



wwPDB EM Validation Summary Report ⓘ

Dec 18, 2022 – 04:35 pm GMT

PDB ID : 7AJU
EMDB ID : EMD-11808
Title : Cryo-EM structure of the 90S-exosome super-complex (state Post-A1-exosome)
Authors : Cheng, J.; Lau, B.; Flemming, D.; Venuta, G.L.; Berninghausen, O.; Beckmann, R.; Hurt, E.
Deposited on : 2020-09-29
Resolution : 3.80 Å (reported)
Based on initial model : 6ZQD

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:

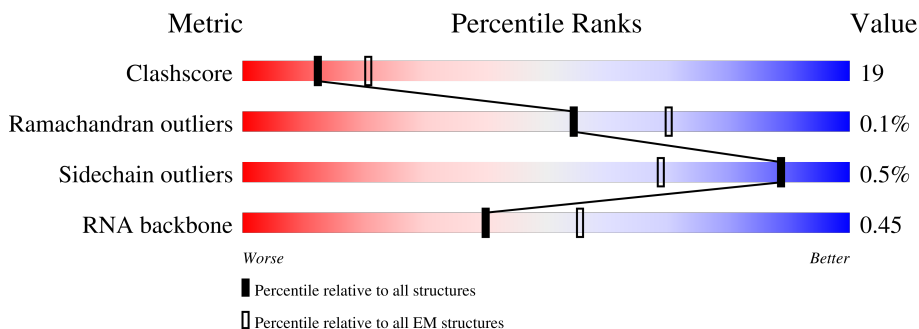
EMDB validation analysis : 0.0.1.dev43
Mogul : 1.8.4, CSD as541be (2020)
MolProbity : 4.02b-467
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.9
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.31.3

1 Overall quality at a glance i

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

The reported resolution of this entry is 3.80 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
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	CA	327	
1	CB	327	
2	DA	255	
3	UA	923	
4	UB	810	
5	UC	610	
6	UD	776	



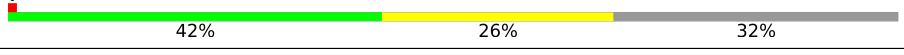

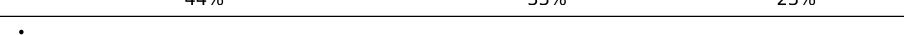
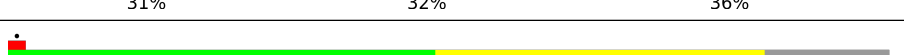



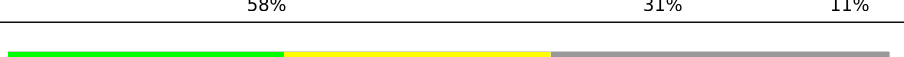
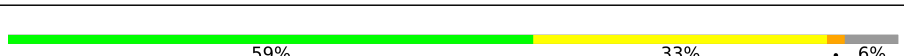
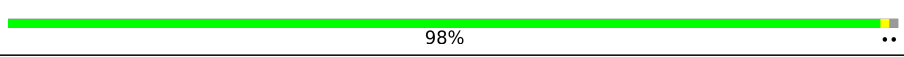
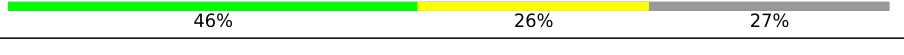

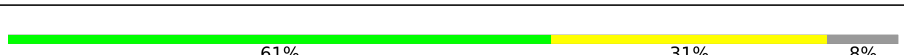









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Mol	Chain	Length	Quality of chain
7	UE	643	
8	UF	440	
9	UG	554	
10	UH	713	
11	UI	575	
12	UJ	1769	
13	UK	250	
14	UL	943	
15	UM	817	
16	UN	899	
17	UO	513	
18	UP	214	
19	UQ	896	
20	UR	594	
21	US	552	
22	UT	2493	
23	UU	939	
24	UV	1237	
25	UX	189	
26	CD	504	
27	CE	511	
28	CF	126	
28	CG	126	
29	CH	573	
30	CI	183	

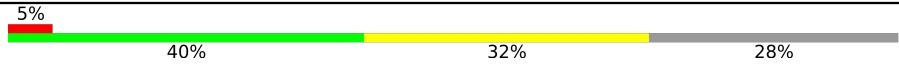

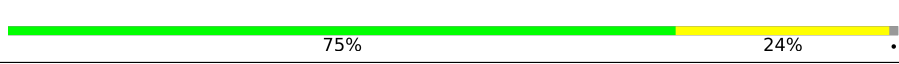
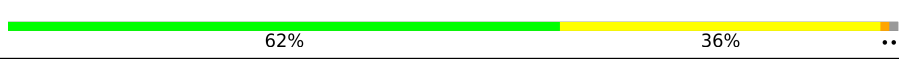

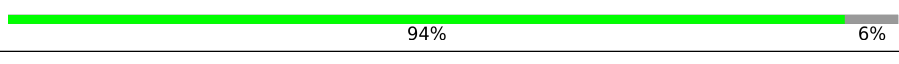
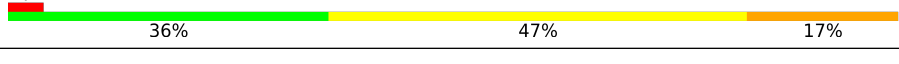
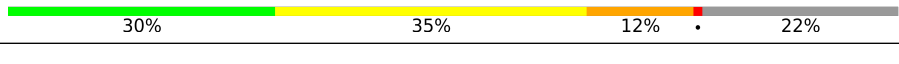
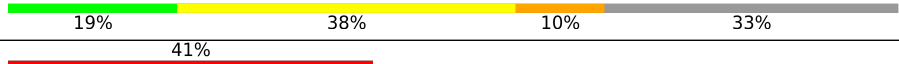


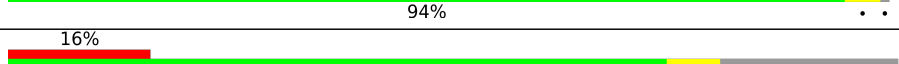

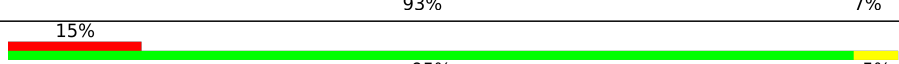
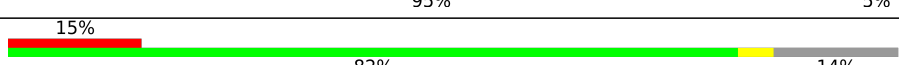
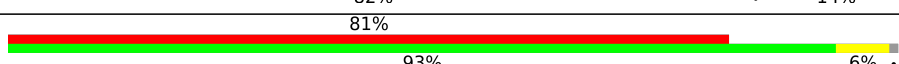
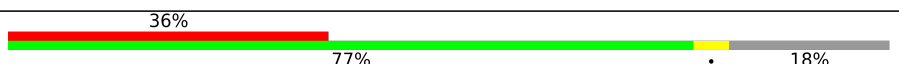

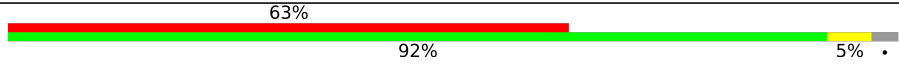


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Mol	Chain	Length	Quality of chain
31	CJ	290	
32	CK	593	
33	CL	1183	
34	CM	367	
35	CN	297	
36	JD	1267	
37	JF	252	
37	JG	252	
38	JH	483	
39	JI	1729	
40	JL	318	
41	JM	217	
42	JP	489	
43	Db	82	
44	JJ	274	
45	DE	261	
46	DF	225	
47	DG	236	
48	DH	190	
49	DI	200	
50	DJ	197	
51	DL	156	
52	DN	151	
53	DO	137	
54	DQ	143	

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Mol	Chain	Length	Quality of chain
55	DS	146	
56	DT	144	
57	DW	130	
58	DX	145	
59	DY	135	
60	Dc	67	
61	D2	81	
62	D3	1802	
63	D4	333	
64	EA	22	
65	EB	305	
66	EC	246	
67	ED	394	
68	EE	223	
69	EF	265	
70	EG	250	
71	EH	240	
72	EI	359	
73	EJ	292	
74	EK	1001	
75	EN	1073	

2 Entry composition [i](#)

There are 78 unique types of molecules in this entry. The entry contains 242031 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
			Total	C	N	O	S		
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
			Total	C	N	O	S		
2	DA	240	Total	C	N	O	S	0	0
			1912	1209	354	345	4		

- Molecule 3 is a protein called Periodic tryptophan protein 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	UA	792	Total	C	N	O	S	0	0
			6322	4040	1083	1181	18		

- Molecule 4 is a protein called Nucleolar complex protein 14.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	UB	553	Total	C	N	O	S	0	0
			4105	2602	736	756	11		

- Molecule 5 is a protein called Something about silencing protein 10.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
5	UC	86	Total	C	N	O	0	0
			694	430	139	125		

- Molecule 6 is a protein called U3 small nucleolar RNA-associated protein 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	UD	663	Total	C	N	O	S	0	0
			5269	3339	915	994	21		

- Molecule 7 is a protein called U3 small nucleolar RNA-associated protein 5.

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

- Molecule 8 is a protein called U3 small nucleolar RNA-associated protein 6.

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

- Molecule 9 is a protein called U3 small nucleolar RNA-associated protein 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	UG	470	Total	C	N	O	S	0	0
			3718	2345	664	698	11		

- Molecule 10 is a protein called U3 small nucleolar RNA-associated protein 8.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	UH	474	Total	C	N	O	S	0	0
			2771	1706	513	549	3		

- Molecule 11 is a protein called U3 small nucleolar RNA-associated protein 9.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	UI	88	Total	C	N	O	S	0	0
			723	462	131	128	2		

- Molecule 12 is a protein called U3 small nucleolar RNA-associated protein 10.

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

- Molecule 13 is a protein called U3 small nucleolar RNA-associated protein 11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	UK	219	1845	1150	356	332	7	0	0

- Molecule 14 is a protein called U3 small nucleolar RNA-associated protein 12.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
14	UL	779	6199	3974	1034	1164	27	0	0

- Molecule 15 is a protein called U3 small nucleolar RNA-associated protein 13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
15	UM	762	5970	3787	1007	1148	28	0	0

- Molecule 16 is a protein called U3 small nucleolar RNA-associated protein 14.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
16	UN	203	1667	1038	313	314	2	0	0

- Molecule 17 is a protein called U3 small nucleolar RNA-associated protein 15.

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

- Molecule 18 is a protein called Bud site selection protein 21.

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

- Molecule 19 is a protein called NET1-associated nuclear protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
19	UQ	820	6557	4171	1107	1260	19	0	0

- Molecule 20 is a protein called U3 small nucleolar RNA-associated protein 18.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
20	UR	481	3791	2399	668	714	10	0	0

- Molecule 21 is a protein called Nucleolar complex protein 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
21	US	487	3587	2305	610	660	12	0	0

- Molecule 22 is a protein called U3 small nucleolar RNA-associated protein 20.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
22	UT	2313	18789	12100	3144	3479	66	0	0

- Molecule 23 is a protein called U3 small nucleolar RNA-associated protein 21.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
23	UU	878	6922	4386	1198	1316	22	0	0

- Molecule 24 is a protein called U3 small nucleolar RNA-associated protein 22.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
24	UV	1083	8753	5692	1442	1595	24	0	0

- Molecule 25 is a protein called rRNA-processing protein FCF1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
25	UX	167	1330	854	241	225	10	0	0

- Molecule 26 is a protein called Nucleolar protein 56.

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

- Molecule 27 is a protein called Nucleolar protein 58.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	CE	436	Total	C	N	O	S	0	0
			3326	2093	571	654	8		

- Molecule 28 is a protein called 13 kDa ribonucleoprotein-associated protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	CF	121	Total	C	N	O	S	0	0
			916	583	158	171	4		
28	CG	121	Total	C	N	O	S	0	0
			916	583	158	171	4		

- Molecule 29 is a protein called Ribosomal RNA-processing protein 9.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	CH	467	Total	C	N	O	S	0	0
			3736	2371	655	700	10		

- Molecule 30 is a protein called U3 small nucleolar ribonucleoprotein protein IMP3.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	CI	175	Total	C	N	O	S	0	0
			1468	929	276	256	7		

- Molecule 31 is a protein called U3 small nucleolar ribonucleoprotein protein IMP4.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	CJ	256	Total	C	N	O	S	0	0
			2081	1306	394	374	7		

- Molecule 32 is a protein called U3 small nucleolar RNA-associated protein MPP10.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	CK	222	Total	C	N	O	S	0	0
			1789	1111	311	363	4		

- Molecule 33 is a protein called Ribosome biogenesis protein BMS1.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	CL	808	Total	C	N	O	S	0	0
			6551	4187	1171	1165	28		

- Molecule 34 is a protein called RNA 3'-terminal phosphate cyclase-like protein.

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

- Molecule 35 is a protein called Ribosomal RNA-processing protein 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
35	CN	229	1868	1197	317	347	7	0	0

- Molecule 36 is a protein called Probable ATP-dependent RNA helicase DHR1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
36	JD	811	6509	4163	1151	1160	35	0	0

- Molecule 37 is a protein called Ribosomal RNA small subunit methyltransferase NEP1.

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

- Molecule 38 is a protein called Essential nuclear protein 1.

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

- Molecule 39 is a protein called rRNA biogenesis protein RRP5.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
39	JI	265	1314	784	265	265	0	0

- Molecule 40 is a protein called Dimethyladenosine transferase.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
40	JL	283	2262	1439	401	408	14	0	0

- Molecule 41 is a protein called rRNA-processing protein FCF2.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	JM	134	Total	C	N	O	S	0	0
			1131	715	206	207	3		

- Molecule 42 is a protein called Protein SOF1.

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

- Molecule 43 is a protein called 40S ribosomal protein S27-A.

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

- Molecule 44 is a protein called Pre-rRNA-processing protein PNO1.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	JJ	199	Total	C	N	O	S	0	0
			1573	1001	285	283	4		

- Molecule 45 is a protein called 40S ribosomal protein S4-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	DE	246	Total	C	N	O	S	0	0
			1950	1248	361	338	3		

- Molecule 46 is a protein called 40S ribosomal protein S5.

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

- Molecule 47 is a protein called 40S ribosomal protein S6-A.

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

- Molecule 48 is a protein called 40S ribosomal protein S7-A.

Mol	Chain	Residues	Atoms				AltConf	Trace
48	DH	170	Total	C	N	O	0	0
			1361	880	235	246		

- Molecule 49 is a protein called 40S ribosomal protein S8-A.

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

- Molecule 50 is a protein called 40S ribosomal protein S9-A.

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

- Molecule 51 is a protein called 40S ribosomal protein S11-A.

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

- Molecule 52 is a protein called 40S ribosomal protein S13.

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

- Molecule 53 is a protein called 40S ribosomal protein S14-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
53	DO	127	Total	C	N	O	S	0	0
			922	567	185	167	3		

- Molecule 54 is a protein called 40S ribosomal protein S16-A.

Mol	Chain	Residues	Atoms				AltConf	Trace
54	DQ	125	Total	C	N	O	0	0
			969	623	174	172		

- Molecule 55 is a protein called 40S ribosomal protein S18-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
55	DS	105	Total	C	N	O	S	0	0
			861	545	160	154	2		

- Molecule 56 is a protein called 40S ribosomal protein S19-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
56	DT	143	Total	C	N	O	S	0	0
			1112	694	208	208	2		

- Molecule 57 is a protein called 40S ribosomal protein S22-A.

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

- Molecule 58 is a protein called 40S ribosomal protein S23-A.

Mol	Chain	Residues	Atoms					AltConf	Trace
58	DX	143	Total	C	N	O	S	0	0
			1115	705	219	189	2		

- Molecule 59 is a protein called 40S ribosomal protein S24-A.

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

- Molecule 60 is a protein called 40S ribosomal protein S28-A.

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

- Molecule 61 is a RNA chain called 5'ETS RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
61	D2	81	Total	C	N	O	P	0	0
			1741	777	319	564	81		

- Molecule 62 is a RNA chain called 18S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
62	D3	1409	30042	13429	5342	9862	1409	0	0

- Molecule 63 is a RNA chain called U3 snoRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
63	D4	223	4720	2113	816	1568	223	0	0

- Molecule 64 is a RNA chain called RNA.

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

- Molecule 65 is a protein called Exosome complex component RRP45.

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

- Molecule 66 is a protein called Exosome complex component SKI6.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
66	EC	243	1199	713	243	243	0	0

- Molecule 67 is a protein called Exosome complex component RRP43.

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

- Molecule 68 is a protein called Exosome complex component RRP46.

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

- Molecule 69 is a protein called Exosome complex component RRP42.

Mol	Chain	Residues	Atoms			AltConf	Trace	
			Total	C	N			O
69	EF	265	1317	787	265	265	1	0

- Molecule 70 is a protein called Exosome complex component MTR3.

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

- Molecule 71 is a protein called Exosome complex component RRP40.

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

- Molecule 72 is a protein called Exosome complex component RRP4.

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

- Molecule 73 is a protein called Exosome complex component CSL4.

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

- Molecule 74 is a protein called Exosome complex exonuclease DIS3.

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

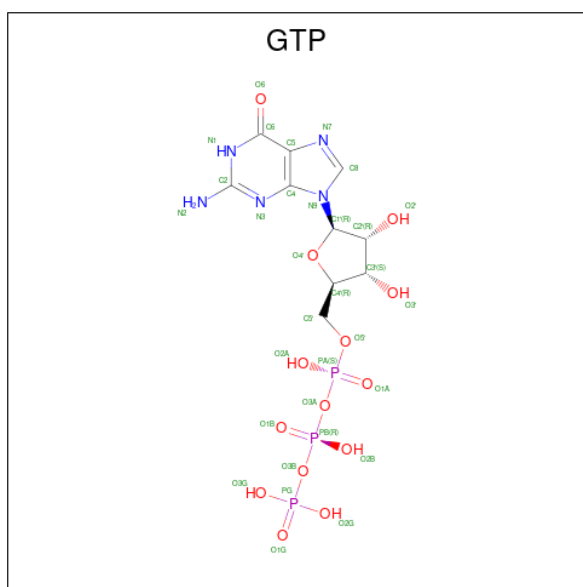
- Molecule 75 is a protein called ATP-dependent RNA helicase DOB1.

Mol	Chain	Residues	Atoms			AltConf	Trace	
			Total	C	N			O
75	EN	963	4762	2839	963	960	0	0

- Molecule 76 is ZINC ION (three-letter code: ZN) (formula: Zn).

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

- Molecule 77 is GUANOSINE-5'-TRIPHOSPHATE (three-letter code: GTP) (formula: $C_{10}H_{16}N_5O_{14}P_3$).



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

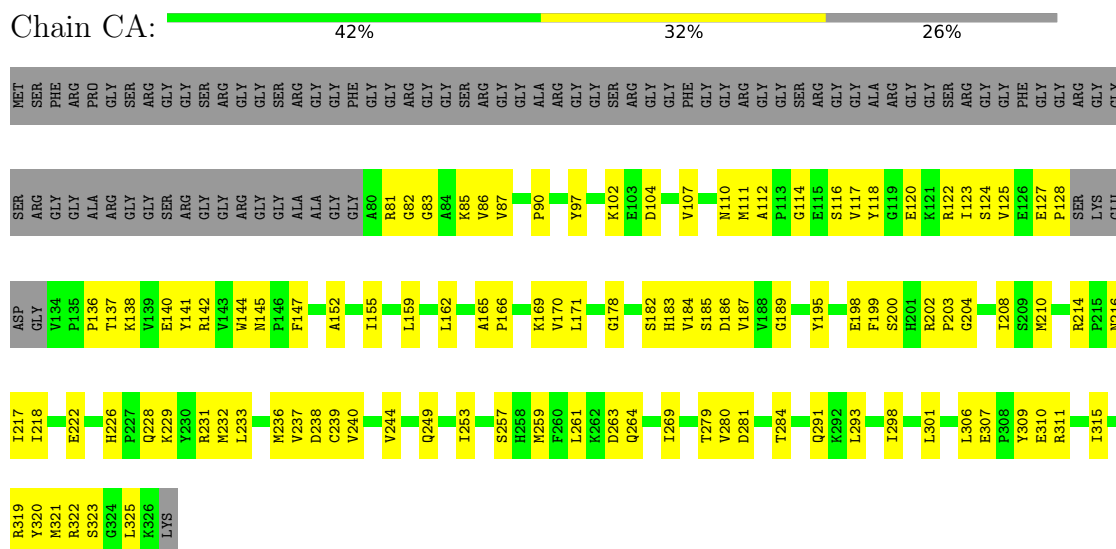
- Molecule 78 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
78	CL	1	Total	Mg	0
			1	1	
78	EK	1	Total	Mg	0
			1	1	

