Full wwPDB EM Validation Report

Mar 6, 2025 – 06:32 pm GMT

PDB ID	:	8AKN
EMDB ID	:	EMD-15488
Title	:	Cryo-EM structure of the proline-rich antimicrobial peptide drosocin bound to the terminating ribosome
Authors	:	Koller, T.O.; Morici, M.; Wilson, D.N.
Deposited on	:	2022-07-30
Resolution	:	2.30 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 ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

The following versions of software and data (see references ⓘ) were used in the production of this report:

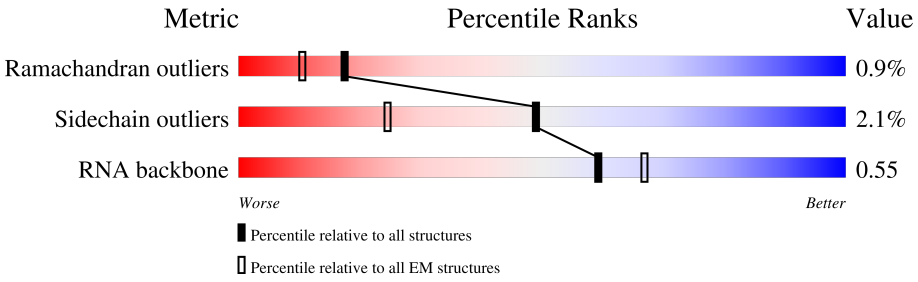
EMDB validation analysis	:	FAILED
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	FAILED
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.41

1 Overall quality at a glance

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

The reported resolution of this entry is 2.30 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415
RNA backbone	6643	2191

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	0	55	91% · 7%
2	1	46	96% ·
3	2	65	95% · ·
4	3	38	97% ·
5	4	70	83% · 14%
6	A	19	95% 5%
7	B	1534	82% 16% ·
8	C	241	90% · 7%
9	D	233	86% · 12%

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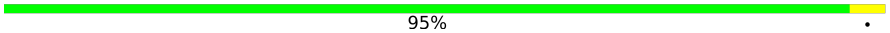
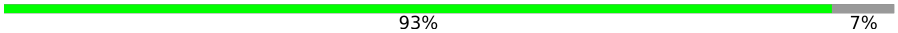
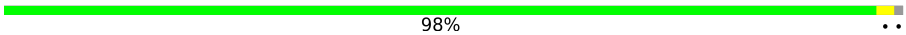
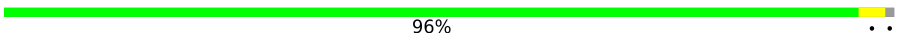
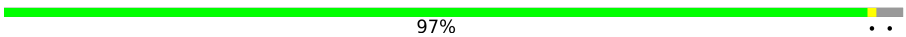
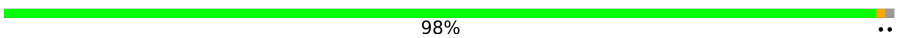
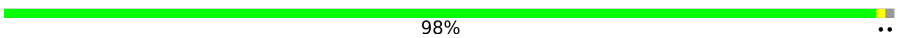
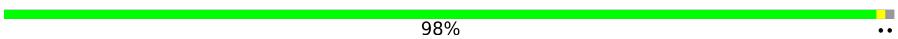
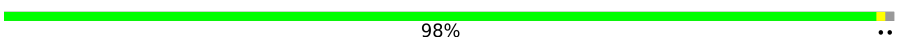
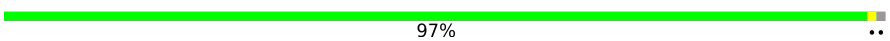
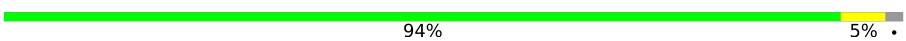
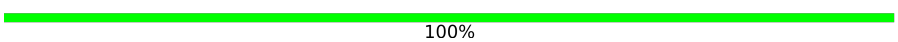
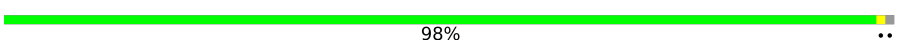
Mol	Chain	Length	Quality of chain
10	E	206	
11	F	167	
12	G	135	
13	H	179	
14	I	130	
15	J	130	
16	K	103	
17	L	129	
18	M	124	
19	N	118	
20	O	101	
21	P	89	
22	Q	82	
23	R	84	
24	S	75	
25	T	92	
26	U	87	
27	V	71	
28	W	360	
29	X	76	
30	Y	9	
31	Z	76	
32	a	2903	
33	b	120	
34	c	273	

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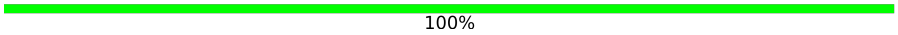
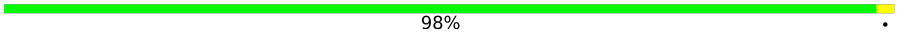
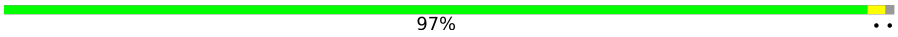
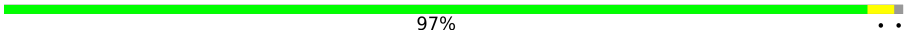
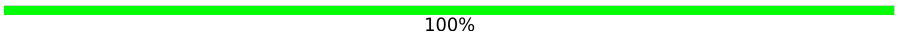
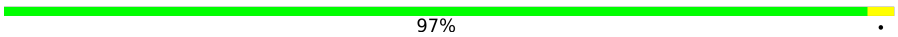
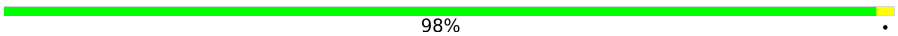
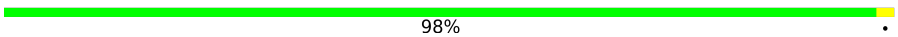
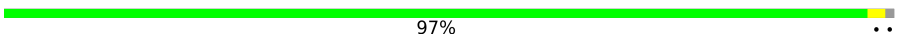
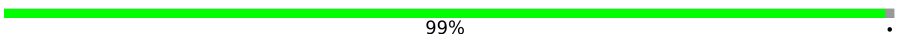
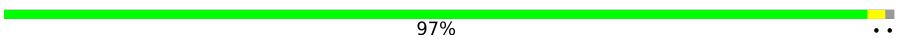
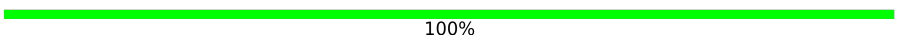
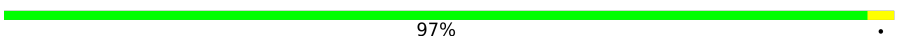
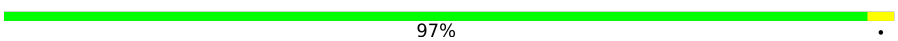
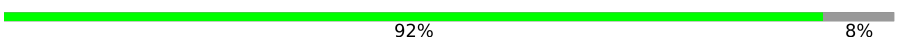
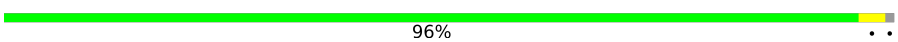
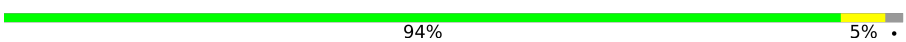
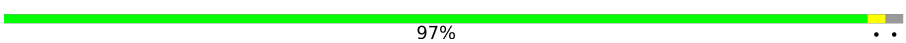
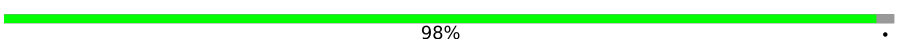
Mol	Chain	Length	Quality of chain
35	d	209	
36	e	201	
37	f	179	
38	g	177	
39	h	149	
40	i	142	
41	j	123	
42	k	144	
43	l	136	
44	m	127	
45	n	117	
46	o	115	
47	p	118	
48	q	103	
49	r	110	
50	s	100	
51	t	104	
52	u	94	
53	v	85	
54	w	78	
55	x	63	
56	y	59	
57	z	57	

2 Entry composition

There are 62 unique types of molecules in this entry. The entry contains 146513 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a protein called 50S ribosomal protein L33.

Mol	Chain	Residues	Atoms				AltConf	Trace
1	0	51	Total	C	N	O	0	0
			417	269	76	72		

- Molecule 2 is a protein called 50S ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	1	46	Total	C	N	O	S	0	0
			377	228	90	57	2		

- Molecule 3 is a protein called 50S ribosomal protein L35.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	2	64	Total	C	N	O	S	0	0
			504	323	105	74	2		

- Molecule 4 is a protein called 50S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	3	38	Total	C	N	O	S	0	0
			302	185	65	48	4		

- Molecule 5 is a protein called 50S ribosomal protein L31.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	4	60	Total	C	N	O	S	0	0
			480	299	90	85	6		

- Molecule 6 is a protein called Drosocin1.

Mol	Chain	Residues	Atoms				AltConf	Trace
6	A	19	Total	C	N	O	0	0
			155	98	34	23		

- Molecule 7 is a RNA chain called 16S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	B	1519	Total	C	N	O	P	0	0
			32608	14548	5986	10555	1519		

- Molecule 8 is a protein called 30S ribosomal protein S2.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	C	224	Total	C	N	O	S	0	0
			1753	1109	315	321	8		

- Molecule 9 is a protein called 30S ribosomal protein S3.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	D	206	Total	C	N	O	S	0	0
			1624	1028	305	288	3		

- Molecule 10 is a protein called 30S ribosomal protein S4.

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

- Molecule 11 is a protein called 30S ribosomal protein S5.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	F	156	Total	C	N	O	S	0	0
			1152	717	217	212	6		

- Molecule 12 is a protein called 30S ribosomal protein S6, fully modified isoform.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	G	103	Total	C	N	O	S	0	0
			839	530	151	151	7		

- Molecule 13 is a protein called 30S ribosomal protein S7.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	H	153	Total	C	N	O	S	0	0
			1203	750	231	218	4		

- Molecule 14 is a protein called 30S ribosomal protein S8.

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

- Molecule 15 is a protein called 30S ribosomal protein S9.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	J	127	Total	C	N	O	S	0	0
			1022	634	206	179	3		

- Molecule 16 is a protein called 30S ribosomal protein S10.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	K	98	Total	C	N	O	S	0	0
			786	493	150	142	1		

- Molecule 17 is a protein called 30S ribosomal protein S11.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	L	117	Total	C	N	O	S	0	0
			877	540	174	160	3		

- Molecule 18 is a protein called 30S ribosomal protein S12.

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

- Molecule 19 is a protein called 30S ribosomal protein S13.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	N	115	Total	C	N	O	S	0	0
			891	552	179	157	3		

- Molecule 20 is a protein called 30S ribosomal protein S14.

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

- Molecule 21 is a protein called 30S ribosomal protein S15.

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

- Molecule 22 is a protein called 30S ribosomal protein S16.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	Q	81	Total	C	N	O	S	0	0
			643	403	127	112	1		

- Molecule 23 is a protein called 30S ribosomal protein S17.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	R	79	Total	C	N	O	S	0	0
			641	406	120	112	3		

- Molecule 24 is a protein called 30S ribosomal protein S18.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	S	66	Total	C	N	O	S	0	0
			544	345	102	96	1		

- Molecule 25 is a protein called 30S ribosomal protein S19.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	T	84	Total	C	N	O	S	0	0
			668	427	127	112	2		

- Molecule 26 is a protein called 30S ribosomal protein S20.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	U	86	Total	C	N	O	S	0	0
			670	414	138	115	3		

- Molecule 27 is a protein called 30S ribosomal protein S21.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	V	70	Total	C	N	O	S	0	0
			589	366	125	97	1		

- Molecule 28 is a protein called Peptide chain release factor RF1.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	W	354	Total	C	N	O	S	0	0
			2792	1708	518	553	13		

- Molecule 29 is a RNA chain called Phenylalanine-tRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	X	76	Total	C	N	O	P	0	0
			1623	723	290	534	76		

- Molecule 30 is a RNA chain called mRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	Y	9	Total	C	N	O	P	0	0
			188	85	31	63	9		

- Molecule 31 is a RNA chain called Isoleucine-tRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	Z	76	Total	C	N	O	P	0	0
			1616	722	287	532	75		

- Molecule 32 is a RNA chain called 23S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	a	2753	Total	C	N	O	P	0	0
			59128	26382	10897	19096	2753		

- Molecule 33 is a RNA chain called 5S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	b	119	Total	C	N	O	P	0	0
			2549	1135	466	829	119		

- Molecule 34 is a protein called 50S ribosomal protein L2.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	c	271	Total	C	N	O	S	0	0
			2082	1288	423	364	7		

- Molecule 35 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	d	209	Total	C	N	O	S	0	0
			1566	980	288	294	4		

- Molecule 36 is a protein called 50S ribosomal protein L4.

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

- Molecule 37 is a protein called 50S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	f	177	Total	C	N	O	S	0	0
			1410	899	249	256	6		

- Molecule 38 is a protein called 50S ribosomal protein L6.

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

- Molecule 39 is a protein called 50S ribosomal protein L9.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	h	41	Total	C	N	O	S	0	0
			303	194	54	54	1		

- Molecule 40 is a protein called 50S ribosomal protein L13.

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

- Molecule 41 is a protein called 50S ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	j	123	Total	C	N	O	S	0	0
			946	593	181	166	6		

- Molecule 42 is a protein called 50S ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	k	144	Total	C	N	O	S	0	0
			1053	654	207	190	2		

- Molecule 43 is a protein called 50S ribosomal protein L16.

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

- Molecule 44 is a protein called 50S ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	m	118	Total	C	N	O	S	0	0
			945	585	194	161	5		

- Molecule 45 is a protein called 50S ribosomal protein L18.

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

- Molecule 46 is a protein called 50S ribosomal protein L19.

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

- Molecule 47 is a protein called 50S ribosomal protein L20.

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

- Molecule 48 is a protein called 50S ribosomal protein L21.

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

- Molecule 49 is a protein called 50S ribosomal protein L22.

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

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

Mol	Chain	Residues	Atoms					AltConf	Trace
50	s	93	Total	C	N	O	S	0	0
			738	466	139	131	2		

- Molecule 51 is a protein called 50S ribosomal protein L24.

