



wwPDB EM Validation Summary Report ⓘ

Dec 10, 2025 – 07:17 pm GMT

PDB ID : 7AJT / pdb_00007ajt
EMDB ID : EMD-11807
Title : Cryo-EM structure of the 90S-exosome super-complex (state Pre-A1-exosome)
Authors : Cheng, J.; Lau, B.; Flemming, D.; Venuta, G.L.; Berninghausen, O.; Beckmann, R.; Hurt, E.
Deposited on : 2020-09-29
Resolution : 4.60 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:

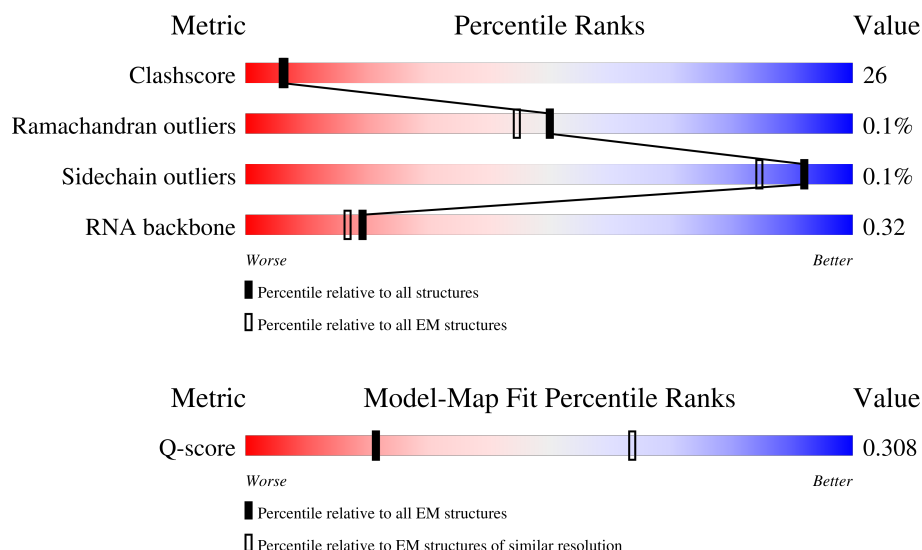
EMDB validation analysis : 0.0.1.dev129
Mogul : 1.8.4, CSD as541be (2020)
MolProbity : 4-5-2 with Phenix2.0
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.47

1 Overall quality at a glance

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

The reported resolution of this entry is 4.60 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)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	210492	15764	-
Ramachandran outliers	207382	16835	-
Sidechain outliers	206894	16415	-
RNA backbone	6643	2191	-
Q-score	-	25397	2407 (4.10 - 5.10)

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	CA	327	
1	CB	327	
2	DA	255	

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Mol	Chain	Length	Quality of chain
3	JA	1056	
3	JB	1056	
4	UA	923	
5	UB	810	
6	UC	610	
7	UD	776	
8	UE	643	
9	UF	440	
10	UG	554	
11	UH	713	
12	UI	575	
13	UJ	1769	
14	UK	250	
15	UL	943	
16	UM	817	
17	UN	899	
18	UO	513	
19	UP	214	
20	UQ	896	
21	UR	594	
22	US	552	
23	UT	2493	
24	UU	939	
25	UV	1237	
26	UX	189	

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Mol	Chain	Length	Quality of chain
27	UZ	274	
28	CD	504	
29	CE	511	
30	CF	126	
30	CG	126	
31	CH	573	
32	CI	183	
33	CJ	290	
34	CK	593	
35	CL	1183	
36	CM	367	
37	CN	297	
38	JC	707	
39	JF	252	
39	JG	252	
40	JH	483	
41	JI	1729	
42	JJ	274	
43	JK	534	
44	JM	217	
45	JN	346	
46	JO	316	
47	JP	489	
48	JQ	206	
49	DE	261	

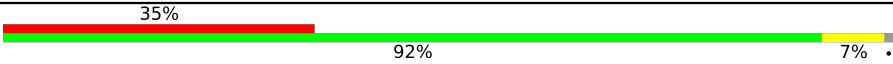
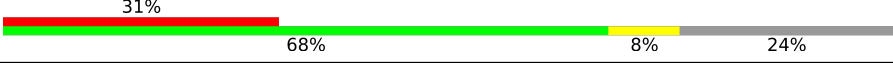
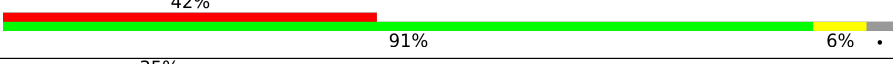
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Mol	Chain	Length	Quality of chain
50	DF	225	
51	DG	236	
52	DH	190	
53	DI	200	
54	DJ	197	
55	DL	156	
56	DN	151	
57	DO	137	
58	DQ	143	
59	DS	146	
60	DW	130	
61	DX	145	
62	DY	135	
63	Db	82	
64	Dc	67	
65	D2	700	
66	D3	1808	
67	D4	333	
68	EA	22	
69	EB	305	
70	EC	246	
71	ED	394	
72	EE	223	
73	EF	267	
74	EG	250	

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Mol	Chain	Length	Quality of chain
75	EH	240	
76	EI	359	
77	EJ	292	
78	EK	1001	
79	EN	1073	

2 Entry composition

There are 82 unique types of molecules in this entry. The entry contains 256149 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 rRNA 2'-O-methyltransferase fibrillarin.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	CA	242	Total	C	N	O	S	0	0
			1881	1193	338	340	10		
1	CB	228	Total	C	N	O	S	0	0
			1782	1131	320	321	10		

- Molecule 2 is a protein called 40S ribosomal protein S1-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	DA	240	Total	C	N	O	S	0	0
			1912	1209	354	345	4		

- Molecule 3 is a protein called RNA cytidine acetyltransferase.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	JA	812	Total	C	N	O	S	0	0
			5916	3745	1044	1102	25		
3	JB	835	Total	C	N	O		0	0
			4132	2462	835	835			

- Molecule 4 is a protein called Periodic tryptophan protein 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	UA	834	Total	C	N	O	S	0	0
			6635	4223	1140	1253	19		

- Molecule 5 is a protein called Nucleolar complex protein 14.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	UB	507	Total	C	N	O	S	0	0
			3734	2367	663	695	9		

- Molecule 6 is a protein called Something about silencing protein 10.

Mol	Chain	Residues	Atoms				AltConf	Trace
6	UC	128	Total	C	N	O		
			1026	633	204	189	0	0

- Molecule 7 is a protein called U3 small nucleolar RNA-associated protein 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	UD	675	Total	C	N	O	S		
			5361	3395	929	1015	22	0	0

- Molecule 8 is a protein called U3 small nucleolar RNA-associated protein 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	UE	475	Total	C	N	O	S		
			3772	2400	649	710	13	0	0

- Molecule 9 is a protein called U3 small nucleolar RNA-associated protein 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	UF	293	Total	C	N	O	S		
			2487	1605	435	434	13	0	0

- Molecule 10 is a protein called U3 small nucleolar RNA-associated protein 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	UG	533	Total	C	N	O	S		
			4218	2646	758	802	12	0	0

- Molecule 11 is a protein called U3 small nucleolar RNA-associated protein 8.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	UH	442	Total	C	N	O	S		
			2701	1680	494	524	3	0	0

- Molecule 12 is a protein called U3 small nucleolar RNA-associated protein 9.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	UI	104	Total	C	N	O	S		
			860	556	152	150	2	0	0

- Molecule 13 is a protein called U3 small nucleolar RNA-associated protein 10.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	UJ	1116	Total	C	N	O	S	0	0
			8961	5802	1468	1666	25		

- Molecule 14 is a protein called U3 small nucleolar RNA-associated protein 11.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	UK	242	Total	C	N	O	S	0	0
			2021	1254	389	371	7		

- Molecule 15 is a protein called U3 small nucleolar RNA-associated protein 12.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	UL	842	Total	C	N	O	S	0	0
			6726	4303	1129	1267	27		

- Molecule 16 is a protein called U3 small nucleolar RNA-associated protein 13.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	UM	762	Total	C	N	O	S	0	0
			5969	3785	1007	1149	28		

- Molecule 17 is a protein called U3 small nucleolar RNA-associated protein 14.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	UN	147	Total	C	N	O	S	0	0
			1227	765	233	227	2		

- Molecule 18 is a protein called U3 small nucleolar RNA-associated protein 15.

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

- Molecule 19 is a protein called Bud site selection protein 21.

Mol	Chain	Residues	Atoms				AltConf	Trace
19	UP	60	Total	C	N	O	0	0
			495	310	101	84		

- Molecule 20 is a protein called NET1-associated nuclear protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	UQ	832	Total	C	N	O	S	0	0
			6662	4236	1124	1283	19		

- Molecule 21 is a protein called U3 small nucleolar RNA-associated protein 18.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	UR	482	Total	C	N	O	S	0	0
			3799	2405	669	715	10		

- Molecule 22 is a protein called Nucleolar complex protein 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	US	494	Total	C	N	O	S	0	0
			3622	2326	617	667	12		

- Molecule 23 is a protein called U3 small nucleolar RNA-associated protein 20.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	UT	2255	Total	C	N	O	S	0	0
			17290	11076	2927	3235	52		

- Molecule 24 is a protein called U3 small nucleolar RNA-associated protein 21.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	UU	848	Total	C	N	O	S	0	0
			6678	4241	1149	1267	21		

- Molecule 25 is a protein called U3 small nucleolar RNA-associated protein 22.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	UV	1081	Total	C	N	O	S	0	0
			8736	5681	1440	1591	24		

- Molecule 26 is a protein called rRNA-processing protein FCF1.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	UX	174	Total	C	N	O	S	0	0
			1395	890	255	240	10		

- Molecule 27 is a protein called Ribosome biogenesis protein UTP30.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	UZ	247	Total	C	N	O	S	0	0
			2006	1284	356	358	8		

- Molecule 28 is a protein called Nucleolar protein 56.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	CD	380	Total	C	N	O	S	0	0
			2994	1898	513	574	9		

- Molecule 29 is a protein called Nucleolar protein 58.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	CE	435	Total	C	N	O	S	0	0
			3325	2093	571	653	8		

- Molecule 30 is a protein called 13 kDa ribonucleoprotein-associated protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	CF	123	Total	C	N	O	S	0	0
			931	594	160	173	4		
30	CG	123	Total	C	N	O	S	0	0
			928	591	160	173	4		

- Molecule 31 is a protein called Ribosomal RNA-processing protein 9.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	CH	465	Total	C	N	O	S	0	0
			3725	2365	653	697	10		

- Molecule 32 is a protein called U3 small nucleolar ribonucleoprotein protein IMP3.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	CI	182	Total	C	N	O	S	0	0
			1530	967	287	269	7		

- Molecule 33 is a protein called U3 small nucleolar ribonucleoprotein protein IMP4.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	CJ	282	Total	C	N	O	S	0	0
			2296	1441	430	418	7		

- Molecule 34 is a protein called U3 small nucleolar RNA-associated protein MPP10.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	CK	207	Total	C	N	O	S	0	0
			1667	1034	297	332	4		

- Molecule 35 is a protein called Ribosome biogenesis protein BMS1.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	CL	781	Total	C	N	O	S	0	0
			6332	4063	1122	1117	30		

- Molecule 36 is a protein called RNA 3'-terminal phosphate cyclase-like protein.

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

- Molecule 37 is a protein called Ribosomal RNA-processing protein 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	CN	232	Total	C	N	O	S	0	0
			1893	1213	322	351	7		

- Molecule 38 is a protein called Ribosome biogenesis protein ENP2.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	JC	354	Total	C	N	O	S	0	0
			2845	1795	489	552	9		

- Molecule 39 is a protein called Ribosomal RNA small subunit methyltransferase NEP1.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	JF	216	Total	C	N	O	S	0	0
			1701	1079	296	315	11		
39	JG	230	Total	C	N	O	S	0	0
			1799	1142	313	333	11		

- Molecule 40 is a protein called Essential nuclear protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	JH	261	Total	C	N	O		0	0
			1295	773	261	261			

- Molecule 41 is a protein called rRNA biogenesis protein RRP5.

Mol	Chain	Residues	Atoms				AltConf	Trace
41	Jl	265	Total	C	N	O	0	0
			1314	784	265	265		

- Molecule 42 is a protein called Pre-rRNA-processing protein PNO1.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	JJ	182	Total	C	N	O	S	0	0
			1442	923	259	256	4		

- Molecule 43 is a protein called Protein BFR2.

Mol	Chain	Residues	Atoms				AltConf	Trace
43	JK	42	Total	C	N	O	0	0
			334	213	54	67		

- Molecule 44 is a protein called rRNA-processing protein FCF2.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	JM	135	Total	C	N	O	S	0	0
			1137	721	211	201	4		

- Molecule 45 is a protein called Protein FAF1.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	JN	186	Total	C	N	O	S	0	0
			1428	879	287	259	3		

- Molecule 46 is a protein called KRR1 small subunit processome component.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	JO	230	Total	C	N	O	S	0	0
			1876	1203	330	332	11		

- Molecule 47 is a protein called Protein SOF1.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	JP	461	Total	C	N	O	S	0	0
			3765	2354	686	709	16		

- Molecule 48 is a protein called Regulator of rDNA transcription protein 14.

Mol	Chain	Residues	Atoms				AltConf	Trace
48	JQ	63	Total	C	N	O	0	0
			381	234	69	78		

- Molecule 49 is a protein called 40S ribosomal protein S4-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
49	DE	245	Total	C	N	O	S	0	0
			1944	1245	360	336	3		

- Molecule 50 is a protein called 40S ribosomal protein S5.

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

- Molecule 51 is a protein called 40S ribosomal protein S6-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
51	DG	218	Total	C	N	O	S	0	0
			1755	1102	337	313	3		

- Molecule 52 is a protein called 40S ribosomal protein S7-A.

Mol	Chain	Residues	Atoms				AltConf	Trace
52	DH	184	Total	C	N	O	0	0
			1481	951	265	265		

- Molecule 53 is a protein called 40S ribosomal protein S8-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
53	DI	177	Total	C	N	O	S	0	0
			1399	869	279	249	2		

- Molecule 54 is a protein called 40S ribosomal protein S9-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
54	DJ	185	Total	C	N	O	S	0	0
			1494	943	289	261	1		

- Molecule 55 is a protein called 40S ribosomal protein S11-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
55	DL	140	Total	C	N	O	S	0	0
			1129	724	215	187	3		

- Molecule 56 is a protein called 40S ribosomal protein S13.

Mol	Chain	Residues	Atoms					AltConf	Trace
56	DN	150	Total	C	N	O	S	0	0
			1192	759	224	207	2		

- Molecule 57 is a protein called 40S ribosomal protein S14-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
57	DO	120	Total	C	N	O	S	0	0
			881	544	167	167	3		

- Molecule 58 is a protein called 40S ribosomal protein S16-A.

Mol	Chain	Residues	Atoms				AltConf	Trace
58	DQ	125	Total	C	N	O		
			973	625	174	174	0	0

- Molecule 59 is a protein called 40S ribosomal protein S18-A.

Mol	Chain	Residues	Atoms				AltConf	Trace
59	DS	104	Total	C	N	O		
			516	308	104	104	0	0

- Molecule 60 is a protein called 40S ribosomal protein S22-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
60	DW	129	Total	C	N	O	S	0	0
			1021	650	188	180	3		

- Molecule 61 is a protein called 40S ribosomal protein S23-A.

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

- Molecule 62 is a protein called 40S ribosomal protein S24-A.

Mol	Chain	Residues	Atoms				AltConf	Trace
62	DY	134	Total	C	N	O	0	0
			1073	676	208	189		

- Molecule 63 is a protein called 40S ribosomal protein S27-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
63	Db	81	Total	C	N	O	S	0	0
			610	382	110	113	5		

- Molecule 64 is a protein called 40S ribosomal protein S28-A.

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

- Molecule 65 is a RNA chain called 5'ETS RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
65	D2	446	Total	C	N	O	P	0	0
			9508	4250	1682	3130	446		

- Molecule 66 is a RNA chain called 18S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
66	D3	1327	Total	C	N	O	P	0	0
			28287	12644	5022	9294	1327		

- Molecule 67 is a RNA chain called U3 snoRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
67	D4	230	Total	C	N	O	P	0	0
			4869	2180	841	1618	230		

- Molecule 68 is a RNA chain called RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
68	EA	22	Total	C	N	O	P	0	0
			366	161	43	140	22		

- Molecule 69 is a protein called Exosome complex component RRP45.

Mol	Chain	Residues	Atoms				AltConf	Trace
69	EB	299	Total	C	N	O	0	0
			1475	877	299	299		

- Molecule 70 is a protein called Exosome complex component SKI6.

Mol	Chain	Residues	Atoms				AltConf	Trace
70	EC	244	Total	C	N	O	0	0
			1204	716	244	244		

- Molecule 71 is a protein called Exosome complex component RRP43.

Mol	Chain	Residues	Atoms				AltConf	Trace
71	ED	317	Total	C	N	O	1	0
			1571	937	317	317		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
ED	363	MET	VAL	conflict	UNP P25359

- Molecule 72 is a protein called Exosome complex component RRP46.

Mol	Chain	Residues	Atoms				AltConf	Trace
72	EE	223	Total	C	N	O	1	0
			1107	661	223	223		

- Molecule 73 is a protein called Exosome complex component RRP42.

Mol	Chain	Residues	Atoms				AltConf	Trace
73	EF	267	Total	C	N	O	1	0
			1326	792	267	267		

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
EF	-1	GLY	-	expression tag	UNP Q12277
EF	0	HIS	-	expression tag	UNP Q12277
EF	138	ILE	VAL	conflict	UNP Q12277

- Molecule 74 is a protein called Exosome complex component MTR3.

Mol	Chain	Residues	Atoms				AltConf	Trace
74	EG	215	Total	C	N	O	0	0
			1058	628	215	215		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
EG	75	SER	THR	conflict	UNP P48240

- Molecule 75 is a protein called Exosome complex component RRP40.

Mol	Chain	Residues	Atoms				AltConf	Trace
75	EH	237	Total	C	N	O	0	0
			1170	696	237	237		

- Molecule 76 is a protein called Exosome complex component RRP4.

Mol	Chain	Residues	Atoms				AltConf	Trace
76	EI	293	Total	C	N	O	0	0
			1440	854	293	293		

- Molecule 77 is a protein called Exosome complex component CSL4.

Mol	Chain	Residues	Atoms				AltConf	Trace
77	EJ	222	Total	C	N	O	0	0
			1091	647	222	222		

- Molecule 78 is a protein called Exosome complex exonuclease DIS3.

Mol	Chain	Residues	Atoms				AltConf	Trace
78	EK	970	Total	C	N	O	1	0
			4818	2878	970	970		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
EK	171	ASN	ASP	conflict	UNP Q08162
EK	551	ASN	ASP	conflict	UNP Q08162

- Molecule 79 is a protein called ATP-dependent RNA helicase DOB1.

Mol	Chain	Residues	Atoms				AltConf	Trace
79	EN	964	Total	C	N	O	0	0
			4767	2842	964	961		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
EN	80	MET	VAL	conflict	UNP P47047

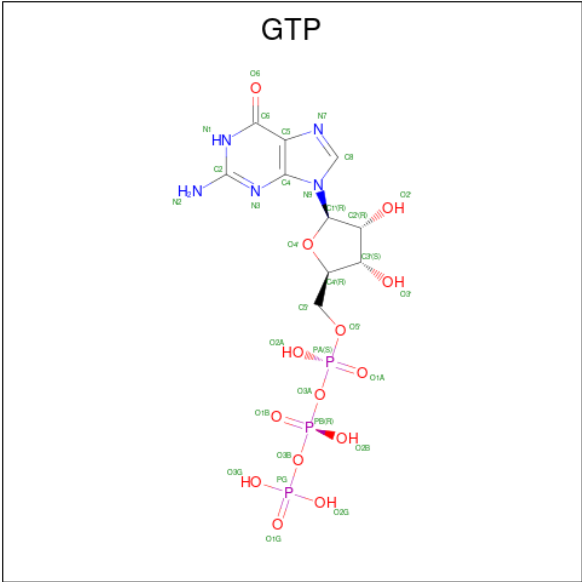
- Molecule 80 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
80	UX	1	Total	Zn	0
			1	1	
80	Db	1	Total	Zn	0
			1	1	
80	EK	1	Total	Zn	0
			1	1	

- Molecule 81 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
81	UX	1	Total	Mg	0
			1	1	
81	CL	1	Total	Mg	0
			1	1	
81	EK	1	Total	Mg	0
			1	1	

- Molecule 82 is GUANOSINE-5'-TRIPHOSPHATE (CCD ID: GTP) (formula: C₁₀H₁₆N₅O₁₄P₃).

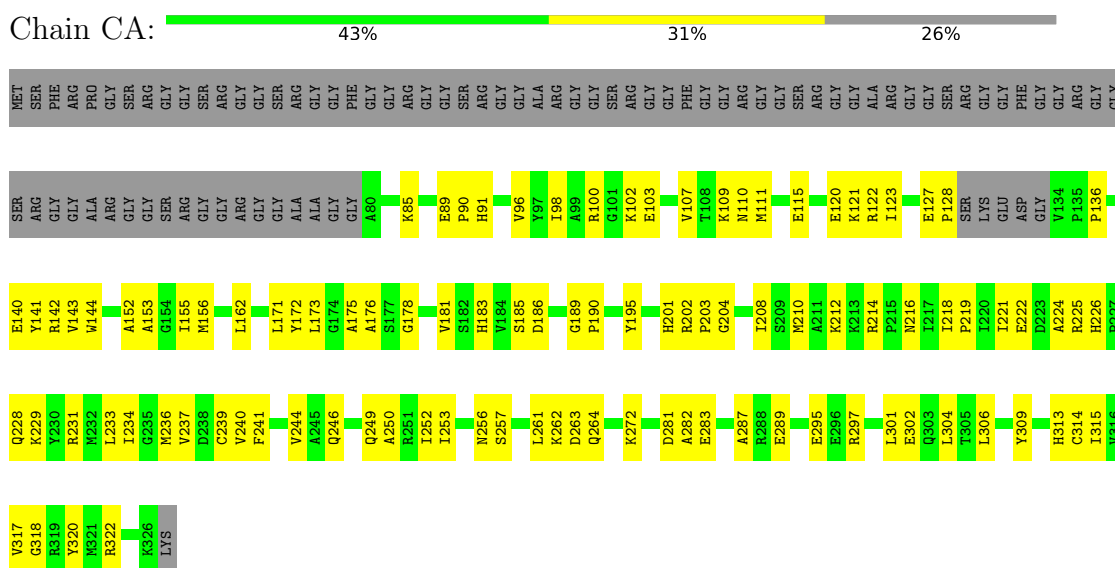


Mol	Chain	Residues	Atoms					AltConf
82	CL	1	Total	C	N	O	P	0
			32	10	5	14	3	

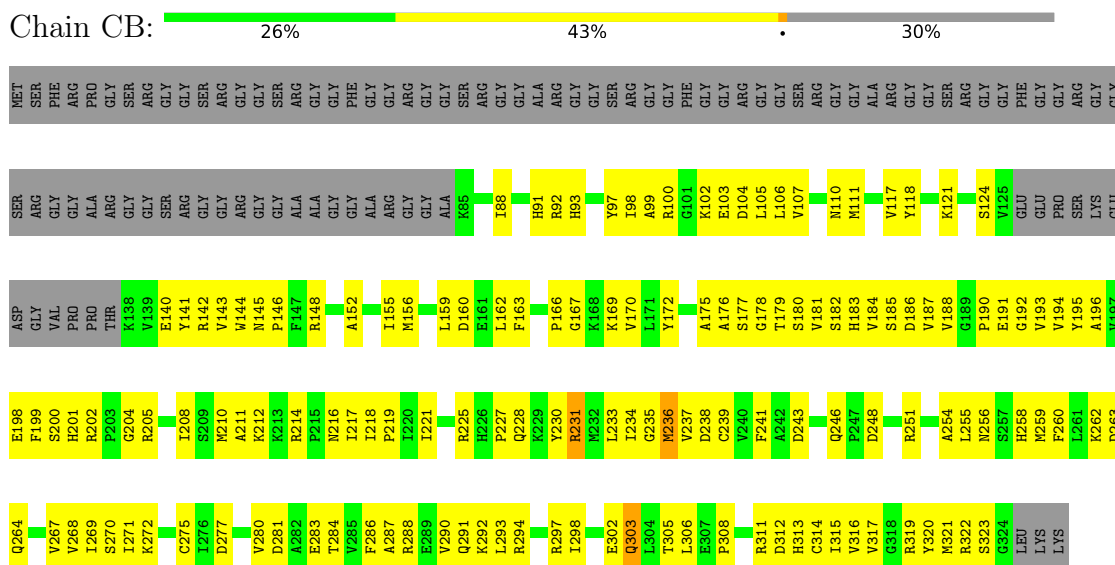
3 Residue-property plots

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: rRNA 2'-O-methyltransferase fibrillarin

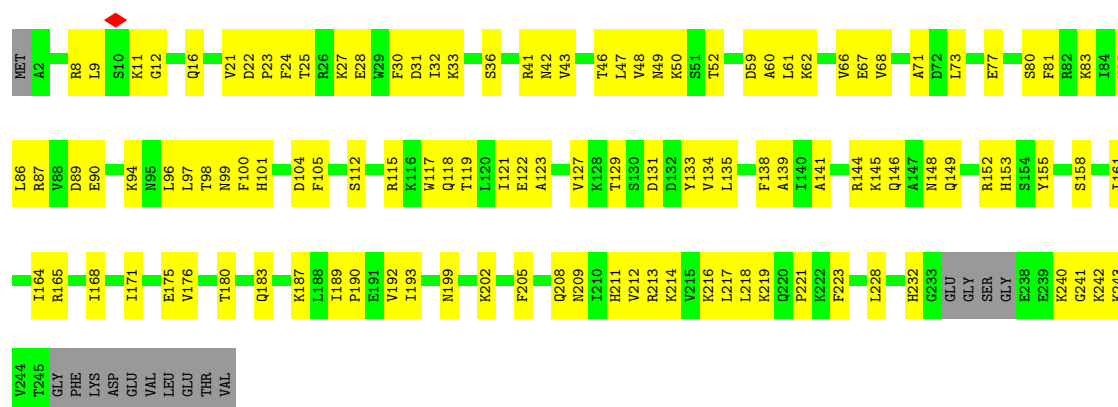


• Molecule 1: rRNA 2'-O-methyltransferase fibrillarin



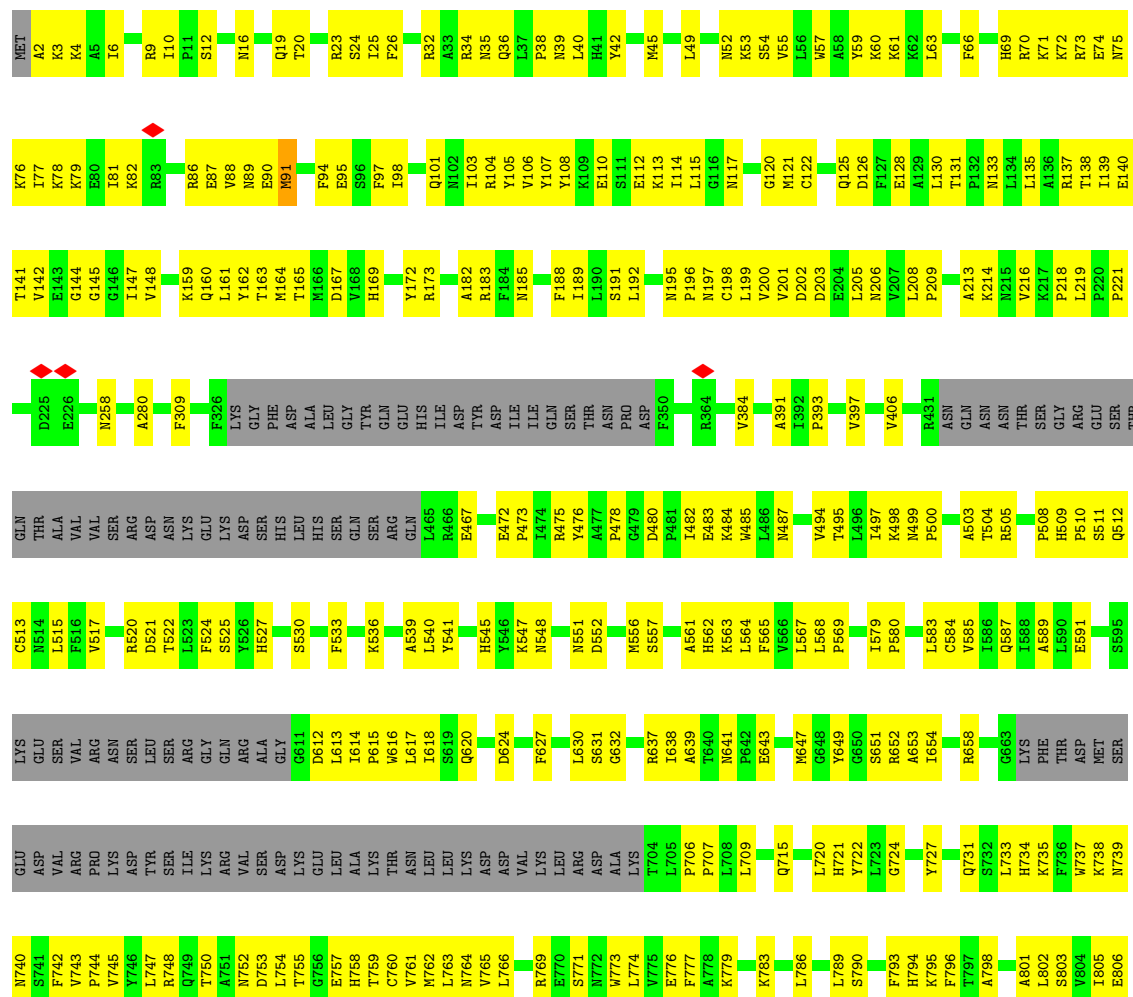
• Molecule 2: 40S ribosomal protein S1-A