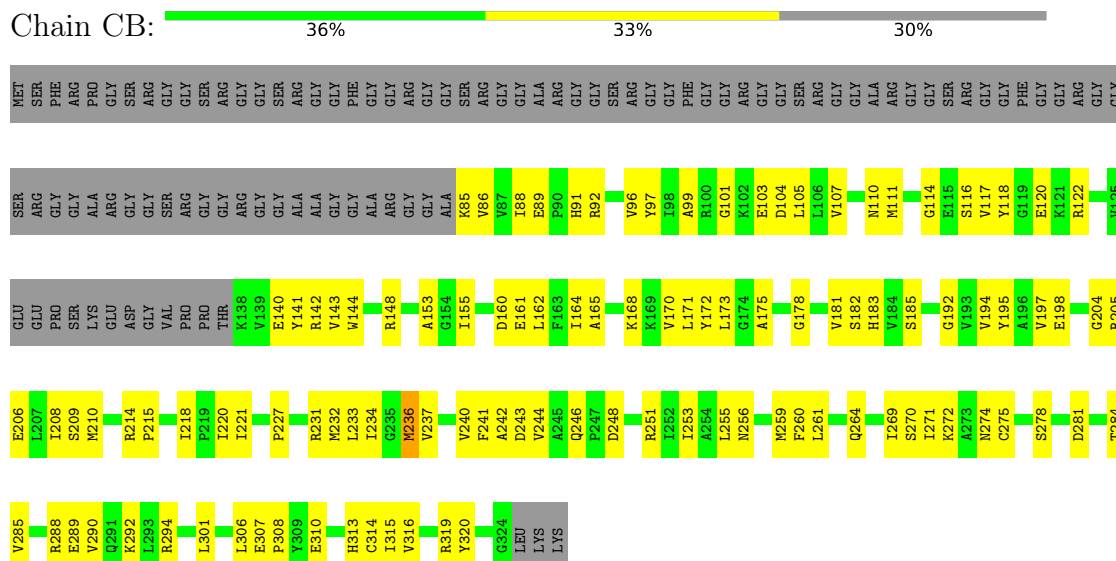
3 Residue-property plots

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

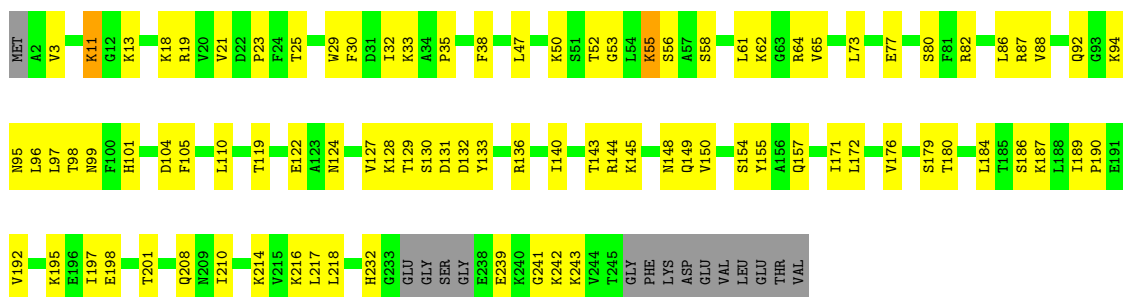


- Molecule 1: rRNA 2'-O-methyltransferase fibrillarin



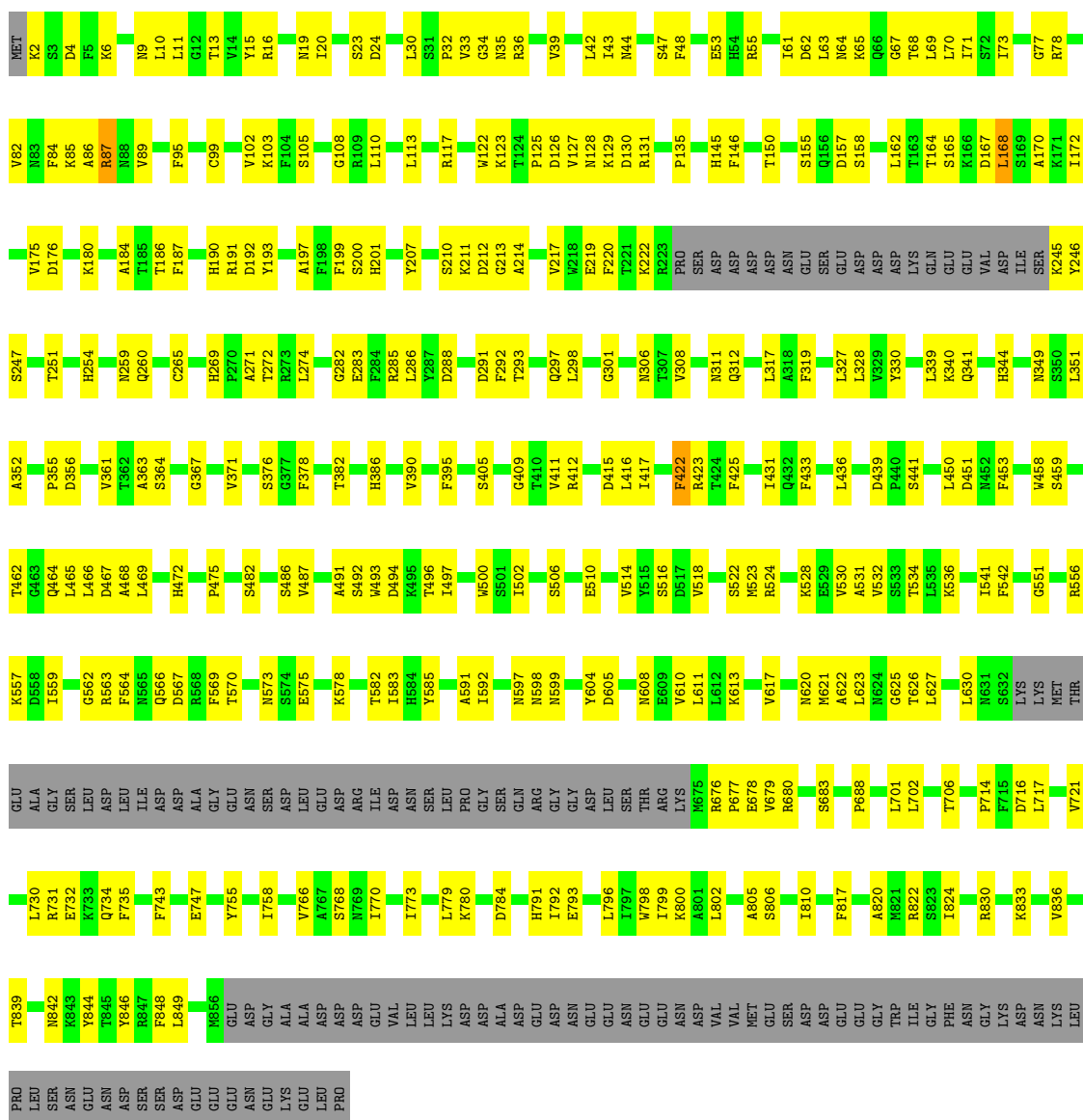
● Molecule 2: 40S ribosomal protein S1-A

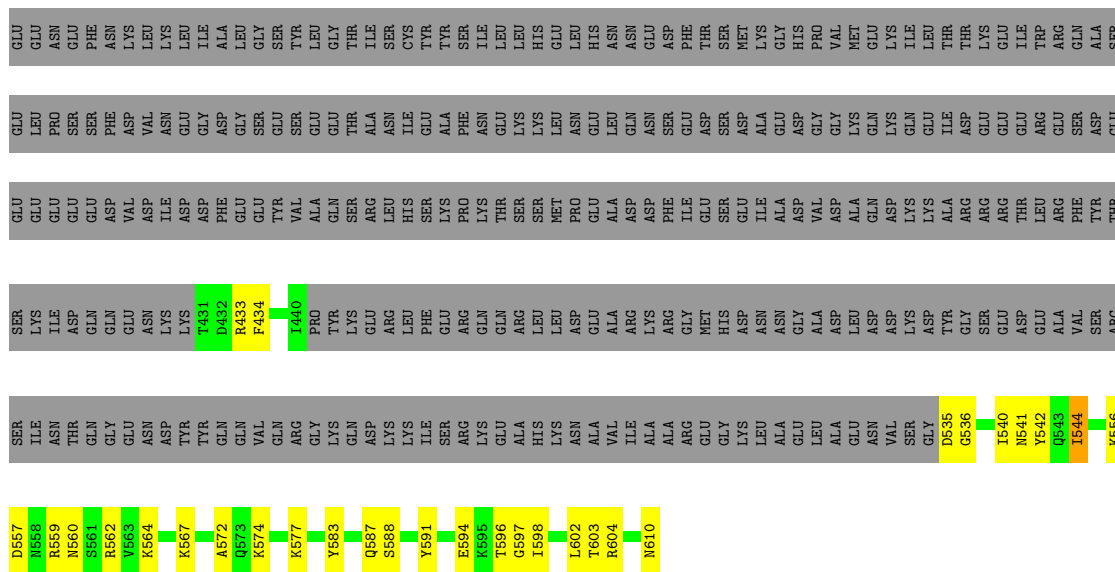
Chain DA: 59% 35% 6%



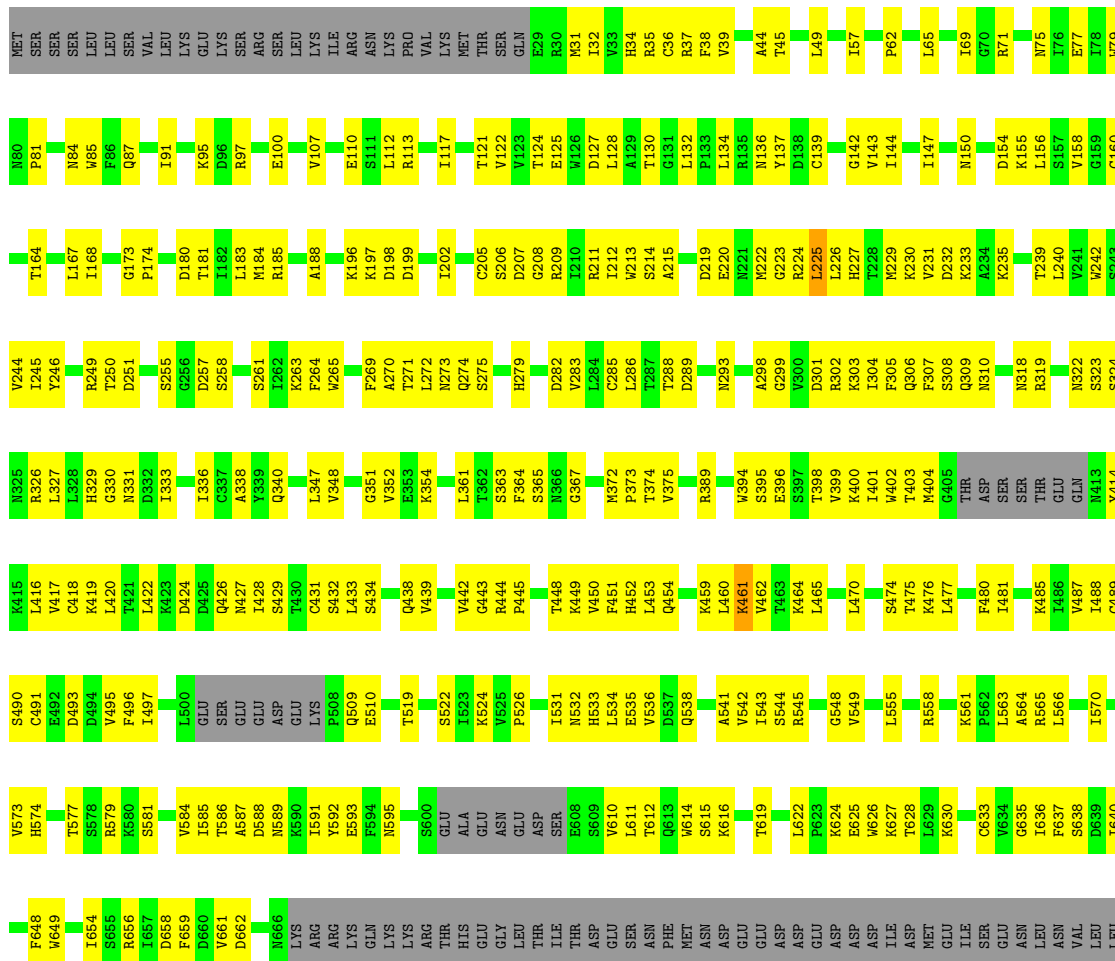
● Molecule 3: Periodic tryptophan protein 2

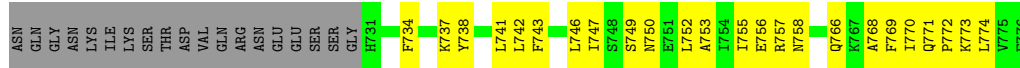
Chain UA: 53% 32% 14%



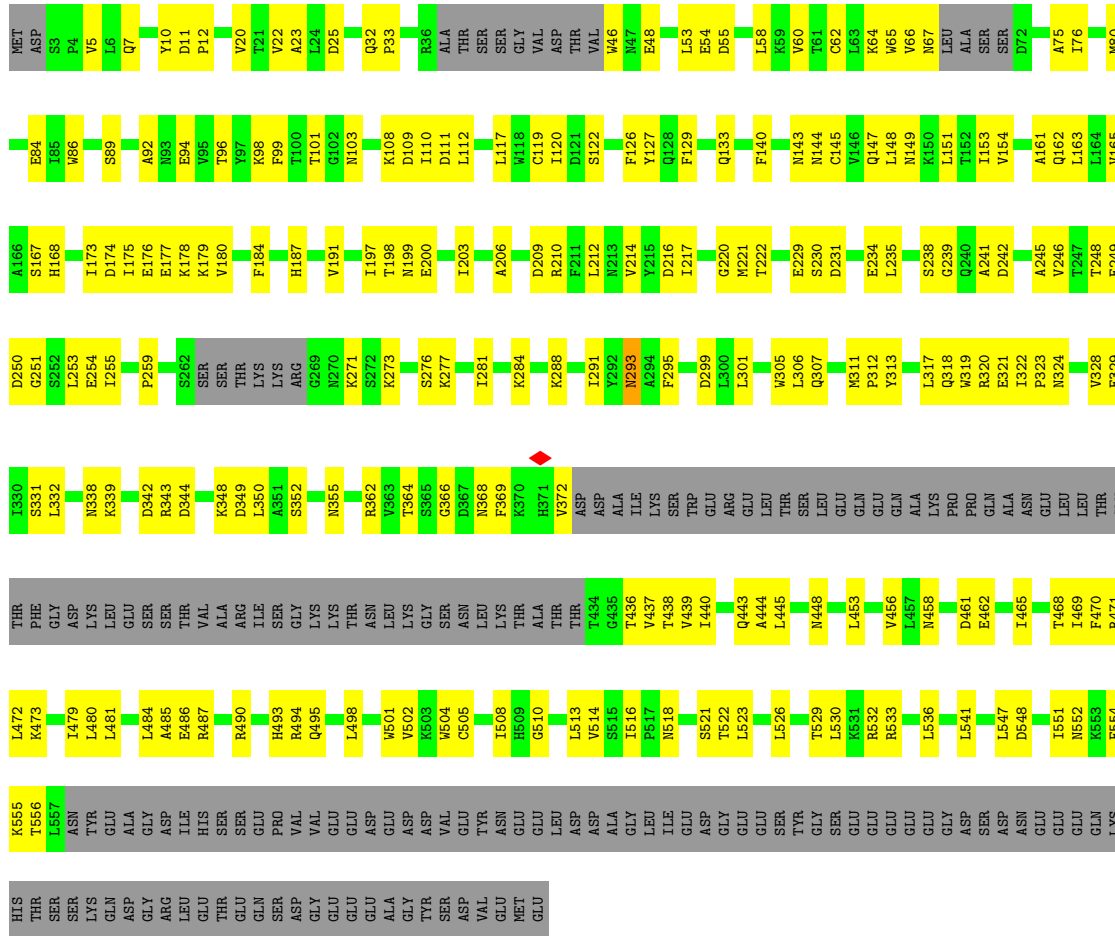


• Molecule 6: U3 small nucleolar RNA-associated protein 4

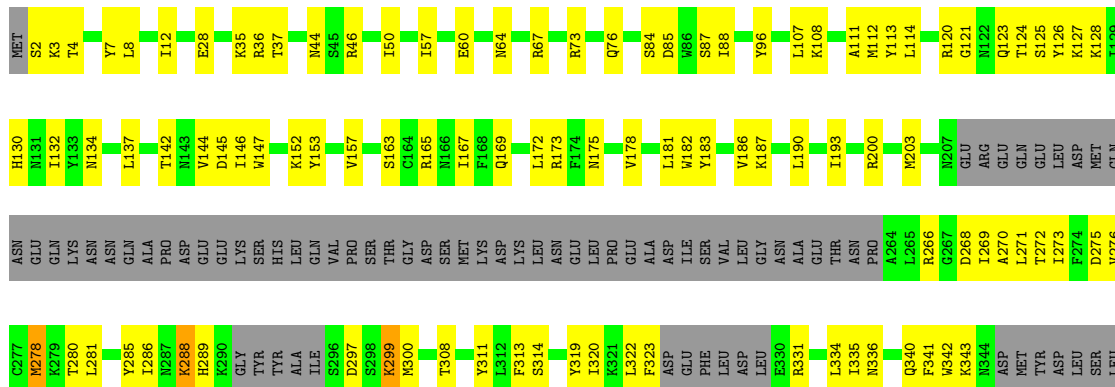


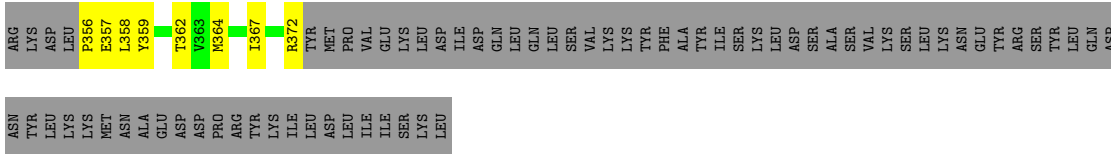


• Molecule 7: U3 small nucleolar RNA-associated protein 5

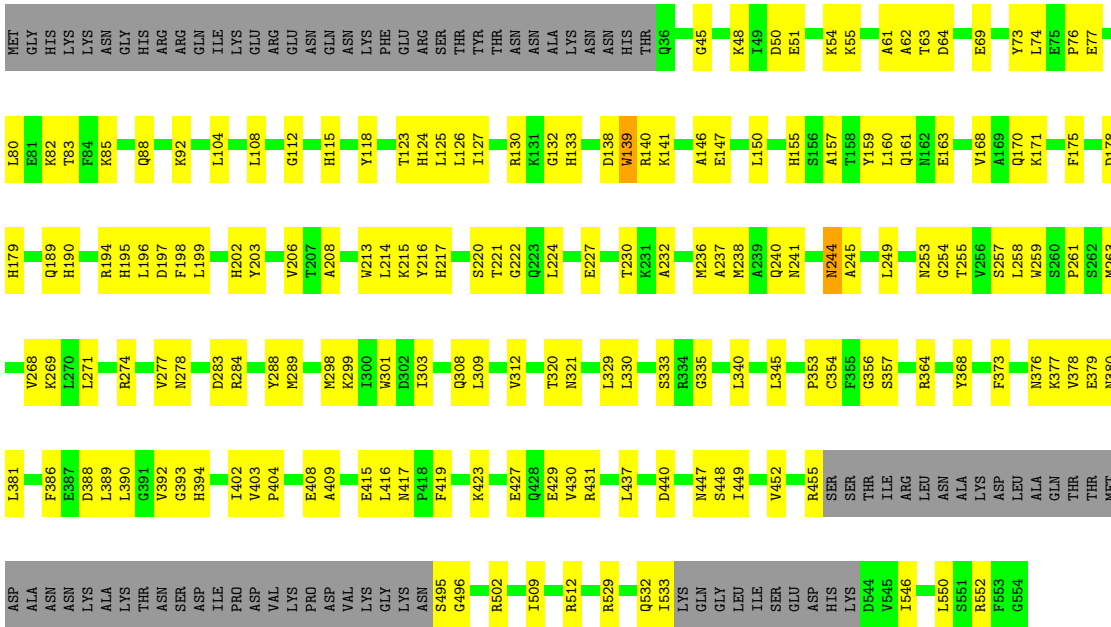


• Molecule 8: U3 small nucleolar RNA-associated protein 6

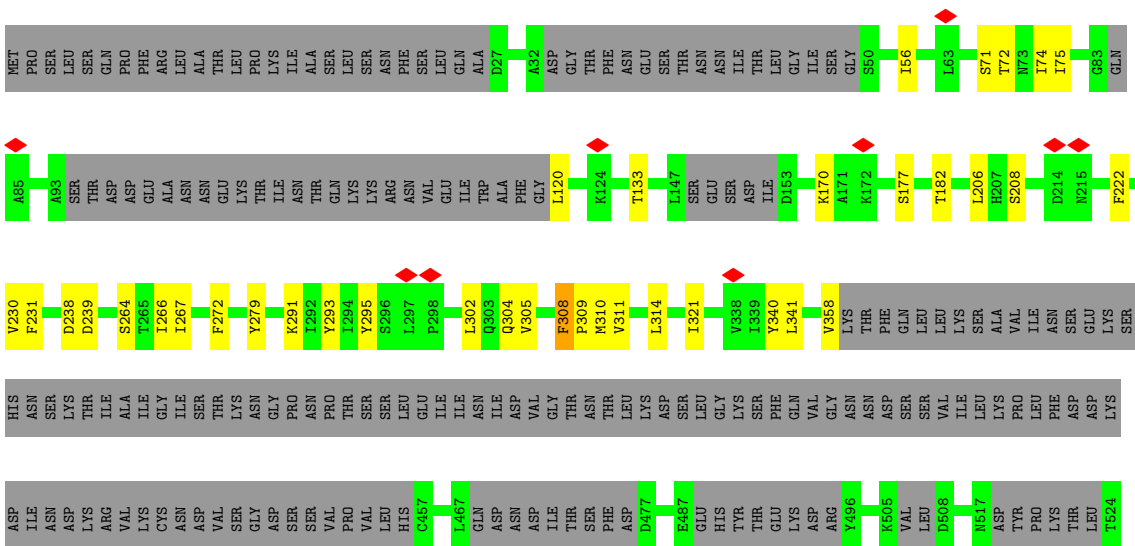


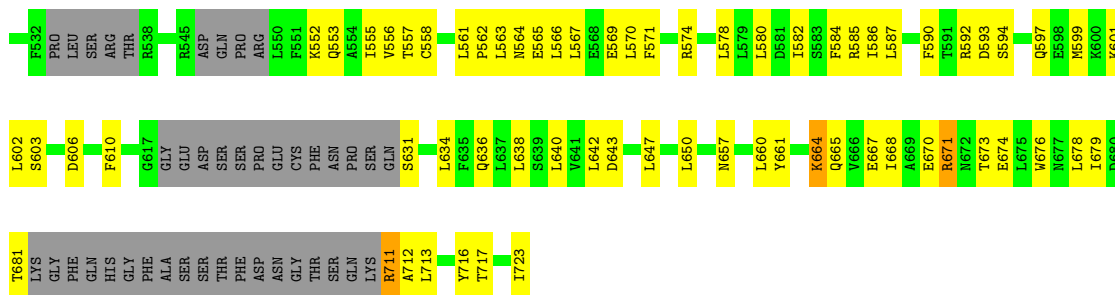


• Molecule 9: U3 small nucleolar RNA-associated protein 7



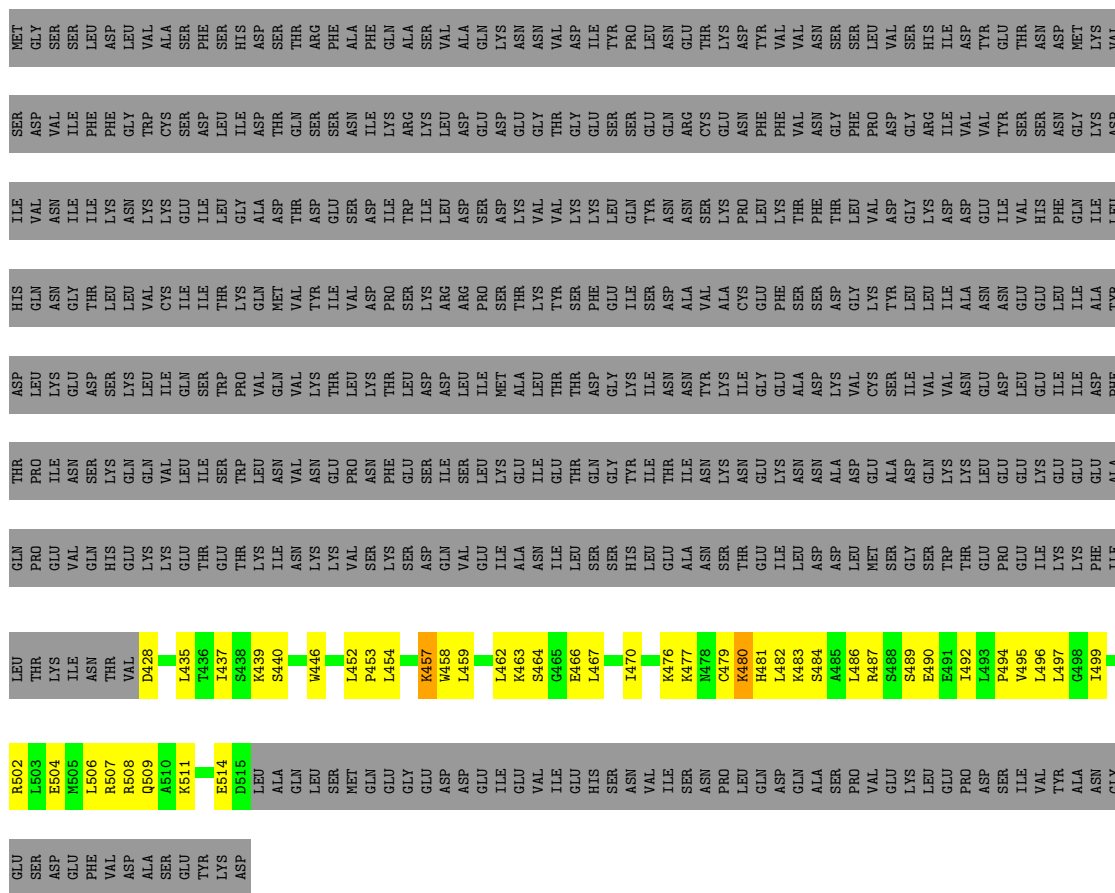
• Molecule 10: U3 small nucleolar RNA-associated protein 8





