



wwPDB EM Validation Summary Report ⓘ

Jun 22, 2026 – 08:23 PM EDT

PDB ID : 4V72 / pdb_00004v72
EMDB ID : EMD-1719
Title : E. coli 70S-fMetVal-tRNAVal-tRNAfMet complex in hybrid pre-translocation state (pre4)
Authors : Blau, C.; Bock, L.V.; Schroder, G.F.; Davydov, I.; Fischer, N.; Stark, H.; Rodnina, M.V.; Vaiana, A.C.; Grubmuller, H.
Deposited on : 2013-10-14
Resolution : 13.00 Å(reported)
Based on initial models : 2WRI, 2K4C, 2HGP, 3I1O

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:

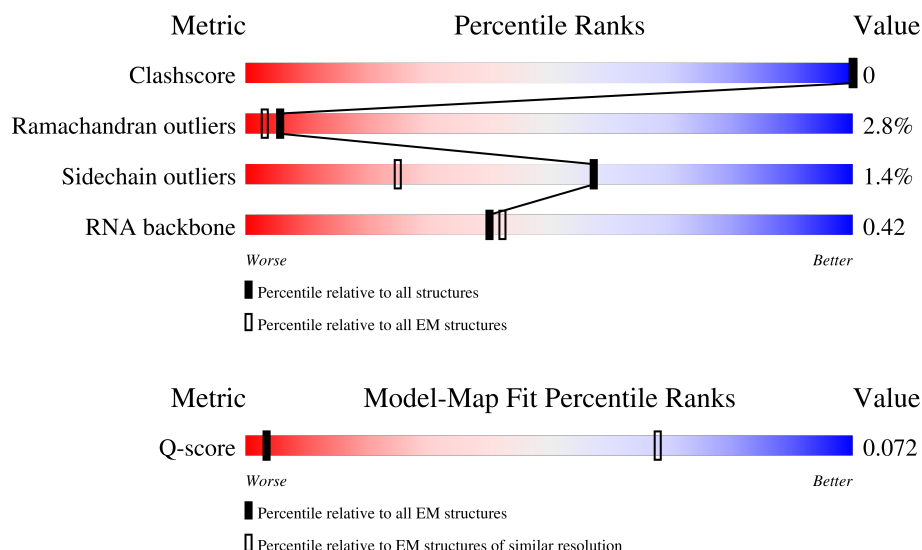
EMDB validation analysis : 0.0.1.dev132
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

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 13.00 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
RNA backbone	8273	3508	-
Q-score	-	25397	65 (12.50 - 13.50)

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	AB	220	29% 95% 5%
2	AC	208	30% 93% 6%
3	AD	206	43% 96% .

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Mol	Chain	Length	Quality of chain
4	AE	152	28% 95% 5% .
5	AF	101	14% 90% 10%
6	AG	152	22% 93% 5% .
7	AH	130	32% 96% . .
8	AI	128	27% 96% . .
9	AJ	100	33% 94% 5% .
10	AK	118	34% 97% .
11	AL	124	38% 98% . .
12	AM	115	38% 93% 5% . .
13	AN	101	40% 97% . .
14	AO	89	17% 97% . . .
15	AP	81	44% 99% .
16	AQ	82	26% 96% .
17	AR	57	30% 96% .
18	AS	81	21% 95% . .
19	AT	86	29% 98% .
20	AU	53	57% 89% 11%
21	AA	1533	6% 61% 31% 7%
22	A1	76	34% 63% 32% 5%
23	A2	15	40% 47% 20% 27% 7%
24	A3	77	10% 52% 35% 13%
25	BC	273	47% 92% 7%
26	BD	209	44% 94% 6%
27	BE	201	32% 96% .
28	BF	179	22% 93% 6% . .

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Mol	Chain	Length	Quality of chain
29	BG	177	
30	BH	149	
31	BI	142	
32	BJ	142	
33	BK	123	
34	BL	144	
35	BM	136	
36	BN	121	
37	BO	117	
38	BP	115	
39	BQ	118	
40	BR	103	
41	BS	110	
42	BT	94	
43	BU	104	
44	BV	94	
45	BW	80	
46	BX	79	
47	BY	63	
48	BZ	59	
49	B0	57	
50	B1	52	
51	B2	46	
52	B3	65	
53	B4	38	

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Mol	Chain	Length	Quality of chain
54	BA	2903	7% 61% 33% 6%
55	BB	118	7% 63% 32% • •
56	B5	234	48% 94% • 5%

2 Entry composition

There are 58 unique types of molecules in this entry. The entry contains 147653 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 30S ribosomal protein S2.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	AB	220	Total	C	N	O	S	0	1
			1708	1083	306	312	7		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
AB	7	ACE	-	acetylation	UNP P0A7V0
AB	226	NH2	-	amidation	UNP P0A7V0

- Molecule 2 is a protein called 30S ribosomal protein S3.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	AC	207	Total	C	N	O	S	0	1
			1625	1028	306	288	3		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
AC	207	NH2	-	amidation	UNP P0A7V3

- Molecule 3 is a protein called 30S ribosomal protein S4.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	AD	205	Total	C	N	O	S	0	0
			1643	1026	315	298	4		

- Molecule 4 is a protein called 30S ribosomal protein S5.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	AE	152	Total	C	N	O	S	0	1
			1109	689	212	202	6		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
AE	8	ACE	-	acetylation	UNP P0A7W1
AE	159	NH2	-	amidation	UNP P0A7W1

- Molecule 5 is a protein called 30S ribosomal protein S6.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	AF	101	Total	C	N	O	S	0	1
			818	515	149	148	6		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
AF	101	NH2	-	amidation	UNP P02358

- Molecule 6 is a protein called 30S ribosomal protein S7.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	AG	152	Total	C	N	O	S	0	1
			1178	732	227	215	4		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
AG	1	ACE	-	acetylation	UNP P02359
AG	152	NH2	-	amidation	UNP P02359

- Molecule 7 is a protein called 30S ribosomal protein S8.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	AH	129	Total	C	N	O	S	0	0
			979	616	173	184	6		

- Molecule 8 is a protein called 30S ribosomal protein S9.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	AI	128	Total	C	N	O	S	0	0
			1025	636	206	180	3		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
AI	2	ACE	-	acetylation	UNP P0A7X3

- Molecule 9 is a protein called 30S ribosomal protein S10.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	AJ	100	Total	C	N	O	S	0	1
			790	495	151	143	1		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
AJ	4	ACE	-	acetylation	UNP P0A7R5
AJ	103	NH2	-	amidation	UNP P0A7R5

- Molecule 10 is a protein called 30S ribosomal protein S11.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	AK	118	Total	C	N	O	S	0	0
			880	542	174	161	3		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
AK	11	ACE	-	acetylation	UNP P0A7R9

- Molecule 11 is a protein called 30S ribosomal protein S12.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	AL	123	Total	C	N	O	S	0	0
			955	590	196	165	4		

- Molecule 12 is a protein called 30S ribosomal protein S13.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	AM	114	Total	C	N	O	S	0	1
			877	541	178	155	3		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
AM	114	NH2	-	amidation	UNP P0A7S9

- Molecule 13 is a protein called 30S ribosomal protein S14.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	AN	100	Total	C	N	O	S	0	0
			805	499	164	139	3		

- Molecule 14 is a protein called 30S ribosomal protein S15.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	AO	88	Total	C	N	O	S	0	0
			714	439	144	130	1		

- Molecule 15 is a protein called 30S ribosomal protein S16.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	AP	81	Total	C	N	O	S	0	1
			639	400	127	111	1		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
AP	81	NH2	-	amidation	UNP P0A7T3

- Molecule 16 is a protein called 30S ribosomal protein S17.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	AQ	82	Total	C	N	O	S	0	1
			652	413	122	114	3		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
AQ	2	ACE	-	acetylation	UNP P0AG63
AQ	83	NH2	-	amidation	UNP P0AG63

- Molecule 17 is a protein called 30S ribosomal protein S18.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	AR	57	Total	C	N	O		0	1
			459	290	87	82			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
AR	18	ACE	-	acetylation	UNP P0A7T7

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Chain	Residue	Modelled	Actual	Comment	Reference
AR	74	NH2	-	amidation	UNP P0A7T7

- Molecule 18 is a protein called 30S ribosomal protein S19.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	AS	81	Total	C	N	O	S	0	1
			641	410	121	108	2		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
AS	1	ACE	-	acetylation	UNP P0A7U3
AS	81	NH2	-	amidation	UNP P0A7U3

- Molecule 19 is a protein called 30S ribosomal protein S20.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	AT	86	Total	C	N	O	S	0	0
			668	413	137	115	3		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
AT	1	ACE	-	acetylation	UNP P0A7U7

- Molecule 20 is a protein called 30S ribosomal protein S21.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	AU	53	Total	C	N	O	S	0	1
			429	267	87	74	1		

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
AU	2	ACE	-	acetylation	UNP P68679
AU	54	NH2	-	amidation	UNP P68679

- Molecule 21 is a RNA chain called 16S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	AA	1530	Total	C	N	O	P	0	0
			32828	14642	6024	10633	1529		

- Molecule 22 is a RNA chain called fMet-Val-tRNA-Val.

Mol	Chain	Residues	Atoms						AltConf	Trace
22	A1	76	Total	C	N	O	P	S	0	0
			1627	728	292	531	75	1		

- Molecule 23 is a RNA chain called 5'-R(*AP*CP*UP*AP*UP*GP*GP*UP*UP*UP*UP*UP*AP*UP*U)-3'.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	A2	15	Total	C	N	O	P	0	0
			309	140	46	109	14		

- Molecule 24 is a RNA chain called tRNA-fMet.

Mol	Chain	Residues	Atoms						AltConf	Trace
24	A3	77	Total	C	N	O	P	S	0	0
			1642	734	297	534	76	1		

- Molecule 25 is a protein called 50S ribosomal protein L2.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	BC	272	Total	C	N	O	S	0	1
			2083	1288	424	364	7		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
BC	272	NH2	-	amidation	UNP P60422

- Molecule 26 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	BD	209	Total	C	N	O	S	0	0
			1565	979	288	294	4		

- Molecule 27 is a protein called 50S ribosomal protein L4.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	BE	201	Total	C	N	O	S	0	0
			1552	974	283	290	5		

- Molecule 28 is a protein called 50S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	BF	178	Total	C	N	O	S	0	0
			1420	905	251	258	6		

- Molecule 29 is a protein called 50S ribosomal protein L6.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	BG	176	Total	C	N	O	S	0	0
			1323	832	243	246	2		

- Molecule 30 is a protein called 50S ribosomal protein L9.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	BH	149	Total	C	N	O	S	0	0
			1111	699	197	214	1		

- Molecule 31 is a protein called 50S ribosomal protein L11.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	BI	141	Total	C	N	O	S	0	0
			1032	651	179	196	6		

- Molecule 32 is a protein called 50S ribosomal protein L13.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	BJ	142	Total	C	N	O	S	0	0
			1129	714	212	199	4		

- Molecule 33 is a protein called 50S ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	BK	123	Total	C	N	O	S	0	1
			939	587	181	165	6		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
BK	123	NH2	-	amidation	UNP P0ADY3

- Molecule 34 is a protein called 50S ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	BL	143	Total	C	N	O	S	0	0
			1045	649	206	189	1		

- Molecule 35 is a protein called 50S ribosomal protein L16.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	BM	136	Total	C	N	O	S	0	0
			1074	686	205	177	6		

- Molecule 36 is a protein called 50S ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	BN	121	Total	C	N	O	S	0	1
			961	593	197	166	5		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
BN	121	NH2	-	amidation	UNP P0AG44

- Molecule 37 is a protein called 50S ribosomal protein L18.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	BO	116	Total	C	N	O		0	0
			892	552	178	162			

- Molecule 38 is a protein called 50S ribosomal protein L19.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	BP	114	Total	C	N	O	S	0	0
			917	574	179	163	1		

- Molecule 39 is a protein called 50S ribosomal protein L20.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	BQ	117	Total	C	N	O		0	0
			947	604	192	151			

- Molecule 40 is a protein called 50S ribosomal protein L21.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	BR	103	Total	C	N	O	S	0	0
			816	516	153	145	2		

- Molecule 41 is a protein called 50S ribosomal protein L22.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	BS	110	Total	C	N	O	S	0	0
			857	532	166	156	3		

- Molecule 42 is a protein called 50S ribosomal protein L23.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	BT	94	Total	C	N	O	S	0	1
			739	466	140	131	2		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
BT	94	NH2	-	amidation	UNP P0ADZ0

- Molecule 43 is a protein called 50S ribosomal protein L24.

Mol	Chain	Residues	Atoms				AltConf	Trace
43	BU	103	Total	C	N	O	0	1
			780	492	147	141		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
BU	103	NH2	-	amidation	UNP P60624

- Molecule 44 is a protein called 50S ribosomal protein L25.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	BV	94	Total	C	N	O	S	0	0
			753	479	137	134	3		

- Molecule 45 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	BW	80	Total	C	N	O	S	0	0
			599	369	120	109	1		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
BW	5	ACE	-	acetylation	UNP P0A7L8

- Molecule 46 is a protein called 50S ribosomal protein L28.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	BX	77	Total	C	N	O	S	0	0
			625	388	129	106	2		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
BX	-1	ACE	-	acetylation	UNP P0A7M2

- Molecule 47 is a protein called 50S ribosomal protein L29.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	BY	63	Total	C	N	O	S	0	0
			509	313	99	95	2		

- Molecule 48 is a protein called 50S ribosomal protein L30.

Mol	Chain	Residues	Atoms					AltConf	Trace
48	BZ	58	Total	C	N	O	S	0	0
			449	281	87	79	2		

- Molecule 49 is a protein called 50S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
49	B0	56	Total	C	N	O	S	0	0
			444	269	94	80	1		

- Molecule 50 is a protein called 50S ribosomal protein L33.

Mol	Chain	Residues	Atoms					AltConf	Trace
50	B1	52	Total	C	N	O		0	1
			413	265	76	72			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B1	2	ACE	-	acetylation	UNP P0A7N9
B1	53	NH2	-	amidation	UNP P0A7N9

- Molecule 51 is a protein called 50S ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
51	B2	46	Total	C	N	O	S	0	0
			377	228	90	57	2		

- Molecule 52 is a protein called 50S ribosomal protein L35.

Mol	Chain	Residues	Atoms					AltConf	Trace
52	B3	64	Total	C	N	O	S	0	0
			504	323	105	74	2		

- Molecule 53 is a protein called 50S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace
53	B4	38	Total	C	N	O	S	0	0
			302	185	65	48	4		

- Molecule 54 is a RNA chain called 23S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
54	BA	2903	Total	C	N	O	P	0	0
			62317	27801	11467	20147	2902		

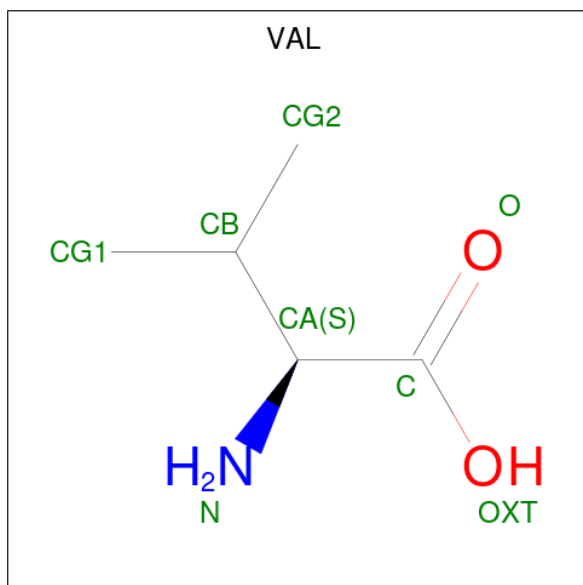
- Molecule 55 is a RNA chain called 5S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
55	BB	117	Total	C	N	O	P	0	0
			2504	1116	459	813	116		

- Molecule 56 is a protein called 50S ribosomal protein L1.

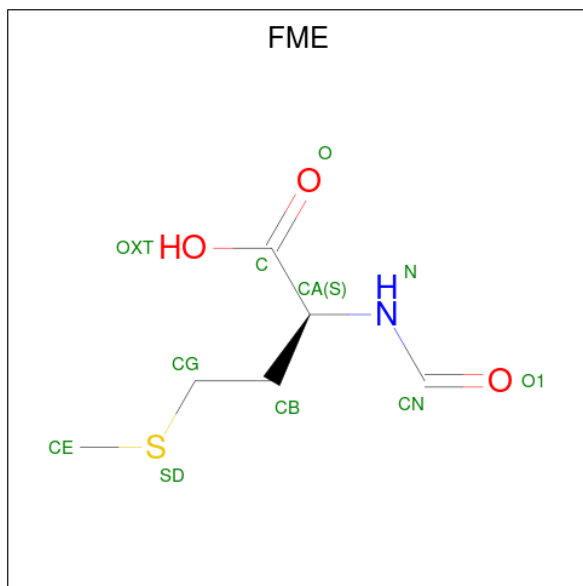
Mol	Chain	Residues	Atoms					AltConf	Trace
56	B5	223	Total	C	N	O	S	0	0
			1658	1038	302	312	6		

- Molecule 57 is VALINE (CCD ID: VAL) (formula: C₅H₁₁NO₂).



