Full wwPDB EM Validation Report ⓘ

Mar 2, 2025 – 02:41 PM JST

PDB ID	:	8ZDD
EMDB ID	:	EMD-39958
Title	:	Cryo-EM structure of the human ubiquitylated pre-40S ribosome with RIOK3 (without NOB1)
Authors	:	Huang, Z.; Wang, M.; Li, Y.; Beckmann, R.; Cheng, J.
Deposited on	:	2024-05-01
Resolution	:	3.70 Å(reported)

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

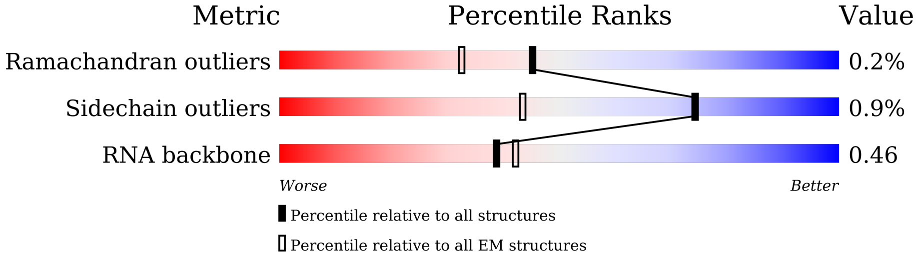
EMDB validation analysis	:	FAILED
MolProbity	:	4.02b-467
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	FAILED
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.41.2

1 Overall quality at a glance (i)

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

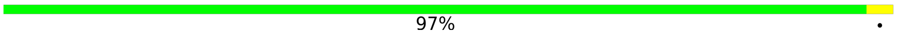
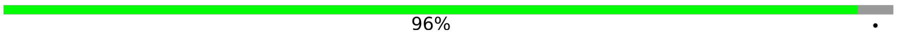
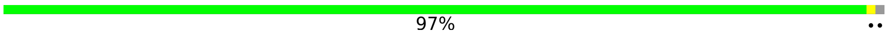
The reported resolution of this entry is 3.70 Å.

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.



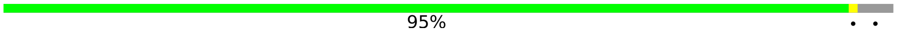
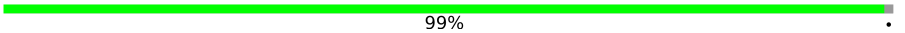
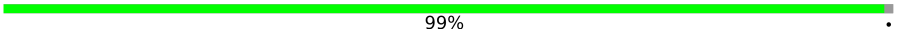
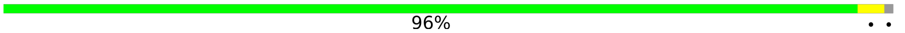
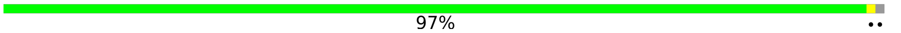
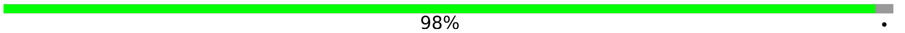
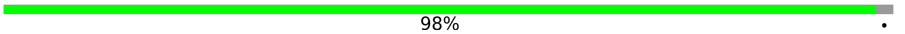
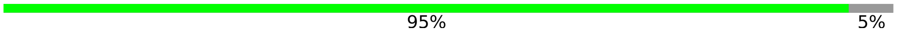
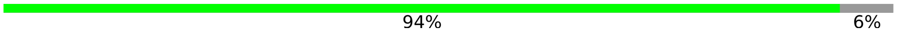
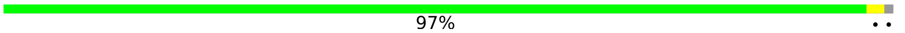
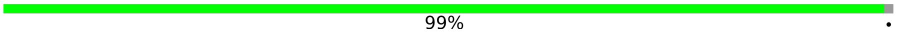
Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415
RNA backbone	6643	2191

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	2	1873	
2	R	135	
3	A	295	
4	B	264	
5	C	293	
6	E	263	
7	G	249	
8	H	194	
9	I	208	

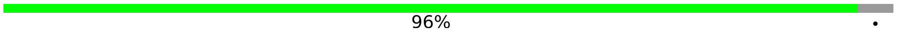
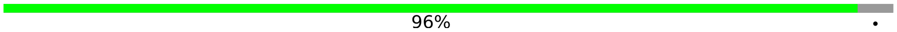
Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
10	J	194	
11	L	158	
12	N	151	
13	O	151	
14	V	83	
15	W	130	
16	X	143	
17	Y	133	
18	b	84	
19	x	252	
20	u	804	
21	t	475	
22	d	56	
23	D	243	
24	F	204	
25	K	165	
26	M	132	
27	P	145	
28	Q	146	
29	S	152	
30	T	145	
31	U	119	
32	Z	125	
33	c	69	
34	g	317	

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
35	p	519	
36	i	76	
36	j	76	

2 Entry composition ⓘ

There are 37 unique types of molecules in this entry. The entry contains 81515 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a RNA chain called 18S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	2	1652	35283	15748	6344	11540	1651	0	0

- Molecule 2 is a protein called Small ribosomal subunit protein eS17.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	R	122	990	621	184	182	3	0	0

- Molecule 3 is a protein called Small ribosomal subunit protein uS2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	A	216	1705	1083	299	315	8	0	0

- Molecule 4 is a protein called Small ribosomal subunit protein eS1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	B	213	1729	1098	309	308	14	0	0

- Molecule 5 is a protein called Small ribosomal subunit protein uS5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	C	218	1690	1094	289	297	10	0	0

- Molecule 6 is a protein called Small ribosomal subunit protein eS4, X isoform.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	E	262	2076	1324	386	358	8	0	0

- Molecule 7 is a protein called Small ribosomal subunit protein eS6.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	G	230	Total 1862	C 1164	N 371	O 320	S 7	0	0

- Molecule 8 is a protein called Small ribosomal subunit protein eS7.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	H	186	Total 1501	C 957	N 276	O 267	S 1	0	0

- Molecule 9 is a protein called Small ribosomal subunit protein eS8.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	I	205	Total 1682	C 1056	N 331	O 290	S 5	0	0

- Molecule 10 is a protein called Small ribosomal subunit protein uS4.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	J	180	Total 1499	C 955	N 300	O 242	S 2	0	0

- Molecule 11 is a protein called Small ribosomal subunit protein uS17.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	L	151	Total 1229	C 782	N 230	O 211	S 6	0	0

- Molecule 12 is a protein called Small ribosomal subunit protein uS15.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	N	149	Total 1202	C 770	N 228	O 203	S 1	0	0

- Molecule 13 is a protein called Small ribosomal subunit protein uS11.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	O	135	Total 1009	C 618	N 198	O 187	S 6	0	0

- Molecule 14 is a protein called Small ribosomal subunit protein eS21.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	V	82	Total 625	C 384	N 116	O 120	S 5	0	0

- Molecule 15 is a protein called Small ribosomal subunit protein uS8.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	W	129	Total 1034	C 659	N 193	O 176	S 6	0	0

- Molecule 16 is a protein called Small ribosomal subunit protein uS12.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	X	141	Total 1098	C 693	N 219	O 183	S 3	0	0

- Molecule 17 is a protein called Small ribosomal subunit protein eS24.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	Y	124	Total 1014	C 641	N 198	O 170	S 5	0	0

- Molecule 18 is a protein called Small ribosomal subunit protein eS27.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	b	82	Total 640	C 402	N 118	O 113	S 7	0	0

- Molecule 19 is a protein called RNA-binding protein PNO1.

