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PDB ID		6YWS
EMDB ID	:	EMD-10973
Title	:	The structure of the large subunit of the mitoribosome from Neurospora crassa
Authors	:	Amunts, A.; Itoh, Y.; Naschberger, A.
Deposited on	:	2020-04-30
Resolution	:	2.74 Å(reported)

This is a Full wwPDB EM Validation 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. dev92 1.8.4. CSD as541be (2020)
Mogui	·	1.0.4, ODD asserbe (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7(2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	FAILED
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

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 2.74 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	$egin{array}{c} { m Whole \ archive} \ (\#{ m Entries}) \end{array}$	${f EM\ structures}\ (\#{f Entries})$		
Clashscore	158937	4297		
Ramachandran outliers	154571	4023		
Sidechain outliers	154315	3826		
RNA backbone	4643	859		

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5%

Mol	Chain	Length	Quality of chain		
1	А	3464	68%	12% •	19%
2	В	383	83%		• 15%
3	С	384	77%	•	20%
4	D	325	75%	•	22%
5	Е	352	85%		• 12%
6	F	255	76%	•	21%
7	G	300	24% 75%		



Conti	nued fron	n previous	page	
Mol	Chain	Length	Quality of chain	
8	f	347	70%	• 29%
9	g	158	93%	7%
10	Н	183	92%	8%
11	Ι	131	87%	• 9%
12	J	312	76%	• 22%
13	К	249	62% 5%	33%
14	L	193	93%	6% •
15	М	258	72%	• 25%
16	Ν	217	58% •	39%
17	0	364	71%	• 25%
18	Р	228	76%	• 21%
19	Q	396	86%	• 11%
20	R	447	55% ·	40%
21	S	274	62% ·	35%
22	Т	263	65% •	32%
23	U	161	84%	• 14%
24	V	219	26% · 74%	
25	W	129	41% 5%	54%
26	Х	59	73%	8% 19%
27	Y	140	30% • 67%	
28	0	124	36% • 639	%
29	1	449	77%	• 18%
30	2	370	31% · 67%	
31	3	103	88%	• 8%
32	4	138	95%	••



Mol	Chain	Length	Quality of chain		
33	5	439	77%	•	20%
34	6	368	69%	5%	26%
35	7	165	48% ·	49%	
36	8	443	72%	•	25%
37	h	98	100%		
38	i	218	56% •	43%	
39	9	267	74%	•	23%
40	a	225	71%		28%
41	b	162	99%		
42	с	110	89%		11%
43	d	292	80%		20%
44	е	303	80%		20%
45	j	201	97%		·



2 Entry composition (i)

There are 50 unique types of molecules in this entry. The entry contains 223401 atoms, of which 97522 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 RNA (2820-MER).

Mol	Chain	Residues			AltConf	Trace				
1	А	2820	Total 90332	C 26969	H 30189	N 10787	O 19567	Р 2820	0	0

• Molecule 2 is a protein called 60S ribosomal protein L2.

Mol	Chain	Residues			AltConf	Trace				
2	В	326	Total 5136	C 1578	Н 2592	N 515	0 436	${ m S}\ 15$	0	0

• Molecule 3 is a protein called 60S ribosomal protein L3.

Mol	Chain	Residues			AltConf	Trace				
3	С	307	Total 4758	C 1468	Н 2422	N 447	0 413	S 8	0	0

• Molecule 4 is a protein called 60S ribosomal protein L4, variant.

Mol	Chain	Residues			AltConf	Trace				
4	D	254	Total 4068	C 1280	Н 2040	N 372	0 371	${ m S}{ m 5}$	0	0

• Molecule 5 is a protein called 50S ribosomal protein L5.

Mol	Chain	Residues			Atom	s			AltConf	Trace
5	Е	309	Total 4910	C 1558	Н 2461	N 436	0 443	S 12	0	0

• Molecule 6 is a protein called 60S ribosomal protein L6.

Mol	Chain	Residues			AltConf	Trace				
6	F	201	Total 3253	C 1022	Н 1645	N 290	0 288	S 8	0	0



• Molecule 7 is a protein called RIBOSOMAL_L9 domain-containing protein.

Mol	Chain	Residues			Aton	ıs			AltConf	Trace
7	G	74	Total 1245	C 390	Н 627	N 121	O 104	${ m S} { m 3}$	0	0

• Molecule 8 is a protein called Uncharacterized protein.

Mol	Chain	Residues			Atoms	5			AltConf	Trace
8	f	245	Total 3801	C 1202	Н 1925	N 325	0 346	${ m S} { m 3}$	0	0

• Molecule 9 is a protein called 60S ribosomal protein L19.

Mol	Chain	Residues			Atom	S			AltConf	Trace
9	g	147	$\begin{array}{c} \text{Total} \\ 2257 \end{array}$	C 700	Н 1154	N 203	O 196	${S \over 4}$	0	0

• Molecule 10 is a protein called Ribosomal protein L13.

Mol	Chain	Residues			Atom	S			AltConf	Trace
10	Н	183	Total 2885	C 899	H 1459	N 268	0 251	S 8	0	0

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

Mol	Chain	Residues			Aton	ns			AltConf	Trace
11	Ι	119	Total 1898	C 564	Н 985	N 182	O 159	S 8	0	0

• Molecule 12 is a protein called Ribosomal protein L15.

Mol	Chain	Residues			Atoms	5			AltConf	Trace
12	J	243	Total 3827	C 1198	Н 1939	N 346	0 343	S 1	0	0

• Molecule 13 is a protein called 60S ribosomal protein L16.

Mol	Chain	Residues			Atom	.s			AltConf	Trace
13	K	168	Total	С	Η	Ν	Ο	\mathbf{S}	0	0
10	11	100	2751	850	1401	263	231	6	0	0

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



Mol	Chain	Residues			Atom	S			AltConf	Trace
14	L	192	Total 3135	C 960	Н 1590	N 294	O 285	S 6	0	0

• Molecule 15 is a protein called Mitochondrial ribosomal protein.

Mol	Chain	Residues			Atom	ıs			AltConf	Trace
15	М	194	Total 3164	C 981	Н 1628	N 292	O 253	S 10	0	0

• Molecule 16 is a protein called Aconitate hydratase.

Mol	Chain	Residues			Atom	.s			AltConf	Trace
16	Ν	133	Total 2176	$\begin{array}{c} \mathrm{C} \\ 673 \end{array}$	Н 1120	N 195	O 182	${ m S}{ m 6}$	0	0

• Molecule 17 is a protein called Mitochondrial large ribosomal subunit.

Mol	Chain	Residues			Atoms	5			AltConf	Trace
17	Ο	272	Total 4532	C 1392	Н 2323	N 424	O 387	S 6	0	0

• Molecule 18 is a protein called Mitochondrial ribosomal protein subunit L23.

Mol	Chain	Residues			Atom	S			AltConf	Trace
18	Р	180	Total 2975	C 953	Н 1494	N 270	0 254	$\frac{S}{4}$	0	0

• Molecule 19 is a protein called KOW domain-containing protein.

Mol	Chain	Residues			Atom	s			AltConf	Trace
19	Q	353	Total	C	H	N F 47	0	S 11	0	0
			5829	1780	2961	547	524	11		

• Molecule 20 is a protein called Uncharacterized protein.

Mol	Chain	Residues			Atom	5			AltConf	Trace
20	R	266	Total 4499	C 1374	Н 2310	N 441	O 370	$\frac{S}{4}$	0	0

• Molecule 21 is a protein called 50S ribosomal protein L24.



Mol	Chain	Residues			Atom	S			AltConf	Trace
21	S	179	Total 2979	C 937	H 1507	N 281	O 252	${ m S} { m 2}$	0	0

• Molecule 22 is a protein called 54S ribosomal protein L4, mitochondrial.

Mol	Chain	Residues			Atom	IS			AltConf	Trace
22	Т	180	Total 2950	C 937	Н 1453	N 279	O 278	${ m S} { m 3}$	0	0

• Molecule 23 is a protein called 50S ribosomal protein L30.

Mol	Chain	Residues			Atom	.s			AltConf	Trace
23	U	138	Total 2263	C 698	Н 1164	N 213	O 185	${ m S} { m 3}$	0	0

• Molecule 24 is a protein called Uncharacterized protein.

Mol	Chain	Residues		A	Atoms	5			AltConf	Trace
24	V	58	Total 951	C 300	Н 477	N 88	O 85	S 1	0	0

• Molecule 25 is a protein called Mitochondrial ribosomal protein subunit L32.

Mol	Chain	Residues		ŀ	Atom	s			AltConf	Trace
25	W	59	Total 949	C 282	H 489	N 98	0 72	S 8	0	0

• Molecule 26 is a protein called Uncharacterized protein.

Mol	Chain	Residues		A	Atom	s			AltConf	Trace
26	X	48	Total 836	C 263	Н 433	N 71	O 65	$\frac{S}{4}$	0	0

• Molecule 27 is a protein called Related to ribosomal protein L34, mitochondrial.

Mol	Chain	Residues		ŀ	Atoms	s			AltConf	Trace
27	Y	46	Total 777	C 224	H 412	N 84	O 56	S 1	0	0

• Molecule 28 is a protein called Ribosomal protein.



Mol	Chain	Residues		ŀ	Atom	S			AltConf	Trace
28	0	46	Total 797	C 240	Н 409	N 86	O 58	${f S}$ 4	0	0

• Molecule 29 is a protein called Mitochondrial large ribosomal subunit YmL35.

Mol	Chain	Residues			Atom	s			AltConf	Trace
29	1	367	Total 6014	C 1899	Н 3029	N 547	0 531	S 8	0	0

• Molecule 30 is a protein called Uncharacterized protein.

Mol	Chain	Residues			Atom	.S			AltConf	Trace
30	2	123	Total 2101	C 660	Н 1055	N 211	0 171	${S \atop 4}$	0	0

• Molecule 31 is a protein called Uncharacterized protein.

Mol	Chain	Residues			AltConf	Trace				
31	3	95	Total 1536	C 489	Н 773	N 135	0 137	${ m S} { m 2}$	0	0

• Molecule 32 is a protein called Mitochondrial ribosomal protein L43.

Mol	Chain	Residues			Atom	S			AltConf	Trace
32	4	137	Total 2139	C 671	Н 1087	N 192	0 183	S 6	0	0

• Molecule 33 is a protein called 60S ribosomal protein L3.

