



wwPDB EM Validation Summary Report ⓘ

Dec 11, 2022 – 09:08 am GMT

PDB ID : 6RXZ
EMDB ID : EMD-10056
Title : Cryo-EM structure of the 90S pre-ribosome (Kre33-Noc4) from *Chaetomium thermophilum*, state b
Authors : Cheng, J.; Kellner, N.; Griesel, S.; Berninghausen, O.; Beckmann, R.; Hurt, E.
Deposited on : 2019-06-10
Resolution : 4.40 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:

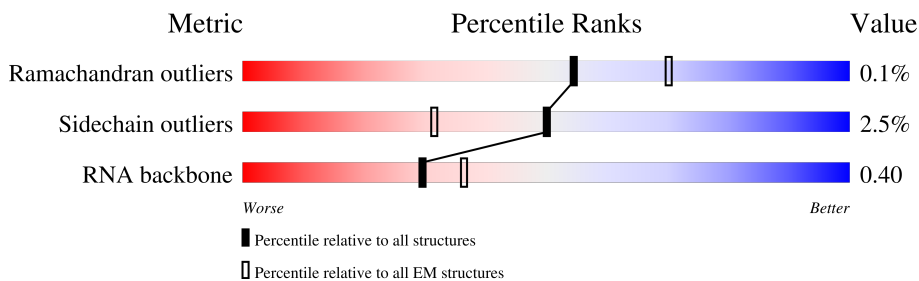
EMDB validation analysis : 0.0.1.dev43
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.9
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.31.3

1 Overall quality at a glance

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

The reported resolution of this entry is 4.40 Å.

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



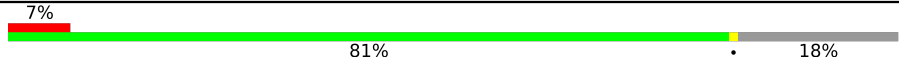
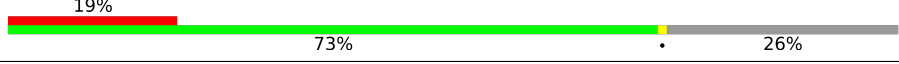
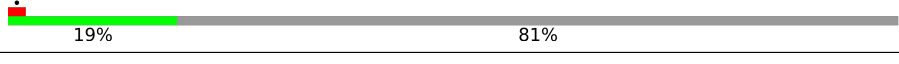
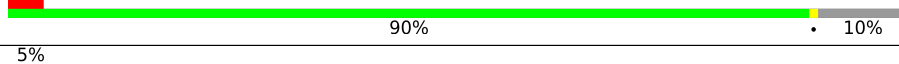

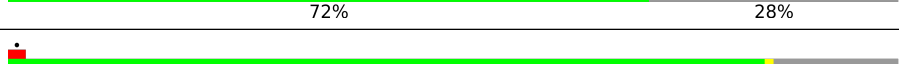
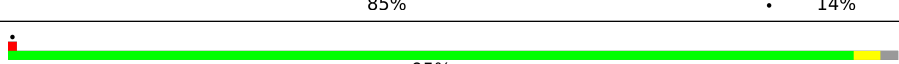
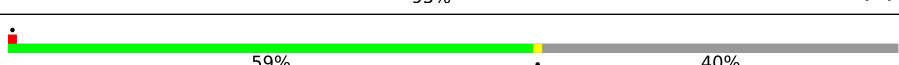
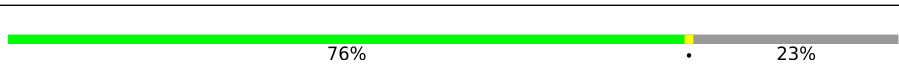


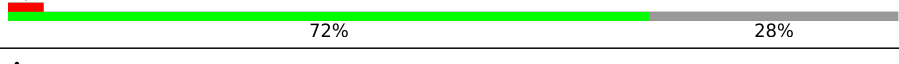
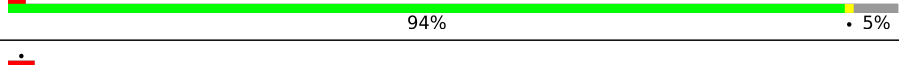
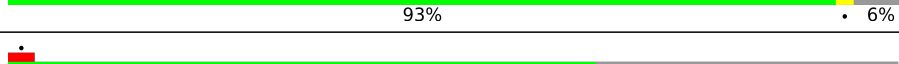
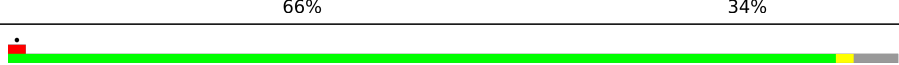
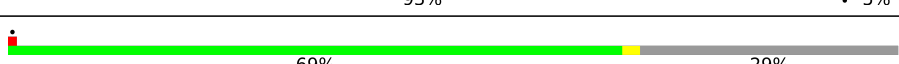
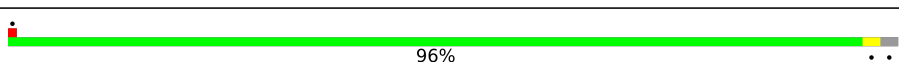
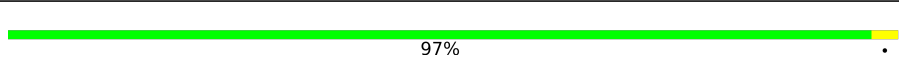

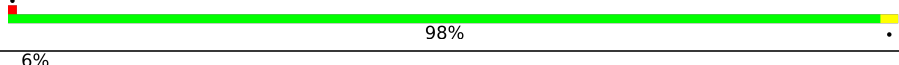
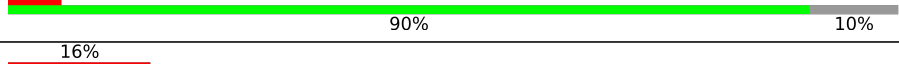




Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion $< 40\%$). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	UA	904	
2	UB	907	
3	UC	648	
4	UD	884	
5	UF	414	
6	UG	558	
7	UJ	1802	
8	UK	270	

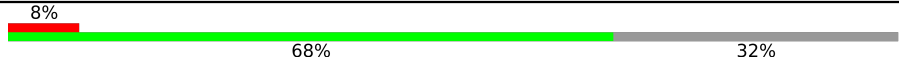
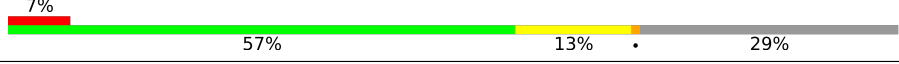
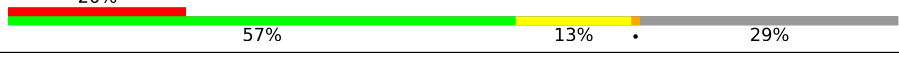

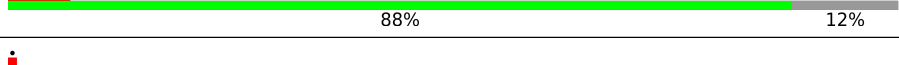
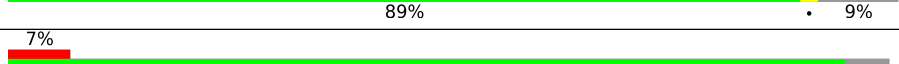
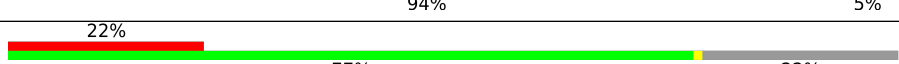
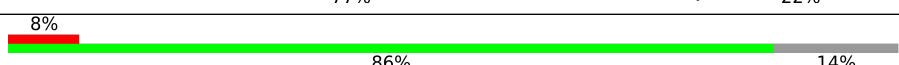
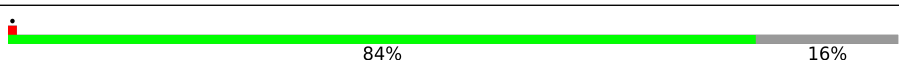


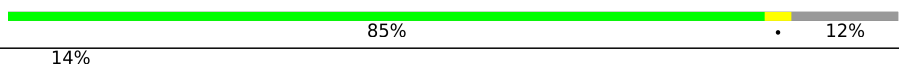
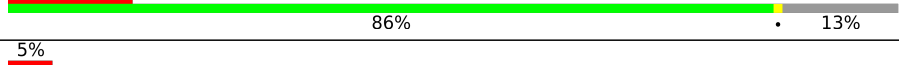
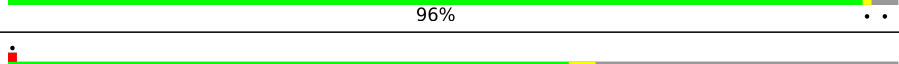
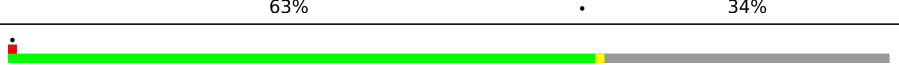

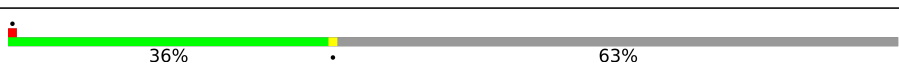
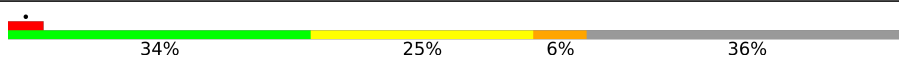
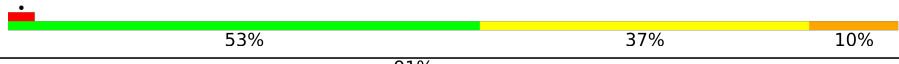
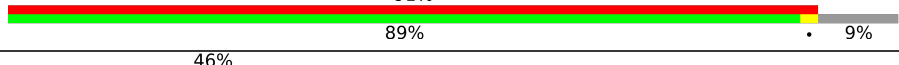





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Mol	Chain	Length	Quality of chain
9	UL	962	
10	UM	912	
11	UN	938	
12	UO	557	
13	UQ	960	
14	UR	618	
15	UU	1049	
16	UX	193	
17	UZ	391	
18	CA	313	
18	CB	313	
19	CC	523	
20	CD	582	
21	CE	127	
21	CF	127	
22	CG	630	
23	CH	411	
24	CI	1163	
25	CJ	183	
26	CK	297	
27	CL	785	
28	CM	446	
29	CN	252	
29	CO	252	
30	CP	322	

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Mol	Chain	Length	Quality of chain
31	CQ	259	
32	CR	1073	
32	CS	1073	
33	CT	203	
34	Cb	264	
35	Cc	212	
36	Cd	239	
37	Ce	203	
38	Cf	202	
39	Cg	190	
40	Ch	151	
41	Ci	150	
42	Cj	143	
43	Ck	161	
44	Cm	130	
45	Cn	145	
46	Co	136	
47	Cp	68	
48	CU	311	
49	C1	2323	
50	C2	230	
51	UV	1171	
52	CV	322	
53	CW	668	
54	UT	2612	

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Mol	Chain	Length	Quality of chain
55	UH	930	38% 61%
56	UE	410	23% 7% 70%
56	UI	410	6% 23% 7% 70%
57	US	549	6% 82% 18%
58	CI	156	18% 49% 49%
59	CX	480	16% 55% 44%
60	CY	381	6% 32% 68%
61	CZ	609	6% 93%
62	UP	364	15% 85%
63	Cz	1796	6% 15% 85%

2 Entry composition [i](#)

There are 64 unique types of molecules in this entry. The entry contains 218474 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 Periodic tryptophan protein 2-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	UA	839	6366	4101	1136	1105	24	0	0

- Molecule 2 is a protein called Utp2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	UB	512	4079	2576	781	711	11	0	0

- Molecule 3 is a protein called Utp3.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
3	UC	74	588	371	120	97	0	0

- Molecule 4 is a protein called Utp4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	UD	772	6071	3851	1093	1103	24	0	0

- Molecule 5 is a protein called Utp6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	UF	331	2591	1674	504	399	14	0	0

- Molecule 6 is a protein called Utp7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	UG	479	3717	2369	700	636	12	0	0

- Molecule 7 is a protein called UTP10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	UJ	1090	8416	5408	1452	1525	31	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	UK	217	1687	1062	351	269	5	0	0

- Molecule 9 is a protein called Utp12.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	UL	785	6175	3940	1088	1130	17	0	0

- Molecule 10 is a protein called Utp13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	UM	679	5273	3351	924	986	12	0	0

- Molecule 11 is a protein called Utp14.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	UN	177	1401	892	263	239	7	0	0

- Molecule 12 is a protein called Utp15.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	UO	504	3819	2422	699	684	14	0	0

- Molecule 13 is a protein called Utp17.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	UQ	789	6008	3831	1037	1119	21	0	0

- Molecule 14 is a protein called Utp18.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
14	UR	447	3491	2209	656	616	10	0	0

- Molecule 15 is a protein called Putative U3 snoRNP protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
15	UU	902	6734	4336	1236	1136	26	0	0

- Molecule 16 is a protein called Utp24.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
16	UX	190	1470	932	282	246	10	0	0

- Molecule 17 is a protein called Utp30.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
17	UZ	235	1815	1184	330	298	3	0	0

- Molecule 18 is a protein called Nop1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
18	CA	242	1778	1149	327	293	9	0	0
18	CB	237	1816	1154	318	335	9	0	0

- Molecule 19 is a protein called Putative nucleolar protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
19	CC	387	2866	1836	527	492	11	0	0

- Molecule 20 is a protein called Nop58.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
20	CD	420	3150	2023	560	557	10	0	0

- Molecule 21 is a protein called Snu13.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	CE	121	Total	C	N	O	S	0	0
			879	557	165	154	3		
21	CF	120	Total	C	N	O	S	0	0
			864	550	161	150	3		

- Molecule 22 is a protein called Rrp9.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	CG	416	Total	C	N	O	S	0	0
			3245	2065	587	580	13		

- Molecule 23 is a protein called RNA 3'-terminal phosphate cyclase-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	CH	389	Total	C	N	O	S	0	0
			2888	1827	526	525	10		

- Molecule 24 is a protein called Bms1.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	CI	822	Total	C	N	O	S	0	0
			6486	4169	1213	1077	27		

- Molecule 25 is a protein called Imp3.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	CJ	179	Total	C	N	O	S	0	0
			1434	918	283	226	7		

- Molecule 26 is a protein called Putative U3 small nucleolar ribonucleoprotein.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	CK	297	Total	C	N	O	S	0	0
			2329	1476	445	400	8		

- Molecule 27 is a protein called Putative U3 small nucleolar ribonucleoprotein protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	CL	231	Total	C	N	O	S	0	0
			1786	1114	339	327	6		

- Molecule 28 is a protein called Sof1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
28	CM	445	3501	2195	672	619	15	0	0

- Molecule 29 is a protein called Emg1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
29	CN	226	1762	1119	306	327	10	0	0
29	CO	215	1683	1067	293	313	10	0	0

- Molecule 30 is a protein called KRR1 small subunit processome component.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
30	CP	187	1504	961	269	265	9	0	0

- Molecule 31 is a protein called Pre-rRNA-processing protein PNO1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
31	CQ	175	1361	862	250	242	7	0	0

- Molecule 32 is a protein called Kre33.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
32	CR	760	5989	3851	1024	1087	27	0	0
32	CS	760	5989	3851	1024	1087	27	0	0

- Molecule 33 is a protein called Fcf2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
33	CT	131	1035	656	197	178	4	0	0

- Molecule 34 is a protein called 40S ribosomal protein S4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
34	Cb	232	1851	1179	340	325	7	0	0

- Molecule 35 is a protein called 40S ribosomal protein s5-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
35	Cc	192	1464	926	278	253	7	0	0

- Molecule 36 is a protein called 40S ribosomal protein S6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
36	Cd	226	1819	1138	363	313	5	0	0

- Molecule 37 is a protein called 40S ribosomal protein S7.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
37	Ce	159	1279	810	237	232	0	0

- Molecule 38 is a protein called 40S ribosomal protein S8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
38	Cf	174	1398	872	283	242	1	0	0

- Molecule 39 is a protein called 40S ribosomal protein s9-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
39	Cg	159	1242	801	255	184	2	0	0

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

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
40	Ch	49	406	265	79	62	0	0

- Molecule 41 is a protein called 40S ribosomal protein S14-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
41	Ci	115	791	492	154	141	4	0	0

- Molecule 42 is a protein called 40S ribosomal protein S16-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
42	Cj	126	943	613	177	151	2	0	0

- Molecule 43 is a protein called 40S ribosomal protein S11-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
43	Ck	140	1163	750	224	184	5	0	0

- Molecule 44 is a protein called 40S ribosomal protein S22-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
44	Cm	126	985	632	184	164	5	0	0

- Molecule 45 is a protein called 40S ribosomal protein s23-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
45	Cn	96	702	456	134	110	2	0	0

- Molecule 46 is a protein called 40S ribosomal protein S24.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
46	Co	92	741	474	139	126	2	0	0

- Molecule 47 is a protein called 40S ribosomal protein S28-like protein.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
47	Cp	61	455	284	97	74	0	0

- Molecule 48 is a protein called Faf1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
48	CU	114	882	544	178	154	6	0	0

- Molecule 49 is a RNA chain called 35S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
49	C1	1487	31732	14158	5691	10396	1487	0	0

- Molecule 50 is a RNA chain called U3 snoRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
50	C2	230	4891	2182	856	1623	230	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
51	UV	1061	8424	5399	1480	1523	22	0	0

- Molecule 52 is a protein called Rrp7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
52	CV	148	1145	729	198	216	2	0	0

- Molecule 53 is a protein called Ribosome biogenesis protein ENP2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
53	CW	382	2924	1857	530	524	13	0	0

- Molecule 54 is a protein called Utp20.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
54	UT	2028	16000	10303	2813	2816	68	0	0

- Molecule 55 is a protein called Utp8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
55	UH	359	2809	1773	496	527	13	0	0

- Molecule 56 is a protein called Utp5.

Mol	Chain	Residues	Atoms					AltConf	Trace
56	UE	125	Total	C	N	O	S	0	0
			972	608	183	175	6		
56	UI	125	Total	C	N	O	S	0	0
			972	608	183	175	6		

- Molecule 57 is a protein called Noc4.

Mol	Chain	Residues	Atoms					AltConf	Trace
57	US	451	Total	C	N	O	S	0	0
			3672	2389	608	660	15		

- Molecule 58 is a protein called Rps18.

Mol	Chain	Residues	Atoms					AltConf	Trace
58	Cl	80	Total	C	N	O	S	0	0
			633	400	115	117	1		

- Molecule 59 is a protein called Enp1.