Mol	Chain	Residues	Atoms				AltConf
57	A1	1	Total	C	N	O	0
			7	5	1	1	

- Molecule 58 is N-FORMYLMETHIONINE (CCD ID: FME) (formula: C₆H₁₁NO₃S).

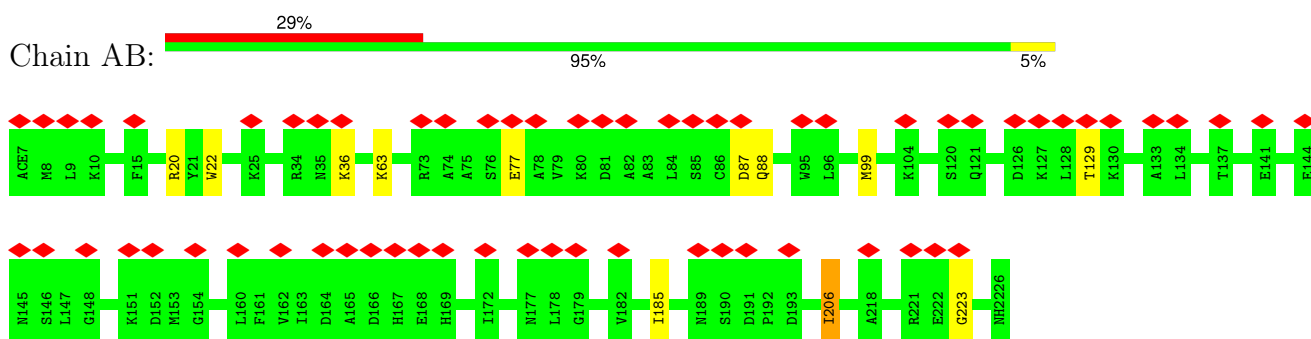


Mol	Chain	Residues	Atoms					AltConf
58	BA	1	Total	C	N	O	S	0
			10	6	1	2	1	

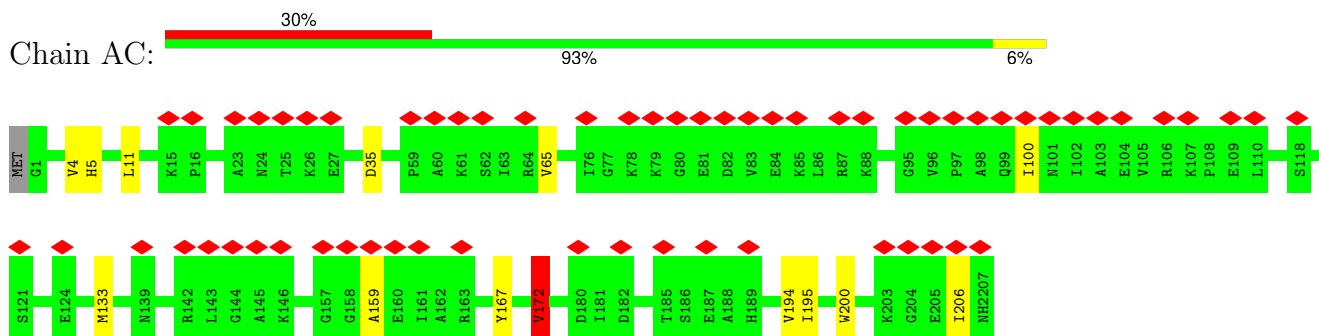
3 Residue-property plots

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.

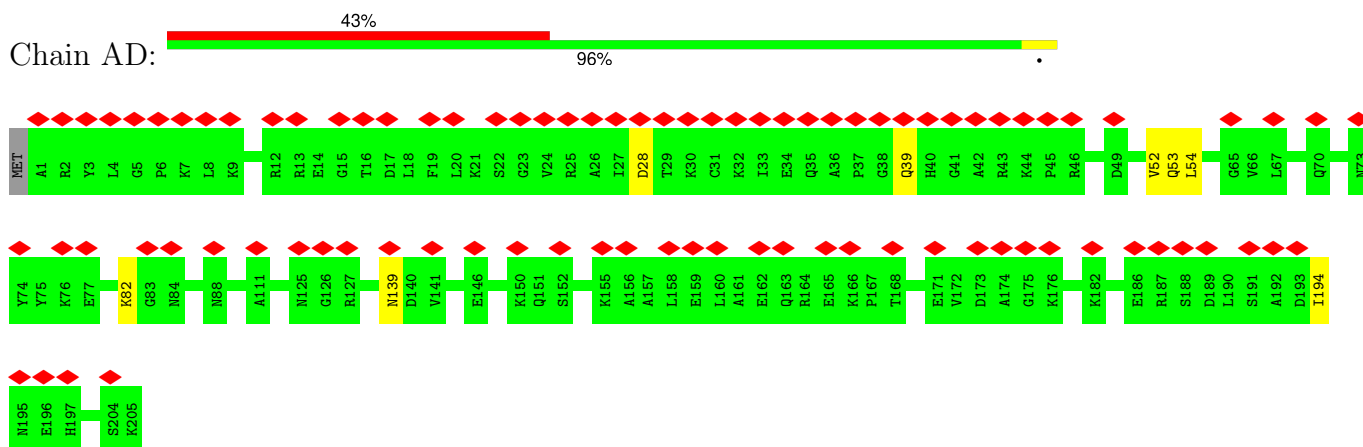
• Molecule 1: 30S ribosomal protein S2



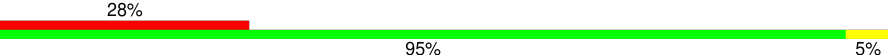
• Molecule 2: 30S ribosomal protein S3

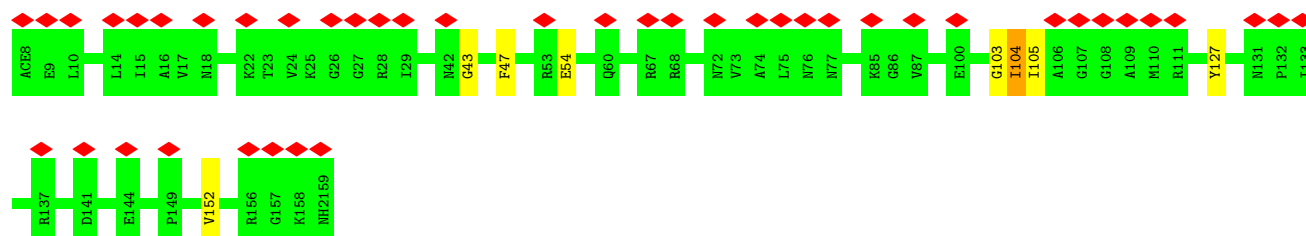


• Molecule 3: 30S ribosomal protein S4



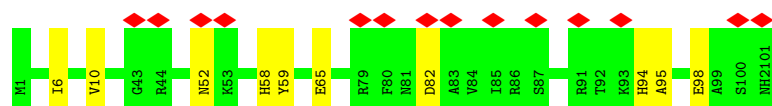
- Molecule 4: 30S ribosomal protein S5

Chain AE: 

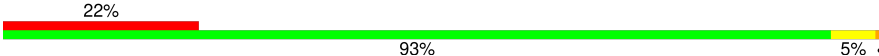


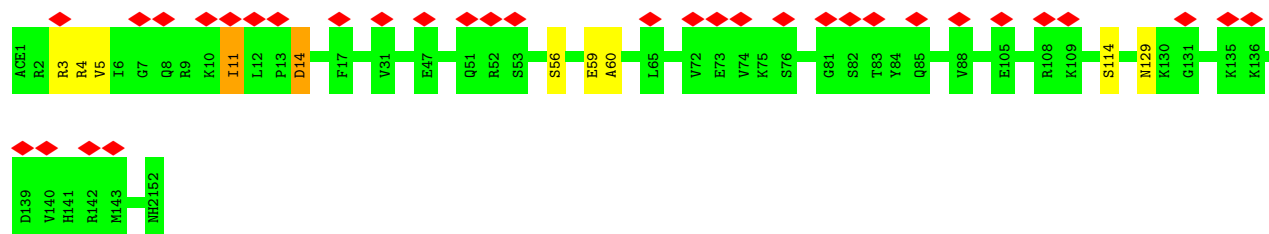
- Molecule 5: 30S ribosomal protein S6

Chain AF: 



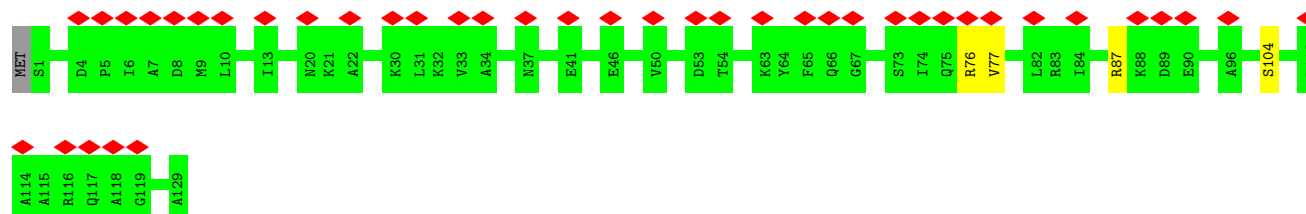
- Molecule 6: 30S ribosomal protein S7

Chain AG: 

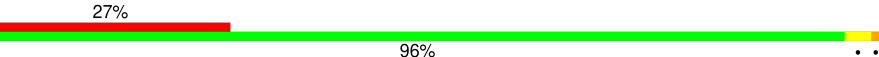


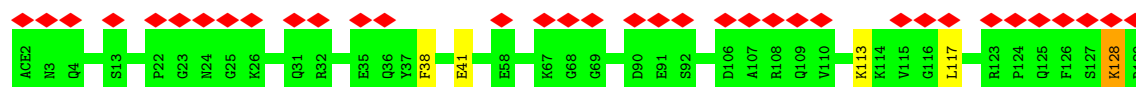
- Molecule 7: 30S ribosomal protein S8

Chain AH: 

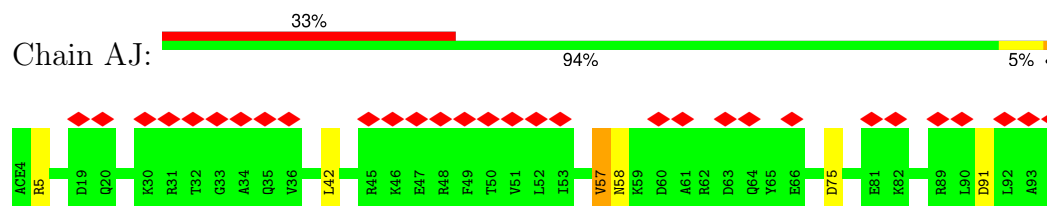


- Molecule 8: 30S ribosomal protein S9

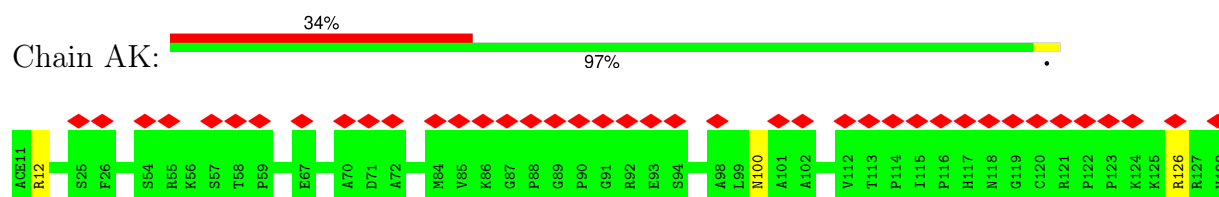
Chain AI: 



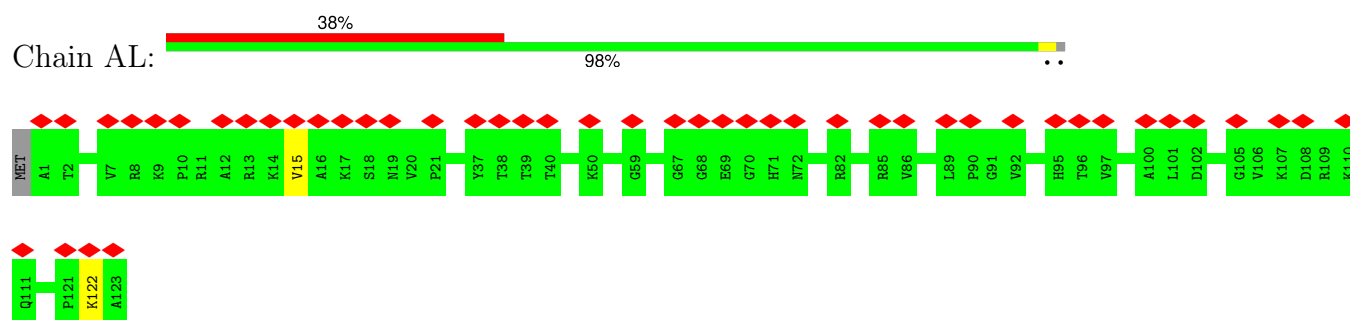
- Molecule 9: 30S ribosomal protein S10



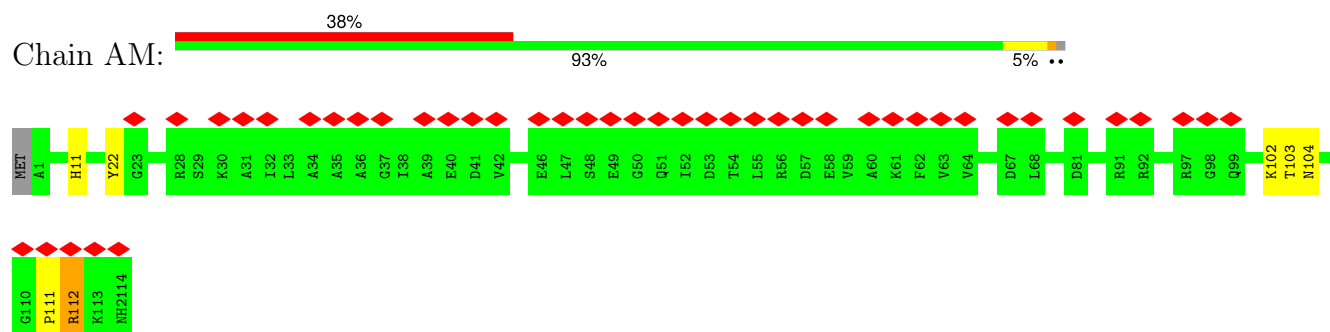
- Molecule 10: 30S ribosomal protein S11



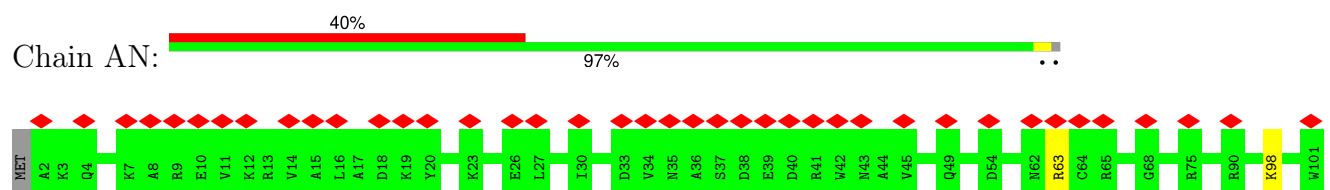
- Molecule 11: 30S ribosomal protein S12



- Molecule 12: 30S ribosomal protein S13

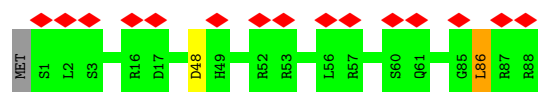


- Molecule 13: 30S ribosomal protein S14

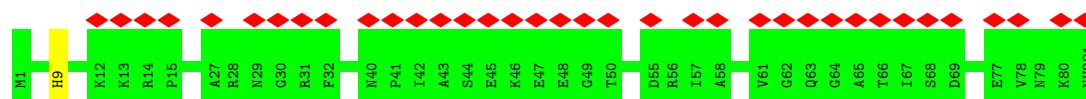


- Molecule 14: 30S ribosomal protein S15

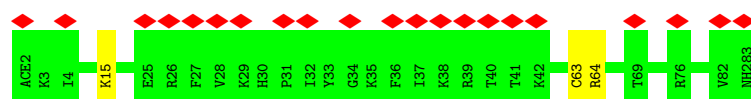




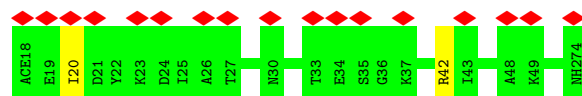
- Molecule 15: 30S ribosomal protein S16