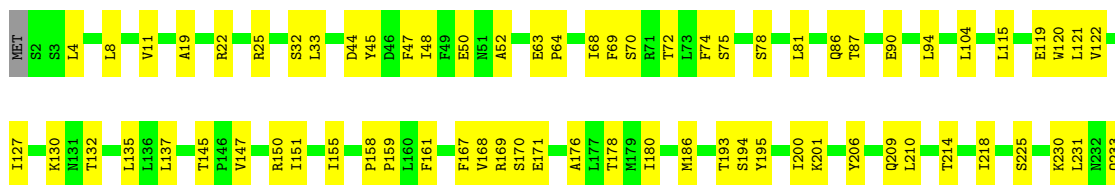
• Molecule 11: U3 small nucleolar RNA-associated protein 9

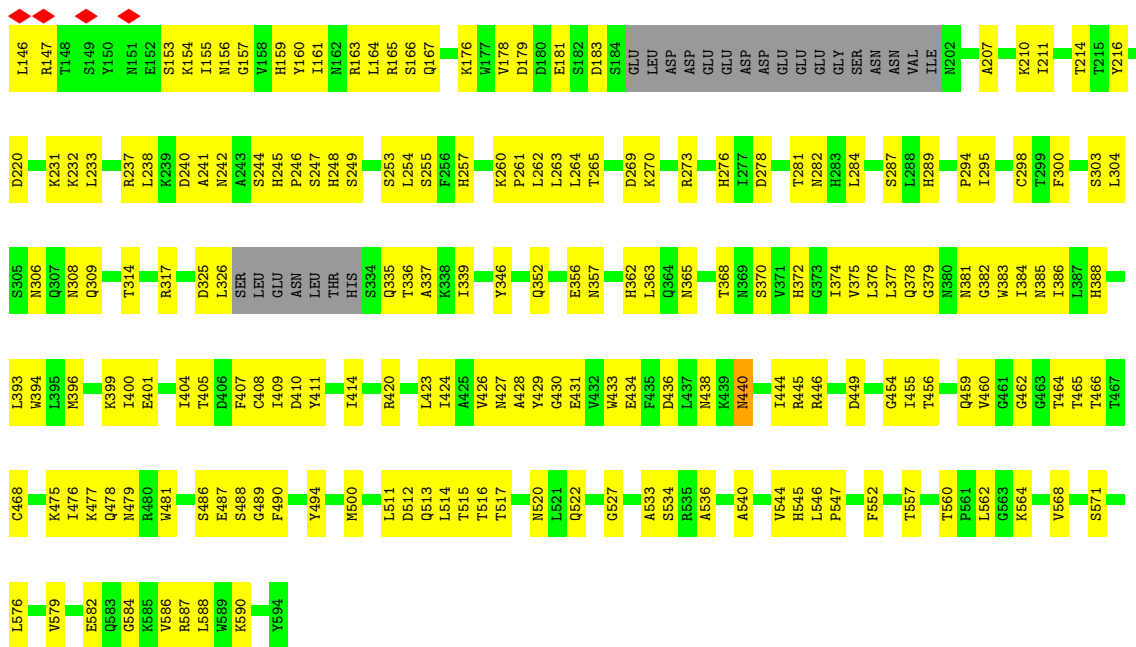
Chain UI: 8% 7% 85%



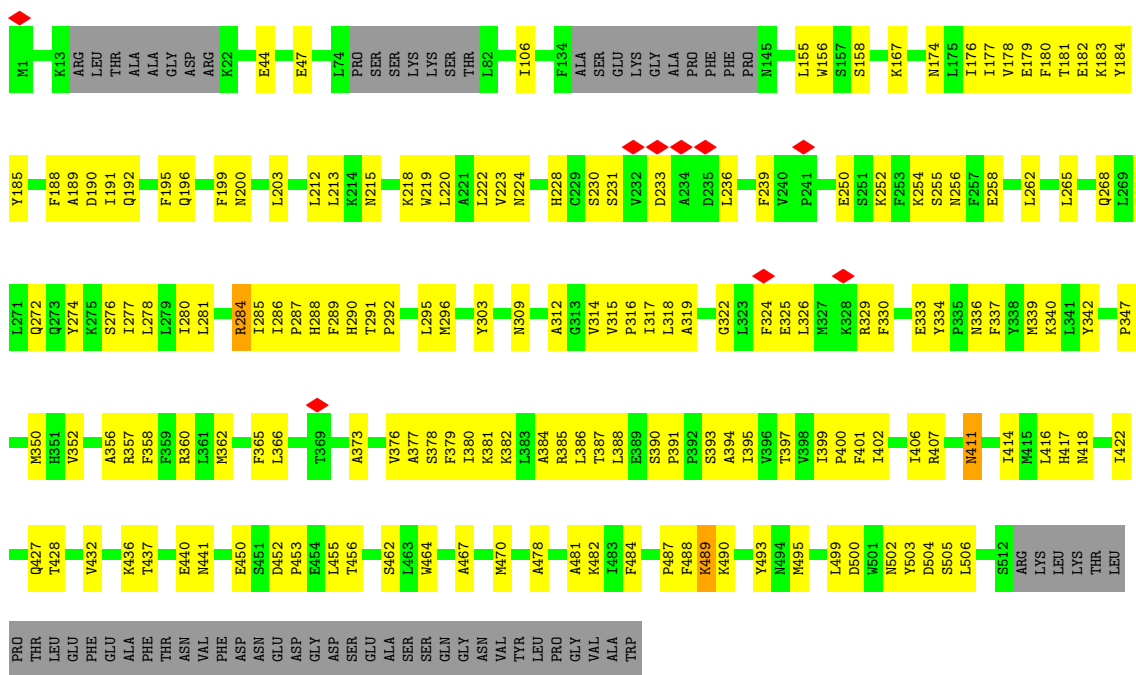
• Molecule 12: U3 small nucleolar RNA-associated protein 10

Chain UJ: 36% 27% 37%

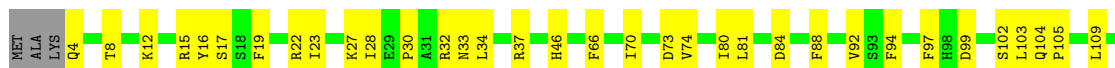




• Molecule 21: Nucleolar complex protein 4



• Molecule 22: U3 small nucleolar RNA-associated protein 20



M1309	S1310	Y1311	S1312	S1313	S1314	S1315	M1316	H1317	D1169	L1170	V1171	T1172	L1173	S1174	C1175	T1176	I1250	V1251	M1258	I1261	E1262	E1263	L1264	Y1265	L1189	S1190	D1191	S1192	M1193	S1194	I1195	S1196	T1197	F1198	L1199	M1200	E1277	R1278	M1201	Y1205	T1206	E1207	M1208	L1284	G1209	F1210	I1211	D1214	H1215	V1216	I1221	S1222	I1225	S1226	I1227	L1228	L1232	K1233	S1302	K1303	L1304	V1305	L1306	D1307	M1372																																		
C1114	H1115	D1116	L1117	G1118	P1119	D1120	Y1125	A1128	I1129	K1130	T1131	L1132	I1133	L1136	I1140	E1141	F1142	S1145	L1155	L1162	L1166	K1169	I1178	P1179	L1180	L1181	L1188	S1189	R1190	F1191	E1194	S1197	R201	K202	R209	V212	R213	S214	V215	F216	E217	K218	L219	E220	G221	D222	Q225	T226	M227	L228	Y229	E230	G231	E232	N303	L232	D304	S305	L306	T311	D312	R313	I314	L315	K316	Q244	E245	L246	L247	H248	V322	F323	K250	L254	G326	R327	R328	H260	E261	A262	L263	T264	S267	P268	E269	R270	S271	V272	L275	S276	D277	L278	W279	M280	R283	A286	S287	I288	E289
S290	L291	L292	P293	V294	M298	Y299	Q300	D301	F302	N303	L232	D304	S305	L306	T311	D312	R313	I314	L315	K316	Q244	E245	L246	L247	H248	V322	F323	K250	L254	G326	R327	R328	H260	E261	A262	L263	T264	S267	P268	E269	R270	S271	V272	L275	S276	D277	L278	W279	M280	R283	A286	S287	I288	E289																																													
F362	A363	L364	F365	R366	K367	N368	S369	D370	Y371	K372	T373	L374	T375	L376	Q379	K380	L381	F382	N383	I389	C392	F393	L394	F396	F397	L401	R402	L403	S404	Y405	F406	R407	V408	F411	M412	G413	L414	K415	P416	L417	Q418	L419	K422	R423	M424	W425	S426	Q427	G428	G429	K430	K431																																															
I432	A433	L434	F435	L436	L437	E438	V439	D440	D441	K442	Q446	K447	V448	R449	E450	V451	M452	P457	L537	L538	V317	I461	I470	M471	D472	S473	L476	Y480	W481	A483	I484	I485	F486	S489	K490	L491	Q492	M493	T494	I497	I498	P499	L500	L501	E502	R503	I504	F505	D512	M513	F514	T515																																															
M518	V519	G520	D593	L521	L522	L523	K524	I525	Y526	D441	K442	Q446	K447	V448	R449	E450	V451	M452	P457	L537	L538	V317	I461	I470	M471	D472	S473	L476	Y480	W481	A483	I484	I485	F486	S489	K490	L491	Q492	M493	T494	I497	I498	P499	L500	L501	E502	R503	I504	F505	D512	M513	F514	T515																																														
M590	L591	P592	D593	C594	K595	L596	R597	Y598	E599	L603	T606	L607	M608	F609	L610	Q614	V615	S620	M623	E626	L632	R636	D637	R641	T642	K643	A647	K651	T652	K653	T654	D655	K656	V658	F661	Y665	L666	F667	G668	T671	V672	R673	F674	S675																																																							
P676	R677	W678	G680	D683	T684	F703	E599	L603	T606	L607	M608	F609	L610	Q614	V615	S620	M623	E626	L632	R636	D637	R641	T642	K643	A647	K651	T652	K653	T654	D655	K656	V658	F661	Y665	L666	F667	G668	T671	V672	R673	F674	S675																																																									
R795	L796	F904	THR	TYR	LYS	ASP	GLU	ASP	ASN	GLU	ASP	ASN	GLU	ARG	VAL	ILE	THR	GLY	S822	W823	T824	D827	R828	M829	V830	K833	S836	K839	V844	F845	S846	E849	S860	R861	M862	T863	D864	V865	Q866	L874	K877	S981	L881	M882	K883	F984	N985	K958	P959	Y960	S969	L972	D973	Y976	F977	N980	S981	Q983	I984	N985	Y988	R989																																					
D886	L891	F897	K898	D899	E900	I901	T902	T903	F904	L905	Q911	A915	T910	D917	E918	N922	P923	L926	R927	I928	F929	F930	G931	S944	R945	I950	V952	N955	K958	P959	Y960	S969	L972	D973	Y976	F977	N980	S981	Q983	I984	N985	Y988	R989																																																								
S987	K988	K992	R996	F1000	I1003	V1004	M1005	L1008	L1011	R1012	T1013	M1014	F1015	P1016	H1017	H1018	T1019	S1021	V1022	I1023	M1032	V1036	S1041	T1042	E1043	E1044	M1050	L1059	K1060	C1061	L1062	V1065	F1068	V1069	F1073	D1074	M1075	S1076	M1079	E1086	D1081	I1082	N985	Y988	R989																																																						
A1084	V1085	V1086	V1087	K1088	P1089	R1090	I1091	S1095	L1096	E1097	M1098	Q1101	P1102	S1103	L1106	H1114	M1115	P1116	S1117	L1118	Y1119	Q1120	F1121	L1122	Y1124	D1125	E1126	F1127	A1128	T1129	A1132	L1133	T1136	V1142	K1143	I1147	G1148	I1151	E1152	A1153	D1154	D1155	S1156	I1157	I1158	H1166	Y1167	V1168																																																			
D1169	L1170	V1171	T1172	L1173	S1174	C1175	T1176	I1250	V1251	M1258	I1261	E1262	E1263	L1264	Y1265	L1189	S1190	D1191	S1192	M1193	S1194	I1195	S1196	T1197	F1198	L1199	M1200	E1277	R1278	M1201	Y1205	T1206	E1207	M1208	L1284	G1209	F1210	I1211	D1214	H1215	V1216	I1221	S1222	I1225	S1226	I1227	L1228	L1232	K1233	S1302	K1303	L1304	V1305	L1306	D1307	M1372																																											
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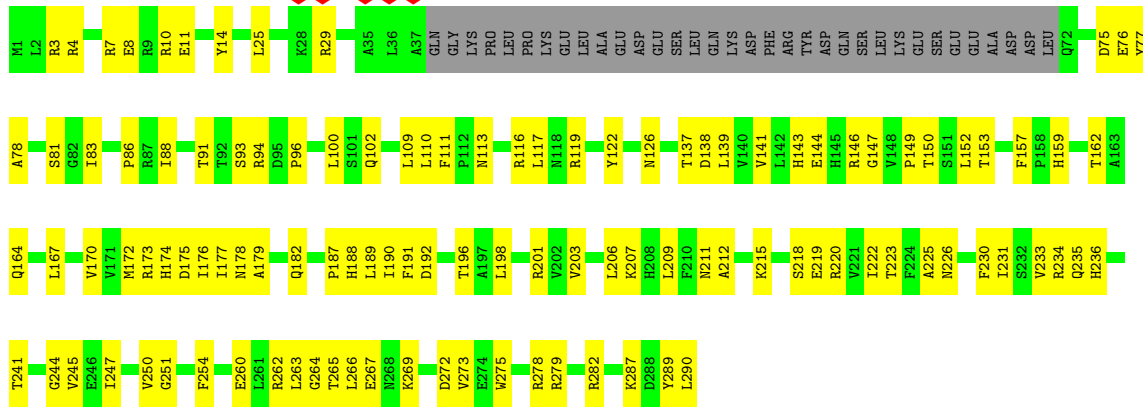
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D2334	Y2335	I2340	G2341	G2342	I2343	F2344	S2345	T2347	ASP	HIS	ARG	MET	S2353	F2354	M2355	S2356	K2357	R2440	R2441	K2442	E2443	R2444	R2445	R2448	A2449	I2450	LEU	ALA	VAL	N2454	E2379	GLY	E2381	K2382	L2385	P2386	L2387	Y2390	LEU	GLU	THR	TYR	GLN	THR	ARG	ALA	VAL	ASP	ASN	GLY	GLU	ASN	TYR	GLN	THR	GLN	ALA	ARG							
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L2106	V2109	S2110	F2111	N2112	D2113	D2114	A2115	L2125	L2130	P2131	K2132	L2133	E2134	N2135	K2136	D2137	L2138	E2139	I2140	V2141	E2142	A2146	L2149	L2158	G2161	ASP	N2154	A2155	L2158	N2159	L2160	G2161	R2162	R2163	T2164	Y2165	K2166	Y2167	Y2168	L2169	K2170	S2171	ILE	GLY	PHE	ASP	ASP	ASN	H2176	S2096	K2097	L2098	S2099	A2105											
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T1914	R1915	L1916	I1917	L1918	I1919	T1920	L1921	L1924	F1925	D1926	S1927	D1928	E1929	S1930	K1935	R1939	K1940	V1941	L1942	N1943	I1944	P1949	S1950	T1951	S1952	L1960	K1961	S1964	A1965	F1966	T1970	L1983	V1986	L1987	P1988	D1989	L1990	Q1996	G1997	L1998	A1999	F2000	R2001	F2002	L2003	L2006																			
S1808	E1809	I1810	L1811	L1812	S1825	ASN	SER	PRO	GLN	PRD	PRO	LYS	LYS	VAL	LYS	ASP	GLN	L1847	L1848	T1856	K1856	N1860	S1861	L1863	L1868	R1877	R1882	H1883	R1884	L1887	T1888	V1889	H1891	I1896	L1899	L1903	F1904	R1905	S1905	E1906	M1907	V1910																							
R1601	D1602	D1603	E1604	T1605	I1606	E1608	R1609	M1610	P1611	L1616	V1617	M1618	G1621	L1622	T1623	M1625	I1628	F1631	L1632	I1635	L1636	T1637	Q1641	V1642	L1643	R1644	S1645	K1646	S1647	R1651	D1652	R1655	I1663	I1664	L1665	G1666	A1667	E1668	Y1669	V1671	R1683	G1684	S1685	Q1686	V1689																				
Y1523	R1529	S1532	M1533	T1536	K1537	K1542	V1545	V1549	Q1550	L1551	P1554	L1555	R1556	E1557	T1558	L1559	V1562	R1563	ASP	GLY	ALA	GLU	SER	LYS	LEU	THR	LEU	SER	LYS	PHE	PRO	ASN	ASP	LEU	ASP	GLU	PRO	SER	A1584	F1585	I1586	K1587	L1590	Y1591	P1592	T1593	L1594	K1596																	
GLY	ASP	GLU	GLU	ASP	PHE	THR	THR	ASN	ASN	VAL	HIS	ILE	Q1458	Q1463	R1468	L1469	G1470	E1471	H1472	A1473	H1474	Q1475	L1476	K1477	D1478	M1479	L1480	S1481	S1482	H1483	Y1484	L1485	I1486	I1489	S1495	ASP	R1498	R1499	TYR	R1501	M1502	I1503	G1504	M1505	E1506	T1507	Q1508	I1509	Q1516	H1517	M1518														
K1373	F1374	I1375	L1376	F1377	M1378	E1380	K1381	P1382	ASN	ASN	L1384	M1385	E1386	A1387	S1388	K1389	S1390	I1391	S1392	M1393	L1394	H1395	D1396	I1397	L1398	L1399	D1408	S1409	E1412	S1415	E1416	Y1417	V1418	L1421	M1424	V1425	K1426	M1427	T1428	G1429	Y1430	F1431	E1435	I1439	L1440	L1441	TYR	ASN																	

• Molecule 23: U3 small nucleolar RNA-associated protein 21

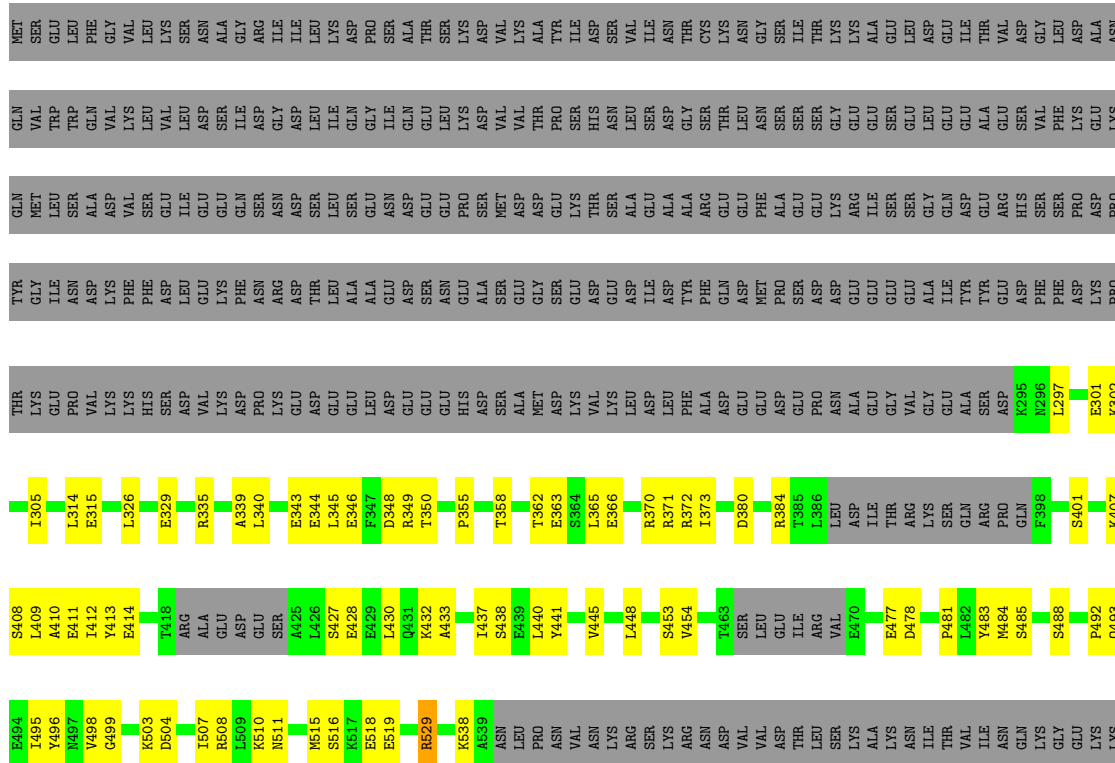




• Molecule 31: U3 small nucleolar ribonucleoprotein protein IMP4



• Molecule 32: U3 small nucleolar RNA-associated protein MPP10



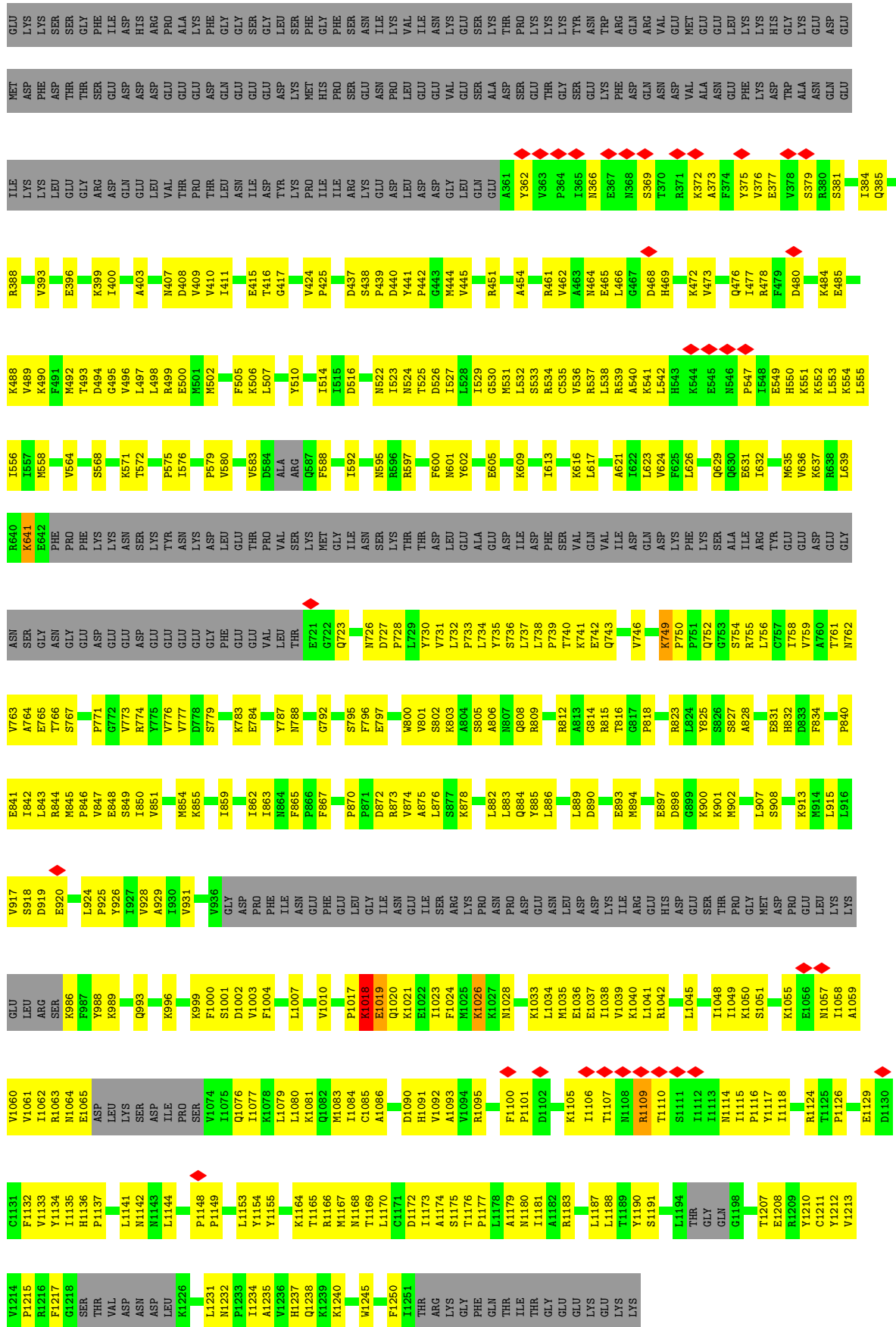
ASP VAL SER GLY LYS THR LYS LYS SER SER ARG SER SER PRO ASP THR THR ASN ILE LYS LEU

● Molecule 33: Ribosome biogenesis protein BMS1

Chain CL:



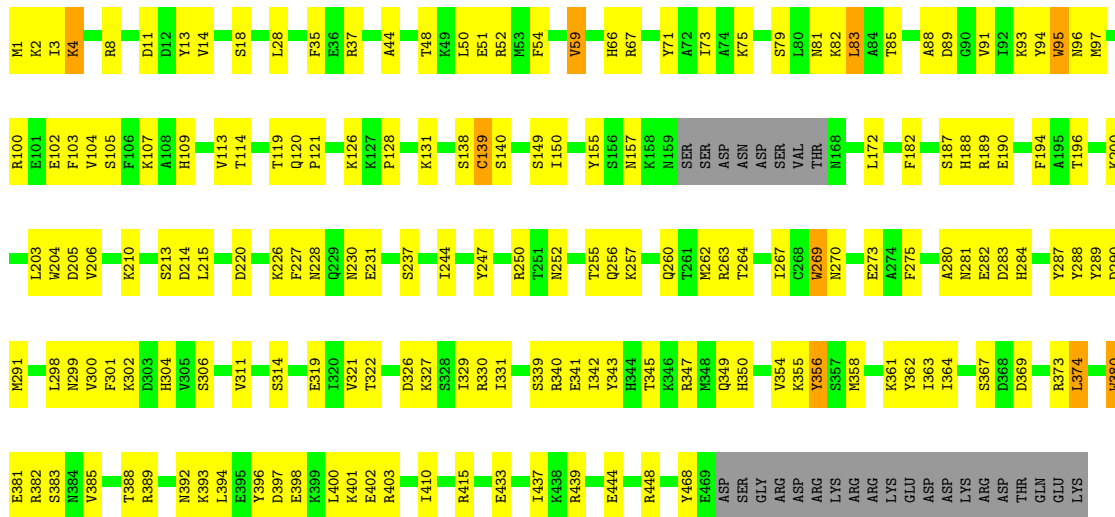
Table of amino acid residues for Chain CL, including residue number and name. Residues are color-coded by validation status: green (good), yellow (medium), orange (poor), and grey (not modeled).