Mol	Chain	Residues	Atoms				AltConf	Trace
19	x	178	Total 880	C 524	N 178	O 178	0	0

- Molecule 20 is a protein called Pre-rRNA-processing protein TSR1 homolog.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	u	615	Total 4954	C 3179	N 885	O 866	S 24	0	0

- Molecule 21 is a protein called Protein LTV1 homolog.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
21	t	61	517	316	107	94	0	0

- Molecule 22 is a protein called Small ribosomal subunit protein uS14.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
22	d	55	459	286	94	74	5	0	0

- Molecule 23 is a protein called Small ribosomal subunit protein uS3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
23	D	225	1752	1117	315	313	7	0	0

- Molecule 24 is a protein called Small ribosomal subunit protein uS7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
24	F	189	1495	934	284	270	7	0	0

- Molecule 25 is a protein called Small ribosomal subunit protein eS10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
25	K	95	800	522	142	131	5	0	0

- Molecule 26 is a protein called Small ribosomal subunit protein eS12.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
26	M	123	953	598	169	177	9	0	0

- Molecule 27 is a protein called Small ribosomal subunit protein uS19.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
27	P	120	984	625	184	168	7	0	0

- Molecule 28 is a protein called Small ribosomal subunit protein uS9.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
28	Q	139	1109	704	210	192	3	0	0

- Molecule 29 is a protein called Small ribosomal subunit protein uS13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
29	S	143	1184	743	240	200	1	0	0

- Molecule 30 is a protein called Small ribosomal subunit protein eS19.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
30	T	144	1122	703	217	199	3	0	0

- Molecule 31 is a protein called Small ribosomal subunit protein uS10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
31	U	101	803	504	153	142	4	0	0

- Molecule 32 is a protein called Small ribosomal subunit protein eS25.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
32	Z	72	574	368	104	101	1	0	0

- Molecule 33 is a protein called Small ribosomal subunit protein eS28.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
33	c	61	479	292	95	90	2	0	0

- Molecule 34 is a protein called Small ribosomal subunit protein RACK1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
34	g	314	2440	1537	425	466	12	0	0

- Molecule 35 is a protein called Serine/threonine-protein kinase RIO3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
35	p	389	2419	1468	462	483	6	0	0

- Molecule 36 is a protein called Ubiquitin.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
36	i	73	361	215	73	73	0	0
36	j	73	361	215	73	73	0	0

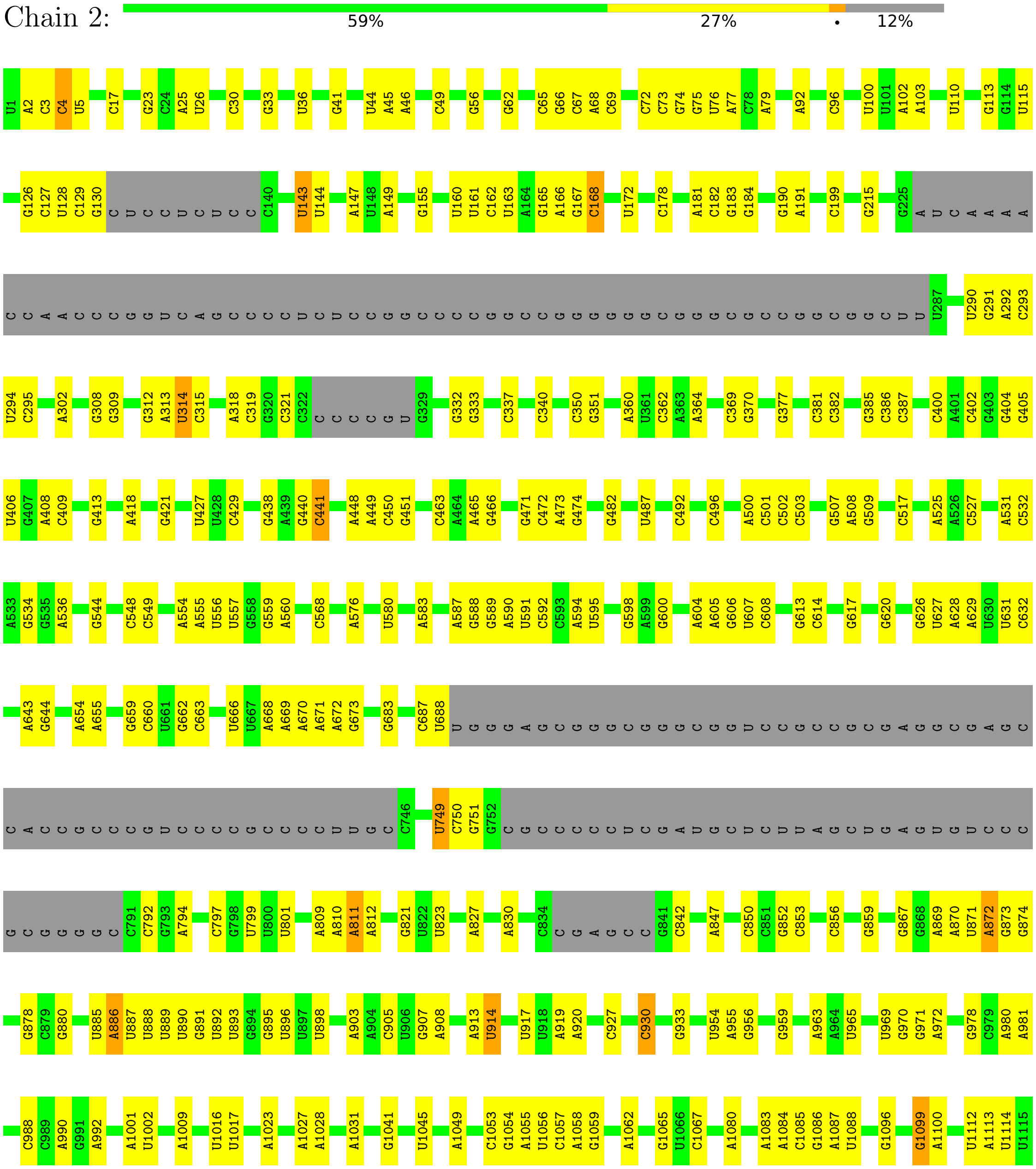
- Molecule 37 is ZINC ION (three-letter code: ZN) (formula: Zn).

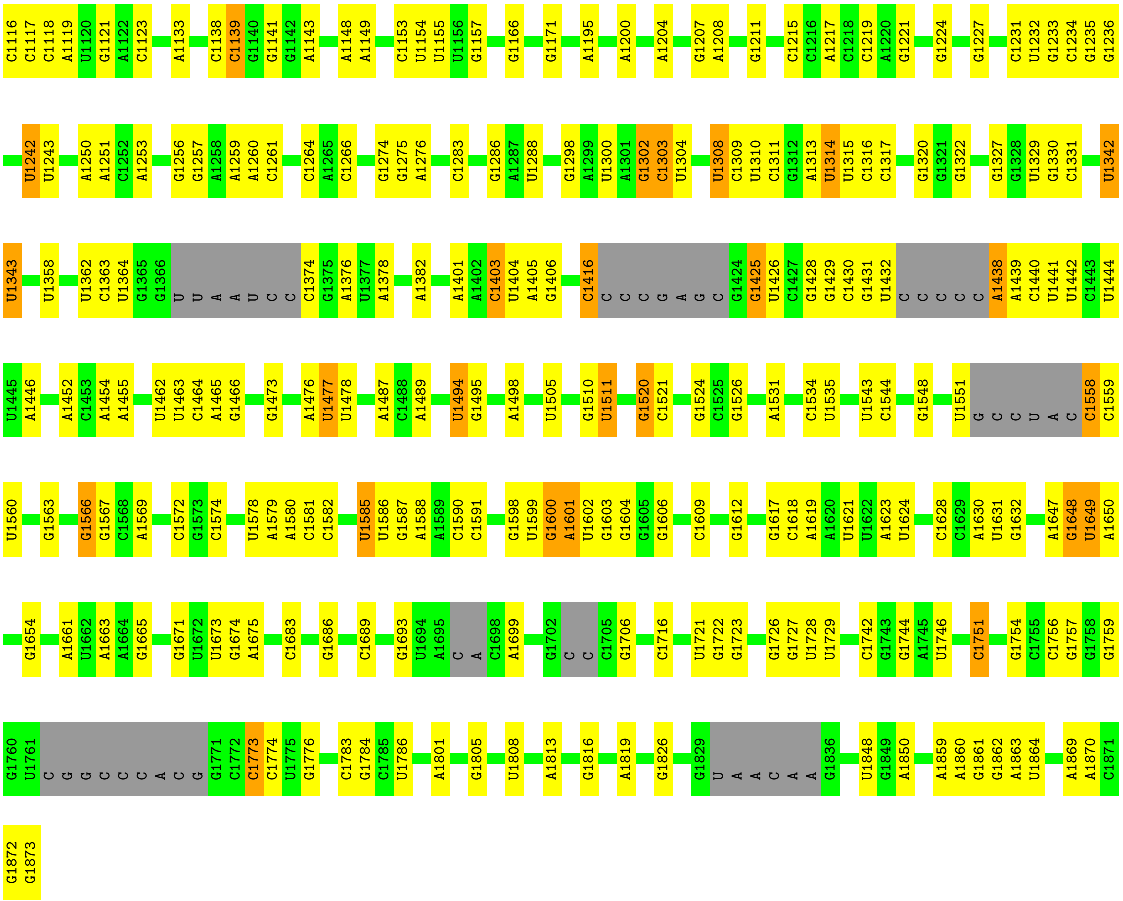
Mol	Chain	Residues	Atoms		AltConf
			Total	Zn	
37	d	1	1	1	0