Mol	Chain	Residues			AltConf	Trace				
33	5	350	Total 5429	C 1740	Н 2710	N 477	0 493	S 9	0	0

• Molecule 34 is a protein called 50S ribosomal subunit L30.

Mol	Chain	Residues			Atoms	5			AltConf	Trace
34	6	273	Total 4474	C 1418	Н 2248	N 399	0 401	S 8	0	0

• Molecule 35 is a protein called Uncharacterized protein.



Mol	Chain	Residues		Α	toms			AltConf	Trace
35	7	84	Total 1383	C 431	Н 709	N 130	0 113	0	0

• Molecule 36 is a protein called Uncharacterized protein.

Mol	Chain	Residues			Atoms	5			AltConf	Trace
36	8	331	$\begin{array}{c} \text{Total} \\ 5374 \end{array}$	C 1683	Н 2714	N 480	O 489	S 8	0	0

• Molecule 37 is a protein called Mitochondrial ribosomal protein L44.

Mol	Chain	Residues			AltConf	Trace				
37	h	98	Total 1577	C 490	Н 798	N 139	O 146	$\frac{S}{4}$	0	0

• Molecule 38 is a protein called Uncharacterized protein.

Mol	Chain	Residues			Atom	.s			AltConf	Trace
38	i	124	Total 1998	C 613	Н 1022	N 181	0 177	${ m S}{ m 5}$	0	0

• Molecule 39 is a protein called RNase III domain-containing protein.

Mol	Chain	Residues			Atoms	5			AltConf	Trace
39	9	206	Total 3341	C 1051	Н 1698	N 295	O 290	S 7	0	0

• Molecule 40 is a protein called 60S ribosomal protein L20.

Mol	Chain	Residues			Atom	S			AltConf	Trace
40	a	161	Total 2671	C 837	Н 1340	N 253	O 235	S 6	0	0

• Molecule 41 is a protein called Mitoc_mL59 domain-containing protein.

Mol	Chain	Residues			Atom	s			AltConf	Trace
41	b	161	Total 2693	C 840	Н 1379	N 249	0 221	${f S}$ 4	0	0

• Molecule 42 is a protein called 54S ribosomal protein L31, mitochondrial.



Mol	Chain	Residues			Aton	ns			AltConf	Trace
42	с	98	Total 1700	C 528	Н 873	N 162	O 134	${ m S} { m 3}$	0	0

• Molecule 43 is a protein called Uncharacterized protein.

Mol	Chain	Residues	Atoms					AltConf	Trace	
43	d	235	Total 3797	C 1180	Н 1909	N 363	O 339	${ m S}{ m 6}$	0	0

• Molecule 44 is a protein called 60S ribosomal protein L1.

Mol	Chain	Residues	Atoms					AltConf	Trace	
44	е	242	Total 3821	C 1189	Н 1935	N 332	O 353	S 12	0	0

• Molecule 45 is a protein called L51_S25_CI-B8 domain-containing protein.

Mol	Chain	Residues			Atom	S			AltConf	Trace
45	j	195	Total 3133	C 970	Н 1582	N 290	0 283	S 8	0	0

• Molecule 46 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	AltConf
46	А	160	Total Mg 160 160	0
46	К	1	Total Mg 1 1	0
46	2	1	Total Mg 1 1	0
46	3	1	Total Mg 1 1	0





Mol	Chain	Residues	Atoms			AltConf	
47	٨	1	Total	С	Η	Ν	0
47	A	1	40	10	26	4	0

• Molecule 48 is POTASSIUM ION (three-letter code: K) (formula: K).

Mol	Chain	Residues	Atoms	AltConf
48	А	12	Total K 12 12	0

• Molecule 49 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	AltConf
49	W	1	Total Zn 1 1	0
49	0	1	Total Zn 1 1	0

• Molecule 50 is NICOTINAMIDE-ADENINE-DINUCLEOTIDE (three-letter code: NAD) (formula: $C_{21}H_{27}N_7O_{14}P_2$) (labeled as "Ligand of Interest" by depositor).





Mol	Chain	Residues	Atoms				AltConf		
50	0	1	Total	С	Η	Ν	Ο	Р	0
50	Δ	1	70	21	26	7	14	2	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. 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: RNA (2820-MER)





PROTEIN DATA BANK



 \bullet Molecule 3: 60S ribosomal protein L3

Chain C:	77%	• 20%
MET ALA PRO ARG LEU PRO ALA ARG CYS TRP	ARG CLN CLN CLN CLU CLU CLU CLU CLU CLU CLU CLU CLU CLU	ALA SER SER PRO PRO PRO PRO PHE PHE PHE PHE PRO CLEU TLEU TLEU TLEU PRO CLN
ARG GLY V63 R78 R100 T104	T124 T124 T124 T162 T27 T27 T27 T27 T27 T27 T27 T27 T27 T2	
• Molecule 4:	60S ribosomal protein L4, variant	
Chain D:	75%	• 22%
MET ALA GLY GLY GLY CLY CLY LYS SER SER LEU ASN	GIU GIU ALA ALA ALA ALA ALA ALA ALA SER CYS CYS CYS CYS CYS CYS CYS CYS CYS CYS	ALA THR PRO PRO PRO ALA ALA ALA ALA ALA ARG SER VAL SER VAL SER CIU TRP GLN
PR0 162 871 175 175 175 175 175 175 175 175 175 1	R1 75 81 75 81 75 81 75 81 75 81 75 82 46 82 46 82 46 82 46 82 45 82 48 82 4 83 12 83 12 84 12 8	
• Molecule 5:	50S ribosomal protein L5	
Chain E:	85%	• 12%
MET ALA SER LLEU ARG CLY VAL SER ARG SER	ALA ALA ARG CLU CLU CLU CLU CLU PRIC PRIC ALA ALA ALA ALA ALA ALA ALA ALA ALA AL	L144 D57 A58 A58 458 A58 A124 T128 L223 L223 L223
R235 R268 Q343 N352		
• Molecule 6:	60S ribosomal protein L6	
Chain F:	76%	• 21%
MET PHE ALA PRO SER ARG ARG VAL LEU	ALA ALA ALA ALA ALA ALA ALA SER SER SER SER SER SER SER PLU THR THR THR THR THR TLEU VAL LLU VAL CLU VAL ALA ALA ALA ALA ALA ALA ALA ALA ALA	PHE SER ALA ALA ALA ALA THR THR ARG SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 SS2 S 2 S 2 S 2
D167 T168 T168 V181 V181 LYS LYS	TWE	
• Molecule 7:	RIBOSOMAL_L9 domain-containing protei	n
Chain G:	24% 75%	
MET THR ALA ALA LEU LEU LEU TRP PRO	THR CYS CYS CYS CYS CYS ALA ALA ALA ALA ALA ALA ALA ALA ALA AL	VILE VILE HIS HIS GLN ALS ASS ASS ASS ASS ASS ASS ASS ASS ASS



ALL AFRA PRUSE PRU	VAL ASP ASP ASP ASP ASP AC ASP ASP AC AC AC AC AC AC AC AC AC AC AC AC AC	PRO TLE PRO TLE SER GLN PRO LYS
PRO LAUA LAUA LAUA LAUA PRO LIVS SER PRO ALA ARG ARG ARG ARG ARG ARG ARG ARG ARG AR	THR CLIY CLIY CLIY CLIY CLIY ARG ARG PHIE PHIE PHIE PHIE PHIE CLIY ARS SER SER ASP ASP ASP ASP ASP ASP ASP ASP ASP ASP	GLU GLU ALA SER ARG TLE VAL
GLY SER SER VAL VAL VAL VAL VAL VAL VAL ALA ALA ALA	ILE ILE ALA ALA ALA ARG ARG ALA ARG CLY CLY SER PRO CLY SER PRO CLY SER CLU CLU CLU CLU CLU CLU CLU CLU CLU CLU	
• Molecule 8: Uncharacterized pr	rotein	
Chain f: 70%	• 29%	_
MET SER LEU ARG LEU SER ARG ARG ARG CLY VAL ARG CLY SER SER SER SER SER SER SER SER SER SER	ARG SER ALA ALA ALA ALA LEU LEU LEU LEU LEU LEU THR SER THR SER THR SER THR SER THR SER ALA ALA ALA ALA ALA ALA ALA ALA ALA AL	LEU R54 L146 L146 H298
MET LEU CLEU CLEU CLEU ALA ALA CLU CLU CLU CLU CLU CLU CLU CLU CLU CLU	SER SER ARG ARG ARG CU LEU CLU CLU CLU CLU CLU CLU CLU CLU CLU CL	
• Molecule 9: 60S ribosomal prot	tein L19	
Chain g:	93%	7%
MET SER LYS ALA ALA ALA CLY GLY GLY P158		
• Molecule 10: Ribosomal protein	n L13	
Chain H:	020/	
	92%	8%
M1 18 18 14 14 16 16 16 16 16 16 16 16 16 16 16 13 16 13 16 13 16 13 16 13 16 13 16 16 16 16 16 16 16 16 16 16 16 16 16	92% 8882 - 2 1	8%
• Molecule 11: 50S ribosomal pro	btein L14	8%
 g g g g g g g g g g g g g g g g g g g	92%	9%
E E	92%	9%
 Molecule 11: 50S ribosomal pro Molecule 12: Ribosomal protein 	92% 92% ptein L14 87% • 115	9%
 Molecule 11: 50S ribosomal pro Chain I: Molecule 12: Ribosomal protein 	92% 92% ptein L14 87% • 15 76% • 22%	9%
 Molecule 11: 50S ribosomal pro Molecule 11: 50S ribosomal pro Chain I: P 2 3 2 3 4 5 4 5 4 5 4 4 5 4 4 5 5 4 4 5 5 4 5 5 4 5 5 4 5 5 4 5	92% 92% ptein L14 87% · 115 76% · 22% 服 其 版 版 服 用 版 图 服 其 其 函 版 素 图 账 聚 版 2 2 2 2 2 2 2 2 2 2	9% 1318 13 13 13 13 13 13 13 13 13 13 13 13 13 1