ARG
ARG

- Molecule 42: Protein SOF1

Chain JP: 59% 33% 6%



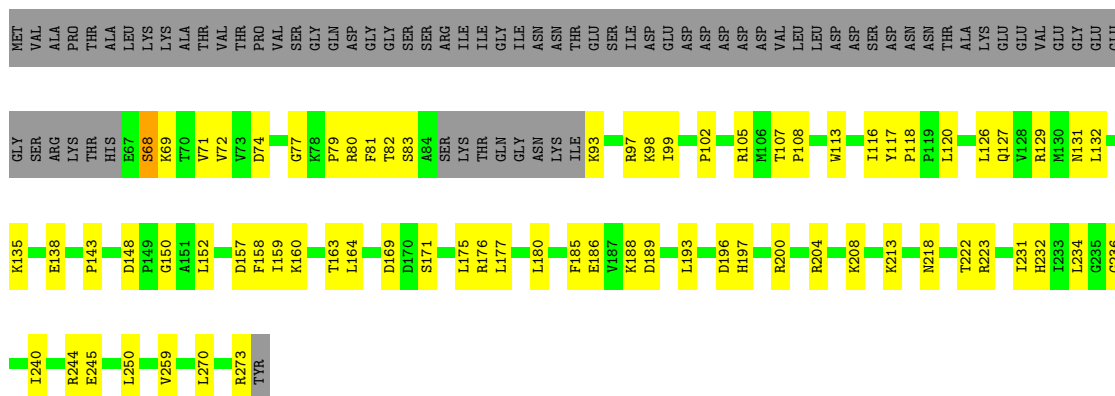
- Molecule 43: 40S ribosomal protein S27-A

Chain Db: 98%



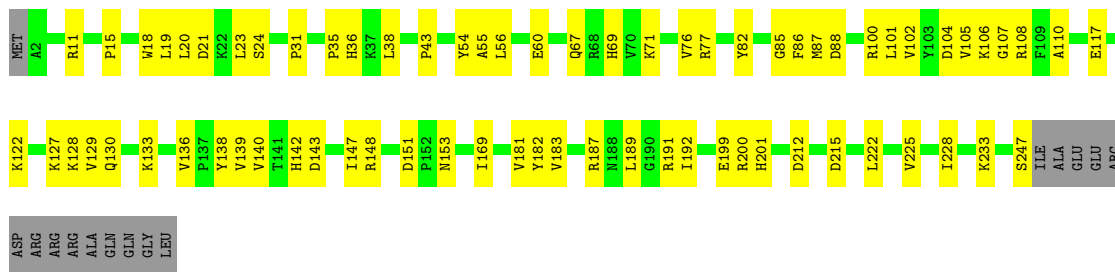
- Molecule 44: Pre-rRNA-processing protein PNO1

Chain JJ: 46% 26% 27%

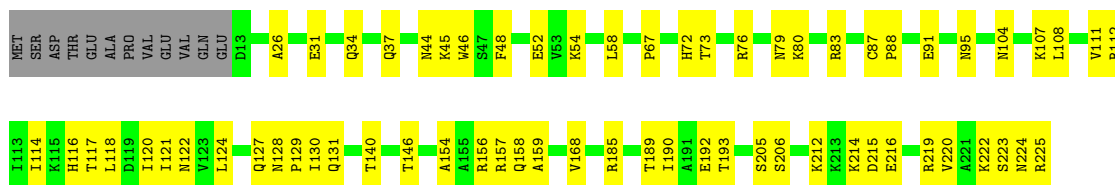


- Molecule 45: 40S ribosomal protein S4-A

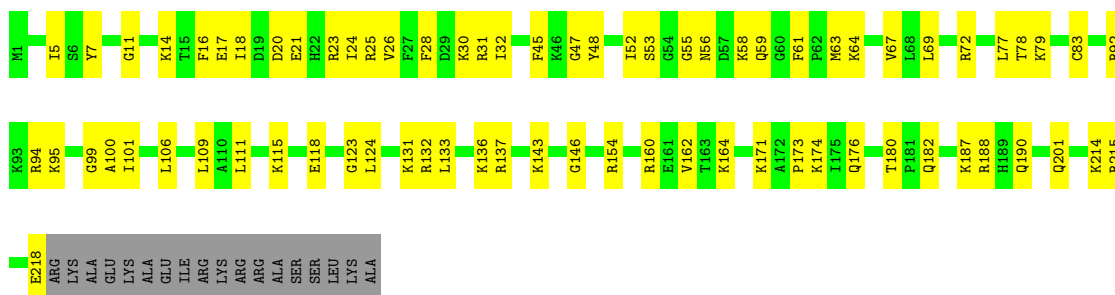
Chain DE: 67% 27% 6%



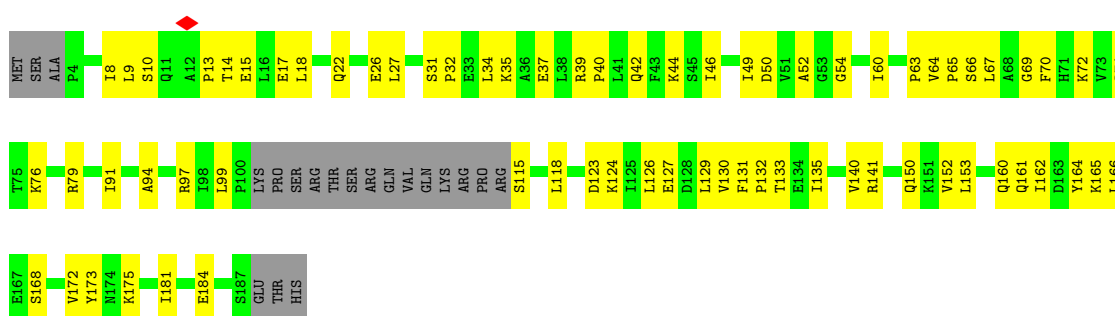
• Molecule 46: 40S ribosomal protein S5



• Molecule 47: 40S ribosomal protein S6-A

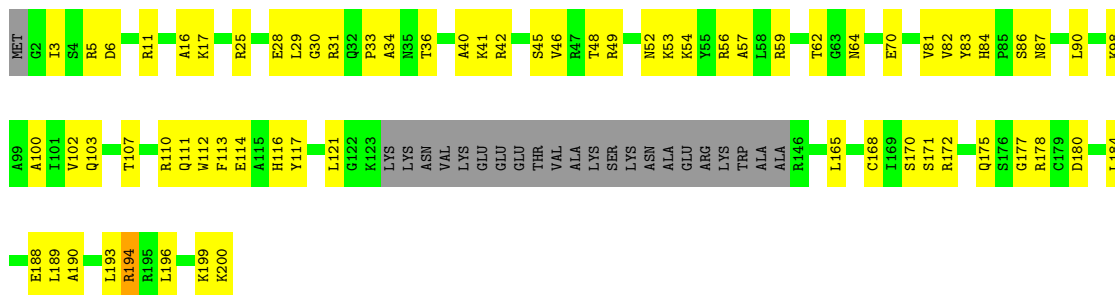


• Molecule 48: 40S ribosomal protein S7-A

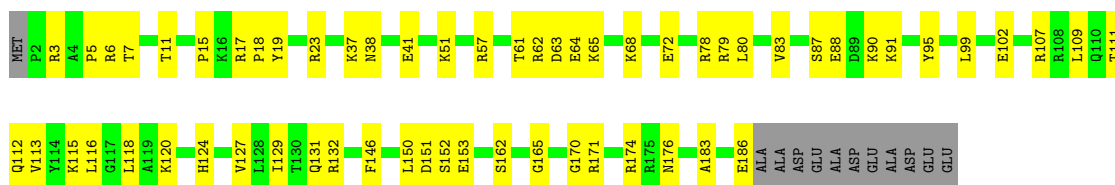


• Molecule 49: 40S ribosomal protein S8-A

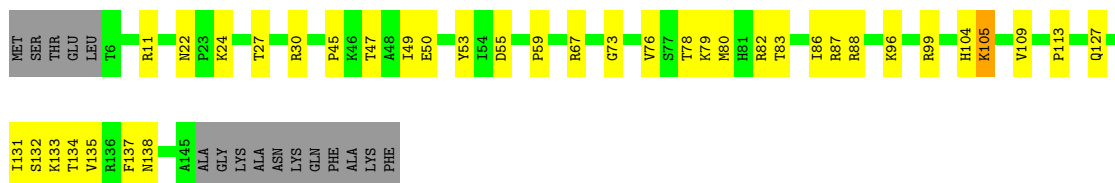




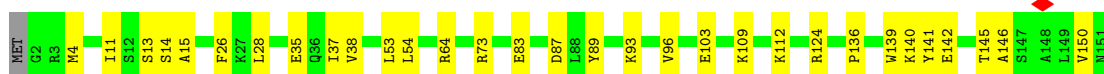
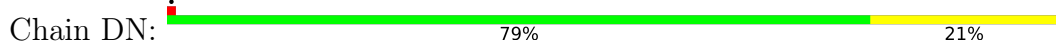
- Molecule 50: 40S ribosomal protein S9-A



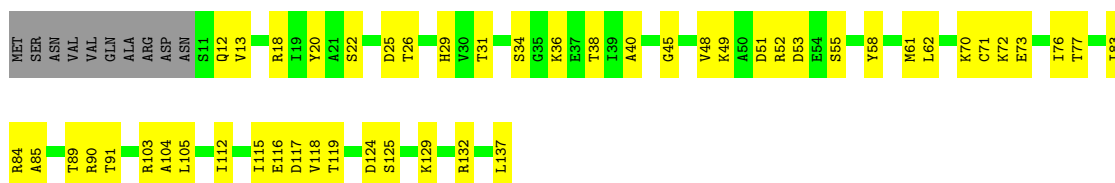
- Molecule 51: 40S ribosomal protein S11-A



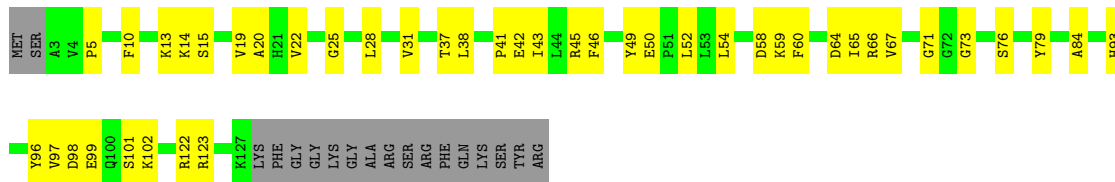
- Molecule 52: 40S ribosomal protein S13



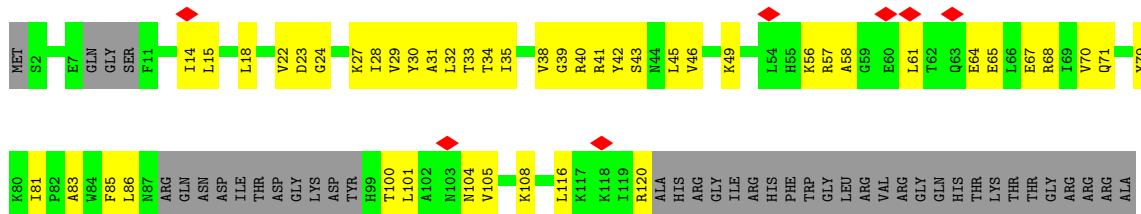
- Molecule 53: 40S ribosomal protein S14-A



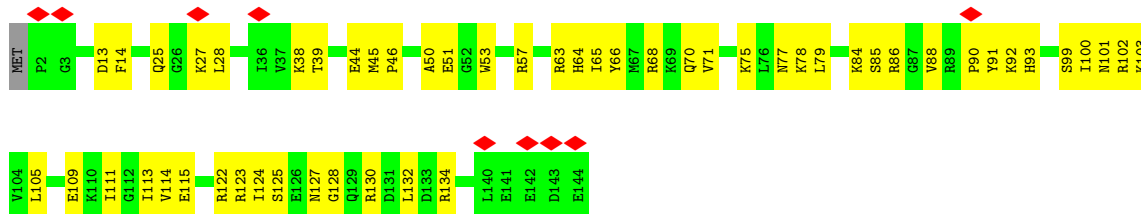
- Molecule 54: 40S ribosomal protein S16-A



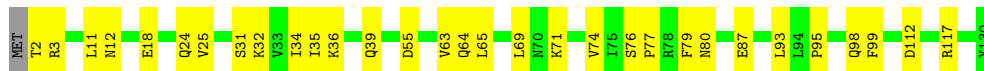
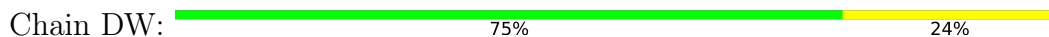
• Molecule 55: 40S ribosomal protein S18-A



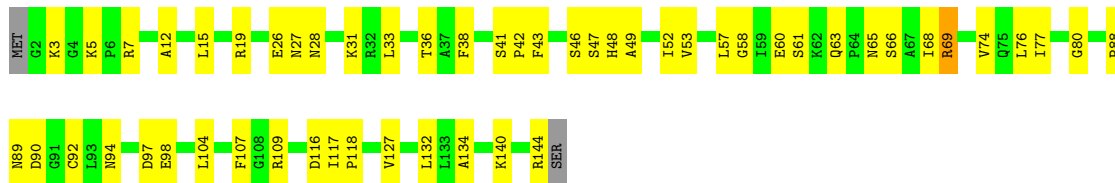
• Molecule 56: 40S ribosomal protein S19-A



• Molecule 57: 40S ribosomal protein S22-A



• Molecule 58: 40S ribosomal protein S23-A



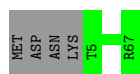
• Molecule 59: 40S ribosomal protein S24-A

Chain DY: 76% 24%



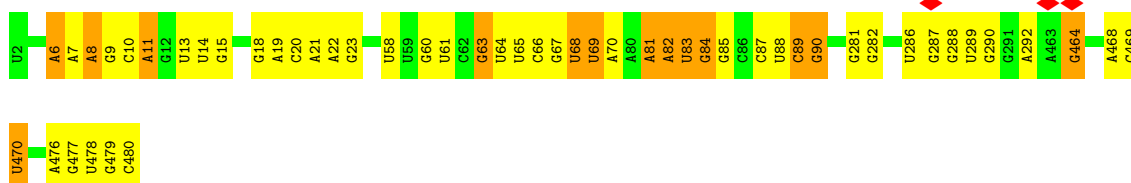
- Molecule 60: 40S ribosomal protein S28-A

Chain Dc: 94% 6%



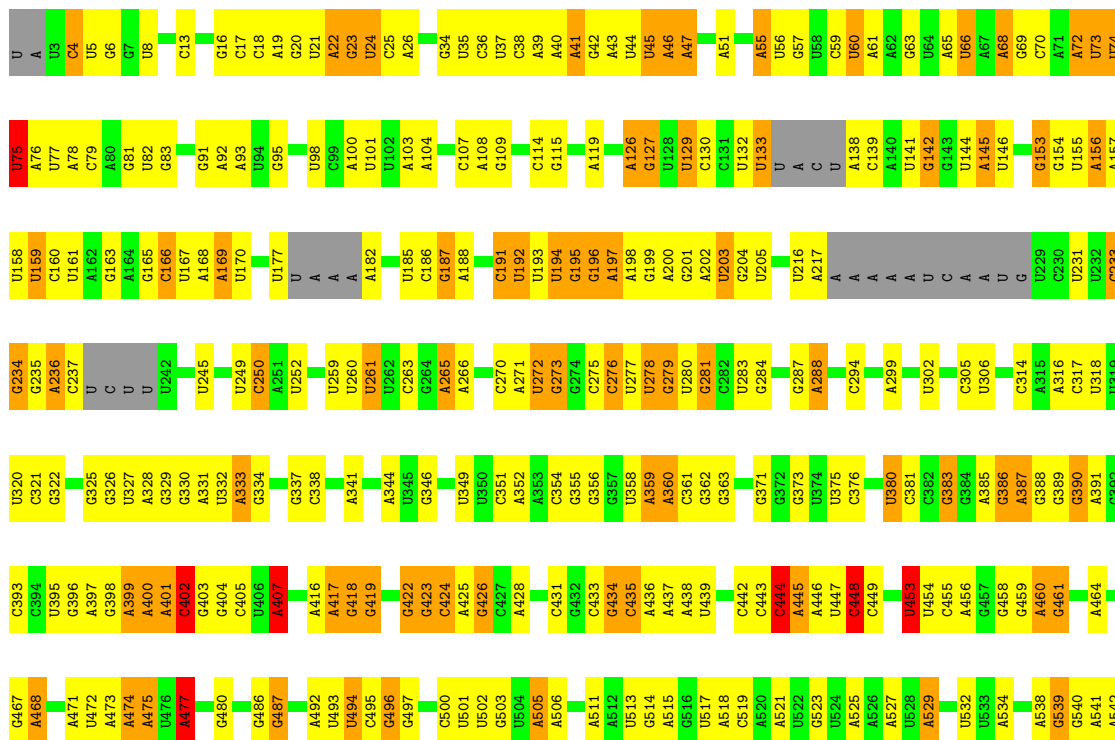
- Molecule 61: 5'ETS RNA

Chain D2: 36% 47% 17%

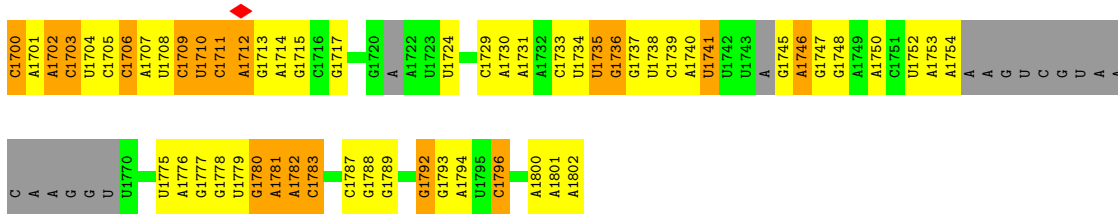


- Molecule 62: 18S rRNA

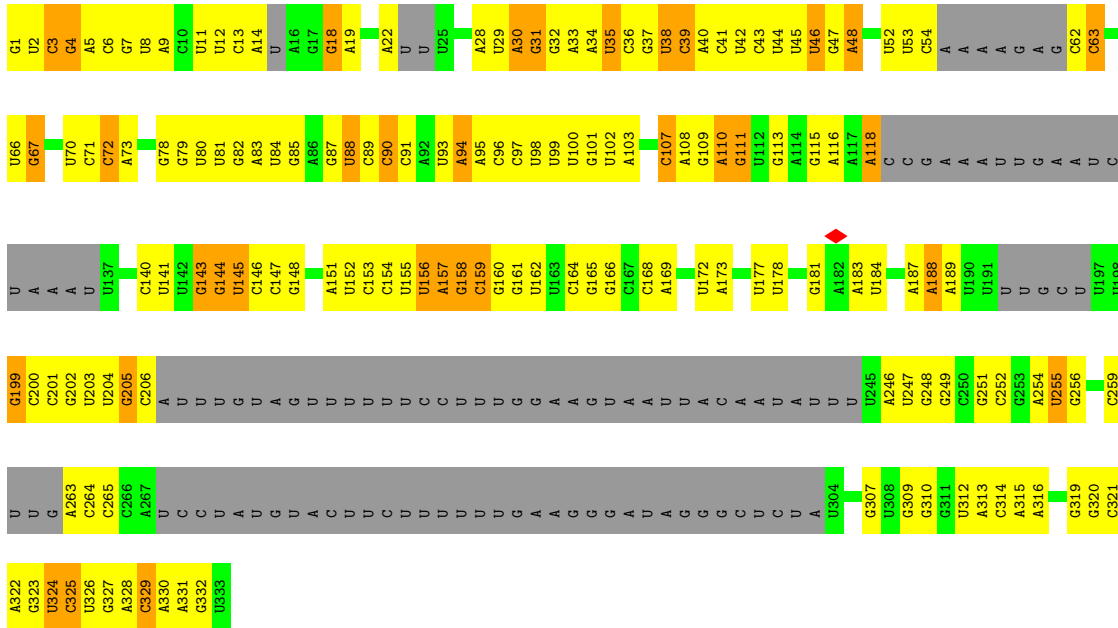
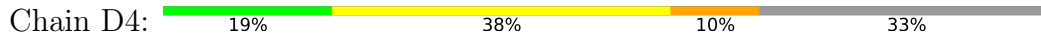
Chain D3: 30% 35% 12% 22%