3 Residue-property plots

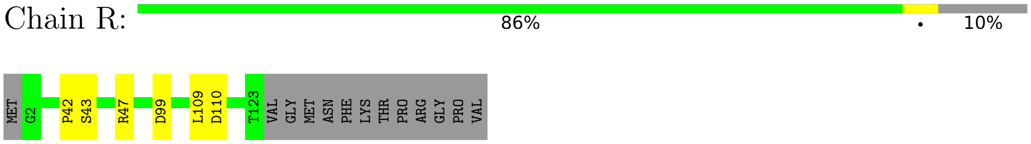
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: 18S rRNA

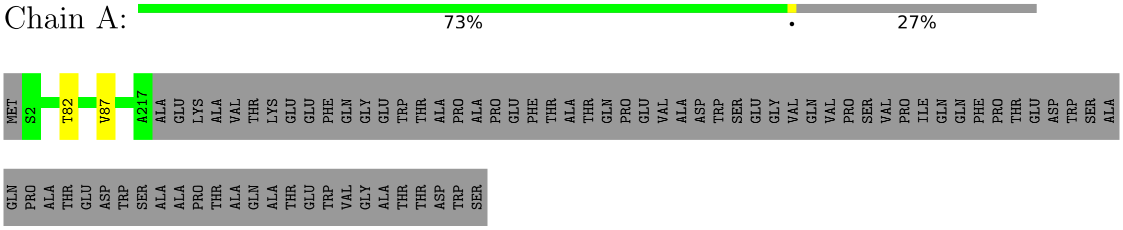




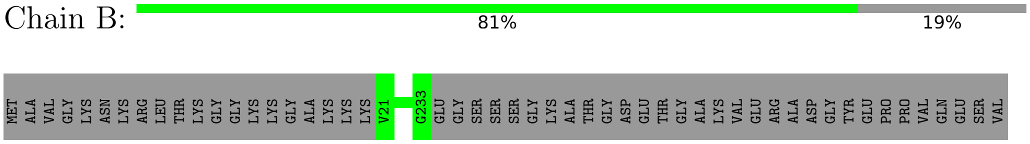
- Molecule 2: Small ribosomal subunit protein eS17



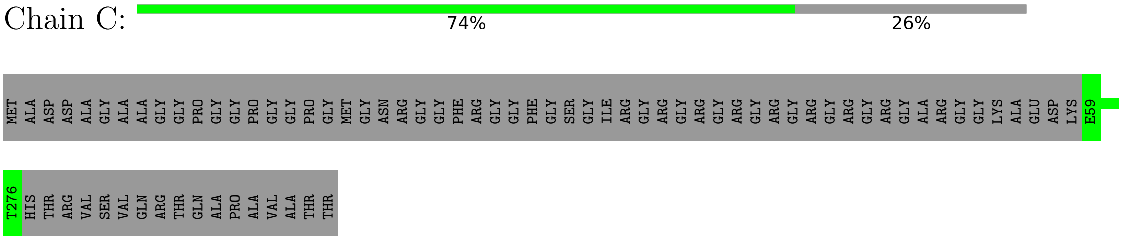
- Molecule 3: Small ribosomal subunit protein uS2



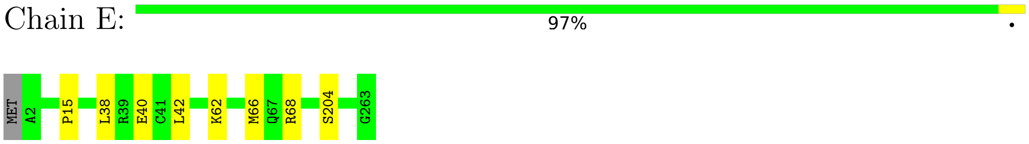
- Molecule 4: Small ribosomal subunit protein eS1



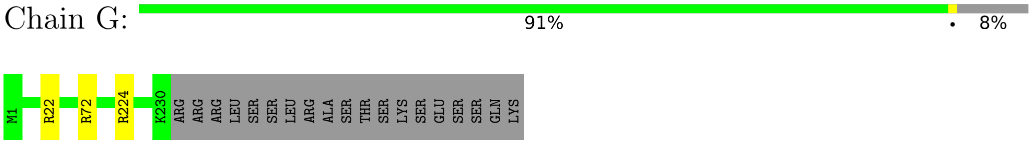
- Molecule 5: Small ribosomal subunit protein uS5



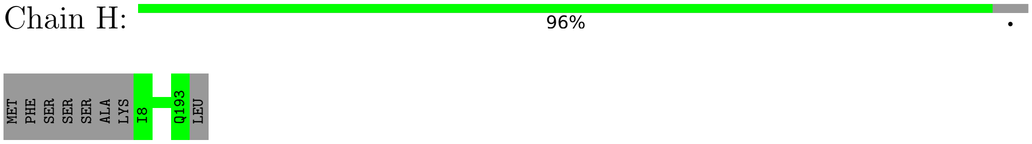
- Molecule 6: Small ribosomal subunit protein eS4, X isoform



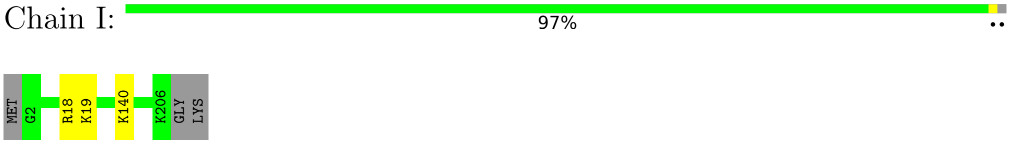
- Molecule 7: Small ribosomal subunit protein eS6



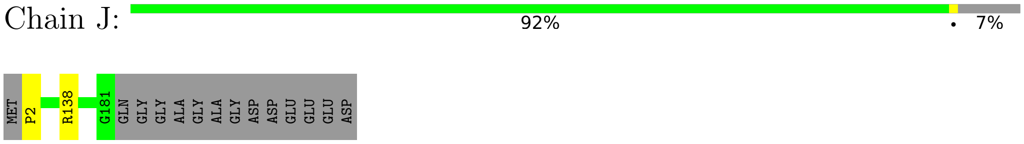
- Molecule 8: Small ribosomal subunit protein eS7



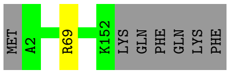
- Molecule 9: Small ribosomal subunit protein eS8



- Molecule 10: Small ribosomal subunit protein uS4

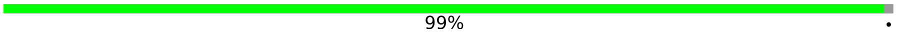


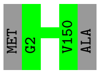
- Molecule 11: Small ribosomal subunit protein uS17



- Molecule 12: Small ribosomal subunit protein uS15

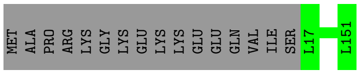
Chain N:





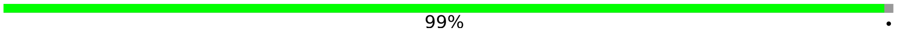
- Molecule 13: Small ribosomal subunit protein uS11

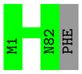
Chain O:



- Molecule 14: Small ribosomal subunit protein eS21

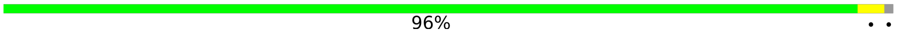
Chain V:

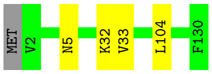




- Molecule 15: Small ribosomal subunit protein uS8

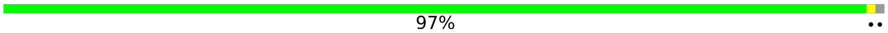
Chain W:

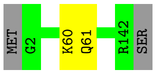




- Molecule 16: Small ribosomal subunit protein uS12

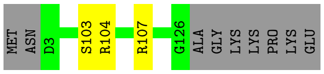
Chain X:





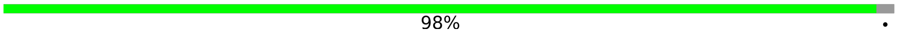
- Molecule 17: Small ribosomal subunit protein eS24

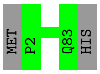
Chain Y:



- Molecule 18: Small ribosomal subunit protein eS27

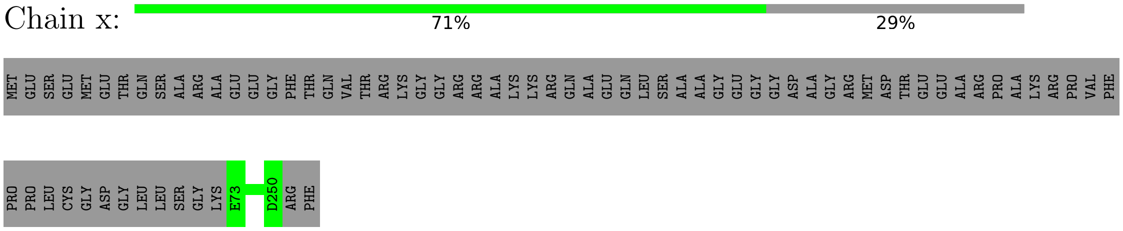
Chain b:





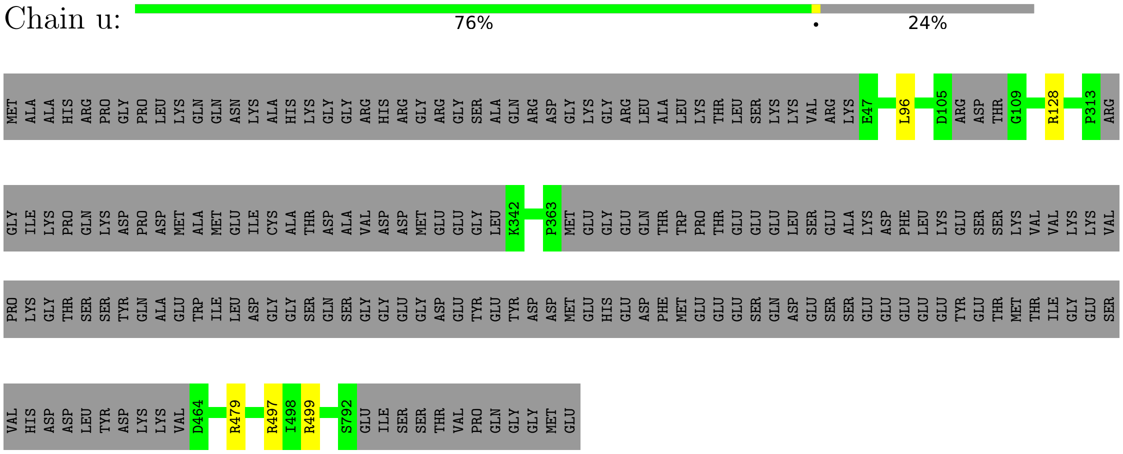
- Molecule 19: RNA-binding protein PNO1

Chain x:



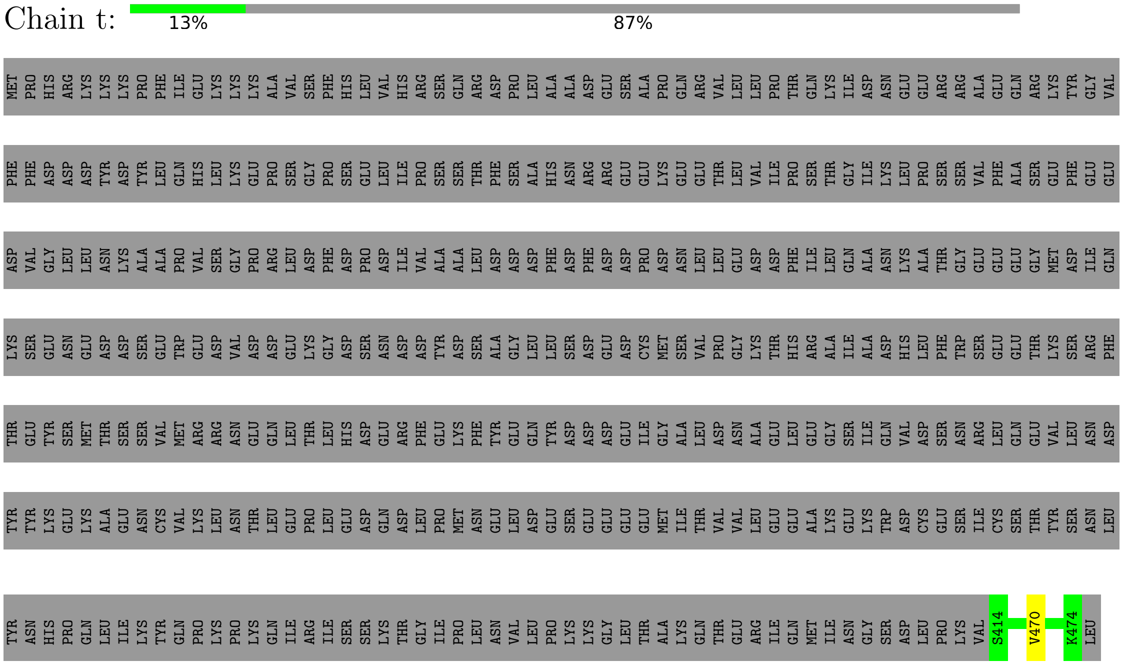
- Molecule 20: Pre-rRNA-processing protein TSR1 homolog

Chain u:



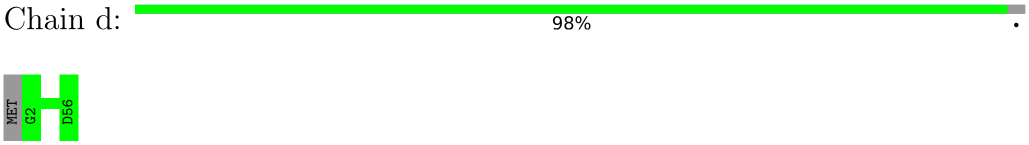
- Molecule 21: Protein LTV1 homolog

Chain t:



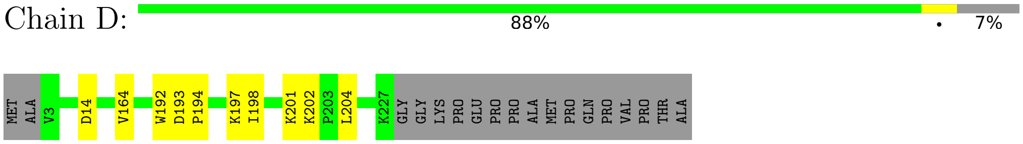
- Molecule 22: Small ribosomal subunit protein uS14

Chain d:



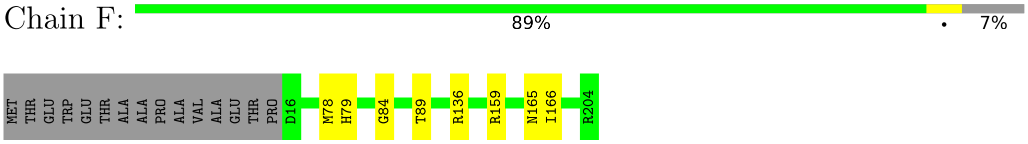
- Molecule 23: Small ribosomal subunit protein uS3

Chain D:



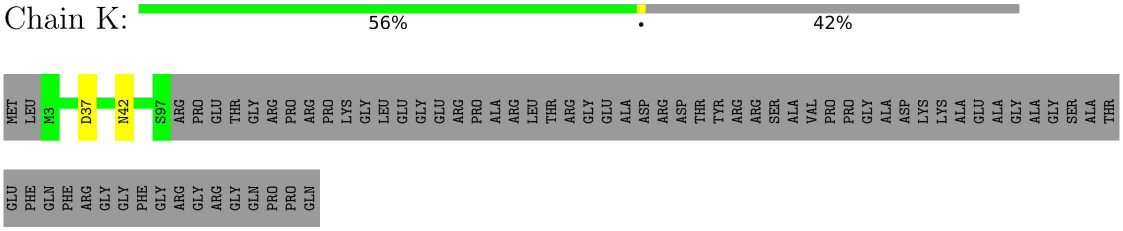
- Molecule 24: Small ribosomal subunit protein uS7

Chain F:



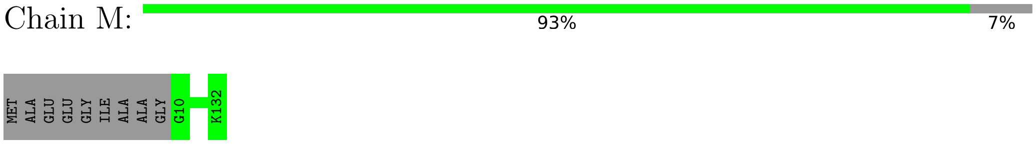
- Molecule 25: Small ribosomal subunit protein eS10

Chain K:



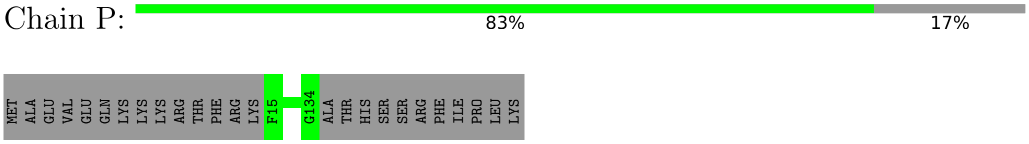
- Molecule 26: Small ribosomal subunit protein eS12