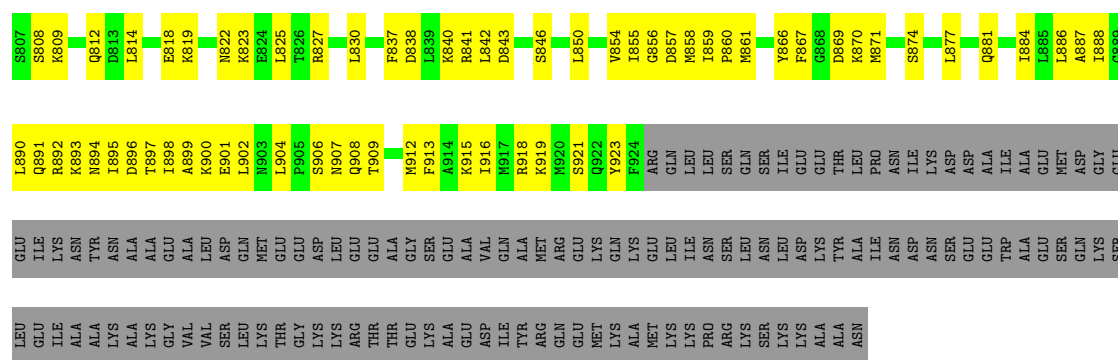
Chain DA:  49% 45% 6%



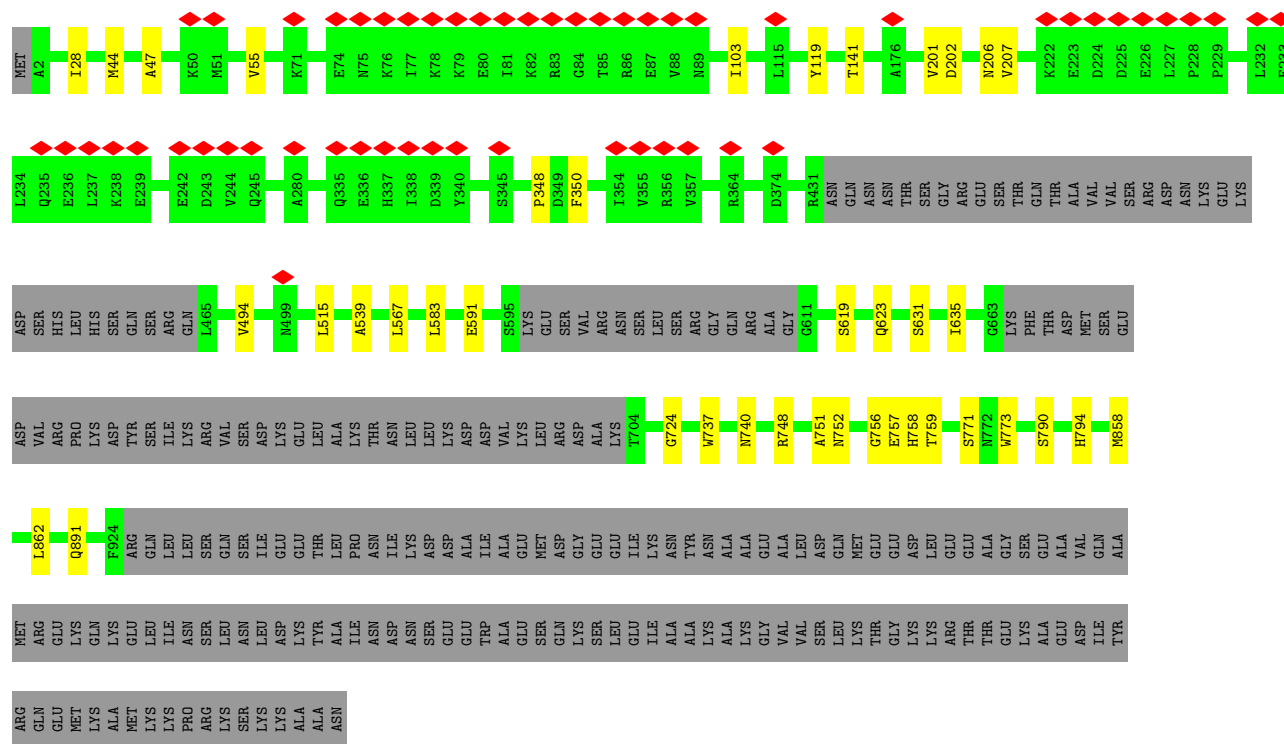
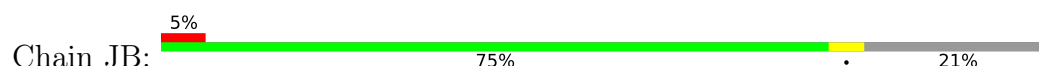
• Molecule 3: RNA cytidine acetyltransferase

Chain JA:  44% 33% 23%

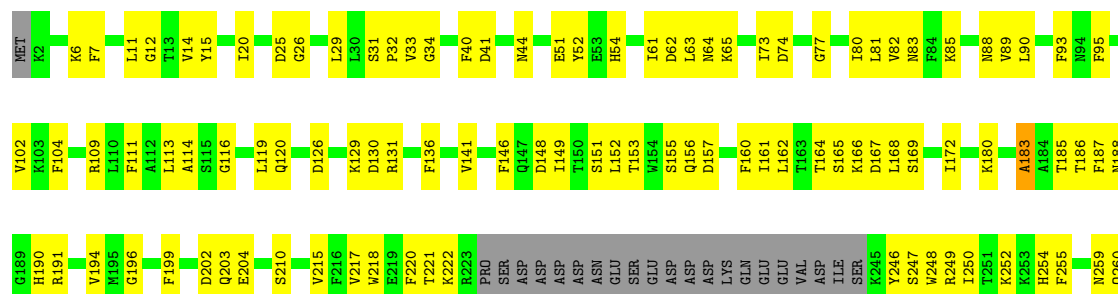




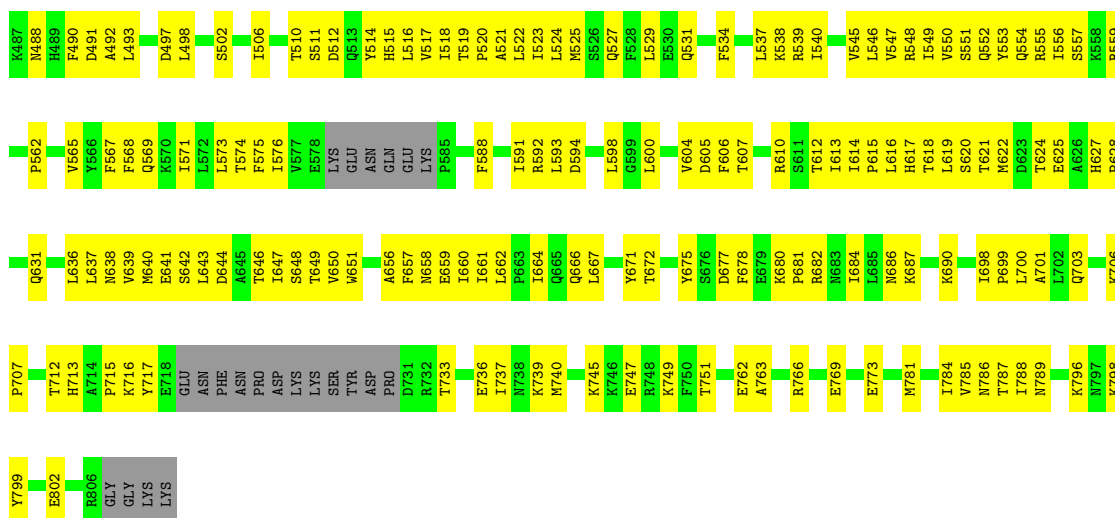
• Molecule 3: RNA cytidine acetyltransferase



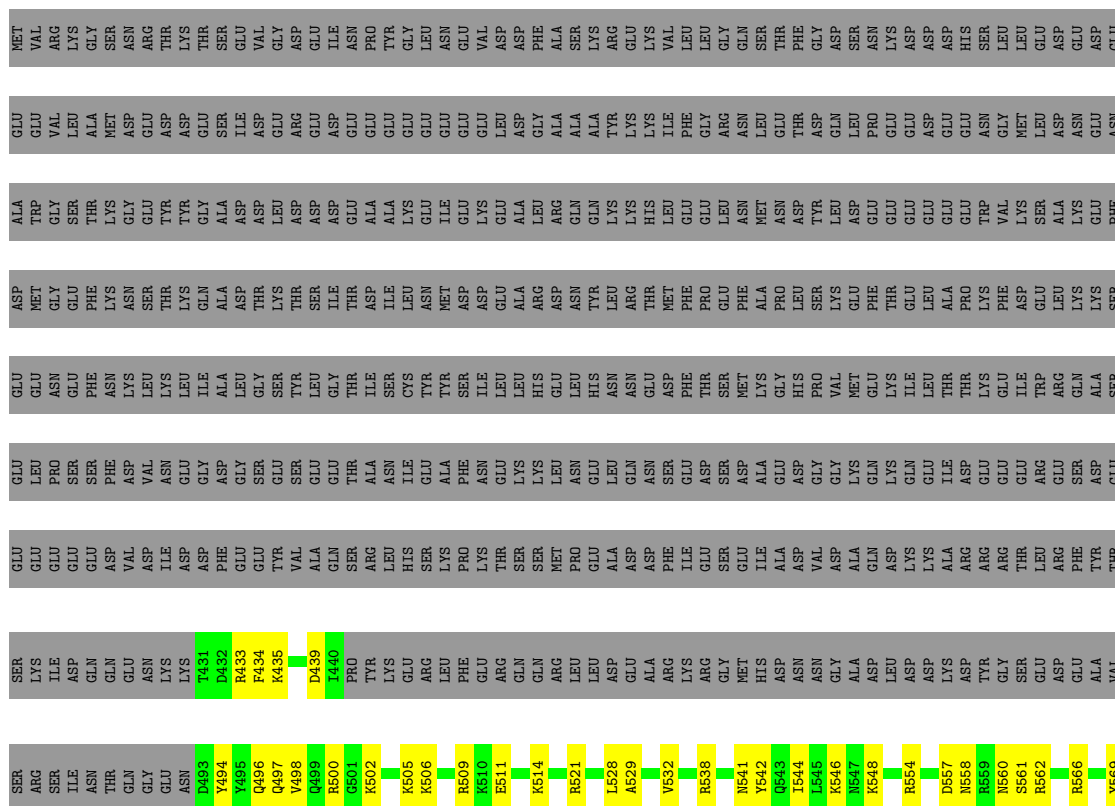
• Molecule 4: Periodic tryptophan protein 2







- Molecule 6: Something about silencing protein 10



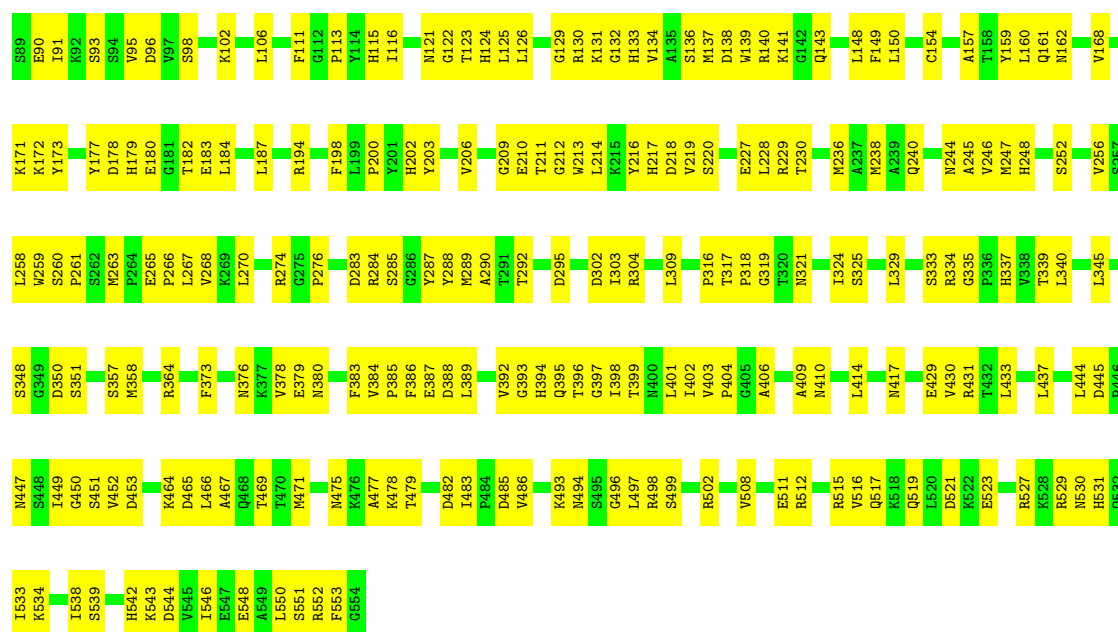
- Molecule 7: U3 small nucleolar RNA-associated protein 4



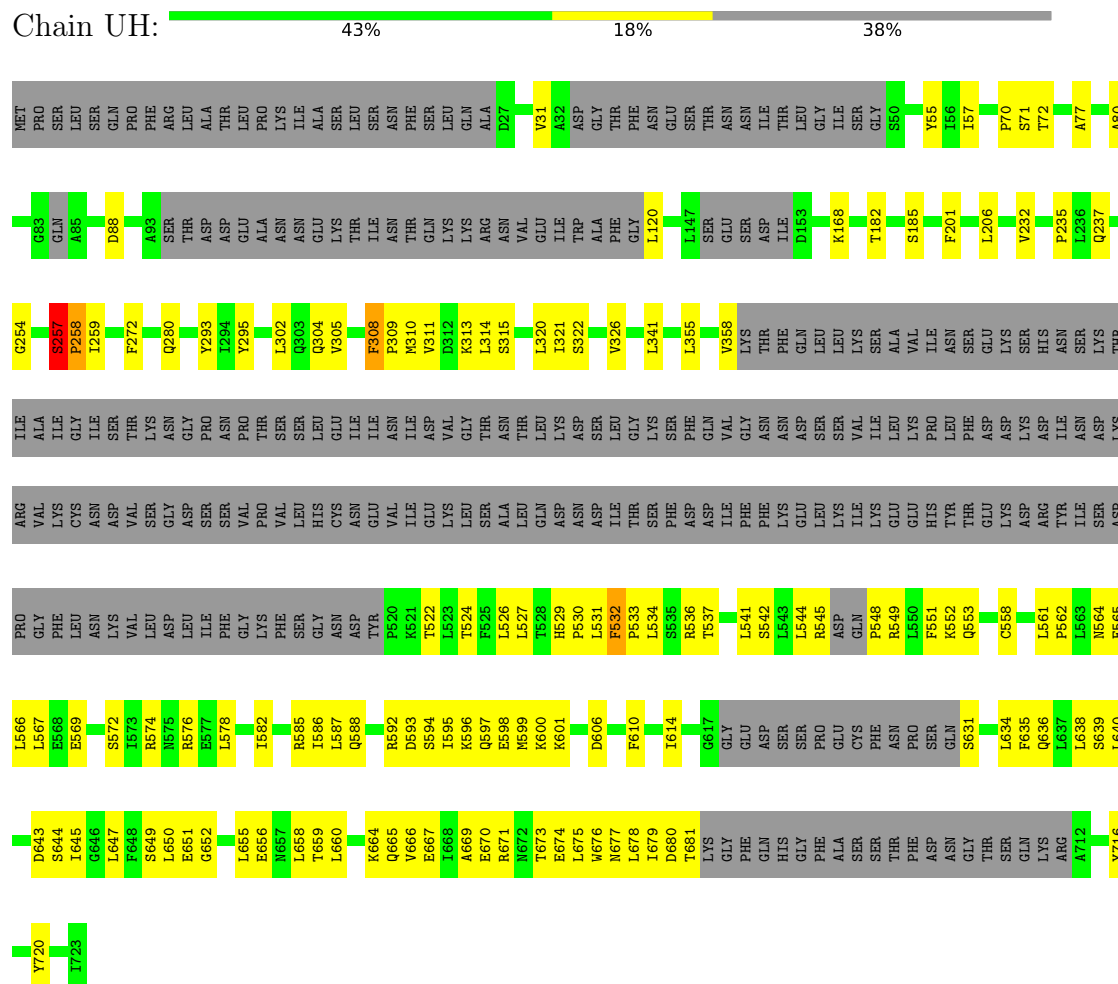


L151	G83	Met
L152	E84	S3
I153	I85	S3
V154	W86	P4
	L87	
G157	Y88	S8
	S89	A9
Q162	V90	Y10
L163	A91	D11
L164	A92	
V165	N93	G14
A166	E94	Q15
S167	V95	Y16
H168	T96	L17
	Y97	
L172	K98	T21
	F99	V22
K178		A23
	M103	L24
		D25
V181	I107	T34
M182	K108	Q35
T183	D109	R36
F184	I110	ALA
	D111	THR
V191	L112	SER
	M113	SER
T198	G114	GLY
H199	N115	VAL
E200	Q116	ASP
F201	L117	THR
F202	M118	THR
T203	C119	VAL
	I120	W46
A206	D121	N47
	S122	E48
D209	S123	
R210	D124	
F211	A125	L51
L212	D126	Y52
N213	F126	L53
M214	Y127	E54
Y215	Q128	
D216	F129	V60
L217	D130	W65
H218	L131	W66
S219		N67
	L136	LEU
T222	L137	ALA
	Q138	SER
L226	H139	SER
V227	F140	THR
A228	R141	D72
	I142	T73
L232	N143	V74
K233	N144	A75
E234	C145	
		G79
S238	L148	M80
	N149	N81
T243	K150	

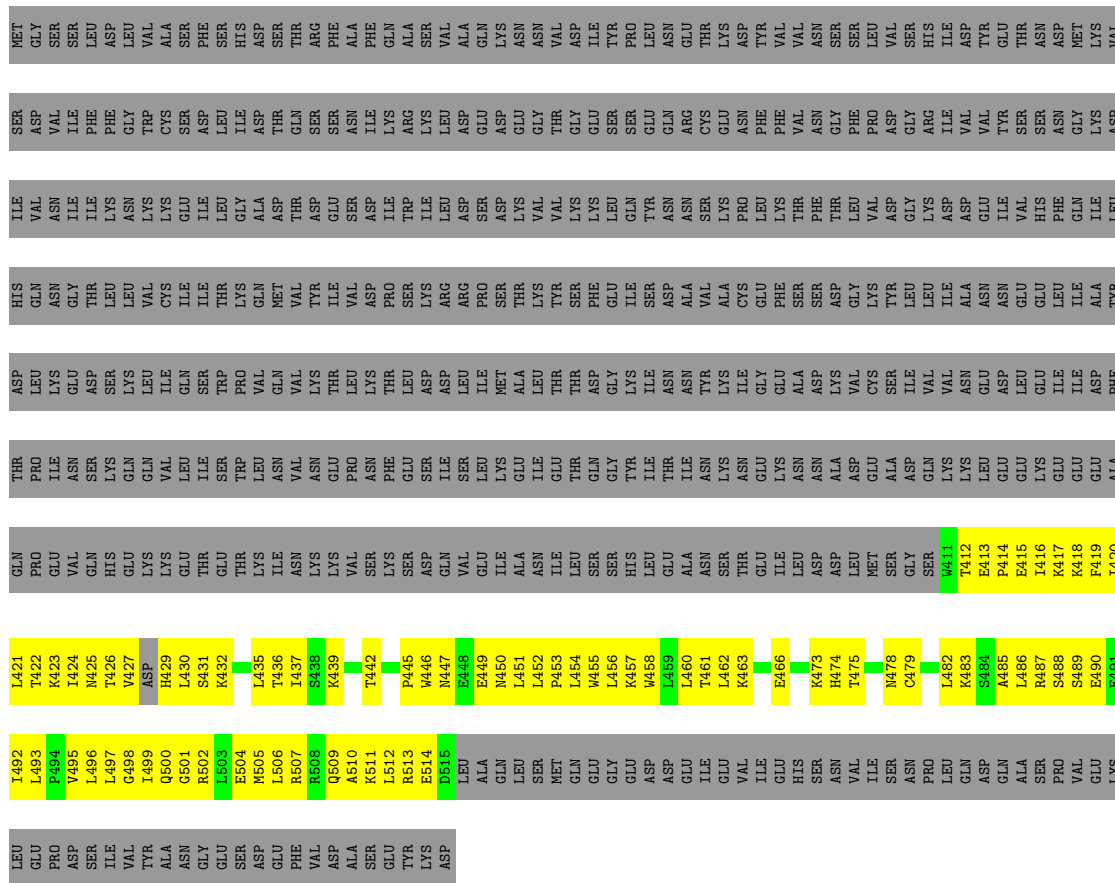




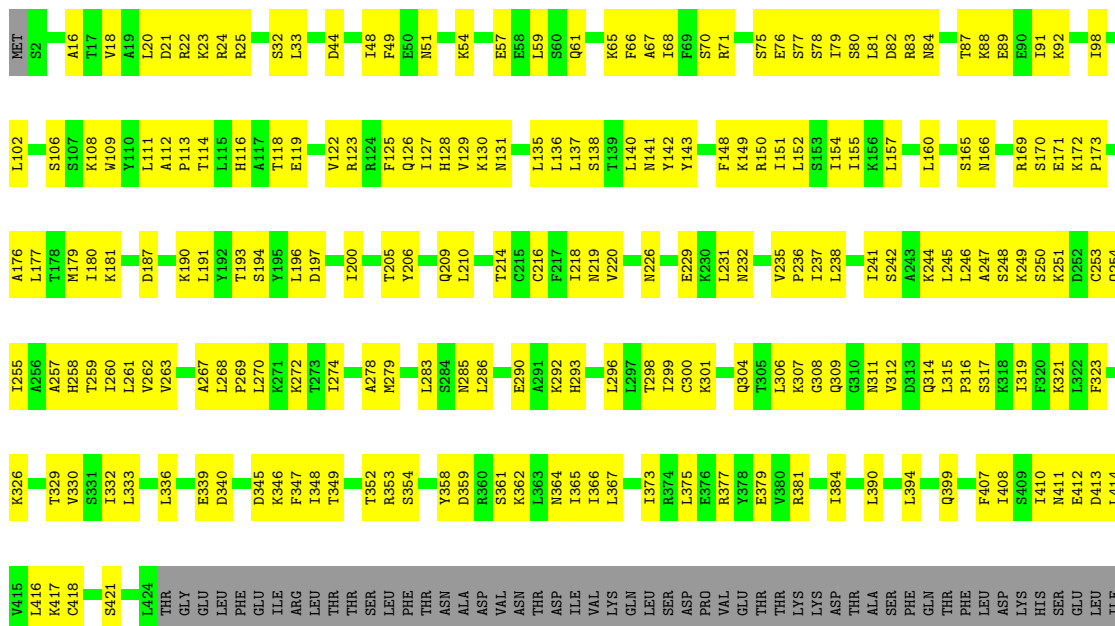
- Molecule 11: U3 small nucleolar RNA-associated protein 8



- Molecule 12: U3 small nucleolar RNA-associated protein 9



- Molecule 13: U3 small nucleolar RNA-associated protein 10







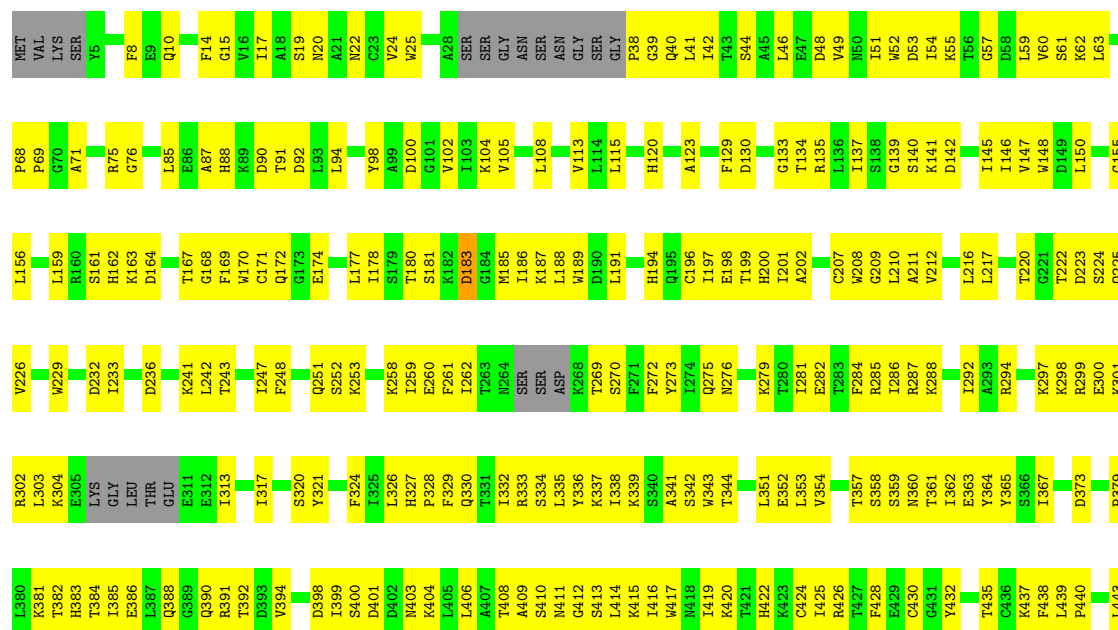
• Molecule 14: U3 small nucleolar RNA-associated protein 11