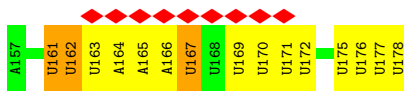
U1629	G1629	G1041	G972	G895	C827	U	U679	C543
U1630	G1042	G1043	A973	U896	U828	U744	U680	A544
A1631	A1043	A1043	A974	C897	A829	C747	U681	A545
C1632	C1120	C1120	C975	A898	U830	C747	U682	U546
A1633	G1046	G1046	G976	G899	U831	A753	G610	U547
C1638	G1053	G1053	A977	A900	U	A754	U611	G548
C1639	U1054	U1054	A978	G901	U	A754	U612	G549
G1645	U1057	U1057	G980	U903	U	A762	U613	G552
U1646	U1058	U1058	U981	G904	U	A763	C614	G553
U1647	U1059	U1059	U982	A905	U	A764	A615	G554
G1648	U1060	U1060	A983	A906	U	U765	G616	A555
U1649	A1061	A1061	G984	A907	U	U766	U617	A556
U1650	A1062	A1062	G985	U908	U	A769	U618	A557
A1651	U1063	U1063	G986	U909	U	A770	A619	U558
C1654	A1064	A1064	C990	C910	C842	A771	A620	C559
A1655	A1065	A1065	G991	U911	U843	A772	A621	U560
U1656	C1066	C1066	A992	U912	A844	C773	A622	G561
U1657	G1067	G1067	A993	G913	G845	A774	A623	G562
G1658	A1069	A1069	G994	C914	G846	A775	U628	U653
U1661	C1072	C1072	G997	A915	A847	G776	U629	C565
G1662	U1073	U1073	U998	U916	C848	G777	U638	G566
G1663	G1074	G1074	A999	U917	C849	G778	U	A567
U1664	C1075	C1075	C1000	U921	A850	G779	U	G568
U1665	A1076	A1076	A1001	G922	C852	A780	C	C569
A1666	C1077	C1077	U1003	A923	G853	U781	A642	A570
U1667	U1078	U1078	A1004	U924	U854	U782	G643	G571
U1668	U1079	U1079	U1005	G925	A855	C784	C709	C572
U1669	U1080	U1080	C1006	C927	U	C785	U710	C573
U1670	A1081	A1081	C1007	U930	U	C786	U649	C575
C1671	C1082	C1082	U1008	A931	A860	G787	U650	G576
G1672	G1085	G1085	C1010	U932	U861	A	G655	U578
C1673	A1086	A1086	C1011	A933	A862	U790	G656	A579
C1674	A1087	A1087	U1012	C934	A863	A793	U657	U581
C1677	A1088	A1088	A1013	U935	U864	U794	U658	U582
U1680	A1091	A1091	C1016	A939	G868	U795	C	C583
U1681	A1092	A1092	A1020	A941	A869	A803	G	C584
U1682	A1093	A1093	C1021	G942	U873	A804	A	A585
U1683	C1096	C1096	C1022	G948	C874	U805	U	G586
U1684	U1097	U1097	A1023	C949	G875	A	U	U588
U1685	U1098	U1098	U1024	U958	G876	A	U	C589
U1686	U1099	U1099	A1025	U959	G877	U813	U	A592
U1687	G1100	G1100	A1026	U960	A881	A817	U	A594
A1688	U1106	U1106	C1028	G957	U884	C	G	G595
U1689	G1107	G1107	U1031	U988	A884	U	U	C596
U1690	G1108	G1108	G1032	U959	G885	G	U	A599
U1691	G1110	G1110	U1036	U960	G886	U	U	U600
A1691	G1111	G1111	C1037	A966	A887	U	A	A601
U1692	G1112	G1112	U1038	C969	A881	U	U	U602
U1693	A1113	A1113	A1039	A970	A892	G823	G	U603
U1694	G1114	G1114	U1115	U971	U893	U824	A	A
U1695	U1115	U1115			U894	U826	C	A
U1696							U	
U1697								
U1698								
U1699								



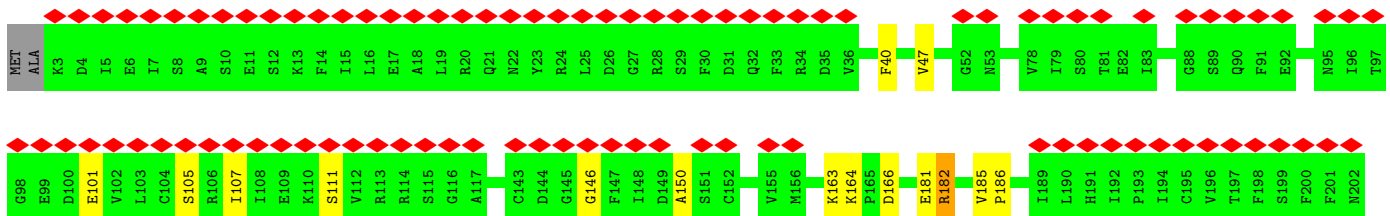
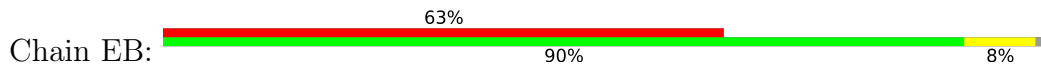
• Molecule 63: U3 snoRNA

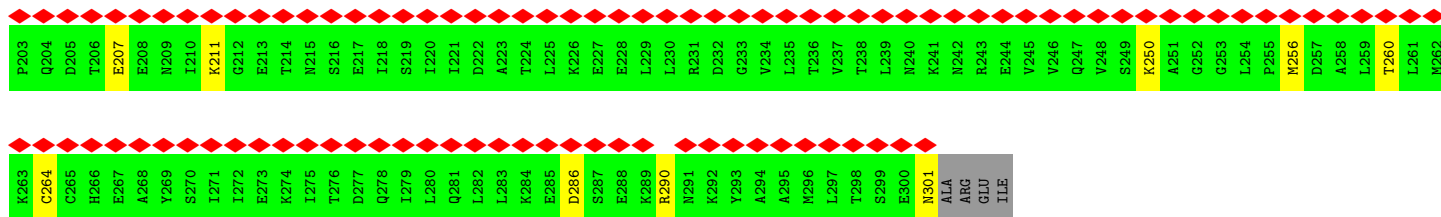


• Molecule 64: RNA

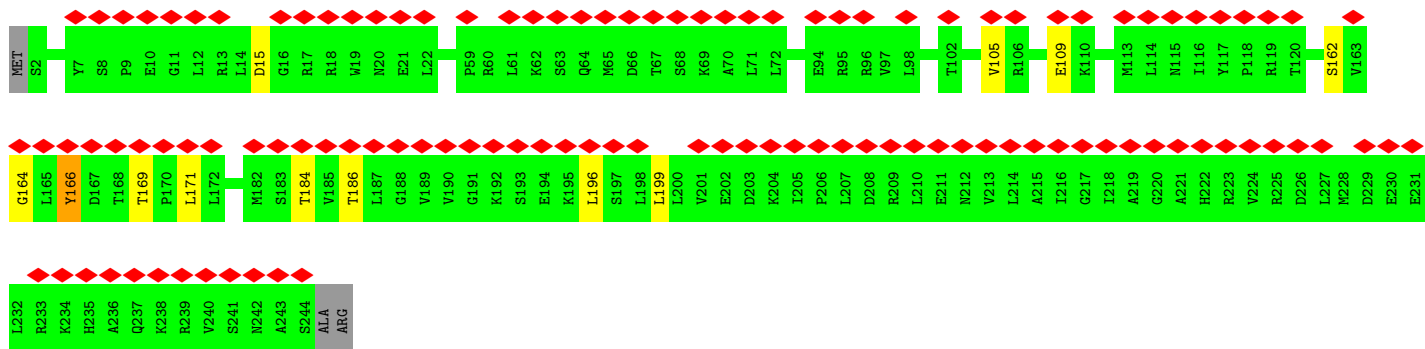


• Molecule 65: Exosome complex component RRP45

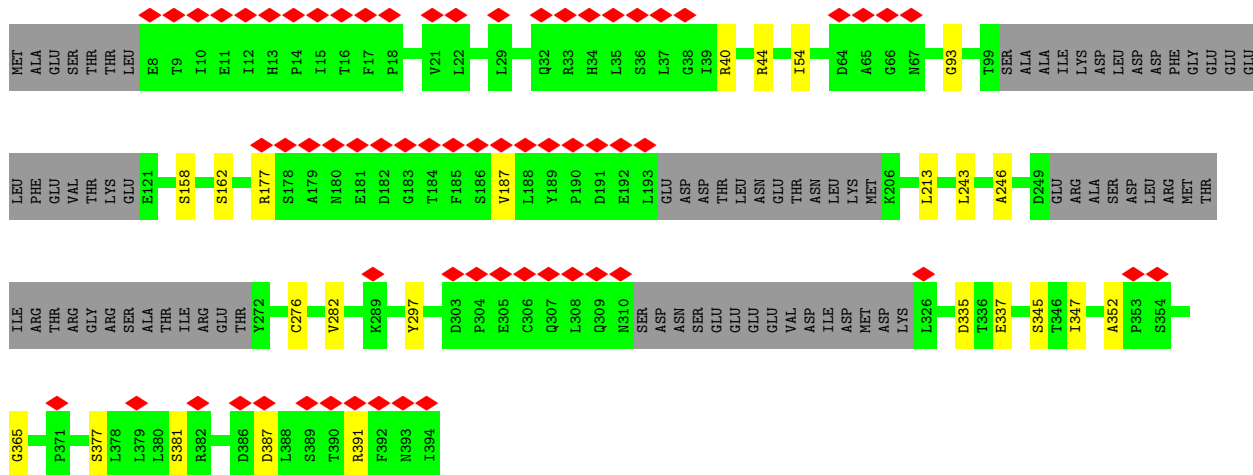
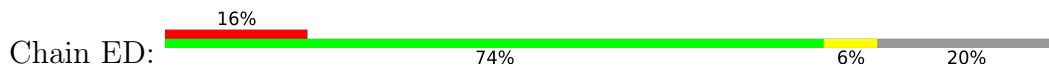




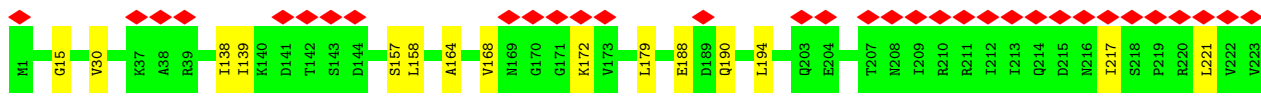
• Molecule 66: Exosome complex component SKI6



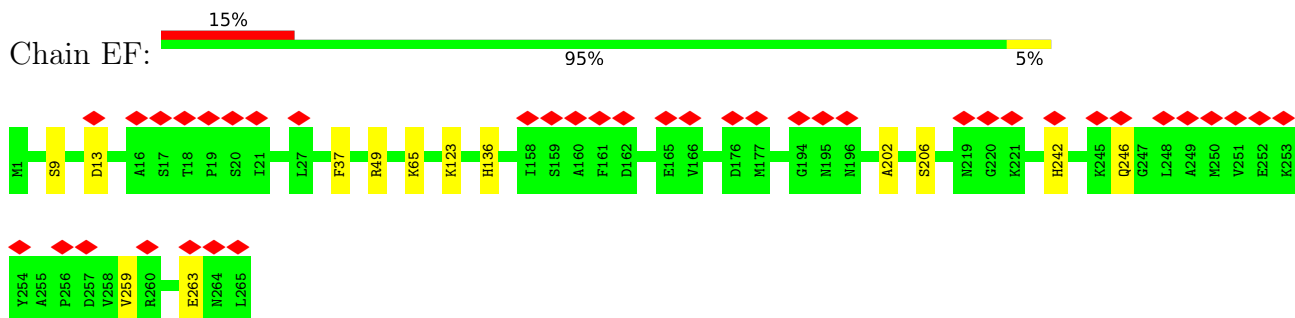
• Molecule 67: Exosome complex component RRP43



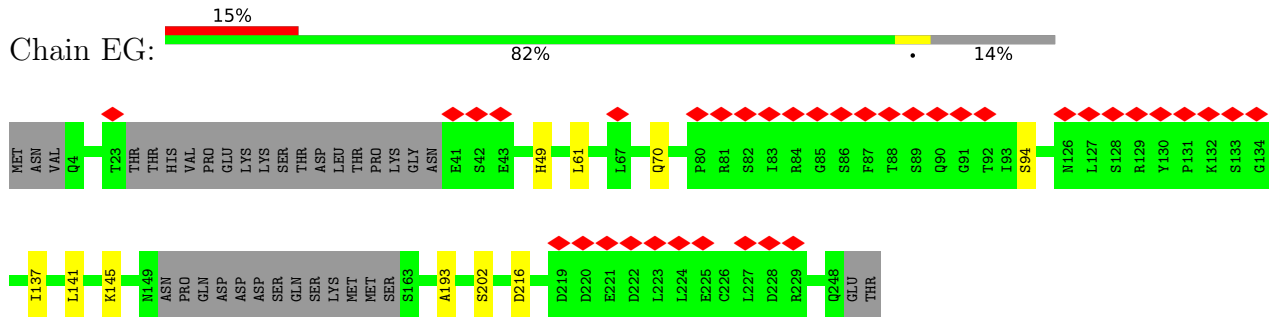
• Molecule 68: Exosome complex component RRP46



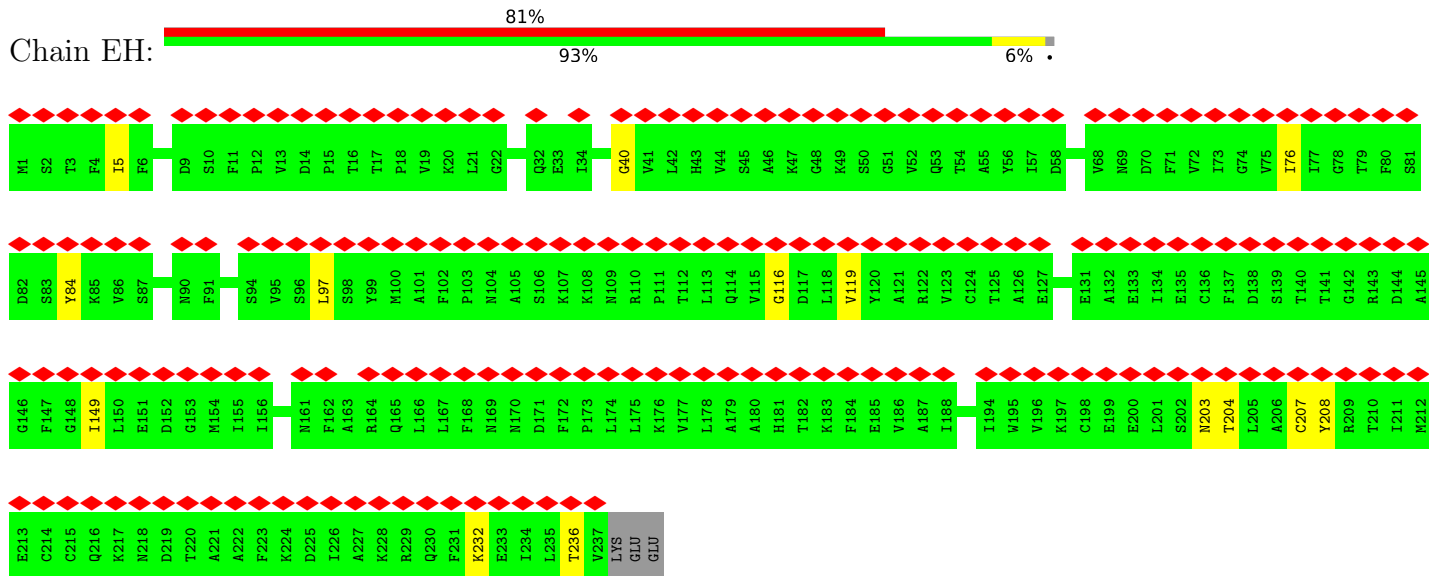
• Molecule 69: Exosome complex component RRP42



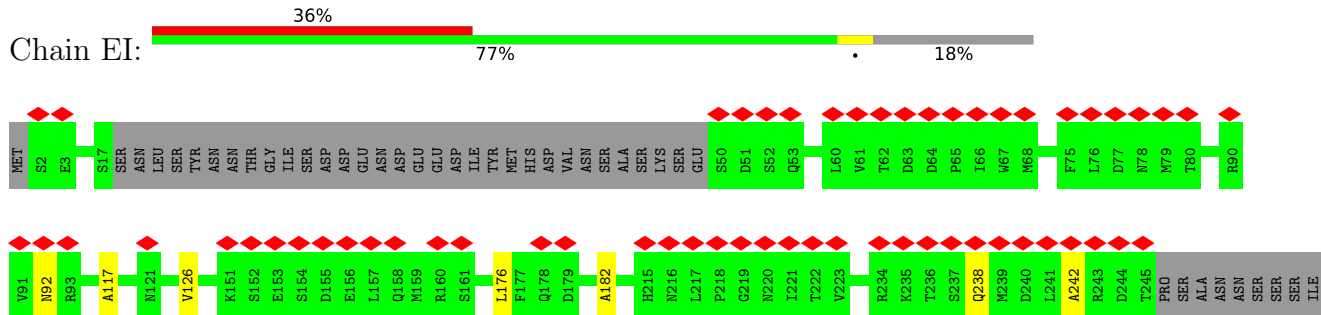
• Molecule 70: Exosome complex component MTR3

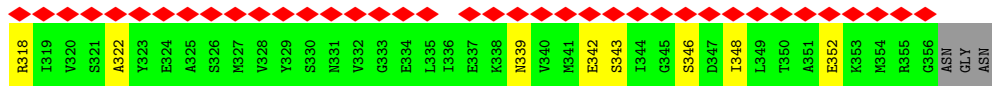
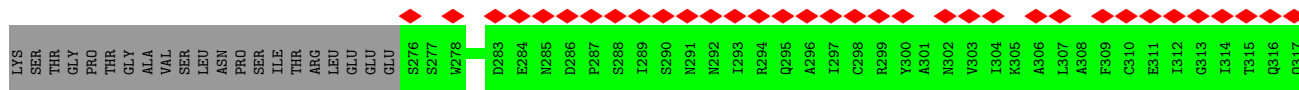


• Molecule 71: Exosome complex component RRP40

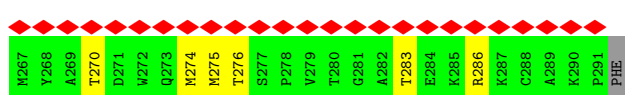
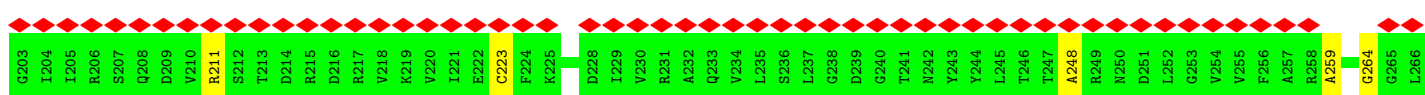
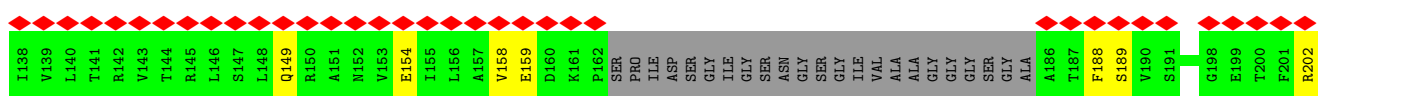
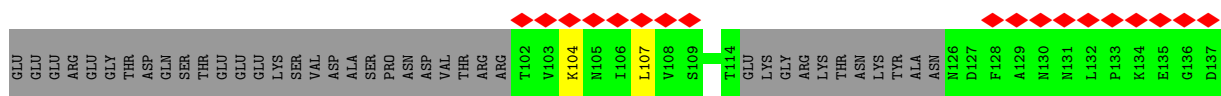
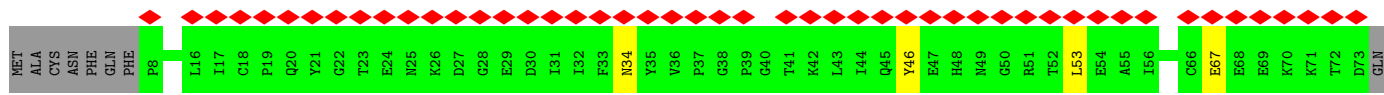


• Molecule 72: Exosome complex component RRP4

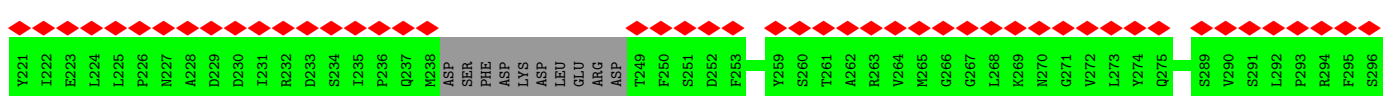
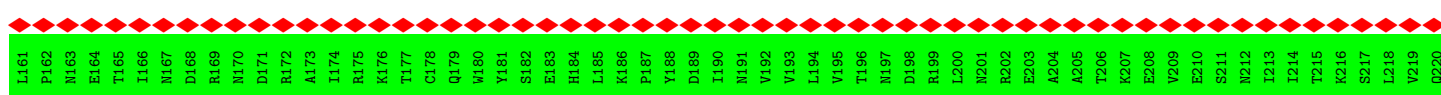
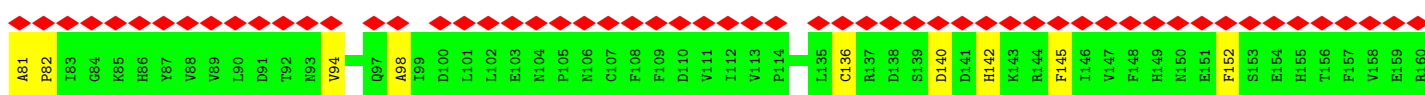
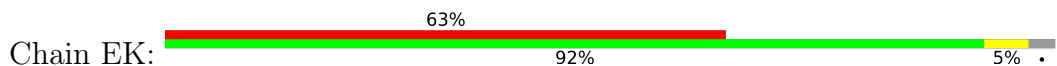