Chain M:



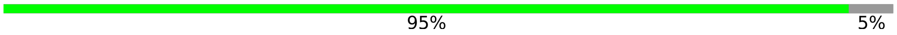
- Molecule 27: Small ribosomal subunit protein uS19

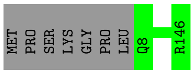
Chain P:



- Molecule 28: Small ribosomal subunit protein uS9

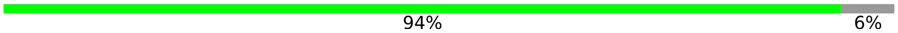
Chain Q:

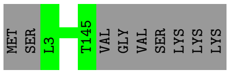




- Molecule 29: Small ribosomal subunit protein uS13

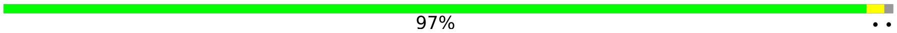
Chain S:

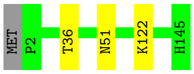




- Molecule 30: Small ribosomal subunit protein eS19

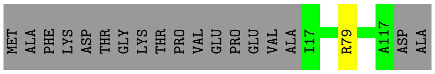
Chain T:





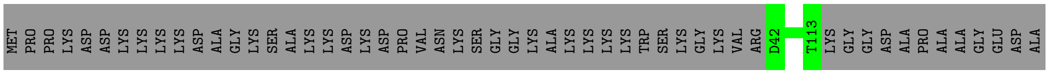
- Molecule 31: Small ribosomal subunit protein uS10

Chain U:



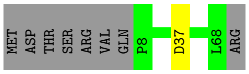
- Molecule 32: Small ribosomal subunit protein eS25

Chain Z:



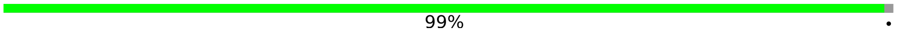
- Molecule 33: Small ribosomal subunit protein eS28

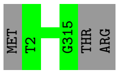
Chain c:



- Molecule 34: Small ribosomal subunit protein RACK1

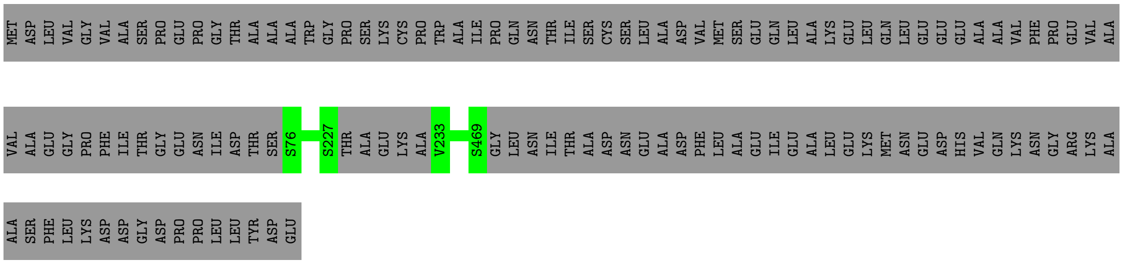
Chain g:





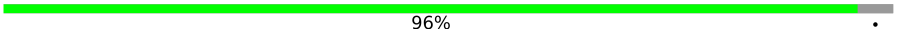
- Molecule 35: Serine/threonine-protein kinase RIO3

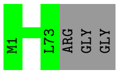
Chain p:



- Molecule 36: Ubiquitin

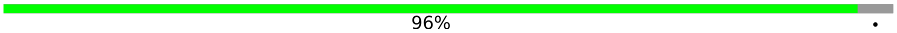
Chain i:

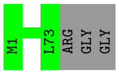




- Molecule 36: Ubiquitin

Chain j:





4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	34363	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 ($e^-/\text{Å}^2$)	58	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k 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: ZN

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	2	0.61	0/39452	1.04	132/61476 (0.2%)
2	R	0.35	0/1002	0.78	3/1345 (0.2%)
3	A	0.39	0/1742	0.62	0/2367
4	B	0.29	0/1756	0.56	0/2350
5	C	0.43	0/1726	0.65	0/2332
6	E	0.48	0/2118	0.68	0/2849
7	G	0.33	0/1885	0.65	0/2510
8	H	0.29	0/1524	0.57	0/2042
9	I	0.43	0/1711	0.67	0/2282
10	J	0.42	0/1524	0.67	0/2035
11	L	0.49	0/1250	0.62	0/1673
12	N	0.34	0/1226	0.57	0/1649
13	O	0.29	0/1022	0.62	0/1372
14	V	0.38	0/631	0.67	0/844
15	W	0.48	0/1051	0.71	1/1406 (0.1%)
16	X	0.44	0/1116	0.69	1/1490 (0.1%)
17	Y	0.41	0/1031	0.65	0/1370
18	b	0.32	0/653	0.61	0/876
19	x	0.25	0/879	0.41	0/1223
20	u	0.30	0/5076	0.59	1/6860 (0.0%)
21	t	0.32	0/518	0.62	0/677
22	d	0.36	0/470	0.62	0/623
23	D	0.42	0/1780	0.70	1/2397 (0.0%)
24	F	0.31	0/1516	0.60	0/2037
25	K	0.32	0/824	0.64	1/1112 (0.1%)
26	M	0.25	0/963	0.52	0/1291
27	P	0.31	0/1003	0.65	0/1341
28	Q	0.36	0/1126	0.67	0/1506
29	S	0.27	0/1202	0.60	0/1610
30	T	0.31	0/1142	0.62	0/1530
31	U	0.36	0/813	0.66	0/1092
32	Z	0.28	0/580	0.60	0/780

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
33	c	0.27	0/481	0.69	1/643 (0.2%)
34	g	0.28	0/2497	0.54	0/3399
35	p	0.31	0/2444	0.51	0/3338
36	i	0.24	0/360	0.44	0/500
36	j	0.24	0/360	0.43	0/500
All	All	0.49	0/86454	0.85	141/124727 (0.1%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
9	I	0	1
24	F	0	1
30	T	0	1
All	All	0	3

There are no bond length outliers.

All (141) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	2	914	U	C5-C4-O4	21.37	138.72	125.90
1	2	914	U	N3-C4-O4	-20.54	105.02	119.40
1	2	872	A	N1-C6-N6	-12.11	111.33	118.60
1	2	1343	U	C2-N1-C1’	11.14	131.07	117.70
1	2	293	C	N1-C2-O2	10.78	125.37	118.90
1	2	293	C	C2-N1-C1’	10.23	130.05	118.80
1	2	1774	C	N3-C2-O2	-9.83	115.02	121.90
1	2	293	C	N3-C2-O2	-9.11	115.52	121.90
1	2	1343	U	N3-C2-O2	-8.94	115.94	122.20
1	2	853	C	C2-N1-C1’	8.82	128.50	118.80
1	2	1374	C	N3-C2-O2	-8.28	116.11	121.90
1	2	1016	U	N1-C2-O2	8.27	128.59	122.80
1	2	1751	C	C2-N1-C1’	8.07	127.68	118.80
1	2	1374	C	N1-C2-O2	8.05	123.73	118.90
1	2	1343	U	N1-C2-O2	7.98	128.39	122.80
1	2	1016	U	N3-C2-O2	-7.85	116.70	122.20
1	2	853	C	N1-C2-O2	7.83	123.60	118.90
1	2	1139	C	N3-C2-O2	-7.75	116.48	121.90
1	2	1016	U	C2-N1-C1’	7.56	126.77	117.70
1	2	1628	C	N3-C2-O2	-7.55	116.61	121.90