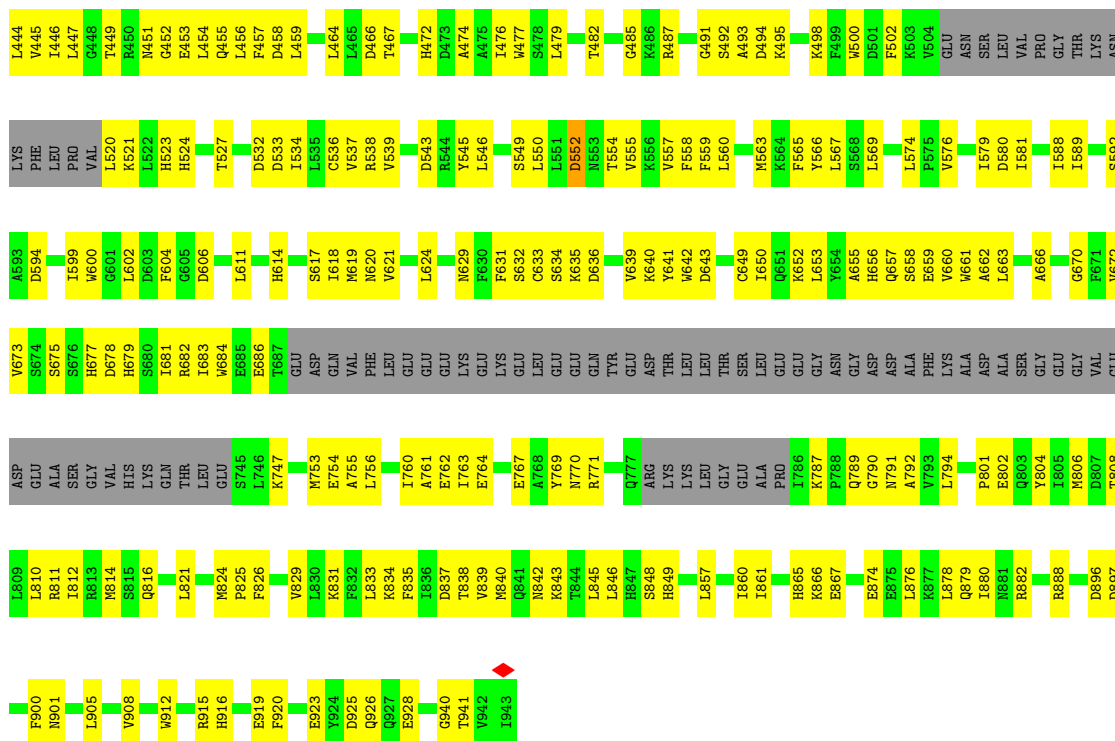
Chain UK: 40% 57%



• Molecule 15: U3 small nucleolar RNA-associated protein 12

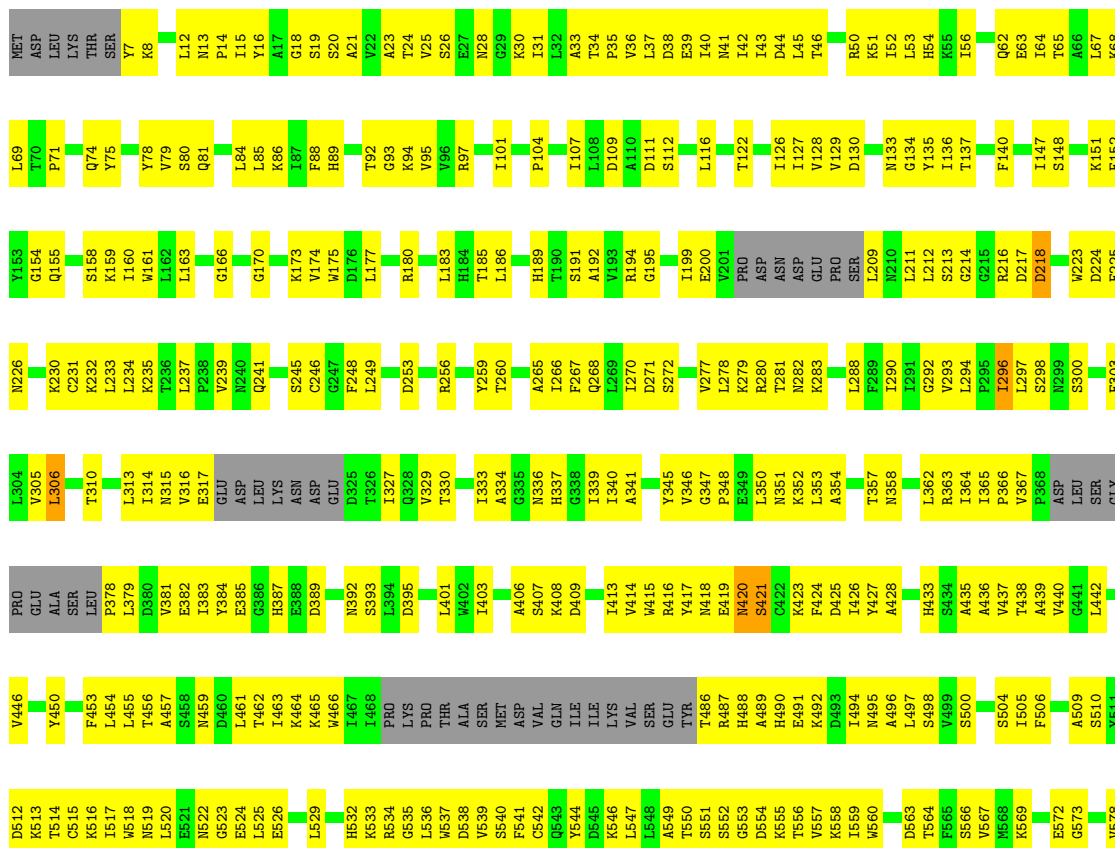
Chain UL: 43% 46% 11%



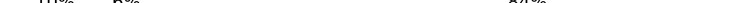


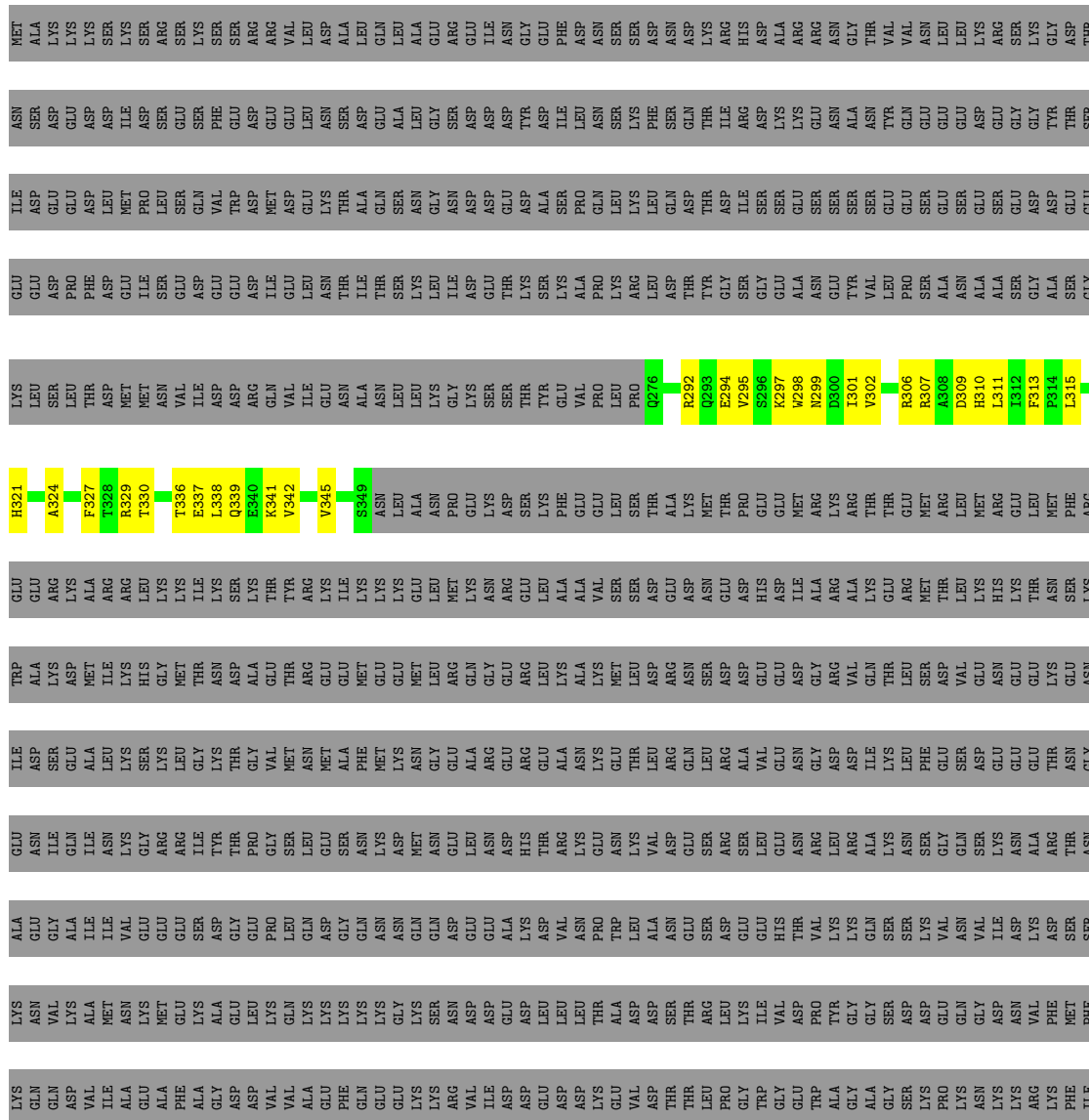
• Molecule 16: U3 small nucleolar RNA-associated protein 13

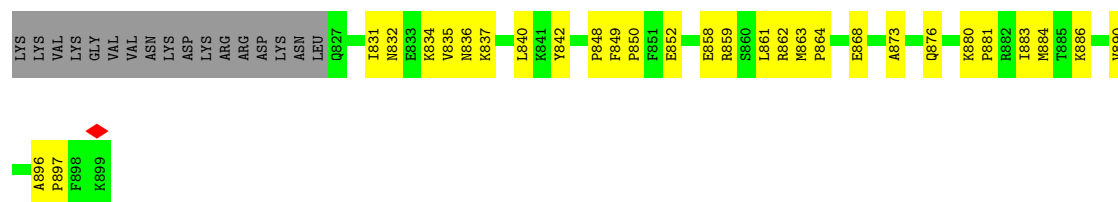
Chain UM: 40% 53% 7%



- Molecule 17: U3 small nucleolar RNA-associated protein 14

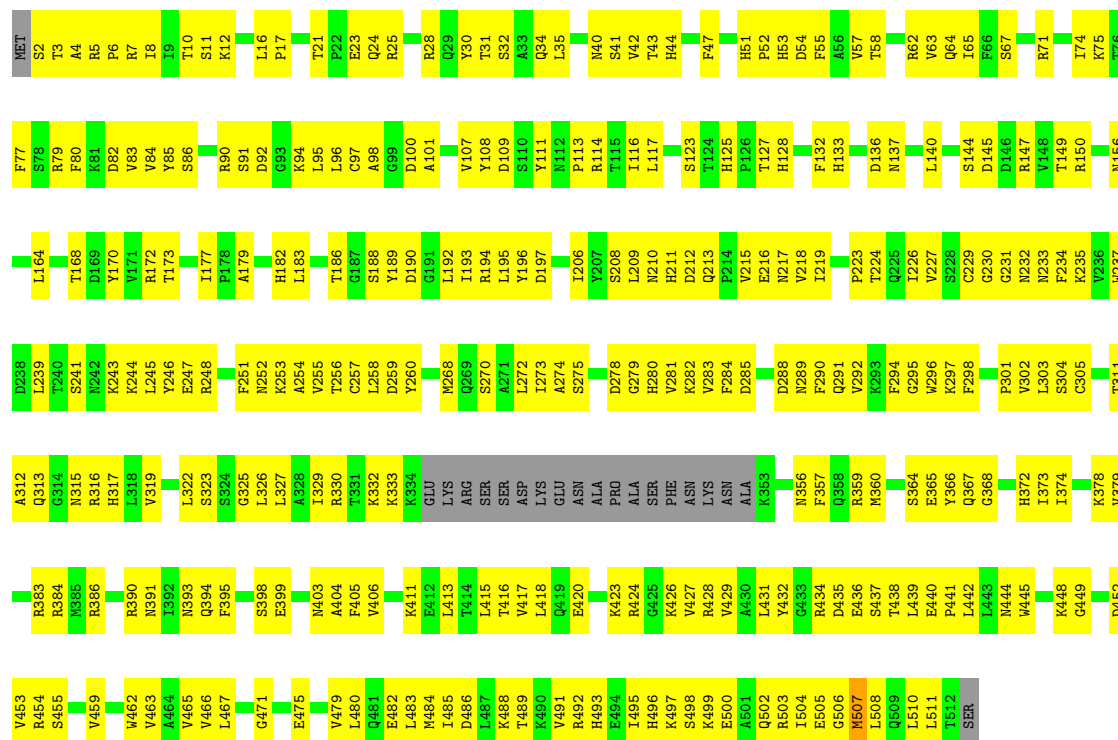
Chain UN:  10% 6% 84%





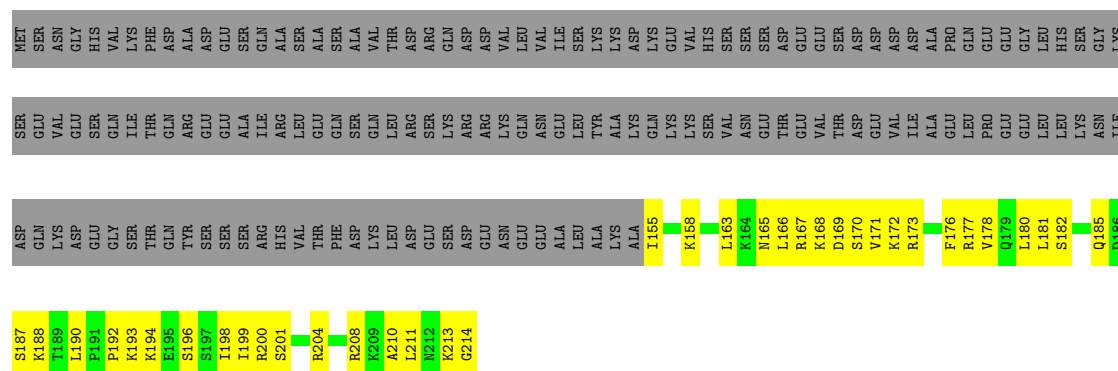
- Molecule 18: U3 small nucleolar RNA-associated protein 15

Chain UO: 41% 55% .

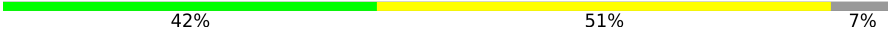
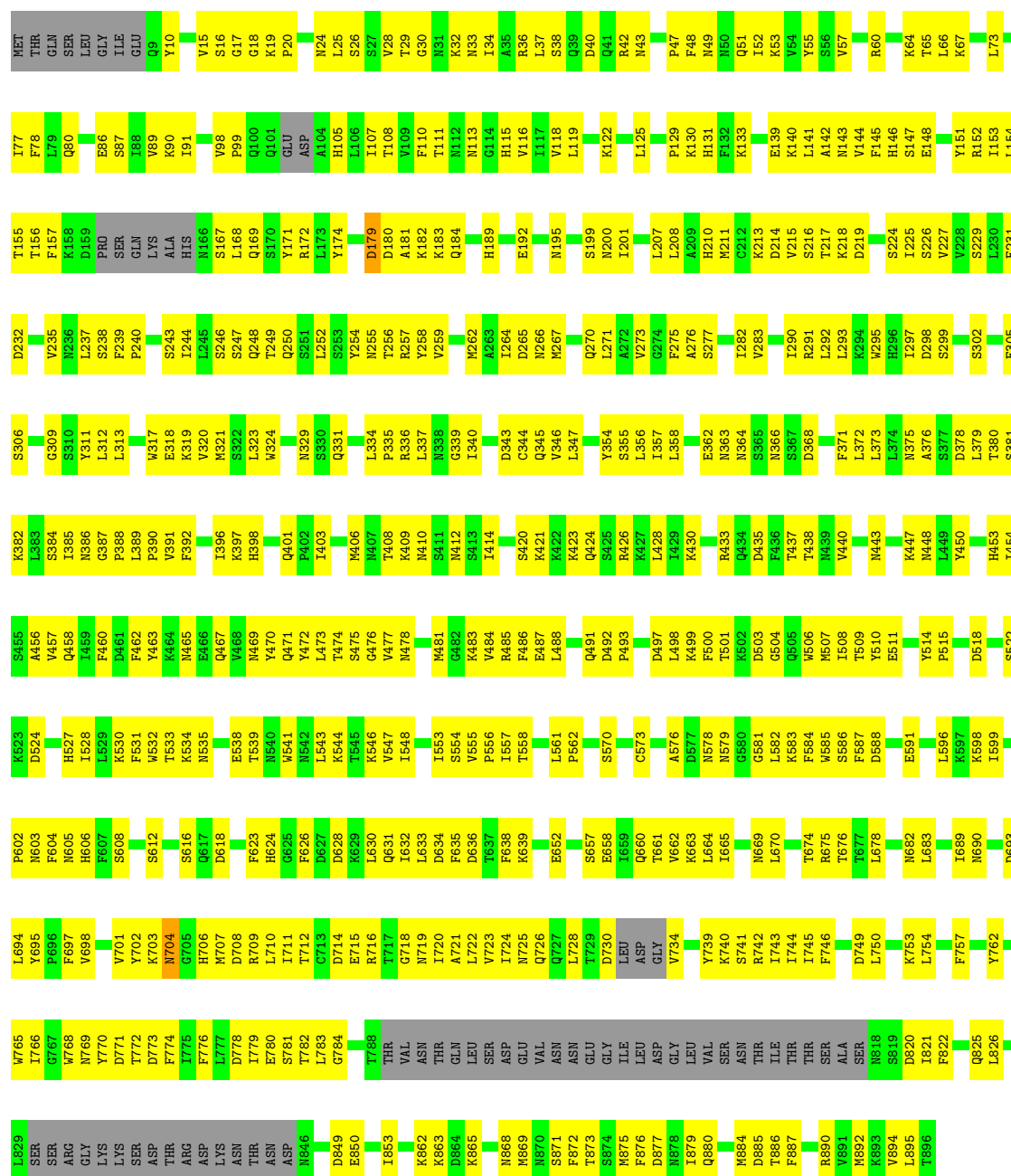


- Molecule 19: Bud site selection protein 21

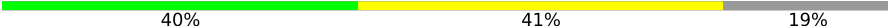
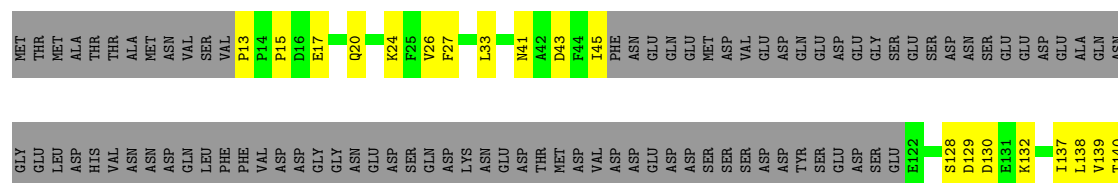
Chain UP: 11% 17% 72%

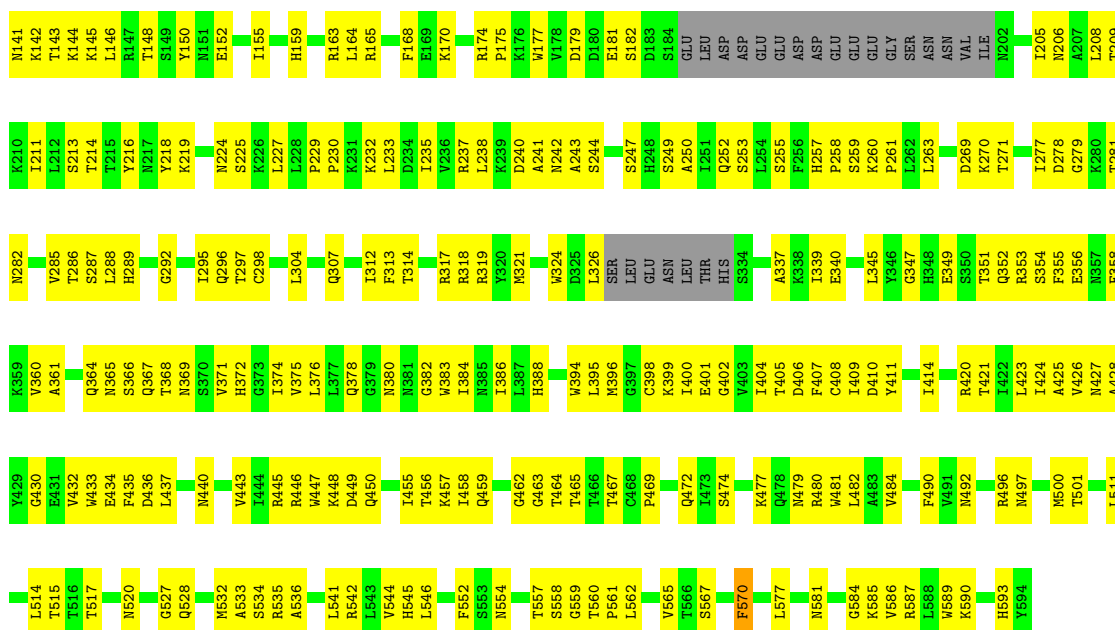


- Molecule 20: NET1-associated nuclear protein 1

Chain UQ:  42% 51% 7%

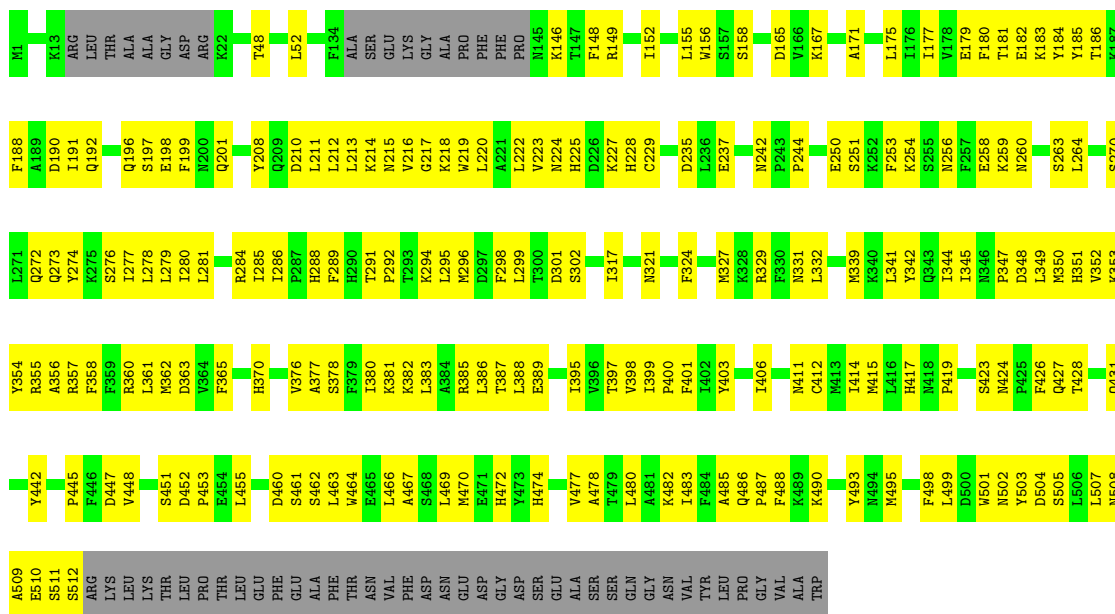
● Molecule 21: U3 small nucleolar RNA-associated protein 18

Chain UR:  40% 41% 19%



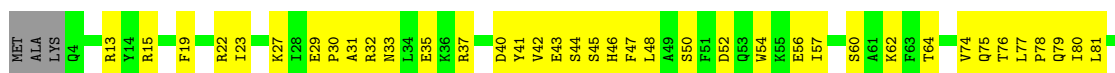
• Molecule 22: Nucleolar complex protein 4