Mol	Chain	Residues	Atoms					AltConf	Trace
59	CX	267	Total	C	N	O	S	0	0
			2122	1380	374	358	10		

- Molecule 60 is a protein called U3 small nucleolar ribonucleoprotein protein lcp5-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
60	CY	122	Total	C	N	O	S	0	0
			975	590	194	188	3		

- Molecule 61 is a protein called Bfr2.

Mol	Chain	Residues	Atoms					AltConf	Trace
61	CZ	42	Total	C	N	O	S	0	0
			354	223	68	62	1		

- Molecule 62 is a protein called Utp16.

Mol	Chain	Residues	Atoms				AltConf	Trace
62	UP	54	Total	C	N	O	0	0
			422	264	88	70		

- Molecule 63 is a protein called Rrp5.

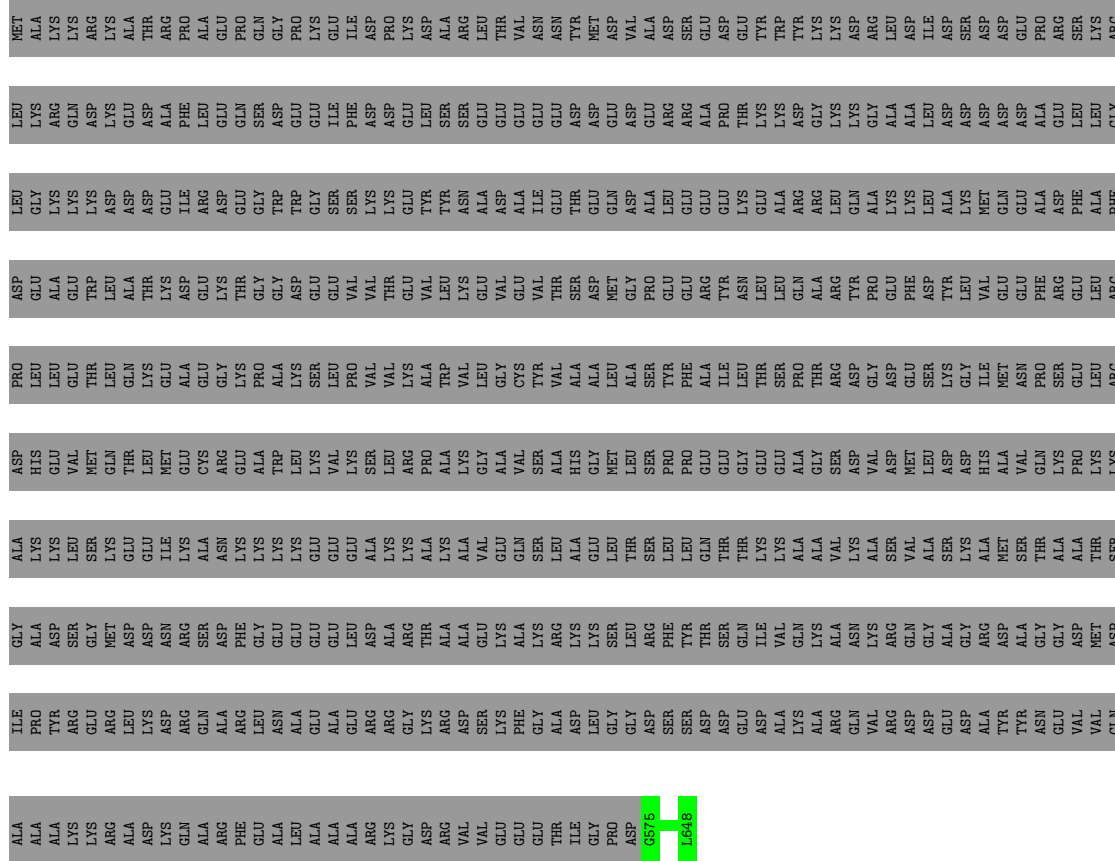
Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
63	Cz	275	2259	1435	401	420	3	0	0

- Molecule 64 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
			Total	Zn	
64	UX	1	1	1	0

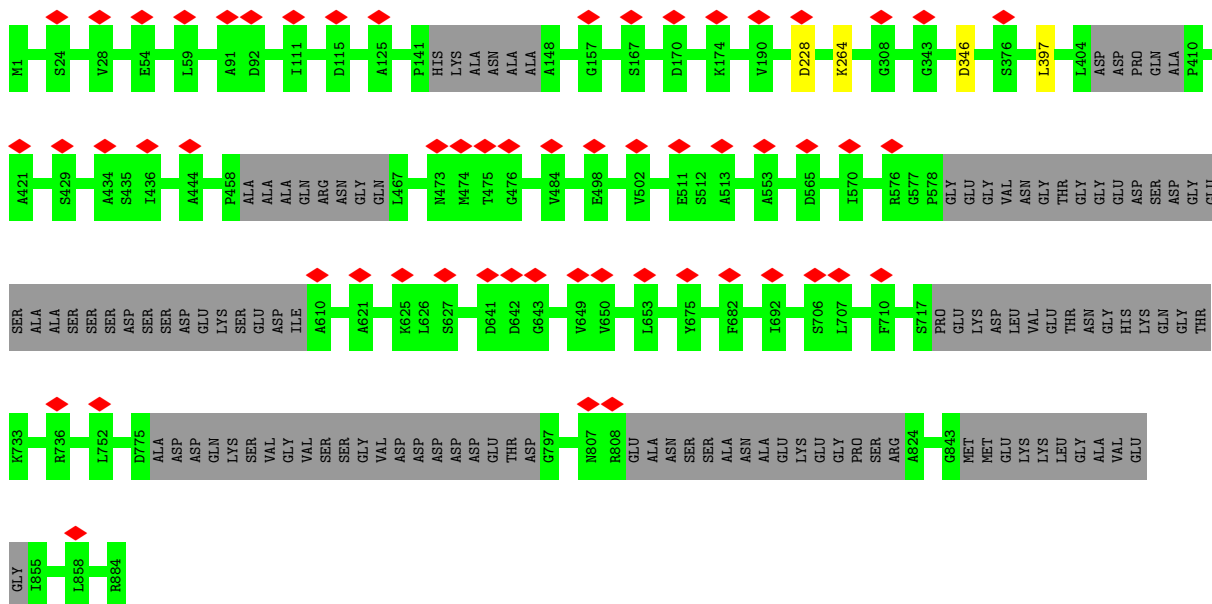
• Molecule 3: Utp3

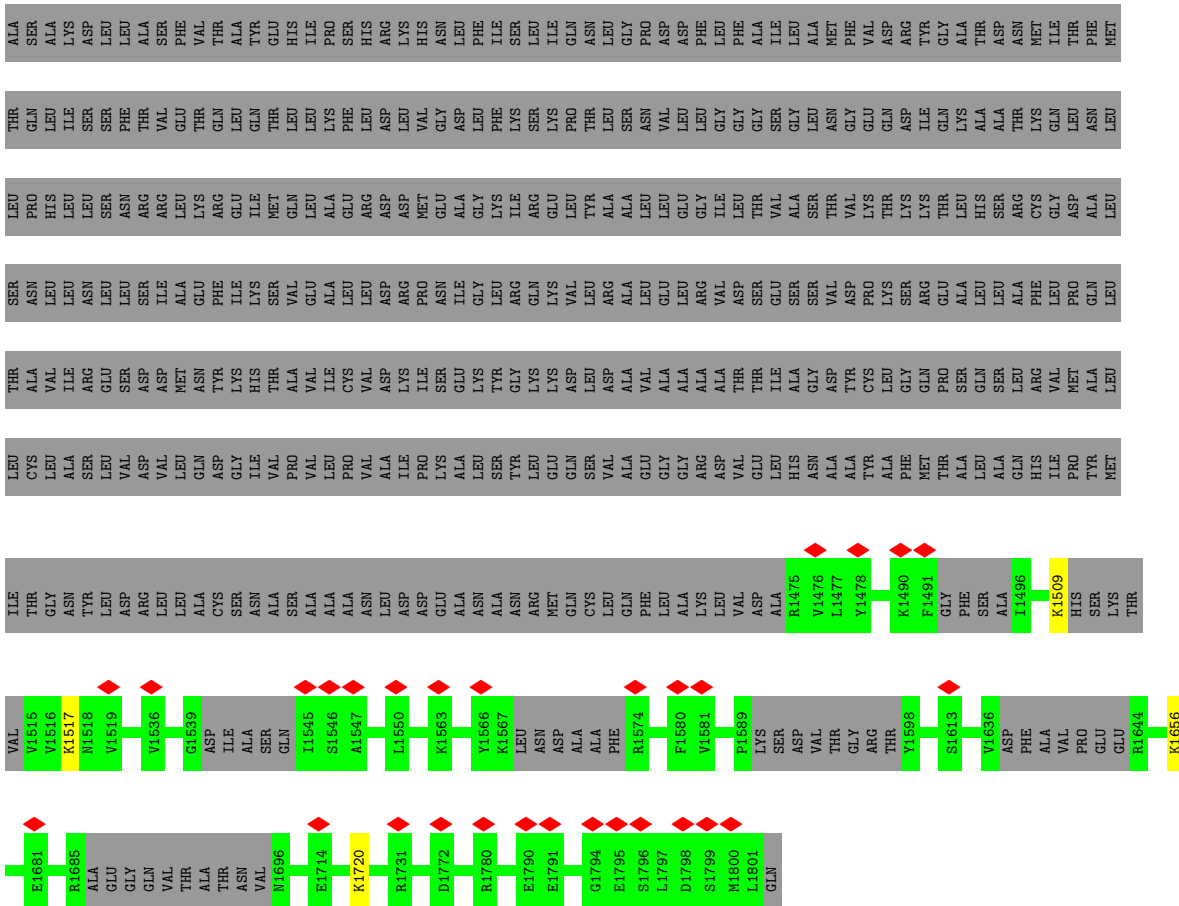
Chain UC: 11% 89%



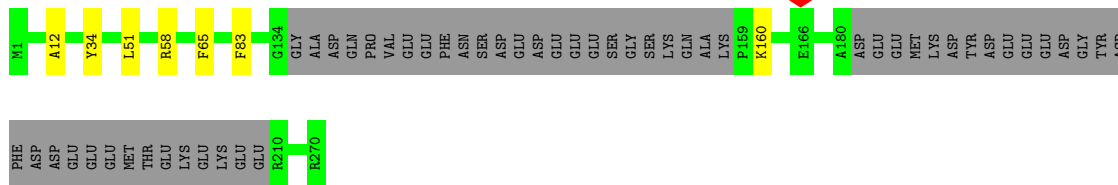
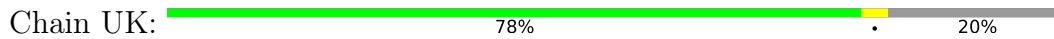
• Molecule 4: Utp4

Chain UD: 6% 87% 13%

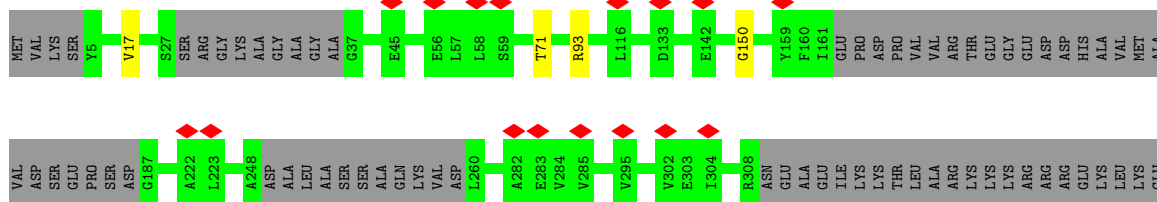
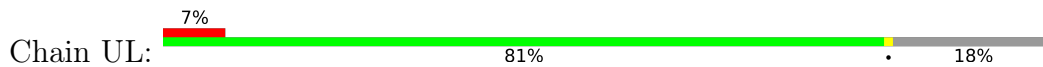


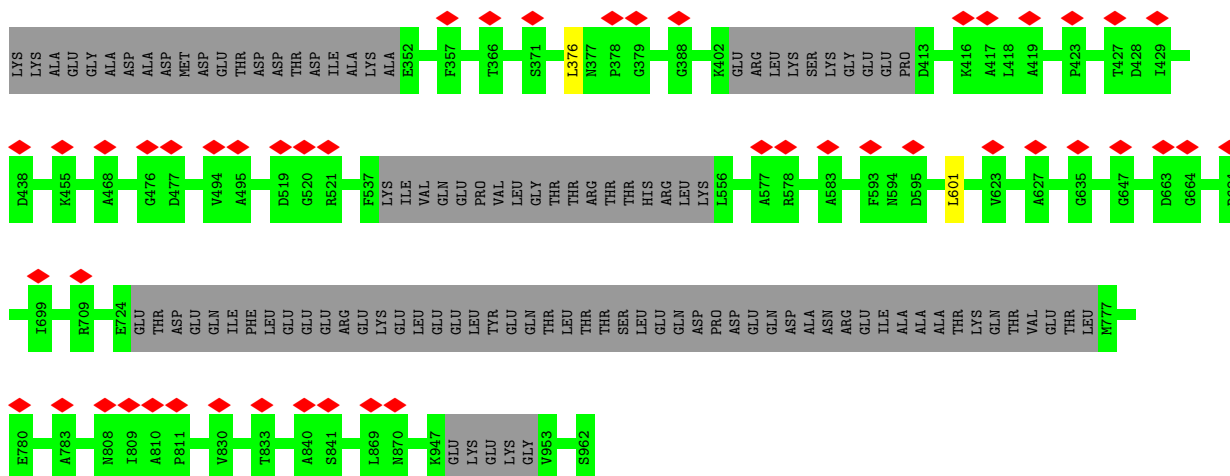


• Molecule 8: U3 small nucleolar RNA-associated protein 11

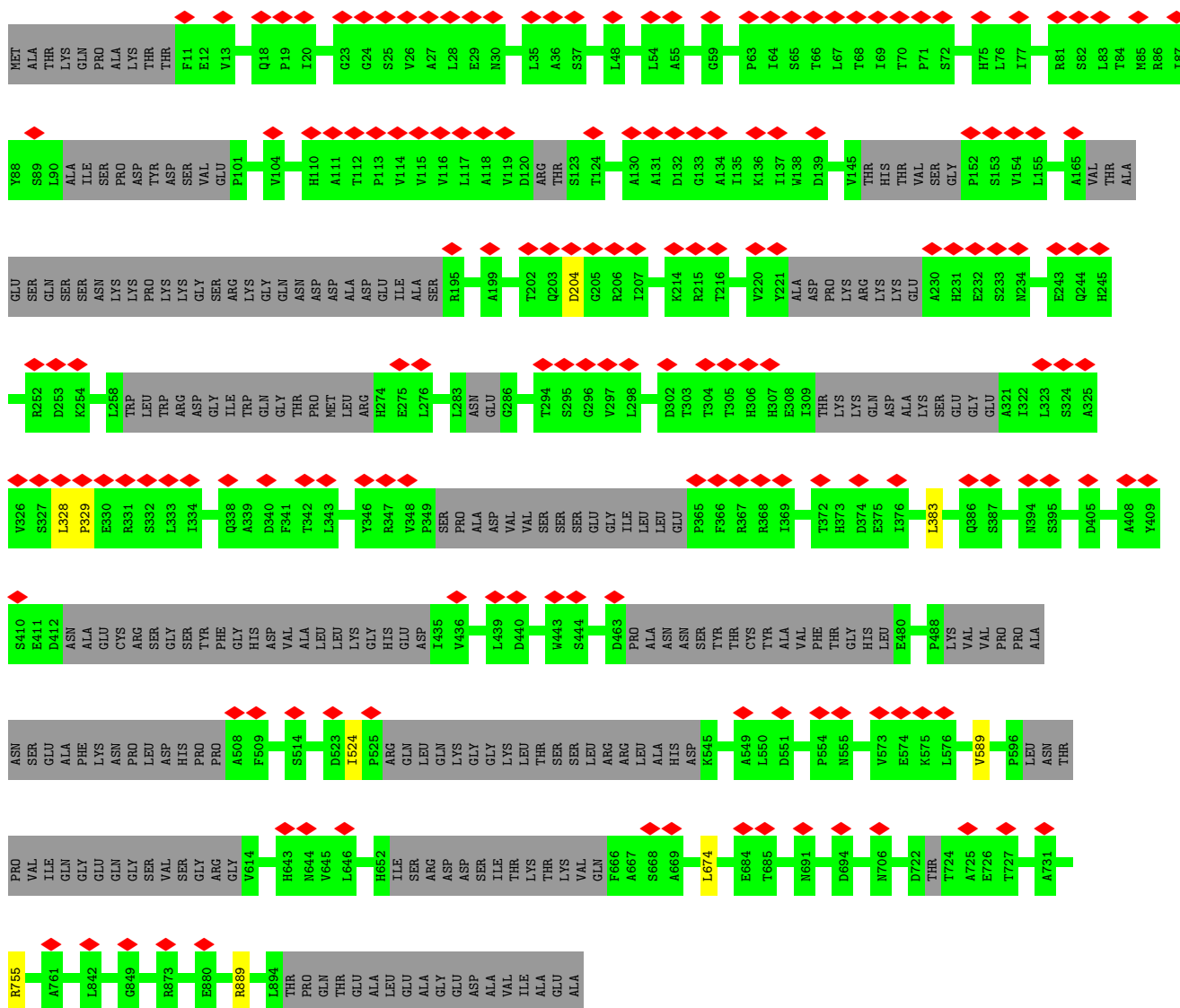
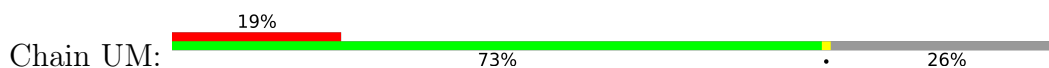


