

wwPDB EM Validation Summary Report (i)

Feb 17, 2024 - 08:01 am GMT

PDB ID	:	8QPP
EMDB ID	:	EMD-18558
Title	:	Bacillus subtilis MutS2-collided disome complex (stalled 70S)
Authors	:	Park, E.; Mackens-Kiani, T.; Berhane, R.; Esser, H.; Erdenebat, C.; Bur-
		roughs, A.M.; Berninghausen, O.; Aravind, L.; Beckmann, R.; Green, R.;
		Buskirk, A.R.
Deposited on	:	2023-10-02
Resolution	:	3.40 Å(reported)

This is a wwPDB EM Validation Summary Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org* A user guide is available at https://www.wwpdb.org/validation/2017/EMValidationReportHelp with specific help available everywhere you see the (i) 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 (1)) were used in the production of this report:

EMDB validation analysis	:	0.0.1. dev 70
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.13
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 (i)

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

The reported resolution of this entry is 3.40 Å.

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



Metric	$\begin{array}{c} \textbf{Whole archive} \\ \textbf{(\#Entries)} \end{array}$	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=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	0	59	88% • 8	8%
2	1	48	98%	•
3	2	44	100%	
4	3	66	94%	••
5	4	37	100%	
6	6	64	9%97%	•••
7	В	246	10% 85% · 1:	1%
8	С	218	• 92% •	6%

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Mol	Chain	Length	Quality of chain	
9	D	200	<u>6%</u> 94%	•••
10	Е	166	97%	••
11	F	95	5% 92%	• • •
12	G	156	6% 92%	•••
13	Н	132	97%	••
14	Ι	130	90%	6% •
15	J	102	90%	• 7%
16	K	131	83%	•• 13%
17	L	138	96%	••
18	М	121	88%	•• 11%
19	Ν	61	90%	8% •
20	Ο	89	92%	• •
21	Р	90	93%	• • •
22	Q	87	94%	•••
23	R	79	9%81%	19%
24	S	92	83%	• 15%
25	Т	88	92%	• 6%
26	U	77	73%	27%
27	V	33	36% 64%	
28	W	785	11% 11% 89%	
29	Y	112	68% 3	2%
30	Z	275	96%	•••
31	a	207	96%	•
32	b	205	99%	•
33	с	178	93%	6% ·

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 Mol
 Chain
 Length

Continued on next page...



Mol	Chain	Length	Quality of chain	
34	d	175	98%	·
35	е	142	96%	•
36	f	122	96%	•••
37	i	146	99%	
38	j	138	97%	•••
39	k	119	98%	•
40	1	120	99%	•
41	m	115	97%	•
42	n	117	• 100%	
43	О	101	99%	•
44	r	109	96%	•
45	s	93	95%	
46	t	101	98%	•
47	u	82	98%	· .
48	v	58	100%	
49	w	65	98%	•
50	х	58	100%	
51	9	149	91%	9%
52	Х	2928	74%	24% •••
53	А	1533	74%	26%

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2 Entry composition (i)

There are 53 unique types of molecules in this entry. The entry contains 237112 atoms, of which 94493 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 50S ribosomal protein L32.

Mol	Chain	Residues		ŀ	AltConf	Trace				
1	0	54	Total 872	C 262	Н 446	N 86	0 71	${f S}{7}$	0	0

• Molecule 2 is a protein called Large ribosomal subunit protein bL33.

Mol	Chain	Residues	Atoms						AltConf	Trace
2	1	48	Total 815	C 244	Н 413	N 80	0 74	$\frac{S}{4}$	0	0

• Molecule 3 is a protein called Large ribosomal subunit protein bL34.

Mol	Chain	Residues		ŀ	AltConf	Trace				
3	2	44	Total 778	C 222	Н 410	N 89	O 55	${ m S} { m 2}$	0	0

• Molecule 4 is a protein called Large ribosomal subunit protein bL35.

Mol	Chain	Residues		-	AltConf	Trace				
4	3	64	Total 1075	C 321	Н 563	N 107	O 82	$\begin{array}{c} \mathrm{S} \\ \mathrm{2} \end{array}$	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
3	48	SER	ALA	conflict	UNP A0A063XFQ7

• Molecule 5 is a protein called 50S ribosomal protein L36.

Mol	Chain	Residues		ŀ	AltConf	Trace				
5	4	37	Total 639	C 186	Н 342	N 60	O 46	${ m S}{ m 5}$	0	0

• Molecule 6 is a protein called Large ribosomal subunit protein bL31.



Mol	Chain	Residues		ŀ	Atom	s			AltConf	Trace
6	6	63	Total 990	C 312	Н 491	N 91	0 91	${ m S}{ m 5}$	0	0

• Molecule 7 is a protein called 30S ribosomal protein S2.

Mol	Chain	Residues			Atom	5			AltConf	Trace
7	В	218	Total 3588	C 1119	Н 1831	N 309	O 323	S 6	0	0

• Molecule 8 is a protein called 30S ribosomal protein S3.

Mol	Chain	Residues			Atoms	5			AltConf	Trace
8	С	206	Total 3278	C 1011	Н 1659	N 304	O 301	${ m S} { m 3}$	0	0

• Molecule 9 is a protein called 30S ribosomal protein S4.

Mol	Chain	Residues			Atom	s			AltConf	Trace
9	D	195	Total 3174	C 991	Н 1605	N 291	O 285	${ m S} { m 2}$	0	0

• Molecule 10 is a protein called 30S ribosomal protein S5.

Mol	Chain	Residues			Atom	IS			AltConf	Trace
10	Е	164	Total 2520	C 767	Н 1301	N 225	O 225	$\frac{S}{2}$	0	0

• Molecule 11 is a protein called 30S ribosomal protein S6.

Mol	Chain	Residues			Atom	ns			AltConf	Trace
11	F	92	Total 1502	C 476	Н 747	N 132	0 146	S 1	0	0

• Molecule 12 is a protein called 30S ribosomal protein S7.

Mol	Chain	Residues			Atom	IS			AltConf	Trace
12	G	149	Total 2417	C 740	Н 1236	N 220	0 215	S 6	0	0

• Molecule 13 is a protein called 30S ribosomal protein S8.



Mol	Chain	Residues			Atom	S			AltConf	Trace
13	Н	131	Total 2133	$\begin{array}{c} \mathrm{C} \\ 655 \end{array}$	Н 1096	N 191	O 188	${ m S} { m 3}$	0	0

• Molecule 14 is a protein called 30S ribosomal protein S9.

Mol	Chain	Residues			Atom	S			AltConf	Trace
14	Ι	125	Total 1972	$\begin{array}{c} \mathrm{C} \\ 599 \end{array}$	Н 1006	N 191	O 175	S 1	0	0

• Molecule 15 is a protein called 30S ribosomal protein S10.

Mol	Chain	Residues			Aton	ns			AltConf	Trace
15	J	95	Total 1557	C 479	Н 796	N 139	0 141	${ m S} { m 2}$	0	0

• Molecule 16 is a protein called 30S ribosomal protein S11.