Chain US: 54% 35% 11%



• Molecule 23: U3 small nucleolar RNA-associated protein 20

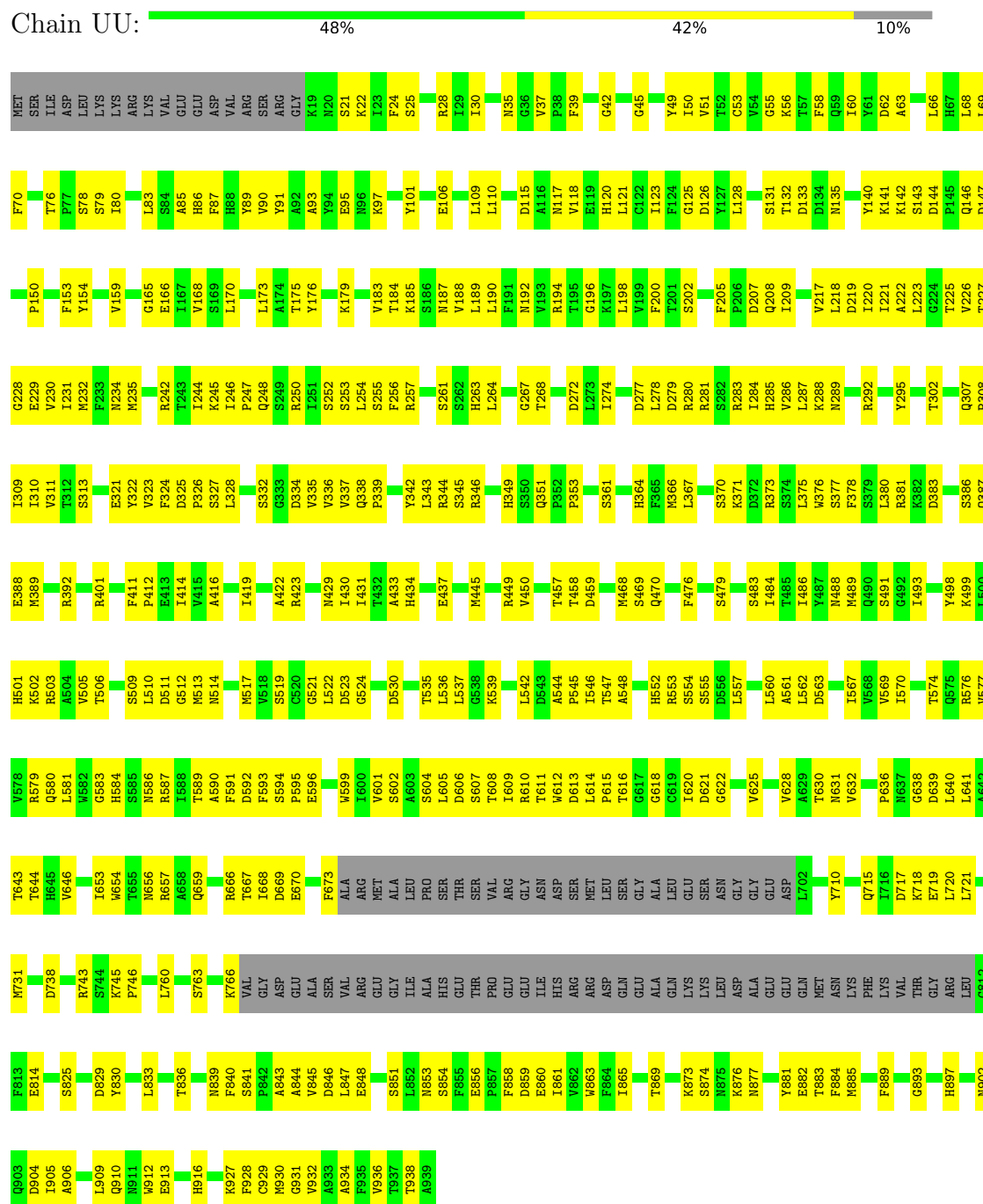
Chain UT: 47% 43% 10%



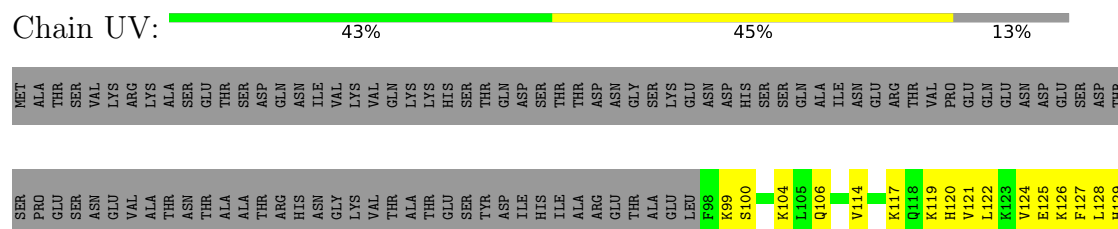
Q1120	F1121	L1122	Y1123	Y1124	D1125	F1126	F1127	A1130	M1134	Q1140	H1141	K1143	A1144	A1145	V1146	I1147	G1148	I1150	I1151	A1154	D1155	S1156	I1157	M1163	H1166	D1169	C1178	I1181	L1185	Y1186	K1187	L1188	Q1101	P1102	S1103	D1191	S1194	F1198	L1199	M1200	L1201	V1202	S1204	I1205	T1206									
Y1035	V1036	E1040	L1054	R1055	Q1056	Q1057	G1058	L1059	K1060	S1063	S1064	V1065	F1066	E1067	V1068	V1069	T1072	P1073	D1074	M1075	S1078	M1079	I1082	Y1083	V1087	K1088	P1089	R1090	I1091	F1094	S1095	D1096	E1097	N1098	Q1100	P1102	S1103	S1104	L1105	L1106	R1107	L1108	Y1111	M1112	A1113	L1118	Y1119							
VAL	ILE	THR	GLY	S822	V830	F831	L832	F838	K839	N840	L841	V844	Y845	E849	L850	H851	D852	H853	L854	K855	V856	L857	L858	S859	S860	R861	N862	T863	V865	K866	K867	L868	A869	L870	L873	L874	A875	V876	R877	N878	L881	Y884	R885	D886	N887	L888	K889	H890	L891	D893				
D894	F897	K898	D899	E900	I901	T902	T903	F904	T906	S910	K914	D917	E918	K919	V920	N921	M922	I924	P923	Y924	V925	R926	T927	F928	Y929	Q934	V935	P936	T937	T938	S939	G940	K941	K942	R943	S944	R945	K946	I947	A948	Y949	S950	V951	L952	L953	P954	N955	F956	K957	K958	P959	Y960	T961	
F964	S969	E970	R971	L972	D973	Y974	F977	F978	G979	N980	S981	H982	K988	A989	T990	L991	K992	T993	I994	R995	R996	M997	T998	G999	F1000	V1001	N1002	I1003	V1004	N1005	S1006	T1007	L1008	S1009	V1010	L1011	R1012	T1013	R1014	F1015	P1016	L1017	H1018	T1019	N1020	S1021	V1022	L1023	Q1024	T1027	Y1028	A1033	Y1034	
Y1035	V1036	E1040	L1054	R1055	Q1056	Q1057	G1058	L1059	K1060	S1063	S1064	V1065	F1066	E1067	V1068	V1069	T1072	P1073	D1074	M1075	S1078	M1079	I1082	Y1083	V1087	K1088	P1089	R1090	I1091	F1094	S1095	D1096	E1097	N1098	Q1099	Q1101	P1102	S1103	S1104	L1105	L1106	R1107	L1108	Y1111	M1112	A1113	L1118	Y1119						
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F159	K160	Y161	F165	L166	V167	L172	T173	C174	D175	L176	L177	I178	L181	S184	Y187	L188	S189	R190	F191	S192	A193	E194	A195	A262	L263	L264	F197	F198	L199	V200	R201	P204	L208	F211	V212	R213	S214	V215	F216	I217	E218	F142	S145	N146	V147	F148	A363	L364	F365	E296	L155			
L232	L233	I234	L235	F236	T237	E238	S239	M240	T241	S242	T243	T246	L247	H248	S249	K250	A251	K252	A253	I254	M255	S256	V257	L258	L259	H260	E261	A262	L263	L264	K265	S266	P268	E269	R270	S271	L272	S273	L274	L275	S276	D277	L278	M280	N281	L282	I288	L291	L292	K293	V294	Y295	E296	L297
M298	Y299	Q300	D301	F302	N303	L306	T309	R313	I314	L315	K316	V317	L318	K319	T320	A321	V322	F323	S324	Y405	R406	S326	G327	I330	P331	D332	W333	I336	T337	I340	I343	M344	S345	Q347	F435	ASN	CYS	ALA	SER	LEU	SER	D356	K357	V358	F362	A363	L364	F365	E296	L367				
N368	S369	L374	Y384	A385	L386	I461	R462	D463	F464	F465	A468	E546	Y480	W481	R482	A483	I484	F485	F486	K487	N488	T494	E495	I496	I497	L498	P499	L500	L501	F502	R503	F508	A509	D440	D441	K442	P443	E444	L445	Q446	K447	V448	R449	E450	V451	L366	R367							
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T600	L603	M604	K605	R606	L607	M608	L609	ALA	SER	GLY	N635	N636	L637	L638	K639	T640	S641	S642	L643	E644	Y645	K646	E647	L648	K649	L650	L651	L652	L653	L654	L655	L656	L657	L658	L659	L660	L661	L662	L663	L664	L665	L666	L667	L668	L669	L670								
V671	V672	R673	F674	S675	P676	V677	W678	V681	F682	D683	N687	V688	F689	T690	E691	D692	L695	V696	W697	L698	E699	V700	F703	T704	K705	L706	P707	D708	Q711	D714	Y715	P718	L719	F726	T727	L728	W729	D730	S731	S732	F733	V734	R735	L736	I740	H745								
I746	W747	S748	K749	Y750	S751	N754	T755	F756	S757	F758	S759	T760	T761	L762	E763	R764	P771	L772	L773	L774	R775	W776	Q777	W781	W782	L783	S784	L785	F786	Q787	E790	D795	A796	F798	F799	V800	Y801	N802	D803	F804	LYS	THR	TYR	LYS	ASP	GLU	ASP	GLU	NET	GLU	ASN	GLU	ARG	
VAL	ILE	THR	GLY	S822	V830	F831	L832	F838	K839	N840	L841	V844	Y845	E849	L850	H851	D852	H853	L854	K855	V856	L857	L858	S859	S860	R861	N862	T863	V865	K866	K867	L868	A869	L870	L873	L874	A875	V876	R877	N878	L881	Y884	R885	D886	N887	L888	K889	H890	L891	D893				
D894	F897	K898	D899	E900	I901	T902	T903	F904	T906	S910	K914	D917	E918	K919	V920	N921	M922	I924	P923	Y924	V925	R926	T927	F928	Y929	Q934	V935	P936	T937	T938	S939	G940	K941	K942	R943	S944	R945	K946	I947	A948	Y949	S950	V951	L952	L953	P954	N955	F956	K957	K958	P959	Y960	T961	
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GLU	L2417	GLU	S1930	K1853	P1772	L1639	LEU	GLU	V1425	L1283	E1267
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ASP	VAL	VAL	E1932	T1856	K1774	L1705	LEU	TYR	A1427	G1209	G1209
GLN	LYS	LYS	F1933	I1857	A1775	H1706	SER	R1501	T1428	E1286	F1210
ASN	LYS	LYS	F1934	M1860	L1776	S1708	PHE	M1502	F1431	T1287	I1211
THR	THR	THR	K1935	M1860	L1777	S1645	PRO	M1505	T1432	F1288	V1216
TYR	THR	THR	M1936	L1863	M1778	L1710	SER	M1506	D1433	A1217	V1216
GLY	GLY	GLY	C1937	L1863	V1779	S1647	LEU	T1507	F1434	S1368	A1217
ASP	ASP	ASP	A1938	K1870	R1780	E1648	ASN	Q1508	E1435	L1289	S1218
GLU	GLU	GLU	K1940	K1871	I1781	T1712	ASP	Q1508	D1436	R1219	R1219
THR	THR	THR	K1941	A1872	N1785	S1713	GLU	A1515	M1437	P1296	L1220
LYS	LYS	LYS	V1941	L1875	L1789	R1651	PRO	Q1516	K1372	P1297	I1221
THR	THR	THR	L1942	L1876	L1792	D1653	SER	H1517	F1374	L1298	L1224
ALA	ALA	ALA	I1944	L1877	L1792	V1654	ASN	M1518	I1375	I1227	I1227
LYS	LYS	LYS	I1945	R1877	L1793	R1655	TYR	M1519	D1376	L1228	L1228
VAL	VAL	VAL	S1948	H1878	R1793	R1656	GLY	S1519	F1377	V1305	V1305
GLN	GLN	GLN	P1949	H1879	R1794	T1657	ASP	N1521	ASP	A1306	A1306
THR	THR	THR	P1950	I1880	R1795	G1659	GLU	Q1522	GLU	D1307	Q1236
VAL	VAL	VAL	T1951	L1887	G1799	K1660	ALA	K1524	ALA	E1237	E1237
GLU	GLU	GLU	S1952	T1888	L1800	S1662	ASP	Q1524	ASP	N1238	N1238
ARG	ARG	ARG	S1952	T1889	N1801	I1663	PHE	Q1527	PHE	D1239	D1239
ARG	ARG	ARG	Q1957	H1890	H1802	I1664	THR	L1527	THR	S1310	S1310
ASP	ASP	ASP	M1958	H1891	L1803	L1665	ASN	L1531	ASN	Y1311	Y1311
LYS	LYS	LYS	Q1958	L1892	S1804	G1666	VAL	S1532	VAL	K1242	K1242
GLU	GLU	GLU	F1966	E1893	D1805	A1667	ASN	M1533	ASN	S1312	S1312
SER	SER	SER	I1967	G1894	E1731	E1668	GLN	L1534	GLN	S1313	S1313
VAL	VAL	VAL	R1968	F1895	E1732	Y1669	ASN	L1535	ASN	S1314	S1314
THR	THR	THR	H1969	I1896	L1670	I1671	HIS	S1390	HIS	K1315	K1315
LEU	LEU	LEU	T1970	P1897	K1733	D1602	ILE	S1390	ILE	L1246	L1246
ASP	ASP	ASP	Y1970	F1898	E1736	D1603	ASP	L1394	ASP	L1247	L1247
LYS	LYS	LYS	K1975	F1898	E1736	F1672	ASP	Q1458	ASP	K1248	K1248
ALA	ALA	ALA	Y1975	L1899	Q1817	F1672	ASN	M1541	ASN	L1249	L1249
ILE	ILE	ILE	Y1979	R1900	L1818	L1674	ASN	M1542	ASN	I1250	I1250
ALA	ALA	ALA	L1979	D1901	L1818	E1675	THR	Q1543	THR	S1326	S1326
VAL	VAL	VAL	L1983	S1902	S1825	K1676	GLN	K1544	GLN	K1329	K1329
ASN	ASN	ASN	Y1983	L1903	ASN	L1677	VAL	A1544	VAL	Y1254	Y1254
ALA	ALA	ALA	V1986	E1906	SER	L1677	THR	V1545	THR	D1334	D1334
PRO	PRO	PRO	L1987	M1907	PRO	A1679	GLN	Q1546	PRO	G1335	G1335
GLN	GLN	GLN	P1988	E1907	GLN	K1743	LEU	L1547	GLN	Y1336	Y1336
THR	THR	THR	D1989	M1907	ILE	E1744	THR	I1548	THR	K1337	K1337
TYR	TYR	TYR	L1990	V1910	ILE	L1681	ASN	V1549	ASN	S1338	S1338
SER	SER	SER	L1991	I1911	LYS	K1746	ASN	Q1550	SER	Y1339	Y1339
SER	SER	SER	N1991	I1912	LYS	R1682	LYS	L1551	LYS	E1262	E1262
ASP	ASP	ASP	E1992	S1913	LYS	G1683	LYS	L1551	LYS	Y1265	Y1265
ALA	ALA	ALA	P1993	T1914	VAL	S1685	THR	P1554	THR	E1341	E1341
LYS	LYS	LYS	S1994	L1915	VAL	Q1686	THR	L1555	THR	L1342	L1342
LEU	LEU	LEU	R1995	R1916	ASP	I1687	LYS	R1556	LYS	T1268	T1268
ASP	ASP	ASP	Q1996	I1917	GLN	H1688	GLN	E1557	ASP	S1269	S1269
GLU	GLU	GLU	G1997	L1918	VAL	V1689	VAL	T1558	GLU	L1271	L1271
LYS	LYS	LYS	L1998	I1919	VAL	L1690	ASP	G1622	LYS	F1272	F1272
HIS	HIS	HIS	A1999	I1922	ASP	T1693	ASP	M1625	LYS	L1343	L1343
ALA	ALA	ALA	F2000	R1922	E1841	H1694	THR	D1626	ALA	F1349	F1349
ARG	ARG	ARG	N2001	R1923	D1844	H1695	THR	I1561	ARG	T1274	T1274
ARG	ARG	ARG	F2002	L1924	F1845	I1696	LYS	V1562	ARG	F1275	F1275
ARG	ARG	ARG	L2003	D1925	F1846	L1763	GLY	ASP	M1488	F1276	F1276
LYS	LYS	LYS	K2004	F1926	L1847	L1688	ALA	ASP	I1481	D1277	D1277
ARG	ARG	ARG	A2005	S1927	E1851	L1699	GLU	S1495	ARG	R1278	R1278
LYS	LYS	LYS	L2414	D1928	E1851	S1700	GLU	S1422	LYS	N1279	N1279
HIS	HIS	HIS	K2415	I12416	S1852	M1701	SER	Y1423	HIS	M1356	M1356
										K1358	K1358

• Molecule 24: U3 small nucleolar RNA-associated protein 21



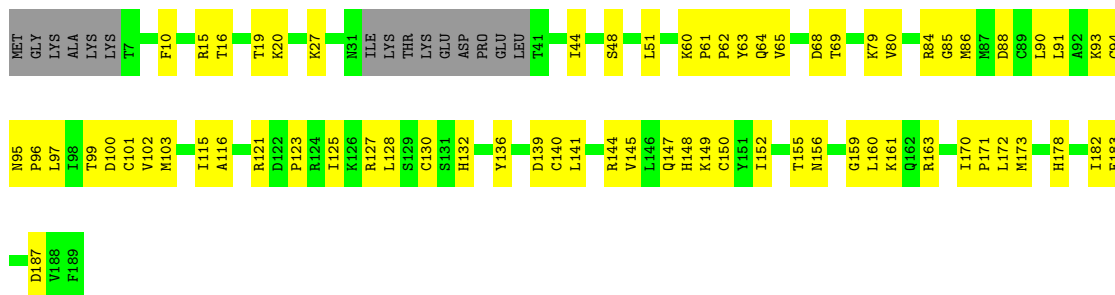
• Molecule 25: U3 small nucleolar RNA-associated protein 22



I1169	Y1096	ASP	E932	P845	S752	L933	E846	P845	S752	F592	F507	D437	E357	F290	D204	K130
G1170	D1097	SER	L933	E846	I753	A934	G847	E875	L754	P593	S508	G438	S358	F290	T205	L131
V1171	F1098	LYS	A934	G847	P755	E935	P676	E675	P676	F594	N509	H439	F359	F290	T206	L132
N1172	V1099	THR	E935	K851	P755	L936	T677	T595	T677	T595	F511	Q441	E361	L294	T207	D133
G1177	L1101	MET	L936	K851	R761	L937	L855	K596	R761	K596	L512	F442	A362	L296	T208	L134
D1178	L1102	LYS	A938	L855	Y762	L938	R855	R679	Y762	R679	L515	H443	T363	G297	E212	L135
K1179	R1103	LEU	L939	R858	L765	L940	R858	K698	L765	K698	S516	PR0	F364	F298	L213	I138
N1180	R1103	SER	K940	R858	C766	E941	R858	H681	C766	H681	S516	PR0	G366	Y300	F214	P139
V1181	G1107	E1010	F941	R858	N683	F942	J861	F684	N683	F684	Y600	Y600	G366	Y300	E215	D140
T1182	K1109	M1022	F942	J861	F768	N943	L864	F768	F768	T603	K522	ASN	R367	K302	D218	V141
G1184	L1183	N1023	F943	L864	Y769	F944	R865	Y769	Y769	G604	K523	SER	W369	F303	E143	E143
L1185	L1115	F1024	F945	R865	F770	E945	R865	F770	F770	L525	D524	SER	L370	E304	R222	K144
T1186	S1116	T1025	A946	A866	F771	A946	A866	H689	F771	G526	L525	SER	Q371	P305	R223	S145
K1187	ALA	N1026	P947	I867	F771	P947	I867	V690	H689	Y527	K307	SER	Q372	C224	L146	L146
P1188	THR	L1027	Y948	I867	D781	Y948	A870	V690	D781	N609	D528	P453	R373	K307	L225	A147
F1189	GLU	R1028	F949	A870	W782	F949	A870	V690	W782	V529	V529	P453	R373	L308	H226	E148
L1190	PHE	Q1038	L950	A870	W782	F949	A870	V690	W782	D611	V529	P453	R373	L308	H226	E148
F1190	LYS	Q1038	L950	A870	W782	F949	A870	V690	W782	D611	V529	P453	R373	L308	H226	E148
K1191	ASN	F1039	L954	K875	E785	L954	K875	V690	E785	P612	P532	Y457	S376	L309	K227	S151
H1194	ILE	F1040	E955	E879	F786	E955	E879	V690	F786	L533	P532	Y457	S376	L309	K227	S151
R1197	THR	V1041	N956	E879	F786	E955	E879	V690	F786	L533	P532	Y457	S376	L309	K227	S151
L1200	ASP	D1046	F958	K888	K791	F958	K888	V690	K791	L617	P532	Y457	S376	L309	K227	S151
D1201	GLN	P1047	L960	R889	W792	L960	R889	V690	W792	L618	P532	Y457	S376	L309	K227	S151
C1202	A1128	S1048	K960	A891	F793	K960	A891	V690	F793	L618	P532	Y457	S376	L309	K227	S151
N1203	F1132	G1049	V961	E795	D794	V961	E795	V690	D794	L618	P532	Y457	S376	L309	K227	S151
V1204	L1205	L1050	L962	R894	L796	L962	R894	V690	L796	L618	P532	Y457	S376	L309	K227	S151
K1205	N1135	L1051	K963	R895	T797	K963	R895	V690	T797	L618	P532	Y457	S376	L309	K227	S151
P1206	L1136	L1205	F964	R896	S798	F964	R896	V690	S798	L618	P532	Y457	S376	L309	K227	S151
V1207	L1137	P1057	L965	R897	L799	L965	R897	V690	L799	L618	P532	Y457	S376	L309	K227	S151
D1208	D1138	L1058	S966	T898	F713	S966	T898	V690	F713	L618	P532	Y457	S376	L309	K227	S151
E1209	S1139	P1059	K968	E900	K801	K968	E900	V690	K801	L618	P532	Y457	S376	L309	K227	S151
E1210	K1140	I1060	F968	E900	L708	F968	E900	V690	L708	L618	P532	Y457	S376	L309	K227	S151
E1211	E1141	R371	K971	I902	L807	K971	I902	V690	L807	L618	P532	Y457	S376	L309	K227	S151
V1212	K1142	R1063	D972	S903	K808	D972	S903	V690	K808	L618	P532	Y457	S376	L309	K227	S151
I1213	M1143	L1064	D973	H904	K809	D973	H904	V690	K809	L618	P532	Y457	S376	L309	K227	S151
L1214	D1144	T1065	P974	S905	L810	P974	S905	V690	L810	L618	P532	Y457	S376	L309	K227	S151
M1215	P1145	T1065	L975	Y906	Q811	L975	Y906	V690	Q811	L618	P532	Y457	S376	L309	K227	S151
K1216	T1146	K1069	L975	Y906	Q811	L975	Y906	V690	Q811	L618	P532	Y457	S376	L309	K227	S151
I1219	Y1147	V1072	E983	Y909	E812	E983	Y909	V690	E812	L618	P532	Y457	S376	L309	K227	S151
F1220	K1148	L1072	ASP	Y909	E813	ASP	Y909	V690	E813	L618	P532	Y457	S376	L309	K227	S151
H1221	L1149	L1075	ILE	R914	L814	ILE	R914	V690	L814	L618	P532	Y457	S376	L309	K227	S151
E1222	K1151	L1075	ILE	R914	L814	ILE	R914	V690	L814	L618	P532	Y457	S376	L309	K227	S151
I1223	K1151	L1075	ILE	R914	L814	ILE	R914	V690	L814	L618	P532	Y457	S376	L309	K227	S151
F1226	K1156	L1080	ASP	F916	F824	ASP	F916	V690	F824	L618	P532	Y457	S376	L309	K227	S151
G1227	Y1157	M1081	THR	R917	F825	THR	R917	V690	F825	L618	P532	Y457	S376	L309	K227	S151
N1228	K1158	Q1082	PHE	R918	F825	PHE	R918	V690	F825	L618	P532	Y457	S376	L309	K227	S151
D1229	N1159	Q1083	GLU	R919	R827	GLU	R919	V690	R827	L618	P532	Y457	S376	L309	K227	S151
M1230	S1160	T1084	THR	L920	N834	T1084	L920	V690	N834	L618	P532	Y457	S376	L309	K227	S151
L1161	L1161	N1085	SER	D921	L836	SER	D921	V690	L836	L618	P532	Y457	S376	L309	K227	S151
V1231	L1162	N1086	ILE	T922	L836	ILE	T922	V690	L836	L618	P532	Y457	S376	L309	K227	S151
I1232	L1163	L1087	GLY	H923	L837	GLY	H923	V690	L837	L618	P532	Y457	S376	L309	K227	S151
N1233	S1164	L1088	ALA	L926	L837	ALA	L926	V690	L837	L618	P532	Y457	S376	L309	K227	S151
F1234	S1165	F1089	GLY	L926	L840	GLY	L926	V690	L840	L618	P532	Y457	S376	L309	K227	S151
D1237	R1166	T1090	SER	T930	L840	SER	T930	V690	L840	L618	P532	Y457	S376	L309	K227	S151
Y287	R1166	D1095	LEU	T931	T844	LEU	T931	V690	T844	L618	P532	Y457	S376	L309	K227	S151

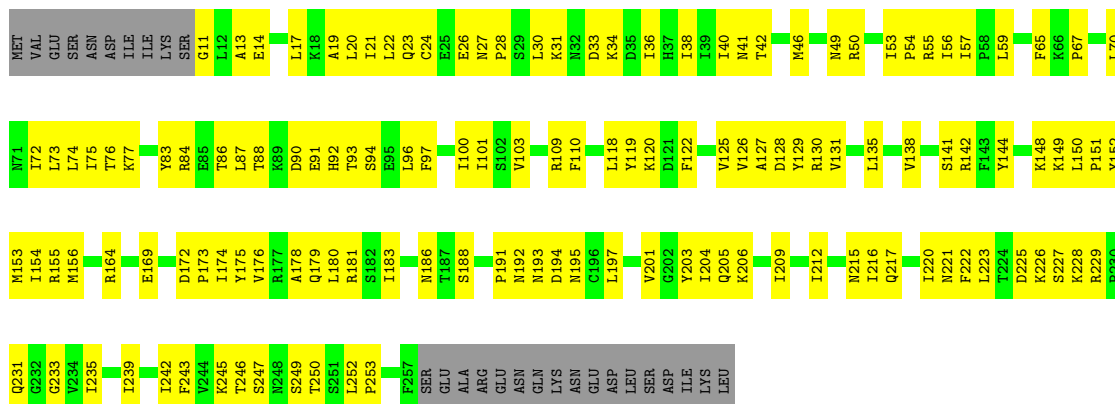
• Molecule 26: rRNA-processing protein FCF1

Chain UX:  56% 37% 8%



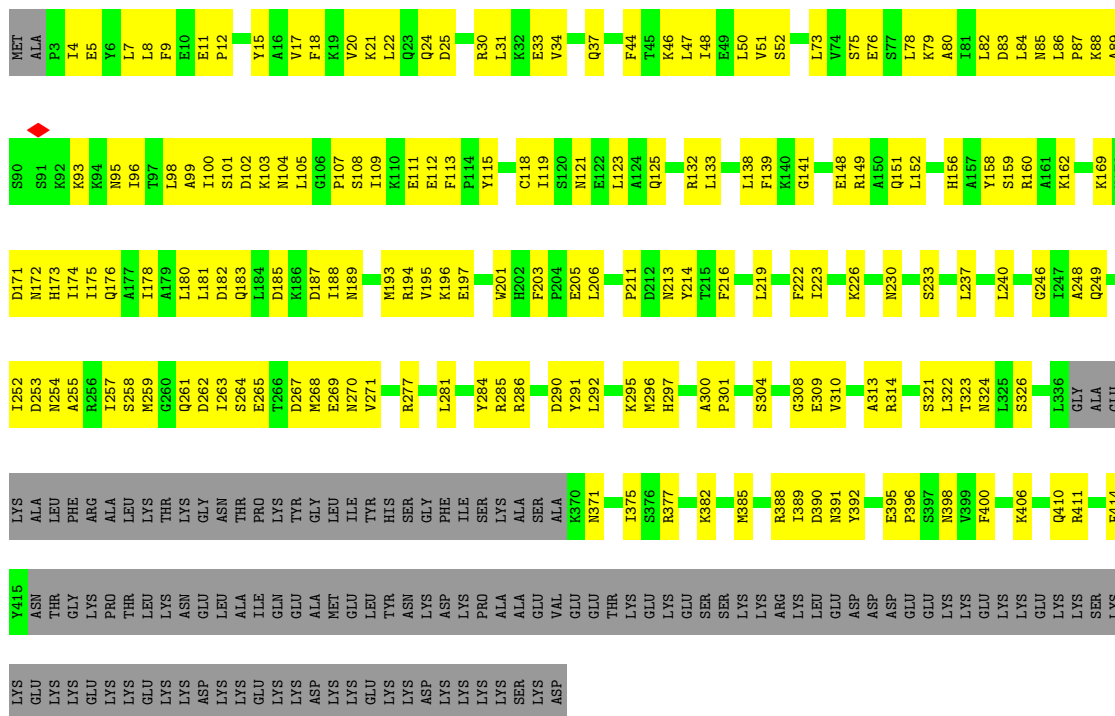
• Molecule 27: Ribosome biogenesis protein UTP30

Chain UZ: 41% 49% 10%

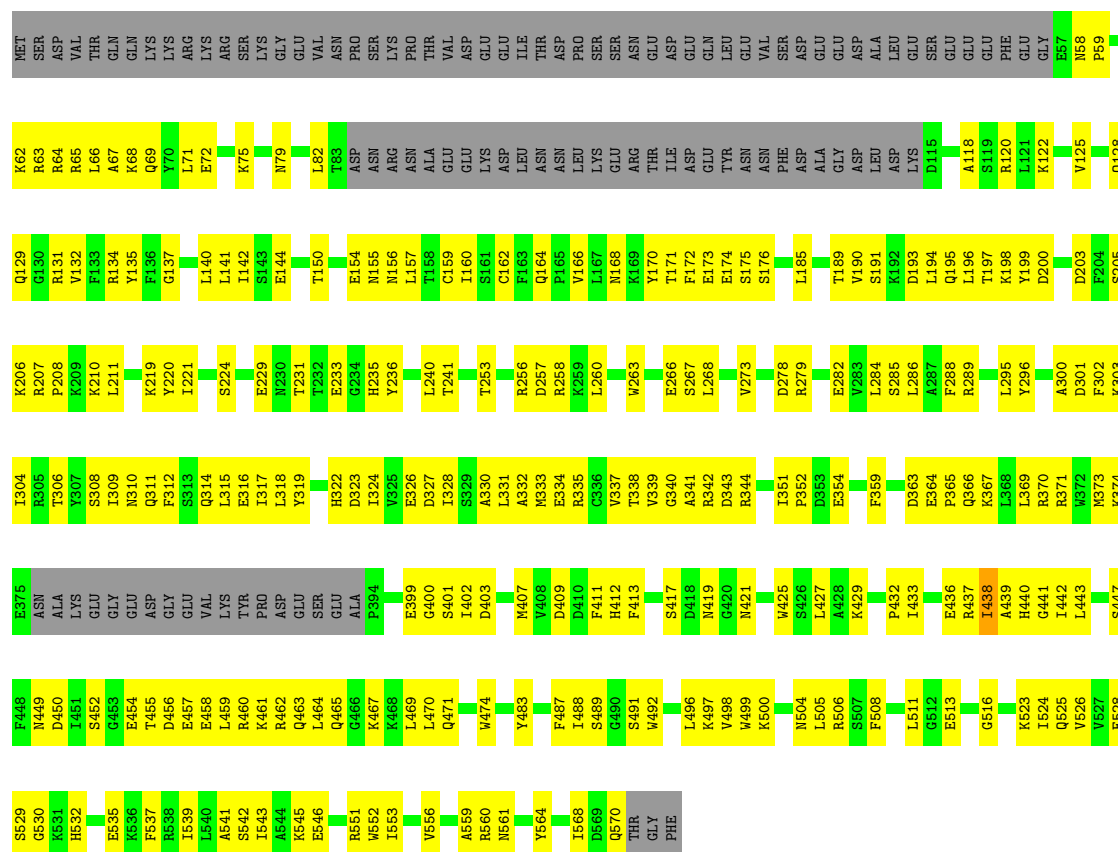


• Molecule 28: Nucleolar protein 56

Chain CD: 40% 35% 25%

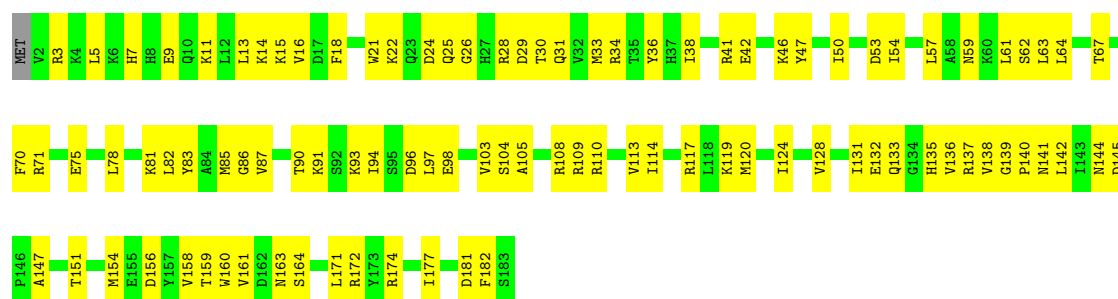






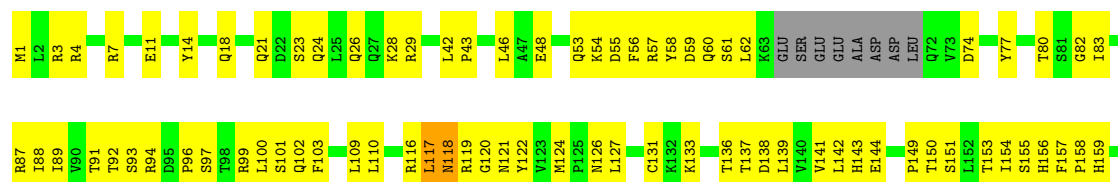
- Molecule 32: U3 small nucleolar ribonucleoprotein protein IMP3