Mol	Chain	Residues	Atoms				AltConf	Trace
51	t	102	Total	C	N	O	0	0
			779	492	146	141		

- Molecule 52 is a protein called 50S ribosomal protein L25.

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

- Molecule 53 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace
53	v	78	Total	C	N	O	S	0	0
			586	362	116	107	1		

- Molecule 54 is a protein called 50S ribosomal protein L28.

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

- Molecule 55 is a protein called 50S ribosomal protein L29.

Mol	Chain	Residues	Atoms					AltConf	Trace
55	x	62	Total	C	N	O	S	0	0
			501	308	98	94	1		

- Molecule 56 is a protein called 50S ribosomal protein L30.

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

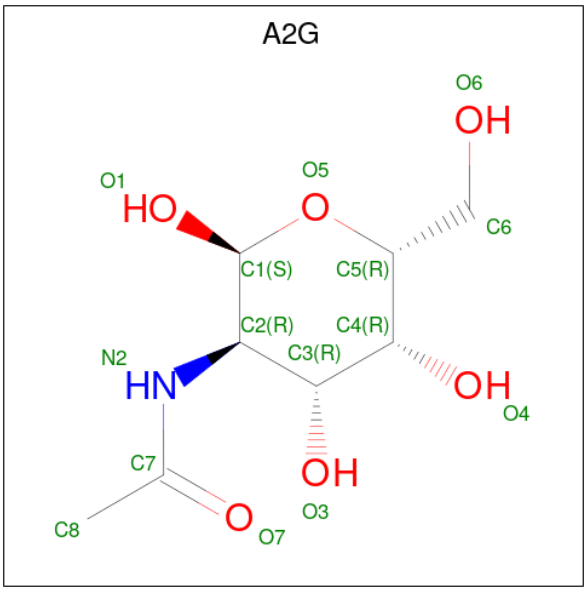
- Molecule 57 is a protein called 50S ribosomal protein L32.

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

- Molecule 58 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
58	3	1	Total	Zn	0
			1	1	
58	4	1	Total	Zn	0
			1	1	

- Molecule 59 is 2-acetamido-2-deoxy-alpha-D-galactopyranose (three-letter code: A2G) (formula: $C_8H_{15}NO_6$) (labeled as "Ligand of Interest" by depositor).

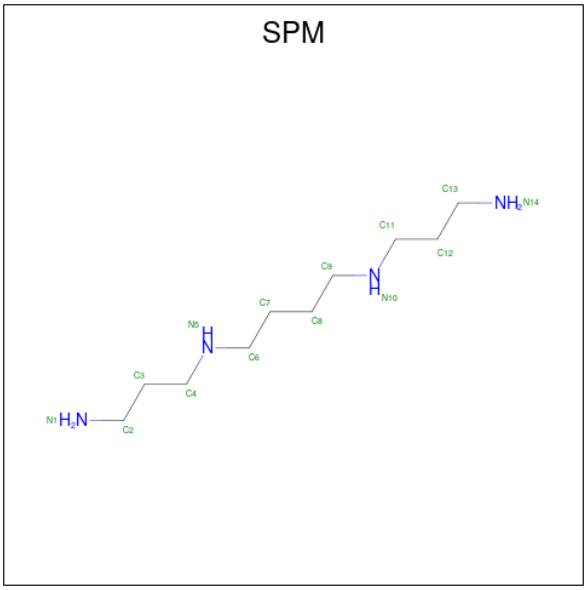


Mol	Chain	Residues	Atoms				AltConf
59	A	1	Total	C	N	O	0
			14	8	1	5	

- Molecule 60 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	AltConf
60	B	89	Total Mg 89 89	0
60	a	208	Total Mg 208 208	0
60	b	5	Total Mg 5 5	0
60	c	1	Total Mg 1 1	0
60	d	1	Total Mg 1 1	0
60	z	1	Total Mg 1 1	0

- Molecule 61 is SPERMINE (three-letter code: SPM) (formula: $C_{10}H_{26}N_4$).



Mol	Chain	Residues	Atoms	AltConf
61	a	1	Total C N 14 10 4	0

- Molecule 62 is water.

Mol	Chain	Residues	Atoms	AltConf
62	0	1	Total O 1 1	0
62	1	2	Total O 2 2	0
62	2	12	Total O 12 12	0

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Mol	Chain	Residues	Atoms	AltConf
62	3	3	Total O 3 3	0
62	A	16	Total O 16 16	0
62	B	189	Total O 189 189	0
62	D	2	Total O 2 2	0
62	E	1	Total O 1 1	0
62	F	2	Total O 2 2	0
62	M	2	Total O 2 2	0
62	N	1	Total O 1 1	0
62	R	1	Total O 1 1	0
62	W	18	Total O 18 18	0
62	X	1	Total O 1 1	0
62	Y	6	Total O 6 6	0
62	a	1331	Total O 1331 1331	0
62	b	10	Total O 10 10	0
62	c	41	Total O 41 41	0
62	d	20	Total O 20 20	0
62	e	15	Total O 15 15	0
62	h	1	Total O 1 1	0
62	i	2	Total O 2 2	0
62	j	5	Total O 5 5	0
62	k	16	Total O 16 16	0

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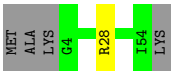
Mol	Chain	Residues	Atoms	AltConf
62	l	8	Total O 8 8	0
62	m	8	Total O 8 8	0
62	n	1	Total O 1 1	0
62	o	5	Total O 5 5	0
62	p	8	Total O 8 8	0
62	q	3	Total O 3 3	0
62	r	7	Total O 7 7	0
62	s	1	Total O 1 1	0
62	t	1	Total O 1 1	0
62	u	1	Total O 1 1	0
62	v	3	Total O 3 3	0
62	w	3	Total O 3 3	0
62	z	7	Total O 7 7	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.

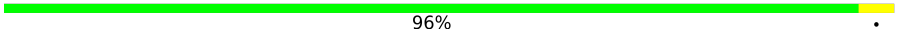
- Molecule 1: 50S ribosomal protein L33

Chain 0:



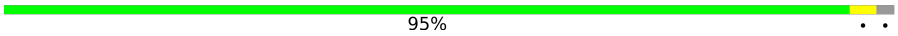
- Molecule 2: 50S ribosomal protein L34

Chain 1:



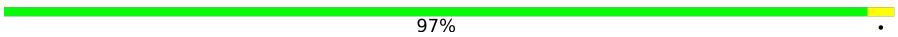
- Molecule 3: 50S ribosomal protein L35

Chain 2:



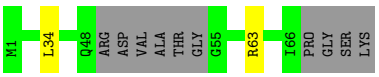
- Molecule 4: 50S ribosomal protein L36

Chain 3:



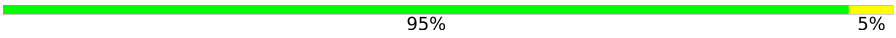
- Molecule 5: 50S ribosomal protein L31

Chain 4:



- Molecule 6: Drosocin1

Chain A:



• Molecule 7: 16S ribosomal RNA

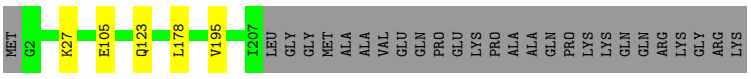
Chain B:

• Molecule 8: 30S ribosomal protein S2

Chain C:

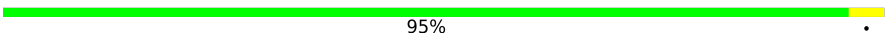
• Molecule 9: 30S ribosomal protein S3

Chain D:



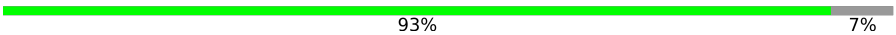
• Molecule 10: 30S ribosomal protein S4

Chain E:



• Molecule 11: 30S ribosomal protein S5

Chain F:



• Molecule 12: 30S ribosomal protein S6, fully modified isoform

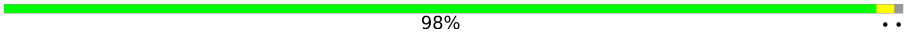
Chain G:

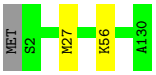
• Molecule 13: 30S ribosomal protein S7

Chain H:

• Molecule 14: 30S ribosomal protein S8

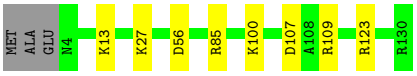
Chain I:





• Molecule 15: 30S ribosomal protein S9

Chain J:



• Molecule 16: 30S ribosomal protein S10

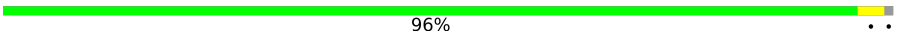
Chain K:

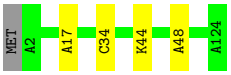
• Molecule 17: 30S ribosomal protein S11

Chain L:

• Molecule 18: 30S ribosomal protein S12

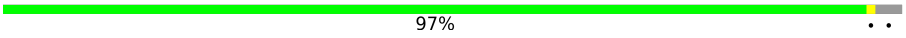
Chain M:

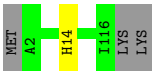




• Molecule 19: 30S ribosomal protein S13

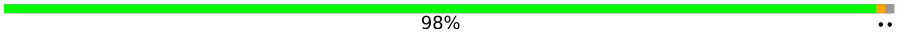
Chain N:

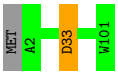




• Molecule 20: 30S ribosomal protein S14

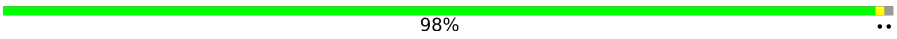
Chain O:

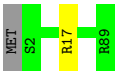




• Molecule 21: 30S ribosomal protein S15

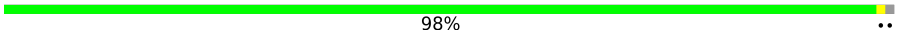
Chain P:





• Molecule 22: 30S ribosomal protein S16

Chain Q:

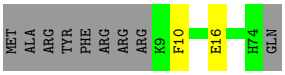


• Molecule 23: 30S ribosomal protein S17

Chain R:

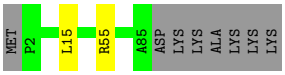
• Molecule 24: 30S ribosomal protein S18

Chain S:



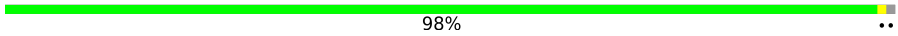
• Molecule 25: 30S ribosomal protein S19

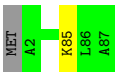
Chain T:



• Molecule 26: 30S ribosomal protein S20

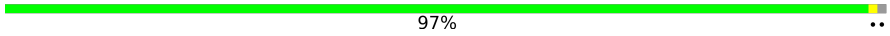
Chain U:

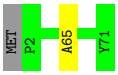




• Molecule 27: 30S ribosomal protein S21

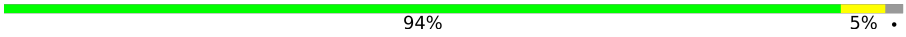
Chain V:

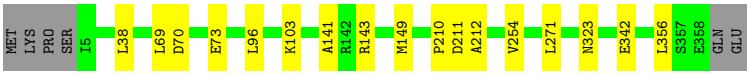




• Molecule 28: Peptide chain release factor RF1

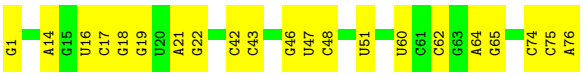
Chain W:





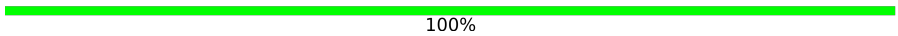
• Molecule 29: Phenylalanine-tRNA

Chain X:



• Molecule 30: mRNA

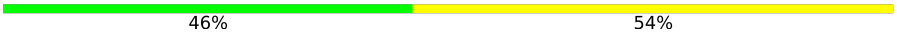
Chain Y:

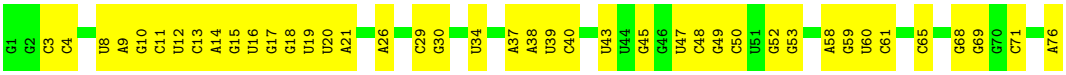


There are no outlier residues recorded for this chain.

• Molecule 31: Isoleucine-tRNA

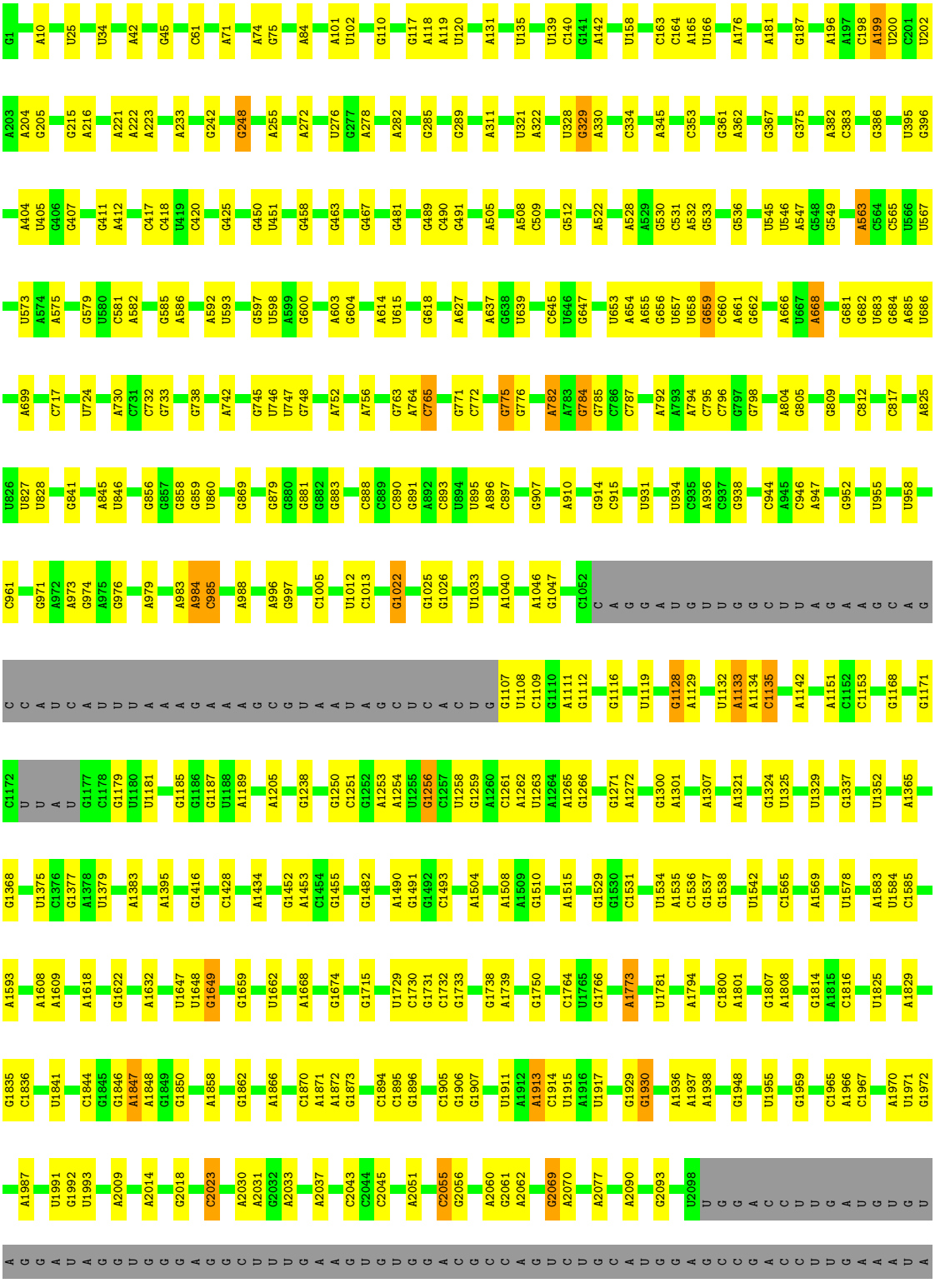
Chain Z:

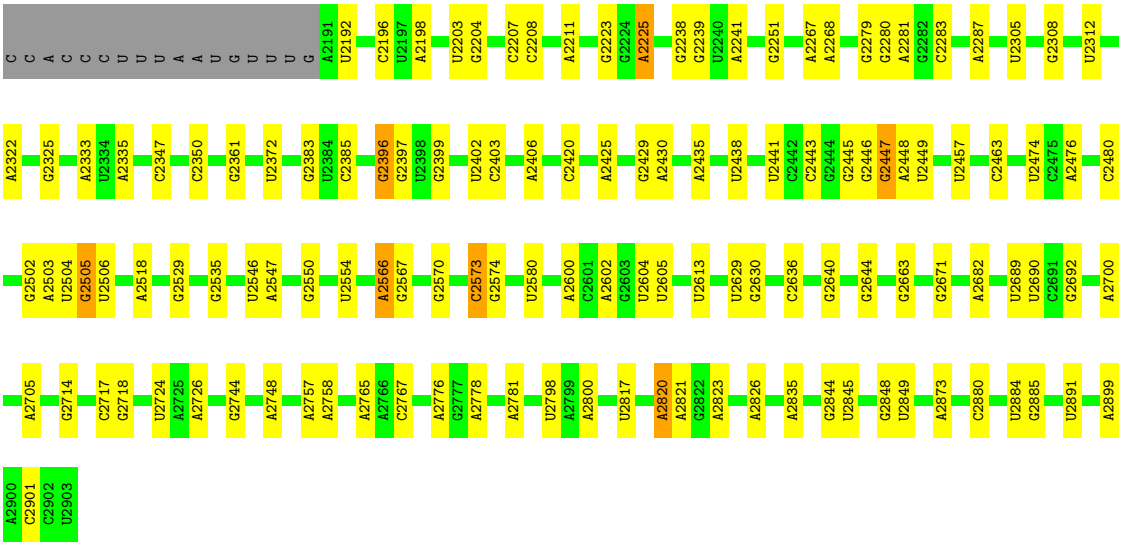




• Molecule 32: 23S ribosomal RNA

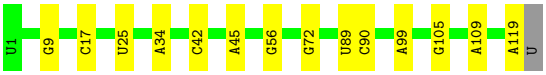
Chain a:





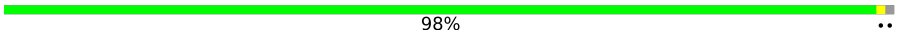
• Molecule 33: 5S ribosomal RNA

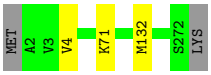
Chain b:



• Molecule 34: 50S ribosomal protein L2

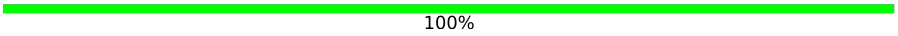
Chain c:





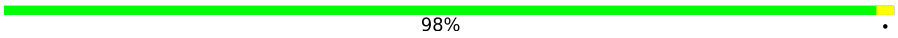
• Molecule 35: 50S ribosomal protein L3

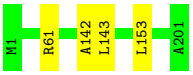
Chain d:



• Molecule 36: 50S ribosomal protein L4

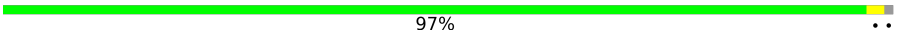
Chain e:





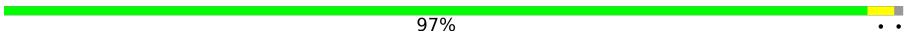
• Molecule 37: 50S ribosomal protein L5

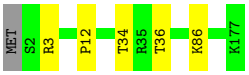
Chain f:



• Molecule 38: 50S ribosomal protein L6

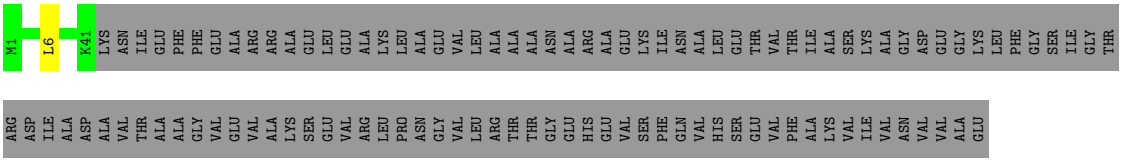
Chain g:





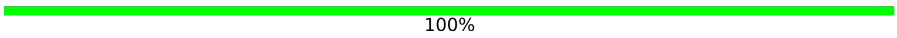
• Molecule 39: 50S ribosomal protein L9

Chain h:



• Molecule 40: 50S ribosomal protein L13

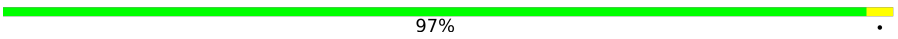
Chain i:

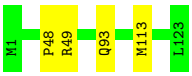


There are no outlier residues recorded for this chain.

• Molecule 41: 50S ribosomal protein L14

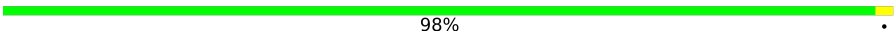
Chain j:





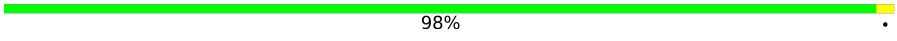
• Molecule 42: 50S ribosomal protein L15

Chain k:



• Molecule 43: 50S ribosomal protein L16

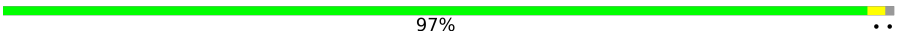
Chain l:

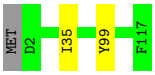


• Molecule 44: 50S ribosomal protein L17

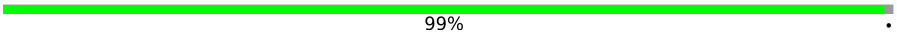
Chain m:

• Molecule 45: 50S ribosomal protein L18

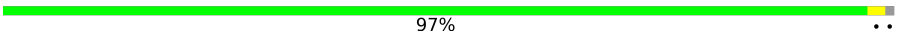
Chain n: 



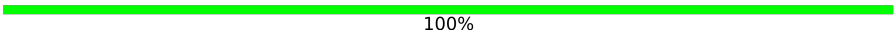
• Molecule 46: 50S ribosomal protein L19

Chain o: 

• Molecule 47: 50S ribosomal protein L20

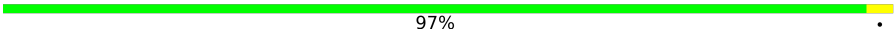
Chain p: 

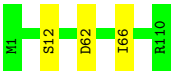
• Molecule 48: 50S ribosomal protein L21

Chain q: 

There are no outlier residues recorded for this chain.

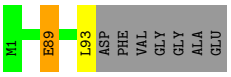
• Molecule 49: 50S ribosomal protein L22

Chain r: 



• Molecule 50: 50S ribosomal protein L23

Chain s: 

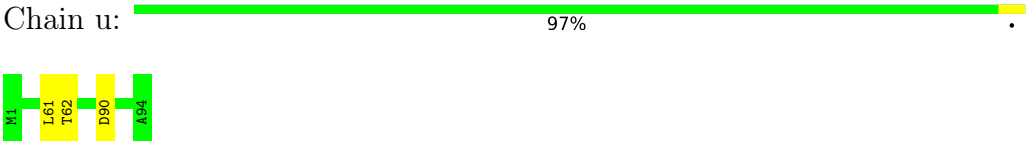


• Molecule 51: 50S ribosomal protein L24

Chain t: 

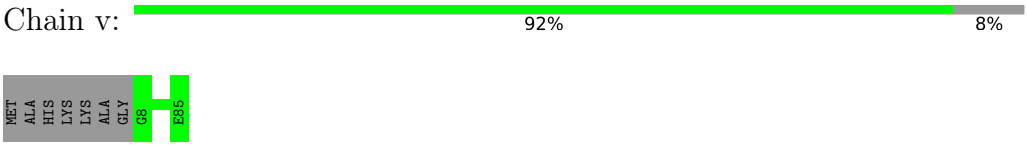
• Molecule 52: 50S ribosomal protein L25

Chain u:



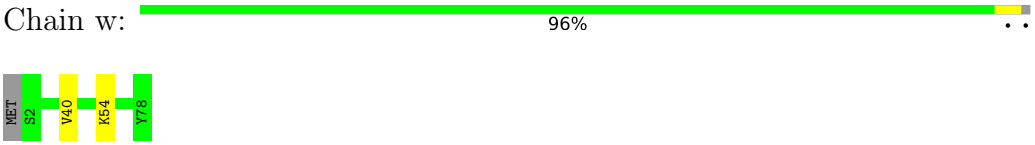
• Molecule 53: 50S ribosomal protein L27

Chain v:



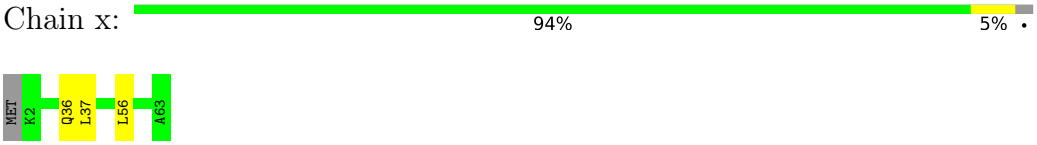
• Molecule 54: 50S ribosomal protein L28

Chain w:



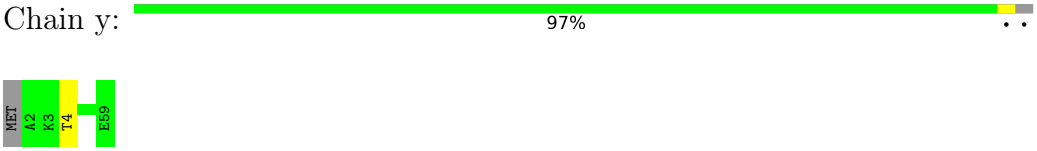
• Molecule 55: 50S ribosomal protein L29

Chain x:



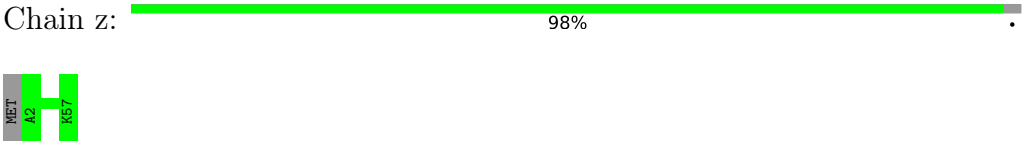
• Molecule 56: 50S ribosomal protein L30

Chain y:



• Molecule 57: 50S ribosomal protein L32

Chain z:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	137449	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	40	Depositor
Minimum defocus (nm)	400	Depositor
Maximum defocus (nm)	900	Depositor
Magnification	Not provided	
Image detector	FEI FALCON IV (4k x 4k)	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: A2G, 2MG, UR3, H2U, 5MU, OMC, 5MC, OMU, 6MZ, 4OC, 2MA, OMG, ZN, MG, G7M, 1MG, MEQ, SPM, PSU

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$\|Z\|$ >5	RMSZ	#$\|Z\|$ >5
1	0	0.26	0/424	0.50	0/565
2	1	0.33	0/380	0.60	0/498
3	2	0.28	0/513	0.54	0/676
4	3	0.30	0/303	0.55	0/397
5	4	0.26	0/488	0.46	0/649
6	A	0.51	0/162	0.66	0/221
7	B	0.55	12/36287 (0.0%)	0.94	9/56602 (0.0%)
8	C	0.66	0/1784	0.72	0/2403
9	D	0.65	0/1651	0.73	0/2225
10	E	0.65	0/1665	0.74	0/2227
11	F	0.66	0/1165	0.75	0/1568
12	G	0.73	1/858 (0.1%)	0.73	0/1160
13	H	0.67	0/1219	0.74	0/1635
14	I	0.64	0/989	0.73	0/1326
15	J	0.65	0/1034	0.74	0/1375
16	K	0.65	0/796	0.73	0/1077
17	L	0.65	0/893	0.75	0/1205
18	M	0.62	0/969	0.77	0/1300
19	N	0.66	0/900	0.74	0/1204
20	O	0.64	0/817	0.72	0/1088
21	P	0.63	0/722	0.70	0/964
22	Q	0.63	0/653	0.76	0/877
23	R	0.66	0/650	0.77	0/871
24	S	0.63	0/553	0.70	0/742
25	T	0.64	0/685	0.72	0/922
26	U	0.65	0/676	0.72	0/895
27	V	0.63	0/597	0.72	0/792
28	W	0.65	0/2832	0.72	0/3816
29	X	1.04	1/1813 (0.1%)	1.17	0/2823
30	Y	1.03	0/209	1.16	0/322
31	Z	0.98	0/1805	1.11	0/2812