Mol	Chain	Residues			Aton	ns			AltConf	Trace
16	K	114	Total 1694	C 516	Н 855	N 164	0 157	${ m S} { m 2}$	0	0

• Molecule 17 is a protein called 30S ribosomal protein S12.

Mol	Chain	Residues			Atom	S			AltConf	Trace
17	L	136	Total 2164	$\begin{array}{c} \mathrm{C} \\ 653 \end{array}$	Н 1112	N 211	O 186	${ m S} { m 2}$	0	0

• Molecule 18 is a protein called 30S ribosomal protein S13.

Mol	Chain	Residues		Α	toms			AltConf	Trace
18	М	108	Total 1794	C 534	Н 926	N 176	O 158	0	0

• Molecule 19 is a protein called 30S ribosomal protein S14 type Z.

Mol	Chain	Residues		ŀ	Atom	s			AltConf	Trace
19	N	60	Total 1030	C 317	Н 532	N 98	O 78	${f S}{5}$	0	0

• Molecule 20 is a protein called 30S ribosomal protein S15.



Mol	Chain	Residues			Aton	ns			AltConf	Trace
20	0	85	Total 1446	C 436	Н 736	N 144	O 129	S 1	0	0

• Molecule 21 is a protein called 30S ribosomal protein S16.

Mol	Chain	Residues			Aton	ıs			AltConf	Trace
21	Р	88	Total 1417	С 441	Н 722	N 128	0 124	${ m S} { m 2}$	0	0

• Molecule 22 is a protein called 30S ribosomal protein S17.

Mol	Chain	Residues			Aton	ıs			AltConf	Trace
22	Q	84	Total 1420	C 435	Н 729	N 128	0 126	${S \over 2}$	0	0

• Molecule 23 is a protein called 30S ribosomal protein S18.

Mol	Chain	Residues		A	Atom	s			AltConf	Trace
23	R	64	Total 1074	C 332	Н 556	N 96	O 88	${ m S} { m 2}$	0	0

• Molecule 24 is a protein called 30S ribosomal protein S19.

Mol	Chain	Residues			Aton	ns			AltConf	Trace
24	S	78	Total 1283	C 409	Н 650	N 112	0 110	$\begin{array}{c} \mathrm{S} \\ \mathrm{2} \end{array}$	0	0

• Molecule 25 is a protein called 30S ribosomal protein S20.

Mol	Chain	Residues			Aton	ns			AltConf	Trace
25	Т	83	Total 1334	C 390	Н 697	N 130	0 116	S 1	0	0

• Molecule 26 is a RNA chain called tRNA (77-MER).

Mol	Chain	Residues			Ator	\mathbf{ns}			AltConf	Trace
26	U	77	Total 2474	C 731	Н 831	N 290	0 545	Р 77	0	0

• Molecule 27 is a RNA chain called mRNA (33-MER).



Mol	Chain	Residues			Ator	\mathbf{ns}			AltConf	Trace
27	V	33	Total 1063	C 315	Н 359	N 130	O 226	Р 33	0	0

• Molecule 28 is a protein called Endonuclease MutS2.

Mol	Chain	Residues		A	toms			AltConf	Trace
28	W	86	Total 1335	C 411	Н 673	N 124	O 127	0	0

• Molecule 29 is a RNA chain called 5S rRNA (112-MER).

Mol	Chain	Residues			Aton	ns			AltConf	Trace
29	Y	112	Total	С	Η	Ν	0	Р	0	0
	-	±± =	3605	1068	1213	435	778	111	Ŭ	Ŭ

• Molecule 30 is a protein called Large ribosomal subunit protein uL2.

Mol	Chain	Residues			Atoms	5			AltConf	Trace
30	Z	272	Total 4254	C 1296	Н 2171	N 408	0 373	S 6	0	0

• Molecule 31 is a protein called Large ribosomal subunit protein uL3.

Mol	Chain	Residues			Atom	S			AltConf	Trace
31	a	206	Total 3209	C 985	Н 1640	N 289	O 290	${ m S}{ m 5}$	0	0

• Molecule 32 is a protein called Large ribosomal subunit protein uL4.

Mol	Chain	Residues			Atom	S			AltConf	Trace
32	b	205	Total 3211	C 980	Н 1649	N 289	O 291	${ m S} { m 2}$	0	0

• Molecule 33 is a protein called Large ribosomal subunit protein uL5.

Mol	Chain	Residues			Atom	.S			AltConf	Trace
33	С	176	Total 2835	C 882	H 1449	N 241	0 256	S 7	0	0

• Molecule 34 is a protein called Large ribosomal subunit protein uL6.



Mol	Chain	Residues			Atom	IS			AltConf	Trace
34	d	175	Total 2734	C 835	Н 1391	N 248	O 258	$\frac{S}{2}$	0	0

• Molecule 35 is a protein called Large ribosomal subunit protein uL13.

Mol	Chain	Residues			Atom	s			AltConf	Trace
35	е	142	Total 2289	C 710	Н 1165	N 206	O 203	${ m S}{ m 5}$	0	0

• Molecule 36 is a protein called 50S ribosomal protein L14.

Mol	Chain	Residues			AltConf	Trace				
36	f	122	Total 1898	C 571	Н 977	N 173	0 173	$\frac{S}{4}$	0	0

• Molecule 37 is a protein called 50S ribosomal protein L15.

Mol	Chain	Residues			Atom	.s			AltConf	Trace
37	i	146	Total 2214	C 671	Н 1132	N 207	O 202	${ m S} { m 2}$	0	0

• Molecule 38 is a protein called Large ribosomal subunit protein uL16.

Mol	Chain	Residues			Atom	S			AltConf	Trace
38	j	135	Total 2221	C 690	Н 1145	N 205	O 176	${ m S}{ m 5}$	0	0

• Molecule 39 is a protein called Large ribosomal subunit protein bL17.

Mol	Chain	Residues			Aton	ıs			AltConf	Trace
39	k	119	Total 1940	C 583	Н 986	N 186	0 181	${S \atop 4}$	0	0

• Molecule 40 is a protein called 50S ribosomal protein L18.

Mol	Chain	Residues			Aton	ns			AltConf	Trace
40	1	120	Total 1860	C 564	Н 947	N 176	0 172	S 1	0	0

• Molecule 41 is a protein called 50S ribosomal protein L19.



Mol	Chain	Residues			Atom	S			AltConf	Trace
41	m	115	Total 1965	C 600	Н 1020	N 185	O 159	S 1	0	0

• Molecule 42 is a protein called Large ribosomal subunit protein bL20.

Mol	Chain	Residues			AltConf	Trace				
42	n	117	Total 1948	C 591	H 1007	N 189	0 157	${ m S}_4$	0	0

• Molecule 43 is a protein called Large ribosomal subunit protein bL21.

Mol	Chain	Residues		A	toms		Atoms					
43	О	101	Total 1616	C 501	Н 829	N 139	0 147	0	0			

• Molecule 44 is a protein called Large ribosomal subunit protein uL22.