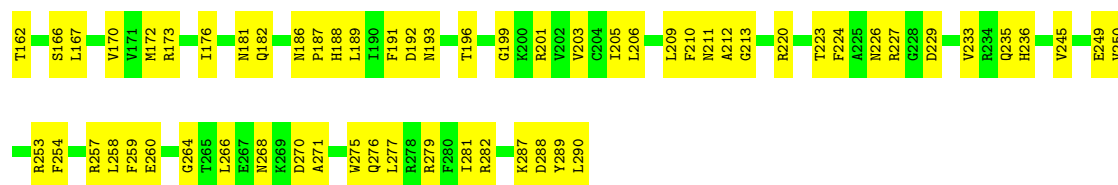
Chain CI: 47% 52%



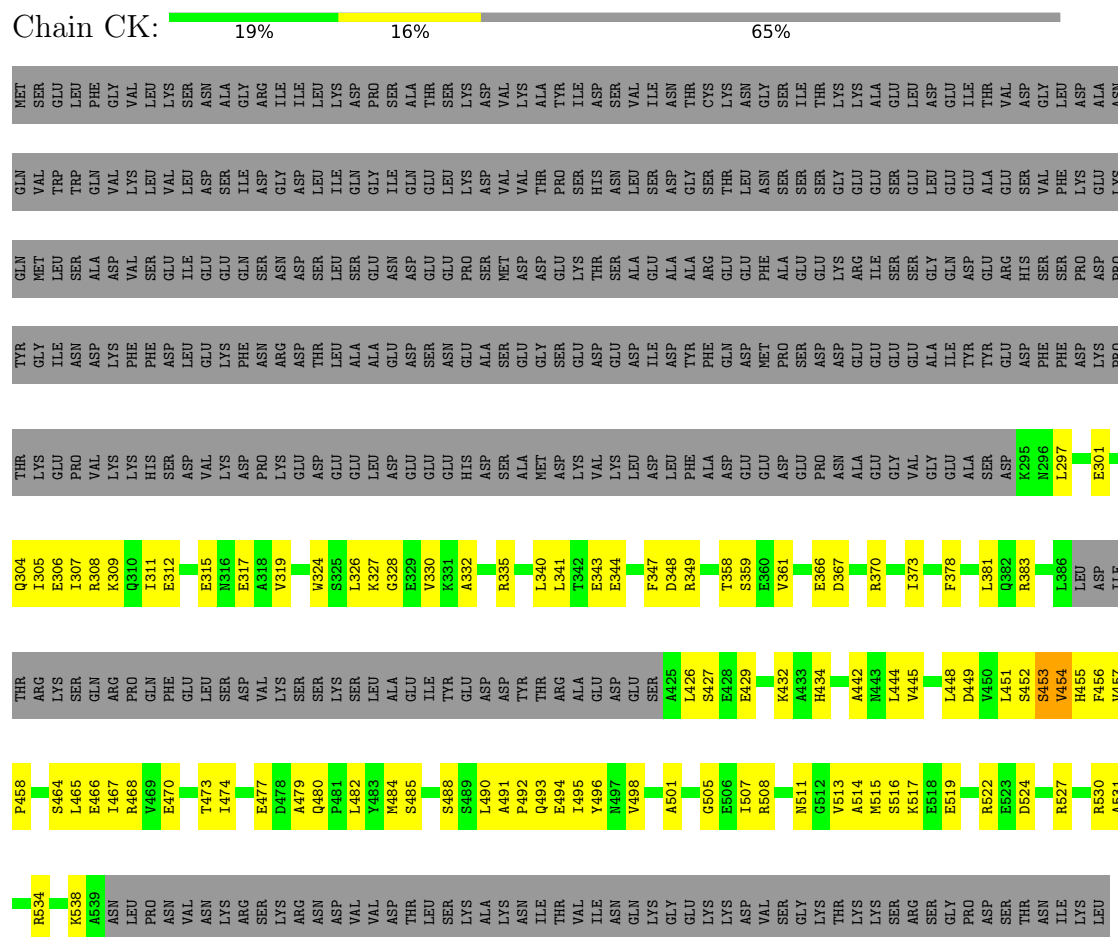
- Molecule 33: U3 small nucleolar ribonucleoprotein protein IMP4

Chain CJ: 50% 47%

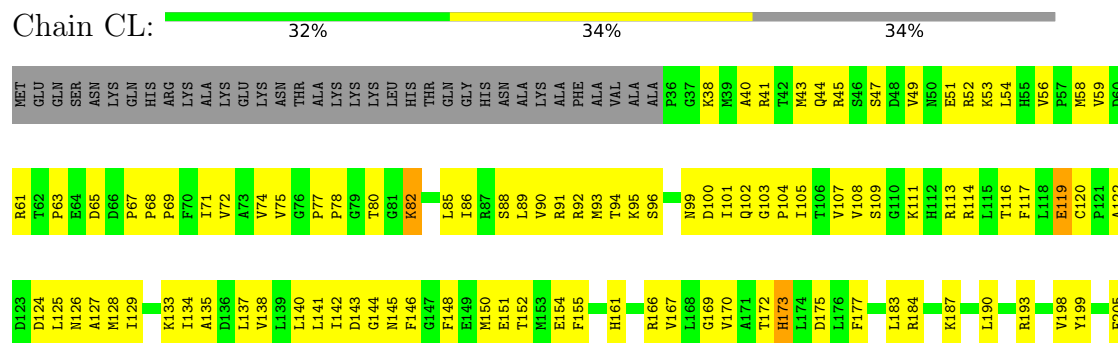




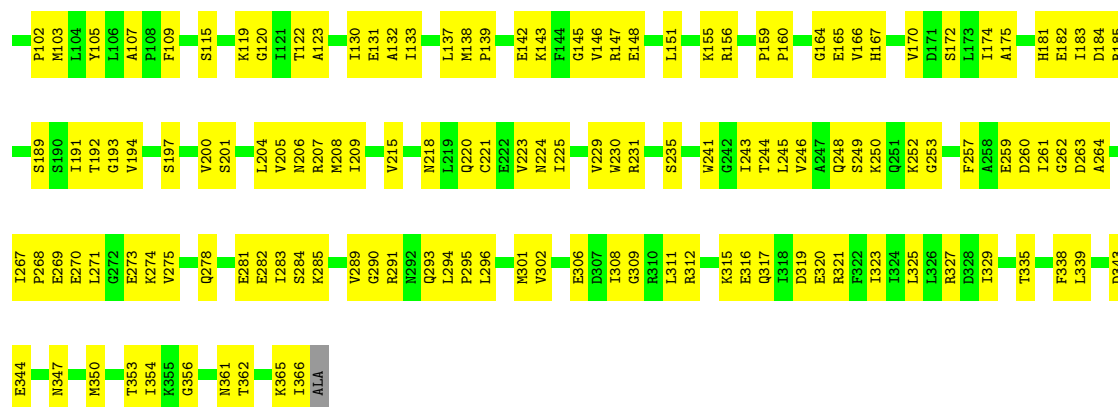
• Molecule 34: U3 small nucleolar RNA-associated protein MPP10



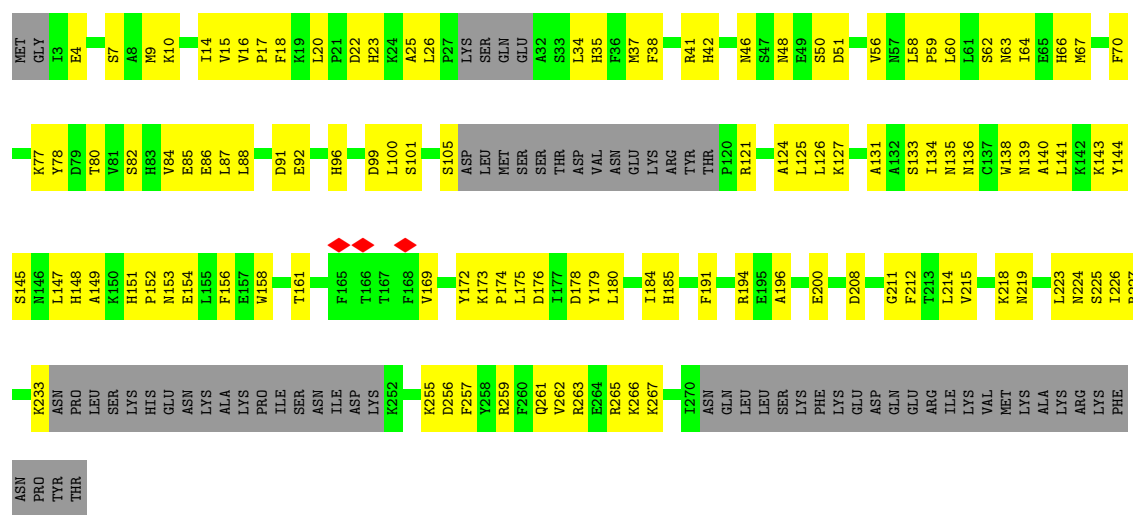
• Molecule 35: Ribosome biogenesis protein BMS1



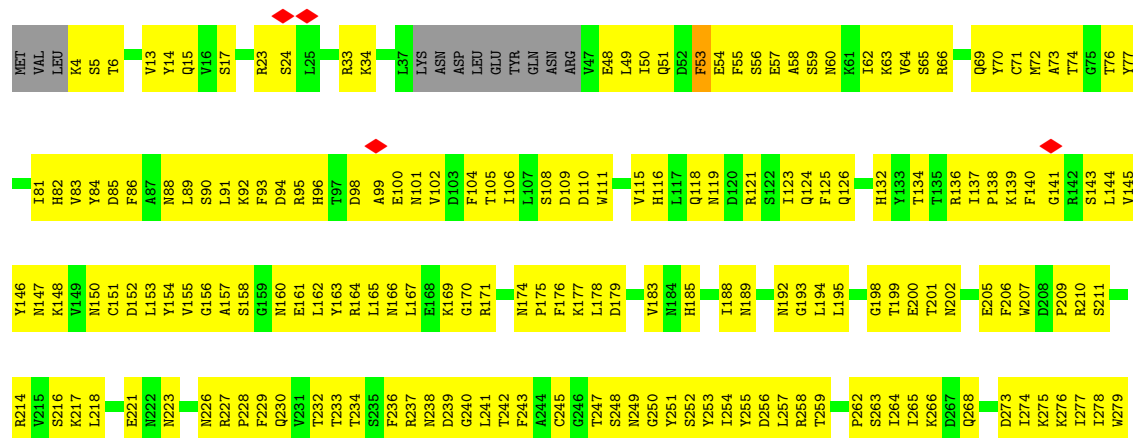




• Molecule 37: Ribosomal RNA-processing protein 7

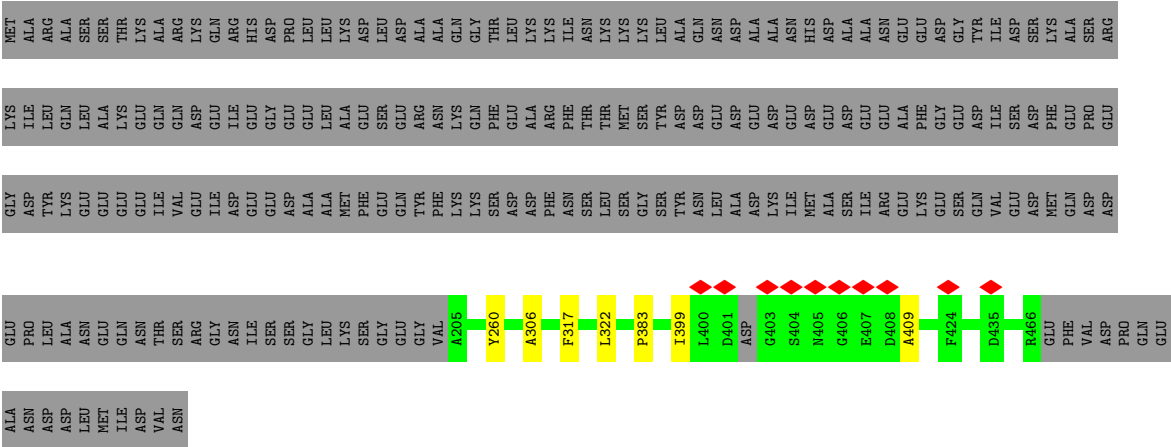


• Molecule 38: Ribosome biogenesis protein ENP2

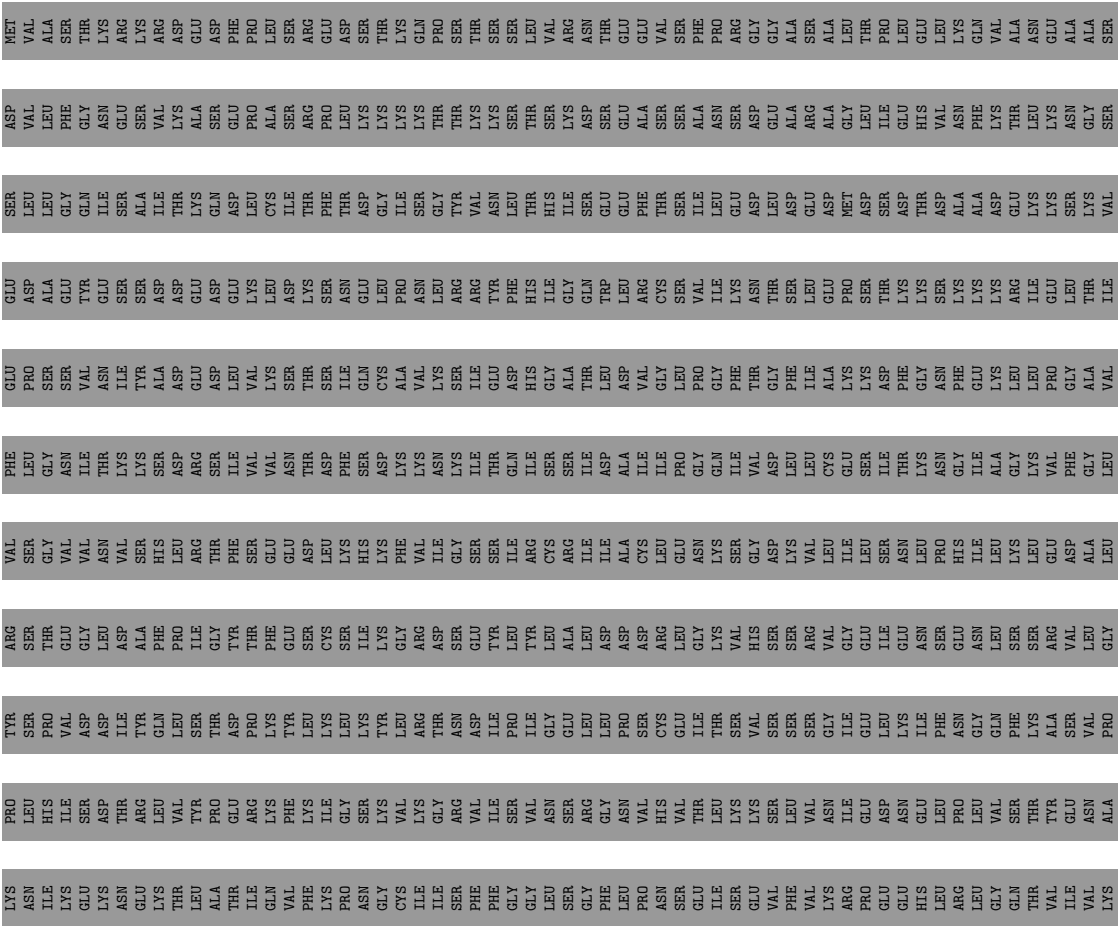




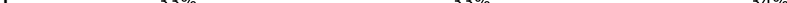
• Molecule 40: Essential nuclear protein 1



• Molecule 41: rRNA biogenesis protein RRP5



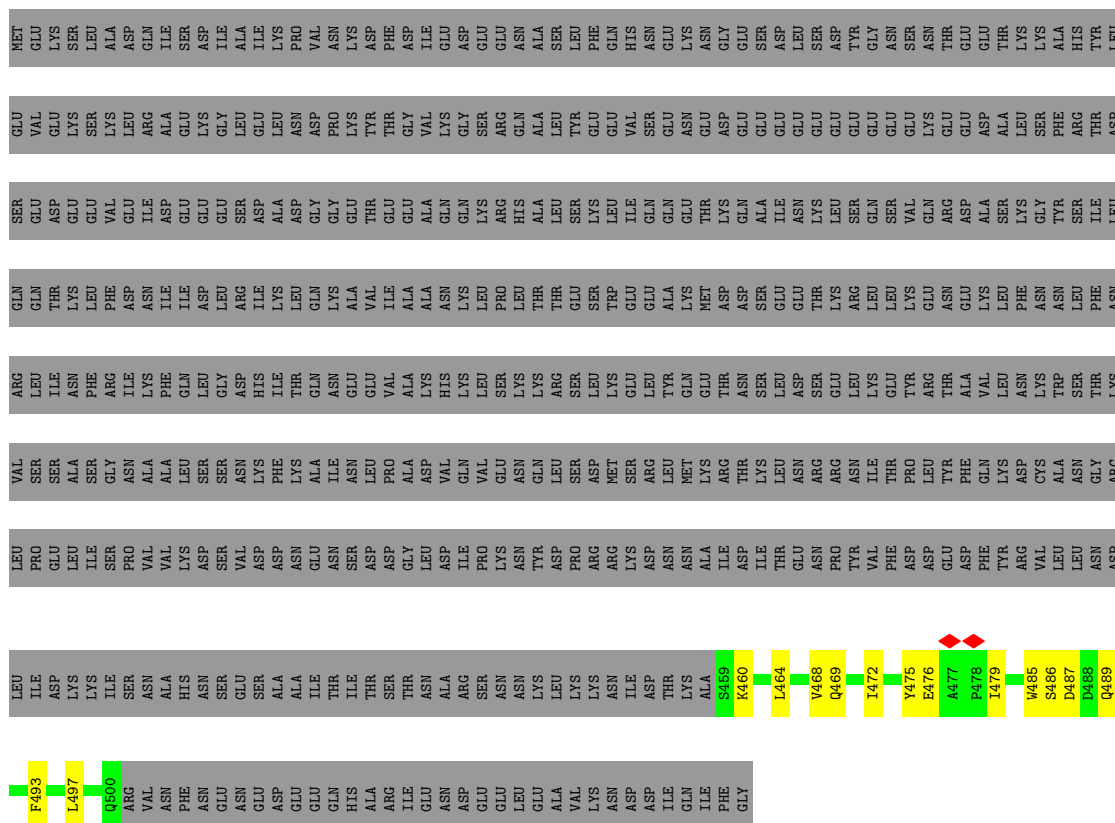
T1716	HIS
E1717	GLU
Y1718	SER
V1719	GLN
A1720	LYS
S1721	ALA
	ASP
	GLU

- Chain JJ:  33% 33% 34%

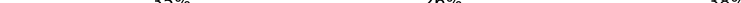
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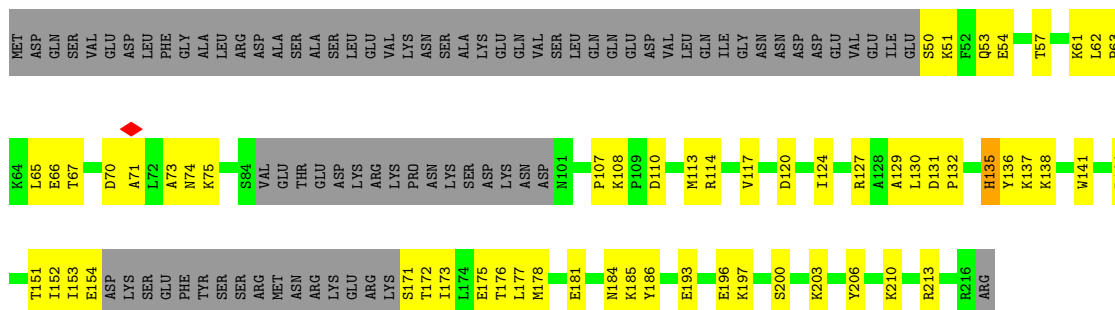
- Molecule 43: Protein BFR2

Chain JK: 5% . 92%



- Molecule 44: rRNA-processing protein FCF2

Chain JM: 



- Molecule 45: Protein FAF1

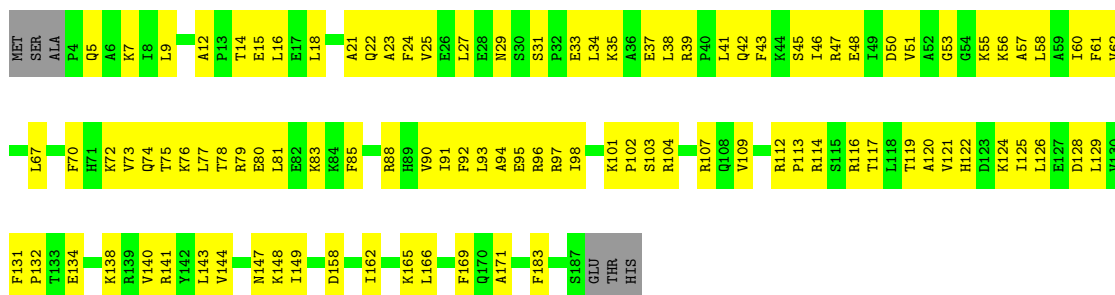




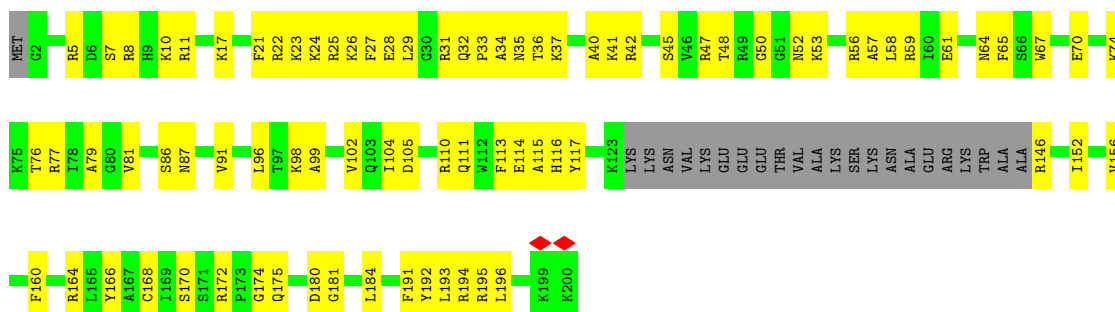
• Molecule 51: 40S ribosomal protein S6-A



• Molecule 52: 40S ribosomal protein S7-A

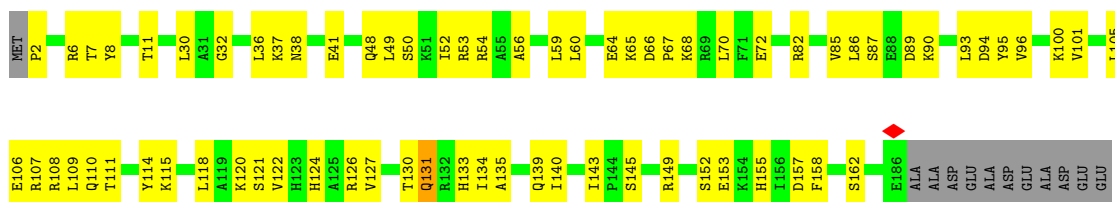


• Molecule 53: 40S ribosomal protein S8-A

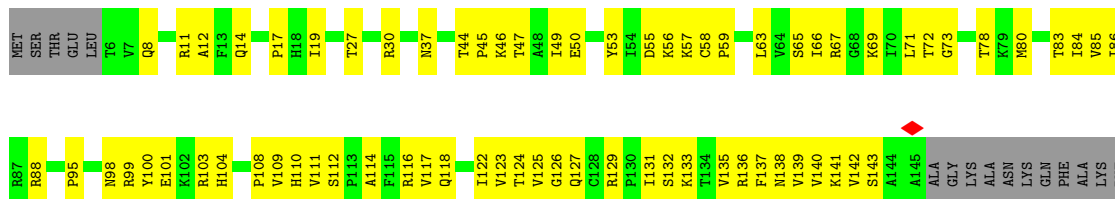


• Molecule 54: 40S ribosomal protein S9-A

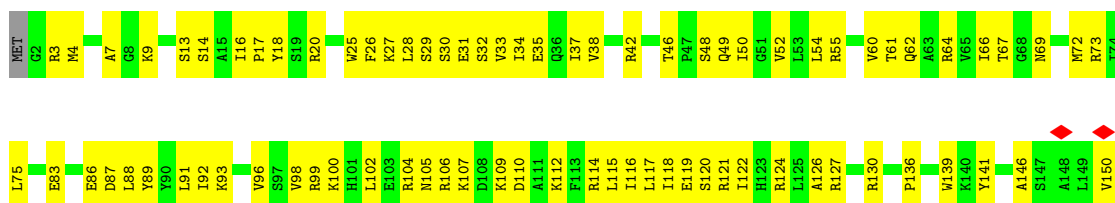




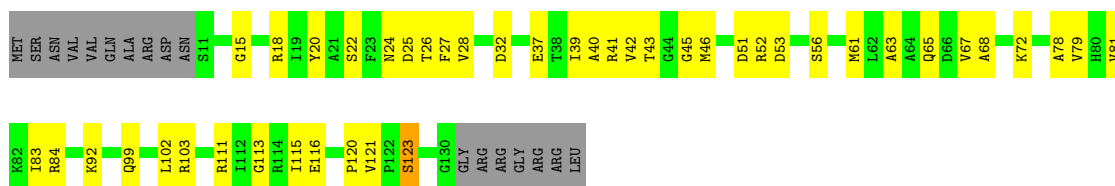
• Molecule 55: 40S ribosomal protein S11-A



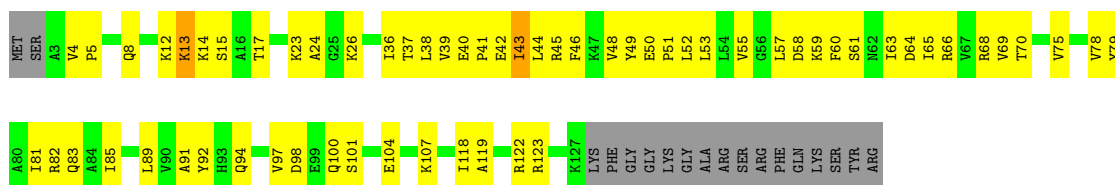
• Molecule 56: 40S ribosomal protein S13



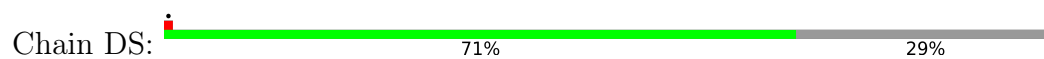
• Molecule 57: 40S ribosomal protein S14-A



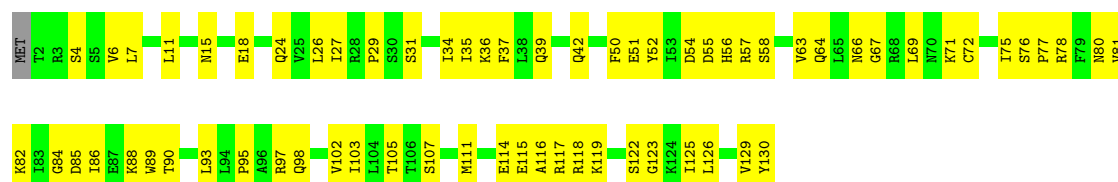
• Molecule 58: 40S ribosomal protein S16-A



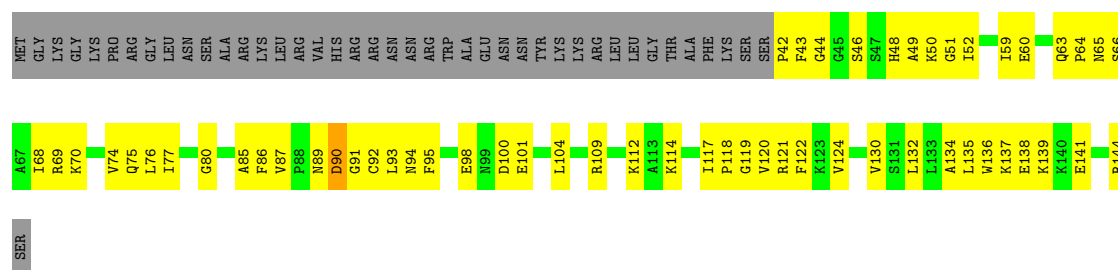
• Molecule 59: 40S ribosomal protein S18-A