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
32	a	1.09	206/65700 (0.3%)	1.27	188/102494 (0.2%)
33	b	1.02	2/2850 (0.1%)	1.19	0/4444
34	c	0.61	0/2121	0.76	0/2852
35	d	0.62	0/1576	0.77	0/2119
36	e	0.63	0/1571	0.73	0/2113
37	f	0.65	0/1434	0.72	0/1926
38	g	0.67	0/1343	0.75	0/1816
39	h	0.69	0/306	0.77	0/413
40	i	0.60	0/1152	0.72	0/1551
41	j	0.61	0/955	0.77	0/1279
42	k	0.65	0/1062	0.74	0/1413
43	l	0.59	0/1093	0.74	0/1460
44	m	0.61	0/958	0.76	0/1281
45	n	0.64	0/902	0.75	0/1209
46	o	0.62	0/929	0.74	0/1242
47	p	0.60	0/960	0.76	0/1278
48	q	0.62	0/829	0.78	0/1107
49	r	0.63	0/864	0.74	0/1156
50	s	0.63	0/744	0.73	0/994
51	t	0.66	0/787	0.78	0/1051
52	u	0.63	0/766	0.73	0/1025
53	v	0.61	0/593	0.77	0/785
54	w	0.61	0/635	0.75	0/848
55	x	0.64	0/502	0.70	0/667
56	y	0.64	0/453	0.74	0/605
57	z	0.63	0/450	0.74	0/599
All	All	0.86	222/156027 (0.1%)	1.06	197/232964 (0.1%)

All (222) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
32	a	2018	G	C5-C4	15.35	1.49	1.38
32	a	682	G	C8-N7	15.01	1.40	1.30
32	a	2396	G	C8-N7	14.63	1.39	1.30
32	a	1846	G	C8-N7	14.50	1.39	1.30
32	a	796	C	C4-C5	13.17	1.53	1.43
32	a	2018	G	N1-C2	12.99	1.48	1.37
32	a	2018	G	N9-C8	12.46	1.46	1.37
32	a	2018	G	C8-N7	12.41	1.38	1.30
7	B	579	A	N7-C5	12.35	1.46	1.39
32	a	2692	G	C8-N7	11.16	1.37	1.30
32	a	682	G	C2-N3	10.95	1.41	1.32

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
32	a	2070	A	N3-C4	10.80	1.41	1.34
32	a	2018	G	C6-N1	10.66	1.47	1.39
32	a	796	C	N1-C2	10.61	1.50	1.40
32	a	683	U	C4-C5	10.60	1.53	1.43
32	a	1895	C	N1-C2	10.34	1.50	1.40
32	a	1256	G	C8-N7	10.25	1.37	1.30
32	a	563	A	C6-N6	10.11	1.42	1.33
32	a	794	A	N9-C4	10.09	1.44	1.37
32	a	2070	A	C6-N1	10.02	1.42	1.35
12	G	103	VAL	C-O	9.82	1.42	1.23
32	a	771	G	C8-N7	9.68	1.36	1.30
32	a	598	U	C4-C5	9.48	1.52	1.43
32	a	585	G	N3-C4	9.43	1.42	1.35
32	a	2014	A	N7-C5	9.37	1.44	1.39
32	a	1262	A	C8-N7	9.29	1.38	1.31
32	a	733	G	C6-N1	9.29	1.46	1.39
32	a	1259	G	N7-C5	9.24	1.44	1.39
32	a	1254	A	N7-C5	9.23	1.44	1.39
32	a	382	A	C6-N1	9.19	1.42	1.35
32	a	581	C	N3-C4	9.00	1.40	1.33
32	a	1262	A	N9-C4	8.98	1.43	1.37
32	a	733	G	N3-C4	8.96	1.41	1.35
32	a	699	A	N3-C4	8.94	1.40	1.34
32	a	2037	A	N7-C5	8.85	1.44	1.39
32	a	2279	G	C8-N7	8.73	1.36	1.30
32	a	795	C	C4-C5	8.71	1.50	1.43
32	a	988	A	N9-C4	8.70	1.43	1.37
32	a	581	C	N1-C6	8.55	1.42	1.37
32	a	666	A	N9-C4	8.54	1.43	1.37
32	a	2717	C	C4-C5	8.54	1.49	1.43
32	a	1256	G	C2-N3	8.36	1.39	1.32
32	a	798	G	N3-C4	8.22	1.41	1.35
32	a	683	U	N1-C2	8.20	1.46	1.38
32	a	2037	A	N9-C4	8.16	1.42	1.37
32	a	1847	A	C6-N1	8.11	1.41	1.35
32	a	1846	G	C5-C4	8.10	1.44	1.38
32	a	684	G	N9-C8	8.08	1.43	1.37
32	a	733	G	N7-C5	7.92	1.44	1.39
7	B	579	A	N3-C4	7.84	1.39	1.34
7	B	579	A	N9-C4	7.83	1.42	1.37
7	B	1387	G	C8-N7	7.81	1.35	1.30
32	a	666	A	N7-C5	7.69	1.43	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
32	a	2420	C	C4-C5	7.65	1.49	1.43
7	B	1392	G	N7-C5	7.59	1.43	1.39
32	a	2239	G	N9-C8	7.53	1.43	1.37
32	a	2717	C	N1-C2	7.51	1.47	1.40
32	a	2070	A	N7-C5	7.42	1.43	1.39
32	a	2438	U	C4-C5	7.41	1.50	1.43
32	a	2018	G	N7-C5	7.40	1.43	1.39
29	X	1	G	OP3-P	-7.40	1.52	1.61
32	a	2420	C	N3-C4	7.40	1.39	1.33
32	a	2844	G	C5-C4	7.39	1.43	1.38
32	a	598	U	N1-C2	7.38	1.45	1.38
32	a	662	G	C8-N7	7.37	1.35	1.30
32	a	1894	C	C5-C6	7.30	1.40	1.34
32	a	2280	G	C8-N7	7.26	1.35	1.30
32	a	1254	A	N3-C4	7.21	1.39	1.34
32	a	467	G	C2-N3	7.20	1.38	1.32
32	a	585	G	C6-N1	7.17	1.44	1.39
32	a	798	G	C6-N1	7.17	1.44	1.39
32	a	592	A	N7-C5	7.16	1.43	1.39
32	a	2018	G	C2'-C1'	7.07	1.61	1.53
32	a	1846	G	C2'-C1'	7.06	1.61	1.53
32	a	658	U	N1-C2	7.00	1.44	1.38
32	a	682	G	C5-C4	7.00	1.43	1.38
32	a	2844	G	N1-C2	6.99	1.43	1.37
32	a	2844	G	C8-N7	6.94	1.35	1.30
32	a	1844	C	C4-C5	6.92	1.48	1.43
32	a	1894	C	C4-C5	6.88	1.48	1.43
32	a	2438	U	N1-C2	6.84	1.44	1.38
32	a	684	G	C8-N7	6.83	1.35	1.30
32	a	733	G	N9-C8	6.82	1.42	1.37
32	a	1894	C	C2-N3	6.78	1.41	1.35
32	a	662	G	C5-C4	6.77	1.43	1.38
32	a	467	G	C8-N7	6.77	1.35	1.30
32	a	798	G	N7-C5	6.77	1.43	1.39
32	a	1959	G	C8-N7	6.66	1.34	1.30
32	a	2420	C	N1-C2	6.65	1.46	1.40
32	a	795	C	C2-N3	6.64	1.41	1.35
32	a	979	A	C5-C4	6.64	1.43	1.38
32	a	2090	A	N3-C4	6.63	1.38	1.34
32	a	2009	A	N7-C5	6.62	1.43	1.39
32	a	976	G	C8-N7	6.61	1.34	1.30
32	a	597	G	C8-N7	6.56	1.34	1.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
32	a	1307	A	N9-C4	6.54	1.41	1.37
32	a	1948	G	C8-N7	6.54	1.34	1.30
32	a	684	G	C2-N3	6.50	1.38	1.32
32	a	795	C	N1-C2	6.49	1.46	1.40
32	a	1254	A	C6-N1	6.46	1.40	1.35
32	a	682	G	C2'-C1'	6.45	1.60	1.53
32	a	2090	A	N7-C5	6.43	1.43	1.39
32	a	682	G	N1-C2	6.38	1.42	1.37
32	a	1895	C	C4-C5	6.37	1.48	1.43
32	a	2070	A	N9-C8	6.37	1.42	1.37
32	a	681	G	N1-C2	6.36	1.42	1.37
32	a	1895	C	C5-C6	6.36	1.39	1.34
32	a	699	A	C6-N1	6.35	1.40	1.35
32	a	938	G	C8-N7	6.32	1.34	1.30
32	a	2037	A	N3-C4	6.29	1.38	1.34
32	a	683	U	C2'-C1'	6.29	1.60	1.53
32	a	1847	A	C2-N3	6.26	1.39	1.33
32	a	2090	A	C6-N1	6.26	1.40	1.35
32	a	2281	A	C6-N1	6.25	1.40	1.35
32	a	592	A	N9-C4	6.23	1.41	1.37
32	a	597	G	N7-C5	6.19	1.43	1.39
32	a	658	U	C4-C5	6.19	1.49	1.43
32	a	699	A	N1-C2	6.15	1.39	1.34
32	a	825	A	N7-C5	6.13	1.43	1.39
32	a	382	A	C5-C4	6.13	1.43	1.38
32	a	2700	A	N7-C5	6.10	1.43	1.39
32	a	683	U	C5-C6	6.09	1.39	1.34
32	a	1844	C	N1-C2	6.09	1.46	1.40
32	a	2014	A	N3-C4	6.05	1.38	1.34
32	a	1846	G	N1-C2	6.05	1.42	1.37
32	a	765	C	C4-C5	6.03	1.47	1.43
32	a	1936	A	N9-C4	6.02	1.41	1.37
32	a	976	G	N9-C4	5.98	1.42	1.38
32	a	661	A	C8-N7	5.96	1.35	1.31
32	a	1846	G	C6-O6	5.96	1.29	1.24
32	a	2014	A	N9-C4	5.95	1.41	1.37
32	a	660	C	C5-C6	5.95	1.39	1.34
32	a	2281	A	N3-C4	5.94	1.38	1.34
32	a	1896	G	C8-N7	5.91	1.34	1.30
32	a	1455	G	C8-N7	5.89	1.34	1.30
32	a	661	A	N9-C4	5.87	1.41	1.37
32	a	597	G	N9-C4	5.86	1.42	1.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
32	a	579	G	C8-N7	5.86	1.34	1.30
32	a	1649	G	C8-N7	5.83	1.34	1.30
32	a	979	A	C2'-C1'	5.83	1.59	1.53
32	a	1959	G	C5-C4	5.79	1.42	1.38
32	a	1894	C	N1-C2	5.79	1.46	1.40
32	a	592	A	C8-N7	5.74	1.35	1.31
7	B	925	G	C8-N7	5.71	1.34	1.30
32	a	662	G	N1-C2	5.70	1.42	1.37
32	a	699	A	C5-C4	5.62	1.42	1.38
32	a	2705	A	N9-C4	5.62	1.41	1.37
32	a	1850	G	N3-C4	5.58	1.39	1.35
32	a	1263	U	C2'-C1'	5.55	1.59	1.53
7	B	1387	G	C5-C4	5.54	1.42	1.38
32	a	1850	G	C6-N1	5.54	1.43	1.39
32	a	604	G	C8-N7	5.53	1.34	1.30
32	a	1258	U	C4-C5	5.51	1.48	1.43
32	a	804	A	N7-C5	5.51	1.42	1.39
32	a	841	G	C8-N7	5.50	1.34	1.30
32	a	1659	G	C8-N7	5.50	1.34	1.30
33	b	72	G	N3-C4	5.49	1.39	1.35
32	a	985	C	C5-C6	5.48	1.38	1.34
32	a	2700	A	N3-C4	5.44	1.38	1.34
32	a	1258	U	N1-C2	5.44	1.43	1.38
32	a	585	G	C2-N2	5.43	1.40	1.34
7	B	667	G	C8-N7	5.42	1.34	1.30
32	a	1168	G	N9-C4	5.42	1.42	1.38
32	a	467	G	N7-C5	5.40	1.42	1.39
32	a	1337	G	C5-C4	5.39	1.42	1.38
32	a	593	U	C4-C5	5.38	1.48	1.43
32	a	787	C	C4-C5	5.37	1.47	1.43
32	a	2700	A	N9-C4	5.37	1.41	1.37
32	a	979	A	N1-C2	5.35	1.39	1.34
32	a	1337	G	N1-C2	5.34	1.42	1.37
32	a	936	A	N9-C4	5.33	1.41	1.37
32	a	2399	G	C5-C4	5.33	1.42	1.38
32	a	856	G	C8-N7	5.33	1.34	1.30
32	a	1107	G	P-O5'	5.32	1.65	1.59
32	a	798	G	N9-C8	5.32	1.41	1.37
32	a	1259	G	C2-N3	5.32	1.37	1.32
32	a	2399	G	N9-C8	5.31	1.41	1.37
32	a	1265	A	C6-N1	5.30	1.39	1.35
32	a	1794	A	N7-C5	5.30	1.42	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
32	a	657	U	N1-C2	5.29	1.43	1.38
32	a	1259	G	N9-C4	5.26	1.42	1.38
32	a	1846	G	N7-C5	-5.26	1.36	1.39
32	a	382	A	N7-C5	5.26	1.42	1.39
32	a	771	G	N1-C2	5.24	1.42	1.37
32	a	1814	G	C8-N7	5.23	1.34	1.30
32	a	2443	C	C4-C5	5.23	1.47	1.43
32	a	600	G	C2-N3	5.23	1.36	1.32
32	a	763	G	C8-N7	5.22	1.34	1.30
32	a	1895	C	C2-N3	5.22	1.40	1.35
32	a	585	G	N9-C8	5.21	1.41	1.37
33	b	72	G	C6-N1	5.21	1.43	1.39
32	a	742	A	N9-C4	5.20	1.41	1.37
7	B	1392	G	N9-C4	5.20	1.42	1.38
32	a	787	C	N1-C2	5.19	1.45	1.40
32	a	656	G	C8-N7	5.18	1.34	1.30
7	B	881	G	C8-N7	5.18	1.34	1.30
32	a	581	C	C2-O2	5.18	1.29	1.24
32	a	1895	C	C2'-C1'	5.17	1.59	1.53
32	a	1256	G	N9-C4	5.17	1.42	1.38
32	a	581	C	C4-C5	5.16	1.47	1.43
7	B	1387	G	N1-C2	5.15	1.41	1.37
32	a	2397	G	C6-O6	5.15	1.28	1.24
32	a	592	A	C2-N3	5.13	1.38	1.33
32	a	825	A	N3-C4	5.12	1.38	1.34
32	a	2241	A	N9-C4	5.11	1.41	1.37
32	a	463	G	C8-N7	5.10	1.34	1.30
32	a	2845	U	C4-O4	5.10	1.27	1.23
32	a	467	G	N1-C2	5.08	1.41	1.37
32	a	2018	G	C2-N3	5.08	1.36	1.32
32	a	825	A	C6-N1	5.07	1.39	1.35
32	a	756	A	N7-C5	5.06	1.42	1.39
32	a	1181	U	C4-C5	5.06	1.48	1.43
32	a	1847	A	P-O5'	5.04	1.64	1.59
32	a	131	A	N3-C4	5.03	1.37	1.34
32	a	2396	G	C5-C4	5.02	1.41	1.38
32	a	1368	G	C8-N7	5.02	1.33	1.30
32	a	1261	C	N1-C6	5.02	1.40	1.37
32	a	659	G	C8-N7	5.01	1.33	1.30
32	a	1850	G	N7-C5	5.01	1.42	1.39
32	a	1168	G	N7-C5	5.01	1.42	1.39
7	B	1392	G	C8-N7	5.01	1.33	1.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
32	a	1337	G	C8-N7	5.00	1.33	1.30

