wwPDB EM Validation Summary Report ⓘ

Feb 22, 2024 – 11:08 AM EST

PDB ID	:	4V47
Title	:	Real space refined coordinates of the 30S and 50S subunits fitted into the low resolution cryo-EM map of the EF-G.GTP state of E. coli 70S ribosome
Authors	:	Gao, H.; Sengupta, J.; Valle, M.; Korostelev, A.; Eswar, N.; Stagg, S.M.; Van Roey, P.; Agrawal, R.K.; Harvey, S.T.; Sali, A.; Chapman, M.S.; Frank, J.
Deposited on	:	2003-05-06
Resolution	:	12.30 Å(reported)
Based on initial models	:	1GIY, 1IBL, 1FFK, 1FJG, 1LNR, 1JJ2

This is a wwPDB EM Validation Summary Report for a publicly released PDB/EMDB 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:

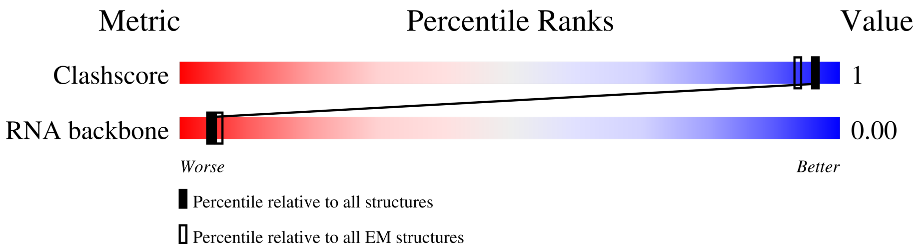
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

1 Overall quality at a glance ⓘ

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

The reported resolution of this entry is 12.30 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
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 <=5%

Mol	Chain	Length	Quality of chain
1	A0	2904	87% 13%
2	A9	120	90% 10%
3	AA	272	83% 17%
4	AB	209	75% 25%
5	AC	201	71% 29%
6	AD	178	99% •
7	AE	176	95% 5%
8	AF	149	51% 49%
9	AG	141	99% •
10	AH	142	99% •

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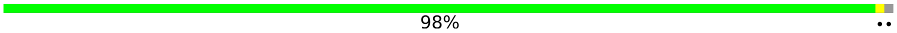
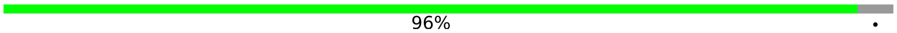
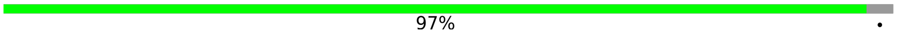
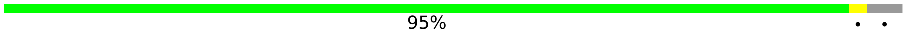
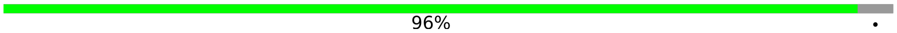
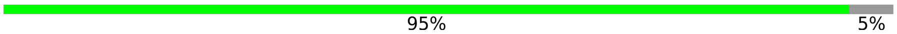
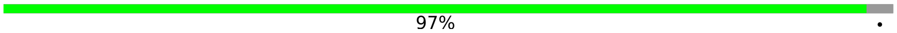
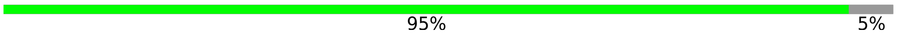
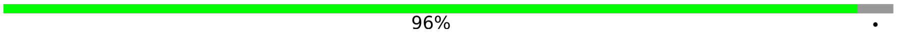
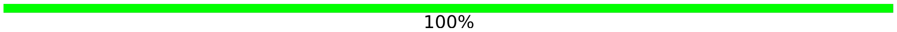
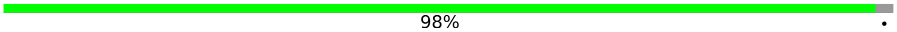
Mol	Chain	Length	Quality of chain
11	AI	123	
12	AJ	144	
13	AK	136	
14	AL	127	
15	AM	117	
16	AN	114	
17	AO	117	
18	AQ	110	
19	AR	100	
20	AS	103	
21	AT	94	
22	AU	84	
23	AW	63	
24	AX	58	
25	AZ	56	
26	A1	54	
27	A4	38	
28	BA	1542	
29	BC	232	
30	BD	205	
31	BE	166	
32	BF	135	
33	BG	178	
34	BH	129	
35	BI	129	