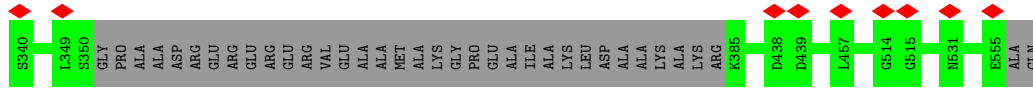
• Molecule 9: Utp12



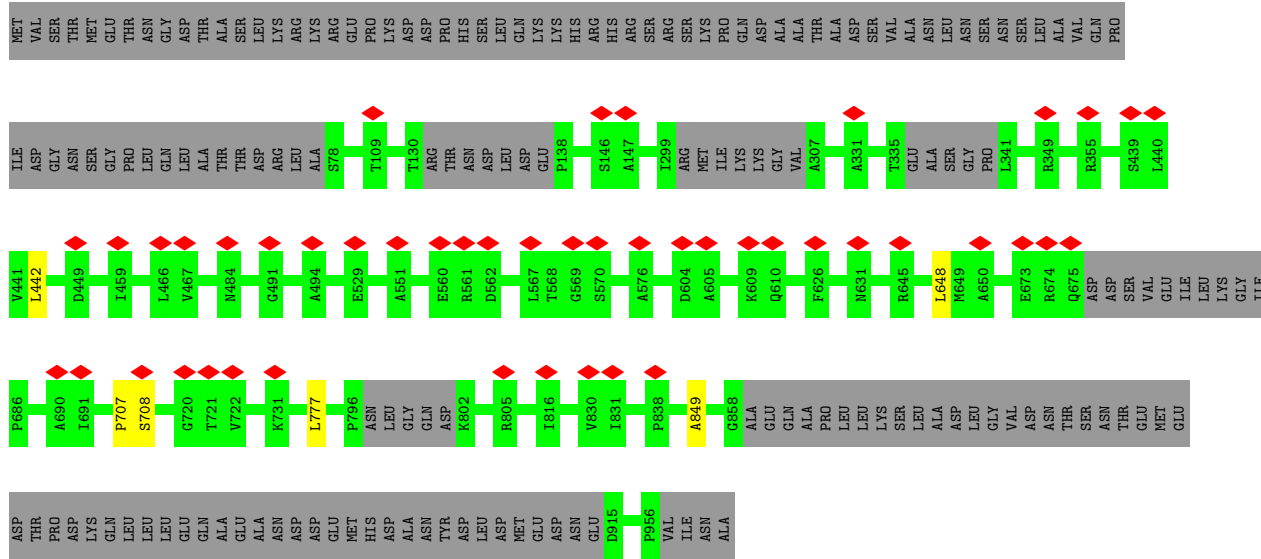
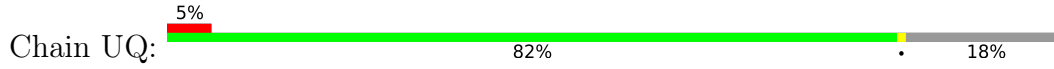


• Molecule 10: Utp13

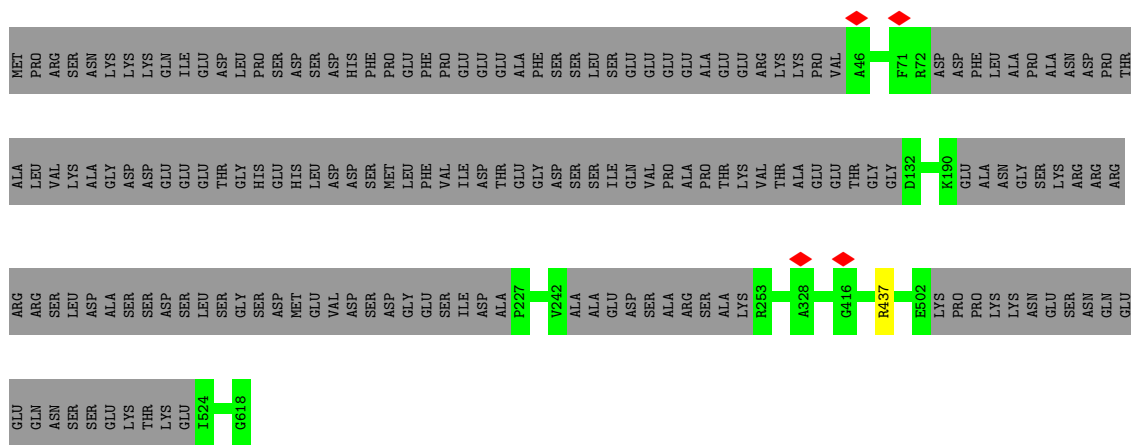
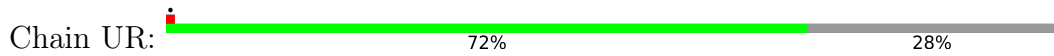




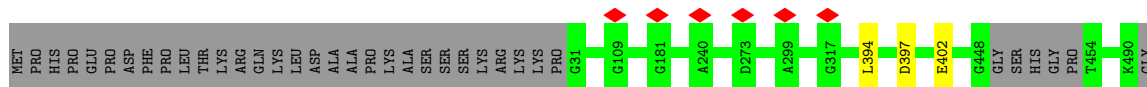
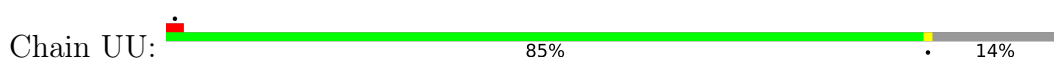
• Molecule 13: Utp17

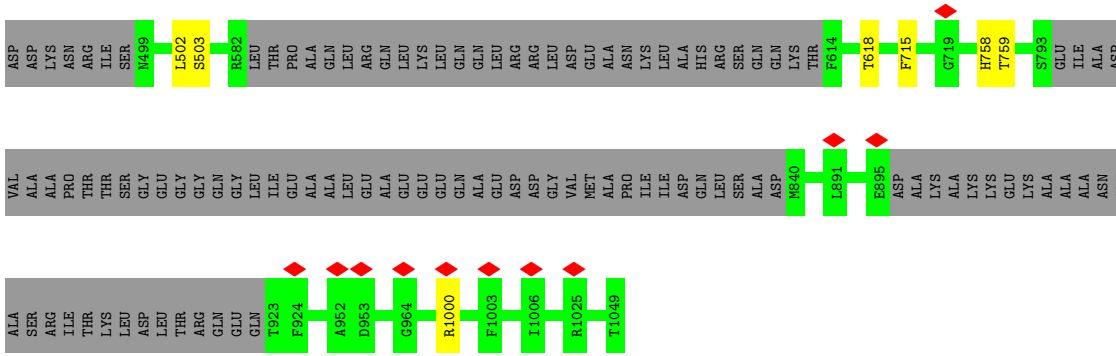


• Molecule 14: Utp18

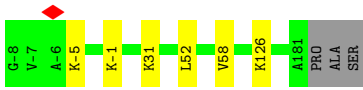


• Molecule 15: Putative U3 snoRNP protein

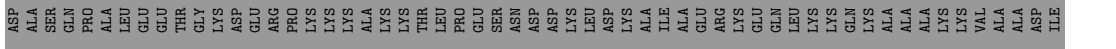
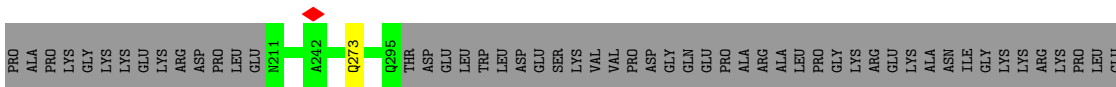
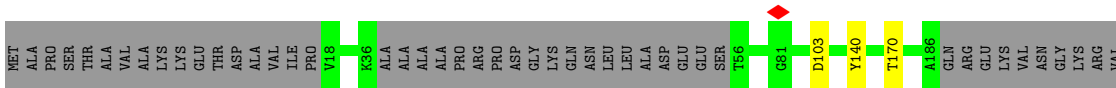




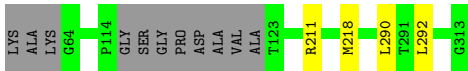
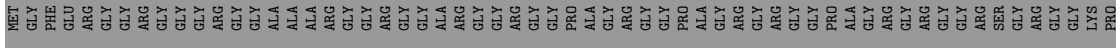
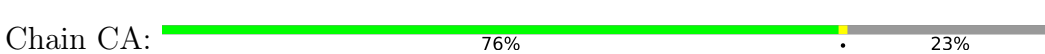
● Molecule 16: Utp24



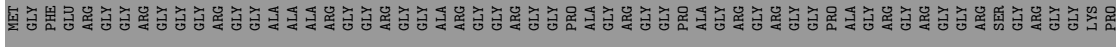
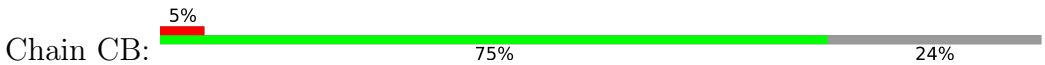
● Molecule 17: Utp30

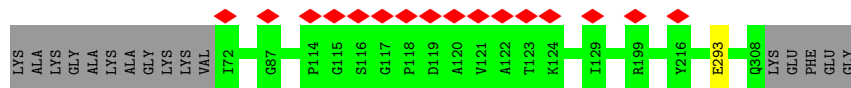


● Molecule 18: Nop1



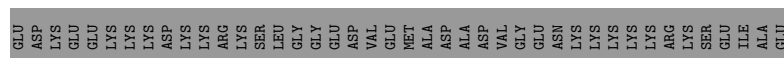
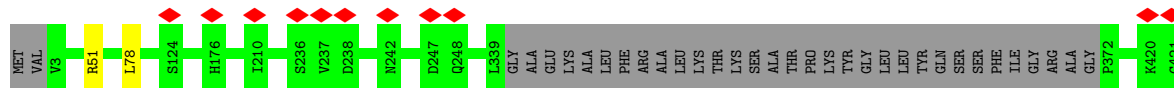
● Molecule 18: Nop1





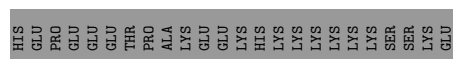
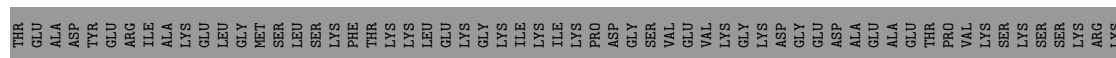
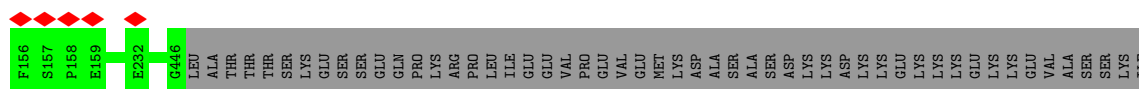
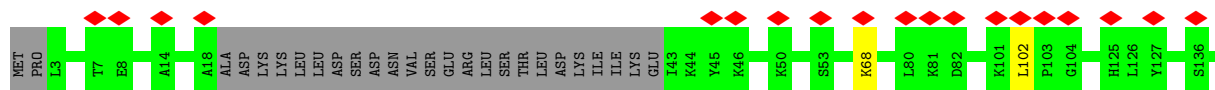
- Molecule 19: Putative nucleolar protein

Chain CC: 74% 26%



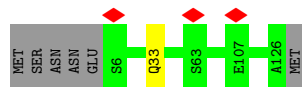
- Molecule 20: Nop58

Chain CD: 72% 28%



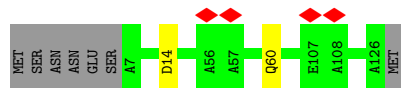
- Molecule 21: Snu13

Chain CE: 94% 5%



- Molecule 21: Snu13

Chain CF: 93% 6%

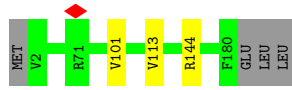


- Molecule 22: Rrp9

Chain CG: 66% 34%



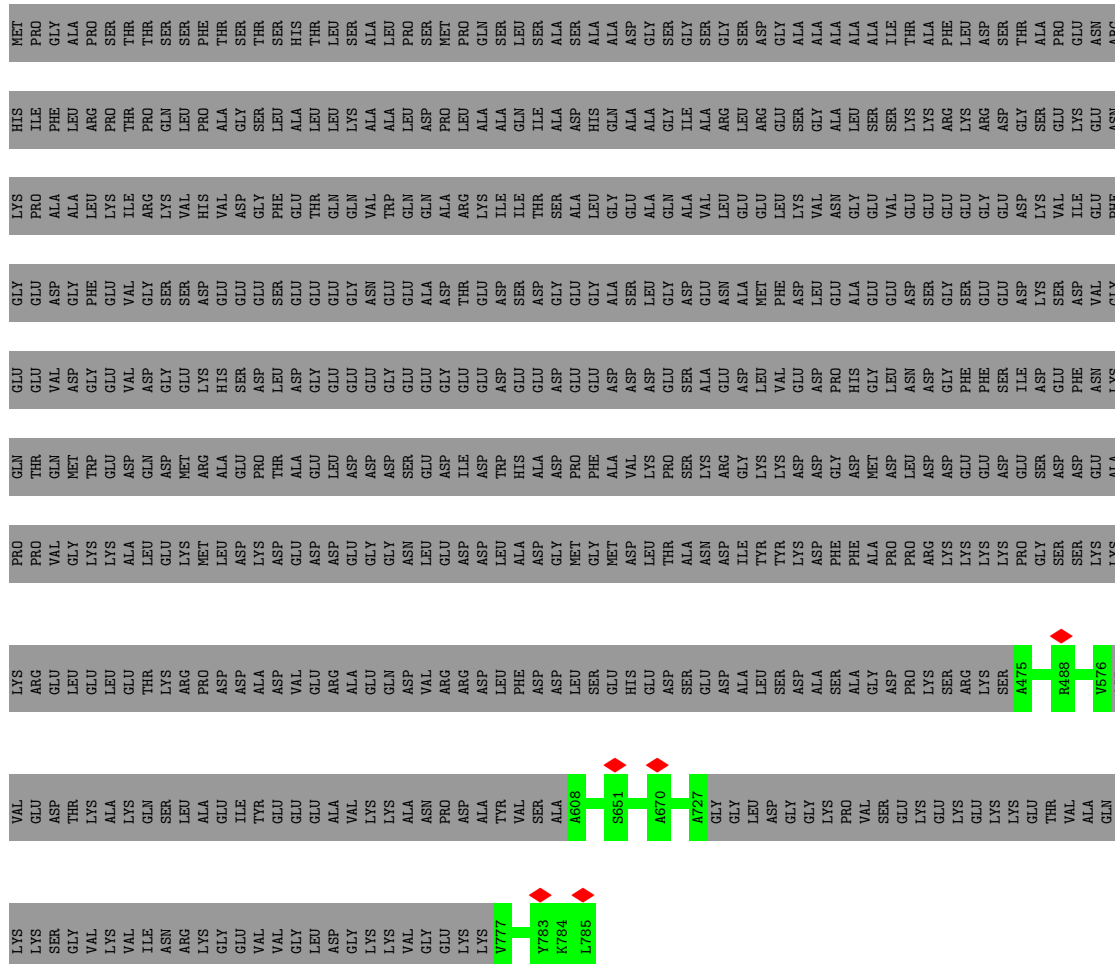
• Molecule 25: Imp3

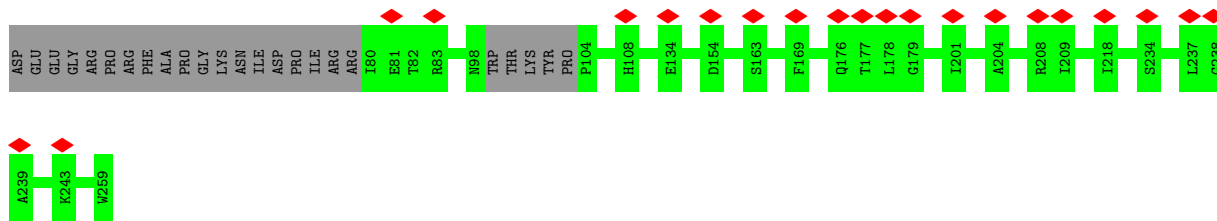


• Molecule 26: Putative U3 small nucleolar ribonucleoprotein

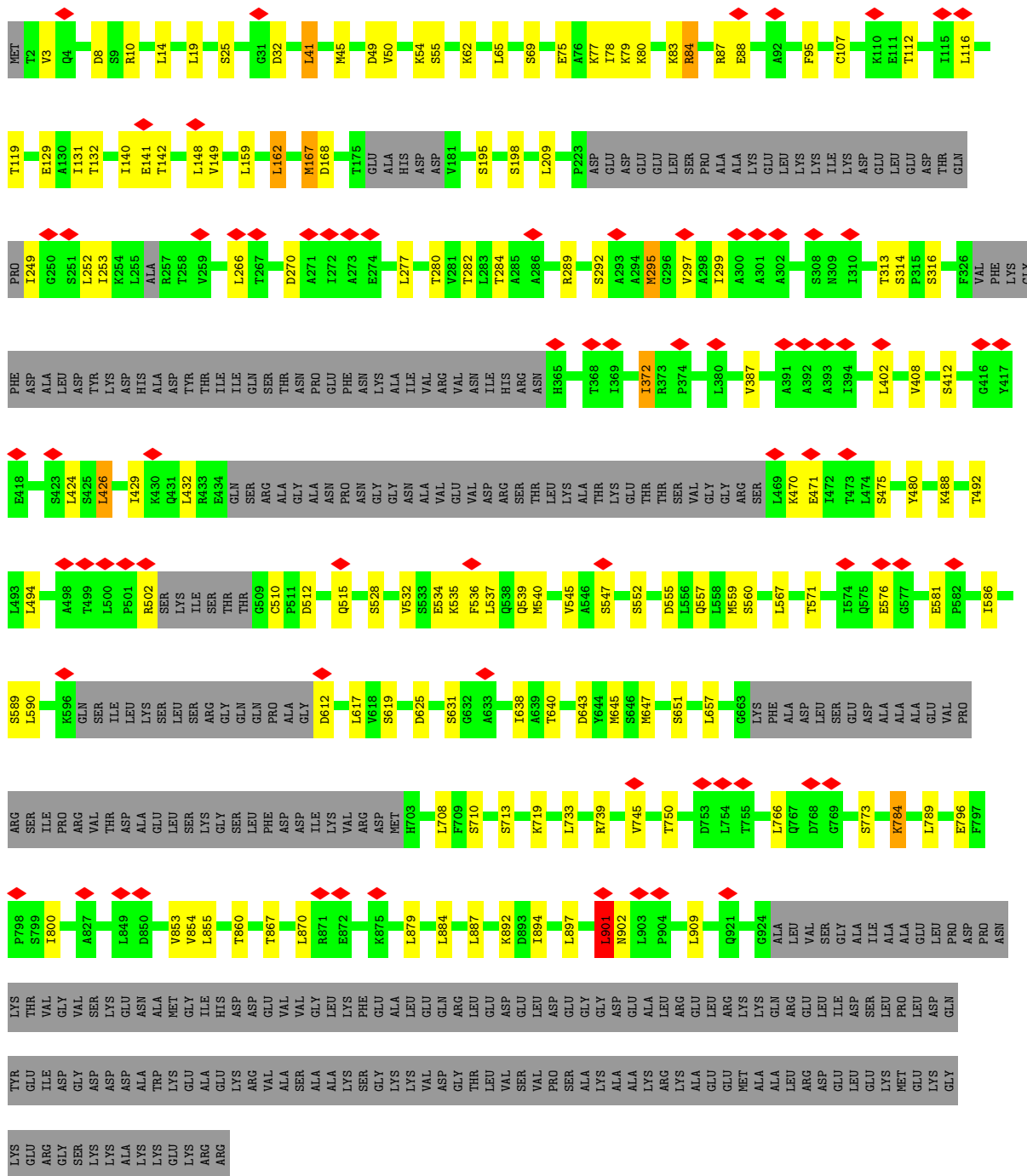



• Molecule 27: Putative U3 small nucleolar ribonucleoprotein protein

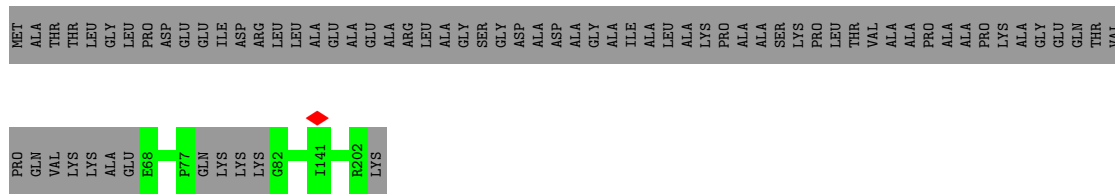





• Molecule 32: Kre33

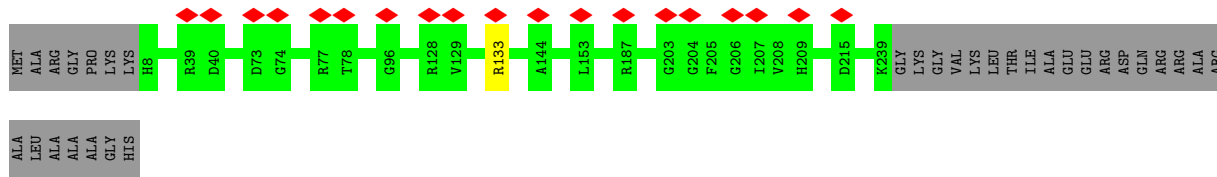


Chain CT:  65% 35%




• Molecule 34: 40S ribosomal protein S4

Chain Cb:  7% 88% 12%



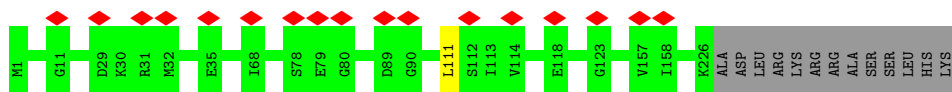
• Molecule 35: 40S ribosomal protein s5-like protein

