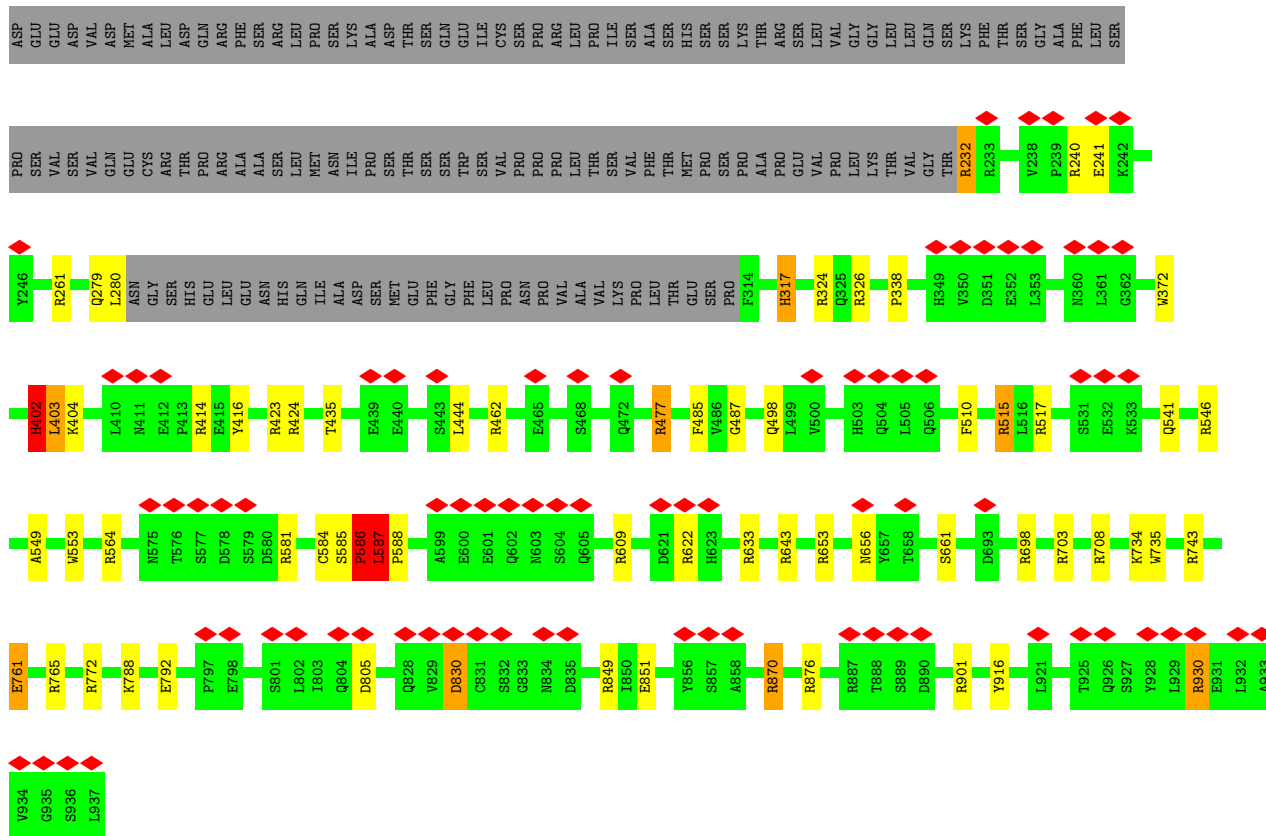


• Molecule 15: Nuclear pore complex protein Nup96

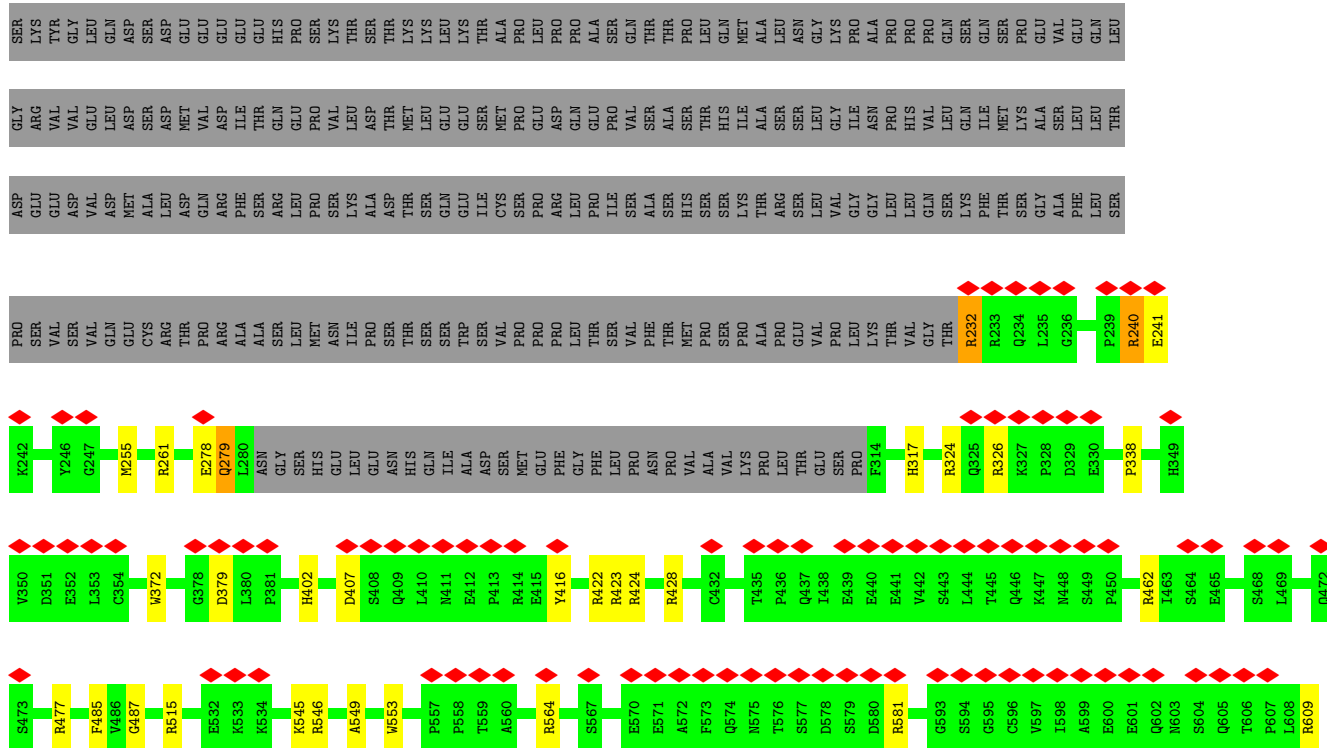


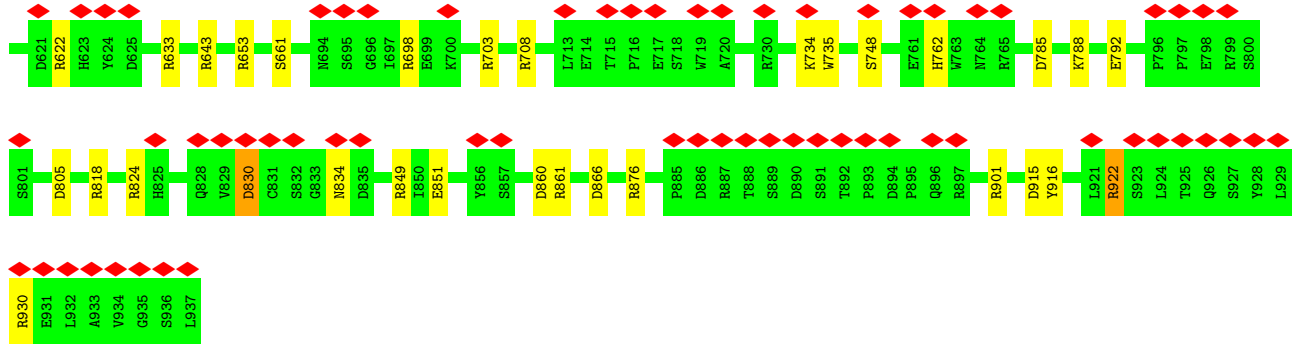
• Molecule 15: Nuclear pore complex protein Nup96



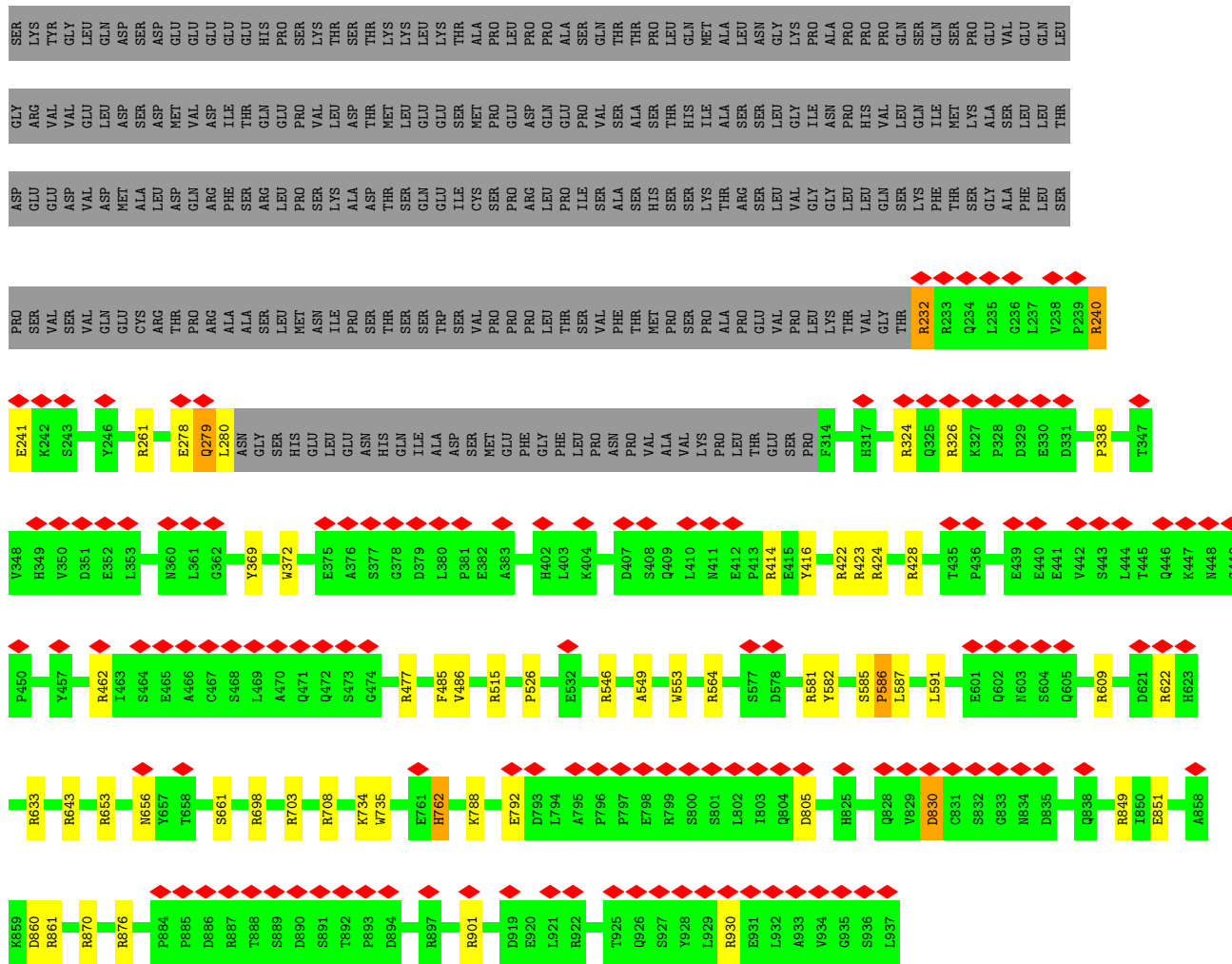


• Molecule 15: Nuclear pore complex protein Nup96

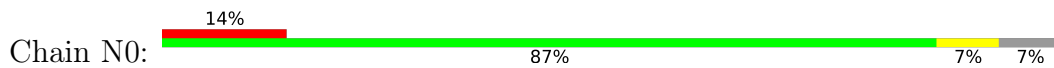


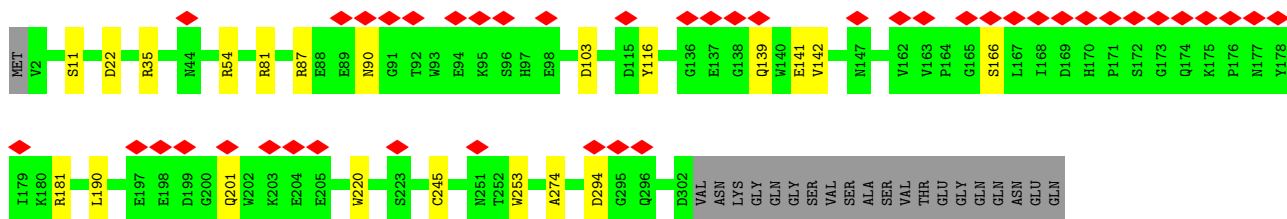


• Molecule 15: Nuclear pore complex protein Nup96

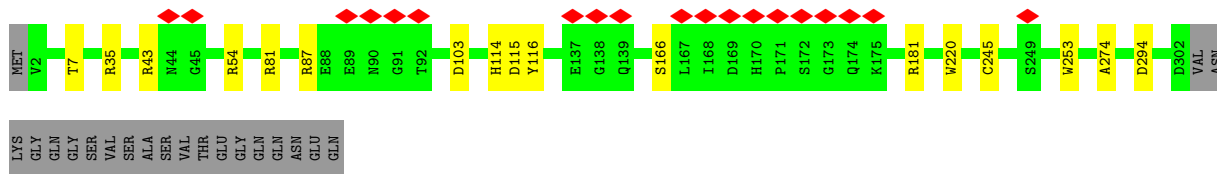
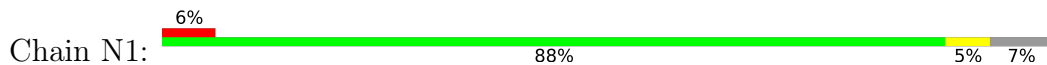


• Molecule 16: Protein SEC13 homolog

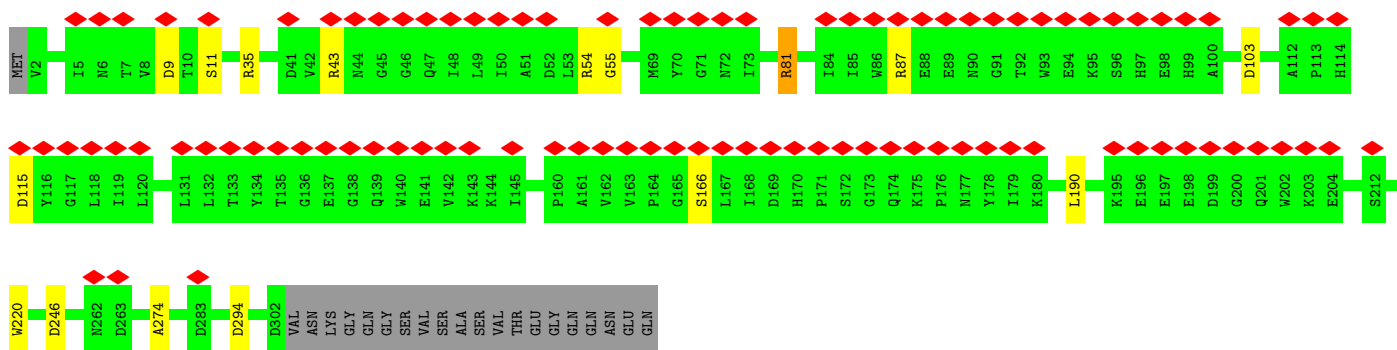
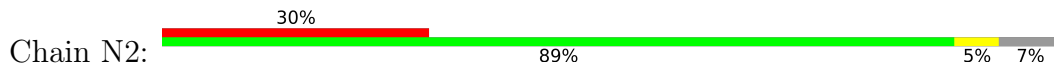




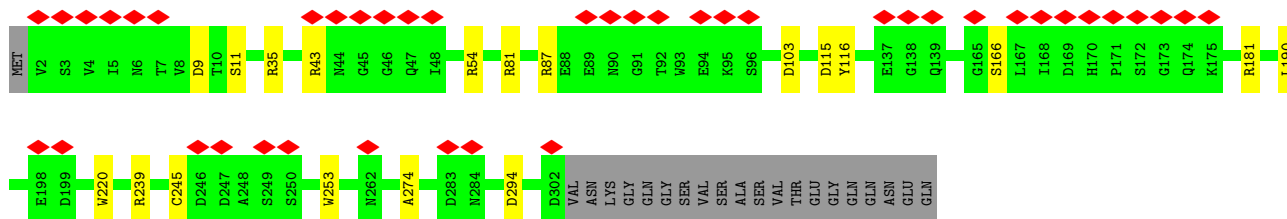
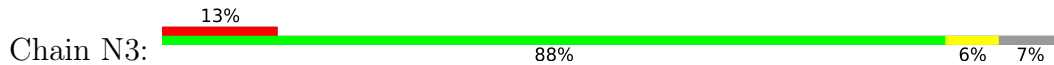
• Molecule 16: Protein SEC13 homolog