Mol	Chain	Residues			Aton	ıs			AltConf	Trace
44	r	109	Total 1745	C 525	Н 902	N 164	0 151	${ m S} { m 3}$	0	0

• Molecule 45 is a protein called Large ribosomal subunit protein uL23.

Mol	Chain	Residues			Aton	ns			AltConf	Trace
45	S	90	Total 1496	C 452	Н 771	N 134	0 136	${ m S} { m 3}$	0	0

• Molecule 46 is a protein called Large ribosomal subunit protein uL24.

Mol	Chain	Residues			Aton	ns			AltConf	Trace
46	t	101	Total 1584	C 478	Н 821	N 142	0 139	$\frac{S}{4}$	0	0

• Molecule 47 is a protein called Large ribosomal subunit protein bL27.

Mol	Chain	Residues		A	toms			AltConf	Trace
47	u	82	Total 1278	C 390	Н 647	N 123	O 118	0	0

• Molecule 48 is a protein called Large ribosomal subunit protein bL28.



Mol	Chain	Residues		ŀ	Atom	S			AltConf	Trace
48	v	58	Total 935	C 275	Н 490	N 92	O 76	${ m S} { m 2}$	0	0

• Molecule 49 is a protein called Large ribosomal subunit protein uL29.

Mol	Chain	Residues			Atoms						
49	W	65	Total 1099	C 328	Н 568	N 102	O 99	S 2	0	0	

• Molecule 50 is a protein called Large ribosomal subunit protein uL30.

Mol	Chain	Residues		ŀ	Atom	S			AltConf	Trace
50	x	58	Total 950	C 281	Н 494	N 89	O 85	S 1	0	0

• Molecule 51 is a protein called 50S ribosomal protein L9.

Mol	Chain	Residues		Ato	ms		AltConf	Trace
51	9	149	Total 733	C 435	N 149	O 149	0	0

• Molecule 52 is a RNA chain called 23S ribosomal RNA.

Mol	Chain	Residues			Ato	\mathbf{ms}			AltConf	Trace
52	Х	2887	Total 93205	C 27661	Н 31200	N 11460	O 19998	Р 2886	0	0

• Molecule 53 is a RNA chain called 16S rRNA (1533-MER).

Mol	Chain	Residues			Ato	ms			AltConf	Trace
53	А	1533	Total 49450	C 14667	H 16559	N 6034	O 10657	Р 1533	0	0



3 Residue-property plots (i)

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: 50S ribosomal protein L32







• Molecule 19: 30S ribosomal protein S14 type Z



Chain N:	90%	8% •
MET A2 M6 M6 21 R26 E46 €46	MG 1	
• Molecule 20:	30S ribosomal protein S15	
Chain O:	92%	• •
MET ALA ILE T 4 R 7 E14 E14 K84	R 88 ARG	
• Molecule 21:	30S ribosomal protein S16	
Chain P:	93%	
MET A2 D24 E53 E53 E53 E54 K1	TX8	
• Molecule 22:	30S ribosomal protein S17	
Chain Q:	94%	
MET 22 Y30 N52 N52 ILE ILE		
• Molecule 23:	30S ribosomal protein S18	
Chain B:	910/	10%
ALA ALA ALA ALA ALA ALA ALA ALA ALA ALA	ARG ARG 126 126 126 128 128 128 128 128 128 128 128 128 128	1970
• Molecule 24:	30S ribosomal protein S19	
Chain S:	83%	• 15%
MET ALA ARG ARG S4 S4 C5 K6 K28 K28 K28 K28 C12 K21 C12 K21	ALA SER ASP ASP ASP LYS LYS TTRR ARG ARG	
• Molecule 25:	30S ribosomal protein S20	
Chain T:	92%	• 6%
MET PRIO ASN ASN 14 14 034 034 V67	L86 SER ALA	
	PROTEIN DATA BANK	

• Molecule 26:	tRNA (77-MER)		
Chain U:	73%	27%	I
61 62 66 67 01 11 01 61 7 61 7	U10 U20 U20 U20 U20 U25 U47 U47 C48 C42 C48 C48 C56 C56 C56 C56 C56 C56 C56 C56 C68 C68 C68 C68	A76	
• Molecule 27:	mRNA (33-MER)		
Chain V:	58% 36%	64%	I
A434 6435 6435 6435 6437 6441 6442 6443 6444 6444	U446 U446 G447 G447 A449 A449 G451 U452 G451 U455 G454 G455 G456 G457 G456 G457		
• Molecule 28:	Endonuclease MutS2		
Chain W: 11%	6 6	89%	-
MET GLN GLN GLN LYS VAL LEU SER ALA LEU CLU PHE	HIS VAL LYS CUU GLU GLN CLN GLN HIS CLY HIS CLY ALA ALA ALA ALA ALA ALA ALA CLY CLY CLY CLY CLY CLY CLY CLU CLU CLU CLU CLU CLU CLU CLU CLU CLU	LEU LEU LYS PRO SER ALA SER ALA CLU LYS CLU LYS CLU ASP CLU ASP CLU ASP CLU ASP CLU ASP ASP ASP ASP ASP ASP ASP ASP ASP ASP	ILE ILE ARG LEU ARG
GLY GLN ALA PRO PHE GLY GLY CLEU ASP ILE	ARG GLY ALA LEU LEU ARG ARG ARG ALA CLU TLE CLU SER SER SER SER SER THE SER CLU CLU	TLE SER GLY LEU LEU LEU LEU TTR VAL LLYS LLYS CLN MET TTR HTS PHE TLR GLN GLN GLN GLN GLY VAL CLN GLY ASP	ILE PRO LEU HIE HIS
GLIN HIS ALA GLU GLU CLU CLU LEU LEU LEU SER SER ASP	LEU ARG ASP ASP ASP ASP ASP ASP ASP ASP ASP ALS ALA ASP ALAS ASP ASP ASP ASP ASP ASP ASP ASP ASP A	CLU THR LEU ARG CLFU ARG CLFU ARG CLU SER ARG CLU SER ARG CLU SER ARG CLU SER ARG CLU SER ARG CLU SER ARG CLU SER ARG CLU ARG C C C C C C C C C C C C C C C C C C C	LEU ARG SER SER SER
ALA SER LYS MET MET LEU SER ASP THR ILE VAL THR	LLE ARG ASP ASP ASP ARG PHE PHE PHE PHE CLN CLN CLN CLN CLN CLN CLN CLN CLN CLN	11.E H1.S ASP ASP ASP SER SER SER SER ALA ALA ALA ALA ALA ALA ALA ALA ASN ASN	SER LEU GLN GLN ALA
LYS VAL LYS GLU GLU GLU ARG GLU ARG	LEU VARC THR THR THR THR THR THR THR THR THR THR	VAL THR GLU GLU ASP PHE ALA ALA ALA ALA ALA ALA ALA ALA ALA AL	MET ASN ASP THR GLY
E G G I S G A S S G G E H	19 19 19 19 19 19 19 19 19 19 19 19 19 1	4月1日 11 11 11 11 11 11 11 11 11 11 11 11 1	
C T A T L L L L L L L L L L L L L L L L L	TTT A B A A A A A A A A A A A A A A A A	YHEOTAFOOTEYEJCICICE	H L C 23 C
TLE PRO ALA ASP ALA GLU GLU GLU ALA ALA ALA	PHE GLU HIS VAL HIS PHE ASP ASP GLV GLV GLV GLV GLV CLU SER U SER THR	PHE SERR HIS SERR HIS SERR HIS SERR ASN CLU CLU CLU CLU CLU CLU CLU CLU CLU CLU	GLU LEU GLY GLY GLY
THR ASP PRO GLU GLU GLU ALA ALA ALA ALA MET	SER LLEU ASP ASP ASP VAL HIS ARG ARG ALA ALA ALA ALA ALA ALA ALA ALA ALA AL	GLU LEU LLYS LLYS TYR GLY GLY VAL NET NET NET NET NET NET NET CLU GLU THE CLU TLEU	SER PRO THR TYR LYS
LEU LEU LLEU LLE GLY PRO GLY ARG SER ASN ALA	PHE GLU TLE SER LVS SER LVS ALA CLU CLEU CLEU PRO ALA GLV GLV SER SER SER SER	MET THR ALA ALA ALA ASP ALA ASP ALA ASP ALA SER CLU CLU CLU CLU CLU CLU CLU CLU CLU CLU	GLU LEU SER GLU THR
GLU SER ILE ARG ARG GLU GLU CLV LVS LLEU HIS	LYS CLU CLU CLU CLU CLU CLU CLU CLU CLU CLU	ALA ALA GLU GLU GLU CLYS CLYS CLYS CLYS CLYS ALA ALA ALA ALA ALA ALA ALA ALA ALA AL	THR ILE LYS GLU GLU
LYS SER PHE LYS ASP ASP ASP CLU CLU CLU CLU CLU CLU ASN ASN	LYS LYS LYS LYS LUSU GLU GLU GLU PRO ALA ALA PALA CLVS SER LYS SER LYS SER LYS SER LYS SER LYS	PR0 LYS ALA ALA ALA ARA PR0 ASP PR0 GLV VAL LYS CLY VAL LYS CLY CLYS CLY CLYS CLY CLYS CLY CLYS CLY CLYS CLY CLYS CLYS	LEU LLEU LLYS THR
		•••••	
GLY GLY ASN ASN ASN VAL CLN GLN ILE GLY	LEU NET LYS VAL LYS GLU GLU GLU CLEU GLU FHE LYS SER AACA GLU GLU CGLU	LYS GLU CYS CLU LYS TLE TLE TLE K700 G701 F700 G701 F700 G701 F700 G701 F700 G701 F700 G701 F700 C700 C700 F700 C700 C700 C700 C700	L/12 R713 G714 E715 R716 R716 Y717 E718 E718