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Mol	Chain	Length	Quality of chain
36	BJ	103	93% 7%
37	BK	128	79% 21%
38	BL	123	79% 21%
39	BM	117	98% •
40	BN	100	32% 68%
41	BO	88	98% •
42	BP	82	95% 5%
43	BQ	83	95% 5%
44	BR	74	69% 31%
45	BS	91	71% 29%
46	BT	86	97% •

2 Entry composition

There are 46 unique types of molecules in this entry. The entry contains 8647 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a RNA chain called 23S ribosomal RNA.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	P		
1	A0	2536	2536	2536	0	2536

- Molecule 2 is a RNA chain called 5S ribosomal RNA.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	P		
2	A9	108	108	108	0	108

- Molecule 3 is a protein called 50S ribosomal protein L2.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
3	AA	227	227	227	0	227

- Molecule 4 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
4	AB	156	156	156	0	156

- Molecule 5 is a protein called 50S ribosomal protein L4.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
5	AC	142	142	142	0	142

- Molecule 6 is a protein called 50S ribosomal protein L5.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
6	AD	177	177	177	0	177

- Molecule 7 is a protein called 50S ribosomal protein L6.

Mol	Chain	Residues	Atoms	AltConf	Trace
7	AE	167	Total C 167 167	0	167

- Molecule 8 is a protein called 50S ribosomal protein L9.

Mol	Chain	Residues	Atoms	AltConf	Trace
8	AF	76	Total C 76 76	0	76

- Molecule 9 is a protein called 50S ribosomal protein L11.

Mol	Chain	Residues	Atoms	AltConf	Trace
9	AG	139	Total C 139 139	0	139

- Molecule 10 is a protein called 50S ribosomal protein L13.

Mol	Chain	Residues	Atoms	AltConf	Trace
10	AH	142	Total C 142 142	0	142

- Molecule 11 is a protein called 50S ribosomal protein L14.

Mol	Chain	Residues	Atoms	AltConf	Trace
11	AI	122	Total C 122 122	0	122

- Molecule 12 is a protein called 50S ribosomal protein L15.

Mol	Chain	Residues	Atoms	AltConf	Trace
12	AJ	70	Total C 70 70	0	70

- Molecule 13 is a protein called 50S ribosomal protein L16.

Mol	Chain	Residues	Atoms	AltConf	Trace
13	AK	131	Total C 131 131	0	131

- Molecule 14 is a protein called 50S ribosomal protein L17.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
14	AL	99	99	99	0	99

- Molecule 15 is a protein called 50S ribosomal protein L18.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
15	AM	113	113	113	0	113

- Molecule 16 is a protein called 50S ribosomal protein L19.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
16	AN	114	114	114	0	114

- Molecule 17 is a protein called 50S ribosomal protein L20.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
17	AO	68	68	68	0	68

- Molecule 18 is a protein called 50S ribosomal protein L22.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
18	AQ	106	106	106	0	106

- Molecule 19 is a protein called 50S ribosomal protein L23.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
19	AR	74	74	74	0	74

- Molecule 20 is a protein called 50S ribosomal protein L24.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
20	AS	99	99	99	0	99

- Molecule 21 is a protein called 50S ribosomal protein L25.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
21	AT	94	94	94	0	94

- Molecule 22 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
22	AU	68	68	68	0	68

- Molecule 23 is a protein called 50S ribosomal protein L29.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
23	AW	60	60	60	0	60

- Molecule 24 is a protein called 50S ribosomal protein L30.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
24	AX	56	56	56	0	56

- Molecule 25 is a protein called 50S ribosomal protein L32.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
25	AZ	29	29	29	0	29

- Molecule 26 is a protein called 50S ribosomal protein L33.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
26	A1	52	52	52	0	52