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	2	1311	C	N1-C2-O2	7.46	123.37	118.90
1	2	1139	C	N1-C2-O2	7.34	123.30	118.90
1	2	1590	C	N1-C2-O2	7.23	123.24	118.90
1	2	872	A	C5-C6-N6	7.20	129.46	123.70
1	2	1343	U	C6-N1-C1'	-7.20	111.12	121.20
1	2	1751	C	N1-C2-O2	7.10	123.16	118.90
1	2	293	C	C6-N1-C1'	-7.06	112.33	120.80
2	R	99	ASP	CB-CG-OD1	6.99	124.59	118.30
1	2	1624	U	C2-N1-C1'	6.94	126.03	117.70
1	2	1628	C	C6-N1-C2	-6.89	117.54	120.30
1	2	293	C	C6-N1-C2	-6.72	117.61	120.30
1	2	1123	C	C2-N1-C1'	6.61	126.07	118.80
1	2	749	U	C2-N1-C1'	6.58	125.59	117.70
1	2	1314	U	C2-N1-C1'	6.53	125.54	117.70
1	2	1551	U	C2-N1-C1'	6.53	125.53	117.70
1	2	853	C	N3-C2-O2	-6.49	117.36	121.90
1	2	1591	C	C6-N1-C2	-6.45	117.72	120.30
1	2	853	C	C6-N1-C1'	-6.45	113.07	120.80
1	2	811	A	C2'-C3'-O3'	6.43	123.99	113.70
1	2	914	U	C4-C5-C6	-6.43	115.84	119.70
1	2	1139	C	C2-N1-C1'	6.42	125.86	118.80
1	2	1624	U	N1-C2-O2	6.41	127.29	122.80
1	2	1403	C	P-O3'-C3'	6.38	127.36	119.70
1	2	1219	C	N1-C2-O2	6.37	122.72	118.90
1	2	1310	U	N1-C2-O2	6.23	127.16	122.80
1	2	914	U	C2-N3-C4	6.20	130.72	127.00
1	2	1477	U	N1-C2-O2	6.15	127.11	122.80
1	2	1477	U	C2-N1-C1'	6.15	125.08	117.70
1	2	856	C	N1-C2-O2	6.12	122.57	118.90
1	2	49	C	N3-C2-O2	-6.11	117.62	121.90
2	R	110	ASP	CB-CG-OD1	6.02	123.72	118.30
1	2	1591	C	N1-C2-O2	5.97	122.48	118.90
1	2	1648	G	P-O3'-C3'	5.96	126.85	119.70
1	2	1591	C	N3-C2-O2	-5.96	117.73	121.90
1	2	1494	U	P-O3'-C3'	5.93	126.82	119.70
33	c	37	ASP	CB-CG-OD1	5.92	123.62	118.30
1	2	369	C	N1-C2-O2	5.91	122.45	118.90
1	2	850	C	N1-C2-O2	5.89	122.43	118.90
1	2	1585	U	P-O3'-C3'	5.88	126.76	119.70
1	2	1308	U	P-O3'-C3'	5.88	126.75	119.70
1	2	1520	G	N1-C6-O6	-5.87	116.38	119.90
1	2	1511	U	C2-N1-C1'	5.87	124.75	117.70

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	2	427	U	N3-C2-O2	-5.86	118.10	122.20
1	2	1751	C	C6-N1-C1’	-5.86	113.77	120.80
1	2	314	U	N3-C2-O2	-5.85	118.11	122.20
25	K	37	ASP	CB-CG-OD1	5.81	123.53	118.30
1	2	1310	U	C2-N1-C1’	5.81	124.67	117.70
1	2	1600	G	C4-N9-C1’	5.81	134.05	126.50
1	2	1558	C	P-O3’-C3’	5.79	126.65	119.70
1	2	1566	G	O5’-P-OP1	5.78	117.64	110.70
1	2	856	C	N3-C2-O2	-5.75	117.87	121.90
1	2	402	C	N1-C2-O2	5.75	122.35	118.90
1	2	1139	C	C6-N1-C2	-5.74	118.00	120.30
1	2	1774	C	N1-C2-O2	5.71	122.33	118.90
1	2	1311	C	N3-C2-O2	-5.69	117.91	121.90
1	2	1773	C	N1-C2-O2	5.67	122.30	118.90
1	2	1551	U	N3-C2-O2	-5.67	118.23	122.20
1	2	1624	U	N3-C2-O2	-5.66	118.24	122.20
1	2	1591	C	C2-N1-C1’	5.65	125.02	118.80
1	2	872	A	N1-C2-N3	-5.63	126.48	129.30
1	2	1551	U	N1-C2-O2	5.63	126.74	122.80
1	2	1303	C	N1-C2-O2	5.62	122.27	118.90
1	2	1601	A	P-O3’-C3’	5.62	126.45	119.70
1	2	168	C	N1-C2-O2	5.61	122.27	118.90
1	2	17	C	C6-N1-C2	-5.61	118.06	120.30
1	2	527	C	N3-C2-O2	-5.61	117.97	121.90
1	2	1123	C	N1-C2-O2	5.56	122.24	118.90
1	2	1343	U	C6-N1-C2	-5.56	117.67	121.00
1	2	1242	U	N1-C2-O2	5.56	126.69	122.80
1	2	1716	C	C2-N1-C1’	5.56	124.91	118.80
1	2	1683	C	N1-C2-O2	5.54	122.22	118.90
2	R	109	LEU	C-N-CA	5.54	135.54	121.70
1	2	850	C	N3-C2-O2	-5.53	118.03	121.90
1	2	1123	C	C6-N1-C2	-5.52	118.09	120.30
1	2	914	U	N1-C2-N3	-5.50	111.60	114.90
1	2	4	C	C6-N1-C2	-5.49	118.10	120.30
1	2	162	C	C6-N1-C2	-5.49	118.10	120.30
1	2	369	C	C2-N1-C1’	5.47	124.81	118.80
1	2	1310	U	N3-C2-O2	-5.46	118.38	122.20
1	2	1600	G	N3-C4-N9	5.45	129.27	126.00
1	2	1600	G	N3-C4-C5	-5.42	125.89	128.60
1	2	1099	G	O4’-C1’-N9	5.40	112.52	108.20
1	2	1342	U	P-O3’-C3’	5.39	126.17	119.70
1	2	659	G	C4-N9-C1’	5.37	133.49	126.50

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	2	1343	U	C5-C6-N1	5.36	125.38	122.70
1	2	1438	A	P-O3'-C3'	5.34	126.11	119.70
1	2	1416	C	C2-N1-C1'	5.34	124.67	118.80
1	2	666	U	C2-N1-C1'	5.33	124.10	117.70
1	2	1628	C	N1-C2-N3	5.33	122.93	119.20
1	2	178	C	N1-C2-O2	5.32	122.09	118.90
1	2	1628	C	C6-N1-C1'	5.32	127.18	120.80
1	2	1416	C	N1-C2-O2	5.29	122.08	118.90
1	2	441	C	C2-N1-C1'	5.28	124.61	118.80
1	2	1590	C	N3-C2-O2	-5.27	118.21	121.90
1	2	5	U	C5-C6-N1	5.26	125.33	122.70
1	2	1219	C	N3-C2-O2	-5.24	118.23	121.90
20	u	96	LEU	CA-CB-CG	5.21	127.29	115.30
1	2	930	C	N1-C2-O2	5.20	122.02	118.90
1	2	1774	C	C6-N1-C2	-5.18	118.23	120.30
1	2	1673	U	P-O3'-C3'	5.18	125.91	119.70
1	2	143	U	P-O3'-C3'	5.17	125.91	119.70
1	2	532	C	C2-N1-C1'	5.17	124.49	118.80
1	2	886	A	C4-N9-C1'	5.17	135.60	126.30
1	2	199	C	N1-C2-O2	5.16	122.00	118.90
1	2	749	U	N1-C2-O2	5.16	126.41	122.80
1	2	1649	U	C5-C6-N1	5.15	125.28	122.70
1	2	1759	G	N1-C2-N2	-5.14	111.58	116.20
16	X	60	LYS	C-N-CA	5.12	134.50	121.70
1	2	1302	G	P-O3'-C3'	5.11	125.83	119.70
1	2	1477	U	N3-C2-O2	-5.10	118.63	122.20
1	2	1649	U	P-O3'-C3'	5.09	125.81	119.70
1	2	580	U	N1-C2-O2	5.09	126.36	122.80
1	2	965	U	N1-C2-O2	5.09	126.36	122.80
1	2	1053	C	C2-N1-C1'	5.08	124.39	118.80
23	D	14	ASP	CB-CG-OD1	5.06	122.86	118.30
1	2	1219	C	C2-N1-C1'	5.06	124.36	118.80
1	2	162	C	C5-C6-N1	5.05	123.53	121.00
1	2	662	G	C3'-C2'-C1'	-5.04	97.47	101.50
1	2	1425	G	P-O3'-C3'	5.04	125.75	119.70
15	W	104	LEU	CA-CB-CG	5.02	126.84	115.30
1	2	168	C	N3-C2-O2	-5.00	118.40	121.90

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
24	F	165	ASN	Peptide
9	I	140	LYS	Peptide
30	T	36	THR	Peptide