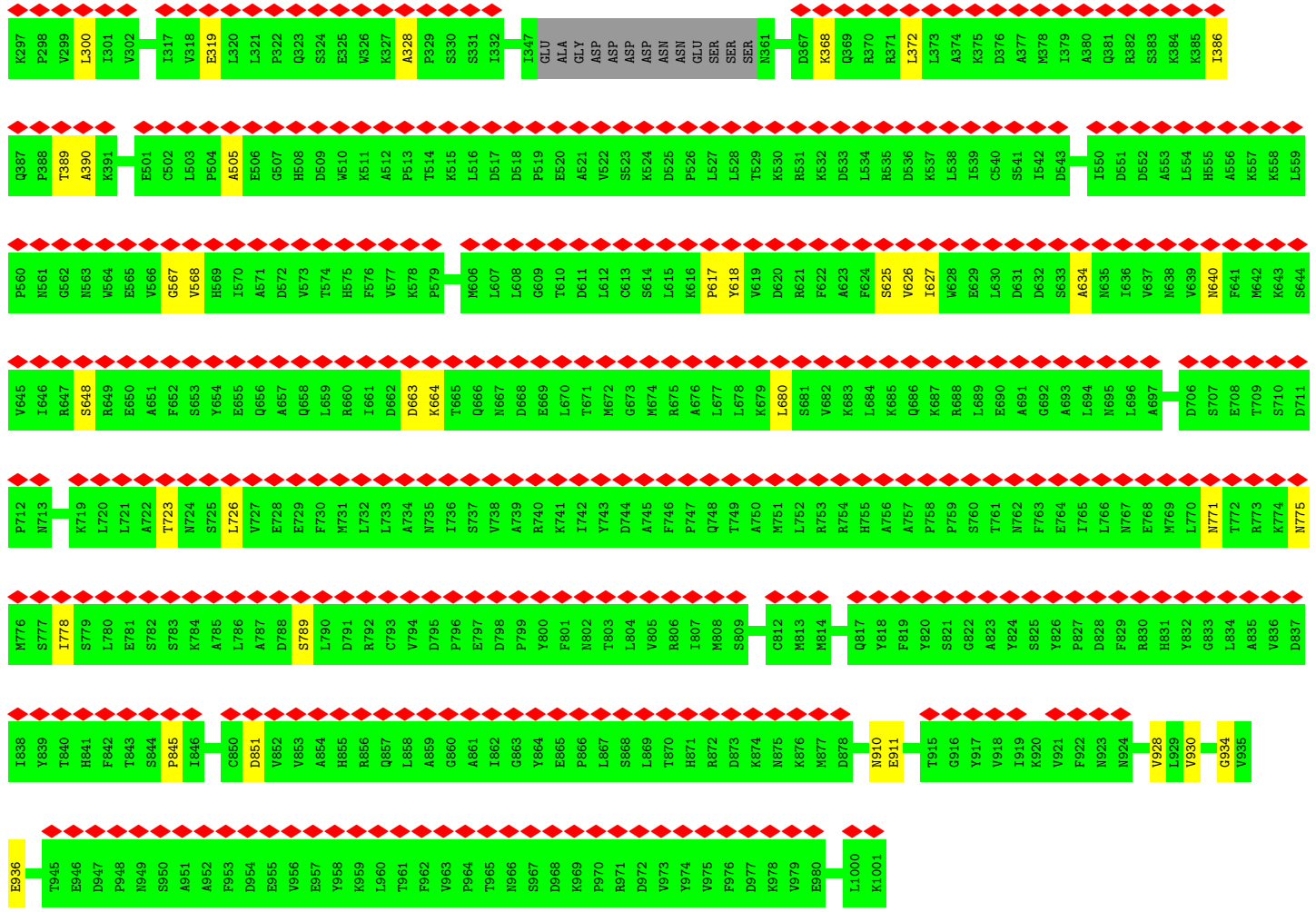


● Molecule 73: Exosome complex component CSL4

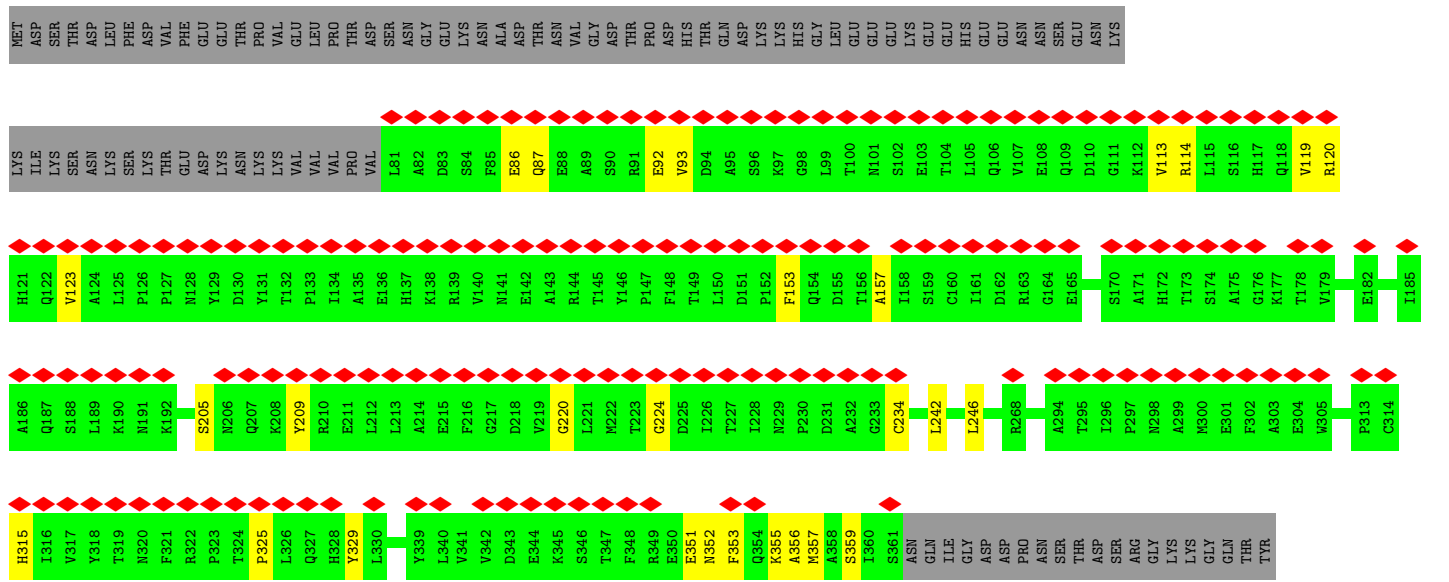
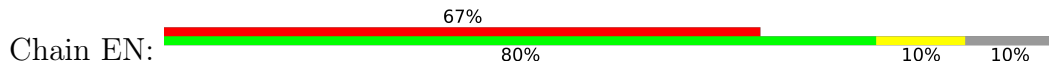


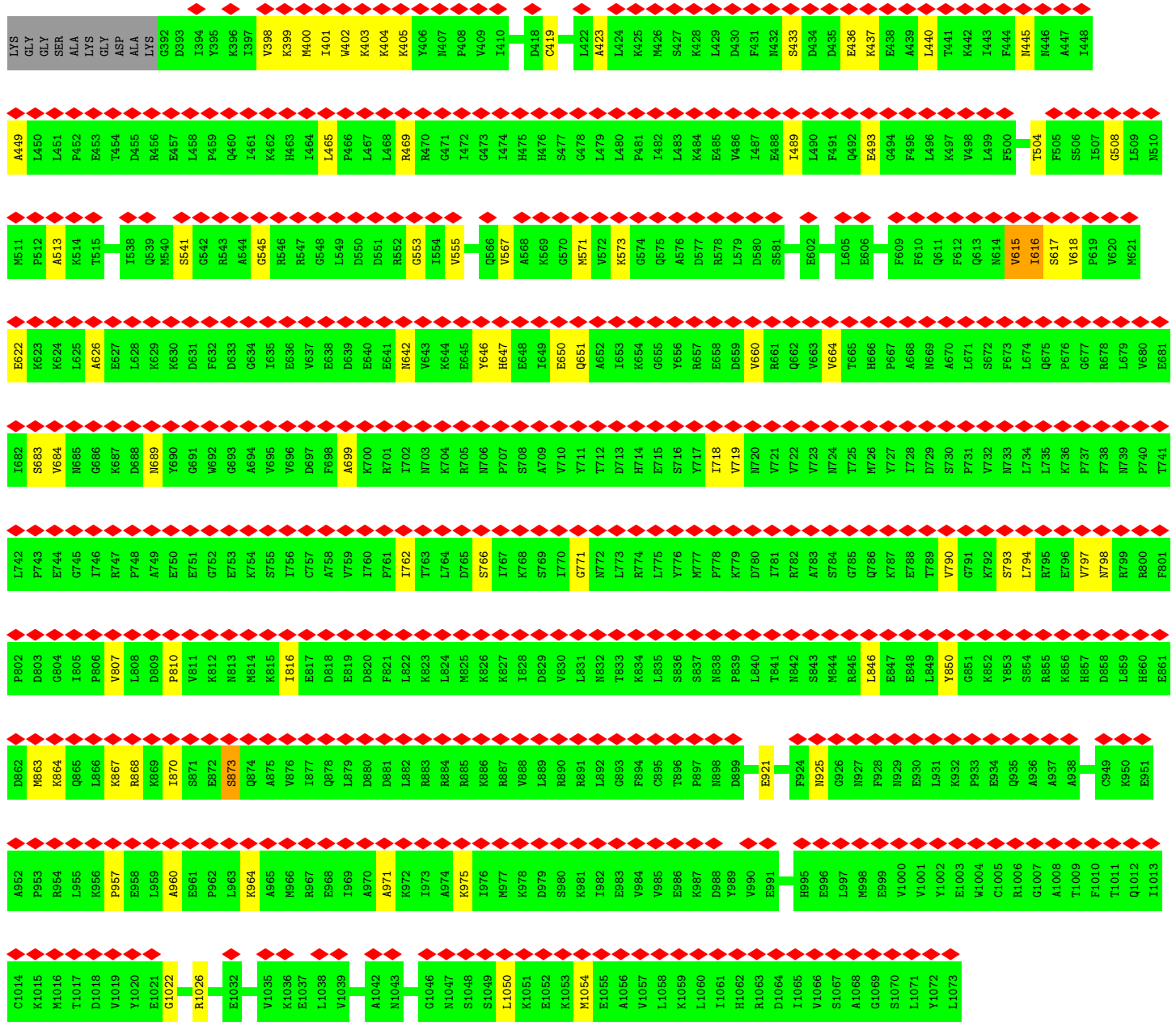
● Molecule 74: Exosome complex exonuclease DIS3





● Molecule 75: ATP-dependent RNA helicase DOB1





4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	35320	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	0.473	Depositor
Minimum map value	-0.263	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.008	Depositor
Recommended contour level	0.01	Depositor
Map size (Å)	571.86, 571.86, 571.86	wwPDB
Map dimensions	540, 540, 540	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.059, 1.059, 1.059	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, ZN, MG

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	0.76	0/1917	0.66	0/2588
1	CB	0.38	0/1815	0.54	1/2448 (0.0%)
2	DA	0.62	0/1937	0.62	0/2593
3	UA	0.65	1/6465 (0.0%)	0.63	2/8752 (0.0%)
4	UB	0.30	0/4158	0.45	0/5607
5	UC	0.69	0/699	0.63	1/919 (0.1%)
6	UD	0.31	0/5369	0.52	1/7272 (0.0%)
7	UE	0.39	0/3840	0.52	0/5208
8	UF	0.52	0/2538	0.56	1/3405 (0.0%)
9	UG	0.64	1/3796 (0.0%)	0.65	1/5126 (0.0%)
10	UH	0.24	0/2773	0.49	0/3798
11	UI	0.24	0/735	0.50	0/987
12	UJ	0.39	0/9111	0.53	1/12323 (0.0%)
13	UK	0.36	0/1869	0.52	0/2472
14	UL	0.43	0/6324	0.57	2/8546 (0.0%)
15	UM	0.43	0/6071	0.59	1/8218 (0.0%)
16	UN	0.58	0/1697	0.58	0/2284
17	UO	0.31	0/3993	0.55	1/5413 (0.0%)
18	UP	0.31	0/499	0.57	0/659
19	UQ	0.30	0/6688	0.50	0/9062
20	UR	0.44	0/3875	0.56	0/5254
21	US	0.26	0/3667	0.45	0/5001
22	UT	0.49	0/19132	0.61	1/25831 (0.0%)
23	UU	0.53	0/7059	0.56	0/9536
24	UV	0.39	0/8962	0.51	0/12120
25	UX	0.78	0/1353	0.72	2/1819 (0.1%)
26	CD	0.55	0/3041	0.57	1/4098 (0.0%)
27	CE	0.38	0/3364	0.55	1/4539 (0.0%)
28	CF	0.63	0/928	0.79	3/1262 (0.2%)
28	CG	0.63	0/928	0.79	3/1262 (0.2%)
29	CH	0.61	1/3809 (0.0%)	0.59	1/5128 (0.0%)
30	CI	0.45	0/1494	0.60	0/2008

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
31	CJ	0.53	0/2118	0.62	0/2855
32	CK	0.48	0/1808	0.62	3/2424 (0.1%)
33	CL	0.58	0/6691	0.61	1/9000 (0.0%)
34	CM	0.50	0/2832	0.58	1/3825 (0.0%)
35	CN	0.38	0/1909	0.51	0/2571
36	JD	0.33	0/6634	0.53	0/8927
37	JF	0.26	0/1727	0.51	1/2329 (0.0%)
37	JG	0.29	0/1828	0.51	1/2470 (0.0%)
38	JH	0.23	0/1293	0.36	0/1801
39	JI	0.23	0/1313	0.36	0/1830
40	JL	0.32	0/2305	0.51	0/3116
41	JM	0.40	0/1151	0.56	0/1535
42	JP	0.87	5/3844 (0.1%)	0.72	6/5174 (0.1%)
43	Db	0.63	0/620	0.62	0/838
44	JJ	0.55	0/1600	0.62	0/2154
45	DE	0.89	0/1991	0.69	0/2683
46	DF	0.49	0/1690	0.56	0/2285
47	DG	0.53	0/1779	0.60	0/2379
48	DH	0.56	0/1383	0.64	0/1863
49	DI	0.67	0/1422	0.63	0/1899
50	DJ	0.82	0/1519	0.70	1/2035 (0.0%)
51	DL	0.83	0/1155	0.63	1/1557 (0.1%)
52	DN	0.65	0/1215	0.61	0/1638
53	DO	0.61	0/933	0.65	0/1256
54	DQ	0.56	0/986	0.58	0/1330
55	DS	0.28	0/871	0.58	0/1171
56	DT	0.35	0/1130	0.57	0/1517
57	DW	0.92	0/1038	0.74	0/1395
58	DX	0.65	0/1133	0.68	1/1510 (0.1%)
59	DY	0.77	0/1087	0.60	0/1449
60	Dc	0.55	0/499	0.62	0/670
61	D2	0.33	0/1946	0.79	0/3024
62	D3	1.26	54/33586 (0.2%)	1.01	49/52290 (0.1%)
63	D4	0.67	0/5263	0.86	2/8171 (0.0%)
64	EA	0.77	0/405	1.53	6/625 (1.0%)
65	EB	0.47	0/1474	0.57	0/2050
66	EC	0.47	0/1198	0.58	0/1666
67	ED	0.43	0/1569	0.62	0/2179
68	EE	0.46	0/1109	0.61	0/1545
69	EF	0.42	0/1319	0.60	0/1839
70	EG	0.45	0/1055	0.59	0/1462
71	EH	0.45	0/1169	0.64	0/1626
72	EI	0.44	0/1437	0.62	0/1992

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
73	EJ	0.40	0/1087	0.62	0/1504
74	EK	0.39	0/4818	0.57	0/6720
75	EN	0.40	0/4760	0.58	0/6629
All	All	0.65	62/249605 (0.0%)	0.67	97/346346 (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
9	UG	0	2
10	UH	0	3
14	UL	0	1
15	UM	0	1
17	UO	0	1
22	UT	0	2
25	UX	0	1
26	CD	0	1
36	JD	0	1
42	JP	0	2
44	JJ	0	1
51	DL	0	1
59	DY	0	1
66	EC	0	1
67	ED	0	3
68	EE	0	1
69	EF	0	1
70	EG	0	2
72	EI	0	1
73	EJ	0	1
75	EN	0	3
All	All	0	32

The worst 5 of 62 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
42	JP	380	TRP	CB-CG	-6.84	1.38	1.50
3	UA	422	PHE	CB-CG	-6.75	1.39	1.51
62	D3	385	A	N9-C4	-6.50	1.33	1.37
62	D3	407	A	N9-C4	-6.26	1.34	1.37

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
62	D3	538	A	N9-C4	-6.21	1.34	1.37

The worst 5 of 97 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
64	EA	167	U	N1-C2-O2	13.97	132.58	122.80
64	EA	167	U	N3-C2-O2	-11.26	114.32	122.20
64	EA	167	U	C2-N1-C1'	11.20	131.14	117.70
62	D3	849	C	OP2-P-O3'	-11.15	80.68	105.20
62	D3	850	A	OP1-P-OP2	9.95	134.53	119.60

There are no chirality outliers.

5 of 32 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	DA	11	LYS	Peptide
9	UG	199	LEU	Peptide
9	UG	452	VAL	Peptide
10	UH	266	ILE	Peptide
10	UH	74	ILE	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	105	0
1	CB	1782	0	1826	100	0
2	DA	1912	0	2023	89	0
3	UA	6322	0	6223	242	0
4	UB	4105	0	3846	152	0
5	UC	694	0	742	31	0
6	UD	5269	0	5281	267	0
7	UE	3772	0	3806	189	0
8	UF	2487	0	2533	99	0
9	UG	3718	0	3721	140	0
10	UH	2771	0	1817	75	0
11	UI	723	0	770	37	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
12	UJ	8961	0	9273	378	0
13	UK	1845	0	1926	100	0
14	UL	6199	0	6221	306	0
15	UM	5970	0	6009	358	0
16	UN	1667	0	1658	67	0
17	UO	3911	0	3906	284	0
18	UP	495	0	561	40	0
19	UQ	6557	0	6489	338	0
20	UR	3791	0	3772	200	0
21	US	3587	0	3200	130	0
22	UT	18789	0	19126	887	0
23	UU	6922	0	6886	301	0
24	UV	8753	0	8867	421	0
25	UX	1330	0	1416	59	0
26	CD	2994	0	3018	101	0
27	CE	3326	0	3406	161	0
28	CF	916	0	964	54	0
28	CG	916	0	964	50	0
29	CH	3736	0	3756	124	0
30	CI	1468	0	1519	73	0
31	CJ	2081	0	2112	107	0
32	CK	1789	0	1801	99	0
33	CL	6551	0	6707	284	0
34	CM	2781	0	2878	109	0
35	CN	1868	0	1845	92	0
36	JD	6509	0	6724	354	0
37	JF	1701	0	1767	78	0
37	JG	1799	0	1872	92	0
38	JH	1295	0	570	3	0
39	JI	1314	0	610	5	0
40	JL	2262	0	2330	88	0
41	JM	1131	0	1161	62	0
42	JP	3765	0	3714	145	0
43	Db	610	0	630	0	0
44	JJ	1573	0	1650	70	0
45	DE	1950	0	2035	57	0
46	DF	1669	0	1724	53	0
47	DG	1755	0	1846	70	0
48	DH	1361	0	1437	52	0
49	DI	1399	0	1431	61	0
50	DJ	1494	0	1573	47	0
51	DL	1129	0	1196	31	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
52	DN	1192	0	1255	32	0
53	DO	922	0	946	44	0
54	DQ	969	0	1025	37	0
55	DS	861	0	896	38	0
56	DT	1112	0	1124	40	0
57	DW	1021	0	1060	29	0
58	DX	1115	0	1191	53	0
59	DY	1073	0	1132	25	0
60	Dc	497	0	535	0	0
61	D2	1741	0	876	50	0
62	D3	30042	0	15140	753	0
63	D4	4720	0	2397	161	0
64	EA	366	0	184	1	0
65	EB	1475	0	658	14	0
66	EC	1199	0	527	9	0
67	ED	1571	0	699	10	0
68	EE	1107	0	499	7	0
69	EF	1317	0	575	6	0
70	EG	1058	0	478	4	0
71	EH	1170	0	528	7	0
72	EI	1440	0	648	7	0
73	EJ	1091	0	500	12	0
74	EK	4818	0	2108	32	0
75	EN	4762	0	2107	57	0
76	Db	1	0	0	0	0
76	EK	1	0	0	0	0
76	UX	1	0	0	0	0
77	CL	32	0	12	3	0
78	CL	1	0	0	0	0
78	EK	1	0	0	0	0
All	All	242031	0	212166	8401	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 19.

The worst 5 of 8401 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)
14:UL:671:PHE:HA	14:UL:684:TRP:O	1.25	1.32
3:UA:77:GLY:HA3	3:UA:95:PHE:O	1.27	1.28
9:UG:132:GLY:HA3	9:UG:150:LEU:O	1.33	1.24

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
23:UU:228:GLY:HA3	23:UU:246:ILE:O	1.12	1.22
59:DY:29:HIS:O	59:DY:67:GLY:HA2	1.36	1.21

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%)	211 (89%)	27 (11%)	0	100	100
1	CB	224/327 (68%)	209 (93%)	15 (7%)	0	100	100
2	DA	236/255 (92%)	210 (89%)	26 (11%)	0	100	100
3	UA	786/923 (85%)	699 (89%)	87 (11%)	0	100	100
4	UB	535/810 (66%)	513 (96%)	22 (4%)	0	100	100
5	UC	82/610 (13%)	72 (88%)	10 (12%)	0	100	100
6	UD	653/776 (84%)	589 (90%)	64 (10%)	0	100	100
7	UE	465/643 (72%)	425 (91%)	40 (9%)	0	100	100
8	UF	283/440 (64%)	278 (98%)	5 (2%)	0	100	100
9	UG	464/554 (84%)	410 (88%)	54 (12%)	0	100	100
10	UH	446/713 (63%)	406 (91%)	39 (9%)	1 (0%)	47	79
11	UI	86/575 (15%)	84 (98%)	2 (2%)	0	100	100
12	UJ	1092/1769 (62%)	1030 (94%)	62 (6%)	0	100	100
13	UK	213/250 (85%)	197 (92%)	15 (7%)	1 (0%)	29	66
14	UL	765/943 (81%)	677 (88%)	88 (12%)	0	100	100
15	UM	750/817 (92%)	663 (88%)	87 (12%)	0	100	100
16	UN	197/899 (22%)	180 (91%)	17 (9%)	0	100	100
17	UO	489/513 (95%)	453 (93%)	36 (7%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
18	UP	58/214 (27%)	55 (95%)	3 (5%)	0	100	100
19	UQ	810/896 (90%)	739 (91%)	71 (9%)	0	100	100
20	UR	473/594 (80%)	435 (92%)	38 (8%)	0	100	100
21	US	479/552 (87%)	456 (95%)	23 (5%)	0	100	100
22	UT	2265/2493 (91%)	2078 (92%)	185 (8%)	2 (0%)	51	83
23	UU	870/939 (93%)	792 (91%)	78 (9%)	0	100	100
24	UV	1071/1237 (87%)	1025 (96%)	46 (4%)	0	100	100
25	UX	163/189 (86%)	148 (91%)	15 (9%)	0	100	100
26	CD	376/504 (75%)	354 (94%)	21 (6%)	1 (0%)	41	74
27	CE	434/511 (85%)	404 (93%)	30 (7%)	0	100	100
28	CF	119/126 (94%)	112 (94%)	7 (6%)	0	100	100
28	CG	119/126 (94%)	112 (94%)	7 (6%)	0	100	100
29	CH	461/573 (80%)	416 (90%)	44 (10%)	1 (0%)	47	79
30	CI	171/183 (93%)	159 (93%)	12 (7%)	0	100	100
31	CJ	252/290 (87%)	220 (87%)	32 (13%)	0	100	100
32	CK	214/593 (36%)	198 (92%)	16 (8%)	0	100	100
33	CL	796/1183 (67%)	723 (91%)	73 (9%)	0	100	100
34	CM	358/367 (98%)	332 (93%)	26 (7%)	0	100	100
35	CN	221/297 (74%)	212 (96%)	9 (4%)	0	100	100
36	JD	793/1267 (63%)	714 (90%)	77 (10%)	2 (0%)	41	74
37	JF	212/252 (84%)	207 (98%)	5 (2%)	0	100	100
37	JG	226/252 (90%)	218 (96%)	8 (4%)	0	100	100
38	JH	257/483 (53%)	250 (97%)	7 (3%)	0	100	100
39	JI	263/1729 (15%)	251 (95%)	12 (5%)	0	100	100
40	JL	281/318 (88%)	269 (96%)	12 (4%)	0	100	100
41	JM	130/217 (60%)	119 (92%)	11 (8%)	0	100	100
42	JP	457/489 (94%)	410 (90%)	47 (10%)	0	100	100
43	Db	79/82 (96%)	72 (91%)	7 (9%)	0	100	100
44	JJ	195/274 (71%)	180 (92%)	15 (8%)	0	100	100
45	DE	244/261 (94%)	231 (95%)	13 (5%)	0	100	100
46	DF	211/225 (94%)	190 (90%)	21 (10%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
47	DG	216/236 (92%)	201 (93%)	15 (7%)	0	100	100
48	DH	166/190 (87%)	150 (90%)	16 (10%)	0	100	100
49	DI	173/200 (86%)	162 (94%)	11 (6%)	0	100	100
50	DJ	183/197 (93%)	168 (92%)	15 (8%)	0	100	100
51	DL	138/156 (88%)	131 (95%)	7 (5%)	0	100	100
52	DN	148/151 (98%)	141 (95%)	7 (5%)	0	100	100
53	DO	125/137 (91%)	110 (88%)	15 (12%)	0	100	100
54	DQ	123/143 (86%)	113 (92%)	10 (8%)	0	100	100
55	DS	99/146 (68%)	91 (92%)	8 (8%)	0	100	100
56	DT	141/144 (98%)	129 (92%)	12 (8%)	0	100	100
57	DW	127/130 (98%)	109 (86%)	18 (14%)	0	100	100
58	DX	141/145 (97%)	125 (89%)	16 (11%)	0	100	100
59	DY	132/135 (98%)	126 (96%)	6 (4%)	0	100	100
60	Dc	61/67 (91%)	56 (92%)	5 (8%)	0	100	100
65	EB	297/305 (97%)	274 (92%)	21 (7%)	2 (1%)	22	60
66	EC	241/246 (98%)	224 (93%)	17 (7%)	0	100	100
67	ED	308/394 (78%)	283 (92%)	24 (8%)	1 (0%)	41	74
68	EE	222/223 (100%)	209 (94%)	13 (6%)	0	100	100
69	EF	264/265 (100%)	250 (95%)	14 (5%)	0	100	100
70	EG	209/250 (84%)	192 (92%)	17 (8%)	0	100	100
71	EH	235/240 (98%)	217 (92%)	18 (8%)	0	100	100
72	EI	287/359 (80%)	262 (91%)	25 (9%)	0	100	100
73	EJ	214/292 (73%)	198 (92%)	16 (8%)	0	100	100
74	EK	965/1001 (96%)	939 (97%)	25 (3%)	1 (0%)	51	83
75	EN	959/1073 (89%)	891 (93%)	64 (7%)	4 (0%)	34	70
All	All	27236/36685 (74%)	25138 (92%)	2082 (8%)	16 (0%)	54	83