- Molecule 27 is a protein called 50S ribosomal protein L36.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
27	A4	36	36	36	0	36

- Molecule 28 is a RNA chain called 16S RIBOSOMAL RNA.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	P		
28	BA	1487	1487	1487	0	1487

- Molecule 29 is a protein called 30S RIBOSOMAL PROTEIN S3.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
29	BC	206	206	206	0	206

- Molecule 30 is a protein called 30S RIBOSOMAL PROTEIN S4.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
30	BD	204	204	204	0	204

- Molecule 31 is a protein called 30S RIBOSOMAL PROTEIN S5.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
31	BE	148	148	148	0	148

- Molecule 32 is a protein called 30S RIBOSOMAL PROTEIN S6.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
32	BF	95	95	95	0	95

- Molecule 33 is a protein called 30S RIBOSOMAL PROTEIN S7.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
33	BG	137	137	137	0	137

- Molecule 34 is a protein called 30S RIBOSOMAL PROTEIN S8.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
34	BH	127	127	127	0	127

- Molecule 35 is a protein called 30S RIBOSOMAL PROTEIN S9.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
35	BI	99	99	99	0	99

- Molecule 36 is a protein called 30S RIBOSOMAL PROTEIN S10.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
36	BJ	96	96	96	0	96

- Molecule 37 is a protein called 30S RIBOSOMAL PROTEIN S11.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
37	BK	101	101	101	0	101

- Molecule 38 is a protein called 30S RIBOSOMAL PROTEIN S12.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
38	BL	97	97	97	0	97

- Molecule 39 is a protein called 30S RIBOSOMAL PROTEIN S13.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
39	BM	115	115	115	0	115

- Molecule 40 is a protein called 30S RIBOSOMAL PROTEIN S14.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
40	BN	32	32	32	0	32

- Molecule 41 is a protein called 30S RIBOSOMAL PROTEIN S15.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
41	BO	86	86	86	0	86

- Molecule 42 is a protein called 30S RIBOSOMAL PROTEIN S16.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
42	BP	78	78	78	0	78

- Molecule 43 is a protein called 30S RIBOSOMAL PROTEIN S17.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
43	BQ	79	79	79	0	79

- Molecule 44 is a protein called 30S RIBOSOMAL PROTEIN S18.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
44	BR	51	51	51	0	51

- Molecule 45 is a protein called 30S RIBOSOMAL PROTEIN S19.

Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
45	BS	65	65	65	0	65

- Molecule 46 is a protein called 30S RIBOSOMAL PROTEIN S20.