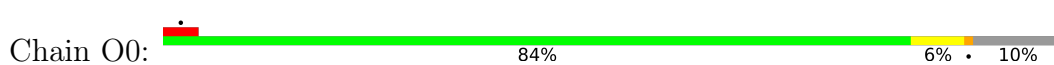
• Molecule 16: Protein SEC13 homolog

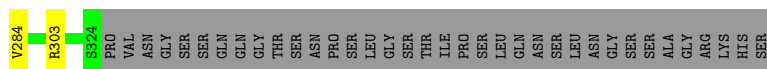


• Molecule 16: Protein SEC13 homolog

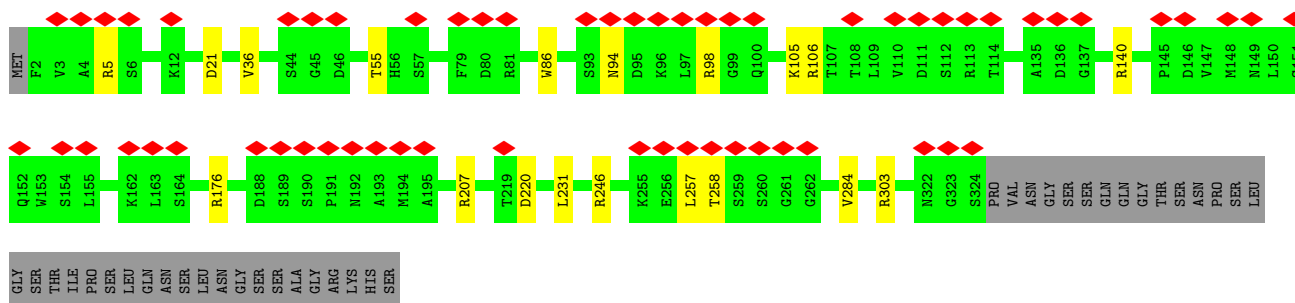
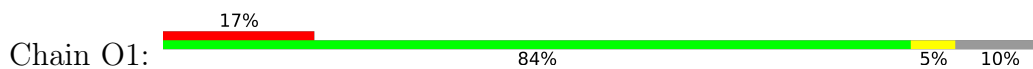


• Molecule 17: Nucleoporin SEH1

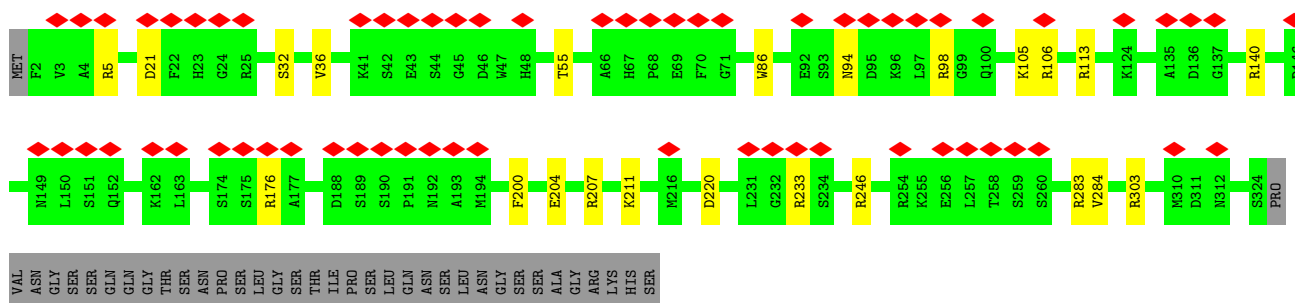
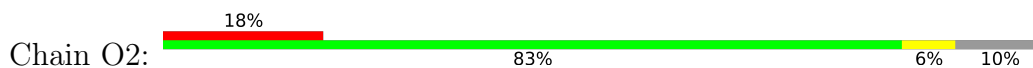




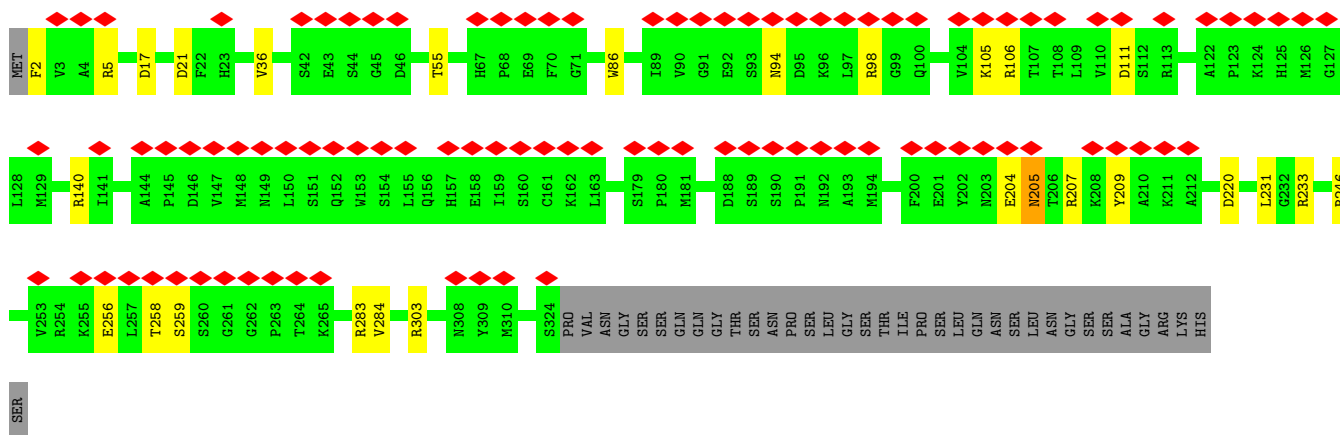
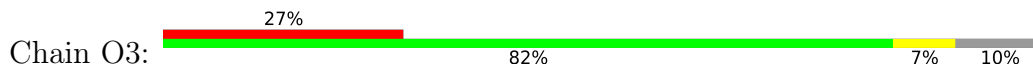
• Molecule 17: Nucleoprin SEH1



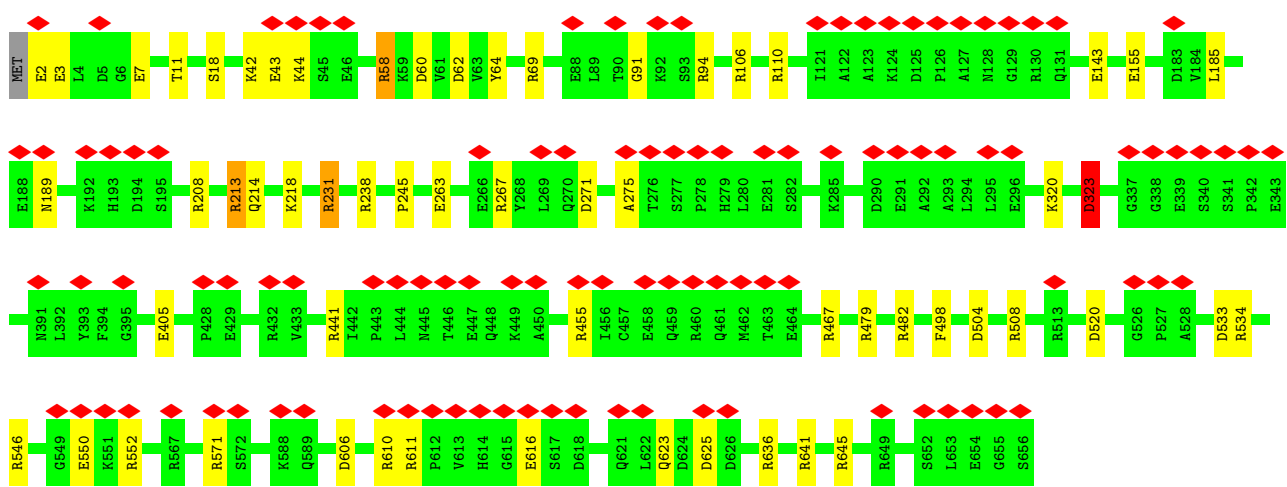
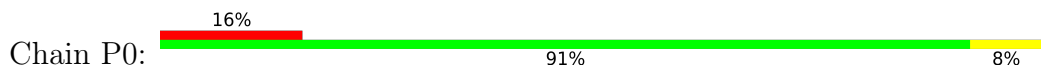
• Molecule 17: Nucleoprin SEH1



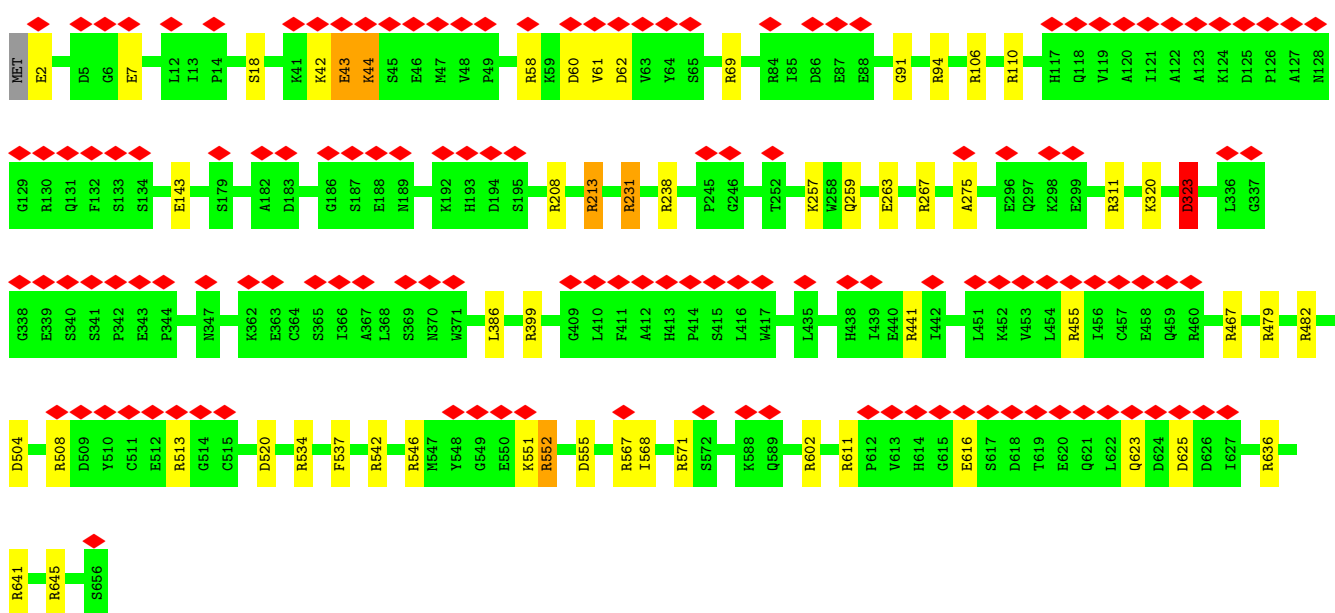
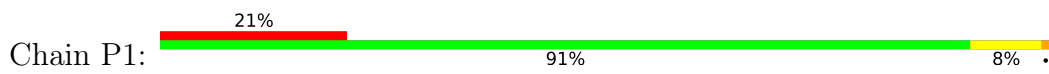
• Molecule 17: Nucleoprin SEH1



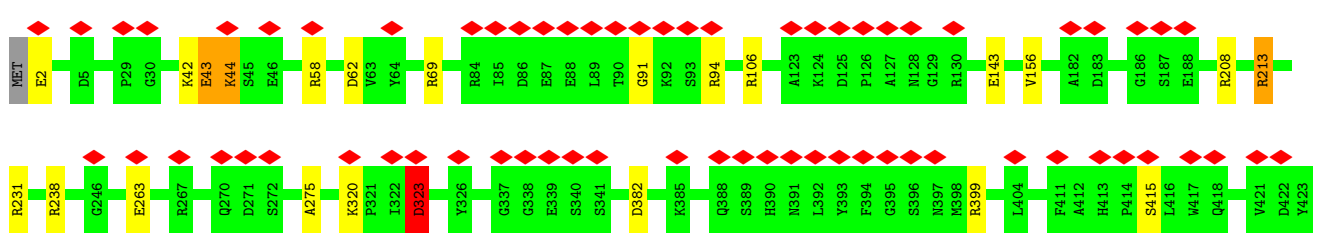
• Molecule 18: Nuclear pore complex protein Nup85

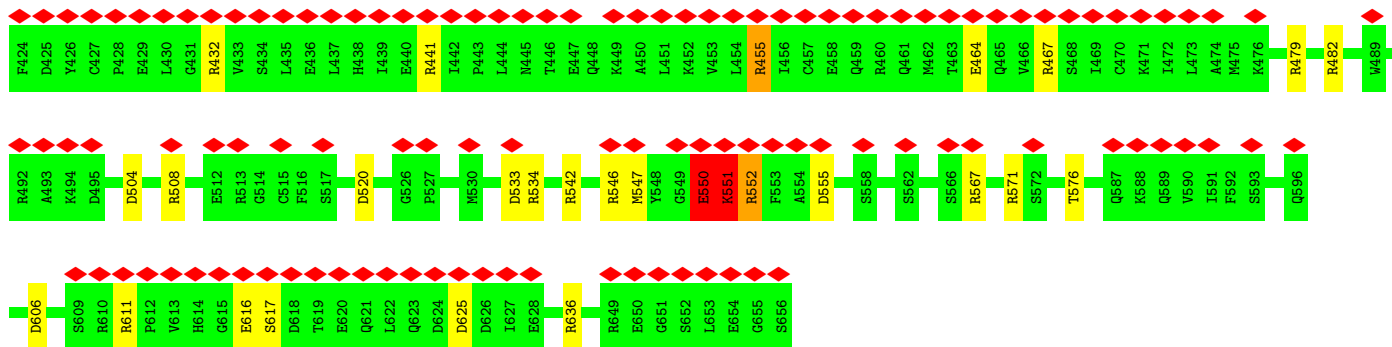


• Molecule 18: Nuclear pore complex protein Nup85

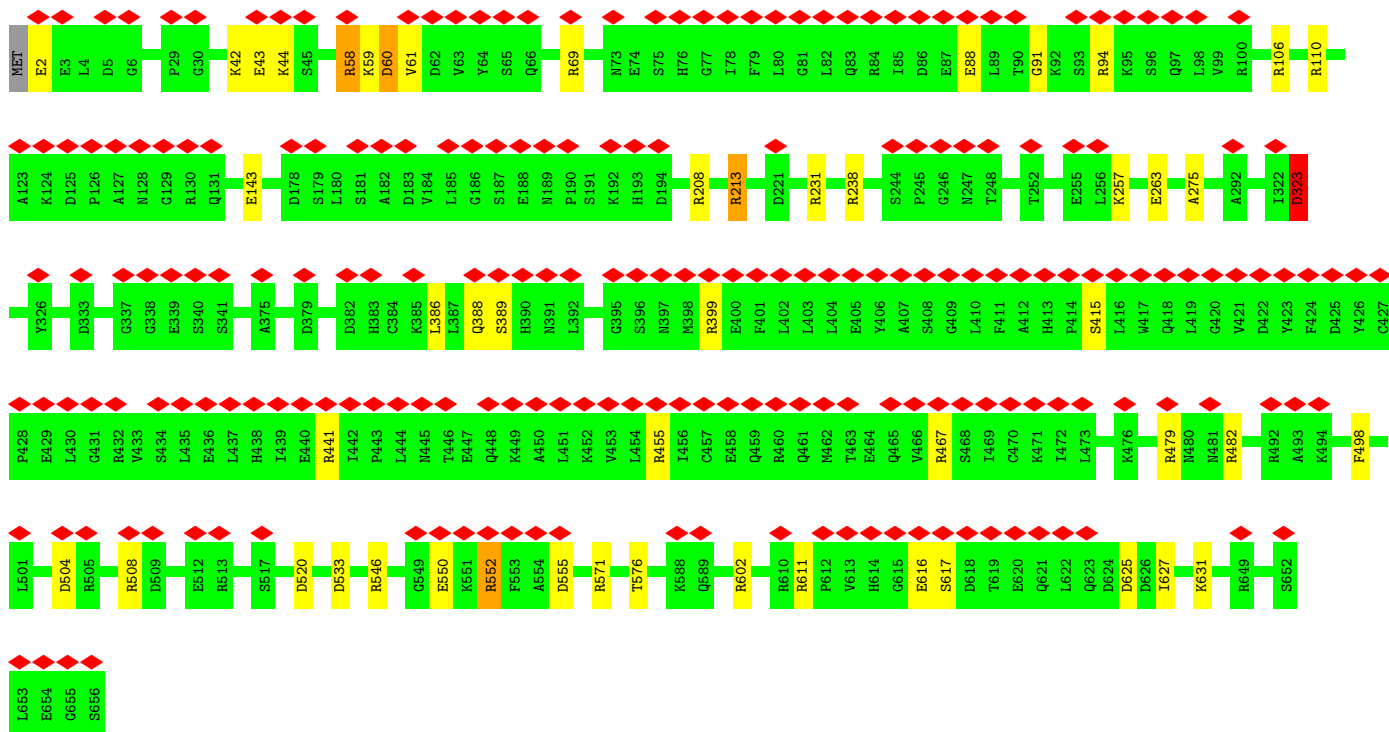
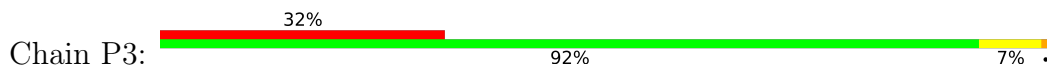


