



wwPDB EM Validation Summary Report ⓘ

Mar 20, 2024 – 09:36 AM JST

PDB ID : 6LQR
EMDB ID : EMD-0951
Title : Cryo-EM structure of 90S small subunit preribosomes in transition states (State C)
Authors : Du, Y.; Ye, K.
Deposited on : 2020-01-14
Resolution : 8.60 Å (reported)
Based on initial model : 6LQP

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:

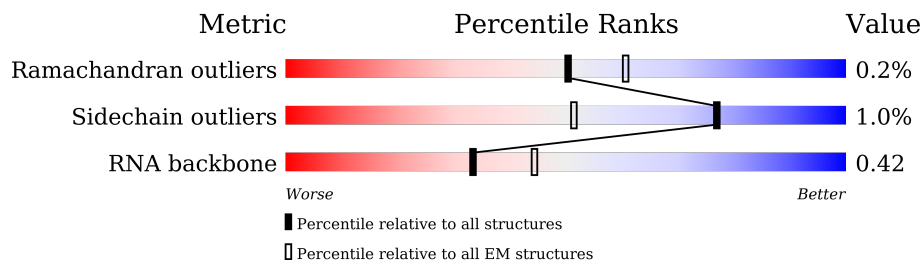
EMDB validation analysis : 0.0.1.dev70
Mogul : 1.8.5 (274361), CSD as541be (2020)
MolProbity : 4.02b-467
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

1 Overall quality at a glance

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

The reported resolution of this entry is 8.60 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)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

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	3A	333	
2	5A	700	
3	SA	1809	
4	SC	255	
5	SF	261	
6	SG	225	
7	SH	236	
8	SI	190	

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Mol	Chain	Length	Quality of chain
9	SJ	200	20% 81% 17%
10	SK	197	5% 86% 13%
11	SM	156	8% 77% 21%
12	SO	151	17% 87% 11%
13	SP	137	26% 84% 14%
14	SR	143	6% 87% 13%
15	SX	130	25% 96% ..
16	SY	145	13% 70% 29%
17	SZ	135	10% 74% 24%
18	Sc	82	34% 96% ..
19	Sd	67	7% 94% 6%
20	3B	327	. 73% 27%
20	3C	327	17% 68% 31%
21	3D	504	. 72% 27%
22	3E	511	21% 83% 16%
23	3F	573	5% 78% 21%
24	3G	126	11% 93% . .
24	3H	126	6% 94% . .
25	A4	776	20% 84% 15%
26	A5	643	28% 79% 20%
27	A8	713	33% 71% . . 25%
28	A9	575	11% 22% 78%
29	AE	1769	54% 86% 13%
30	AF	513	43% 95% . .
31	AG	896	24% 91% 8%

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Mol	Chain	Length	Quality of chain
32	B1	923	84% 14%
33	B2	943	86% 13%
34	B3	817	89% 7%
35	B8	594	80% 20%
36	BE	939	86% 13%
37	B6	440	84% 15%
38	5B	214	72%
39	5C	554	81% 17%
40	5D	250	65% 33%
41	5E	593	67%
42	5F	183	98%
43	5G	290	73% 24%
44	5H	610	88%
45	5I	489	93% 6%
46	5J	217	70% 30%
47	5K	189	92% 7%
48	RA	707	52%
49	RB	357	62%
50	RD	1729	82%
51	RE	1237	86% 13%
52	RF	297	79% 19%
53	RG	252	84% 14%
53	RH	252	90% 9%
54	RJ	1183	66% 33%
55	RK	367	96%

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Mol	Chain	Length	Quality of chain
56	RL	1056	<p>52% 76% 24%</p>
56	RM	1056	<p>62% 72% 27%</p>
57	RN	810	<p>66% 74% 25%</p>
58	RO	552	<p>94% 94% 5%</p>
59	RP	2493	<p>31% 84% 15%</p>
60	RQ	899	<p>10% 25% 75%</p>
61	RS	483	<p>49% 52% 48%</p>
62	RT	326	<p>22% 51% 48%</p>
63	RY	534	<p>7% 93%</p>
64	X1	347	<p>6% 94%</p>

2 Entry composition [i](#)

There are 67 unique types of molecules in this entry. The entry contains 215267 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 RNA chain called U3 snoRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	3A	175	3711	1661	648	1227	175	0	0

- Molecule 2 is a RNA chain called 5' ETS.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
2	5A	192	4117	1838	746	1341	192	0	0

- Molecule 3 is a RNA chain called 18S pre-rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
3	SA	1283	27362	12228	4872	8979	1283	0	0

- Molecule 4 is a protein called 40S ribosomal protein S1-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	SC	230	1830	1156	335	335	4	0	0

- Molecule 5 is a protein called 40S ribosomal protein S4-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	SF	229	1815	1161	331	320	3	0	0

- Molecule 6 is a protein called 40S ribosomal protein S5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	SG	213	1669	1045	307	314	3	0	0

- Molecule 7 is a protein called 40S ribosomal protein S6-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	SH	167	1327	834	256	235	2	0	0

- Molecule 8 is a protein called 40S ribosomal protein S7-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	SI	165	1321	853	226	242		0	0

- Molecule 9 is a protein called 40S ribosomal protein S8-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	SJ	166	1324	824	262	236	2	0	0

- Molecule 10 is a protein called 40S ribosomal protein S9-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	SK	171	1388	879	268	240	1	0	0

- Molecule 11 is a protein called 40S ribosomal protein S11-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	SM	123	997	641	189	164	3	0	0

- Molecule 12 is a protein called 40S ribosomal protein S13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	SO	134	1087	698	202	186	1	0	0

- Molecule 13 is a protein called 40S ribosomal protein S14-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	SP	118	868	536	164	165	3	0	0

- Molecule 14 is a protein called 40S ribosomal protein S16-A.

Mol	Chain	Residues	Atoms				AltConf	Trace
14	SR	125	Total	C	N	O	0	0
			973	625	174	174		

- Molecule 15 is a protein called 40S ribosomal protein S22-B.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	SX	127	Total	C	N	O	S	0	0
			1003	640	183	177	3		

- Molecule 16 is a protein called 40S ribosomal protein S23-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	SY	103	Total	C	N	O	S	0	0
			786	503	144	137	2		

- Molecule 17 is a protein called 40S ribosomal protein S24-A.

Mol	Chain	Residues	Atoms				AltConf	Trace
17	SZ	102	Total	C	N	O	0	0
			809	517	148	144		

- Molecule 18 is a protein called 40S ribosomal protein S27-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	Sc	80	Total	C	N	O	S	0	0
			603	377	109	112	5		

- Molecule 19 is a protein called 40S ribosomal protein S28-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	Sd	63	Total	C	N	O	S	0	0
			497	306	99	91	1		

- Molecule 20 is a protein called rRNA 2'-O-methyltransferase fibrillar.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	3B	240	Total	C	N	O	S	0	0
			1865	1184	333	338	10		
20	3C	225	Total	C	N	O	S	0	0
			1763	1120	316	317	10		

- Molecule 21 is a protein called Nucleolar protein 56.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
21	3D	369	2848	1811	489	540	8	0	0

- Molecule 22 is a protein called Nucleolar protein 58.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
22	3E	431	3028	1888	543	588	9	0	0

- Molecule 23 is a protein called Ribosomal RNA-processing protein 9.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
23	3F	454	3643	2315	638	680	10	0	0

- Molecule 24 is a protein called 13 kDa ribonucleoprotein-associated protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
24	3G	121	916	583	158	171	4	0	0
24	3H	121	916	583	158	171	4	0	0

- Molecule 25 is a protein called U3 small nucleolar RNA-associated protein 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
25	A4	662	5226	3309	910	986	21	0	0

- Molecule 26 is a protein called U3 small nucleolar RNA-associated protein 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
26	A5	514	3976	2520	688	755	13	0	0

- Molecule 27 is a protein called U3 small nucleolar RNA-associated protein 8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
27	A8	532	3229	2008	592	626	3	0	0

- Molecule 28 is a protein called U3 small nucleolar RNA-associated protein 9.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
28	A9	128	939	594	173	170	2	0	0

- Molecule 29 is a protein called U3 small nucleolar RNA-associated protein 10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
29	AE	1534	9955	6242	1771	1923	19	0	0

- Molecule 30 is a protein called U3 small nucleolar RNA-associated protein 15.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
30	AF	493	3911	2462	702	735	12	0	0

- Molecule 31 is a protein called NET1-associated nuclear protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
31	AG	826	6570	4181	1111	1259	19	0	0

- Molecule 32 is a protein called Periodic tryptophan protein 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
32	B1	793	6331	4046	1085	1182	18	0	0

- Molecule 33 is a protein called U3 small nucleolar RNA-associated protein 12.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
33	B2	825	6502	4156	1096	1223	27	0	0

- Molecule 34 is a protein called U3 small nucleolar RNA-associated protein 13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
34	B3	757	5919	3769	993	1130	27	0	0

- Molecule 35 is a protein called U3 small nucleolar RNA-associated protein 18.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
35	B8	477	3764	2387	662	705	10	0	0

- Molecule 36 is a protein called U3 small nucleolar RNA-associated protein 21.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
36	BE	820	6450	4090	1114	1225	21	0	0

- Molecule 37 is a protein called U3 small nucleolar RNA-associated protein 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
37	B6	374	2800	1782	501	505	12	0	0

- Molecule 38 is a protein called Bud site selection protein 21.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
38	5B	60	495	310	101	84	0	0

- Molecule 39 is a protein called U3 small nucleolar RNA-associated protein 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
39	5C	458	3612	2276	636	689	11	0	0

- Molecule 40 is a protein called U3 small nucleolar RNA-associated protein 11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
40	5D	167	1396	862	266	263	5	0	0

- Molecule 41 is a protein called U3 small nucleolar RNA-associated protein MPP10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
41	5E	193	1564	970	280	310	4	0	0

- Molecule 42 is a protein called U3 small nucleolar ribonucleoprotein protein IMP3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
42	5F	182	1530	967	287	269	7	0	0

- Molecule 43 is a protein called U3 small nucleolar ribonucleoprotein protein IMP4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
43	5G	219	1756	1107	325	318	6	0	0

- Molecule 44 is a protein called Something about silencing protein 10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
44	5H	74	596	373	122	101		0	0

- Molecule 45 is a protein called Protein SOF1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
45	5I	461	3765	2354	686	709	16	0	0

- Molecule 46 is a protein called rRNA-processing protein FCF2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
46	5J	151	1280	807	240	228	5	0	0

- Molecule 47 is a protein called rRNA-processing protein FCF1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
47	5K	175	1403	896	256	241	10	0	0

- Molecule 48 is a protein called Ribosome biogenesis protein ENP2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
48	RA	338	2709	1713	463	524	9	0	0

- Molecule 49 is a protein called U3 small nucleolar ribonucleoprotein protein LCP5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
49	RB	134	1108	664	227	214	3	0	0

- Molecule 50 is a protein called rRNA biogenesis protein RRP5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
50	RD	316	2412	1541	414	452	5	0	0

- Molecule 51 is a protein called U3 small nucleolar RNA-associated protein 22.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
51	RE	1079	8716	5666	1437	1589	24	0	0

- Molecule 52 is a protein called Ribosomal RNA-processing protein 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
52	RF	241	1963	1253	335	367	8	0	0

- Molecule 53 is a protein called Ribosomal RNA small subunit methyltransferase NEP1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
53	RG	216	1701	1079	296	315	11	0	0
53	RH	230	1799	1142	313	333	11	0	0

- Molecule 54 is a protein called Ribosome biogenesis protein BMS1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
54	RJ	796	6379	4086	1136	1128	29	0	0

- Molecule 55 is a protein called RNA 3'-terminal phosphate cyclase-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
55	RK	360	2781	1781	473	516	11	0	0

- Molecule 56 is a protein called RNA cytidine acetyltransferase.

Mol	Chain	Residues	Atoms					AltConf	Trace
56	RL	805	Total	C	N	O	S	0	0
			4539	2760	885	887	7		
56	RM	766	Total	C	N	O		0	0
			3779	2247	766	766			

- Molecule 57 is a protein called Nucleolar complex protein 14.

Mol	Chain	Residues	Atoms					AltConf	Trace
57	RN	607	Total	C	N	O	S	0	0
			4529	2861	820	837	11		

- Molecule 58 is a protein called Nucleolar complex protein 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
58	RO	525	Total	C	N	O	S	0	0
			3766	2412	646	696	12		

- Molecule 59 is a protein called U3 small nucleolar RNA-associated protein 20.

Mol	Chain	Residues	Atoms					AltConf	Trace
59	RP	2108	Total	C	N	O	S	0	0
			12171	7483	2291	2381	16		

- Molecule 60 is a protein called U3 small nucleolar RNA-associated protein 14.

Mol	Chain	Residues	Atoms					AltConf	Trace
60	RQ	226	Total	C	N	O	S	0	0
			1651	1023	313	313	2		

- Molecule 61 is a protein called Essential nuclear protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
61	RS	251	Total	C	N	O	S	0	0
			2051	1340	349	359	3		

- Molecule 62 is a protein called Pno1.

Mol	Chain	Residues	Atoms					AltConf	Trace
62	RT	169	Total	C	N	O	S	0	0
			1334	849	244	237	4		

- Molecule 63 is a protein called Protein BFR2.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
63	RY	37	299	191	48	60	0	0

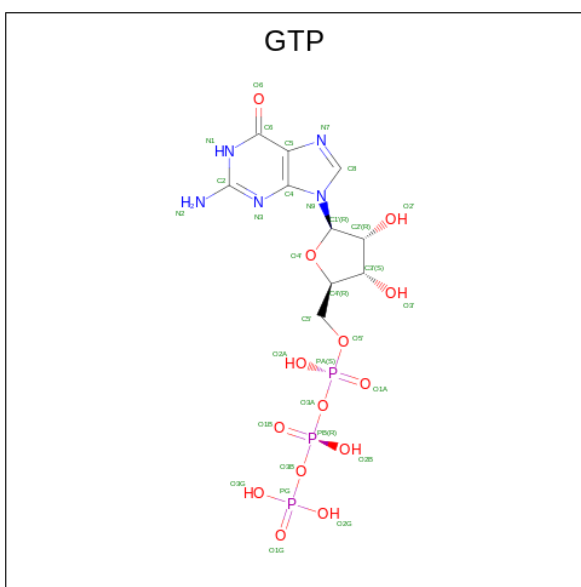
- Molecule 64 is a protein called Unassigned helices.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
64	X1	22	110	66	22	22	0	0

- Molecule 65 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
			Total	Zn	
65	Sc	1	1	1	0
65	5K	1	1	1	0

- Molecule 66 is GUANOSINE-5'-TRIPHOSPHATE (three-letter code: GTP) (formula: C₁₀H₁₆N₅O₁₄P₃).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
66	RJ	1	32	10	5	14	3	0

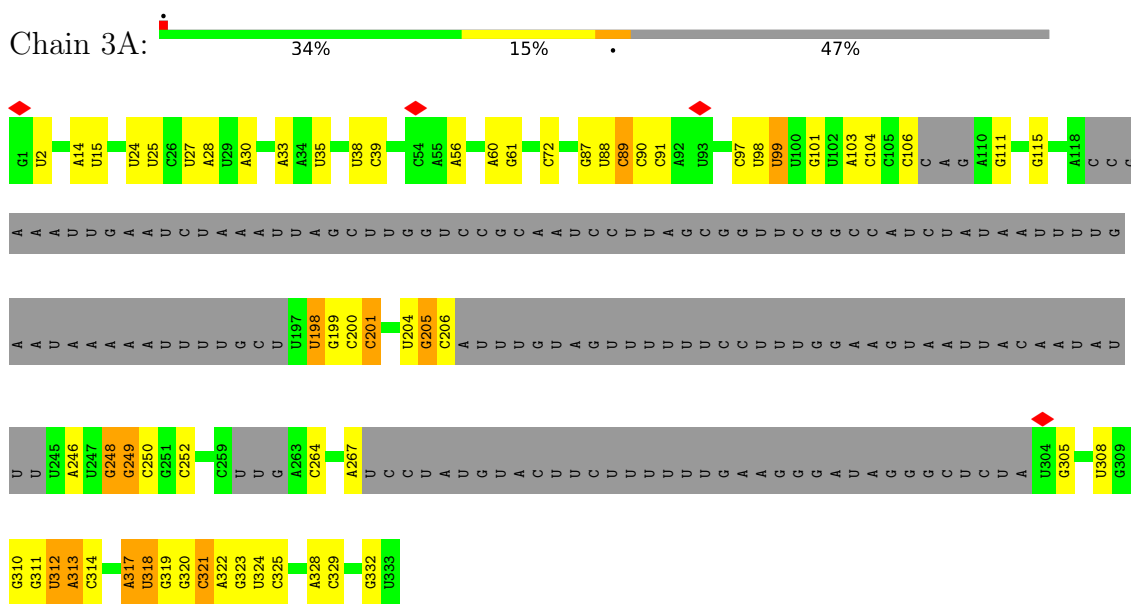
- Molecule 67 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
67	RJ	1	Total	Mg	0
			1	1	

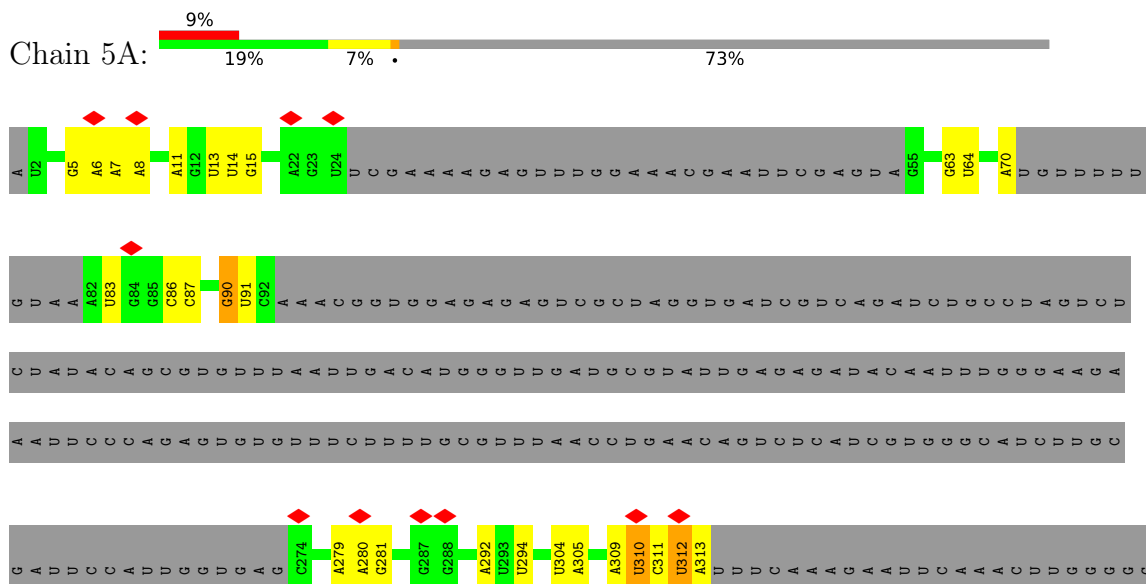
3 Residue-property plots [i](#)

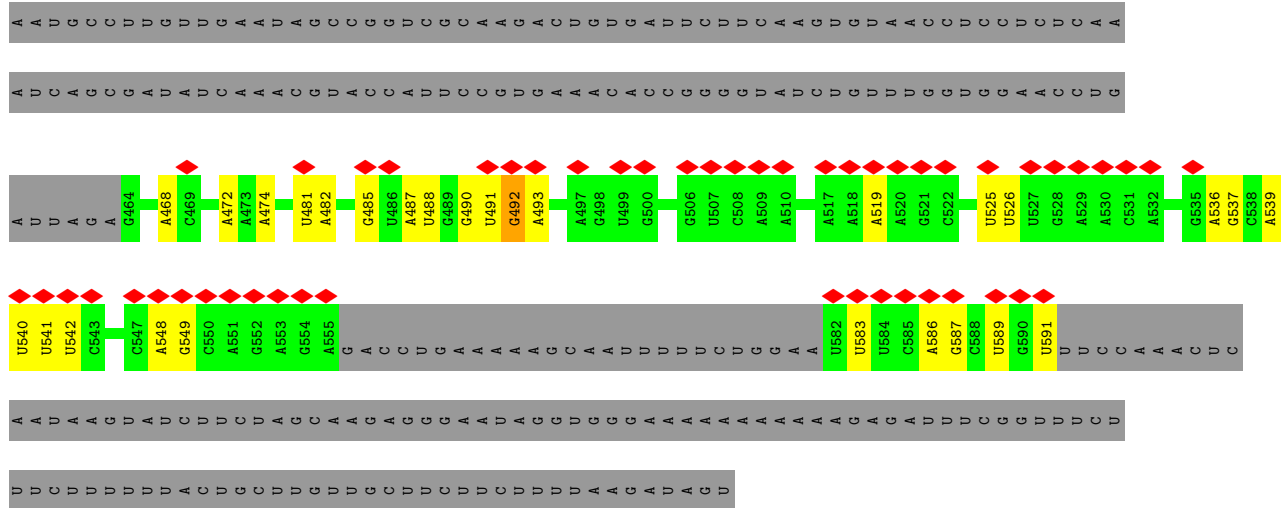
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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: U3 snoRNA