Chain Cc:  89% 9%




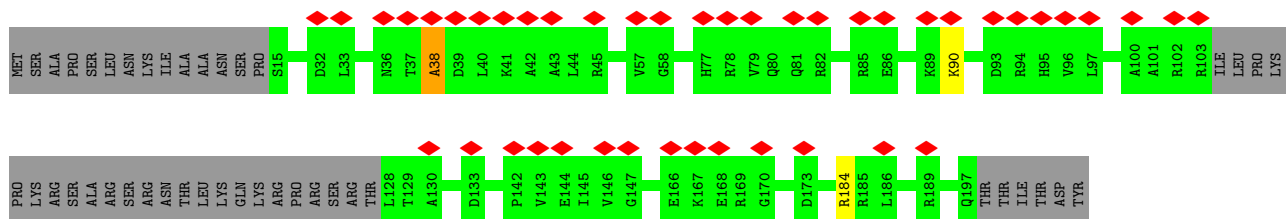
• Molecule 36: 40S ribosomal protein S6

Chain Cd:  7% 94% 5%




• Molecule 37: 40S ribosomal protein S7

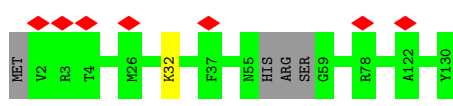
Chain Ce:  22% 77% 22%



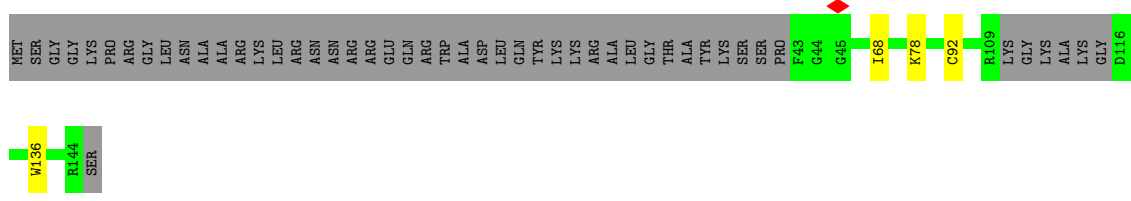
• Molecule 38: 40S ribosomal protein S8

Chain Cf:  8% 86% 14%

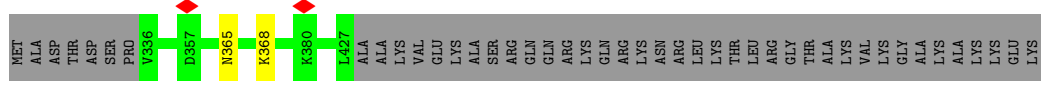




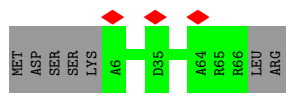
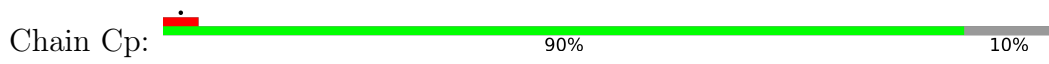
- Molecule 45: 40S ribosomal protein s23-like protein



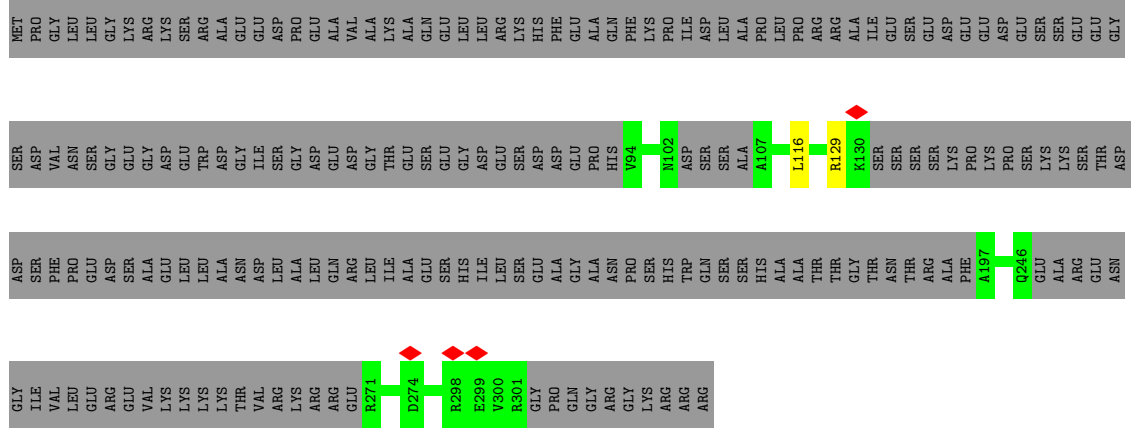
- Molecule 46: 40S ribosomal protein S24



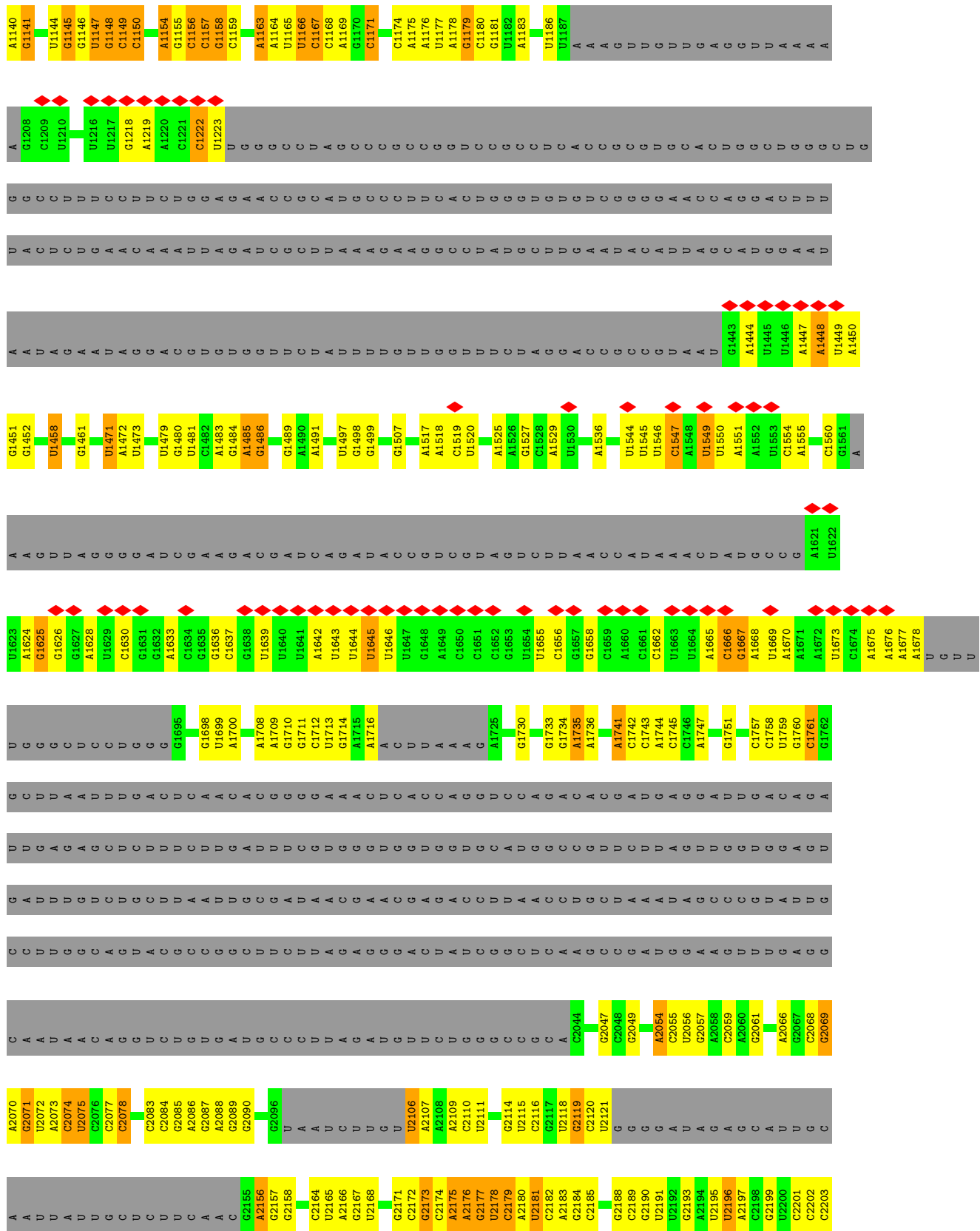
- Molecule 47: 40S ribosomal protein S28-like protein

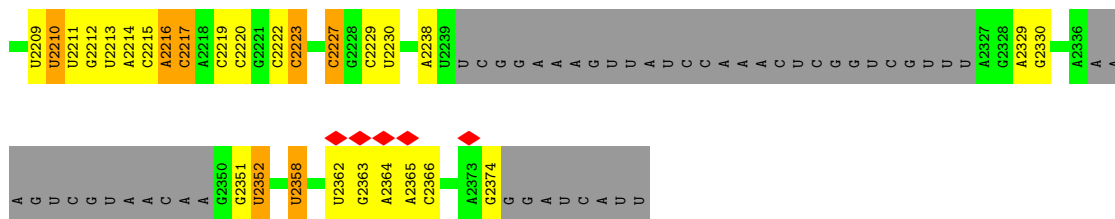


- Molecule 48: Faf1

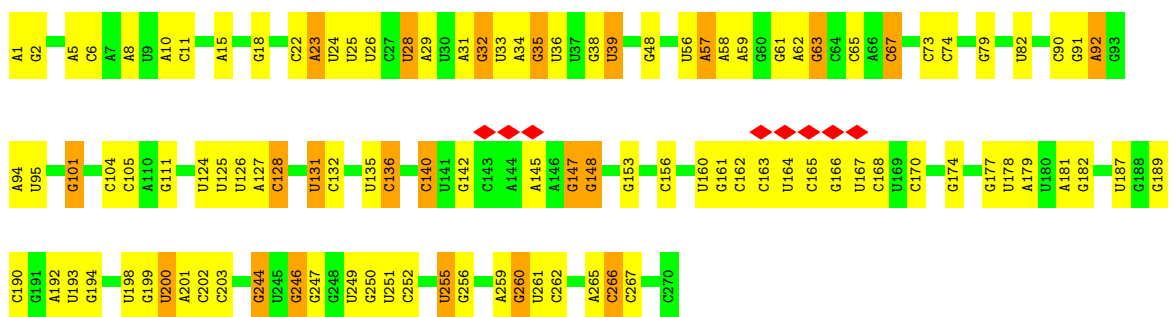


- Molecule 49: 35S ribosomal RNA

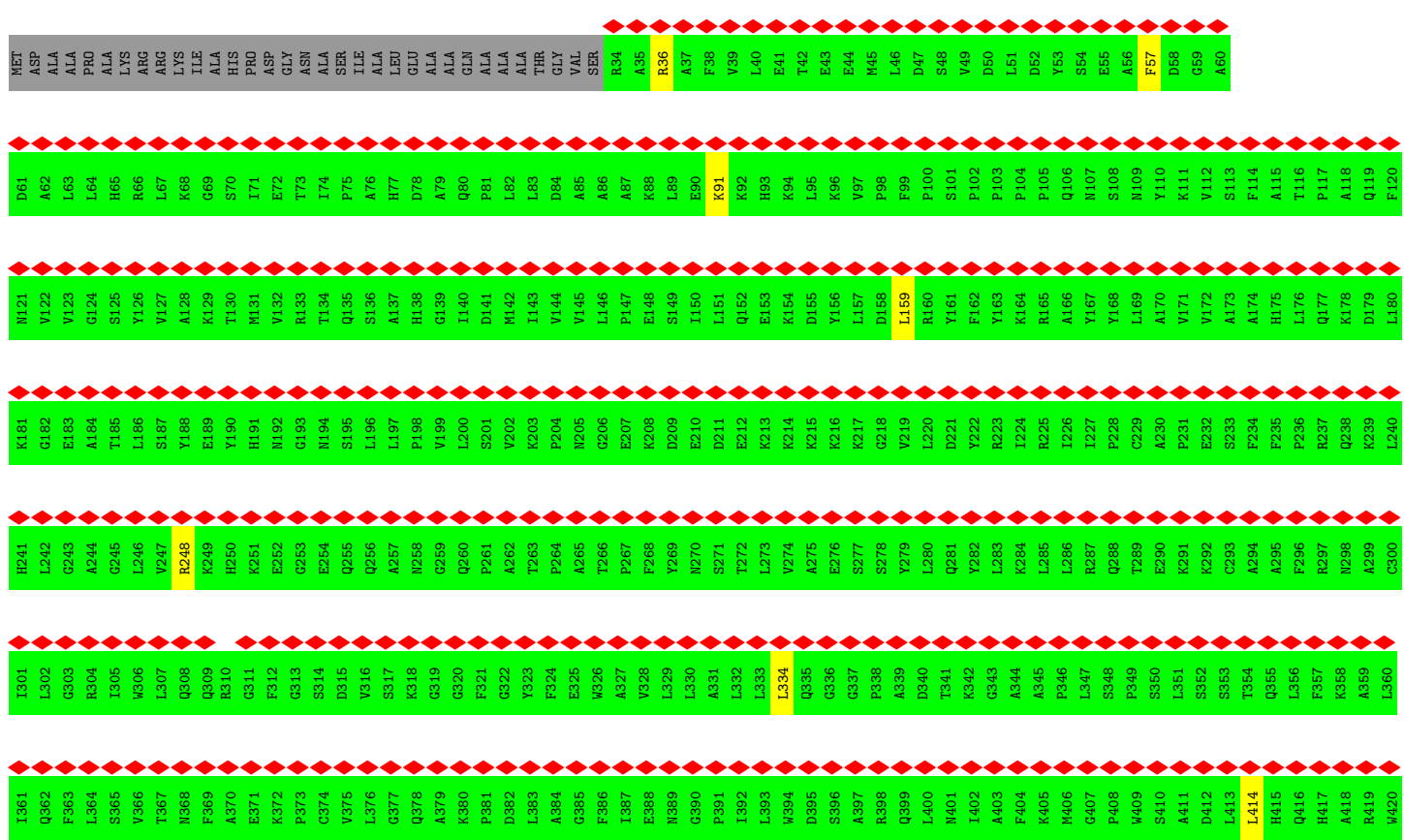
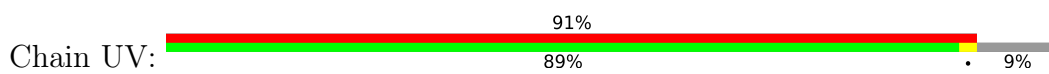




• Molecule 50: U3 snoRNA

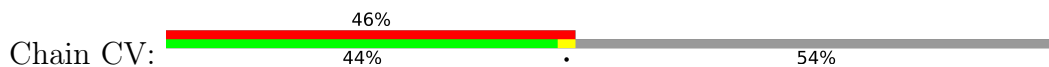


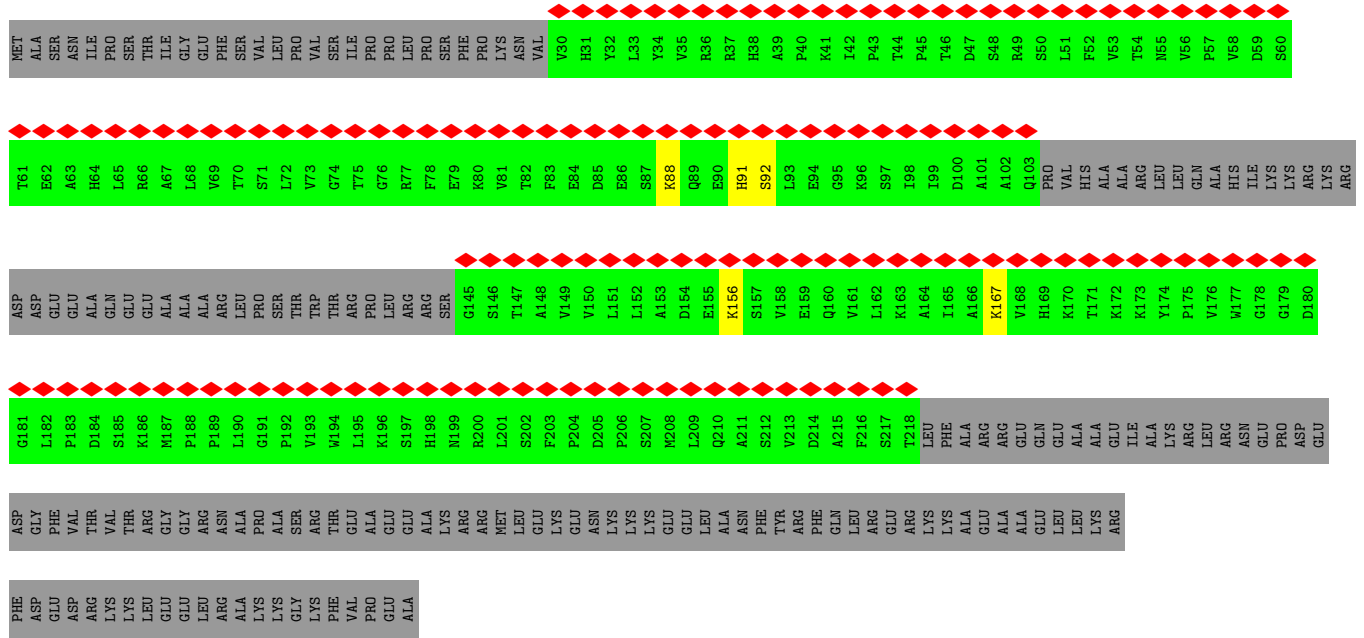
• Molecule 51: U3 small nucleolar RNA-associated protein 22