All (197) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
32	a	682	G	N9-C4-C5	13.85	110.94	105.40
32	a	682	G	C4-C5-N7	-12.50	105.80	110.80
32	a	2018	G	C5-C6-N1	-10.43	106.28	111.50
32	a	682	G	C8-N9-C4	-8.55	102.98	106.40
32	a	1256	G	N9-C4-C5	8.47	108.79	105.40
32	a	1846	G	C5-C6-N1	-8.13	107.44	111.50
32	a	1846	G	N9-C4-C5	8.12	108.65	105.40
32	a	682	G	C4-C5-C6	8.09	123.66	118.80
32	a	512	G	O4'-C1'-N9	8.06	114.64	108.20
32	a	1846	G	C8-N9-C4	-7.88	103.25	106.40
7	B	22	G	O5'-P-OP2	-7.86	98.63	105.70
32	a	2018	G	C6-C5-N7	-7.76	125.75	130.40
32	a	1913	A	P-O3'-C3'	-7.46	110.75	119.70
32	a	1915	U	P-O3'-C3'	-7.46	110.75	119.70
32	a	1256	G	C4-C5-N7	-7.40	107.84	110.80
32	a	2018	G	C5-C6-O6	7.32	132.99	128.60
32	a	662	G	C8-N9-C4	-7.20	103.52	106.40
7	B	579	A	C8-N9-C4	7.14	108.66	105.80
32	a	1251	C	C4-C5-C6	7.09	120.94	117.40
32	a	329	G	O3'-P-O5'	-6.98	90.74	104.00
32	a	1914	C	P-O3'-C3'	-6.93	111.38	119.70
32	a	681	G	C8-N9-C4	-6.70	103.72	106.40
32	a	1254	A	C8-N9-C4	6.67	108.47	105.80
32	a	784	G	OP1-P-O3'	6.63	119.80	105.20
32	a	985	C	C5-C6-N1	-6.52	117.74	121.00
32	a	1251	C	N3-C4-C5	-6.52	119.29	121.90
32	a	2018	G	C5-N7-C8	-6.51	101.05	104.30
32	a	158	U	P-O3'-C3'	-6.45	111.97	119.70
32	a	242	G	C3'-C2'-C1'	-6.42	96.36	101.50
32	a	1153	C	OP1-P-O3'	6.42	119.33	105.20
32	a	2014	A	C8-N9-C4	6.42	108.37	105.80
32	a	467	G	N9-C4-C5	6.41	107.97	105.40
32	a	796	C	C5-C6-N1	-6.37	117.81	121.00
32	a	1895	C	C4-C5-C6	6.34	120.57	117.40
32	a	2573	C	O4'-C1'-N1	6.30	113.24	108.20
32	a	1936	A	O4'-C1'-N9	6.26	113.21	108.20
32	a	772	C	N3-C4-C5	-6.22	119.41	121.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
32	a	2267	A	OP1-P-O3'	6.21	118.86	105.20
32	a	2018	G	N7-C8-N9	6.19	116.20	113.10
32	a	2396	G	C5-N7-C8	-6.19	101.20	104.30
32	a	794	A	C5-N7-C8	6.19	107.00	103.90
32	a	782	A	OP1-P-O3'	6.17	118.78	105.20
32	a	682	G	N1-C6-O6	6.12	123.57	119.90
32	a	795	C	C4-C5-C6	6.10	120.45	117.40
32	a	2208	C	P-O3'-C3'	-6.07	112.42	119.70
32	a	958	U	OP1-P-O3'	6.03	118.46	105.20
32	a	684	G	N9-C4-C5	6.02	107.81	105.40
32	a	984	A	O4'-C1'-N9	6.00	113.00	108.20
32	a	2239	G	C8-N9-C4	-5.94	104.02	106.40
32	a	1936	A	C1'-O4'-C4'	-5.94	105.15	109.90
32	a	1133	A	C1'-O4'-C4'	-5.93	105.16	109.90
32	a	2447	G	C3'-C2'-C1'	-5.87	96.81	101.50
32	a	1930	G	C3'-C2'-C1'	-5.82	96.85	101.50
32	a	1825	U	OP1-P-O3'	5.80	117.96	105.20
32	a	658	U	C5-C6-N1	-5.76	119.82	122.70
32	a	328	U	OP1-P-O3'	5.75	117.85	105.20
7	B	976	G	O3'-P-O5'	-5.73	93.11	104.00
7	B	561	U	O3'-P-O5'	-5.73	93.12	104.00
32	a	592	A	C4-C5-N7	-5.70	107.85	110.70
32	a	973	A	OP1-P-O3'	5.68	117.70	105.20
32	a	2051	A	OP1-P-O3'	5.67	117.67	105.20
32	a	659	G	C8-N9-C4	-5.64	104.14	106.40
32	a	2062	A	OP1-P-O3'	5.62	117.58	105.20
32	a	1128	G	C1'-O4'-C4'	-5.62	105.40	109.90
32	a	984	A	C1'-O4'-C4'	-5.60	105.42	109.90
32	a	2280	G	N9-C4-C5	5.59	107.64	105.40
32	a	1649	G	C8-N9-C4	-5.59	104.16	106.40
32	a	1668	A	OP1-P-O3'	5.59	117.50	105.20
32	a	1262	A	N9-C4-C5	5.58	108.03	105.80
32	a	2207	C	P-O3'-C3'	-5.58	113.00	119.70
32	a	202	U	OP1-P-O3'	5.58	117.47	105.20
32	a	2546	U	OP1-P-O3'	5.57	117.46	105.20
32	a	952	G	OP1-P-O3'	5.55	117.41	105.20
32	a	2018	G	C6-N1-C2	5.55	128.43	125.10
32	a	166	U	P-O3'-C3'	-5.54	113.05	119.70
32	a	1022	G	OP1-P-O3'	5.54	117.39	105.20
32	a	395	U	O4'-C1'-N1	5.54	112.63	108.20
32	a	2848	G	O4'-C1'-N9	5.52	112.62	108.20
32	a	582	A	N7-C8-N9	-5.52	111.04	113.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
32	a	775	G	OP1-P-O3'	5.51	117.33	105.20
32	a	2724	U	O5'-P-OP2	-5.51	100.74	105.70
32	a	732	C	OP1-P-O3'	5.51	117.32	105.20
32	a	2566	A	OP1-P-O3'	5.50	117.31	105.20
32	a	2055	C	OP1-P-O3'	5.50	117.31	105.20
32	a	2823	A	OP1-P-O3'	5.50	117.30	105.20
32	a	61	C	OP1-P-O3'	5.49	117.27	105.20
32	a	512	G	C1'-O4'-C4'	-5.48	105.52	109.90
32	a	682	G	N3-C4-C5	-5.43	125.89	128.60
32	a	1134	A	OP1-P-O3'	5.43	117.15	105.20
32	a	1632	A	OP1-P-O3'	5.43	117.14	105.20
32	a	683	U	N1-C2-N3	5.42	118.16	114.90
7	B	576	C	O5'-P-OP1	5.42	117.20	110.70
32	a	2550	G	OP1-P-O3'	5.41	117.10	105.20
32	a	467	G	C8-N9-C4	-5.40	104.24	106.40
32	a	639	U	OP1-P-O3'	5.40	117.07	105.20
32	a	1846	G	C4-C5-C6	5.40	122.04	118.80
32	a	1936	A	C5-C6-N1	-5.39	115.00	117.70
32	a	997	G	OP1-P-O3'	5.38	117.04	105.20
32	a	944	C	OP1-P-O3'	5.37	117.02	105.20
32	a	2505	G	OP2-P-O3'	5.36	117.00	105.20
32	a	825	A	OP2-P-O3'	5.36	117.00	105.20
32	a	860	U	OP1-P-O3'	5.36	116.98	105.20
32	a	2873	A	C1'-O4'-C4'	-5.34	105.63	109.90
32	a	2225	A	OP1-P-O3'	5.33	116.93	105.20
32	a	1151	A	OP1-P-O3'	5.33	116.93	105.20
7	B	932	C	N3-C4-C5	-5.33	119.77	121.90
32	a	2573	C	C3'-C2'-C1'	-5.32	97.24	101.50
32	a	2045	C	OP1-P-O3'	5.32	116.89	105.20
32	a	1254	A	N9-C4-C5	-5.29	103.68	105.80
32	a	2767	C	OP1-P-O3'	5.29	116.83	105.20
32	a	205	G	C3'-C2'-C1'	-5.27	97.28	101.50
32	a	1256	G	C8-N9-C4	-5.26	104.30	106.40
32	a	771	G	N9-C4-C5	5.25	107.50	105.40
32	a	582	A	C8-N9-C4	5.25	107.90	105.80
7	B	686	U	C3'-C2'-C1'	-5.25	97.30	101.50
32	a	2640	G	OP2-P-O3'	5.25	116.74	105.20
7	B	1347	G	C3'-C2'-C1'	-5.24	97.31	101.50
32	a	199	A	C1'-O4'-C4'	-5.24	105.71	109.90
32	a	598	U	C5-C6-N1	-5.24	120.08	122.70
32	a	2820	A	OP1-P-O3'	5.24	116.72	105.20
32	a	971	G	OP1-P-O3'	5.23	116.71	105.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
32	a	748	G	C1'-O4'-C4'	-5.22	105.72	109.90
32	a	567	U	OP1-P-O3'	5.22	116.69	105.20
32	a	1266	G	C3'-C2'-C1'	-5.22	97.32	101.50
32	a	1395	A	C1'-O4'-C4'	-5.22	105.72	109.90
32	a	334	C	OP1-P-O3'	5.21	116.67	105.20
32	a	117	G	OP1-P-O3'	5.20	116.65	105.20
32	a	458	G	C3'-C2'-C1'	-5.20	97.34	101.50
32	a	2463	C	OP1-P-O3'	5.20	116.65	105.20
32	a	1185	G	OP1-P-O3'	5.20	116.64	105.20
32	a	2636	C	OP1-P-O3'	5.20	116.64	105.20
32	a	2776	A	OP1-P-O3'	5.20	116.63	105.20
32	a	407	G	OP1-P-O3'	5.19	116.62	105.20
32	a	1966	A	OP1-P-O3'	5.19	116.62	105.20
32	a	1259	G	C5-C6-O6	-5.19	125.49	128.60
32	a	329	G	OP1-P-O3'	5.19	116.61	105.20
32	a	198	C	OP1-P-OP2	-5.18	111.82	119.60
32	a	2600	A	OP1-P-O3'	5.18	116.60	105.20
32	a	2570	G	OP1-P-O3'	5.18	116.59	105.20
32	a	176	A	OP1-P-O3'	5.17	116.58	105.20
32	a	1766	G	OP1-P-O3'	5.17	116.58	105.20
32	a	2835	A	OP1-P-O3'	5.17	116.58	105.20
32	a	2826	A	OP1-P-O3'	5.17	116.57	105.20
32	a	2196	C	OP1-P-O3'	5.16	116.56	105.20
32	a	25	U	OP1-P-O3'	5.16	116.55	105.20
32	a	2023	C	OP1-P-O3'	5.16	116.54	105.20
32	a	1375	U	OP1-P-O3'	5.14	116.51	105.20
32	a	1325	U	OP1-P-O3'	5.14	116.50	105.20
32	a	1324	G	O4'-C1'-N9	5.14	112.31	108.20
32	a	2849	U	OP1-P-O3'	5.14	116.50	105.20
32	a	467	G	C4-C5-N7	-5.13	108.75	110.80
32	a	2718	G	OP1-P-O3'	5.13	116.49	105.20
32	a	809	G	N9-C4-C5	5.13	107.45	105.40
32	a	1133	A	O4'-C1'-N9	5.13	112.30	108.20
32	a	1662	U	OP1-P-O3'	5.12	116.47	105.20
32	a	668	A	OP1-P-O3'	5.12	116.46	105.20
32	a	522	A	OP1-P-O3'	5.11	116.44	105.20
32	a	662	G	N9-C4-C5	5.11	107.44	105.40
32	a	1025	G	OP1-P-O3'	5.10	116.43	105.20
32	a	1377	G	OP1-P-O3'	5.10	116.43	105.20
32	a	418	C	OP1-P-O3'	5.10	116.42	105.20
32	a	1238	G	OP1-P-O3'	5.10	116.42	105.20
32	a	1836	C	OP1-P-O3'	5.10	116.42	105.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
32	a	775	G	O4'-C1'-N9	5.10	112.28	108.20
32	a	248	G	OP1-P-O3'	5.09	116.41	105.20
32	a	1992	G	OP1-P-O3'	5.09	116.39	105.20
32	a	604	G	OP1-P-O3'	5.09	116.39	105.20
32	a	2817	U	OP1-P-O3'	5.09	116.39	105.20
32	a	2781	A	OP1-P-O3'	5.08	116.38	105.20
32	a	187	G	OP1-P-O3'	5.08	116.38	105.20
32	a	528	A	OP2-P-O3'	5.08	116.36	105.20
32	a	2457	PSU	OP1-P-O3'	5.07	116.36	105.20
32	a	565	C	OP2-P-O3'	5.07	116.35	105.20
32	a	1781	U	OP1-P-O3'	5.06	116.34	105.20
32	a	1128	G	OP1-P-O3'	5.05	116.32	105.20
32	a	255	A	OP1-P-O3'	5.05	116.32	105.20
32	a	1773	A	OP2-P-O3'	5.05	116.32	105.20
32	a	1565	C	O3'-P-O5'	-5.05	94.40	104.00
32	a	450	G	OP1-P-O3'	5.04	116.29	105.20
32	a	204	A	OP1-P-O3'	5.04	116.28	105.20
32	a	223	A	OP1-P-O3'	5.04	116.28	105.20
32	a	2605	PSU	OP2-P-O3'	5.04	116.28	105.20
32	a	752	A	OP1-P-O3'	5.03	116.27	105.20
32	a	375	G	OP1-P-O3'	5.03	116.26	105.20
32	a	204	A	O3'-P-O5'	-5.03	94.45	104.00
32	a	2446	G	OP1-P-O3'	5.03	116.26	105.20
32	a	2717	C	C5-C6-N1	-5.02	118.49	121.00
32	a	536	G	OP1-P-O3'	5.02	116.25	105.20
32	a	947	A	OP1-P-O3'	5.02	116.24	105.20
32	a	382	A	N1-C2-N3	-5.02	126.79	129.30
32	a	1135	C	OP1-P-O3'	5.02	116.24	105.20
32	a	1189	A	OP1-P-O3'	5.01	116.23	105.20
7	B	576	C	O5'-P-OP2	-5.01	101.19	105.70
32	a	417	C	OP1-P-O3'	5.01	116.22	105.20
32	a	2644	G	OP1-P-O3'	5.01	116.21	105.20
32	a	662	G	C2-N3-C4	-5.00	109.40	111.90
32	a	817	C	OP1-P-O3'	5.00	116.21	105.20