5 of 16 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
36	JD	1019	GLU
75	EN	615	VAL
75	EN	617	SER

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Mol	Chain	Res	Type
10	UH	309	PRO
29	CH	552	TRP

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	CA	202/240 (84%)	202 (100%)	0	100	100
1	CB	192/240 (80%)	192 (100%)	0	100	100
2	DA	212/224 (95%)	211 (100%)	1 (0%)	88	94
3	UA	695/812 (86%)	693 (100%)	2 (0%)	92	96
4	UB	382/732 (52%)	381 (100%)	1 (0%)	92	96
5	UC	74/538 (14%)	74 (100%)	0	100	100
6	UD	604/713 (85%)	603 (100%)	1 (0%)	93	97
7	UE	428/574 (75%)	426 (100%)	2 (0%)	88	94
8	UF	277/414 (67%)	273 (99%)	4 (1%)	67	81
9	UG	405/480 (84%)	402 (99%)	3 (1%)	84	91
10	UH	125/657 (19%)	122 (98%)	3 (2%)	49	71
11	UI	83/533 (16%)	81 (98%)	2 (2%)	49	71
12	UJ	1031/1633 (63%)	1027 (100%)	4 (0%)	91	95
13	UK	207/234 (88%)	207 (100%)	0	100	100
14	UL	690/832 (83%)	689 (100%)	1 (0%)	93	97
15	UM	668/719 (93%)	666 (100%)	2 (0%)	92	96
16	UN	183/808 (23%)	183 (100%)	0	100	100
17	UO	437/454 (96%)	435 (100%)	2 (0%)	88	94
18	UP	57/196 (29%)	55 (96%)	2 (4%)	36	64
19	UQ	756/826 (92%)	753 (100%)	3 (0%)	91	95
20	UR	424/529 (80%)	423 (100%)	1 (0%)	93	97
21	US	332/506 (66%)	328 (99%)	4 (1%)	71	84

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
22	UT	2134/2307 (92%)	2125 (100%)	9 (0%)	91	95
23	UU	768/819 (94%)	766 (100%)	2 (0%)	92	96
24	UV	988/1125 (88%)	984 (100%)	4 (0%)	91	95
25	UX	148/169 (88%)	146 (99%)	2 (1%)	67	81
26	CD	326/435 (75%)	325 (100%)	1 (0%)	92	96
27	CE	352/433 (81%)	350 (99%)	2 (1%)	86	92
28	CF	100/104 (96%)	85 (85%)	15 (15%)	3	18
28	CG	100/104 (96%)	85 (85%)	15 (15%)	3	18
29	CH	407/503 (81%)	407 (100%)	0	100	100
30	CI	165/172 (96%)	165 (100%)	0	100	100
31	CJ	227/258 (88%)	227 (100%)	0	100	100
32	CK	201/535 (38%)	201 (100%)	0	100	100
33	CL	710/1039 (68%)	707 (100%)	3 (0%)	91	95
34	CM	307/312 (98%)	307 (100%)	0	100	100
35	CN	209/274 (76%)	207 (99%)	2 (1%)	76	86
36	JD	724/1140 (64%)	718 (99%)	6 (1%)	81	89
37	JF	195/222 (88%)	195 (100%)	0	100	100
37	JG	206/222 (93%)	204 (99%)	2 (1%)	76	86
40	JL	255/283 (90%)	254 (100%)	1 (0%)	91	95
41	JM	125/200 (62%)	124 (99%)	1 (1%)	81	89
42	JP	416/443 (94%)	416 (100%)	0	100	100
43	Db	70/71 (99%)	69 (99%)	1 (1%)	67	81
44	JJ	174/238 (73%)	174 (100%)	0	100	100
45	DE	210/222 (95%)	210 (100%)	0	100	100
46	DF	180/191 (94%)	180 (100%)	0	100	100
47	DG	187/201 (93%)	187 (100%)	0	100	100
48	DH	151/170 (89%)	151 (100%)	0	100	100
49	DI	142/161 (88%)	141 (99%)	1 (1%)	84	91
50	DJ	158/166 (95%)	158 (100%)	0	100	100
51	DL	125/137 (91%)	125 (100%)	0	100	100
52	DN	127/128 (99%)	127 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
53	DO	90/105 (86%)	90 (100%)	0	100	100
54	DQ	104/119 (87%)	104 (100%)	0	100	100
55	DS	96/129 (74%)	96 (100%)	0	100	100
56	DT	115/116 (99%)	114 (99%)	1 (1%)	78	88
57	DW	110/111 (99%)	110 (100%)	0	100	100
58	DX	118/120 (98%)	118 (100%)	0	100	100
59	DY	112/113 (99%)	112 (100%)	0	100	100
60	Dc	56/60 (93%)	56 (100%)	0	100	100
All	All	19852/26551 (75%)	19746 (100%)	106 (0%)	89	94

5 of 106 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
27	CE	215	ARG
28	CF	114	ILE
37	JG	88	ARG
28	CF	9	PHE
28	CF	50	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 106 such sidechains are listed below:

Mol	Chain	Res	Type
22	UT	1366	ASN
24	UV	1199	ASN
46	DF	224	ASN
22	UT	2030	ASN
23	UU	490	GLN

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
61	D2	76/81 (93%)	23 (30%)	0
62	D3	1387/1802 (76%)	387 (27%)	25 (1%)
63	D4	214/333 (64%)	58 (27%)	4 (1%)
64	EA	21/22 (95%)	15 (71%)	0
All	All	1698/2238 (75%)	483 (28%)	29 (1%)

5 of 483 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
61	D2	6	A
61	D2	8	A
61	D2	11	A
61	D2	14	U
61	D2	15	G

5 of 29 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
62	D3	1058	U
63	D4	156	U
62	D3	1115	U
62	D3	1670	G
62	D3	1096	C

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 6 ligands modelled in this entry, 5 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
77	GTP	CL	2001	78	26,34,34	1.43	3 (11%)	32,54,54	1.97	7 (21%)

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
77	GTP	CL	2001	78	-	7/18/38/38	0/3/3/3

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
77	CL	2001	GTP	C5-C6	-4.96	1.37	1.47
77	CL	2001	GTP	C5-C4	-2.21	1.37	1.43
77	CL	2001	GTP	O4'-C4'	-2.09	1.40	1.45

The worst 5 of 7 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
77	CL	2001	GTP	PA-O3A-PB	-5.41	114.25	132.83
77	CL	2001	GTP	PB-O3B-PG	-4.86	116.17	132.83
77	CL	2001	GTP	C5-C6-N1	3.47	120.08	113.95
77	CL	2001	GTP	C2-N1-C6	-3.38	118.87	125.10
77	CL	2001	GTP	C3'-C2'-C1'	3.25	105.87	100.98

There are no chirality outliers.

5 of 7 torsion outliers are listed below:

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

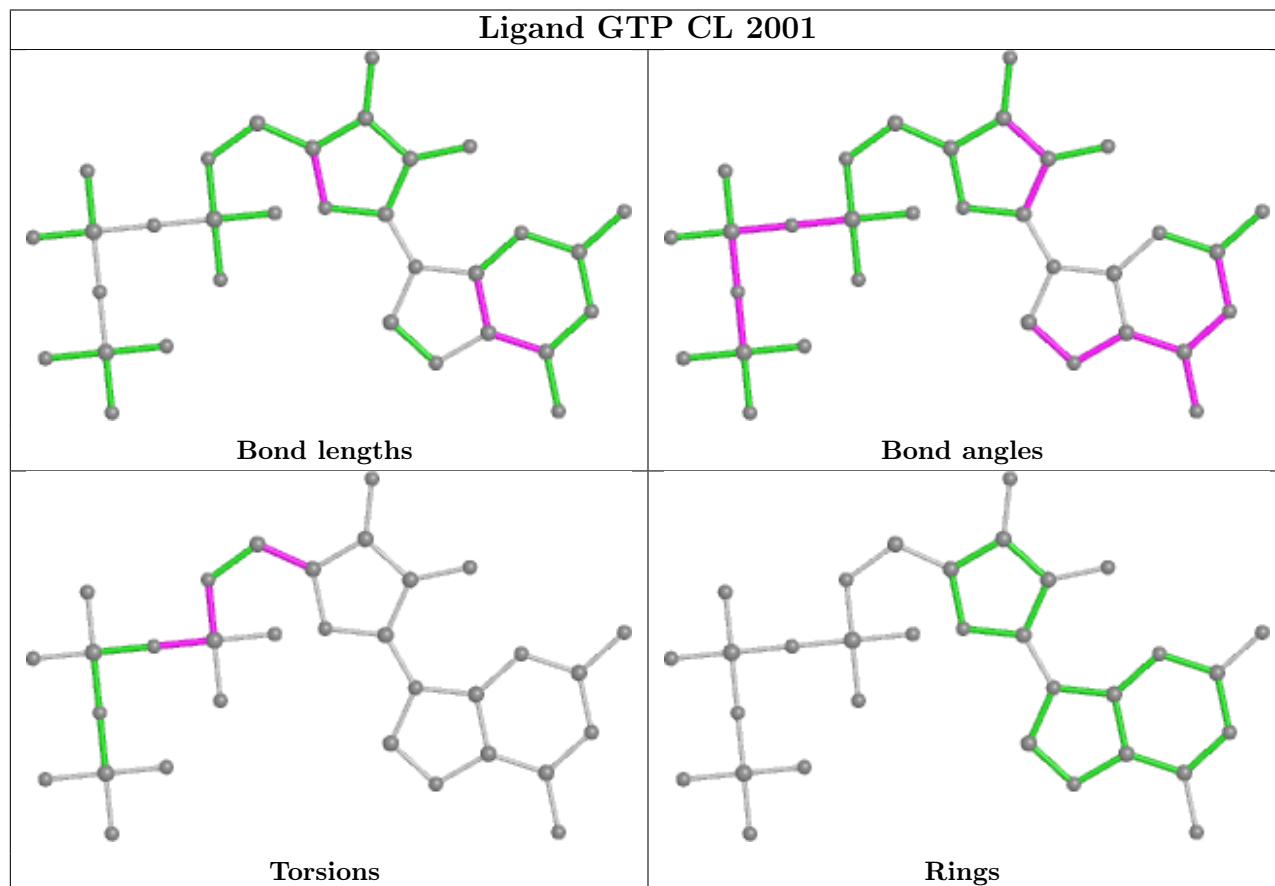
There are no ring outliers.

1 monomer is involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
77	CL	2001	GTP	3	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](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
61	D2	4

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	D2	92:C	O3'	281:G	P	62.30
1	D2	292:A	O3'	463:A	P	45.10
1	D2	70:A	O3'	80:A	P	19.53
1	D2	24:U	O3'	56:G	P	14.66

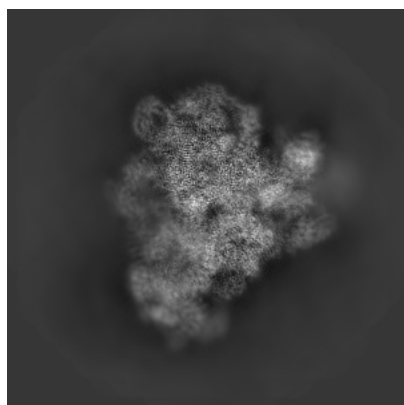
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-11808. These allow visual inspection of the internal detail of the map and identification of artifacts.

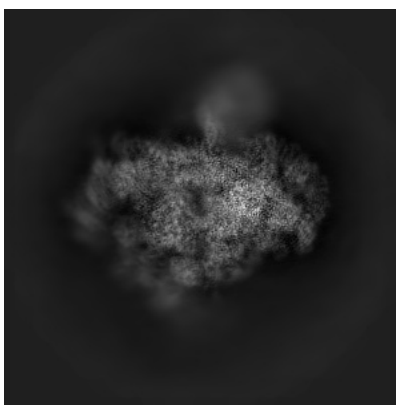
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

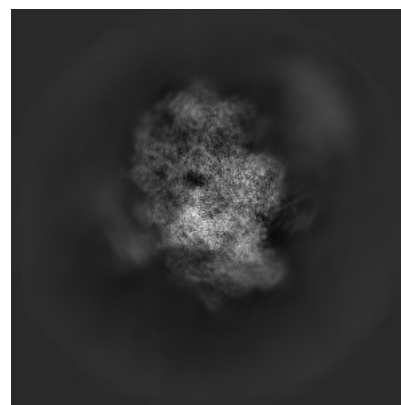
6.1.1 Primary map



X



Y

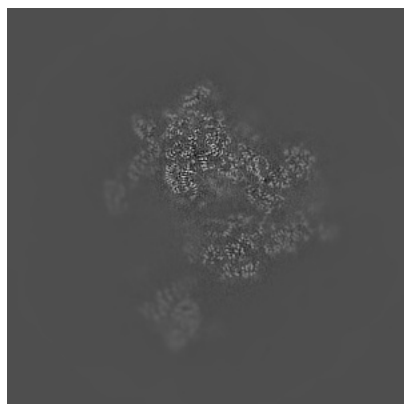


Z

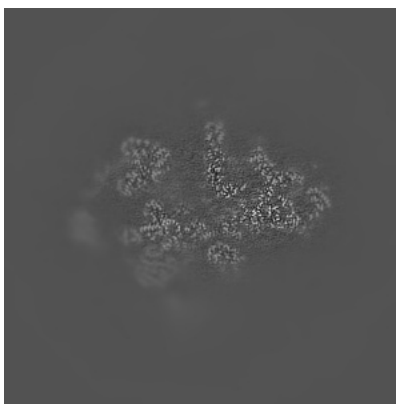
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

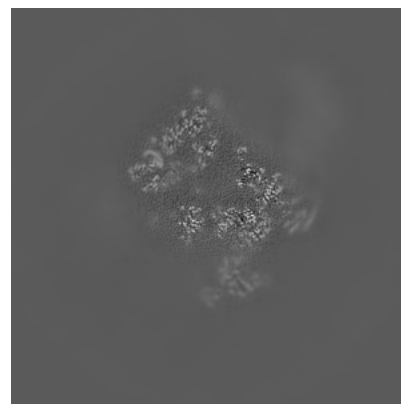
6.2.1 Primary map



X Index: 270



Y Index: 270

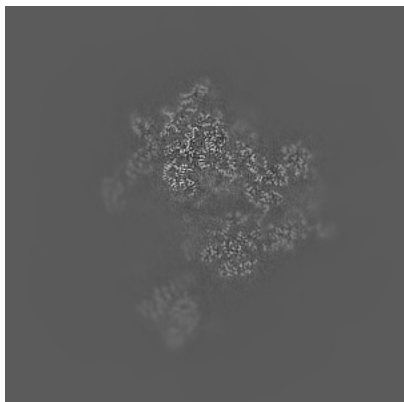


Z Index: 270

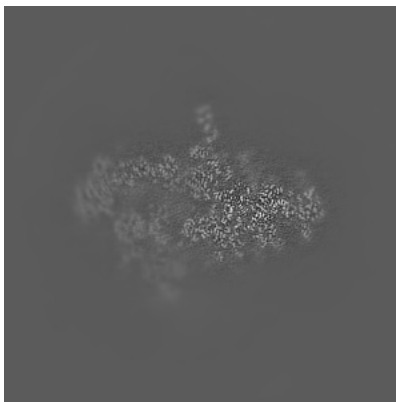
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

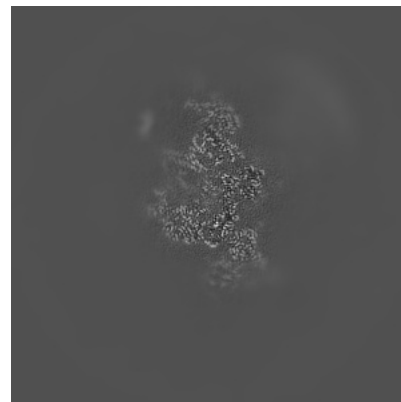
6.3.1 Primary map



X Index: 271



Y Index: 249



Z Index: 314

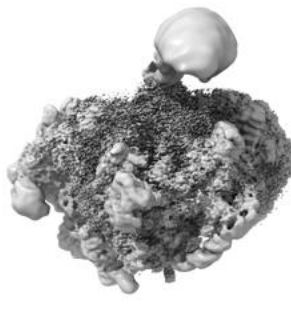
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal surface views [i](#)

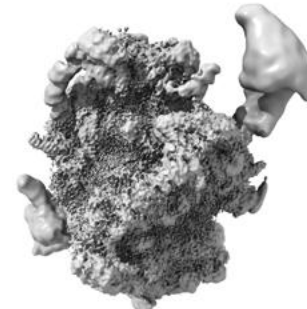
6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.01. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

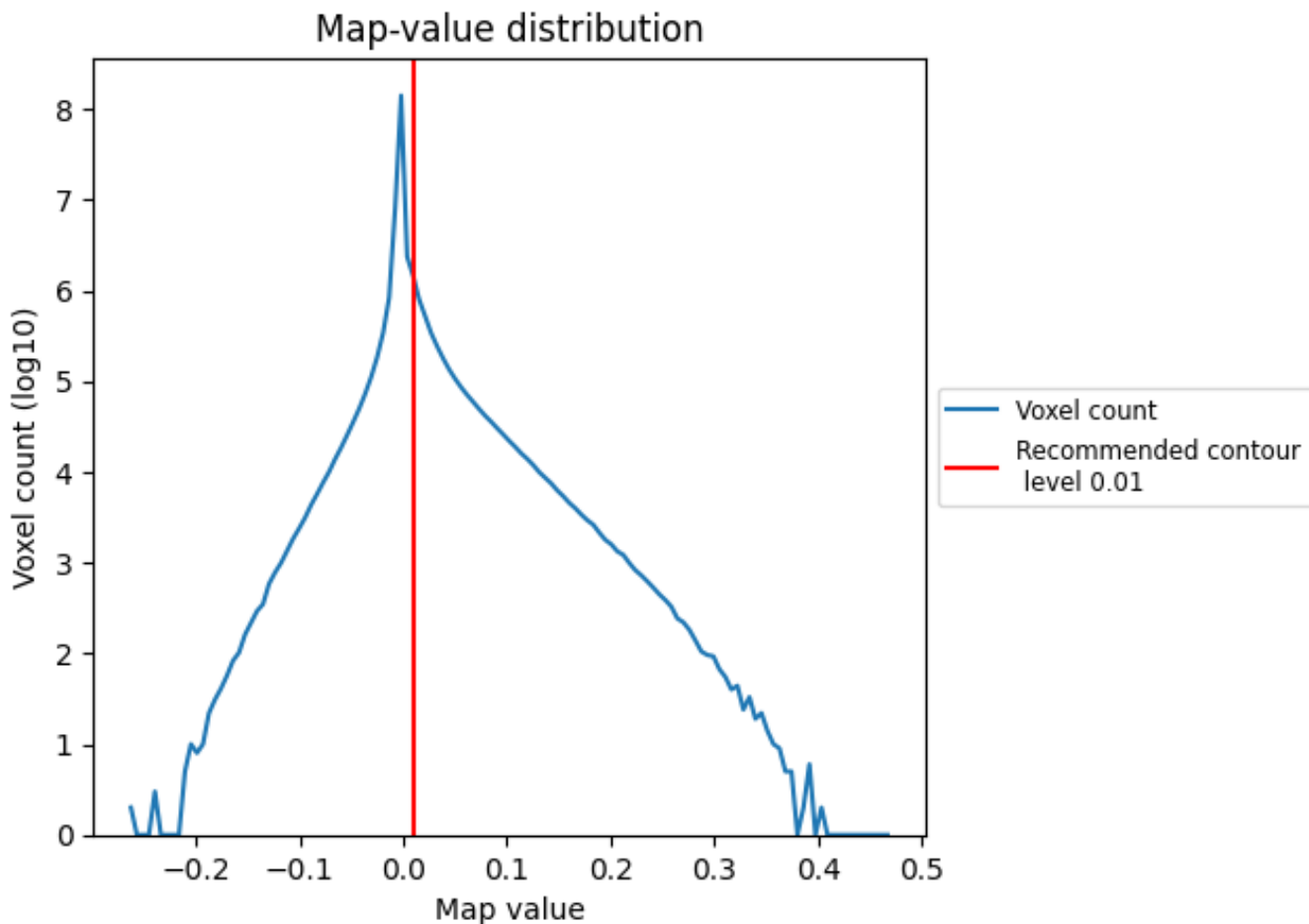
6.5 Mask visualisation

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

7 Map analysis [i](#)

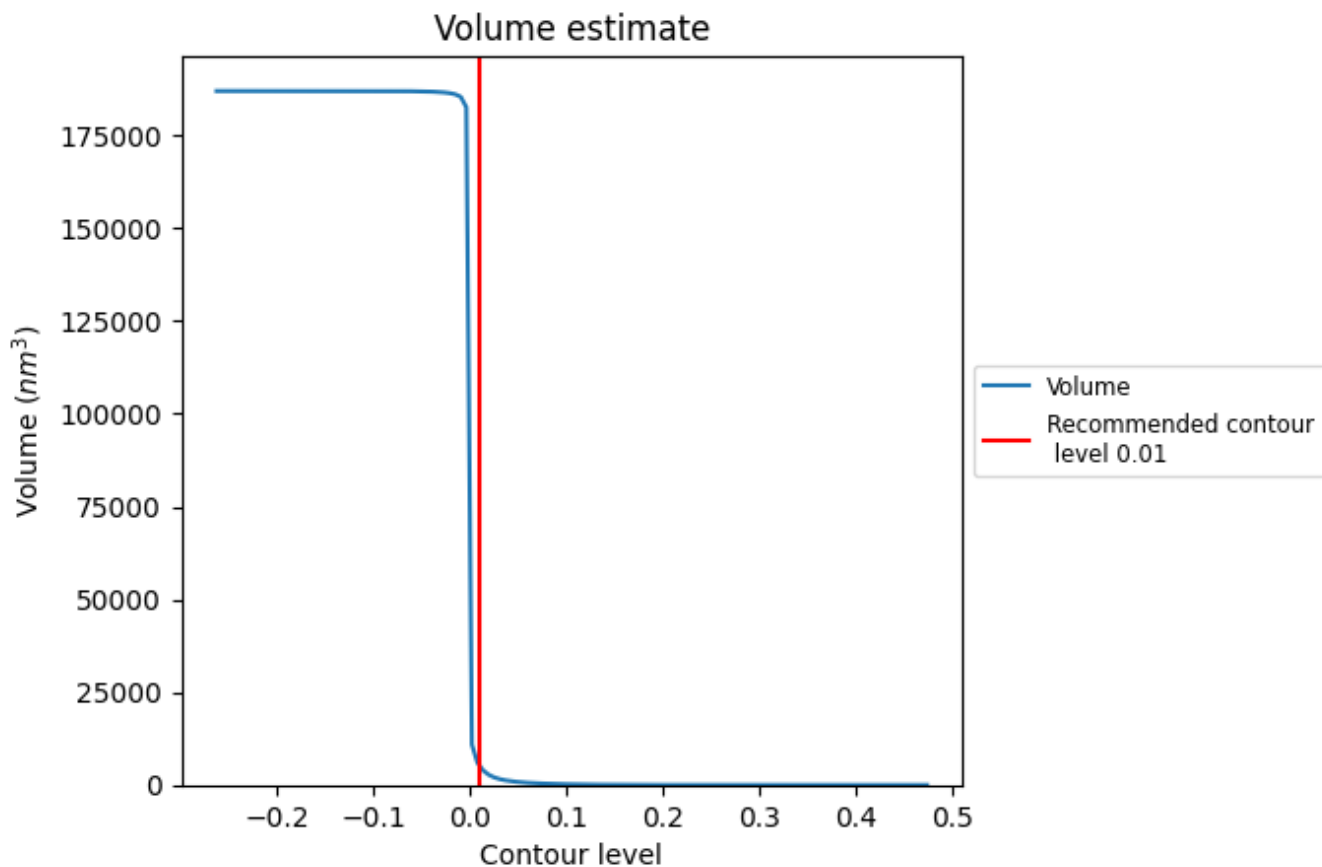
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