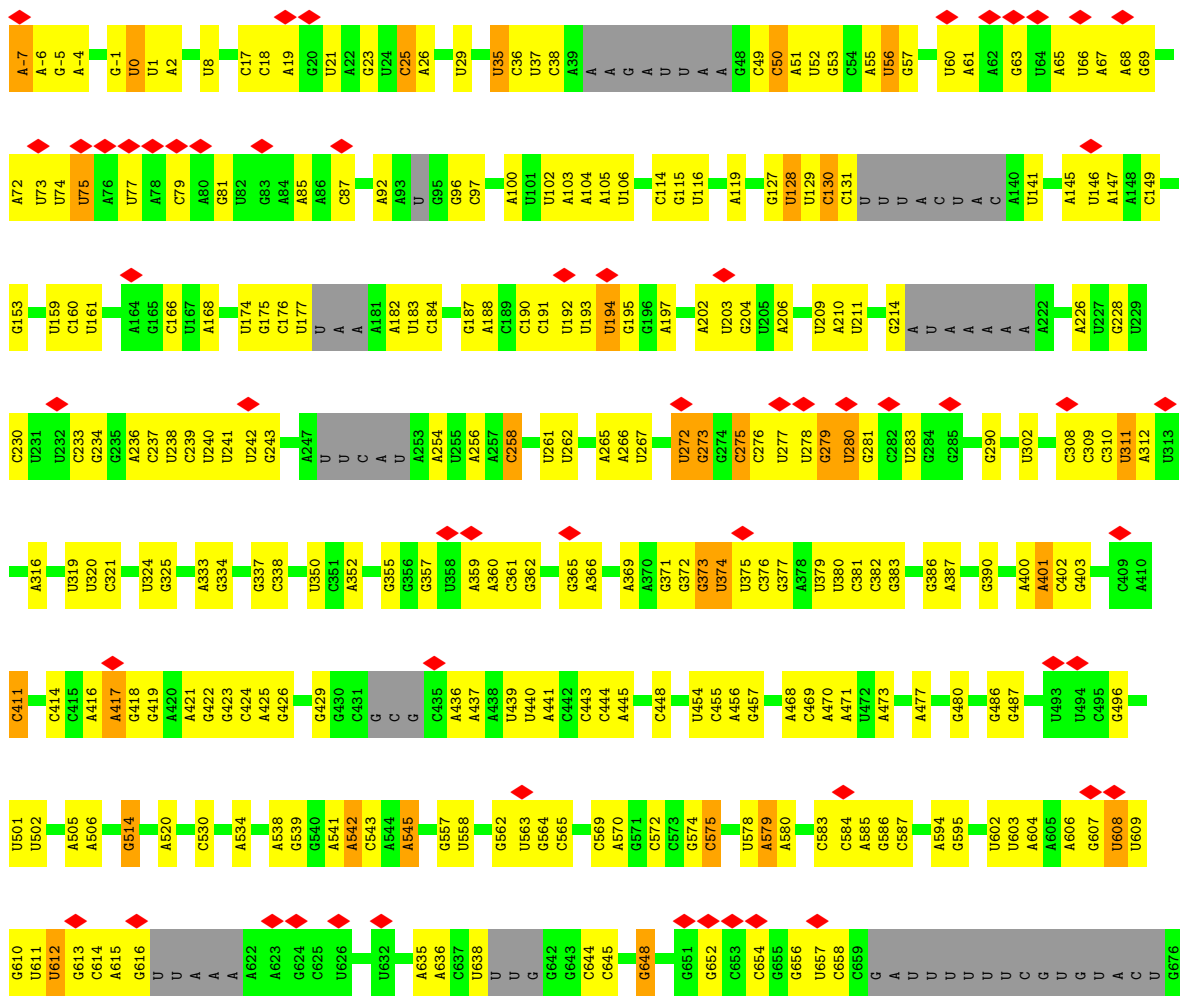


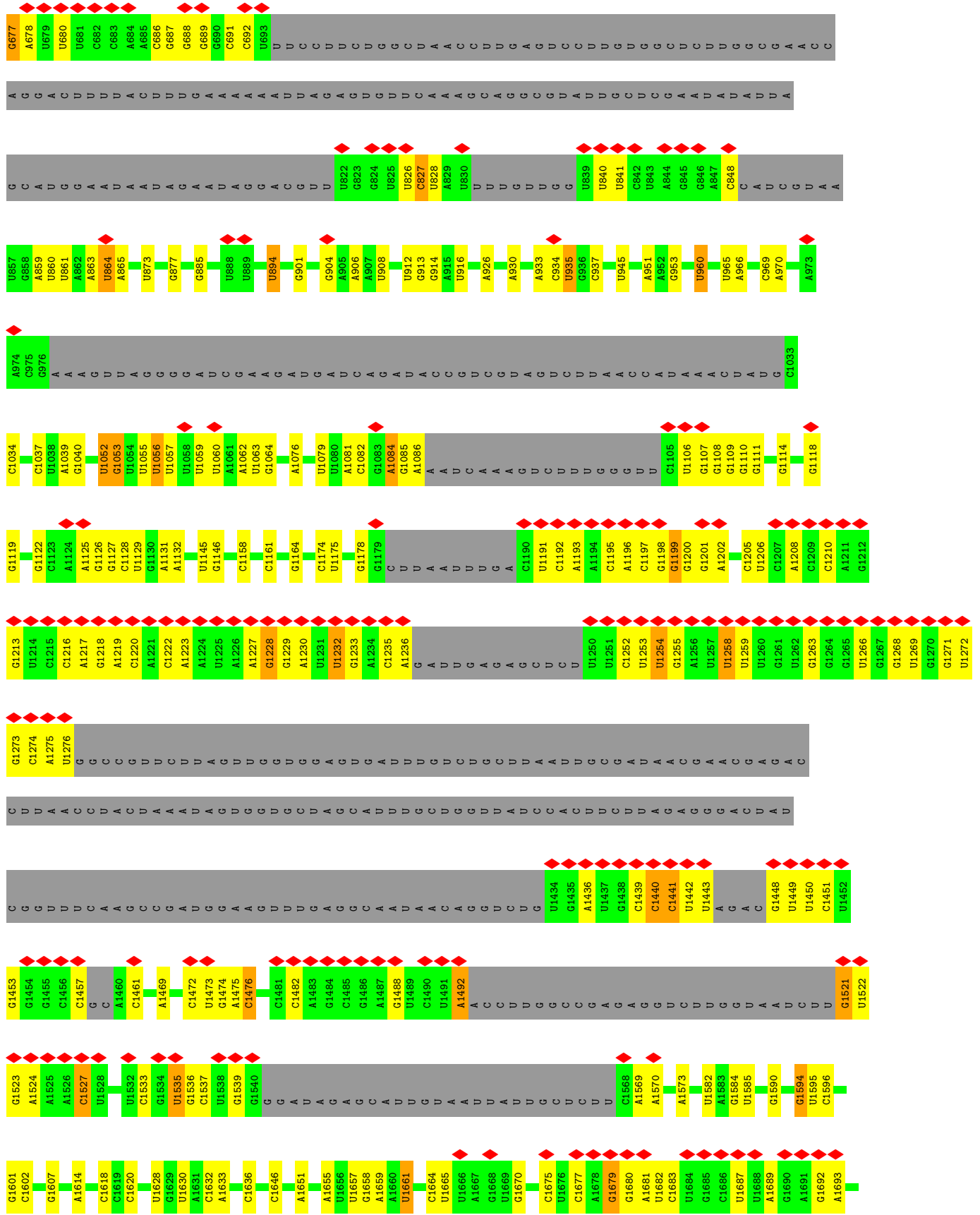
- Molecule 2: 5' ETS

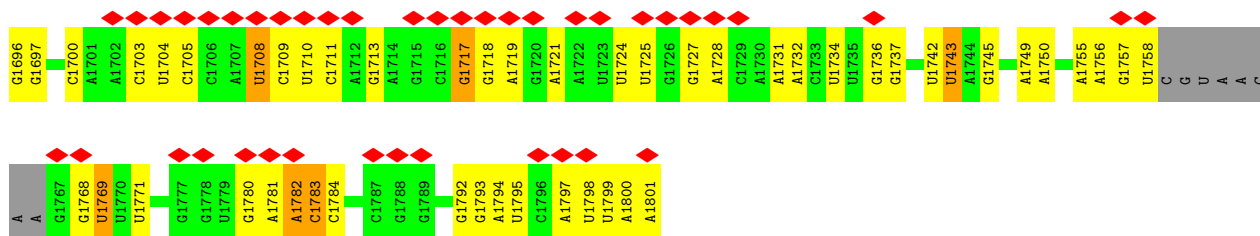




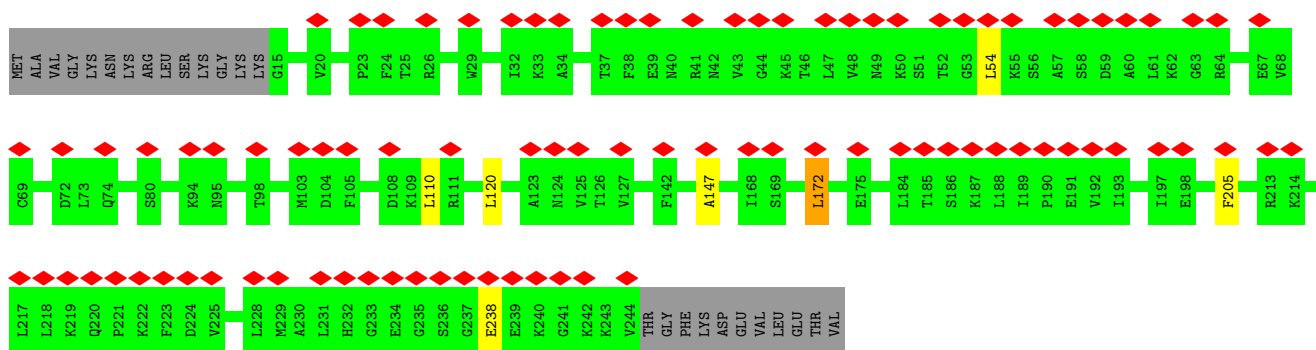
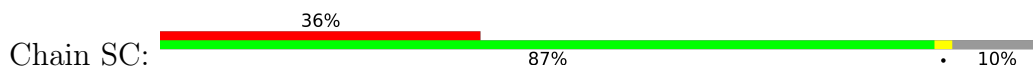
• Molecule 3: 18S pre-rRNA



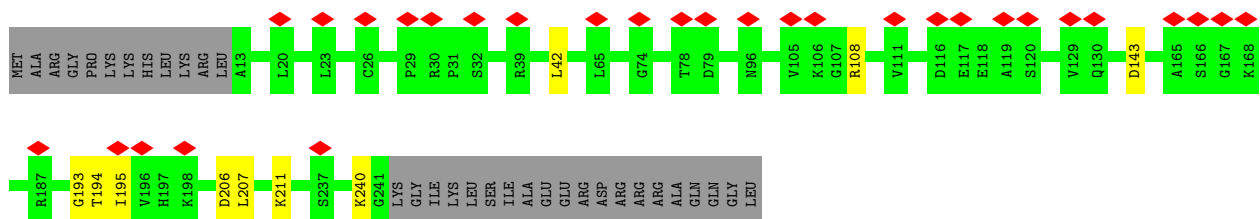
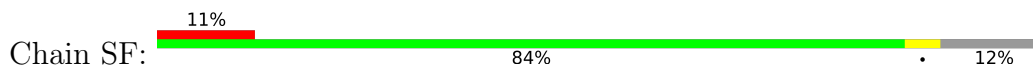




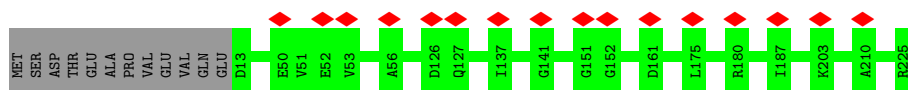
• Molecule 4: 40S ribosomal protein S1-A



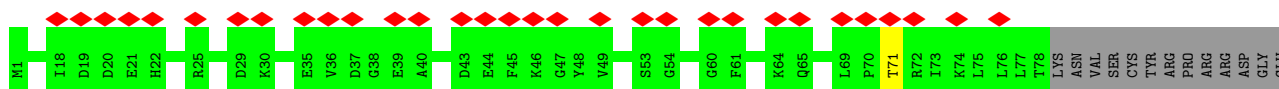
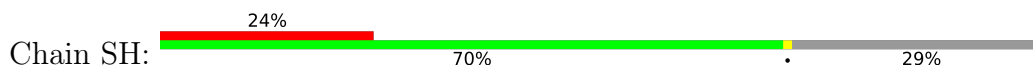
• Molecule 5: 40S ribosomal protein S4-A

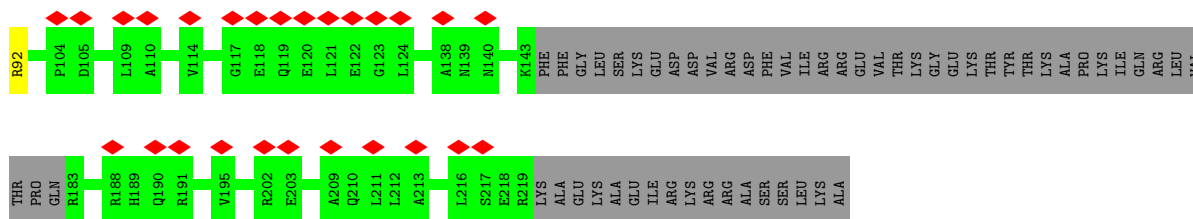


• Molecule 6: 40S ribosomal protein S5

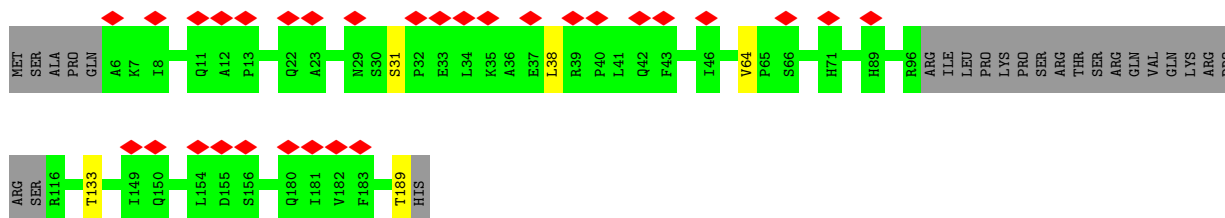
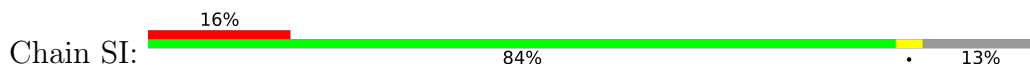


• Molecule 7: 40S ribosomal protein S6-A

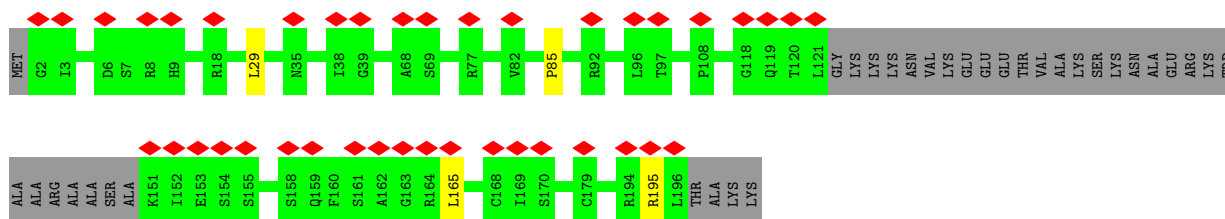
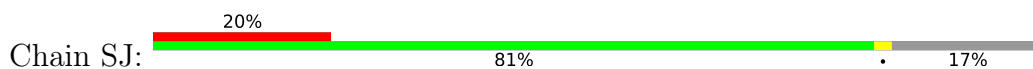




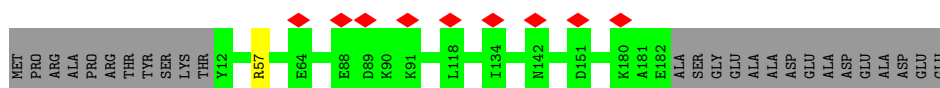
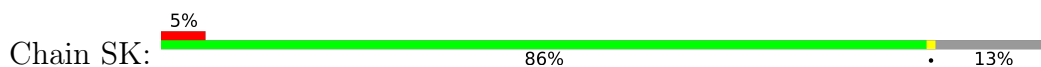
- Molecule 8: 40S ribosomal protein S7-A



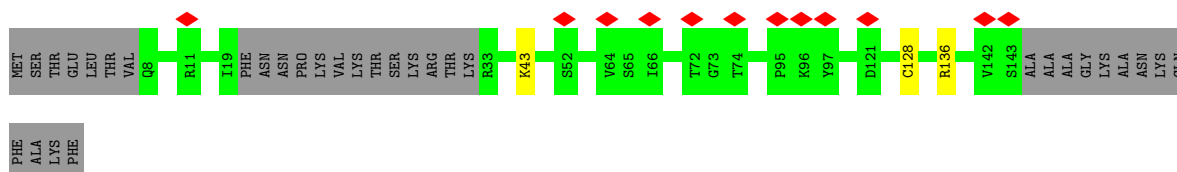
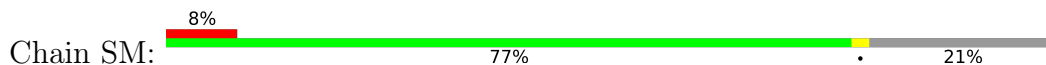
- Molecule 9: 40S ribosomal protein S8-A



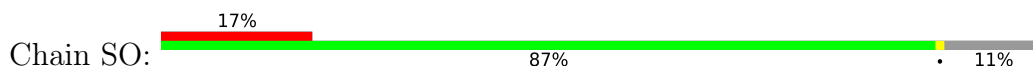
- Molecule 10: 40S ribosomal protein S9-A

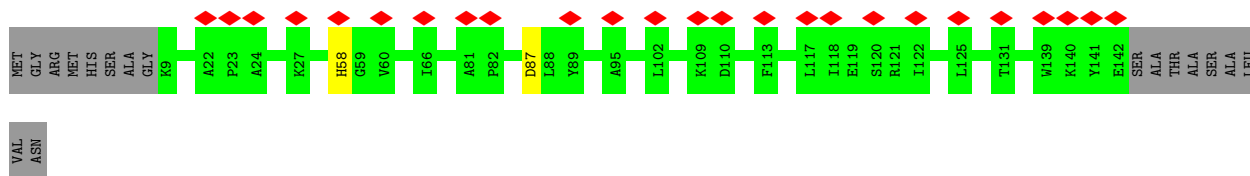


- Molecule 11: 40S ribosomal protein S11-A

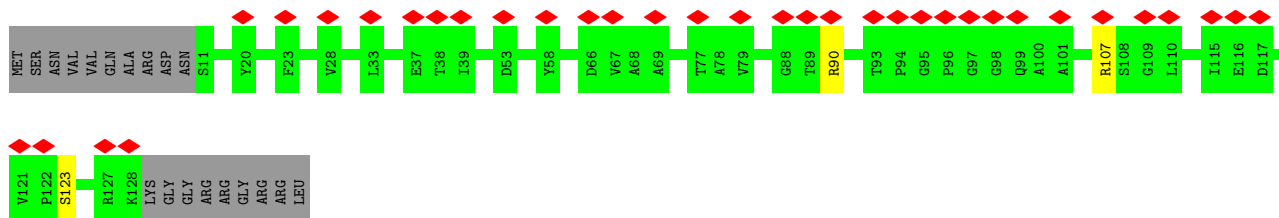
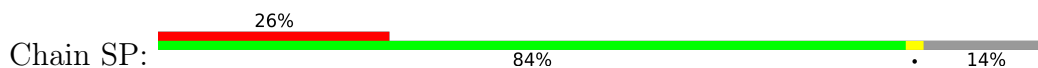


- Molecule 12: 40S ribosomal protein S13

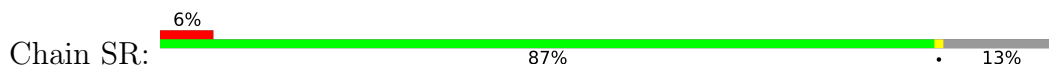




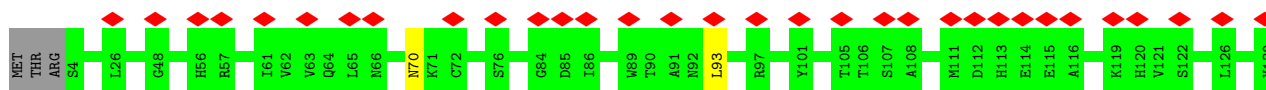
• Molecule 13: 40S ribosomal protein S14-A



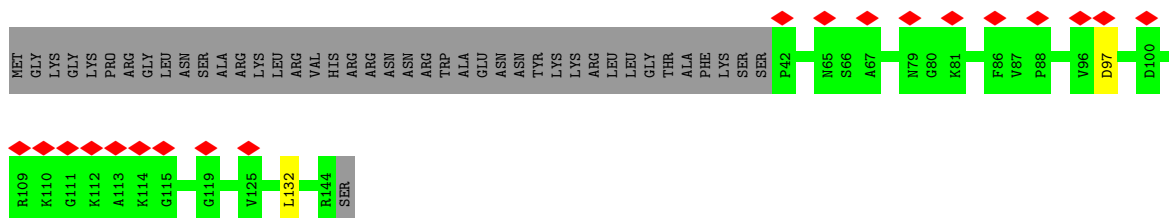
• Molecule 14: 40S ribosomal protein S16-A



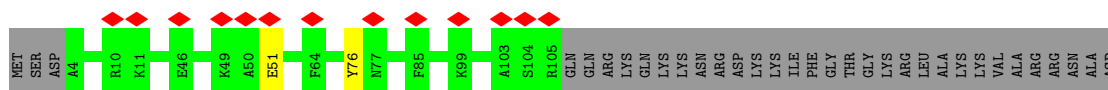
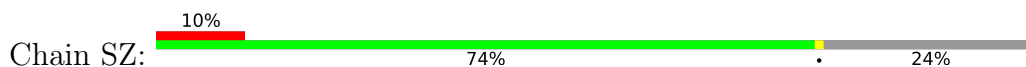
• Molecule 15: 40S ribosomal protein S22-B

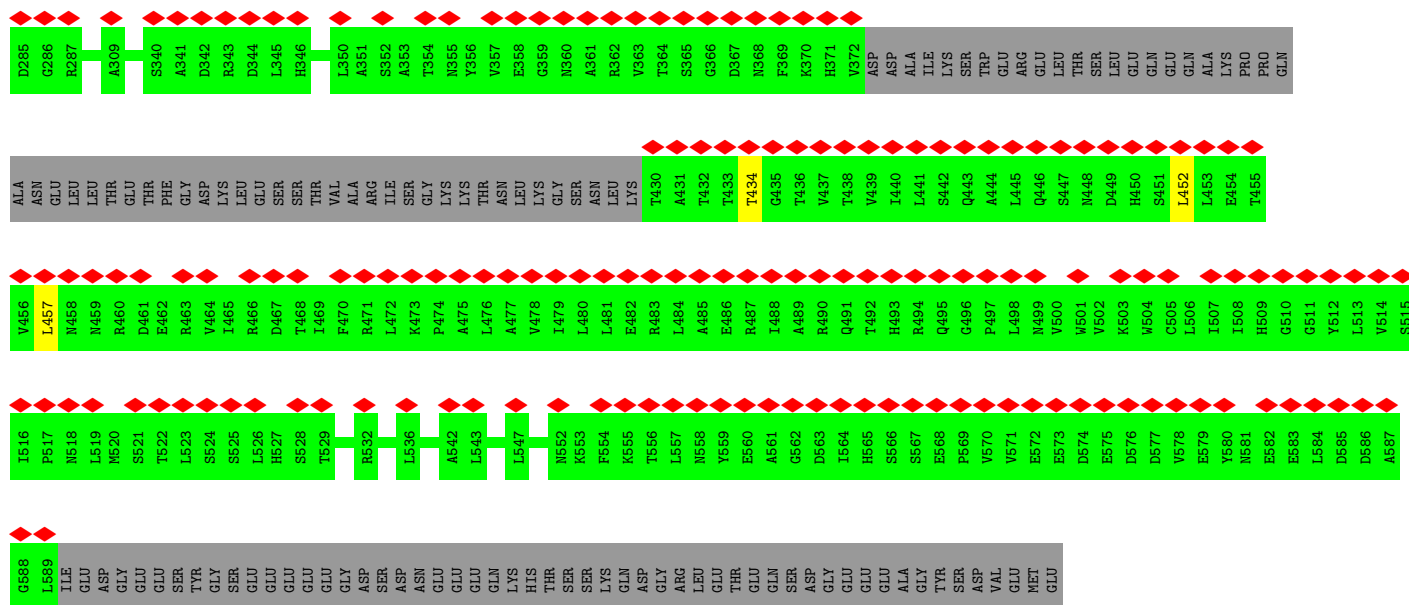


• Molecule 16: 40S ribosomal protein S23-A

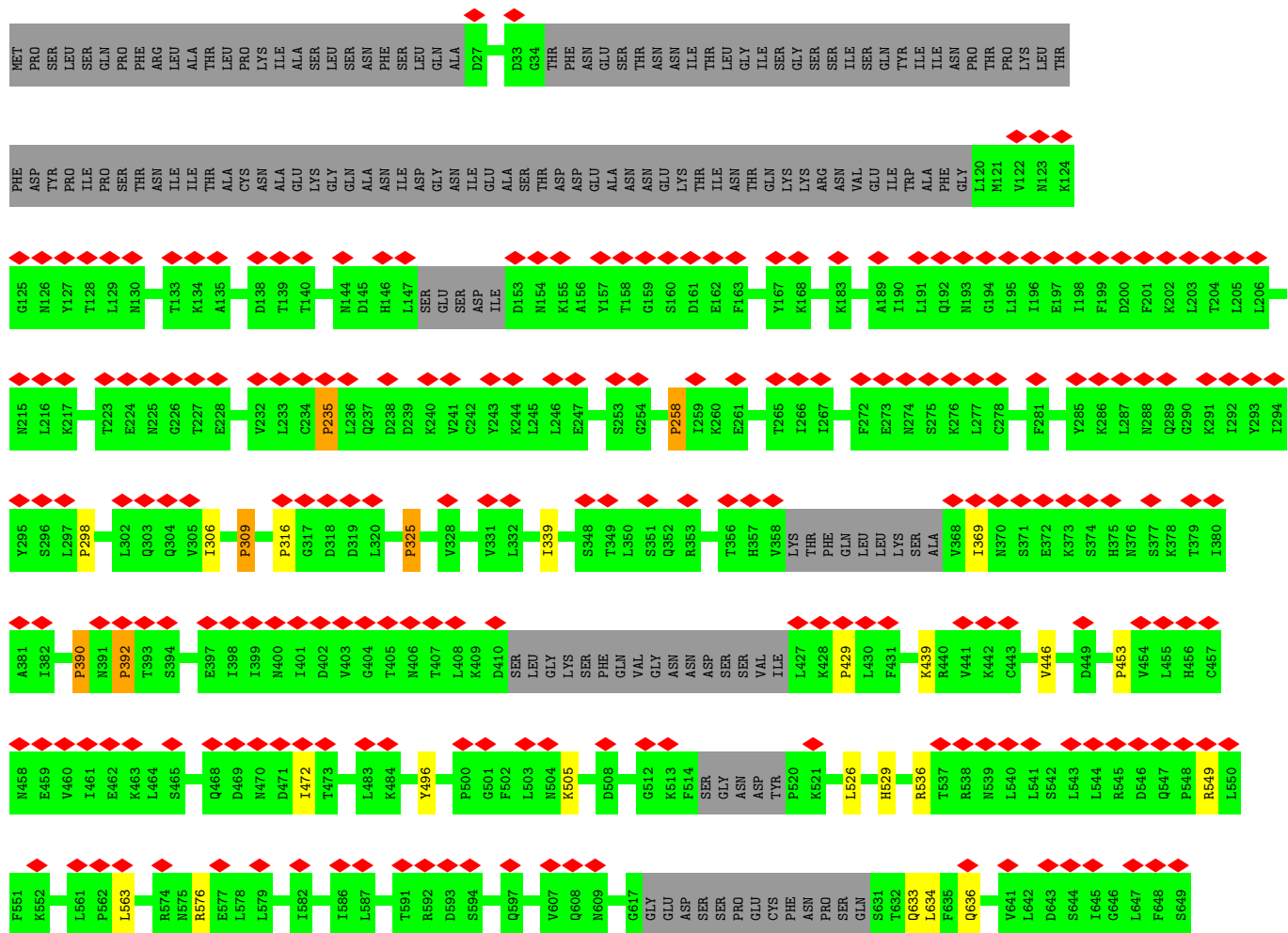
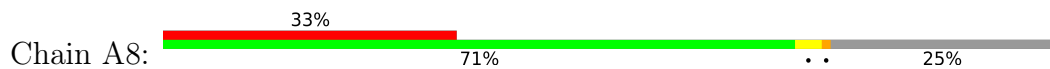


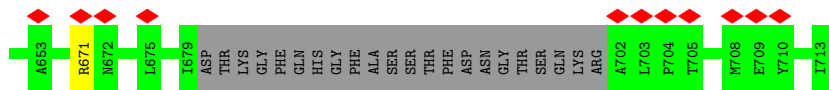
• Molecule 17: 40S ribosomal protein S24-A