Chain d:



• Molecule 35: Large ribosomal subunit protein uL13

Chain e: 96% .
T4 D53 B114 B1115 B114 B1117 B1119 C145 C145
\bullet Molecule 36: 50S ribosomal protein L14
Chain f: 96% ···
M 2012 012 012 012 012 012 012 012
\bullet Molecule 37: 50S ribosomal protein L15
Chain i: 99% .
\bullet Molecule 38: Large ribosomal subunit protein uL16
Chain j: 97%
M1 Ref 135 GL V GL V
\bullet Molecule 39: Large ribosomal subunit protein bL17
Chain k: 98% .
22 178 V 120 V 120
\bullet Molecule 40: 50S ribosomal protein L18
Chain l: 99% .

• Molecule 41: 50S ribosomal protein L19



Chain m:	97% .
M1 15 6 7 49 10 11 15 4	
• Molecule 42: Large ribosomal subunit	protein bL20
Chain n:	100%
P2 E89 V90 N118	
• Molecule 43: Large ribosomal subunit	protein bL21
Chain o:	99% .
139 1025 1102	
• Molecule 44: Large ribosomal subunit	protein uL22
Chain r: 96	%
Q2 E31 H60 A93 K110	
• Molecule 45: Large ribosomal subunit	protein uL23
Chain s: 95	% • •
MET K22 K2 E3 E3 F1LE F1LE	
• Molecule 46: Large ribosomal subunit	protein uL24
Chain t:	8% •
M 850 851 175 175 175 175 175 175 175 175 175 1	
• Molecule 47: Large ribosomal subunit	protein bL27
Chain u:	
811 817 ← 065 - 183 193 193	



• Molecule 48: Large ribosomal subunit	t protein bL28	
Chain v:	100%	
R3 B3 7 E60 E60		
• Molecule 49: Large ribosomal subuni	t protein uL29	
Chain w:	98%	
• Molecule 50: Large ribosomal subunit	t protein uL30	
Chain x:	100%	•
<mark>42</mark> 39 ●		
• Molecule 51: 50S ribosomal protein I	-9	
44% Chain 9: 91	1% 9%	•
M1 F29 A36 A36 A36 A36 A36 A36 A36 A36	C84 C87 C87 C87 C87 C87 F90 C81 S95 C81 C97 C97 C102 E100 C101 C102 C102 C102 C102 C102 C102 C	D105 H106 N107 1108 V110 V110 K112 K112 K113 K113 F113 F115 P118 D119 C120
1121 R122 A123 C126 G126 G126 T127 V126 V131 V132 P130 P130 P131 V128 V129 P130 P131 V132 P133 P134 P135 P140 V143 V143 V143 V143 V143 V143 V143 V143 V144 V143 V144 V144 </td <td>◆ 170</td> <td></td>	◆ 170	
\bullet Molecule 52: 23S ribosomal RNA		
Chain X: 74%	24%	
G C C C C C C C C C C C C C	UT7 UT7 UT7 C00 C00 C00 C00 C00 C00 C00 C00 C00 C0	U119 A126 A126 C127 C127
A130 V138 V138 A139 A150 A150 A150 A166 A166 A176 A176 A176 A176 A177 A178 A178 A178 A178 A178 A178 A178	A199 A201 A201 A201 A201 A201 C211 A204 A226 A226 A226 A226 A226 A230 A226 A230 A231 A233 A234 A230 A234 A234 A230 A234 A234 A234 A234 A234 A234 A234 A234	0251 0255 0255 0255 0258
A275 C276 C276 A279 C288 C288 C288 C288 C288 C288 C288 C28	U 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	450 1346 1346 1346 1355
G367 U372 A373 A373 A374 A374 A389 A389 A389 C399 C399 C399 C399 C399 C399 C399 C	A418 6419 6419 6420 A421 A431 C442 C443 C443 C443 C443 C444 C444 C445 C445	