• Molecule 13: 60S ribosomal protein L16



Chain K:	62%	5%	33%	
MET LYS HIS ALA ALA SER SER ALA LEU LEU SER SER	GLY GLY GLY LEU LEU ARG SER SER SER ALA ALA ALA ALA SER ALA SER ALA SER ALA SER ALA	SER ALA ARG ARG ARG PRO TLE ALA PRO PRO PRO	SER VAL ALA SER HIS VAL VAL LEU PHE SER SER	THR ALA ILE GLN ALA
G61 K88 W94 W94 M101 B103 D103	R1 22 Q1 22 R1 25 R1 26 R1 26 S1 44 S1 45 S1 45	PRO PRO GLU THR THR SER ALA ALA ALA ALA SER SER SER	THR ALA PRO PRO SER	
• Molecule 14: 50	OS ribosomal protein L17			
Chain L:	93%		6% •	I
MET A2 Y8 H1 7 E33 E33 R58	R86 E103 S113 S113 R157 R157 R174			
• Molecule 15: M	litochondrial ribosomal pro	otein		
Chain M:	72%		25%	
MET ASN THAL THR ALA SER SER ARG PRO CLEU	CVL LLEU LLFS LLEU LLEU CLFS CLFS CLFS CLFS CLFS CLFS CLFS CLFS	ALLA SER THR THR SER THR SER G17 44 145	N46 K56 V64 R145 D163 V219	S234 SER LYS GLY
LEU THR GLY GLY GLY GLY GLY GLY CLY CLN	GLN SER LYS CLN SER LYS LYS ASN			
• Molecule 16: A	conitate hydratase			
Chain N:	58%	•	39%	
MET SER SER ALA ALA ALA ALA SER CLU CLEU CLU	ARNA THR PRO PRO PRO ARG PRO PRO PRO PRO PRO PRO PRO PRO PRO PRO	PHE LEU HIS GLN GLN GLN CAL CAL PRO FRO THR	SER GLN SER ALA ALA ALA ALA ALA ALA ALA ALA	LEU LEU LYS ALA SER
PRO PRO LYS LYS THR THR ALA THR THR FHR CLU CLU	ALA ALA ALA ALA ALA PRO PRO PRO PRO CLN CLN CLN CLN CLN CLN CLN CLN CLN CLN	R1 63 K1 85 K1 86 K1 86 R1 87 L2 17		
• Molecule 17: M	et i i i i i i i i i i i i i i i i i i i	al subunit		
##SINE##1###B1# • Molecule 17: M Chain O:	EIII EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE	al subunit	25%	
• Molecule 17: M • Molecule 17: M Chain O:	E T T R E E E E E E E E E E E E E E E E	nal subunit	611 H H L C K K K K K K K K K K K K K K K K K K	GLU GLU FHE GLU GLU
 MOLECULE 17: M MOLECULE 17: M Chain O: MUN NUMBER NUMBER	E T T T T E E E E E E E E E E E E E E E	HIR ALS ALA SER TIR ALA SER ALA ALA SER ALA ALA SER ALA ALA SER ALA ALA SER ALA ALA SER ALA ALA ALAS ALA ALAS	E184 q51 R206 K52 K241 T7 T245 R76 L1% F296 PR0 T1H T1317 g1M G1M	R322 GLU B322 GLU TLE D352 PHE GLU GLU
 Molecule 17: M Molecule 17: M Chain O: Main Name Main Name<td>E T T T R E E E E E E E E E E E E E E E</td><td>HILL HILL HILL HILL HILL HILL HILL HILL</td><td>E184 4651 R306 K52 K241 T71 7345 F171 1745 F171 1745 F171 174 F171 174 F171</td><td>R332 GLU R332 ILE ILE D352 PHE GLU</td>	E T T T R E E E E E E E E E E E E E E E	HILL HILL HILL HILL HILL HILL HILL HILL	E184 4651 R306 K52 K241 T71 7345 F171 1745 F171 1745 F171 174 F171	R332 GLU R332 ILE ILE D352 PHE GLU

Chain P:

76%



ATA BANK

21%

THR ARG GLN

• Molecule 19: KOW domain-containing protein

Chain Q:	86%	• 11%
M P67 E73 E73 E73 E73 R104 N143 N143 R169 R169 R169 R248 R224 R324	Contraction of the second seco	GLN LEU SER SER GLY GLY GLY GLN GLN ALA ALA
THR THR FIR FIR FIR CLIV CLIV FIR CLIV VAL		
• Molecule 20: Uncharacterized pr	otein	
Chain R: 55%	• 40%	
MET HIS LEU ALA CLEU ALA CLEU ARG ARG ARG ALA ALA ALA ALA ALA ALA ALA ALA ALA AL	TIRK TIRK SER SER SER VAL VAL ALA ALA ALA ALA ALA CUU CUU CUU CUU CUU CUU CUU CUU CUU CU	SER SER SER SER ASN VAL VAL CLU GLU GLU GLV GLY ARG ARG ARG
ALA SER VAL VAL VAL VAL ALA GLN CLU CLU T196 CLU T196 CLU T196 CLU PRO PRO PRO PRO PRO PRO PRO	GLY CLYS CLYS LYS VAL VAL CLYS CLY GLN GLN GLN GLY ALA ALA ALA ALA ALA ALA ALA ALA SER ALA SER SER SER	SER SER THR ILE SER ALA SER SER SER SER SER
ASN ASN GLY GLY GLY CJ248 R3248 R323 R323 R323 C309 C309 C309 C309 R325 R325 R355 R355 R355 R356 R356 R356	E364 E364 V368 V371 R370 R370 R370 R370 R370 R373 F373 F373 C12 C12 C12 C12 C12 C12 C12 C12 C12 C12	SER GLU LYS LYS GLU VAL VAL CYS GLU CLYS ALA GLU CLYS ALA ALA ALA
ALA ALA ALA ALA ALA ALA ALA CLU CLU CLU CLU CLU CLU CLU CLU CLU CLU	LINS LINS ALA ALA ALA ALA ALA CLU CLYS CLYS SER CLYS CLYS CLYS CLU CLYS CLYS CLYS CLYS CLYS CLYS CLYS CLYS	
• Molecule 21: 50S ribosomal prote	ein L24	
Chain S: 62%	• 35%	
MET SER SER PHE VAL LEU VAL LEU PHE PHE CYS CYS PHE ARG THR THR THR THR THR THR THR THR THR THR	VAL VAL GLN GLN GLN GLN GLN GLN ARG ARG ARG ARA ALA THR THR THR THR THR THR THR THR THR THR	R147 L159 R166 R166 R178 A178 A178 A178 CUU
ASP ASP ASP ALV C221 C221 C221 C225 ALA ALA ALA C1U C1V C1V C1V C1V C1V C1V C1V C1V C1V C1V	AGA AGA LEU LITE LITE LITE LITE CLU CLU CLU CLU CLU CLU CLU CLU CLU CLU	GLU PRO LYS PRO THR LYS MET ALA
• Molecule 22: 54S ribosomal prote	ein L4, mitochondrial	
Chain T: 65%	• 32%	6
MET ALLA PRO PRO ALLA ALLA ALLA ALLA ALLA ALLA ALLA AL	LI'S VAL ALA VAL ALA VAL PRO VAL PRO VAL ALA ALA ALA ALA ALA ALA ALA ALA ALA	G123 K134 N157 N157 E171 E171
R193 FT23 FT23 CUU CUU CUU CUU CUU CUU CUU CUU CUU CU	111E ASP PRO THR THR THR THR THR FRO SER SER SER SER SER ALA ALA ALA ALA VAL	



• Molecule 23: 50S ribosomal protein L30					
Chain U:		84%		• 14%	
MET 82 L28 L28 R86 V102 VAL GLU GLU	LEU LYS ALA GLN CYS CLU ASN ASN CLU CLU CLU CLU	GLU LYS MET VAL VAL GLU GLU GLV GLV L161 L161			
• Molecule 24:	Uncharacterized	l protein			
Chain V:	26% •		74%		
MET SER SER LYS LEU PRO THR THR THR LEU LEU ARG	ARG PRO SER ALA LEU PRO PRO THR THR THR THR THR	ALA TYR SER ALA ALA ARG PRO PRO PRO PRO SER	CYS THR ALA ALA GLY GLN GLN GLN GLN ASN ASN	A48 A48 771 771 GLU GLU ASP GLU ALA GLU GLU GLU	
LYS LEU LEU ALA ALA ARG GLU GLY ARG ARG	GLY TRP ASP ASP ASP ASP ALA LYS MET THR THR PPR0 GLU	GLU ALA ALA ALA ALA ALA LEU ALA ALA ALA GLY	GLY GLY GLY ALA ALA GLY GLY GLY ALA ALA ALA ALA ALA ALA	ALIA ALIA ALIA ALIA GLU GLU CLEU LLEU LLYS LLYS LLYS CLYS GLU GLU	
GLU GLU GLU ALA ALA ALA LYS LYS ALA ALA GLU	GLU GLU ALA ASP PRO PRO PRO FRO SER LEU ASP LEU	ILE SER GLY TYR ALA ALA GLU ASN MET ASN PRO	GLY LEU ASN PHE LYS GLU THR HIS TYR GLY LYS	LYS LYS	
• Molecule 25:	Mitochondrial r	ibosomal protei	in subunit L32		
Chain W:	41%	5%	54%		
MET ALA ALA ALA THR ALA ALA ALA ALA PRO	ALA MET ARG LEU PHE PHE PHE PHE GLN	THR LEU ARG GLN GLN PHE GLY VAL PRO ALA	LEU ASN PHE ALA ALA ALA ALA ALA TLE SER LEU	PRO SER TLE PRO SER LEU LEU CLU ASP TLE TRP GLU GLU	
ILE LEU ARG A64 V65 P66 H77 M80	K83 V88 V88 C95 G12 G12 G12 SER ASN ALA	ALA TYR			
• Molecule 26:	Uncharacterized	l protein			
Chain X:		73%	8%	19%	
MET ALA LYS LYS LYS S7 G21 R30 R30	K39 R46 A54 A54 GLY GLY SER SER				
• Molecule 27:	Related to ribos	somal protein L	34, mitochondria	1	
Chain Y:	30% ·		67%		
MET SER ARG ILE PHE SER SER ALA GLN ALA	VAL PHE LYS PRO SER ALA PHE LEU PRO LYS ALA	THR ARG SER PHE SER ILEU PRO SER LEU ARG	PRO ALA THR LEU SER SER PRO SER THR THR THR THR PRO	ALA PRO ASN ALA ALA THR ALA PRO SER SER SER SER SER	
ALA THR THR GLY GLY ASP GLY GLU VAL LEU ASP	LEU LEU SER ALA ALA SER SER LEU TLE SER HIS PRO	ALA LEU SER GLY GLY LEU GLY GLY TLE ARG CYS	G95 R135 R135 A140		
• Molecule 28:	Ribosomal prote	ein			
Chain 0:	36%		63%		



MIST LEU ANG SER ASSER ASSER ASSER ALLEU A

• Molecule 29: Mitochondrial large ribosomal subunit YmL35

α · 1				
Chain 1:	77%	•	18%	

R402 R427 A449

• Molecule 30: Uncharacterized protein

 Chain 2:
 31%
 67%

 11/2
 31%
 67%

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• Molecule 31: Uncharacterized protein

Chain 3: • 8% • 8%

• Molecule 32: Mitochondrial ribosomal protein L43

Chain 4: . .