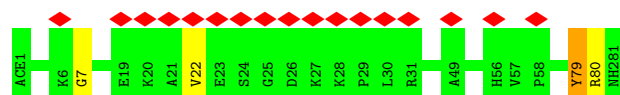
- Molecule 16: 30S ribosomal protein S17



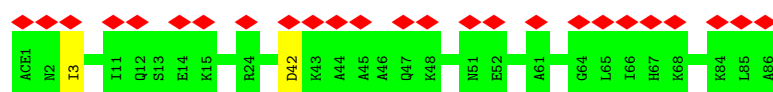
- Molecule 17: 30S ribosomal protein S18



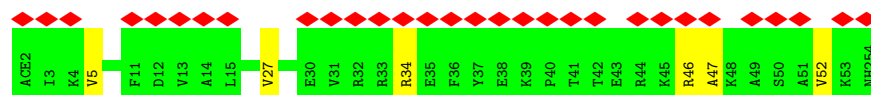
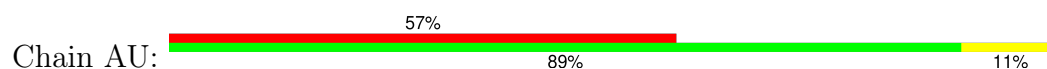
- Molecule 18: 30S ribosomal protein S19



- Molecule 19: 30S ribosomal protein S20

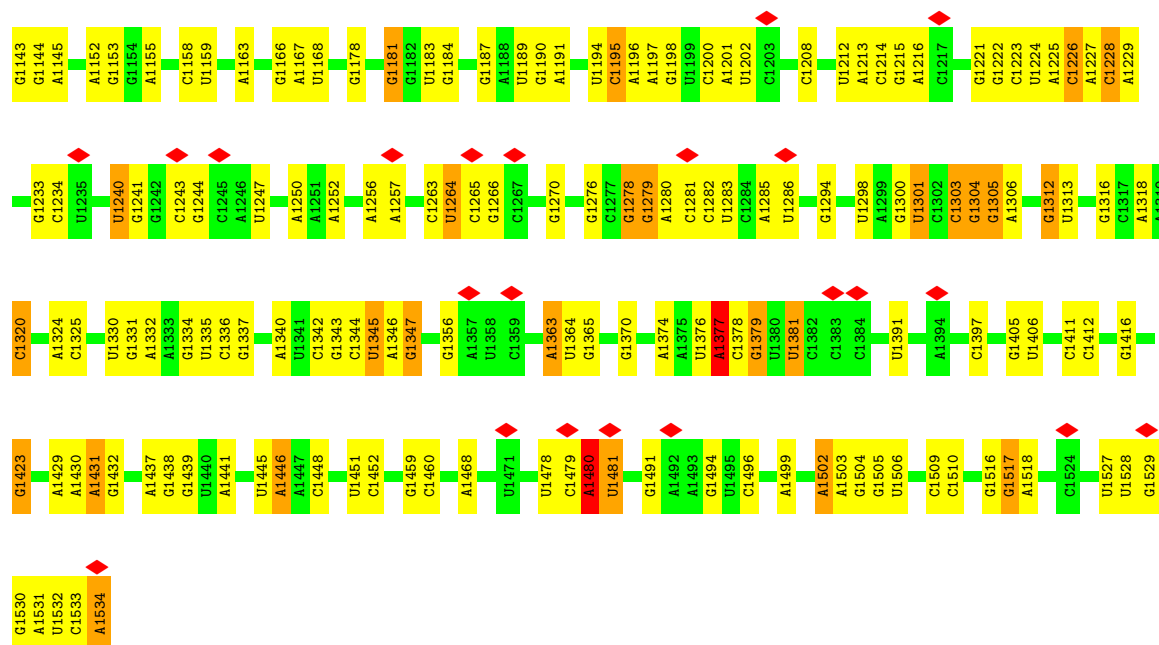


- Molecule 20: 30S ribosomal protein S21

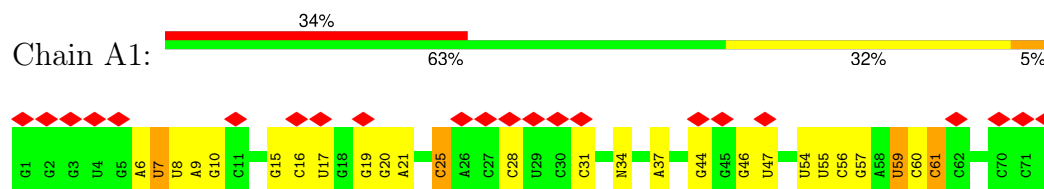


Chain AA:

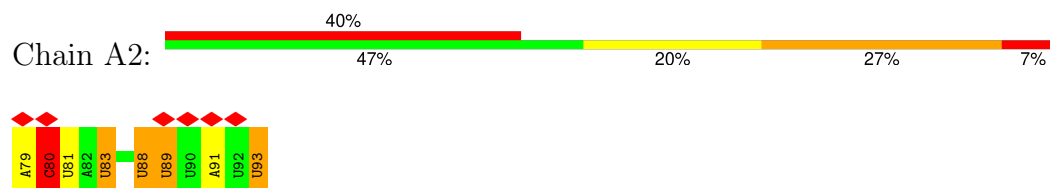




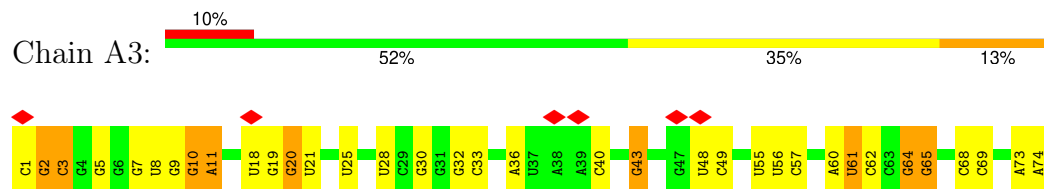
• Molecule 22: fMet-Val-tRNA-Val



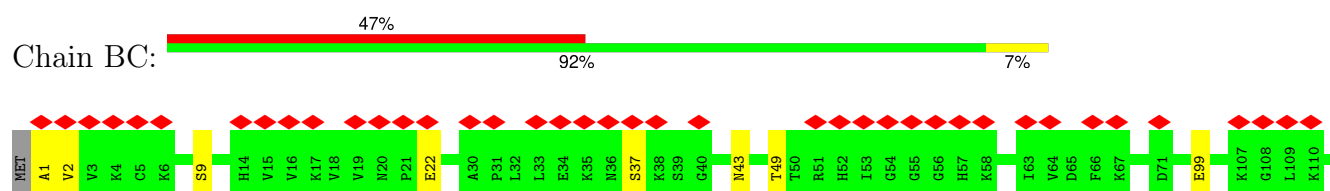
• Molecule 23: 5'-R(*AP*CP*UP*AP*UP*GP*GP*UP*UP*UP*UP*UP*AP*UP*U)-3'

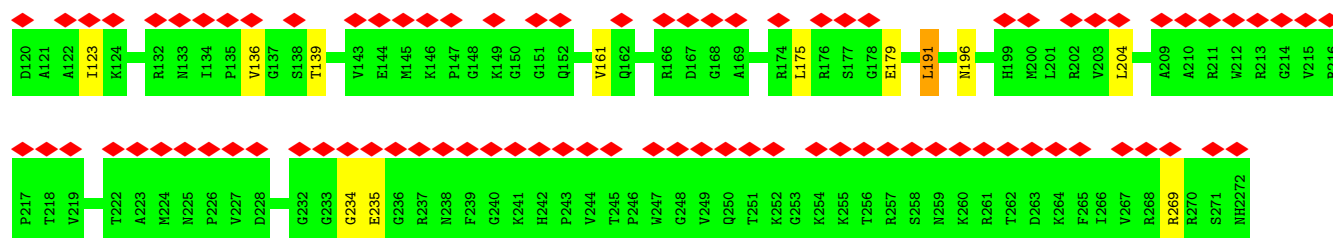


• Molecule 24: tRNA-fMet

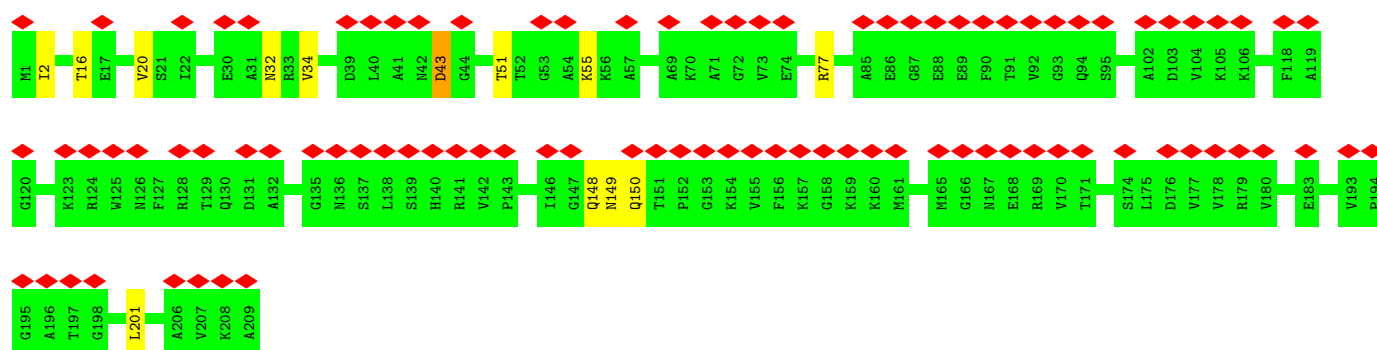


• Molecule 25: 50S ribosomal protein L2

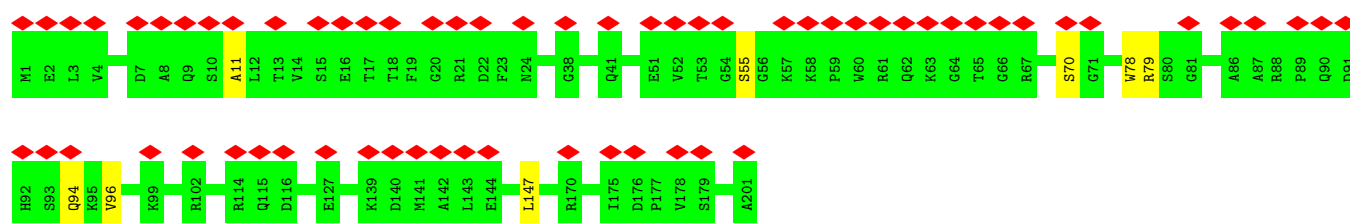




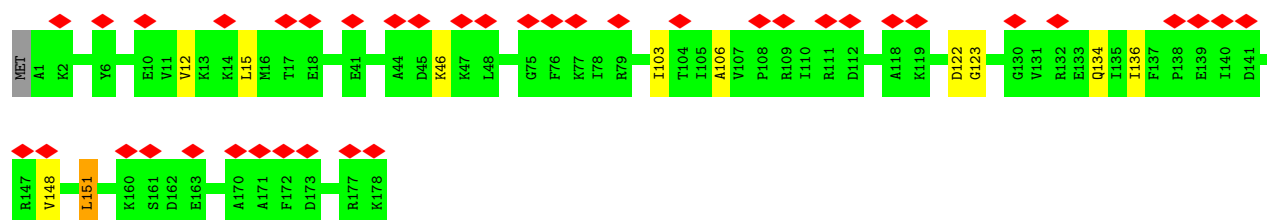
• Molecule 26: 50S ribosomal protein L3



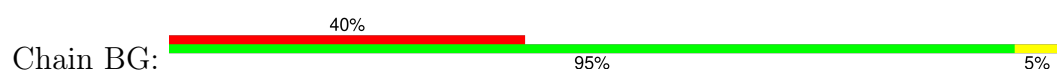
• Molecule 27: 50S ribosomal protein L4

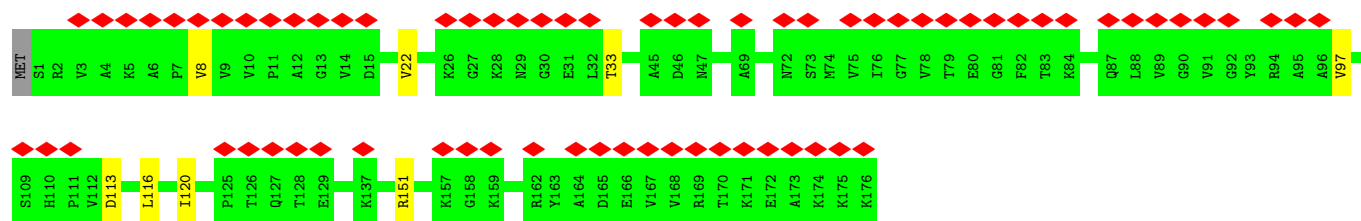


• Molecule 28: 50S ribosomal protein L5



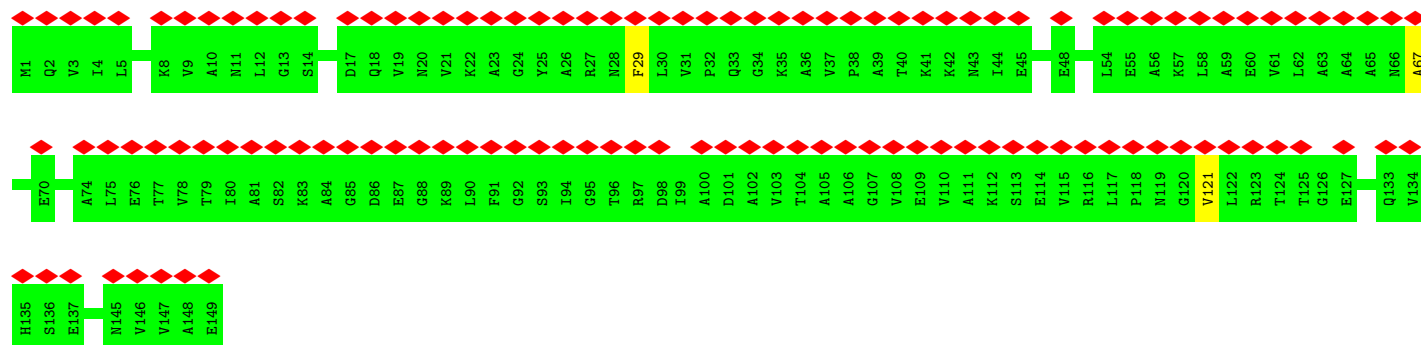
• Molecule 29: 50S ribosomal protein L6





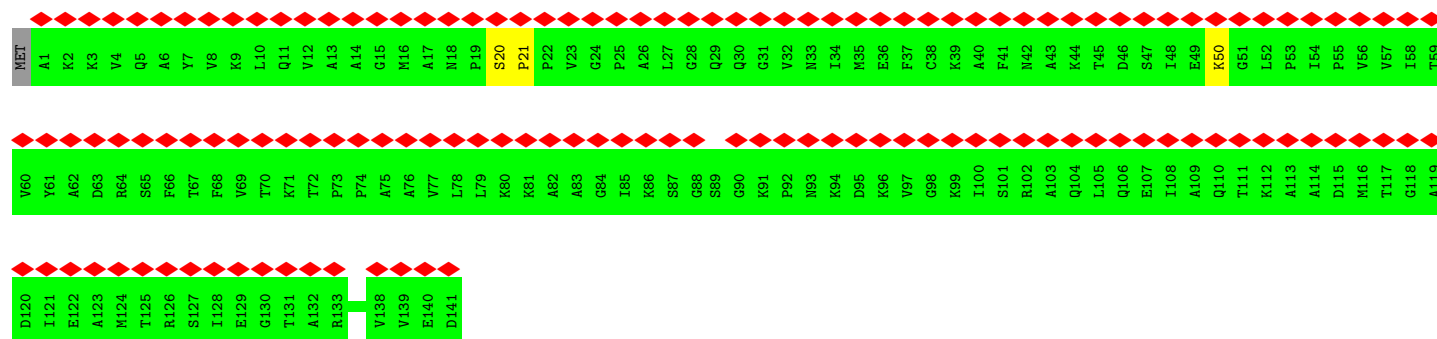
• Molecule 30: 50S ribosomal protein L9

Chain BH: 80%
98%



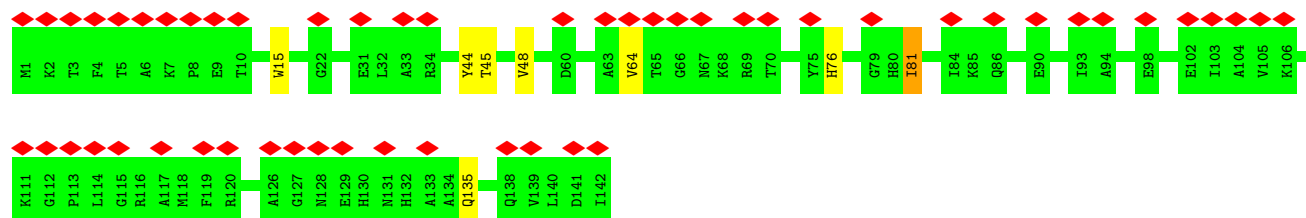
• Molecule 31: 50S ribosomal protein L11