U495	C502 C503	Nove U511 G512	G528 C529	G540 G541	G542	A548 A549 A550	6550 4551 6552	4553 U554 2015	C556 C556	G564		C573 A574	676 G576 11577	4578 4579 4579	U590	U591 A592	A593 C594 G595	UGOG	G607	G01/ A618 A619	A630	G631 U632	A646 A647	
A 658 A 659	G660 A673	A683 U691	G697 C698	A699 U700 G701	A702	A717 C718 C718	C/19 G729	U733	A762 A763	C764 A765	C777	U794	G 795	G822	G823 G824	<mark>G825</mark> U826	4829 4830	U831 G832	<mark>U837</mark>	<mark>6852</mark>	<mark>G85</mark> 6	C859	U874	
U875 U892	(906 6906	6928 6928	C333 C333	U934 A935	C930	0941 0942	A943	A957 A958 C959	A964	69 <mark>73</mark>	1979 1979	A987	A991	6992	A999	A1005 A1006 G1007	G1018	A1019 A1020	G1030 C1031	G1035	A1036	A1046	U1058 A1059	I
G1068 U1069	A1072 A1073	01079 U1079	G1085 U1090	U1091 A1092 G1093	A1100	G1101 G1102		G1108 G1109 G1109	C1110 U1111	01112 A1113	A1116 C1117	C1118 A1119	<mark>G1120</mark> C1121	C1122 A1123	C1124 C1125 A1106	A1126 U1127 U1128	U1129 A1130	A1131 A1132 A1132	61135 61135	U1136 G1137	C1138 G1139	U1140 A1141 A1142	U1143 A1144	61140
<mark>C1146</mark> U1147 C1148	01154 C1155 C1155	61157 61158 01159 01159	G1160 A1161	U1176 G1177 I11778	A1179 C1180	C1181 G1182 C1182	G1183 G1184 G1185	A1188	A1201	U1215 C1216	n	C G1220	G1227	G1236	C1241	G1247 C1248	A1260	A1265	A1277 G1278	A1293 A1294	U1295 G1296	G1311 A1312	G1315	
A1339 A1340 A1340	U1352 C1353	C1364 U1368	C1369 C1369 C1370 G1371	A1388 C1389	C1390 U1391	C1402	G1403 A1404 A1405	A1406	A1417 U1418	A1423 A1424	C1425 A1426	61427	A1434 U1435	A1442	C1449 C1450	U1451 C1452	C1454 C1454 C1455	U1458	U1459 G1460		U1466	G1471 G1472 A1473	C1474	
A1480	A1490	01500 U1505 A1506	U1507 C1508	C1514 C1515 A1516	G1525	G1526 C1527	01528 G1529	A1536 G1537	G1538 C1539 A1540	U1543	C1544	C1552 A1553 	0 A1555	G1566 U1567	G1568 A1569	U1570 G1571	<mark>C1577</mark> ն	Å	A U	A D	D C	A G1589	41601 U1602	
A1617	U1626 G1632	A1653 A1654 A1655	C1 693	G1696 A1697	A1710 G1711	G1712 A1713	C1717 G1718	61719 C1720	G1732	U1 738 C1 739	G1740 G1741	A1745	G1757 111758	01759 01759 A1760	G1761	G1765 C1766		G1775 A1776	G1779	G1792 G1793	A1797	A1802	C1811	
A1820 61828	C1829 G1830 A1831		A1845 A1848 A1848	A1858	A1877	A1882 A1883 A1883	G1898 G1898	U1899 A1900	A1901 G1902	G1910	G1935	A1941 A1942	C1943 U1944	A1945	A1957 G1958	G1959	G1962	C1970	C1971 U1 <u>9</u> 72	U1 <mark>984</mark>	C1992 G1993	C1994 A1995	C1996 41999 A1999	
A2000 G2001	U2020 G2021 U2022	C2025 U2024 C2025 A2026	A2052 C2053	C2054	A2060 G2061	A2062 U2063	62065 C2065	C2072	G2081	62085	A2088 A2089	62090	6.2098	62122 A2123	U2127	U2128 G2129	62130 U2131 A2132	C2133 A2134	G2135	62139 U2140	A2141 C2142	A2143 G2144	G2145 A2146 U2147	A2148
62149 62150 02151	A2152 G2153 G2154	A2155 G2156 C2157	U2158 U2159 U2160	G2162 A2163	A2164 A2165 C2166	c2167 G2168	G2169 A2170	G2171 C2172	G2173	C2175	G2177	U2180 C2181	G2182 G2183 112184	0210 3 G2185 G2186	A2187	C2190	U2192 C2193	G2194 G2195	U2196 G2197	G2198 G2199	A2200 U2201 A2202	C2203 U2204	A2205 C2206 C2207	C2208 U2209 G2210
<mark>62211</mark> C2212	A2216 U2217 U2218	42219 A2220 C2221 C2222	U2223 U2224 C2225	U2226 A2227	62232 C2233	A2241	<mark>G2245</mark> G2246	A2252	G2253 A2254	G2267 G2268	G2280	A2297	C2312	A2315 A2316	<mark>A2317</mark> G2318	U2334	02335 62336 62337	A2338 A2339	A2349	62350 A2351	A2356 A2357	C2363	G2374	
C2379 G2380	A2381 G2404	62412 62413 C2414	U2415	U2431 C2432	C2435	A2440	62453 A2454	G2457 G2458	A2459	C2470	G2476 A2477	C2503	C2504 A2505	A2507	G2516	G2523	C2527	A2532 U2533	G2534 U2535	A2547 112548	C2549	G2558	02502 C2563 G2564	
U2583 U2584	A2595 G2596	C2602 G2607	G2611	U2614 C2628	A2631	G2632	U2642	A2658	G2659 G2674	C2675	A2689 G2690	G2711	U2719	C2720	G2743	A2762	02/68	A2777	U2785	A2790	A2793 A2794	A2805 67806	42807 42807 U2808	





 \bullet Molecule 53: 16S rRNA (1533-MER)