- Molecule 60: 40S ribosomal protein S22-A



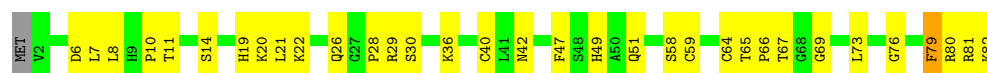
- Molecule 61: 40S ribosomal protein S23-A



- Molecule 62: 40S ribosomal protein S24-A



- Molecule 63: 40S ribosomal protein S27-A



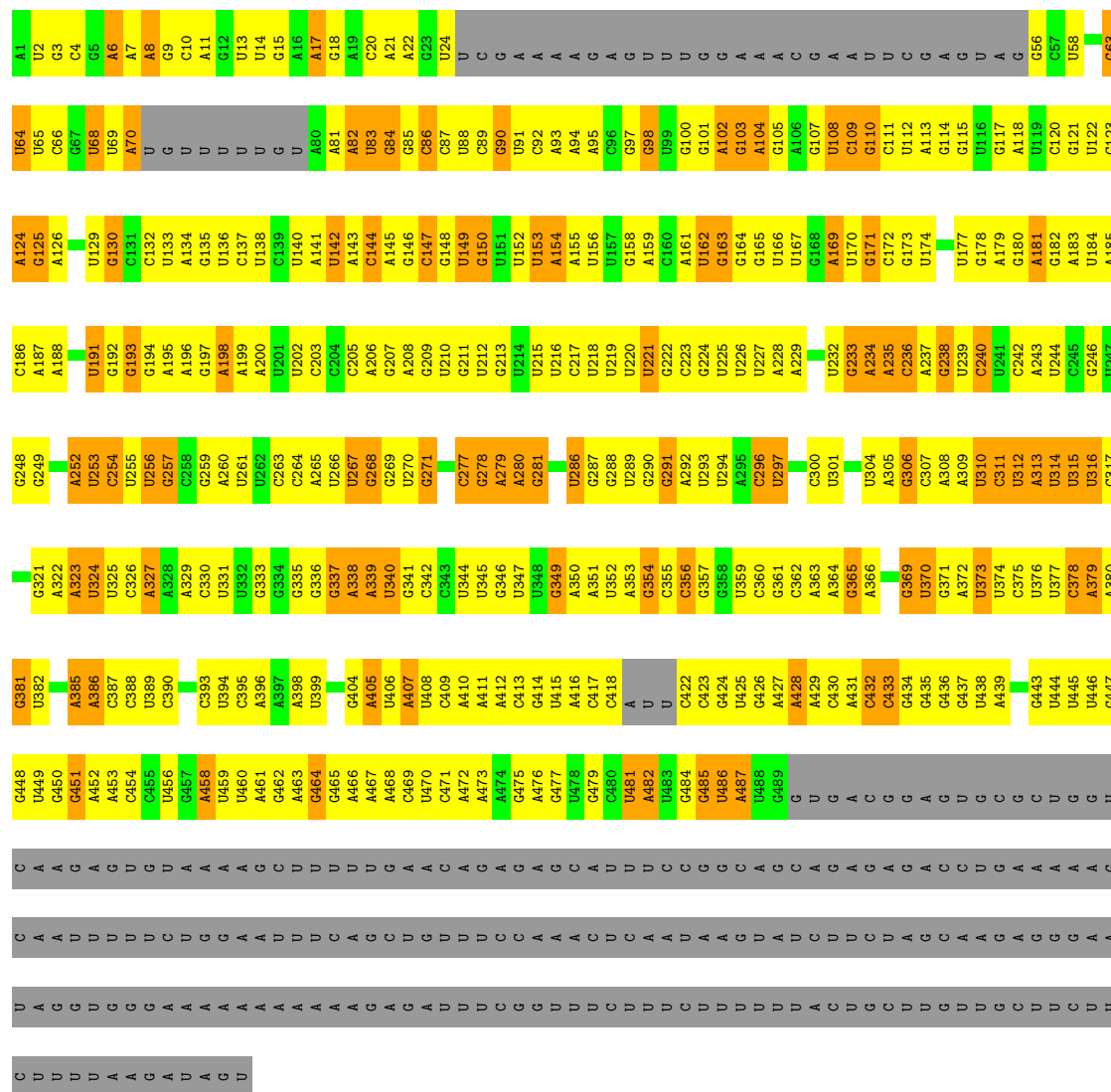
- Molecule 64: 40S ribosomal protein S28-A





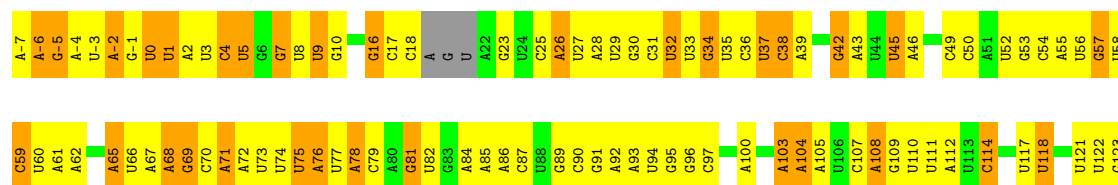
• Molecule 65: 5'ETS RNA

Chain D2: 12% 37% 14% 36%



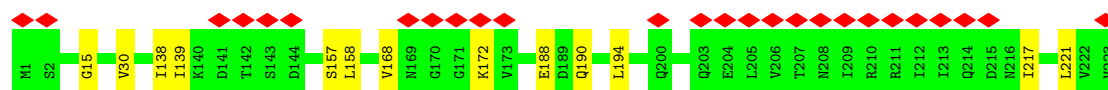
• Molecule 66: 18S rRNA

Chain D3: 13% 42% 19% 27%

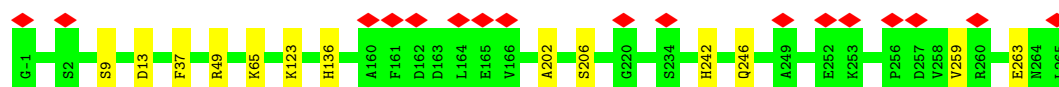




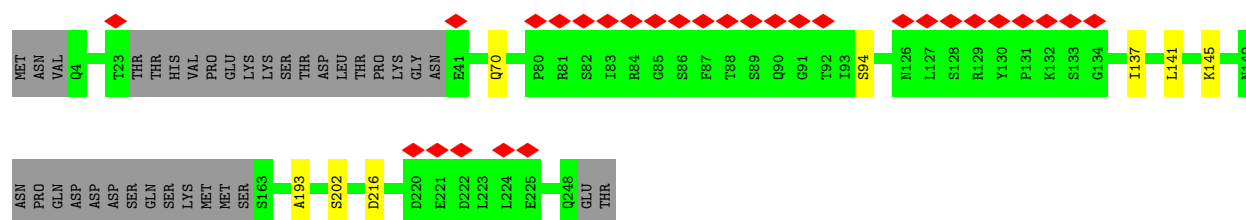
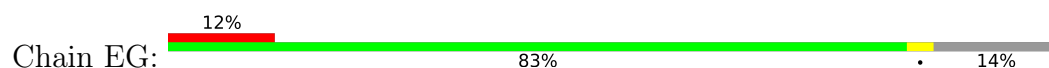
- Molecule 72: Exosome complex component RRP46



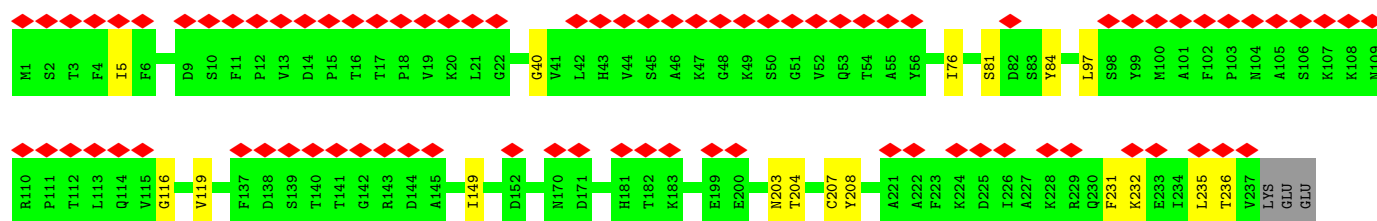
- Molecule 73: Exosome complex component RRP42



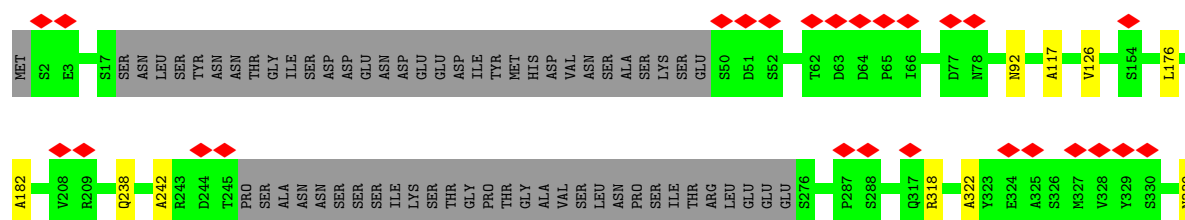
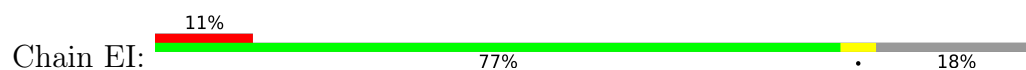
- Molecule 74: Exosome complex component MTR3



- Molecule 75: Exosome complex component RRP40

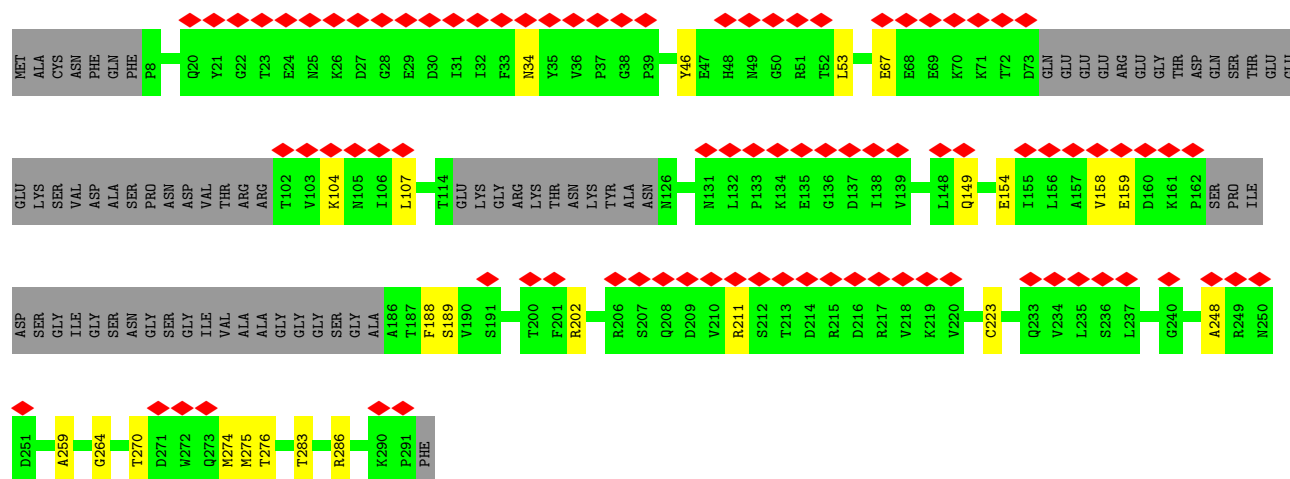


- Molecule 76: Exosome complex component RRP4

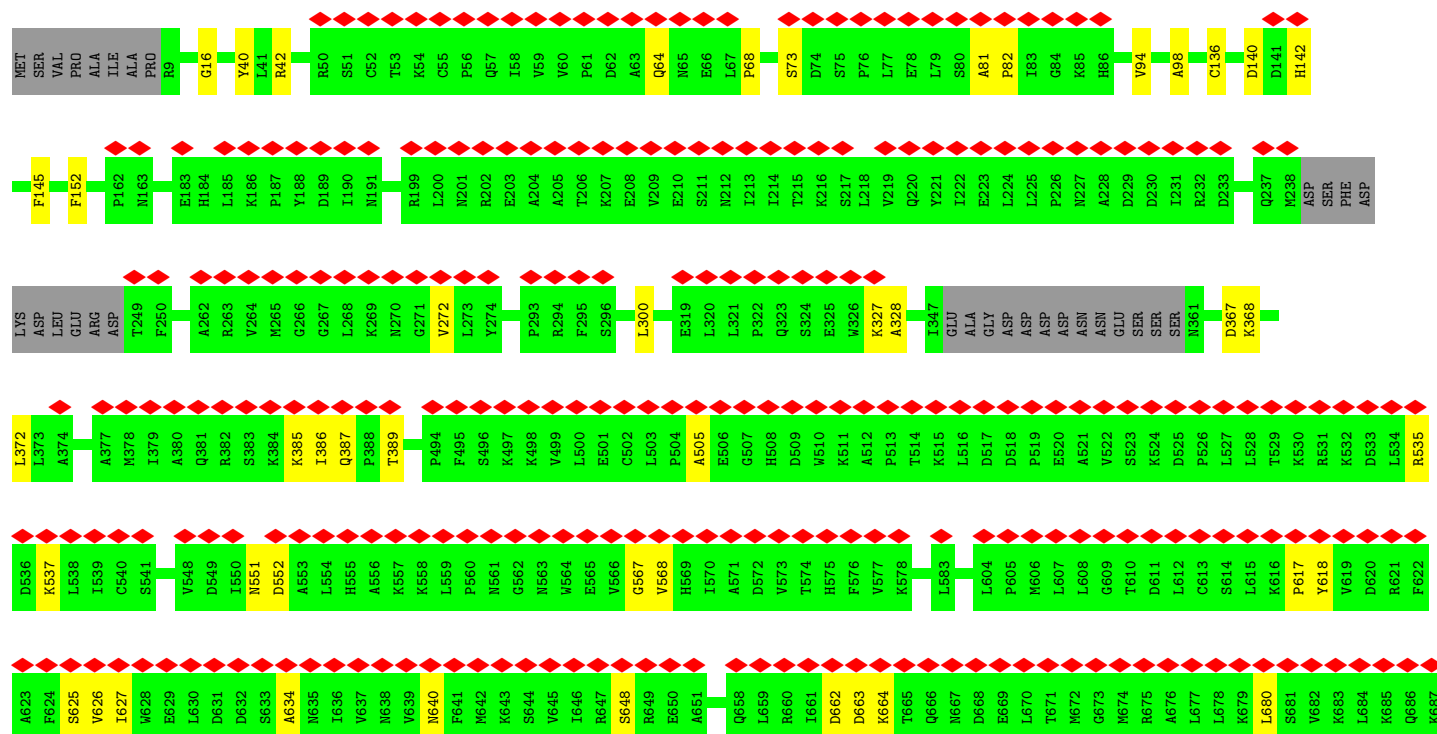
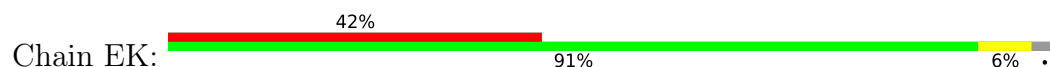


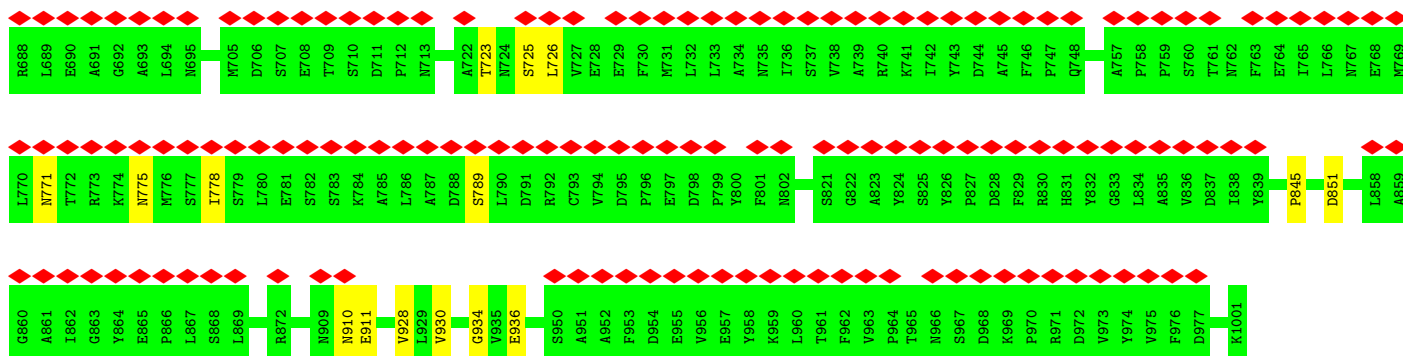


• Molecule 77: Exosome complex component CSL4

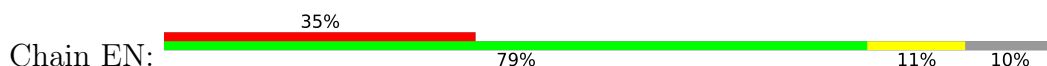


• Molecule 78: Exosome complex exonuclease DIS3





• Molecule 79: ATP-dependent RNA helicase DOB1



MET	ASP	SER	THR	ASP	LEU	PHE	ASP	VAL	PHE	GLU	GLY	THR	PRO	VAL	GLU	LEU	PRO	THR	ASP	SER	ASN	GLY	GLN	GLY	LYS	ASN	ALA	ASP	THR	ASN	VAL	GLY	ASP	THR	PRO	THR	HIS	THR	GLN	ASP	LYS	LYS	HIS	GLY	LEU	GLU	GLU	GLU	ASN	ASN	SER	GLU	ASN	LYS
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LYS	ILE	LYS	SER	ASN	ASN	LYS	SER	LYS	THR	GLY	ASP	LYS	ASN	LYS	VAL	VAL	VAL	PRO	M80	L81	A82	L83	G84	F85	E86	Q87	E88	A89	S90	R91	E92	V93	D94	A95	S96	K97	Q98	T100	L99	T101	S102	E103	T104	L105	Q106	V107	E108	Q109	D110	G111	K112	V113	R114	L115	S116	V119	R120
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V123	A124	L125	P126	P127	N128	Y129	D130	Y131	T132	P133	I134	A135	E136	H137	K138	R139	V140	N141	Y146	P147	F148	T149	L150	F153	A157	S205	Y209	R210	L213	A214	E215	G224	L242	L246	H315	P325	Y329	P332	D336	G337	E351	N352	F353	Q354
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K355	A356	M357	S361	ASN	GLN	ILE	GLY	ASP	ASP	PRO	ASN	SER	THR	ASP	SER	ARG	GLY	LYS	GLY	GLN	THR	TYR	LYS	GLY	GLY	SER	ALA	LYS	GLY	ASP	ALA	LYS	G392	Y395	V398	K399	M400	I401	W402	K403	K404	K405	C419	E420	E421	L422	A423	M426	S427	K428	L429	D430
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S433	K437	L440	M445	A449	L450	L451	P452	E453	T454	D455	R456	E457	L465	B469	T489	E493	E641	T504	G508	A513	S541	G545	R546	R547	G548	L549	G553	I554	V555	V567	M571	V572	K573	G574	Q575	A576	F612	Q613	M614	V615	I616	S617
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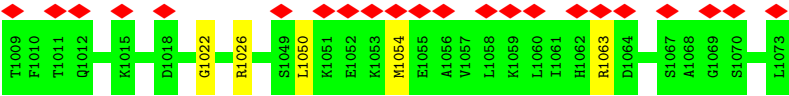
V618	P619	V620	M621	E622	K623	K624	L625	A626	E627	L628	K629	K630	D631	F632	D633	G634	I635	E636	V637	E638	D639	E640	E641	N642	V643	K644	E645	Y646	H647	E648	I649	E650	Q651	A652	I653	K654	G655	Y656	D659	V660	V663	V664	T665	H666	A668	N669	A670	S671	S672	F673	L674	Q675	P676	G677	L678	L679
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I682	S683	V684	N685	G686	K687	D688	N689	Y690	G691	G692	G693	A694	V695	V696	D697	F698	A699	K700	R701	I702	N703	T704	R705	N706	P707	S708	A709	V710	Y711	T712	D713	H714	E715	S716	Y717	I718	V719	N720	V721	T722	V723	N724	T725	M726	Y727	I728	A670	S671	S672	F673	L674	Q675	P676	G677	L678	L679
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T741	L742	P743	E744	G745	L746	R747	P748	A749	E750	E751	G752	E753	K754	S755	I756	C757	A758	V759	I760	P761	I762	T763	L764	D765	S766	I770	G771	N772	L773	R774	L775	Y776	M777	P778	K779	D780	I781	R782	A783	S784	G785	Q786	K787	E788	T789	V790	G791	K792	S793	L794	R795	E796	Y797	N798	R799	F800	F801	P802
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D803	G804	I805	P806	V807	L808	D809	P810	V811	K812	N813	M814	K815	L816	E817	D818	E819	D820	F821	L822	K823	L824	M825	K826	K827	L828	D829	V830	L831	N832	T833	K834	L835	S836	S837	N838	P839	L840	T841	N842	S843	M844	R845	L846	E847	E848	L849	Y850	G851	K852	Y853	S854	R855	K856	H857	D858	L859	H860	E861	D862
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M863	K864	Q865	L866	K867	R868	K869	I870	S871	E872	S873	Q874	A875	L889	G893	T896	P897	N898	S912	E921	N925	E930	L931	K932	P933	K950	P953	R954	L955	K956	P957	E958	L959	A960	E961	K964	A971	K975	D979	M998	Y1002	R1006	G1007	A1008
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4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	6024	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 ($e^-/\text{\AA}^2$)	44	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.259	Depositor
Minimum map value	-0.204	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.007	Depositor
Recommended contour level	0.01	Depositor
Map size ($\text{\AA}$)	571.86, 571.86, 571.86	wwPDB
Map dimensions	540, 540, 540	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	1.059, 1.059, 1.059	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

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

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	CA	0.59	0/1917	0.75	0/2588
1	CB	0.35	0/1815	0.68	2/2448 (0.1%)
2	DA	0.40	0/1937	0.66	0/2593
3	JA	0.19	0/6021	0.50	2/8176 (0.0%)
3	JB	0.14	0/4128	0.40	0/5747
4	UA	0.48	0/6780	0.72	4/9175 (0.0%)
5	UB	0.24	0/3787	0.52	0/5126
6	UC	0.48	0/1034	0.75	0/1365
7	UD	0.33	0/5461	0.62	0/7395
8	UE	0.32	0/3840	0.61	0/5208
9	UF	0.37	0/2538	0.61	0/3405
10	UG	0.57	0/4302	0.78	0/5805
11	UH	0.21	0/2716	0.56	0/3721
12	UI	0.24	0/875	0.59	0/1176
13	UJ	0.30	0/9111	0.54	1/12323 (0.0%)
14	UK	0.48	0/2047	0.78	2/2711 (0.1%)
15	UL	0.29	0/6857	0.58	0/9253
16	UM	0.27	0/6070	0.57	3/8216 (0.0%)
17	UN	0.48	0/1252	0.75	0/1688
18	UO	0.35	0/3993	0.63	1/5413 (0.0%)
19	UP	0.30	0/499	0.58	0/659
20	UQ	0.32	0/6794	0.59	1/9203 (0.0%)
21	UR	0.48	0/3883	0.70	2/5265 (0.0%)
22	US	0.28	0/3703	0.56	0/5053
23	UT	0.20	0/17584	0.50	2/23824 (0.0%)
24	UU	0.40	0/6815	0.62	2/9213 (0.0%)
25	UV	0.23	0/8945	0.47	0/12097
26	UX	0.61	0/1418	0.78	0/1906
27	UZ	0.31	0/2041	0.58	0/2745
28	CD	0.40	0/3041	0.61	0/4098
29	CE	0.35	0/3362	0.63	0/4533
30	CF	0.45	0/944	0.71	1/1284 (0.1%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
30	CG	0.50	0/941	0.85	3/1281 (0.2%)
31	CH	0.32	0/3798	0.61	0/5113
32	CI	0.71	0/1559	0.91	0/2097
33	CJ	0.54	0/2337	0.73	2/3148 (0.1%)
34	CK	0.40	0/1685	0.66	0/2261
35	CL	0.43	0/6471	0.71	4/8708 (0.0%)
36	CM	0.28	0/2832	0.52	0/3825
37	CN	0.20	0/1934	0.46	0/2604
38	JC	0.20	0/2908	0.53	0/3938
39	JF	0.24	0/1727	0.55	0/2329
39	JG	0.32	0/1828	0.64	0/2470
40	JH	0.12	0/1293	0.35	0/1801
41	JI	0.09	0/1313	0.32	0/1830
42	JJ	0.28	0/1469	0.57	0/1980
43	JK	0.21	0/342	0.47	0/462
44	JM	0.41	0/1156	0.67	0/1536
45	JN	0.51	0/1435	0.73	0/1907
46	JO	0.42	0/1910	0.65	0/2569
47	JP	0.61	0/3844	0.86	4/5174 (0.1%)
48	JQ	0.28	0/385	0.56	0/529
49	DE	0.28	0/1985	0.55	0/2675
50	DF	0.46	0/1690	0.67	0/2285
51	DG	0.19	0/1779	0.46	0/2379
52	DH	0.30	0/1506	0.56	0/2028
53	DI	0.19	0/1422	0.47	0/1899
54	DJ	0.51	0/1519	0.76	1/2035 (0.0%)
55	DL	0.19	0/1155	0.48	0/1557
56	DN	0.36	0/1215	0.65	0/1638
57	DO	0.38	0/892	0.61	0/1202
58	DQ	0.58	0/990	0.84	1/1335 (0.1%)
59	DS	0.19	0/513	0.44	0/711
60	DW	0.53	0/1038	0.76	0/1395
61	DX	0.47	0/798	0.79	0/1065
62	DY	0.35	0/1087	0.63	1/1449 (0.1%)
63	Db	0.43	0/620	0.66	0/838
64	Dc	0.41	0/499	0.75	0/670
65	D2	0.36	0/10633	0.37	0/16564
66	D3	0.32	0/31617	0.35	0/49213
67	D4	0.36	1/5432 (0.0%)	0.34	0/8439
68	EA	0.42	0/405	0.72	0/625
69	EB	0.60	1/1474 (0.1%)	0.79	0/2050
70	EC	0.60	0/1203	0.79	0/1673
71	ED	0.54	0/1569	0.82	0/2179

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
72	EE	0.56	0/1109	0.81	0/1545
73	EF	0.52	0/1328	0.80	0/1851
74	EG	0.56	0/1055	0.80	0/1462
75	EH	0.55	0/1169	0.86	2/1626 (0.1%)
76	EI	0.54	0/1437	0.84	0/1992
77	EJ	0.48	0/1087	0.84	0/1504
78	EK	0.66	0/4818	1.10	10/6720 (0.1%)
79	EN	0.49	0/4765	0.84	4/6636 (0.1%)
All	All	0.37	2/264486 (0.0%)	0.60	55/368214 (0.0%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
2	DA	0	1
3	JA	0	1
4	UA	0	1
6	UC	0	1
9	UF	0	1
11	UH	0	3
15	UL	0	2
16	UM	0	3
20	UQ	0	1
21	UR	0	1
23	UT	0	2
30	CG	0	1
31	CH	0	1
33	CJ	0	1
34	CK	0	1
38	JC	0	1
44	JM	0	1
47	JP	0	3
56	DN	0	1
57	DO	0	1
58	DQ	0	1
63	Db	0	1
70	EC	0	1
71	ED	0	3
72	EE	0	1
73	EF	0	1

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Mol	Chain	#Chirality outliers	#Planarity outliers
74	EG	0	2
76	EI	0	1
77	EJ	0	1
79	EN	0	3
All	All	0	43

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
69	EB	250	LYS	CA-CB	-7.14	1.43	1.53
67	D4	197	U	C1'-N1	5.73	1.57	1.48

The worst 5 of 55 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
78	EK	272	VAL	N-CA-C	9.36	120.17	110.62
23	UT	1991	ASN	CA-C-N	-8.37	109.97	121.61
23	UT	1991	ASN	C-N-CA	-8.37	109.97	121.61
58	DQ	43	ILE	N-CA-C	-7.83	104.90	113.43
62	DY	114	ARG	CB-CG-CD	7.77	129.17	111.30

There are no chirality outliers.