Chain BI: 96%
97%

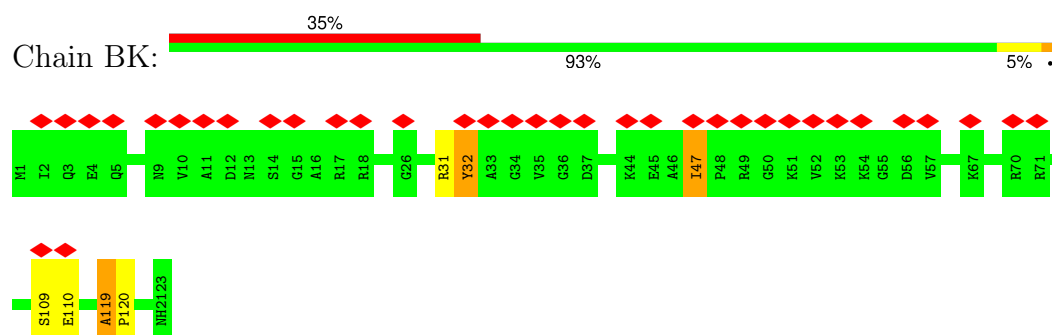


• Molecule 32: 50S ribosomal protein L13

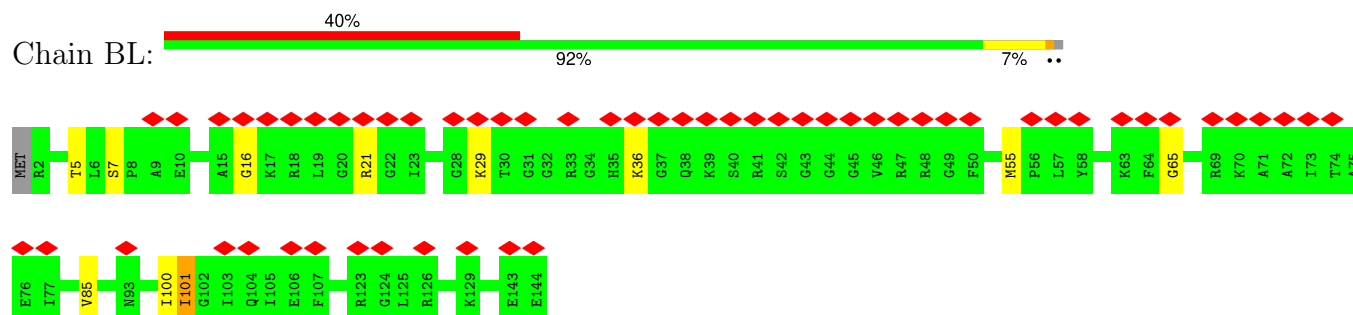
Chain BJ: 37%
94% 5%



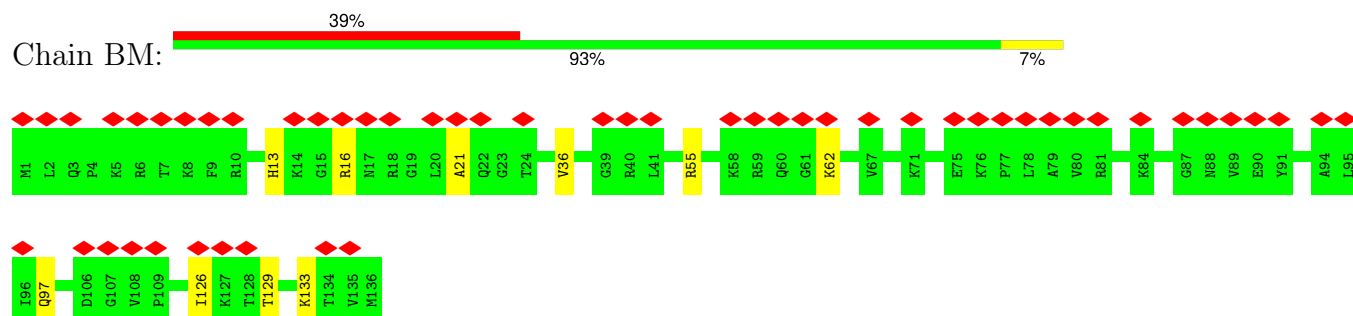
• Molecule 33: 50S ribosomal protein L14



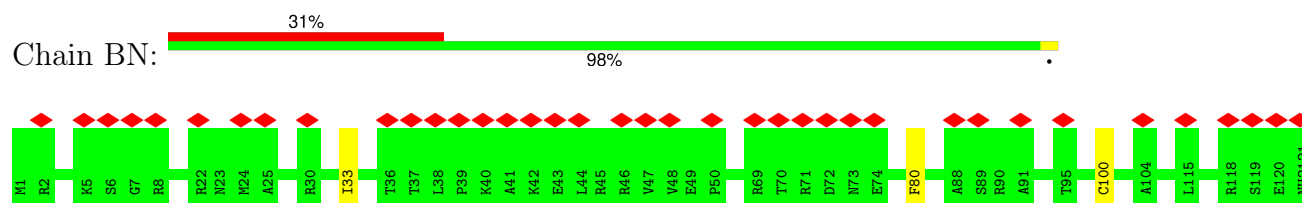
- Molecule 34: 50S ribosomal protein L15



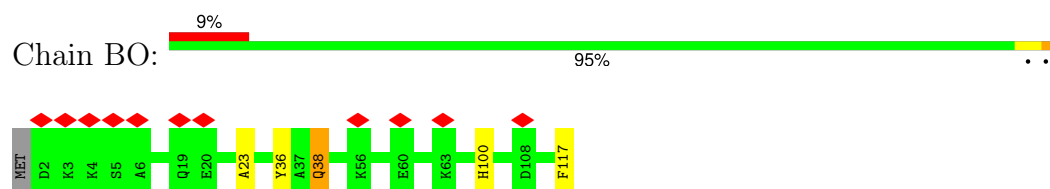
- Molecule 35: 50S ribosomal protein L16



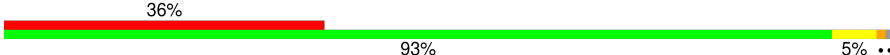
- Molecule 36: 50S ribosomal protein L17

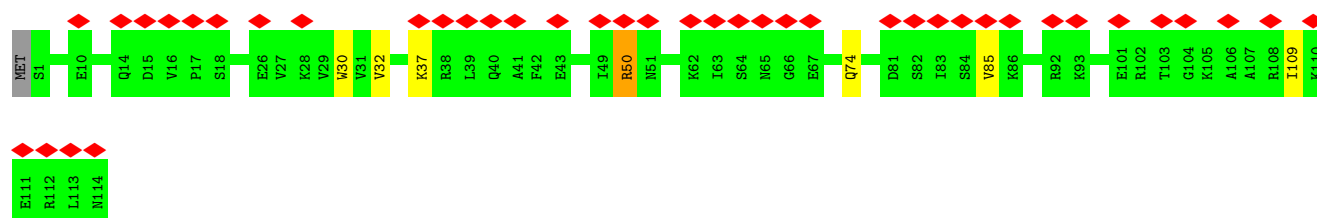


- Molecule 37: 50S ribosomal protein L18

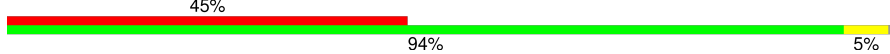


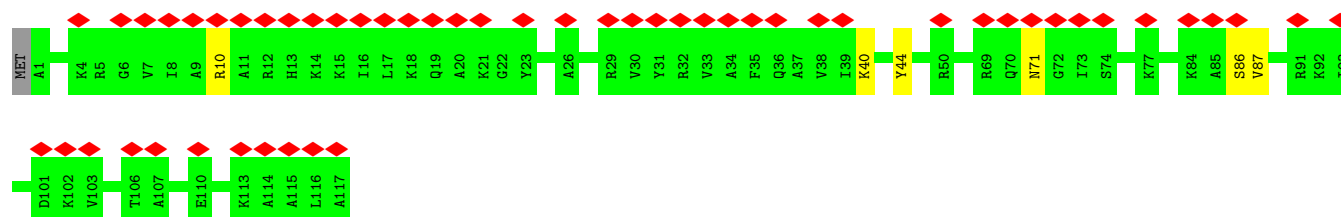
- Molecule 38: 50S ribosomal protein L19

Chain BP:  36% 93% 5% ..

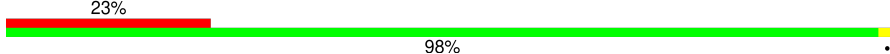


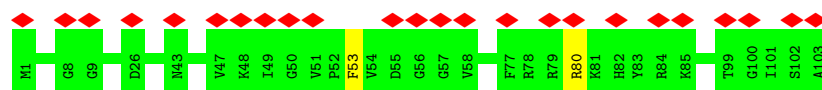
- Molecule 39: 50S ribosomal protein L20

Chain BQ:  45% 94% 5% .

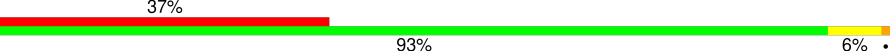


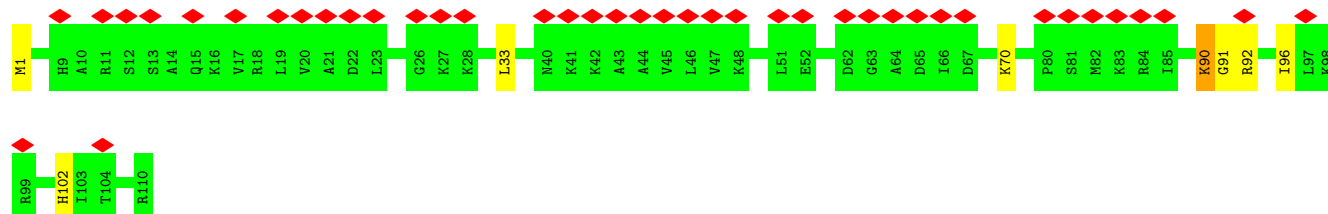
- Molecule 40: 50S ribosomal protein L21

Chain BR:  23% 98% .

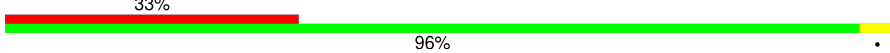


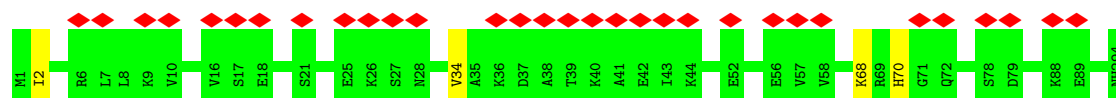
- Molecule 41: 50S ribosomal protein L22

Chain BS:  37% 93% 6% .

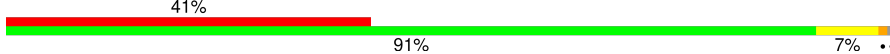


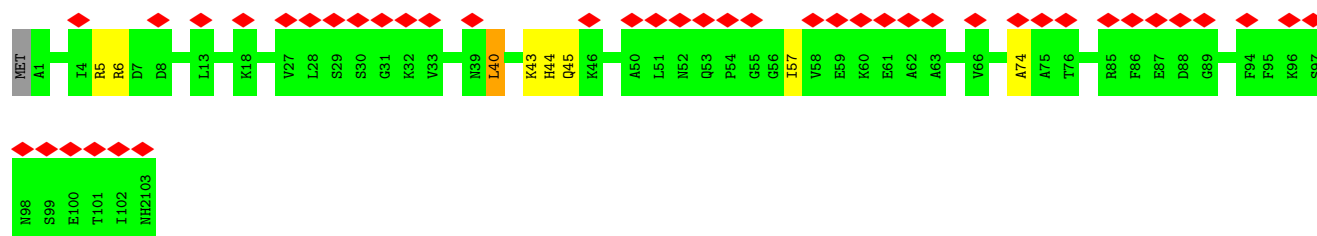
- Molecule 42: 50S ribosomal protein L23

Chain BT:  33% 96% .

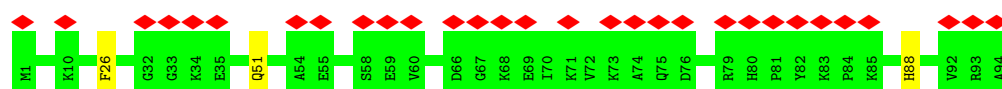


- Molecule 43: 50S ribosomal protein L24

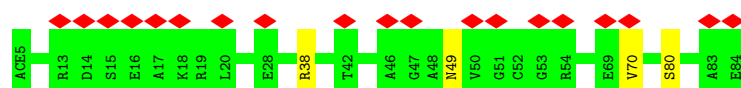
Chain BU:  41% 91% 7% ..



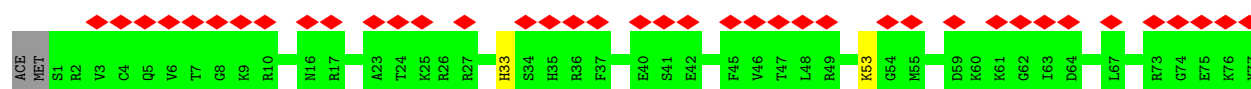
- Molecule 44: 50S ribosomal protein L25



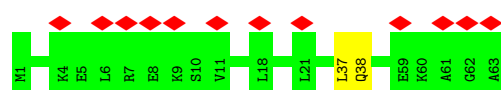
- Molecule 45: 50S ribosomal protein L27



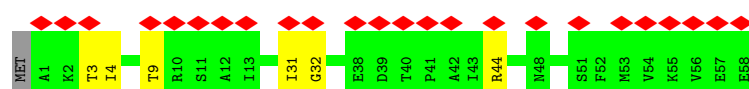
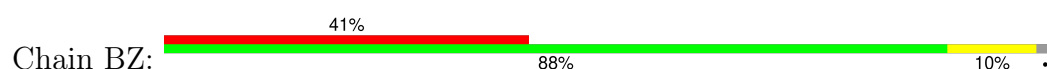
- Molecule 46: 50S ribosomal protein L28



- Molecule 47: 50S ribosomal protein L29

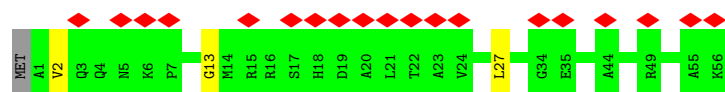


- Molecule 48: 50S ribosomal protein L30

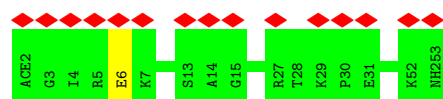


- Molecule 49: 50S ribosomal protein L32

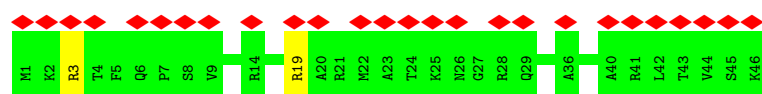




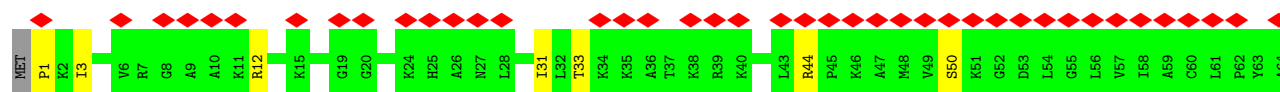
- Molecule 50: 50S ribosomal protein L33



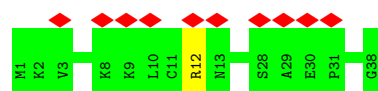
- Molecule 51: 50S ribosomal protein L34