• Molecule 33: 60S ribosomal protein L3



Chain 5:	77%	• 20%
MET LYS ARG ALA ALA THR PRO SER LEU THR	SER ALL LEU VLEU VLEU VLEU ALL ALL ALL ALL ALL ALL ALL ALL ALL AL	SER THR ALA ALA ALA ALA ALA ALA ALA ALA ALA AL
N119 L146 Y204 D229 D233	8237 ASP PRO LYX VAL ALA ALA ALA ALA ALA ASP CLU CLU CLN CLU CLU CLN CLU CLU CLU CLU CLU CLU CLU CLU CLU	MET MLA ALA ALA ALA ALA ASD CLU CLU CLU CLU CLU CLU CLU CLU CLU CLU
• Molecule 34	: 50S ribosomal subunit L30	
Chain 6:	69%	5% 26%
MET SER SER SER SER ARG GLY ALA ALA LEU	ARG ARG SER GLN GLN GLN ILEU CYS CYS CYS CYS CYS CYS CYS CYS CYS CYS	ARG PHE SER SER SER ALA ALA ALA ALA ALA ALA ALA ALA ALA THR THR THR THR THR THR
THR LEU PRO PRO PRO PRO PRO VAL THR	THR STHR CLY THR HIS ALA ALA ALA ALA ALA ALA ALA ALA ALA AL	R229 1230 K245 ASP ASP ASP ASP ASP ASP GLU GLU GLU CGLU CSS CSC CSC CSC CSC CSC CSC CSC CSC CS
F303 GLY GLN GLN LYS ASP GLY GLY LEU L211 L311	N334 L335 H336 E567 R368 R368	
• Molecule 35	: Uncharacterized protein	
Chain 7:	48% •	49%
MET PHE ARG SER THR PHE CLEU CEV SER	ALA ALA CLAILE CLAILE CLAILE CLAILE ALA ALA ALA ALA ALA ALA ALA ALA ALA A	PRO THR THR THR THR THR THR THR PRO GLN GLN GLN GLN GLN THR THR THR
GLN PRO THR THR PRO FRO GLN GLN THR	ALY ALA ALA ALA ALA ALA CLU CLU CLU CLU CLU SER FIR FIR FIR FIS FIS FIS	
• Molecule 36	: Uncharacterized protein	
Chain 8:	72%	• 25%
MET ARG ARG ILE PRO PRO TLE TLE PRO PRO PRO	ALA SER ALA CFEU CFEU CFEU SER SER SER SER ALA ALA ALA ALA ALA ALA ALA ALA ALA AL	SER TLE TLE CYS CYS CYS SER CYS SER THR SER THR SER ALA ALA ARG ARG ARG ARG CTN CTN CTN CTN CTN CTN CTN CTN CTN CTN
ASN THR VAL GLN GLN GLN ARG CYS CYS	THR THR VAL THR CLU CLU CLU PRO CLU PRO CLU ALA ALA ALA ALA ALA ALA ALA ALA ALA A	GLN ARG LYS LYS LYS ARG CLY GLY CLU THR CLU CLN CLN CLN CLN CLN CLN CLN CLN CLN CLN
R295 1296 K297 8298 8298 E299 1314 1314 S317	W322 R339 F362 C426 GLN	
• Molecule 37	: Mitochondrial ribosomal protein L44	
Chain h:	100%	
There are no o	outlier residues recorded for this chain.	

• Molecule 38: Uncharacterized protein



Chain i:	56%	·	43%
MET ILE CYS CYS CYS CYS CYS CYS LEU ARG ARG ARG ARG SER	PHE PHE ALA ALA ALA ALA ALA ALA ALA ALA ALA AL	ARG ALA ALA ALA ALA ALA ALA FHE SER THR THR FHE SER VAL CYS THR	PRO PRO ALA ALA ALA PRO PRO ALA ALA ALA ALA ALA ALA ALA ALA ALA AL
GLY LEU ALA PRO PRO PRO GLY ALA ALA ALA ALA THR	GLU GLU ALA ALA ALA ALA ALA C 10 C 11 C 11 C 11 C 11 C 11 C 11 C 1	ASF ALA ASP GLY ASP CLY SER LYS SER LYS SER K138	N1 81
• Molecule 39:	RNase III domain-contai	ning protein	
Chain 9:	74%		• 23%
MET ALA ALA LEU LEU THR PRO SER SER VAL VAL	ALA THR THR CYS CYS CYS ALA ALA CYS SER ARG CYS SER ARG CYL VAL	GLN GLN LEU ALA ALA ALA PRO PRO ALA ALA ALA CLN CLN SER	SER SER SER ALA ALA CLN CLN CLN CLN CLN CLN CLN SER SER SER SER SER SER SER SER
061 W66 R72 R88 R88 Q110 Q110 R135	R140 M196 R219 E222 ALA ALA		
• Molecule 40:	60S ribosomal protein L2	20	
Chain a:	71%		28%
MET GLU GLU SER SER LEU PHE PRO PRO	THLA THLA CYS CYS CYS CYS CYS ARG ARG ARG SER SER SER SER SER SER SER SER SER SER	ALA ALA ALA ALA CLY CLY SER VAL TRG 41 A	F103 LVS PR0 PR0 ALA ALA PR0 CLU SER SER SER ASP ALA
ALA ALA ALA ALA ASP ASP GLN HIS GLN CI28 D128 CI28 CI28	1325		
• Molecule 41:	Mitoc_mL59 domain-co	ntaining protein	
Chain b:		99%	·
ALA A2 K162			
• Molecule 42:	54S ribosomal protein L3	31, mitochondrial	
Chain c:	89%		11%
MET PHE GLY ALA ALA PHE PHE ASN PRO LEU	SER 613 V110		
• Molecule 43:	Uncharacterized protein		
Chain d:	80%		20%
MET ASN SER SER VAL THR THR THR THR THR TLE GLY	LEU LEU PHE CLY CLY CLY CLY CLY CLY CLY CLY CLY CLY	ALA ALA ALA BIA BIA CLU SER SER SER SER SER SER SER SER SER	LEU VAL GLY GLY GLU ITS LYS CLY SER ALA SER ALA CLY GLY ALA ALA VAL VAL



.



• Molecule 44: 60S ribosomal protein L1

Chain e: 80% 20%

E300 SER VAL MET

• Molecule 45: L51_S25_CI-B8 domain-containing protein

Chain j:

97%





4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	131806	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 $(e^-/\text{\AA}^2)$	35	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	130000	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor



5 Model quality (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: K, NAD, ZN, MG, SPM

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	Bond lengths		Bond angles	
	Ullaili	RMSZ	# Z > 5	RMSZ	# Z > 5	
1	А	0.20	0/67352	0.67	0/104875	
2	В	0.24	0/2603	0.44	0/3508	
3	С	0.24	0/2380	0.44	0/3209	
4	D	0.23	0/2072	0.41	0/2794	
5	Е	0.25	0/2518	0.41	0/3427	
6	F	0.24	0/1644	0.41	0/2218	
7	G	0.24	0/630	0.44	0/842	
8	f	0.24	0/1923	0.41	0/2631	
9	g	0.24	0/1126	0.41	0/1525	
10	Н	0.24	0/1460	0.42	0/1975	
11	Ι	0.24	0/918	0.45	0/1225	
12	J	0.24	0/1931	0.41	0/2597	
13	K	0.24	0/1376	0.42	0/1842	
14	L	0.23	0/1569	0.40	0/2106	
15	М	0.24	0/1572	0.43	0/2117	
16	Ν	0.24	0/1077	0.45	0/1452	
17	0	0.23	0/2248	0.39	0/3015	
18	Р	0.24	0/1523	0.39	0/2058	
19	Q	0.24	0/2916	0.40	0/3927	
20	R	0.24	0/2227	0.41	0/2978	
21	S	0.23	0/1510	0.40	0/2042	
22	Т	0.23	0/1538	0.39	0/2086	
23	U	0.23	0/1117	0.42	0/1496	
24	V	0.25	0/486	0.44	0/659	
25	W	0.23	0/467	0.41	0/616	
26	Х	0.24	0/411	0.42	0/551	
27	Y	0.23	0/368	0.44	0/485	
28	0	0.25	0/395	0.45	0/523	
29	1	0.24	0/3053	0.39	0/4108	
30	2	0.25	0/1074	0.40	0/1449	
31	3	0.25	0/783	0.44	0/1056	
32	4	0.25	0/1077	0.42	0/1453	



Mal	Mol Chain		Bond lengths		l angles
	Unam	RMSZ	# Z > 5	RMSZ	# Z > 5
33	5	0.25	0/2790	0.39	0/3794
34	6	0.25	0/2274	0.42	0/3062
35	7	0.23	0/686	0.42	0/919
36	8	0.24	0/2714	0.40	0/3657
37	h	0.24	0/791	0.40	0/1065
38	i	0.24	0/989	0.39	0/1324
39	9	0.23	0/1678	0.38	0/2267
40	a	0.23	0/1364	0.40	0/1842
41	b	0.23	0/1348	0.37	0/1816
42	с	0.23	0/846	0.41	0/1134
43	d	0.23	0/1930	0.41	0/2597
44	е	0.24	0/1918	0.41	0/2582
45	j	0.23	0/1581	0.40	0/2127
All	All	0.22	0/134253	0.56	0/195031

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 (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	А	60143	30189	30189	109	0
2	В	2544	2592	2592	5	0
3	С	2336	2422	2420	10	0
4	D	2028	2040	2040	5	0
5	Е	2449	2461	2461	8	0
6	F	1608	1645	1645	4	0
7	G	618	627	627	1	0
8	f	1876	1925	1925	0	0
9	g	1103	1154	1154	0	0
10	Н	1426	1459	1459	9	0
11	Ι	913	985	985	3	0
12	J	1888	1939	1939	3	0