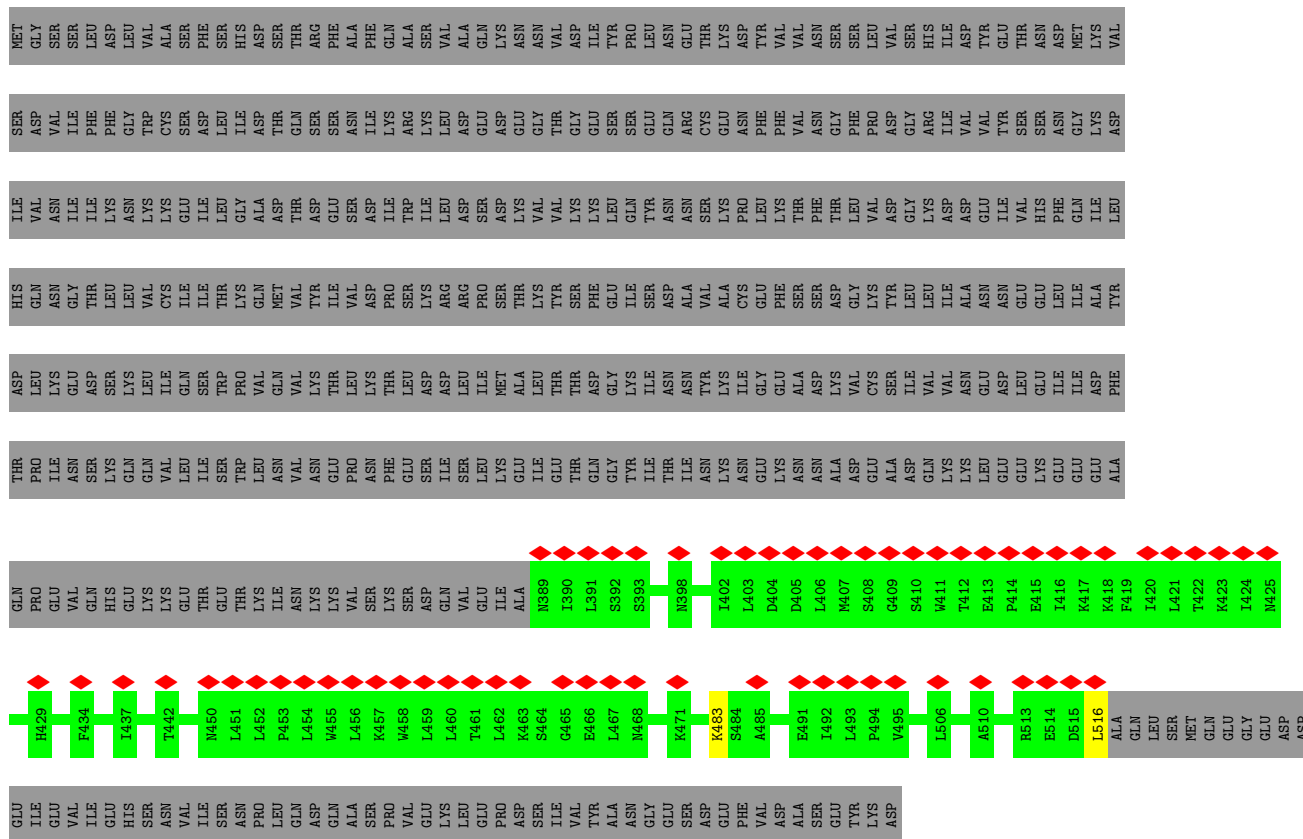


● Molecule 27: U3 small nucleolar RNA-associated protein 8

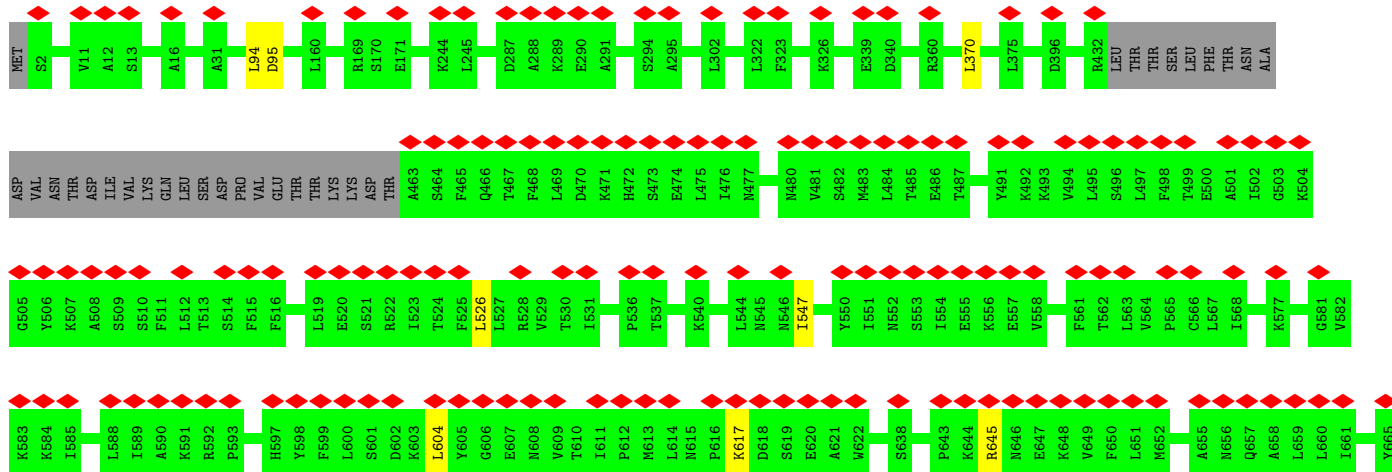
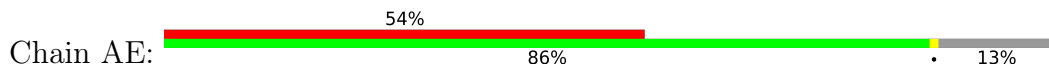




● Molecule 28: U3 small nucleolar RNA-associated protein 9



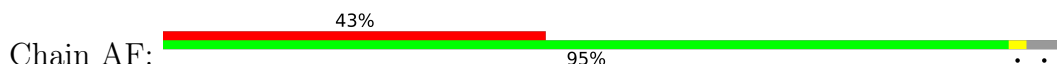
● Molecule 29: U3 small nucleolar RNA-associated protein 10



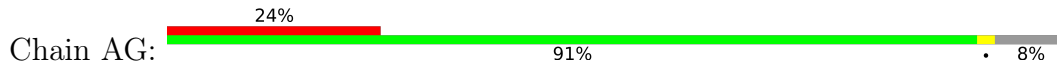
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S1435	P1375	A1315	S1255	ILE	ALA	M1006	I945	ASP	ILE	T668
I1436	P1376	L1316	T1256	ASN	LEU	PHE	L946	GLU	ASN	T679
R1437	S1377	V1317	S1257	THR	LEU	LEU	ALA	THR	GLU	Y680
I1438	I1378	S1318	T1258	PHE	VAL	LEU	THR	LEU	ASP	A681
S1439	K1379	K1319	M1259	PHE	GLU	LEU	ALA	THR	GLU	Y682
V1440	L1380	V1320	E1260	ASN	LEU	SER	SER	ASP	THR	S683
I1441	F1381	G1321	D1261	ILE	H1080	PHE	E954	GLN	ASP	A753
D1442	D1382	LYS	I1262	LYS	N1081	THR	V955	G887	PHE	E754
L1443	A1383	LYS	R1263	THR	E1083	THR	V956	V891	SER	R755
I1444	S1384	LEU	E1264	GLU	E1084	ALA	I957	L892	LYS	L756
I1445	S1385	GLU	H1265	THR	E1085	GLN	L957	L893	ARG	I757
I1446	A1386	S1326	L1266	ASP	S1086	H1019	H958	Y893	ARG	S758
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I1448	S1388	N1209	L1268	GLN	L1088	R1024	V960	Q895	ARG	E689
D1449	S1389	E1210	V1269	LYS	M1089	M1025	E896	E896	THR	E690
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K1451	P1391	A1212	G1271	THR	E1093	K1027	P962	T897	THR	S762
E1452	L1392	S1213	D1272	ASN	L1094	F1029	I963	L898	THR	L763
L1453	K1393	D1214	K1273	ASN	D1093	F1029	P964	I899	THR	N764
L1454	E1394	E1215	F1274	THR	I1094	S1030	F965	CYS	THR	N765
K1455	Q1395	E1216	E1275	ASP	I1095	S1030	F966	THR	ASN	A766
V1456	L1396	SER	L1276	LEU	K1096	T1031	M967	LEU	THR	Q767
L1457	Q1397	LEU	E1277	SER	L1097	I1032	G968	ASN	THR	K768
F1458	V1398	SER	G1278	ASP	L1098	ILE	ALA	THR	GLN	S700
R1459	A1399	ASP	G1279	THR	L1098	LYS	HIS	THR	LEU	S701
I1460	I1400	H1222	S1279	THR	T1099	THR	ALA	THR	LEU	W702
M1461	L1401	T1223	E1280	LEU	S1100	LEU	ILE	THR	GLU	E703
S1462	L1402	T1224	A1281	ASP	S1101	ASP	ARG	THR	LEU	K704
L1403	L1403	E1225	P1283	PRO	K1102	GLN	ARG	THR	GLU	T711
F1404	F1404	I1226	I1284	LEU	S1103	ASP	GLU	THR	HIS	E714
A1405	A1405	K1227	V1285	ASP	S1104	GLU	PHE	THR	LEU	H715
G1406	G1406	I1228	V1285	GLU	S1105	THR	THR	THR	LYS	F716
L1407	L1407	L1229	M1286	THR	E1106	THR	THR	THR	ILE	E717
I1408	I1408	L1230	M1287	SER	K1107	ALA	VAL	THR	ILE	R718
M1409	M1409	F1231	V1288	THR	K1108	GLN	VAL	VAL	THR	R719
R1410	M1409	K1232	M1289	K1173	K1109	GLN	VAL	VAL	THR	S719
I1411	R1410	V1233	K1290	K1174	S1110	TVR	ARG	ARG	GLU	L720
P1412	I1411	L1294	L1291	L1175	S1111	SER	THR	ALA	ASP	V721
S1413	S1413	L1292	L1293	I1176	E1112	SER	THR	ALA	ASP	N722
F1414	F1414	D1294	D1294	R1177	L1113	ALA	VAL	VAL	LEU	L723
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S1417	S1417	LEU	L1297	GLU	N1059	N1059	VAL	ALA	THR	F726
M1418	M1418	ILE	P1297	GLU	F1060	F1060	ALA	ALA	ARG	F727
I1419	I1419	PRO	E1299	PHE	K1061	K1061	ALA	ILE	LEU	K727
L1420	L1420	V1243	E1299	THR	I1062	I1062	ALA	THR	LEU	E728
D1421	D1421	K1300	K1300	THR	G1063	G1063	GLY	THR	PHEN	K729
L1422	L1422	E1245	E1245	LEU	E1064	E1064	VAL	THR	THR	F732
L1423	L1423	F1246	F1246	LEU	A1065	A1065	VAL	THR	THR	M733
T1484	T1484	N1248	N1248	LEU	R1066	R1066	VAL	THR	THR	I734
V1425	V1425	A1249	A1249	GLU	R1067	R1067	VAL	THR	THR	D735
I1426	I1426	V1250	V1250	VAL	L1067	L1067	VAL	SER	THR	F736
Y1427	Y1427	L1251	L1251	LEU	L1068	L1068	VAL	SER	THR	V737
F1428	F1428	F1369	F1369	LEU	L1069	L1069	VAL	SER	THR	A740
S1429	S1429	V1370	V1370	LEU	E1070	E1070	VAL	THR	THR	L741
K1430	K1430	P1371	P1371	LEU	PHE	PHE	VAL	THR	THR	N742
E1431	E1431	K1372	K1372	LEU	LEU	LEU	VAL	THR	THR	S743
S1492	S1492	T1312	T1312	LEU	LEU	LEU	VAL	THR	THR	D744

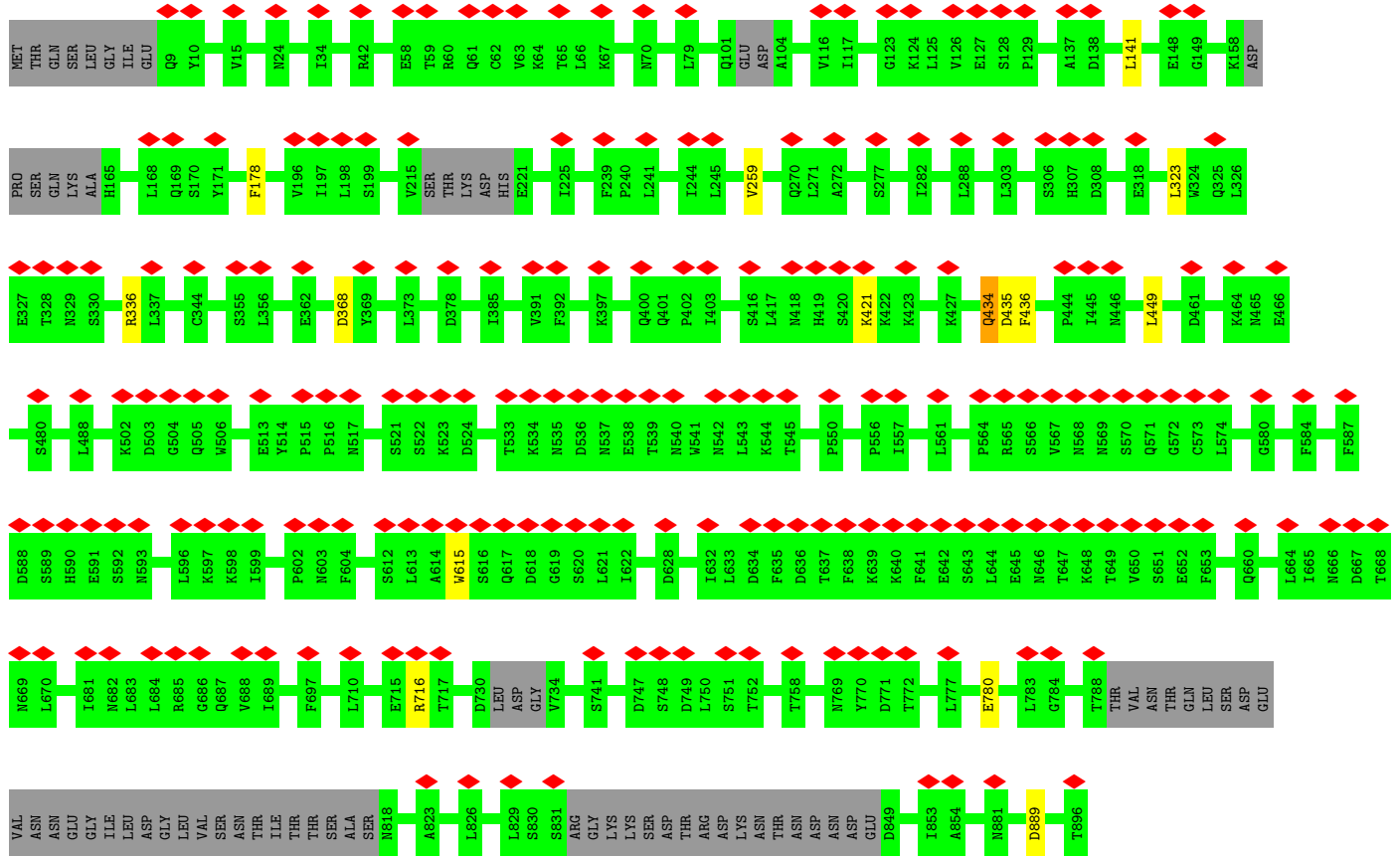


• Molecule 30: U3 small nucleolar RNA-associated protein 15

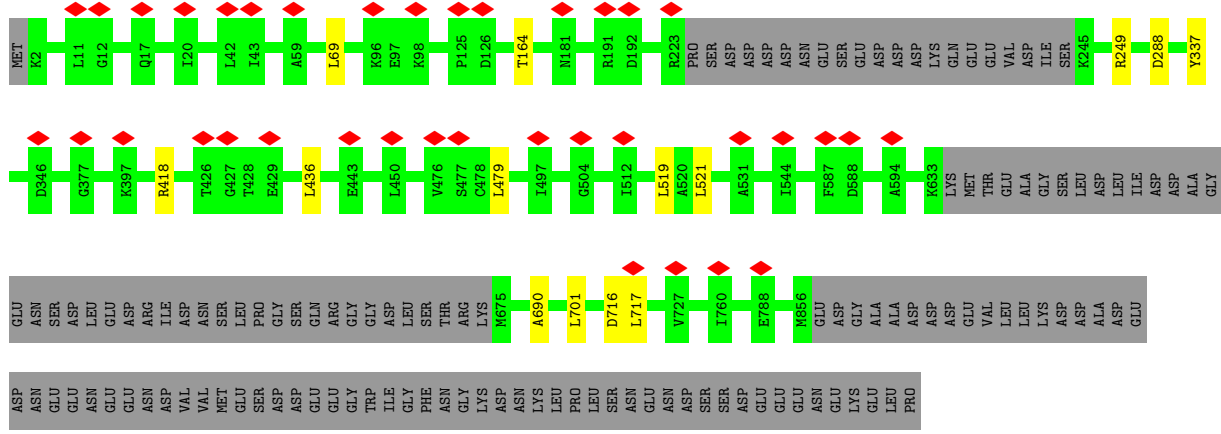
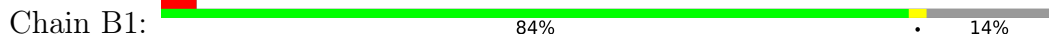


• Molecule 31: NET1-associated nuclear protein 1

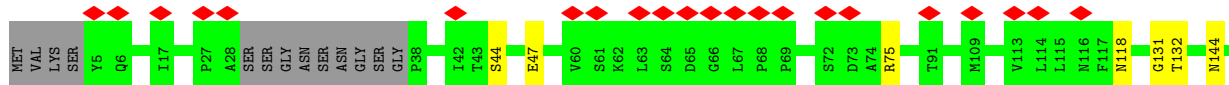
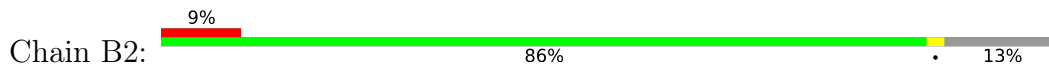


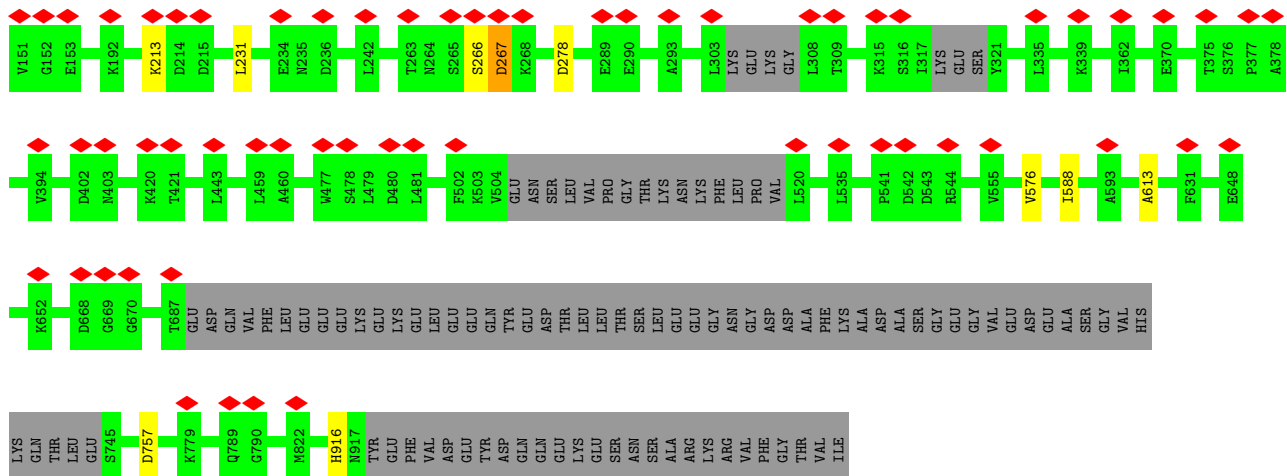


• Molecule 32: Periodic tryptophan protein 2

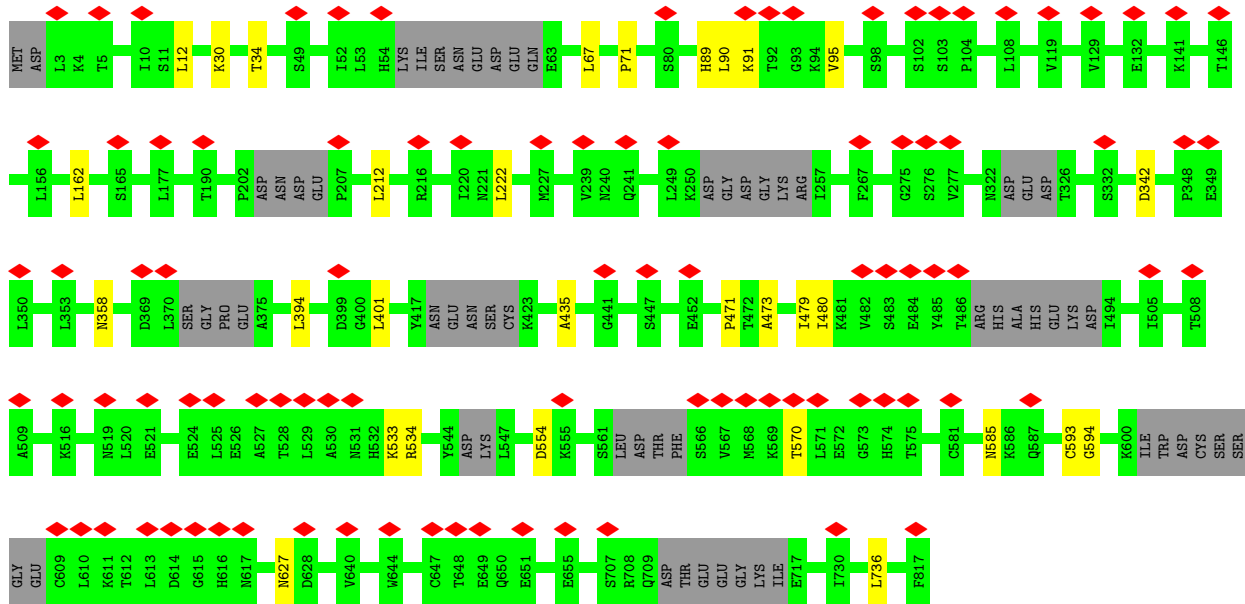
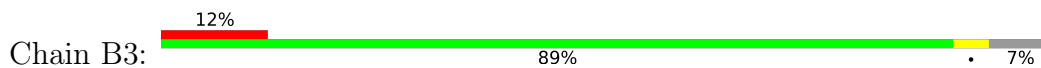


• Molecule 33: U3 small nucleolar RNA-associated protein 12

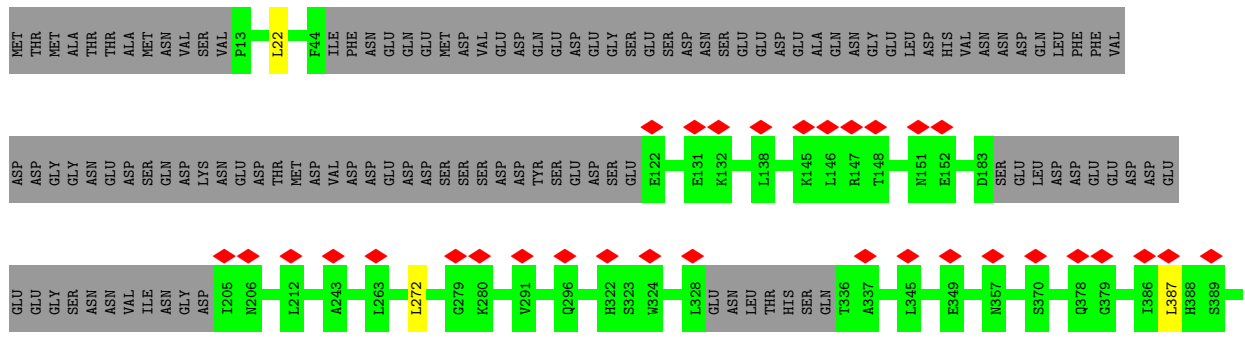
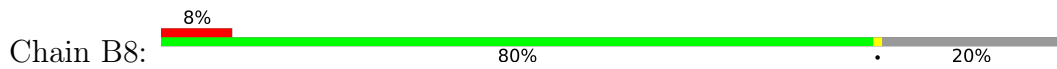


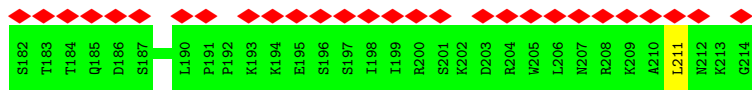


• Molecule 34: U3 small nucleolar RNA-associated protein 13

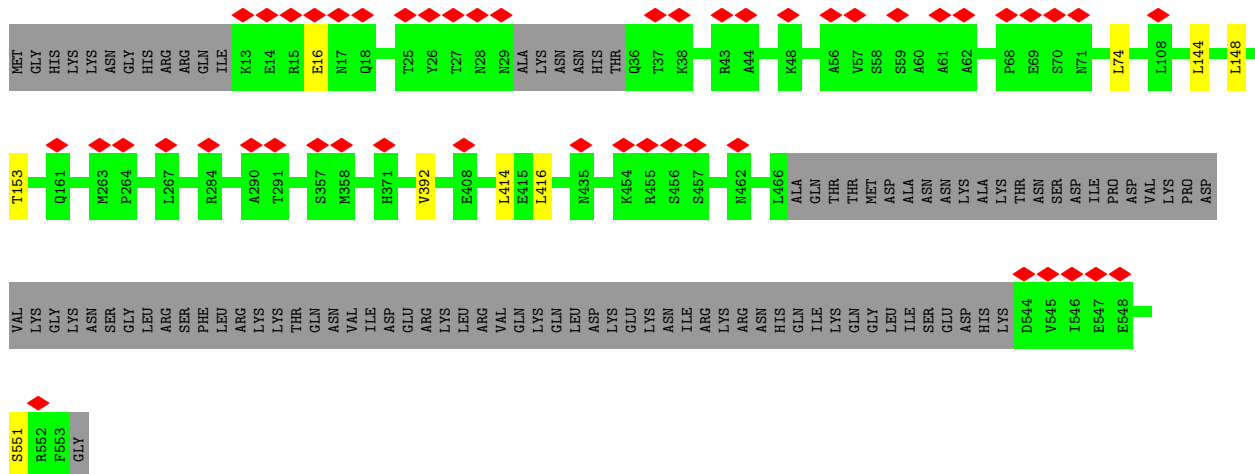
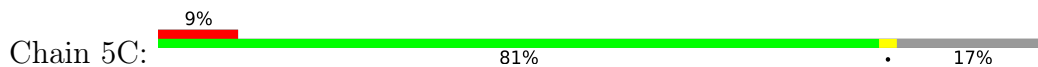