5.2 Too-close contacts (i)

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

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	R	120/135 (89%)	108 (90%)	11 (9%)	1 (1%)	16	49
3	A	214/295 (72%)	205 (96%)	9 (4%)	0	100	100
4	B	211/264 (80%)	203 (96%)	8 (4%)	0	100	100
5	C	216/293 (74%)	206 (95%)	10 (5%)	0	100	100
6	E	260/263 (99%)	246 (95%)	13 (5%)	1 (0%)	30	62
7	G	228/249 (92%)	220 (96%)	8 (4%)	0	100	100
8	H	184/194 (95%)	182 (99%)	2 (1%)	0	100	100
9	I	203/208 (98%)	197 (97%)	6 (3%)	0	100	100
10	J	178/194 (92%)	166 (93%)	11 (6%)	1 (1%)	22	54
11	L	149/158 (94%)	144 (97%)	5 (3%)	0	100	100
12	N	147/151 (97%)	142 (97%)	5 (3%)	0	100	100
13	O	133/151 (88%)	127 (96%)	6 (4%)	0	100	100
14	V	80/83 (96%)	79 (99%)	1 (1%)	0	100	100
15	W	127/130 (98%)	125 (98%)	1 (1%)	1 (1%)	16	49
16	X	139/143 (97%)	134 (96%)	4 (3%)	1 (1%)	19	51
17	Y	122/133 (92%)	116 (95%)	6 (5%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
18	b	80/84 (95%)	77 (96%)	3 (4%)	0	100	100
19	x	176/252 (70%)	171 (97%)	5 (3%)	0	100	100
20	u	607/804 (76%)	577 (95%)	30 (5%)	0	100	100
21	t	59/475 (12%)	55 (93%)	3 (5%)	1 (2%)	7	36
22	d	53/56 (95%)	51 (96%)	2 (4%)	0	100	100
23	D	223/243 (92%)	214 (96%)	8 (4%)	1 (0%)	30	62
24	F	187/204 (92%)	172 (92%)	13 (7%)	2 (1%)	12	43
25	K	93/165 (56%)	87 (94%)	6 (6%)	0	100	100
26	M	121/132 (92%)	117 (97%)	4 (3%)	0	100	100
27	P	118/145 (81%)	118 (100%)	0	0	100	100
28	Q	137/146 (94%)	129 (94%)	8 (6%)	0	100	100
29	S	141/152 (93%)	130 (92%)	11 (8%)	0	100	100
30	T	142/145 (98%)	135 (95%)	7 (5%)	0	100	100
31	U	99/119 (83%)	95 (96%)	4 (4%)	0	100	100
32	Z	70/125 (56%)	68 (97%)	2 (3%)	0	100	100
33	c	59/69 (86%)	55 (93%)	4 (7%)	0	100	100
34	g	312/317 (98%)	290 (93%)	22 (7%)	0	100	100
35	p	385/519 (74%)	368 (96%)	17 (4%)	0	100	100
36	i	71/76 (93%)	71 (100%)	0	0	100	100
36	j	71/76 (93%)	71 (100%)	0	0	100	100
All	All	5915/7348 (80%)	5651 (96%)	255 (4%)	9 (0%)	45	72

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
16	X	61	GLN
23	D	194	PRO
24	F	166	ILE
10	J	138	ARG
15	W	5	ASN
6	E	68	ARG
2	R	42	PRO
24	F	84	GLY
21	t	470	VAL

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	R	110/122 (90%)	108 (98%)	2 (2%)	54	71
3	A	180/243 (74%)	178 (99%)	2 (1%)	70	80
4	B	194/231 (84%)	194 (100%)	0	100	100
5	C	184/225 (82%)	184 (100%)	0	100	100
6	E	224/225 (100%)	217 (97%)	7 (3%)	35	57
7	G	200/218 (92%)	197 (98%)	3 (2%)	60	75
8	H	167/174 (96%)	167 (100%)	0	100	100
9	I	178/180 (99%)	176 (99%)	2 (1%)	70	80
10	J	160/168 (95%)	159 (99%)	1 (1%)	84	90
11	L	135/142 (95%)	134 (99%)	1 (1%)	81	88
12	N	130/131 (99%)	130 (100%)	0	100	100
13	O	105/119 (88%)	105 (100%)	0	100	100
14	V	66/67 (98%)	66 (100%)	0	100	100
15	W	112/113 (99%)	110 (98%)	2 (2%)	54	71
16	X	113/115 (98%)	113 (100%)	0	100	100
17	Y	108/115 (94%)	105 (97%)	3 (3%)	38	60
18	b	74/76 (97%)	74 (100%)	0	100	100
20	u	539/705 (76%)	535 (99%)	4 (1%)	81	88
21	t	56/434 (13%)	56 (100%)	0	100	100
22	d	48/49 (98%)	48 (100%)	0	100	100
23	D	189/202 (94%)	181 (96%)	8 (4%)	25	51
24	F	159/170 (94%)	154 (97%)	5 (3%)	35	57
25	K	86/136 (63%)	85 (99%)	1 (1%)	67	79
26	M	104/108 (96%)	104 (100%)	0	100	100
27	P	107/130 (82%)	107 (100%)	0	100	100
28	Q	115/121 (95%)	115 (100%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
29	S	124/132 (94%)	124 (100%)	0	100	100
30	T	114/115 (99%)	112 (98%)	2 (2%)	54	71
31	U	93/107 (87%)	92 (99%)	1 (1%)	70	80
32	Z	64/103 (62%)	64 (100%)	0	100	100
33	c	54/62 (87%)	54 (100%)	0	100	100
34	g	272/275 (99%)	272 (100%)	0	100	100
35	p	136/454 (30%)	136 (100%)	0	100	100
All	All	4700/5967 (79%)	4656 (99%)	44 (1%)	74	84

All (44) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	R	43	SER
2	R	47	ARG
3	A	82	THR
3	A	87	VAL
6	E	15	PRO
6	E	38	LEU
6	E	40	GLU
6	E	42	LEU
6	E	62	LYS
6	E	66	MET
6	E	204	SER
7	G	22	ARG
7	G	72	ARG
7	G	224	ARG
9	I	18	ARG
9	I	19	LYS
10	J	2	PRO
11	L	69	ARG
15	W	32	LYS
15	W	33	VAL
17	Y	103	SER
17	Y	104	ARG
17	Y	107	ARG
20	u	128	ARG
20	u	479	ARG
20	u	497	ARG
20	u	499	ARG
23	D	164	VAL

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
23	D	192	TRP
23	D	193	ASP
23	D	197	LYS
23	D	198	ILE
23	D	201	LYS
23	D	202	LYS
23	D	204	LEU
24	F	78	MET
24	F	79	HIS
24	F	89	THR
24	F	136	ARG
24	F	159	ARG
25	K	42	ASN
30	T	51	ASN
30	T	122	LYS
31	U	79	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
4	B	186	ASN
15	W	92	ASN
18	b	49	HIS
20	u	286	ASN
20	u	298	GLN
27	P	32	GLN
29	S	134	GLN
33	c	29	GLN
33	c	45	ASN

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	2	1639/1873 (87%)	481 (29%)	35 (2%)

All (481) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	2	2	A
1	2	3	C

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	2	4	C
1	2	23	G
1	2	25	A
1	2	26	U
1	2	30	C
1	2	33	G
1	2	36	U
1	2	41	G
1	2	44	U
1	2	45	A
1	2	46	A
1	2	56	G
1	2	62	G
1	2	65	C
1	2	66	G
1	2	67	C
1	2	68	A
1	2	69	C
1	2	72	C
1	2	73	C
1	2	74	G
1	2	75	G
1	2	76	U
1	2	77	A
1	2	79	A
1	2	92	A
1	2	96	C
1	2	100	U
1	2	103	A
1	2	110	U
1	2	113	G
1	2	115	U
1	2	126	G
1	2	127	C
1	2	128	U
1	2	129	C
1	2	130	G
1	2	143	U
1	2	144	U
1	2	147	A
1	2	149	A
1	2	155	G

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	2	160	U
1	2	161	U
1	2	163	U
1	2	165	G
1	2	166	A
1	2	167	G
1	2	168	C
1	2	172	U
1	2	181	A
1	2	182	C
1	2	183	G
1	2	184	G
1	2	190	G
1	2	191	A
1	2	215	G
1	2	290	U
1	2	291	G
1	2	292	A
1	2	294	U
1	2	295	C
1	2	302	A
1	2	308	G
1	2	309	G
1	2	312	G
1	2	313	A
1	2	315	C
1	2	318	A
1	2	319	C
1	2	321	C
1	2	332	G
1	2	333	G
1	2	337	C
1	2	340	C
1	2	350	C
1	2	351	G
1	2	360	A
1	2	362	C
1	2	364	A
1	2	370	G
1	2	377	G
1	2	381	C
1	2	382	C

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	2	385	G
1	2	386	C
1	2	387	C
1	2	400	C
1	2	404	G
1	2	405	G
1	2	406	U
1	2	408	A
1	2	409	C
1	2	413	G
1	2	418	A
1	2	421	G
1	2	429	C
1	2	438	G
1	2	441	C
1	2	448	A
1	2	449	A
1	2	450	C
1	2	451	G
1	2	463	C
1	2	466	G
1	2	471	G
1	2	472	C
1	2	473	A
1	2	474	G
1	2	482	G
1	2	487	U
1	2	492	C
1	2	496	C
1	2	500	A
1	2	501	C
1	2	502	C
1	2	503	C
1	2	507	G
1	2	508	A
1	2	509	G
1	2	517	C
1	2	525	A
1	2	531	A
1	2	534	G
1	2	536	A
1	2	544	G