COULU	Continuea from previous page					
Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
13	K	1350	1401	1401	7	0
14	L	1545	1590	1590	6	0
15	М	1536	1628	1628	7	0
16	N	1056	1120	1120	6	0
17	0	2209	2323	2323	9	0
18	Р	1481	1494	1494	4	0
19	Q	2868	2961	2961	9	0
20	R	2189	2310	2310	14	0
21	S	1472	1507	1507	6	0
22	Т	1497	1453	1453	6	0
23	U	1099	1164	1164	2	0
24	V	474	477	477	2	0
25	W	460	489	488	5	0
26	Х	403	433	433	4	0
27	Y	365	412	412	3	0
28	0	388	409	409	1	0
29	1	2985	3029	3029	13	0
30	2	1046	1055	1055	8	0
31	3	763	773	773	2	0
32	4	1052	1087	1087	4	0
33	5	2719	2710	2710	9	0
34	6	2226	2248	2248	12	0
35	7	674	709	709	3	0
36	8	2660	2714	2714	7	0
37	h	779	798	798	0	0
38	i	976	1022	1022	0	0
39	9	1643	1698	1698	7	0
40	a	1331	1340	1340	0	0
41	b	1314	1379	1379	0	0
42	с	827	873	873	0	0
43	d	1888	1909	1909	0	0
44	е	1886	1935	1935	0	0
45	j	1551	1582	1581	0	0
46	2	1	0	0	0	0
46	3	1	0	0	0	0
46	А	160	0	0	0	0
46	K	1	0	0	0	0
47	А	14	26	26	0	0
48	А	12	0	0	0	0
49	0	1	0	0	0	0
49	W	1	0	0	0	0
50	2	44	26	26	2	0



Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	125879	97522	97518	245	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.

All (245) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom_2	Interatomic	Clash
Atom-1	Atom-2	distance $(Å)$	overlap (Å)
1:A:2276:U:OP1	3:C:63:VAL:N	2.09	0.85
1:A:2580:U:O2	20:R:360:ARG:NH1	2.11	0.84
17:O:296:PHE:O	17:O:317:THR:OG1	2.00	0.80
1:A:2337:U:O2'	1:A:2339:U:OP1	2.00	0.80
1:A:3094:A:OP1	10:H:94:ARG:NH1	2.15	0.79
1:A:831:U:OP1	1:A:854:A:O2'	2.00	0.79
33:5:146:LEU:O	39:9:140:ARG:NH2	2.16	0.79
30:2:279:ARG:NH2	34:6:171:GLU:OE2	2.19	0.76
1:A:2797:C:OP1	26:X:39:LYS:NZ	2.19	0.75
34:6:100:LEU:O	34:6:368:ARG:NH1	2.20	0.74
1:A:96:G:OP2	18:P:93:ARG:NH1	2.21	0.73
1:A:3363:A:O2'	1:A:3365:A:OP2	2.07	0.73
36:8:295:ARG:NH1	36:8:299:GLU:O	2.22	0.72
1:A:3334:C:OP1	3:C:217:ARG:NH1	2.22	0.72
1:A:2008:U:OP2	1:A:2013:A:N6	2.23	0.72
50:2:4301:NAD:N7N	50:2:4301:NAD:O1N	2.23	0.70
17:O:51:GLN:O	17:O:56:ARG:NH1	2.25	0.69
17:O:364:TRP:O	32:4:125:ARG:NH1	2.26	0.69
19:Q:164:GLN:NE2	19:Q:169:LYS:O	2.25	0.69
1:A:975:A:OP1	27:Y:95:GLY:N	2.26	0.69
5:E:57:ASP:OD2	29:1:123:ARG:NH2	2.25	0.69
13:K:91:THR:O	13:K:134:ARG:NH1	2.26	0.68
30:2:325:ARG:NH1	34:6:264:THR:O	2.27	0.67
36:8:195:GLU:OE1	36:8:339:ARG:NE	2.28	0.67
1:A:2757:G:OP2	30:2:285:ARG:NH1	2.27	0.67
14:L:136:ARG:NH1	25:W:95:PRO:O	2.27	0.66
29:1:219:PHE:O	29:1:340:ARG:NH1	2.29	0.65
19:Q:337:GLU:N	19:Q:337:GLU:OE1	2.29	0.65
26:X:7:SER:OG	26:X:30:ARG:NH2	2.30	0.64
4:D:81:GLU:OE2	4:D:285:ARG:NE	2.30	0.64
1:A:2536:A:OP1	20:R:262:ARG:NH1	2.30	0.64
12:J:259:ARG:NH2	12:J:277:PRO:O	2.30	0.64
1:A:3033:G:N2	1:A:3033:G:OP2	2.31	0.64



	l l l l l l l l l l l l l l l l l l l	Interatomic	Clash
Atom-1	Atom-2	distance (Å)	overlap (Å)
19:Q:248:ASP:OD1	22:T:123:GLY:N	2.30	0.64
11:I:116:ARG:NH1	11:I:130:GLN:OE1	2.30	0.64
5:E:223:LEU:O	5:E:227:THR:OG1	2.15	0.64
33:5:349:PHE:O	39:9:72:ARG:NH2	2.31	0.63
1:A:2491:A:N6	1:A:2637:U:OP2	2.32	0.63
32:4:81:ARG:NH1	32:4:107:GLY:O	2.32	0.63
1:A:614:G:OP1	1:A:1528:U:O2'	2.15	0.62
34:6:334:ASN:ND2	34:6:336:HIS:O	2.33	0.62
17:O:154:ARG:NH2	36:8:426:GLY:O	2.32	0.62
20:R:136:HIS:ND1	20:R:138:ASP:OD1	2.33	0.62
34:6:266:GLU:OE1	34:6:274:ARG:NH2	2.32	0.62
1:A:2582:G:OP2	20:R:356:ARG:NH2	2.34	0.61
39:9:110:GLN:O	39:9:110:GLN:NE2	2.34	0.61
18:P:185:ASN:ND2	19:Q:67:PRO:O	2.32	0.61
18:P:159:THR:OG1	18:P:161:ASP:OD1	2.17	0.60
1:A:2925:A:OP2	1:A:2926:C:N4	2.31	0.60
2:B:280:ARG:N	2:B:365:TRP:O	2.35	0.59
27:Y:137:ARG:NE	27:Y:140:ALA:O	2.34	0.59
1:A:2380:G:N1	1:A:2383:A:OP2	2.35	0.59
10:H:8:THR:N	17:O:352:ASP:OD1	2.36	0.58
1:A:1272:A:O2'	1:A:1381:A:N6	2.36	0.58
14:L:58:ARG:O	14:L:86:ARG:NH1	2.37	0.57
21:S:93:THR:OG1	21:S:140:ARG:NH1	2.37	0.57
11:I:10:CYS:O	11:I:45:ARG:NH1	2.37	0.57
1:A:473:G:N7	21:S:147:ARG:NH2	2.51	0.57
15:M:145:ARG:O	15:M:145:ARG:HG2	2.03	0.57
22:T:157:ASN:OD1	22:T:160:ARG:NH1	2.34	0.57
1:A:3111:G:N2	1:A:3114:A:OP2	2.37	0.57
5:E:343:GLN:OE1	30:2:345:SER:OG	2.23	0.57
1:A:1014:G:O2'	12:J:85:GLN:OE1	2.22	0.56
1:A:2689:G:O6	29:1:367:GLU:N	2.38	0.56
14:L:103:GLU:O	14:L:113:SER:OG	2.23	0.56
1:A:601:C:OP1	16:N:185:LYS:NZ	2.37	0.55
13:K:94:TRP:O	13:K:174:ARG:NH1	2.36	0.55
17:O:52:LYS:NZ	22:T:174:GLU:OE2	2.34	0.55
33:5:204:TYR:OH	39:9:196:MET:O	2.24	0.55
1:A:599:A:OP2	16:N:187:ARG:NH1	2.34	0.55
1:A:640:G:OP1	35:7:94:ARG:NH1	2.40	0.54
1:A:2635:A:OP1	5:E:235:ARG:NH2	2.39	0.54
29:1:105:GLU:O	29:1:116:ARG:NH1	2.40	0.54
15:M:145:ARG:O	15:M:145:ARG:CG	2.55	0.54



		Interatomic	Clash	
Atom-1	Atom-2	distance $(Å)$	overlap (Å)	
1:A:2058:G:O2'	1:A:2206:U:OP2	2.25	0.54	
13:K:103:ASP:OD2	13:K:106:ARG:NH1	2.37	0.53	
17:O:206:ARG:NH1	25:W:80:MET:SD	2.82	0.53	
29:1:144:ASP:OD2	29:1:146:SER:OG	2.22	0.53	
1:A:822:U:N3	1:A:823:G:O6	2.42	0.53	
3:C:100:ARG:O	3:C:104:THR:OG1	2.22	0.53	
1:A:2851:G:O2'	26:X:21:GLY:O	2.25	0.52	
20:R:353:GLU:OE1	20:R:354:GLU:N	2.43	0.52	
1:A:541:G:N7	27:Y:135:ARG:NH1	2.52	0.52	
34:6:148:GLU:OE2	34:6:195:ARG:NH1	2.42	0.52	
1:A:2174:U:OP1	1:A:3056:U:O2'	2.26	0.52	
1:A:2346:U:OP1	1:A:2354:U:N3	2.43	0.52	
10:H:170:GLU:OE1	10:H:170:GLU:N	2.38	0.52	
13:K:122:GLN:OE1	13:K:125:ARG:NH1	2.43	0.51	
29:1:267:ASP:OD1	29:1:271:ARG:NH2	2.37	0.51	
1:A:1565:A:O2'	1:A:1566:A:OP2	2.28	0.51	
4:D:71:SER:O	4:D:75:LEU:N	2.39	0.51	
1:A:1271:A:OP1	1:A:1382:C:O2'	2.24	0.51	
5:E:58:ALA:O	29:1:116:ARG:NH2	2.43	0.51	
1:A:2453:G:O2'	1:A:2899:U:O2	2.27	0.51	
1:A:3421:C:OP2	14:L:157:ARG:NH2	2.43	0.51	
1:A:1515:A:O2'	32:4:39:ARG:NH1	2.40	0.51	
22:T:171:GLU:OE1	22:T:171:GLU:N	2.43	0.51	
4:D:127:LYS:NZ	4:D:131:GLN:OE1	2.42	0.51	
33:5:229:ASP:OD1	33:5:233:ASP:N	2.42	0.51	
1:A:2026:U:HO2'	2:B:356:THR:HG1	1.60	0.50	
1:A:49:G:OP1	3:C:78:ARG:NH2	2.43	0.50	
1:A:2540:C:OP2	20:R:323:ARG:NH2	2.42	0.50	
2:B:193:ASP:OD1	2:B:194:SER:N	2.45	0.50	
6:F:167:ASP:OD2	6:F:169:ARG:NH1	2.40	0.50	
1:A:329:A:OP1	19:Q:278:ASN:N	2.43	0.49	
1:A:1388:U:H4'	1:A:1389:A:O4'	2.12	0.49	
1:A:2596:A:N6	34:6:161:ASN:OD1	2.43	0.49	
2:B:373:ASN:ND2	2:B:376:VAL:O	2.42	0.49	
16:N:157:ALA:HB3	16:N:158:PRO:CD	2.42	0.49	
1:A:1634:G:OP1	21:S:120:ARG:NH2	2.44	0.49	
1:A:615:G:O2'	1:A:2254:G:OP1	2.26	0.49	
1:A:536:G:N2	1:A:539:A:OP2	2.36	0.49	
1:A:2170:G:N2	1:A:2199:G:OP1	2.44	0.48	
3:C:206:ASP:OD2	3:C:335:ARG:NH2	2.42	0.48	
20:R:309:GLY:O	26:X:46:ARG:NH2	2.46	0.48	