• Molecule 35: U3 small nucleolar RNA-associated protein 18

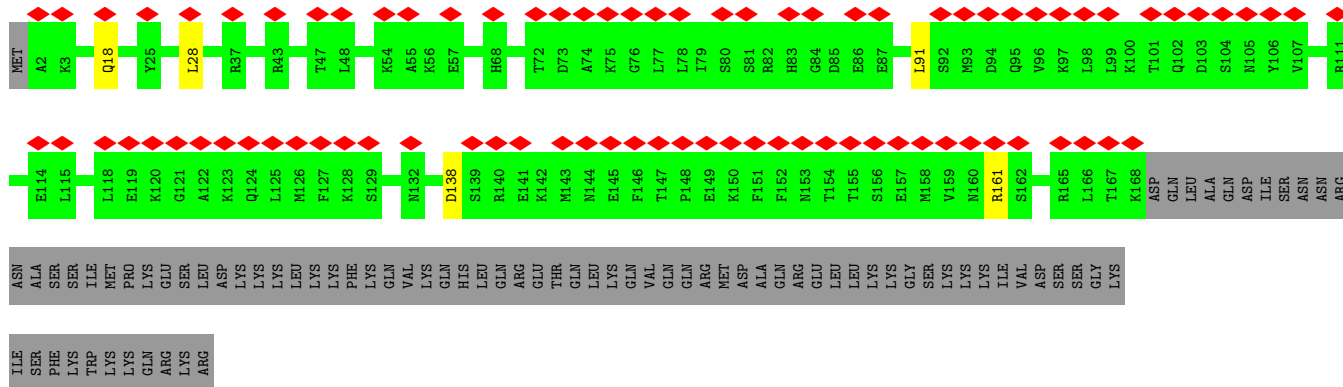




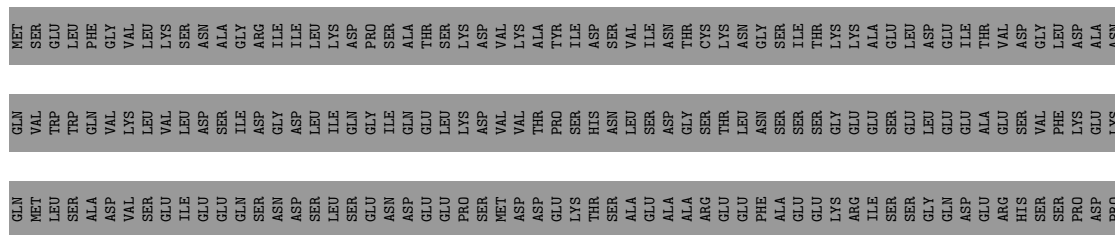
• Molecule 39: U3 small nucleolar RNA-associated protein 7

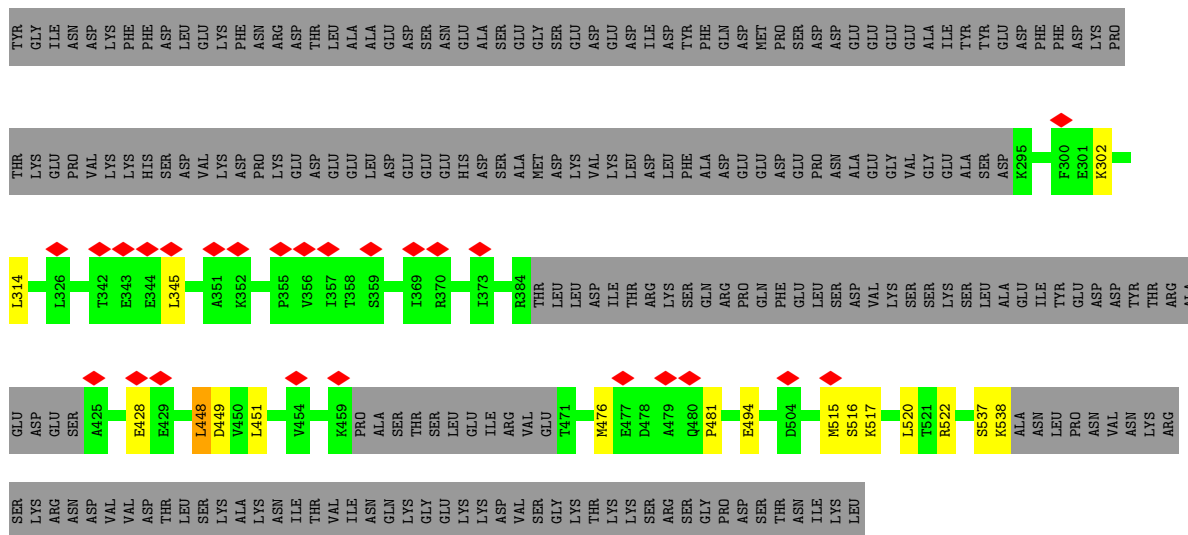


• Molecule 40: U3 small nucleolar RNA-associated protein 11

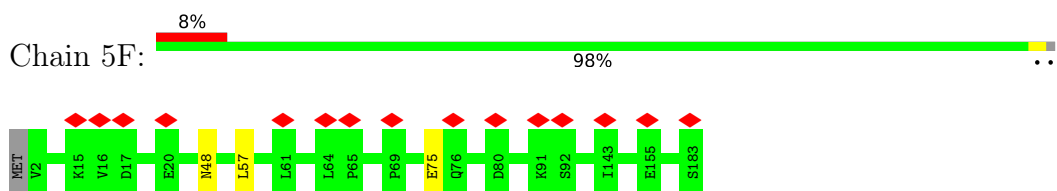


• Molecule 41: U3 small nucleolar RNA-associated protein MPP10

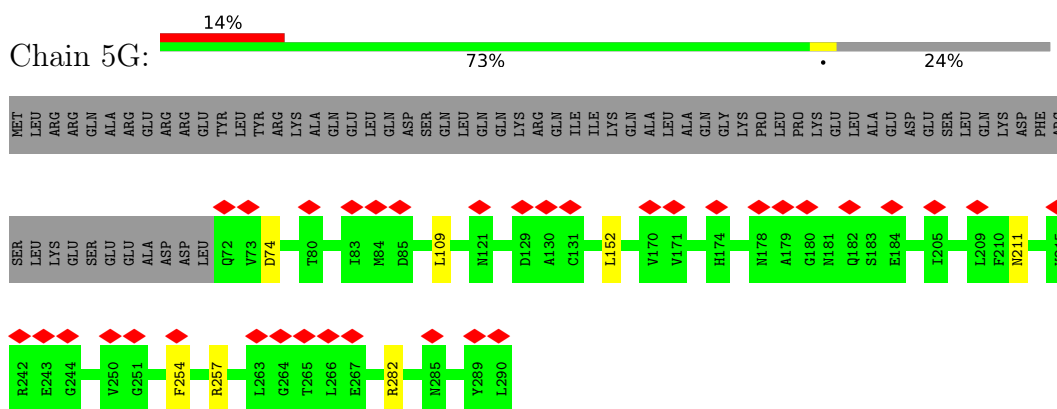




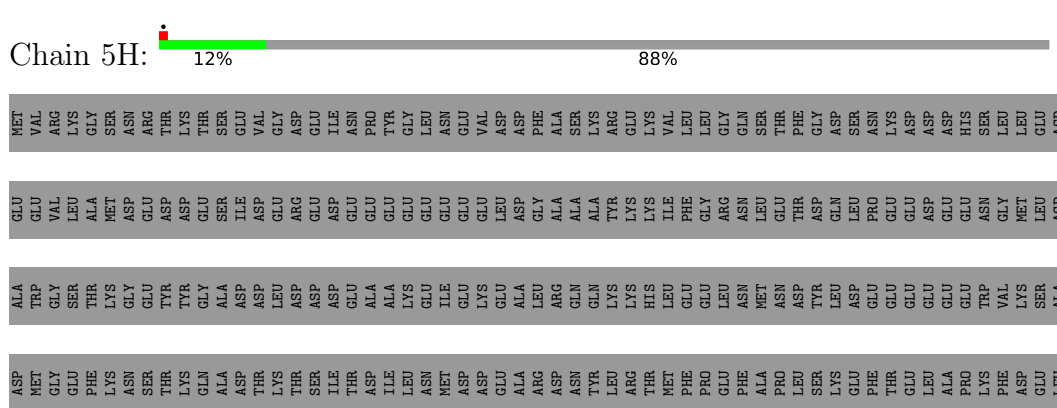
• Molecule 42: U3 small nucleolar ribonucleoprotein protein IMP3

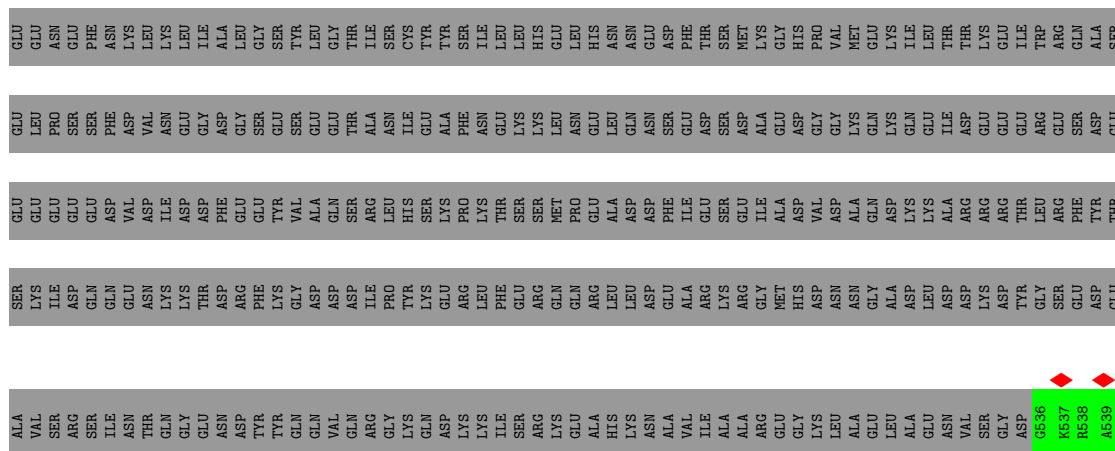


• Molecule 43: U3 small nucleolar ribonucleoprotein protein IMP4

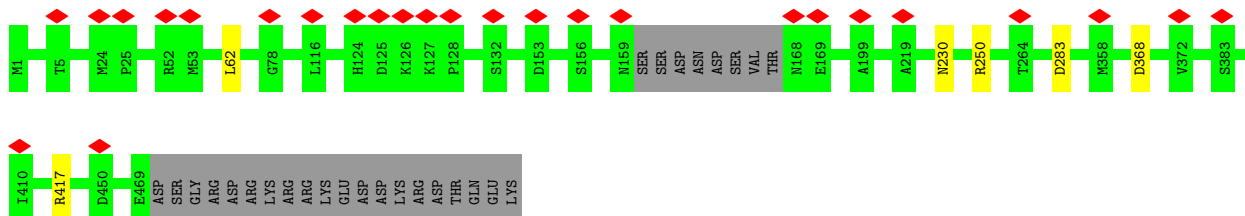


• Molecule 44: Something about silencing protein 10

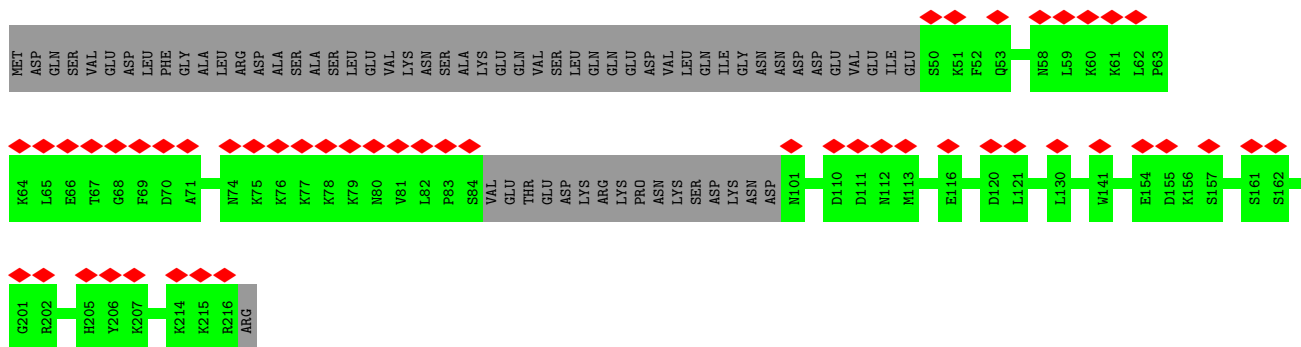




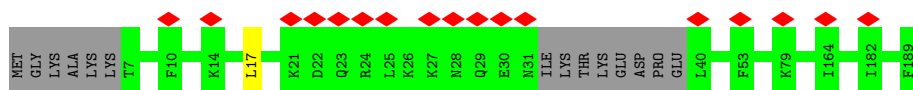
• Molecule 45: Protein SOF1

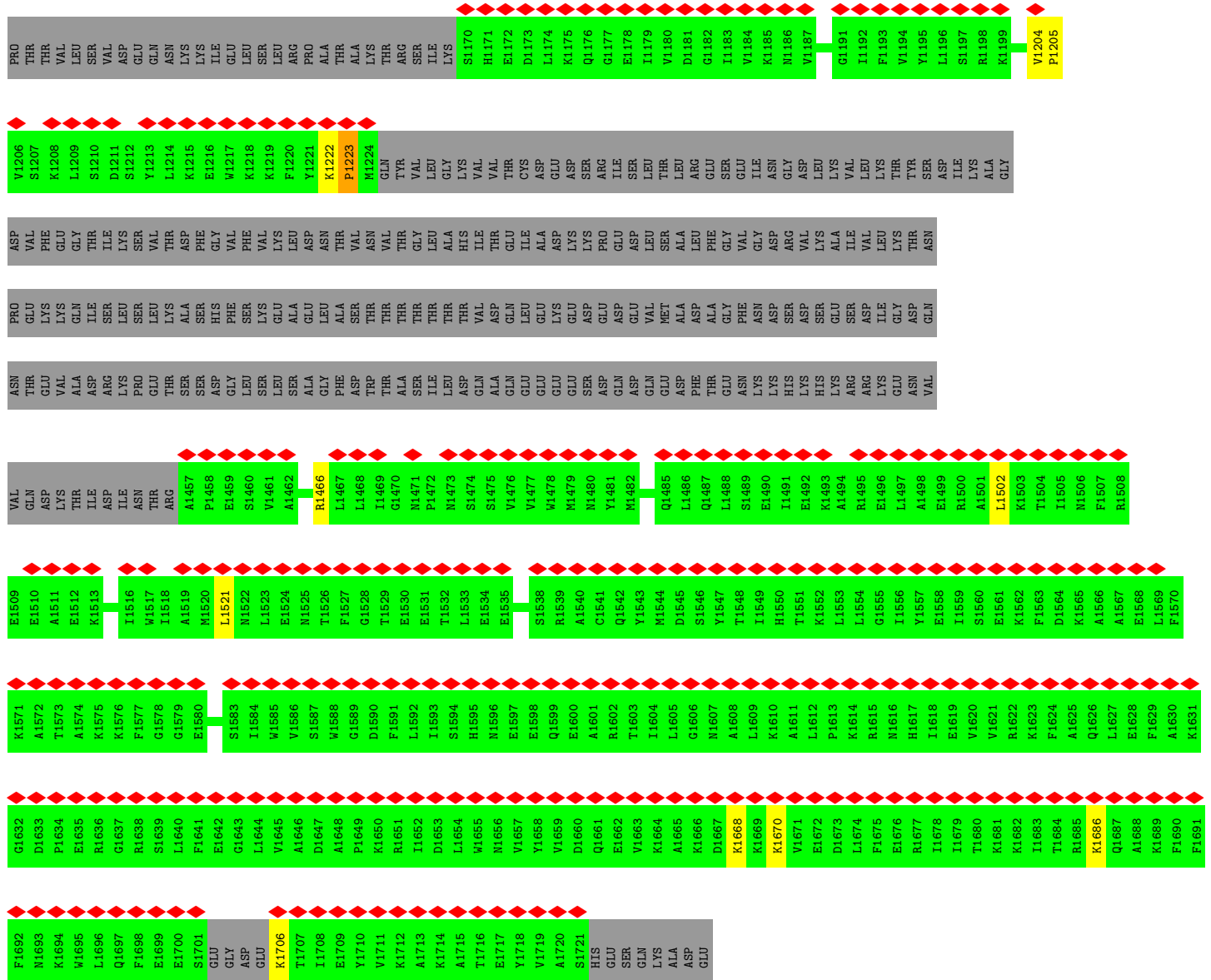


• Molecule 46: rRNA-processing protein FCF2

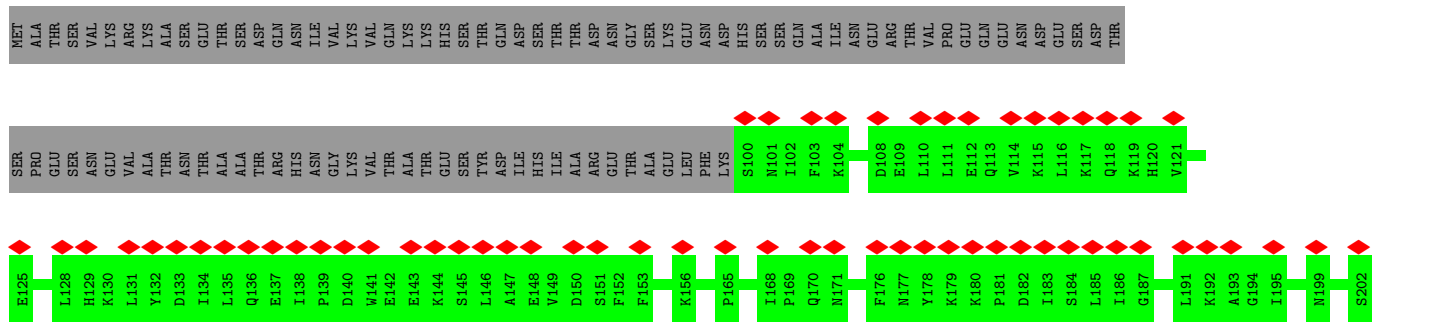
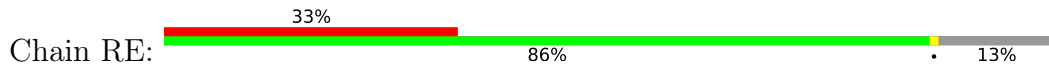


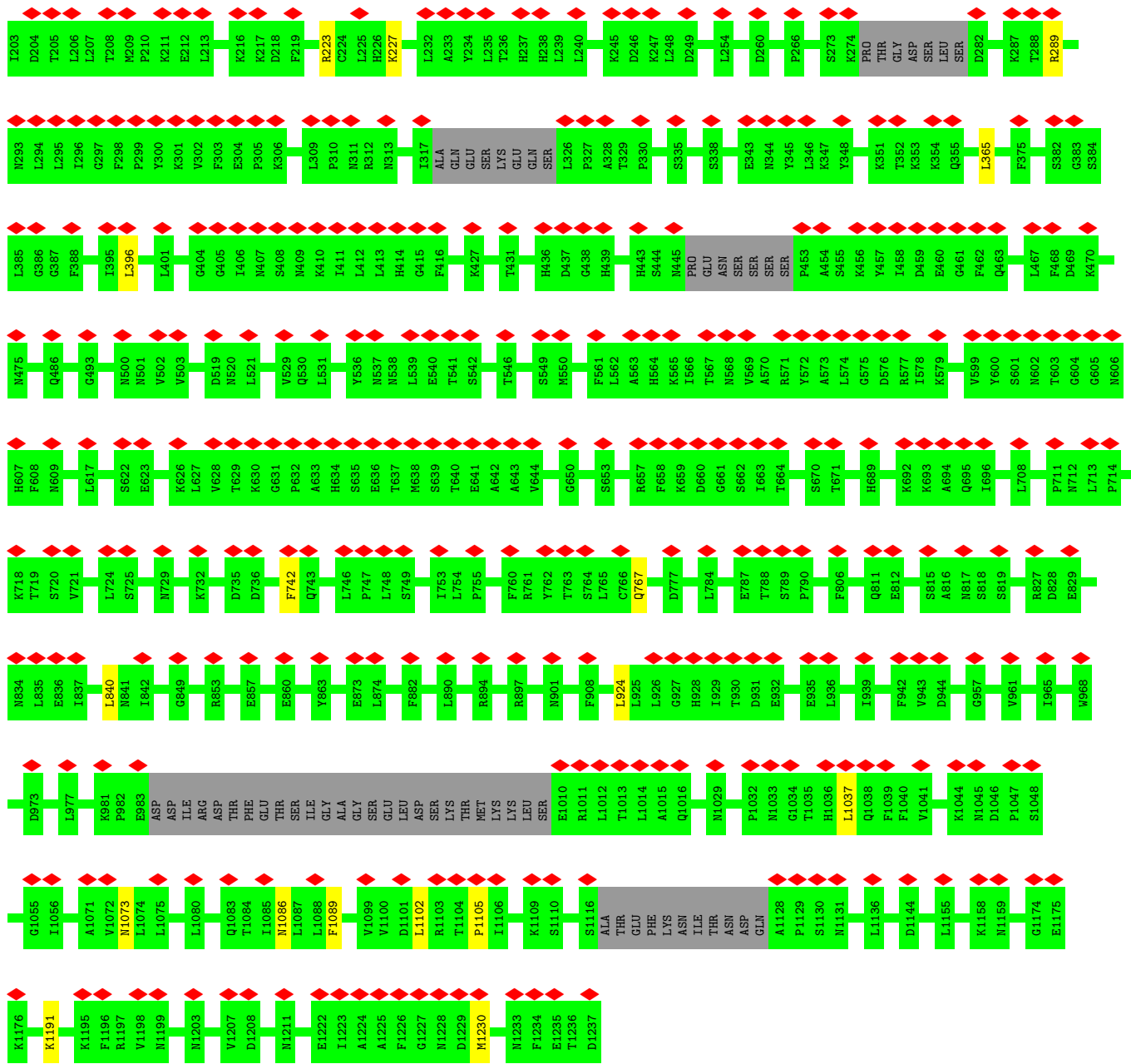
• Molecule 47: rRNA-processing protein FCF1



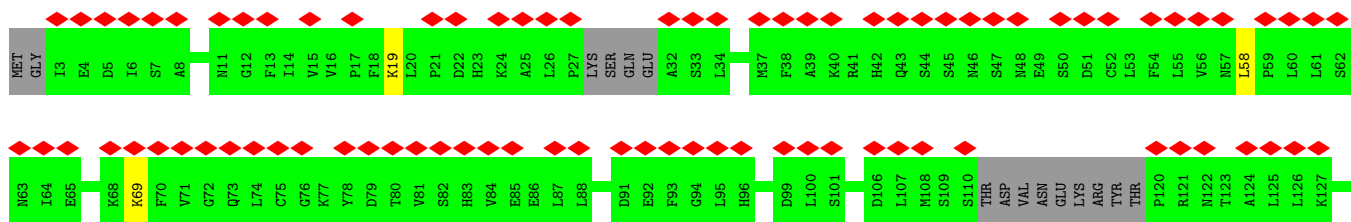
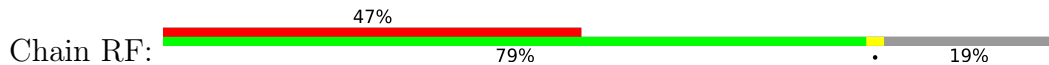


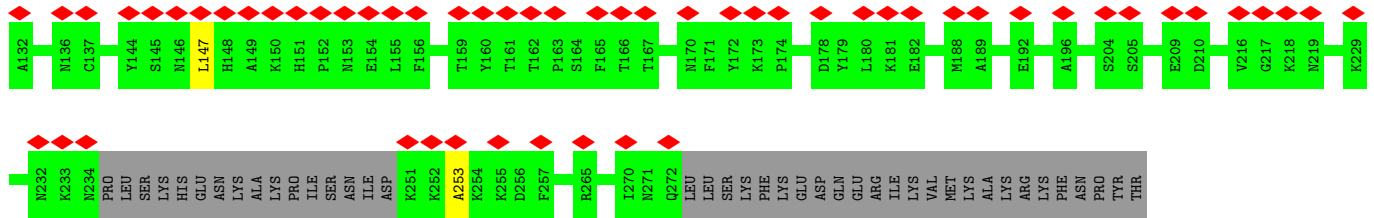
● Molecule 51: U3 small nucleolar RNA-associated protein 22





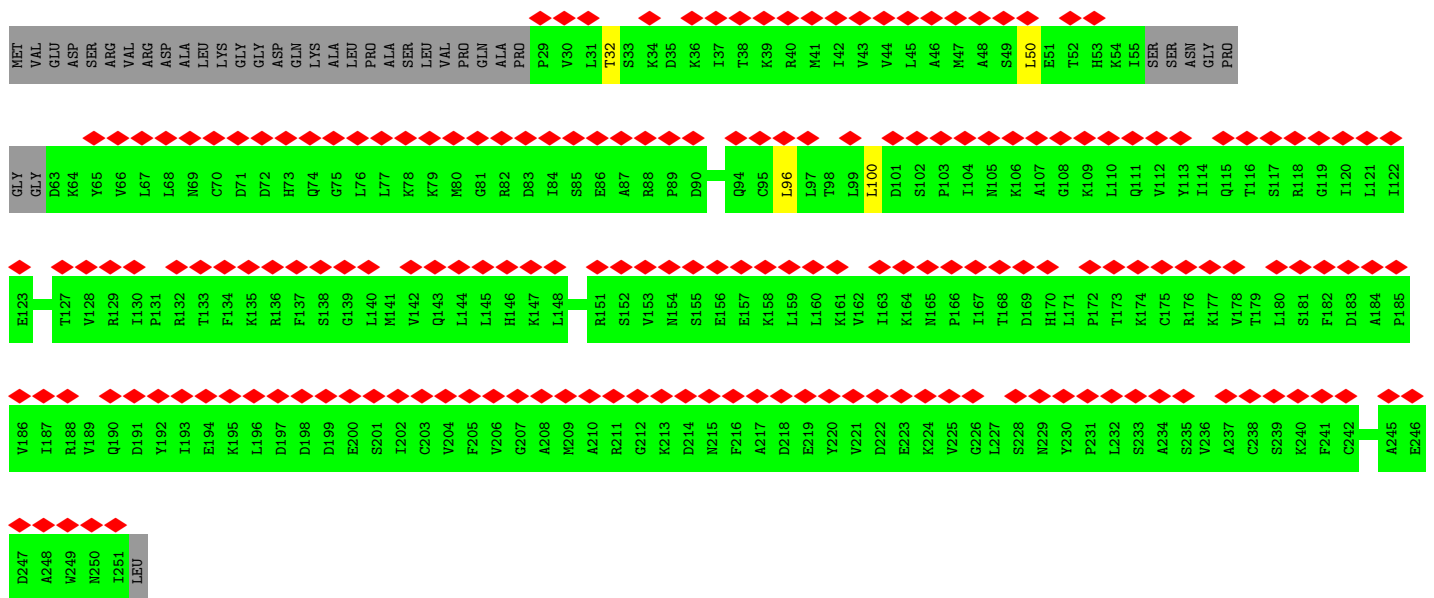
• Molecule 52: Ribosomal RNA-processing protein 7