• Molecule 18: Nuclear pore complex protein Nup85

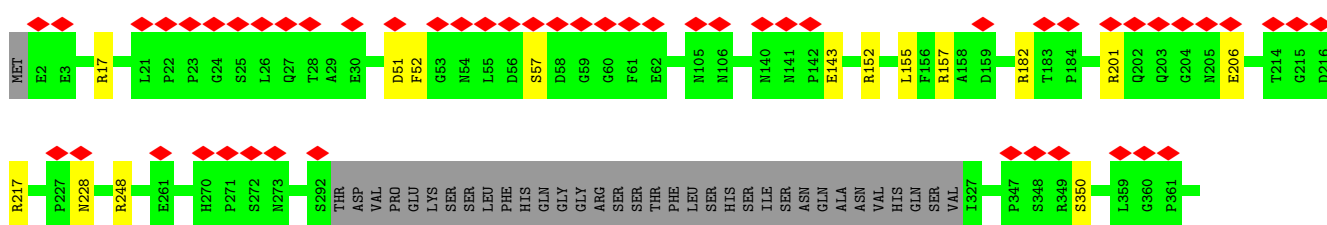




• Molecule 18: Nuclear pore complex protein Nup85

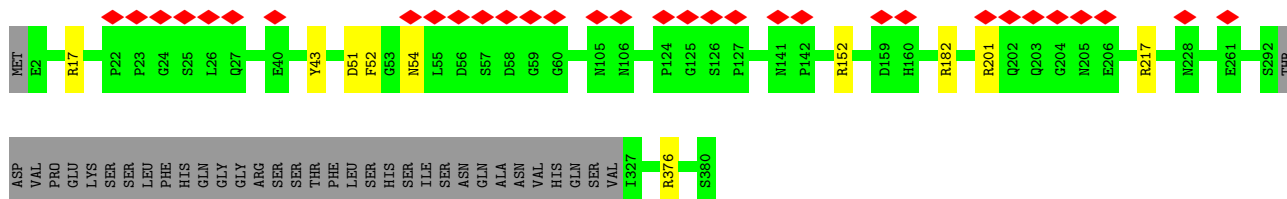
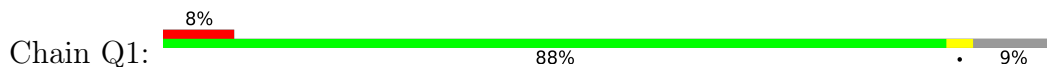


• Molecule 19: Nucleoporin Nup43

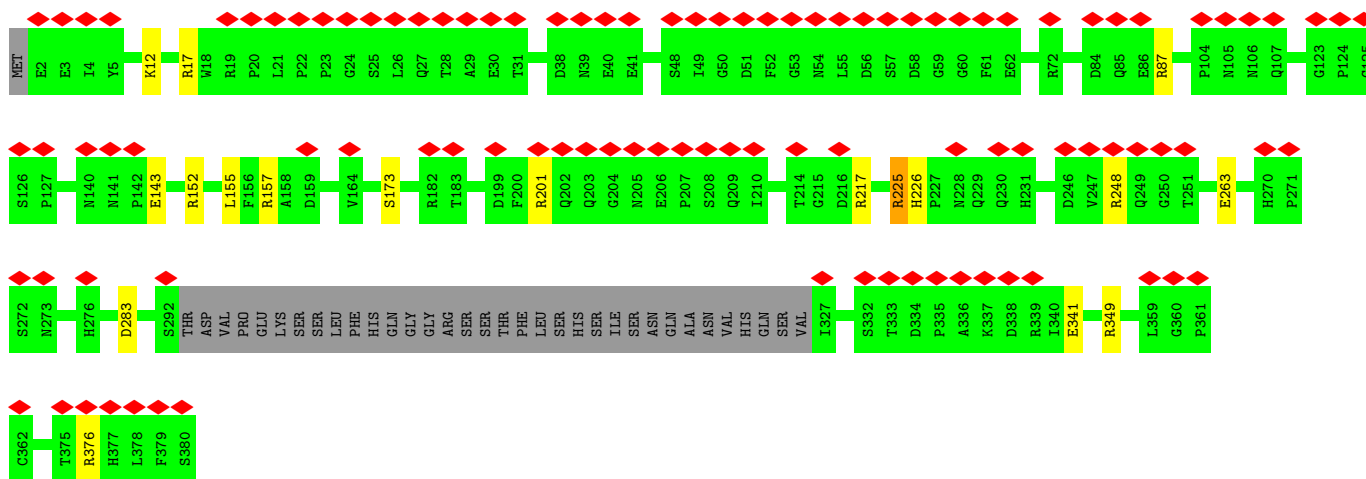
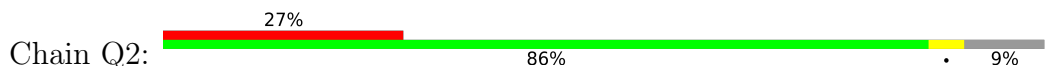




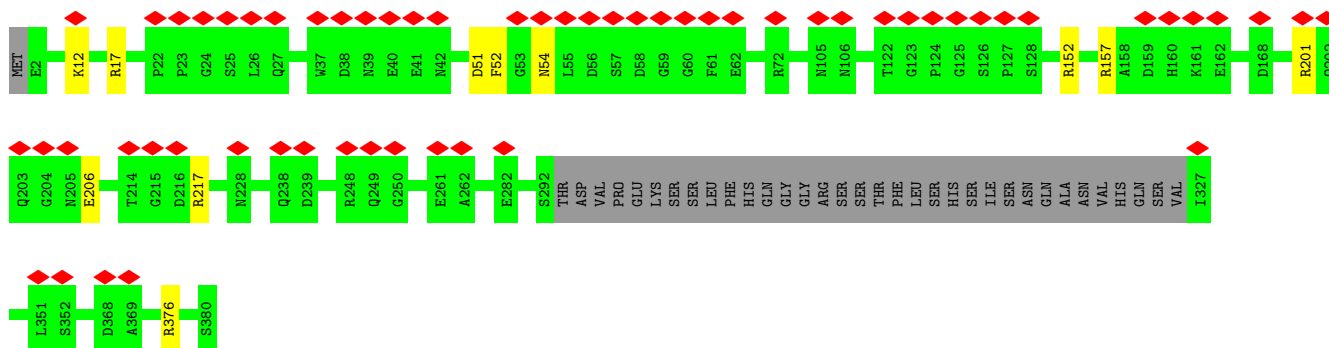
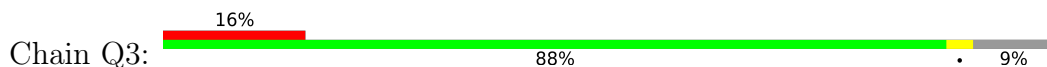
• Molecule 19: Nucleoporin Nup43



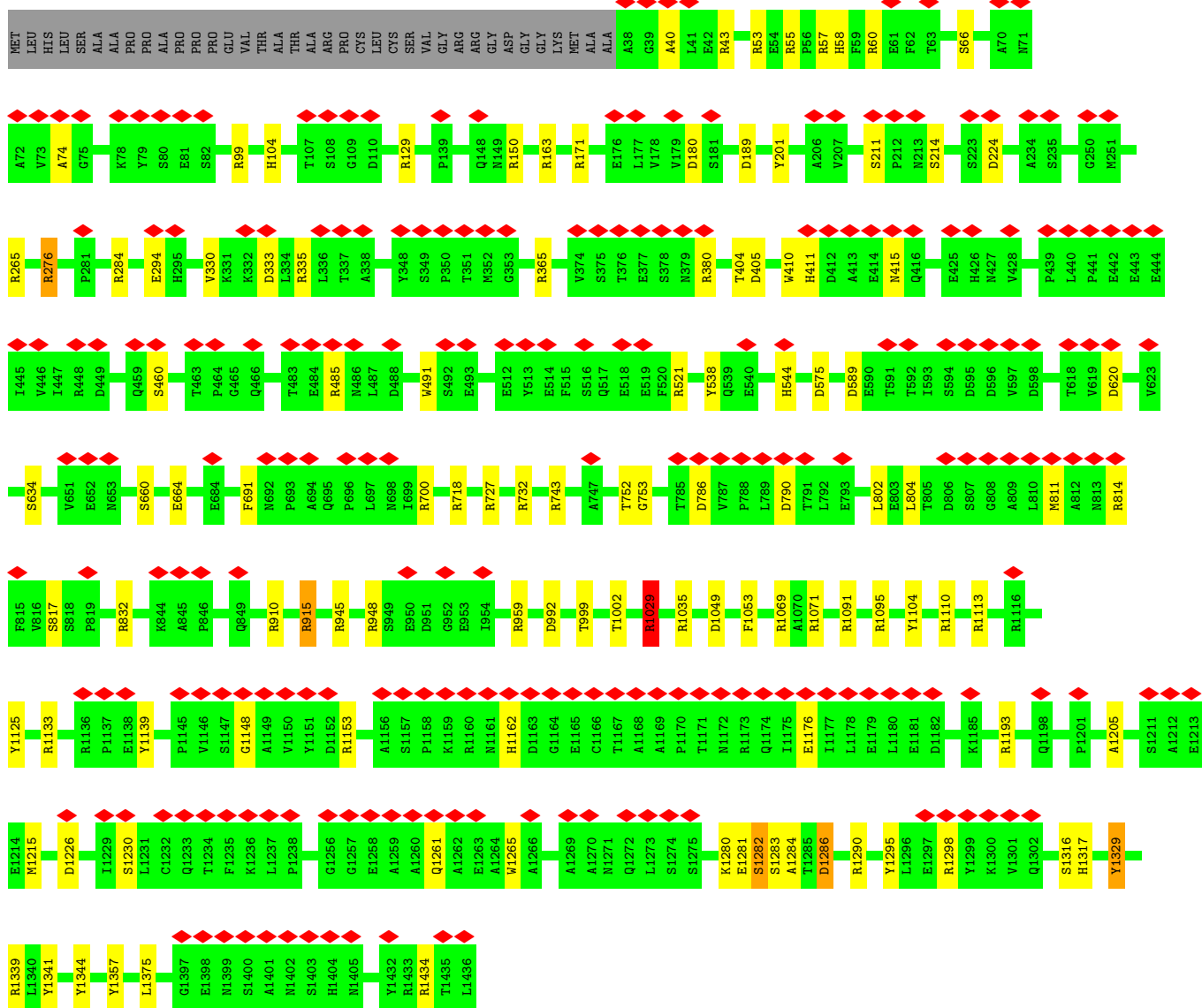
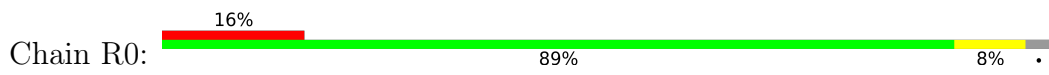
• Molecule 19: Nucleoporin Nup43



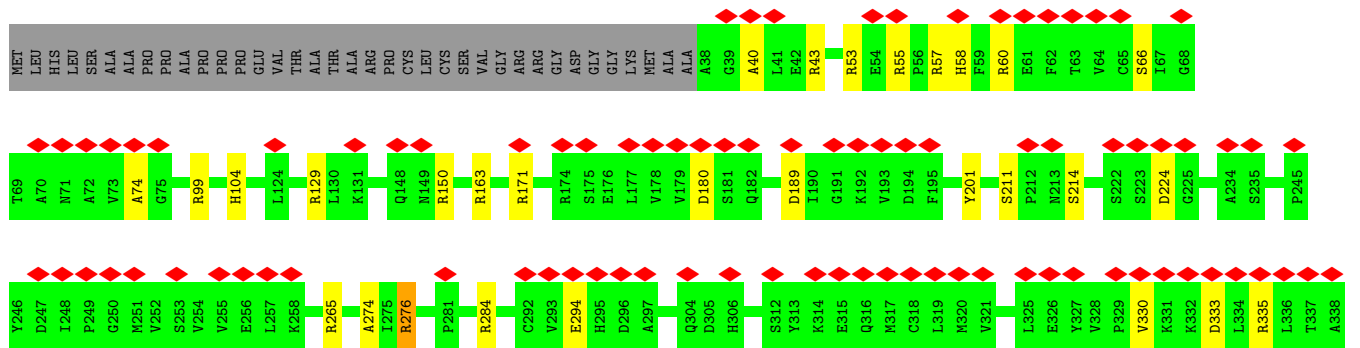
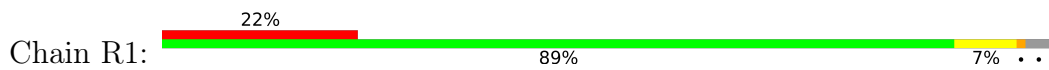
• Molecule 19: Nucleoporin Nup43