	bus puge	Interatomic	Clash	
Atom-1	Atom-2	distance (Å)	overlap (Å)	
1:A:3107:G:O2'	1:A:3108:U:OP2	2.30	0.48	
1:A:1567:A:O2'	1:A:1568:A:OP1	2.25	0.48	
1:A:3455:U:O2'	39:9:219:ARG:NH1	2.46	0.48	
1:A:2096:U:OP1	1:A:2862:G:O2'	2.28	0.48	
10:H:14:ARG:NH1	10:H:67:ASP:O	2.42	0.48	
19:Q:104:ARG:NH1	19:Q:143:ASN:O	2.46	0.48	
1:A:1902:G:HO2'	11:I:6:THR:HG1	1.62	0.47	
1:A:1107:U:O2'	1:A:1108:U:O5'	2.32	0.47	
24:V:71:THR:OG1	30:2:358:THR:OG1	2.29	0.47	
22:T:134:LYS:O	22:T:193:ARG:NH1	2.41	0.47	
31:3:65:THR:HB	31:3:66:PRO:HD2	1.97	0.47	
1:A:1154:U:OP2	13:K:88:LYS:NZ	2.40	0.47	
17:O:241:LYS:O	17:O:245:THR:OG1	2.23	0.47	
1:A:320:A:OP2	19:Q:212:HIS:NE2	2.48	0.46	
1:A:1991:A:N3	1:A:1991:A:H2'	2.30	0.46	
33:5:109:ASP:OD2	33:5:290:ARG:NH1	2.49	0.46	
5:E:124:ARG:O	5:E:128:THR:OG1	2.24	0.46	
36:8:276:LEU:HD13	36:8:276:LEU:O	2.15	0.46	
1:A:2295:A:H2'	1:A:2295:A:N3	2.30	0.46	
1:A:2598:U:O3'	20:R:344:ARG:NH1	2.49	0.46	
4:D:175:ARG:O	4:D:179:SER:OG	2.31	0.46	
1:A:1176:A:N6	23:U:28:LEU:O	2.49	0.46	
15:M:219:VAL:HG12	15:M:219:VAL:O	2.15	0.46	
29:1:87:LEU:O	29:1:92:ARG:NH2	2.49	0.46	
1:A:2641:U:O2'	1:A:2827:C:O2	2.31	0.46	
12:J:200:ARG:NE	12:J:218:THR:O	2.49	0.46	
1:A:3047:G:N2	1:A:3050:A:OP2	2.38	0.45	
20:R:357:ARG:NH1	20:R:361:GLU:OE1	2.49	0.45	
1:A:2138:U:OP1	2:B:337:LYS:NZ	2.44	0.45	
5:E:268:ARG:NH1	24:V:62:GLN:OE1	2.46	0.45	
33:5:432:ASP:OD1	33:5:433:MET:N	2.48	0.45	
1:A:445:A:OP2	19:Q:324:ARG:NH2	2.44	0.45	
21:S:159:LEU:O	21:S:178:ARG:NH1	2.50	0.45	
1:A:988:G:N2	1:A:1012:U:OP1	2.49	0.45	
16:N:86:PRO:O	16:N:163:ARG:NH1	2.50	0.45	
1:A:1725:G:H2'	1:A:1726:A:O4'	2.17	0.45	
10:H:139:ALA:O	10:H:142:LYS:NZ	2.47	0.45	
16:N:137:ASP:OD2	23:U:86:ARG:NH2	2.48	0.45	
1:A:3406:U:H3'	1:A:3407:U:H5"	1.99	0.44	
1:A:2040:U:O2'	1:A:2041:A:OP2	2.26	0.44	
19:Q:72:ASP:OD1	19:Q:73:GLU:N	2.45	0.44	



	Atom 2	Interatomic	Clash	
Atom-1	Atom-2	distance (\AA)	overlap (Å)	
30:2:301:ILE:HD12	34:6:367:GLU:HG3	2.00	0.44	
1:A:3006:U:N3	1:A:3007:U:O4	2.50	0.44	
10:H:63:ASP:OD2	10:H:65:SER:OG	2.28	0.44	
29:1:163:ARG:NH2	29:1:167:GLU:OE1	2.50	0.44	
1:A:2251:U:O2'	25:W:66:PRO:O	2.31	0.44	
1:A:2090:A:N7	7:G:52:ALA:N	2.66	0.44	
10:H:35:SER:OG	10:H:36:GLU:OE2	2.36	0.44	
1:A:1539:G:O2'	1:A:1540:U:OP2	2.33	0.44	
50:2:4301:NAD:O2A	50:2:4301:NAD:H8A	2.18	0.44	
1:A:2925:A:O2'	1:A:2926:C:O4'	2.35	0.44	
1:A:3372:G:OP1	3:C:162:ARG:NH1	2.45	0.44	
30:2:353:ARG:NH2	30:2:363:ALA:O	2.47	0.43	
33:5:116:PRO:O	33:5:119:ASN:ND2	2.48	0.43	
34:6:96:ARG:NH1	34:6:230:LEU:O	2.45	0.43	
29:1:317:ASP:OD1	29:1:317:ASP:N	2.47	0.43	
1:A:526:G:O2'	1:A:527:A:P	2.76	0.43	
1:A:2545:U:OP1	34:6:165:ARG:NH2	2.46	0.43	
14:L:29:LEU:O	14:L:33:GLU:N	2.49	0.43	
39:9:66:TRP:O	39:9:135:ARG:NH2	2.47	0.43	
29:1:398:GLU:OE2	29:1:402:ARG:NH1	2.51	0.43	
1:A:2610:A:H2'	1:A:2610:A:N3	2.33	0.43	
29:1:267:ASP:OD1	29:1:267:ASP:N	2.52	0.43	
1:A:1226:A:OP2	1:A:1227:C:N4	2.38	0.43	
33:5:348:ASP:OD1	33:5:348:ASP:O	2.37	0.43	
1:A:2606:U:O4	1:A:2607:A:N6	2.51	0.43	
5:E:89:TYR:OH	5:E:103:GLN:O	2.29	0.43	
35:7:141:VAL:N	35:7:142:PRO:CD	2.82	0.43	
1:A:1076:U:O2	30:2:324:THR:OG1	2.37	0.43	
1:A:2897:G:H2'	1:A:2951:U:H5"	2.01	0.43	
20:R:336:THR:O	20:R:340:GLY:N	2.48	0.43	
1:A:450:G:OP2	21:S:166:ARG:NH2	2.53	0.42	
1:A:2541:A:OP2	20:R:323:ARG:NH1	2.52	0.42	
6:F:75:LYS:O	6:F:75:LYS:HG3	2.19	0.42	
34:6:289:VAL:HG12	34:6:289:VAL:O	2.18	0.42	
1:A:525:A:O2'	1:A:526:G:H3'	2.18	0.42	
1:A:1875:A:OP1	22:T:67:ARG:NH2	2.49	0.42	
1:A:3345:U:OP1	3:C:350:HIS:NE2	2.48	0.42	
21:S:221:VAL:O	21:S:225:GLN:NE2	2.52	0.42	
1:A:2460:G:O2'	1:A:2879:U:OP2	2.37	0.42	
1:A:2659:G:N3	1:A:2659:G:H2'	2.35	0.42	
35:7:152:ARG:NE	35:7:155:GLU:OE1	2.42	0.42	