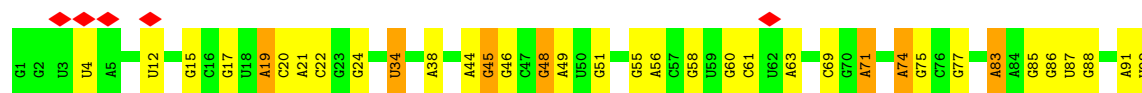
- Molecule 52: 50S ribosomal protein L35

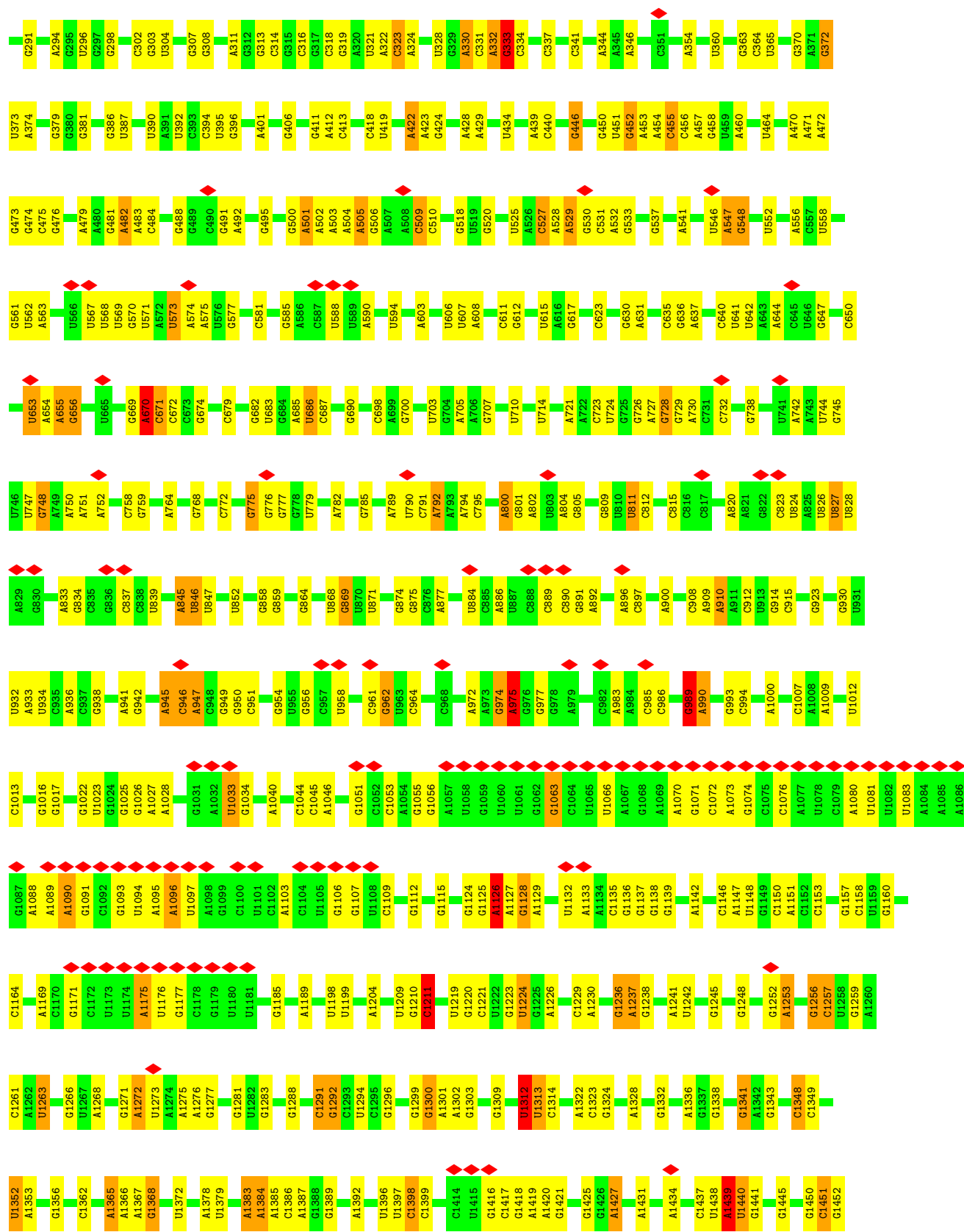


- Molecule 53: 50S ribosomal protein L36

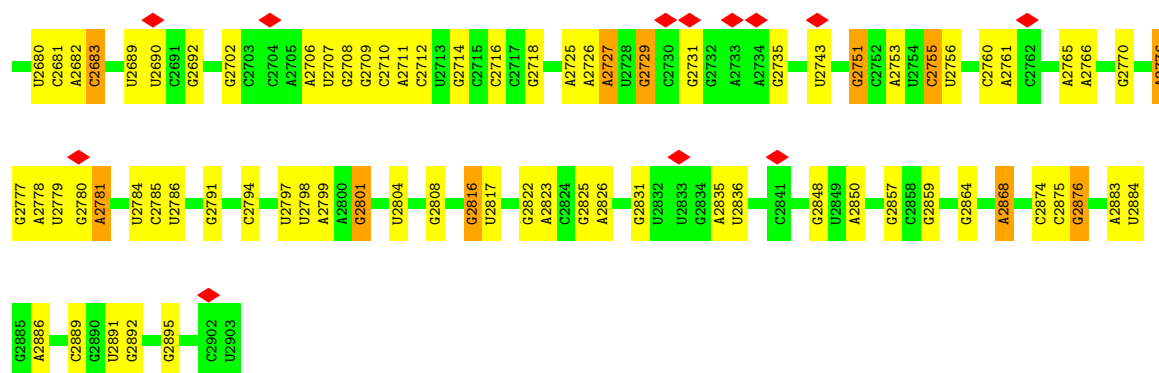


- Molecule 54: 23S ribosomal RNA

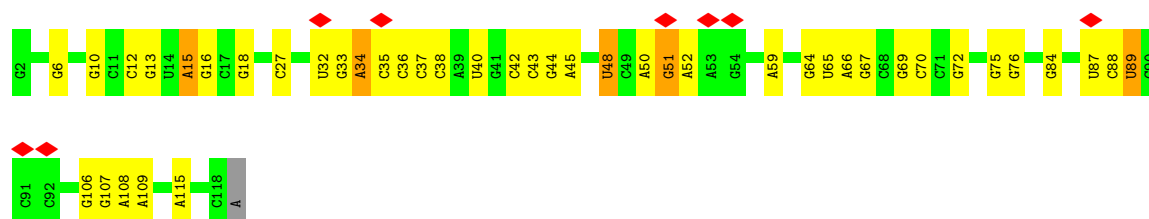




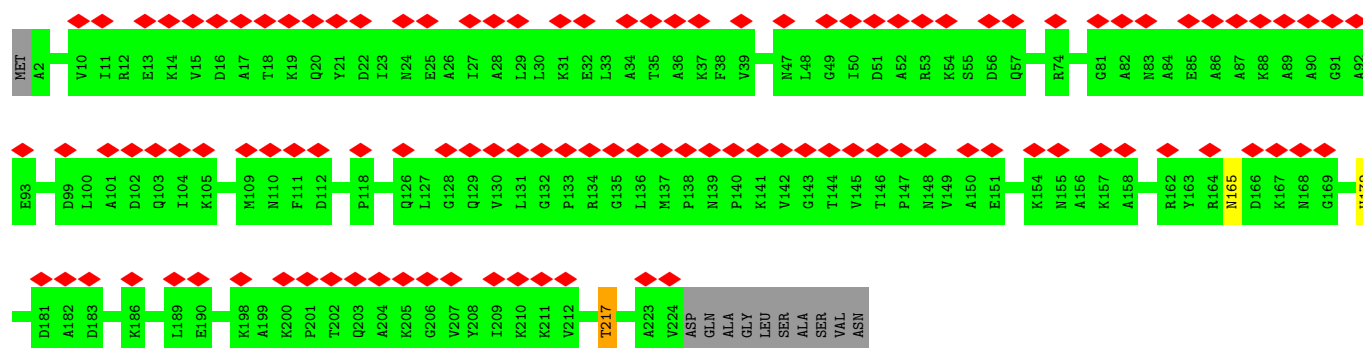
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C2501	A2502	A2503	U2504	G2505	A2506	C2507	G2508	G2509						A2513	U2514	C2515	A2516	C2517	A2518	U2519	C2520	U2431	A2432			G2536	U2537	G2538	C2539		G2540					G2472	U2473	U2474	A2475	A2476	U2477	G2488	U2489	G2490	U2491	U2492	U2493	G2494	U2495	C2496	G2499		G2594																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
C2395	U2402	C2403	A2406	G2407	U2408		G2415	U2423	C2424	A2425	A2426	G2427	G2428	G2429	A2430	U2431	A2432								U2438	A2439	C2440	U2441	G2444	G2447	A2448	U2449	G2454	G2458	A2459	U2460	A2469	G2472	U2473	U2474	A2475	A2476	U2477	G2488	U2489	G2490	U2491	U2492	U2493	G2494	U2495	C2496	G2499		G2594																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
U2305	G2308	A2309	C2310	A2311	U2312	C2313	G2318	G2319	U2320	U2321				G2325	C2326	A2327	G2331	C2332	A2333	U2334	A2335	A2336	G2337	C2338	C2339		C2342	G2345	A2346	C2347	G2349	G2353	G2357	A2358	U2359	C2360	G2367	A2368		G2375	G2383	U2384	C2385	A2386	G2389	U2390	C2391	A2392	U2393	C2394		G2594																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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G2116	A2117	U2118	A2119	G2120	G2127	G2128	C2129	U2132	G2133	A2134	U2137	G2138	U2139	G2140	G2141	A2142	C2143	G2144	C2145	G2148	U2149	C2153	G2157	A2158	G2159	C2160	A2163	C2164	C2165	G2168	A2169	A2173	C2174	U2180	U2181	U2182	G2186	U2187	U2188	U2189	U2192	G2193	U2194	A2198	A2199	C2200																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
U2017	G2018	A2019	A2020	C2021	U2022	C2023	U2028	G2029	A2030	A2031	G2032	A2033	U2034	G2035	C2036	A2037	C2043	G2063	A2064	C2065	A2058	G2061	A2062	C2063	G2067	U2068	G2069	A2070	U2076	A2077	U2086	C2089	A2090	C2091	U2092	G2093	U2098	C2104	U2105	U2106	G2107	A2108	U2111	G2112	U2113	A2114	G2115																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
G1929	G1930	U1931	A1932	G1933	A1936	A1937	A1938	U1939	U1940	C1941	U1942	U1943	G1944	G1945	G1950	A1953	U1955	U1956	G1957	C1958	G1959	A1960	U1963	G1964	C1965	A1966	G1967	G1968	A1969	U1971	G1972	G1973	C1974	U1979	G1980	A1981	C1986	U1991	U1992	U1993	C1997	C2006	A2009	A2014	A2015	U2016																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
G1807	A1808	G1814	A1815	C1816	U1820	A1821	C1822	G1828	A1829	C1830	G1831	C1832	C1837	G1838	C1839	G1842	C1843	C1844	A1847	A1848	G1849	U1855	G1860	G1861	G1869	C1881	U1882	U1883	G1884	A1900	A1901	G1906	C1909	G1910	A1913	C1914	U1915	A1916	G1920	G1921	G1922	A1927	A1928																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
C1728	U1729	G1730	G1731	C1732	G1733	G1737	G1738	A1739	G1740	A1744	A1745	U1746	U1747	C1748	A1749	G1750	G1753	A1757	U1758	G1763	C1764	C1768	U1769	A1773	C1774	U1775	G1776	A1780	U1781	U1782	A1783	A1784	U1785	A1786	A1787	C1788	A1789	C1790	A1791	G1795	U1796	G1797	C1800	A1801	A1802	C1804	A1805	C1806																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
A1562	G1563	U1564	U1559	G1560	C1561	U1562	A1566	G1567	G1568	A1569	A1572	G1573	C1577	U1578	A1579	A1580	G1581	C1585	U1589	A1590	A1591	C1592	A1593	U1594	C1595	A1598	G1601	U1602	A1603	C1607	A1608	A1614	C1615	A1616	C1617	A1618	G1619	G1620	U1621	G1622	G1623	U1624	G1625	A1626	G1628	G1631	A1632																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														



• Molecule 55: 5S ribosomal RNA



• Molecule 56: 50S ribosomal protein L1



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	8375	Depositor
Resolution determination method	FSC 0.5 CUT-OFF	Depositor
CTF correction method	local	Depositor
Microscope	FEI/PHILIPS CM200FEG	Depositor
Voltage (kV)	160	Depositor
Electron dose ($e^-/\text{\AA}^2$)	20	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	162740	Depositor
Image detector	GENERIC TVIPS (4k x 4k)	Depositor
Maximum map value	194.626	Depositor
Minimum map value	-114.806	Depositor
Average map value	-0.932	Depositor
Map value standard deviation	20.010	Depositor
Recommended contour level	26	Depositor
Map size ($\text{\AA}$)	358.4, 358.4, 358.4	wwPDB
Map dimensions	128, 128, 128	wwPDB
Map angles ($^\circ$)	90, 90, 90	wwPDB
Pixel spacing ($\text{\AA}$)	2.8, 2.8, 2.8	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: 4SU, OMC, PSU, 5MU, CM0, ACE, 7MG, H2U, 6MZ, NH2, FME

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	AB	0.96	0/1736	1.39	7/2340 (0.3%)
2	AC	0.97	0/1651	1.38	4/2225 (0.2%)
3	AD	0.98	0/1665	1.42	5/2227 (0.2%)
4	AE	0.95	0/1119	1.39	4/1506 (0.3%)
5	AF	0.96	0/835	1.47	2/1128 (0.2%)
6	AG	0.96	0/1188	1.44	4/1593 (0.3%)
7	AH	0.93	0/989	1.32	1/1326 (0.1%)
8	AI	0.99	0/1035	1.43	4/1377 (0.3%)
9	AJ	0.97	0/797	1.41	2/1079 (0.2%)
10	AK	0.99	0/894	1.41	3/1207 (0.2%)
11	AL	1.02	0/969	1.42	2/1300 (0.2%)
12	AM	1.02	0/884	1.51	6/1181 (0.5%)
13	AN	1.00	0/817	1.38	0/1088
14	AO	0.97	0/722	1.39	0/964
15	AP	0.99	0/648	1.35	0/870
16	AQ	0.96	1/658 (0.2%)	1.48	3/883 (0.3%)
17	AR	0.99	0/463	1.34	1/623 (0.2%)
18	AS	1.00	0/653	1.48	5/879 (0.6%)
19	AT	0.93	0/672	1.40	0/890
20	AU	0.99	0/431	1.57	4/572 (0.7%)
21	AA	0.98	0/36759	1.16	58/57346 (0.1%)
22	A1	0.99	0/1668	1.14	0/2595
23	A2	1.03	0/343	1.31	3/531 (0.6%)
24	A3	1.00	0/1722	1.16	5/2685 (0.2%)
25	BC	0.99	0/2121	1.56	8/2852 (0.3%)
26	BD	0.91	0/1586	1.48	3/2134 (0.1%)
27	BE	0.88	0/1571	1.43	0/2113
28	BF	0.90	0/1444	1.40	2/1937 (0.1%)
29	BG	0.89	0/1343	1.45	0/1816
30	BH	0.88	0/1122	1.43	0/1515
31	BI	0.91	0/1046	1.43	1/1410 (0.1%)
32	BJ	0.96	0/1152	1.51	5/1551 (0.3%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
33	BK	0.95	0/947	1.43	3/1268 (0.2%)
34	BL	0.97	0/1054	1.53	4/1403 (0.3%)
35	BM	0.94	0/1093	1.51	2/1460 (0.1%)
36	BN	0.96	0/973	1.47	2/1301 (0.2%)
37	BO	0.94	0/902	1.44	2/1209 (0.2%)
38	BP	0.95	0/929	1.45	1/1242 (0.1%)
39	BQ	0.96	0/960	1.49	0/1278
40	BR	0.91	0/829	1.46	0/1107
41	BS	0.89	0/864	1.45	5/1156 (0.4%)
42	BT	0.86	0/744	1.44	2/994 (0.2%)
43	BU	0.93	0/787	1.57	2/1051 (0.2%)
44	BV	0.93	0/766	1.49	2/1025 (0.2%)
45	BW	0.96	0/604	1.56	0/799
46	BX	0.96	0/635	1.45	3/848 (0.4%)
47	BY	0.91	0/510	1.49	1/677 (0.1%)
48	BZ	0.95	0/453	1.53	2/605 (0.3%)
49	B0	0.99	0/450	1.51	0/599
50	B1	0.89	0/417	1.43	0/556
51	B2	0.99	0/380	1.53	1/498 (0.2%)
52	B3	1.01	0/513	1.51	1/676 (0.1%)
53	B4	0.96	0/303	1.49	1/397 (0.3%)
54	BA	0.83	0/69796	1.14	112/108888 (0.1%)
55	BB	0.83	0/2800	1.13	0/4367
56	B5	0.89	0/1673	1.41	1/2255 (0.0%)
All	All	0.91	1/160085 (0.0%)	1.23	289/239402 (0.1%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
2	AC	0	1
6	AG	0	1
7	AH	0	1
21	AA	0	369
22	A1	0	10
23	A2	0	4
24	A3	0	19
37	BO	0	1
52	B3	0	1
54	BA	0	715

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Mol	Chain	#Chirality outliers	#Planarity outliers
55	BB	0	28
All	All	0	1150

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
16	AQ	63	CYS	CA-C	6.04	1.56	1.53

The worst 5 of 289 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
16	AQ	63	CYS	CA-C-N	10.20	140.06	121.70
16	AQ	63	CYS	C-N-CA	10.20	140.06	121.70
1	AB	206	ILE	CA-C-N	10.17	140.01	121.70
1	AB	206	ILE	C-N-CA	10.17	140.01	121.70
12	AM	102	LYS	CA-C-N	9.58	138.94	121.70

There are no chirality outliers.