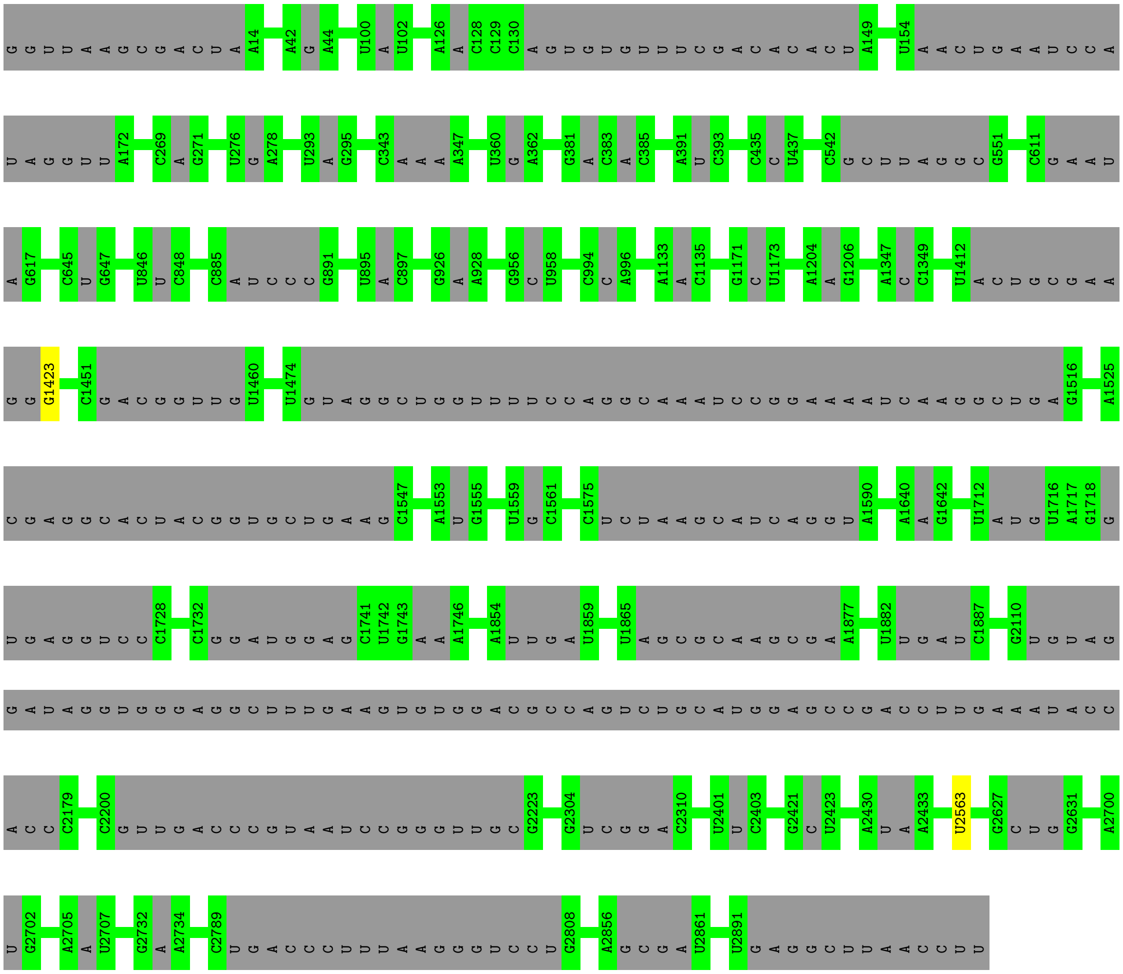
Mol	Chain	Residues	Atoms		AltConf	Trace
			Total	C		
46	BT	83	83	83	0	83

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. 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. 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.

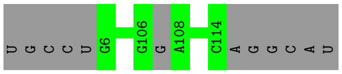
- Molecule 1: 23S ribosomal RNA

Chain A0:



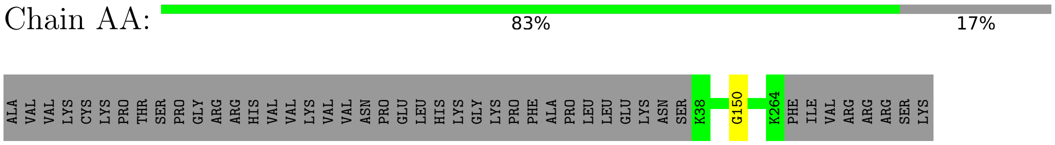
- Molecule 2: 5S ribosomal RNA

Chain A9:



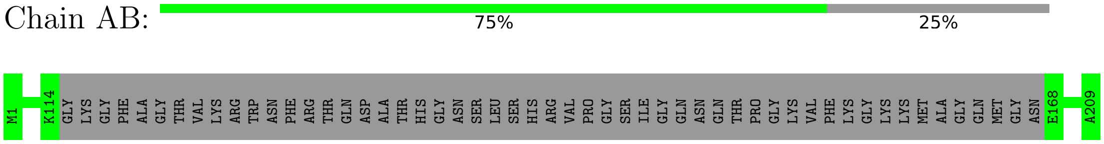
- Molecule 3: 50S ribosomal protein L2

Chain AA:



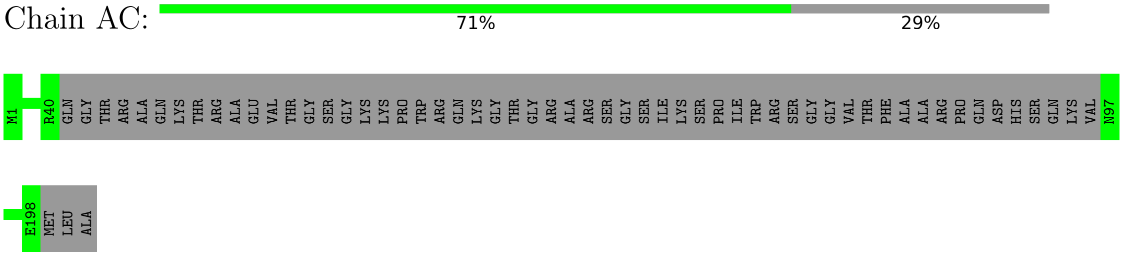
- Molecule 4: 50S ribosomal protein L3

Chain AB:



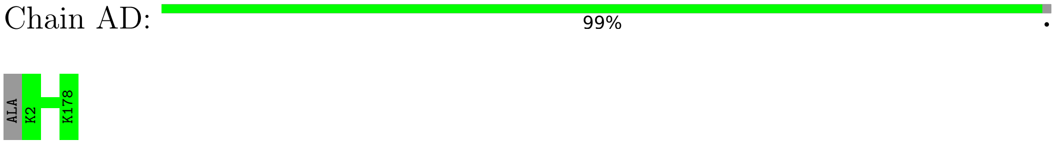
- Molecule 5: 50S ribosomal protein L4

Chain AC:



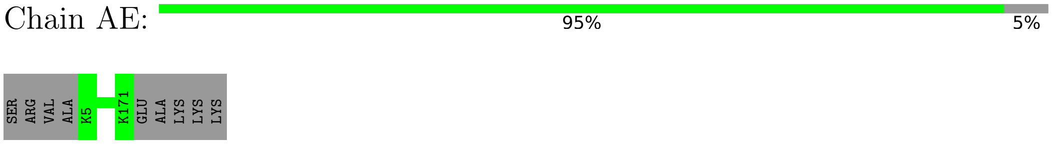
- Molecule 6: 50S ribosomal protein L5

Chain AD:



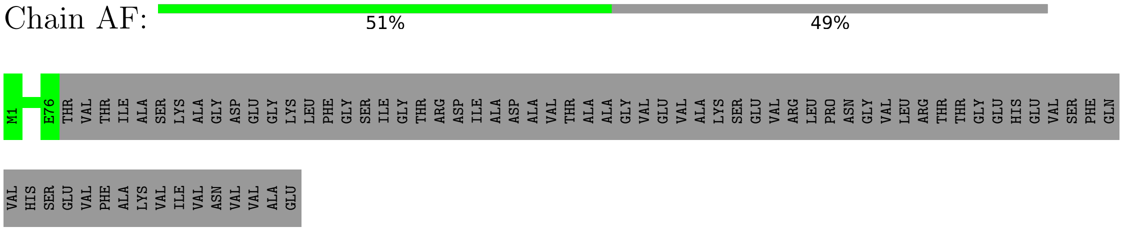
- Molecule 7: 50S ribosomal protein L6

Chain AE:



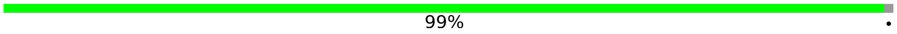
- Molecule 8: 50S ribosomal protein L9

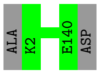
Chain AF:



- Molecule 9: 50S ribosomal protein L11

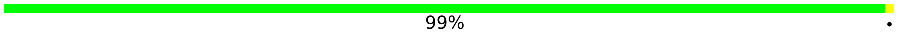
Chain AG:

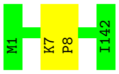




- Molecule 10: 50S ribosomal protein L13

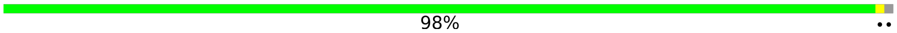
Chain AH:

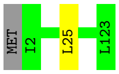




- Molecule 11: 50S ribosomal protein L14

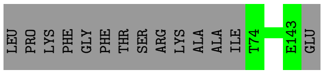
Chain AI:





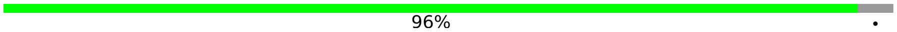
- Molecule 12: 50S ribosomal protein L15