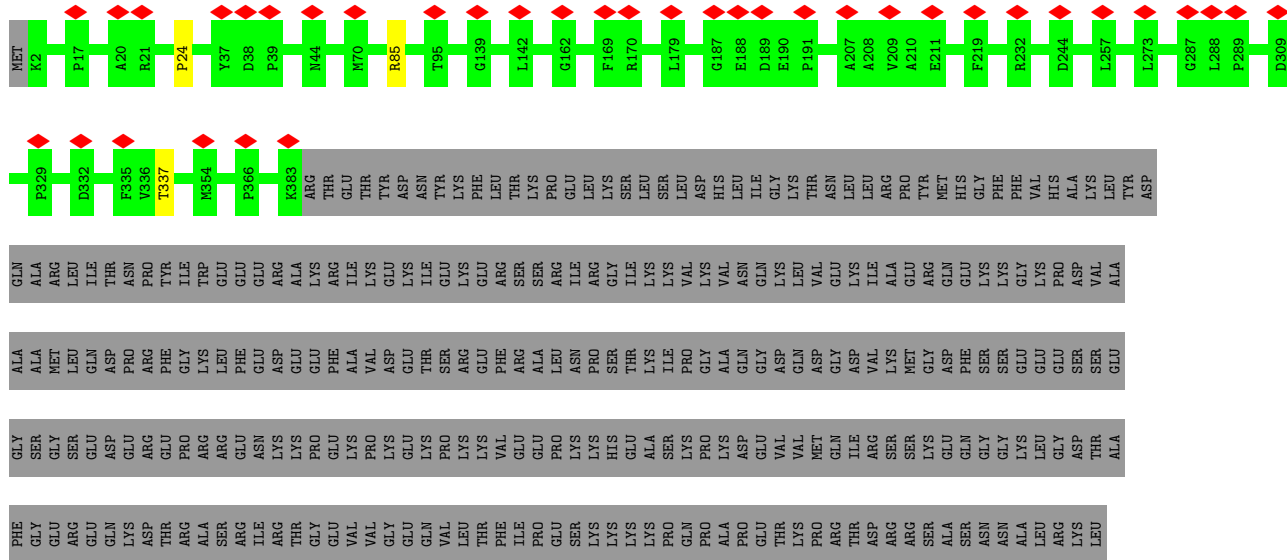
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R422	V482	N542	I602	P662	L722	Q782	K842	GLU	A962	K1022	E1082
K423	Y483	M543	M603	L663	L723	T783	L843	LEU	L963	G1023	G1083
L424	R484	A544	R604	R664	M724	K784	S844	ALA	A964	Q1024	D1084
L425	I485	A544	Y605	I665	I725	D785	M845	GLN	K965	E1025	K1085
A426	I485	A544	I606	R666	G726	K786	H846	GLU	S966	I1026	K1086
D427	R487	T546	I607	R667	R727	T787	F847	ARG	A967	K1027	I1087
G428	R488	D548	G608	V668	L728	T788	P848	ALA	A968	F1028	G1088
A429	A489	R549	L609	N669	L729	E789	P849	ILE	R969	K1029	A1089
V430	A489	G550	H610	P670	E730	Q790	E850	ALA	V970	V1030	A1090
D431	S491	P551	L611	I671	R731	Y791	L851	THR	I971	L1031	W1091
Q432	D492	S552	R612	C672	F732	L792	L852	ARG	I972	A1032	W1092
F433	K493	A553	V613	P673	K733	R793	E853	L915	E973	P1033	N1093
Q434	M494	G554	G614	E674	P734	Q794	L854	D916	Q974	E1034	P1094
P435	M495	P555	Q615	L675	G735	R795	F855	W918	G975	T1035	L1095
T436	E496	S556	L616	R676	E736	A796	V856	R919	V976	V1036	V1096
F437	G497	A557	Q617	H677	I737	S797	L857	K920	D977	E1037	K1097
I438	G498	E558	D618	S678	R738	T798	H858	L921	L978	P1038	R1098
L439	E499	E559	D619	S679	T739	Q799	T859	D922	D979	P1039	K1099
K440	R500	K560	I620	L680	H740	L800	F860	P923	V980	L1040	W1100
A441	A501	E561	V621	K681	V741	A601	L861	G824	R981	P1041	R1101
D442	R502	T562	F622	T682	G742	S802	A862	Q925	L982	V1042	V1102
L443	L503	C563	Y623	P683	L743	F603	P863	Q926	L983	A1043	N1103
P444	I504	E564	G624	S684	D744	R604	Y864	H927	F984	Q1044	L1104
T445	H505	K565	R625	F685	D745	R605	P865	T928	V985	P1045	P1105
H446	L506	F566	G626	G686	A746	T606	V866	V929	P986	H1046	T1106
T447	K507	R567	L627	P687	R747	F607	D867	L930	S987	V1047	S1107
Y448	V508	R568	P628	S688	V748	V608	V868	F931	L988	D1048	Y1108
D449	S509	F569	A629	K689	E749	H609	P869	V932	K889	V1049	X1109
L450	P510	W570	L630	S690	T750	L810	S870	A933	E990	L1050	P1110
V451	G511	G571	L631	G691	E751	P611	S871	T934	Y991	L1051	V1111
A452	F512	E572	S632	P692	N752	L812	P872	A935	D992	K1052	ALA
R453	S513	K573	I633	R693	L753	H613	T873	H936	V993	Q1053	GLY
M454	S514	K574	K634	P694	A754	T814	T874	E937	L994	L1054	GLY
D455	S515	E575	P635	M695	F755	Q615	G875	Q938	L995	S1055	ASP
P456	S516	L576	S636	E696	L756	V616	F876	S939	Y996	A1056	GLU
E457	W517	R577	D637	V697	D757	I617	L877	G940	L997	Y1057	GLU
K458	S518	F578	T638	R698	V758	T818	R878	T941	N999	Y1058	ASP
V459	L519	F579	A639	I699	I759	T619	T879	H942	T999	D1059	GLU
S460	N520	G580	L640	S700	Y760	A820	L880	W943	K1000	S1060	ASP
E461	E521	G581	F641	F701	A761	T621	L881	T944	V1001	A1061	GLU
A462	K522	D582	N642	E702	S762	T622	F882	S945	L1002	A1062	GLU
A463	P523	T583	V643	A703	G763	R623	L883	V946	K1003	G1063	ASP
P464	Q524	I584	A644	S704	A764	F824	A884	G948	S1004	A1064	ASP
D465	P525	R585	R645	G705	C765	P625	R885	G949	A1005	S1065	GLY
K466	Q526	E586	K646	K706	F766	A826	V886	H949	L1006	G1066	GLU
V467	K527	T587	T647	W707	R767	L627	D887	P950	R1007	T1067	GLU
A468	A528	L588	F648	P708	V768	S828	W888	R951	T1008	G1068	ARG
H469	G529	V589	T649	E709	R769	P629	R889	P952	Y1009	P1069	GLU
E470	T530	W590	S650	S710	I770	T630	T890	S953	I1010	L1070	GLU
A471	P531	S591	F651	L711	Q771	I631	D891	K954	T1011	V1071	ARG
R472	I532	A592	E652	I712	A772	R832	P892	V955	V1012	F1072	GLY
G473	E533	Q593	R653	A713	D773	L833	L893	V956	D1013	F1073	GLU
R474	I534	T594	D654	I714	L774	V634	T894	A957	R1014	R1074	GLY
H475	G535	P595	L655	Q715	E775	K635	I695	A958	A1015	S1075	GLU
W476	V536	F596	R656	R716	E776	H636	D896	R959	T1016	D1076	GLU
Q477	L537	D597	D657	T717	S777	W637	T897	H960	E1017	T1077	GLU
V478	F538	L598	L658	K718	L778	F838	F938	SER	M1018	T1078	GLU
G479	D539	C599	E559	I719	L779	S839	S839	LEU	N1019	A1079	GLU
H480	P540	E600	D660	A720	E780	V640	V640	ASN	G1020	T1080	GLU

• Molecule 52: Rrp7

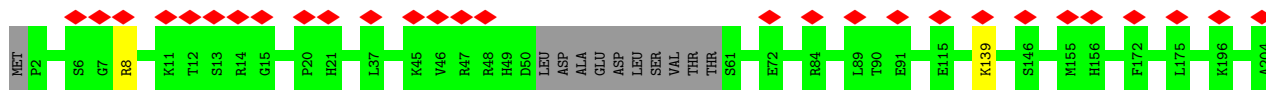
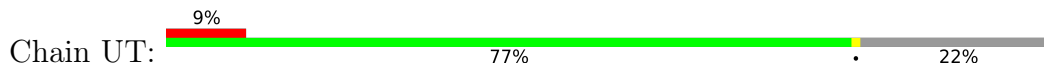


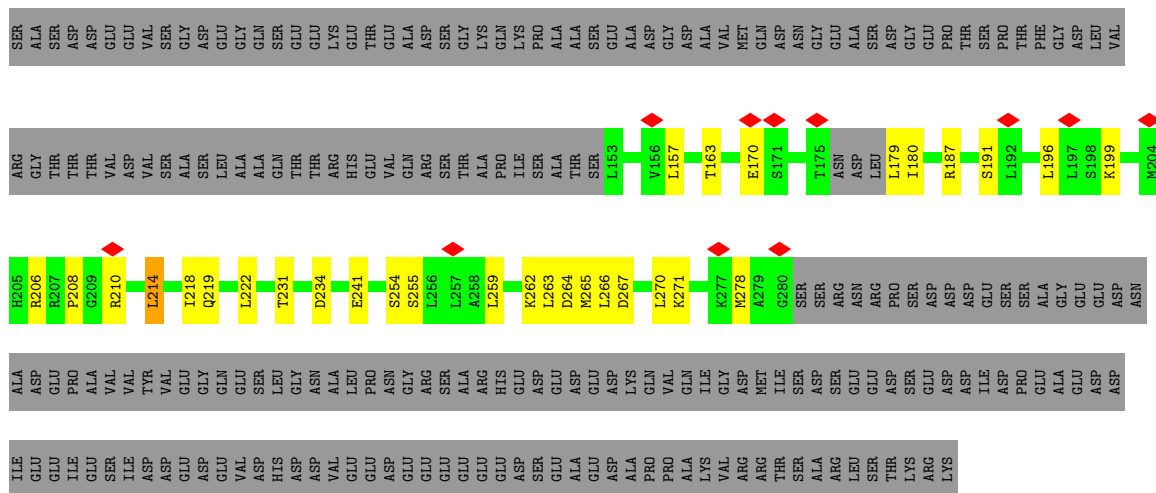


• Molecule 53: Ribosome biogenesis protein ENP2

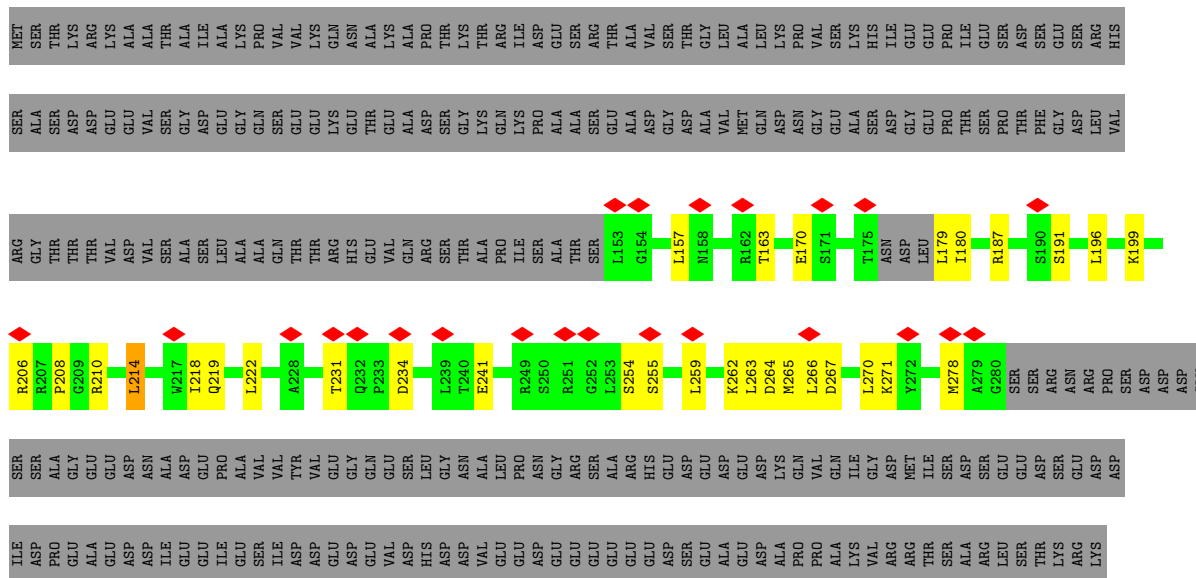


• Molecule 54: Utp20

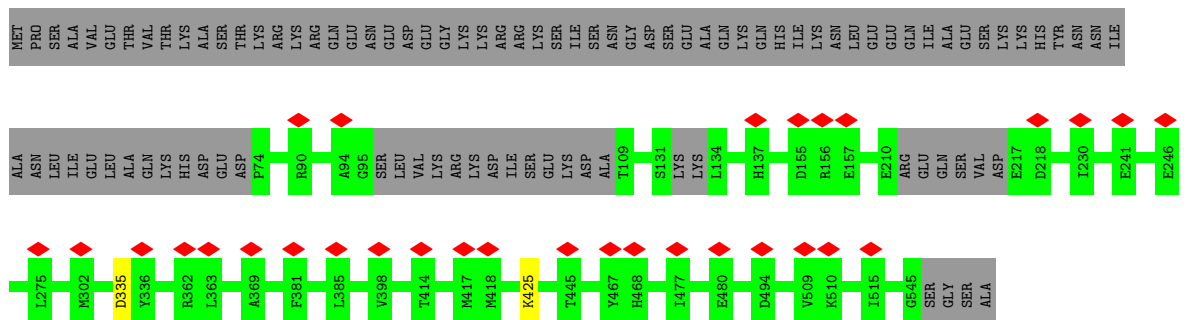
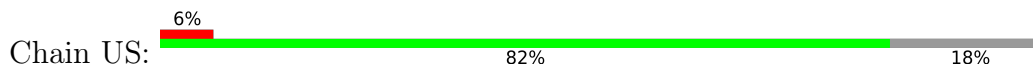