Cł	nai	n .	A:	•											74	%															269	%			-		
00 00	A10 611		C32 G33	A34	G46	C49	CEO	U51 A52	A53	A62		A72 C73	A74	G75 A76		G78	679	400 A81	G82 G82		UB5	G 86	C89	C90	U92	G93 <u>A94</u>	U95	696 197	198 400	66 4	A117 A118	C119	A120	A128	C130	<mark>G133</mark>	C134 C135
G147	G156 C157	G158	C162	G165	G166	G167 C168	U169	0172		A178 U179	G180	G181	G188	A189 A100	C191	C192	A195	U196	G197	A204	C205 A206	U207	A208 A209	0105		U218 11210	C220	G221 G222		QZZ A	A228	U231	A232 C233		G249 G249	U253	A254 G255
(2259	U260 U260	1070	U269 A270	A271 C272	G273	G274 C275		A287 C288		G297	A306	G307	G311	110 1 6	0316 C316		A329	C336	A337	G340	<u>A352</u>	C353	G354	C360	G362	C363 A364		A371 A372	U373	0375 0375			6400		0400	G414	G418 A419
U420 G421	A422	U429	C430 G431	G432	0437	A440		0443 C444	U445	6446 U447	-	G455 A456		C461	A402 A463	G464	0400	C472	6473 A474	A475	U476 A477	G478	C481	G482	6483 U484	A485	C487	U488	G493	G494	C497	4500	A501	C503 C503	A504 G505	A506	A518 A519
C520	C527	<mark>6530</mark>	<mark>6536</mark>	11540	A541	A556		G566 G567	A568	U571	A572	U573 U574		U580 A E e 1	A 50 1 A 58 2		9880 G586		G590	G597	11603	A604	A605	U628	0629 A630	A631	G641	U642 C643		ADDA	U662	A674	IIGOR	A696		A703 A704	G720
C728	c729	U732	G740	C741 G742		A757	C763	6/64	A7 90	U802	A803	G812		A823	Ao 24 A8 25	C826	U829	G830	A837		G841	G845	<mark>(848</mark>	G849 11950		U852	C853	G855	C856	U8 <mark>61</mark>	A 874	<u>A875</u>	A882	A886	7C0V		C 36
C944	A945	G954	<u>6955</u>	1967 4968	A969	0970 0971	C972	G976	C977	A978 A979	C980	G981	A985	G986 A 007	1901	A993	1999		01002 G1003		A1006	U1012	G1013 A1014	C1015	U1018	C1019	U1021	A1022 G1023	A1024	A1028	G1029	G1030 A1031	C1032 C1033	U1034	C1035 C1036	U1039	U1040 C1041
G1042 G1043	C1047	A1048	G1053	111 059	G1060	G1063	C1064	A1065	U1088	G1089	U1 095	01096	G1099	61104	01105 U1105	C1106	CT10	A1111	G1118		G1134 U1135	U1136	G1137	U1145	C1140 A1147	G1148	G1152	G1153	G1165	U1168	<mark>G1169</mark>	A1176	C1177	A1180	G1186	G1187 A1188	G1193
A1200	4100F	A1206	A1210	U1211 C1212	A1213	01214 G1215	C1216	C1217 C1218	C1219	U1220 U1221	A1222	U1223 G1224		A1234	01233 A1236	44044	A1247 A1248	U1249	G1250	C1265	A1266 G1267	C1268	G1269	C1276	1771	A1283	FORT	C1287 A1288	A1289	06710	A1294	C1295 A1296	111 306	C1307	A1308 G1309	01310 01311	G1314
A1315 U1316	C1317	C1329	C1337	G1338 U1339	G1340	01345		A1355 G1356		G1362	A1369	G1370 C1371	A1372	U1373	G1380		A1 30.4	V1 385	A1386	C138/ G1388	1		G1410	G1414	C1423		G1428	A1435	U1445	C1446 C1446	G1448	U1449 G1450	A1451	G1452 G1453	U1454 A1455	U1460	U1461 U1462
A1463 G1464	G1465 41466	G1467	C1468	C1473	G14/4	G1477	G1499	U1500	A1503	G1504	G1507		A1513 G1514	G1515	U1516 A1517		G1539 C1EAO	OFCLA																			



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	11740	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE	Depositor
	CORRECTION	
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{\AA}^2)$	43.6	Depositor
Minimum defocus (nm)	400	Depositor
Maximum defocus (nm)	3500	Depositor
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT $(4k \ge 4k)$	Depositor
Maximum map value	1.923	Depositor
Minimum map value	-0.737	Depositor
Average map value	0.014	Depositor
Map value standard deviation	0.106	Depositor
Recommended contour level	0.377	Depositor
Map size (Å)	522.5, 522.5, 522.5	wwPDB
Map dimensions	500, 500, 500	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.045, 1.045, 1.045	Depositor



5 Model quality (i)

5.1 Standard geometry (i)

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).

Mal	Chain	Bond	lengths]	Bond angles
	Ullalli	RMSZ	# Z > 5	RMSZ	# Z > 5
1	0	0.31	0/433	0.71	0/574
2	1	0.32	0/407	0.71	0/540
3	2	0.27	0/371	0.80	0/483
4	3	0.26	0/519	0.62	0/680
5	4	0.31	0/300	0.68	0/393
6	6	0.30	0/509	0.60	0/678
7	В	0.30	0/1782	0.69	1/2392~(0.0%)
8	С	0.27	0/1641	0.65	0/2208
9	D	0.32	0/1599	0.69	0/2147
10	Е	0.29	0/1231	0.65	0/1655
11	F	0.35	0/766	0.75	1/1031~(0.1%)
12	G	0.36	0/1196	0.80	1/1604~(0.1%)
13	Н	0.33	0/1049	0.76	2/1407~(0.1%)
14	Ι	0.31	0/979	0.76	1/1315~(0.1%)
15	J	0.32	0/773	0.75	1/1044~(0.1%)
16	K	0.32	0/853	0.74	1/1153~(0.1%)
17	L	0.28	0/1069	0.67	0/1435
18	М	0.30	0/873	0.78	1/1166~(0.1%)
19	Ν	0.33	0/508	0.74	0/672
20	0	0.30	0/718	0.70	0/960
21	Р	0.32	0/708	0.72	2/950~(0.2%)
22	Q	0.33	0/699	0.71	0/933
23	R	0.32	0/526	0.75	0/705
24	S	0.30	0/649	0.64	0/872
25	Т	0.30	0/639	0.66	0/852
26	U	0.30	0/1834	0.81	0/2858
27	V	0.23	0/787	0.82	0/1224
28	W	0.25	0/670	0.58	0/894
29	Y	0.34	0/2675	0.89	2/4170~(0.0%)
30	Z	0.28	$0/2\overline{120}$	0.67	4/2845(0.1%)
31	a	0.28	$0/1\overline{591}$	0.64	2/2132~(0.1%)
32	b	0.29	0/1581	0.62	0/2132
33	с	0.32	0/1405	0.64	$\overline{1/1887}~(0.1\%)$
34	d	0.30	0/1361	0.66	0/1832



Mal	Chain	Bond	lengths]	Bond angles
	Unam	RMSZ	# Z > 5	RMSZ	# Z > 5
35	е	0.28	0/1147	0.63	0/1542
36	f	0.32	0/928	0.78	2/1245~(0.2%)
37	i	0.29	0/1094	0.61	0/1457
38	j	0.32	0/1099	0.72	0/1468
39	k	0.30	0/961	0.73	1/1284~(0.1%)
40	1	0.28	0/922	0.69	0/1236
41	m	0.30	0/958	0.74	0/1279
42	n	0.29	0/953	0.63	0/1266
43	0	0.31	0/798	0.60	0/1070
44	r	0.30	0/852	0.71	0/1146
45	s	0.34	0/731	0.74	1/974~(0.1%)
46	t	0.32	0/773	0.69	1/1032~(0.1%)
47	u	0.30	0/639	0.69	1/847~(0.1%)
48	V	0.28	0/449	0.69	0/596
49	W	0.31	0/532	0.77	0/707
50	Х	0.29	0/458	0.68	0/613
51	9	0.46	0/732	0.65	0/1016
52	Х	0.37	0/69451	0.86	58/108344 (0.1%)
53	А	0.35	0/36826	0.85	20/57450~(0.0%)
All	All	0.35	0/155124	0.82	104/232395~(0.0%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
33	с	0	1

There are no bond length outliers.