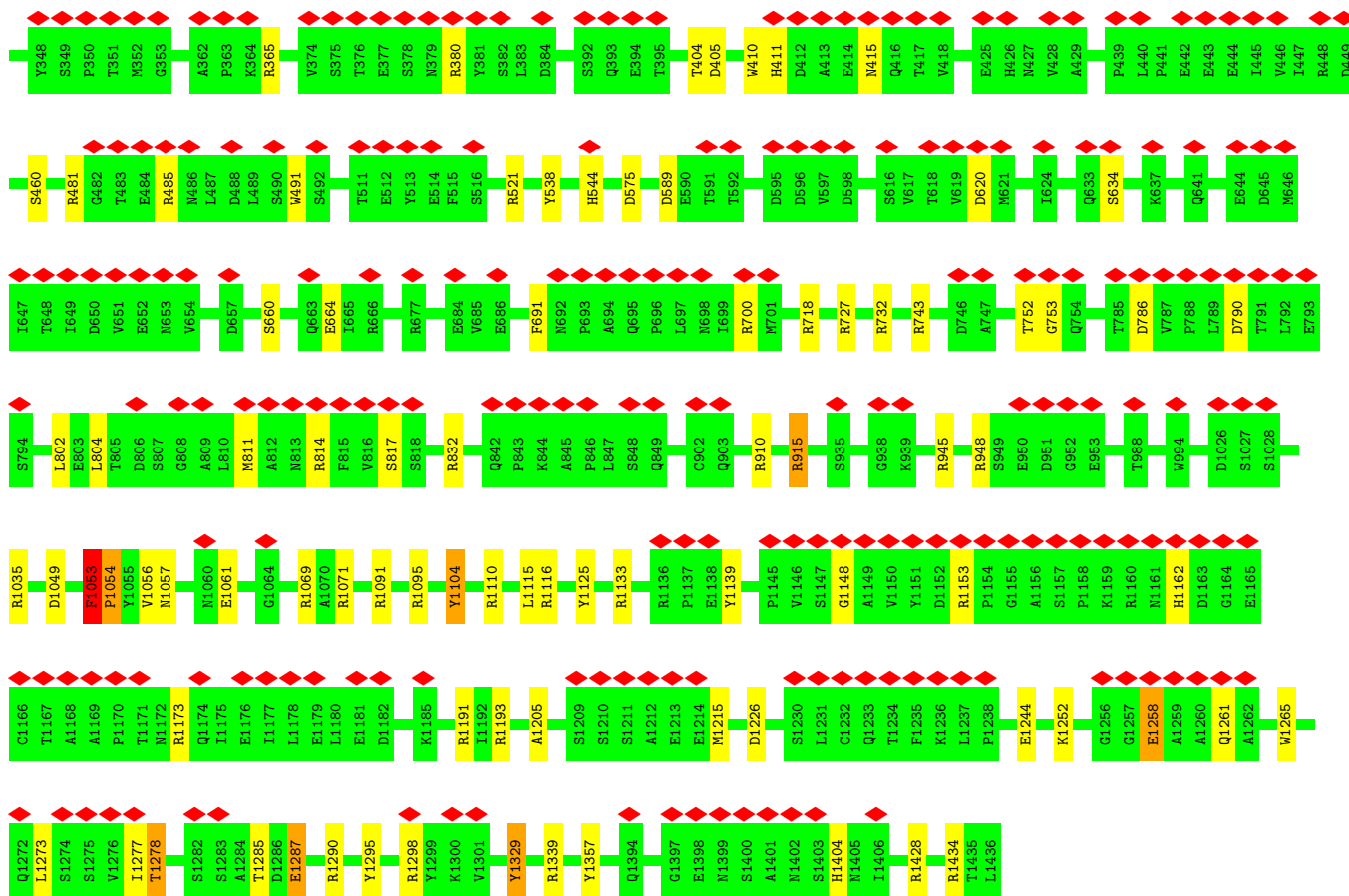


• Molecule 20: Nuclear pore complex protein Nup160

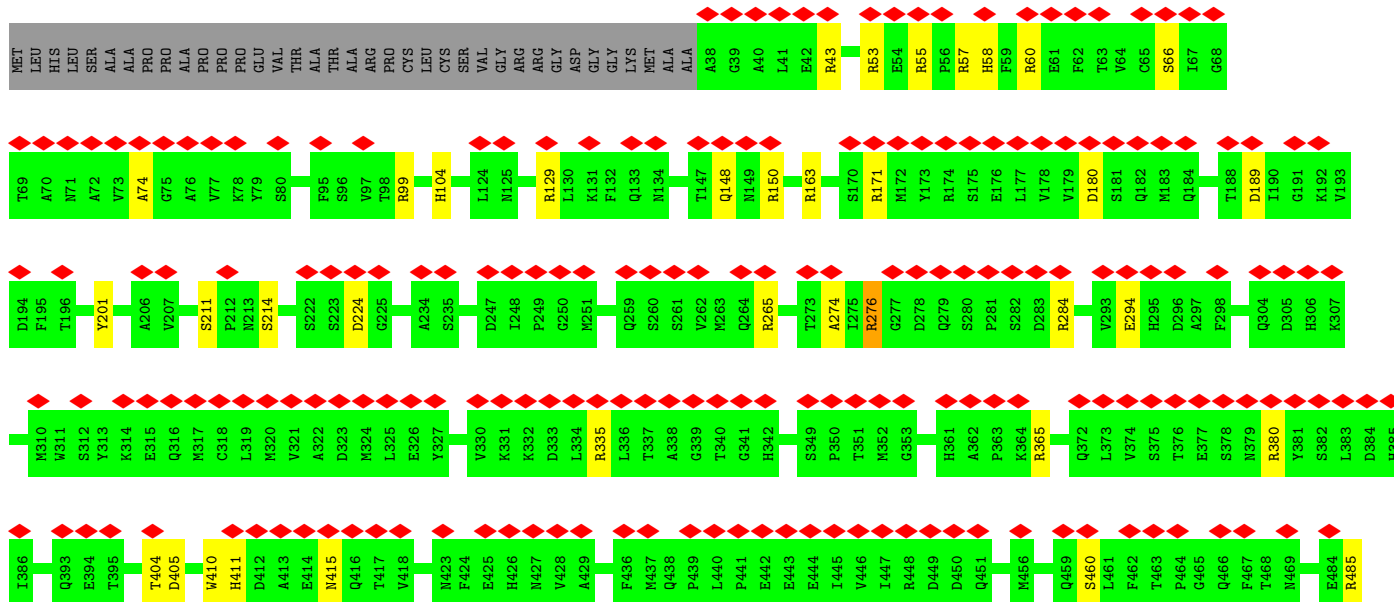
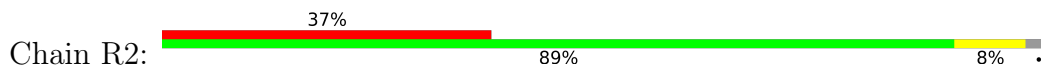


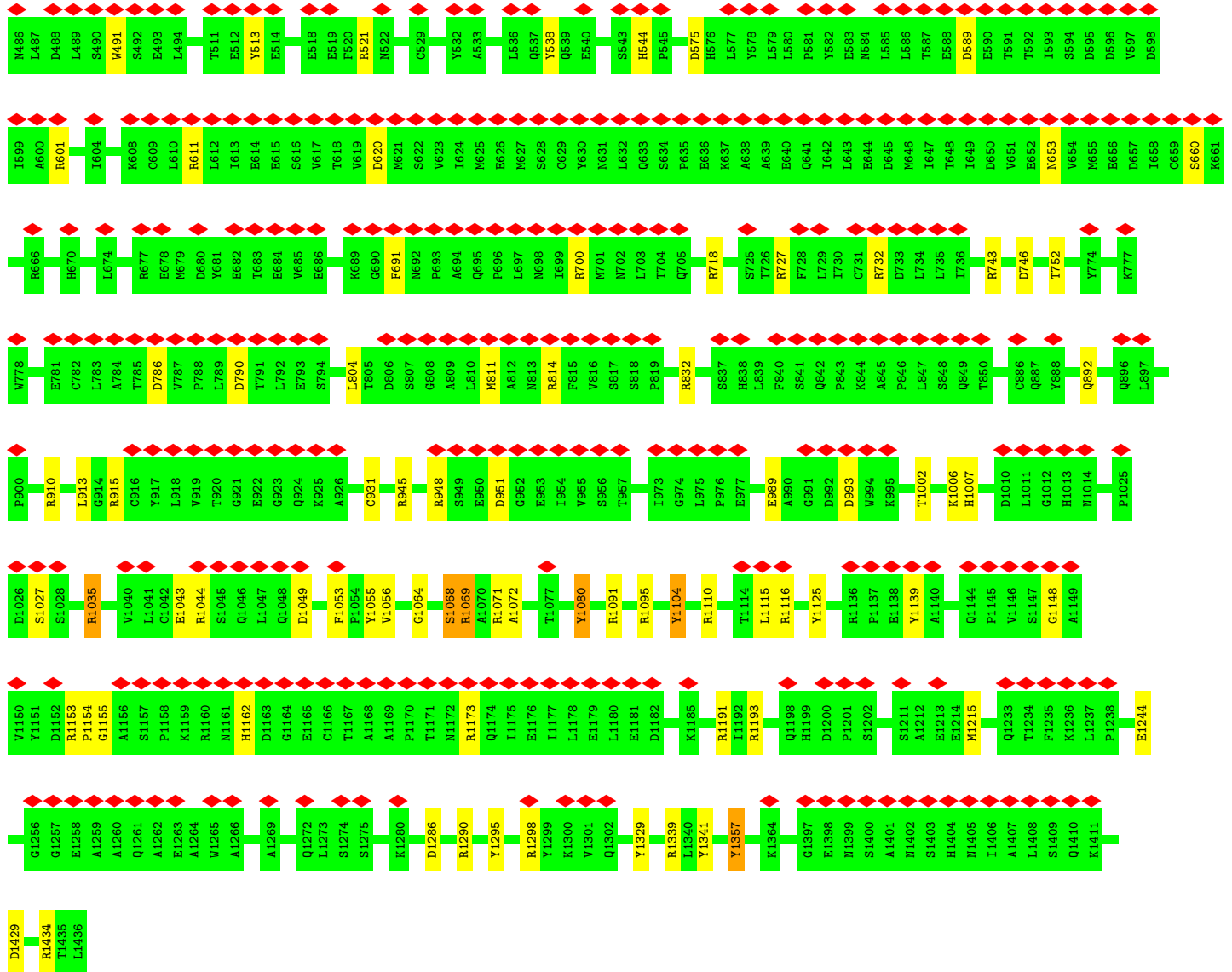
• Molecule 20: Nuclear pore complex protein Nup160



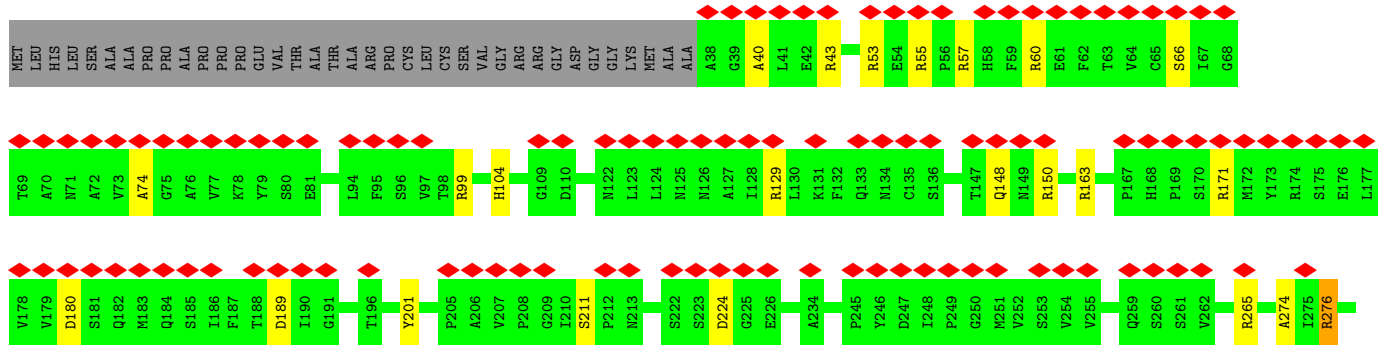


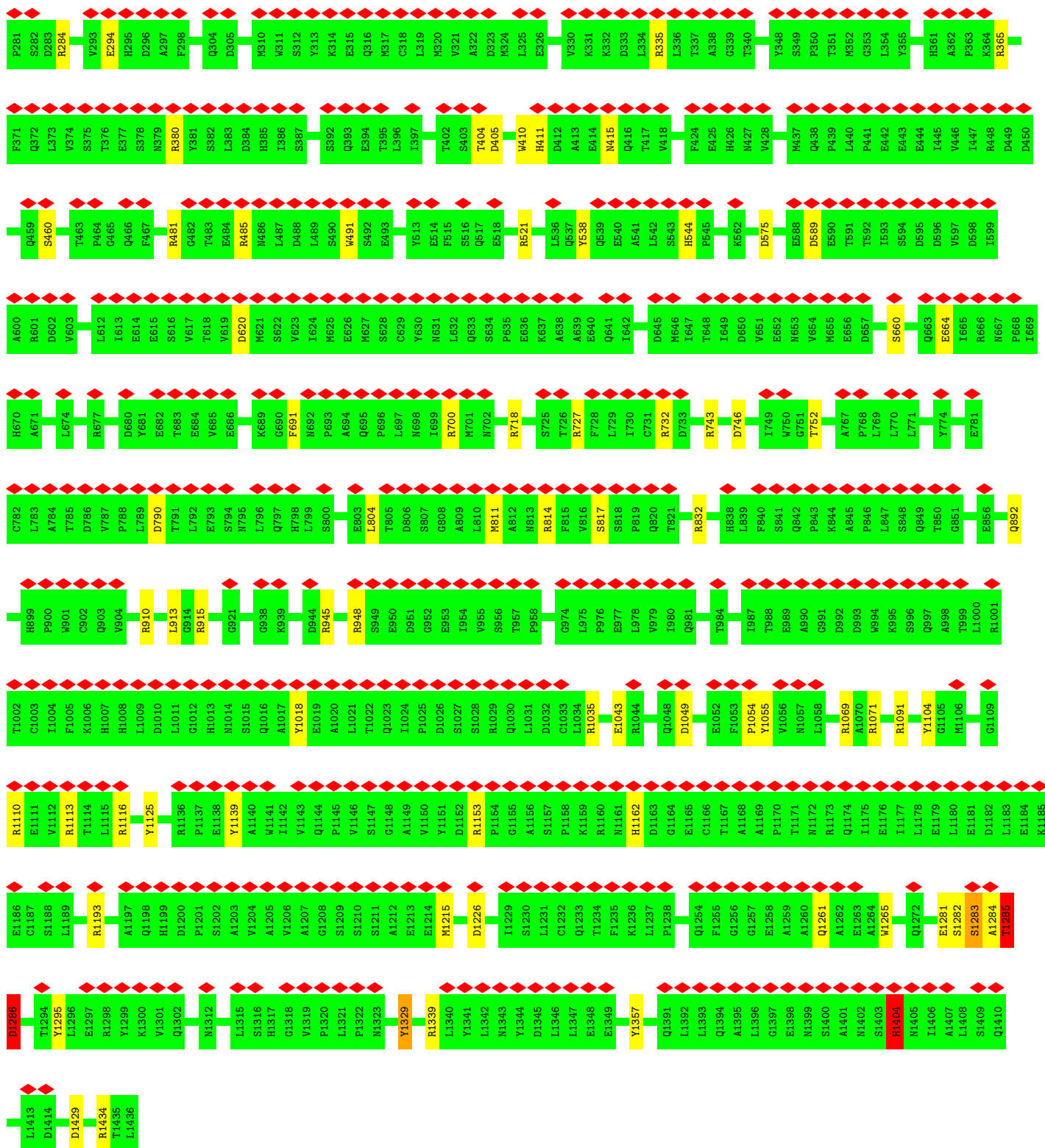
• Molecule 20: Nuclear pore complex protein Nup160



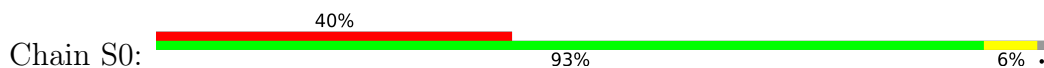


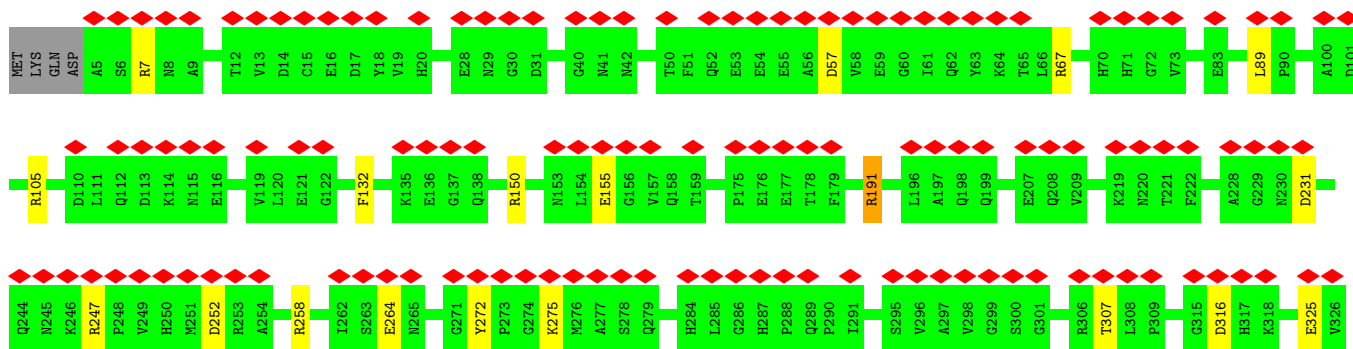
• Molecule 20: Nuclear pore complex protein Nup160



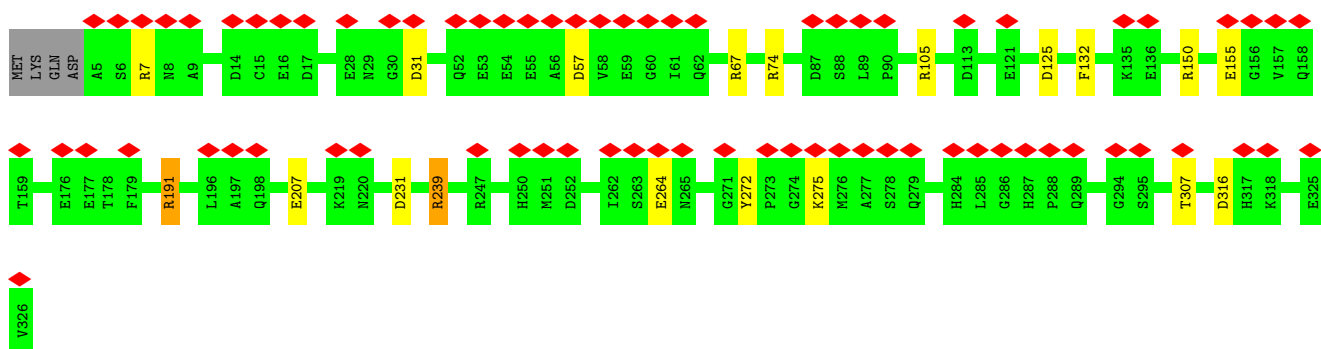
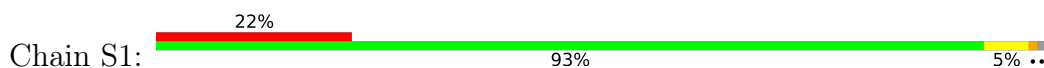


• Molecule 21: Nucleoporin Nup37

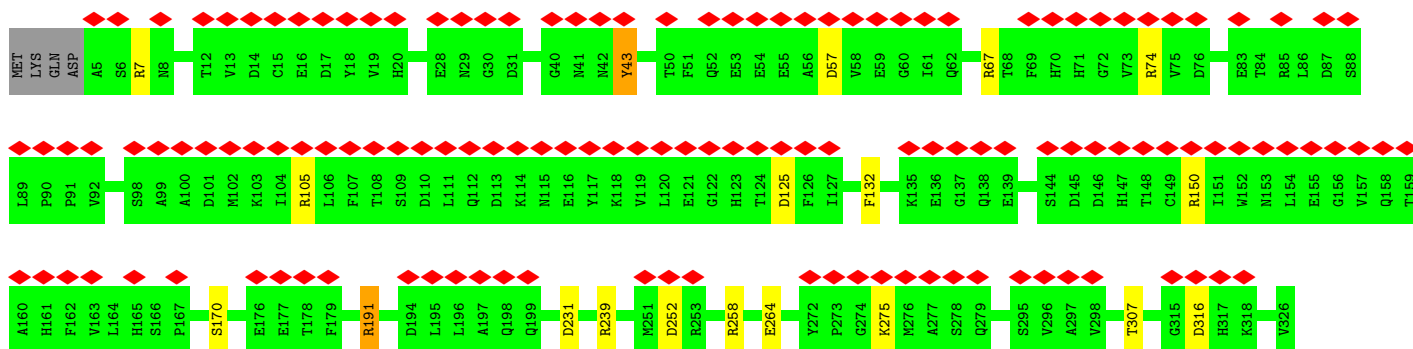
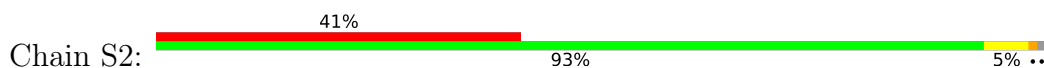