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	2	548	C
1	2	549	C
1	2	555	A
1	2	556	U
1	2	557	U
1	2	559	G
1	2	560	A
1	2	568	C
1	2	576	A
1	2	583	A
1	2	587	A
1	2	588	G
1	2	589	G
1	2	590	A
1	2	591	U
1	2	592	C
1	2	594	A
1	2	595	U
1	2	598	G
1	2	600	G
1	2	605	A
1	2	606	G
1	2	607	U
1	2	608	C
1	2	613	G
1	2	614	C
1	2	617	G
1	2	620	G
1	2	626	G
1	2	627	U
1	2	628	A
1	2	629	A
1	2	632	C
1	2	643	A
1	2	644	G
1	2	654	A
1	2	655	A
1	2	660	C
1	2	663	C
1	2	668	A
1	2	669	A
1	2	670	A

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	2	671	A
1	2	672	A
1	2	673	G
1	2	683	G
1	2	687	C
1	2	688	U
1	2	749	U
1	2	750	C
1	2	751	G
1	2	792	C
1	2	794	A
1	2	797	C
1	2	799	U
1	2	801	U
1	2	809	A
1	2	810	A
1	2	812	A
1	2	821	G
1	2	823	U
1	2	827	A
1	2	830	A
1	2	842	C
1	2	847	A
1	2	852	G
1	2	859	G
1	2	867	G
1	2	869	A
1	2	870	A
1	2	871	U
1	2	872	A
1	2	873	G
1	2	874	G
1	2	878	G
1	2	880	G
1	2	885	U
1	2	886	A
1	2	887	U
1	2	888	U
1	2	889	U
1	2	890	U
1	2	891	G
1	2	892	U

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	2	893	U
1	2	895	G
1	2	896	U
1	2	898	U
1	2	903	A
1	2	905	C
1	2	907	G
1	2	908	A
1	2	913	A
1	2	914	U
1	2	917	U
1	2	919	A
1	2	920	A
1	2	927	C
1	2	930	C
1	2	933	G
1	2	954	U
1	2	955	A
1	2	956	G
1	2	959	G
1	2	963	A
1	2	969	U
1	2	970	G
1	2	971	G
1	2	972	A
1	2	978	G
1	2	981	A
1	2	988	C
1	2	990	A
1	2	992	A
1	2	1001	A
1	2	1002	U
1	2	1009	A
1	2	1017	U
1	2	1023	A
1	2	1027	A
1	2	1028	A
1	2	1031	A
1	2	1041	G
1	2	1045	U
1	2	1049	A
1	2	1054	G

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	2	1055	A
1	2	1056	U
1	2	1057	C
1	2	1058	A
1	2	1059	G
1	2	1062	A
1	2	1065	G
1	2	1067	C
1	2	1080	A
1	2	1083	A
1	2	1084	A
1	2	1085	C
1	2	1086	G
1	2	1087	A
1	2	1088	U
1	2	1096	G
1	2	1099	G
1	2	1100	A
1	2	1112	U
1	2	1113	A
1	2	1114	U
1	2	1116	C
1	2	1117	C
1	2	1118	C
1	2	1119	A
1	2	1121	G
1	2	1133	A
1	2	1138	C
1	2	1139	C
1	2	1141	G
1	2	1143	A
1	2	1148	A
1	2	1149	A
1	2	1153	C
1	2	1154	U
1	2	1155	U
1	2	1157	G
1	2	1166	G
1	2	1171	G
1	2	1195	A
1	2	1200	A
1	2	1204	A

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	2	1207	G
1	2	1208	A
1	2	1211	G
1	2	1215	C
1	2	1217	A
1	2	1221	G
1	2	1224	G
1	2	1227	G
1	2	1232	U
1	2	1233	G
1	2	1234	C
1	2	1235	G
1	2	1236	G
1	2	1242	U
1	2	1243	U
1	2	1250	A
1	2	1251	A
1	2	1253	A
1	2	1257	G
1	2	1259	A
1	2	1260	A
1	2	1261	C
1	2	1264	C
1	2	1266	C
1	2	1274	G
1	2	1275	G
1	2	1276	A
1	2	1283	C
1	2	1286	G
1	2	1288	U
1	2	1298	G
1	2	1300	U
1	2	1302	G
1	2	1303	C
1	2	1304	U
1	2	1308	U
1	2	1309	C
1	2	1313	A
1	2	1314	U
1	2	1315	U
1	2	1317	C
1	2	1320	G

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	2	1322	G
1	2	1327	G
1	2	1329	U
1	2	1331	C
1	2	1343	U
1	2	1358	U
1	2	1362	U
1	2	1363	C
1	2	1364	U
1	2	1376	A
1	2	1378	A
1	2	1382	A
1	2	1401	A
1	2	1404	U
1	2	1405	A
1	2	1406	G
1	2	1416	C
1	2	1426	U
1	2	1428	G
1	2	1429	G
1	2	1430	C
1	2	1431	G
1	2	1432	U
1	2	1439	A
1	2	1441	U
1	2	1442	U
1	2	1444	U
1	2	1446	A
1	2	1452	A
1	2	1454	A
1	2	1455	A
1	2	1462	U
1	2	1463	U
1	2	1465	A
1	2	1466	G
1	2	1473	G
1	2	1476	A
1	2	1477	U
1	2	1478	U
1	2	1487	A
1	2	1489	A
1	2	1494	U

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	2	1495	G
1	2	1498	A
1	2	1505	U
1	2	1510	G
1	2	1511	U
1	2	1520	G
1	2	1521	C
1	2	1524	G
1	2	1526	G
1	2	1531	A
1	2	1535	U
1	2	1543	U
1	2	1544	C
1	2	1548	G
1	2	1559	C
1	2	1560	U
1	2	1563	G
1	2	1566	G
1	2	1567	G
1	2	1569	A
1	2	1572	C
1	2	1574	C
1	2	1578	U
1	2	1579	A
1	2	1580	A
1	2	1581	C
1	2	1582	C
1	2	1585	U
1	2	1586	U
1	2	1587	G
1	2	1588	A
1	2	1598	G
1	2	1599	U
1	2	1600	G
1	2	1601	A
1	2	1602	U
1	2	1603	G
1	2	1604	G
1	2	1606	G
1	2	1609	C
1	2	1612	G
1	2	1617	G

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	2	1618	C
1	2	1619	A
1	2	1621	U
1	2	1623	A
1	2	1630	A
1	2	1631	U
1	2	1632	G
1	2	1647	A
1	2	1649	U
1	2	1650	A
1	2	1654	G
1	2	1661	A
1	2	1663	A
1	2	1665	G
1	2	1671	G
1	2	1674	G
1	2	1675	A
1	2	1686	G
1	2	1689	C
1	2	1693	G
1	2	1699	A
1	2	1706	G
1	2	1721	U
1	2	1722	G
1	2	1723	G
1	2	1727	G
1	2	1728	U
1	2	1729	U
1	2	1742	C
1	2	1744	G
1	2	1746	U
1	2	1751	C
1	2	1754	G
1	2	1756	C
1	2	1757	G
1	2	1773	C
1	2	1776	G
1	2	1783	C
1	2	1784	G
1	2	1786	U
1	2	1801	A
1	2	1805	G

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	2	1808	U
1	2	1813	A
1	2	1816	G
1	2	1819	A
1	2	1826	G
1	2	1848	U
1	2	1850	A
1	2	1859	A
1	2	1860	A
1	2	1861	G
1	2	1862	G
1	2	1863	A
1	2	1864	U
1	2	1869	A
1	2	1870	A
1	2	1872	G
1	2	1873	G

All (35) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	2	102	A
1	2	143	U
1	2	291	G
1	2	314	U
1	2	332	G
1	2	440	G
1	2	465	A
1	2	473	A
1	2	554	A
1	2	604	A
1	2	631	U
1	2	811	A
1	2	870	A
1	2	980	A
1	2	1231	C
1	2	1256	G
1	2	1302	G
1	2	1308	U
1	2	1316	C
1	2	1330	G
1	2	1342	U

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	2	1403	C
1	2	1425	G
1	2	1430	C
1	2	1438	A
1	2	1440	C
1	2	1464	C
1	2	1494	U
1	2	1534	C
1	2	1558	C
1	2	1585	U
1	2	1601	A
1	2	1648	G
1	2	1649	U
1	2	1726	G

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

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 1 ligands modelled in this entry, 1 is monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.