5 of 1150 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
21	AA	6	G	Sidechain
21	AA	7	A	Sidechain
2	AC	172	VAL	Peptide
6	AG	3	ARG	Sidechain
7	AH	76	ARG	Sidechain

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	AB	1708	0	1736	0	0
2	AC	1625	0	1699	0	0
3	AD	1643	0	1710	0	0
4	AE	1109	0	1152	0	0
5	AF	818	0	808	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	AG	1178	0	1234	0	0
7	AH	979	0	1034	0	0
8	AI	1025	0	1074	0	0
9	AJ	790	0	832	1	0
10	AK	880	0	891	0	0
11	AL	955	0	1019	0	0
12	AM	877	0	937	0	0
13	AN	805	0	844	0	0
14	AO	714	0	737	0	0
15	AP	639	0	656	0	0
16	AQ	652	0	695	0	0
17	AR	459	0	482	0	0
18	AS	641	0	669	0	0
19	AT	668	0	718	0	0
20	AU	429	0	453	0	0
21	AA	32828	0	16520	2	0
22	A1	1627	0	832	0	0
23	A2	309	0	158	0	0
24	A3	1642	0	843	0	0
25	BC	2083	0	2157	0	0
26	BD	1565	0	1616	0	0
27	BE	1552	0	1619	0	0
28	BF	1420	0	1460	1	0
29	BG	1323	0	1374	0	0
30	BH	1111	0	1148	0	0
31	BI	1032	0	1088	0	0
32	BJ	1129	0	1162	0	0
33	BK	939	0	1012	1	0
34	BL	1045	0	1117	0	0
35	BM	1074	0	1157	0	0
36	BN	961	0	1000	0	0
37	BO	892	0	923	0	0
38	BP	917	0	965	2	0
39	BQ	947	0	1022	1	0
40	BR	816	0	839	0	0
41	BS	857	0	922	0	0
42	BT	739	0	807	0	0
43	BU	780	0	834	0	0
44	BV	753	0	780	0	0
45	BW	599	0	614	0	0
46	BX	625	0	655	0	0
47	BY	509	0	543	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
48	BZ	449	0	491	0	0
49	B0	444	0	461	0	0
50	B1	413	0	444	0	0
51	B2	377	0	418	0	0
52	B3	504	0	574	0	0
53	B4	302	0	343	0	0
54	BA	62317	0	31345	1	0
55	BB	2504	0	1271	0	0
56	B5	1658	0	1751	0	0
57	A1	7	0	8	0	0
58	BA	10	0	10	0	0
All	All	147653	0	99663	11	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 0.

The worst 5 of 11 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)
28:BF:151:LEU:HD13	28:BF:151:LEU:H	1.75	0.51
9:AJ:57:VAL:HG23	9:AJ:58:ASN:H	1.77	0.50
5:AF:94:HIS:CG	5:AF:95:ALA:H	2.30	0.50
21:AA:565:U:H2'	21:AA:566:G:C8	2.48	0.47
21:AA:940:C:H2'	21:AA:941:G:C8	2.50	0.46

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	AB	218/220 (99%)	198 (91%)	16 (7%)	4 (2%)	6 34

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	AC	205/208 (99%)	188 (92%)	8 (4%)	9 (4%)	2	17
3	AD	203/206 (98%)	182 (90%)	18 (9%)	3 (2%)	8	40
4	AE	150/152 (99%)	136 (91%)	8 (5%)	6 (4%)	2	18
5	AF	99/101 (98%)	84 (85%)	9 (9%)	6 (6%)	1	13
6	AG	150/152 (99%)	130 (87%)	14 (9%)	6 (4%)	2	18
7	AH	127/130 (98%)	124 (98%)	2 (2%)	1 (1%)	16	54
8	AI	126/128 (98%)	115 (91%)	9 (7%)	2 (2%)	7	38
9	AJ	98/100 (98%)	92 (94%)	2 (2%)	4 (4%)	2	18
10	AK	116/118 (98%)	104 (90%)	11 (10%)	1 (1%)	14	51
11	AL	121/124 (98%)	107 (88%)	13 (11%)	1 (1%)	16	54
12	AM	112/115 (97%)	98 (88%)	9 (8%)	5 (4%)	2	17
13	AN	98/101 (97%)	87 (89%)	10 (10%)	1 (1%)	12	49
14	AO	86/89 (97%)	79 (92%)	6 (7%)	1 (1%)	10	44
15	AP	79/81 (98%)	71 (90%)	7 (9%)	1 (1%)	9	42
16	AQ	80/82 (98%)	71 (89%)	7 (9%)	2 (2%)	4	26
17	AR	55/57 (96%)	52 (94%)	2 (4%)	1 (2%)	6	34
18	AS	79/81 (98%)	67 (85%)	9 (11%)	3 (4%)	2	19
19	AT	84/86 (98%)	78 (93%)	4 (5%)	2 (2%)	4	27
20	AU	51/53 (96%)	33 (65%)	14 (28%)	4 (8%)	1	10
25	BC	270/273 (99%)	237 (88%)	25 (9%)	8 (3%)	3	23
26	BD	207/209 (99%)	181 (87%)	17 (8%)	9 (4%)	2	17
27	BE	199/201 (99%)	180 (90%)	12 (6%)	7 (4%)	3	20
28	BF	176/179 (98%)	161 (92%)	8 (4%)	7 (4%)	2	18
29	BG	174/177 (98%)	158 (91%)	11 (6%)	5 (3%)	3	23
30	BH	147/149 (99%)	129 (88%)	15 (10%)	3 (2%)	6	31
31	BI	139/142 (98%)	132 (95%)	7 (5%)	0	100	100
32	BJ	140/142 (99%)	124 (89%)	11 (8%)	5 (4%)	2	20
33	BK	121/123 (98%)	103 (85%)	12 (10%)	6 (5%)	1	16
34	BL	141/144 (98%)	122 (86%)	10 (7%)	9 (6%)	1	12
35	BM	134/136 (98%)	121 (90%)	8 (6%)	5 (4%)	2	20
36	BN	119/121 (98%)	101 (85%)	17 (14%)	1 (1%)	16	54

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
37	BO	114/117 (97%)	109 (96%)	4 (4%)	1 (1%)	14	51
38	BP	112/115 (97%)	99 (88%)	10 (9%)	3 (3%)	4	25
39	BQ	115/118 (98%)	105 (91%)	7 (6%)	3 (3%)	4	25
40	BR	101/103 (98%)	94 (93%)	5 (5%)	2 (2%)	6	31
41	BS	108/110 (98%)	96 (89%)	8 (7%)	4 (4%)	2	20
42	BT	92/94 (98%)	80 (87%)	10 (11%)	2 (2%)	5	29
43	BU	101/104 (97%)	79 (78%)	16 (16%)	6 (6%)	1	13
44	BV	92/94 (98%)	88 (96%)	4 (4%)	0	100	100
45	BW	78/80 (98%)	64 (82%)	12 (15%)	2 (3%)	4	25
46	BX	75/79 (95%)	69 (92%)	6 (8%)	0	100	100
47	BY	61/63 (97%)	57 (93%)	3 (5%)	1 (2%)	7	38
48	BZ	56/59 (95%)	47 (84%)	4 (7%)	5 (9%)	0	8
49	B0	54/57 (95%)	50 (93%)	2 (4%)	2 (4%)	2	20
50	B1	50/52 (96%)	45 (90%)	4 (8%)	1 (2%)	6	31
51	B2	44/46 (96%)	42 (96%)	2 (4%)	0	100	100
52	B3	62/65 (95%)	50 (81%)	8 (13%)	4 (6%)	1	12
53	B4	36/38 (95%)	34 (94%)	2 (6%)	0	100	100
56	B5	221/234 (94%)	205 (93%)	15 (7%)	1 (0%)	24	63
All	All	5876/6008 (98%)	5258 (90%)	453 (8%)	165 (3%)	6	24

5 of 165 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	AB	206	ILE
2	AC	4	VAL
3	AD	54	LEU
4	AE	105	ILE
5	AF	59	TYR

5.3.2 Protein sidechains ⓘ

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

The Analysed column shows the number of residues for which the sidechain conformation was

analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	AB	180/180 (100%)	174 (97%)	6 (3%)	33	55
2	AC	170/171 (99%)	166 (98%)	4 (2%)	43	64
3	AD	172/173 (99%)	169 (98%)	3 (2%)	53	69
4	AE	113/113 (100%)	112 (99%)	1 (1%)	70	79
5	AF	87/87 (100%)	86 (99%)	1 (1%)	65	76
6	AG	123/123 (100%)	120 (98%)	3 (2%)	43	64
7	AH	104/105 (99%)	103 (99%)	1 (1%)	68	78
8	AI	105/105 (100%)	103 (98%)	2 (2%)	50	67
9	AJ	86/86 (100%)	86 (100%)	0	100	100
10	AK	90/90 (100%)	89 (99%)	1 (1%)	65	76
11	AL	103/104 (99%)	103 (100%)	0	100	100
12	AM	91/92 (99%)	91 (100%)	0	100	100
13	AN	83/84 (99%)	82 (99%)	1 (1%)	63	75
14	AO	76/77 (99%)	74 (97%)	2 (3%)	40	62
15	AP	65/65 (100%)	65 (100%)	0	100	100
16	AQ	74/74 (100%)	74 (100%)	0	100	100
17	AR	48/48 (100%)	48 (100%)	0	100	100
18	AS	70/70 (100%)	70 (100%)	0	100	100
19	AT	65/65 (100%)	65 (100%)	0	100	100
20	AU	44/44 (100%)	44 (100%)	0	100	100
25	BC	216/217 (100%)	208 (96%)	8 (4%)	30	51
26	BD	164/164 (100%)	161 (98%)	3 (2%)	51	68
27	BE	165/165 (100%)	164 (99%)	1 (1%)	78	83
28	BF	149/150 (99%)	146 (98%)	3 (2%)	48	66
29	BG	137/138 (99%)	134 (98%)	3 (2%)	45	64
30	BH	114/114 (100%)	114 (100%)	0	100	100
31	BI	109/110 (99%)	107 (98%)	2 (2%)	51	68
32	BJ	116/116 (100%)	115 (99%)	1 (1%)	70	79
33	BK	103/103 (100%)	101 (98%)	2 (2%)	50	67
34	BL	102/103 (99%)	102 (100%)	0	100	100
35	BM	109/109 (100%)	106 (97%)	3 (3%)	38	60

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
36	BN	100/100 (100%)	99 (99%)	1 (1%)	68	78
37	BO	86/87 (99%)	84 (98%)	2 (2%)	44	64
38	BP	99/100 (99%)	97 (98%)	2 (2%)	48	66
39	BQ	89/90 (99%)	88 (99%)	1 (1%)	65	76
40	BR	84/84 (100%)	84 (100%)	0	100	100
41	BS	93/93 (100%)	91 (98%)	2 (2%)	45	64
42	BT	80/80 (100%)	79 (99%)	1 (1%)	61	74
43	BU	83/84 (99%)	82 (99%)	1 (1%)	63	75
44	BV	78/78 (100%)	77 (99%)	1 (1%)	61	74
45	BW	59/59 (100%)	57 (97%)	2 (3%)	32	54
46	BX	67/68 (98%)	67 (100%)	0	100	100
47	BY	55/55 (100%)	55 (100%)	0	100	100
48	BZ	48/49 (98%)	48 (100%)	0	100	100
49	B0	47/48 (98%)	46 (98%)	1 (2%)	47	65
50	B1	45/45 (100%)	45 (100%)	0	100	100
51	B2	38/38 (100%)	37 (97%)	1 (3%)	40	62
52	B3	51/52 (98%)	50 (98%)	1 (2%)	48	66
53	B4	34/34 (100%)	34 (100%)	0	100	100
56	B5	173/181 (96%)	171 (99%)	2 (1%)	63	75
All	All	4842/4870 (99%)	4773 (99%)	69 (1%)	57	72

5 of 69 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
41	BS	1	MET
42	BT	34	VAL
51	B2	19	ARG
14	AO	86	LEU
14	AO	48	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 60 such sidechains are listed below:

Mol	Chain	Res	Type
25	BC	133	ASN

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Mol	Chain	Res	Type
49	B0	18	HIS
30	BH	18	GLN
49	B0	5	ASN
53	B4	37	GLN

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
21	AA	1529/1533 (99%)	268 (17%)	86 (5%)
22	A1	75/76 (98%)	15 (20%)	5 (6%)
23	A2	15/15 (100%)	5 (33%)	4 (26%)
24	A3	76/77 (98%)	19 (25%)	6 (7%)
54	BA	2902/2903 (99%)	485 (16%)	117 (4%)
55	BB	116/118 (98%)	18 (15%)	4 (3%)
All	All	4713/4722 (99%)	810 (17%)	222 (4%)

5 of 810 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
21	AA	8	A
21	AA	27	G
21	AA	28	A
21	AA	32	A
21	AA	35	G

5 of 222 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
54	BA	276	U
55	BB	107	G
54	BA	989	G
55	BB	51	G
54	BA	2428	G

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

11 non-standard protein/DNA/RNA residues are modelled in this entry.

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
22	CM0	A1	34	22,23	21,26,27	1.30	2 (9%)	26,37,40	1.36	3 (11%)
22	6MZ	A1	37	22	22,25,26	0.68	0	29,36,39	1.13	3 (10%)
22	4SU	A1	7	22	18,21,22	1.41	2 (11%)	25,30,33	1.08	3 (12%)
24	OMC	A3	33	24	19,22,23	0.68	0	25,31,34	1.12	1 (4%)
24	PSU	A3	56	24	18,21,22	0.82	0	21,30,33	1.10	2 (9%)
24	5MU	A3	55	24	19,22,23	0.71	0	27,32,35	1.33	3 (11%)
22	PSU	A1	55	22	18,21,22	0.82	0	21,30,33	1.36	3 (14%)
24	H2U	A3	21	24	18,21,22	1.36	2 (11%)	19,30,33	1.23	3 (15%)
22	5MU	A1	54	22	19,22,23	0.68	0	27,32,35	1.21	2 (7%)
22	7MG	A1	46	22	23,26,27	4.09	2 (8%)	27,39,42	1.51	2 (7%)
24	4SU	A3	8	24	18,21,22	1.49	1 (5%)	25,30,33	0.83	1 (4%)

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
22	CM0	A1	34	22,23	-	2/12/30/31	0/2/2/2
22	6MZ	A1	37	22	-	0/9/27/28	0/3/3/3
22	4SU	A1	7	22	-	0/7/25/26	0/2/2/2
24	OMC	A3	33	24	-	0/9/27/28	0/2/2/2
24	PSU	A3	56	24	-	2/7/25/26	0/2/2/2
24	5MU	A3	55	24	-	0/7/25/26	0/2/2/2
22	PSU	A1	55	22	-	1/7/25/26	0/2/2/2
24	H2U	A3	21	24	-	0/7/38/39	0/2/2/2
22	5MU	A1	54	22	-	0/7/25/26	0/2/2/2
22	7MG	A1	46	22	-	0/7/37/38	0/3/3/3
24	4SU	A3	8	24	-	0/7/25/26	0/2/2/2

The worst 5 of 9 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
22	A1	46	7MG	C8-N9	-19.21	1.33	1.45
24	A3	8	4SU	C5-C4	-5.26	1.36	1.42

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
22	A1	7	4SU	C5-C4	-5.02	1.36	1.42
22	A1	34	CM0	O5-C5	-4.72	1.25	1.36
24	A3	21	H2U	C2-N3	-3.46	1.31	1.38

The worst 5 of 26 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
22	A1	46	7MG	N9-C8-N7	6.08	111.97	103.37
22	A1	34	CM0	C7-O5-C5	4.47	123.17	117.48
22	A1	55	PSU	C6-C5-C4	3.73	120.69	118.17
22	A1	37	6MZ	C9-N6-C6	3.47	126.07	122.85
24	A3	33	OMC	O2-C2-N3	-3.45	116.89	122.33

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
24	A3	56	PSU	O4'-C1'-C5-C4
24	A3	56	PSU	O4'-C1'-C5-C6
22	A1	34	CM0	O5-C7-C8-O9
22	A1	34	CM0	O5-C7-C8-O8
22	A1	55	PSU	O4'-C1'-C5-C6

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

2 ligands are modelled in this entry.