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

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

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	0	49/55 (89%)	49 (100%)	0	0	100 100
2	1	44/46 (96%)	44 (100%)	0	0	100 100
3	2	62/65 (95%)	60 (97%)	1 (2%)	1 (2%)	8 7
4	3	36/38 (95%)	35 (97%)	1 (3%)	0	100 100
5	4	56/70 (80%)	52 (93%)	4 (7%)	0	100 100
6	A	17/19 (90%)	17 (100%)	0	0	100 100
8	C	222/241 (92%)	203 (91%)	17 (8%)	2 (1%)	14 17
9	D	204/233 (88%)	174 (85%)	30 (15%)	0	100 100
10	E	203/206 (98%)	191 (94%)	10 (5%)	2 (1%)	13 15
11	F	154/167 (92%)	143 (93%)	11 (7%)	0	100 100
12	G	101/135 (75%)	96 (95%)	2 (2%)	3 (3%)	3 2
13	H	151/179 (84%)	125 (83%)	23 (15%)	3 (2%)	6 5
14	I	127/130 (98%)	116 (91%)	11 (9%)	0	100 100
15	J	125/130 (96%)	112 (90%)	10 (8%)	3 (2%)	5 4
16	K	96/103 (93%)	86 (90%)	7 (7%)	3 (3%)	3 2
17	L	115/129 (89%)	104 (90%)	9 (8%)	2 (2%)	7 7
18	M	121/124 (98%)	115 (95%)	4 (3%)	2 (2%)	7 7
19	N	113/118 (96%)	107 (95%)	6 (5%)	0	100 100
20	O	98/101 (97%)	94 (96%)	3 (3%)	1 (1%)	13 15
21	P	86/89 (97%)	80 (93%)	6 (7%)	0	100 100
22	Q	79/82 (96%)	73 (92%)	5 (6%)	1 (1%)	10 11
23	R	77/84 (92%)	72 (94%)	4 (5%)	1 (1%)	10 11
24	S	64/75 (85%)	59 (92%)	5 (8%)	0	100 100
25	T	82/92 (89%)	77 (94%)	5 (6%)	0	100 100
26	U	84/87 (97%)	83 (99%)	1 (1%)	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
27	V	68/71 (96%)	65 (96%)	2 (3%)	1 (2%)	8 8
28	W	352/360 (98%)	327 (93%)	15 (4%)	10 (3%)	4 3
34	c	269/273 (98%)	254 (94%)	14 (5%)	1 (0%)	30 39
35	d	206/209 (99%)	195 (95%)	11 (5%)	0	100 100
36	e	199/201 (99%)	191 (96%)	7 (4%)	1 (0%)	25 32
37	f	175/179 (98%)	163 (93%)	11 (6%)	1 (1%)	22 27
38	g	174/177 (98%)	160 (92%)	13 (8%)	1 (1%)	22 27
39	h	39/149 (26%)	33 (85%)	6 (15%)	0	100 100
40	i	140/142 (99%)	134 (96%)	6 (4%)	0	100 100
41	j	121/123 (98%)	113 (93%)	7 (6%)	1 (1%)	16 20
42	k	142/144 (99%)	132 (93%)	9 (6%)	1 (1%)	19 23
43	l	134/136 (98%)	127 (95%)	7 (5%)	0	100 100
44	m	116/127 (91%)	108 (93%)	8 (7%)	0	100 100
45	n	114/117 (97%)	109 (96%)	4 (4%)	1 (1%)	14 17
46	o	112/115 (97%)	105 (94%)	7 (6%)	0	100 100
47	p	115/118 (98%)	115 (100%)	0	0	100 100
48	q	101/103 (98%)	93 (92%)	8 (8%)	0	100 100
49	r	108/110 (98%)	103 (95%)	4 (4%)	1 (1%)	14 17
50	s	91/100 (91%)	86 (94%)	4 (4%)	1 (1%)	12 13
51	t	100/104 (96%)	89 (89%)	6 (6%)	5 (5%)	1 1
52	u	92/94 (98%)	88 (96%)	4 (4%)	0	100 100
53	v	76/85 (89%)	73 (96%)	3 (4%)	0	100 100
54	w	75/78 (96%)	67 (89%)	8 (11%)	0	100 100
55	x	60/63 (95%)	55 (92%)	3 (5%)	2 (3%)	3 2
56	y	56/59 (95%)	52 (93%)	3 (5%)	1 (2%)	7 6
57	z	54/57 (95%)	51 (94%)	3 (6%)	0	100 100
All	All	5855/6292 (93%)	5455 (93%)	348 (6%)	52 (1%)	17 17

All (52) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
13	H	5	ARG
13	H	130	ASN

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Mol	Chain	Res	Type
28	W	70	ASP
28	W	211	ASP
28	W	323	ASN
34	c	71	LYS
49	r	12	SER
51	t	98	SER
8	C	64	LYS
8	C	77	SER
12	G	33	GLU
13	H	113	ASP
16	K	31	ARG
16	K	57	VAL
27	V	65	ALA
28	W	143	ARG
28	W	212	ALA
50	s	89	GLU
51	t	39	ILE
51	t	97	LYS
51	t	99	ASN
55	x	37	LEU
56	y	4	THR
17	L	89	PRO
17	L	119	ASN
18	M	17	ALA
23	R	50	ASN
55	x	36	GLN
3	2	28	ASN
10	E	166	GLU
12	G	38	ARG
12	G	68	GLN
16	K	91	ASP
18	M	48	ALA
28	W	38	LEU
28	W	73	GLU
42	k	29	LYS
45	n	99	TYR
51	t	76	ALA
15	J	13	LYS
15	J	109	ARG
20	O	33	ASP
15	J	107	ASP
22	Q	80	LYS

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Mol	Chain	Res	Type
28	W	141	ALA
36	e	142	ALA
28	W	210	PRO
28	W	342	GLU
37	f	109	PRO
10	E	64	ILE
38	g	12	PRO
41	j	48	PRO

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	0	46/49 (94%)	45 (98%)	1 (2%)	47	65
2	1	38/38 (100%)	36 (95%)	2 (5%)	19	28
3	2	51/52 (98%)	50 (98%)	1 (2%)	50	68
4	3	34/34 (100%)	33 (97%)	1 (3%)	37	54
5	4	55/62 (89%)	53 (96%)	2 (4%)	30	44
6	A	18/18 (100%)	17 (94%)	1 (6%)	17	26
8	C	186/199 (94%)	181 (97%)	5 (3%)	40	57
9	D	170/190 (90%)	165 (97%)	5 (3%)	37	54
10	E	172/173 (99%)	165 (96%)	7 (4%)	26	39
11	F	119/126 (94%)	119 (100%)	0	100	100
12	G	90/116 (78%)	84 (93%)	6 (7%)	13	19
13	H	126/147 (86%)	124 (98%)	2 (2%)	58	74
14	I	104/105 (99%)	102 (98%)	2 (2%)	52	69
15	J	105/107 (98%)	100 (95%)	5 (5%)	21	32
16	K	86/90 (96%)	81 (94%)	5 (6%)	17	24
17	L	90/99 (91%)	89 (99%)	1 (1%)	70	83
18	M	103/104 (99%)	101 (98%)	2 (2%)	52	69

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
19	N	93/96 (97%)	92 (99%)	1 (1%)	70	83
20	O	83/84 (99%)	82 (99%)	1 (1%)	67	81
21	P	76/77 (99%)	75 (99%)	1 (1%)	65	79
22	Q	65/65 (100%)	65 (100%)	0	100	100
23	R	73/78 (94%)	70 (96%)	3 (4%)	26	39
24	S	57/65 (88%)	55 (96%)	2 (4%)	31	46
25	T	72/79 (91%)	70 (97%)	2 (3%)	38	55
26	U	65/66 (98%)	64 (98%)	1 (2%)	60	76
27	V	60/61 (98%)	60 (100%)	0	100	100
28	W	294/300 (98%)	287 (98%)	7 (2%)	44	61
34	c	216/218 (99%)	214 (99%)	2 (1%)	75	87
35	d	163/163 (100%)	162 (99%)	1 (1%)	84	92
36	e	165/165 (100%)	162 (98%)	3 (2%)	54	71
37	f	148/150 (99%)	145 (98%)	3 (2%)	50	68
38	g	137/138 (99%)	133 (97%)	4 (3%)	37	54
39	h	32/114 (28%)	31 (97%)	1 (3%)	35	51
40	i	116/116 (100%)	116 (100%)	0	100	100
41	j	104/104 (100%)	101 (97%)	3 (3%)	37	54
42	k	103/103 (100%)	101 (98%)	2 (2%)	52	69
43	l	109/109 (100%)	106 (97%)	3 (3%)	38	55
44	m	98/103 (95%)	97 (99%)	1 (1%)	73	85
45	n	86/87 (99%)	85 (99%)	1 (1%)	67	81
46	o	99/100 (99%)	99 (100%)	0	100	100
47	p	89/90 (99%)	87 (98%)	2 (2%)	47	65
48	q	84/84 (100%)	84 (100%)	0	100	100
49	r	93/93 (100%)	91 (98%)	2 (2%)	47	65
50	s	80/84 (95%)	78 (98%)	2 (2%)	42	60
51	t	83/85 (98%)	81 (98%)	2 (2%)	44	61
52	u	78/78 (100%)	75 (96%)	3 (4%)	28	42
53	v	58/63 (92%)	58 (100%)	0	100	100
54	w	67/68 (98%)	65 (97%)	2 (3%)	36	52

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
55	x	54/55 (98%)	53 (98%)	1 (2%)	52 69
56	y	48/49 (98%)	48 (100%)	0	100 100
57	z	47/48 (98%)	47 (100%)	0	100 100
All	All	4888/5147 (95%)	4784 (98%)	104 (2%)	49 66

All (104) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	0	28	ARG
2	1	1	MET
2	1	25	LYS
3	2	31	HIS
4	3	2	LYS
5	4	34	LEU
5	4	63	ARG
6	A	19	VAL
8	C	23	TRP
8	C	32	PHE
8	C	93	ASN
8	C	105	LYS
8	C	222	ARG
9	D	27	LYS
9	D	105	GLU
9	D	123	GLN
9	D	178	LEU
9	D	195	VAL
10	E	8	LYS
10	E	14	ARG
10	E	34	ILE
10	E	45	LYS
10	E	57	GLU
10	E	181	THR
10	E	188	ARG
12	G	17	GLN
12	G	37	HIS
12	G	62	MET
12	G	74	LEU
12	G	91	ARG
12	G	102	MET
13	H	67	GLU
13	H	92	ARG

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Mol	Chain	Res	Type
14	I	27	MET
14	I	56	LYS
15	J	27	LYS
15	J	56	ASP
15	J	85	ARG
15	J	100	LYS
15	J	123	ARG
16	K	17	LEU
16	K	18	ILE
16	K	27	GLU
16	K	45	ARG
16	K	90	LEU
17	L	129	VAL
18	M	34	CYS
18	M	44	LYS
19	N	14	HIS
20	O	33	ASP
21	P	17	ARG
23	R	6	ARG
23	R	57	ASP
23	R	67	LEU
24	S	10	PHE
24	S	16	GLU
25	T	15	LEU
25	T	55	ARG
26	U	85	LYS
28	W	69	LEU
28	W	96	LEU
28	W	103	LYS
28	W	149	MET
28	W	254	VAL
28	W	271	LEU
28	W	356	LEU
34	c	4	VAL
34	c	132	MET
35	d	1	MET
36	e	61	ARG
36	e	143	LEU
36	e	153	LEU
37	f	30	ARG
37	f	83	TYR
37	f	120	LYS

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Mol	Chain	Res	Type
38	g	3	ARG
38	g	34	THR
38	g	36	THR
38	g	86	LYS
39	h	6	LEU
41	j	49	ARG
41	j	93	GLN
41	j	113	MET
42	k	112	LEU
42	k	129	LYS
43	l	36	VAL
43	l	53	MET
43	l	82	MET
44	m	51	LEU
45	n	35	ILE
47	p	51	ARG
47	p	112	LYS
49	r	62	ASP
49	r	66	ILE
50	s	89	GLU
50	s	93	LEU
51	t	52	LEU
51	t	74	ASN
52	u	61	LEU
52	u	62	THR
52	u	90	ASP
54	w	40	VAL
54	w	54	LYS
55	x	56	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
8	C	177	ASN
8	C	203	ASN
9	D	123	GLN
11	F	97	GLN
13	H	68	ASN
15	J	110	GLN
17	L	118	HIS
20	O	60	GLN
22	Q	26	ASN