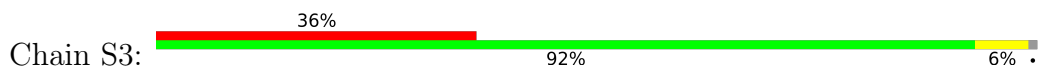
• Molecule 21: Nucleoporin Nup37

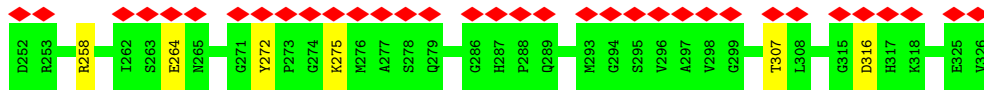
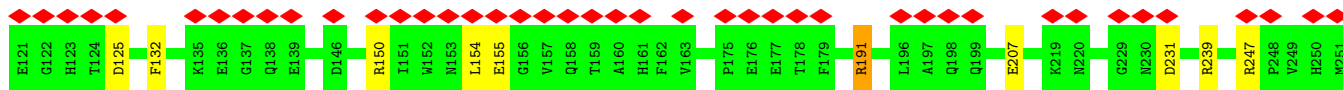


• Molecule 21: Nucleoporin Nup37

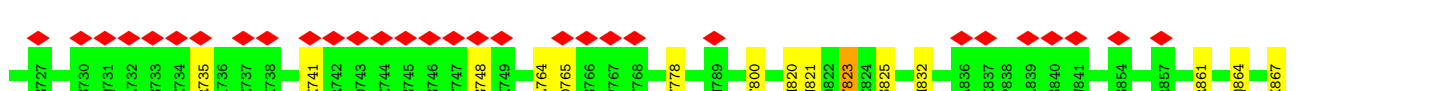
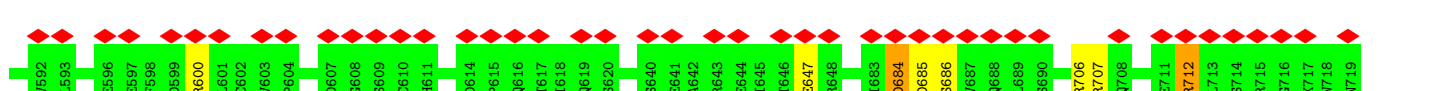
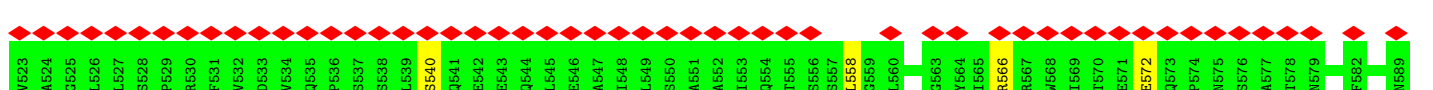
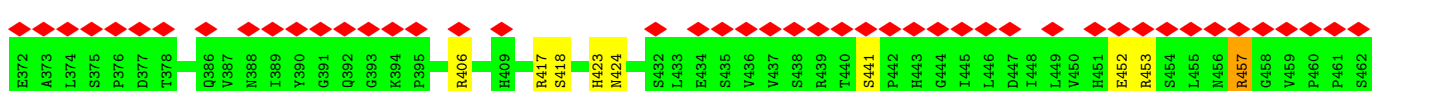
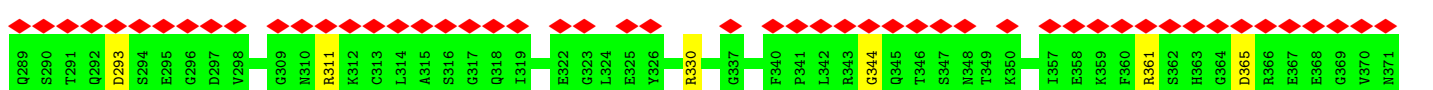
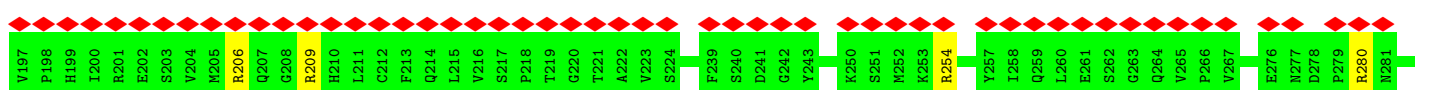
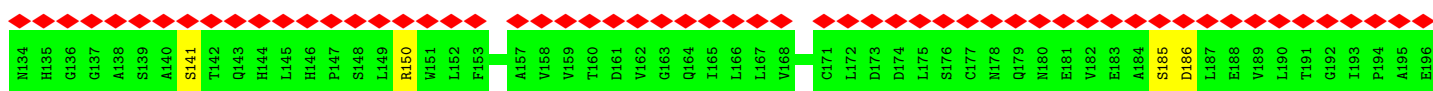
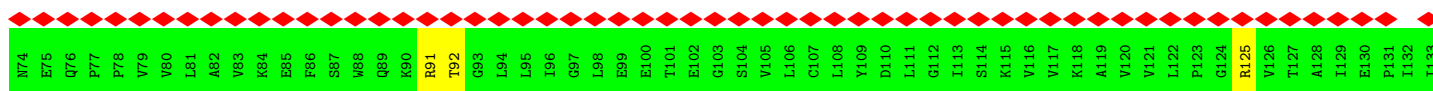
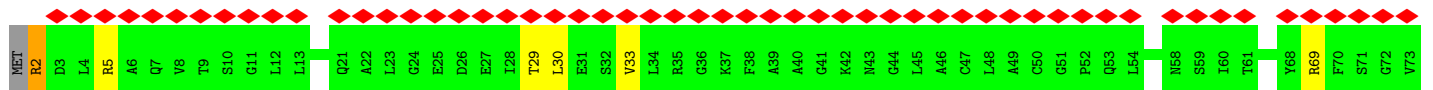
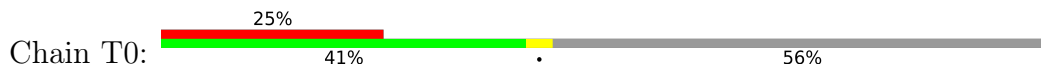


• Molecule 21: Nucleoporin Nup37





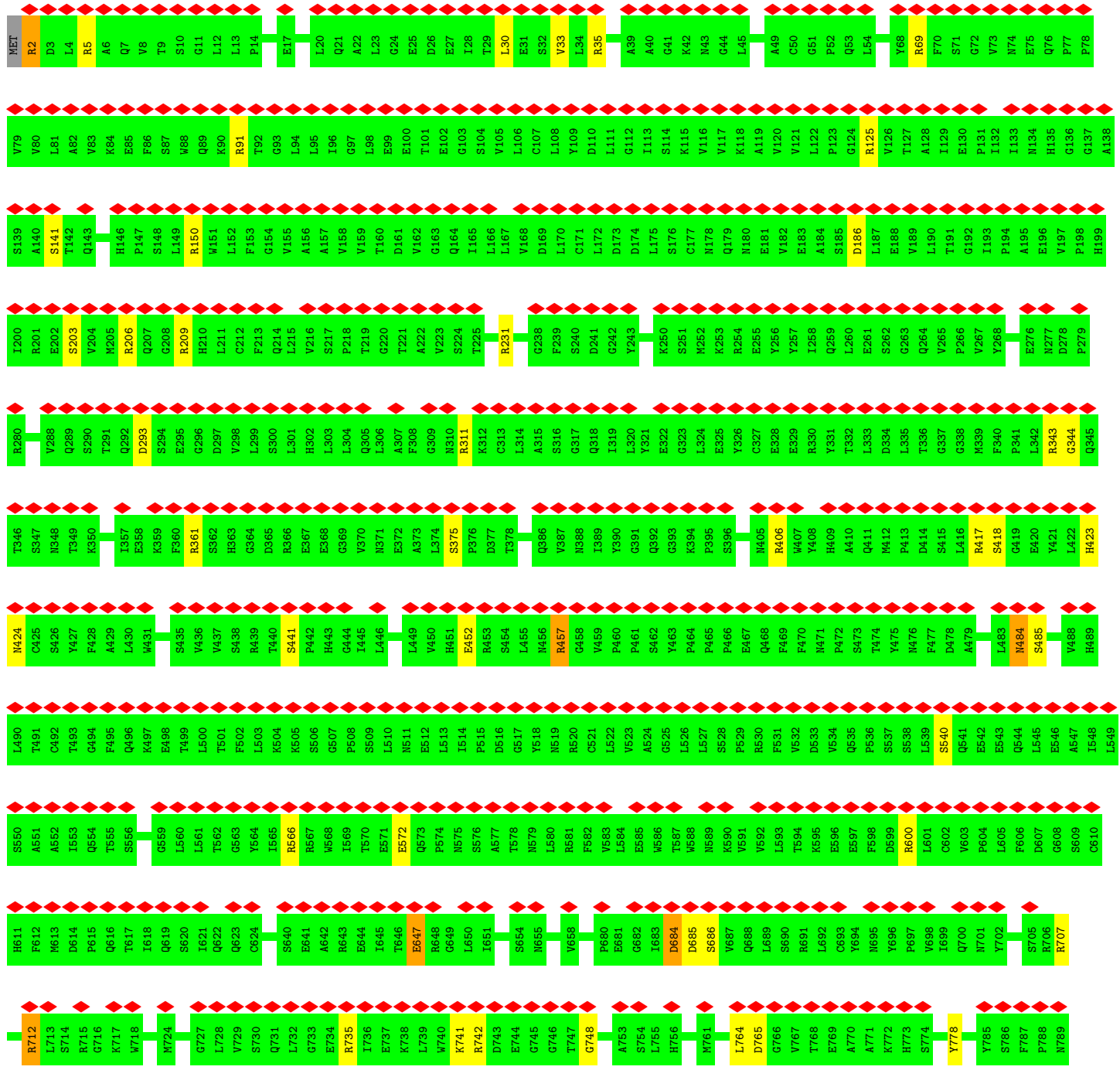
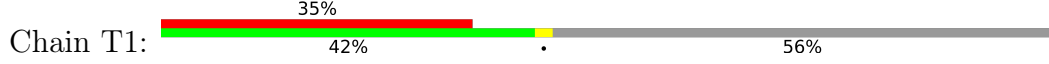
• Molecule 22: Protein ELYS



ILE ARG THR ARG THR SER TYR PRO LYS THR LYS GLN ALA SER LYS ASN THR GLU LYS GLU SER ALA TEP SER PRO PRO ILE GLU ILE ARG ILE SER PRO LEU ALA SER PRO ASP GLY VAL LYS SER PRO ARG LYS THR GLU VAL THR GLY THR GLY LYS ARG ASN ARG LYS

LEU SER TYR PRO LYS GLN ILE LEU ARG ARG MET LEU

● Molecule 22: Protein ELYS



4 Experimental information

Property	Value	Source
EM reconstruction method	SUBTOMOGRAM AVERAGING	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of subtomograms used	7711	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING ONLY	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	120	Depositor
Minimum defocus (nm)	2000	Depositor
Maximum defocus (nm)	4000	Depositor
Magnification	Not provided	
Image detector	GATAN K2 QUANTUM (4k x 4k)	Depositor
Maximum map value	82.185	Depositor
Minimum map value	-69.686	Depositor
Average map value	0.077	Depositor
Map value standard deviation	0.791	Depositor
Recommended contour level	3.5	Depositor
Map size (\AA)	1941.1199, 1941.1199, 1941.1199	wwPDB
Map dimensions	576, 576, 576	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	3.37, 3.37, 3.37	Depositor

5 Model quality i

5.1 Standard geometry i

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	00	0.69	0/6212	1.06	25/8405 (0.3%)
1	01	0.69	0/6212	1.05	23/8405 (0.3%)
1	02	0.69	0/6212	1.04	24/8405 (0.3%)
1	03	0.69	0/6212	1.05	23/8405 (0.3%)
1	04	0.69	0/6212	1.04	20/8405 (0.2%)
2	10	0.66	0/14350	1.04	51/19560 (0.3%)
2	11	0.66	0/14350	1.04	52/19560 (0.3%)
2	12	0.66	0/14350	1.04	49/19560 (0.3%)
2	13	0.66	0/14350	1.04	51/19560 (0.3%)
2	14	0.66	0/14350	1.03	51/19560 (0.3%)
2	15	0.66	0/14350	1.03	50/19560 (0.3%)
2	16	0.66	0/14350	1.03	50/19560 (0.3%)
2	17	0.66	0/14350	1.03	51/19560 (0.3%)
3	40	0.68	0/3007	1.07	8/4114 (0.2%)
3	41	0.68	0/3007	1.06	10/4114 (0.2%)
4	A0	0.72	0/6687	1.10	34/9036 (0.4%)
4	A1	0.71	0/6687	1.07	31/9036 (0.3%)
4	A2	0.72	0/6687	1.09	34/9036 (0.4%)
4	A3	0.71	0/6687	1.06	30/9036 (0.3%)
4	A4	0.71	0/5972	1.08	31/8068 (0.4%)
4	A5	0.71	0/5972	1.09	39/8068 (0.5%)
4	A6	0.71	0/5972	1.04	25/8068 (0.3%)
5	B0	0.68	0/14018	1.02	39/19022 (0.2%)
5	B1	0.68	0/14018	1.03	36/19022 (0.2%)
6	C0	0.69	0/16330	1.04	75/22131 (0.3%)
6	C1	0.69	0/16330	1.04	73/22131 (0.3%)
6	C2	0.68	0/16330	1.00	50/22131 (0.2%)
6	C3	0.68	1/16330 (0.0%)	1.06	80/22131 (0.4%)
6	C4	0.69	0/16330	1.02	63/22131 (0.3%)
7	D0	0.67	0/10568	1.02	40/14320 (0.3%)
7	D1	0.68	0/10568	1.02	39/14320 (0.3%)
7	D2	0.67	0/10568	1.02	39/14320 (0.3%)
7	D3	0.68	0/10568	1.03	41/14320 (0.3%)
7	D4	0.67	0/10568	1.01	38/14320 (0.3%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
7	D5	0.68	0/10568	1.03	43/14320 (0.3%)
8	E0	0.73	0/4563	1.00	11/6214 (0.2%)
8	E1	0.73	0/4563	0.98	10/6214 (0.2%)
9	F0	0.72	0/1882	1.12	6/2556 (0.2%)
9	F1	0.70	0/1882	1.05	4/2556 (0.2%)
9	F2	0.72	0/1882	1.17	11/2556 (0.4%)
9	F3	0.70	0/1882	1.08	9/2556 (0.4%)
10	H0	0.65	0/3114	1.04	14/4211 (0.3%)
10	H1	0.65	0/3114	1.03	16/4211 (0.4%)
10	H2	0.64	0/3114	1.03	14/4211 (0.3%)
10	H3	0.64	0/3114	1.02	15/4211 (0.4%)
11	I0	0.65	0/1416	0.97	3/1911 (0.2%)
11	I1	0.65	0/1416	0.99	3/1911 (0.2%)
11	I2	0.65	0/1416	0.98	3/1911 (0.2%)
11	I3	0.65	0/1416	0.98	3/1911 (0.2%)
12	J0	0.62	0/1420	1.00	6/1915 (0.3%)
12	J1	0.62	0/1420	1.01	6/1915 (0.3%)
12	J2	0.62	0/1420	1.00	6/1915 (0.3%)
12	J3	0.62	0/1420	1.02	6/1915 (0.3%)
12	J4	0.63	0/1420	1.00	4/1915 (0.2%)
13	K0	0.69	0/8740	1.04	27/11848 (0.2%)
13	K1	0.69	1/8740 (0.0%)	1.22	37/11848 (0.3%)
13	K2	0.68	0/8740	1.02	28/11848 (0.2%)
13	K3	0.68	0/8740	1.02	27/11848 (0.2%)
14	L0	0.71	0/6518	1.07	35/8819 (0.4%)
14	L1	0.71	0/6518	1.07	32/8819 (0.4%)
14	L2	0.70	0/6518	1.06	29/8819 (0.3%)
14	L3	0.72	2/6518 (0.0%)	1.10	41/8819 (0.5%)
15	M0	0.70	0/5588	1.13	30/7581 (0.4%)
15	M1	0.70	0/5588	1.13	35/7581 (0.5%)
15	M2	0.70	0/5588	1.11	35/7581 (0.5%)
15	M3	0.69	0/5588	1.11	35/7581 (0.5%)
16	N0	0.67	0/2419	1.05	5/3301 (0.2%)
16	N1	0.67	0/2419	1.04	7/3301 (0.2%)
16	N2	0.67	0/2419	1.04	5/3301 (0.2%)
16	N3	0.67	0/2419	1.04	7/3301 (0.2%)
17	O0	0.67	0/2593	1.04	7/3520 (0.2%)
17	O1	0.66	0/2593	1.03	7/3520 (0.2%)
17	O2	0.67	0/2593	1.05	10/3520 (0.3%)
17	O3	0.66	0/2593	1.06	8/3520 (0.2%)
18	P0	0.70	0/5365	1.05	25/7257 (0.3%)
18	P1	0.70	0/5365	1.05	31/7257 (0.4%)
18	P2	0.70	0/5365	1.05	26/7257 (0.4%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
18	P3	0.70	0/5365	1.04	23/7257 (0.3%)
19	Q0	0.67	0/2775	1.05	9/3786 (0.2%)
19	Q1	0.67	0/2775	1.02	7/3786 (0.2%)
19	Q2	0.67	0/2775	1.05	10/3786 (0.3%)
19	Q3	0.66	0/2775	1.04	7/3786 (0.2%)
20	R0	0.71	0/11371	1.05	48/15446 (0.3%)
20	R1	0.70	0/11371	1.06	55/15446 (0.4%)
20	R2	0.71	0/11371	1.06	57/15446 (0.4%)
20	R3	0.70	0/11371	1.05	49/15446 (0.3%)
21	S0	0.70	0/2623	1.03	8/3568 (0.2%)
21	S1	0.69	0/2623	1.02	7/3568 (0.2%)
21	S2	0.69	0/2623	1.04	6/3568 (0.2%)
21	S3	0.70	0/2623	1.03	7/3568 (0.2%)
22	T0	0.70	0/8141	1.03	27/11065 (0.2%)
22	T1	0.69	0/8141	1.02	22/11065 (0.2%)
23	U0	0.72	0/1217	1.04	4/1644 (0.2%)
23	U1	0.67	0/152	1.32	1/204 (0.5%)
23	U2	0.77	0/152	1.53	4/204 (2.0%)
23	U3	0.82	0/152	1.58	4/204 (2.0%)
23	U4	0.83	0/152	1.64	4/204 (2.0%)
23	U5	0.79	0/152	1.39	3/204 (1.5%)
23	U6	0.66	0/152	1.28	1/204 (0.5%)
24	V0	0.67	0/2240	1.07	11/3019 (0.4%)
25	W0	0.67	0/5972	1.04	26/8105 (0.3%)
All	All	0.68	4/630097 (0.0%)	1.05	2497/855041 (0.3%)