The worst 5 of 104 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	$Observed(^{o})$	$Ideal(^{o})$
52	Х	138	U	OP1-P-O3'	-35.75	26.55	105.20
52	Х	139	A	OP1-P-OP2	-13.65	99.13	119.60
46	t	52	PRO	CA-N-CD	-9.60	98.06	111.50
52	Х	1970	С	C2-N1-C1'	8.98	128.68	118.80
53	А	1107	С	N3-C2-O2	-8.78	115.75	121.90

There are no chirality outliers.

All (1) planarity outliers are listed below:



Mol	Chain	Res	Type	Group
33	с	43	ALA	Peptide

5.2 Too-close contacts (i)

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

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Perce	entiles
1	0	52/59~(88%)	50~(96%)	2(4%)	0	100	100
2	1	46/48~(96%)	43~(94%)	3~(6%)	0	100	100
3	2	42/44~(96%)	39~(93%)	3 (7%)	0	100	100
4	3	62/66~(94%)	58~(94%)	4 (6%)	0	100	100
5	4	35/37~(95%)	33~(94%)	2 (6%)	0	100	100
6	6	61/64~(95%)	52 (85%)	9 (15%)	0	100	100
7	В	216/246~(88%)	199 (92%)	17 (8%)	0	100	100
8	С	204/218~(94%)	189~(93%)	15 (7%)	0	100	100
9	D	193/200~(96%)	171 (89%)	22 (11%)	0	100	100
10	Е	162/166~(98%)	148 (91%)	14 (9%)	0	100	100
11	F	90/95~(95%)	84 (93%)	6 (7%)	0	100	100
12	G	147/156~(94%)	126 (86%)	21 (14%)	0	100	100
13	Н	129/132~(98%)	119 (92%)	10 (8%)	0	100	100
14	Ι	123/130~(95%)	113 (92%)	10 (8%)	0	100	100
15	J	93/102~(91%)	87 (94%)	6 (6%)	0	100	100
16	К	112/131~(86%)	107 (96%)	5 (4%)	0	100	100
17	L	134/138~(97%)	125 (93%)	9 (7%)	0	100	100
18	М	106/121 (88%)	95 (90%)	11 (10%)	0	100	100

Continued on next page...



Mol	Chain	Analysed	Favoured	Allowed	Outliers	Perce	entiles
19	Ν	58/61~(95%)	48 (83%)	10~(17%)	0	100	100
20	Ο	83/89~(93%)	75~(90%)	8 (10%)	0	100	100
21	Р	86/90~(96%)	80~(93%)	6 (7%)	0	100	100
22	Q	82/87~(94%)	79~(96%)	3 (4%)	0	100	100
23	R	62/79~(78%)	57~(92%)	5 (8%)	0	100	100
24	S	76/92~(83%)	67~(88%)	9 (12%)	0	100	100
25	Т	81/88~(92%)	78~(96%)	3 (4%)	0	100	100
28	W	84/785 (11%)	78~(93%)	6 (7%)	0	100	100
30	Z	270/275~(98%)	253 (94%)	17 (6%)	0	100	100
31	a	204/207~(99%)	190 (93%)	14 (7%)	0	100	100
32	b	203/205~(99%)	186 (92%)	17 (8%)	0	100	100
33	с	174/178~(98%)	160 (92%)	13 (8%)	1 (1%)	25	57
34	d	173/175~(99%)	154 (89%)	19 (11%)	0	100	100
35	е	140/142~(99%)	133 (95%)	7 (5%)	0	100	100
36	f	120/122~(98%)	111 (92%)	9 (8%)	0	100	100
37	i	144/146~(99%)	139 (96%)	5 (4%)	0	100	100
38	j	133/138~(96%)	123 (92%)	10 (8%)	0	100	100
39	k	117/119~(98%)	113 (97%)	4 (3%)	0	100	100
40	1	118/120 (98%)	104 (88%)	14 (12%)	0	100	100
41	m	113/115 (98%)	106 (94%)	7 (6%)	0	100	100
42	n	115/117 (98%)	108 (94%)	7 (6%)	0	100	100
43	О	99/101 (98%)	87 (88%)	12 (12%)	0	100	100
44	r	107/109~(98%)	99~(92%)	8 (8%)	0	100	100
45	s	88/93~(95%)	81 (92%)	7 (8%)	0	100	100
46	t	99/101 (98%)	88 (89%)	11 (11%)	0	100	100
47	u	80/82~(98%)	75 (94%)	5 (6%)	0	100	100
48	V	56/58~(97%)	51 (91%)	5 (9%)	0	100	100
49	W	63/65~(97%)	57 (90%)	6 (10%)	0	100	100
50	х	56/58~(97%)	52 (93%)	4 (7%)	0	100	100
51	9	147/149~(99%)	107 (73%)	27 (18%)	13 (9%)	1	5
All	All	5438/6399~(85%)	4977 (92%)	447 (8%)	14 (0%)	44	72

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5 of 14 Ramachandran outliers are listed below:

Mol	Chain	\mathbf{Res}	Type
51	9	37	VAL
51	9	107	ASN
51	9	130	PRO
51	9	135	PRO
51	9	104	LYS

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent side chain 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	Perce	entiles
1	0	48/53~(91%)	46 (96%)	2(4%)	30	59
2	1	46/46~(100%)	45 (98%)	1 (2%)	52	75
3	2	39/39~(100%)	39 (100%)	0	100	100
4	3	54/57~(95%)	52 (96%)	2(4%)	34	62
5	4	35/35~(100%)	35~(100%)	0	100	100
6	6	53/53~(100%)	52 (98%)	1 (2%)	57	78
7	В	189/212~(89%)	180 (95%)	9(5%)	25	56
8	С	168/178~(94%)	163 (97%)	5 (3%)	41	68
9	D	169/173~(98%)	161 (95%)	8 (5%)	26	57
10	Ε	128/130~(98%)	125 (98%)	3 (2%)	50	74
11	F	81/84~(96%)	76 (94%)	5~(6%)	18	48
12	G	125/132~(95%)	120 (96%)	5(4%)	31	60
13	Н	111/112~(99%)	110 (99%)	1 (1%)	78	90
14	Ι	98/102~(96%)	91~(93%)	7 (7%)	14	44
15	J	86/92~(94%)	84 (98%)	2(2%)	50	74
16	Κ	86/100~(86%)	81 (94%)	5~(6%)	20	50
17	L	$11\overline{4/116}~(98\%)$	111 (97%)	3(3%)	46	72
18	М	94/104~(90%)	92 (98%)	2(2%)	53	76
19	Ν	53/54~(98%)	48 (91%)	5(9%)	8	30