• Molecule 53: Ribosomal RNA small subunit methyltransferase NEP1

Chain RG: 74% 84% 14%

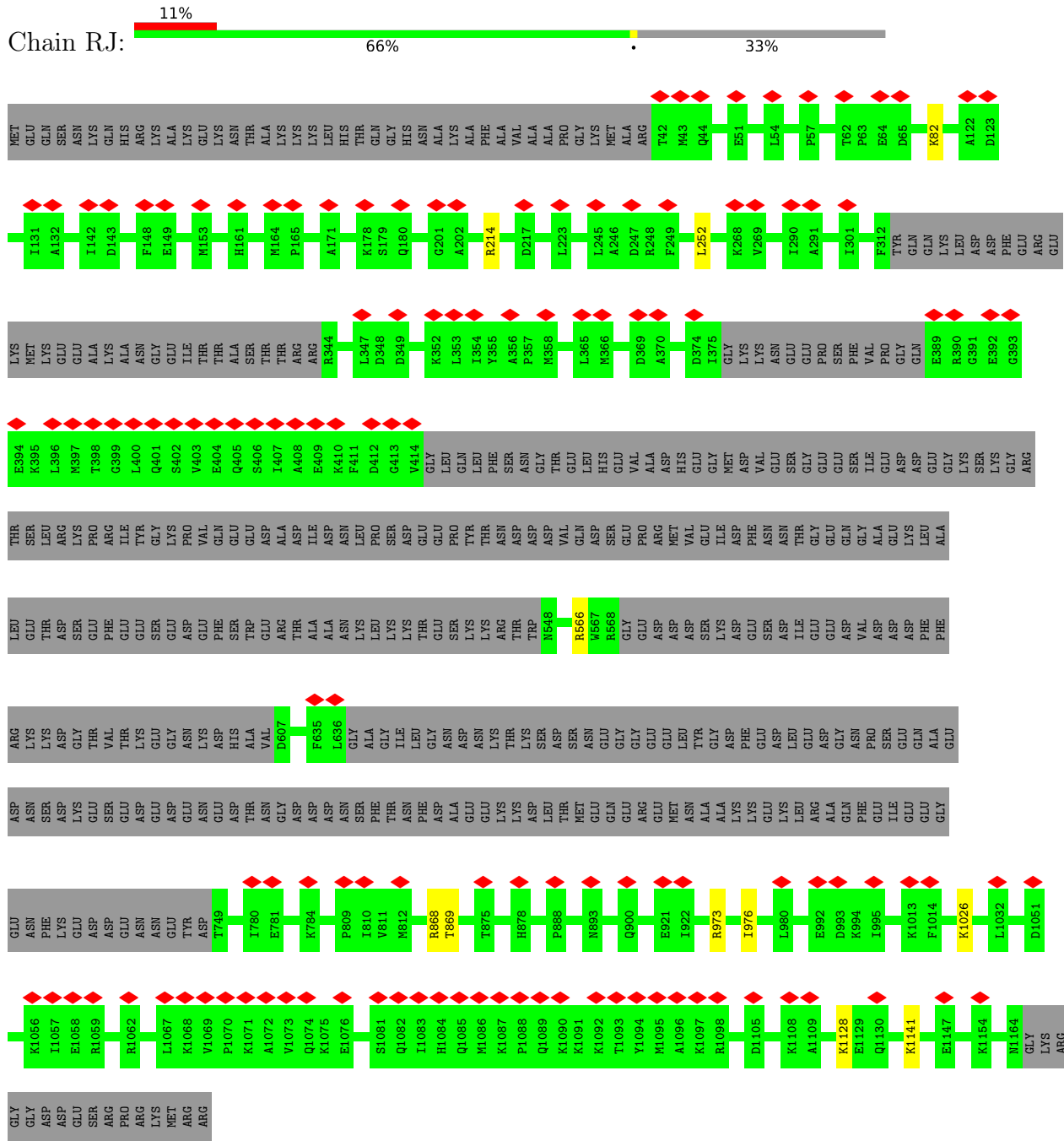


• Molecule 53: Ribosomal RNA small subunit methyltransferase NEP1

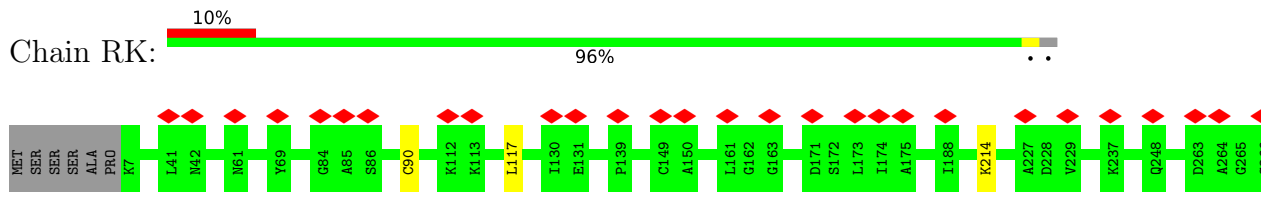
Chain RH: 76% 90% 9%



● Molecule 54: Ribosome biogenesis protein BMS1

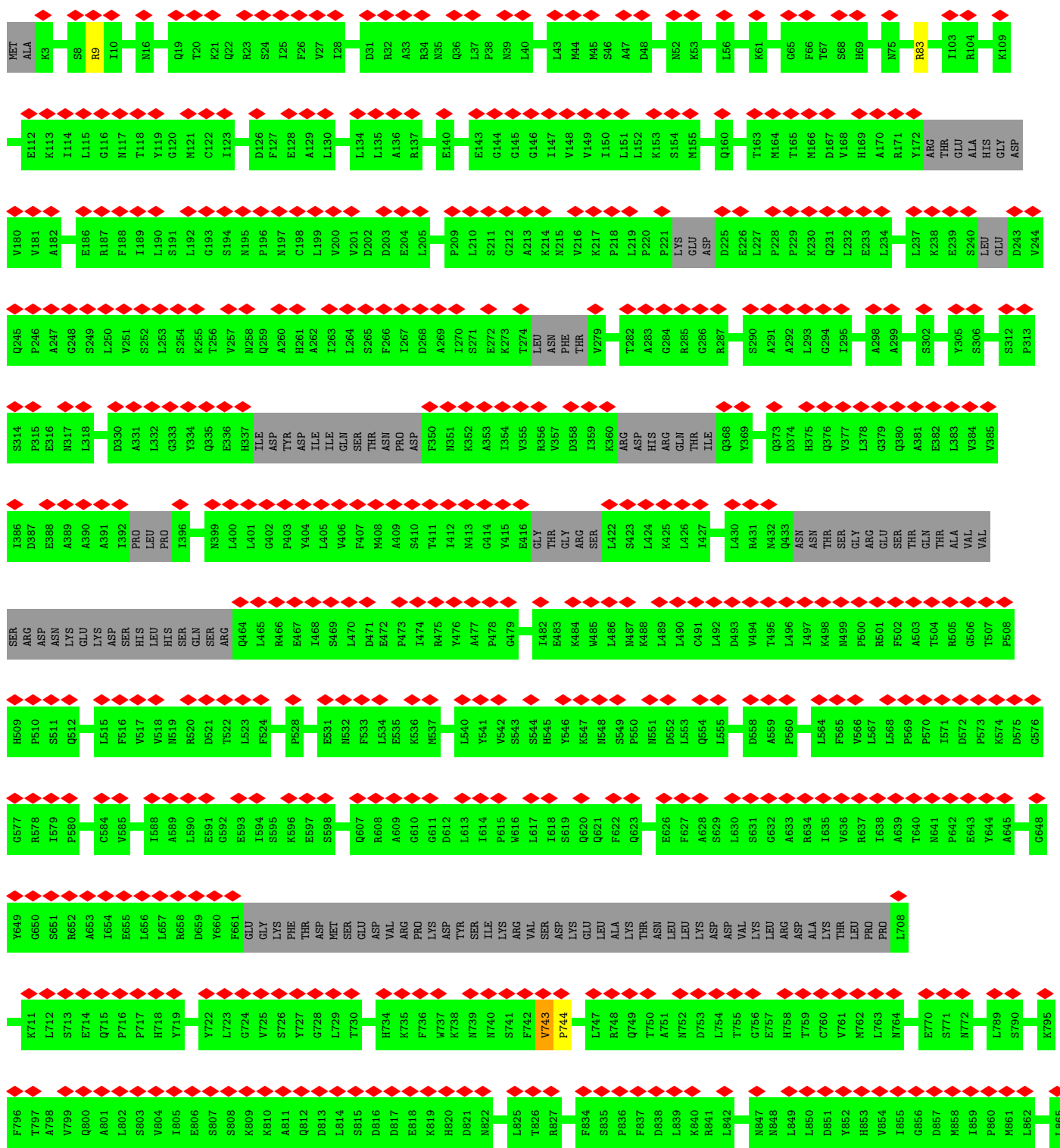
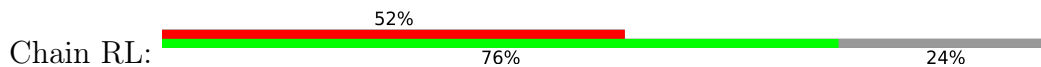


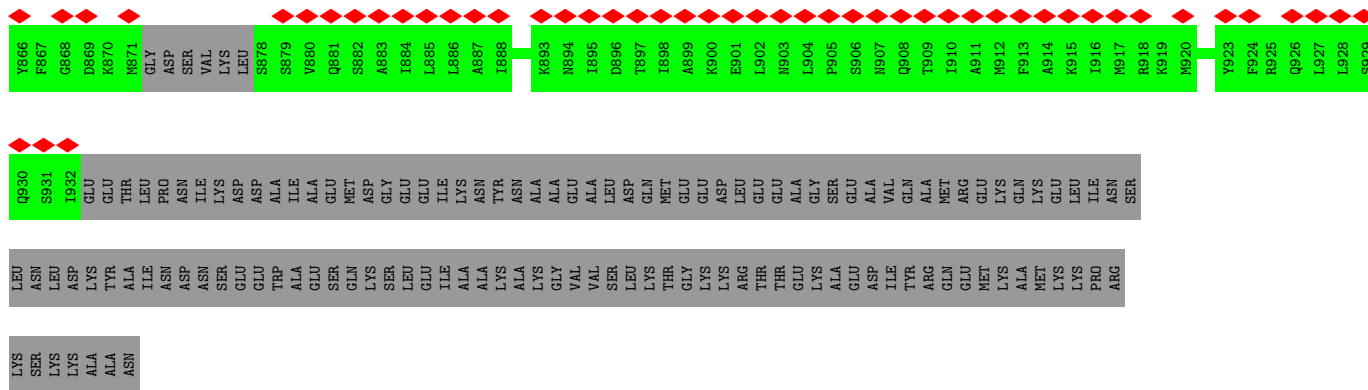
● Molecule 55: RNA 3'-terminal phosphate cyclase-like protein



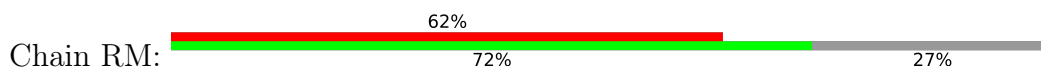


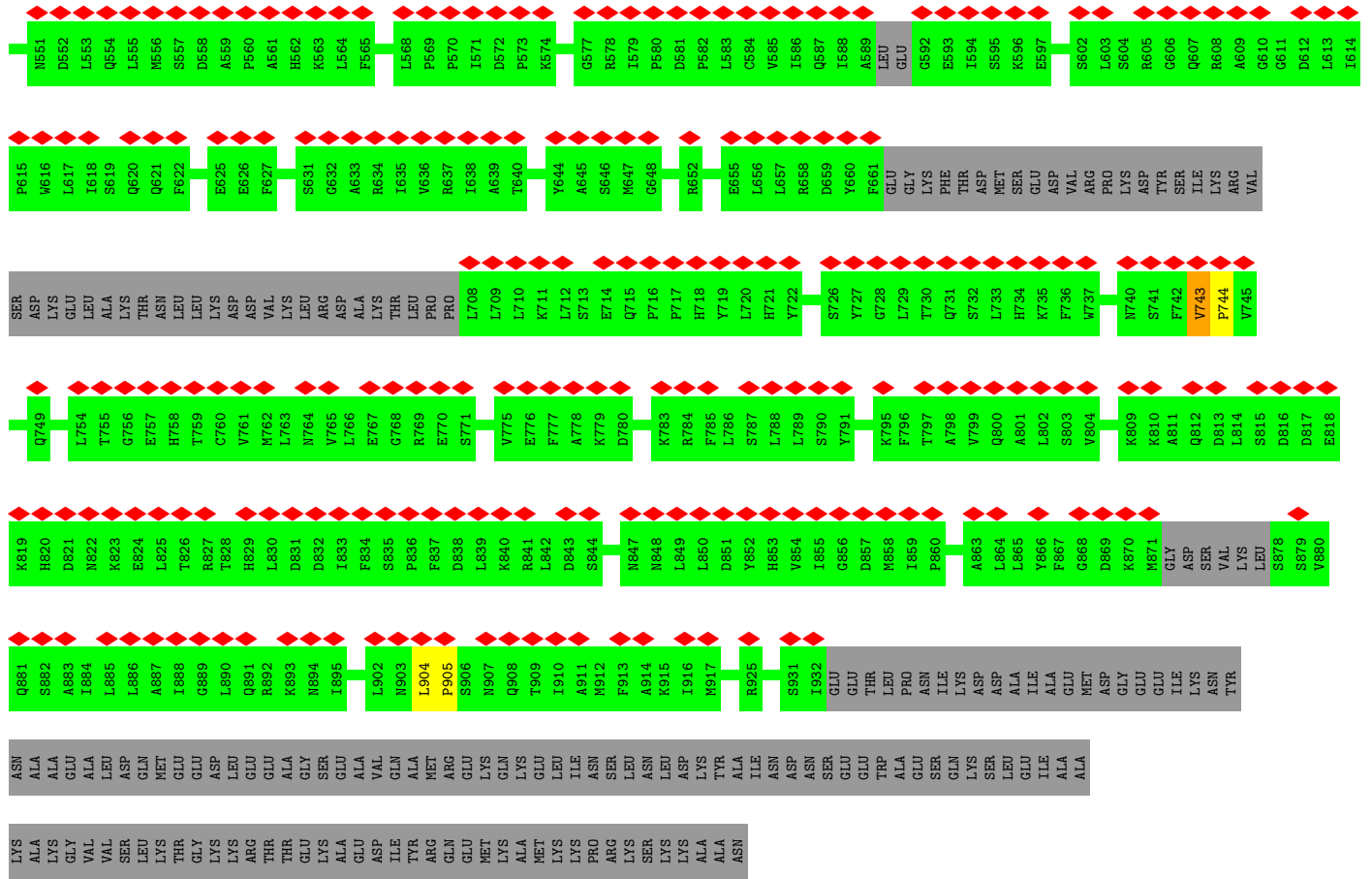
• Molecule 56: RNA cytidine acetyltransferase



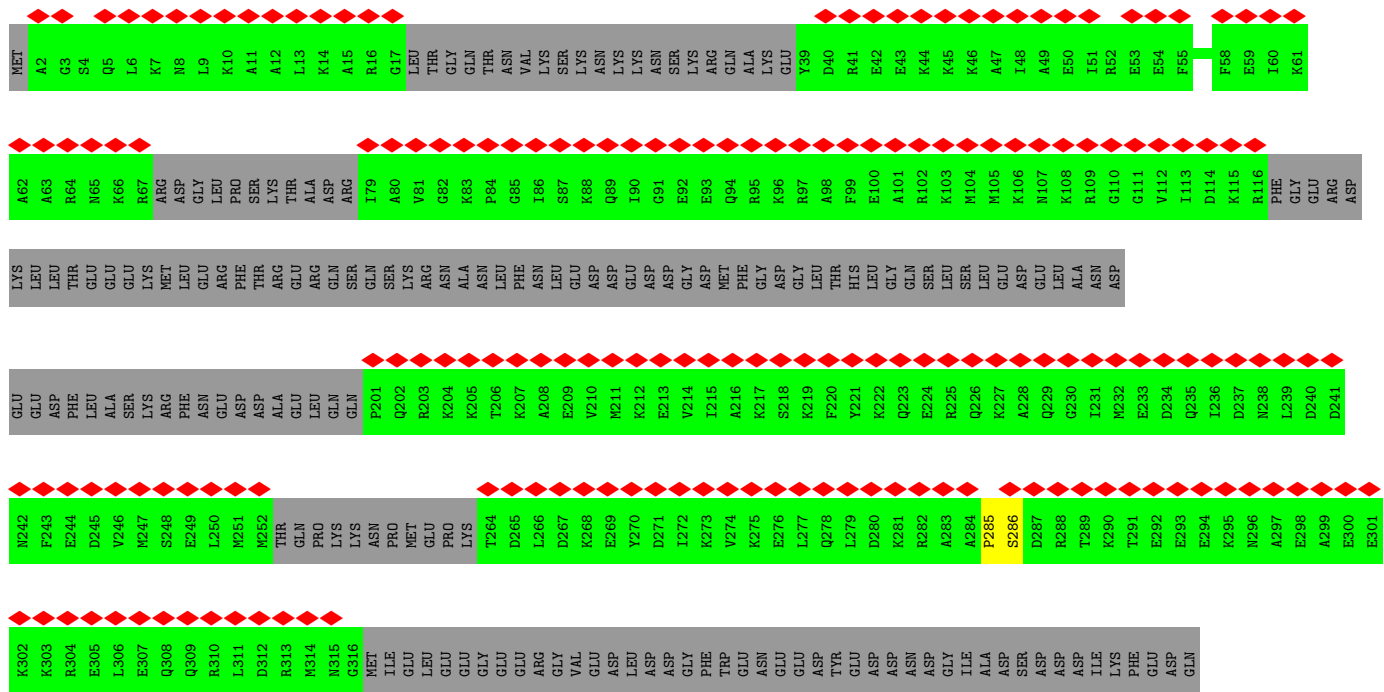
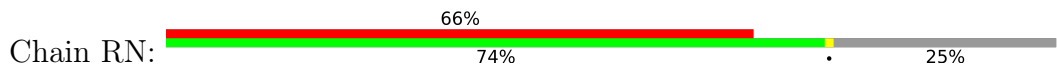


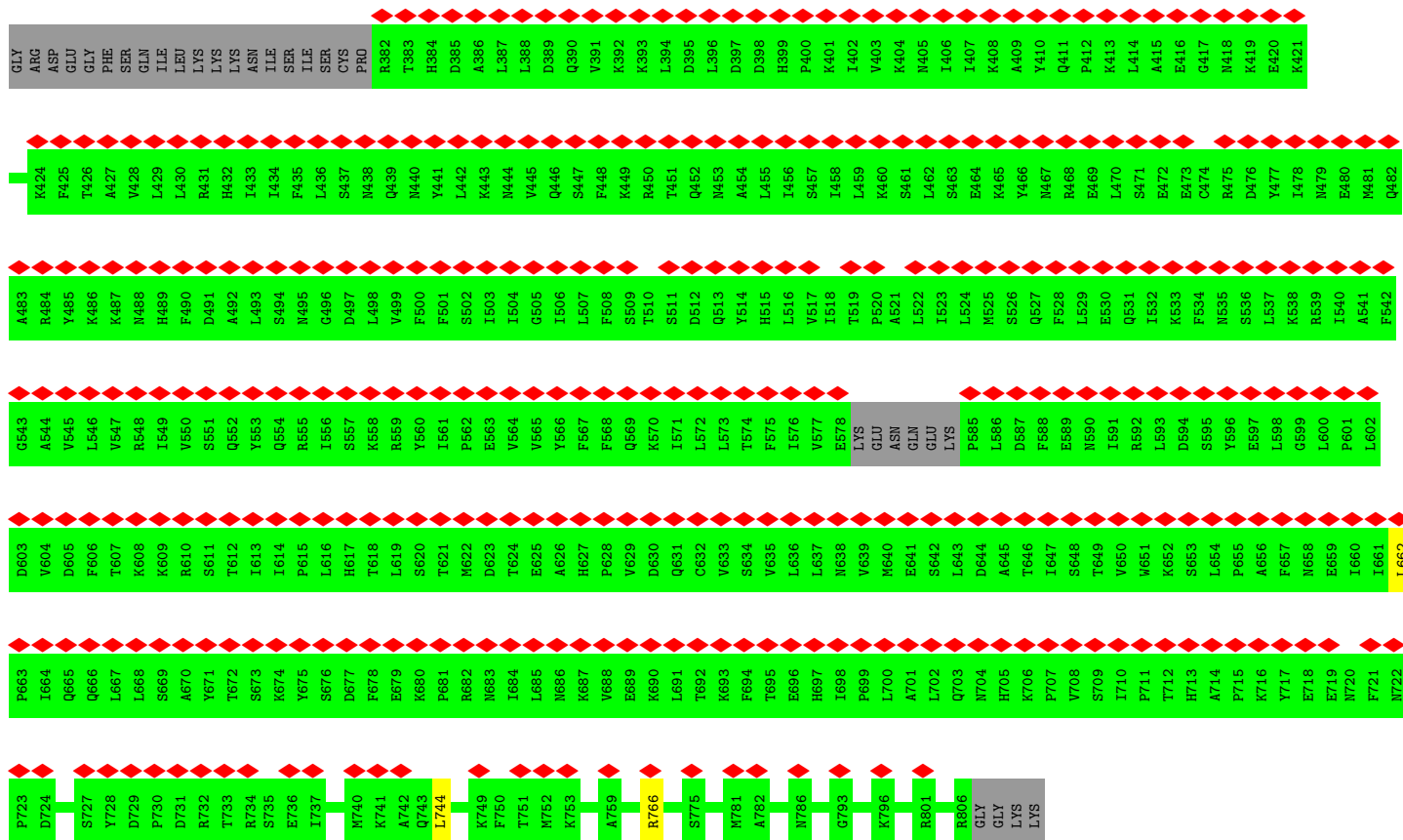
● Molecule 56: RNA cytidine acetyltransferase



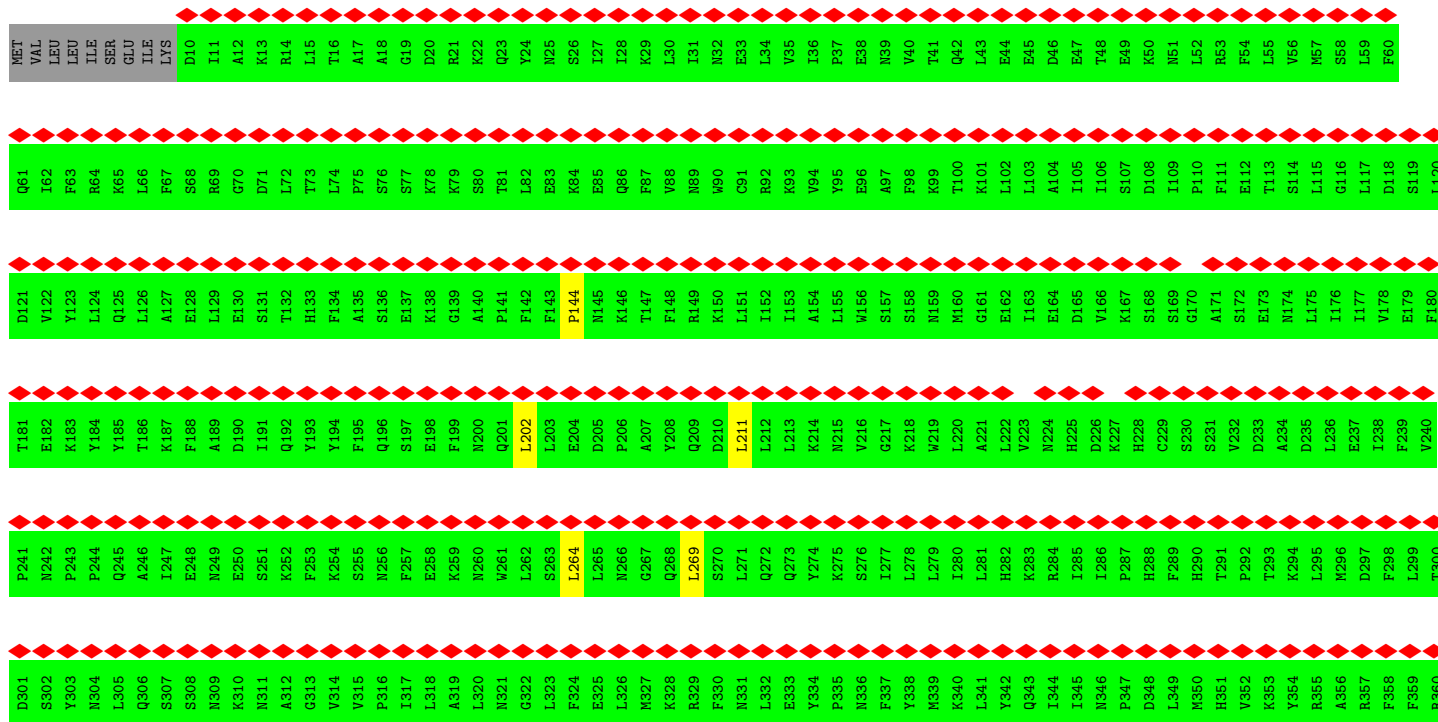


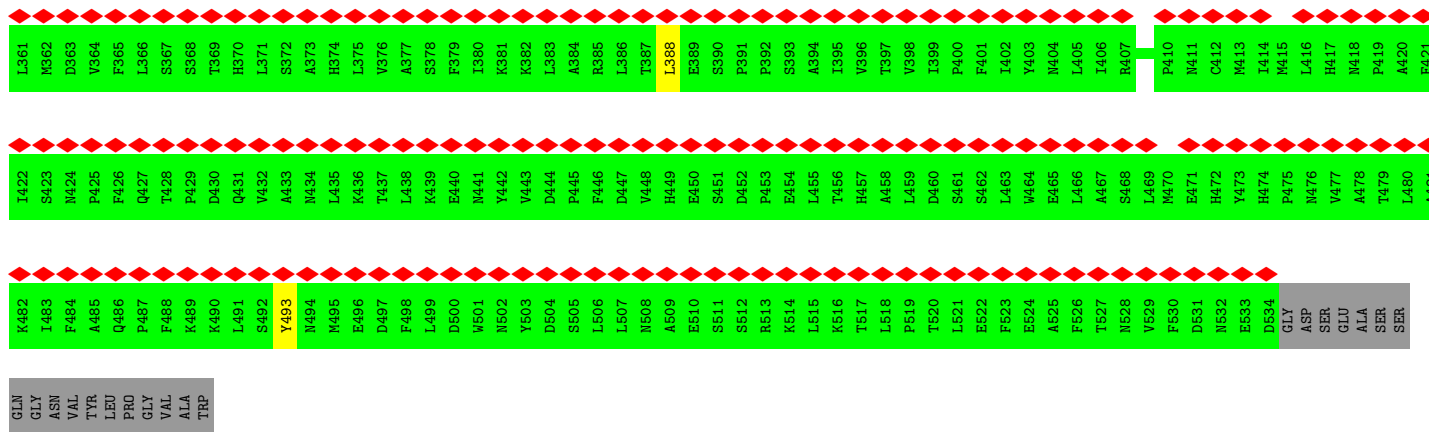
• Molecule 57: Nucleolar complex protein 14