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	00	0	6
1	01	0	3
1	02	0	4
1	03	0	5
1	04	0	4
2	10	0	11
2	11	0	13
2	12	0	10
2	13	0	13
2	14	0	11

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Mol	Chain	#Chirality outliers	#Planarity outliers
2	15	0	13
2	16	0	10
2	17	0	13
3	40	0	4
3	41	0	6
4	A0	1	23
4	A1	0	16
4	A2	0	17
4	A3	0	14
4	A4	0	9
4	A5	0	9
4	A6	0	6
5	B0	0	28
5	B1	0	26
6	C0	1	15
6	C1	1	16
6	C2	1	18
6	C3	1	23
6	C4	1	15
7	D0	0	7
7	D1	0	14
7	D2	0	12
7	D3	0	14
7	D4	0	7
7	D5	0	16
8	E0	0	2
8	E1	0	2
9	F0	0	6
9	F1	0	3
9	F2	0	3
9	F3	0	2
10	H0	0	6
10	H1	0	3
10	H2	0	3
10	H3	0	4
12	J0	0	2
12	J1	0	1
12	J2	0	2
12	J3	0	1
12	J4	0	1
13	K0	0	12
13	K1	0	5

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Mol	Chain	#Chirality outliers	#Planarity outliers
13	K2	0	13
13	K3	0	10
14	L0	0	6
14	L1	0	6
14	L2	0	7
14	L3	0	5
15	M0	0	9
15	M1	0	9
15	M2	0	7
15	M3	0	6
16	N0	0	2
16	N1	0	2
16	N2	0	2
16	N3	0	2
17	O3	0	1
18	P0	0	7
18	P1	1	9
18	P2	0	8
18	P3	0	8
19	Q0	0	1
19	Q1	0	2
19	Q2	0	2
19	Q3	0	1
20	R0	0	14
20	R1	0	13
20	R2	0	17
20	R3	0	18
21	S0	0	4
21	S1	0	5
21	S2	0	6
21	S3	0	5
22	T0	2	11
22	T1	2	9
23	U0	0	1
24	V0	0	1
25	W0	0	10
All	All	11	728

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
14	L3	731	GLY	CA-C	6.62	1.62	1.51

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
14	L3	731	GLY	N-CA	6.34	1.55	1.46
6	C3	4	PRO	N-CD	-5.29	1.40	1.47
13	K1	577	PRO	N-CD	-5.17	1.40	1.47

The worst 5 of 2497 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
13	K1	986	ASP	CB-CG-OD1	50.04	163.34	118.30
13	K1	986	ASP	CB-CG-OD2	-37.67	84.40	118.30
2	15	5	GLY	O-C-N	-27.80	78.22	122.70
2	10	5	GLY	O-C-N	-27.48	78.72	122.70
2	13	5	GLY	O-C-N	-27.47	78.75	122.70

5 of 11 chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
4	A0	156	LEU	CA
6	C0	174	THR	CB
6	C1	174	THR	CB
6	C2	174	THR	CB
6	C3	174	THR	CB

5 of 728 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	00	132	TYR	Sidechain
1	00	175	TYR	Sidechain
1	00	193	ARG	Sidechain
1	00	375	THR	Peptide,Mainchain
1	00	710	TYR	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	00	6085	0	6080	38	0
1	01	6085	0	6080	27	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	O2	6085	0	6080	8	0
1	O3	6085	0	6080	37	0
1	O4	6085	0	6080	12	0
2	10	14046	0	14194	20	0
2	11	14046	0	14194	26	0
2	12	14046	0	14194	33	0
2	13	14046	0	14194	22	0
2	14	14046	0	14194	25	0
2	15	14046	0	14194	14	0
2	16	14046	0	14194	10	0
2	17	14046	0	14194	10	0
3	40	2922	0	2899	4	0
3	41	2922	0	2899	2	0
4	A0	6568	0	6527	68	0
4	A1	6568	0	6527	8	0
4	A2	6568	0	6527	22	0
4	A3	6568	0	6527	7	0
4	A4	5860	0	5828	22	0
4	A5	5860	0	5828	4	0
4	A6	5860	0	5828	7	0
5	B0	13746	0	13949	4	0
5	B1	13746	0	13949	7	0
6	C0	16013	0	16224	13	0
6	C1	16013	0	16224	14	0
6	C2	16013	0	16224	86	0
6	C3	16013	0	16224	69	0
6	C4	16013	0	16224	58	0
7	D0	10363	0	10400	47	0
7	D1	10363	0	10400	115	0
7	D2	10363	0	10400	55	0
7	D3	10363	0	10400	65	0
7	D4	10363	0	10400	56	0
7	D5	10363	0	10400	57	0
8	E0	4432	0	4472	13	0
8	E1	4432	0	4472	1	0
9	F0	1837	0	1825	13	0
9	F1	1837	0	1825	4	0
9	F2	1837	0	1825	3	0
9	F3	1837	0	1825	10	0
10	H0	3066	0	3103	26	0
10	H1	3066	0	3103	5	0
10	H2	3066	0	3103	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
10	H3	3066	0	3103	3	0
11	I0	1398	0	1431	26	0
11	I1	1398	0	1431	3	0
11	I2	1398	0	1431	3	0
11	I3	1398	0	1431	4	0
12	J0	1403	0	1391	2	0
12	J1	1403	0	1391	2	0
12	J2	1403	0	1391	1	0
12	J3	1403	0	1391	1	0
12	J4	1403	0	1391	0	0
13	K0	8574	0	8438	14	0
13	K1	8574	0	8438	17	0
13	K2	8574	0	8438	21	0
13	K3	8574	0	8438	21	0
14	L0	6383	0	6313	24	0
14	L1	6383	0	6313	34	0
14	L2	6383	0	6313	13	0
14	L3	6383	0	6313	12	0
15	M0	5461	0	5443	9	0
15	M1	5461	0	5443	11	0
15	M2	5461	0	5443	4	0
15	M3	5461	0	5443	6	0
16	N0	2352	0	2220	17	0
16	N1	2352	0	2220	2	0
16	N2	2352	0	2220	0	0
16	N3	2352	0	2220	1	0
17	O0	2528	0	2444	44	0
17	O1	2528	0	2444	6	0
17	O2	2528	0	2444	6	0
17	O3	2528	0	2444	19	0
18	P0	5257	0	5249	10	0
18	P1	5257	0	5249	8	0
18	P2	5257	0	5249	3	0
18	P3	5257	0	5249	11	0
19	Q0	2703	0	2555	16	0
19	Q1	2703	0	2555	0	0
19	Q2	2703	0	2555	5	0
19	Q3	2703	0	2555	1	0
20	R0	11132	0	11066	72	0
20	R1	11132	0	11066	19	0
20	R2	11132	0	11066	23	0
20	R3	11132	0	11066	25	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
21	S0	2552	0	2452	4	0
21	S1	2552	0	2452	0	0
21	S2	2552	0	2452	0	0
21	S3	2552	0	2452	1	0
22	T0	7960	0	7896	3	0
22	T1	7960	0	7896	3	0
23	U0	1193	0	1188	7	0
23	U1	151	0	167	25	0
23	U2	151	0	167	25	0
23	U3	151	0	167	20	0
23	U4	151	0	167	25	0
23	U5	151	0	167	24	0
23	U6	151	0	167	25	0
24	V0	2203	0	2226	19	0
25	W0	5836	0	5850	14	0
All	All	617133	0	616873	1129	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 1.

The worst 5 of 1129 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)
6:C2:1249:ILE:HG21	20:R0:1284:ALA:CB	1.29	1.54
6:C2:622:PRO:HB3	20:R0:1316:SER:CB	1.44	1.47
6:C2:788:VAL:CG2	17:O0:258:THR:HG21	1.53	1.39
6:C2:1249:ILE:CG2	20:R0:1284:ALA:HB2	1.58	1.33
6:C2:622:PRO:CB	20:R0:1316:SER:HB3	1.56	1.33

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	00	754/3224 (23%)	703 (93%)	43 (6%)	8 (1%)	14	52
1	01	754/3224 (23%)	706 (94%)	42 (6%)	6 (1%)	19	60
1	02	754/3224 (23%)	707 (94%)	44 (6%)	3 (0%)	34	72
1	03	754/3224 (23%)	700 (93%)	45 (6%)	9 (1%)	13	50
1	04	754/3224 (23%)	702 (93%)	49 (6%)	3 (0%)	34	72
2	10	1829/1887 (97%)	1726 (94%)	94 (5%)	9 (0%)	29	69
2	11	1829/1887 (97%)	1725 (94%)	93 (5%)	11 (1%)	25	66
2	12	1829/1887 (97%)	1724 (94%)	95 (5%)	10 (0%)	29	69
2	13	1829/1887 (97%)	1711 (94%)	107 (6%)	11 (1%)	25	66
2	14	1829/1887 (97%)	1731 (95%)	90 (5%)	8 (0%)	34	72
2	15	1829/1887 (97%)	1733 (95%)	87 (5%)	9 (0%)	29	69
2	16	1829/1887 (97%)	1734 (95%)	86 (5%)	9 (0%)	29	69
2	17	1829/1887 (97%)	1724 (94%)	95 (5%)	10 (0%)	29	69
3	40	379/546 (69%)	350 (92%)	28 (7%)	1 (0%)	41	77
3	41	379/546 (69%)	348 (92%)	29 (8%)	2 (0%)	29	69
4	A0	816/819 (100%)	741 (91%)	65 (8%)	10 (1%)	13	50
4	A1	816/819 (100%)	753 (92%)	54 (7%)	9 (1%)	14	52
4	A2	816/819 (100%)	756 (93%)	50 (6%)	10 (1%)	13	50
4	A3	816/819 (100%)	755 (92%)	55 (7%)	6 (1%)	22	63
4	A4	724/819 (88%)	680 (94%)	40 (6%)	4 (1%)	25	66
4	A5	724/819 (88%)	688 (95%)	31 (4%)	5 (1%)	22	63
4	A6	724/819 (88%)	674 (93%)	47 (6%)	3 (0%)	34	72
5	B0	1746/1749 (100%)	1634 (94%)	93 (5%)	19 (1%)	14	52
5	B1	1746/1749 (100%)	1626 (93%)	103 (6%)	17 (1%)	15	55
6	C0	2009/2012 (100%)	1878 (94%)	111 (6%)	20 (1%)	15	55
6	C1	2009/2012 (100%)	1879 (94%)	109 (5%)	21 (1%)	15	55
6	C2	2009/2012 (100%)	1886 (94%)	106 (5%)	17 (1%)	19	60
6	C3	2009/2012 (100%)	1876 (93%)	118 (6%)	15 (1%)	22	63
6	C4	2009/2012 (100%)	1873 (93%)	123 (6%)	13 (1%)	25	66
7	D0	1308/1391 (94%)	1207 (92%)	89 (7%)	12 (1%)	17	57
7	D1	1308/1391 (94%)	1209 (92%)	88 (7%)	11 (1%)	19	60
7	D2	1308/1391 (94%)	1218 (93%)	81 (6%)	9 (1%)	22	63

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
7	D3	1308/1391 (94%)	1210 (92%)	85 (6%)	13 (1%)	15	55
7	D4	1308/1391 (94%)	1221 (93%)	77 (6%)	10 (1%)	19	60
7	D5	1308/1391 (94%)	1233 (94%)	65 (5%)	10 (1%)	19	60
8	E0	544/674 (81%)	516 (95%)	26 (5%)	2 (0%)	34	72
8	E1	544/674 (81%)	514 (94%)	29 (5%)	1 (0%)	47	81
9	F0	239/326 (73%)	189 (79%)	33 (14%)	17 (7%)	1	14
9	F1	239/326 (73%)	192 (80%)	33 (14%)	14 (6%)	1	17
9	F2	239/326 (73%)	177 (74%)	45 (19%)	17 (7%)	1	14
9	F3	239/326 (73%)	188 (79%)	39 (16%)	12 (5%)	2	20
10	H0	381/507 (75%)	365 (96%)	16 (4%)	0	100	100
10	H1	381/507 (75%)	364 (96%)	16 (4%)	1 (0%)	41	77
10	H2	381/507 (75%)	366 (96%)	15 (4%)	0	100	100
10	H3	381/507 (75%)	363 (95%)	16 (4%)	2 (0%)	29	69
11	I0	171/599 (28%)	168 (98%)	3 (2%)	0	100	100
11	I1	171/599 (28%)	167 (98%)	3 (2%)	1 (1%)	25	66
11	I2	171/599 (28%)	167 (98%)	4 (2%)	0	100	100
11	I3	171/599 (28%)	167 (98%)	4 (2%)	0	100	100
12	J0	169/522 (32%)	166 (98%)	3 (2%)	0	100	100
12	J1	169/522 (32%)	168 (99%)	1 (1%)	0	100	100
12	J2	169/522 (32%)	167 (99%)	2 (1%)	0	100	100
12	J3	169/522 (32%)	166 (98%)	2 (1%)	1 (1%)	25	66
12	J4	169/522 (32%)	168 (99%)	1 (1%)	0	100	100
13	K0	1084/1156 (94%)	985 (91%)	85 (8%)	14 (1%)	12	48
13	K1	1084/1156 (94%)	990 (91%)	78 (7%)	16 (2%)	10	46
13	K2	1084/1156 (94%)	992 (92%)	82 (8%)	10 (1%)	17	57
13	K3	1084/1156 (94%)	1001 (92%)	70 (6%)	13 (1%)	13	50
14	L0	780/925 (84%)	734 (94%)	42 (5%)	4 (0%)	29	69
14	L1	780/925 (84%)	734 (94%)	38 (5%)	8 (1%)	15	55
14	L2	780/925 (84%)	732 (94%)	45 (6%)	3 (0%)	34	72
14	L3	780/925 (84%)	731 (94%)	43 (6%)	6 (1%)	19	60
15	M0	669/937 (71%)	609 (91%)	50 (8%)	10 (2%)	10	46