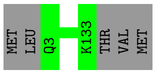
Chain AJ:



- Molecule 13: 50S ribosomal protein L16

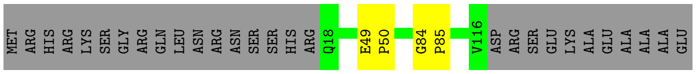
Chain AK:





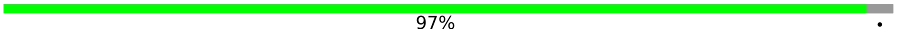
- Molecule 14: 50S ribosomal protein L17

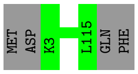
Chain AL:



- Molecule 15: 50S ribosomal protein L18

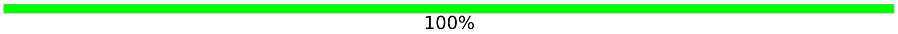
Chain AM:





- Molecule 16: 50S ribosomal protein L19

Chain AN:



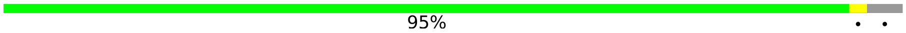
There are no outlier residues recorded for this chain.

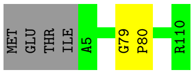
- Molecule 17: 50S ribosomal protein L20

Chain AO:

- Molecule 18: 50S ribosomal protein L22

Chain AQ:



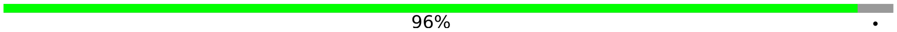


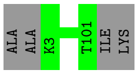
- Molecule 19: 50S ribosomal protein L23

Chain AR:

- Molecule 20: 50S ribosomal protein L24

Chain AS:





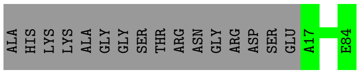
- Molecule 21: 50S ribosomal protein L25

Chain AT:

There are no outlier residues recorded for this chain.

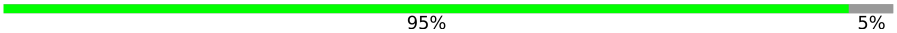
- Molecule 22: 50S ribosomal protein L27

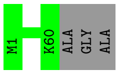
Chain AU:



- Molecule 23: 50S ribosomal protein L29

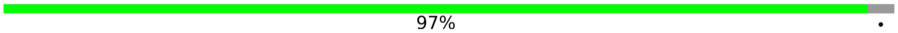
Chain AW:

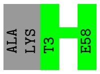




- Molecule 24: 50S ribosomal protein L30

Chain AX:



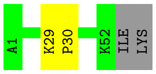


- Molecule 25: 50S ribosomal protein L32

Chain AZ:

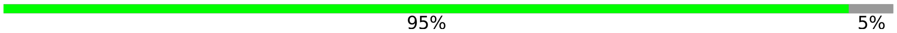
- Molecule 26: 50S ribosomal protein L33

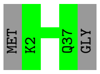
Chain A1:



- Molecule 27: 50S ribosomal protein L36

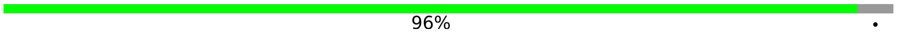
Chain A4:

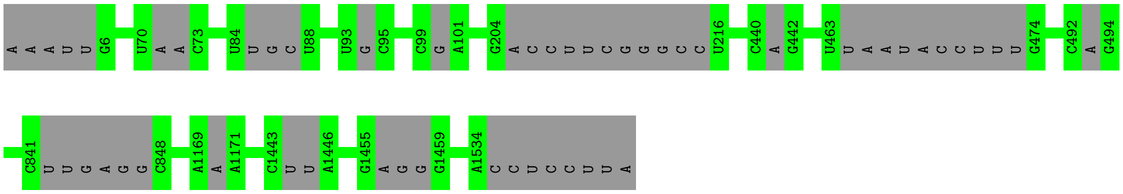




- Molecule 28: 16S RIBOSOMAL RNA

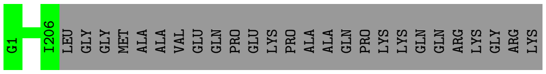
Chain BA:





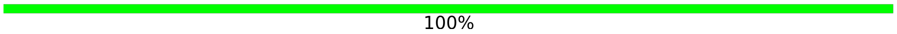
- Molecule 29: 30S RIBOSOMAL PROTEIN S3

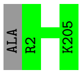
Chain BC:



- Molecule 30: 30S RIBOSOMAL PROTEIN S4

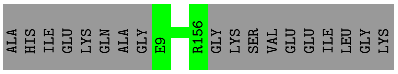
Chain BD:





- Molecule 31: 30S RIBOSOMAL PROTEIN S5

Chain BE:



- Molecule 32: 30S RIBOSOMAL PROTEIN S6

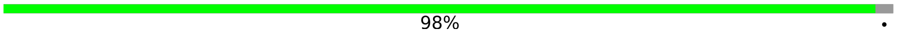
Chain BF:

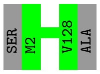
- Molecule 33: 30S RIBOSOMAL PROTEIN S7

Chain BG:

- Molecule 34: 30S RIBOSOMAL PROTEIN S8

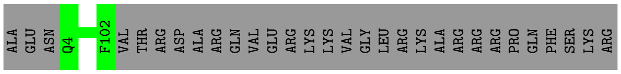
Chain BH:





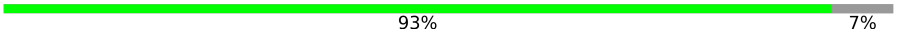
- Molecule 35: 30S RIBOSOMAL PROTEIN S9

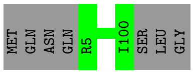
Chain BI:



- Molecule 36: 30S RIBOSOMAL PROTEIN S10

Chain BJ:



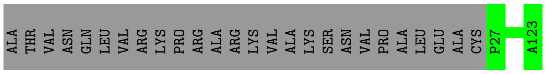


- Molecule 37: 30S RIBOSOMAL PROTEIN S11

Chain BK:

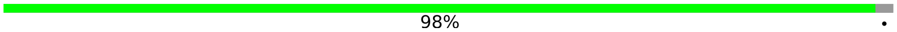
- Molecule 38: 30S RIBOSOMAL PROTEIN S12

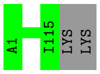
Chain BL:



- Molecule 39: 30S RIBOSOMAL PROTEIN S13

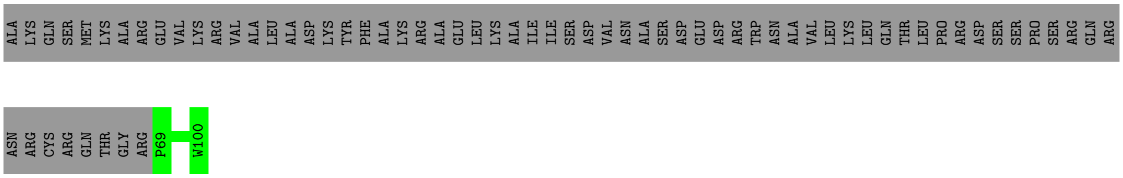
Chain BM:





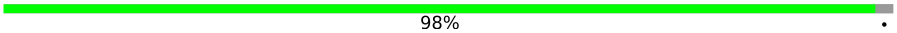
- Molecule 40: 30S RIBOSOMAL PROTEIN S14

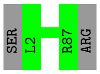
Chain BN:



- Molecule 41: 30S RIBOSOMAL PROTEIN S15

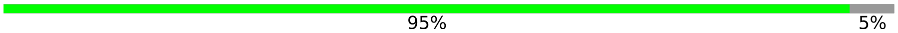
Chain BO:

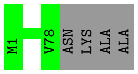




- Molecule 42: 30S RIBOSOMAL PROTEIN S16

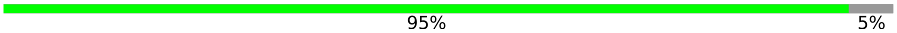
Chain BP:

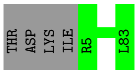




- Molecule 43: 30S RIBOSOMAL PROTEIN S17

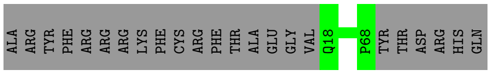
Chain BQ:





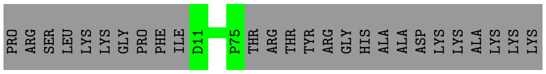
- Molecule 44: 30S RIBOSOMAL PROTEIN S18

Chain BR:



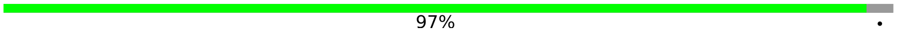
- Molecule 45: 30S RIBOSOMAL PROTEIN S19

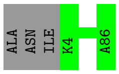
Chain BS:



- Molecule 46: 30S RIBOSOMAL PROTEIN S20

Chain BT:





4 Data and refinement statistics ⓘ

Xtriage (Phenix) and EDS failed to run properly - this section is therefore incomplete.

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	1.00Å 1.00Å 1.00Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	(Not available) – 12.30	Depositor
% Data completeness (in resolution range)	(Not available) ((Not available)-12.30)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	unknown	Depositor
R, R_{free}	(Not available) , (Not available)	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	8647	wwPDB-VP
Average B, all atoms (Å^2)	15.0	wwPDB-VP

5 Model quality ⓘ

5.1 Standard geometry ⓘ

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).

There are no protein, RNA or DNA chains available to summarize Z scores of covalent bonds and angles.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A0	2536	0	0	2	0
2	A9	108	0	0	0	0
3	AA	227	0	0	1	0
4	AB	156	0	0	0	0
5	AC	142	0	0	0	0
6	AD	177	0	0	0	0
7	AE	167	0	0	0	0
8	AF	76	0	0	0	0
9	AG	139	0	0	0	0
10	AH	142	0	0	1	0
11	AI	122	0	0	1	0
12	AJ	70	0	0	0	0
13	AK	131	0	0	0	0
14	AL	99	0	0	2	0
15	AM	113	0	0	0	0
16	AN	114	0	0	0	0
17	AO	68	0	0	0	0
18	AQ	106	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
19	AR	74	0	0	0	0
20	AS	99	0	0	0	0
21	AT	94	0	0	0	0
22	AU	68	0	0	0	0
23	AW	60	0	0	0	0
24	AX	56	0	0	0	0
25	AZ	29	0	0	0	0
26	A1	52	0	0	1	0
27	A4	36	0	0	0	0
28	BA	1487	0	0	0	0
29	BC	206	0	0	0	0
30	BD	204	0	0	0	0
31	BE	148	0	0	0	0
32	BF	95	0	0	0	0
33	BG	137	0	0	0	0
34	BH	127	0	0	0	0
35	BI	99	0	0	0	0
36	BJ	96	0	0	0	0
37	BK	101	0	0	0	0
38	BL	97	0	0	0	0
39	BM	115	0	0	0	0
40	BN	32	0	0	0	0
41	BO	86	0	0	0	0
42	BP	78	0	0	0	0
43	BQ	79	0	0	0	0
44	BR	51	0	0	0	0
45	BS	65	0	0	0	0
46	BT	83	0	0	0	0
All	All	8647	0	0	7	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 1.

The worst 5 of 7 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)
1:A0:1423:G:P	3:AA:150:GLY:CA	2.65	0.83
1:A0:2563:U:P	11:AI:25:LEU:CA	2.85	0.64
26:A1:29:LYS:CA	26:A1:30:PRO:CA	2.94	0.45
10:AH:7:LYS:CA	10:AH:8:PRO:CA	2.94	0.45
14:AL:84:GLY:CA	14:AL:85:PRO:CA	2.96	0.44

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

There are no protein backbone outliers to report in this entry.

5.3.2 Protein sidechains (i)

There are no protein residues with a non-rotameric sidechain to report in this entry.

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	A0	0/2904	-	-
2	A9	0/120	-	-
28	BA	0/1542	-	-
All	All	0/4566	-	-

There are no RNA backbone outliers to report.

There are no RNA pucker outliers to report.

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)

There are no ligands in this entry.

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.