• Molecule 56: Utp5



• Molecule 57: Noc4



• Molecule 58: Rps18

L1502	R1573	A1704	LEU	ASP	ARG	LYS	ILE	GLY	LEU	LYS	THR	PRO	GLY	LEU
L1503	M1578	S1705	GLU	VAL	LEU	GLY	THR	THR	SER	LEU	LYS	VAL	VAL	LYS
G1504	D1579	S1706	ALA	ASP	SER	GLY	ASN	GLY	GLY	ARG	LEU	ARG	GLY	GLU
Q1505	D1580	V1707	GLY	SER	LEU	SER	THR	THR	ASP	LEU	LEU	VAL	VAL	ILE
Q1506	D1581	A1708	PHE	ASP	ASP	PHE	LEU	LEU	SER	LEU	ASP	LEU	LEU	ILE
D1507	R1581	K1709	ASP	ALA	TRP	ASP	ALA	GLN	ASP	GLU	LEU	VAL	VAL	GLU
S1508	Q1593	M1710	TRP	ALA	ALA	GLY	ALA	VAL	GLY	ALA	ASP	GLY	GLY	VAL
S1509	S1594	M1711	ALA	ALA	ALA	ALA	ALA	VAL	ASP	GLY	ASP	ASP	ASP	GLY
E1510	G1595	A1712	ALA	ALA	ALA	ALA	ALA	VAL	GLY	GLY	ASP	GLY	GLY	THR
L1511	G1595	A1712	ASN	LEU	ALA	ASN	ASN	GLY	ASP	GLY	ASP	ASP	ASP	HIS
L1512	K1596	D1713	LEU	ASP	ASP	ASN	ASN	ILE	ASP	ASP	ASP	ASP	ASP	LEU
W1512	Y1597	P1714	ASP	ALA	ALA	GLY	GLY	ILE	GLY	ARG	ARG	ARG	ALA	ALA
I1513	K1598	R1723	ALA	ASP	ASP	ALA	ALA	PHE	ASP	VAL	VAL	VAL	PHE	PHE
A1514	E1599	G1724	ASP	ASP	ASP	ASP	ASP	VAL	ASP	VAL	VAL	VAL	VAL	VAL
M1520	E1599	T1725	ASP	ASP	ASP	ASP	ASN	PHE	ASP	ASN	ASN	ASN	ASN	ASN
Q1521	A1600	K1726	GLY	GLY	GLY	GLY	ASN	VAL	SER	SER	SER	SER	ALA	ALA
V1522	K1609	V1727	ASN	ASN	ASN	ASN	ASN	VAL	ASP	THR	THR	THR	THR	THR
N1523	S1613	K1728	ALA	ALA	ALA	ALA	ALA	VAL	GLY	SER	SER	SER	ARG	ARG
D1524	E1614	G1729	VAL	VAL	VAL	VAL	VAL	VAL	LEU	LEU	LEU	LEU	PRO	PRO
L1525	E1614	G1729	ALA	ALA	ALA	ALA	ALA	VAL	LEU	LEU	LEU	LEU	ALA	ALA
S1526	W1619	L1730	GLU	GLU	GLU	GLU	GLU	VAL	GLY	GLY	GLY	GLY	GLY	GLY
S1527	T1628	W1738	VAL	ASP	ASP	ASP	ASP	VAL	ILE	ASP	ASP	ASP	VAL	VAL
A1528	K1629	R1755	PRO	LEU	LEU	LEU	LEU	PRO	ASP	PRO	PRO	PRO	GLY	GLY
A1529	K1633	E1756	LYS	LYS	LYS	LYS	LYS	LYS	GLY	VAL	VAL	VAL	VAL	VAL
N1530	E1634	R1767	LYS	LYS	LYS	LYS	LYS	LYS	VAL	VAL	VAL	VAL	VAL	VAL
I1531	Q1635	A1768	LYS	ARG	ARG	ARG	ARG	VAL	ILE	LEU	LEU	LEU	LEU	LEU
A1532	Q1635	LYS	ARG	ARG	ARG	ARG	ARG	VAL	ILE	LEU	LEU	LEU	LEU	LEU
E1533	A1636	LYS	GLU	SER	SER	SER	SER	VAL	ASP	ASP	ASP	ASP	GLY	GLY
R1534	R1637	ALA	GLU	PRO	PRO	PRO	PRO	VAL	ASP	ASP	ASP	ASP	GLY	GLY
A1535	A1638	ALA	GLN	GLY	GLY	GLY	GLY	VAL	GLY	GLY	GLY	GLY	GLN	GLN
S1536	K1641	THR	GLY	ILE	ILE	ILE	ILE	VAL	LEU	LEU	LEU	LEU	LEU	LEU
K1537	M1649	LEU	ILE	ASP	ASP	ASP	ASP	VAL	LEU	LEU	LEU	LEU	LEU	LEU
T1538	T1650	LEU	LYS	LYS	LYS	LYS	LYS	VAL	LEU	LEU	LEU	LEU	LEU	LEU
I1539	K1651	GLU	LYS	LYS	LYS	LYS	LYS	VAL	LEU	LEU	LEU	LEU	LEU	LEU
N1540	T1651	GLU	LYS	LYS	LYS	LYS	LYS	VAL	LEU	LEU	LEU	LEU	LEU	LEU
I1541	K1651	GLU	LYS	LYS	LYS	LYS	LYS	VAL	LEU	LEU	LEU	LEU	LEU	LEU
E1542	T1652	GLN	GLU	SER	SER	SER	SER	VAL	LEU	LEU	LEU	LEU	LEU	LEU
E1543	T1653	GLN	LEU	ASP	ASP	ASP	ASP	VAL	LEU	LEU	LEU	LEU	LEU	LEU
E1544	Y1656	GLU	VAL	LEU	LEU	LEU	LEU	VAL	LEU	LEU	LEU	LEU	LEU	LEU
T1545	A1662	GLU	ASN	ASN	ASN	ASN	ASN	VAL	LEU	LEU	LEU	LEU	LEU	LEU
E1546	A1663	GLU	GLY	THR	THR	THR	THR	VAL	LEU	LEU	LEU	LEU	LEU	LEU
I1552	L1664	GLU	GLY	THR	THR	THR	THR	VAL	LEU	LEU	LEU	LEU	LEU	LEU
L1555	K1682	GLU	GLY	THR	THR	THR	THR	VAL	LEU	LEU	LEU	LEU	LEU	LEU
N1556	A1685	GLU	GLY	THR	THR	THR	THR	VAL	LEU	LEU	LEU	LEU	LEU	LEU
L1557	T1686	GLU	GLY	THR	THR	THR	THR	VAL	LEU	LEU	LEU	LEU	LEU	LEU
E1558	K1689	GLU	GLY	THR	THR	THR	THR	VAL	LEU	LEU	LEU	LEU	LEU	LEU
V1559	R1690	GLU	GLY	THR	THR	THR	THR	VAL	LEU	LEU	LEU	LEU	LEU	LEU
A1560	F1691	GLU	GLY	THR	THR	THR	THR	VAL	LEU	LEU	LEU	LEU	LEU	LEU
Y1561	D1692	GLU	GLY	THR	THR	THR	THR	VAL	LEU	LEU	LEU	LEU	LEU	LEU
G1562	L1693	GLU	GLY	THR	THR	THR	THR	VAL	LEU	LEU	LEU	LEU	LEU	LEU
T1563	W1694	GLU	GLY	THR	THR	THR	THR	VAL	LEU	LEU	LEU	LEU	LEU	LEU
D1564	E1694	GLU	GLY	THR	THR	THR	THR	VAL	LEU	LEU	LEU	LEU	LEU	LEU
E1565	E1701	GLU	GLY	THR	THR	THR	THR	VAL	LEU	LEU	LEU	LEU	LEU	LEU
E1569														
V1570														
F1571														
K1572														

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	24283	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 ($e^-/\text{\AA}^2$)	28	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	FEI FALCON II (4k x 4k)	Depositor
Maximum map value	0.834	Depositor
Minimum map value	-0.505	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.012	Depositor
Recommended contour level	0.03	Depositor
Map size (Å)	520.32, 520.32, 520.32	wwPDB
Map dimensions	480, 480, 480	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.084, 1.084, 1.084	Depositor

5 Model quality i

5.1 Standard geometry i

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

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	UA	0.55	2/6521 (0.0%)	0.71	2/8867 (0.0%)
2	UB	0.37	0/4154	0.56	1/5583 (0.0%)
3	UC	0.59	0/595	0.65	0/786
4	UD	0.33	0/6211	0.58	1/8408 (0.0%)
5	UF	0.34	0/2657	0.53	0/3596
6	UG	0.49	0/3790	0.65	1/5120 (0.0%)
7	UJ	0.33	0/8567	0.59	2/11619 (0.0%)
8	UK	0.64	2/1701 (0.1%)	0.67	1/2251 (0.0%)
9	UL	0.34	0/6299	0.63	2/8531 (0.0%)
10	UM	0.30	0/5366	0.59	2/7282 (0.0%)
11	UN	0.38	0/1425	0.57	1/1913 (0.1%)
12	UO	0.36	0/3903	0.61	1/5312 (0.0%)
13	UQ	0.32	0/6136	0.59	3/8348 (0.0%)
14	UR	0.40	0/3564	0.61	0/4816
15	UU	0.43	0/6903	0.63	2/9392 (0.0%)
16	UX	0.61	0/1493	0.70	1/2011 (0.0%)
17	UZ	0.40	0/1857	0.62	0/2526
18	CA	0.53	0/1814	0.65	1/2456 (0.0%)
18	CB	0.36	0/1853	0.59	0/2511
19	CC	0.38	0/2911	0.58	1/3937 (0.0%)
20	CD	0.37	0/3205	0.62	1/4338 (0.0%)
21	CE	0.46	0/891	0.60	0/1214
21	CF	0.40	0/876	0.66	0/1195
22	CG	0.34	0/3307	0.60	0/4462
23	CH	0.42	0/2939	0.64	1/3988 (0.0%)
24	CI	0.59	3/6631 (0.0%)	0.70	4/8943 (0.0%)
25	CJ	0.74	1/1462 (0.1%)	0.76	0/1967
26	CK	0.71	1/2376 (0.0%)	0.81	3/3214 (0.1%)
27	CL	0.48	0/1812	0.59	0/2437
28	CM	0.56	3/3573 (0.1%)	0.69	1/4829 (0.0%)
29	CN	0.33	0/1797	0.60	0/2443
29	CO	0.32	0/1714	0.60	2/2325 (0.1%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
30	CP	0.30	0/1528	0.63	1/2057 (0.0%)
31	CQ	0.29	0/1379	0.57	0/1850
32	CR	0.37	1/6108 (0.0%)	0.74	13/8266 (0.2%)
32	CS	0.37	1/6108 (0.0%)	0.74	13/8266 (0.2%)
33	CT	0.53	0/1053	0.62	0/1413
34	Cb	0.31	0/1890	0.59	0/2548
35	Cc	0.44	0/1485	0.59	0/2008
36	Cd	0.32	0/1850	0.58	0/2474
37	Ce	0.35	0/1298	0.67	1/1750 (0.1%)
38	Cf	0.30	0/1429	0.56	0/1915
39	Cg	0.46	0/1259	0.60	0/1687
40	Ch	0.28	0/412	0.57	0/549
41	Ci	0.31	0/801	0.60	0/1087
42	Cj	0.58	0/958	0.72	0/1293
43	Ck	0.31	0/1190	0.53	0/1592
44	Cm	0.40	0/1001	0.59	0/1345
45	Cn	0.81	2/712 (0.3%)	0.79	0/954
46	Co	0.34	0/754	0.59	0/1011
47	Cp	0.34	0/458	0.65	0/617
48	CU	0.35	0/887	0.61	1/1178 (0.1%)
49	C1	0.83	45/35454 (0.1%)	1.37	556/55209 (1.0%)
50	C2	0.88	3/5459 (0.1%)	1.47	88/8498 (1.0%)
51	UV	0.33	0/8638	0.66	6/11725 (0.1%)
52	CV	0.34	0/1172	0.71	0/1592
53	CW	0.32	0/2996	0.63	1/4075 (0.0%)
54	UT	0.31	0/16314	0.57	4/22075 (0.0%)
55	UH	0.34	0/2852	0.60	3/3846 (0.1%)
56	UE	0.38	0/980	0.78	2/1316 (0.2%)
56	UI	0.38	0/980	0.78	2/1316 (0.2%)
57	US	0.33	0/3765	0.56	1/5100 (0.0%)
58	CI	0.32	0/638	0.65	0/857
59	CX	0.27	0/2172	0.51	0/2946
60	CY	0.36	0/982	0.61	0/1298
61	CZ	0.33	0/362	0.73	1/483 (0.2%)
62	UP	0.33	0/428	0.57	0/570
63	Cz	0.31	0/2310	0.54	0/3120
All	All	0.51	64/226365 (0.0%)	0.84	727/314506 (0.2%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	UA	0	10
5	UF	0	1
6	UG	0	2
8	UK	0	2
9	UL	0	2
10	UM	0	4
11	UN	0	1
12	UO	0	1
13	UQ	0	2
15	UU	0	4
16	UX	0	2
17	UZ	0	2
18	CB	0	1
21	CE	0	1
21	CF	0	2
23	CH	0	1
24	CI	0	6
25	CJ	0	2
26	CK	0	1
28	CM	0	1
29	CO	0	2
32	CR	0	1
32	CS	0	1
37	Ce	0	1
41	Ci	0	1
42	Cj	0	3
45	Cn	0	1
46	Co	0	1
51	UV	0	4
52	CV	0	2
54	UT	0	5
55	UH	0	1
58	Cl	0	1
60	CY	0	1
63	Cz	0	1
All	All	0	74

The worst 5 of 64 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	UA	488	TRP	CB-CG	-8.05	1.35	1.50
50	C2	57	A	N7-C5	-7.73	1.34	1.39
32	CS	515	GLN	CA-CB	7.33	1.70	1.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
32	CR	515	GLN	CA-CB	7.33	1.70	1.53
49	C1	1154	A	N9-C4	-6.99	1.33	1.37

The worst 5 of 727 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
50	C2	2	G	O5'-P-OP1	-32.38	71.84	110.70
50	C2	2	G	OP1-P-OP2	-26.27	80.19	119.60
24	CI	995	VAL	C-N-CA	19.84	171.29	121.70
50	C2	2	G	O5'-P-OP2	17.99	132.29	110.70
49	C1	2074	C	N1-C2-O2	16.01	128.50	118.90

There are no chirality outliers.

5 of 74 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	UA	273	GLY	Peptide
1	UA	320	GLY	Peptide
1	UA	386	THR	Peptide
1	UA	424	GLU	Peptide
1	UA	443	GLY	Peptide

5.2 Too-close contacts [i](#)

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

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	UA	835/904 (92%)	733 (88%)	102 (12%)	0	100	100
2	UB	502/907 (55%)	472 (94%)	30 (6%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
3	UC	72/648 (11%)	58 (81%)	14 (19%)	0	100	100
4	UD	754/884 (85%)	708 (94%)	46 (6%)	0	100	100
5	UF	325/414 (78%)	303 (93%)	21 (6%)	1 (0%)	41	76
6	UG	475/558 (85%)	433 (91%)	39 (8%)	3 (1%)	25	65
7	UJ	1062/1802 (59%)	1000 (94%)	62 (6%)	0	100	100
8	UK	211/270 (78%)	196 (93%)	15 (7%)	0	100	100
9	UL	767/962 (80%)	704 (92%)	63 (8%)	0	100	100
10	UM	645/912 (71%)	595 (92%)	49 (8%)	1 (0%)	47	81
11	UN	171/938 (18%)	161 (94%)	9 (5%)	1 (1%)	25	65
12	UO	498/557 (89%)	459 (92%)	39 (8%)	0	100	100
13	UQ	775/960 (81%)	703 (91%)	71 (9%)	1 (0%)	51	85
14	UR	437/618 (71%)	400 (92%)	37 (8%)	0	100	100
15	UU	890/1049 (85%)	797 (90%)	93 (10%)	0	100	100
16	UX	188/193 (97%)	172 (92%)	16 (8%)	0	100	100
17	UZ	229/391 (59%)	206 (90%)	23 (10%)	0	100	100
18	CA	238/313 (76%)	218 (92%)	20 (8%)	0	100	100
18	CB	235/313 (75%)	216 (92%)	19 (8%)	0	100	100
19	CC	383/523 (73%)	361 (94%)	22 (6%)	0	100	100
20	CD	416/582 (72%)	384 (92%)	32 (8%)	0	100	100
21	CE	119/127 (94%)	112 (94%)	7 (6%)	0	100	100
21	CF	118/127 (93%)	109 (92%)	9 (8%)	0	100	100
22	CG	402/630 (64%)	366 (91%)	36 (9%)	0	100	100
23	CH	383/411 (93%)	344 (90%)	38 (10%)	1 (0%)	41	76
24	CI	812/1163 (70%)	732 (90%)	80 (10%)	0	100	100
25	CJ	177/183 (97%)	154 (87%)	23 (13%)	0	100	100
26	CK	295/297 (99%)	255 (86%)	40 (14%)	0	100	100
27	CL	225/785 (29%)	205 (91%)	20 (9%)	0	100	100
28	CM	443/446 (99%)	402 (91%)	41 (9%)	0	100	100
29	CN	222/252 (88%)	202 (91%)	20 (9%)	0	100	100
29	CO	211/252 (84%)	196 (93%)	13 (6%)	2 (1%)	17	56
30	CP	185/322 (58%)	181 (98%)	4 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
31	CQ	171/259 (66%)	165 (96%)	6 (4%)	0	100	100
32	CR	746/1073 (70%)	692 (93%)	54 (7%)	0	100	100
32	CS	746/1073 (70%)	692 (93%)	54 (7%)	0	100	100
33	CT	127/203 (63%)	111 (87%)	16 (13%)	0	100	100
34	Cb	230/264 (87%)	211 (92%)	19 (8%)	0	100	100
35	Cc	188/212 (89%)	166 (88%)	22 (12%)	0	100	100
36	Cd	224/239 (94%)	208 (93%)	16 (7%)	0	100	100
37	Ce	155/203 (76%)	145 (94%)	10 (6%)	0	100	100
38	Cf	170/202 (84%)	162 (95%)	8 (5%)	0	100	100
39	Cg	157/190 (83%)	149 (95%)	8 (5%)	0	100	100
40	Ch	47/151 (31%)	47 (100%)	0	0	100	100
41	Ci	113/150 (75%)	100 (88%)	13 (12%)	0	100	100
42	Cj	124/143 (87%)	109 (88%)	15 (12%)	0	100	100
43	Ck	136/161 (84%)	131 (96%)	5 (4%)	0	100	100
44	Cm	122/130 (94%)	116 (95%)	6 (5%)	0	100	100
45	Cn	92/145 (63%)	83 (90%)	9 (10%)	0	100	100
46	Co	90/136 (66%)	82 (91%)	8 (9%)	0	100	100
47	Cp	59/68 (87%)	55 (93%)	4 (7%)	0	100	100
48	CU	106/311 (34%)	99 (93%)	7 (7%)	0	100	100
51	UV	1057/1171 (90%)	948 (90%)	108 (10%)	1 (0%)	51	85
52	CV	144/322 (45%)	129 (90%)	14 (10%)	1 (1%)	22	62
53	CW	380/668 (57%)	349 (92%)	31 (8%)	0	100	100
54	UT	1982/2612 (76%)	1878 (95%)	100 (5%)	4 (0%)	47	81
55	UH	349/930 (38%)	335 (96%)	14 (4%)	0	100	100
56	UE	121/410 (30%)	111 (92%)	9 (7%)	1 (1%)	19	60
56	UI	121/410 (30%)	111 (92%)	9 (7%)	1 (1%)	19	60
57	US	443/549 (81%)	420 (95%)	23 (5%)	0	100	100
58	Cl	78/156 (50%)	74 (95%)	4 (5%)	0	100	100
59	CX	265/480 (55%)	251 (95%)	14 (5%)	0	100	100
60	CY	118/381 (31%)	109 (92%)	9 (8%)	0	100	100
61	CZ	40/609 (7%)	32 (80%)	8 (20%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
62	UP	52/364 (14%)	45 (86%)	7 (14%)	0	100	100
63	Cz	273/1796 (15%)	261 (96%)	12 (4%)	0	100	100
All	All	22926/35864 (64%)	21113 (92%)	1795 (8%)	18 (0%)	54	85

5 of 18 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
6	UG	176	LEU
29	CO	85	SER
51	UV	1059	ASP
54	UT	487	ILE
5	UF	121	LYS

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	UA	651/775 (84%)	647 (99%)	4 (1%)	86	92
2	UB	425/788 (54%)	423 (100%)	2 (0%)	88	93
3	UC	61/536 (11%)	61 (100%)	0	100	100
4	UD	653/738 (88%)	650 (100%)	3 (0%)	88	93
5	UF	248/341 (73%)	246 (99%)	2 (1%)	81	89
6	UG	373/474 (79%)	371 (100%)	2 (0%)	88	93
7	UJ	898/1526 (59%)	890 (99%)	8 (1%)	78	88
8	UK	159/227 (70%)	156 (98%)	3 (2%)	57	75
9	UL	667/821 (81%)	665 (100%)	2 (0%)	92	95
10	UM	569/770 (74%)	567 (100%)	2 (0%)	91	94
11	UN	146/765 (19%)	146 (100%)	0	100	100
12	UO	404/456 (89%)	401 (99%)	3 (1%)	84	90
13	UQ	650/817 (80%)	650 (100%)	0	100	100
14	UR	360/524 (69%)	359 (100%)	1 (0%)	92	95