		Interatomic	Clash
Atom-1	Atom-2	distance (Å)	overlap (Å)
32:4:49:LEU:N	32:4:50:PRO:CD	2.82	0.42
39:9:88:ARG:NE	39:9:222:GLU:OE2	2.38	0.42
1:A:58:G:O2'	25:W:77:HIS:ND1	2.51	0.42
1:A:2618:U:O4	1:A:2619:A:N6	2.53	0.42
15:M:56:LYS:HG3	15:M:56:LYS:O	2.18	0.42
1:A:1025:A:HO2'	1:A:1026:A:P	2.41	0.42
1:A:2883:A:O2'	1:A:2884:A:P	2.78	0.42
1:A:102:C:O4'	1:A:106:A:O2'	2.37	0.42
1:A:1041:G:N3	1:A:2470:A:H2'	2.35	0.42
16:N:157:ALA:HB3	16:N:158:PRO:HD3	2.02	0.42
6:F:123:ASN:N	6:F:129:GLN:OE1	2.52	0.41
15:M:44:ASP:N	15:M:44:ASP:OD1	2.53	0.41
6:F:181:VAL:O	6:F:181:VAL:HG13	2.19	0.41
1:A:822:U:C2	1:A:823:G:C6	3.08	0.41
1:A:2641:U:OP1	1:A:2833:C:O2'	2.36	0.41
1:A:3166:U:O2'	15:M:163:ASP:OD2	2.28	0.41
1:A:520:U:H4'	1:A:521:A:H5'	2.01	0.41
3:C:322:GLU:OE2	3:C:322:GLU:N	2.53	0.41
34:6:156:ASP:N	34:6:156:ASP:OD1	2.54	0.41
1:A:2408:U:HO2'	1:A:2410:A:HO2'	1.67	0.41
13:K:101:MET:O	13:K:167:ASN:N	2.50	0.41
1:A:1835:U:OP2	31:3:20:LYS:NZ	2.49	0.41
1:A:2310:U:OP2	1:A:2440:G:O2'	2.30	0.41
1:A:2977:G:HO2'	28:0:79:MET:N	2.19	0.41
14:L:139:GLU:OE1	14:L:174:ARG:NE	2.48	0.41
17:O:184:GLU:OE2	17:O:332:ARG:NE	2.41	0.41
18:P:88:ASP:OD1	18:P:88:ASP:N	2.51	0.41
25:W:88:VAL:HG23	25:W:88:VAL:O	2.21	0.41
20:R:370:ARG:HA	20:R:373:PHE:CE2	2.55	0.41
10:H:155:LEU:O	10:H:157:ARG:NH2	2.54	0.41
13:K:130:ARG:N	13:K:174:ARG:O	2.51	0.41
36:8:203:GLY:O	36:8:208:ASN:ND2	2.54	0.41
4:D:246:ASP:OD1	4:D:248:ARG:NH2	2.54	0.41
20:R:372:GLU:O	20:R:376:LYS:HD2	2.22	0.41
1:A:944:G:H2'	1:A:945:A:O4'	2.21	0.40
3:C:124:THR:HG22	3:C:124:THR:O	2.22	0.40
36:8:314:LEU:O	36:8:317:SER:OG	2.38	0.40
29:1:269:GLY:O	29:1:271:ARG:NH1	2.49	0.40
36:8:296:LEU:HD13	36:8:297:LYS:N	2.36	0.40
1:A:439:U:H4'	1:A:440:A:OP2	2.21	0.40
1:A:871:G:H2'	1:A:872:A:N7	2.37	0.40



Atom-1	Atom-2	Interatomic $distance (\hat{\lambda})$	Clash
		distance (A)	overlap (A)
1:A:1205:A:H4'	1:A:1206:G:OP1	2.21	0.40
1:A:3374:U:O2'	3:C:162:ARG:NH2	2.54	0.40
15:M:46:ASN:O	15:M:64:VAL:N	2.50	0.40
20:R:364:GLU:O	20:R:368:VAL:HG23	2.22	0.40
33:5:109:ASP:OD1	33:5:110:ALA:N	2.55	0.40
1:A:2015:A:H1'	1:A:2173:A:N6	2.36	0.40
10:H:96:ASN:O	10:H:97:THR:OG1	2.33	0.40

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	Perce	ntiles
2	В	324/383~(85%)	316~(98%)	8 (2%)	0	100	100
3	C	305/384~(79%)	300 (98%)	5(2%)	0	100	100
4	D	250/325~(77%)	246 (98%)	4 (2%)	0	100	100
5	Е	307/352~(87%)	302 (98%)	5(2%)	0	100	100
6	F	199/255~(78%)	197 (99%)	2(1%)	0	100	100
7	G	72/300~(24%)	72 (100%)	0	0	100	100
8	f	243/347~(70%)	239 (98%)	4 (2%)	0	100	100
9	g	145/158~(92%)	141 (97%)	4 (3%)	0	100	100
10	Н	181/183~(99%)	179 (99%)	2(1%)	0	100	100
11	Ι	115/131~(88%)	112 (97%)	3~(3%)	0	100	100
12	J	241/312 (77%)	236 (98%)	5(2%)	0	100	100
13	K	166/249~(67%)	164 (99%)	2(1%)	0	100	100
14	L	190/193~(98%)	189 (100%)	1 (0%)	0	100	100
15	М	192/258~(74%)	190 (99%)	2 (1%)	0	100	100



Mol	Chain	Analysed	Favoured	Allowed	Outliers	-	Perce	ntiles
16	Ν	131/217~(60%)	126~(96%)	5(4%)	0		100	100
17	Ο	268/364~(74%)	266~(99%)	2(1%)	0		100	100
18	Р	178/228~(78%)	177~(99%)	1 (1%)	0		100	100
19	Q	351/396~(89%)	350 (100%)	1 (0%)	0		100	100
20	R	262/447~(59%)	258~(98%)	4 (2%)	0		100	100
21	S	175/274~(64%)	168 (96%)	7 (4%)	0		100	100
22	Т	178/263~(68%)	174 (98%)	4 (2%)	0		100	100
23	U	134/161~(83%)	133 (99%)	1 (1%)	0		100	100
24	V	56/219~(26%)	56 (100%)	0	0		100	100
25	W	57/129~(44%)	56~(98%)	1 (2%)	0		100	100
26	Х	46/59~(78%)	45~(98%)	1 (2%)	0		100	100
27	Y	44/140 (31%)	44 (100%)	0	0		100	100
28	0	44/124~(36%)	42 (96%)	2(4%)	0		100	100
29	1	365/449~(81%)	358~(98%)	7 (2%)	0		100	100
30	2	121/370~(33%)	121 (100%)	0	0		100	100
31	3	93/103~(90%)	87~(94%)	6 (6%)	0		100	100
32	4	135/138~(98%)	133~(98%)	2(2%)	0		100	100
33	5	346/439~(79%)	345 (100%)	1 (0%)	0		100	100
34	6	267/368~(73%)	265~(99%)	2 (1%)	0		100	100
35	7	82/165~(50%)	81 (99%)	1 (1%)	0		100	100
36	8	329/443~(74%)	325~(99%)	4 (1%)	0		100	100
37	h	96/98~(98%)	95~(99%)	1 (1%)	0		100	100
38	i	120/218~(55%)	113 (94%)	7 (6%)	0		100	100
39	9	204/267~(76%)	201 (98%)	3 (2%)	0		100	100
40	a	157/225~(70%)	156 (99%)	1 (1%)	0		100	100
41	b	159/162~(98%)	156 (98%)	3 (2%)	0		100	100
42	с	96/110~(87%)	95~(99%)	1 (1%)	0		100	100
43	d	231/292~(79%)	226~(98%)	5 (2%)	0		100	100
44	е	240/303~(79%)	233~(97%)	7 (3%)	0		100	100
45	j	193/201~(96%)	186 (96%)	7 (4%)	0		100	100
All	All	8088/11202 (72%)	7954 (98%)	134 (2%)	0		100	100



There are no Ramachandran outliers to report.

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	ntiles
2	В	267/312~(86%)	265~(99%)	2 (1%)	84	90
3	С	242/303~(80%)	241 (100%)	1 (0%)	91	94
4	D	216/274~(79%)	216 (100%)	0	100	100
5	Е	267/296~(90%)	267~(100%)	0	100	100
6	F	173/216~(80%)	172~(99%)	1 (1%)	86	91
7	G	64/254~(25%)	64 (100%)	0	100	100
8	f	206/287~(72%)	204 (99%)	2 (1%)	76	85
9	g	120/124 (97%)	120 (100%)	0	100	100
10	Н	149/149~(100%)	149 (100%)	0	100	100
11	Ι	100/105~(95%)	100 (100%)	0	100	100
12	J	198/255~(78%)	197 (100%)	1 (0%)	88	92
13	Κ	142/205~(69%)	141 (99%)	1 (1%)	84	90
14	L	164/165~(99%)	162 (99%)	2 (1%)	71	83
15	М	164/209~(78%)	164 (100%)	0	100	100
16	Ν	119/188~(63%)	119 (100%)	0	100	100
17	Ο	235/315~(75%)	235~(100%)	0	100	100
18	Р	158/196~(81%)	157~(99%)	1 (1%)	86	91
19	Q	312/347~(90%)	311 (100%)	1 (0%)	92	95
20	R	226/359~(63%)	226 (100%)	0	100	100
21	S	159/242~(66%)	159 (100%)	0	100	100
22	Т	161/224~(72%)	160 (99%)	1 (1%)	86	91
23	U	118/138~(86%)	118 (100%)	0	100	100
24	V	54/170~(32%)	54(100%)	0	100	100
25	W	50/102~(49%)	49 (98%)	1 (2%)	55	72



Mol	Chain	Analysed	Rotameric	Outliers	Perce	ntiles
26	Х	46/54~(85%)	46 (100%)	0	100	100
27	Y	38/116~(33%)	38 (100%)	0	100	100
28	0	41/108 (38%)	41 (100%)	0	100	100
29	1	316/384 (82%)	314 (99%)	2 (1%)	86	91
30	2	109/317~(34%)	109 (100%)	0	100	100
31	3	83/91 (91%)	82 (99%)	1 (1%)	71	83
32	4	113/114 (99%)	113 (100%)	0	100	100
33	5	279/351~(80%)	278 (100%)	1 (0%)	91	94
34	6	238/310~(77%)	236 (99%)	2 (1%)	81	89
35	7	69/136~(51%)	69 (100%)	0	100	100
36	8	285/378~(75%)	283 (99%)	2 (1%)	84	90
37	h	88/88 (100%)	88 (100%)	0	100	100
38	i	101/162~(62%)	98 (97%)	3 (3%)	41	61
39	9	176/225~(78%)	176 (100%)	0	100	100
40	a	146/196~(74%)	145 (99%)	1 (1%)	84	90
41	b	141/141 (100%)	141 (100%)	0	100	100
42	с	86/96~(90%)	86 (100%)	0	100	100
43	d	201/243 (83%)	200 (100%)	1 (0%)	88	92
44	е	207/256~(81%)	207 (100%)	0	100	100
45	j	167/171~(98%)	166 (99%)	1 (1%)	86	91
All	All	6994/9372 (75%)	6966 (100%)	28 (0%)	91	94

All (28) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	В	109	HIS
2	В	298	HIS
3	С	277	GLN
6	F	71	GLU
8	f	59	TYR
8	f	146	LEU
12	J	266	TYR
13	Κ	144	SER
14	L	8	TYR
14	L	17	HIS



Mol	Chain	Res	Type
18	Р	53	PHE
19	Q	198	ARG
22	Т	72	ARG
25	W	83	LYS
29	1	229	PHE
29	1	427	ARG
31	3	10	LEU
33	5	119	ASN
34	6	229	ARG
34	6	334	ASN
36	8	322	TRP
36	8	362	PHE
38	i	98	ASP
38	i	110	TRP
38	i	181	ASN
40	a	205	ARG
43	d	69	LEU
45	i	82	MET