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Mol	Chain	Analysed	Rotameric	Outliers	Perce	ntiles
20	Ο	80/83~(96%)	77~(96%)	3~(4%)	33	61
21	Р	74/76~(97%)	71~(96%)	3~(4%)	30	59
22	Q	77/80~(96%)	75~(97%)	2(3%)	46	72
23	R	56/64~(88%)	56 (100%)	0	100	100
24	S	70/81~(86%)	68~(97%)	2(3%)	42	69
25	Т	66/70~(94%)	64 (97%)	2(3%)	41	68
28	W	69/673~(10%)	69 (100%)	0	100	100
30	Z	220/223~(99%)	214 (97%)	6 (3%)	44	70
31	a	167/168~(99%)	162 (97%)	5(3%)	41	68
32	b	169/169~(100%)	166 (98%)	3 (2%)	59	79
33	с	151/153~(99%)	144 (95%)	7(5%)	27	57
34	d	148/148 (100%)	145 (98%)	3 (2%)	55	77
35	е	120/120~(100%)	115 (96%)	5 (4%)	30	59
36	f	101/101 (100%)	97~(96%)	4 (4%)	31	60
37	i	110/110 (100%)	108 (98%)	2(2%)	59	79
38	j	109/111~(98%)	108 (99%)	1 (1%)	78	90
39	k	99/99~(100%)	98~(99%)	1 (1%)	76	88
40	1	93/93~(100%)	92~(99%)	1 (1%)	73	86
41	m	100/100~(100%)	97~(97%)	3~(3%)	41	68
42	n	96/96~(100%)	96 (100%)	0	100	100
43	О	83/83~(100%)	82 (99%)	1 (1%)	71	85
44	r	90/90~(100%)	86 (96%)	4 (4%)	28	58
45	s	81/84~(96%)	80 (99%)	1 (1%)	71	85
46	t	85/85~(100%)	84 (99%)	1 (1%)	71	85
47	u	64/64~(100%)	63~(98%)	1 (2%)	62	81
48	V	$\overline{47/47}$ (100%)	47 (100%)	0	100	100
49	W	56/56~(100%)	55 (98%)	1 (2%)	59	79
50	х	52/52~(100%)	52 (100%)	0	100	100
All	All	4510/5251 (86%)	4382 (97%)	128 (3%)	46	70

 $5~{\rm of}~128$ residues with a non-rotameric side chain are listed below:



Mol	Chain	Res	Type
40	l	34	PHE
43	0	39	LEU
14	Ι	127	PHE
14	Ι	113	ARG
44	r	31	GLU

Sometimes side chains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 22 such side chains are listed below:

Mol	Chain	Res	Type
35	е	8	ASN
40	l	43	GLN
39	k	72	ASN
43	0	50	ASN
11	F	33	ASN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
26	U	76/77~(98%)	21 (27%)	0
27	V	32/33~(96%)	21 (65%)	0
29	Y	111/112 (99%)	35 (31%)	3~(2%)
52	Х	2881/2928 (98%)	684 (23%)	36 (1%)
53	А	1532/1533~(99%)	384 (25%)	20 (1%)
All	All	4632/4683 (98%)	1145 (24%)	59 (1%)

5 of 1145 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
26	U	2	G
26	U	6	G
26	U	8	U
26	U	16	U
26	U	17	U

5 of 59 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
52	Х	2192	U
53	А	1369	А
52	Х	2469	С
53	А	1316	U

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Mol	Chain	\mathbf{Res}	Type
53	А	1022	А

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 (i)

There are no chain breaks in this entry.



6 Map visualisation (i)

This section contains visualisations of the EMDB entry EMD-18558. These allow visual inspection of the internal detail of the map and identification of artifacts.

Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections (i)

6.1.1 Primary map



6.1.2 Raw map



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



6.2Central slices (i)

Primary map 6.2.1



X Index: 250



Y Index: 250



Z Index: 250

6.2.2Raw map



X Index: 250

Y Index: 250



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: 246





Z Index: 167

6.3.2 Raw map



X Index: 0

Y Index: 0



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



6.4.2 Raw map



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



6.5 Orthogonal surface views (i)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.377. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

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 2415 $\rm nm^3;$ this corresponds to an approximate mass of 2182 kDa.

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



7.3 Rotationally averaged power spectrum (i)



*Reported resolution corresponds to spatial frequency of 0.294 ${\rm \AA^{-1}}$



8 Fourier-Shell correlation (i)

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

8.1 FSC (i)



*Reported resolution corresponds to spatial frequency of 0.294 $\mathrm{\AA^{-1}}$



8.2 Resolution estimates (i)

$\mathbf{Bosolution} \text{ ostimato } (\mathbf{\hat{\lambda}})$	Estimation criterion (FSC cut-off)		
Resolution estimate (A)	0.143	0.5	Half-bit
Reported by author	3.40	-	-
Author-provided FSC curve	3.59	4.44	3.68
Unmasked-calculated*	6.72	12.17	7.33

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 6.72 differs from the reported value 3.4 by more than 10 %



9 Map-model fit (i)

This section contains information regarding the fit between EMDB map EMD-18558 and PDB model 8QPP. Per-residue inclusion information can be found in section 3 on page 13.

9.1 Map-model overlay (i)



The images above show the 3D surface view of the map at the recommended contour level 0.377 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.



9.2 Q-score mapped to coordinate model (i)



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

9.3 Atom inclusion mapped to coordinate model (i)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.377).



9.4 Atom inclusion (i)



At the recommended contour level, 89% of all backbone atoms, 90% of all non-hydrogen atoms, are inside the map.



1.0

0.0 <0.0

9.5 Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (0.377) and Q-score for the entire model and for each chain.

\mathbf{Chain}	Atom inclusion	Q-score
All	0.9000	0.4150
0	0.8620	0.4680
1	0.7450	0.4240
2	0.8320	0.4800
3	0.8140	0.4790
4	0.8140	0.4590
6	0.7400	0.3390
9	0.5360	0.2560
А	0.9600	0.4070
В	0.6580	0.3500
С	0.7330	0.3860
D	0.7510	0.3620
E	0.7770	0.4390
F	0.7150	0.4120
G	0.6980	0.3620
Н	0.7770	0.4350
Ι	0.7700	0.3840
J	0.7740	0.3920
K	0.6850	0.4160
L	0.7930	0.4390
М	0.8270	0.3850
N	0.8360	0.4190
О	0.7820	0.4000
Р	0.8080	0.4190
Q	0.7520	0.4330
R	0.6690	0.4040
S	0.8650	0.3990
T	0.7800	0.3800
U	0.9190	0.3930
V	0.4590	0.2680
W	0.0260	0.2270
X	0.9550	0.4240
Y	0.9720	0.3960
Z	0.8020	0.4740
a	0.8480	0.4720

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Chain	Atom inclusion	Q-score
b	0.8030	0.4310
с	0.7640	0.3650
d	0.7960	0.3910
е	0.8560	0.4410
f	0.7740	0.4660
i	0.8040	0.4450
j	0.8200	0.4580
k	0.8310	0.4530
l	0.7970	0.3890
m	0.8150	0.4560
n	0.8500	0.4220
0	0.8250	0.4430
r	0.8130	0.4490
S	0.7850	0.4590
t	0.7920	0.4180
u	0.8300	0.4560
V	0.7110	0.4600
W	0.7920	0.3810
X	0.8270	0.4360