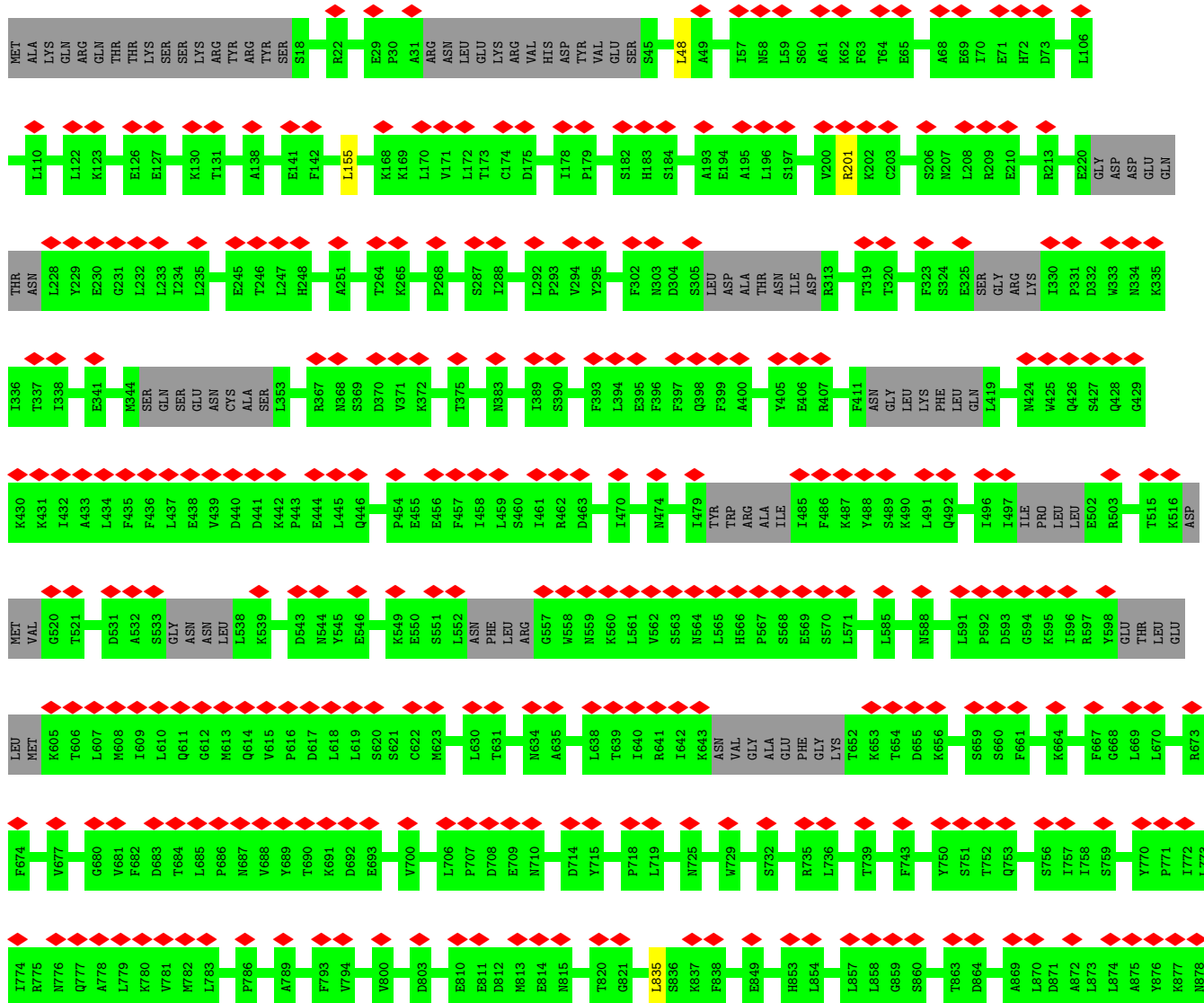
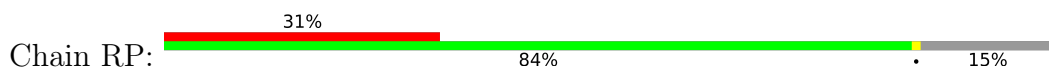


● Molecule 58: Nucleolar complex protein 4

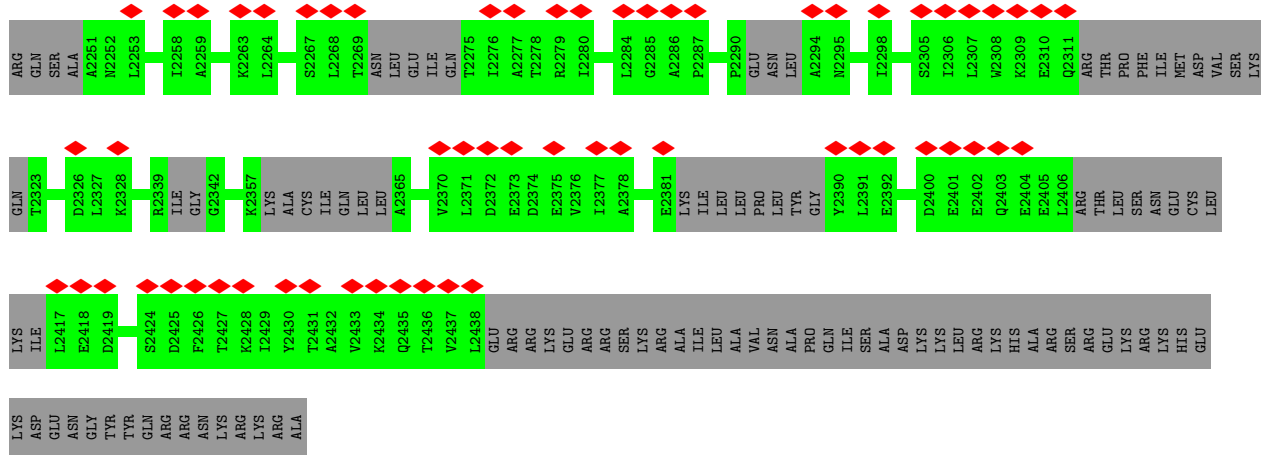




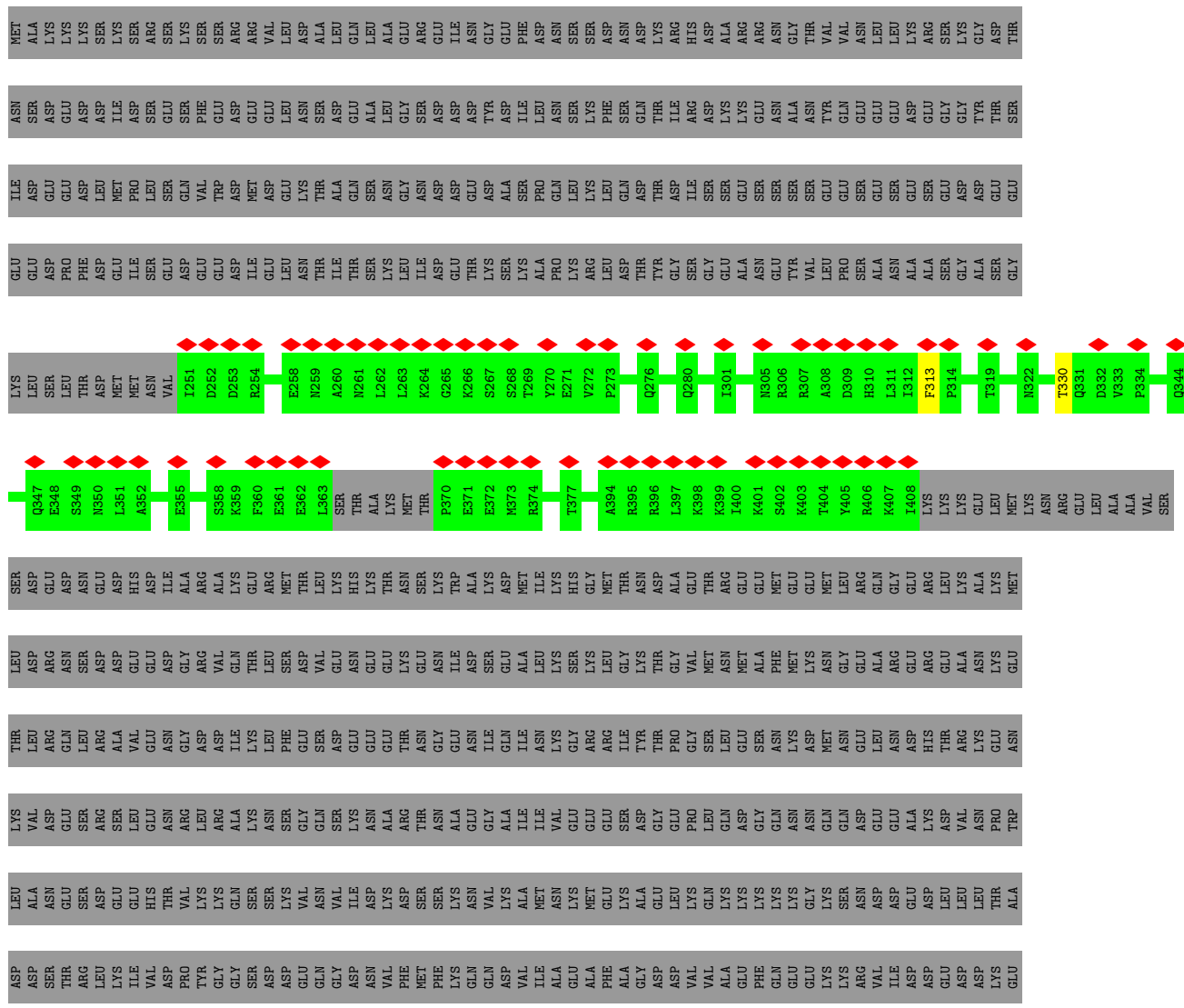
• Molecule 59: U3 small nucleolar RNA-associated protein 20

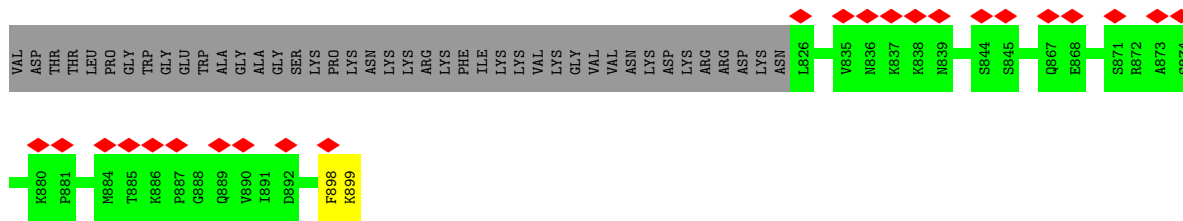


F879	T880	L881	R882	R883	R884	L891	T895	R896	D899	E900	I901	E907	S910	Q911	E916	D917	E918	H922	P923	Y924	T938	Q941	R942	R943	S944	R946	Y949	A968	S969	E970	D973	Y976	N980	S981	H982	Q983	N984	R985	S986	S987	H1018	S1021	V1022										
P1025	Y1028	S1029	I1030	A1031	M1032	L1033	Y1034	Y1035	V1036	L1037	H1046	Q1057	K1060	C1061	L1062	E1067	D1074	W1075	S1076	T1077	S1078	H1079	V1085	V1086	V1087	N1098	L1099	Q1100	Q1101	S1104	Y1119	Q1120	F1121	L1122	Y1123	Y1124	F1127	T1131	Q1140	H1141	V1142	K1143	E1144	A1145	V1146								
P1149	I1150	I1151	E1152	A1153	A1154	L1155	S1156	I1157	D1164	D1165	H1166	Y1167	V1168	D1169	L1170	V1171	T1172	L1173	I1174	C1175	T1176	S1177	C1178	L1179	K1180	I1181	L1185	Y1186	V1187	K1188	L1189	S1190	D1191	S1192	N1193	S1194	I1195	S1196	T1197	F1198	L1199	M1200	L1201	L1202	V1203	S1204	I1205	M1208	G1209	D1214	H1215	V1216	R1217
S1222	S1223	K1233	K1234	M1238	D1239	L1240	Q1241	I1242	I1243	L1247	M1255	C1256	S1257	M1258	L1264	Y1265	T1266	T1267	I1268	S1269	F1272	K1273	M1279	L1280	R1281	I1289	E1299	V1305	A1306	H1317	D1320	F1321	P1322	ARG	ILE	LEU	SER	THR	PHE	LYS	GLY	LEU	ILE	GLU	ASP	GLY	TYR						
LYS	SER	TYR	SER	GLU	LEU	GLU	TRP	LEU	PRO	LEU	PHE	HIS	PHE	ILE	ASN	ARG	GLU	GLU	LEU	ALA	LEU	THR	ASN	ALA	SER	HIS	ALA	ILE	MET	LYS	LYS	PHE	ILE	D1376	N1379	E1380	I1391	K1395	D1396	V1413	GLN	SER	GLU	TYR	VAL	SER	V1420	K1426	N1427				
T1428	K1429	Y1430	F1431	M1443	G1444	D1445	E1446	E1447	A1448	D1449	PHE	PHE	THR	ASN	VAL	ARG	HIS	ILE	GLN	LEU	HIS	R1461	M1468	L1469	H1472	A1473	H1474	Q1475	H1483	Y1484	L1485	I1486	I1489	Y1492	V1493	D1497	E1498	R1499	Y1500	G1504	M1505	I1509	A1510	G1513	A1525	L1526	L1527	R1528					
I1531	L1534	K1535	T1536	K1537	P1538	M1539	I1548	VAL	GLN	LEU	SER	VAL	PRO	LEU	ARG	GLU	T1558	R1563	D1564	K1574	S1577	ASN	LEU	ASP	GLU	PRO	SER	ASN	PHE	ILE	GLN	GLU	LEU	TYR	PRO	THR	SER	LYS	ASP	ILE	LEU	GLY	ARG	ASP	GLU	THR	ILE	E1608	R1609				
M1625	D1626	L1627	I1628	F1631	L1632	P1633	S1634	I1635	M1638	V1642	L1643	K1646	S1647	E1648	E1649	A1667	F1672	S1691	I1697	V1704	L1705	K1706	I1717	K1733	D1734	S1735	E1736	M1737	Y1738	H1739	K1746	K1749	L1757	M1760	L1763	T1764	E1765	F1766	G1767	L1770	S1771												
I1781	M1782	L1783	R1784	K1788	L1789	S1790	E1791	L1792	L1793	L1797	K1813	F1814	H1815	Q1817	L1818	E1821	S1822	E1823	MET	ASN	SER	ASN	SER	PRO	PRO	GLN	ILE	PRO	LYS	LYS	VAL	VAL	LYS	ASP	GLN	VAL	ASP	GLU	GLY	ASP	PHE	PHE	LEU	VAL	ASN	LEU	SER	LYS	THR	THR	ILE	ASN	
SER	ASN	S1861	L1862	V1879	S1885	F1886	L1887	T1888	V1889	S1890	I1896	D1901	L1904	S1905	E1906	M1907	E1908	T1920	L1921	I1922	F1926	R1939	M1943	K1946	V1947	S1948	P1949	S1950	T1951	L1955	M1958	G1959	I1967	T1970	D1971	S1972	T1973	L1974	K1975	D1976	T1977	A1978	V1986										
M1991	E1992	P1993	R1994	R1995	A1999	F2002	H2010	I2011	M2012	L2013	P2014	E2015	L2016	Y2017	D2018	L2019	A2020	T2023	K2033	V2042	F2046	L2047	M2048	E2049	Y2050	D2051	Q2052	S2053	K2054	F2061	M2064	V2065	Y2070	S2074	G2075	S2078	E2081	L2082	I2083	N2084	L2085	L2086	L2087	T2088	K2089	ALA							
ASN	P2092	A2093	L2094	L2098	S2099	S2100	S2101	F2102	F2103	D2113	R2117	E2120	S2123	V2124	L2125	I2126	S2127	T2128	P2131	K2132	L2133	E2134	K2136	D2137	L2138	E2139	L2140	V2141	A2147	TRP	LEU	LYS	GLN	VAL	D2153	N2154	A2156	L2158	N2159	L2162	K2166	V2167	TYR	LEU	LYS	S2171	I2172	G2173					
F2174	E2175	I2178	R2187	I2188	R2189	TYR	ILE	SER	ASP	THR	SER	VAL	GLY	SER	GLU	HIS	TRP	ASP	VAL	TYR	SER	ALA	LEU	ASN	THR	F2213	A2219	T2220	E2221	S2222	V2223	V2224	K2225	H2226	G2227	PHE	LYS	ASP	GLN	ILE	W2232	D2233	G2234	L2235	L2236	T2237	C2238	L2239	L2240	Y2241	P2242	H2243	V2246

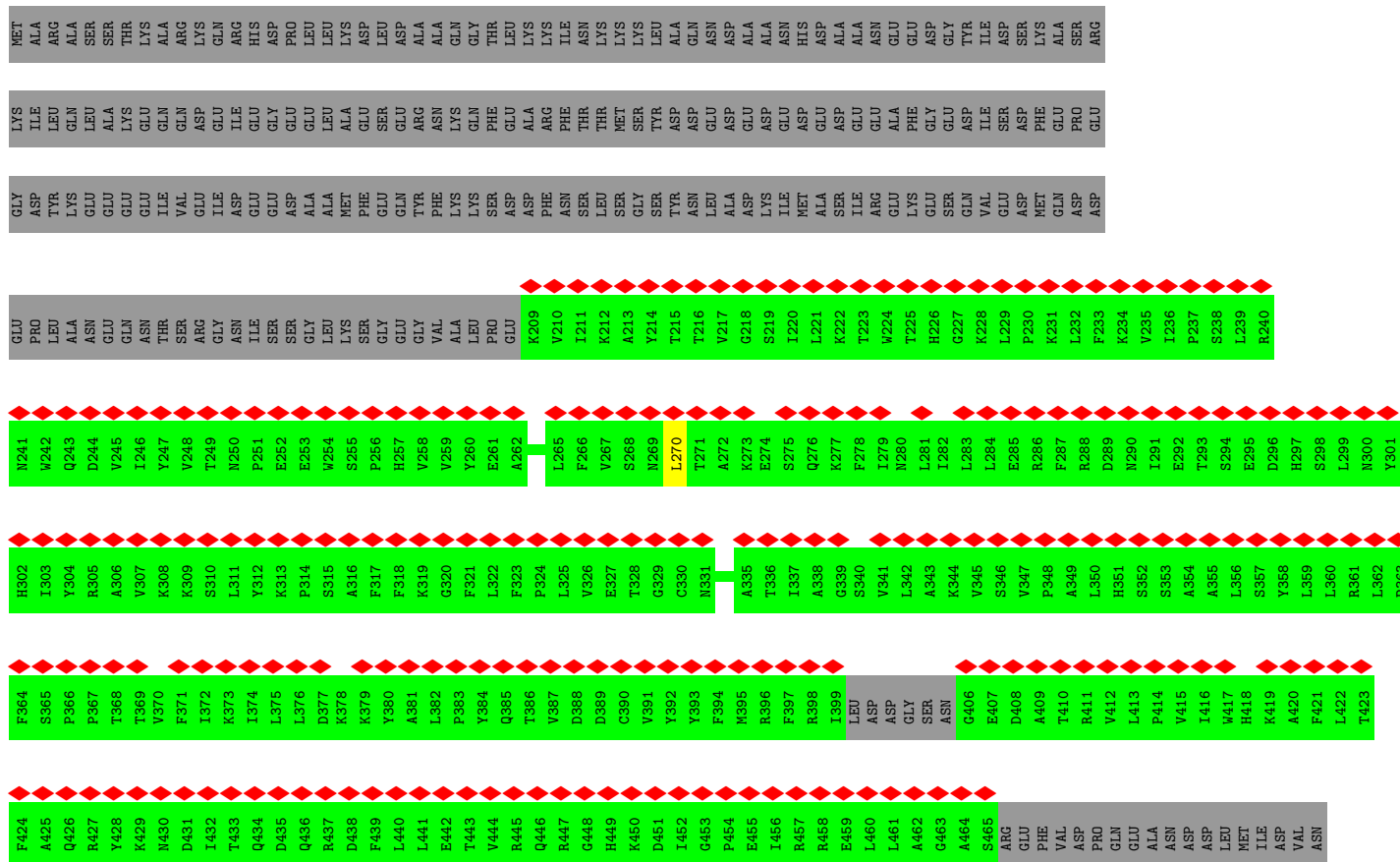


● Molecule 60: U3 small nucleolar RNA-associated protein 14

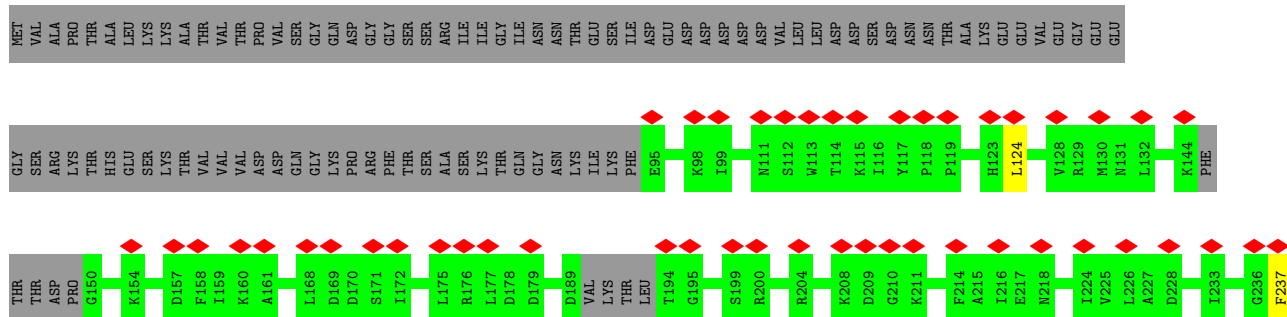




• Molecule 61: Essential nuclear protein 1



• Molecule 62: Pno1





4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	3050	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	1500	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.062	Depositor
Minimum map value	-0.023	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.003	Depositor
Recommended contour level	0.014	Depositor
Map size (Å)	597.632, 597.632, 597.632	wwPDB
Map dimensions	448, 448, 448	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.334, 1.334, 1.334	Depositor