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
15	M1	669/937 (71%)	613 (92%)	48 (7%)	8 (1%)	13	50
15	M2	669/937 (71%)	618 (92%)	45 (7%)	6 (1%)	17	57
15	M3	669/937 (71%)	612 (92%)	50 (8%)	7 (1%)	15	55
16	N0	299/322 (93%)	277 (93%)	19 (6%)	3 (1%)	15	55
16	N1	299/322 (93%)	277 (93%)	20 (7%)	2 (1%)	22	63
16	N2	299/322 (93%)	277 (93%)	19 (6%)	3 (1%)	15	55
16	N3	299/322 (93%)	278 (93%)	18 (6%)	3 (1%)	15	55
17	O0	321/360 (89%)	304 (95%)	14 (4%)	3 (1%)	17	57
17	O1	321/360 (89%)	302 (94%)	15 (5%)	4 (1%)	13	50
17	O2	321/360 (89%)	302 (94%)	18 (6%)	1 (0%)	41	77
17	O3	321/360 (89%)	299 (93%)	19 (6%)	3 (1%)	17	57
18	P0	653/656 (100%)	607 (93%)	40 (6%)	6 (1%)	17	57
18	P1	653/656 (100%)	612 (94%)	35 (5%)	6 (1%)	17	57
18	P2	653/656 (100%)	610 (93%)	36 (6%)	7 (1%)	14	52
18	P3	653/656 (100%)	611 (94%)	35 (5%)	7 (1%)	14	52
19	Q0	341/380 (90%)	320 (94%)	20 (6%)	1 (0%)	41	77
19	Q1	341/380 (90%)	322 (94%)	18 (5%)	1 (0%)	41	77
19	Q2	341/380 (90%)	320 (94%)	20 (6%)	1 (0%)	41	77
19	Q3	341/380 (90%)	323 (95%)	17 (5%)	1 (0%)	41	77
20	R0	1397/1436 (97%)	1288 (92%)	93 (7%)	16 (1%)	14	52
20	R1	1397/1436 (97%)	1285 (92%)	94 (7%)	18 (1%)	12	48
20	R2	1397/1436 (97%)	1298 (93%)	87 (6%)	12 (1%)	17	57
20	R3	1397/1436 (97%)	1294 (93%)	93 (7%)	10 (1%)	22	63
21	S0	320/326 (98%)	292 (91%)	26 (8%)	2 (1%)	25	66
21	S1	320/326 (98%)	293 (92%)	24 (8%)	3 (1%)	17	57
21	S2	320/326 (98%)	290 (91%)	28 (9%)	2 (1%)	25	66
21	S3	320/326 (98%)	292 (91%)	25 (8%)	3 (1%)	17	57
22	T0	1002/2266 (44%)	927 (92%)	62 (6%)	13 (1%)	12	48
22	T1	1002/2266 (44%)	931 (93%)	58 (6%)	13 (1%)	12	48
23	U0	148/880 (17%)	140 (95%)	8 (5%)	0	100	100
23	U1	17/880 (2%)	16 (94%)	1 (6%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
23	U2	17/880 (2%)	15 (88%)	2 (12%)	0	100	100
23	U3	17/880 (2%)	15 (88%)	1 (6%)	1 (6%)	1	17
23	U4	17/880 (2%)	15 (88%)	2 (12%)	0	100	100
23	U5	17/880 (2%)	14 (82%)	2 (12%)	1 (6%)	1	17
23	U6	17/880 (2%)	16 (94%)	1 (6%)	0	100	100
24	V0	271/2090 (13%)	255 (94%)	12 (4%)	4 (2%)	10	46
25	W0	733/741 (99%)	688 (94%)	40 (6%)	5 (1%)	22	63
All	All	77792/109146 (71%)	72515 (93%)	4606 (6%)	671 (1%)	21	57

5 of 671 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	02	165	VAL
4	A1	90	LEU
4	A1	95	ASP
4	A2	88	GLU
4	A2	167	ILE

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	00	675/2818 (24%)	662 (98%)	13 (2%)	57	75
1	01	675/2818 (24%)	663 (98%)	12 (2%)	59	77
1	02	675/2818 (24%)	659 (98%)	16 (2%)	49	69
1	03	675/2818 (24%)	662 (98%)	13 (2%)	57	75
1	04	675/2818 (24%)	658 (98%)	17 (2%)	47	68
2	10	1565/1608 (97%)	1536 (98%)	29 (2%)	57	75
2	11	1565/1608 (97%)	1537 (98%)	28 (2%)	59	77
2	12	1565/1608 (97%)	1535 (98%)	30 (2%)	57	75
2	13	1565/1608 (97%)	1534 (98%)	31 (2%)	55	74

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	14	1565/1608 (97%)	1538 (98%)	27 (2%)	60	78
2	15	1565/1608 (97%)	1538 (98%)	27 (2%)	60	78
2	16	1565/1608 (97%)	1539 (98%)	26 (2%)	60	78
2	17	1565/1608 (97%)	1540 (98%)	25 (2%)	62	79
3	40	323/463 (70%)	314 (97%)	9 (3%)	43	65
3	41	323/463 (70%)	313 (97%)	10 (3%)	40	62
4	A0	725/726 (100%)	702 (97%)	23 (3%)	39	61
4	A1	725/726 (100%)	705 (97%)	20 (3%)	43	65
4	A2	725/726 (100%)	708 (98%)	17 (2%)	50	70
4	A3	725/726 (100%)	707 (98%)	18 (2%)	47	68
4	A4	647/726 (89%)	629 (97%)	18 (3%)	43	65
4	A5	647/726 (89%)	631 (98%)	16 (2%)	47	68
4	A6	647/726 (89%)	629 (97%)	18 (3%)	43	65
5	B0	1540/1541 (100%)	1504 (98%)	36 (2%)	50	70
5	B1	1540/1541 (100%)	1505 (98%)	35 (2%)	50	70
6	C0	1776/1777 (100%)	1740 (98%)	36 (2%)	55	74
6	C1	1776/1777 (100%)	1743 (98%)	33 (2%)	57	75
6	C2	1776/1777 (100%)	1742 (98%)	34 (2%)	57	75
6	C3	1776/1777 (100%)	1740 (98%)	36 (2%)	55	74
6	C4	1776/1777 (100%)	1741 (98%)	35 (2%)	55	74
7	D0	1157/1222 (95%)	1129 (98%)	28 (2%)	49	69
7	D1	1157/1222 (95%)	1123 (97%)	34 (3%)	42	64
7	D2	1157/1222 (95%)	1133 (98%)	24 (2%)	53	72
7	D3	1157/1222 (95%)	1119 (97%)	38 (3%)	38	61
7	D4	1157/1222 (95%)	1126 (97%)	31 (3%)	44	65
7	D5	1157/1222 (95%)	1121 (97%)	36 (3%)	40	62
8	E0	489/604 (81%)	482 (99%)	7 (1%)	67	80
8	E1	489/604 (81%)	483 (99%)	6 (1%)	71	83
9	F0	210/277 (76%)	191 (91%)	19 (9%)	9	30
9	F1	210/277 (76%)	201 (96%)	9 (4%)	29	53
9	F2	210/277 (76%)	193 (92%)	17 (8%)	11	35

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
9	F3	210/277 (76%)	196 (93%)	14 (7%)	16	41
10	H0	345/425 (81%)	338 (98%)	7 (2%)	55	74
10	H1	345/425 (81%)	339 (98%)	6 (2%)	60	78
10	H2	345/425 (81%)	338 (98%)	7 (2%)	55	74
10	H3	345/425 (81%)	339 (98%)	6 (2%)	60	78
11	I0	155/459 (34%)	152 (98%)	3 (2%)	57	75
11	I1	155/459 (34%)	153 (99%)	2 (1%)	69	81
11	I2	155/459 (34%)	151 (97%)	4 (3%)	46	66
11	I3	155/459 (34%)	153 (99%)	2 (1%)	69	81
12	J0	158/401 (39%)	156 (99%)	2 (1%)	69	81
12	J1	158/401 (39%)	156 (99%)	2 (1%)	69	81
12	J2	158/401 (39%)	156 (99%)	2 (1%)	69	81
12	J3	158/401 (39%)	156 (99%)	2 (1%)	69	81
12	J4	158/401 (39%)	153 (97%)	5 (3%)	39	61
13	K0	958/1013 (95%)	921 (96%)	37 (4%)	32	56
13	K1	958/1013 (95%)	934 (98%)	24 (2%)	47	68
13	K2	958/1013 (95%)	927 (97%)	31 (3%)	39	61
13	K3	958/1013 (95%)	927 (97%)	31 (3%)	39	61
14	L0	701/827 (85%)	686 (98%)	15 (2%)	53	72
14	L1	701/827 (85%)	681 (97%)	20 (3%)	42	64
14	L2	701/827 (85%)	687 (98%)	14 (2%)	55	74
14	L3	701/827 (85%)	685 (98%)	16 (2%)	50	70
15	M0	602/840 (72%)	587 (98%)	15 (2%)	47	68
15	M1	602/840 (72%)	584 (97%)	18 (3%)	41	63
15	M2	602/840 (72%)	583 (97%)	19 (3%)	39	61
15	M3	602/840 (72%)	592 (98%)	10 (2%)	60	78
16	N0	255/272 (94%)	250 (98%)	5 (2%)	55	74
16	N1	255/272 (94%)	251 (98%)	4 (2%)	62	79
16	N2	255/272 (94%)	248 (97%)	7 (3%)	44	65
16	N3	255/272 (94%)	250 (98%)	5 (2%)	55	74
17	O0	279/310 (90%)	274 (98%)	5 (2%)	59	77

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
17	O1	279/310 (90%)	275 (99%)	4 (1%)	67	80
17	O2	279/310 (90%)	274 (98%)	5 (2%)	59	77
17	O3	279/310 (90%)	273 (98%)	6 (2%)	52	71
18	P0	584/585 (100%)	564 (97%)	20 (3%)	37	60
18	P1	584/585 (100%)	571 (98%)	13 (2%)	52	71
18	P2	584/585 (100%)	566 (97%)	18 (3%)	40	62
18	P3	584/585 (100%)	567 (97%)	17 (3%)	42	64
19	Q0	303/335 (90%)	301 (99%)	2 (1%)	84	90
19	Q1	303/335 (90%)	302 (100%)	1 (0%)	92	95
19	Q2	303/335 (90%)	301 (99%)	2 (1%)	84	90
19	Q3	303/335 (90%)	301 (99%)	2 (1%)	84	90
20	R0	1233/1259 (98%)	1202 (98%)	31 (2%)	47	68
20	R1	1233/1259 (98%)	1203 (98%)	30 (2%)	49	69
20	R2	1233/1259 (98%)	1202 (98%)	31 (2%)	47	68
20	R3	1233/1259 (98%)	1207 (98%)	26 (2%)	53	72
21	S0	278/282 (99%)	272 (98%)	6 (2%)	52	71
21	S1	278/282 (99%)	272 (98%)	6 (2%)	52	71
21	S2	278/282 (99%)	271 (98%)	7 (2%)	47	68
21	S3	278/282 (99%)	273 (98%)	5 (2%)	59	77
22	T0	891/2037 (44%)	874 (98%)	17 (2%)	57	75
22	T1	891/2037 (44%)	875 (98%)	16 (2%)	59	77
23	U0	131/703 (19%)	125 (95%)	6 (5%)	27	52
23	U1	19/703 (3%)	17 (90%)	2 (10%)	7	24
23	U2	19/703 (3%)	18 (95%)	1 (5%)	22	47
23	U3	19/703 (3%)	18 (95%)	1 (5%)	22	47
23	U4	19/703 (3%)	18 (95%)	1 (5%)	22	47
23	U5	19/703 (3%)	18 (95%)	1 (5%)	22	47
23	U6	19/703 (3%)	17 (90%)	2 (10%)	7	24
24	V0	249/1685 (15%)	238 (96%)	11 (4%)	28	53
25	W0	661/663 (100%)	645 (98%)	16 (2%)	49	69
All	All	68601/94353 (73%)	67018 (98%)	1583 (2%)	53	70

5 of 1583 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
9	F2	151	SER
14	L1	340	ARG
10	H0	196	ASN
9	F2	123	LEU
13	K1	102	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 137 such sidechains are listed below:

Mol	Chain	Res	Type
17	O1	125	HIS
18	P0	621	GLN
20	R1	759	GLN
6	C2	854	ASN
6	C2	786	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](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

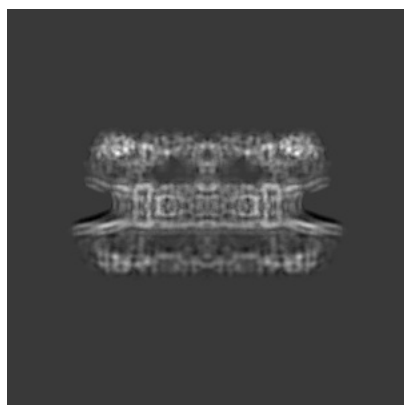
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-14322. These allow visual inspection of the internal detail of the map and identification of artifacts.

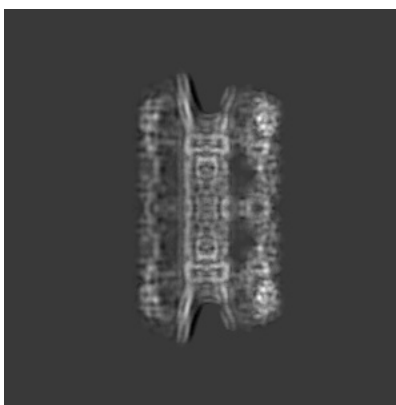
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

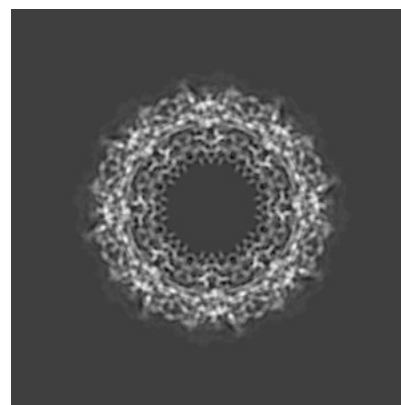
6.1.1 Primary map



X



Y

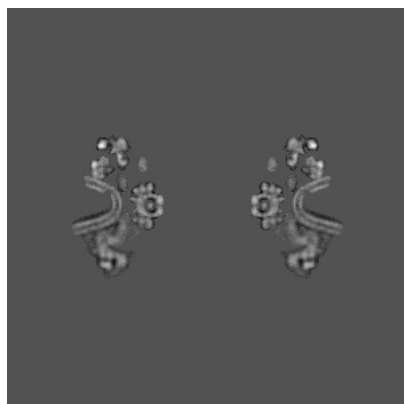


Z

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

6.2 Central slices [i](#)

6.2.1 Primary map



X Index: 288



Y Index: 288



Z Index: 288

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

6.3 Largest variance slices [i](#)

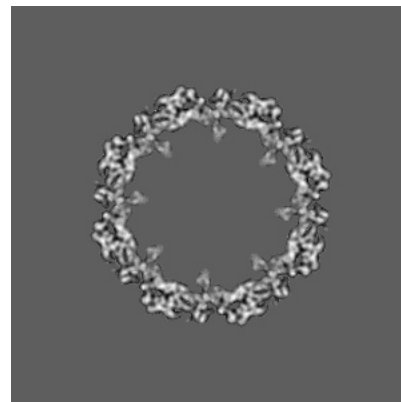
6.3.1 Primary map



X Index: 404



Y Index: 172

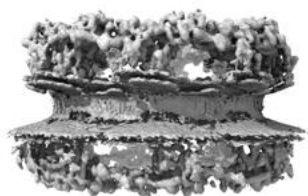


Z Index: 370

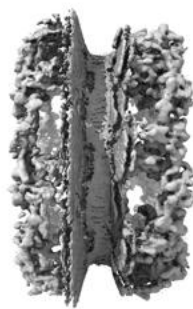
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal surface views [i](#)

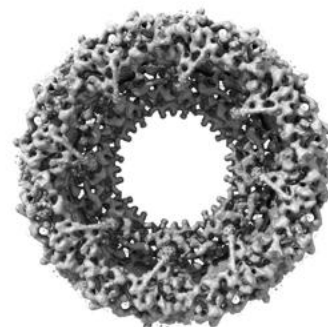
6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 3.5. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