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
15	UU	672/863 (78%)	668 (99%)	4 (1%)	86	92
16	UX	150/167 (90%)	147 (98%)	3 (2%)	55	73
17	UZ	186/329 (56%)	184 (99%)	2 (1%)	73	85
18	CA	175/228 (77%)	172 (98%)	3 (2%)	60	78
18	CB	195/228 (86%)	195 (100%)	0	100	100
19	CC	287/435 (66%)	286 (100%)	1 (0%)	92	95
20	CD	319/489 (65%)	318 (100%)	1 (0%)	92	95
21	CE	91/108 (84%)	91 (100%)	0	100	100
21	CF	88/108 (82%)	88 (100%)	0	100	100
22	CG	331/525 (63%)	329 (99%)	2 (1%)	86	92
23	CH	303/320 (95%)	298 (98%)	5 (2%)	60	78
24	CI	661/1009 (66%)	653 (99%)	8 (1%)	71	84
25	CJ	147/169 (87%)	147 (100%)	0	100	100
26	CK	245/266 (92%)	241 (98%)	4 (2%)	62	79
27	CL	181/642 (28%)	181 (100%)	0	100	100
28	CM	364/383 (95%)	361 (99%)	3 (1%)	81	89
29	CN	202/223 (91%)	202 (100%)	0	100	100
29	CO	193/223 (86%)	190 (98%)	3 (2%)	62	79
30	CP	164/287 (57%)	163 (99%)	1 (1%)	86	92
31	CQ	145/215 (67%)	145 (100%)	0	100	100
32	CR	654/916 (71%)	512 (78%)	142 (22%)	1	6
32	CS	654/916 (71%)	512 (78%)	142 (22%)	1	6
33	CT	108/167 (65%)	108 (100%)	0	100	100
34	Cb	199/221 (90%)	198 (100%)	1 (0%)	88	93
35	Cc	149/178 (84%)	145 (97%)	4 (3%)	44	66
36	Cd	192/204 (94%)	191 (100%)	1 (0%)	88	93
37	Ce	137/177 (77%)	135 (98%)	2 (2%)	65	80
38	Cf	139/164 (85%)	138 (99%)	1 (1%)	84	90
39	Cg	122/162 (75%)	122 (100%)	0	100	100
40	Ch	41/130 (32%)	40 (98%)	1 (2%)	49	69
41	Ci	74/117 (63%)	73 (99%)	1 (1%)	67	81

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
42	Cj	92/115 (80%)	91 (99%)	1 (1%)	73	85
43	Ck	126/143 (88%)	125 (99%)	1 (1%)	81	89
44	Cm	103/113 (91%)	102 (99%)	1 (1%)	76	86
45	Cn	70/116 (60%)	69 (99%)	1 (1%)	67	81
46	Co	79/115 (69%)	78 (99%)	1 (1%)	69	82
47	Cp	46/61 (75%)	46 (100%)	0	100	100
48	CU	92/260 (35%)	91 (99%)	1 (1%)	73	85
51	UV	908/989 (92%)	895 (99%)	13 (1%)	67	81
52	CV	129/276 (47%)	127 (98%)	2 (2%)	62	79
53	CW	309/587 (53%)	307 (99%)	2 (1%)	86	92
54	UT	1724/2276 (76%)	1715 (100%)	9 (0%)	88	93
55	UH	301/788 (38%)	298 (99%)	3 (1%)	76	86
56	UE	105/346 (30%)	76 (72%)	29 (28%)	0	3
56	UI	105/346 (30%)	76 (72%)	29 (28%)	0	3
57	US	404/493 (82%)	403 (100%)	1 (0%)	93	96
58	Cl	71/135 (53%)	69 (97%)	2 (3%)	43	65
59	CX	225/411 (55%)	223 (99%)	2 (1%)	78	88
60	CY	100/322 (31%)	100 (100%)	0	100	100
61	CZ	36/519 (7%)	34 (94%)	2 (6%)	21	48
62	UP	44/314 (14%)	44 (100%)	0	100	100
63	Cz	235/1533 (15%)	233 (99%)	2 (1%)	78	88
All	All	19136/30385 (63%)	18667 (98%)	469 (2%)	50	68

5 of 469 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
32	CS	77	LYS
56	UI	191	SER
32	CS	471	GLU
56	UI	157	LEU
55	UH	624	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 279 such sidechains are listed below:

Mol	Chain	Res	Type
54	UT	377	GLN
54	UT	971	ASN
57	US	152	HIS
17	UZ	110	ASN
16	UX	63	ASN

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
49	C1	1461/2323 (62%)	559 (38%)	35 (2%)
50	C2	226/230 (98%)	86 (38%)	6 (2%)
All	All	1687/2553 (66%)	645 (38%)	41 (2%)

5 of 645 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
49	C1	4	G
49	C1	5	G
49	C1	7	A
49	C1	13	G
49	C1	14	G

5 of 41 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
49	C1	1734	G
50	C2	23	A
49	C1	2054	A
49	C1	2156	A
50	C2	35	G

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 1 ligands modelled in this entry, 1 is monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
50	C2	3

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	C2	206:G	O3'	240:C	P	18.94
1	C2	105:C	O3'	110:A	P	15.09
1	C2	119:C	O3'	123:A	P	11.47

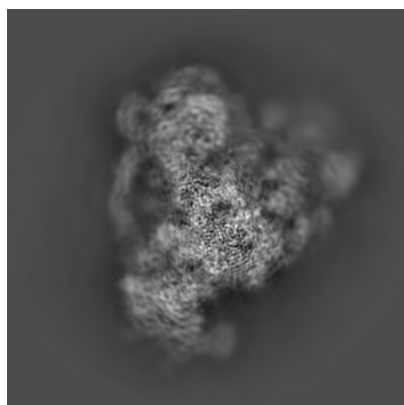
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-10056. These allow visual inspection of the internal detail of the map and identification of artifacts.

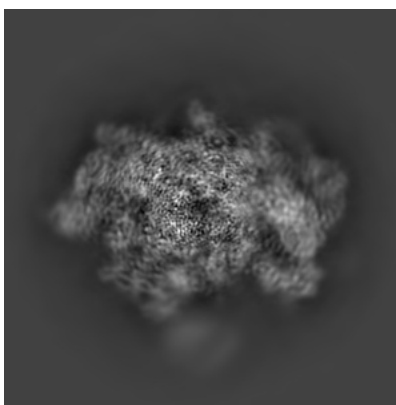
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

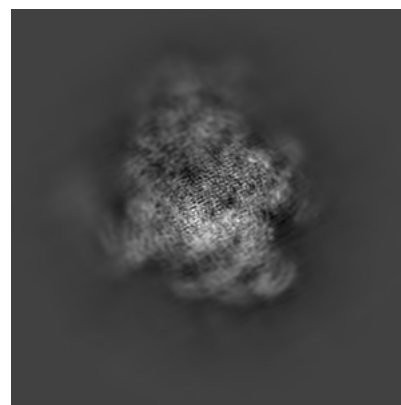
6.1.1 Primary map



X



Y

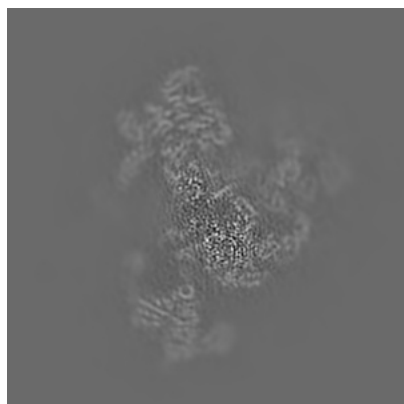


Z

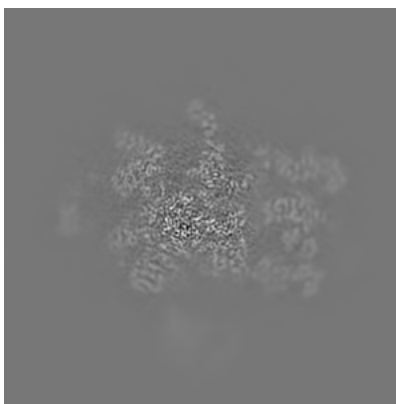
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

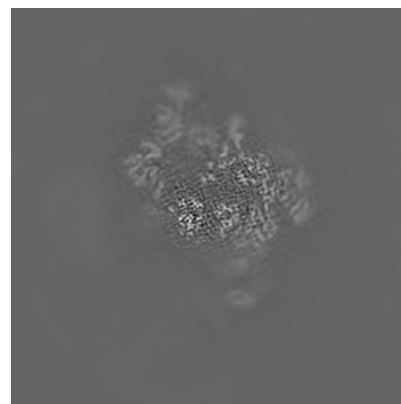
6.2.1 Primary map



X Index: 240



Y Index: 240

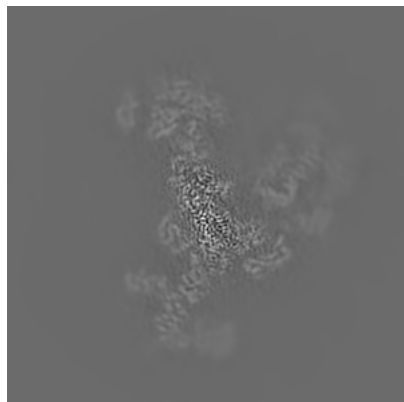


Z Index: 240

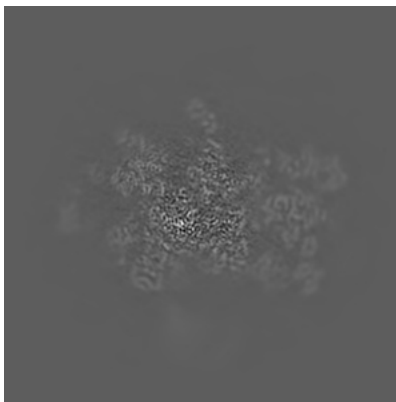
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

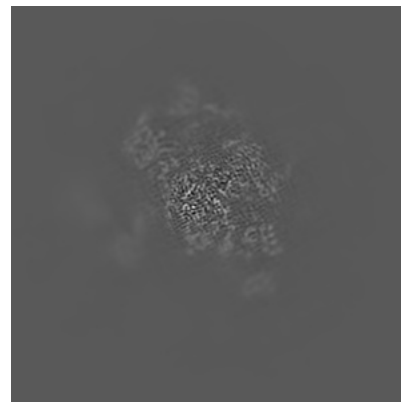
6.3.1 Primary map



X Index: 217



Y Index: 238

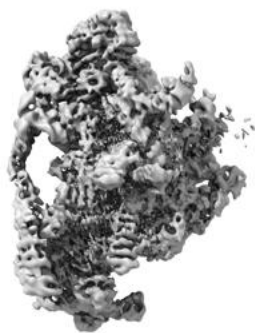


Z Index: 214

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

6.4 Orthogonal surface views [i](#)

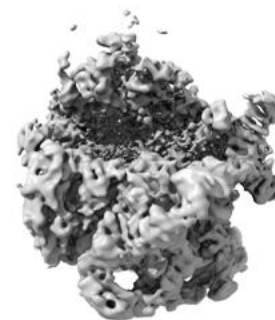
6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.03. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

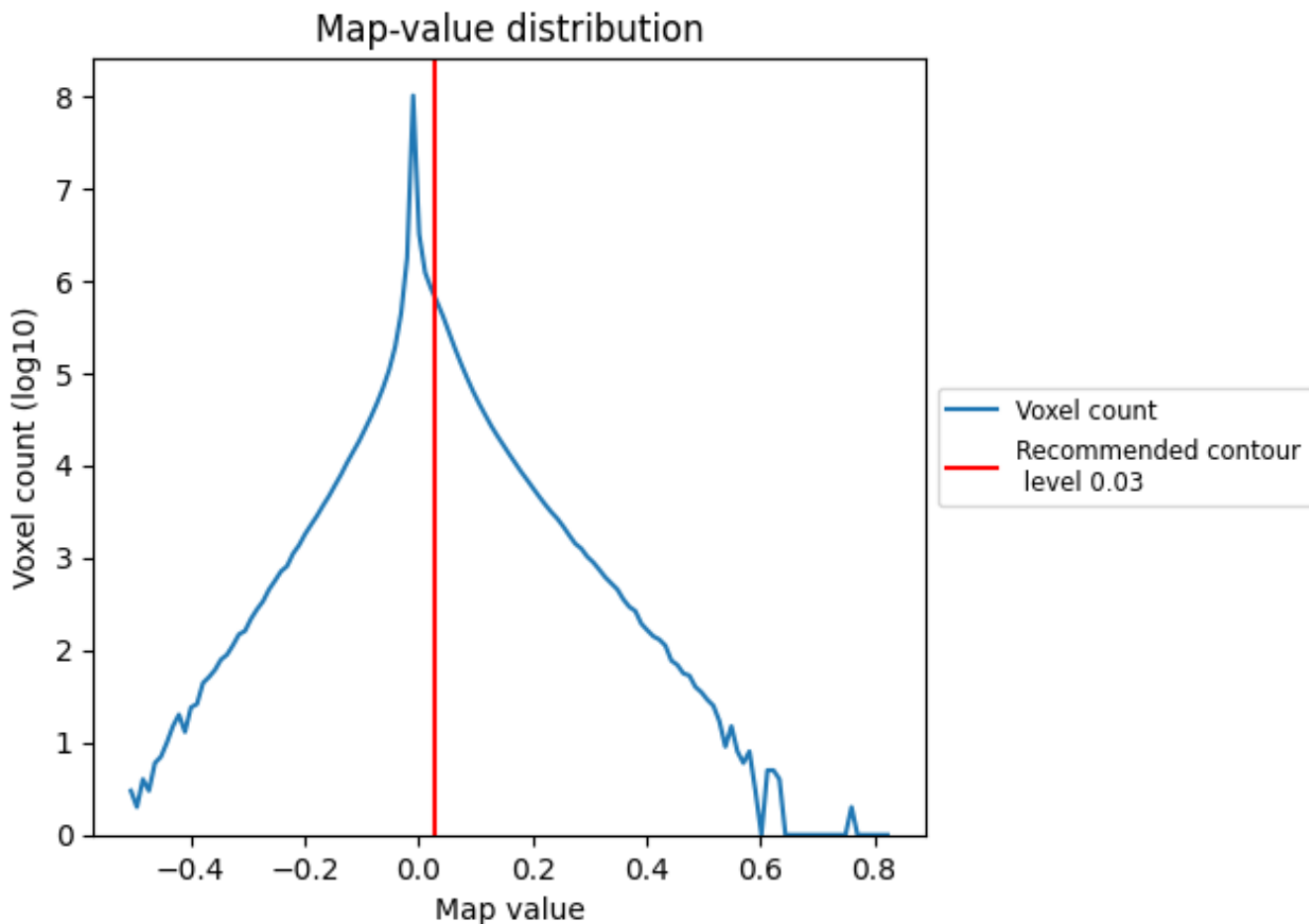
6.5 Mask visualisation

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

7 Map analysis [i](#)

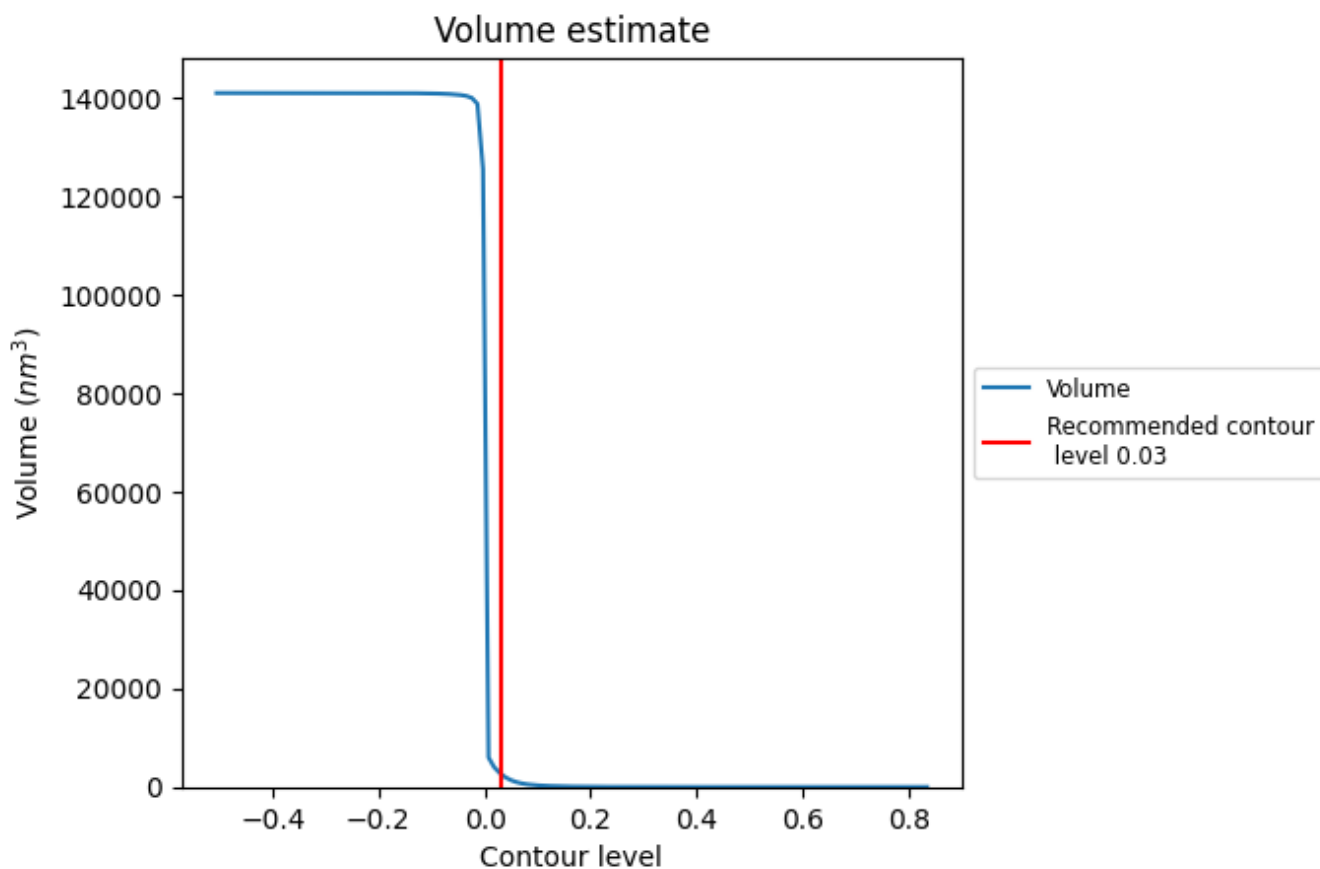
This section contains the results of statistical analysis of the map.

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.