5 Model quality i

5.1 Standard geometry i

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

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	3A	0.91	0/4141	1.25	38/6433 (0.6%)
2	5A	0.80	0/4605	1.08	13/7168 (0.2%)
3	SA	0.70	0/30585	1.16	235/47611 (0.5%)
4	SC	0.47	0/1856	0.73	5/2490 (0.2%)
5	SF	0.35	0/1854	0.66	1/2504 (0.0%)
6	SG	0.53	0/1690	0.64	0/2285
7	SH	0.31	0/1341	0.60	0/1789
8	SI	0.38	0/1341	0.67	1/1806 (0.1%)
9	SJ	0.31	0/1347	0.59	1/1801 (0.1%)
10	SK	0.47	0/1410	0.60	0/1888
11	SM	0.31	0/1020	0.58	0/1374
12	SO	0.45	0/1109	0.62	0/1495
13	SP	0.49	0/879	0.68	0/1186
14	SR	0.58	0/990	0.73	1/1335 (0.1%)
15	SX	0.51	0/1020	0.66	1/1371 (0.1%)
16	SY	0.54	0/798	0.67	1/1065 (0.1%)
17	SZ	0.43	0/822	0.64	0/1103
18	Sc	0.44	0/613	0.65	0/828
19	Sd	0.54	0/499	0.66	0/670
20	3B	0.59	0/1901	0.66	1/2567 (0.0%)
20	3C	0.44	0/1796	0.62	1/2424 (0.0%)
21	3D	0.44	0/2891	0.63	3/3895 (0.1%)
22	3E	0.41	0/3059	0.62	3/4153 (0.1%)
23	3F	0.42	0/3715	0.64	2/5001 (0.0%)
24	3G	0.52	0/928	0.76	1/1262 (0.1%)
24	3H	0.47	0/928	0.69	2/1262 (0.2%)
25	A4	0.47	0/5321	0.66	5/7207 (0.1%)
26	A5	0.48	0/4044	0.68	5/5493 (0.1%)
27	A8	0.34	0/3249	0.71	10/4454 (0.2%)
28	A9	0.31	0/951	0.58	1/1287 (0.1%)
29	AE	0.37	0/10049	0.56	6/13737 (0.0%)
30	AF	0.53	0/3993	0.67	4/5413 (0.1%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
31	AG	0.47	0/6699	0.65	3/9077 (0.0%)
32	B1	0.64	0/6474	0.68	7/8763 (0.1%)
33	B2	0.43	0/6628	0.67	3/8954 (0.0%)
34	B3	0.39	0/6014	0.69	7/8137 (0.1%)
35	B8	0.58	0/3848	0.66	4/5218 (0.1%)
36	BE	0.58	0/6580	0.66	7/8901 (0.1%)
37	B6	0.45	0/2849	0.58	1/3853 (0.0%)
38	5B	0.34	0/499	0.62	0/659
39	5C	0.61	0/3690	0.69	5/4991 (0.1%)
40	5D	0.51	0/1417	0.67	2/1885 (0.1%)
41	5E	0.39	0/1580	0.73	3/2115 (0.1%)
42	5F	0.38	0/1559	0.69	1/2097 (0.0%)
43	5G	0.39	0/1792	0.72	2/2425 (0.1%)
44	5H	0.52	0/601	0.57	0/789
45	5I	0.61	0/3844	0.66	2/5174 (0.0%)
46	5J	0.42	0/1302	0.55	0/1728
47	5K	0.56	0/1426	0.66	1/1917 (0.1%)
48	RA	0.34	0/2769	0.67	1/3753 (0.0%)
49	RB	0.38	0/1121	0.62	0/1487
50	RD	0.31	0/2453	0.63	3/3308 (0.1%)
51	RE	0.38	0/8924	0.63	8/12070 (0.1%)
52	RF	0.34	0/2004	0.63	2/2697 (0.1%)
53	RG	0.39	0/1727	0.68	2/2329 (0.1%)
53	RH	0.42	0/1828	0.61	0/2470
54	RJ	0.50	0/6514	0.61	1/8768 (0.0%)
55	RK	0.44	0/2832	0.65	3/3825 (0.1%)
56	RL	0.29	0/4549	0.50	0/6241
56	RM	0.25	0/3765	0.47	0/5218
57	RN	0.36	0/4591	0.58	2/6187 (0.0%)
58	RO	0.38	0/3849	0.62	5/5261 (0.1%)
59	RP	0.28	0/12225	0.51	5/16812 (0.0%)
60	RQ	0.46	0/1678	0.58	0/2282
61	RS	0.33	0/2104	0.67	1/2854 (0.0%)
62	RT	0.33	0/1355	0.65	1/1821 (0.1%)
63	RY	0.29	0/307	0.51	0/415
All	All	0.51	0/222142	0.77	423/308838 (0.1%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
4	SC	0	1
5	SF	0	2
8	SI	0	3
9	SJ	0	1
11	SM	0	1
12	SO	0	1
13	SP	0	1
17	SZ	0	1
18	Sc	0	1
21	3D	0	3
22	3E	0	1
23	3F	0	1
24	3G	0	2
24	3H	0	1
25	A4	0	1
26	A5	0	1
27	A8	0	2
31	AG	0	2
32	B1	0	2
33	B2	0	8
34	B3	0	11
36	BE	0	1
39	5C	0	1
40	5D	0	1
43	5G	0	2
45	5I	0	2
48	RA	0	2
49	RB	0	1
51	RE	0	1
52	RF	0	1
54	RJ	0	2
55	RK	0	1
56	RL	0	1
56	RM	0	1
57	RN	0	1
58	RO	0	1
59	RP	0	3
60	RQ	0	1
62	RT	0	1
All	All	0	71

There are no bond length outliers.

The worst 5 of 423 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	3A	321	C	N1-C1'-C2'	-10.80	99.96	114.00
3	SA	861	U	C2-N1-C1'	10.60	130.42	117.70
3	SA	376	C	N1-C2-O2	10.43	125.16	118.90
3	SA	1174	C	N1-C2-O2	10.35	125.11	118.90
3	SA	1034	C	C5-C6-N1	10.00	126.00	121.00

There are no chirality outliers.

5 of 71 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
4	SC	238	GLU	Peptide
5	SF	193	GLY	Peptide
5	SF	195	ILE	Peptide
8	SI	31	SER	Peptide
8	SI	64	VAL	Peptide

5.2 Too-close contacts [i](#)

Due to software issues we are unable to calculate clashes - this section is therefore empty.

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	
4	SC	228/255 (89%)	196 (86%)	32 (14%)	0	100	100
5	SF	227/261 (87%)	197 (87%)	29 (13%)	1 (0%)	34	72
6	SG	211/225 (94%)	195 (92%)	16 (8%)	0	100	100
7	SH	161/236 (68%)	143 (89%)	18 (11%)	0	100	100
8	SI	161/190 (85%)	143 (89%)	18 (11%)	0	100	100
9	SJ	162/200 (81%)	140 (86%)	22 (14%)	0	100	100
10	SK	169/197 (86%)	163 (96%)	6 (4%)	0	100	100

Continued on next page...

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
11	SM	119/156 (76%)	103 (87%)	16 (13%)	0	100	100
12	SO	132/151 (87%)	123 (93%)	9 (7%)	0	100	100
13	SP	116/137 (85%)	100 (86%)	15 (13%)	1 (1%)	17	57
14	SR	123/143 (86%)	112 (91%)	11 (9%)	0	100	100
15	SX	125/130 (96%)	119 (95%)	6 (5%)	0	100	100
16	SY	101/145 (70%)	90 (89%)	11 (11%)	0	100	100
17	SZ	100/135 (74%)	87 (87%)	12 (12%)	1 (1%)	15	55
18	Sc	78/82 (95%)	69 (88%)	9 (12%)	0	100	100
19	Sd	61/67 (91%)	57 (93%)	4 (7%)	0	100	100
20	3B	236/327 (72%)	222 (94%)	14 (6%)	0	100	100
20	3C	221/327 (68%)	207 (94%)	14 (6%)	0	100	100
21	3D	359/504 (71%)	346 (96%)	13 (4%)	0	100	100
22	3E	427/511 (84%)	387 (91%)	40 (9%)	0	100	100
23	3F	446/573 (78%)	403 (90%)	42 (9%)	1 (0%)	47	81
24	3G	119/126 (94%)	107 (90%)	11 (9%)	1 (1%)	19	60
24	3H	119/126 (94%)	111 (93%)	8 (7%)	0	100	100
25	A4	648/776 (84%)	590 (91%)	58 (9%)	0	100	100
26	A5	504/643 (78%)	465 (92%)	39 (8%)	0	100	100
27	A8	516/713 (72%)	397 (77%)	107 (21%)	12 (2%)	6	34
28	A9	126/575 (22%)	115 (91%)	11 (9%)	0	100	100
29	AE	1496/1769 (85%)	1367 (91%)	129 (9%)	0	100	100
30	AF	489/513 (95%)	442 (90%)	47 (10%)	0	100	100
31	AG	812/896 (91%)	731 (90%)	80 (10%)	1 (0%)	51	86
32	B1	787/923 (85%)	732 (93%)	55 (7%)	0	100	100
33	B2	813/943 (86%)	724 (89%)	87 (11%)	2 (0%)	47	81
34	B3	733/817 (90%)	606 (83%)	125 (17%)	2 (0%)	41	77
35	B8	469/594 (79%)	439 (94%)	30 (6%)	0	100	100
36	BE	814/939 (87%)	765 (94%)	49 (6%)	0	100	100
37	B6	368/440 (84%)	341 (93%)	27 (7%)	0	100	100
38	5B	58/214 (27%)	55 (95%)	3 (5%)	0	100	100
39	5C	452/554 (82%)	419 (93%)	32 (7%)	1 (0%)	47	81

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
40	5D	165/250 (66%)	145 (88%)	20 (12%)	0	100	100
41	5E	187/593 (32%)	175 (94%)	10 (5%)	2 (1%)	14	52
42	5F	180/183 (98%)	164 (91%)	16 (9%)	0	100	100
43	5G	217/290 (75%)	203 (94%)	14 (6%)	0	100	100
44	5H	72/610 (12%)	65 (90%)	7 (10%)	0	100	100
45	5I	457/489 (94%)	421 (92%)	36 (8%)	0	100	100
46	5J	147/217 (68%)	136 (92%)	11 (8%)	0	100	100
47	5K	171/189 (90%)	166 (97%)	5 (3%)	0	100	100
48	RA	332/707 (47%)	276 (83%)	56 (17%)	0	100	100
49	RB	132/357 (37%)	117 (89%)	14 (11%)	1 (1%)	19	60
50	RD	310/1729 (18%)	284 (92%)	23 (7%)	3 (1%)	15	55
51	RE	1067/1237 (86%)	999 (94%)	68 (6%)	0	100	100
52	RF	233/297 (78%)	203 (87%)	30 (13%)	0	100	100
53	RG	212/252 (84%)	182 (86%)	30 (14%)	0	100	100
53	RH	226/252 (90%)	219 (97%)	7 (3%)	0	100	100
54	RJ	784/1183 (66%)	721 (92%)	62 (8%)	1 (0%)	51	86
55	RK	358/367 (98%)	341 (95%)	17 (5%)	0	100	100
56	RL	781/1056 (74%)	664 (85%)	115 (15%)	2 (0%)	41	77
56	RM	738/1056 (70%)	625 (85%)	109 (15%)	4 (0%)	29	69
57	RN	593/810 (73%)	545 (92%)	47 (8%)	1 (0%)	47	81
58	RO	523/552 (95%)	455 (87%)	68 (13%)	0	100	100
59	RP	2042/2493 (82%)	1815 (89%)	226 (11%)	1 (0%)	100	100
60	RQ	220/899 (24%)	199 (90%)	21 (10%)	0	100	100
61	RS	247/483 (51%)	225 (91%)	22 (9%)	0	100	100
62	RT	163/326 (50%)	147 (90%)	16 (10%)	0	100	100
63	RY	35/534 (7%)	29 (83%)	6 (17%)	0	100	100
All	All	23878/33924 (70%)	21529 (90%)	2311 (10%)	38 (0%)	50	81

5 of 38 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
27	A8	258	PRO
27	A8	309	PRO

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Mol	Chain	Res	Type
27	A8	325	PRO
27	A8	390	PRO
27	A8	392	PRO

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
4	SC	203/224 (91%)	201 (99%)	2 (1%)	76	86
5	SF	196/222 (88%)	190 (97%)	6 (3%)	40	62
6	SG	180/191 (94%)	180 (100%)	0	100	100
7	SH	139/201 (69%)	137 (99%)	2 (1%)	67	80
8	SI	146/170 (86%)	145 (99%)	1 (1%)	84	90
9	SJ	136/161 (84%)	134 (98%)	2 (2%)	65	80
10	SK	147/166 (89%)	146 (99%)	1 (1%)	84	90
11	SM	110/137 (80%)	108 (98%)	2 (2%)	59	77
12	SO	117/128 (91%)	116 (99%)	1 (1%)	78	87
13	SP	90/105 (86%)	89 (99%)	1 (1%)	73	84
14	SR	105/119 (88%)	105 (100%)	0	100	100
15	SX	108/111 (97%)	107 (99%)	1 (1%)	78	87
16	SY	85/120 (71%)	84 (99%)	1 (1%)	71	83
17	SZ	85/113 (75%)	85 (100%)	0	100	100
18	Sc	69/71 (97%)	69 (100%)	0	100	100
19	Sd	56/60 (93%)	56 (100%)	0	100	100
20	3B	201/240 (84%)	201 (100%)	0	100	100
20	3C	190/240 (79%)	187 (98%)	3 (2%)	62	79
21	3D	296/435 (68%)	293 (99%)	3 (1%)	76	86
22	3E	262/433 (60%)	261 (100%)	1 (0%)	91	94
23	3F	396/503 (79%)	394 (100%)	2 (0%)	88	93

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
24	3G	100/104 (96%)	100 (100%)	0	100	100
24	3H	100/104 (96%)	100 (100%)	0	100	100
25	A4	591/713 (83%)	584 (99%)	7 (1%)	71	83
26	A5	433/574 (75%)	432 (100%)	1 (0%)	93	96
27	A8	174/657 (26%)	164 (94%)	10 (6%)	20	45
28	A9	89/533 (17%)	88 (99%)	1 (1%)	73	84
29	AE	708/1633 (43%)	705 (100%)	3 (0%)	91	94
30	AF	437/454 (96%)	433 (99%)	4 (1%)	78	87
31	AG	750/826 (91%)	740 (99%)	10 (1%)	69	81
32	B1	696/812 (86%)	691 (99%)	5 (1%)	84	90
33	B2	712/832 (86%)	707 (99%)	5 (1%)	84	90
34	B3	665/719 (92%)	655 (98%)	10 (2%)	65	80
35	B8	421/529 (80%)	420 (100%)	1 (0%)	93	96
36	BE	718/819 (88%)	714 (99%)	4 (1%)	86	92
37	B6	251/414 (61%)	247 (98%)	4 (2%)	62	79
38	5B	57/196 (29%)	55 (96%)	2 (4%)	36	59
39	5C	394/480 (82%)	392 (100%)	2 (0%)	88	93
40	5D	156/234 (67%)	154 (99%)	2 (1%)	69	81
41	5E	175/535 (33%)	162 (93%)	13 (7%)	13	38
42	5F	171/172 (99%)	169 (99%)	2 (1%)	71	83
43	5G	194/258 (75%)	190 (98%)	4 (2%)	53	72
44	5H	63/538 (12%)	63 (100%)	0	100	100
45	5I	416/443 (94%)	414 (100%)	2 (0%)	88	93
46	5J	140/200 (70%)	140 (100%)	0	100	100
47	5K	157/169 (93%)	157 (100%)	0	100	100
48	RA	303/636 (48%)	300 (99%)	3 (1%)	76	86
49	RB	117/315 (37%)	114 (97%)	3 (3%)	46	66
50	RD	226/1544 (15%)	220 (97%)	6 (3%)	44	65
51	RE	984/1125 (88%)	975 (99%)	9 (1%)	78	87
52	RF	221/274 (81%)	219 (99%)	2 (1%)	78	87
53	RG	195/222 (88%)	193 (99%)	2 (1%)	76	86

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
53	RH	206/222 (93%)	204 (99%)	2 (1%)	76	86
54	RJ	683/1039 (66%)	676 (99%)	7 (1%)	76	86
55	RK	307/312 (98%)	303 (99%)	4 (1%)	69	81
56	RL	164/934 (18%)	162 (99%)	2 (1%)	71	83
57	RN	422/732 (58%)	421 (100%)	1 (0%)	93	96
58	RO	329/506 (65%)	328 (100%)	1 (0%)	92	95
59	RP	499/2307 (22%)	493 (99%)	6 (1%)	71	83
60	RQ	148/808 (18%)	145 (98%)	3 (2%)	55	74
61	RS	225/424 (53%)	225 (100%)	0	100	100
62	RT	146/282 (52%)	144 (99%)	2 (1%)	67	80
63	RY	31/482 (6%)	30 (97%)	1 (3%)	39	61
All	All	17291/29262 (59%)	17116 (99%)	175 (1%)	77	86

5 of 175 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
43	5G	211	ASN
52	RF	69	LYS
45	5I	250	ARG
50	RD	1670	LYS
54	RJ	869	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 298 such sidechains are listed below:

Mol	Chain	Res	Type
51	RE	841	ASN
59	RP	1702	HIS
51	RE	1086	ASN
54	RJ	778	GLN
31	AG	453	HIS

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	3A	169/333 (50%)	55 (32%)	8 (4%)
2	5A	186/700 (26%)	54 (29%)	4 (2%)

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Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
3	SA	1261/1809 (69%)	482 (38%)	19 (1%)
All	All	1616/2842 (56%)	591 (36%)	31 (1%)

5 of 591 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	3A	2	U
1	3A	14	A
1	3A	15	U
1	3A	24	U
1	3A	25	U

5 of 31 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
3	SA	56	U
3	SA	1521	G
3	SA	372	G
3	SA	1632	C
3	SA	1052	U

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 4 ligands modelled in this entry, 3 are monoatomic - leaving 1 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
66	GTP	RJ	1201	67	26,34,34	0.94	2 (7%)	32,54,54	0.92	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
66	GTP	RJ	1201	67	-	3/18/38/38	0/3/3/3

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
66	RJ	1201	GTP	C5-C6	-2.47	1.42	1.47
66	RJ	1201	GTP	C8-N7	-2.05	1.31	1.35

There are no bond angle outliers.

There are no chirality outliers.

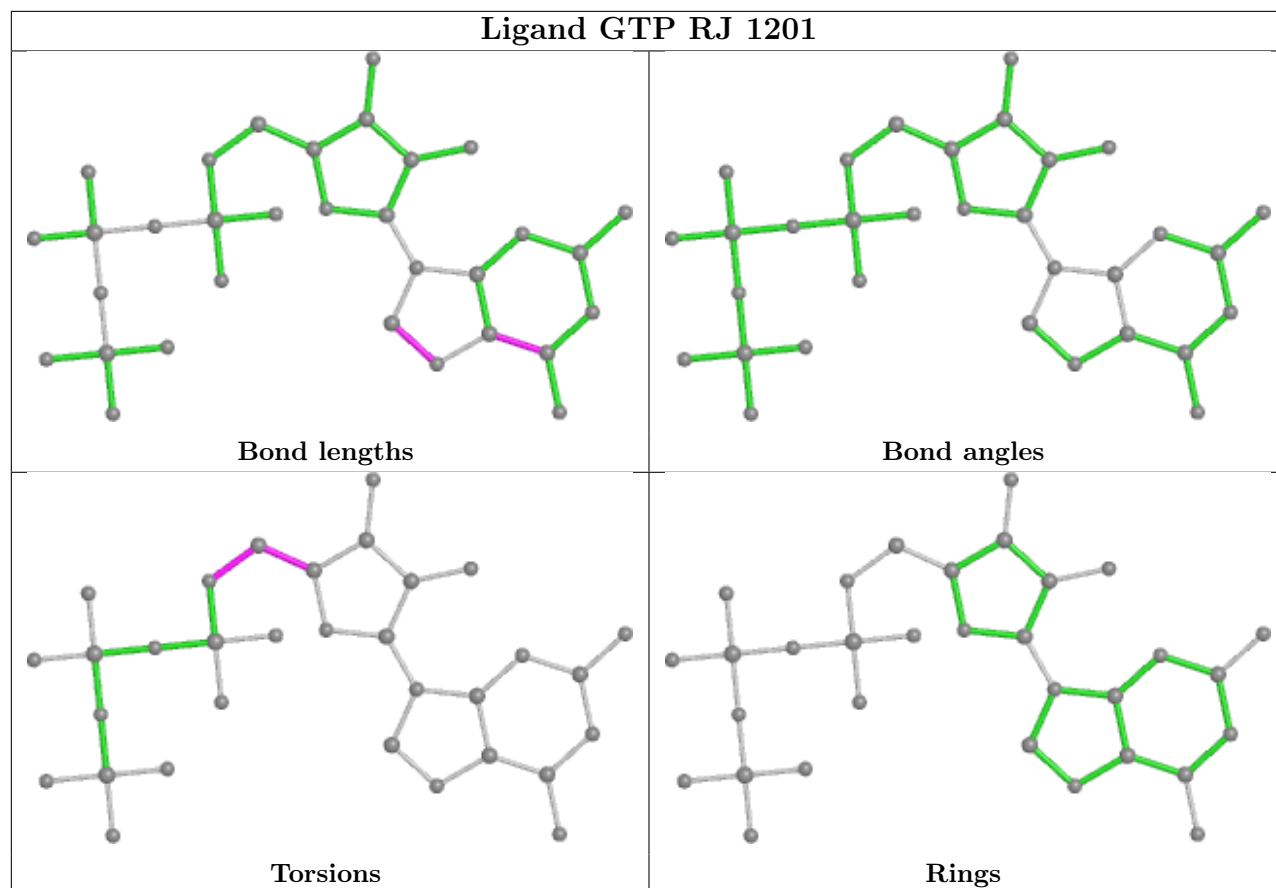
All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
66	RJ	1201	GTP	O4'-C4'-C5'-O5'
66	RJ	1201	GTP	C3'-C4'-C5'-O5'
66	RJ	1201	GTP	C4'-C5'-O5'-PA

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



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

There are no such residues in this entry.

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

There are no chain breaks in this entry.

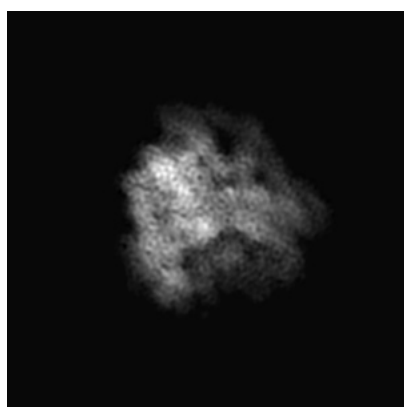
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-0951. These allow visual inspection of the internal detail of the map and identification of artifacts.

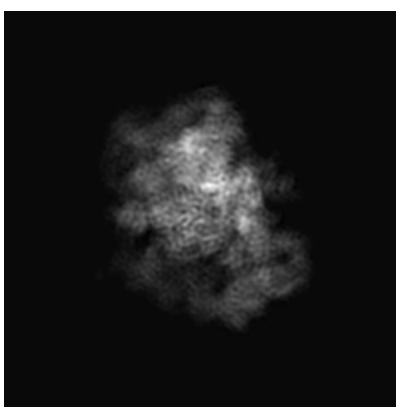
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

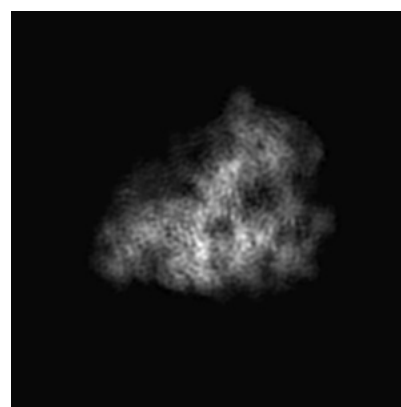
6.1.1 Primary map



X



Y

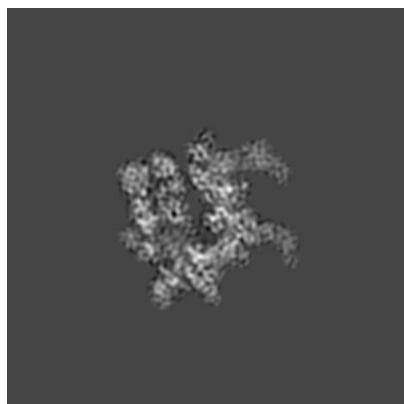


Z

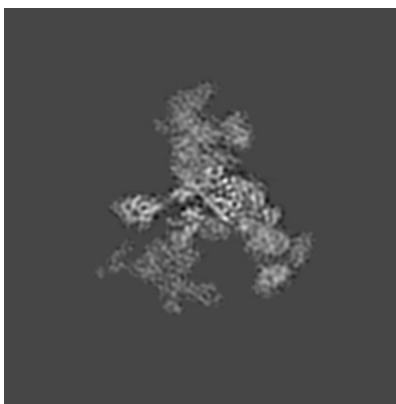
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

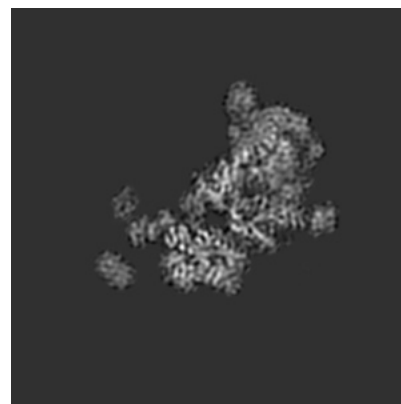
6.2.1 Primary map



X Index: 224



Y Index: 224



Z Index: 224

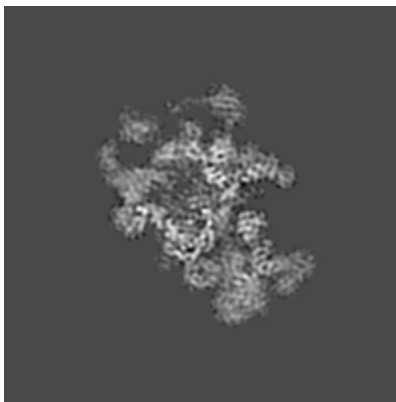
The images above show central slices of the map in three orthogonal directions.

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

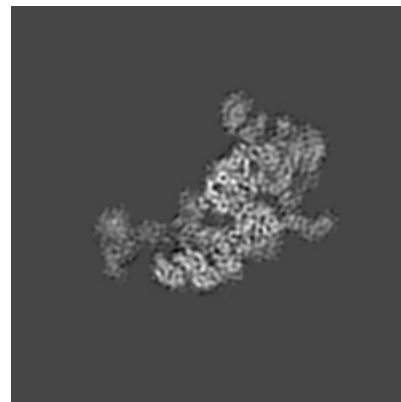
6.3.1 Primary map



X Index: 252



Y Index: 194

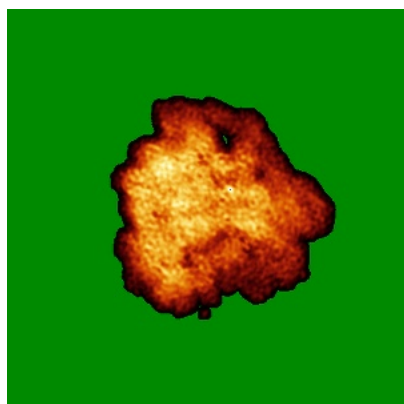


Z Index: 243

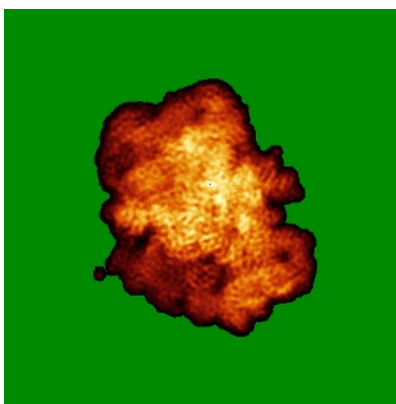
The images above show the largest variance slices of the map in three orthogonal directions.