5 of 43 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	DA	104	ASP	Peptide
3	JA	739	ASN	Peptide
4	UA	289	LEU	Peptide
6	UC	580	ARG	Peptide
9	UF	45	SER	Peptide

5.2 Too-close contacts

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	CA	1881	0	1928	106	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	CB	1782	0	1826	157	0
2	DA	1912	0	2023	113	0
3	JA	5916	0	5463	328	0
3	JB	4132	0	1819	22	0
4	UA	6635	0	6525	342	0
5	UB	3734	0	3432	178	0
6	UC	1026	0	1080	63	0
7	UD	5361	0	5364	364	0
8	UE	3772	0	3806	211	0
9	UF	2487	0	2533	152	0
10	UG	4218	0	4223	246	0
11	UH	2701	0	1951	128	0
12	UI	860	0	922	83	0
13	UJ	8961	0	9273	538	0
14	UK	2021	0	2098	170	0
15	UL	6726	0	6764	407	0
16	UM	5969	0	6006	408	0
17	UN	1227	0	1223	69	0
18	UO	3911	0	3906	283	0
19	UP	495	0	561	52	0
20	UQ	6662	0	6588	419	0
21	UR	3799	0	3783	244	0
22	US	3622	0	3214	192	0
23	UT	17290	0	16616	943	0
24	UU	6678	0	6652	359	0
25	UV	8736	0	8850	471	0
26	UX	1395	0	1473	75	0
27	UZ	2006	0	2118	122	0
28	CD	2994	0	3018	168	0
29	CE	3325	0	3414	224	0
30	CF	931	0	983	48	0
30	CG	928	0	976	74	0
31	CH	3725	0	3746	224	0
32	CI	1530	0	1572	104	0
33	CJ	2296	0	2325	140	0
34	CK	1667	0	1701	105	0
35	CL	6332	0	6515	439	0
36	CM	2781	0	2878	146	0
37	CN	1893	0	1875	107	0
38	JC	2845	0	2761	239	0
39	JF	1701	0	1767	106	0
39	JG	1799	0	1872	110	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
40	JH	1295	0	570	4	0
41	JI	1314	0	610	0	0
42	JJ	1442	0	1513	74	0
43	JK	334	0	313	24	0
44	JM	1137	0	1188	57	0
45	JN	1428	0	1425	70	0
46	JO	1876	0	1968	86	0
47	JP	3765	0	3714	236	0
48	JQ	381	0	255	12	0
49	DE	1944	0	2030	126	0
50	DF	1669	0	1724	125	0
51	DG	1755	0	1846	122	0
52	DH	1481	0	1572	102	0
53	DI	1399	0	1431	96	0
54	DJ	1494	0	1573	69	0
55	DL	1129	0	1196	66	0
56	DN	1192	0	1255	88	0
57	DO	881	0	910	41	0
58	DQ	973	0	1029	71	0
59	DS	516	0	222	0	0
60	DW	1021	0	1060	75	0
61	DX	786	0	843	70	0
62	DY	1073	0	1132	66	0
63	Db	610	0	630	43	0
64	Dc	497	0	535	27	0
65	D2	9508	0	4781	408	0
66	D3	28287	0	14261	1187	0
67	D4	4869	0	2468	192	0
68	EA	366	0	184	1	0
69	EB	1475	0	658	13	0
70	EC	1204	0	530	9	0
71	ED	1571	0	699	12	0
72	EE	1107	0	499	6	0
73	EF	1326	0	580	6	0
74	EG	1058	0	478	3	0
75	EH	1170	0	528	8	0
76	EI	1440	0	648	7	0
77	EJ	1091	0	500	12	0
78	EK	4818	0	2108	34	0
79	EN	4767	0	2109	60	0
80	Db	1	0	0	0	0
80	EK	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
80	UX	1	0	0	0	0
81	CL	1	0	0	0	0
81	EK	1	0	0	0	0
81	UX	1	0	0	0	0
82	CL	32	0	12	2	0
All	All	256149	0	219010	11689	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 26.

The worst 5 of 11689 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)
24:UU:228:GLY:CA	24:UU:246:ILE:O	1.81	1.28
11:UH:341:LEU:HA	11:UH:358:VAL:O	1.15	1.27
4:UA:77:GLY:HA3	4:UA:95:PHE:O	1.33	1.24
24:UU:228:GLY:HA3	24:UU:246:ILE:O	1.04	1.18
16:UM:30:LYS:HA	16:UM:45:LEU:O	1.42	1.18

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	CA	238/327 (73%)	207 (87%)	31 (13%)	0	100	100
1	CB	224/327 (68%)	201 (90%)	23 (10%)	0	100	100
2	DA	236/255 (92%)	212 (90%)	24 (10%)	0	100	100
3	JA	802/1056 (76%)	734 (92%)	68 (8%)	0	100	100
3	JB	827/1056 (78%)	770 (93%)	57 (7%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
4	UA	830/923 (90%)	733 (88%)	97 (12%)	0	100	100
5	UB	495/810 (61%)	465 (94%)	30 (6%)	0	100	100
6	UC	124/610 (20%)	112 (90%)	12 (10%)	0	100	100
7	UD	663/776 (85%)	575 (87%)	88 (13%)	0	100	100
8	UE	465/643 (72%)	419 (90%)	46 (10%)	0	100	100
9	UF	283/440 (64%)	273 (96%)	10 (4%)	0	100	100
10	UG	529/554 (96%)	461 (87%)	68 (13%)	0	100	100
11	UH	426/713 (60%)	375 (88%)	46 (11%)	5 (1%)	11	44
12	UI	100/575 (17%)	98 (98%)	2 (2%)	0	100	100
13	UJ	1092/1769 (62%)	1031 (94%)	61 (6%)	0	100	100
14	UK	238/250 (95%)	214 (90%)	24 (10%)	0	100	100
15	UL	828/943 (88%)	733 (88%)	95 (12%)	0	100	100
16	UM	750/817 (92%)	662 (88%)	87 (12%)	1 (0%)	48	83
17	UN	143/899 (16%)	124 (87%)	19 (13%)	0	100	100
18	UO	489/513 (95%)	432 (88%)	57 (12%)	0	100	100
19	UP	58/214 (27%)	54 (93%)	4 (7%)	0	100	100
20	UQ	820/896 (92%)	735 (90%)	85 (10%)	0	100	100
21	UR	474/594 (80%)	424 (90%)	50 (10%)	0	100	100
22	US	488/552 (88%)	440 (90%)	48 (10%)	0	100	100
23	UT	2213/2493 (89%)	2072 (94%)	141 (6%)	0	100	100
24	UU	842/939 (90%)	755 (90%)	87 (10%)	0	100	100
25	UV	1069/1237 (86%)	1018 (95%)	51 (5%)	0	100	100
26	UX	170/189 (90%)	150 (88%)	20 (12%)	0	100	100
27	UZ	245/274 (89%)	225 (92%)	20 (8%)	0	100	100
28	CD	376/504 (75%)	344 (92%)	32 (8%)	0	100	100
29	CE	431/511 (84%)	393 (91%)	38 (9%)	0	100	100
30	CF	121/126 (96%)	109 (90%)	12 (10%)	0	100	100
30	CG	121/126 (96%)	112 (93%)	9 (7%)	0	100	100
31	CH	459/573 (80%)	401 (87%)	57 (12%)	1 (0%)	44	78
32	CI	180/183 (98%)	157 (87%)	23 (13%)	0	100	100
33	CJ	278/290 (96%)	242 (87%)	36 (13%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
34	CK	203/593 (34%)	184 (91%)	18 (9%)	1 (0%)	25	64
35	CL	771/1183 (65%)	716 (93%)	54 (7%)	1 (0%)	48	83
36	CM	358/367 (98%)	335 (94%)	23 (6%)	0	100	100
37	CN	224/297 (75%)	211 (94%)	13 (6%)	0	100	100
38	JC	350/707 (50%)	316 (90%)	34 (10%)	0	100	100
39	JF	212/252 (84%)	203 (96%)	9 (4%)	0	100	100
39	JG	226/252 (90%)	217 (96%)	9 (4%)	0	100	100
40	JH	257/483 (53%)	243 (95%)	14 (5%)	0	100	100
41	JI	263/1729 (15%)	257 (98%)	6 (2%)	0	100	100
42	JJ	180/274 (66%)	172 (96%)	8 (4%)	0	100	100
43	JK	40/534 (8%)	31 (78%)	9 (22%)	0	100	100
44	JM	129/217 (59%)	121 (94%)	8 (6%)	0	100	100
45	JN	178/346 (51%)	160 (90%)	18 (10%)	0	100	100
46	JO	226/316 (72%)	214 (95%)	12 (5%)	0	100	100
47	JP	457/489 (94%)	392 (86%)	65 (14%)	0	100	100
48	JQ	59/206 (29%)	53 (90%)	6 (10%)	0	100	100
49	DE	243/261 (93%)	218 (90%)	25 (10%)	0	100	100
50	DF	211/225 (94%)	189 (90%)	22 (10%)	0	100	100
51	DG	216/236 (92%)	203 (94%)	13 (6%)	0	100	100
52	DH	182/190 (96%)	165 (91%)	17 (9%)	0	100	100
53	DI	173/200 (86%)	160 (92%)	13 (8%)	0	100	100
54	DJ	183/197 (93%)	154 (84%)	29 (16%)	0	100	100
55	DL	138/156 (88%)	124 (90%)	14 (10%)	0	100	100
56	DN	148/151 (98%)	140 (95%)	8 (5%)	0	100	100
57	DO	118/137 (86%)	107 (91%)	11 (9%)	0	100	100
58	DQ	123/143 (86%)	109 (89%)	14 (11%)	0	100	100
59	DS	98/146 (67%)	91 (93%)	7 (7%)	0	100	100
60	DW	127/130 (98%)	110 (87%)	17 (13%)	0	100	100
61	DX	101/145 (70%)	79 (78%)	21 (21%)	1 (1%)	13	48
62	DY	132/135 (98%)	121 (92%)	11 (8%)	0	100	100
63	Db	79/82 (96%)	67 (85%)	12 (15%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
64	Dc	61/67 (91%)	53 (87%)	8 (13%)	0	100	100
69	EB	297/305 (97%)	274 (92%)	21 (7%)	2 (1%)	19	56
70	EC	242/246 (98%)	225 (93%)	17 (7%)	0	100	100
71	ED	308/394 (78%)	283 (92%)	24 (8%)	1 (0%)	37	72
72	EE	222/223 (100%)	209 (94%)	13 (6%)	0	100	100
73	EF	266/267 (100%)	252 (95%)	14 (5%)	0	100	100
74	EG	209/250 (84%)	192 (92%)	17 (8%)	0	100	100
75	EH	235/240 (98%)	216 (92%)	19 (8%)	0	100	100
76	EI	287/359 (80%)	263 (92%)	24 (8%)	0	100	100
77	EJ	214/292 (73%)	198 (92%)	16 (8%)	0	100	100
78	EK	965/1001 (96%)	939 (97%)	25 (3%)	1 (0%)	48	83
79	EN	960/1073 (90%)	890 (93%)	66 (7%)	4 (0%)	30	68
All	All	28798/39453 (73%)	26318 (91%)	2462 (8%)	18 (0%)	50	83

5 of 18 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
11	UH	258	PRO
31	CH	438	ILE
34	CK	454	VAL
79	EN	615	VAL
79	EN	617	SER

5.3.2 Protein sidechains ⓘ

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	CA	202/240 (84%)	202 (100%)	0	100	100
1	CB	192/240 (80%)	191 (100%)	1 (0%)	86	89
2	DA	212/224 (95%)	212 (100%)	0	100	100
3	JA	555/934 (59%)	555 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
4	UA	730/812 (90%)	730 (100%)	0	100	100
5	UB	344/732 (47%)	344 (100%)	0	100	100
6	UC	107/538 (20%)	107 (100%)	0	100	100
7	UD	615/713 (86%)	613 (100%)	2 (0%)	91	91
8	UE	428/574 (75%)	428 (100%)	0	100	100
9	UF	277/414 (67%)	277 (100%)	0	100	100
10	UG	462/480 (96%)	462 (100%)	0	100	100
11	UH	152/657 (23%)	152 (100%)	0	100	100
12	UI	99/533 (19%)	99 (100%)	0	100	100
13	UJ	1031/1633 (63%)	1031 (100%)	0	100	100
14	UK	226/234 (97%)	226 (100%)	0	100	100
15	UL	747/832 (90%)	747 (100%)	0	100	100
16	UM	668/719 (93%)	668 (100%)	0	100	100
17	UN	137/808 (17%)	137 (100%)	0	100	100
18	UO	437/454 (96%)	437 (100%)	0	100	100
19	UP	57/196 (29%)	57 (100%)	0	100	100
20	UQ	769/826 (93%)	768 (100%)	1 (0%)	92	94
21	UR	425/529 (80%)	425 (100%)	0	100	100
22	US	332/506 (66%)	332 (100%)	0	100	100
23	UT	1787/2307 (78%)	1787 (100%)	0	100	100
24	UU	743/819 (91%)	743 (100%)	0	100	100
25	UV	986/1125 (88%)	986 (100%)	0	100	100
26	UX	156/169 (92%)	156 (100%)	0	100	100
27	UZ	230/256 (90%)	230 (100%)	0	100	100
28	CD	326/435 (75%)	326 (100%)	0	100	100
29	CE	353/433 (82%)	353 (100%)	0	100	100
30	CF	102/104 (98%)	102 (100%)	0	100	100
30	CG	101/104 (97%)	101 (100%)	0	100	100
31	CH	406/503 (81%)	406 (100%)	0	100	100
32	CI	171/172 (99%)	171 (100%)	0	100	100
33	CJ	251/258 (97%)	250 (100%)	1 (0%)	89	90

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
34	CK	187/535 (35%)	187 (100%)	0	100	100
35	CL	690/1039 (66%)	684 (99%)	6 (1%)	75	83
36	CM	307/312 (98%)	307 (100%)	0	100	100
37	CN	212/274 (77%)	212 (100%)	0	100	100
38	JC	318/636 (50%)	318 (100%)	0	100	100
39	JF	195/222 (88%)	195 (100%)	0	100	100
39	JG	206/222 (93%)	206 (100%)	0	100	100
42	JJ	158/238 (66%)	158 (100%)	0	100	100
43	JK	35/482 (7%)	35 (100%)	0	100	100
44	JM	124/200 (62%)	124 (100%)	0	100	100
45	JN	141/304 (46%)	141 (100%)	0	100	100
46	JO	210/289 (73%)	210 (100%)	0	100	100
47	JP	416/443 (94%)	416 (100%)	0	100	100
48	JQ	22/192 (12%)	22 (100%)	0	100	100
49	DE	209/222 (94%)	209 (100%)	0	100	100
50	DF	180/191 (94%)	180 (100%)	0	100	100
51	DG	187/201 (93%)	187 (100%)	0	100	100
52	DH	165/170 (97%)	165 (100%)	0	100	100
53	DI	142/161 (88%)	142 (100%)	0	100	100
54	DJ	158/166 (95%)	158 (100%)	0	100	100
55	DL	125/137 (91%)	125 (100%)	0	100	100
56	DN	127/128 (99%)	127 (100%)	0	100	100
57	DO	91/105 (87%)	91 (100%)	0	100	100
58	DQ	105/119 (88%)	105 (100%)	0	100	100
60	DW	110/111 (99%)	110 (100%)	0	100	100
61	DX	85/120 (71%)	85 (100%)	0	100	100
62	DY	112/113 (99%)	112 (100%)	0	100	100
63	Db	70/71 (99%)	70 (100%)	0	100	100
64	Dc	56/60 (93%)	56 (100%)	0	100	100
All	All	19959/27976 (71%)	19948 (100%)	11 (0%)	92	94

5 of 11 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
35	CL	173	HIS
35	CL	175	ASP
35	CL	215	TYR
35	CL	208	SER
33	CJ	118	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 254 such sidechains are listed below:

Mol	Chain	Res	Type
20	UQ	606	HIS
44	JM	205	HIS
23	UT	1241	GLN
42	JJ	197	HIS
52	DH	5	GLN

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
65	D2	443/700 (63%)	140 (31%)	4 (0%)
66	D3	1303/1808 (72%)	498 (38%)	26 (1%)
67	D4	223/333 (66%)	72 (32%)	4 (1%)
68	EA	21/22 (95%)	15 (71%)	0
All	All	1990/2863 (69%)	725 (36%)	34 (1%)

5 of 725 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
65	D2	6	A
65	D2	8	A
65	D2	14	U
65	D2	15	G
65	D2	17	A

5 of 34 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
66	D3	1638	G
66	D3	1657	U
67	D4	157	A
66	D3	500	C
66	D3	417	A

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 7 ligands modelled in this entry, 6 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$
82	GTP	CL	2001	81	26,34,34	0.92	1 (3%)	32,54,54	1.49	5 (15%)

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
82	GTP	CL	2001	81	-	7/18/38/38	0/3/3/3

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
82	CL	2001	GTP	C6-N1	-2.49	1.34	1.37

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
82	CL	2001	GTP	PB-O3B-PG	-3.53	120.73	132.83
82	CL	2001	GTP	PA-O3A-PB	-3.32	121.42	132.83
82	CL	2001	GTP	C3'-C2'-C1'	3.21	105.81	100.98

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
82	CL	2001	GTP	C8-N7-C5	2.39	107.54	102.99
82	CL	2001	GTP	C5-C6-N1	2.32	118.05	113.95

There are no chirality outliers.

5 of 7 torsion outliers are listed below:

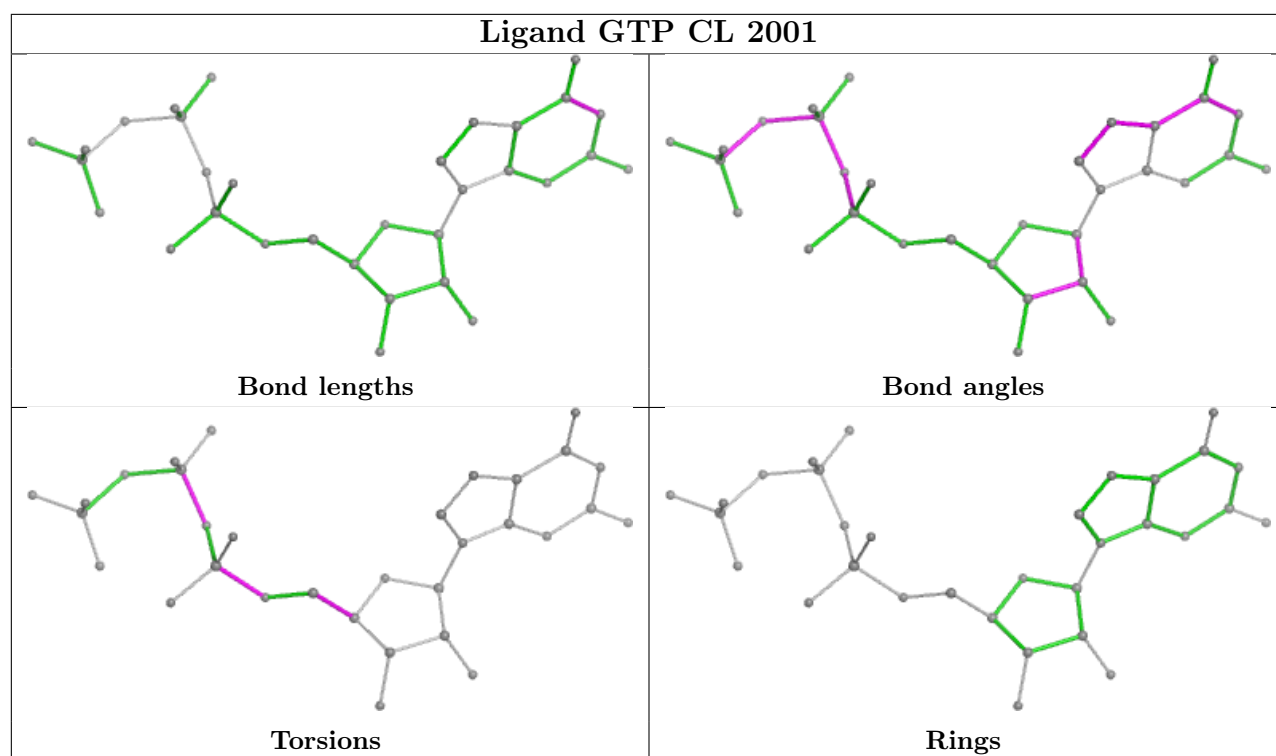
Mol	Chain	Res	Type	Atoms
82	CL	2001	GTP	C5'-O5'-PA-O1A
82	CL	2001	GTP	C3'-C4'-C5'-O5'
82	CL	2001	GTP	O4'-C4'-C5'-O5'
82	CL	2001	GTP	C5'-O5'-PA-O3A
82	CL	2001	GTP	C5'-O5'-PA-O2A

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
82	CL	2001	GTP	2	0

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

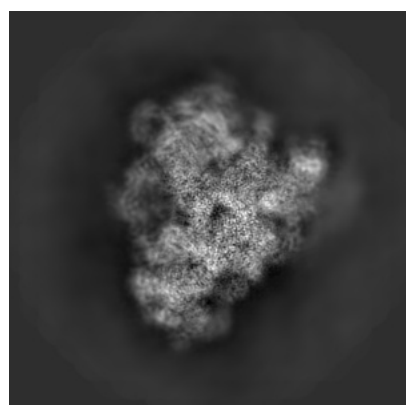
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-11807. These allow visual inspection of the internal detail of the map and identification of artifacts.

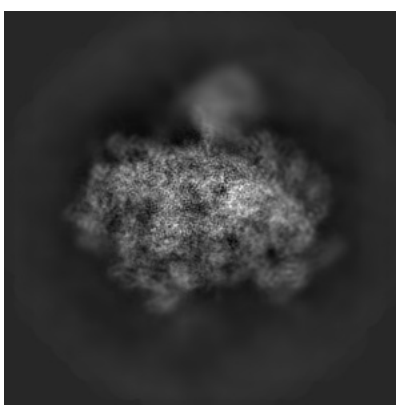
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

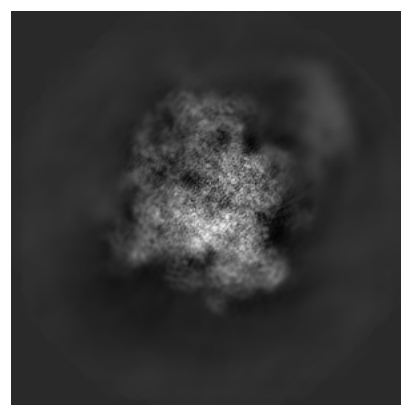
6.1.1 Primary map



X



Y

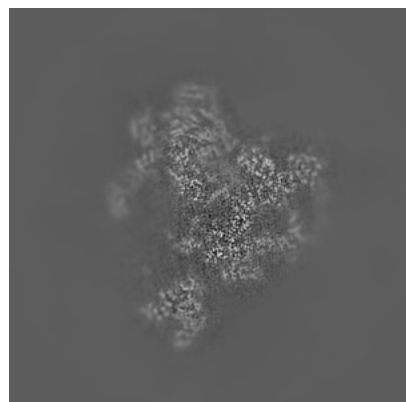


Z

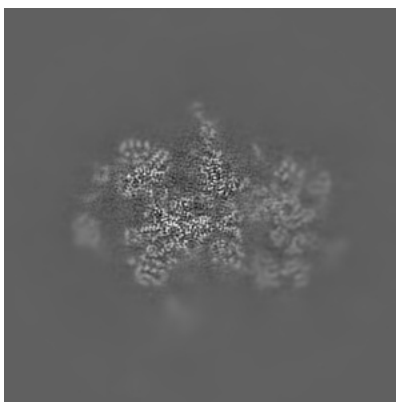
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

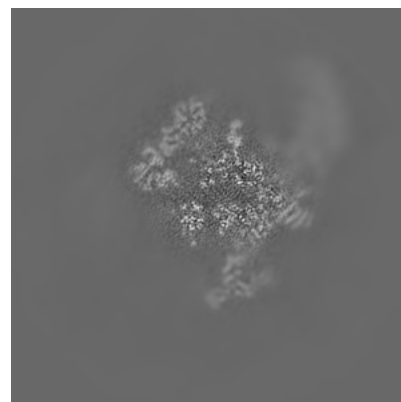
6.2.1 Primary map



X Index: 270



Y Index: 270

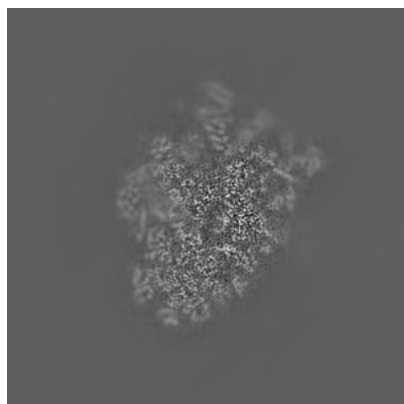


Z Index: 270

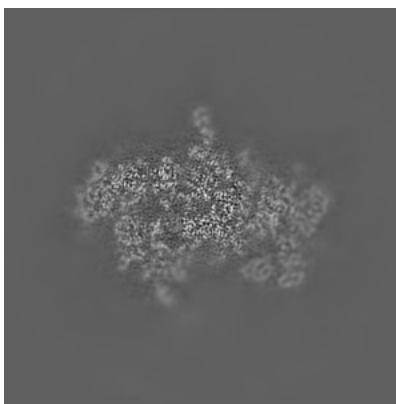
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

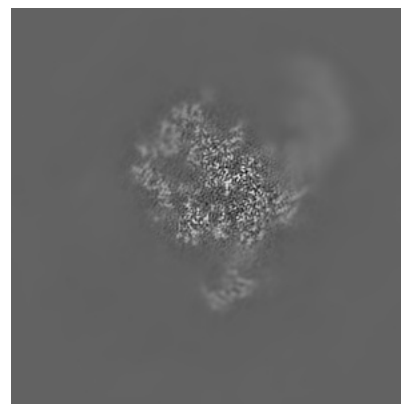
6.3.1 Primary map



X Index: 310



Y Index: 252

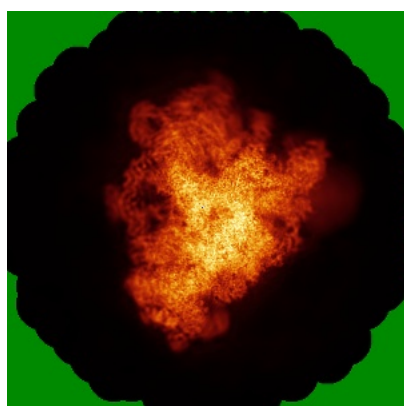


Z Index: 279

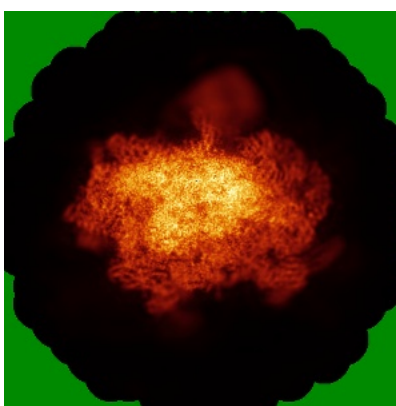
The images above show the largest variance slices of the map in three orthogonal directions.