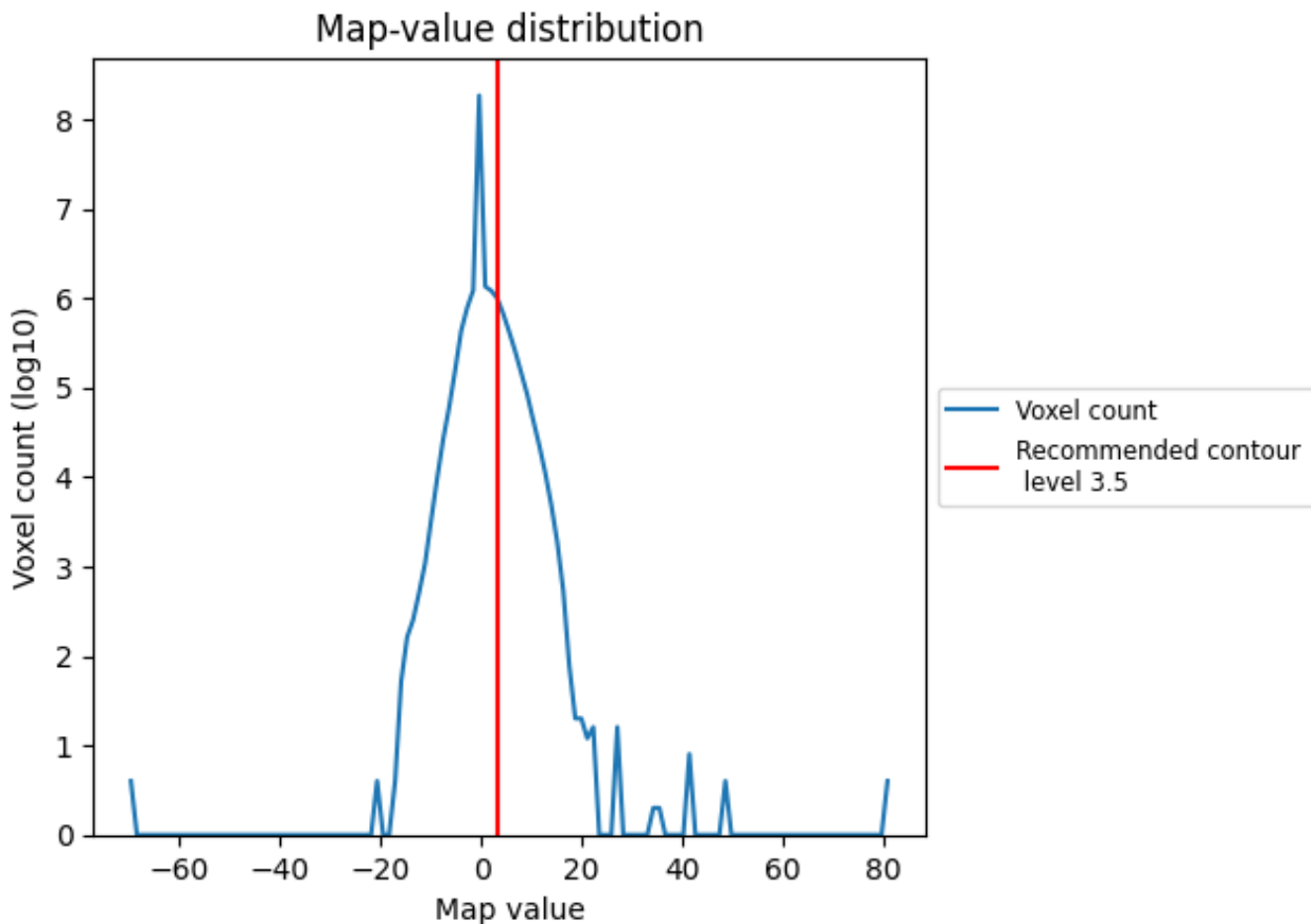
6.5 Mask visualisation

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

7 Map analysis [i](#)

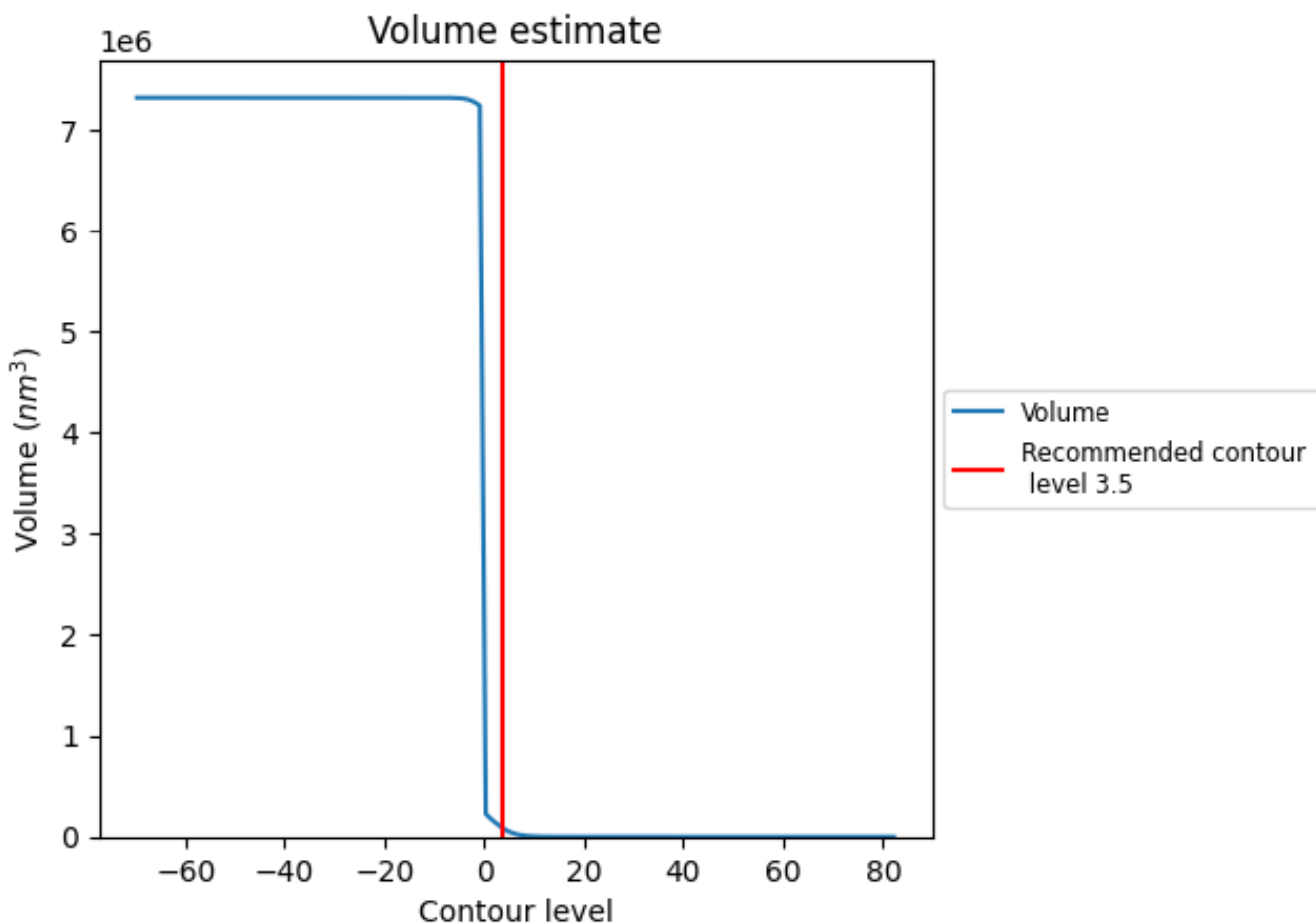
This section contains the results of statistical analysis of the map.

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.

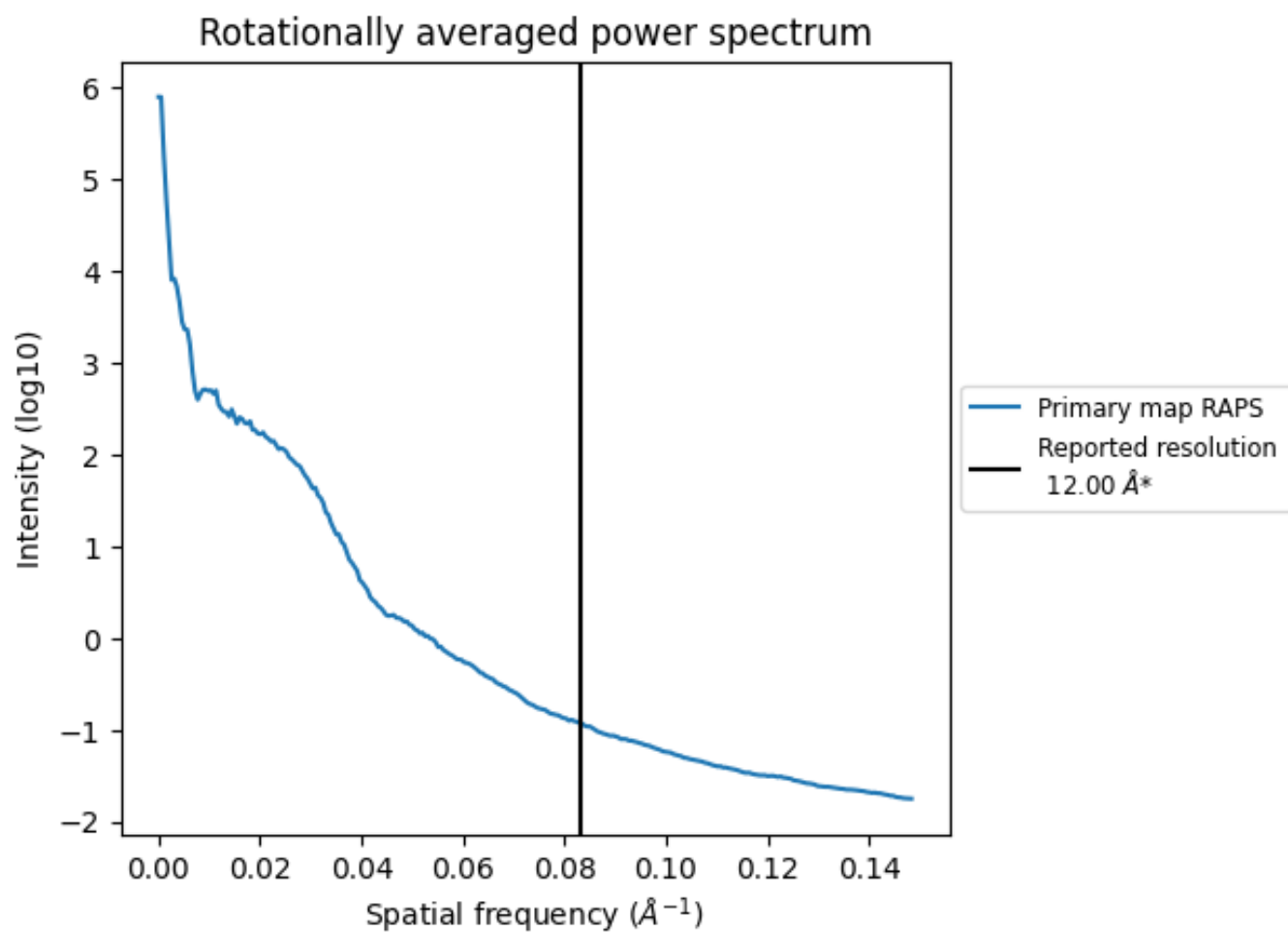
7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 93549 nm³; this corresponds to an approximate mass of 84505 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 0.083 Å⁻¹

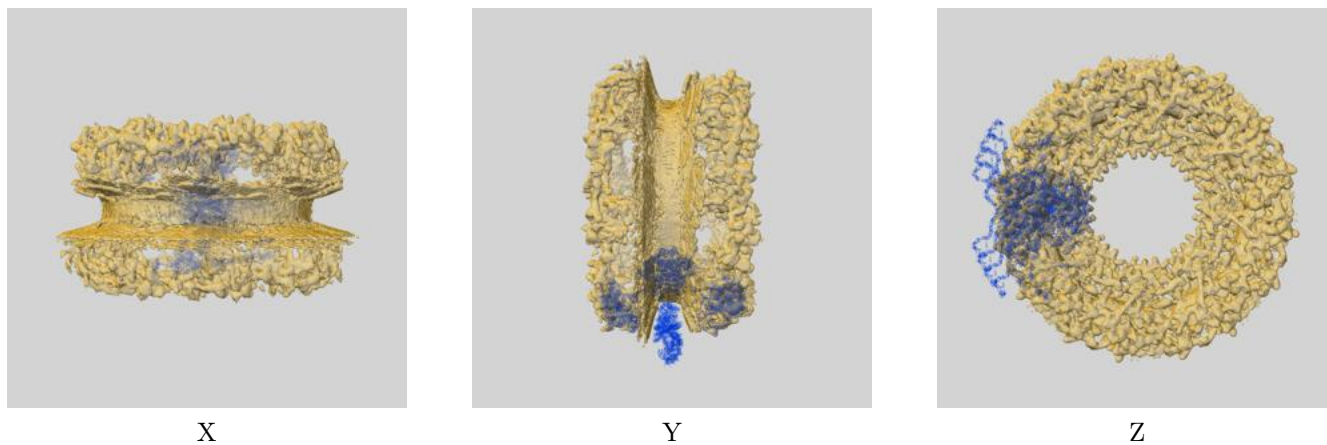
8 Fourier-Shell correlation

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

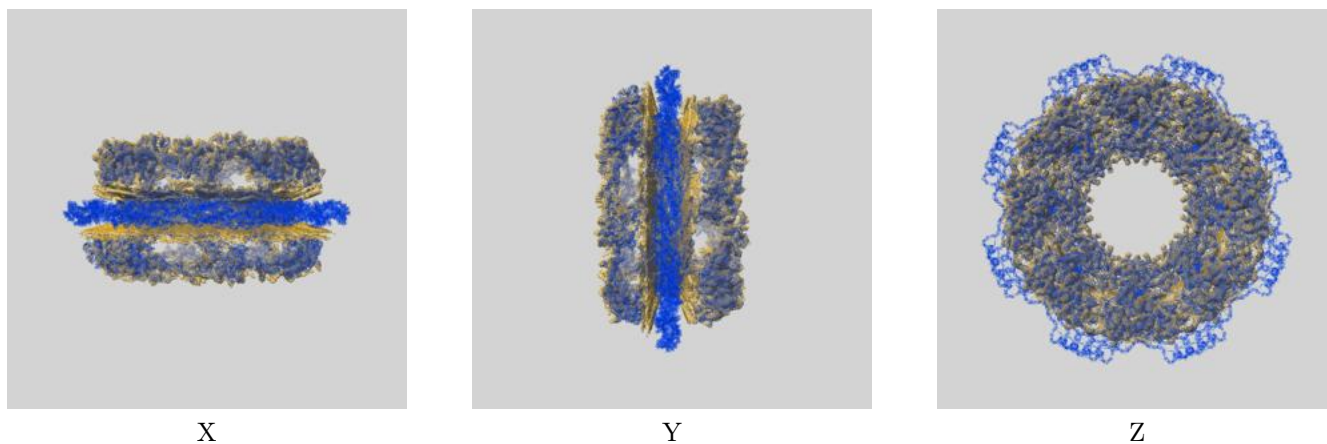
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-14322 and PDB model 7R5K. Per-residue inclusion information can be found in section 3 on page 15.

9.0.1 Map-model overlay [i](#)

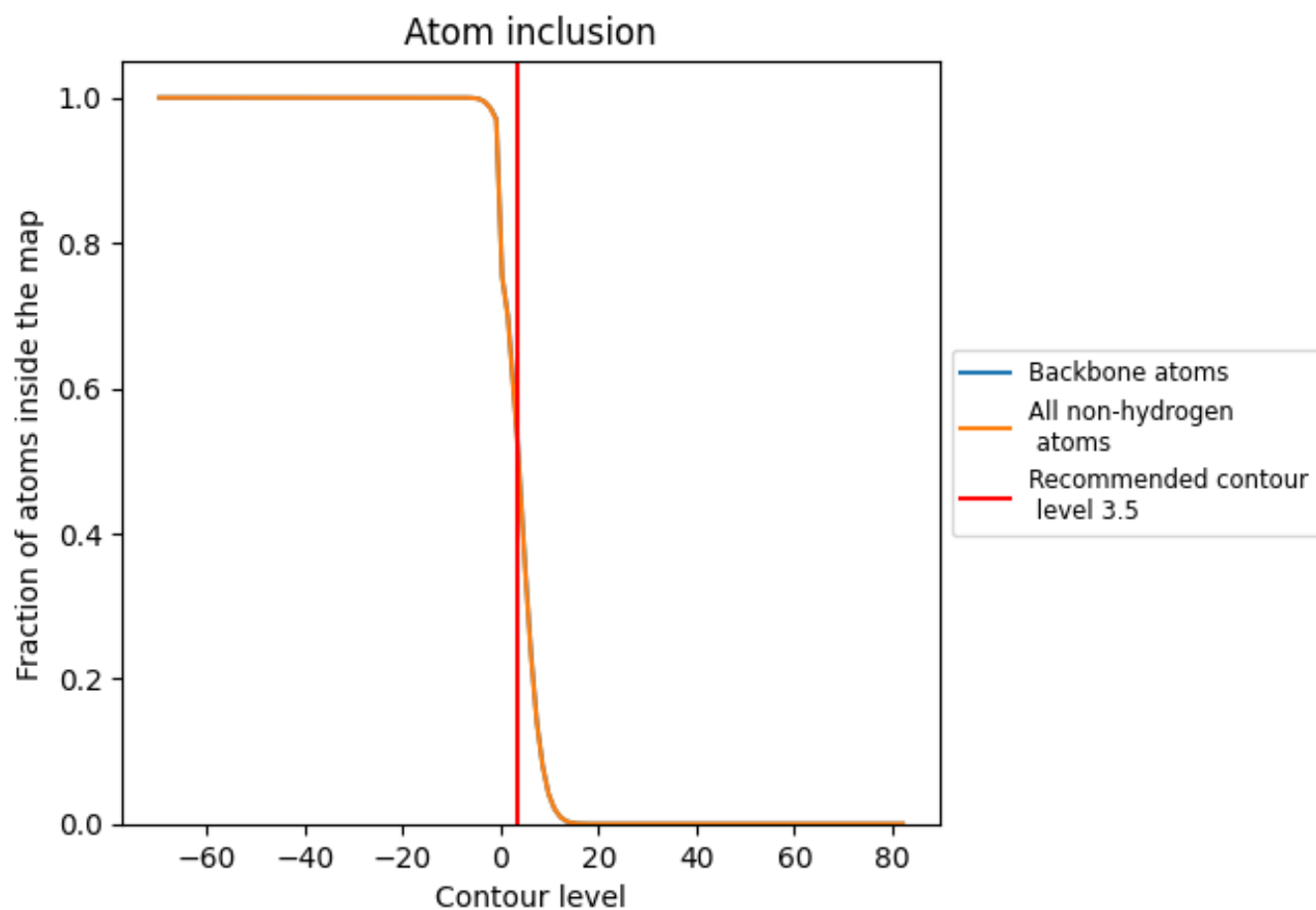


9.0.2 Map-model assembly overlay [i](#)



The images above show the 3D surface view of the map at the recommended contour level 3.5 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.

9.1 Atom inclusion [i](#)



At the recommended contour level, 53% of all backbone atoms, 52% of all non-hydrogen atoms, are inside the map.