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

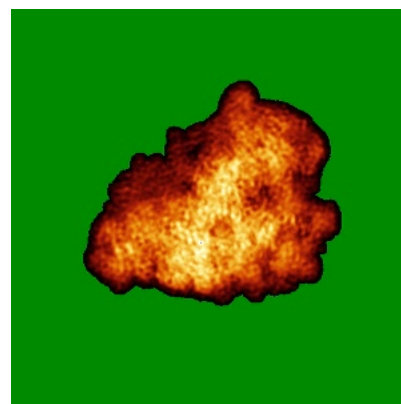
6.4.1 Primary map



X



Y

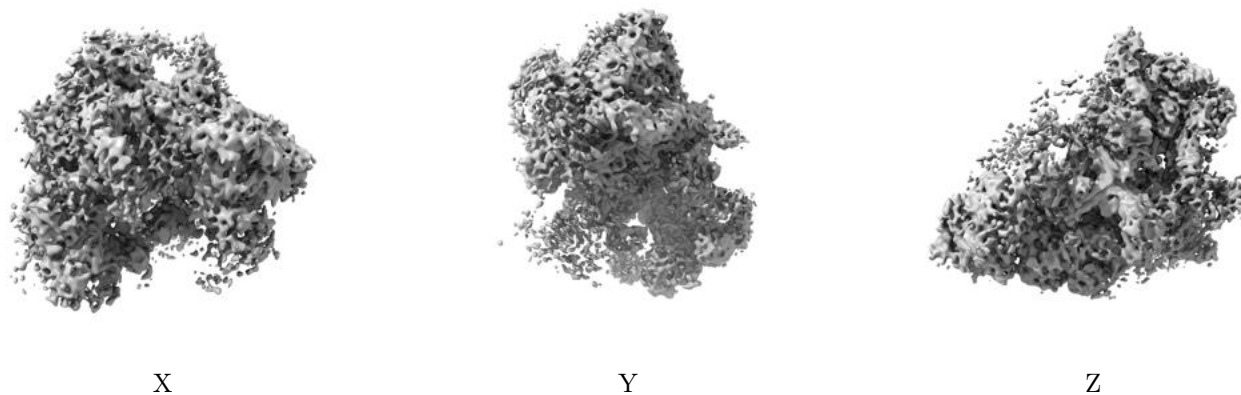


Z

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

6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.014. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

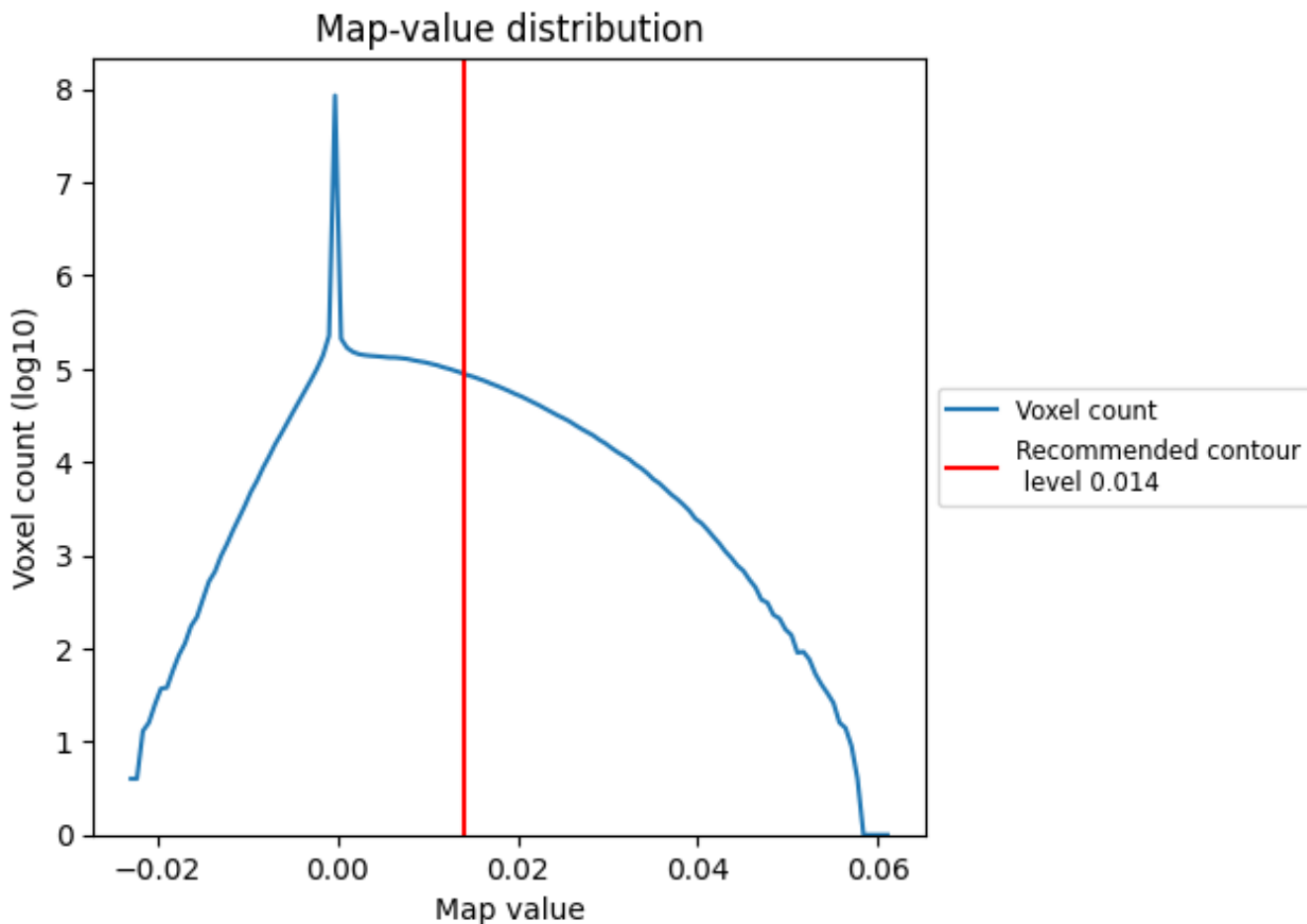
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

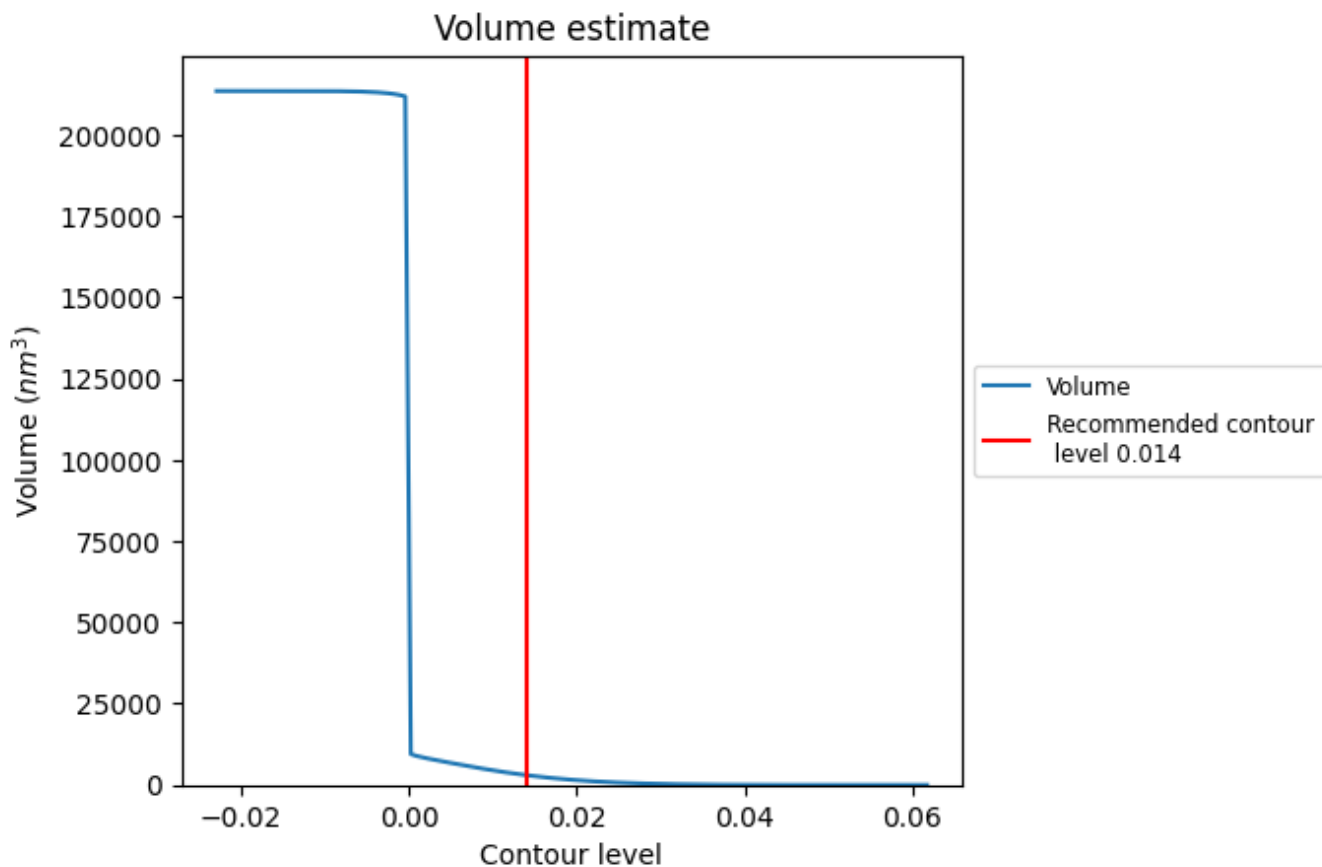
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

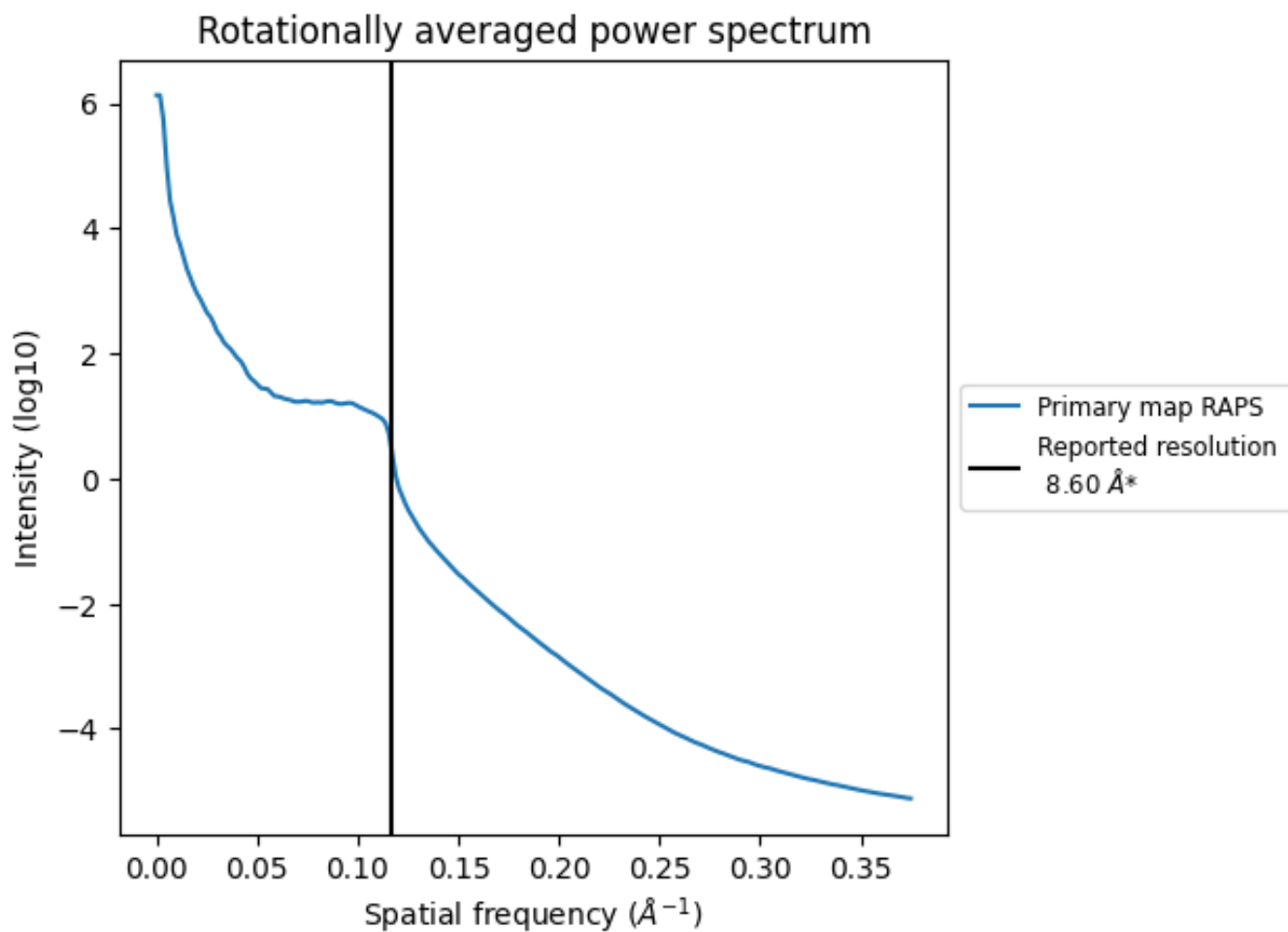
7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 3008 nm³; this corresponds to an approximate mass of 2717 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 0.116\AA^{-1}

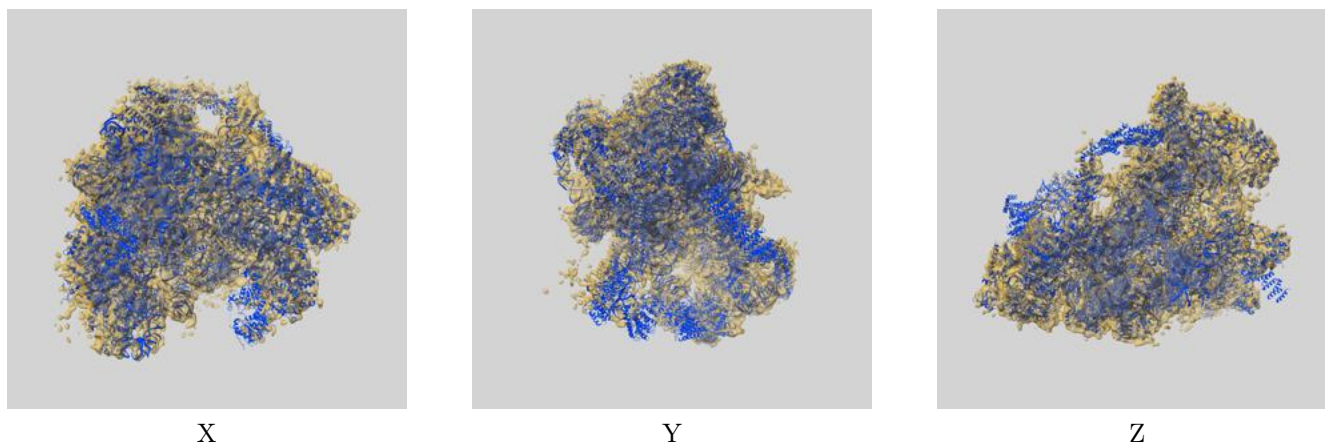
8 Fourier-Shell correlation

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

9 Map-model fit [i](#)

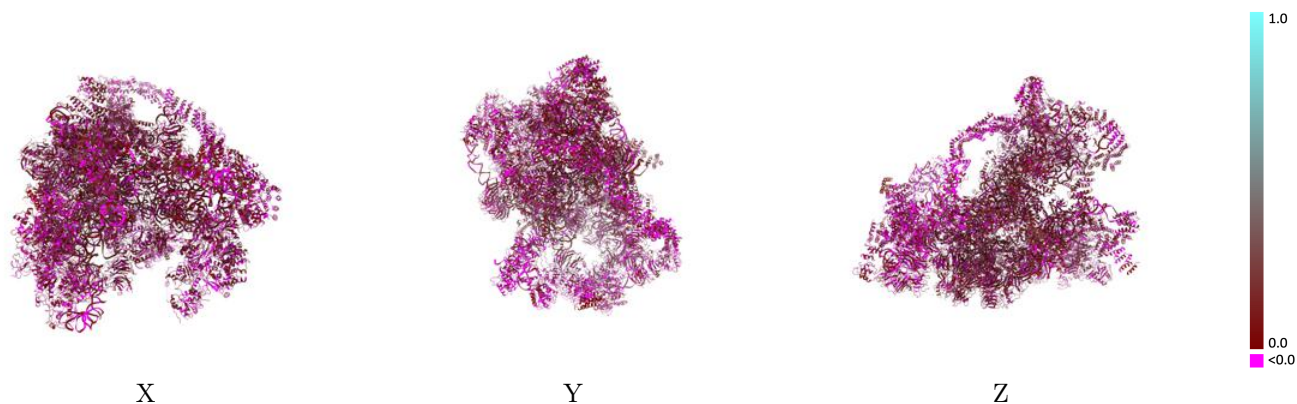
This section contains information regarding the fit between EMDB map EMD-0951 and PDB model 6LQR. Per-residue inclusion information can be found in section 3 on page 17.

9.1 Map-model overlay [i](#)



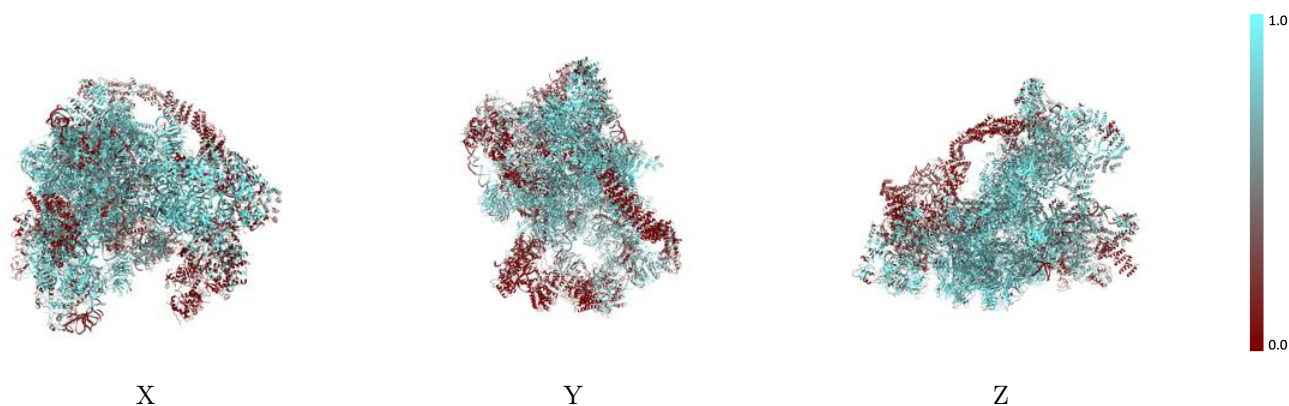
The images above show the 3D surface view of the map at the recommended contour level 0.014 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



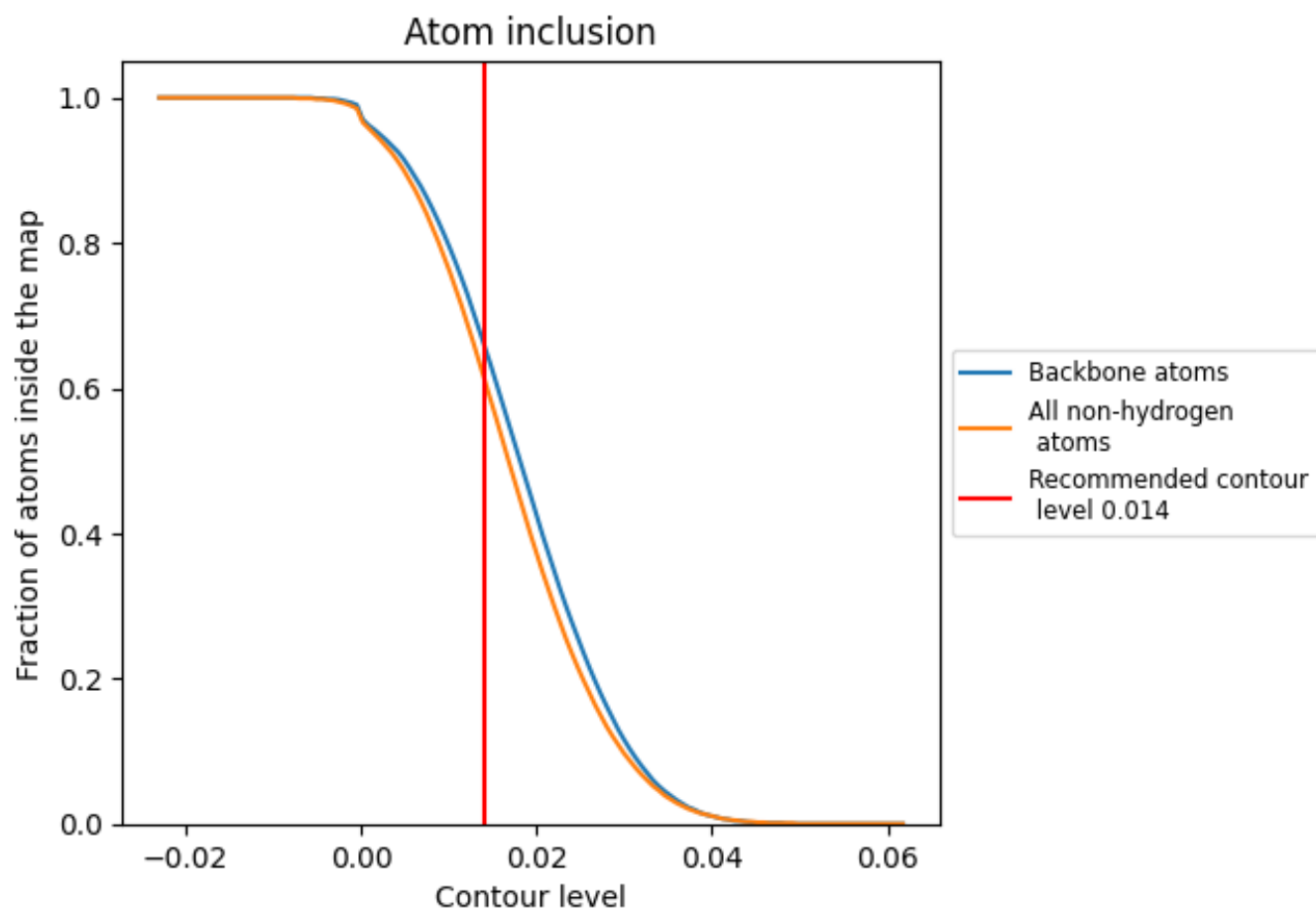
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

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



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.014).







































































9.4 Atom inclusion [i](#)



At the recommended contour level, 66% of all backbone atoms, 62% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary





































































The table lists the average atom inclusion at the recommended contour level (0.014) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6160	 0.0800
3A	 0.9100	 0.1510
3B	 0.7970	 0.1140
3C	 0.6800	 0.0660
3D	 0.8060	 0.1300
3E	 0.6940	 0.0930
3F	 0.8070	 0.1120
3G	 0.7630	 0.1090
3H	 0.7880	 0.1290
5A	 0.5880	 0.0630
5B	 0.1210	 0.0310
5C	 0.7700	 0.1040
5D	 0.4060	 0.0490
5E	 0.7420	 0.1350
5F	 0.7360	 0.1260
5G	 0.6730	 0.0950
5H	 0.7540	 0.1070
5I	 0.8410	 0.1040
5J	 0.5670	 0.0960
5K	 0.7420	 0.1100
A4	 0.6850	 0.0470
A5	 0.6060	 0.0740
A8	 0.5480	 0.0590
A9	 0.4820	 0.0400
AE	 0.3840	 0.0540
AF	 0.4860	 0.0490
AG	 0.6670	 0.0340
B1	 0.8250	 0.1060
B2	 0.7950	 0.0960
B3	 0.7850	 0.0710
B6	 0.7680	 0.1260
B8	 0.7800	 0.0970
BE	 0.8310	 0.1070
RA	 0.5970	 0.0600
RB	 0.7440	 0.1240



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Chain	Atom inclusion	Q-score
RD	 0.0800	 0.0120
RE	 0.5560	 0.0610
RF	 0.3930	 0.0800
RG	 0.1280	 0.0160
RH	 0.1390	 0.0120
RJ	 0.7030	 0.1020
RK	 0.7460	 0.1140
RL	 0.3280	 0.0860
RM	 0.1560	 0.0450
RN	 0.1110	 0.0080
RO	 0.0220	 -0.0030
RP	 0.6090	 0.0830
RQ	 0.5520	 0.0900
RS	 0.0450	 -0.0100
RT	 0.4820	 0.0510
RY	 0.3750	 0.0560
SA	 0.7140	 0.1010
SC	 0.5150	 0.0690
SF	 0.7690	 0.0950
SG	 0.7890	 0.1220
SH	 0.5730	 0.0710
SI	 0.6500	 0.1140
SJ	 0.7190	 0.0430
SK	 0.7950	 0.1150
SM	 0.8200	 0.0610
SO	 0.6930	 0.0860
SP	 0.6230	 0.0520
SR	 0.7910	 0.1080
SX	 0.5930	 0.1030
SY	 0.6430	 0.0990
SZ	 0.7610	 0.1050
Sc	 0.5460	 0.0810
Sd	 0.7760	 0.1250
X1	 0.5360	 0.0930