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Mol	Chain	Res	Type
23	R	9	GLN
25	T	52	HIS
28	W	97	GLN
28	W	307	ASN
48	q	6	GLN
50	s	48	GLN
57	z	6	ASN

5.3.3 RNA

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
29	X	75/76 (98%)	18 (24%)	4 (5%)
30	Y	8/9 (88%)	0	0
31	Z	75/76 (98%)	41 (54%)	3 (4%)
32	a	2747/2903 (94%)	341 (12%)	0
33	b	118/120 (98%)	13 (11%)	0
7	B	1516/1534 (98%)	235 (15%)	24 (1%)
All	All	4539/4718 (96%)	648 (14%)	31 (0%)

All (648) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
7	B	4	U
7	B	5	U
7	B	6	G
7	B	7	A
7	B	8	A
7	B	9	G
7	B	22	G
7	B	32	A
7	B	39	G
7	B	44	A
7	B	47	C
7	B	48	C
7	B	50	A
7	B	51	A
7	B	58	C
7	B	65	A
7	B	66	A
7	B	70	U
7	B	71	A

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Mol	Chain	Res	Type
7	B	72	A
7	B	75	G
7	B	78	A
7	B	81	A
7	B	83	C
7	B	85	U
7	B	86	G
7	B	87	C
7	B	88	U
7	B	96	U
7	B	119	A
7	B	120	A
7	B	121	U
7	B	122	G
7	B	131	A
7	B	142	G
7	B	143	A
7	B	144	G
7	B	159	G
7	B	163	C
7	B	164	G
7	B	182	A
7	B	189	A
7	B	191	G
7	B	197	A
7	B	199	A
7	B	203	G
7	B	204	G
7	B	215	C
7	B	226	G
7	B	240	G
7	B	245	U
7	B	247	G
7	B	251	G
7	B	266	G
7	B	267	C
7	B	271	C
7	B	280	C
7	B	289	G
7	B	299	G
7	B	319	G
7	B	321	A

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Mol	Chain	Res	Type
7	B	328	C
7	B	329	A
7	B	347	G
7	B	352	C
7	B	354	G
7	B	367	U
7	B	369	G
7	B	372	C
7	B	376	G
7	B	392	C
7	B	393	A
7	B	397	A
7	B	404	G
7	B	406	G
7	B	412	A
7	B	413	G
7	B	414	A
7	B	421	U
7	B	422	C
7	B	423	G
7	B	424	G
7	B	429	U
7	B	435	A
7	B	446	G
7	B	451	A
7	B	453	G
7	B	457	G
7	B	467	U
7	B	468	A
7	B	479	U
7	B	484	G
7	B	486	U
7	B	500	G
7	B	511	C
7	B	518	C
7	B	519	C
7	B	521	G
7	B	547	A
7	B	559	A
7	B	572	A
7	B	573	A
7	B	576	C

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Mol	Chain	Res	Type
7	B	579	A
7	B	596	A
7	B	614	C
7	B	615	G
7	B	639	G
7	B	649	A
7	B	650	G
7	B	653	U
7	B	661	G
7	B	665	A
7	B	671	G
7	B	682	G
7	B	723	U
7	B	724	G
7	B	734	G
7	B	747	A
7	B	748	G
7	B	755	G
7	B	777	A
7	B	793	U
7	B	794	A
7	B	815	A
7	B	817	C
7	B	851	G
7	B	857	C
7	B	885	G
7	B	890	G
7	B	914	A
7	B	926	G
7	B	931	C
7	B	934	C
7	B	935	A
7	B	936	C
7	B	960	U
7	B	966	2MG
7	B	968	A
7	B	969	A
7	B	971	G
7	B	975	A
7	B	976	G
7	B	977	A
7	B	978	A

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Mol	Chain	Res	Type
7	B	984	C
7	B	993	G
7	B	994	A
7	B	996	A
7	B	1003	G
7	B	1004	A
7	B	1005	A
7	B	1008	U
7	B	1020	G
7	B	1023	U
7	B	1026	G
7	B	1027	C
7	B	1030	U
7	B	1031	C
7	B	1032	G
7	B	1033	G
7	B	1034	G
7	B	1036	A
7	B	1037	C
7	B	1039	G
7	B	1042	A
7	B	1044	A
7	B	1053	G
7	B	1060	U
7	B	1065	U
7	B	1070	U
7	B	1085	U
7	B	1094	G
7	B	1095	U
7	B	1101	A
7	B	1124	G
7	B	1125	U
7	B	1132	C
7	B	1135	U
7	B	1136	C
7	B	1137	C
7	B	1139	G
7	B	1159	U
7	B	1169	A
7	B	1171	A
7	B	1174	G
7	B	1184	G

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Mol	Chain	Res	Type
7	B	1187	G
7	B	1196	A
7	B	1197	A
7	B	1213	A
7	B	1214	C
7	B	1221	G
7	B	1226	C
7	B	1227	A
7	B	1228	C
7	B	1238	A
7	B	1247	U
7	B	1248	A
7	B	1256	A
7	B	1257	A
7	B	1260	G
7	B	1274	A
7	B	1275	A
7	B	1280	A
7	B	1287	A
7	B	1300	G
7	B	1302	C
7	B	1312	G
7	B	1317	C
7	B	1320	C
7	B	1338	G
7	B	1340	A
7	B	1346	A
7	B	1353	G
7	B	1363	A
7	B	1364	U
7	B	1370	G
7	B	1378	C
7	B	1379	G
7	B	1381	U
7	B	1419	G
7	B	1429	A
7	B	1441	A
7	B	1450	U
7	B	1452	C
7	B	1453	G
7	B	1487	G
7	B	1497	G

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Mol	Chain	Res	Type
7	B	1505	G
7	B	1506	U
7	B	1517	G
7	B	1529	G
7	B	1530	G
7	B	1534	A
29	X	14	A
29	X	17	C
29	X	18	G
29	X	19	G
29	X	21	A
29	X	22	G
29	X	42	C
29	X	43	C
29	X	46	G
29	X	47	U
29	X	48	C
29	X	51	U
29	X	60	U
29	X	62	C
29	X	64	A
29	X	65	G
29	X	75	C
29	X	76	A
31	Z	3	C
31	Z	4	C
31	Z	8	U
31	Z	9	A
31	Z	10	G
31	Z	11	C
31	Z	12	U
31	Z	13	C
31	Z	14	A
31	Z	15	G
31	Z	16	U
31	Z	17	G
31	Z	18	G
31	Z	19	U
31	Z	20	U
31	Z	21	A
31	Z	26	A
31	Z	29	C

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Mol	Chain	Res	Type
31	Z	30	G
31	Z	34	U
31	Z	37	A
31	Z	38	A
31	Z	39	U
31	Z	40	C
31	Z	43	U
31	Z	45	G
31	Z	47	U
31	Z	48	C
31	Z	49	G
31	Z	50	C
31	Z	52	G
31	Z	53	G
31	Z	58	A
31	Z	59	G
31	Z	60	U
31	Z	61	C
31	Z	65	C
31	Z	68	G
31	Z	69	G
31	Z	71	C
31	Z	76	A
32	a	10	A
32	a	34	U
32	a	42	A
32	a	45	G
32	a	71	A
32	a	74	A
32	a	75	G
32	a	84	A
32	a	101	A
32	a	102	U
32	a	110	G
32	a	118	A
32	a	119	A
32	a	120	U
32	a	135	U
32	a	139	U
32	a	140	C
32	a	142	A
32	a	163	C

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Mol	Chain	Res	Type
32	a	164	C
32	a	165	A
32	a	181	A
32	a	196	A
32	a	199	A
32	a	200	U
32	a	215	G
32	a	216	A
32	a	221	A
32	a	222	A
32	a	233	A
32	a	248	G
32	a	272	A
32	a	276	U
32	a	278	A
32	a	282	A
32	a	285	G
32	a	289	G
32	a	311	A
32	a	321	U
32	a	322	A
32	a	329	G
32	a	330	A
32	a	345	A
32	a	353	C
32	a	361	G
32	a	362	A
32	a	367	G
32	a	383	C
32	a	386	G
32	a	396	G
32	a	404	A
32	a	405	U
32	a	411	G
32	a	412	A
32	a	420	C
32	a	425	G
32	a	451	U
32	a	481	G
32	a	489	G
32	a	490	C
32	a	491	G

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Mol	Chain	Res	Type
32	a	505	A
32	a	508	A
32	a	509	C
32	a	530	G
32	a	531	C
32	a	532	A
32	a	533	G
32	a	545	U
32	a	546	U
32	a	547	A
32	a	549	G
32	a	563	A
32	a	573	U
32	a	575	A
32	a	586	A
32	a	603	A
32	a	614	A
32	a	615	U
32	a	618	G
32	a	627	A
32	a	637	A
32	a	645	C
32	a	647	G
32	a	653	U
32	a	654	A
32	a	655	A
32	a	659	G
32	a	668	A
32	a	685	A
32	a	686	U
32	a	717	C
32	a	724	U
32	a	730	A
32	a	738	G
32	a	747	5MU
32	a	764	A
32	a	765	C
32	a	775	G
32	a	776	G
32	a	782	A
32	a	784	G
32	a	785	G

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Mol	Chain	Res	Type
32	a	792	A
32	a	805	G
32	a	812	C
32	a	827	U
32	a	828	U
32	a	845	A
32	a	846	U
32	a	858	G
32	a	859	G
32	a	869	G
32	a	879	G
32	a	881	G
32	a	883	G
32	a	888	C
32	a	890	C
32	a	891	G
32	a	893	C
32	a	895	U
32	a	896	A
32	a	897	C
32	a	907	G
32	a	910	A
32	a	914	G
32	a	915	C
32	a	931	U
32	a	934	U
32	a	946	C
32	a	961	C
32	a	974	G
32	a	983	A
32	a	984	A
32	a	985	C
32	a	996	A
32	a	1005	C
32	a	1012	U
32	a	1013	C
32	a	1022	G
32	a	1026	G
32	a	1033	U
32	a	1040	A
32	a	1046	A
32	a	1047	G

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Mol	Chain	Res	Type
32	a	1108	U
32	a	1109	C
32	a	1111	A
32	a	1112	G
32	a	1116	G
32	a	1119	U
32	a	1128	G
32	a	1129	A
32	a	1132	U
32	a	1133	A
32	a	1135	C
32	a	1142	A
32	a	1171	G
32	a	1179	G
32	a	1187	G
32	a	1205	A
32	a	1250	G
32	a	1253	A
32	a	1256	G
32	a	1271	G
32	a	1272	A
32	a	1300	G
32	a	1301	A
32	a	1321	A
32	a	1329	U
32	a	1352	U
32	a	1365	A
32	a	1379	U
32	a	1383	A
32	a	1416	G
32	a	1428	C
32	a	1434	A
32	a	1452	G
32	a	1453	A
32	a	1482	G
32	a	1490	A
32	a	1491	G
32	a	1493	C
32	a	1504	A
32	a	1508	A
32	a	1510	G
32	a	1515	A

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Mol	Chain	Res	Type
32	a	1529	G
32	a	1531	C
32	a	1534	U
32	a	1535	A
32	a	1536	C
32	a	1537	G
32	a	1538	G
32	a	1542	U
32	a	1569	A
32	a	1578	U
32	a	1583	A
32	a	1584	U
32	a	1585	C
32	a	1593	A
32	a	1608	A
32	a	1609	A
32	a	1622	G
32	a	1647	U
32	a	1648	U
32	a	1649	G
32	a	1674	G
32	a	1715	G
32	a	1729	U
32	a	1730	C
32	a	1731	G
32	a	1732	C
32	a	1733	G
32	a	1738	G
32	a	1739	A
32	a	1750	G
32	a	1764	C
32	a	1773	A
32	a	1800	C
32	a	1801	A
32	a	1807	G
32	a	1808	A
32	a	1816	C
32	a	1829	A
32	a	1841	U
32	a	1847	A
32	a	1848	A
32	a	1858	A

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Mol	Chain	Res	Type
32	a	1862	G
32	a	1866	A
32	a	1870	C
32	a	1871	A
32	a	1872	A
32	a	1873	G
32	a	1905	C
32	a	1906	G
32	a	1907	G
32	a	1913	A
32	a	1929	G
32	a	1930	G
32	a	1937	A
32	a	1938	A
32	a	1955	U
32	a	1965	C
32	a	1967	C
32	a	1970	A
32	a	1971	U
32	a	1972	G
32	a	1987	A
32	a	1991	U
32	a	1993	U
32	a	2023	C
32	a	2030	A
32	a	2031	A
32	a	2033	A
32	a	2043	C
32	a	2055	C
32	a	2056	G
32	a	2060	A
32	a	2061	G
32	a	2069	G7M
32	a	2077	A
32	a	2093	G
32	a	2192	U
32	a	2198	A
32	a	2203	U
32	a	2204	G
32	a	2211	A
32	a	2223	G
32	a	2225	A

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Mol	Chain	Res	Type
32	a	2238	G
32	a	2268	A
32	a	2283	C
32	a	2287	A
32	a	2305	U
32	a	2308	G
32	a	2312	U
32	a	2322	A
32	a	2325	G
32	a	2333	A
32	a	2335	A
32	a	2347	C
32	a	2350	C
32	a	2361	G
32	a	2372	U
32	a	2383	G
32	a	2385	C
32	a	2396	G
32	a	2402	U
32	a	2403	C
32	a	2406	A
32	a	2425	A
32	a	2429	G
32	a	2430	A
32	a	2435	A
32	a	2441	U
32	a	2447	G
32	a	2448	A
32	a	2474	U
32	a	2476	A
32	a	2480	C
32	a	2502	G
32	a	2505	G
32	a	2506	U
32	a	2518	A
32	a	2529	G
32	a	2535	G
32	a	2547	A
32	a	2554	U
32	a	2566	A
32	a	2567	G
32	a	2573	C