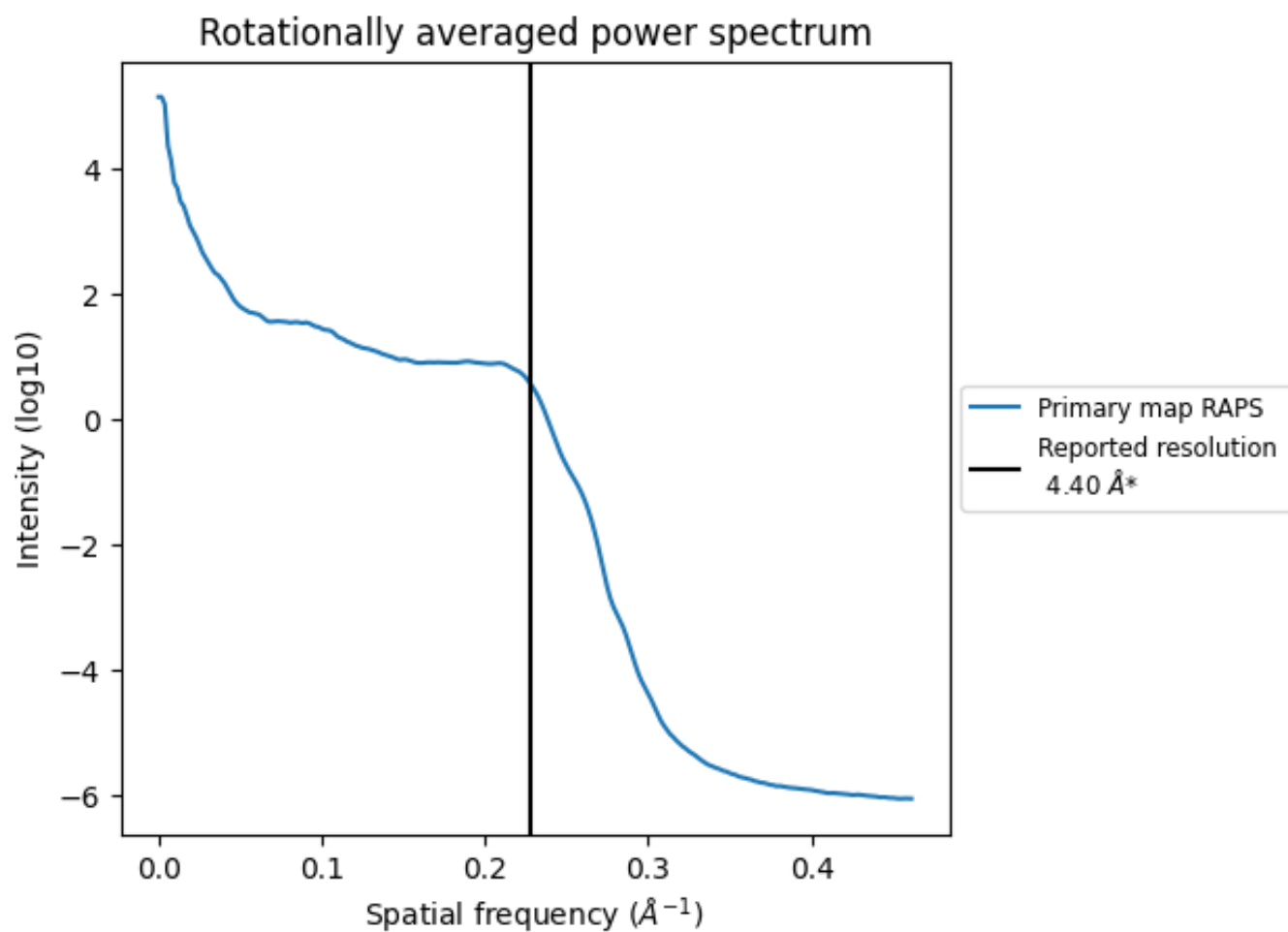
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 2721 nm³; this corresponds to an approximate mass of 2458 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](#)

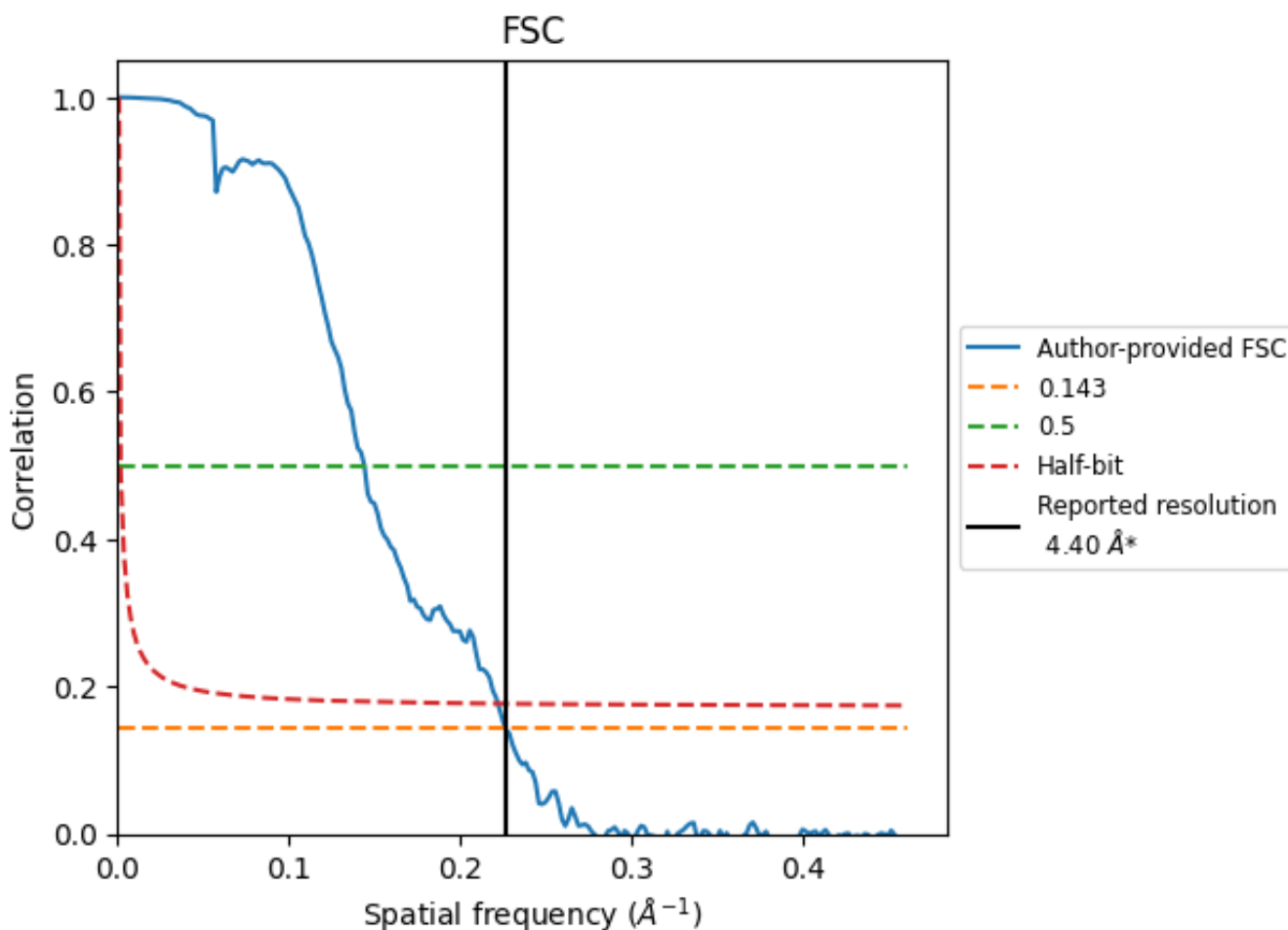


*Reported resolution corresponds to spatial frequency of 0.227 Å⁻¹

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 0.227 Å⁻¹

8.2 Resolution estimates [i](#)

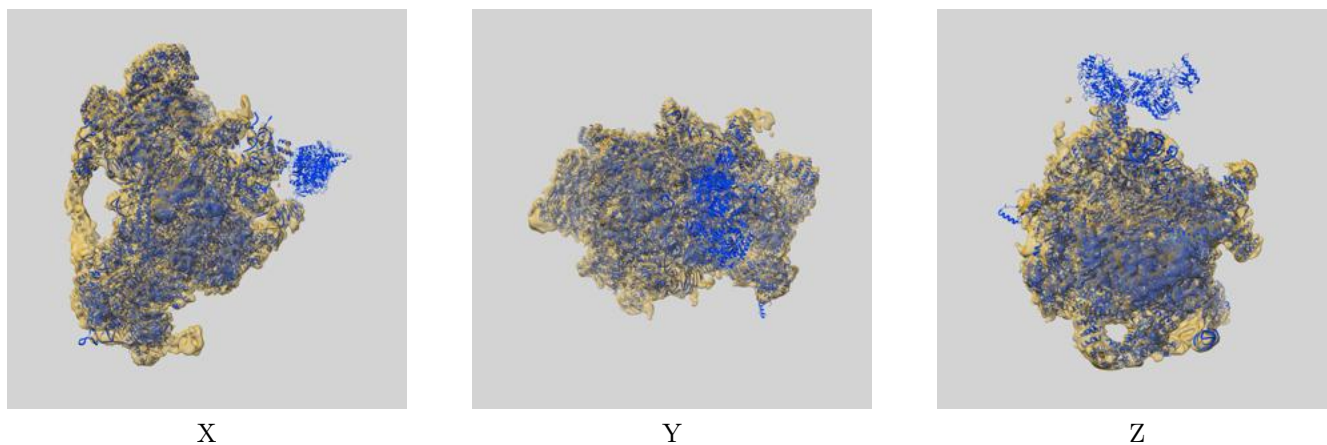
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.40	-	-
Author-provided FSC curve	4.42	6.93	4.50
Unmasked-calculated*	-	-	-

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

9 Map-model fit [i](#)

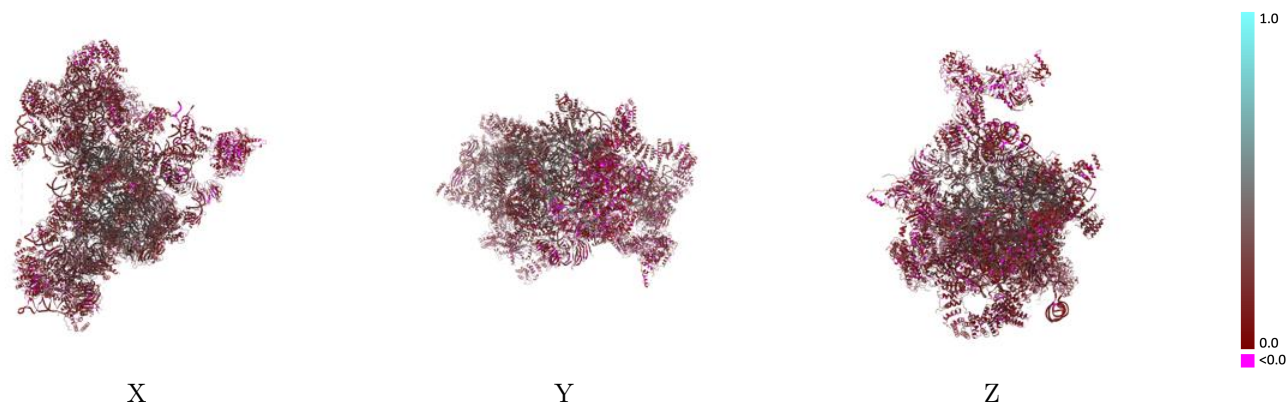
This section contains information regarding the fit between EMDB map EMD-10056 and PDB model 6RXZ. Per-residue inclusion information can be found in section 3 on page 16.

9.1 Map-model overlay [i](#)



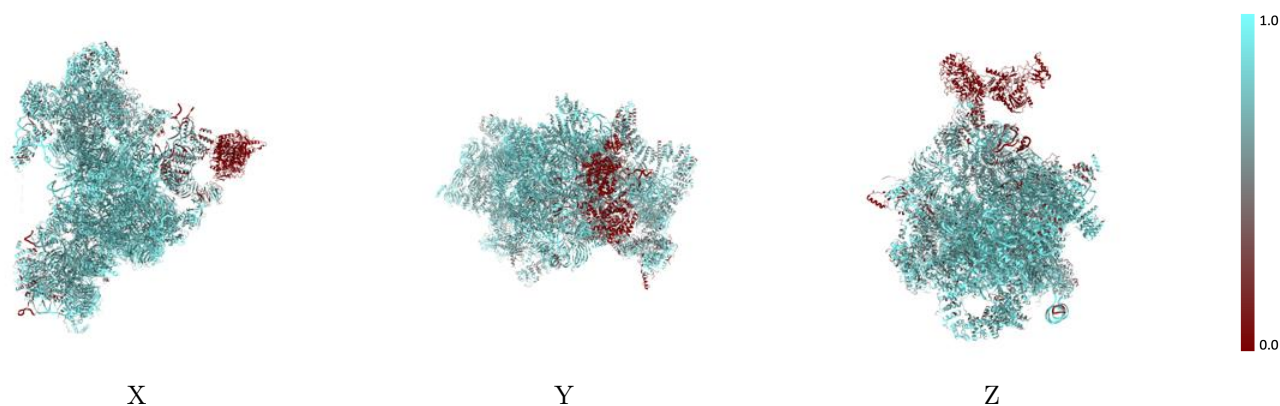
The images above show the 3D surface view of the map at the recommended contour level 0.03 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



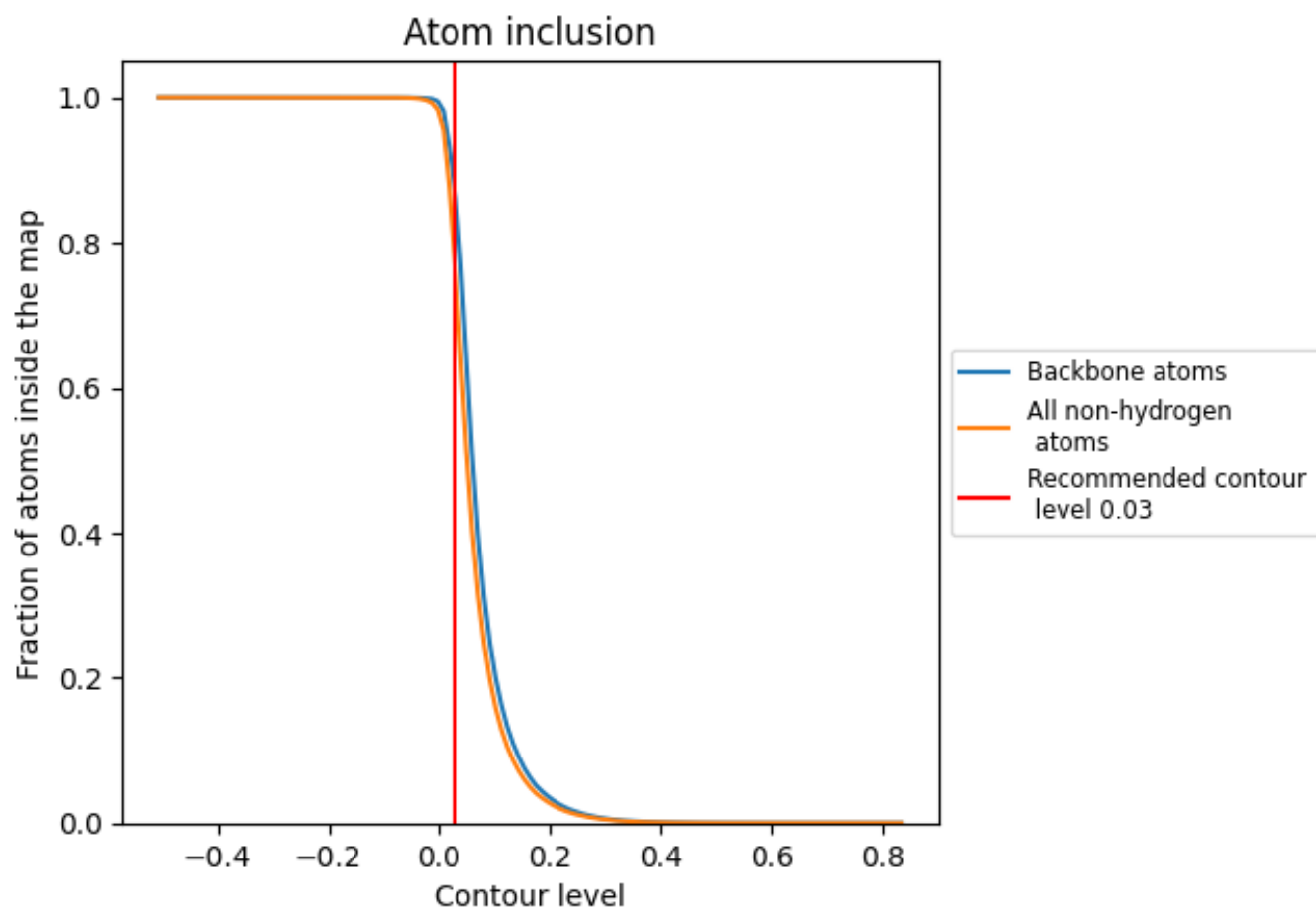
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

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



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.03).







































































9.4 Atom inclusion [i](#)



At the recommended contour level, 86% of all backbone atoms, 75% 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 (0.03) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7524	 0.2270
C1	 0.8699	 0.2580
C2	 0.9053	 0.2760
CA	 0.8723	 0.3590
CB	 0.7423	 0.2130
CC	 0.8126	 0.2470
CD	 0.7939	 0.2420
CE	 0.8606	 0.3370
CF	 0.8184	 0.2680
CG	 0.7831	 0.2070
CH	 0.8128	 0.2770
CI	 0.8791	 0.3550
CJ	 0.9151	 0.4170
CK	 0.8977	 0.4110
CL	 0.8385	 0.3190
CM	 0.8583	 0.3350
CN	 0.7369	 0.2190
CO	 0.6651	 0.1760
CP	 0.5345	 0.1610
CQ	 0.7254	 0.1670
CR	 0.7263	 0.1710
CS	 0.6115	 0.1210
CT	 0.8942	 0.3680
CU	 0.7963	 0.2810
CV	 0.0000	 0.0660
CW	 0.7382	 0.1660
CX	 0.6185	 0.1010
CY	 0.7508	 0.2410
CZ	 0.6959	 0.1540
Cb	 0.7137	 0.1810
Cc	 0.8225	 0.2950
Cd	 0.7366	 0.1700
Ce	 0.5815	 0.1730
Cf	 0.7440	 0.1410
Cg	 0.8543	 0.3460



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Chain	Atom inclusion	Q-score
Ch	0.5345	0.1030
Ci	0.6464	0.1590
Cj	0.8915	0.4000
Ck	0.6735	0.1430
Cl	0.5032	0.2250
Cm	0.7765	0.2740
Cn	0.9175	0.4400
Co	0.7559	0.2010
Cp	0.8023	0.2540
Cz	0.4379	0.1550
UA	0.8579	0.3350
UB	0.7750	0.2200
UC	0.8881	0.3970
UD	0.7717	0.2150
UE	0.7196	0.1650
UF	0.8260	0.2180
UG	0.8044	0.3170
UH	0.7483	0.1680
UI	0.6508	0.1390
UJ	0.7461	0.2010
UK	0.8757	0.3630
UL	0.7576	0.1780
UM	0.6520	0.1240
UN	0.7668	0.2770
UO	0.7735	0.2240
UP	0.7543	0.2410
UQ	0.7901	0.2070
UR	0.8518	0.3000
US	0.7560	0.1660
UT	0.7437	0.1570
UU	0.8530	0.2850
UV	0.0029	0.0740
UX	0.8962	0.4090
UZ	0.8146	0.2630