Sometimes side chains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such side chains are listed below:

Mol	Chain	Res	Type
6	F	189	HIS
17	0	293	ASN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	А	2800/3464~(80%)	345~(12%)	10 (0%)

All (345) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	А	18	А
1	А	19	G
1	А	29	А
1	А	46	U
1	А	47	А
1	А	48	А
1	А	78	С



Mol	Chain	Res	Type
1	А	79	А
1	А	90	А
1	А	98	А
1	А	99	U
1	А	104	U
1	А	107	U
1	А	311	G
1	А	317	А
1	А	319	С
1	А	334	U
1	А	347	U
1	А	348	А
1	А	350	U
1	A	351	A
1	А	367	A
1	A	370	А
1	А	376	U
1	А	387	А
1	А	392	А
1	А	393	А
1	А	395	U
1	А	414	U
1	А	419	U
1	А	433	G
1	А	435	А
1	А	440	А
1	А	441	U
1	А	443	А
1	А	448	А
1	А	462	U
1	А	477	А
1	А	478	U
1	А	486	А
1	А	487	A
1	A	522	С
1	А	526	G
1	А	527	А
1	А	552	А
1	А	569	G
1	А	571	А
1	А	583	А
1	A	584	A



Mol	Chain	Res	Type
1	А	587	А
1	А	588	А
1	А	599	А
1	А	609	U
1	А	611	А
1	А	639	А
1	А	645	U
1	А	824	U
1	А	829	А
1	А	839	А
1	А	840	U
1	А	845	А
1	A	846	A
1	А	849	U
1	А	855	A
1	A	888	U
1	A	909	A
1	А	910	А
1	А	914	U
1	А	931	U
1	А	948	А
1	А	958	А
1	А	960	С
1	А	967	А
1	А	969	G
1	А	976	С
1	А	977	U
1	А	988	G
1	А	995	U
1	А	1010	А
1	А	1012	U
1	A	1026	А
1	А	1042	G
1	A	1070	A
1	А	1071	G
1	А	1081	С
1	А	1107	U
1	А	1108	U
1	A	1109	U
1	А	1118	С
1	A	1119	A
1	А	1140	U



Mol	Chain	Res	Type
1	А	1160	С
1	А	1190	A
1	А	1206	G
1	А	1219	A
1	А	1235	А
1	А	1242	G
1	А	1248	G
1	А	1257	U
1	А	1258	U
1	А	1267	G
1	А	1271	А
1	А	1280	А
1	А	1308	G
1	А	1316	A
1	А	1326	А
1	A	1331	A
1	А	1333	G
1	А	1334	A
1	А	1376	А
1	А	1377	U
1	А	1379	U
1	А	1380	А
1	А	1381	A
1	А	1382	С
1	А	1389	A
1	А	1417	G
1	А	1431	А
1	А	1452	G
1	А	1453	А
1	А	1457	G
1	А	1484	А
1	А	1487	U
1	А	1494	U
1	A	1495	А
1	A	1496	U
1	A	1497	A
1	A	1509	A
1	A	1522	U
1	A	1526	A
1	A	1528	U
1	А	1529	G
1	А	1565	А



Mol	Chain	Res	Type
1	А	1566	А
1	А	1567	А
1	А	1568	А
1	А	1578	G
1	А	1589	А
1	А	1590	А
1	А	1591	А
1	А	1604	G
1	А	1605	U
1	А	1613	С
1	А	1620	U
1	А	1626	U
1	А	1627	А
1	А	1634	G
1	А	1648	U
1	А	1655	А
1	А	1695	А
1	А	1703	А
1	А	1719	А
1	А	1722	А
1	А	1726	А
1	А	1727	U
1	А	1837	С
1	А	1842	А
1	А	1844	U
1	А	1850	А
1	А	1852	А
1	А	1866	А
1	А	1880	U
1	А	1881	G
1	A	1882	А
1	А	1884	U
1	А	1896	С
1	А	1910	G
1	А	1921	А
1	A	1922	С
1	А	1951	A
1	A	1970	A
1	А	1971	А
1	A	1985	U
1	А	1988	А
1	А	1991	А



Mol	Chain	Res	Type
1	А	1993	U
1	А	2002	А
1	А	2029	С
1	А	2030	А
1	А	2032	А
1	А	2039	А
1	А	2041	А
1	А	2048	А
1	А	2051	А
1	А	2052	U
1	А	2105	А
1	А	2106	А
1	А	2108	А
1	А	2121	G
1	А	2136	А
1	А	2142	G
1	А	2164	G
1	А	2165	G
1	А	2172	А
1	А	2173	А
1	А	2190	U
1	А	2198	U
1	А	2199	G
1	А	2202	U
1	А	2205	А
1	А	2206	U
1	А	2207	G
1	А	2226	U
1	А	2228	U
1	А	2258	А
1	А	2265	С
1	А	2266	А
1	A	2268	A
1	А	2278	С
1	A	2287	А
1	A	2290	С
1	А	2291	G
1	A	2295	A
1	А	2304	G
1	A	2328	G
1	А	2337	U
1	А	2347	U



Mol	Chain	Res	Type
1	А	2362	А
1	А	2367	А
1	А	2369	А
1	А	2370	А
1	А	2371	G
1	А	2384	С
1	А	2388	U
1	А	2403	U
1	А	2409	U
1	А	2411	А
1	А	2418	А
1	А	2419	А
1	А	2420	U
1	A	2427	А
1	А	2439	А
1	A	2440	G
1	А	2441	А
1	А	2477	А
1	А	2479	G
1	А	2481	G
1	А	2482	U
1	А	2483	G
1	А	2486	U
1	А	2489	А
1	А	2509	U
1	А	2511	С
1	А	2541	А
1	А	2543	С
1	А	2547	А
1	A	2548	U
1	А	2558	A
1	A	2578	С
1	A	2581	G
1	A	2592	A
1	А	2595	A
1	A	2596	A
1	А	2610	A
1	A	2611	A
1	А	2612	U
1	A	2621	А
1	А	2626	U
1	А	2628	С



Mol	Chain	Res	Type
1	А	2638	А
1	А	2656	А
1	А	2658	А
1	А	2659	G
1	А	2685	А
1	А	2686	U
1	А	2690	G
1	А	2710	U
1	А	2711	U
1	А	2719	U
1	А	2720	U
1	А	2721	U
1	А	2722	U
1	А	2723	U
1	А	2758	U
1	А	2759	U
1	А	2775	U
1	А	2784	U
1	А	2797	С
1	А	2806	U
1	А	2808	А
1	А	2810	А
1	А	2811	А
1	А	2836	G
1	А	2838	С
1	А	2843	G
1	А	2852	А
1	А	2875	U
1	А	2881	G
1	А	2882	А
1	А	2883	А
1	А	2884	А
1	А	2891	G
1	А	2897	G
1	А	2898	А
1	А	2899	U
1	А	2900	А
1	А	2909	А
1	А	2912	U
1	А	2927	А
1	А	2949	С
1	A	2969	A



Mol	Chain	Res	Type
1	А	2971	С
1	А	2980	U
1	А	2981	G
1	А	3018	А
1	А	3019	А
1	А	3025	С
1	А	3030	G
1	А	3034	G
1	А	3053	С
1	А	3054	А
1	А	3055	G
1	А	3061	U
1	А	3062	U
1	А	3065	U
1	А	3081	U
1	А	3082	U
1	А	3124	G
1	А	3125	G
1	А	3156	U
1	А	3166	U
1	А	3259	А
1	А	3260	С
1	А	3261	A
1	А	3262	А
1	А	3263	U
1	А	3276	G
1	А	3288	A
1	А	3296	A
1	А	3310	А
1	А	3349	A
1	А	3359	A
1	А	3391	A
1	А	3399	A
1	А	3407	U
1	А	3408	A
1	А	3413	A
1	А	3420	A
1	А	3424	A
1	А	3425	U
1	А	3428	U
1	А	3429	A
1	А	3447	A



Continued from previous page...

Mol	Chain	Res	Type
1	А	3448	А
1	А	3449	U

All (10) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	А	526	G
1	А	909	А
1	А	1025	А
1	А	1107	U
1	А	1205	А
1	А	1567	А
1	А	2051	А
1	А	2481	G
1	А	2720	U
1	А	2883	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)

Of 179 ligands modelled in this entry, 177 are monoatomic - leaving 2 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with |Z| > 2 is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mal	Mol Type	Chain	Res	Link	Bond lengths			Bond angles		
WIOI					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
47	SPM	А	3661	-	13,13,13	0.32	0	12,12,12	0.75	0
50	NAD	2	4301	46	42,48,48	0.74	1 (2%)	50,73,73	0.93	2 (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
47	SPM	А	3661	-	-	2/11/11/11	-
50	NAD	2	4301	46	-	3/26/62/62	0/5/5/5

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Ζ	Observed(Å)	Ideal(Å)
50	2	4301	NAD	C2N-N1N	-2.09	1.32	1.35

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	$Observed(^{o})$	$Ideal(^{o})$
50	2	4301	NAD	O4B-C1B-C2B	-3.23	102.21	106.93
50	2	4301	NAD	N3A-C2A-N1A	-2.66	124.52	128.68

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	\mathbf{Res}	Type	Atoms
50	2	4301	NAD	C3D-C4D-C5D-O5D
50	2	4301	NAD	O4D-C4D-C5D-O5D
50	2	4301	NAD	C4B-C5B-O5B-PA
47	А	3661	SPM	N10-C11-C12-C13
47	А	3661	SPM	C12-C11-N10-C9

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
50	2	4301	NAD	2	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring



in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.



6 Map visualisation (i)

This section contains visualisations of the EMDB entry EMD-10973. 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)

This section was not generated.

6.2 Central slices (i)

This section was not generated.

6.3 Largest variance slices (i)

This section was not generated.

6.4 Orthogonal standard-deviation projections (False-color) (i)

This section was not generated.

6.5 Orthogonal surface views (i)

This section was not generated.

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)

This section was not generated.

7.2 Volume estimate versus contour level (i)

This section was not generated.

7.3 Rotationally averaged power spectrum (i)

This section was not generated. The rotationally averaged power spectrum had issues being displayed.



8 Fourier-Shell correlation (i)

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



9 Map-model fit (i)

This section was not generated.