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Mol	Chain	Res	Type
32	a	2574	G
32	a	2602	A
32	a	2613	U
32	a	2629	U
32	a	2630	G
32	a	2663	G
32	a	2671	G
32	a	2682	A
32	a	2689	U
32	a	2690	U
32	a	2714	G
32	a	2726	A
32	a	2744	G
32	a	2748	A
32	a	2757	A
32	a	2758	A
32	a	2765	A
32	a	2778	A
32	a	2798	U
32	a	2800	A
32	a	2820	A
32	a	2821	A
32	a	2880	C
32	a	2884	U
32	a	2885	G
32	a	2891	U
32	a	2899	A
32	a	2901	C
33	b	9	G
33	b	17	C
33	b	25	U
33	b	34	A
33	b	42	C
33	b	45	A
33	b	56	G
33	b	89	U
33	b	90	C
33	b	99	A
33	b	105	G
33	b	109	A
33	b	119	A

All (31) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
7	B	7	A
7	B	65	A
7	B	70	U
7	B	83	C
7	B	119	A
7	B	214	C
7	B	251	G
7	B	266	G
7	B	329	A
7	B	468	A
7	B	559	A
7	B	575	G
7	B	653	U
7	B	793	U
7	B	884	U
7	B	992	U
7	B	993	G
7	B	1026	G
7	B	1035	A
7	B	1129	C
7	B	1136	C
7	B	1225	A
7	B	1319	A
7	B	1445	U
29	X	16	U
29	X	18	G
29	X	60	U
29	X	74	C
31	Z	9	A
31	Z	20	U
31	Z	39	U

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

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

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
32	G7M	a	2069	32	20,26,27	1.51	2 (10%)	17,39,42	0.78	0
32	PSU	a	955	32	18,21,22	0.93	1 (5%)	22,30,33	0.83	1 (4%)
7	5MC	B	1407	7	18,22,23	0.31	0	26,32,35	0.70	0
32	OMC	a	2498	32,60	19,22,23	0.29	0	26,31,34	0.56	0
32	2MA	a	2503	32,60	19,25,26	0.86	0	21,37,40	1.95	4 (19%)
32	5MU	a	747	32	19,22,23	0.31	0	28,32,35	0.46	0
7	2MG	B	1207	7	18,26,27	1.01	1 (5%)	16,38,41	0.84	0
32	1MG	a	745	32	18,26,27	0.88	1 (5%)	19,39,42	0.67	0
32	5MU	a	1939	32	19,22,23	0.33	0	28,32,35	0.50	0
32	PSU	a	2604	32	18,21,22	1.01	1 (5%)	22,30,33	0.96	1 (4%)
32	2MG	a	1835	32	18,26,27	1.23	2 (11%)	16,38,41	0.88	0
32	H2U	a	2449	32	18,21,22	0.55	0	21,30,33	0.86	1 (4%)
7	PSU	B	516	7	18,21,22	0.95	1 (5%)	22,30,33	0.63	0
7	2MG	B	1516	7	18,26,27	0.98	1 (5%)	16,38,41	0.87	1 (6%)
7	UR3	B	1498	7	19,22,23	0.33	0	26,32,35	0.62	0
7	G7M	B	527	7	20,26,27	1.17	3 (15%)	17,39,42	0.51	0
32	OMU	a	2552	32	19,22,23	0.24	0	26,31,34	0.57	0
7	4OC	B	1402	7	20,23,24	0.45	0	26,32,35	0.58	0
32	OMG	a	2251	32,60,29	18,26,27	1.01	2 (11%)	19,38,41	0.68	0
32	PSU	a	1917	32	18,21,22	0.88	1 (5%)	22,30,33	0.65	0
32	6MZ	a	1618	32	18,25,26	3.26	1 (5%)	16,36,39	1.90	1 (6%)
7	5MC	B	967	7	18,22,23	0.29	0	26,32,35	0.56	0
7	2MG	B	966	7	18,26,27	1.04	2 (11%)	16,38,41	0.73	0
32	PSU	a	746	32,60	18,21,22	0.88	1 (5%)	22,30,33	0.79	0
32	PSU	a	2580	32,60	18,21,22	1.07	1 (5%)	22,30,33	0.82	1 (4%)
35	MEQ	d	150	35	8,9,10	0.47	0	5,10,12	0.72	0
32	5MC	a	1962	32	18,22,23	0.37	0	26,32,35	0.52	0
32	PSU	a	2504	32	18,21,22	0.95	1 (5%)	22,30,33	0.65	0
32	PSU	a	2605	32	18,21,22	1.70	1 (5%)	22,30,33	0.78	1 (4%)
32	PSU	a	1911	32	18,21,22	0.92	1 (5%)	22,30,33	0.67	0
32	2MG	a	2445	32	18,26,27	1.09	3 (16%)	16,38,41	0.89	1 (6%)
32	PSU	a	2457	32	18,21,22	1.11	1 (5%)	22,30,33	0.64	0

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
32	G7M	a	2069	32	-	2/3/25/26	0/3/3/3
32	PSU	a	955	32	-	0/7/25/26	0/2/2/2
7	5MC	B	1407	7	-	0/7/25/26	0/2/2/2
32	OMC	a	2498	32,60	-	0/9/27/28	0/2/2/2
32	2MA	a	2503	32,60	-	2/3/25/26	0/3/3/3
32	5MU	a	747	32	-	2/7/25/26	0/2/2/2
7	2MG	B	1207	7	-	2/5/27/28	0/3/3/3
32	1MG	a	745	32	-	0/3/25/26	0/3/3/3
32	5MU	a	1939	32	-	0/7/25/26	0/2/2/2
32	PSU	a	2604	32	-	0/7/25/26	0/2/2/2
32	2MG	a	1835	32	-	0/5/27/28	0/3/3/3
32	H2U	a	2449	32	-	0/7/38/39	0/2/2/2
7	PSU	B	516	7	-	0/7/25/26	0/2/2/2
7	2MG	B	1516	7	-	0/5/27/28	0/3/3/3
7	UR3	B	1498	7	-	0/7/25/26	0/2/2/2
7	G7M	B	527	7	-	0/3/25/26	0/3/3/3
32	OMU	a	2552	32	-	0/9/27/28	0/2/2/2
7	4OC	B	1402	7	-	1/9/29/30	0/2/2/2
32	OMG	a	2251	32,60,29	-	1/5/27/28	0/3/3/3
32	PSU	a	1917	32	-	0/7/25/26	0/2/2/2
32	6MZ	a	1618	32	-	0/5/27/28	0/3/3/3
7	5MC	B	967	7	-	0/7/25/26	0/2/2/2
7	2MG	B	966	7	-	2/5/27/28	0/3/3/3
32	PSU	a	746	32,60	-	2/7/25/26	0/2/2/2
32	PSU	a	2580	32,60	-	0/7/25/26	0/2/2/2
35	MEQ	d	150	35	-	2/8/9/11	-
32	5MC	a	1962	32	-	2/7/25/26	0/2/2/2
32	PSU	a	2504	32	-	0/7/25/26	0/2/2/2
32	PSU	a	2605	32	-	0/7/25/26	0/2/2/2
32	PSU	a	1911	32	-	0/7/25/26	0/2/2/2
32	2MG	a	2445	32	-	0/5/27/28	0/3/3/3
32	PSU	a	2457	32	-	0/7/25/26	0/2/2/2

All (28) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
32	a	1618	6MZ	C9-N6	13.52	1.68	1.45
32	a	2605	PSU	C6-C5	6.57	1.43	1.35
32	a	2457	PSU	C6-C5	4.30	1.40	1.35
32	a	2580	PSU	C6-C5	4.13	1.40	1.35
32	a	2069	G7M	C8-N9	4.01	1.40	1.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
32	a	2069	G7M	C8-N7	3.91	1.40	1.33
7	B	516	PSU	C6-C5	3.66	1.39	1.35
32	a	1911	PSU	C6-C5	3.55	1.39	1.35
32	a	2504	PSU	C6-C5	3.53	1.39	1.35
7	B	527	G7M	C8-N9	3.48	1.39	1.33
32	a	1835	2MG	CM2-N2	3.45	1.51	1.45
32	a	955	PSU	C6-C5	3.42	1.39	1.35
32	a	1917	PSU	C6-C5	3.38	1.39	1.35
32	a	2604	PSU	C6-C5	3.38	1.39	1.35
32	a	746	PSU	C6-C5	3.29	1.39	1.35
32	a	2251	OMG	C5-C6	-2.65	1.42	1.47
7	B	966	2MG	C5-C6	-2.55	1.42	1.47
7	B	1207	2MG	C5-C6	-2.49	1.42	1.47
7	B	527	G7M	C8-N7	2.48	1.37	1.33
32	a	2445	2MG	C5-C6	-2.48	1.42	1.47
7	B	527	G7M	C5-C6	-2.44	1.39	1.45
7	B	1516	2MG	C5-C6	-2.39	1.42	1.47
32	a	1835	2MG	C5-C6	-2.22	1.42	1.47
32	a	745	1MG	C5-C4	-2.11	1.37	1.43
32	a	2445	2MG	C8-N7	-2.10	1.31	1.35
7	B	966	2MG	C8-N7	-2.10	1.31	1.35
32	a	2251	OMG	C5-C4	-2.08	1.37	1.43
32	a	2445	2MG	C5-C4	-2.02	1.37	1.43

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
32	a	1618	6MZ	C9-N6-C6	-7.05	116.80	122.87
32	a	2503	2MA	C5-C6-N1	-6.66	116.64	121.01
32	a	2503	2MA	C5-C6-N6	4.37	126.99	120.35
32	a	2449	H2U	C4-N3-C2	-2.62	123.62	125.79
32	a	2580	PSU	C3'-C2'-C1'	2.53	104.59	101.64
32	a	2503	2MA	C2-N1-C6	2.50	121.97	118.08
32	a	2604	PSU	C2'-C3'-C4'	-2.44	97.90	102.64
32	a	2605	PSU	C2'-C3'-C4'	-2.38	98.02	102.64
32	a	2503	2MA	N3-C2-N1	-2.12	121.86	125.73
7	B	1516	2MG	O6-C6-C5	2.07	128.41	124.37
32	a	2445	2MG	O6-C6-C5	2.06	128.40	124.37
32	a	955	PSU	C5-C6-N1	-2.05	119.03	122.11

There are no chirality outliers.

All (18) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	B	966	2MG	O4'-C4'-C5'-O5'
7	B	966	2MG	C3'-C4'-C5'-O5'
7	B	1207	2MG	N1-C2-N2-CM2
7	B	1207	2MG	N3-C2-N2-CM2
32	a	746	PSU	C2'-C1'-C5-C4
32	a	2251	OMG	C1'-C2'-O2'-CM2
35	d	150	MEQ	NE2-CD-CG-CB
35	d	150	MEQ	OE1-CD-CG-CB
32	a	747	5MU	C3'-C4'-C5'-O5'
32	a	747	5MU	O4'-C4'-C5'-O5'
32	a	2069	G7M	C4'-C5'-O5'-P
32	a	1962	5MC	O4'-C1'-N1-C6
32	a	1962	5MC	C2'-C1'-N1-C6
7	B	1402	4OC	O4'-C4'-C5'-O5'
32	a	746	PSU	O4'-C1'-C5-C6
32	a	2503	2MA	O4'-C4'-C5'-O5'
32	a	2069	G7M	O4'-C4'-C5'-O5'
32	a	2503	2MA	C4'-C5'-O5'-P

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 309 ligands modelled in this entry, 307 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).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
61	SPM	a	6209	-	13,13,13	0.21	0	12,12,12	0.20	0
59	A2G	A	101	6	14,14,15	0.48	0	17,19,21	0.95	1 (5%)

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
61	SPM	a	6209	-	-	5/11/11/11	-
59	A2G	A	101	6	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
59	A	101	A2G	O5-C1-C2	-3.34	106.01	111.29

There are no chirality outliers.

All (5) torsion outliers are listed below:

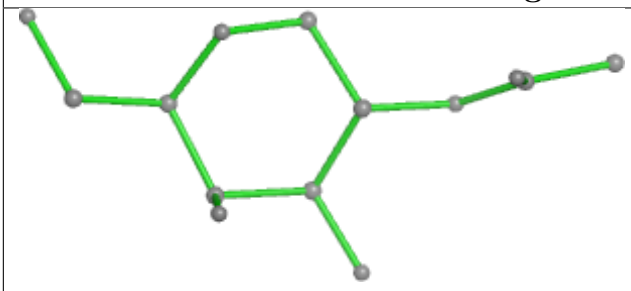
Mol	Chain	Res	Type	Atoms
61	a	6209	SPM	C2-C3-C4-N5
61	a	6209	SPM	N5-C6-C7-C8
61	a	6209	SPM	C11-C12-C13-N14
61	a	6209	SPM	N1-C2-C3-C4
61	a	6209	SPM	N10-C11-C12-C13

There are no ring outliers.

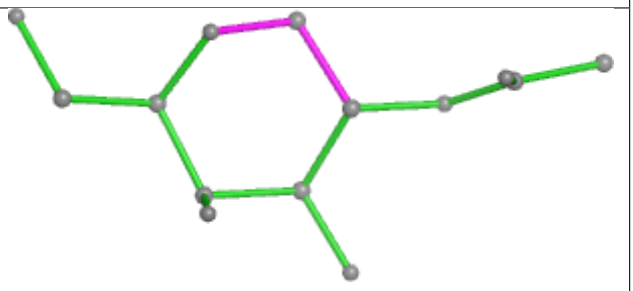
No monomer is involved in short contacts.

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.

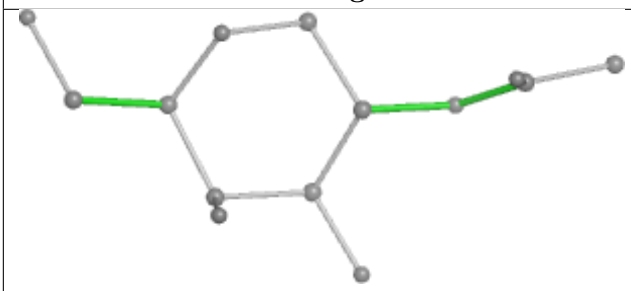
Ligand A2G A 101



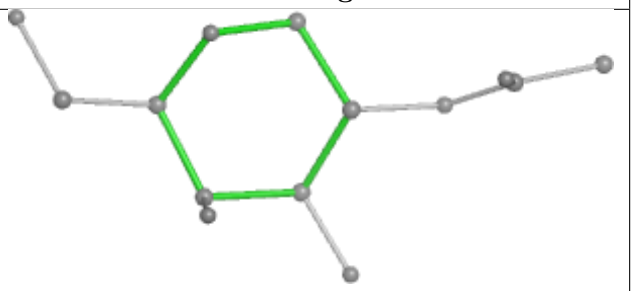
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.