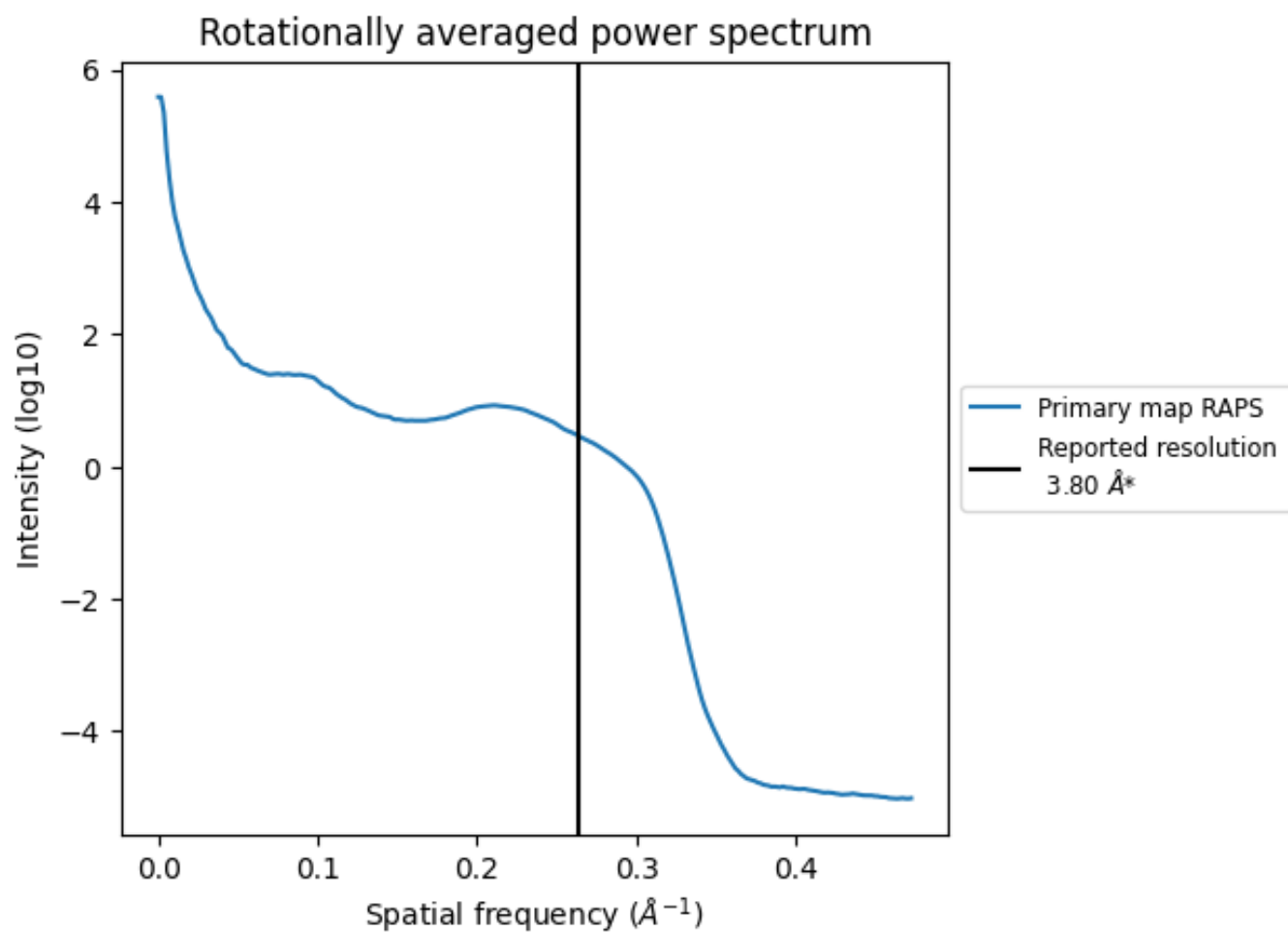
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 5032 nm^3 ; this corresponds to an approximate mass of 4545 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](#)

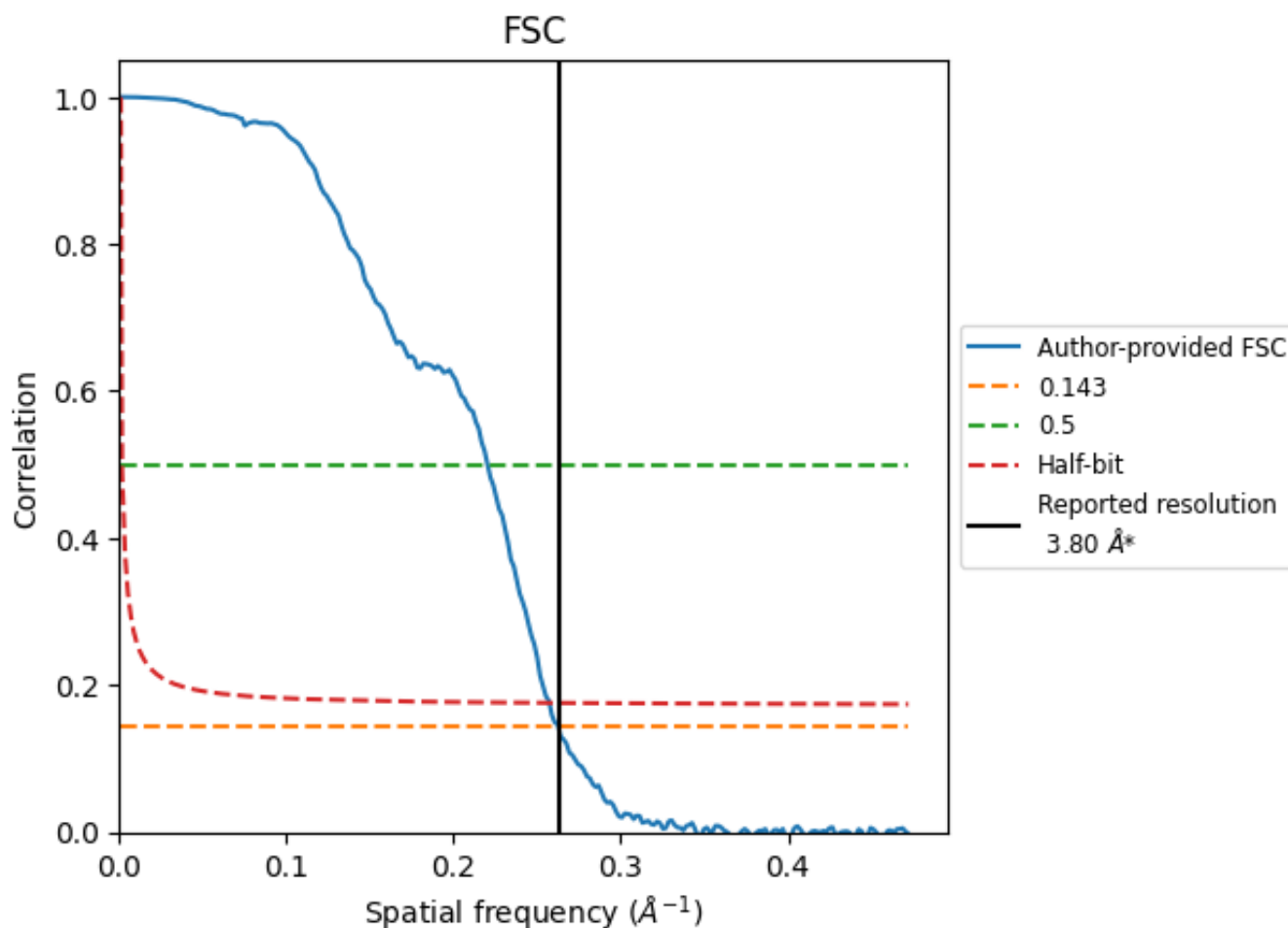


*Reported resolution corresponds to spatial frequency of 0.263 Å⁻¹

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 0.263 Å⁻¹

8.2 Resolution estimates [i](#)

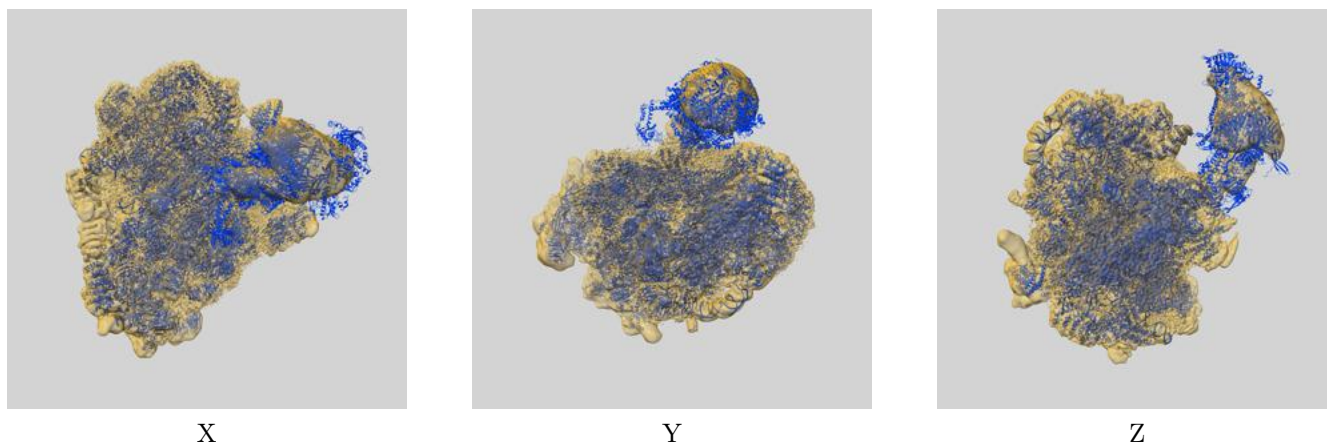
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.80	-	-
Author-provided FSC curve	3.81	4.54	3.89
Unmasked-calculated*	-	-	-

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

9 Map-model fit [i](#)

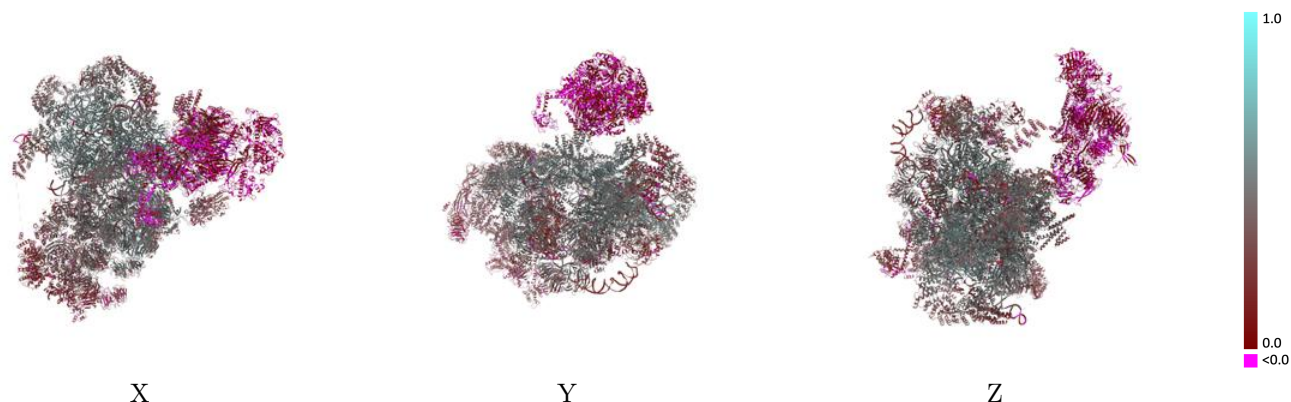
This section contains information regarding the fit between EMDB map EMD-11808 and PDB model 7AJU. Per-residue inclusion information can be found in section 3 on page 18.

9.1 Map-model overlay [i](#)



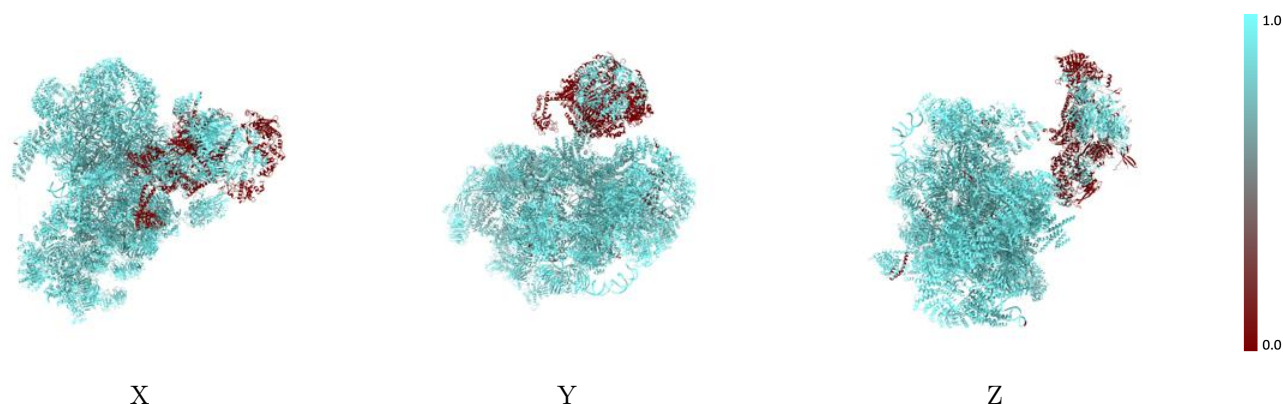
The images above show the 3D surface view of the map at the recommended contour level 0.01 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



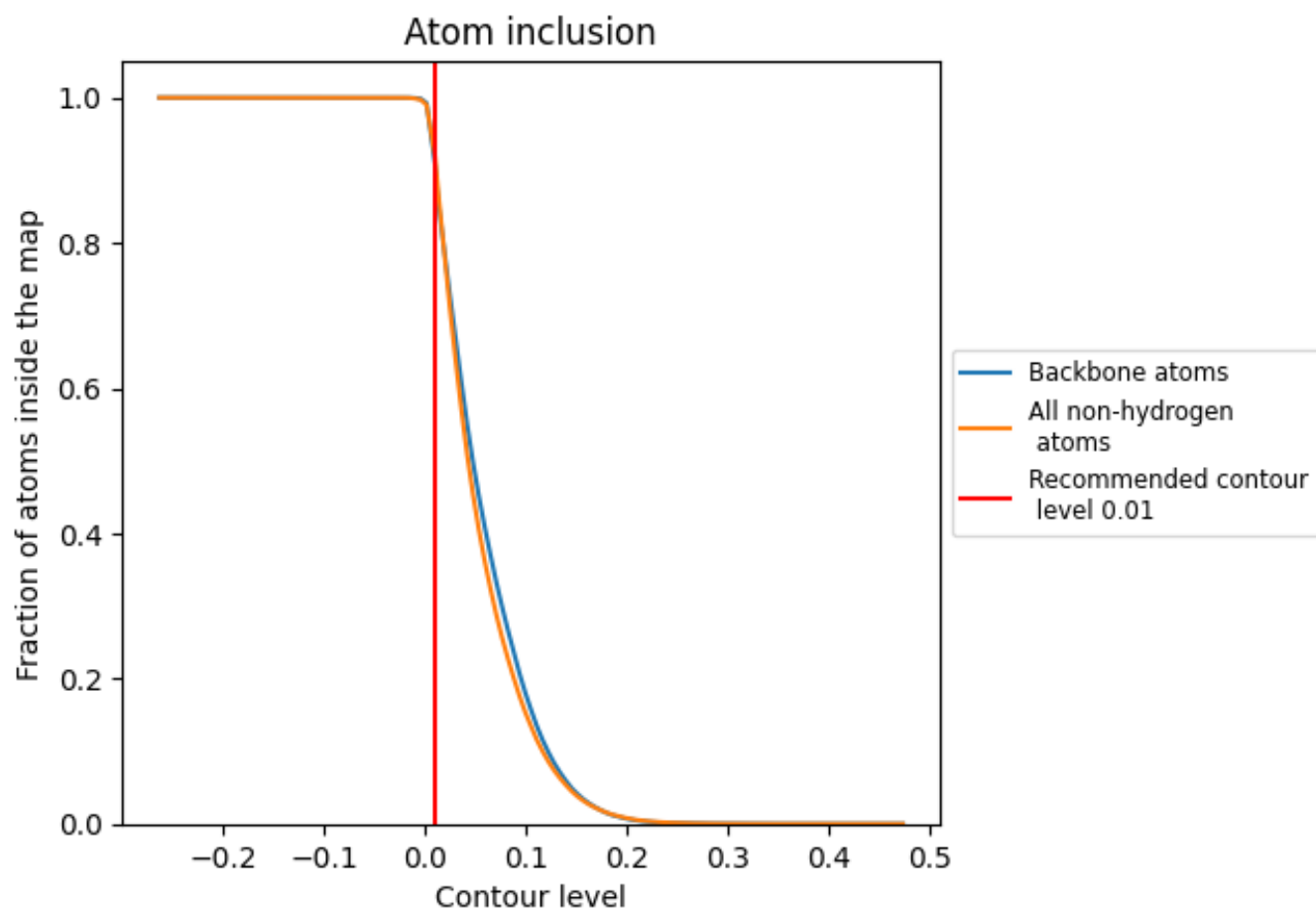
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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, 91% of all backbone atoms, 92% 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	 0.9180	 0.3660
CA	 0.9815	 0.5320
CB	 0.9632	 0.3860
CD	 0.9739	 0.4510
CE	 0.9667	 0.3810
CF	 0.9513	 0.4100
CG	 0.9712	 0.5040
CH	 0.9899	 0.5070
CI	 0.9530	 0.4040
CJ	 0.9471	 0.4640
CK	 0.9783	 0.4530
CL	 0.9624	 0.4670
CM	 0.9865	 0.4770
CN	 0.9762	 0.3130
D2	 0.9288	 0.2450
D3	 0.9782	 0.4550
D4	 0.9468	 0.3430
DA	 0.9755	 0.5000
DE	 0.9900	 0.5770
DF	 0.9816	 0.4750
DG	 0.9929	 0.4920
DH	 0.9724	 0.4760
DI	 0.9874	 0.5300
DJ	 0.9827	 0.5540
DL	 0.9918	 0.5440
DN	 0.9758	 0.5150
DO	 0.9865	 0.5100
DQ	 0.9800	 0.4990
DS	 0.7788	 0.2510
DT	 0.7882	 0.3220
DW	 0.9780	 0.5690
DX	 0.9715	 0.5200
DY	 0.9817	 0.5460
Db	 0.9817	 0.5430
Dc	 0.9937	 0.4990







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Chain	Atom inclusion	Q-score
EA	 0.5546	 -0.0160
EB	 0.3593	 0.0030
EC	 0.5354	 0.0130
ED	 0.7980	 0.0450
EE	 0.8407	 0.0480
EF	 0.8532	 0.0380
EG	 0.8261	 0.0300
EH	 0.1752	 0.0420
EI	 0.5396	 0.0270
EJ	 0.1705	 0.0100
EK	 0.3445	 0.0230
EN	 0.2484	 0.0260
JD	 0.9158	 0.2530
JF	 0.9438	 0.1520
JG	 0.9413	 0.2330
JH	 0.9591	 0.1490
JI	 0.7861	 0.1720
JJ	 0.9759	 0.4860
JL	 0.9246	 0.3520
JM	 0.9547	 0.4290
JP	 0.9856	 0.5510
UA	 0.9792	 0.5040
UB	 0.9329	 0.1870
UC	 0.9688	 0.4960
UD	 0.9734	 0.3120
UE	 0.9534	 0.3570
UF	 0.9839	 0.4230
UG	 0.9814	 0.5010
UH	 0.9721	 0.1410
UI	 0.9690	 0.1760
UJ	 0.9337	 0.3300
UK	 0.9135	 0.3730
UL	 0.9838	 0.4080
UM	 0.9716	 0.4070
UN	 0.9767	 0.4800
UO	 0.9407	 0.2560
UP	 0.9333	 0.3080
UQ	 0.9639	 0.2520
UR	 0.9622	 0.4270
US	 0.9324	 0.1770
UT	 0.9775	 0.4140
UU	 0.9821	 0.4700

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Chain	Atom inclusion	Q-score
UV	 0.9739	 0.3420
UX	 0.9578	 0.5330