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

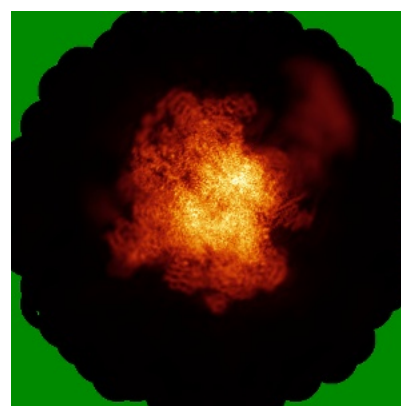
6.4.1 Primary map



X



Y

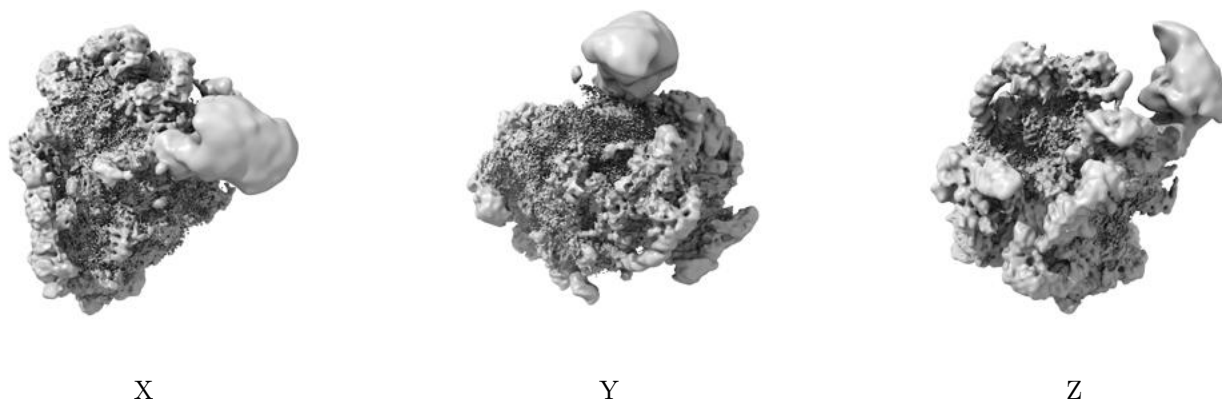


Z

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 0.01. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

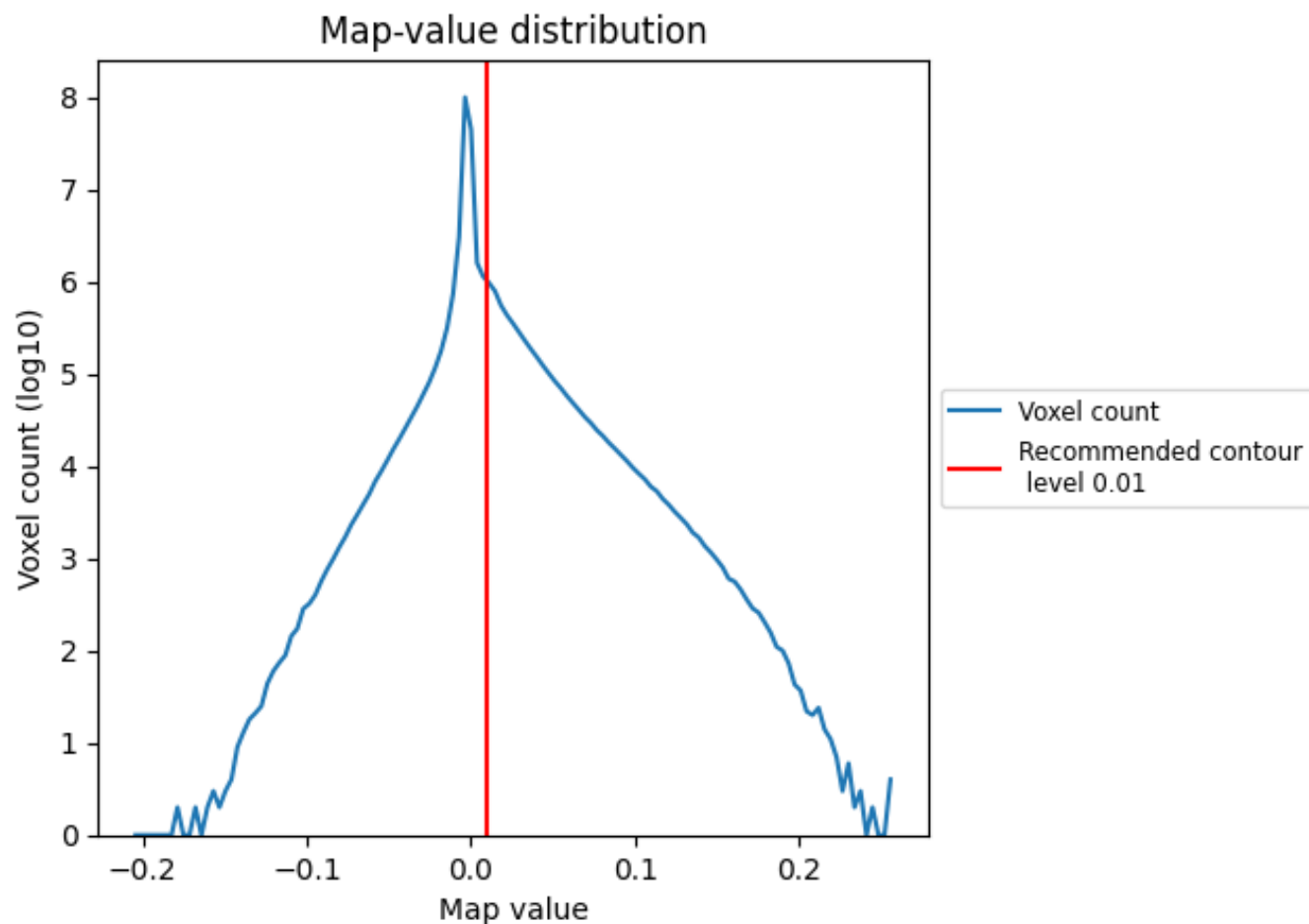
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

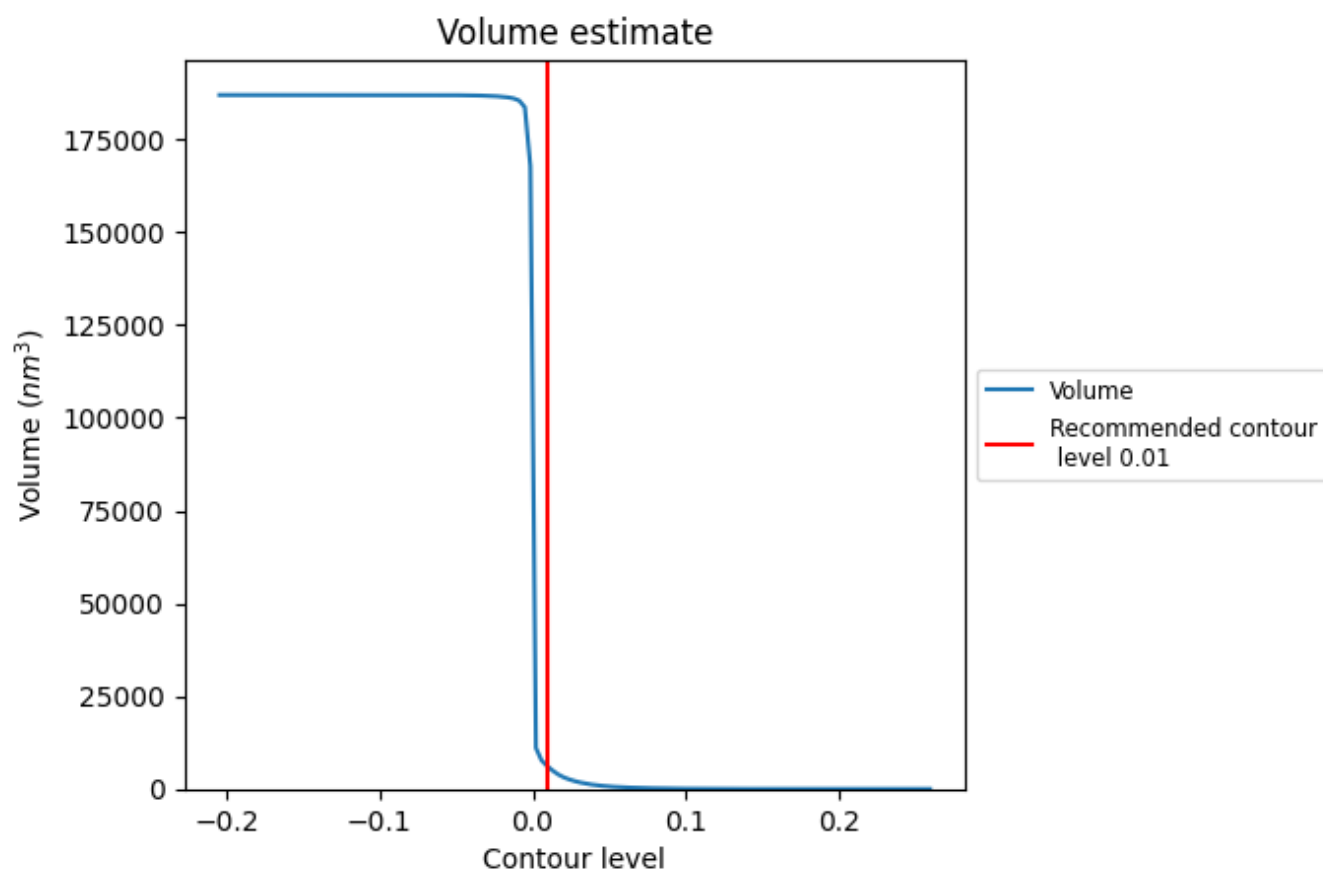
This section contains the results of statistical analysis of the map.

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.

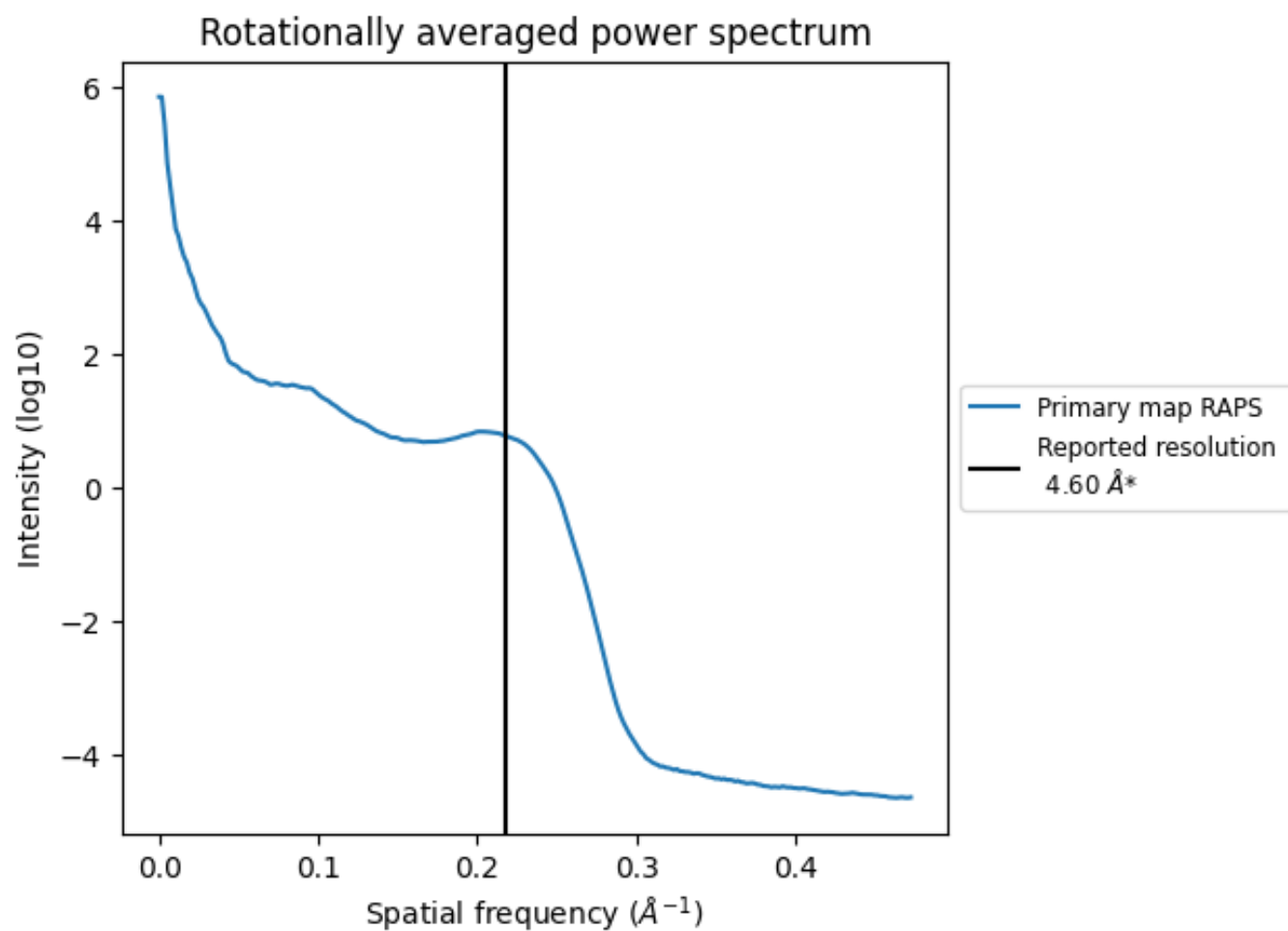
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 5975 nm^3 ; this corresponds to an approximate mass of 5397 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 ⓘ

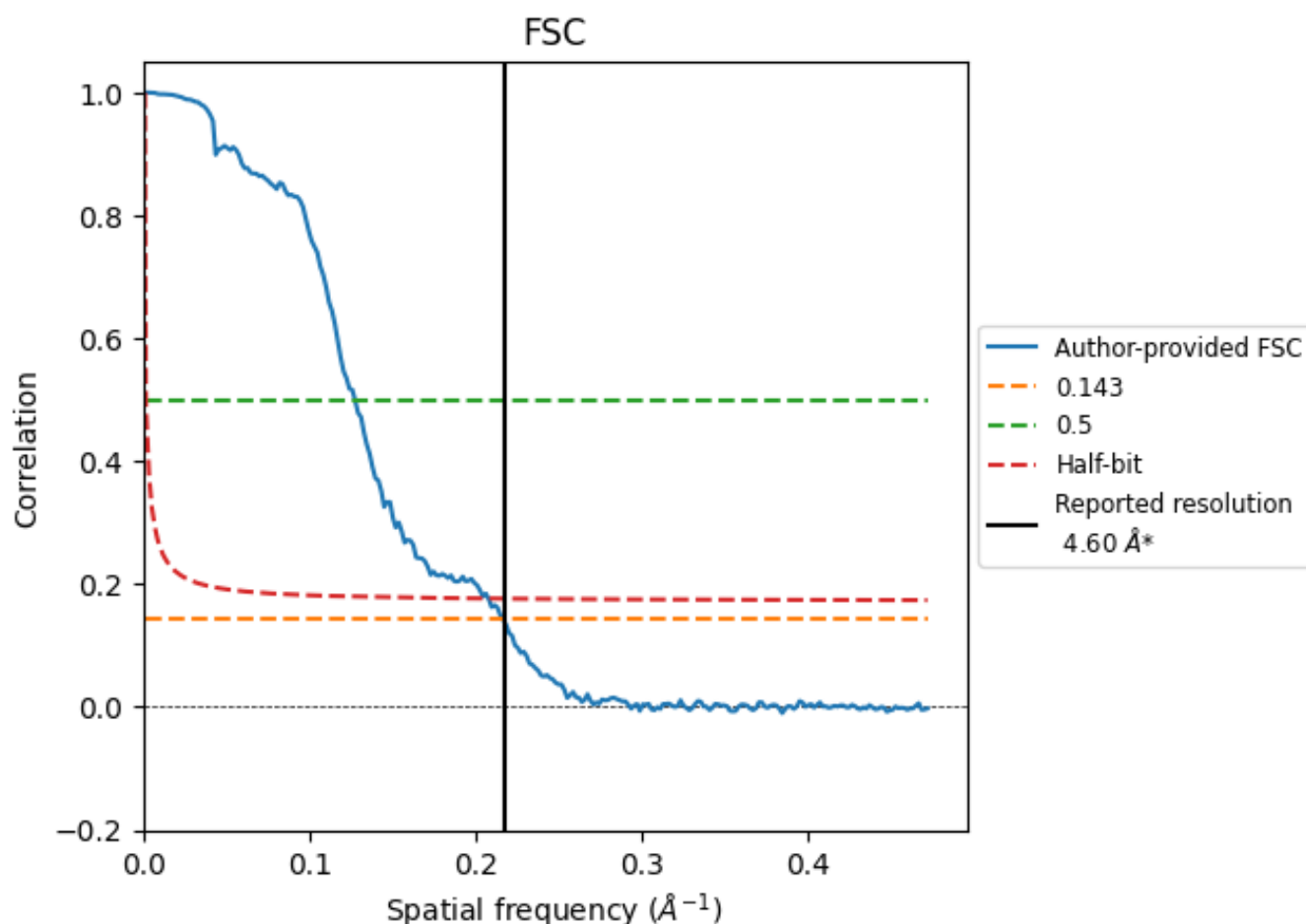


*Reported resolution corresponds to spatial frequency of 0.217 Å⁻¹

8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.217 Å⁻¹

8.2 Resolution estimates [i](#)

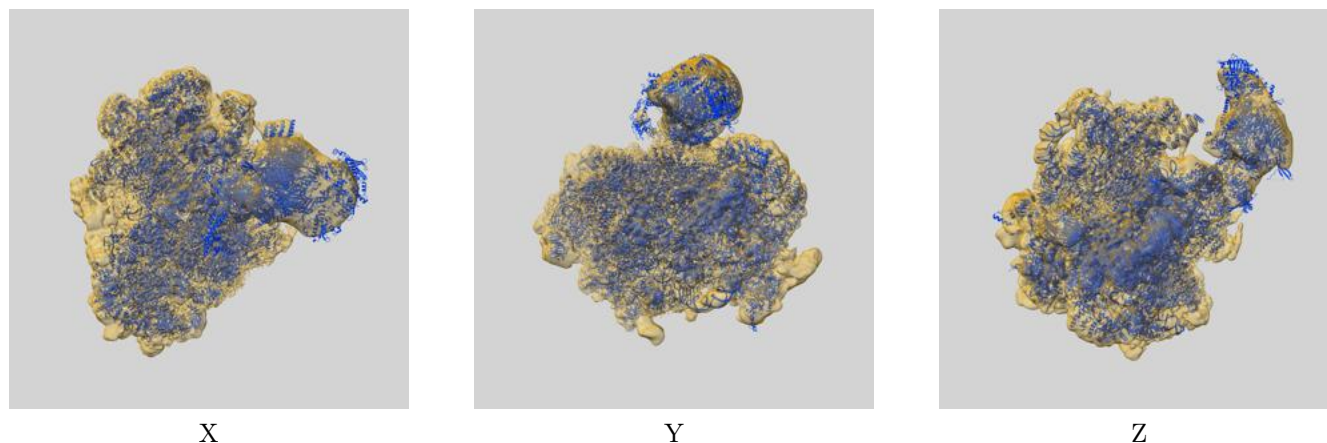
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.60	-	-
Author-provided FSC curve	4.62	7.84	4.81
Unmasked-calculated*	-	-	-

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

9 Map-model fit [i](#)

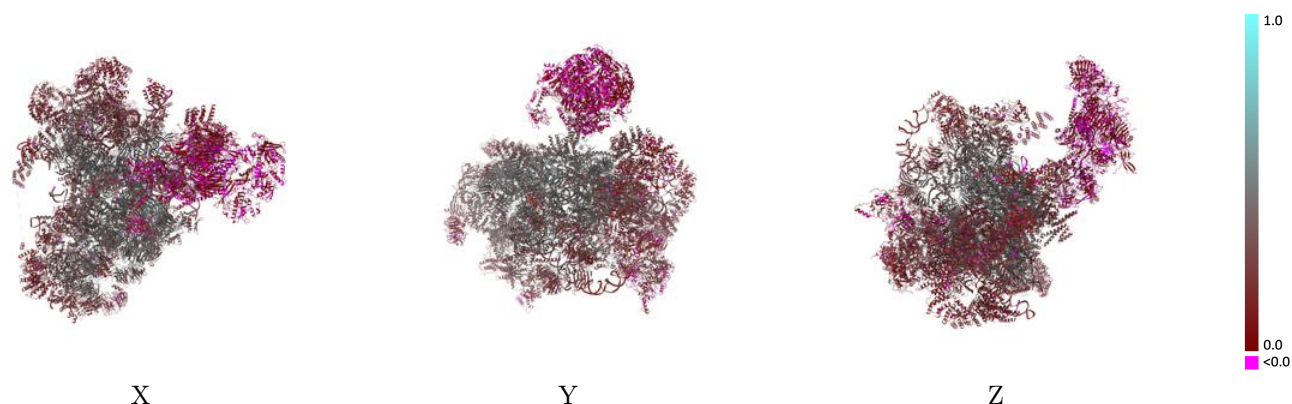
This section contains information regarding the fit between EMDB map EMD-11807 and PDB model 7AJT. Per-residue inclusion information can be found in [section 3](#) on [page 21](#).

9.1 Map-model overlay [i](#)



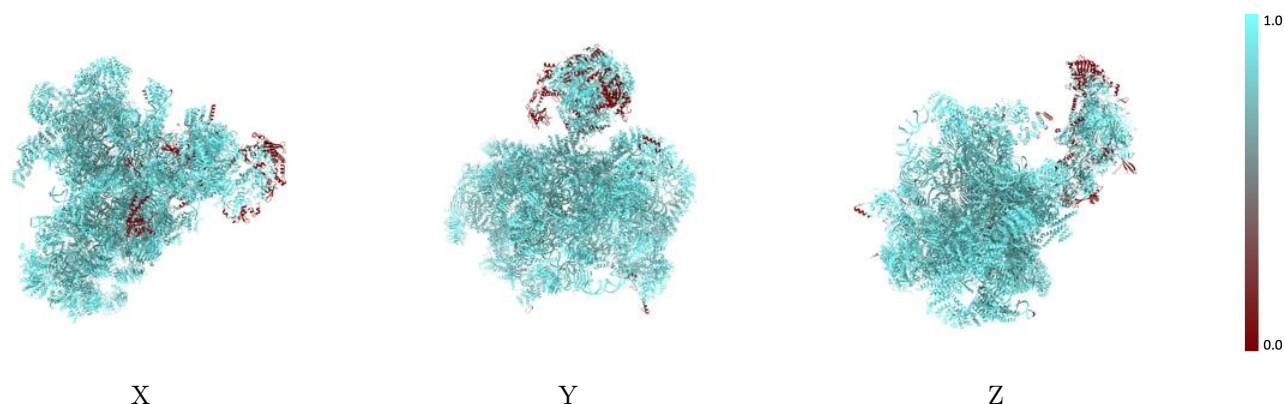
The images above show the 3D surface view of the map at the recommended contour level 0.01 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



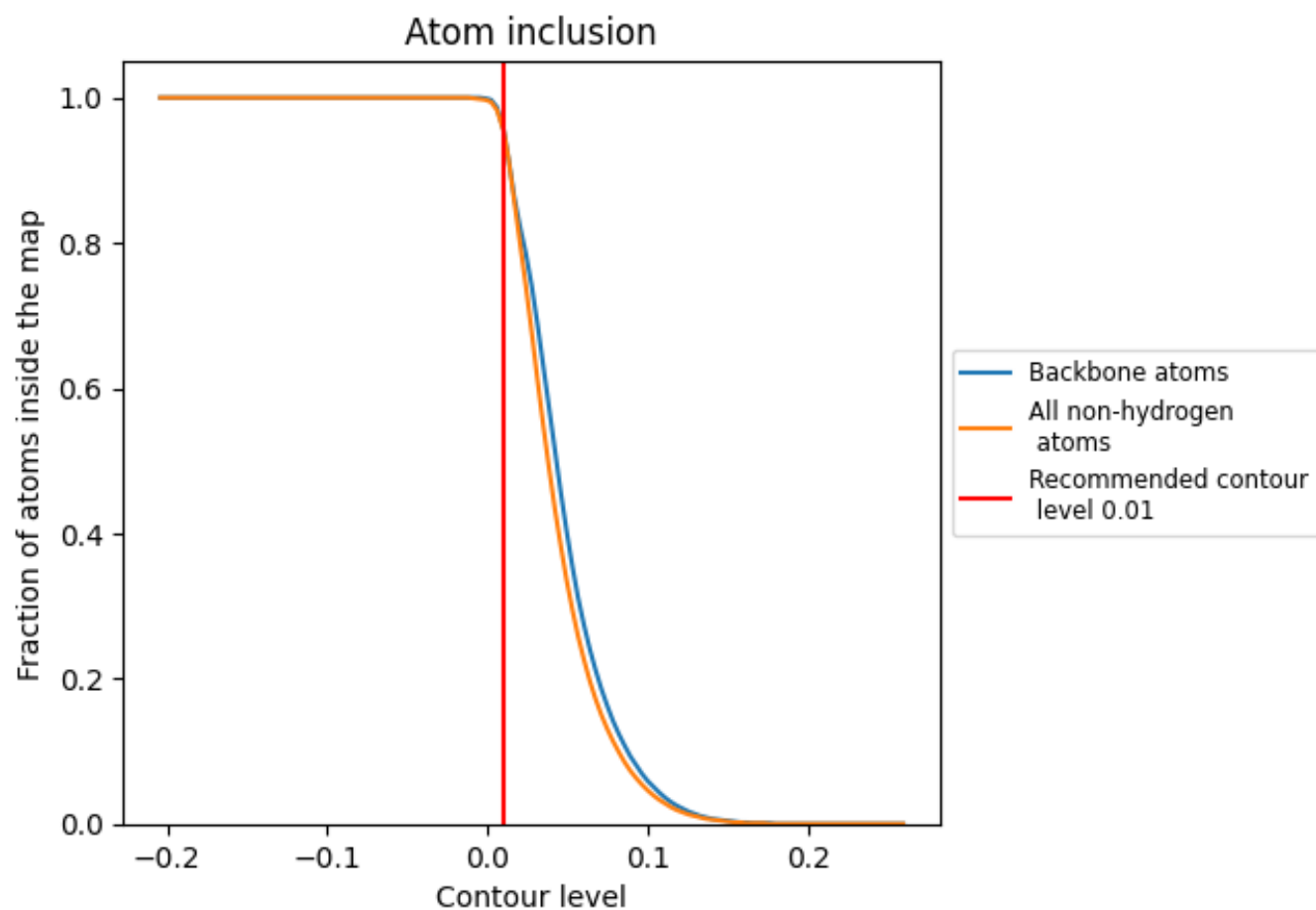
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

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



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.01).

9.4 Atom inclusion [i](#)



At the recommended contour level, 96% of all backbone atoms, 95% 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 (0.01) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9540	 0.3080
CA	 0.9740	 0.4780
CB	 0.9640	 0.3520
CD	 0.9760	 0.3780
CE	 0.9710	 0.3380
CF	 0.9680	 0.4410
CG	 0.9650	 0.4290
CH	 0.9840	 0.3800
CI	 0.9820	 0.5020
CJ	 0.9740	 0.4640
CK	 0.9710	 0.4120
CL	 0.9710	 0.3950
CM	 0.9760	 0.3510
CN	 0.9730	 0.2290
D2	 0.9950	 0.3830
D3	 0.9840	 0.3300
D4	 0.9740	 0.3570
DA	 0.9670	 0.4030
DE	 0.9630	 0.3290
DF	 0.9820	 0.4290
DG	 0.9620	 0.2000
DH	 0.9530	 0.3050
DI	 0.9680	 0.2110
DJ	 0.9580	 0.4480
DL	 0.9580	 0.2070
DN	 0.9630	 0.3770
DO	 0.9740	 0.4170
DQ	 0.9730	 0.4730
DS	 0.9860	 0.3270
DW	 0.9700	 0.4610
DX	 0.9760	 0.4450
DY	 0.9710	 0.3820
Db	 0.9850	 0.4420
Dc	 0.9750	 0.4500
EA	 0.9180	 0.0410



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Chain	Atom inclusion	Q-score
EB	 0.8550	 0.0250
EC	 0.9640	 0.0340
ED	 0.9200	 0.0480
EE	 0.8910	 0.0310
EF	 0.9320	 0.0460
EG	 0.8690	 0.0230
EH	 0.6400	 0.0500
EI	 0.8720	 0.0500
EJ	 0.5890	 0.0360
EK	 0.5680	 0.0340
EN	 0.6120	 0.0570
JA	 0.9600	 0.1970
JB	 0.9280	 0.1730
JC	 0.9340	 0.1790
JF	 0.9800	 0.2710
JG	 0.9620	 0.3670
JH	 0.9510	 0.1210
JI	 0.8140	 0.1750
JJ	 0.9710	 0.2930
JK	 0.9360	 0.1590
JM	 0.9720	 0.4140
JN	 0.9730	 0.4460
JO	 0.9720	 0.4170
JP	 0.9740	 0.4840
JQ	 0.9890	 0.3430
UA	 0.9810	 0.4650
UB	 0.9860	 0.2670
UC	 0.9710	 0.4160
UD	 0.9820	 0.3340
UE	 0.9780	 0.3730
UF	 0.9790	 0.3530
UG	 0.9810	 0.4670
UH	 0.9890	 0.1870
UI	 0.9780	 0.2160
UJ	 0.9700	 0.2600
UK	 0.9740	 0.4070
UL	 0.9820	 0.3270
UM	 0.9740	 0.2870
UN	 0.9590	 0.4230
UO	 0.9760	 0.3790
UP	 0.9770	 0.3200
UQ	 0.9820	 0.3440

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Chain	Atom inclusion	Q-score
UR	 0.9830	 0.4350
US	 0.9810	 0.2890
UT	 0.9750	 0.2090
UU	 0.9790	 0.4300
UV	 0.9750	 0.2370
UX	 0.9730	 0.4970
UZ	 0.9820	 0.3500