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	$\# Z > 2$
57	VAL	A1	101	22,58	4,6,7	0.77	0	6,7,9	1.82	1 (16%)
58	FME	BA	3001	57	8,9,10	0.67	0	8,9,11	1.24	1 (12%)

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
57	VAL	A1	101	22,58	-	0/5/6/8	-
58	FME	BA	3001	57	-	1/7/9/11	-

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
57	A1	101	VAL	O-C-CA	-4.11	114.21	124.77
58	BA	3001	FME	C-CA-N	2.48	114.28	109.50

There are no chirality outliers.

All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
58	BA	3001	FME	O1-CN-N-CA

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](#)

There are no chain breaks in this entry.

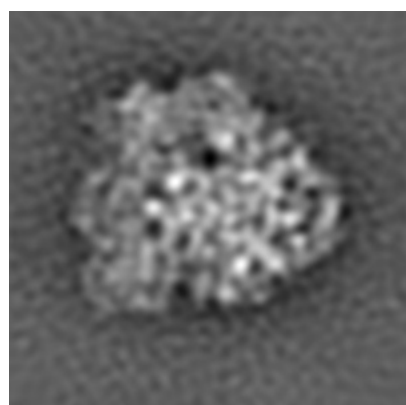
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-1719. These allow visual inspection of the internal detail of the map and identification of artifacts.

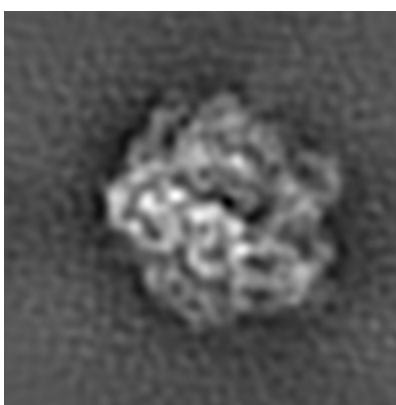
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

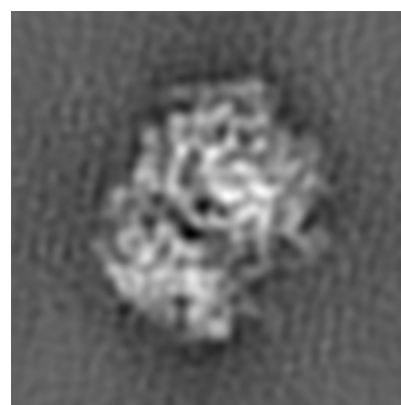
6.1.1 Primary map



X



Y

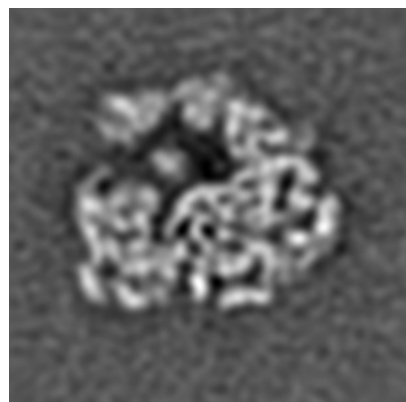


Z

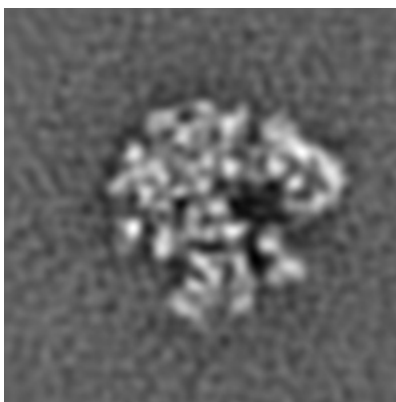
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

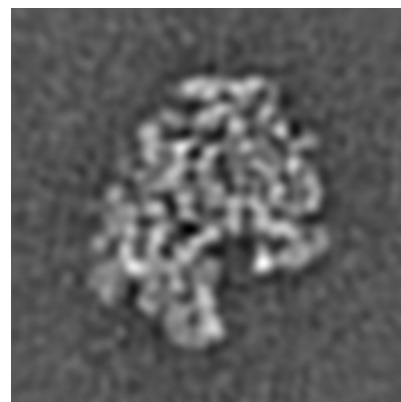
6.2.1 Primary map



X Index: 64



Y Index: 64

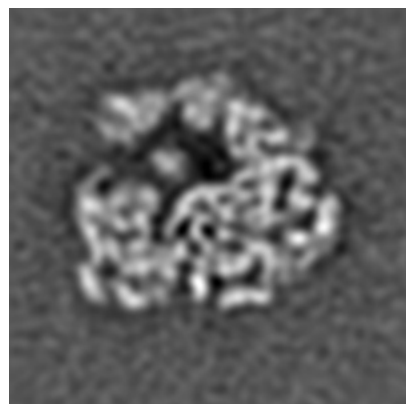


Z Index: 64

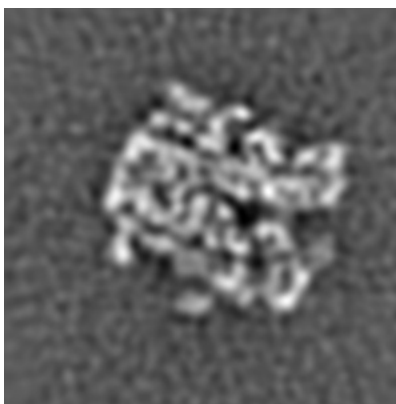
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

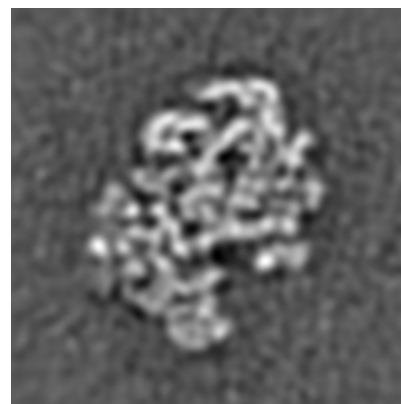
6.3.1 Primary map



X Index: 64



Y Index: 69

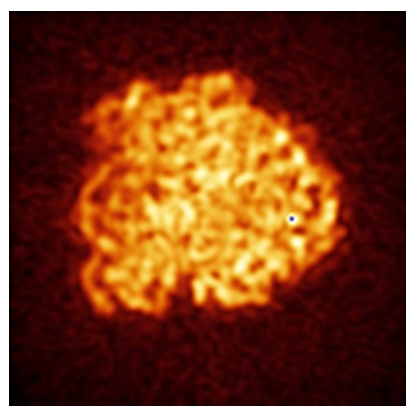


Z Index: 61

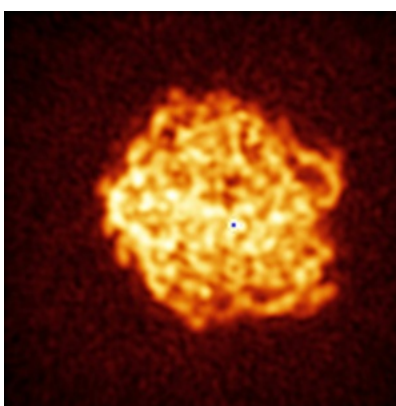
The images above show the largest variance slices of the map in three orthogonal directions.

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

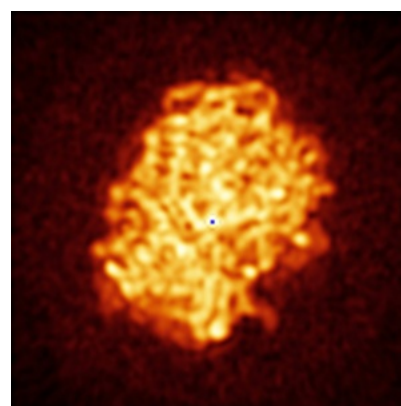
6.4.1 Primary map



X



Y

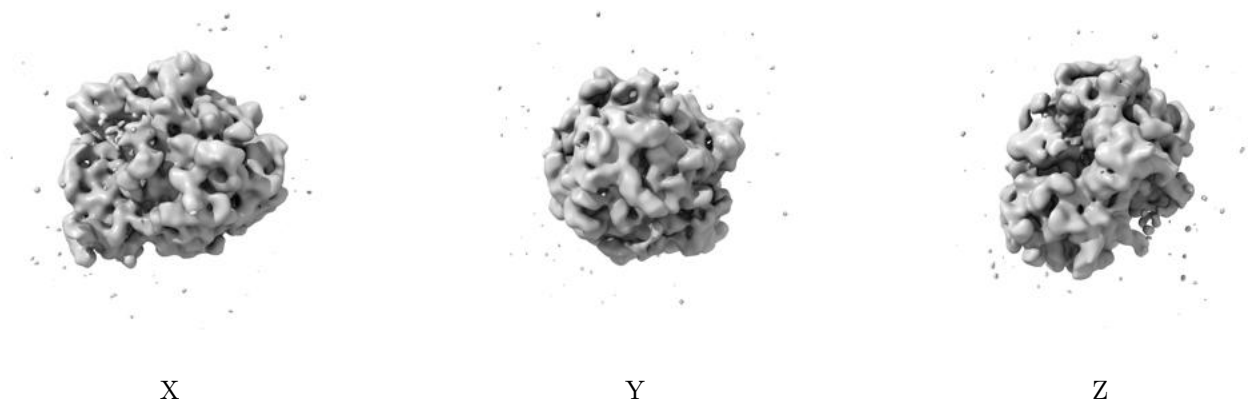


Z

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

6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 26.0. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

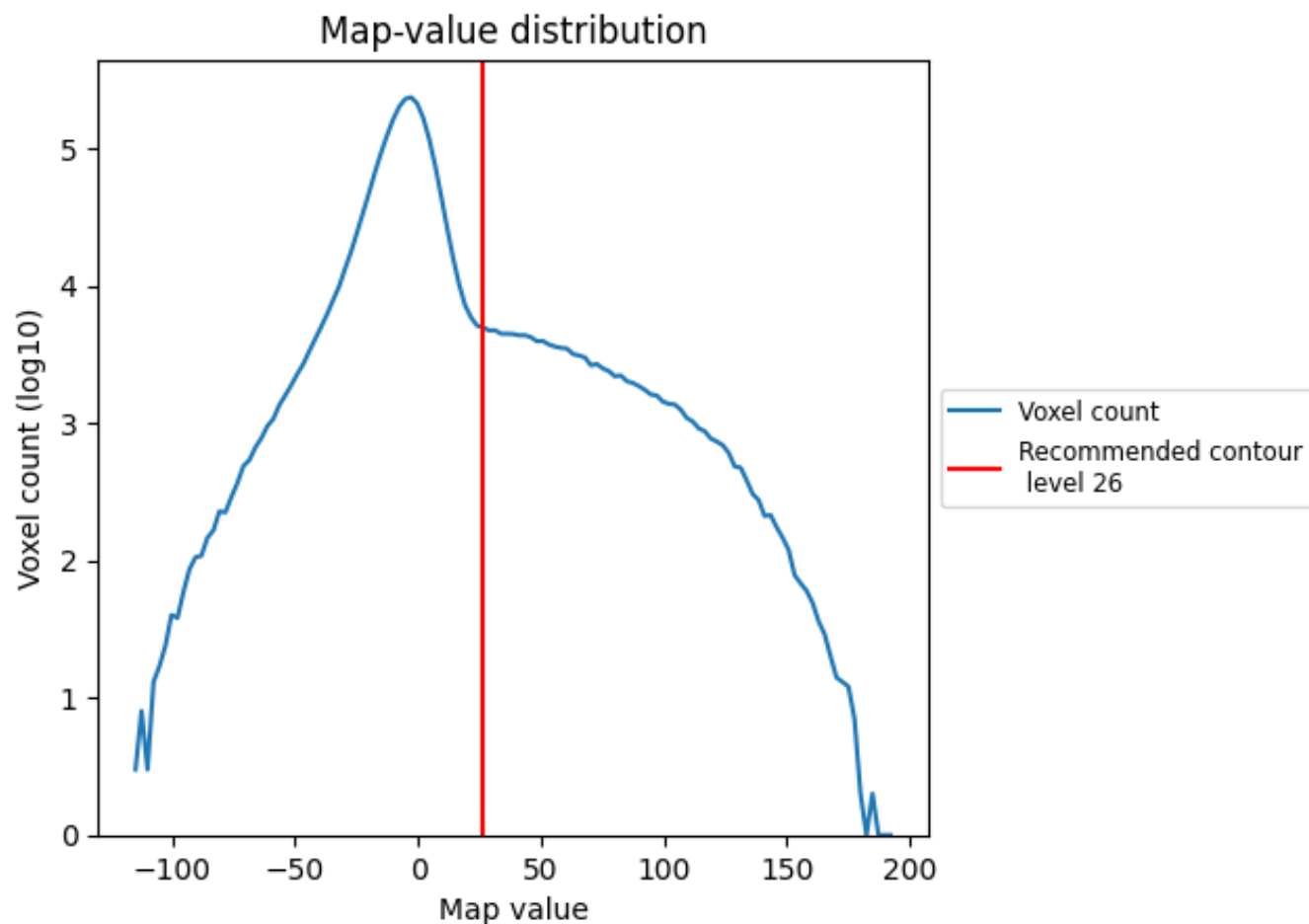
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

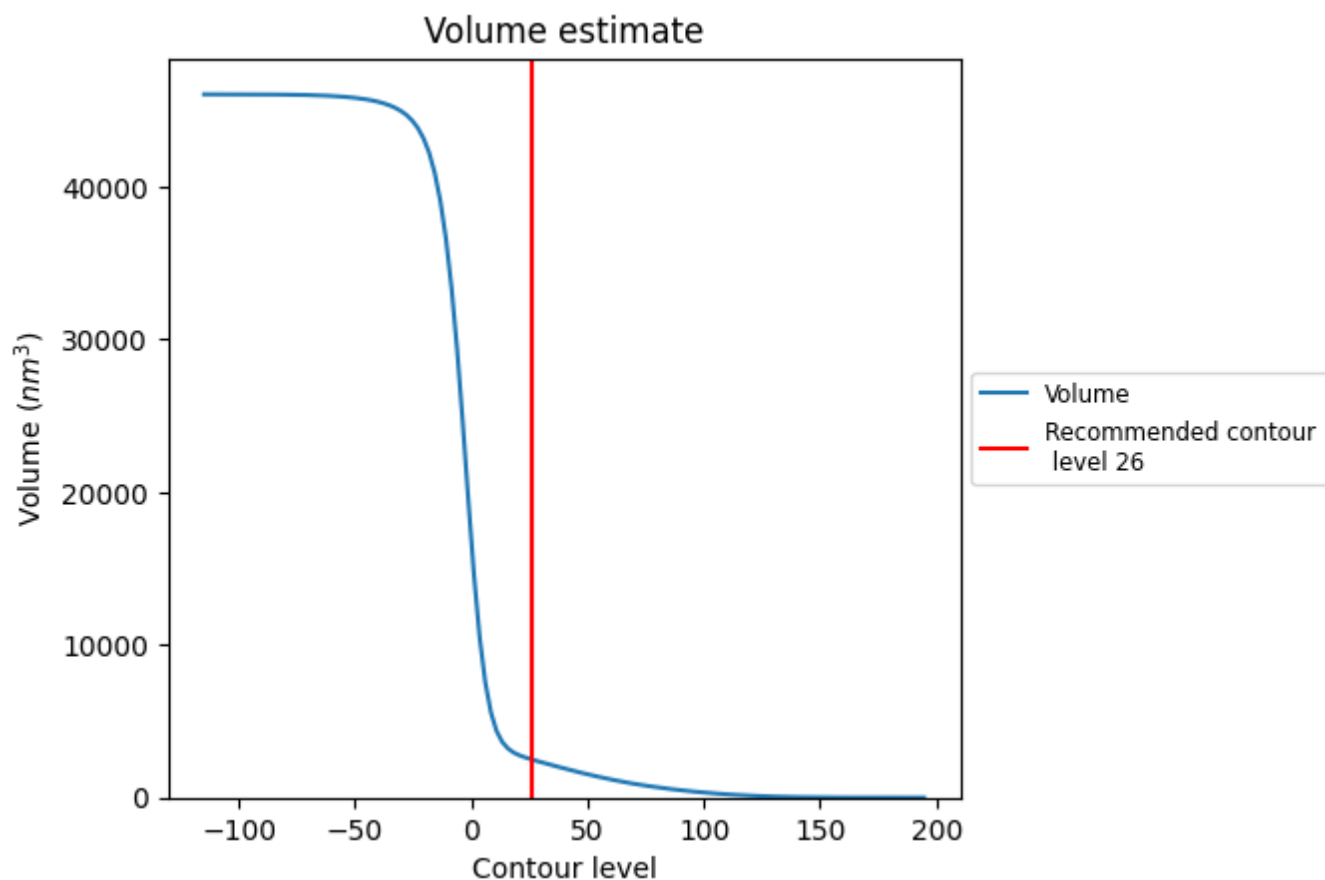
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

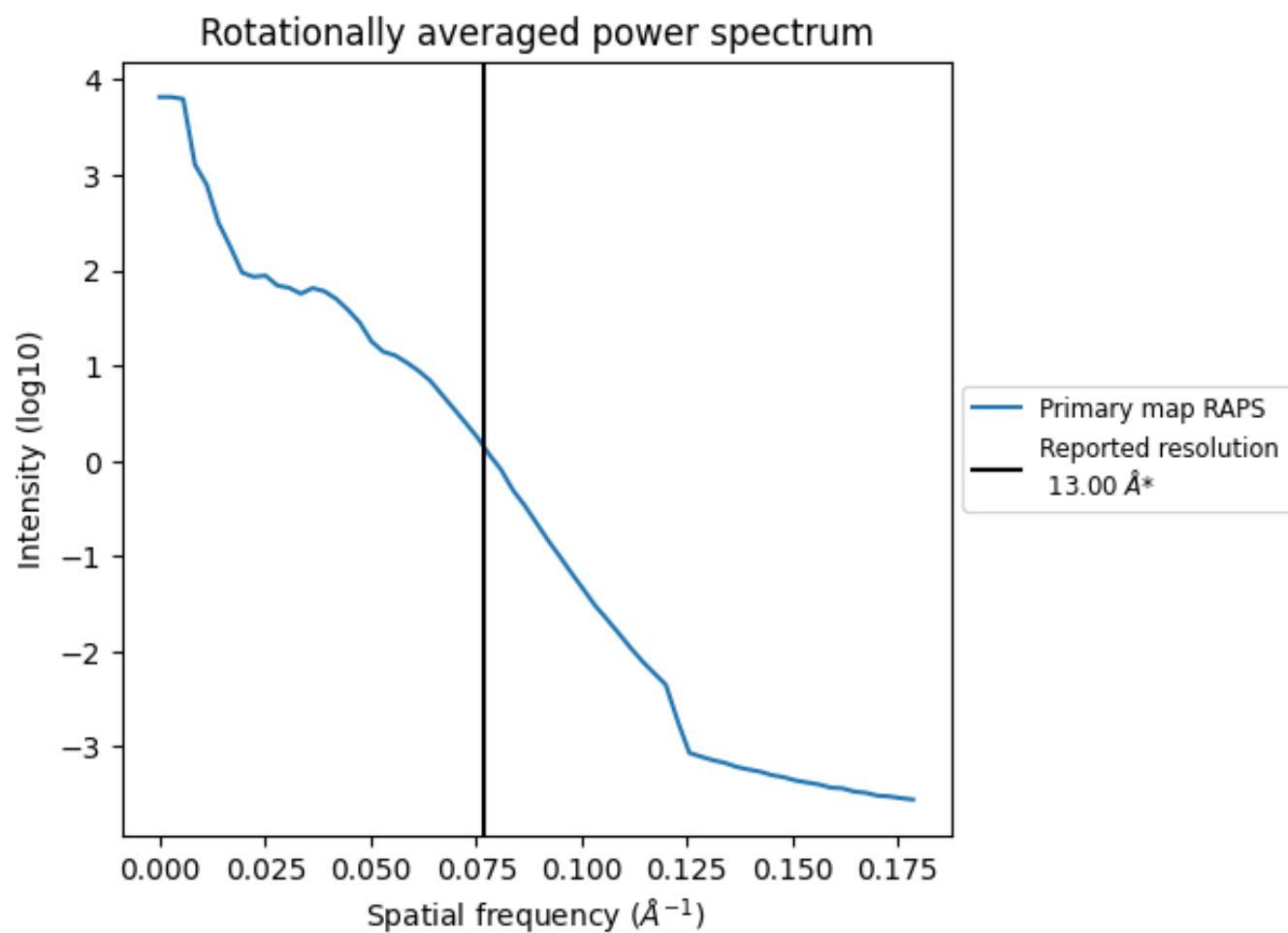
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 2493 nm³; this corresponds to an approximate mass of 2252 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum ⓘ



*Reported resolution corresponds to spatial frequency of 0.077 Å⁻¹

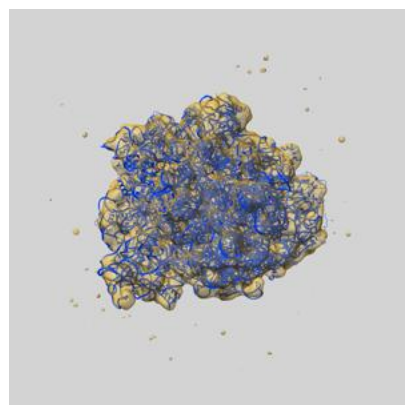
8 Fourier-Shell correlation

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

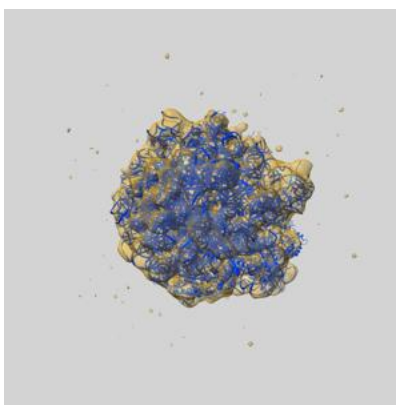
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-1719 and PDB model 4V72. Per-residue inclusion information can be found in [section 3](#) on [page 18](#).

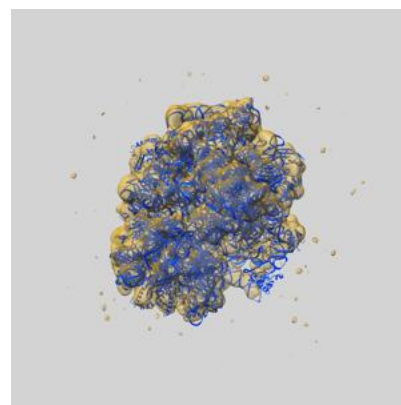
9.1 Map-model overlay [i](#)



X



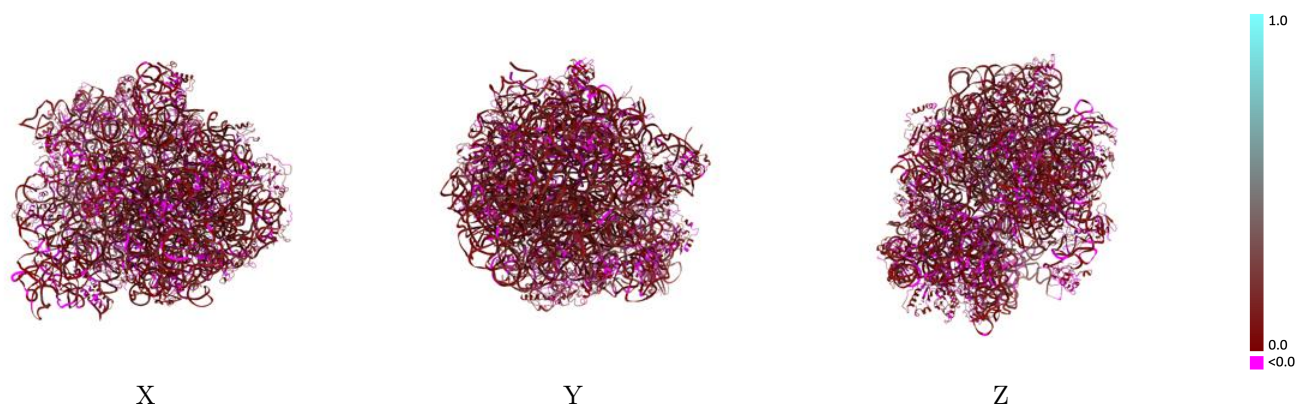
Y



Z

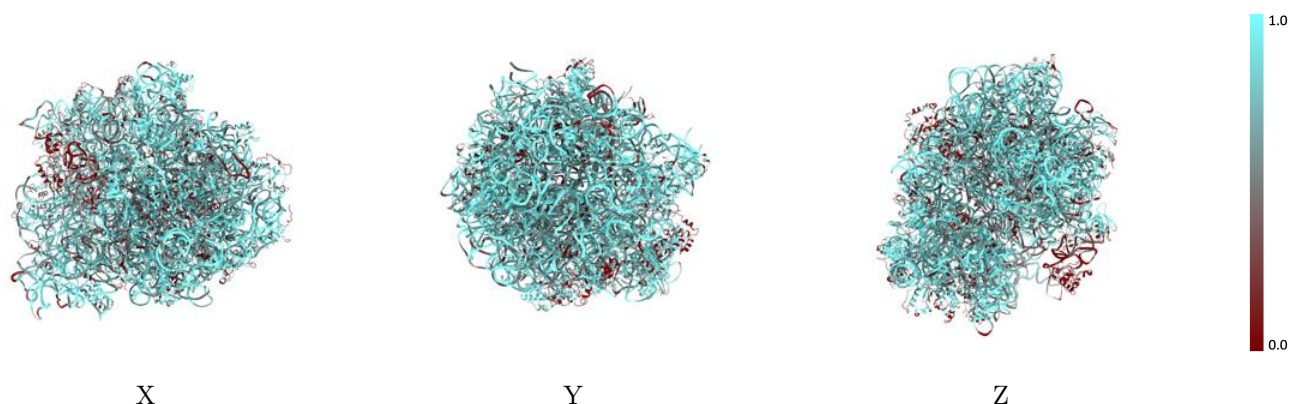
The images above show the 3D surface view of the map at the recommended contour level 26.0 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



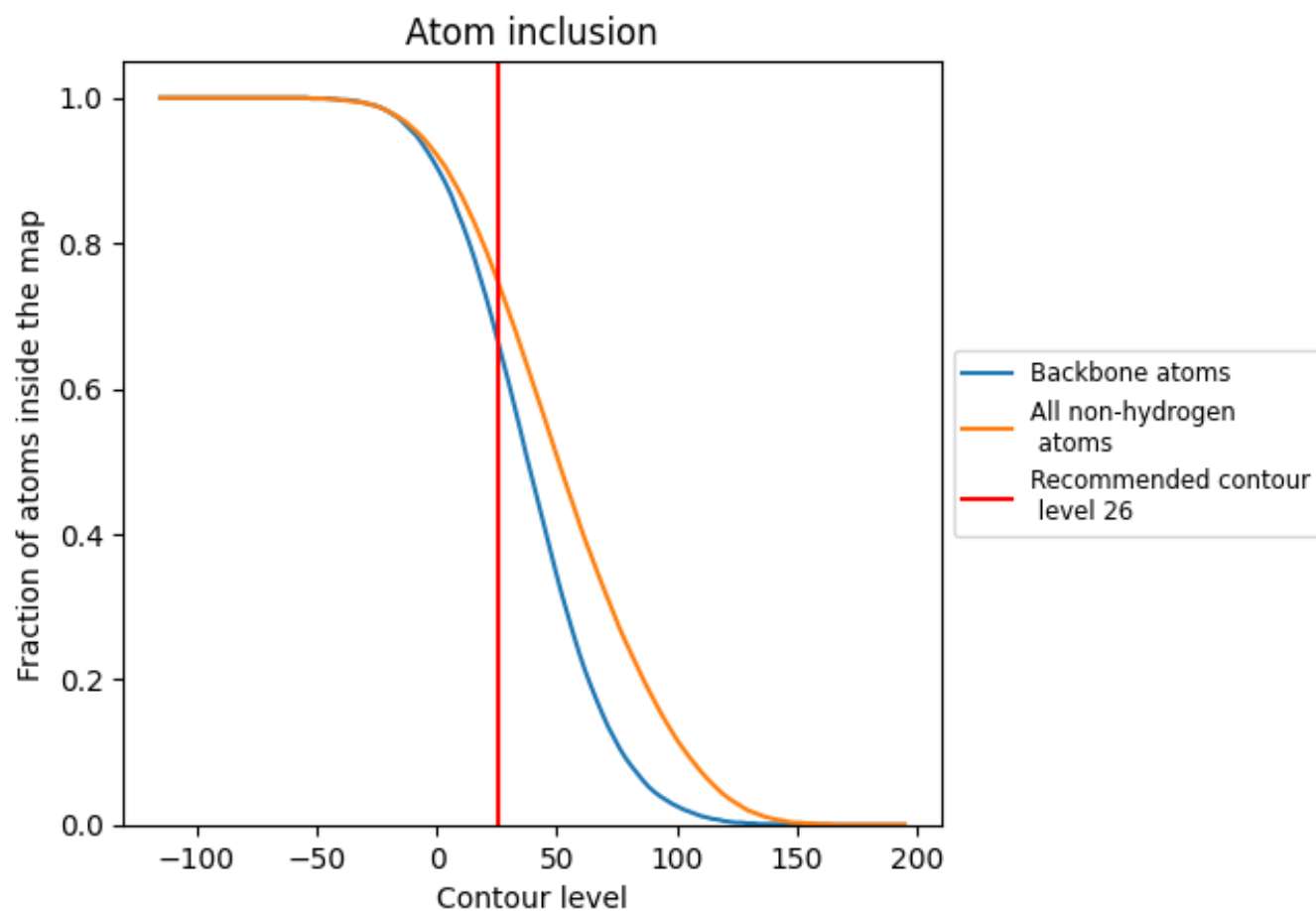
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (26).

9.4 Atom inclusion [i](#)



At the recommended contour level, 66% of all backbone atoms, 74% 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 (26) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7430	 0.0720
A1	 0.5900	 0.0670
A2	 0.5790	 0.0370
A3	 0.7360	 0.0960
AA	 0.8330	 0.0830
AB	 0.6480	 0.0790
AC	 0.6660	 0.0570
AD	 0.5620	 0.0410
AE	 0.6770	 0.0650
AF	 0.8080	 0.0820
AG	 0.7020	 0.0440
AH	 0.6150	 0.0490
AI	 0.6990	 0.0370
AJ	 0.6320	 0.0230
AK	 0.6220	 0.0360
AL	 0.5580	 0.0380
AM	 0.5750	 0.0250
AN	 0.5580	 0.0390
AO	 0.7460	 0.0500
AP	 0.5490	 0.0060
AQ	 0.6850	 0.0690
AR	 0.6860	 0.0420
AS	 0.7710	 0.0290
AT	 0.6640	 0.0250
AU	 0.3940	 -0.0080
B0	 0.6220	 0.0360
B1	 0.6810	 0.0480
B2	 0.3720	 0.0240
B3	 0.3320	 -0.0140
B4	 0.6440	 0.0190
B5	 0.4540	 0.0460
BA	 0.8100	 0.0890
BB	 0.8630	 0.0810
BC	 0.4930	 0.0310
BD	 0.5310	 0.0370



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Chain	Atom inclusion	Q-score
BE	 0.6160	 0.0380
BF	 0.7380	 0.0570
BG	 0.5690	 0.0360
BH	 0.2130	 0.0390
BI	 0.0290	 0.0230
BJ	 0.5760	 0.0310
BK	 0.5640	 0.0400
BL	 0.5720	 0.0130
BM	 0.5190	 0.0400
BN	 0.6150	 0.0260
BO	 0.8580	 0.0500
BP	 0.5770	 0.0500
BQ	 0.5120	 0.0270
BR	 0.7130	 0.0580
BS	 0.5730	 0.0520
BT	 0.6360	 0.0350
BU	 0.5640	 0.0190
BV	 0.6640	 0.0480
BW	 0.6860	 0.0440
BX	 0.4230	 0.0510
BY	 0.7450	 0.0880
BZ	 0.5450	 0.0230